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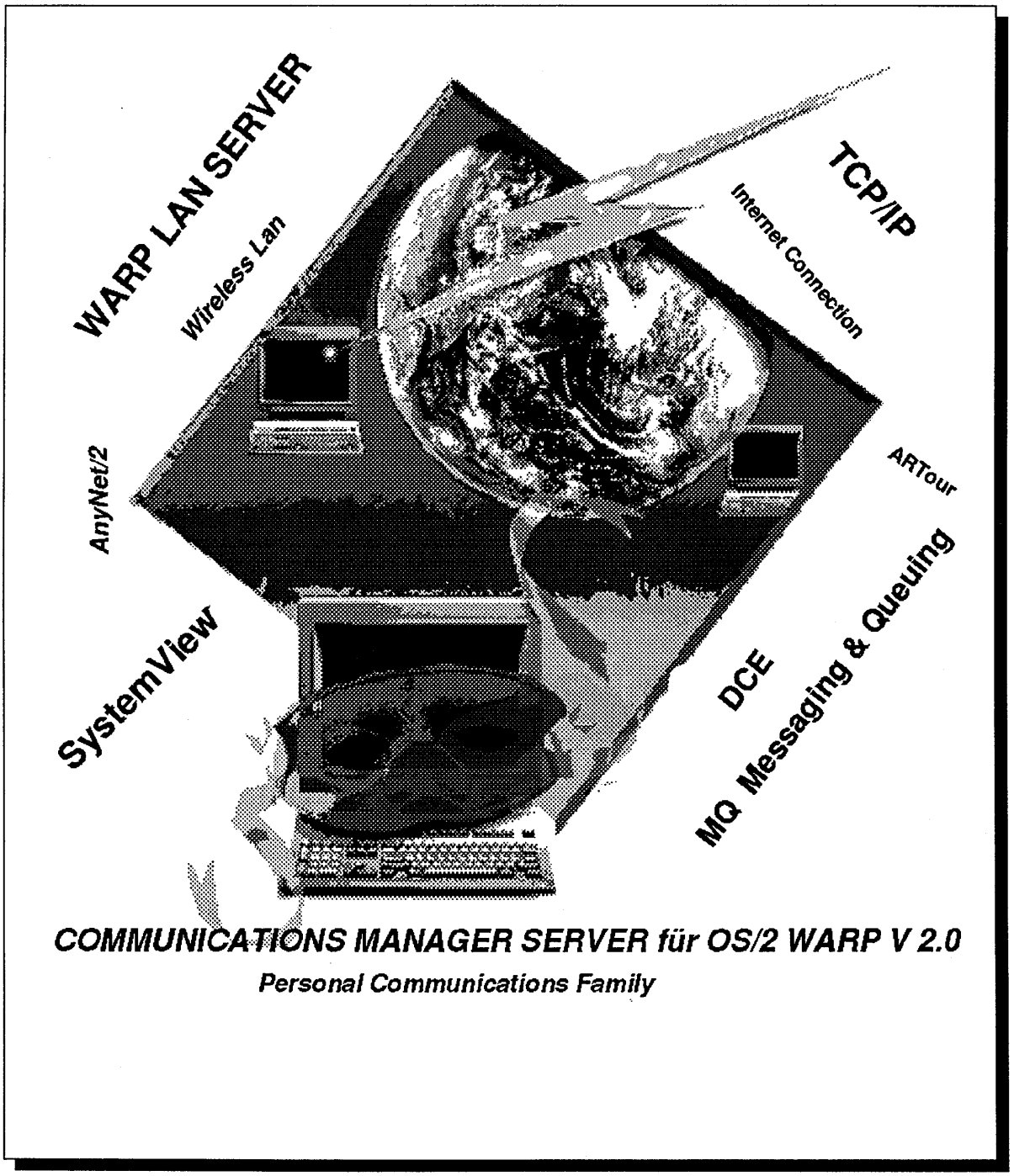
INTERNATIONAL BUSINESS MACHINES CORPORATION

Dated: December 11, 2015

OS/2 WARP
COMMUNICATIONS SEMINAR '95



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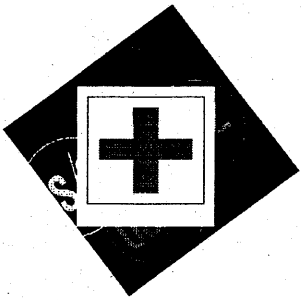

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IBM INTERNET CONNECTION SERVICES

IBM Global Network bietet für die aktuelle, Internet geeignete OS/2 Version (OS/2 Warp Version 3) die IBM Internet Connnection Services an. Der IBM Internet Connection Services sind weltweite Dienste, die in jedem Land, in dem IBM Global Network angeboten wird, zugänglich sind. Sie bieten einen vollständigen Internet Zugang. Die notwendige Software, das IBM Internet Access Kit (IAK), ist im BonusPak von OS/2 Warp Version 3 enthalten.

Schwerpunkte

- o Uneingeschränkter Zugang zum Internet
- o Anwendungsdienste, die einfach die Informationsquellen des Internet zugänglich machen.
- o Software für E-Mail, Gopher, FTP, Telnet, WWW, Informationsbörsen usw.
- o Kundenunterstützung durch die IBM, um die Nutzung des Internet zu erleichtern

Beschreibung

Die IBM Internet Connection Service verknüpfen wirksam Software und Netzdienstleistungen für den Zugang zum Internet. Hierbei werden alle Standard - Internet - Funktionen, als auch die neuen 'Hypermedia' Dienstleistungen zur Verfügung gestellt, die einen interaktiven Zugang zu Text-, Bild- und Sprachdaten über eine Schnittstelle gestatten.

Die IBM Internet Connection Services umfassen folgende Dienste:

- o Zugangsdienste: Wählzugänge, Sicherheit und Verbindungsmöglichkeiten
- o Anwendungsdienste: Navigations- und Anwendungstest-Hilfen
- o Unterstützende Dienste: Betreuung und Hilfen beim Umgang mit dem Service

Diese Services wurden zur besseren Interaktion mit Internet entwickelt. Sie verringern die Komplexität im Internet-Umfeld.

Zugangsdienste

DER DIREKTE INTERNET ZUGANG erweitert die derzeitigen Möglichkeiten von Festleitungs- und Wählleitungs-Diensten zu umfassenden Anschlußmöglichkeiten eines TCP/IP Knotens

DIE ZUGANGSSICHERUNG ermöglicht dem Benutzer ein sicheres Arbeiten in seinem Unternehmensumfeld. Dabei behält er die Kontrolle über den Zugang zu den Internet-Informationsquellen weiter in seiner Hand

DER GLOBALE ZUGANG erweitert die Möglichkeiten zur Teilnahme an Internet-Diensten über das IBM Global Network mit seinen weltweiten Schwestergesellschaften und Joint Ventures.

DIE ZUGANGSKNOTEN erlauben dem Benutzer über weltweit verfügbare Gateways die Internet Nutzung

Anwendungsdienste

TCP/IP PROTOKOLL UNTERSTÜTZUNG wie TELNET, File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), POP3, WHOIS, PING und weitere TCP/IP Anwendungen

NEUIGKEITEN ÜBER DAS NETZ stehen dem IBM Kunden in speziell entwickelten Nachrichtenbörsen zur Verfügung. Er hat die Möglichkeit, an Diskussionsrunden teilzunehmen

NAVIGATIONSMITTEL erleichtern dem Benutzer den Umgang mit dem Netz durch Anwendungen zur Auffindung von Information im Internet, wie Gopher, Archie und World Wide Web (WWW)

IBM

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Condition of Use (COU)	System-Service Vertrag Große/Mittlere Systeme	Erweiterter IBM OS/2 Software Service (OSS)
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Technischer Außendienst

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29.06.93

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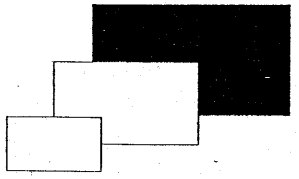
OS/2 Software Service



OSS Preisstruktur (DM/Jahr)

Gruppenpreise	bis 50	51 - 150	151 - 1000	1001-3000
OS/2, DOS & Communication	4680,-	10140,-	19860,-	39168,-
Datenbanken	2340,-	5100,-	9900,-	19584,-
LAN	2340,-	5100,-	9900,-	19584,-
Novell	4680,-	7620,-	13260,-	26112,-
Banking	4680,-	7620,-	13260,-	26112,-
Transaction Processing	2340,-	5100,-	9900,-	19584,-
System Management	2340,-	5100,-	9900,-	19584,-
Sprachen & Tools	2340,-	5100,-	9900,-	19584,-
Büro-Communication	2880,-	6240,-	12300,-	24240,-
Büro-Connectivity	2880,-	6240,-	12300,-	24240,-
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ENTERPRISE TECHNOLOGY NETWORK WORLD 1993 AWARD

Any Application

Any Network

AnyNet

IBM Networking Systems

Any Application, Any Network, AnyNet - Abstract

Corporations are facing many challenges in the 90's: consolidating their network backbone protocols around SNA/APPN and TCP/IP, enabling existing networks to access new application types, and implementing a solution for LAN internetworking. This presentation covers how the IBM AnyNet products meet these challenges, and provides examples of how route tables, address mappings, and LAN filters are configured. AnyNet access node and gateway products on AIX, MVS/ESA, OS/2, OS/400, and Windows include:

- SNA over TCP/IP
- IPX over SNA
- NetBIOS over SNA
- Sockets over SNA
- Sockets over IPX
- Sockets over NetBIOS

These combinations are covered along with their relationship to LAN to LAN over WAN, 2217 Nways Multiprotocol Concentrator, and SNA Client Access.

Biography

Speaker: Kathleen Riordan
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RALVMS(KRIORDAN)

Kathleen joined IBM in 1978 and worked in the VTAM organization until 1990, including assignments in service, development, design, and management. Since 1992 Kathleen has worked on APPN and AnyNet announcement, education, and marketing activities in Networking Products Technical Marketing.

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The announcement and availability of referenced functions is within IBM's business and technical judgement.

Acronyms

APPC	Advanced Peer to Peer Communications
APPN	Advanced Peer to Peer Networking
CICS	Customer Information Control System
CM/2	Communications Manager 2
DB2	DataBase 2
DCAF	Distributed Console Access Facility
DCE	Distributed Computing Environment
DDCS	Distributed Database Connection Services
DSOM	Distributed System Object Management
FTP	File Transfer Protocol
HPR	High Performance Routing
IMS	Information Management System
IPX	Internet Package Exchange
LAN	Local Area Network
LMU	LAN Management Utilities
LTLW	LAN to LAN over WAN
MpC	Multiprotocol Concentrator
MPTN	Multiprotocol Transport Networking
NetBIOS	Network Basic Input Output System
NFS	Network File System
OE	Open Edition
OS/2	Operating System 2
SDLC	Synchronous Data Link Control
SNA	Systems Network Architecture
SNMP	Simple Network Management Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TSO	Time Sharing Option

Contents

- Marketplace Overview
- Multiprotocol Transport Networking (MPTN) Architecture Overview
- AnyNet Multiprotocol Combinations and Platforms
- Technical Information Appendix

AnyNet Overview

- **Versatile software family of access node and multiprotocol gateway products**
- **Allows customers to**
  - Add new application types independent of the existing networking protocol
  - Reduce networking costs by consolidating and simplifying multiprotocol networks while protecting the investment of existing applications
  - Extend the reach of applications across multiple networks
- **Based on the Multiprotocol Transport Networking (MPTN) architecture, an X/Open standard**
- **Industry standard MPTN solution is part of IBM Open Blueprint**

Why AnyNet?

- **Need for AnyNet arises from diversity of today's networks**
  - Most large networks run multiple networking protocols due to growth in networking, particularly local area networking
  - Many more alliances are being formed that cause customers to seek inter-enterprise network connectivity
  - Increased use of public networks (e.g. Internet)

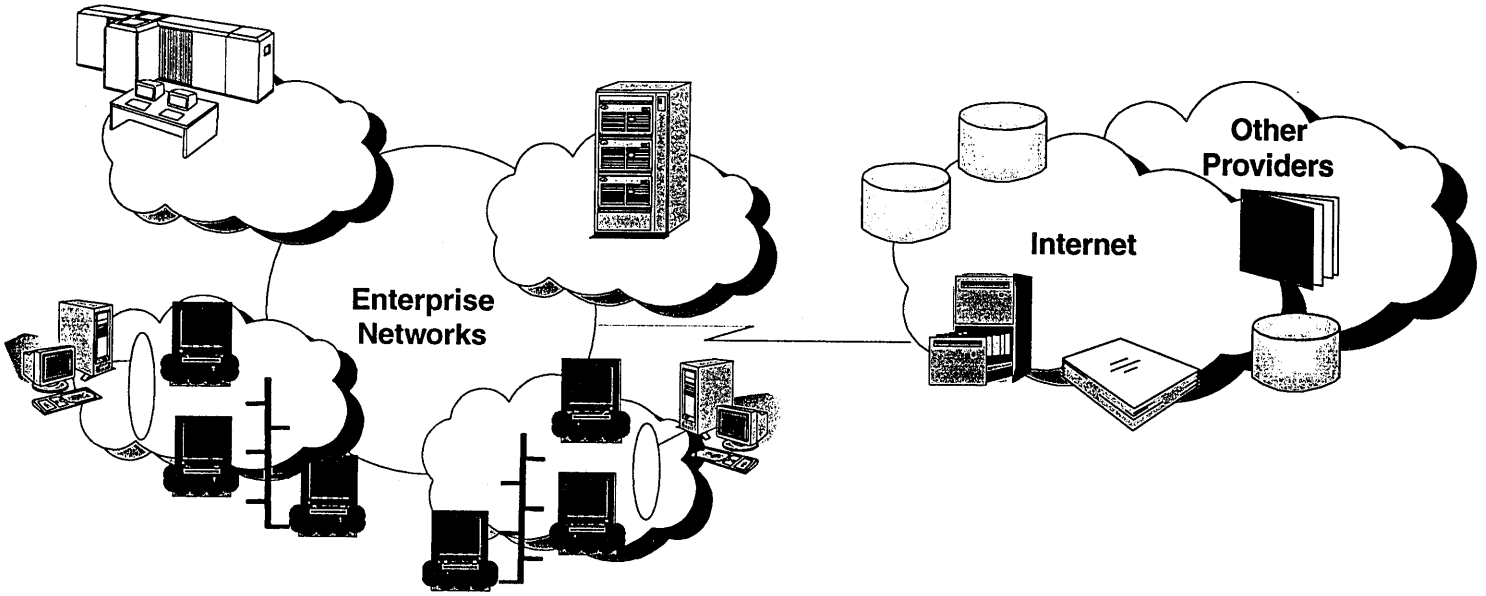
Who Needs AnyNet?

- Customers with single protocol networks with requirements to access applications that are not designed to run over the installed network type
- Industries with remote or branch locations with requirements to reuse the existing backbone network connectivity for LAN internetworking
- Enterprises with diverse protocols already installed who want to consolidate and simplify the number of network protocols they need to configure and manage
- Customers who want to change their backbone network protocol

Competition

- **IP-based routers**
  - Lab test results show routers do not adequately:
    - handle congestion and traffic prioritization
    - reduce equipment costs
    - make bandwidth available
    - simplify LAN/WAN integration
  - Often inappropriately considered for networks with predominantly SNA traffic when new protocols introduced
- **Microsoft NT and Microsoft SNA Server (SNA over TCP/IP)**
  - Pricing and package advantage
  - Rich scalability, ease of config, and platform support
- **Novell SNA Links (IPX over SNA)**
  - Novell dominates installed LANs today
  - AnyNet combinations are more versatile
- **Encapsulated SNA over IP solutions**
  - Requires two entire protocol stacks to be configured and traversed
  - AnyNet has potential performance advantage

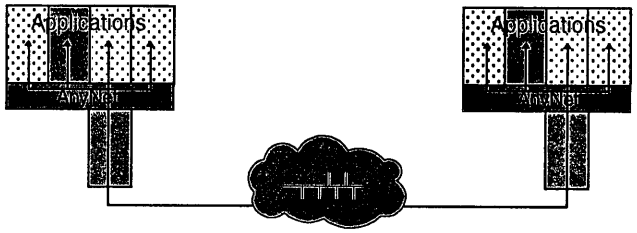
Any Application Any Network AnyNet



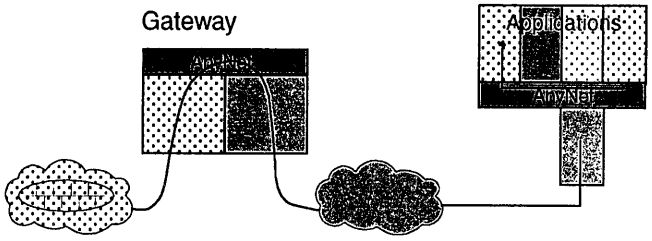
- **Application Choice, Network Independence**
- **Applications: More services for more users**
  - Add new applications without network constraint
  - Leverage existing applications
- **Networks: Expanding service while reducing cost**
  - Consolidate parallel physical networks
  - Manage single backbone protocol
  - Interconnect networks without impacting applications

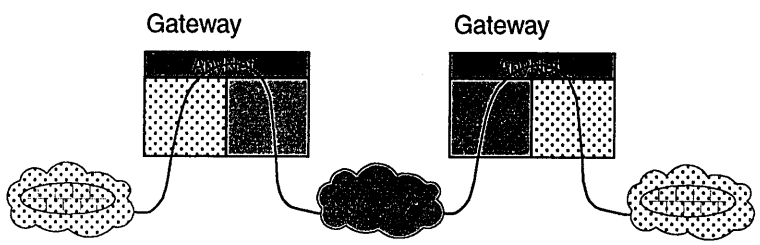
AnyNet Solutions

- **Access node Solutions**
  - Like-to-like applications
  - Allows access to new applications independent of transport network
  - Protocol compentsation occurs in end-systems
  - Simplifies and reduces cost of existing parallel or router networks
  - End-to-end management of single protocol

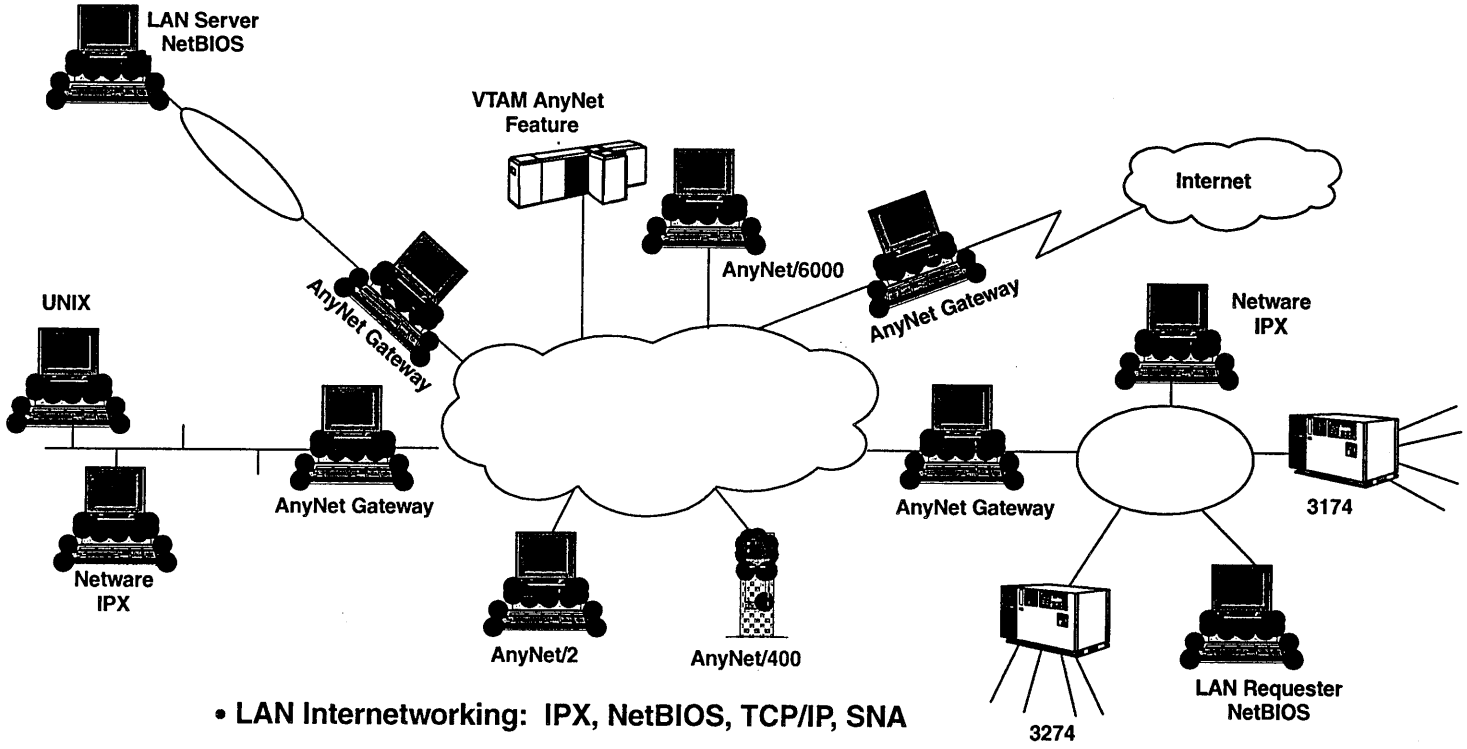


- **Gateway Solutions**
  - Interconnects like applications over multiple networks, extending application reach
  - Reduces protocols in backbone network
  - Supports native systems without change
  - Flexible configurations
    - single gateway
    - multiple gateways
    - parallel gateways



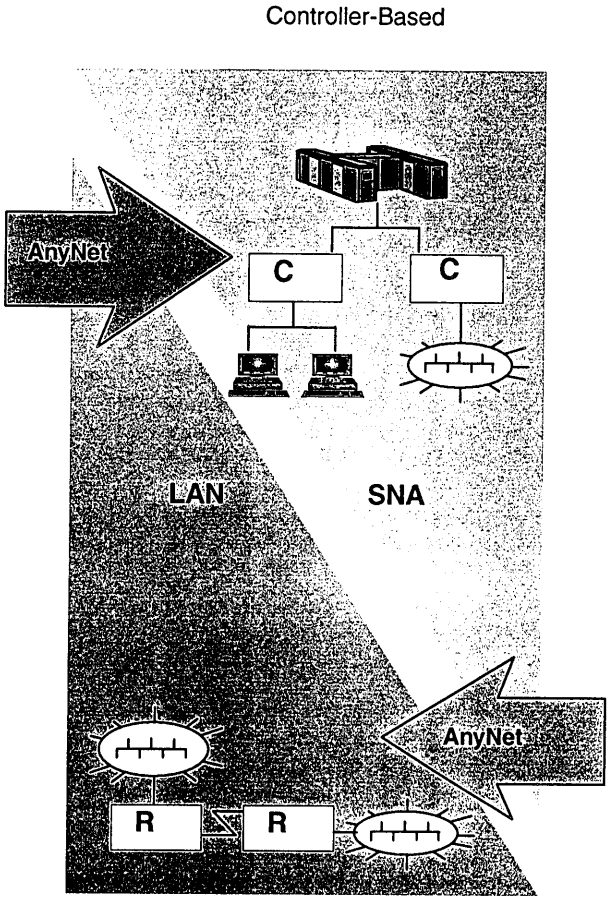


AnyNet Connectivity



- LAN Internetworking: IPX, NetBIOS, TCP/IP, SNA
- Wide Area: SNA, APPN, TCP/IP
- Platforms: MVS/ESA, OS/2, OS/400, AIX, Windows, 2217 Multiprotocol Concentrator
- Standards based (X/OPEN)

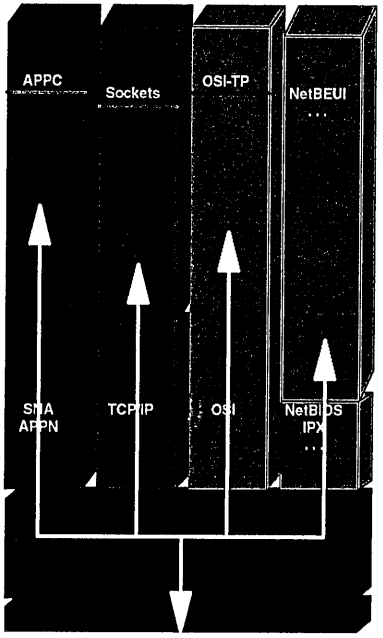
Multiprotocol Concentration Advantages



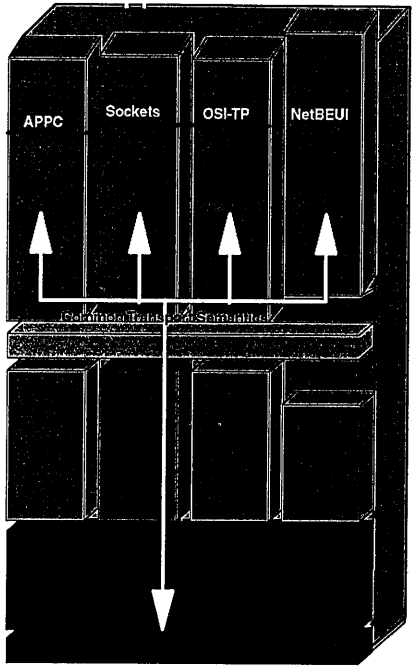
- **Single backbone protocol concentration eliminates complexity of multiple protocol stacks**
- **Non-SNA applications running over SNA benefit from SNA networking features:**
  - cost-effective bandwidth utilization
  - predictable response times
  - traffic prioritization
  - data compression
  - high performance routing
- **AnyNet protects SNA backbone from LAN broadcast storms by**
  - filtering IPX, NetBIOS, TCP/IP broadcasts
  - caching names
- **Non-TCP/IP applications running over TCP/IP benefit from TCP/IP networking features:**
  - router-based networks
  - access to worldwide Internet

Multiprotocol Transport Networking (MPTN) Overview

Today's Environment: Multiple Protocols



- Applications bound to protocols
- Complex, high cost networks
- Multiple active protocols
- Complex code management tasks

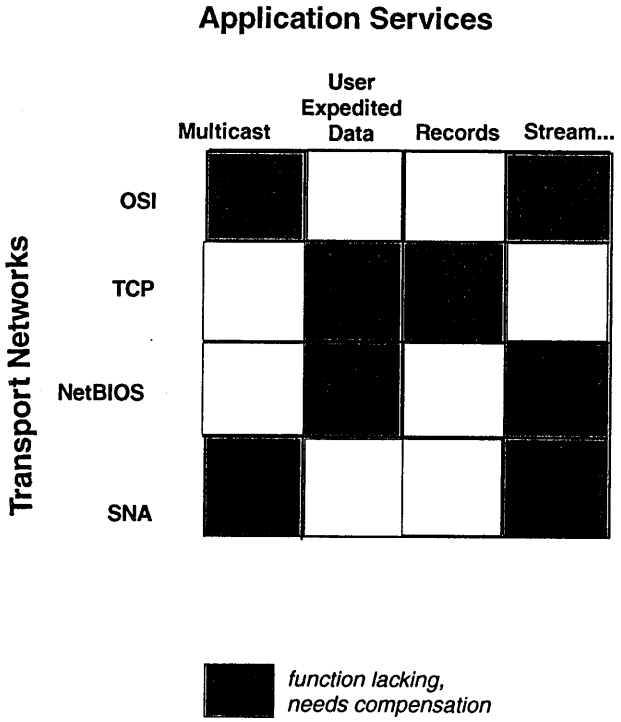


- Applications independent of protocol
- Simpler, cost-effective networks
- Multiple application services and support
- Transport network flexibility

Challenges in Building Multiprotocol Networks

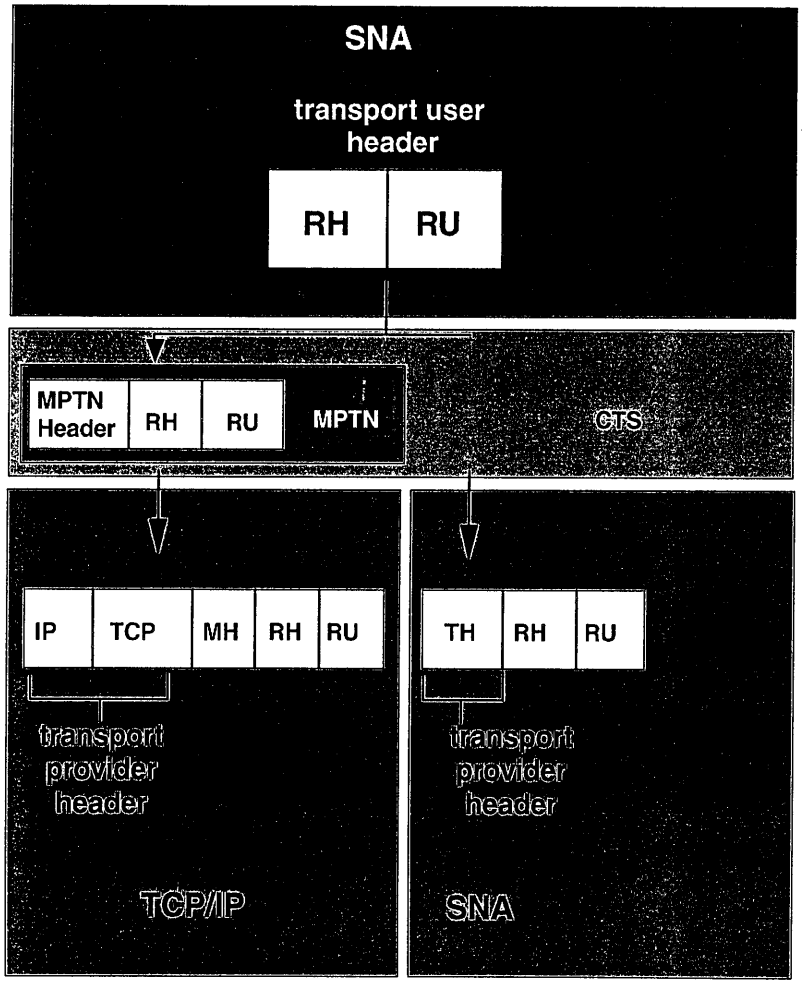
- Function Compensation
- Address Mapping
- Transport Gateways

Functional Compensations Required by Transport Networks



- Every transport network lacks functions supported by other transport networks
- Compensations are common solution for multiple protocols' missing function
- Compensations are minimal
- Compensations required only when application requests services not provided by transport network

MPTN Data Transport - SNA over TCP/IP



Native:

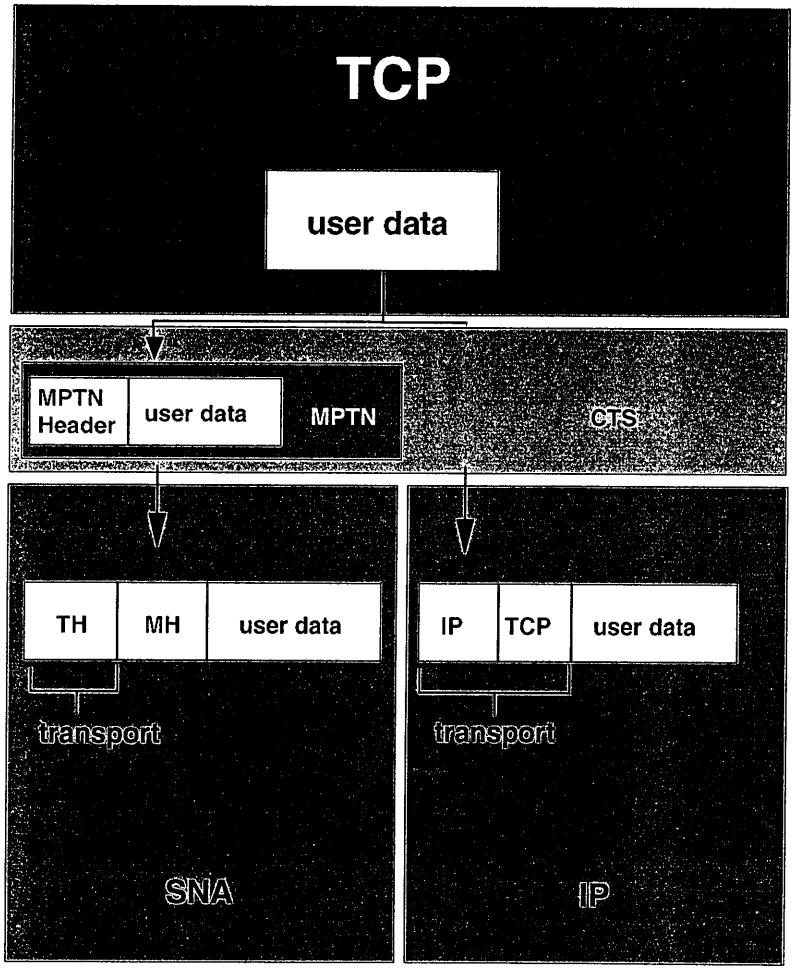
- Transparent flow through CTS
  - same as today
  - no cost or performance overhead

Mixed Protocol:

- End to end application functions preserved in upper layer header
- 5 byte MPTN Header inserted to do compensations
- Lower layers determine transport characteristics
- Performance reflects performance of underlying network

TH-Transmission Header
MH-MPTN Header
RH-Request Header
RU-Request Unit

MPTN Data Transport - Sockets over SNA



Native:

- Transparent flow through CTS
  - same as today
  - no cost or performance overhead

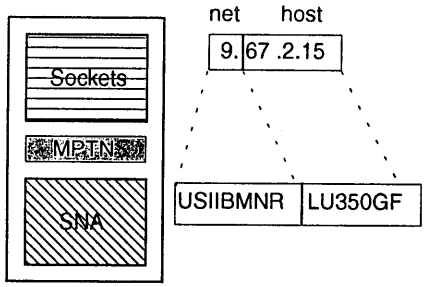
Mixed Protocol:

- End to end application functions preserved in upper layer header
- Small MPTN Header inserted to do compensations
- Lower layers determine transport characteristics
- Performance reflects performance of underlying network

TH-Transmission Header
MH-MPTN Header

MPTN Address Mapping Examples

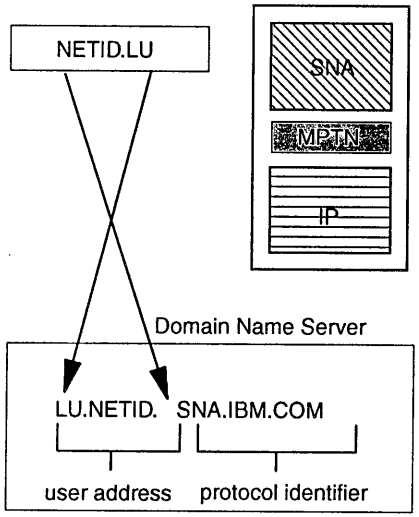
Algorithmic



2 Step Process:

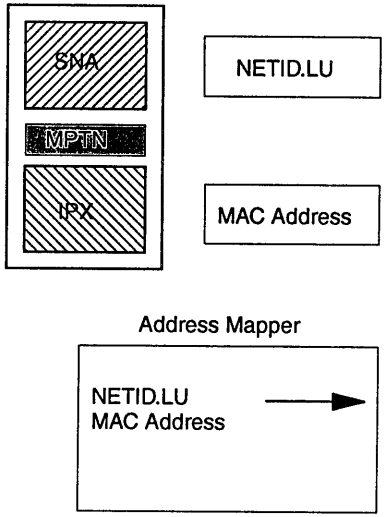
- TCP network ID mapped to SNA network name (table lookup)
- TCP host ID generates LU name (algorithmic)

Protocol Specific Directory



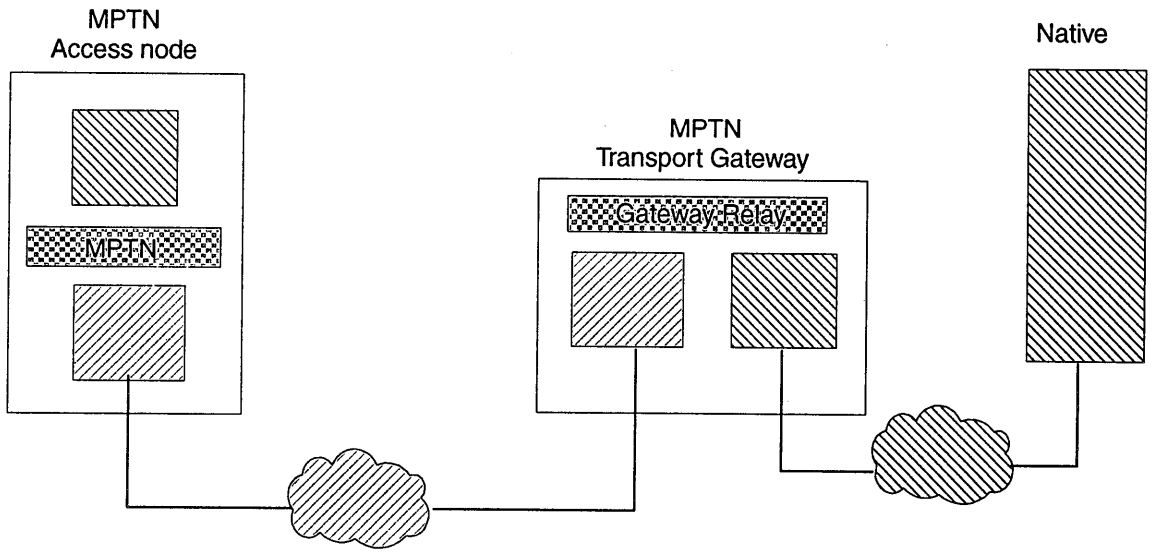
TCP domain name server used to store user address and protocol identifier

Dynamic Address Mapper



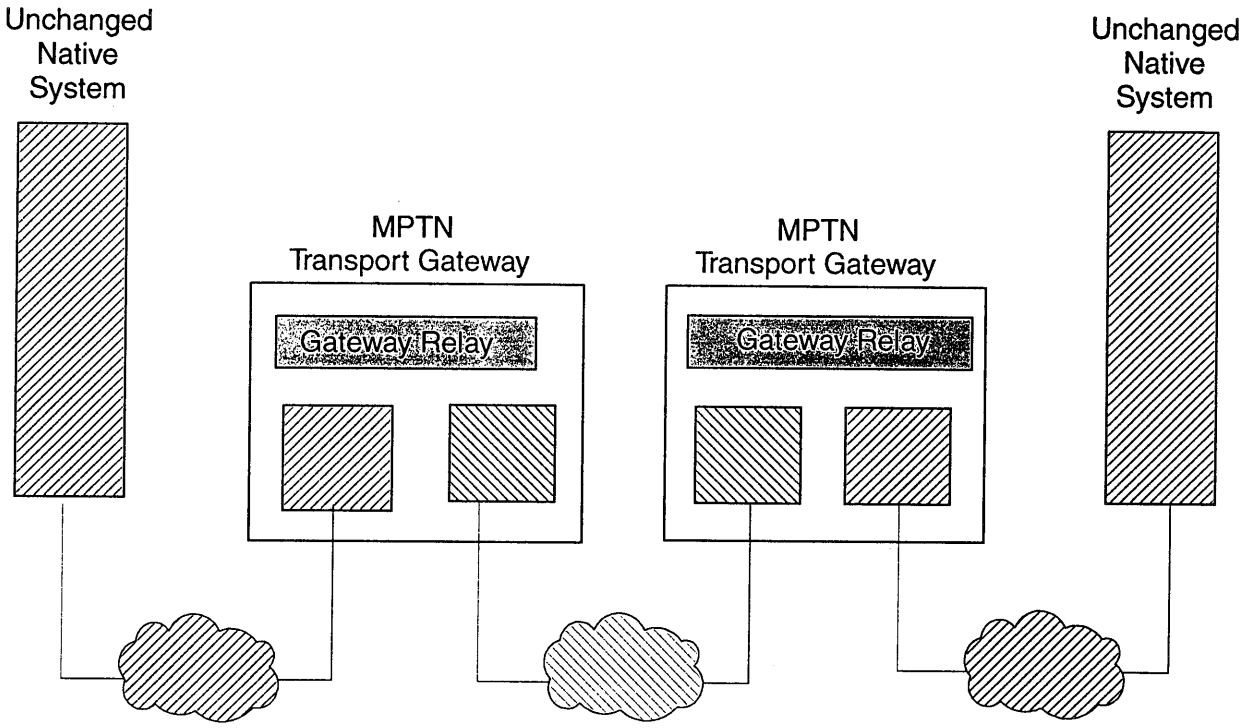
Transport user and transport provider association registered in address mapper

MPTN Transport Gateway



- Interconnects two networks with different transport protocols
- Supports native systems
- Supports parallel gateways

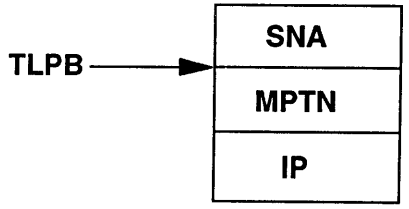
Multiple MPTN Gateways



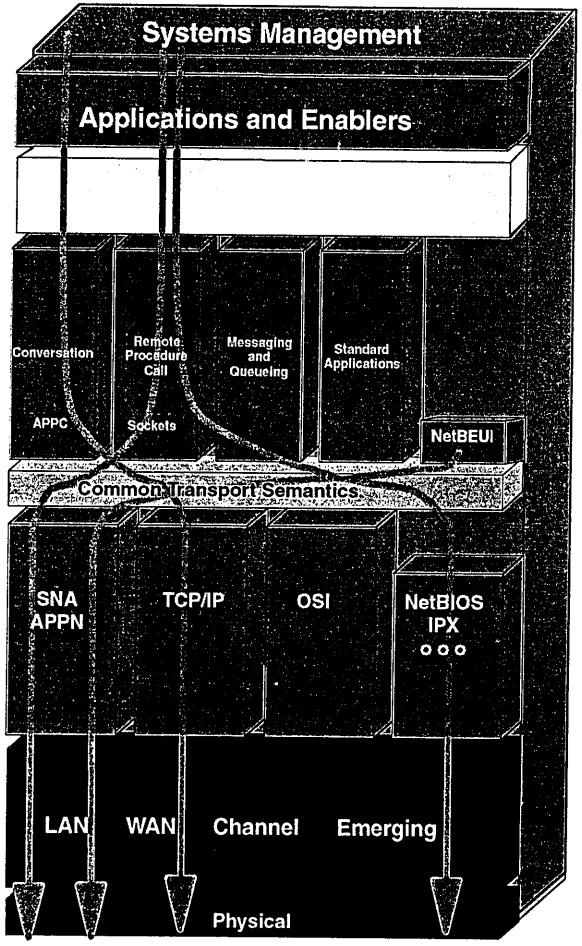
- Interconnects three networks with different transport protocols

Open MPTN Architecture

- **Standard Bodies**
  - X/Open Guide: MPTN Architecture available January 1994
    - ISBN 1-85912-003-2
  - X/Open MPTN specifications available October 1994
    - Access Node - ISBN 1-85912-040-7
    - Address Mapper - ISBN 1-85912-039-3
    - Data Formats - ISBN 1-85912-043-1
    - To order, fax to X/Open in UK: +44(0) 993 708732
- **Transport Layer Protocol Boundary (TLPB) code and specification available to allow other vendors to use AnyNet to enable their stacks**

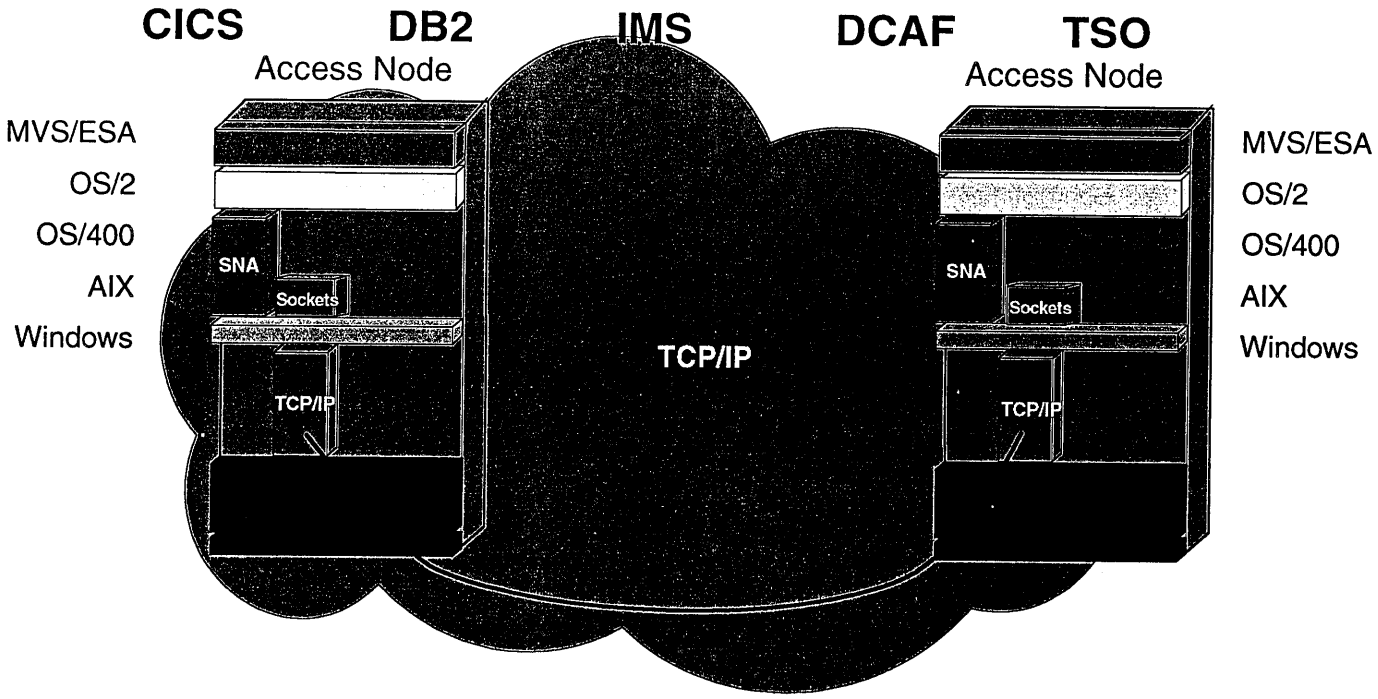


AnyNet Multiprotocol Combinations



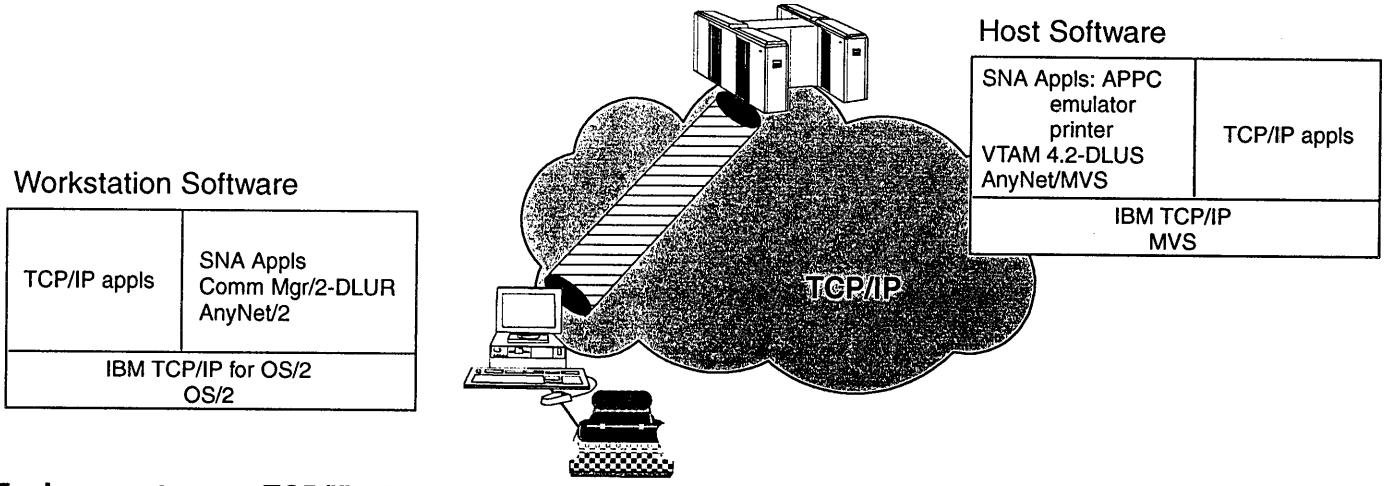
- *SNA over TCP/IP*
- *Sockets over SNA*
- *IPX over SNA*
- *NetBIOS over SNA*
- *Sockets over IPX*
- *Sockets over NetBIOS*

SNA over TCP/IP



- **TCP/IP end-users can access both Sockets and SNA applications with no changes to hardware and applications**
- **APPC over TCP/IP (all platforms)**
- **SNA emulators and printers over TCP/IP (MVS and OS/2)**
- **IBM DatagLANce Network Analyzer delivers LAN analysis and MPTN protocol decoding**

SNA over TCP/IP : TCP/IP Network Adds SNA Applications



Environment: **TCP/IP Network**

Requirement: **Access to host SNA emulator and printer applications**

Solution: **VTAM 4.2 AnyNet Feature SNA over TCP/IP and AnyNet/2 allows SNA data transported over TCP/IP to be printed on SNA printers with no conversion of data**

Benefits: **Access to all VTAM applications including**

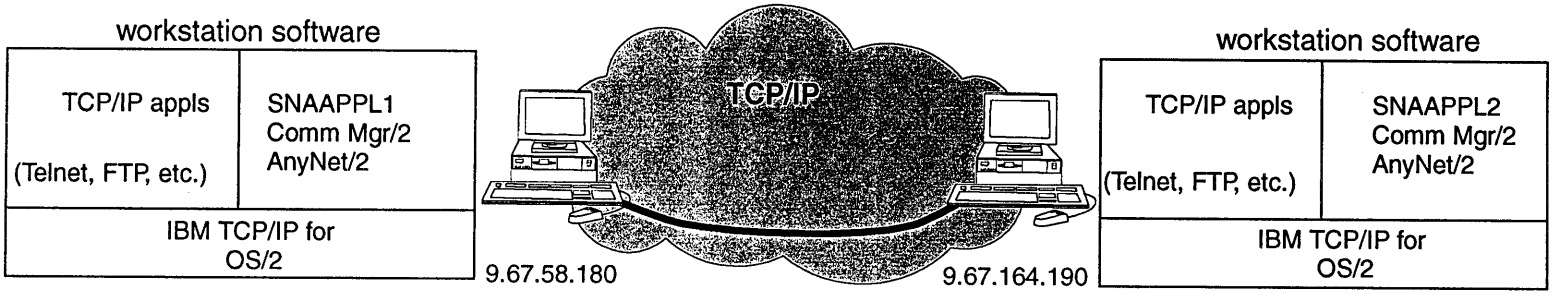
- LU1/LU3 printer applications
- LU2 emulators
- Customer written LU0 and LU2 applications

VTAM session initiation flexibility
Printer support not provided by other SNA over TCP/IP products

SNA over TCP/IP Configuration

- **Map LU names to IP addresses**
  - SNA LU names reformatted by AnyNet into IP domain name in form "luname.netid.SNASUFFIX"
- **Setup routing preference table (LUTAB.LST)**
  - LU names must be added to table before connection with partner LU setup.
  - default is "native" (SNA) routing
  - "nonnative" must be specified in access node in order for the specified LU to be reached over a TCP/IP network
- **Configure TCP/IP interfaces**

SNA over TCP/IP : Defining IP Adresses in Domain Name Server



Domain Name Server

LU name:	IP address:
SNAAPPL1. NET1.SNA.IBM.COM	9.67.58.180
SNAAPPL2.NET1.SNA.IBM.COM	9.67.164.190

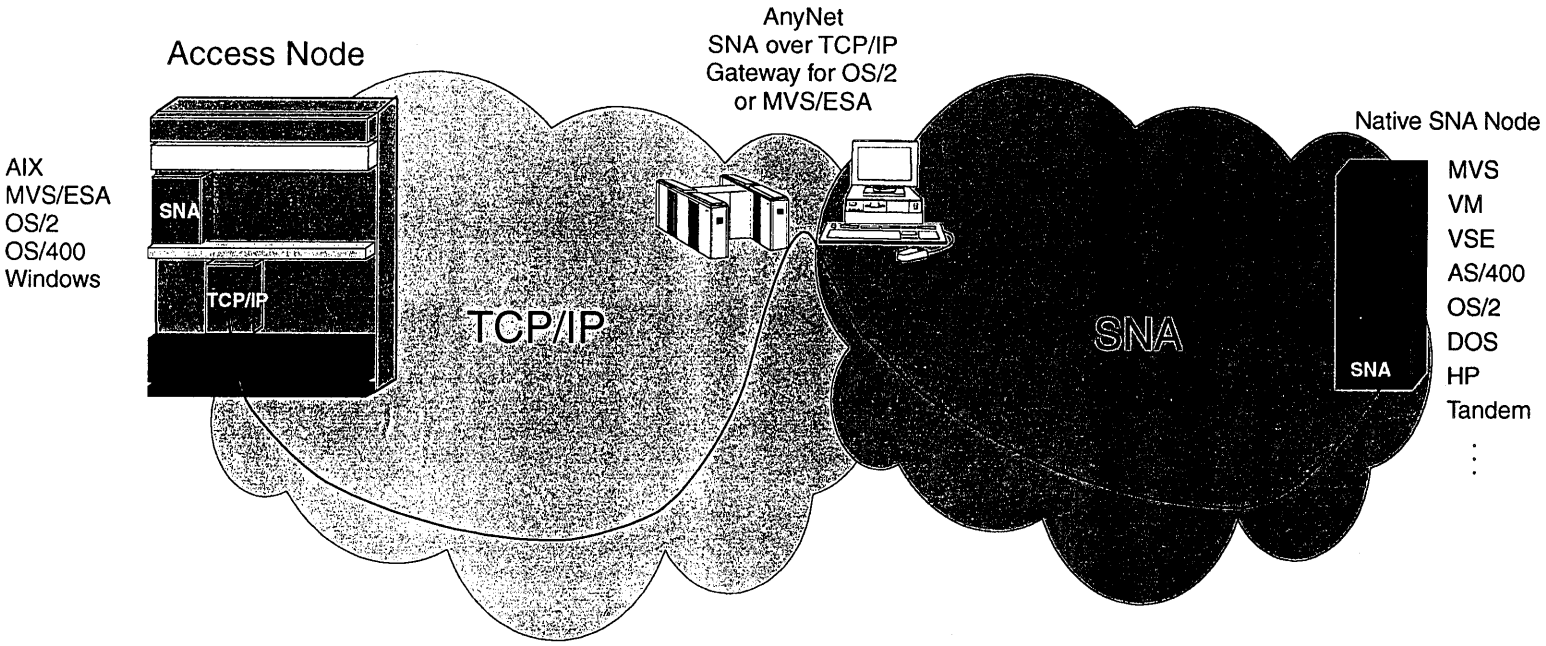
Destination LU name mapped to domain name

- netid.lu mapped to lu.netid.snasuffix
- SNA suffix can be defined by user
- default SNA domain name suffix: SNA.IBM.COM

Two methods provide domain name to IP address mapping:

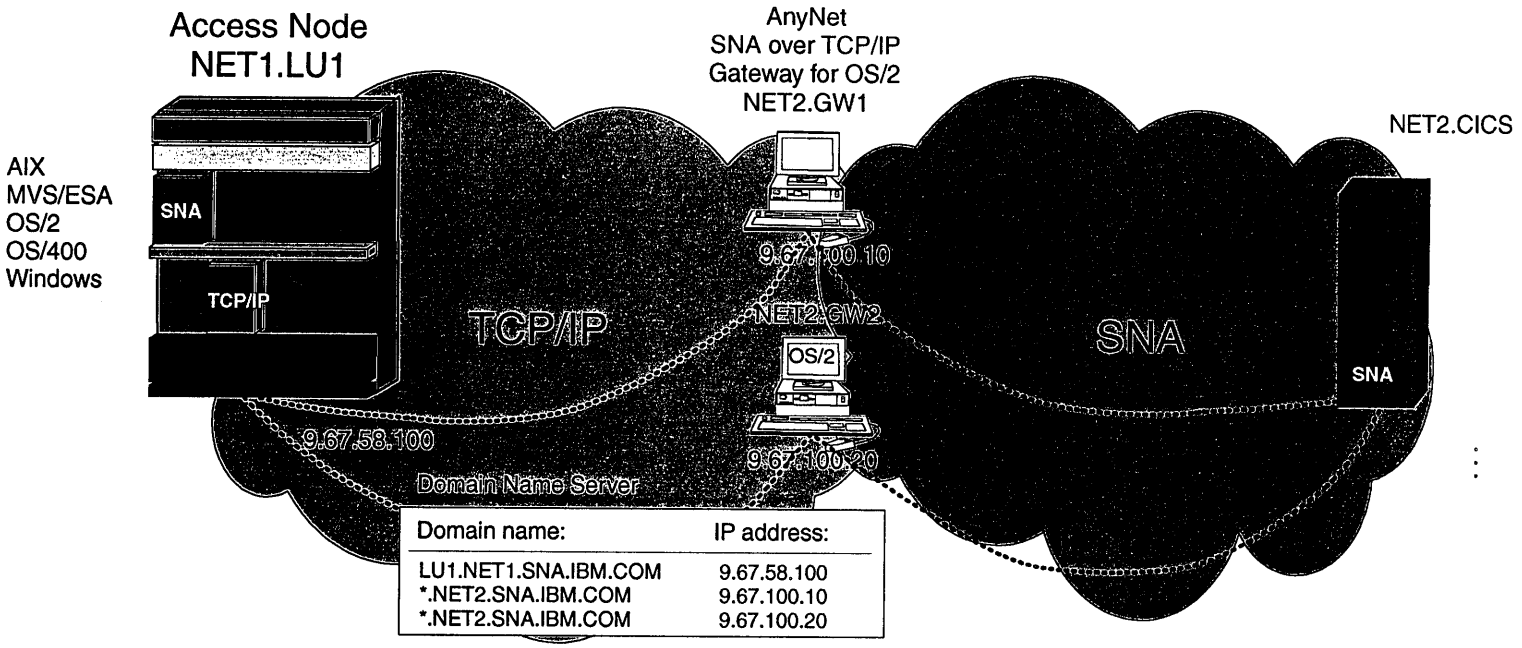
- **TCP/IP HOSTS file:**
  - recommended for small networks as duplicate definitions required in every node
  - definitions can be changed at any time
- **Domain Name Server (DNS)**
  - recommended for large networks as definitions localized to one database
  - required for configurations involving parallel SNA over TCP/IP gateways or dependent LUs
  - modifications to definitions require DNS restart
  - local systems RESOLV file in ETC subdirectory points to DNS that handles mapping

SNA Over TCP/IP Gateway



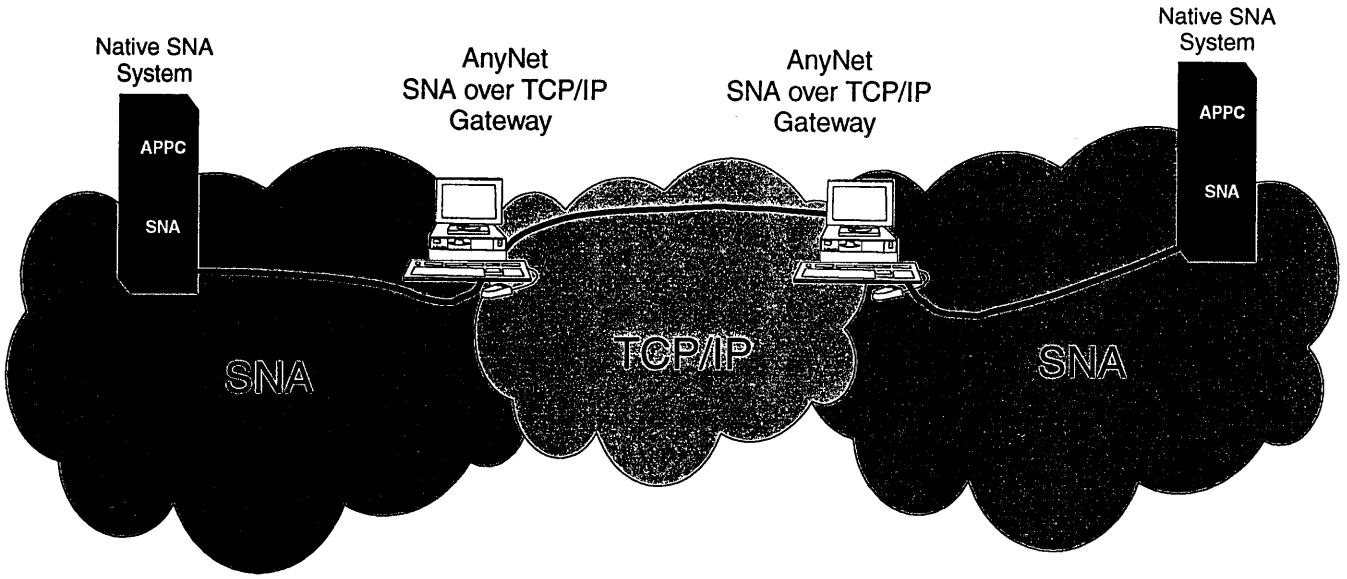
- SNA applications communicate across connected SNA and TCP/IP networks
- SNA emulators and printers can communicate from AnyNet/2 SNA over TCP/IP to applications running in SNA network with VTAM V4R2 on MVS
- 4 OS/2 gateway sizes: 20, 100, 250, 500 connections

SNA Over TCP/IP Gateway - Definition Example



- **Domain names mapped to IP addresses using domain name server**
  - **default SNA domain name suffix: "SNA.IBM.COM"**
  - **wildcard entry (*) defines single domain name server entries for all LUs in NET2.**
- **Routing preference table entry in access node specifies "nonnative" for NET2.CICS to route through gateway**
- **Gateway adds must be configured as Network Nodes**
- **Parallel gateways increase number of simultaneously supported sessions**

SNA over TCP/IP Multiple Gateways



- Two or more gateways connect multiple SNA and TCP/IP networks
- APPC applications communicate with each other

SNA over TCP/IP Troubleshooting Tips

1) Start CM/2 on local box. After CM/2 is up (type "cmsetup" and check that the SNA kernel and SNA Services are ACTIVE), check that AnyNet is up by typing "netstat -s". You should see one STREAM and one UDP socket bound to port 397, and 4 STREAM sockets where the local and remote IP addresses are the same, and whose state is ESTABLISHED.

2) Check if TCP/IP is up in the partner box, by using the TCP program "ping <IP address of partner>".

3) Check if the LU name to be used to reach the partner box maps to the correct IP address by running "host LUname.Netid.%snasuffix%".

4) Check if AnyNet is up in the partner box by running "aping -n Netid.LUname".

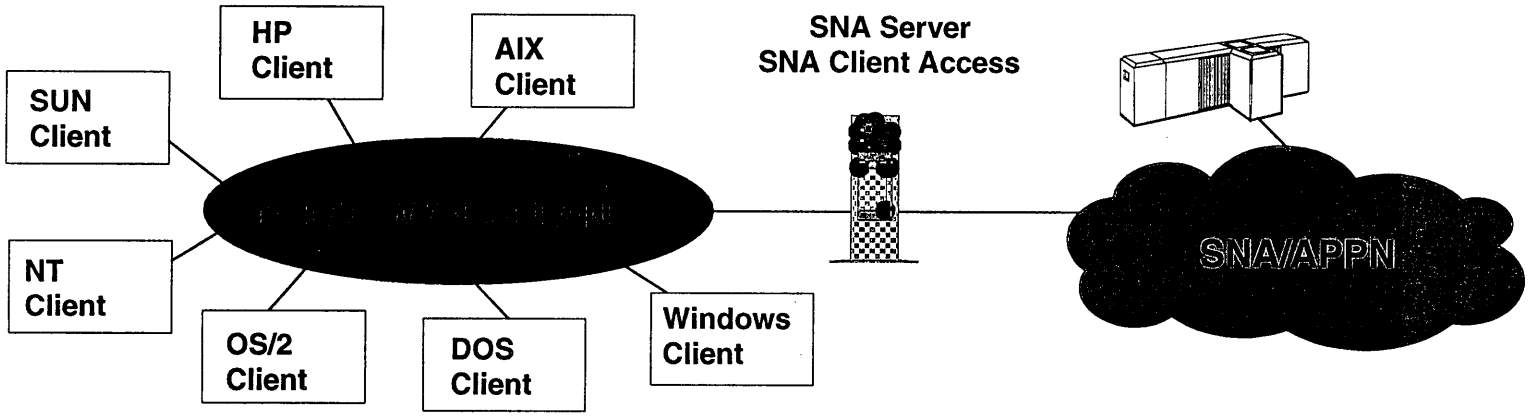
If 1-4 work, then there is a problem with the SNA application the customer is running. Check the Message Log and the System Error Log for messages in both the local and remote boxes.

Refer to these publications for more help with troubleshooting:

- GV40-0375-01: Guide to SNA over TCP/IP Version 2.0.2, Chapter 4: Troubleshooting

- GV40-0216-00: Guide to SNA over TCP/IP Gateway for OS/2 Chapter 4: Troubleshooting

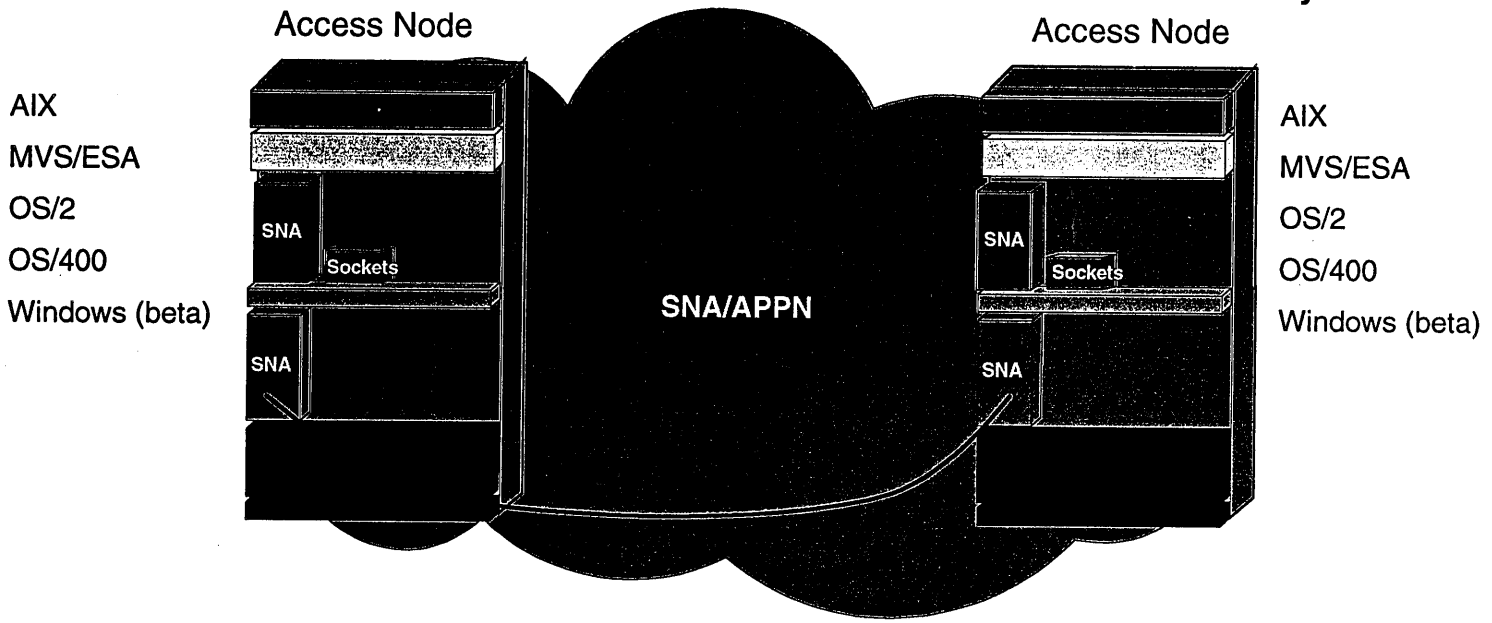
SNA Client Access for AIX



- **Multi-vendor TCP/IP connectivity to SNA**
- **TCP/IP Telnet Server**
- **Client support for:**
  - TN3270 Emulation
  - TN5250 Emulation
  - 3270 Emulation
  - 5250 Emulation

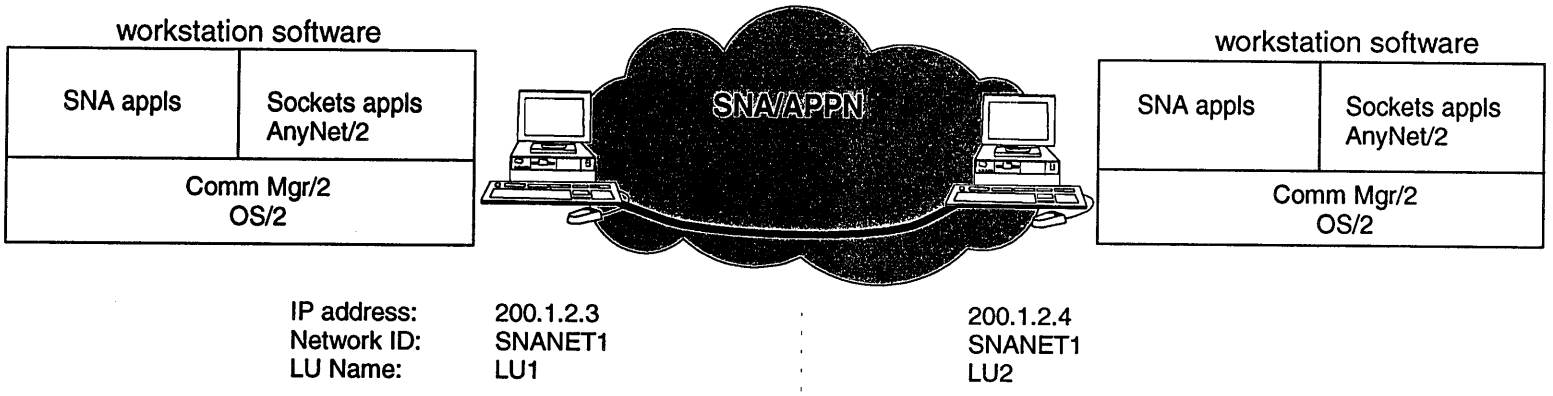
Sockets over SNA

DCE FTP NFS PING SAP SNMP TELNET X Window System



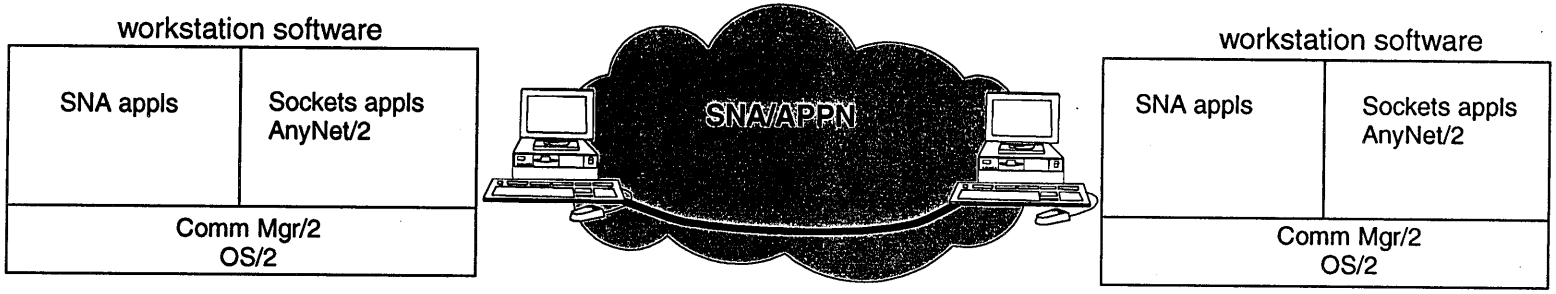
- **SNA end-users can access both SNA and TCP/IP Sockets applications with no changes to hardware or applications**
- **MVS OE sockets applications can run over both TCP/IP and SNA/APPN networks**
- **IBM DatagLANce Network Analyzer delivers LAN analysis and MPTN protocol decoding**

Sockets over SNA - Explicit Definition of LU Names



- **Explicit definition of LU names effective for small number of access nodes**
- **Specify mapping parameters during configuration for each local and remote LU:**
  - IP address
  - SNA network ID
  - SNA LU name
- **Sockets applications configured to communicate over IP network 200.1.2.0**
- **Explicit mappings generate sxmap line entries:**
  - sxmap add sna 200.1.2.3 255.255.255.255 SNANET1 LU1
    sxmap add sna 200.1.2.4 255.255.255.255 SNANET1 LU2
- **All data destined for 200.1.2.3 is mapped to network qualified name SNANET1.LU1**
- **All data destined for 200.1.2.4 is mapped to network qualified name SNANET1.LU2**

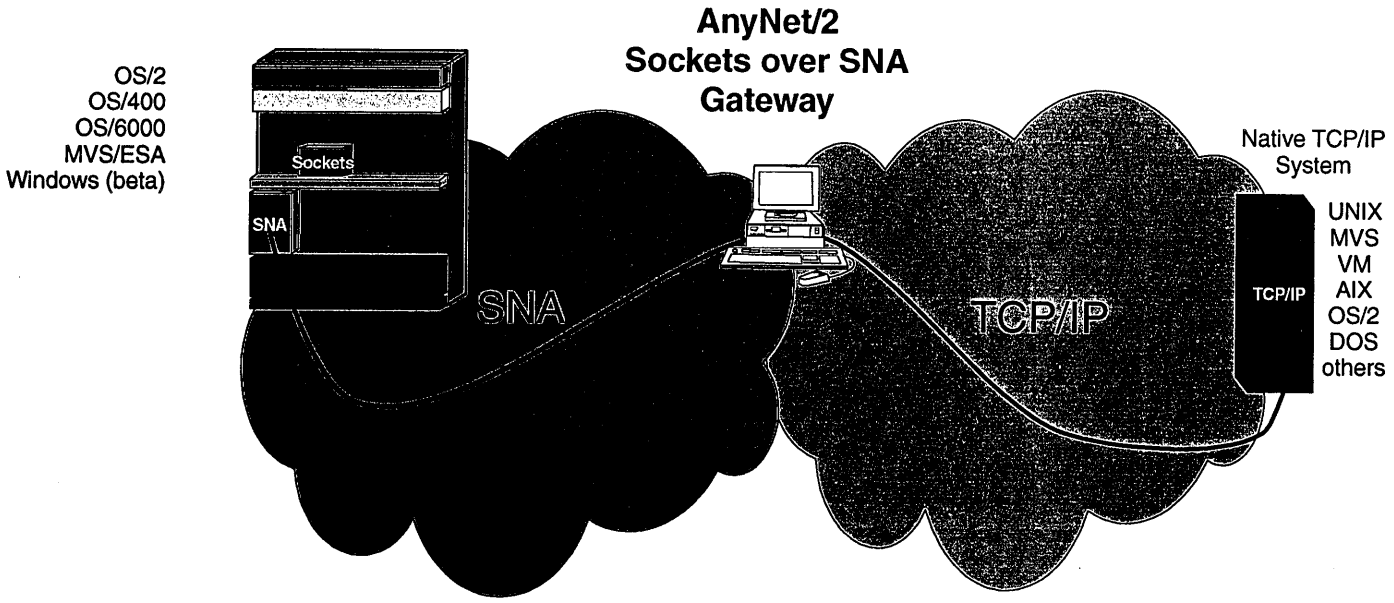
Sockets over SNA - Algorithmic Definition of LU Names



IP address:	200.1.2.3	200.1.2.4
Subnet mask:	255.255.255.0	255.255.255.0
LU Template:	SX	SX
Network ID:	SNANET1	SNANET1

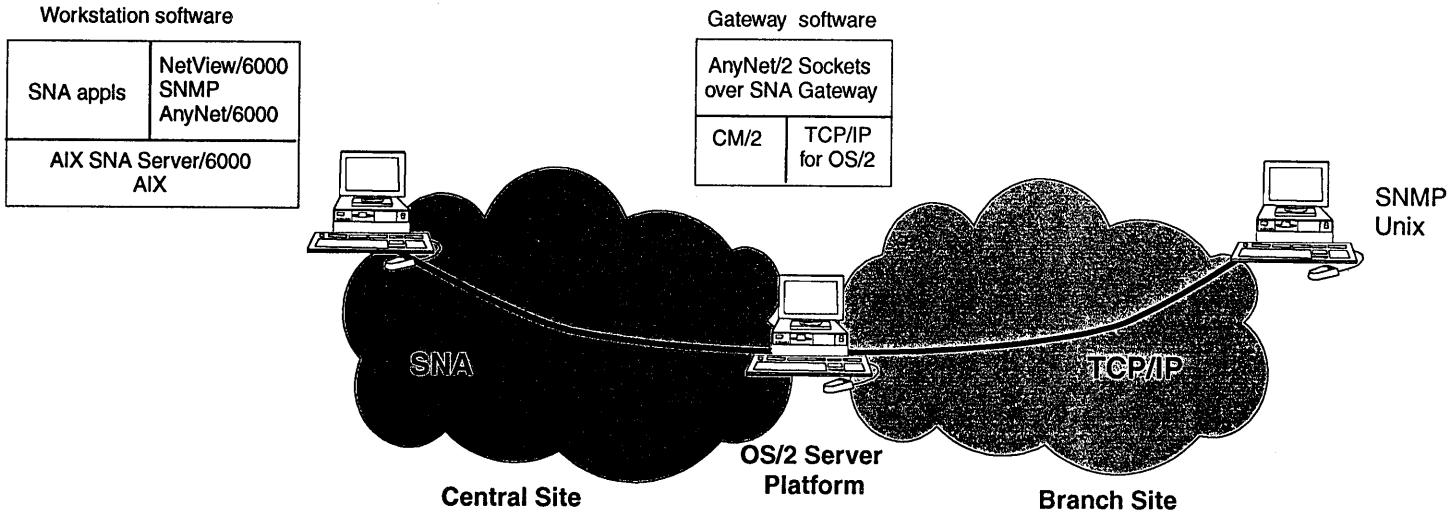
- **Algorithmic mapping recommended for network with more than a few nodes**
- **Specify mapping parameters during configuration:**
  - IP address
  - Address mask to specify the characters in the IP address used to generate SNA LU names
  - SNA network ID to assign to Sockets over SNA nodes
  - LU template: a common prefix for generated LU names
- **Sockets applications configured to communicate over IP network 200.1.2.0**
- **Algorithmic mapping generates sxmap line entry:**
  - sxmap add sna 200.1.2.0 255.255.255.0 SNANET1 SX
- **All data destined for nodes on network 200.1.2.0 mapped to SNA network ID SNANET1**
- **Last 8 bits of IP address, indicated by "0", are used to algorithmically generate corresponding LU name that begins with LU template letters SX**

Sockets over SNA Gateway



- Matching sockets applications communicate across connected SNA and TCP/IP networks
- 3 gateway sizes: 20, 100, 250 connections

Sockets over SNA: SNA Network Adds SNMP



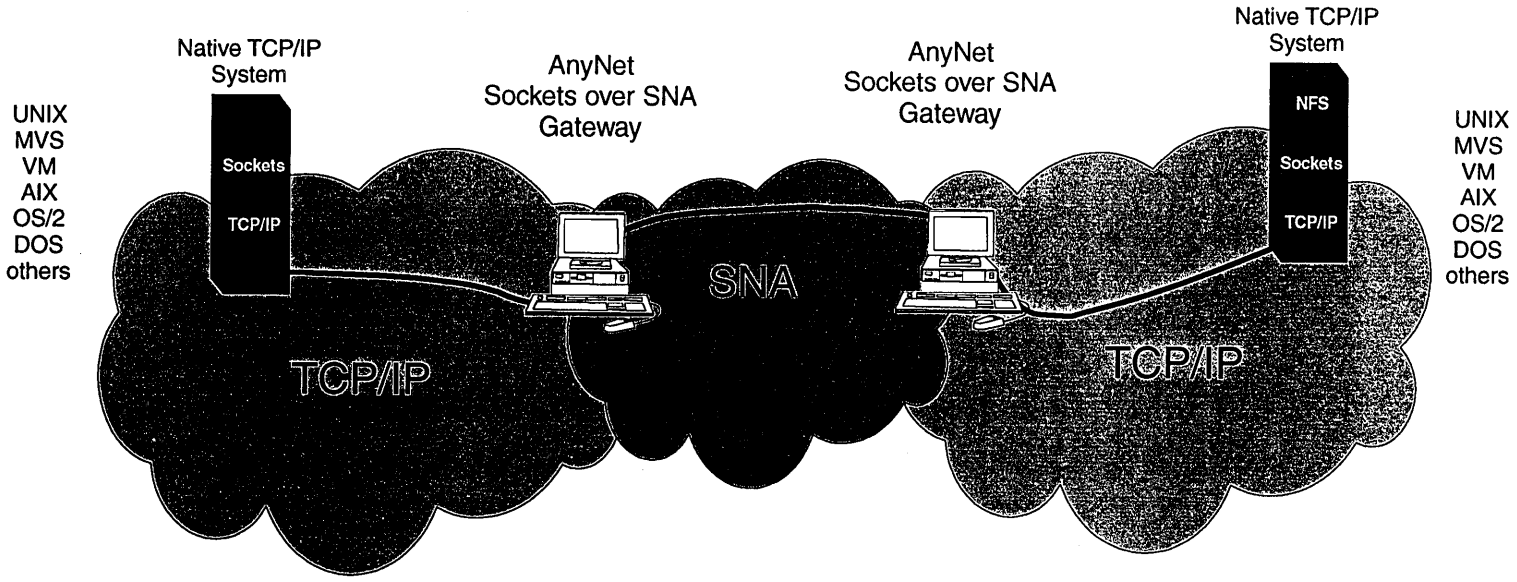
Environment: SNA and TCP/IP, SNMP - based tool

Requirement: Manage nodes at branch sites with SNMP - based tool

Solution: AnyNet Sockets over SNA feature of AIX SNA Server/6000 at central site
AnyNet/2 Sockets over SNA Gateway at each branch site

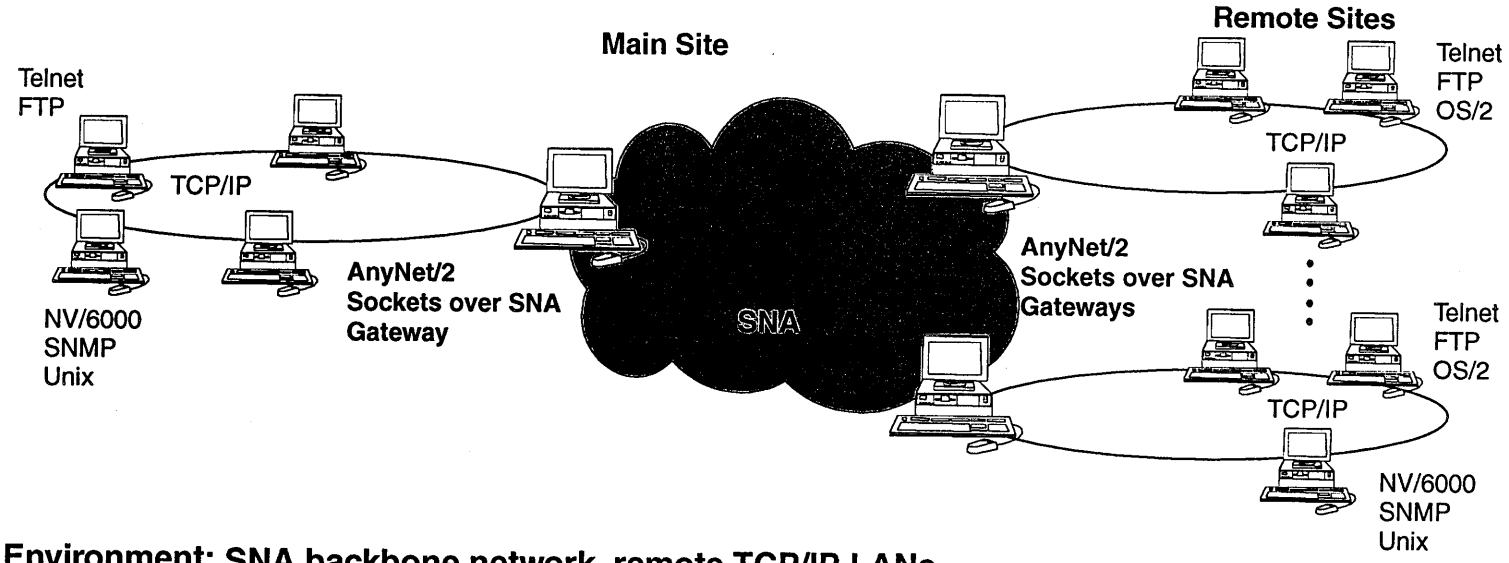
Benefits: Connects unlike networks while providing desired SNMP - based management
No impact on host communications at central site SNA network
No impact on high availability of OS/2 server

Sockets over SNA Multiple Gateways



- Two or more gateways connect remote TCP/IP networks across SNA network
- Sockets applications communicate with each other

Sockets over SNA Gateway: Connect TCP/IP LANs Over SNA



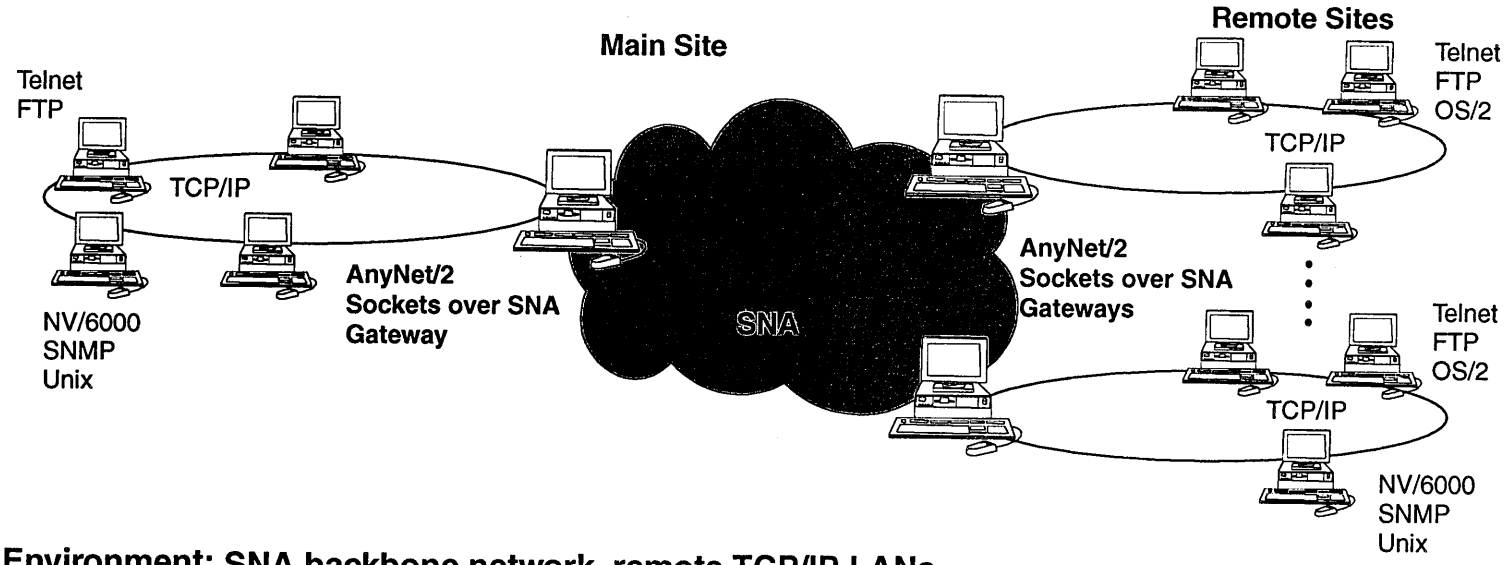
Environment: SNA backbone network, remote TCP/IP LANs

Requirement: Access to TCP/IP (SNMP, Telnet and FTP) Applications

Solution: AnyNet/2 Sockets over SNA Gateway

Benefits: Connects remote TCP/IP LANs
No hardware or application modifications

Sockets over SNA Gateway: Connect TCP/IP LANs Over SNA



Environment: SNA backbone network, remote TCP/IP LANs

Requirement: Access to TCP/IP (SNMP, Telnet and FTP) Applications

Solution: AnyNet/2 Sockets over SNA Gateway

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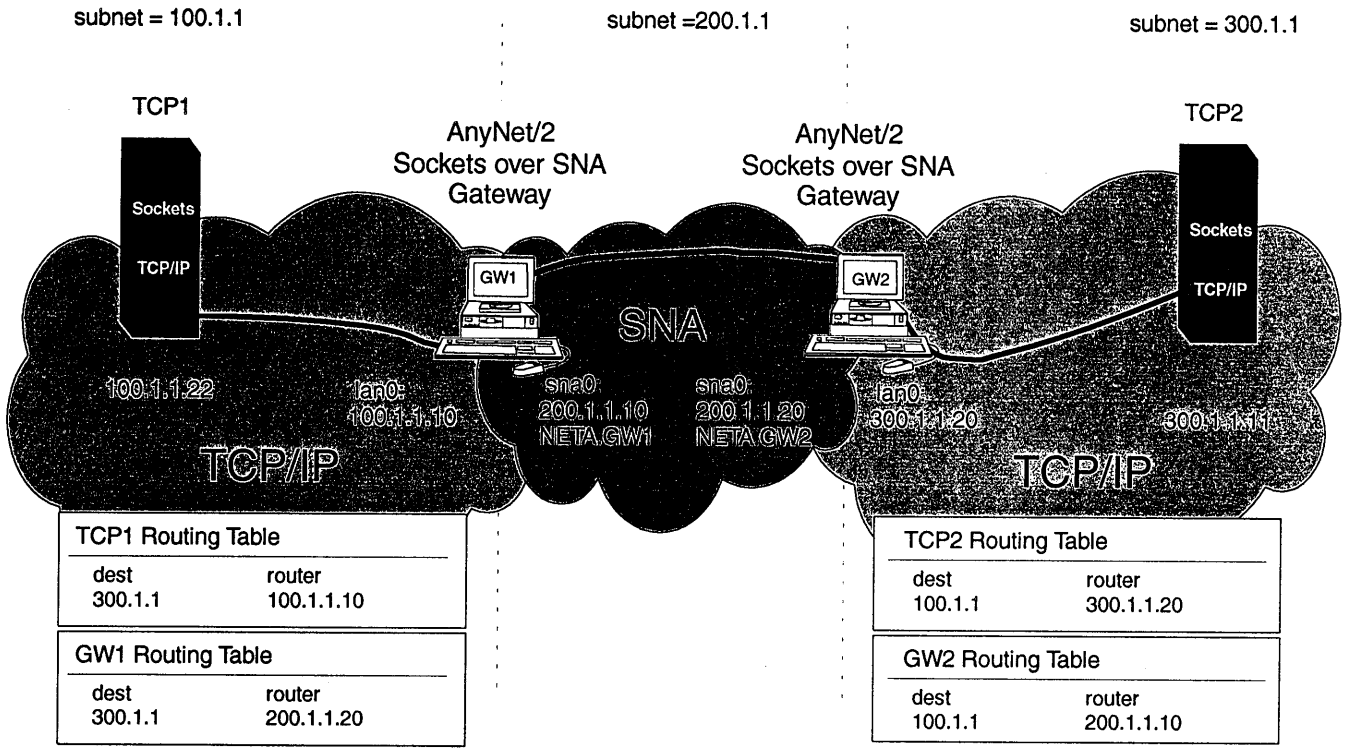
No hardware or application modifications

Sockets over SNA Multiple Gateways - Routing

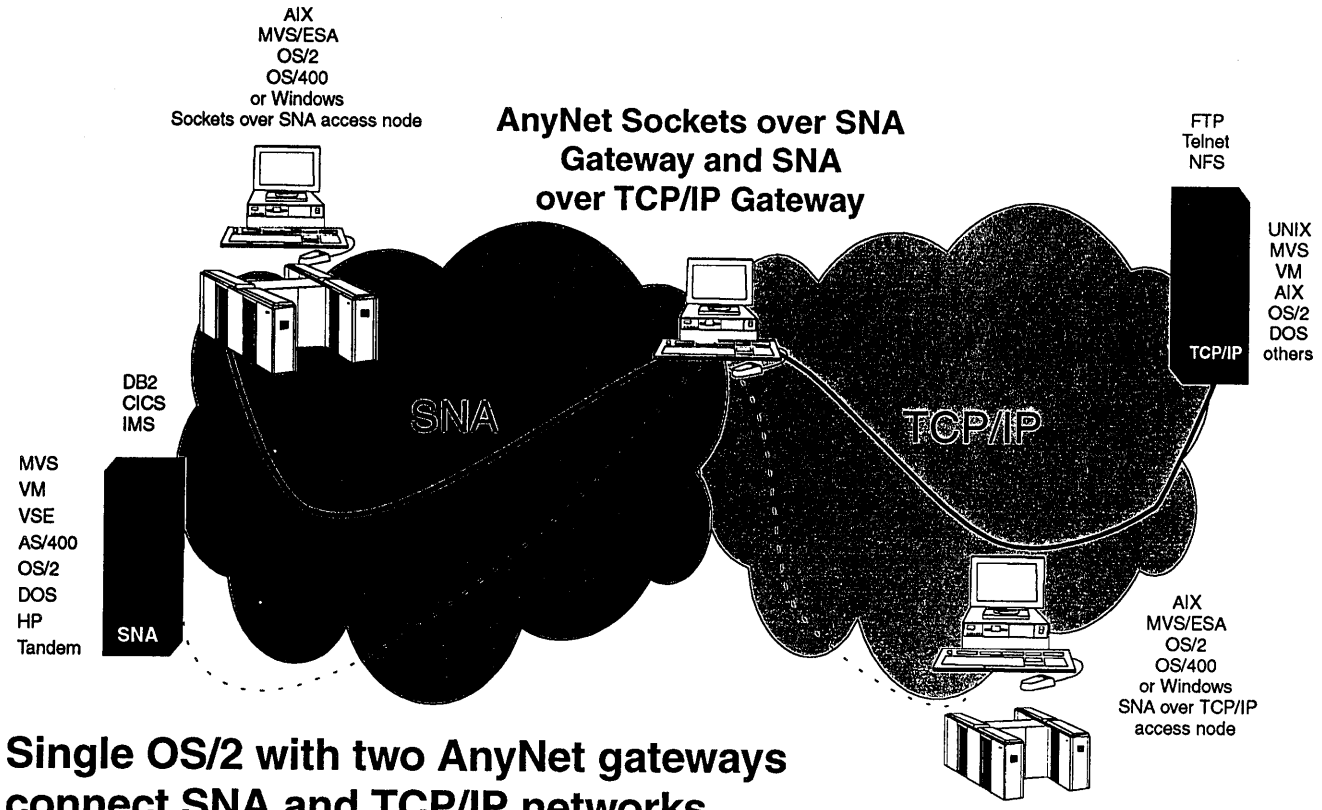


- **Each gateway defined as default router for its TCP network**
- **TCP LANs need to be in their own subnet**
- **Gateway is CM/2 APPC appl. LU name is defined to CM/2.**
- **Gateways don't know about each other until connection establishment and LU6.2 session established**
- **Address masks set to 255.255.255.0**

Sockets over SNA Troubleshooting

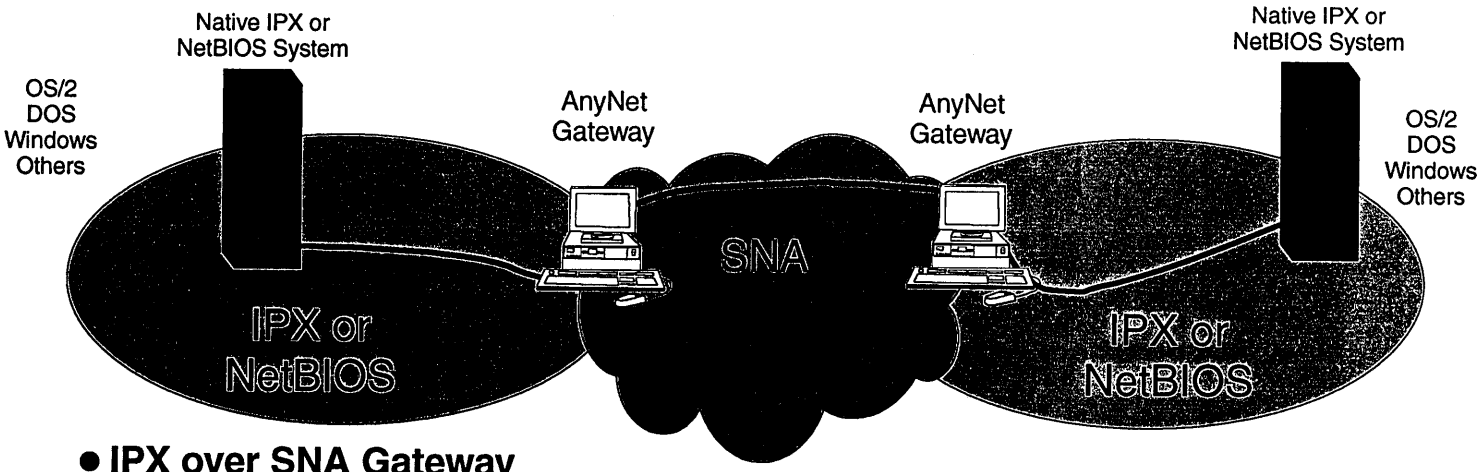
- **Product publications have step-by-step approach for isolating and solving initialization and connectivity problems:**
  - CM/2 startup
  - SNA Connectivity
  - Address Mapping Errors
  - Routes
  - IP Connectivity
  - SNA Interface
- **Refer to:**
  - GV40-0376-01: Guide to Sockets over SNA Version 2.0.2
    Chapter 6: Troubleshooting
  - GV40-0374-02: Guide to Sockets over SNA Gateway Version 1.1.6
    Chapter 6: Troubleshooting

One OS/2, Two Gateways



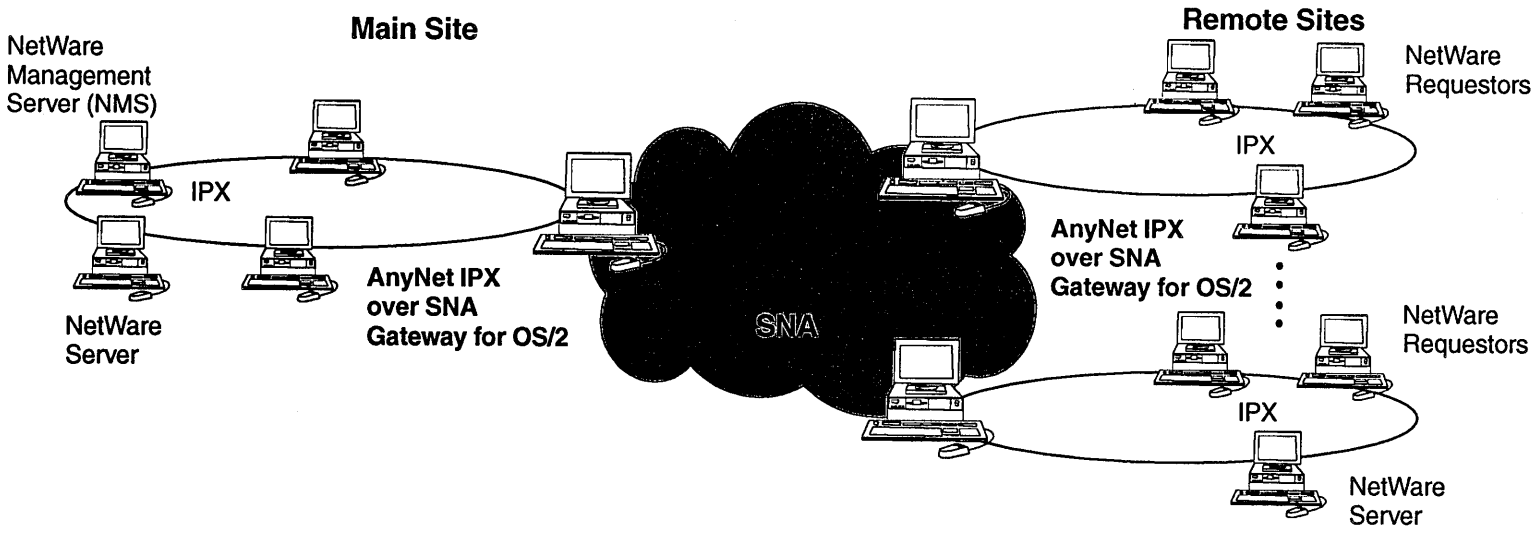
- Single OS/2 with two AnyNet gateways connect SNA and TCP/IP networks
- Matching Sockets, SNA, and APPC applications communicate over connected networks

IPX over SNA Gateway for OS/2
NetBIOS over SNA Gateway for OS/2



- **IPX over SNA Gateway**
  - Connects IPX LANs over SNA Network
  - 4 Gateway sizes: 20, 100, 250, 500 connections
- **NetBIOS over SNA Gateway (beta)**
  - Connects NetBIOS LANs over SNA Network
- **Gateways protect SNA backbone by filtering IPX and NetBIOS broadcasts and caching names**
- **Compatible with LAN to LAN over WAN (LTLW) and 2217 Multiprotocol Concentrator**

IPX over SNA Gateway: Connect IPX LANs over SNA



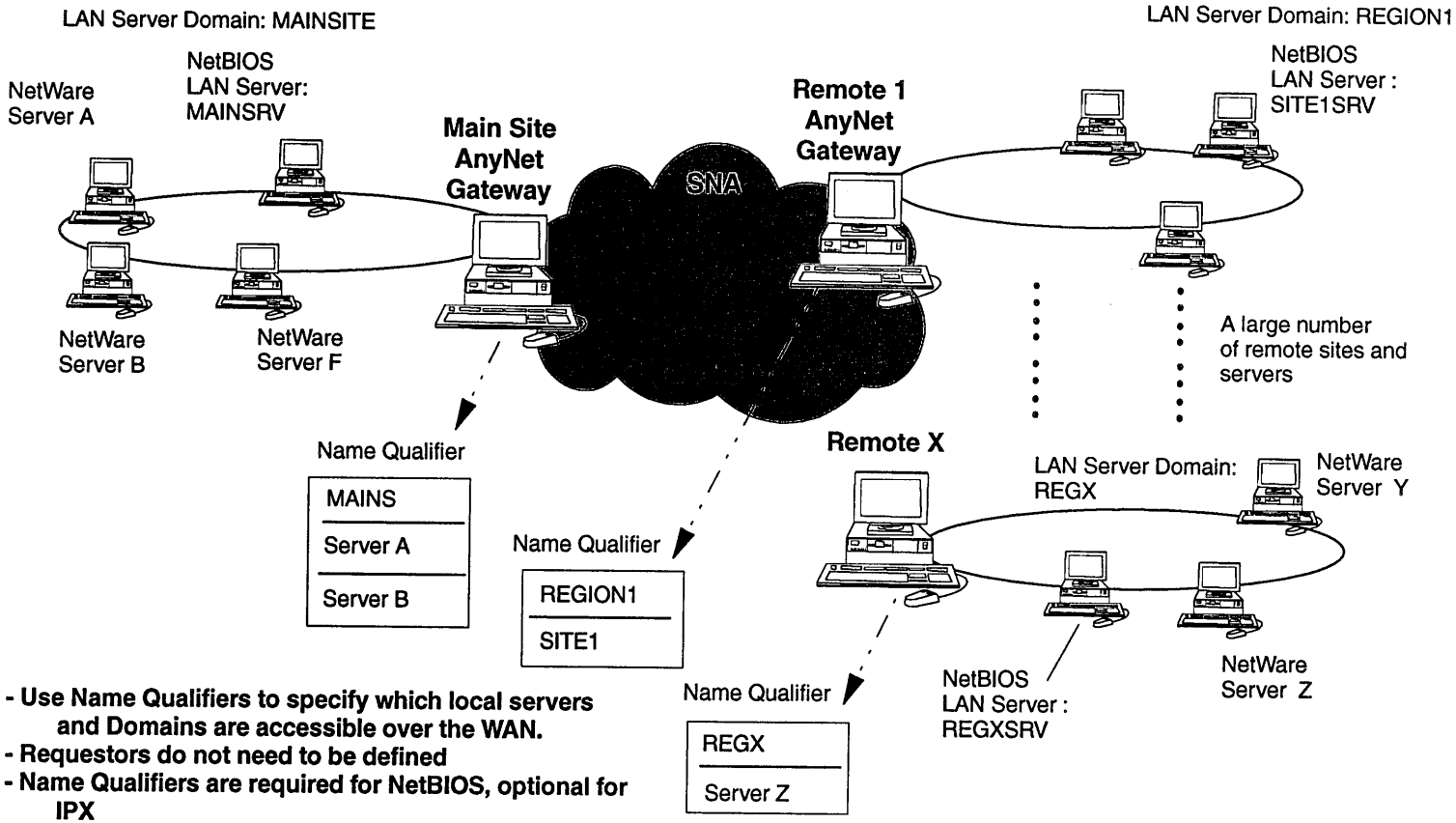
Environment: SNA backbone network, remote IPX LANs

Requirement: Access to IPX (File Server, Print Server and NMS) Applications

Solution: AnyNet IPX over SNA Gateway for OS/2

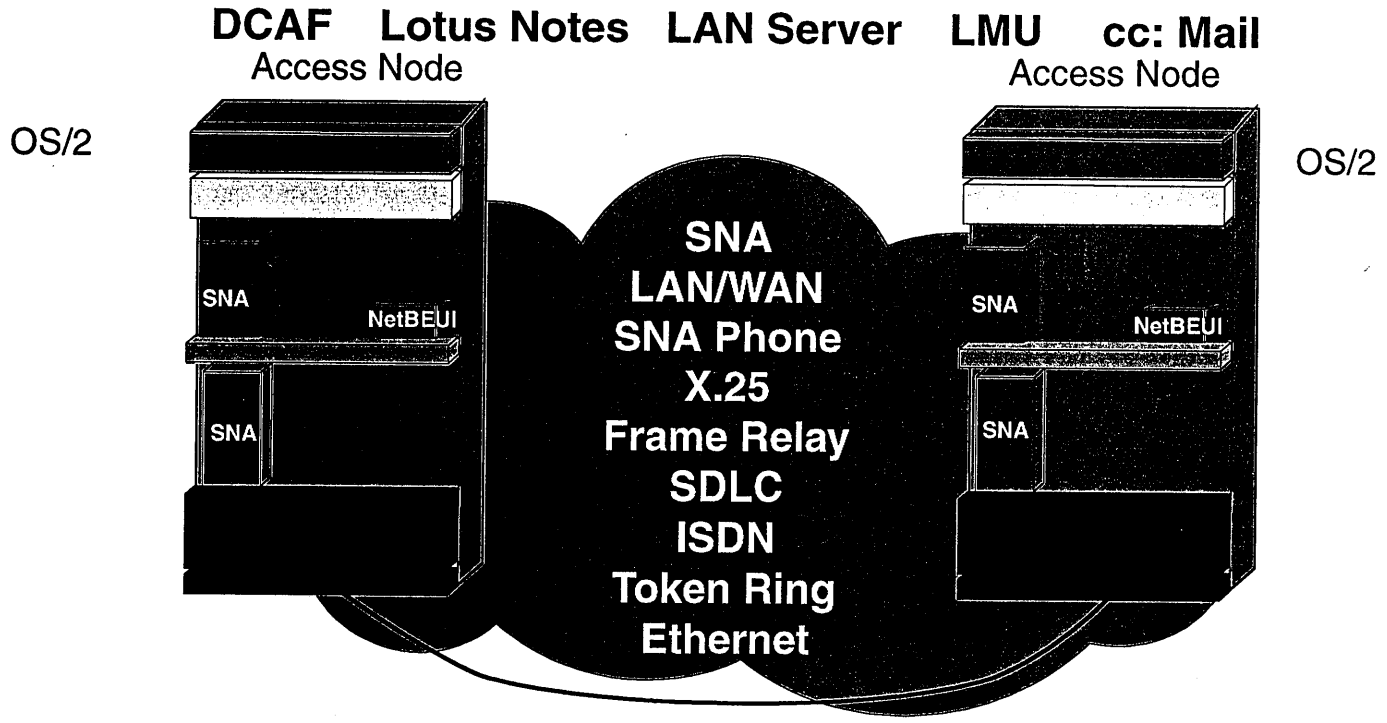
Benefits: Connects remote IPX networks
No hardware or application modifications

NetBIOS and IPX Filtering



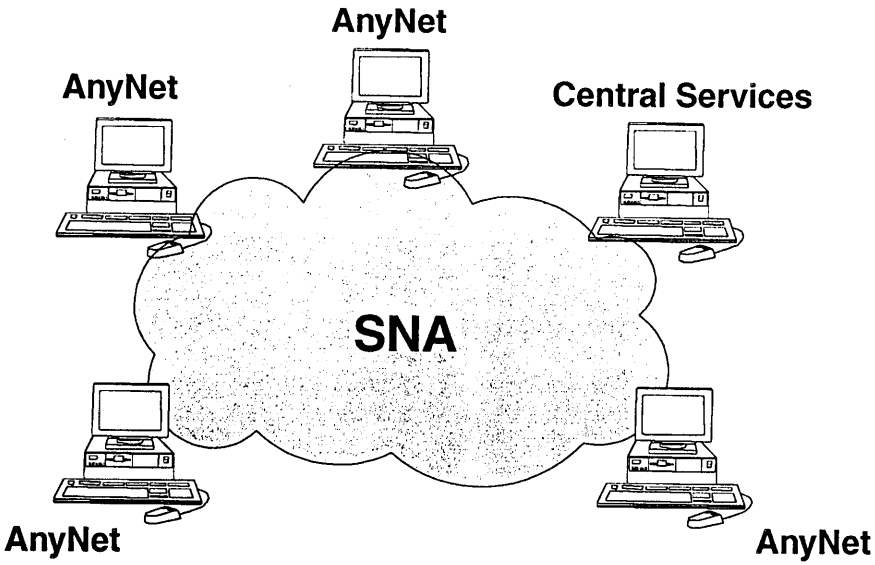
- **Use Name Qualifiers to specify which local servers and Domains are accessible over the WAN.**
- **Requestors do not need to be defined**
- **Name Qualifiers are required for NetBIOS, optional for IPX**
- **Direct searches sent to unique destination over SNA backbone**

NetBIOS over SNA



- SNA end-users can access both SNA and NetBIOS applications
- Eliminates NetBIOS broadcasts
- Increased connectivity options to NetBIOS applications anywhere in enterprise

NetBIOS over SNA - Installation

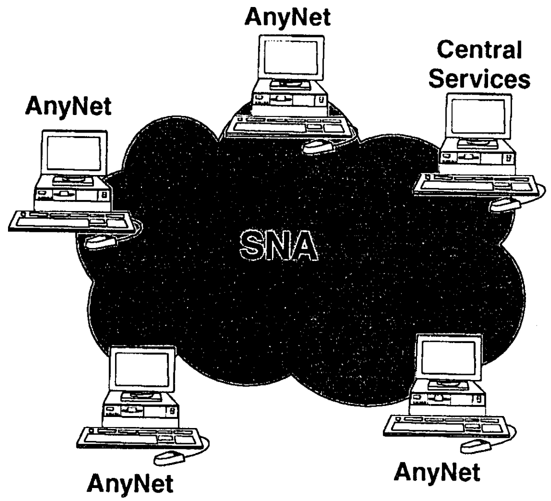


- Install AnyNet/2 NetBEUI over SNA on every workstation where NetBIOS applications will communicate over SNA
- Install Central Services on a single workstation (per set of access nodes that plan to communicate with each other)
- To configure product, LU name of Central Server workstation needed so AnyNet can register NetBIOS application names

NetBIOS over SNA: Address Resolution and Name Caching

AnyNet Workstation Software

SNA appls	NetBIOS appls AnyNet/2 NetBEUI over SNA
Communications Manager/2 OS/2	



AnyNet Central Services
Communications Manager/2
OS/2

- **Central Services resolves NetBIOS names with SNA LU names**
- **NetBIOS applications register with one Central Services workstation**
- **APPC Name Server component of Central Services:**
  - registers NetBIOS names and fully qualified SNA LU name
  - during connection setup, locates and returns SNA LU name correlating to NetBIOS name received
- **AnyNet caches the SNA LU name returned by Name Server**
- **Next time connection made to same partner, no Name Server locate needed**

NetBIOS over SNA - Common Network Configurations

- **Central SNA site to remote SNA LAN**
  - Network with remote LANs need to be accessed from central site using IBM LAN Server
- **Lotus Notes**
  - network with many Lotus Notes clients and servers need to communicate
- **Dial-in LAN Access**
  - Customers need to logon to office LANs remotely
- **Dial-in Lotus Notes clients**
  - Customers need to use Lotus Notes remotely
- Use of other corporate LAN applications such as Time and Place/2, Person to Person/2, etc.

NetBIOS over SNA Troubleshooting

1) Check NetBIOS over SNA window(s) and FFST/2 log for messages

2) Ensure NetBIOS over SNA is running locally (check for window)

3) Ensure Central Services machine is running

4) Ensure NetBIOS over SNA can reach Central Services (try Directory Viewer)

5) Ensure both machines are using the same Central Services (compare Central Services LU names and NETIDs in configuration tool)

6: Ensure simple NetBIOS applications work between the two machines (Ping and Pong)

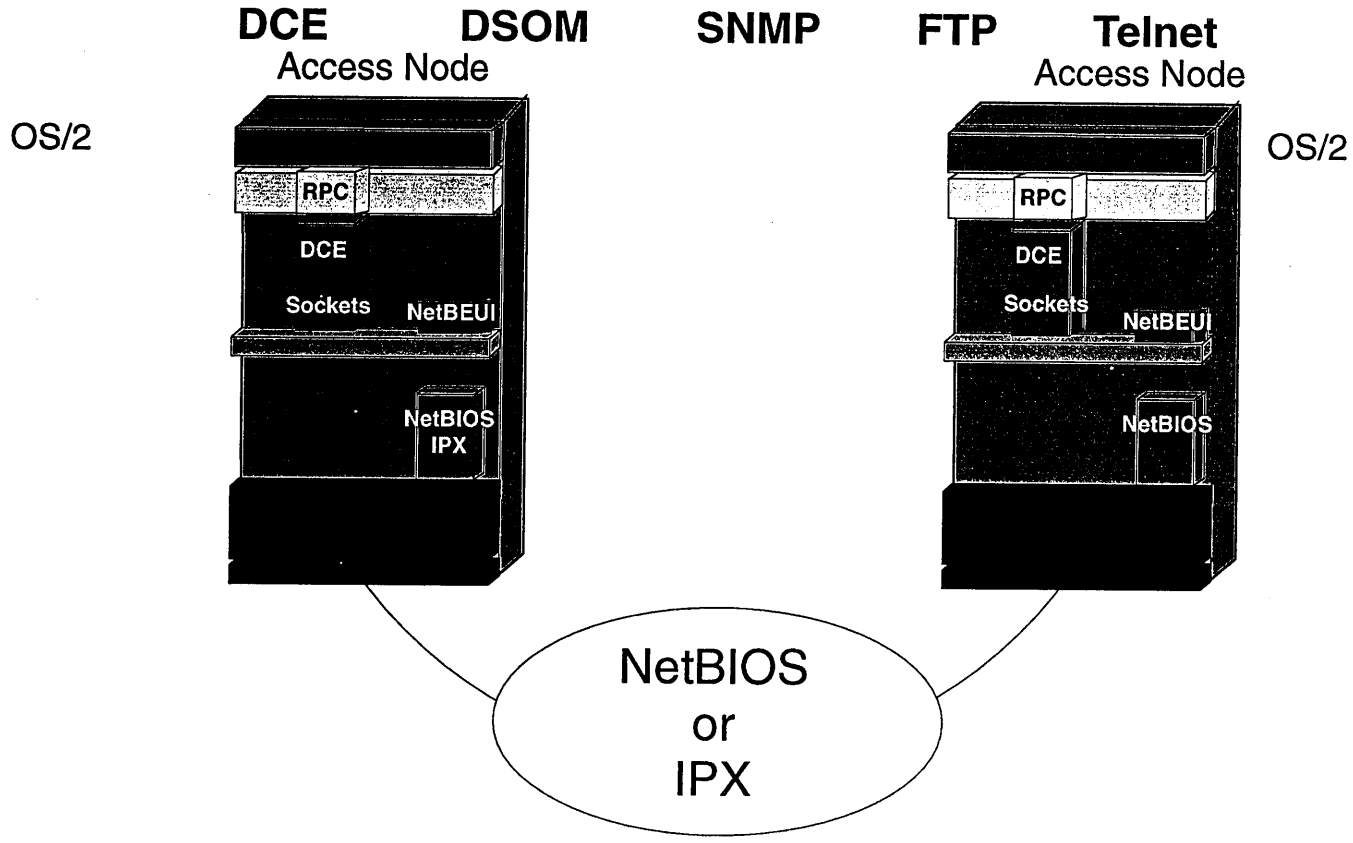
7) Ensure NetBIOS applications set up to use an adapter number of NetBIOS over SNA (adapter numbers may be different)

Refer to these publications for more help with troubleshooting:

- GV40-0377: NetBEUI over SNA User's Guide,
  Chapter 4: Testing the Configuration

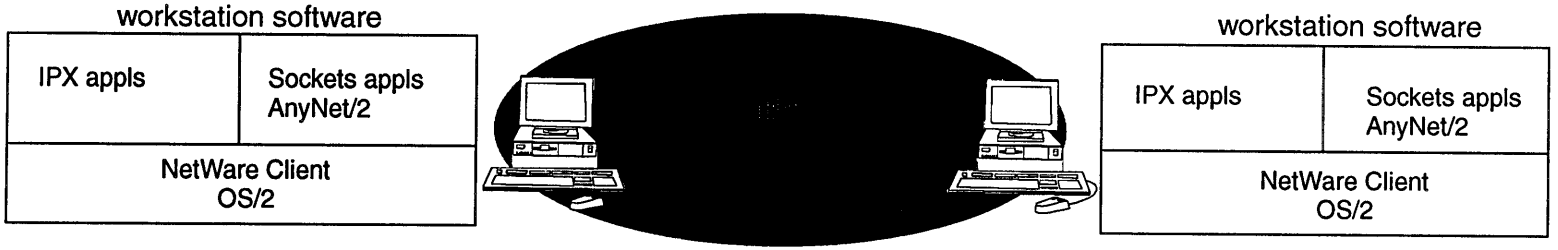
- GV40-0402: NetBEUI over SNA Administrator's Guide,
  Chapter 7: NetBEUI over SNA Problem Determination

Sockets over IPX
Sockets over NetBIOS



- **New function in AnyNet/2 Version 2.0.2: Sockets over NetBIOS and IPX LANs**

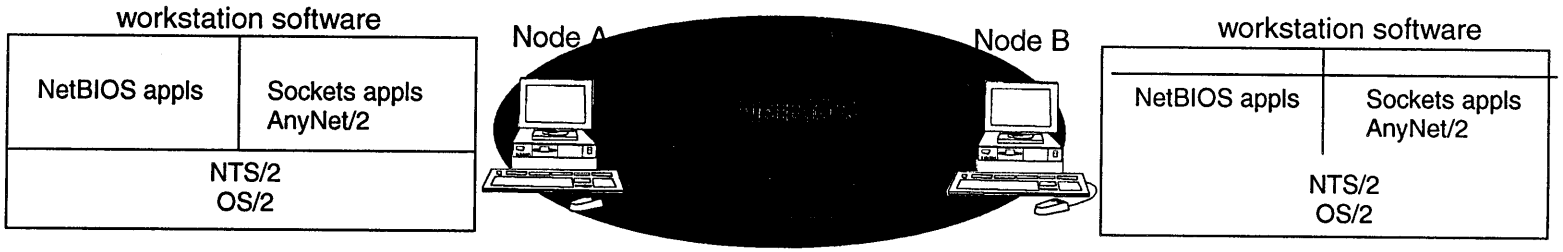
Sockets over IPX - Explicit Definition of IPX Addresses



IP address:	200.1.2.3	200.1.2.4
Network Number:	local	local
Node address:	1002C61F001C	100FF571A012

- **Explicit definition defines one-to-one Sockets-IPX mapping for a single IPX node address**
- **Effective for small number of access nodes**
- **Specify mapping parameters during configuration for each local and remote LU:**
  - IP address
  - Network number
  - Node Address
- **Explicit mappings generate sxmap line entries:**
  - sxmap add ipx 200.1.2.3 255.255.255.255 00000000 1002C61F001C
    sxmap add ipx 200.1.2.4 255.255.255.255 00000000 100FF571A012
- **Data destined for 200.1.2.3 is mapped to IPX address 00000000 .1002C61F001C**
- **Data destined for 200.1.2.4 is mapped to IPX address 00000000 .100FF57A012**

Sockets over NetBIOS - Configuration Example



adapter configuration parameters	adapter number:	0	0
	IP address:	200.1.2.3	200.1.2.4
	Subnet mask:	255.255.255.0	255.255.255.0
	Number of sessions:	default: 20	default: 20
	Number of commands:	default: 30	default: 30

- **Nodes configured to run over local IP network 200.1.2.0**
- **Ifconfig line entries are put into SXSTART.CMD in node A to route data destined for nodes on 200.1.2.0 network over NETBIOS interface nb0:**
  - start sx nb0 20 30
  - ifconfig nb0 200.1.2.3 netmask 255.255.255.0

  and in node B:
  - start sx nb0 20 30
  - if config nb0 200.1.2.3 netmask 255.255.255.0
- **AnyNet automatically maps IP addresses to NetBIOS names and generates NetBIOS name in format:**
  - MPTN.IN.hexidecimal_ip_address

Sockets over IPX and NetBIOS Troubleshooting

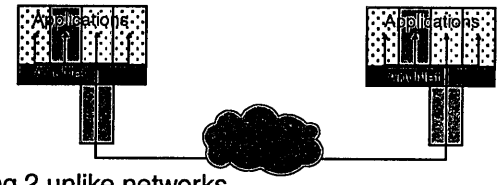
- **Product publications have step-by-step approach for isolating and solving initialization and connectivity problems:**
  - Address Mapping errors
  - Routes
  - IP Connectivity
  - NetBiOS Connectivity
  - IPX or NetBIOS interface
- **Refer to:**
  - SV40-0112-00: Guide to Sockets over IPX Version 2.0.2
    Chapter 6: Troubleshooting
  - SV40-0111-00: Guide to Sockets over NetBIOS Version 2.0.2
    Chapter 6: Troubleshooting

AnyNet and Routers

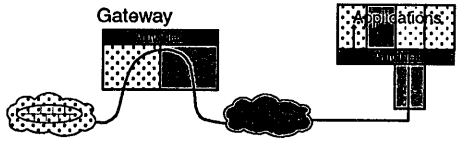
AnyNet

- **Software solution**
- **Reduces the number of protocols in the network**
- **Multiprotocol combinations over IPX, NetBIOS, SNA and TCP/IP**
- **Addresses broader range of configurations**

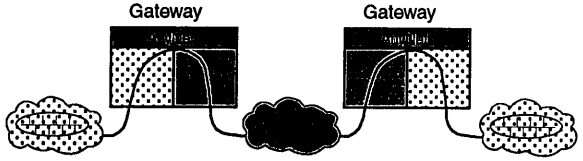
adding non native application to single network



joining 2 unlike networks



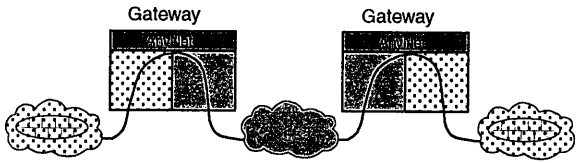
joining like networks via backbone



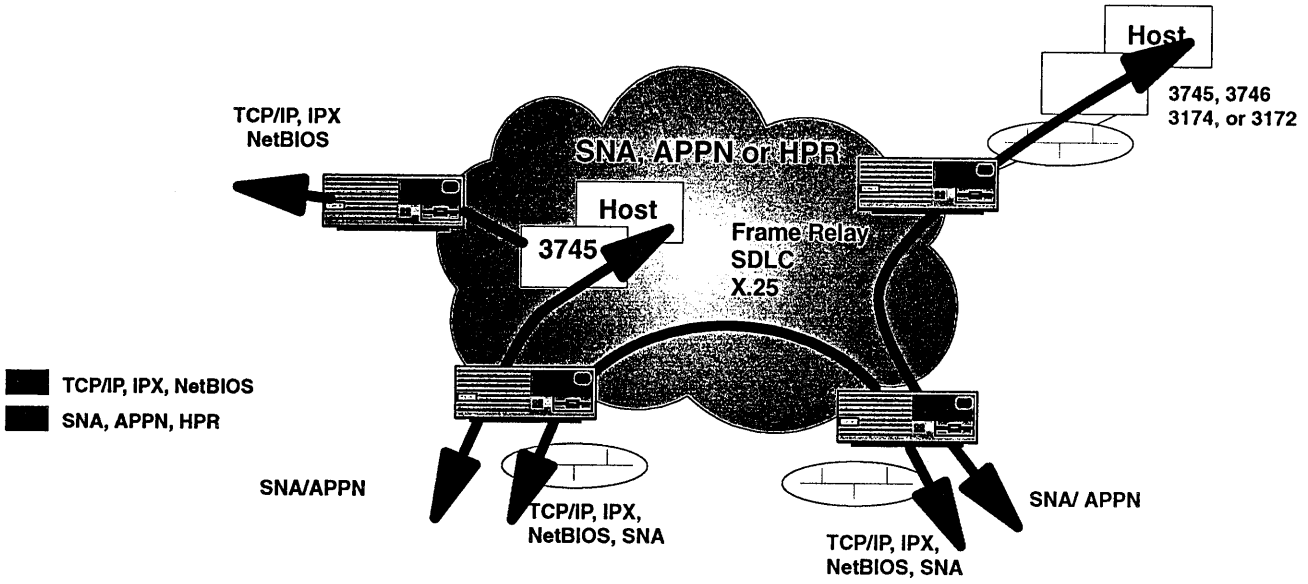
Routers

- **Hardware solution**
- **Consolidate physical resources**
- **Large set of encapsulated protocol combinations over TCP/IP**
- **Addresses smaller range of configurations**

joining like networks via backbone



2217 Nways Multiprotocol Concentrator (MpC)



- Routed protocols: IPX, NetBIOS, TCP/IP, SNA
- Routing protocols: SNA, APPN, HPR
- Remote Configuration
- Ethernet, Token Ring, SDLC, X.25, Frame Relay

AnyNet Customer References

APPC over TCP/IP

Caisse Nationale de Credit Agricole, France

- Industry: banking
- Products: AnyNet/MVS and AnyNet/6000
- Key applications: DB2 on MVS and DDCS/6000

Chevron

- Industry: petroleum
- Products: AnyNet/2
- Key applications: DB2/2

US Postal Service

- Industry: communications
- Products: AnyNet/2
- Key applications: XCOM from Legent, DCAF

Tennessee Valley Authority

- Industry: utilities
- Products: AnyNet/MVS and AnyNet/2
- Key applications: DB2, CICS

Boeing Computer Services

- Industry: aerospace
- Products: AnyNet/MVS and AnyNet/2
- Key applications: CICS, IMS

Pacific Bell

- Industry: telecommunications
- Products: AnyNet/MVS, AnyNet/2, AnyNet/6000
- Key applications: DB2, DB2/6000, X: Change

Sockets over SNA

Tesco Stores Limited, UK

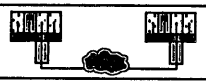
- Industry: retail
- Products: AnyNet/6000
- Key applications: FTP and Telnet

NetBIOS over SNA

Nykredit Mortgage Bank, Denmark

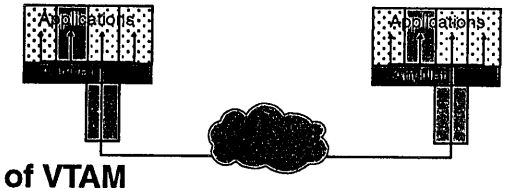
- Industry: banking
- Products: AnyNet/2
- Key applications LAN Server

AnyNet Platforms

Access Nodes	MVS	OS/2	AIX	OS/ 400	WIN	2217 MpC
						
Sockets over IPX		●		Soon	Soon	
SNA over IPX		Soon		Soon	Soon	
Sockets over NetBIOS		●				
NetBIOS over SNA		●				
Sockets over SNA	●	●	●	●	Soon	
SNA/APPC over TCP/IP	●	●	●	●	●	
Gateways						
						
IPX over SNA		●				●
NetBIOS over SNA		●				●
Sockets over SNA		●				●
SNA over TCP/IP	●	●				●

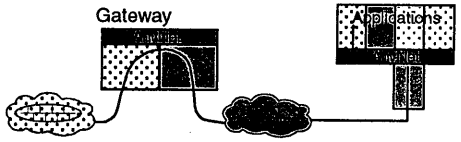
AnyNet Summary

Access Node

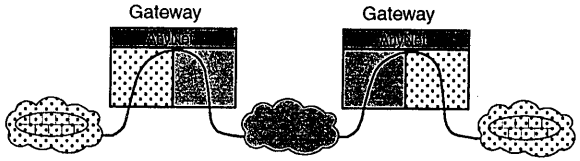


- **AnyNet Feature of VTAM**
  - SNA over TCP/IP
  - Sockets over SNA
- **AnyNet/2 NetBEUI over SNA**
- **AnyNet/6000 Features of AIX SNA Server/6000**
  - APPC over TCP/IP
  - Sockets over SNA

Single or Multiple Gateways



- **AnyNet/2 V2.0.2**
  - SNA over TCP/IP
  - Sockets over SNA
  - * **Sockets over IPX**
  - * **Sockets over NetBIOS**
- **AnyNet/400 in OS/400 V3R1.0**
  - * APPC over IPX (announced)
  - APPC over TCP/IP
  - * Sockets over IPX (announced)
  - Sockets over SNA
- **AnyNet for Windows**
  - APPC over TCP/IP
  - * Sockets over SNA (Beta)



- **AnyNet Sockets over SNA Gateway for OS/2 V1.1.6**
- **AnyNet/MVS SNA over TCP/IP Gateway (in VTAM AnyNet Feature)**
- **AnyNet SNA over TCP/IP Gateway for OS/2 V1**
- **AnyNet IPX over SNA Gateway for OS/2 V1**
- * **AnyNet NetBIOS over SNA Gateway for OS/2 (Beta)**
- **2217 Nways Multiprotocol Concentrator**

AnyNet Application Support - Examples

SNA over TCP/IP

- **AnyNet feature of VTAM**
  - All MVS APPC and CPI-C applications, e.g.:
    - CICS/ESA
    - DB2
    - ImagePlus MVS/ESA
    - IMS/ESA
    - NetView Distribution Manager (NetView DM)
  - 3270 printer and emulator programs
- **AnyNet for OS/2**
  - All APPC and CPI-C applications, e.g.:
    - CICS OS/2
    - Distributed Console Access Facility/2 (DCAF)
    - Distributed Database Connection Services/2 (DDCS)
    - ImagePlus Workstation Program/2
    - NetView DM/2
  - 3270 printer and emulator programs

APPC over TCP/IP

- **AnyNet/400 (in AS/400 V3R1.0)**
  - All APPC and CPI-C applications, e.g.:
    - CICS/400
    - Client Access/400
    - DB2/400
    - 5250 Display Station Passthru
- **AnyNet/6000 (feature of AIX SNA Server/6000)**
  - All APPC and CPI-C applications, e.g.:
    - CICS/6000
    - Datahub 1.2
    - DB2/6000
    - DDCS/6000
    - SNA Server/6000 APPC Application Suite

AnyNet Application Support - Examples

Sockets over SNA

- **AnyNet/MVS feature of VTAM**
  - Distributed Computing Environment (DCE) applications
  - Network File System (NFS)
  - PING
  - SAP R/3
  - Team Connection
  - X-Windows
- **AnyNet Sockets over SNA, IPX, NetBIOS for OS/2**
  - Andrew File System (AFS)
  - Distributed Computing Environment (DCE)
  - Distributed System Object Model (DSOM)
  - File Transfer Program (FTP)
  - LAN Network Manager (LNM)
  - NetDoor
  - Network File System (NFS)
  - NetView for OS/2
  - PING
  - Simple Network Management Protocol (SNMP) agents
  - TELNET
  - TN3270
  - X-Windows
- **AnyNet/6000**
  - FTP
  - NetView/6000
  - Telnet
  - RLOGIN
  - AIX DCE/6000
- **AnyNet/400 (in AS/400 V3R1.0)**
  - FTP
  - Simple Mail Transfer Protocol (SMTP)
  - SNMP agents

IPX over SNA

- **AnyNet IPX over SNA Gateway for OS/2**
  - NetWare Server/Requester
  - NetWare Management Services
  - Lotus Notes

NetBIOS over SNA

- **AnyNet/2 NetBEUI over SNA**
  - IBM LAN Server
  - IBM LAN Requester
  - IBM Time and Place/2
  - IBM Person to Person
  - Lotus Notes (TM)
  - cc: Mail

Technical Information Appendix

- Application enablement
- Publications
- Ordering Information
- Technical Assistance

MPTN and AnyNet Publications

• Architecture	
– GC31-7057	Networking Blueprint: Executive Overview
– GC31-7073	MPTN Architecture: Technical Overview
– GG24-4170	MPTN Architecture Tutorial and Product Implementations
• AnyNet	
– G325-3405-01	AnyNet Product Family (brochure)
– GG24-4395	SNA over TCP/IP Installation and Interoperability (redbook)
– GG24-4396	Sockets over SNA, NetBIOS over SNA Installation and Interoperability (redbook)
– SV40-0533	AnyNet storyboard diskette
• VTAM V4R2 AnyNet Feature	
– G325-3407	AnyNet Feature for VTAM V4R2 (brochure)
– SC31-6528	Guide to Sockets over SNA Gateway
– SC31-6526	Guide to Sockets over SNA
– SC31-6527	Guide to SNA over TCP/IP
– SC31-7123	Planning for Integrated Networks
• AnyNet/2	
– G325-3558	AnyNet/2 (brochure)
– G325-3557	AnyNet/2 Sockets over SNA Gateway (brochure)
– G325-3455	AnyNet SNA over TCP/IP Gateway and IPX over SNA Gateway (brochure)
– GV40-0374-02	Sockets over SNA Gateway V1.1.6
– GV40-0375-01	SNA over TCP/IP V2.0.2
– GV40-0216	Guide to SNA over TCP/IP Gateway for OS/2
– SV40-0112	Sockets over IPX V2.0.2
– SV40-0111	Sockets over NetBIOS V2.0.2
– GV40-0376-01	Sockets over SNA V2.0.2
– G325-3428	NetBEUI over SNA (brochure)
– GV40-0377	NetBEUI over SNA V1 User's Guide
– GV40-0402	NetBEUI over SNA V1 Administrator's Guide
– GV40-0405	Guide to IPX over SNA Gateway for OS/2
• AnyNet/6000	
– G325-3406	AIX SNA Server/6000 AnyNet Feature: Guide to APPC over TCP/IP
– SV40-0212	AnyNet/6000 Features of AIX SNA Server/6000 (brochure)
– SC31-8065	AIX SNA Server/6000 AnyNet Feature: Guide to Sockets over SNA
• AnyNet/400	
– SC41-3420-00	TCP/IP Configuration and Reference
– SC41-3401-00	Communications Configuration
– SC41-3443-00	Advanced Program-to-Program Communications Programming
– SC41-3422-00	Sockets Programming
– GG24-2531	AS/400 AnyNet Scenarios (redbook)
• AnyNet for Windows	
– G325-3454	AnyNet APPC over TCP/IP for Windows (brochure)
– SV40-0215	Guide to APPC over TCP/IP for Windows

AnyNet Ordering Information

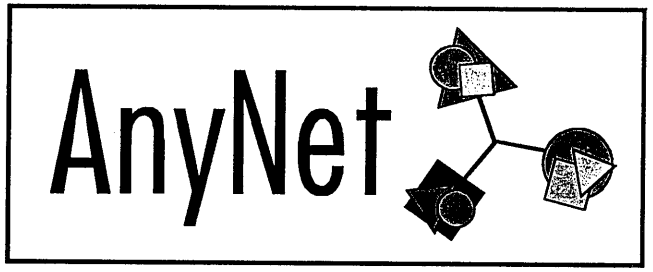
Product	Part Number
AnyNet/2 – SNA over TCP/IP – Sockets over IPX – Sockets over SNA – Sockets over NetBIOS	87G7776
AnyNet Sockets over SNA Gateway for OS/2 – 20 sessions – 100 sessions – 250 sessions	 95G0977 03H4247 03H4244
AnyNet NetBEUI over SNA	87G7794
AnyNet SNA over TCP/IP Gateway for OS/2 – 20 sessions – 100 sessions – 250 sessions – 500 sessions	 22H6830 22H6831 22H6832 22H6833
AnyNet IPX over SNA Gateway for OS/2 – 20 sessions – 100 sessions – 250 sessions – 500 sessions	 22H6736 22H6754 22H6756 22H6758
VTAM V3R4.2 AnyNet Feature – APPC over TCP/IP – Sockets over SNA	5685-085
VTAM V4R2 AnyNet Feature – SNA over TCP/IP – Sockets over SNA	5695-117
AIX SNA Server/6000 AnyNet Feature – APPC over TCP/IP – Sockets over SNA	5765-247 Feature 5052 Feature 5053
AnyNet/400 in OS/400 V3R1.0 – APPC over TCP/IP – Sockets over SNA	5763-SS1
AnyNet APPC over TCP/IP for Windows	20H1709
LTLW **Entry LTLW**	74F7668 62G8512

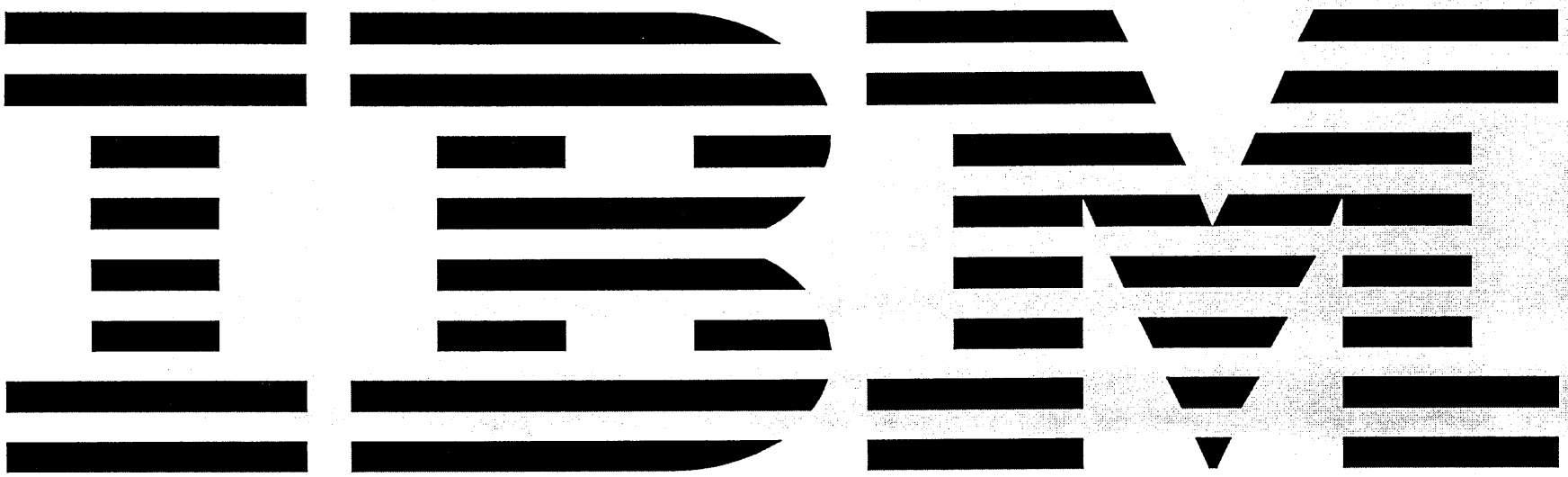
To order call 1-800-IBM-CALL or contact your IBM representative

Need AnyNet Technical Assistance?

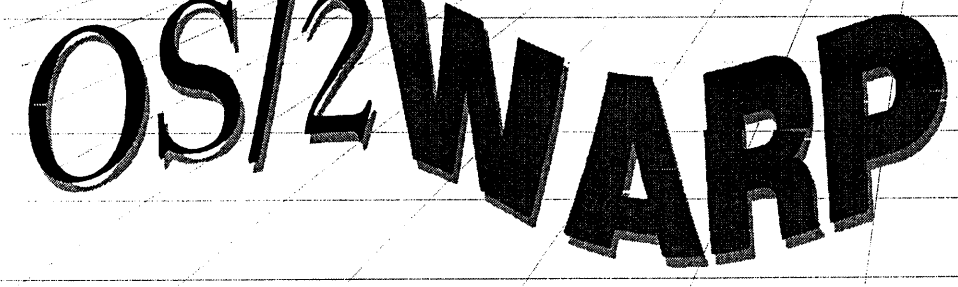
Location	Title
CompuServe	GO(MPTN)
Internet	ANYNET@VNET.IBM.COM
IBMPC and IBMMVS	ANYNET FORUM
IBMPC	ANYNET ANSWERS
OS2BBs and TalkLink	ANYNET CFORUM
or fax questions to	919-254-4029

You can pick your friends and you can pick your network, but you can't pick your friend's network.



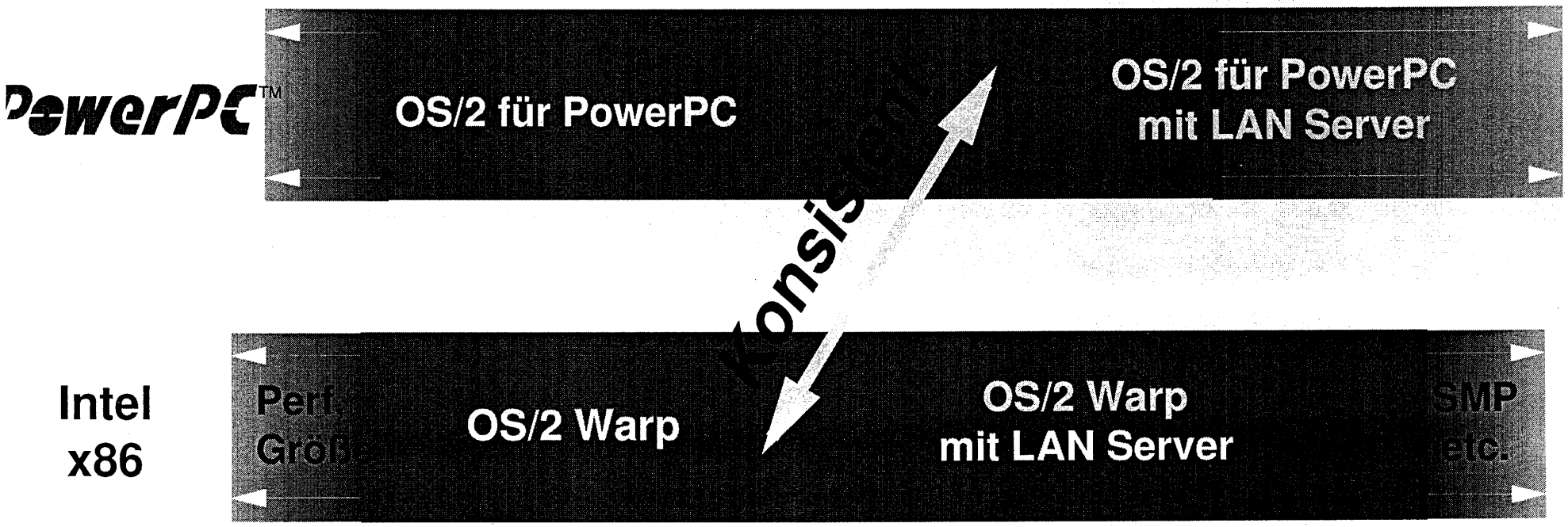


There's a Difference...



Andreas Türk
Software Marketing OS

OS/2 WARP Positionierung



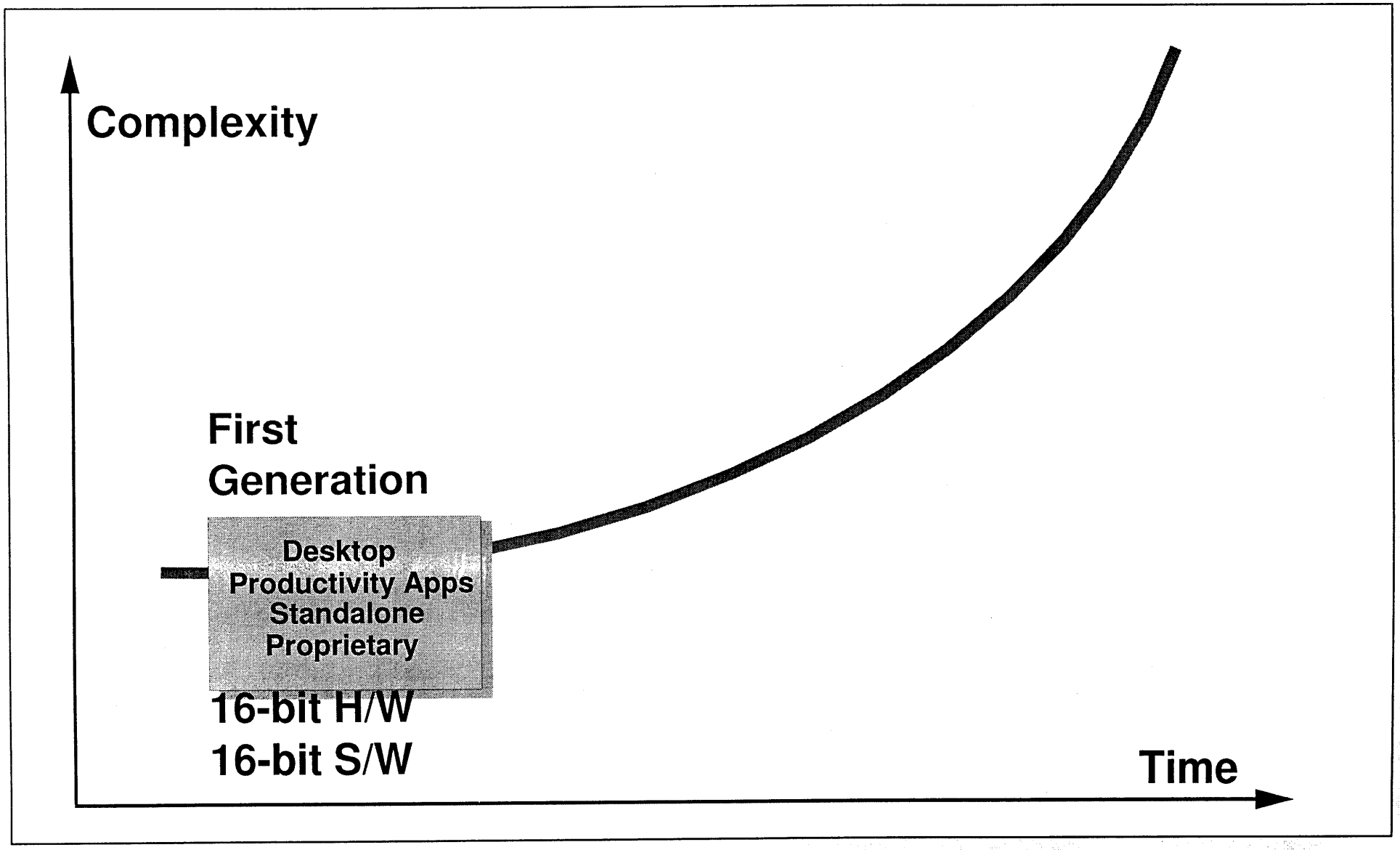
Mobile

LAN Client

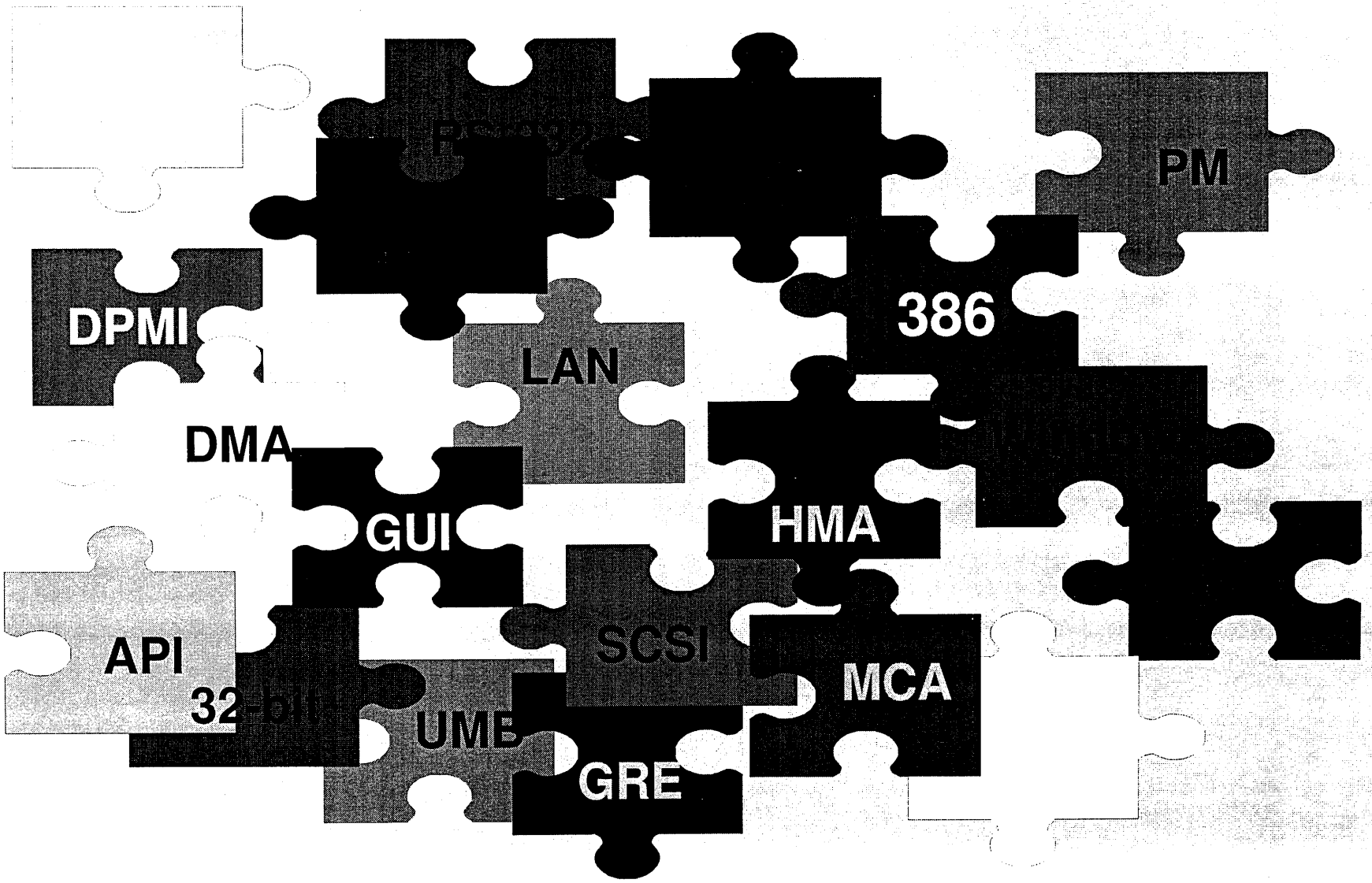
Enterprise Client

Enterprise Server

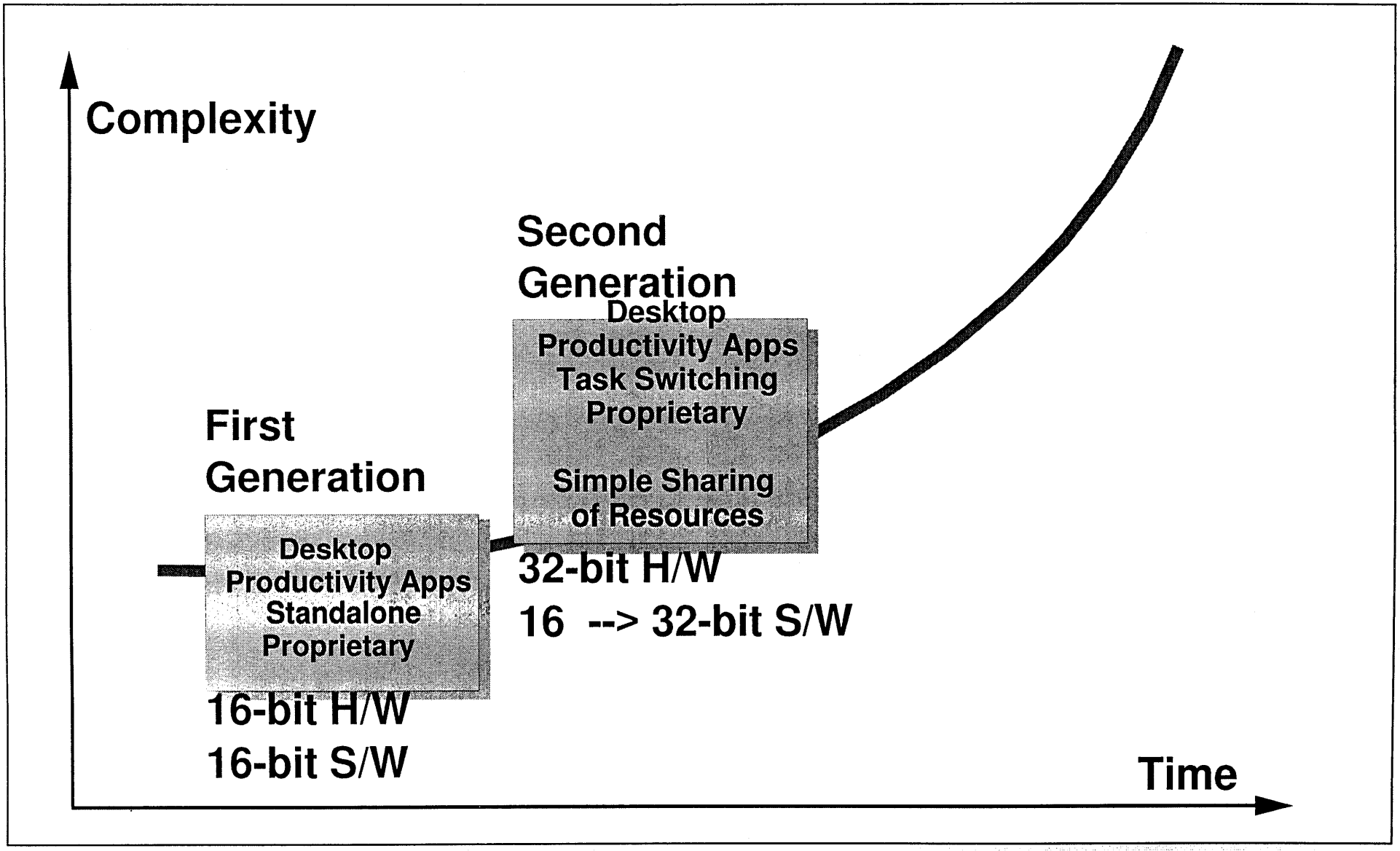
OS/2 WARP Software-Entwicklung



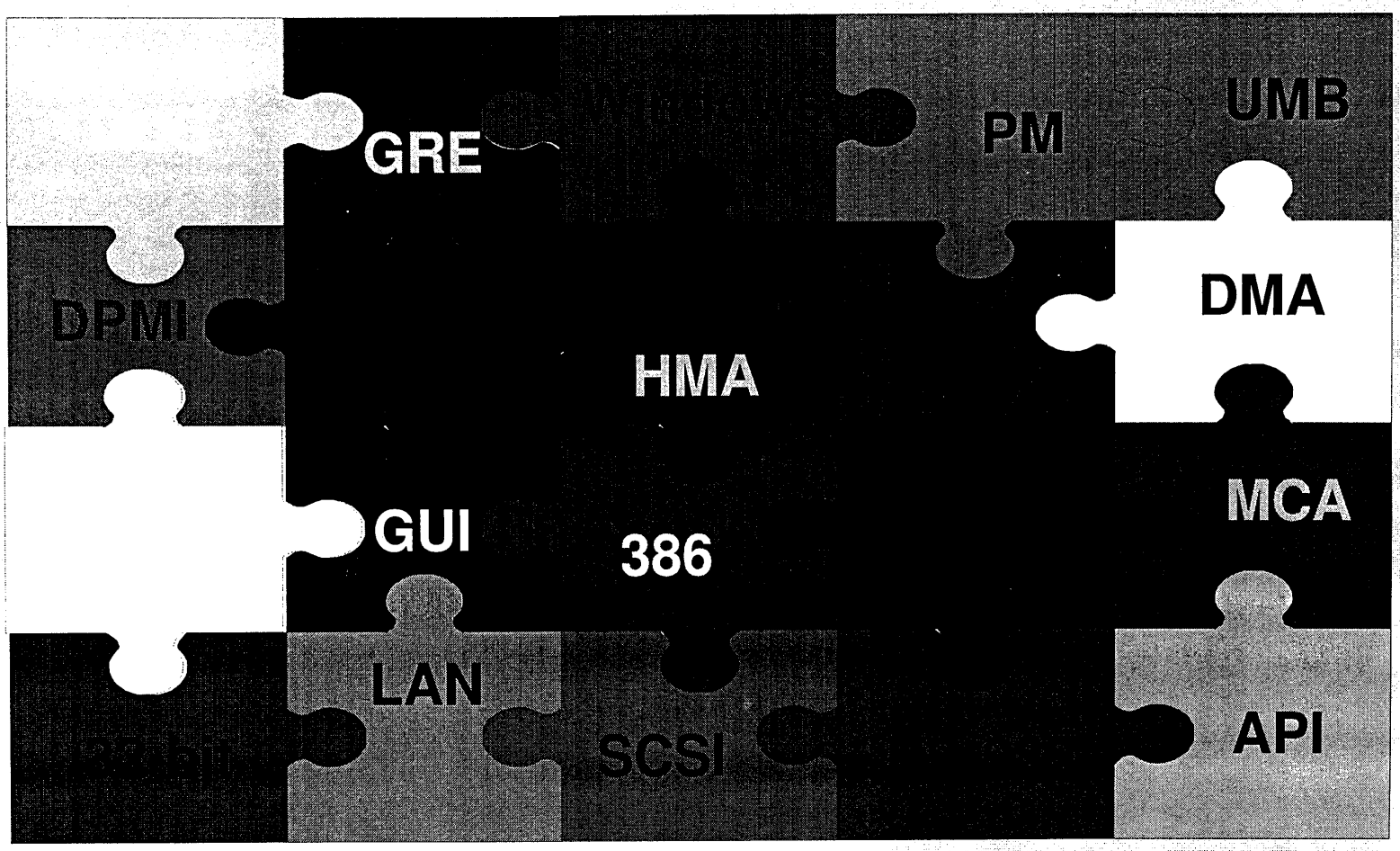
OS/2 WARP PC-Technologie Nutzen ?



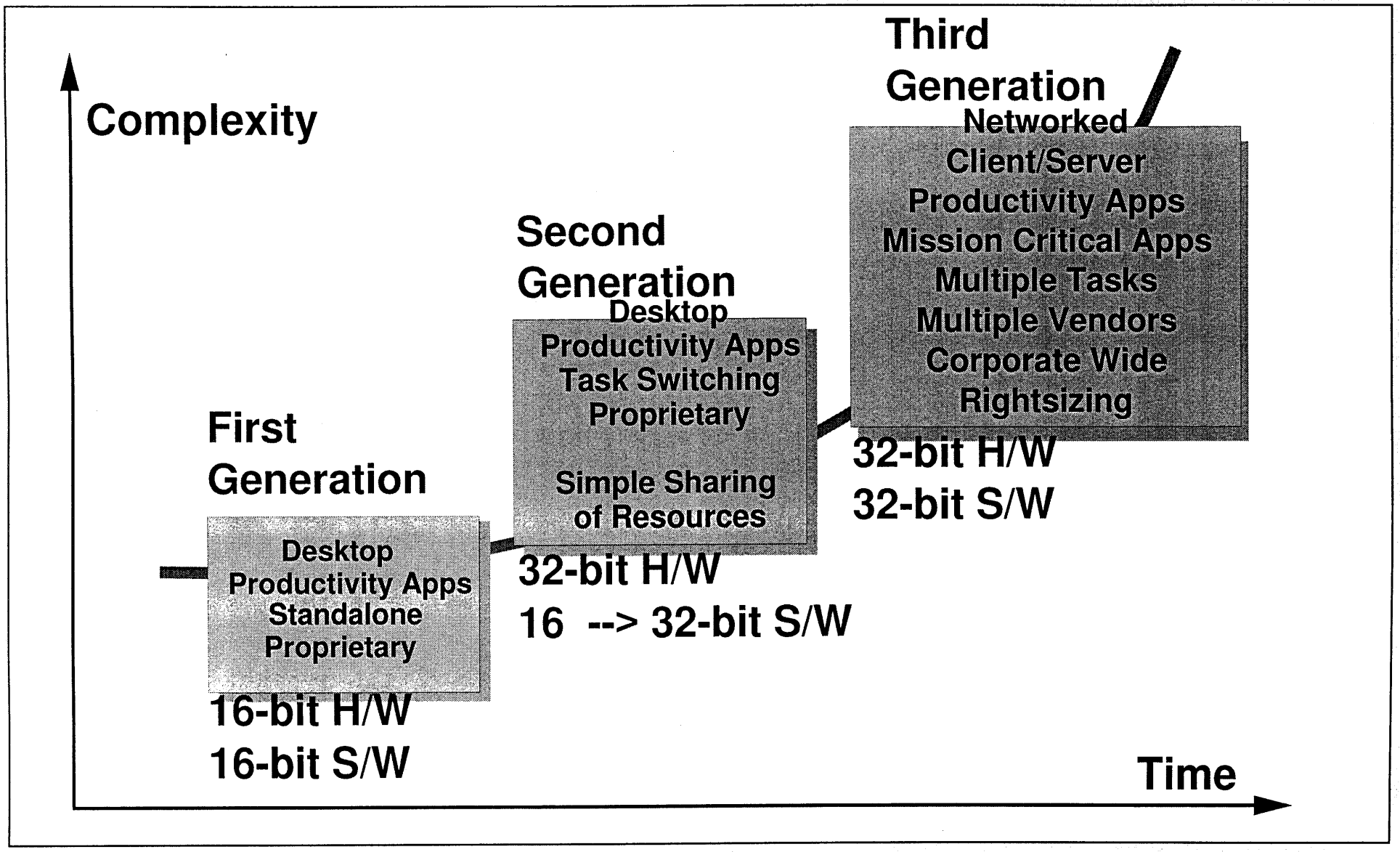
OS/2 WARP Software-Entwicklung



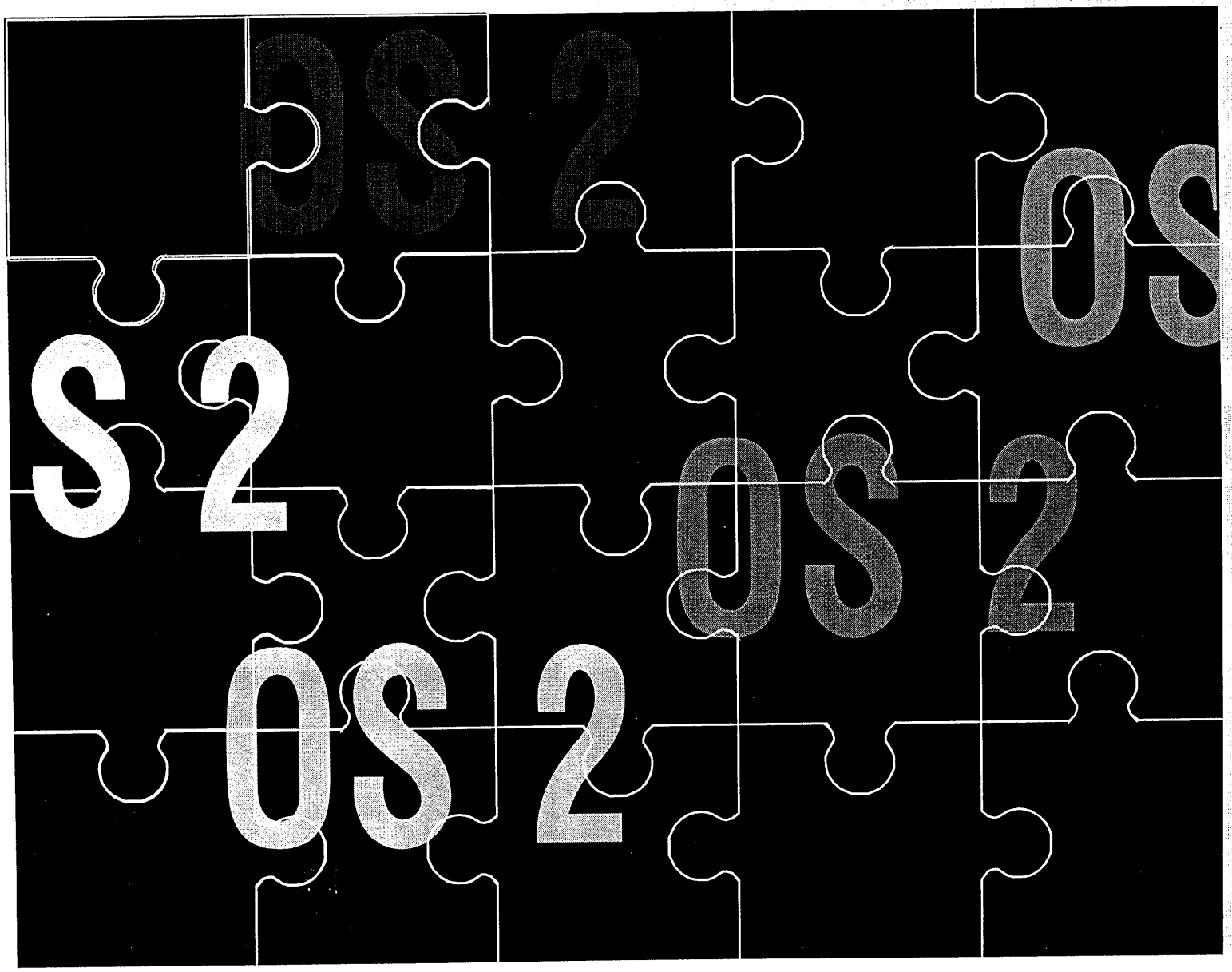
OS/2 WARP Die Geister, die ich rief ...



OS/2 WARP Software-Entwicklung



OS/2 WARP Die Integrationsplattform

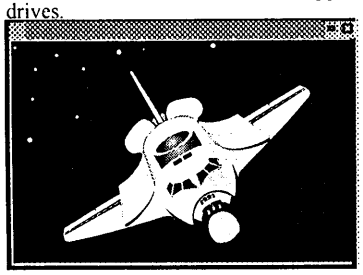


OS/2 WARP HUMAN-CENTERED Interfaces

Dokumentenorientierter Zugriff auf Informationen

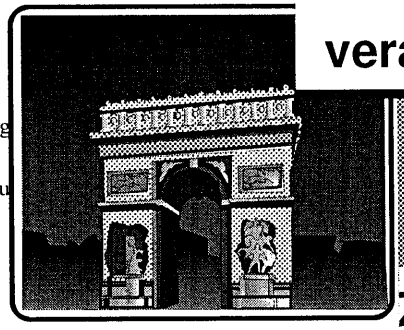
IBM's award winning OS/2 gives you mainframe capability on a micro. Run your favorite software programs simultaneously as though you had dozens of computers side-by-side. OS/2 isolates each product in a virtual mode, protecting one program from another. Each program performs independently, without interruption, even when you switch from one to another. The OS/2 Workplace Shell provides a task oriented environment, with a drag and drop protocol for object manipulation that will make you more productive in this powerful environment.

That's not all! With every shipment of OS/2 2.1 you will receive Multimedia Presentation Manager/2 Version 1.1. MMPM/2 supports Proaudio Spectrum 16, Soundblaster and IBM M-Audio. Other OS/2 enhancements include CD-ROM support for the most popular SCSI drives.



Ωορκ ωιτη χολλεαγυεσ αχροσσ τηε ηαλλ ορ αχροσσ τηε χουντρψ – ωιτηουτ εωερ λεαωινγ ψουρ οφφιχε! Τηισ εξχιτινγ, νεω προδυχτ, Περσον το Περσον/2, γιωε ψου τηε αβιλιτψ το χονφερ ωιτη οτηερσ ον δοχυμεντσ, σπρεαδσηεετσ, ιμαγεσ ανδ γραπηιχσ ασ ωελλ ασ μακε αννοτατιονσ ανδ σενδ μεσσαγεσ – σιμυλτανεουσλψ ον εαχη περσον σχρεεν. Ρεαλ τιμε σηαρινγ ανδ μοδιφιχατιον οφ δατα χαν βε δονε ριγητ ατ ψουρ δεσκτοπ γιωινγ ψου τηε χομπετιτιωε εδγε βψ ιμπροωινγ τηε μακινγ.

Bild-verarbeitung



Zusammenarbeit

Sprachen-erkennung

Bearbeitung

Handschrift-erkennung

Multimedia

vollkommend International

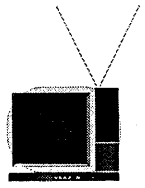
- ✓ anschauliche Benutzeroberfläche
- ✓ Arbeitsorientiert
- ✓ Pen-, Multimedia-, Sprachunterstütz.
- ✓ Intelligente 'Agents'
- ✓ Objekt-Orientierte Oberflche

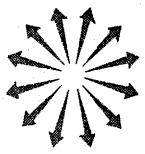
HJG

OS/2 WARP Market Segmentation

	Consumer	Small	Medium / Large		
			Autonomous Departments	Bottoms Up	Tops Down
1994 ($4.0B)	22%	13%	34%	22%	9%
1998 ($6.2B)	36%	14%	20%	23%	7%
CGR	25%	15%	0%	9%	8%

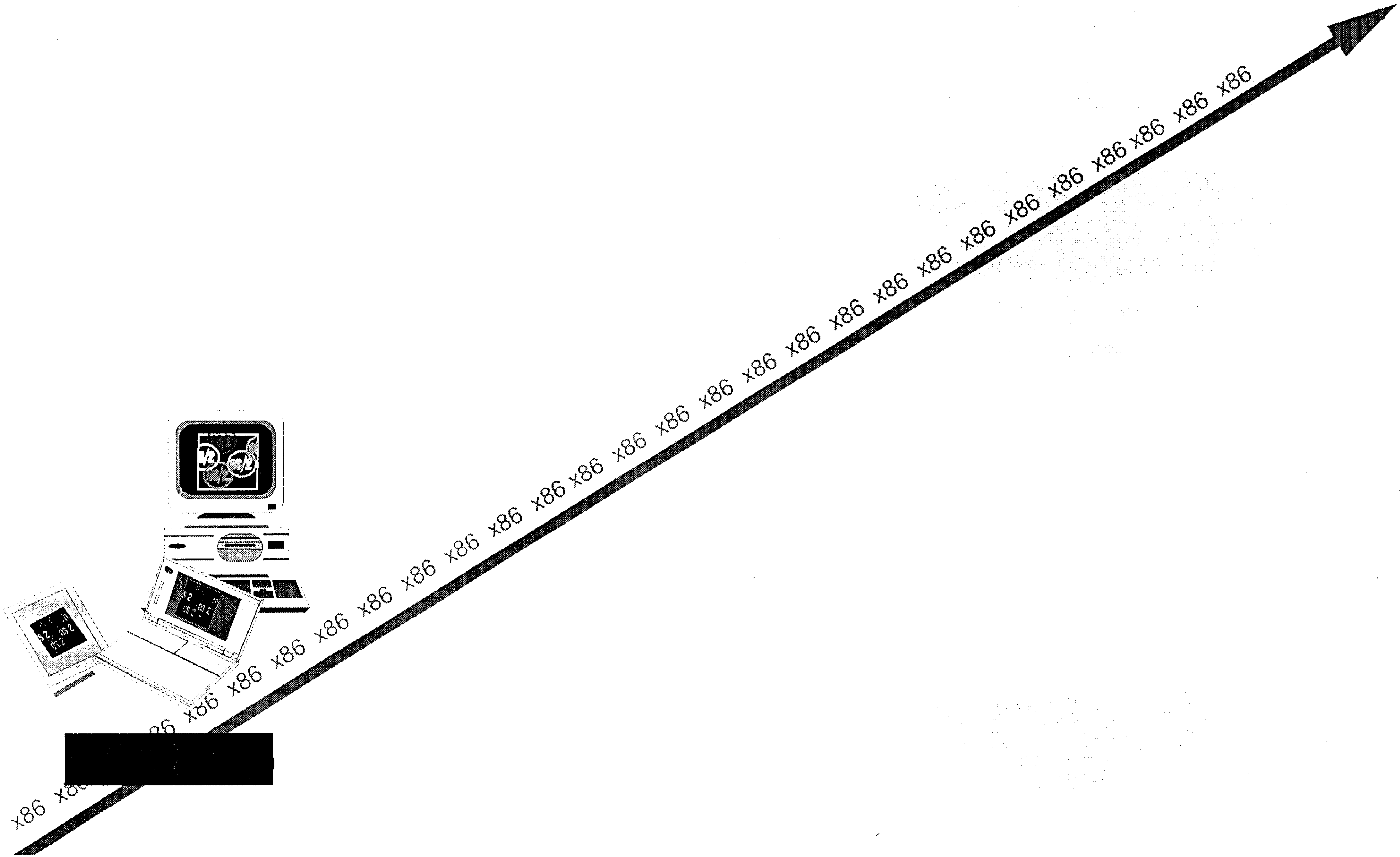
12% Overall





Source: IDC
Total Operating System Marketplace Worldwide

OS/2 WARP The OS/2 Family



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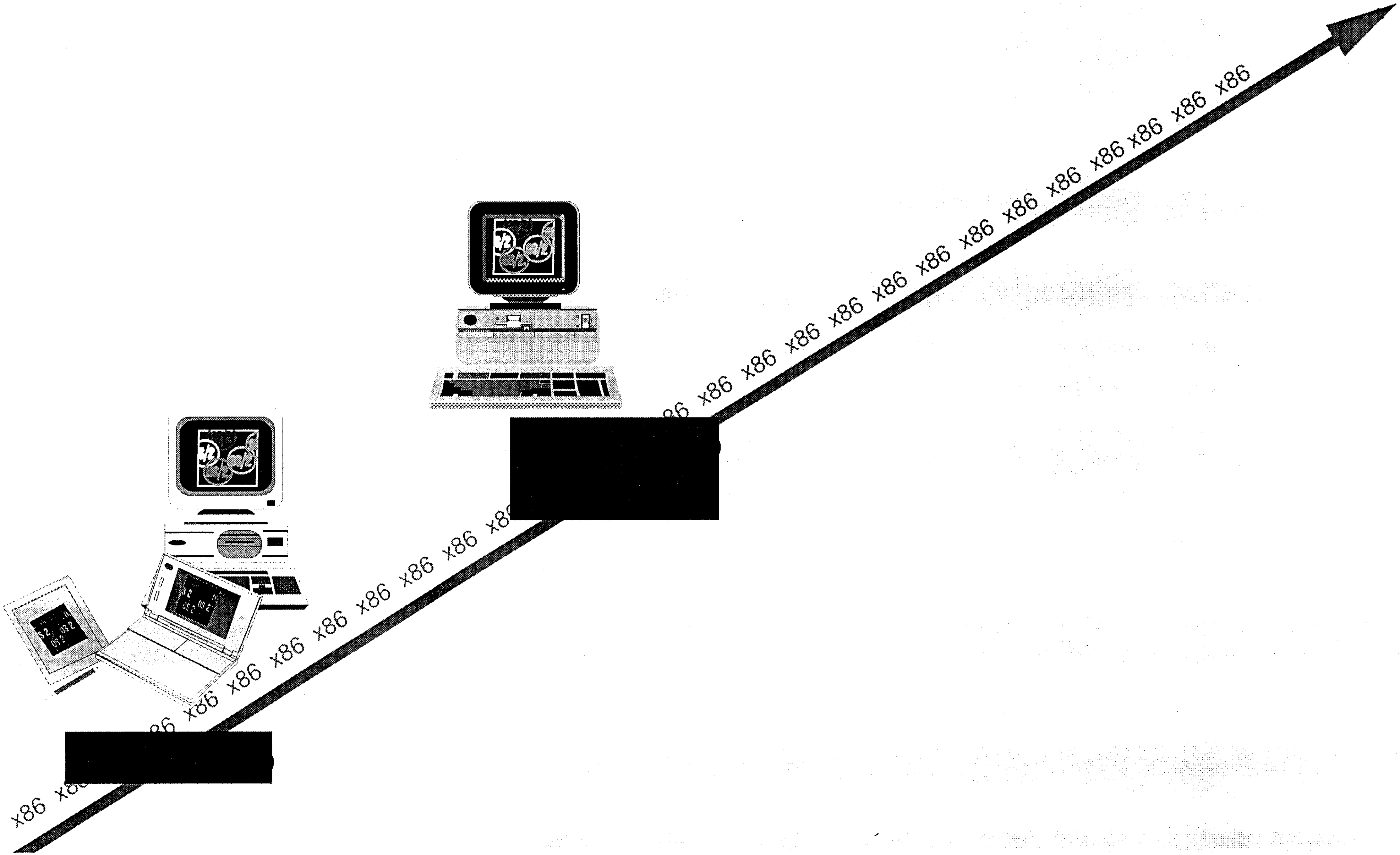
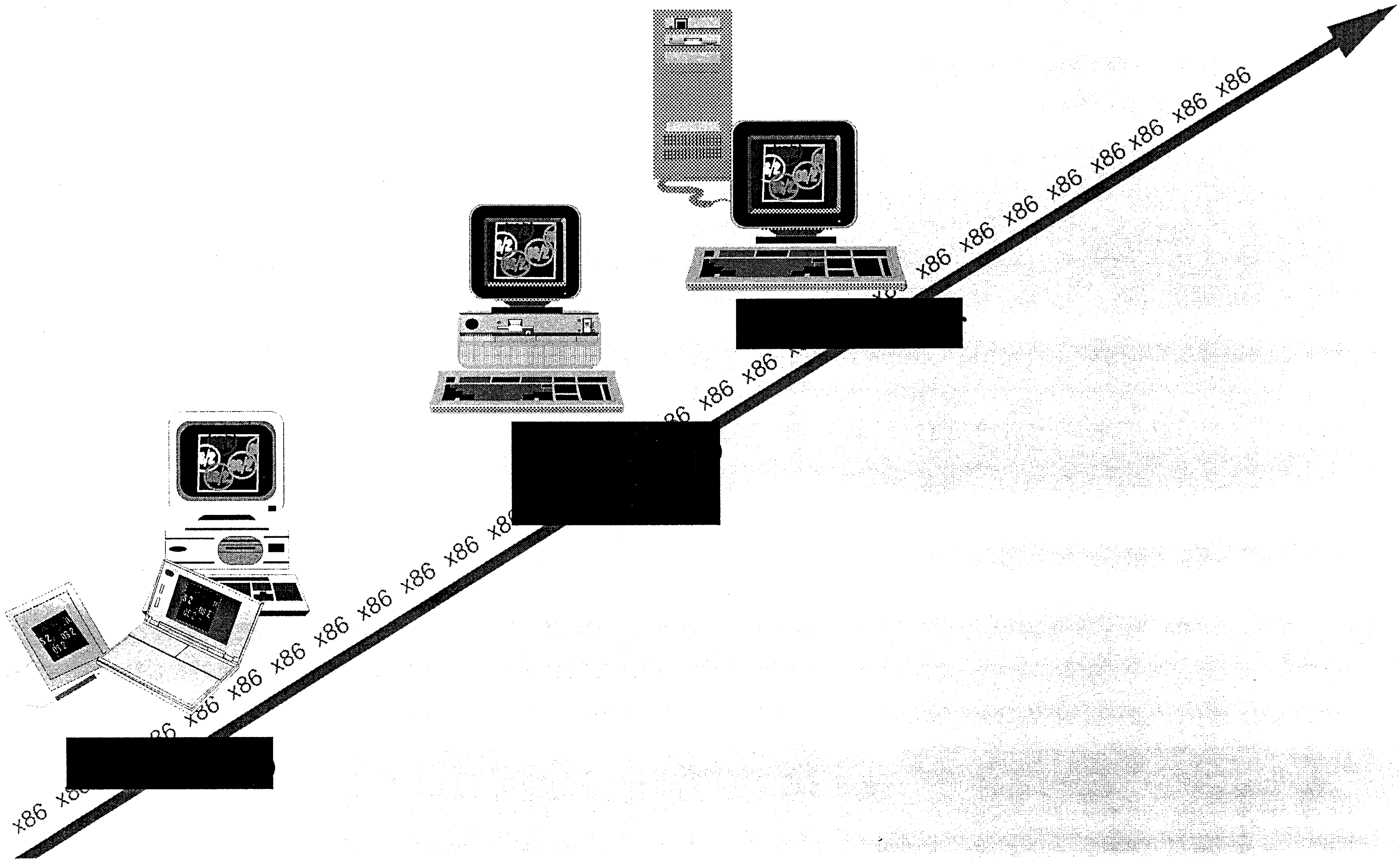
OS/2 WARP The OS/2 Family

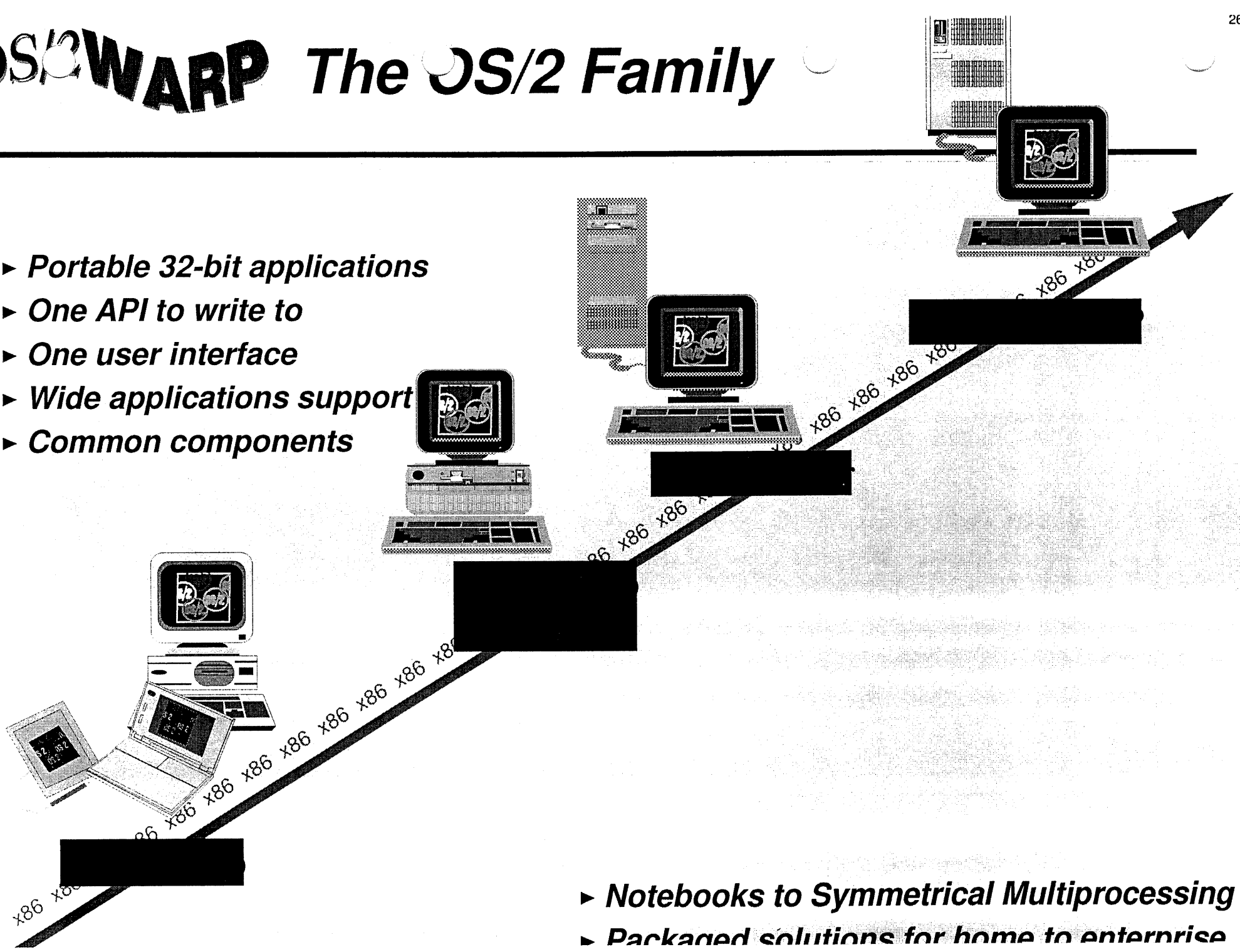


OS/2 WARP The OS/2 Family



OS/2 WARP The OS/2 Family

- *Portable 32-bit applications*
- *One API to write to*
- *One user interface*
- *Wide applications support*
- *Common components*

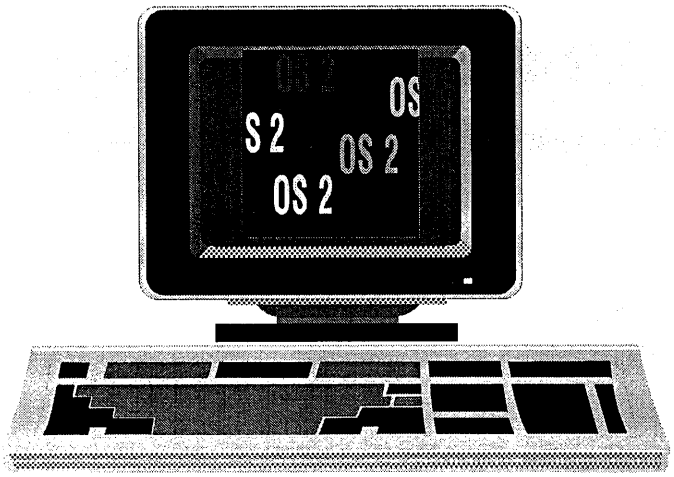


- *Notebooks to Symmetrical Multiprocessing*
- *Packaged solutions for home to enterprise*

OS/2 WARP Offene Standards

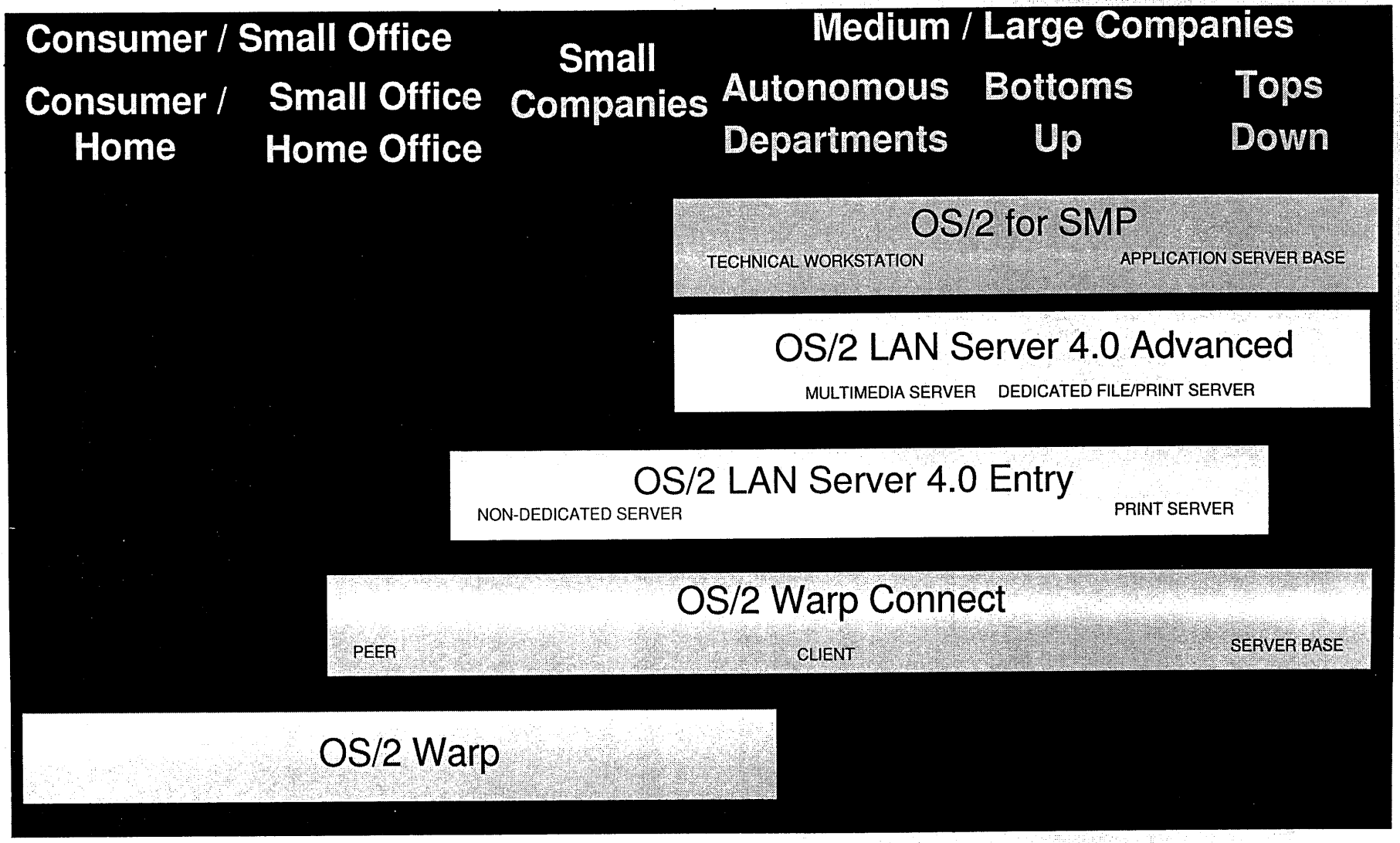
CI Labs/OpenDoc	IBM, Apple, Novell, WordPerfect, Taligent, Sunsoft, XSoft, Borland, Xerox, Oracle, Lotus, Adobe
OMG/CORBA (SOM/DSOM)	IBM, USL, Univel, HP, AT&T/NCR, DEC, Hyperdesk, SunSoft, Intel, Lotus, Novell, Olivetti, Group Bull, Anderson Consulting, Taligent, Object Design, & many others (total of 400 +)
Taligent Frameworks	IBM, Apple, HP, Taligent
OSF/DCE	IBM, HP, DEC, Novell, ICL, OMG, AT&T, Bull, Olivetti, Siemens Nixdorf, Silicon Graphics, Sony, SunSoft, Fujitsu, Hitachi, NEC, & many others (total of 400 +)
Workplace Shell & COSE/CDE	IBM, SCO, Univel, USL, HP, Sun & many others...

OS/2 WARP und was es heute schon bietet



- ✓ 32-Bit Plattform
- ✓ Protected Mode
- ✓ Preemptive Multitasking
- ✓ Virtueller Speicher
- ✓ Client/Server-Architektur
- ✓ Multimedia
- ✓ Performance
- ✓ Zuverlässigkeit
- ✓ Integrationsfähigkeit
- ✓ Connectivity
- ✓ National Language Support
- ✓ Offene Standards
- ✓ HW-Skalierbarkeit

OS/2 WARP Product Positioning

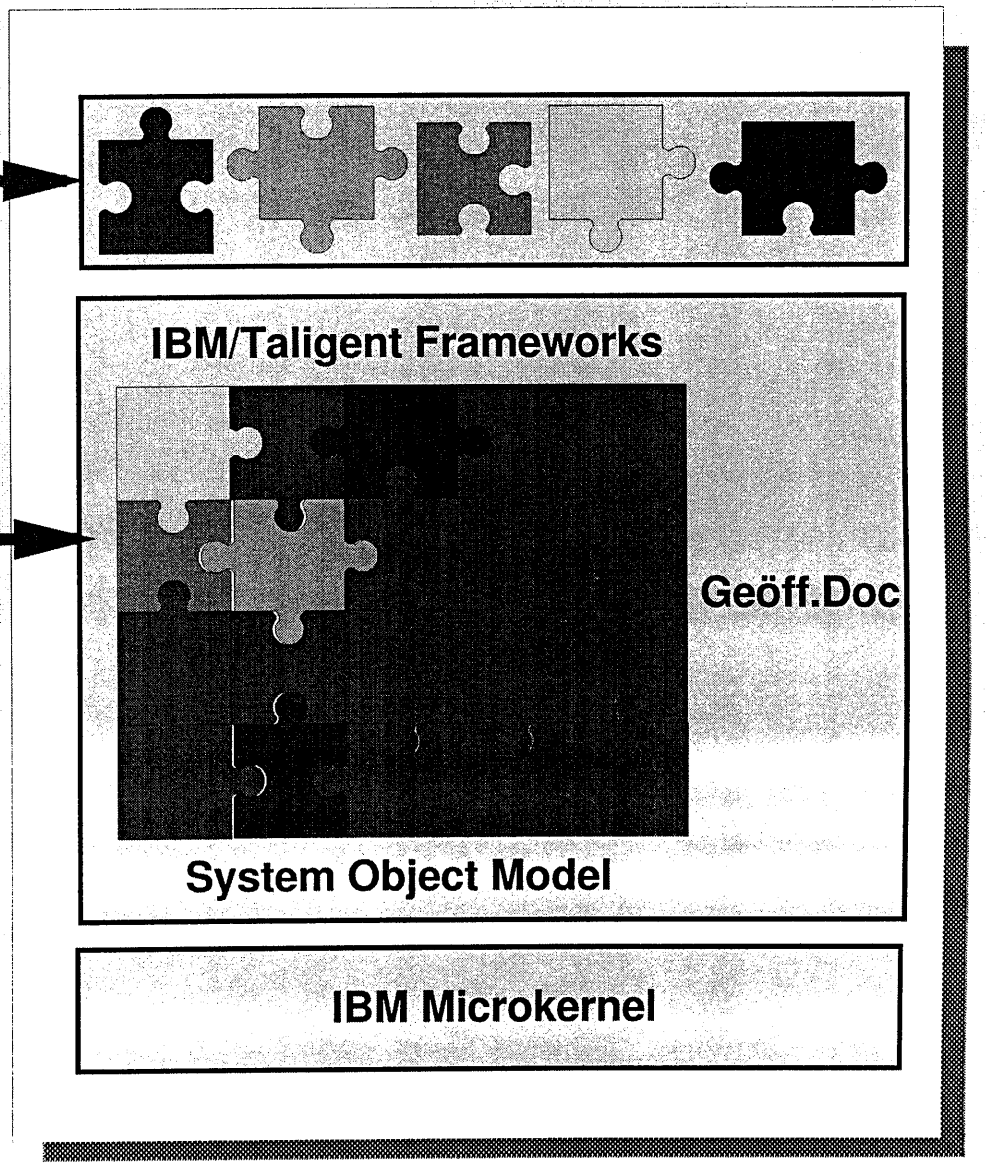


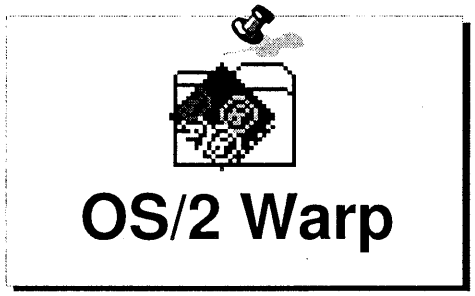
OS/2 WARP

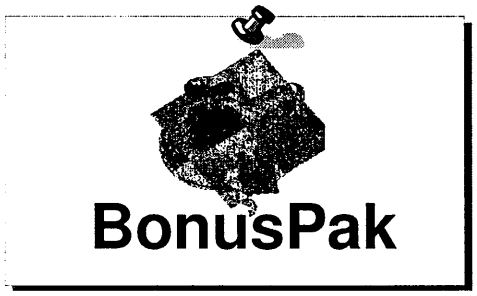
Wiederverwendbare Software Technologien

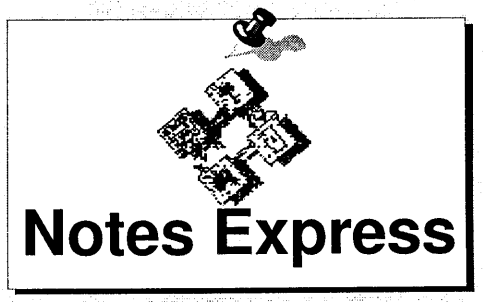
Was Sie schreiben...

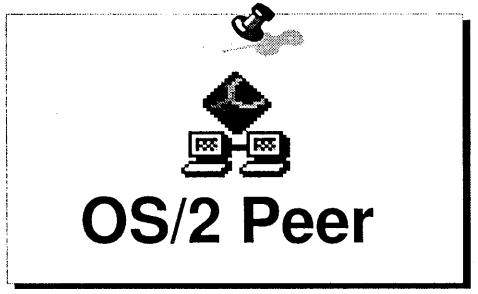
...was Sie erhalten!

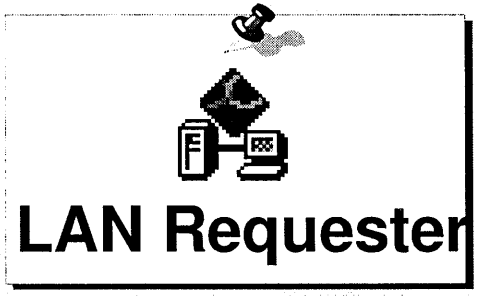


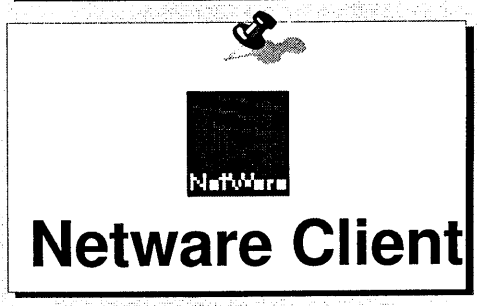


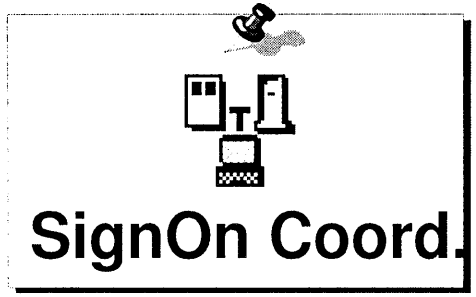


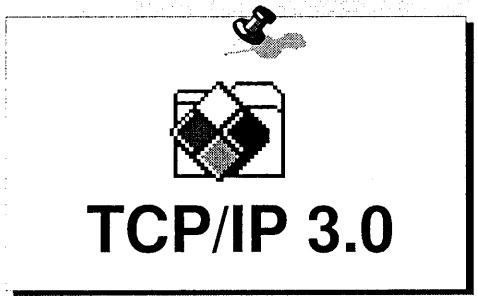


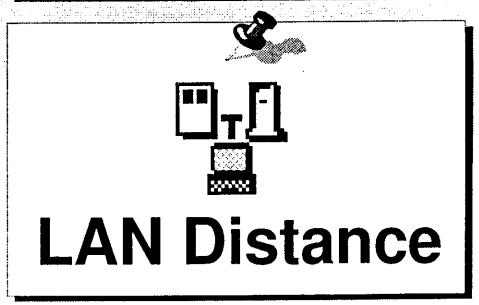






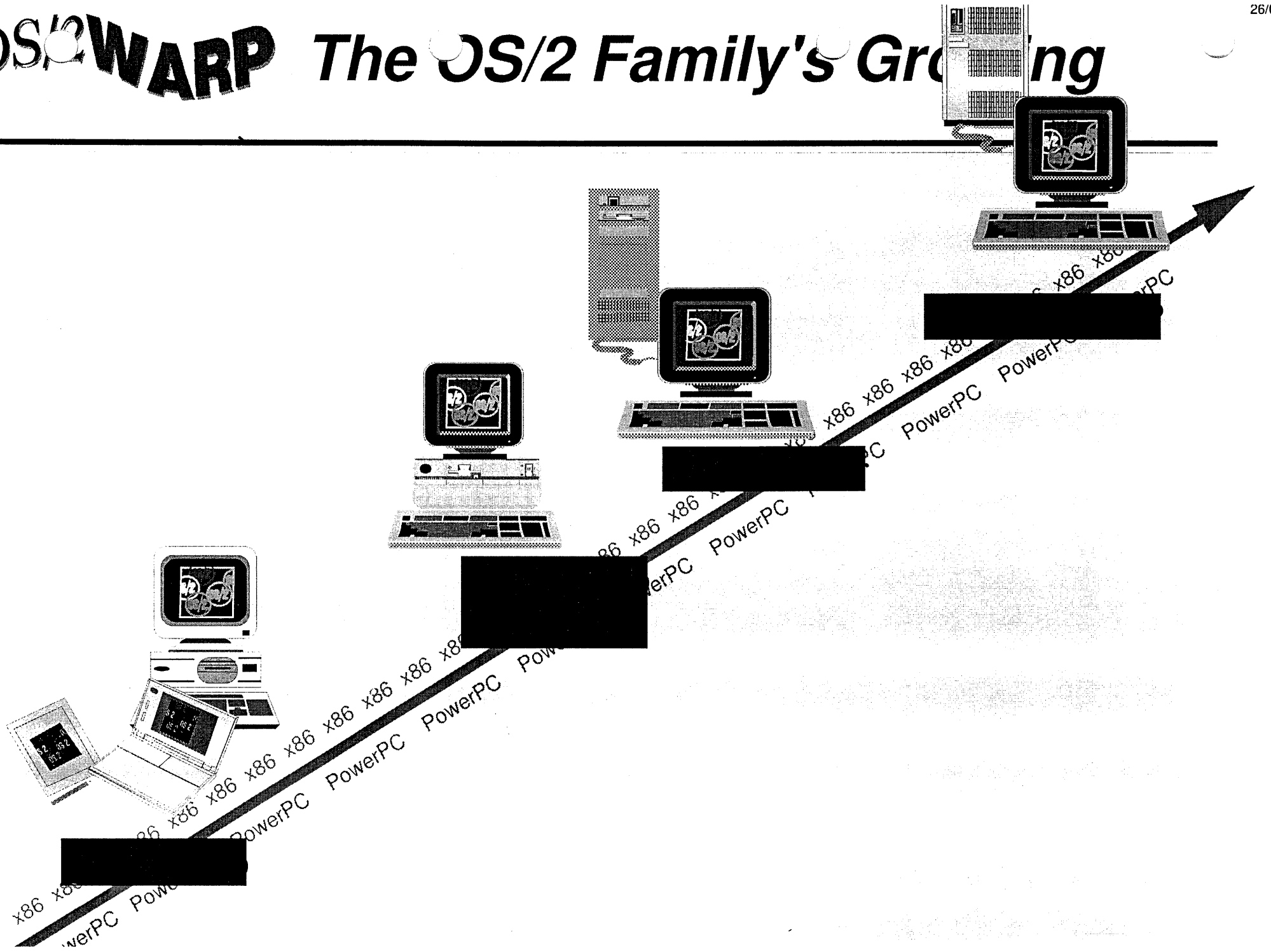






... schafft Verbindungen!

OS/2 WARP The OS/2 Family's Gro ng



OS/2 WARP The OS/2 Family's Gro ng

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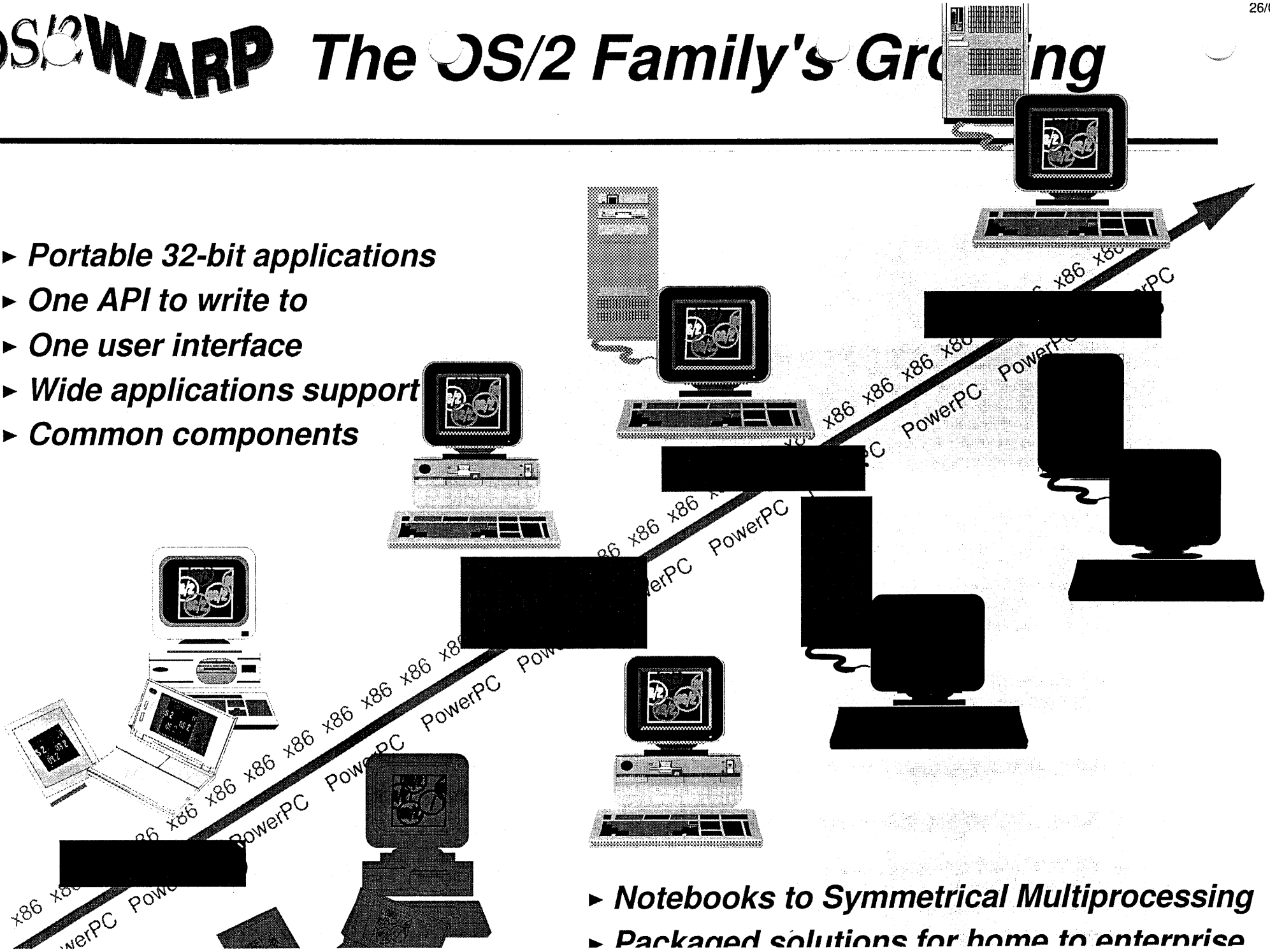
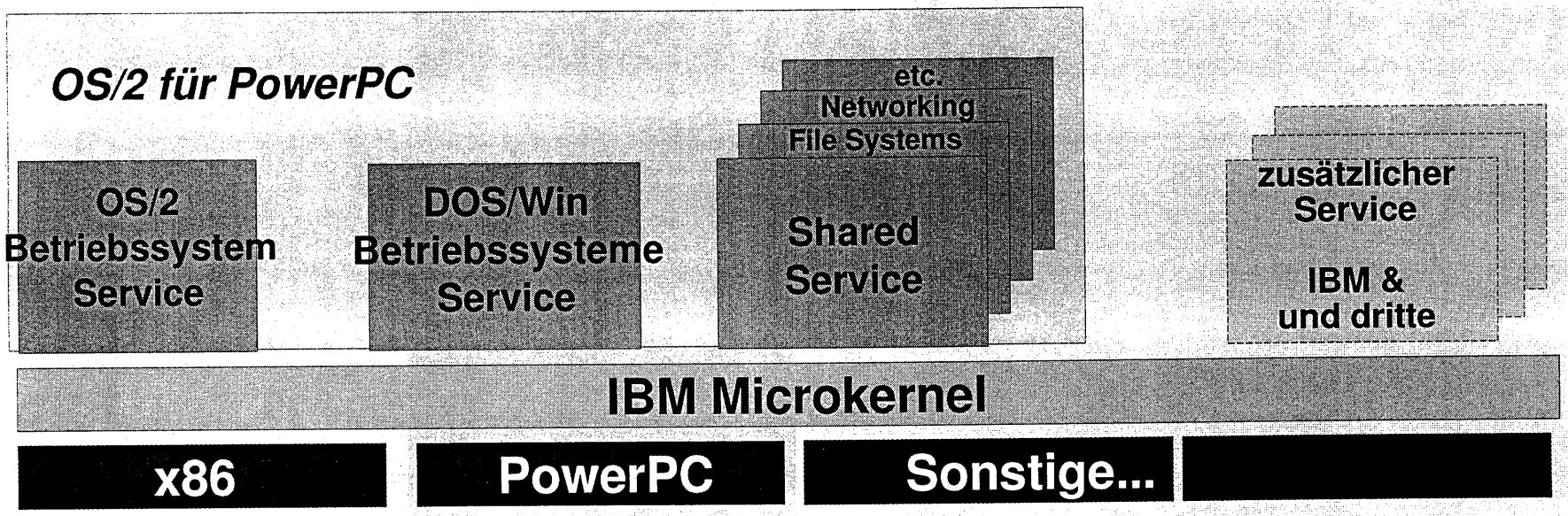


- *Notebooks to Symmetrical Multiprocessing*
- *Packaged solutions for home to enterprise*

OS/2 WARP Microkernel-basierend

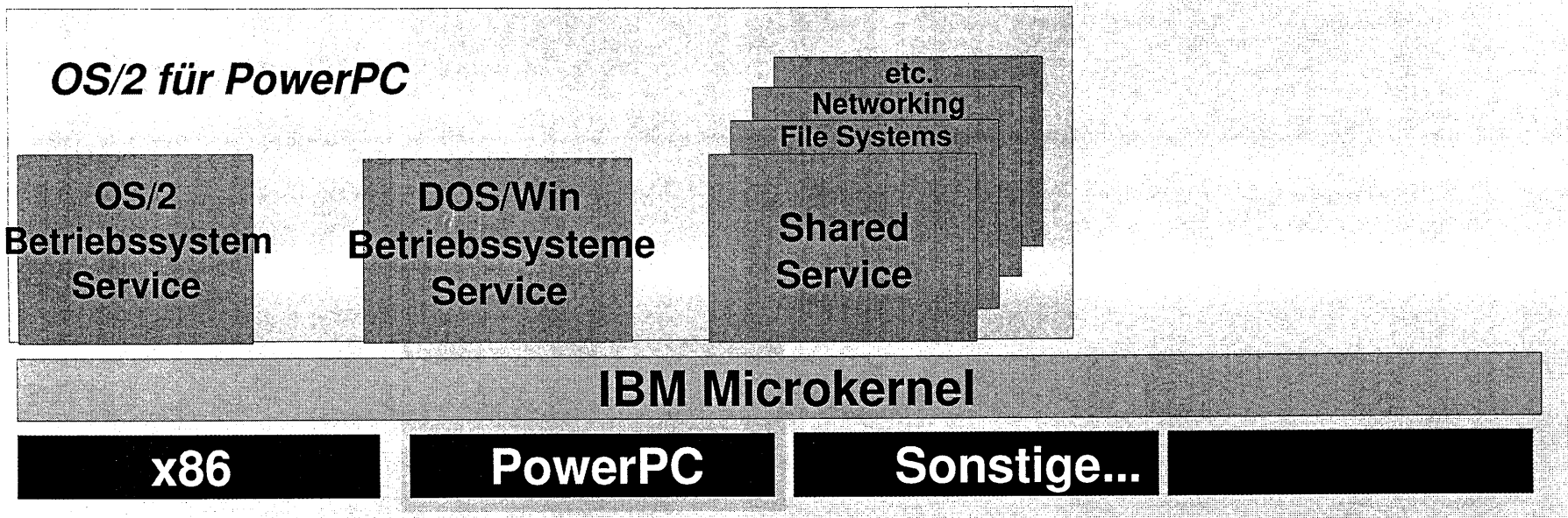
x86	PowerPC	Sonstige...	

OS/2 WARP *Microkernel-basierend*



- **Modular & Flexibel**
  - ✓ Auf den üblichen Systemelementen basierend
  - ✓ erlaubt ein schnelles Eingehen auf neue Technologien und Märkten
- **Marktspezifsche Angebote**
  - ✓ den Vorteil der systemübergreifenden Einheitlichkeit
- **Moderne OS-Struktur**

OS/2 WARP Microkernel-basierend



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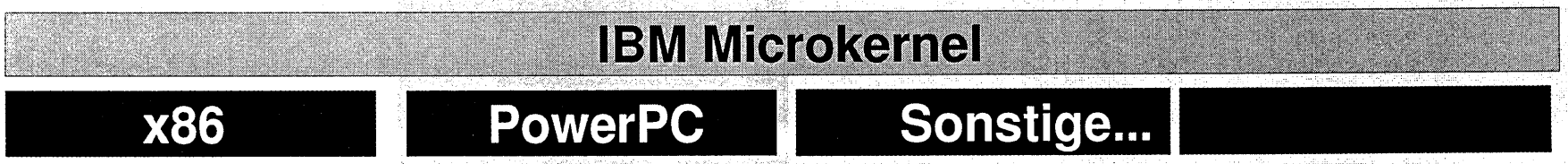
OS/2 WARP *Microkernel-basierend*



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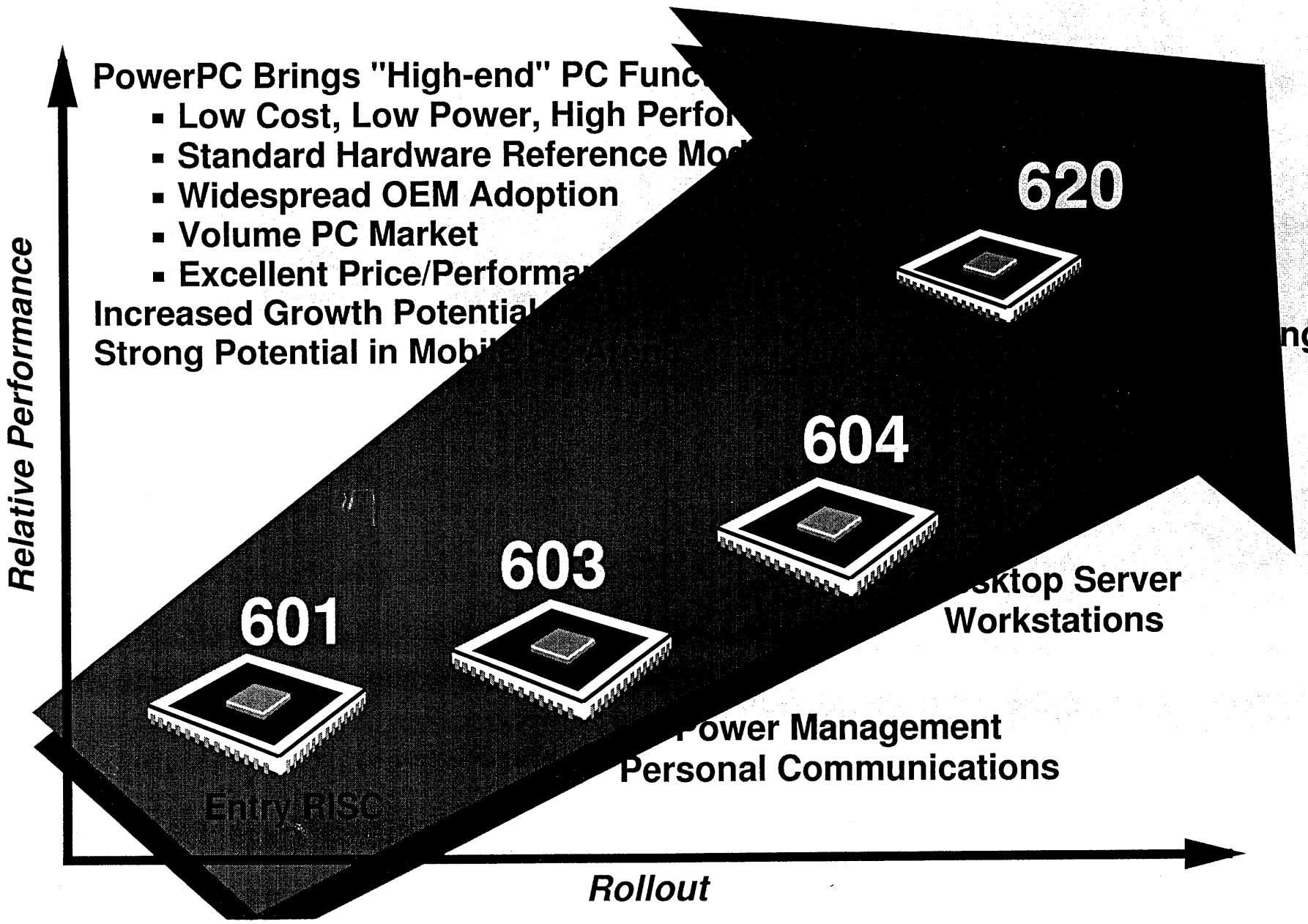
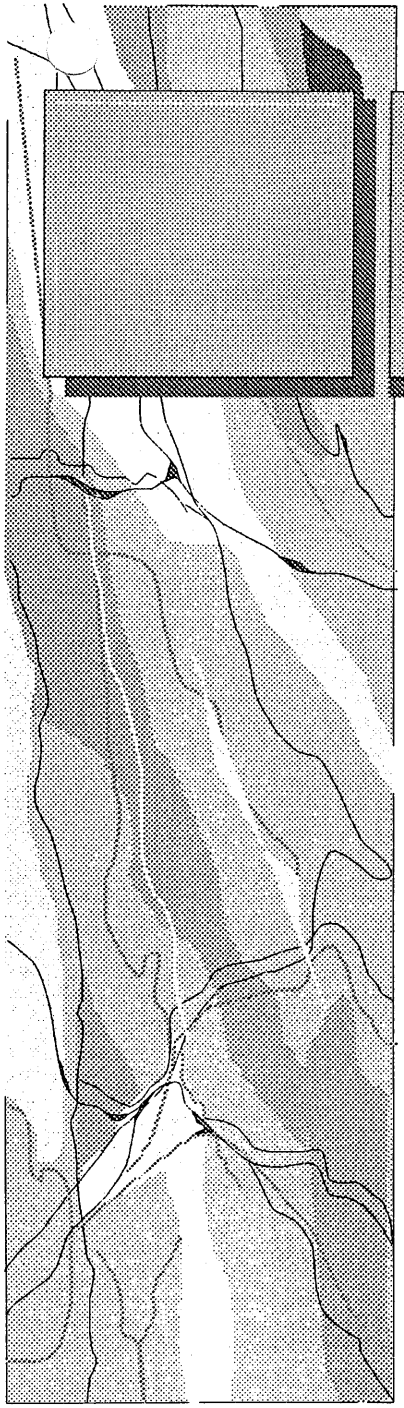
- **Moderne OS-Struktur**

OS/2 WARP PowerPC Microprocessor Family



CM Server für OS/2 Warp
OS/2 Access Feature

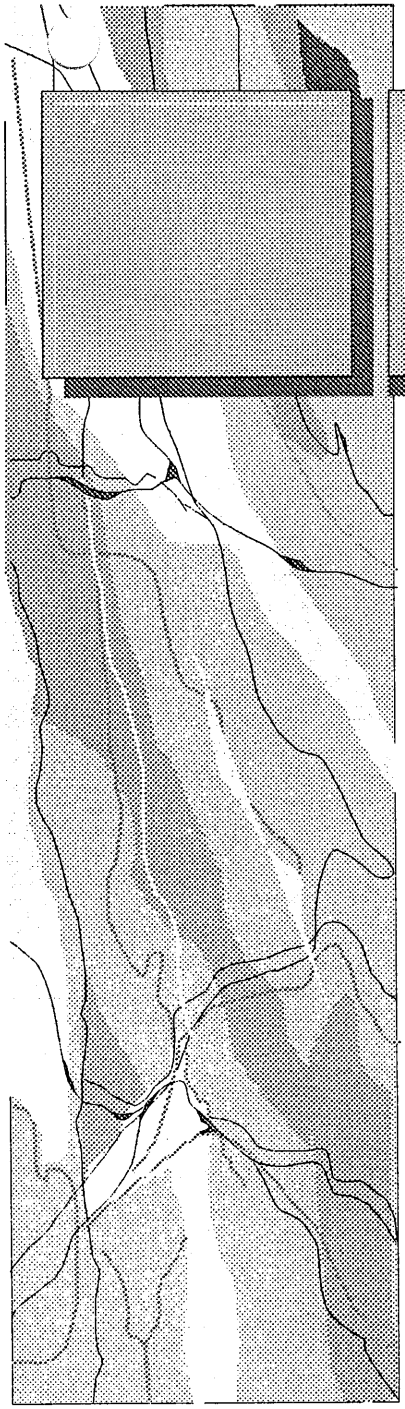
Jörg Drechsel, WBI mbH NL Stuttgart



Gliederung (I)

- Historischer Überblick zum Softwareprodukt
  Versionen
  Architektur
  Funktionen
  Verbindungen

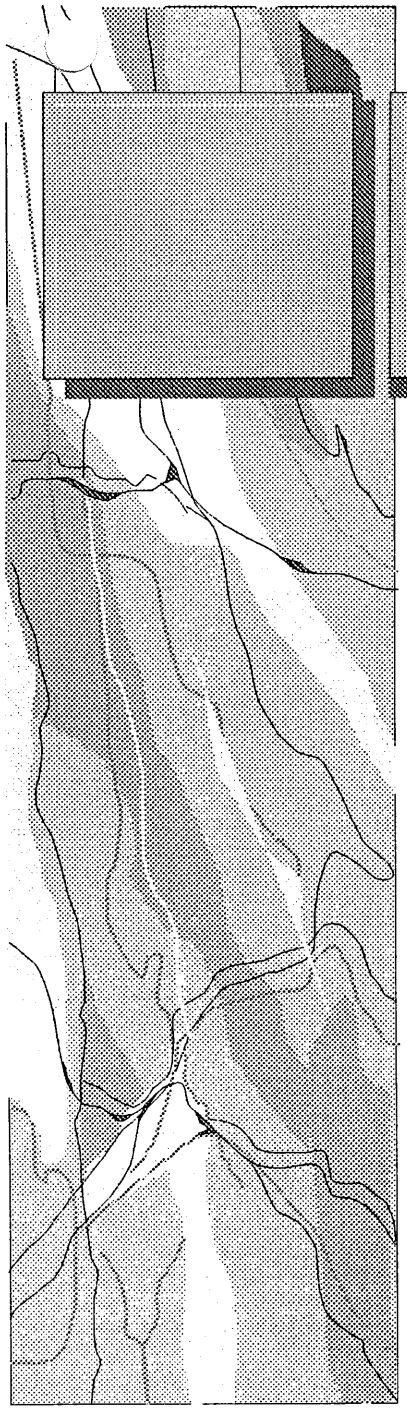
- SNA Entwicklung (System Network Architecture)
  SNA Subarea
  SNA APPC, APPN
  SNA HPR (High Performance Routing)



Gliederung (II)

- Communications Manager Server für OS/2 Warp, Erweiterungen

  Funktionen
  Verbindungen
  Installation/ Konfiguration
  Performance
  Security
  API (Aplication Programing Interface)
  Verschiedenes

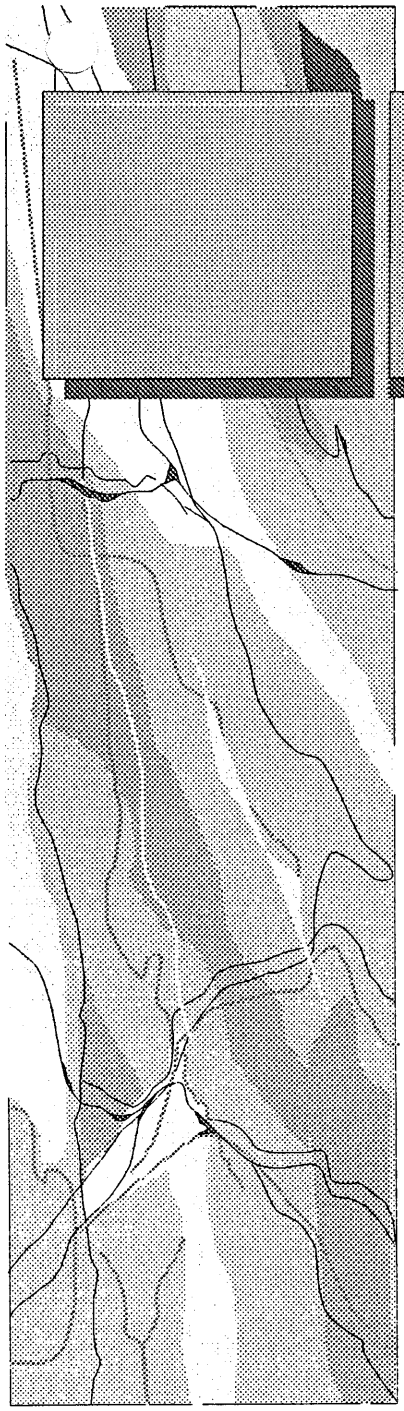


Gliederung (III)

- CM Server Überblick
  Bestandteile CM Server
  Bestandteile OS/2 CM Access Feature
  Dependent LU Server/ Requester
  SNA Gateway
  SDDLU (self defining dependent LU)
  SSCP Takeover
  CP-CP Session AutoReactivation
  SDLC Erweiterung
  Anynet SNA over TCP/ IP
  Anynet Sockets over SNA

Gliederung (IV)

- CM Server Überblick
  Shallow Adapter Support
  Deep Adapter Support
  Emulator Support
  Konfiguration/ Installation
  HPR (High Performance Routing)
  SNA Tranmission Priority
  Security Erweiterungen
  TDU (Topology Database Uptdate)
  API Erweiterungen
  Information Notebook



Historischer Überblick zum Softwareprodukt

- Versionen
  OS/2 Version 1.3 EE
  OS/2 Version ES/2
  CM/2 Version 1.0, 1.1, 1.11
  neu: CM Server für OS/2 Warp
  OS/2 Access Feature
- Architektur
  EE V. 1.3 beinhaltet LAN Tansportdienste
  ES/2 V. 1.0 beinhaltet LAPS
  CM/2 benutzt in allen Versionen NTS/2, MPTS
  CM Server und OS/2 AF benutzen MPTS

Historischer Überblick zum Softwareprodukt

- Funktionen

  Programmschnittstellen (API)
  bei EE V. 1.3 für LAN Requester und DBM

  3270 und 5250 Emulator

  APPC Interface

  ACDI (Asynchr. Comm. Device Interface)
  ! nicht für SNA

Historischer Überblick zum Softwareprodukt

- Verbindungen
  -Terminalanbindung via Koax und Twinax

  -LAN: (PC Network, Etherand, Token Ring)
  mittels MAC Driver in NTS/2 auch 3174Peer

  -WAN: X.25, eigenes API
  SDLC, ASYN (jedoch nicht für SNA)

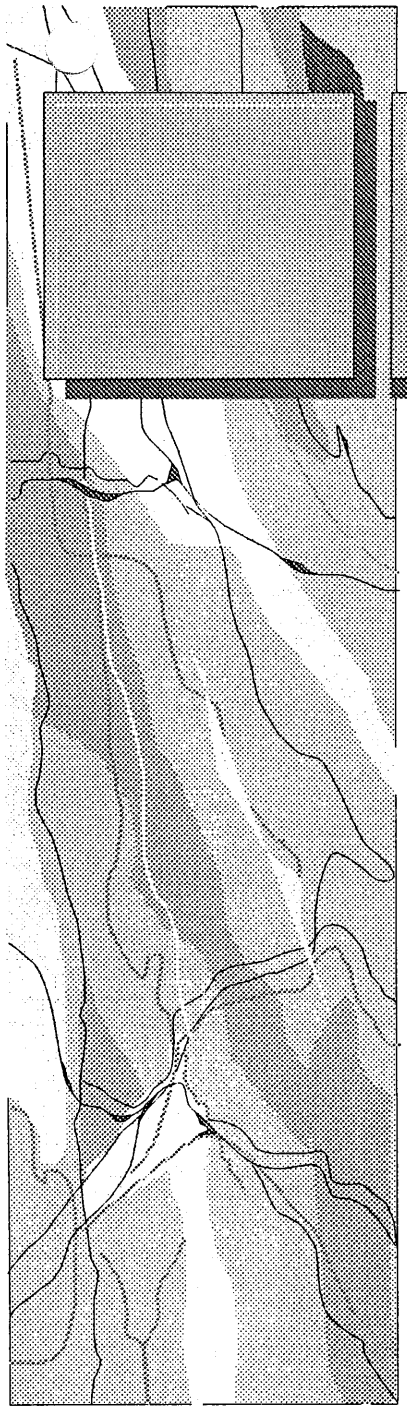
  -NTS/2 und AnyNet-Unterstützung des CM/2
  mittels virtueller Dev. Driver ==>WAN-Zugang

SNA Entwicklung

- SNA Subarea
  3270 Welt

  Host Node (Node T. 5) beinhaltet VTAM
  SSCP gibt log. Sitzungssteuerung

  Comm. Contr. Node (Node T. 4) beinhaltet NCP
  als intermediate Node gibt phys.
  Leitungssteuerung
  periph. Node (Node T. 2.0)
  Benutzerzugriff



SNA Entwicklung

- SNA APPC
  LEN (Low Entry Networking) auch PU T. 2.1
  " peer-to-peer capabilities" unterstützen frühere Anforderungen der "program-toprogram-comm." APPC genannt
  Node T. 2.1 besitzt eigenen control point (CP)
- APPN (Advanced Peer-to Peer Networking)
  ein neuer CP mit einem Set von Funktionen gewährleistet in einer Client-Server Umgebung die dynamische Verbindung von LEN
- Multiprotocol Transport Networking (MPTN)
  AnyNet Produkte

SNA Entwicklung

- SNA HPR (High Performance Routing)
  -offenes, standard-based network
  -verbesserte "routing performance"
  -Ausnutzung neuer "fast packet networks", wie Frame relay und ATM (asynchron tranfer mode)
  -HPR, früher auch APPN+ genannt stellt, als Erweiterung von APPN, die Transport und Netzwerklayer im Modell "Networking Blueprint"
  -HPR nutzt APPN CP, jedoch routed wie BNS (broadband network services)
  -FID2 d. APPN wir durch PTM (PacketTranfer Mode) mit neuer Source Routing Technik, ANR (Automatic Network Routing), ersetzt.

CM Server für OS/2 Warp Erweiterungen

- Funktionen

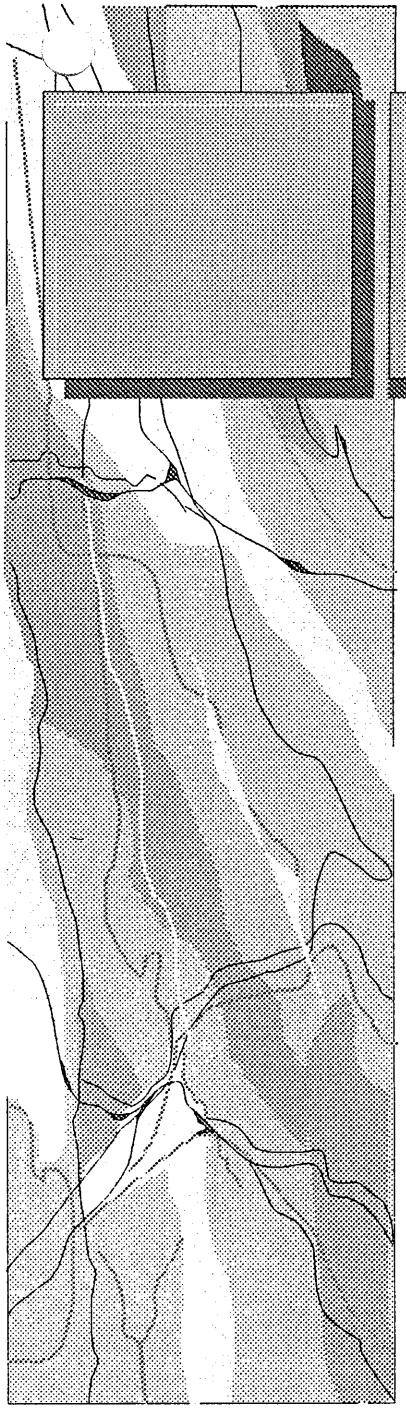
  -Dependent LU Requester/ Server

  -Gateway

  -SDDLU (Self Defining Dependent LU Support)

  -SSCP Takeover Support

  -CP-CP Session Reactivation



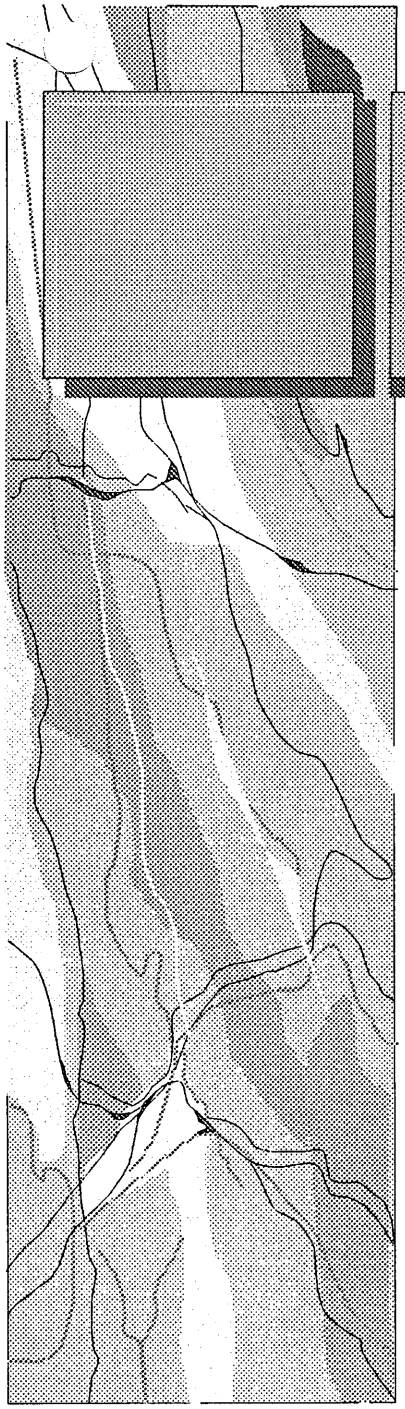
CM Server für OS/2 Warp Erweiterungen

- Verbindungen

-SDLC mindestens 16 Leitungen
T1/E1 speeds
Multipoint primary
Full duplex
Artic Adapter Support

-AnyNet SNA over TCP/ IP
Socket over SNA

-Deep and Shallow Adapter Support



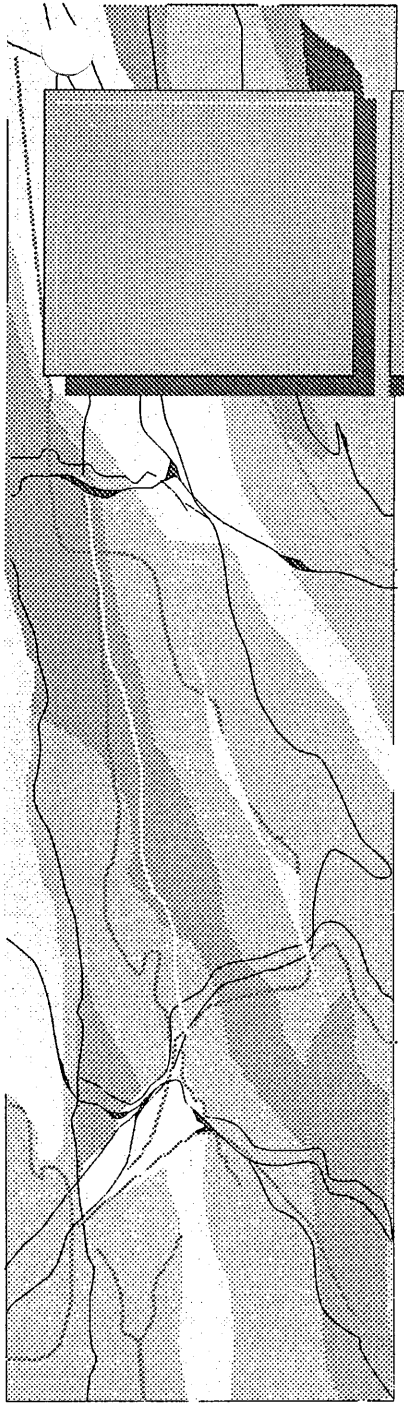
CM Server für OS/2 Warp Erweiterungen

- Installation/ Konfiguration

  -X.25 CUG
  -Dynamic Update via CID

- Performance

  -APPN High Performance Routing
  -SNA tranmission Priority
  -APPN TDU (Topology DataBase Update)



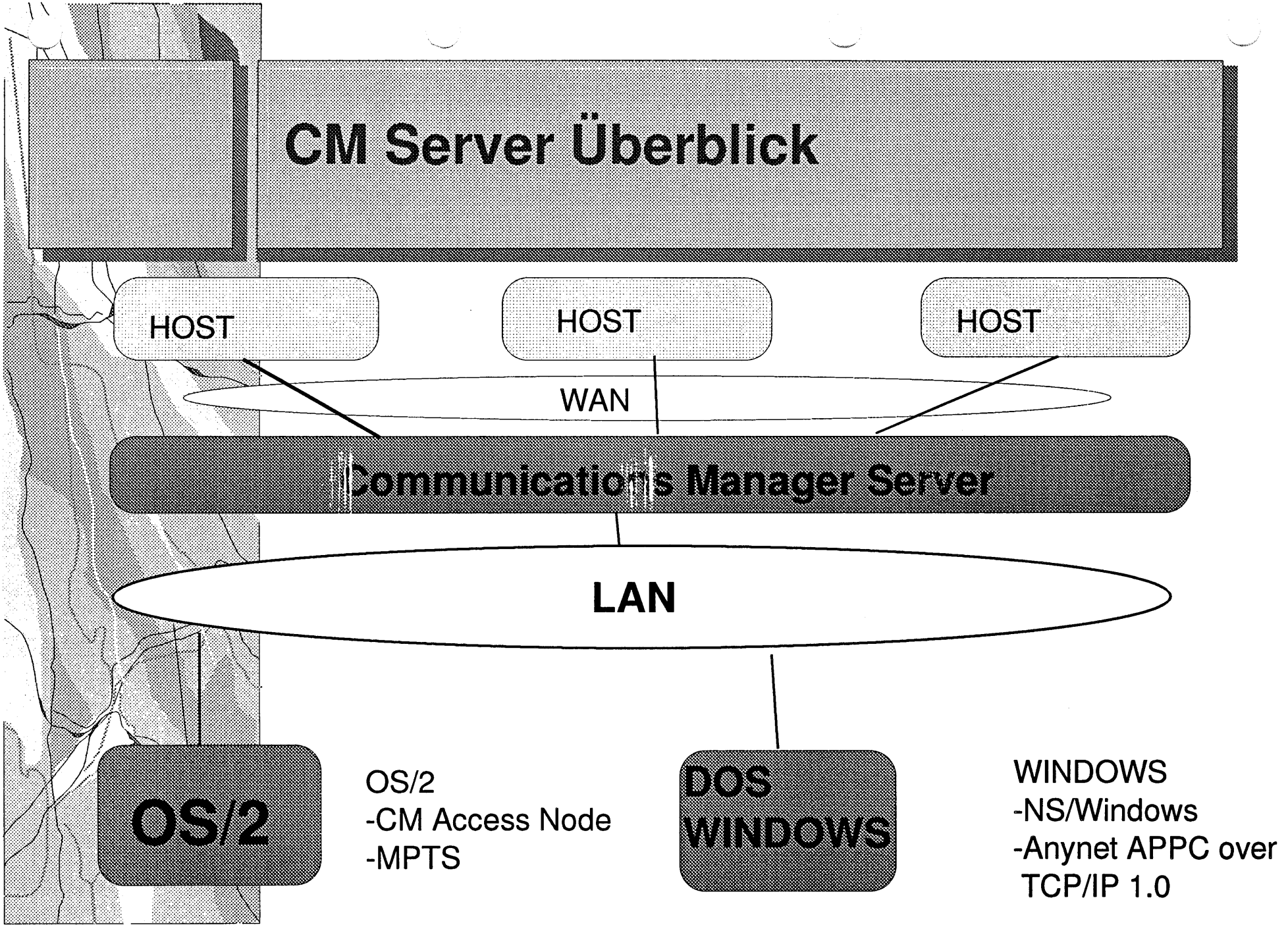
CM Server für OS/2 Warp Erweiterungen

- Security

  -LU 6.2 Session Security
  -LU 6.2 Session Level Encryption

- API (Aplication Programing Interface)
  -32-Bit API

- Verschiedenes

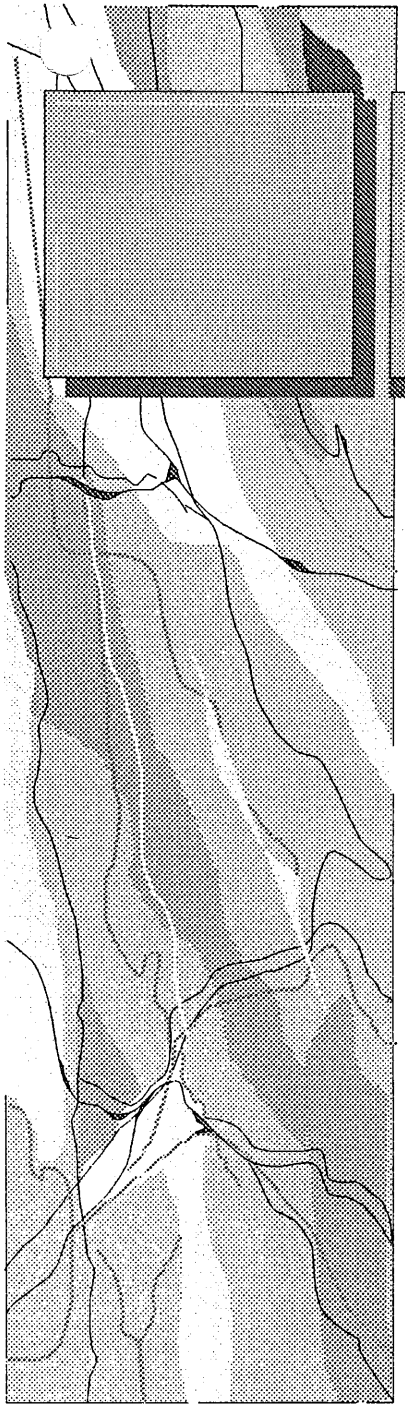

CM Server Überblick
HOST
HOST
HOST
WAN
Communications Manager Server
LAN
OS/2
OS/2
-CM Access Node
-MPTS
DOS
WINDOWS
WINDOWS
-NS/Windows
-Anynet APPC over
TCP/IP 1.0

CM Server Überblick

- Server Funktionen
  Workstations kommunizieren über CM Server zu
  - S/390
  -AS/400
  -anderen Workstation
  CM Server unterstützt Multiprotokoll Support:
  -Sockets over SNA-Gateway
  -SNA over TCP/ IP-Gateway
  Anwendungen kommunizieren über SNA oder über SNA u. TCP/ IP Netzwerke ohne Anpassung oder Änderung der Anwendungen an das Netzwerk der Partner Anwendung.

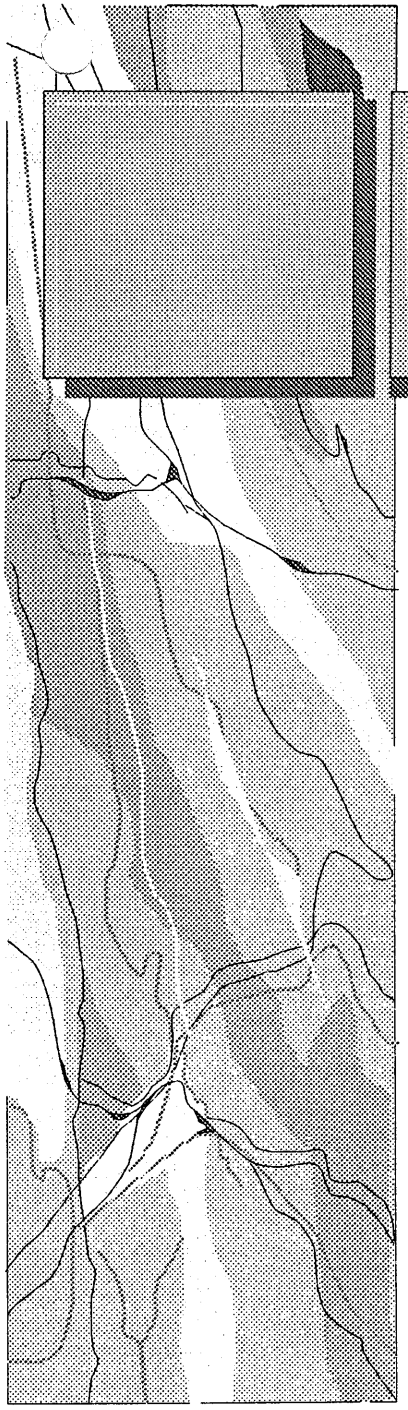
CM Server Überblick

- SNA Gateway
  vermittelt den Zugang zu ein oder mehreren Host (AS/400, S/390) für Workstations unter OS/2, DOS, Windows
- APPN
  APPC Unterstützung für verteilte Anwendungen über Network Node bzw. von End Node
- Unterstützung mehrer 32-Bit API
- Zugang über mehrer LAN und WAN Protokolle
- remote Access zu SNA- Anwendungen über Async., Sync., Autosync, Digital u. Cellular Con.



CM Server Überblick

- APPN High Performance Routing (HPR) verbessert Verfügbarkeit und Durchsatz des Netzwerkes:
  -transparent recovery from network failure
  -error recovery (congestion control capabilities for reduced bandwidth requirements)
  -Vorteile von SNA und connectionorientierten Netzwerken
  -Verfügbarkeit von connectionlosen Netzwerken
- Unterstützung vieler Netzwerkadapter und DÜE's



Bestandteile CM Server

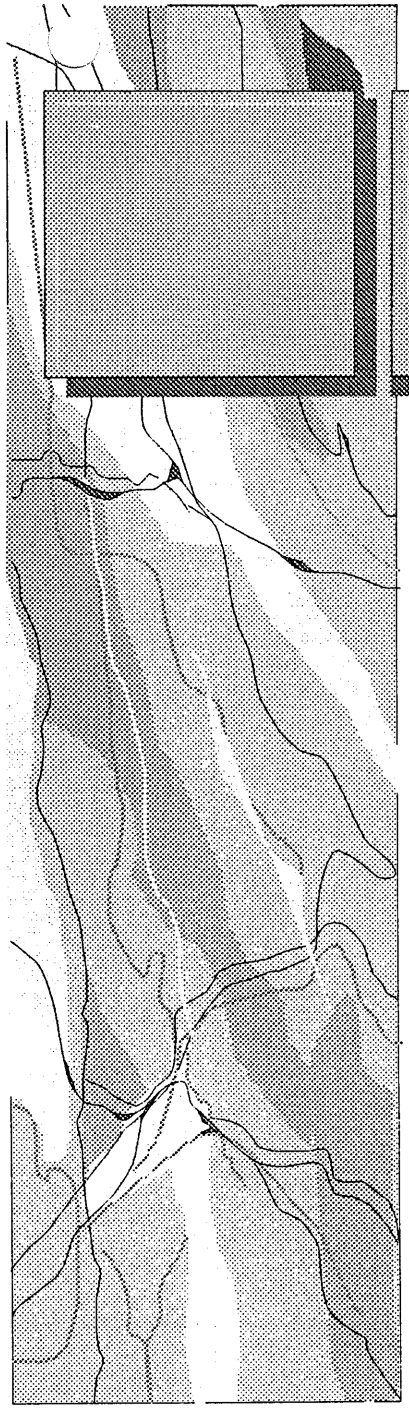
- Im CM Server sind alle Bestandteile des CM/2 Version 1.11, mit Ausnahme der Emulatoren (3270, 5250) enthalten
- Die Emulatorfunktion wird sichergestellt durch:
  -PC3270 Entry (built in)
  -Personal Communications 3270 u./o. AS/400
  beide Emulatoren sind Bestandteile der PCOM Familie
- Multi-protocol Transport Services (MPTS) ist Bestandteil des Softwareproduktes und ersetzt LAPS aus NTS/2 der CM/2 Versionen.

Bestandteile OS/2 CM Access Feature

- Das OS/2 CM Access Feature ist mit dem CM Server vergleichbar, mit Ausnahme von:
  -Network Node Funktion
  -Gateway Funktion
  -Gateway Node Funktion von AnyNet
    SNA over TCP/ IP
    Sockets over SNA
  -PC3270 Entry
  Alle weiteren Funktionen im Bestand des CM Servers werden erfüllt, die Emulatorfunktion benötigt Personal Communication 3270 u./o. AS/400 für OS/2 über LUA- Schnittstelle.

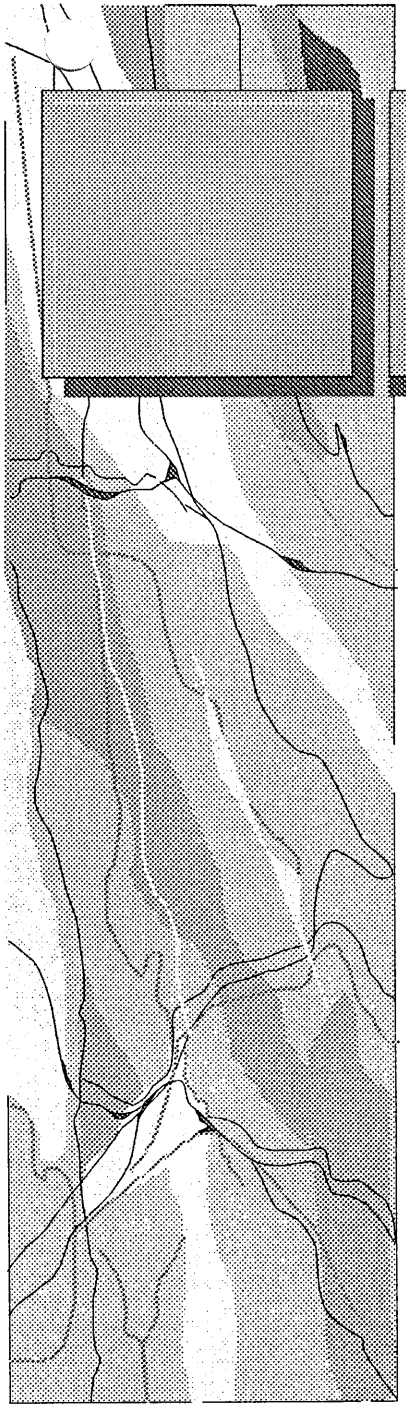
Dependent LU Server/ Requester

- DLUR/ DLUR ermöglichen LU0...LU3, Transportmechanismen des APPN zu nutzen.
  -lokale dep. LU nutzen den lokalen DLUR
  -downstream Workstation am SNA Gateway benutzen den DLUR des Gateway
  -DLUR gestatten multiple PU übere einen Link zum Host
  -DLUR beinhaltet die Unterstützung für das DLUS takeover, ein Bestandteil des SSCP takeover



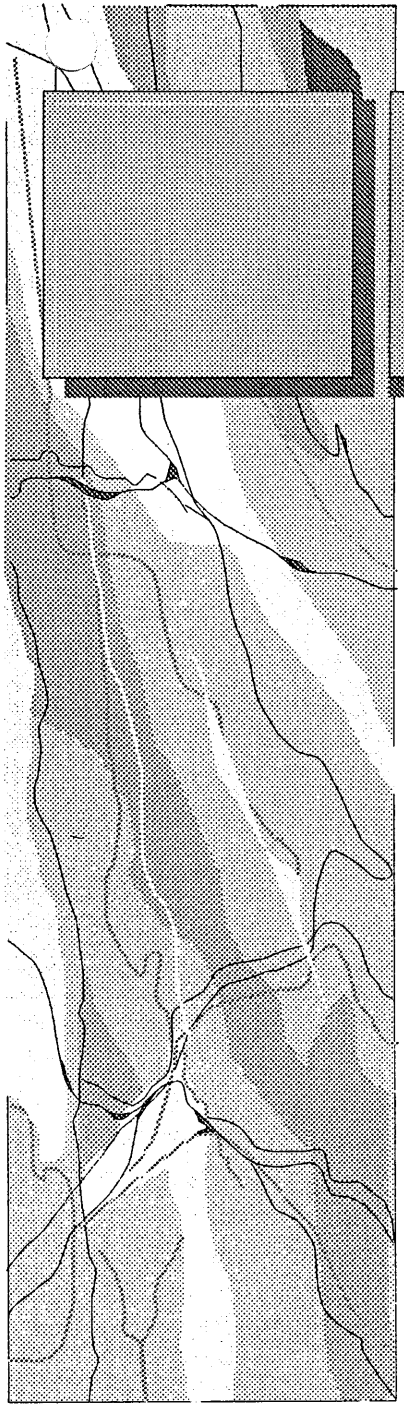
SNA Gateway

- Funktionen der CM Vorversion sind:
  -LU Pooling
  -Dynamic addition of Resources
  -Multiple PU support
  -Dedicated LU
  -Implicit workstation support



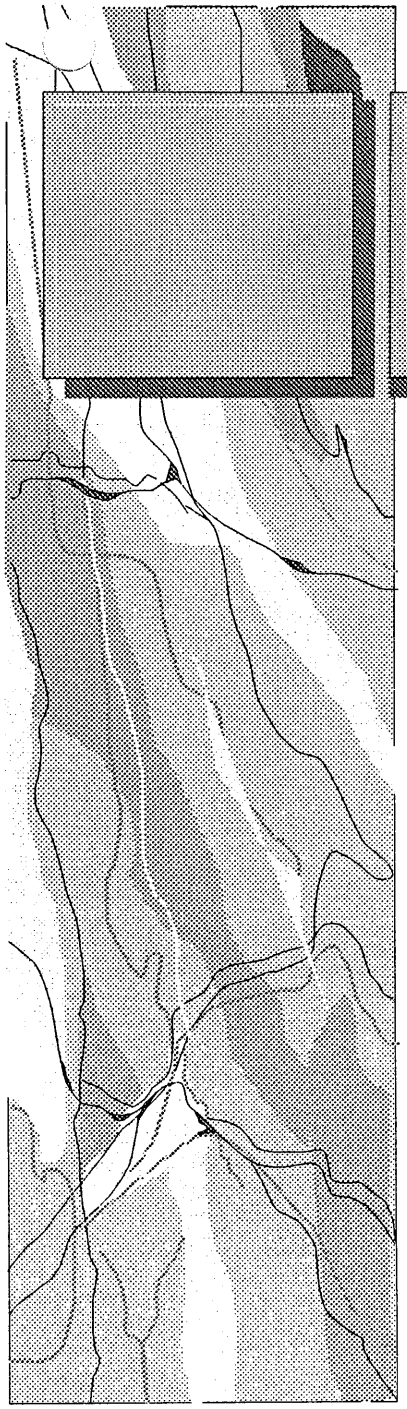
SNA Gateway

- Mit demCM Server sind folgende Funktionen verfügbar:
  -DLUS/DLUR
  -SDDLU
  -SSCP takeover
  -Multipoint Primary Support
  -ARTIC Adapter Support
- dedicated PU function gestattet dem Netzwerkmanagement, Sicht und Zugriff auf PU "hinter" dem SNA Gateway.



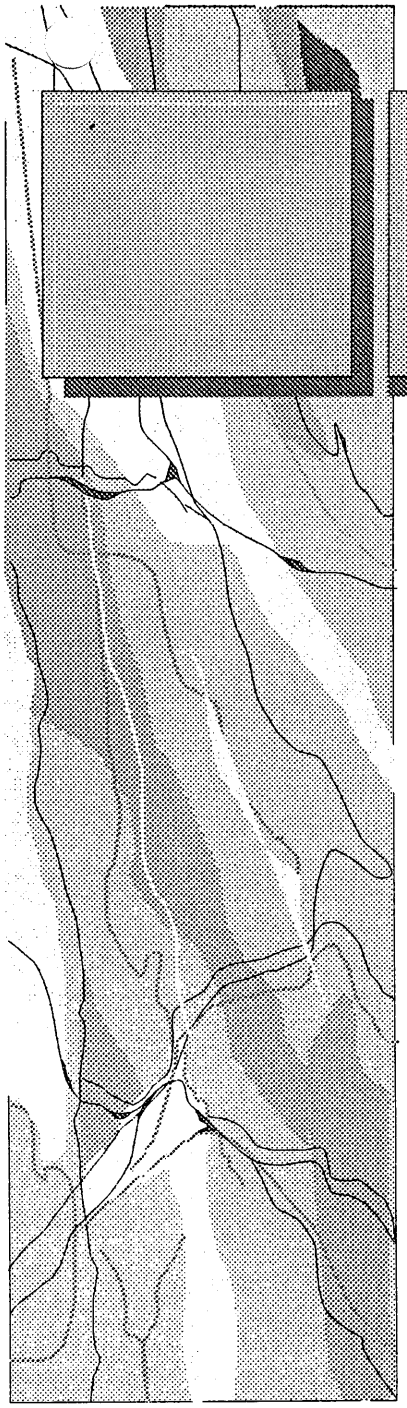
SDDLU (self defining depend. LU)

- SDDLU gestattet dem CM SNA Gateway die dynamische Erstellung von LU Einträgen im VTAM (>= 3.4)
- der Request für zusätzliche, dynamisch zu erstellende LU wird über die SSCP-PU Sitzung des Gatway übertragen (NMVT)
- Auf der Hostseite zeigt in der VTAM Def. für die PU ein "LUGROUP-Parameter) auf die Tabelle mit dem LU Modell Profil



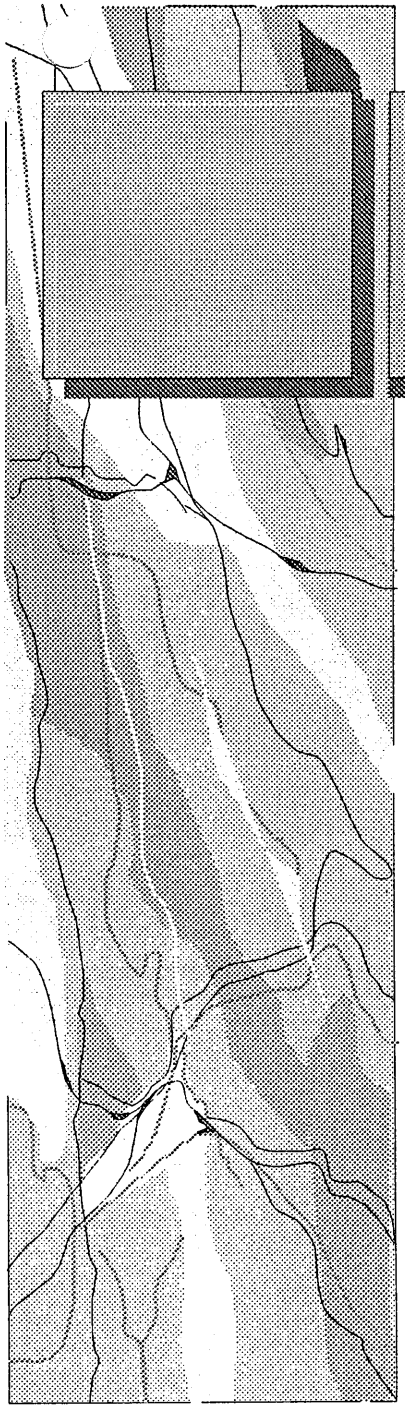
SSCP Takeover

- SSCP Takeover ist eine Eigenschaft im CM und bedarf keiner weiteren Einstellung
- SSCP Takover ermöglicht, eine über einen NN Network Node (CM Server) zum composite NN (APPN VTAM u. APPN NCP) geführte Session, bei Ausfall von übertragenden Knoten und Links, weiter zu betreiben.



CP-CP Session AutoReactivation

- der CM/2 bedurfte bei Verlust des Links von einem End Node zum Network Node, der Aktivierung dieses oder eines anderen Links für die Unterhaltung der CP-CP Session.
- der CM Server aktiviert in diesem Falle automatisch einen alternativen Link zu diesem oder einem weiteren Network Node
- im APPN Funktionsset 1015 wird dies grundsätzlich benannt
- die Anwendung "NNLINK" im ProAid des CM/2 stellt ausschließlich den Link bereit !!



SDLC Erweiterung

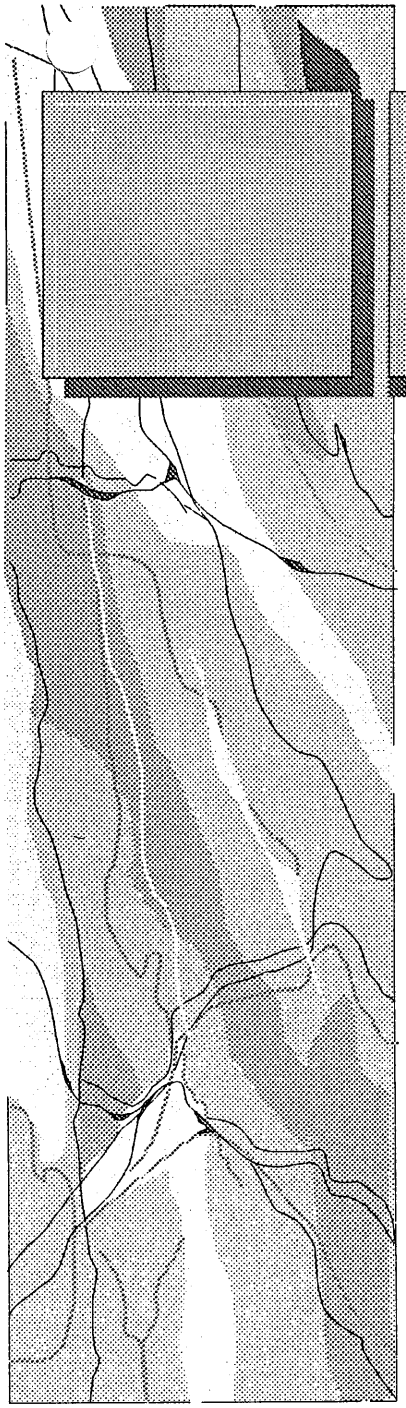
- High Speed support für mehr als eine SDLC Verbindung mit T1/E1 Geschwindigkeit (2Mbps) über WAC Adapter
- Full duplex data tranmission mode
- mehr als 16 SDLC Verbindungen down/ upstream, 16 werden garantiert
- Multiple Primary Support für bis zu 16 downstream Multi Point Verbindungen (Bsp.: SNA Gateway, Network Node)
- ARTIC als Multiple Port Adapter (NDIS) (switched, leased, Koexist. mit LAN Distance)

Anynet SNA over TCP/ IP

- APPC, CPI-C Anwendungen können über ein TCP/ IP Netzwerk kommunizeren, ohne die Anwendungen dem Charakter des Netzwerkes anpassern zu müssen.
- dependent LU werden auch unterstützt
- AnyNet Access Node Produkte auf den Plattformen MVS, OS/400, AIX werden unterstützt
- "nahtlose" Verbindungen zu und durch TCP/ IP Netze

Anynet Sockets over SNA

- TCP Socket Informationen können ohne Veränderung durch ein SNA Netzwerk übertragen werden
- Access Node Support unterstützt Endbenutzern auf TCP-Sockets über ein SNA Netzwerk zu kommunizieren
- Als Gateway können SNA und TCP/ IP Netzwerke, mit bis zu 250 Verbindungen unterstützt werden

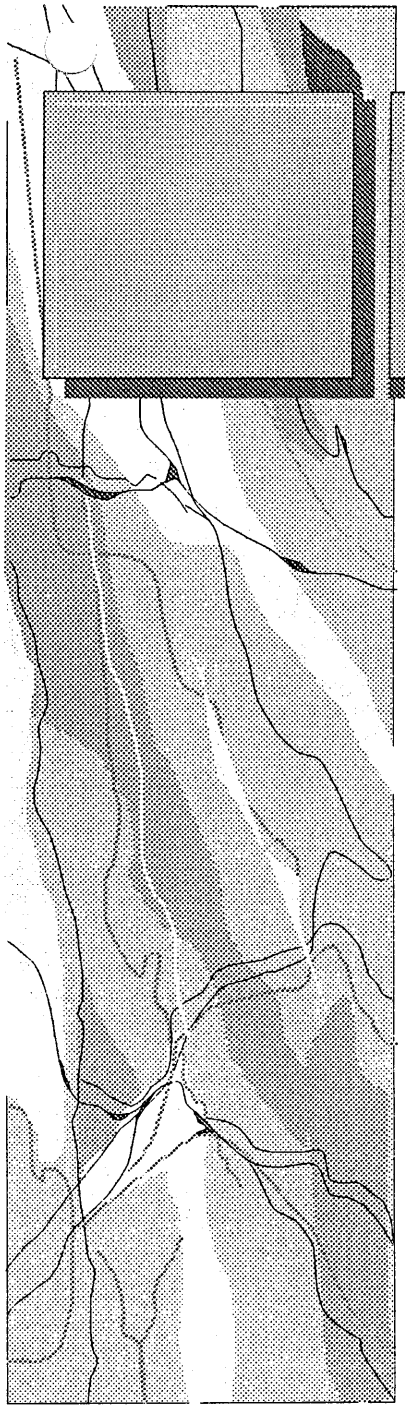


Shallow Adapter Support

- der CM stellt mit der Einrichtung ANDIS (Advanced NDIS) eine Schnittstelle unter MCA, ISA oder EISA für die Protokolle:
  - SDLC (Stand und Wählleitung)
  - IDLC (Stand und Wählleitung)
  - x.25 (Standleitung)
- dies ermöglicht auch ohne die Benutzung weiterer CM-Funktionen den Zugang zu Netzwerkadaptern des CM interfaces lt. Beschreibung

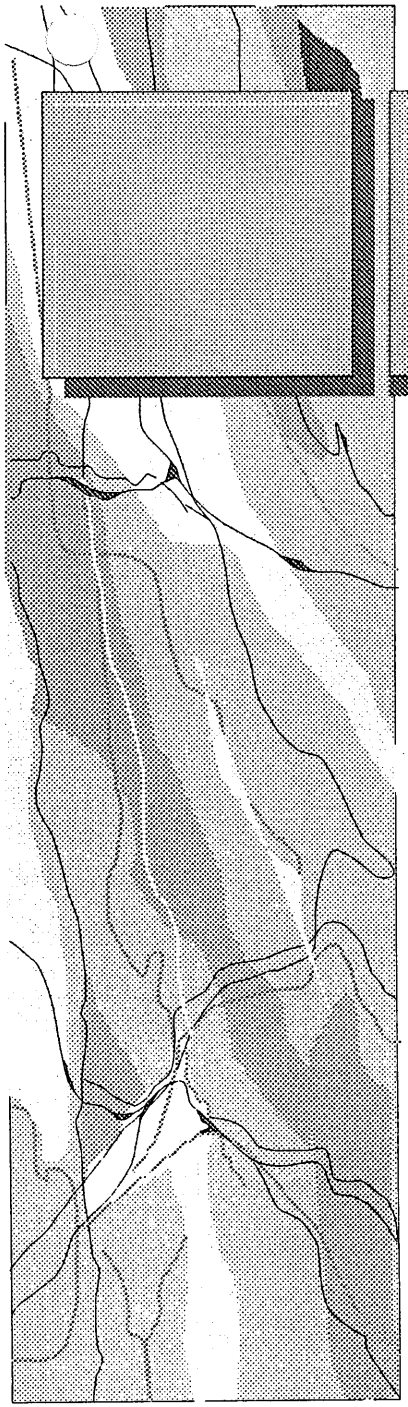
Deep Adapter Support

- über die veröffentlichten Netzwerkadapter hinaus, unterstützt der CM mittels GDLCI, (Genaral DLC Interface) weitere.
- general DLC beschreibt die Anpassung der Signale zwischen NDIS und GDLCI und nimmt somit eine Brücken funktion ein



Emulator Support

- Emulatorfunktionen gegenüber 3270 u./o. AS/400 Host werden durch die PCOM Familie für OS/2 sichergestellt.
- während der CM Server die Version PC3270 Entry built in hat, müssen für das darüberhinausgehende Anforderungen, und das OS/2 Access Feature das jeweilige Vollprodukt der PCOM Familie eingesetzt werden
- Emulatoren kommunizieren auf der CM Plattform über das LUA Interface oder remote über das CM SNA Gateway



Konfiguration/ Installation

- Konfiguration

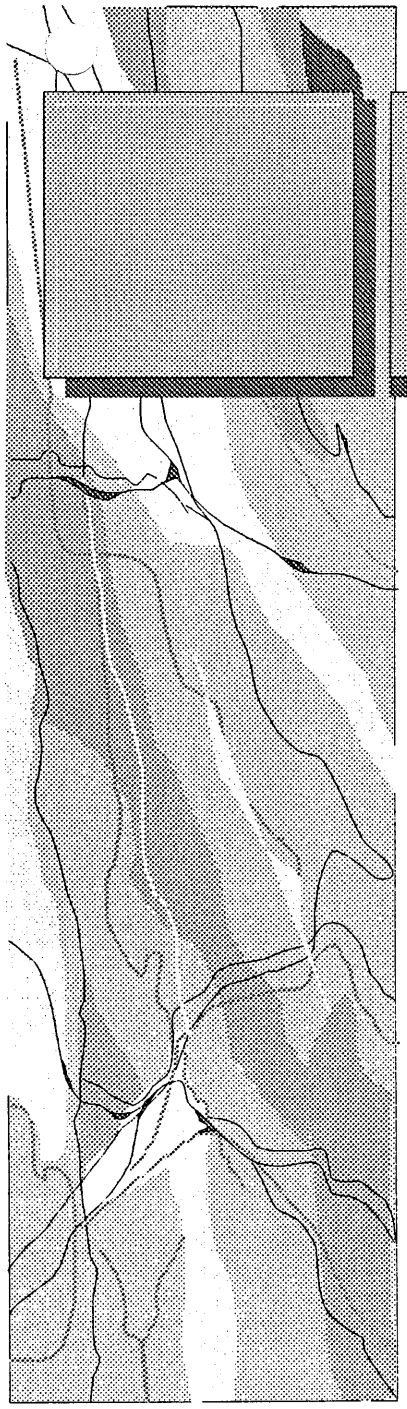
  Dynamic Response File Configuration

  Response File API

  Open Configuration processing

  X.25 Closed User Group (CUG)

  X.25 inactivity Timeout

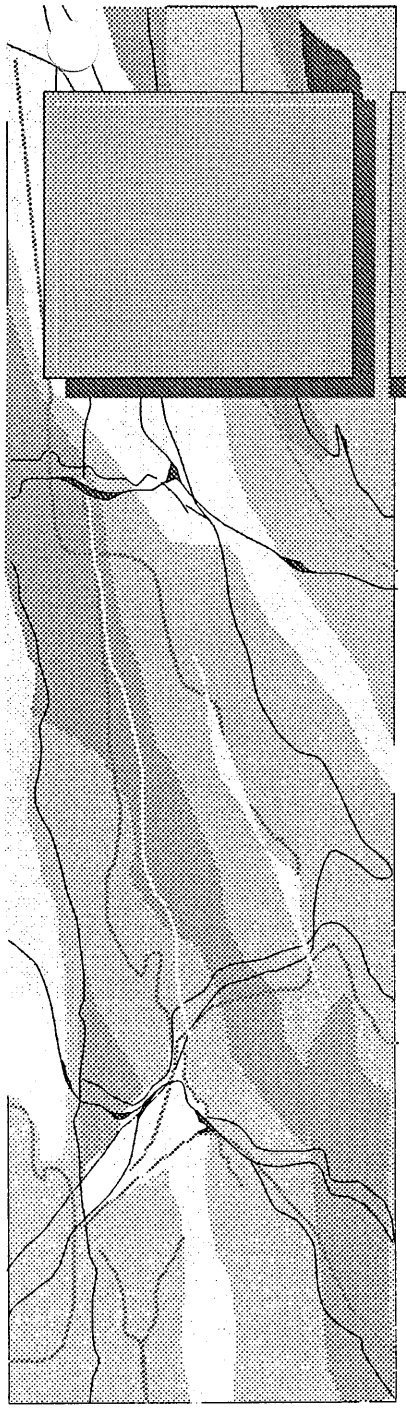


Konfiguration/ Installation

- Installation

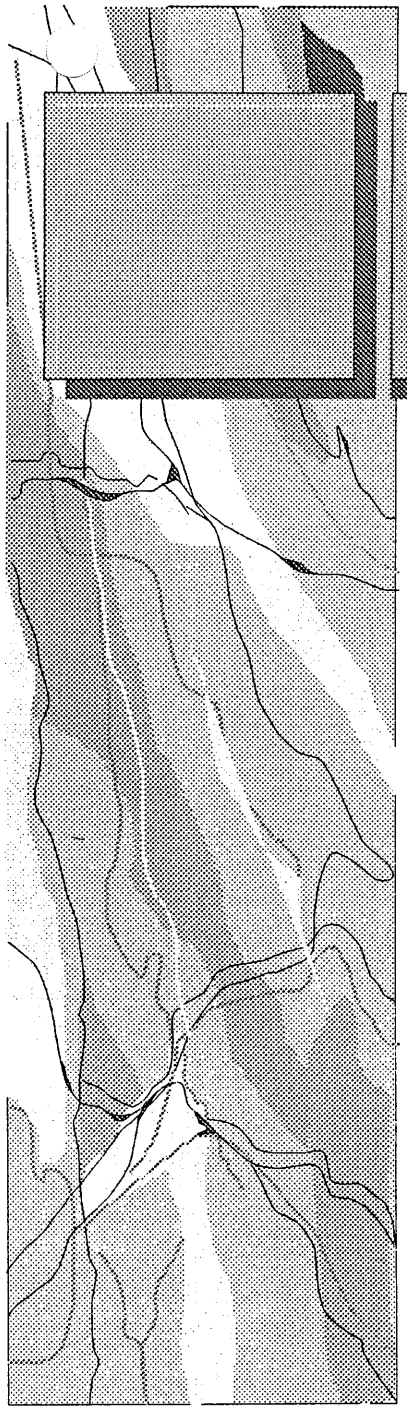
  -ProdAids und Toolkit (16 oder 32 Bit)
  zusätzliche Funktionen ausgewählt werden

  -CM besteht aus:
  CM Server
  OS/2 Access Feature
  Windows Access Feature besteht aus:
  APPC Networking Services for Windows V1.0
  AnyNet APPC over TCP/ IP V1.0 for Windows



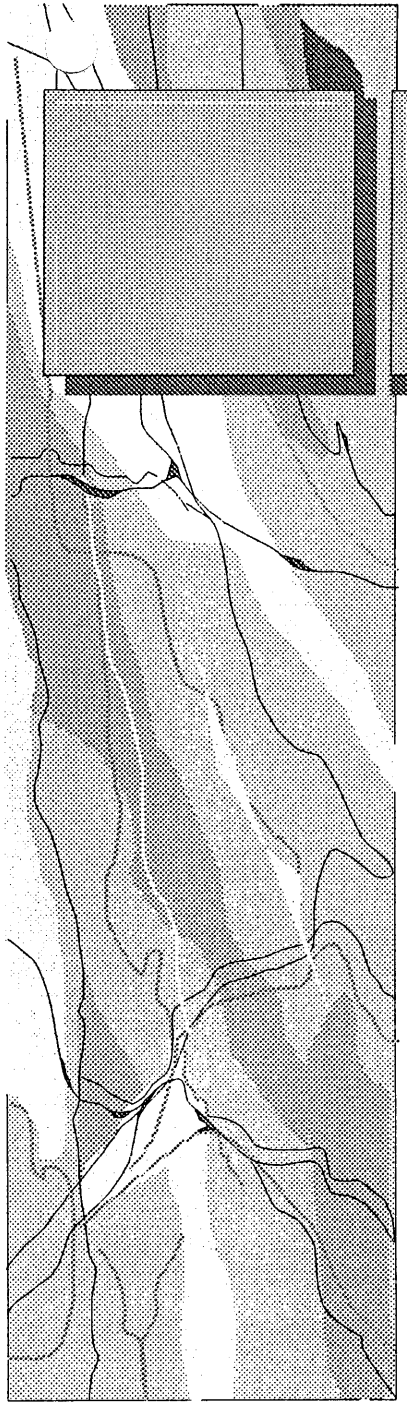
Konfiguration/ Installation

- Lizenbestandteil sind CM Server u.
  OS/2 Access Feature
- Vertrieb erfolgt ausschließlich auf CD ROM, Diskettenimages für Clients können erstellt werden
- CM Folder sind 32-Bit
- Die Oberfläche wurde neu geordnet in:
  -Problem Determination
  -Utilities
  -Remote Operations
  -Productivity



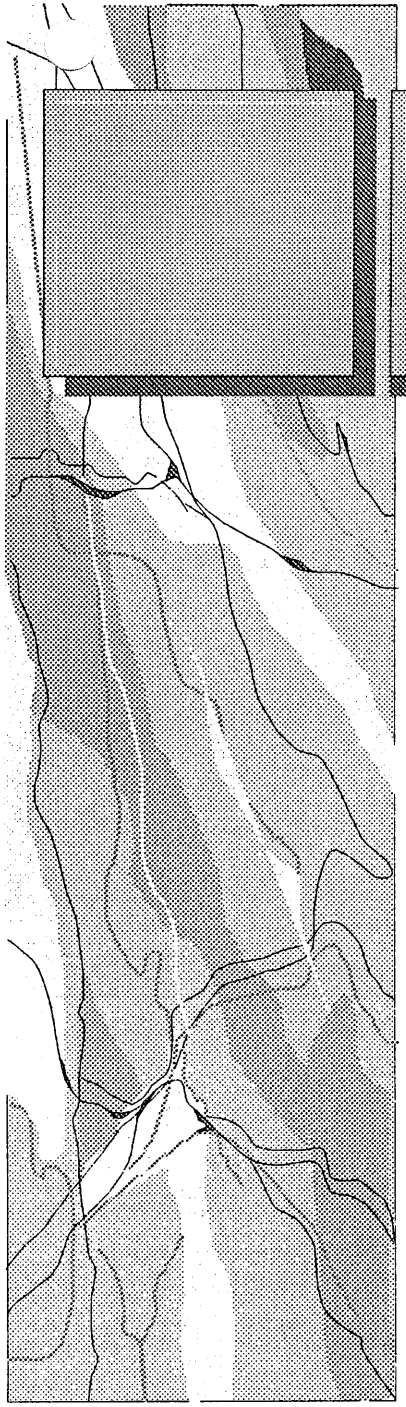
HPR (High Performance Routing)

- HPR wird im CM lediglich durch die Checkbox im Linkprofil aktiviert
- HPR des CM beinhaltet:
  -Rapid-Tranport Protocol (RTP)
  -Automatic Network Routing (ANR)
  -Adaptive Rate Based (
  flow and congestion Control
  -ANR ist Basisfunktion
  -RTP wird von tranport option unterstützt
- Control flows over RTP unterstützt CP-CP Session über RTP Connection bei CM NICHT



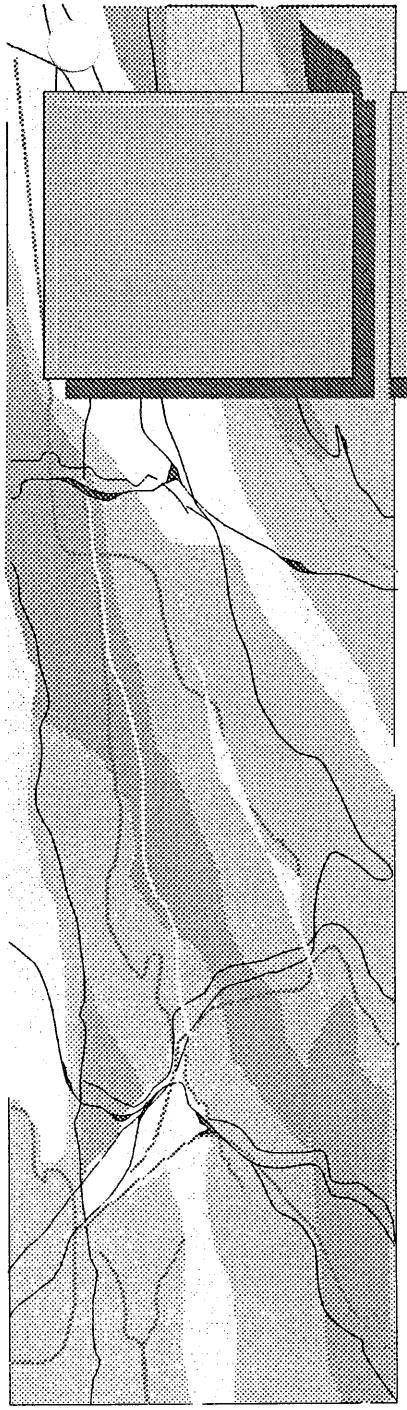
HPR (High Performance Routing)

- HPR des CM wird unterstützt durch
  -IBM Token Ring
  -Ethernet
  -FDDI
  -LAN/ISDN
  -Frame Relay (erfordert RouteXpander/2)
- HPR - Zusammenfassung
  -schnelle Übertragung
  -optimale Routenwahl um def. Links
  -Gewährleistung des Datenflusses durch
  höchste Linkauslastung
  - Übertragung von non-SNA Traffic



SNA Tranmission Priority

- Transmission Priority über einen Link für die LU 0, 1, 2, 3, 6.2, gesteuert über den Mode einer Session.
- Modi werden über COS übertragen
- Modi sind:
  -Network (höchste Priorität, für session control data, pcing messages u. CPSVCMG u.s.w.)
  -High (für interactice class, #INTER,#INTERSC)
  -Medium (für session data , wie #CONNECT)
  -Low (für Sessions, wie #BATCH)
- Deep adapter können zugeordnet werden



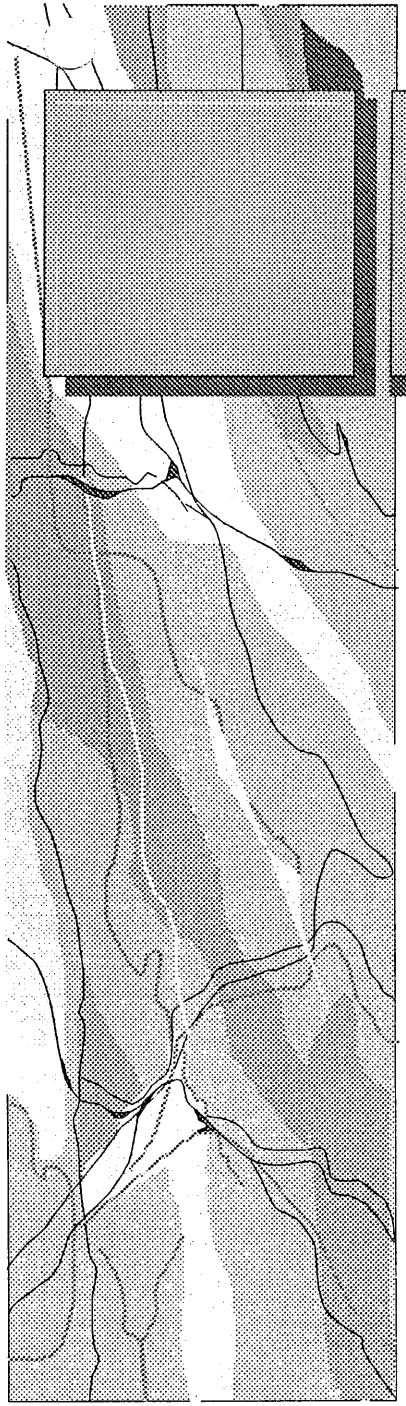
Security Erweiterungen

- LU 6.2 Bind Security
  -schrittweise Migration zum CM
  -message flow (PLU<=>SLU) ist gleich,
  FMH12 Rahmen sind verschieden
- LU 6.2 Session Level Encryption
  -Datenschutz zwischen APPC Anwendungen
  über CCA (Common Cryptgraphic Architecture)
  in Verbindung mit der IBM TSS (Transaction
  Security System)
- erforderlich sind A4755 oder LANDP/2 Server
  mit TSS Security Server

TDU (Topology Database Uptdate)

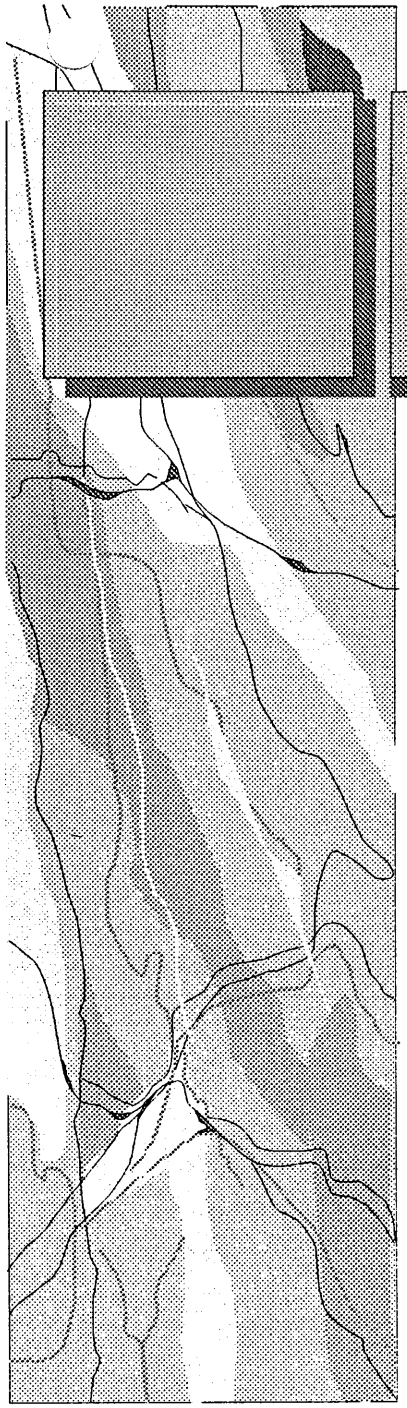
- Parallel Topology DB Update Processing
  -Sendung der TDU erfolgt nacheinander, sollte in dieser Folge eine Verbindung nicht verfügbar sein, wird weiter TDU angehalten
  -CM umgeht dieses Problem und arbeitet TDU's über die funktionstüchtigen Links ab

- Topology DB Update Integrity
  TDU wird mit Time Stamp versendet, überflüssige incoming TDU werden vernichtet



API Erweiterungen

- CM/2 V. 1.11 API's werden weiter unterstützt
- keine Erweiterungen für 16 Bit API's
- unterstützt werden: IBM CSet++ Compiler
  Borland C++ Compiler
  andere Compiler
- erweiterter CPI-C - Support
- EHLLAPI und SRPI werden durch PCOM unterstützt



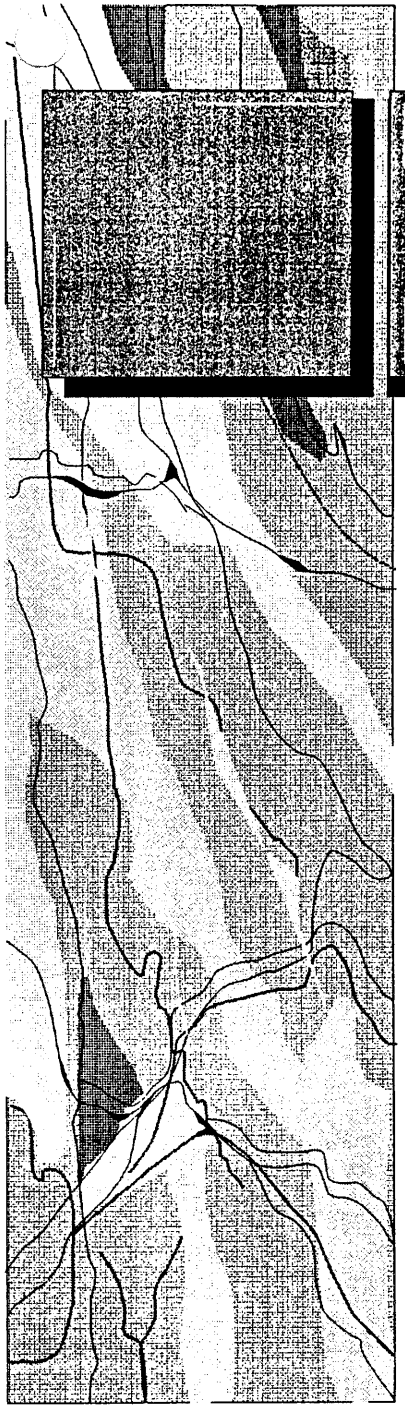
Information Notebook

- neues Information NoteBook hilft beim Einstieg
- Glierungspunkte sind:
  -Benutzerhinweise

  -CM README

  -Multi-protocol Support

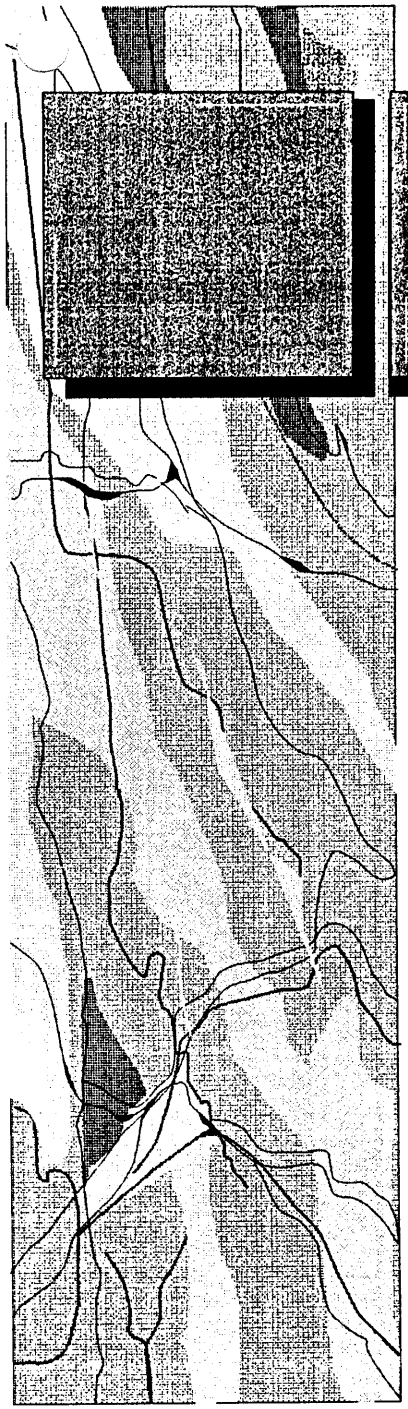
  -Programming Support



Education '96

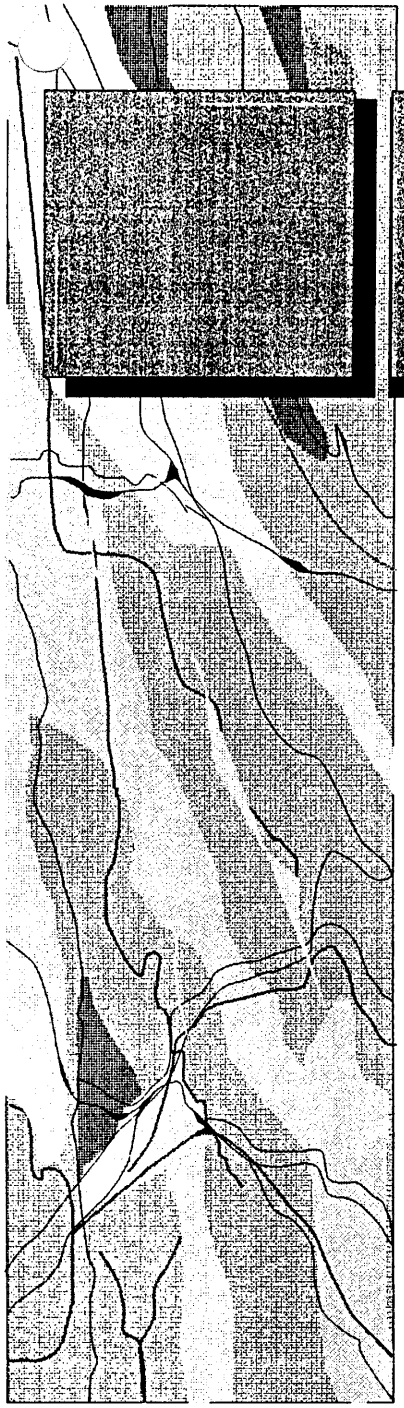
- 78JT0 (Netzwerkarchitekturen u. Protokolle
  OSI, TCP/IP, SNA Subarea, APPNHPR)
- Dauer: 2 Tage
- Termine und Locationen

Böblingen:
12.02. 13.30 bis 14.02. 12.00
02.05. 10.00 bis 03.05. 17.00
23.09. 13.30 bis 25.09. 12.00
11.11. 10.00 bis 12.11. 17.00



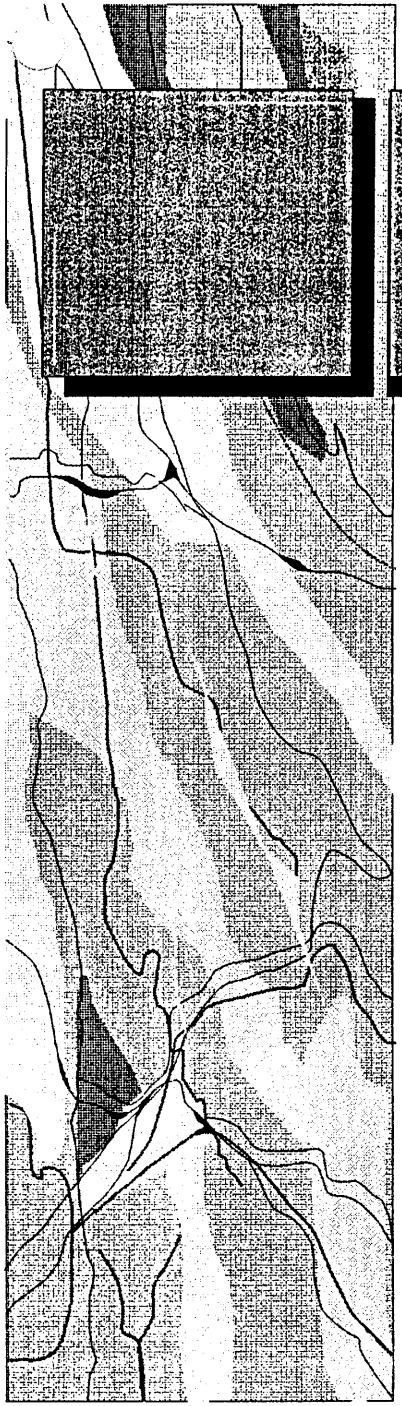
Education '96

- 78JT1 (PS/x u. PC am LAN u. WAN
  MPTS, LSP, ISDN, analoge DFÜ)
- Dauer: 2 Tage
- Termine und Lokationen:
  Berlin:
  11.03. 13.30 bis 13.03. 12.00
  13.05. 13.30 bis 15.05. 12.00
  05.08. 13.30 bis 07.08. 12.00
  04.11. 13.30 bis 06.11. 12.00



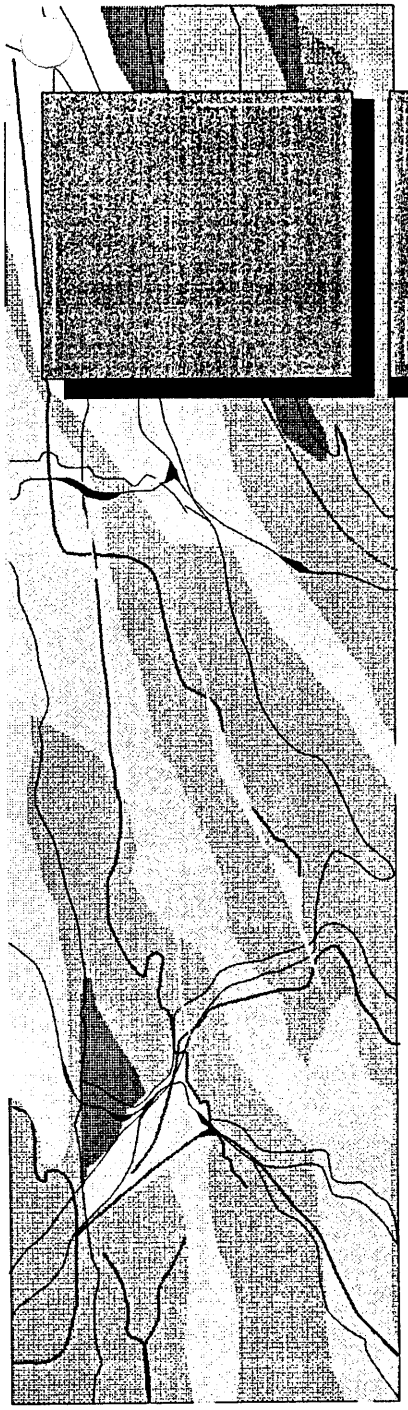
Education '96

- 78J83 (CM/2 V. 1.11, CM Server für OS/2 Warp, OS/2 u. Win Access Feature, PCOM)
- Dauer: 4 Tage
- Termine und Lokationen:
  Böblingen:
  05.02. 13.30 bis 09.02. 12.00
  06.05. 13.30 bis 10.05. 12.00
  22.07. 13.30 bis 26.07. 12.00
  07.10. 13.30 bis 11.10. 12.00
  02.12. 13.30 bis 06.12. 12.00



Education '96

- 78J83 (CM/2 V. 1.11, CM Server für OS/2 Warp, OS/2 u. Win Access Feature, PCOM)
- Dauer: 4 Tage
- Termine und Lokationen:
  Berlin:
  19.02. 13.30 bis 23.02. 12.00
  15.04. 13.30 bis 19.04. 12.00
  24.06. 13.30 bis 28.06. 12.00
  02.09. 13.30 bis 06.09. 12.00
  18.11. 13.30 bis 22.11. 12.00



Education '96

- 78J83 (CM/2 V. 1.11, CM Server für OS/2 Warp, OS/2 u. Win Access Feature, PCOM)
- Dauer: 4 Tage
- Termine und Lokationen:

  Hamburg:

  11.03. 13.30 bis 15.03. 12.00

  05.08. 13.30 bis 09.08. 12.00

  Mainz:

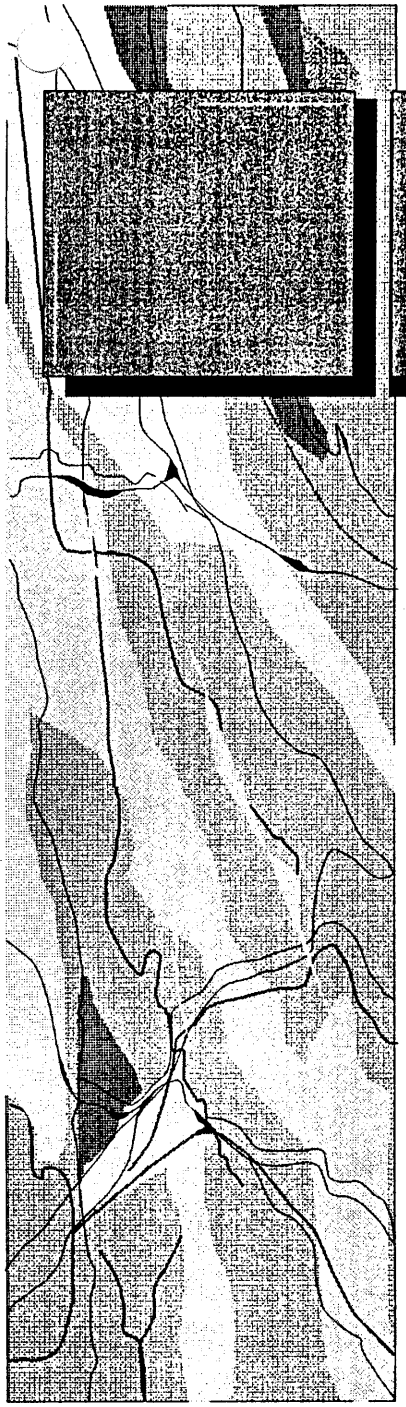
  25.03. 13.30 bis 29.03. 12.00

  20.05. 13.30 bis 24.05. 12.00

  10.06. 13.30 bis 14.06. 12.00

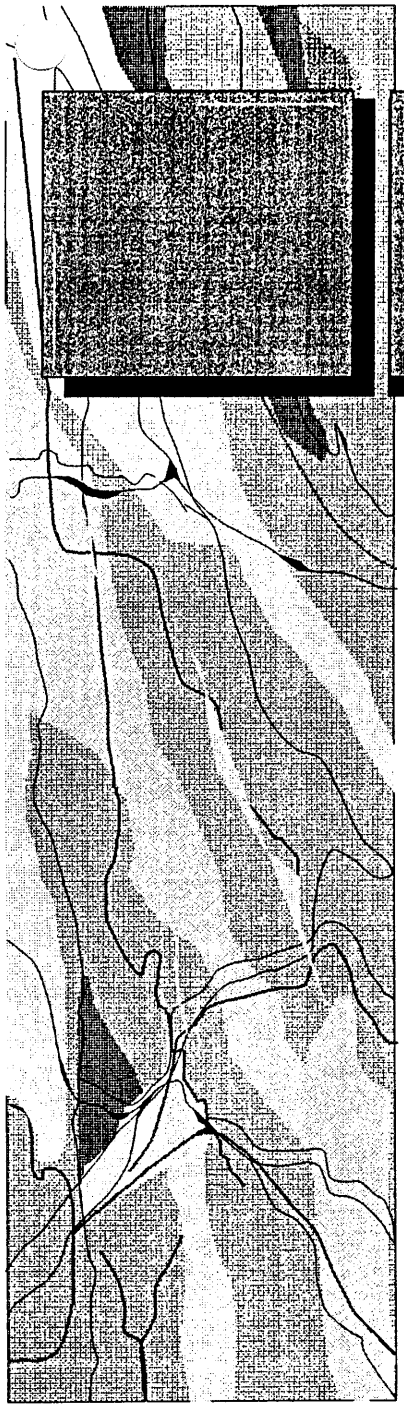
  08.07. 13.30 bis 12.07. 12.00

  21.10. 13.30 bis 25.10. 12.00



Education '96

- 78J83 (CM/2 V. 1.11, CM Server für OS/2 Warp, OS/2 u. Win Access Feature, PCOM)
- Dauer: 4 Tage
- Termine und Lokationen:
  Neuss:
  22.04. 13.30 bis 26.04. 12.00
  04.11. 13.30 bis 08.11. 12.00
  Dresden:
  16.12. 13.30 bis 20.12. 12.00
  München:
  19.08. 13.30 bis 23.08. 12.00

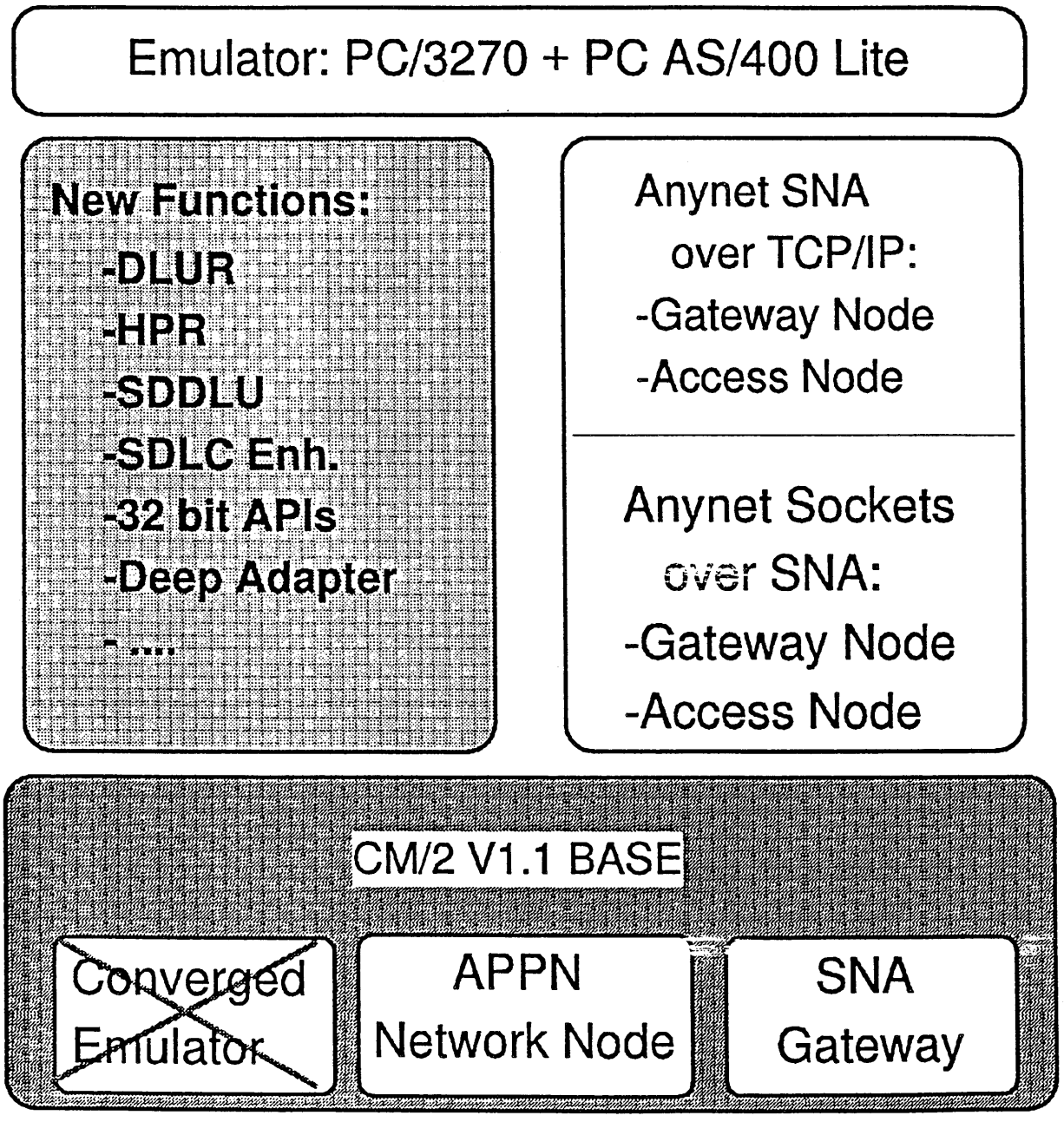


Education '96

- 78J56 (Personal Communications ; DOS, WIN OS/2)
- Dauer: 3 Tage
- Termine und Lokationen:
  Berlin:
  09.04. 13.30 bis 12.04. 12.00

  Böblingen:
  26.02. 13.30 bis 29.02. 12.00
  12.08. 10.00 bis 14.08. 16.00

CM Server Components



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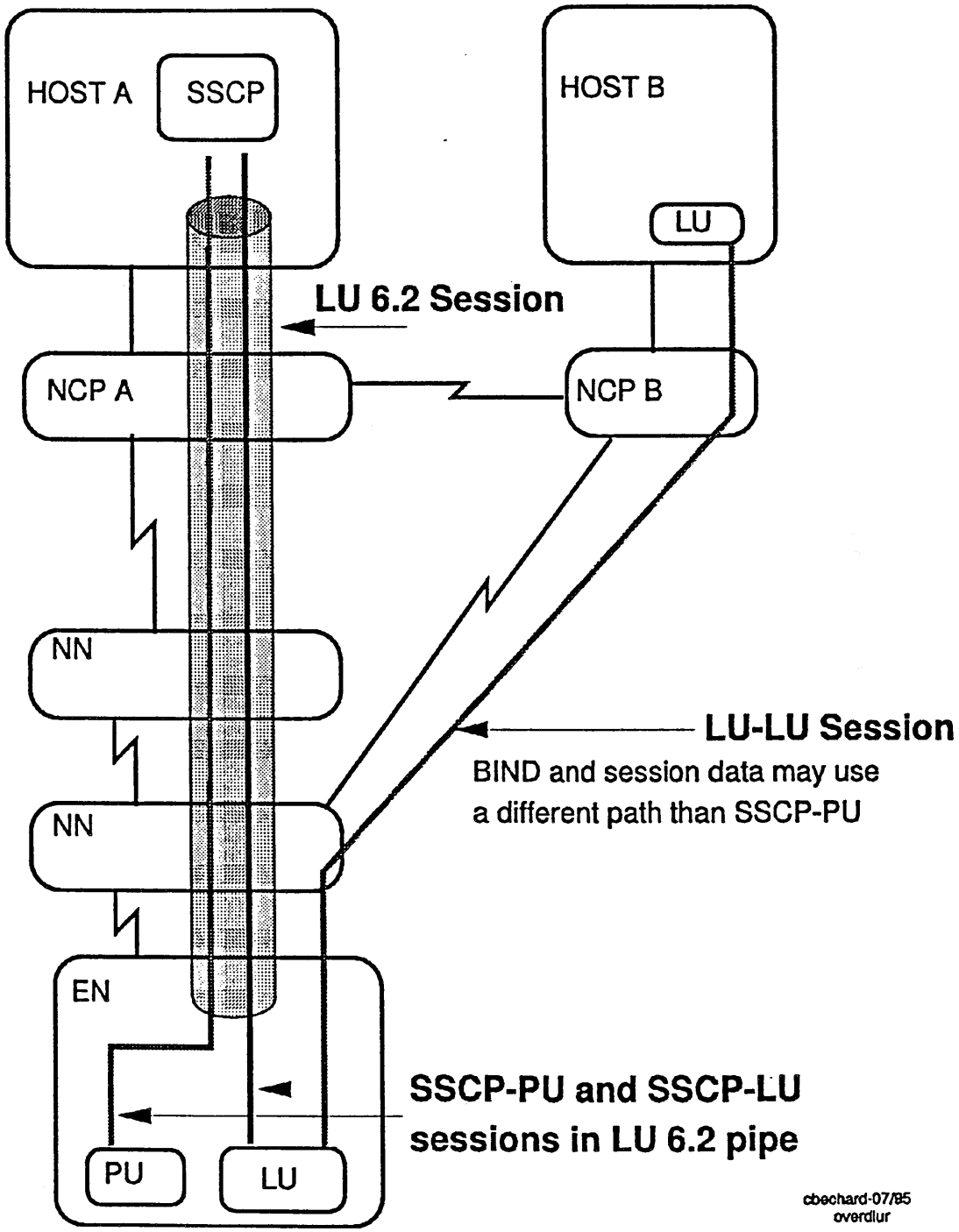
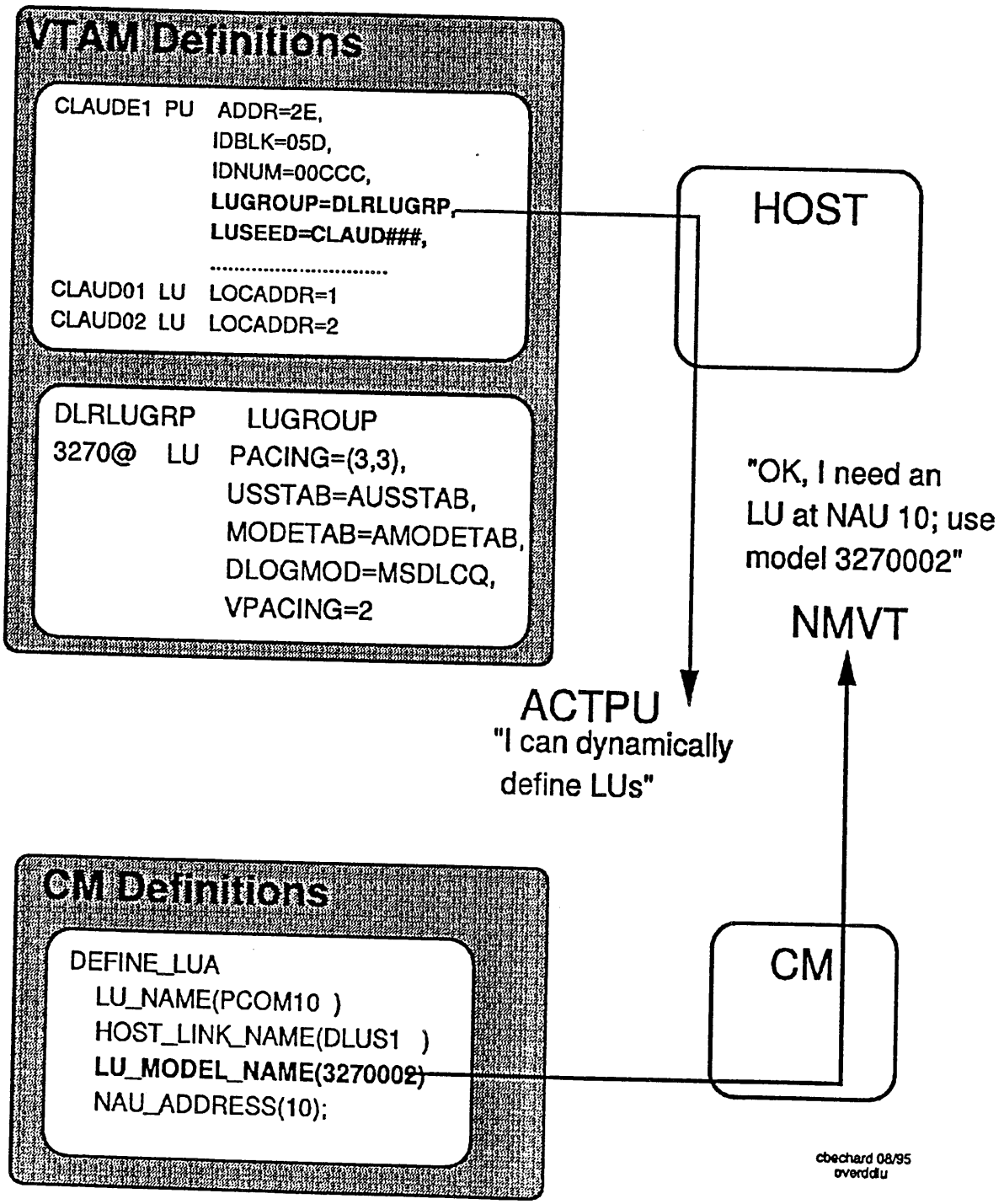
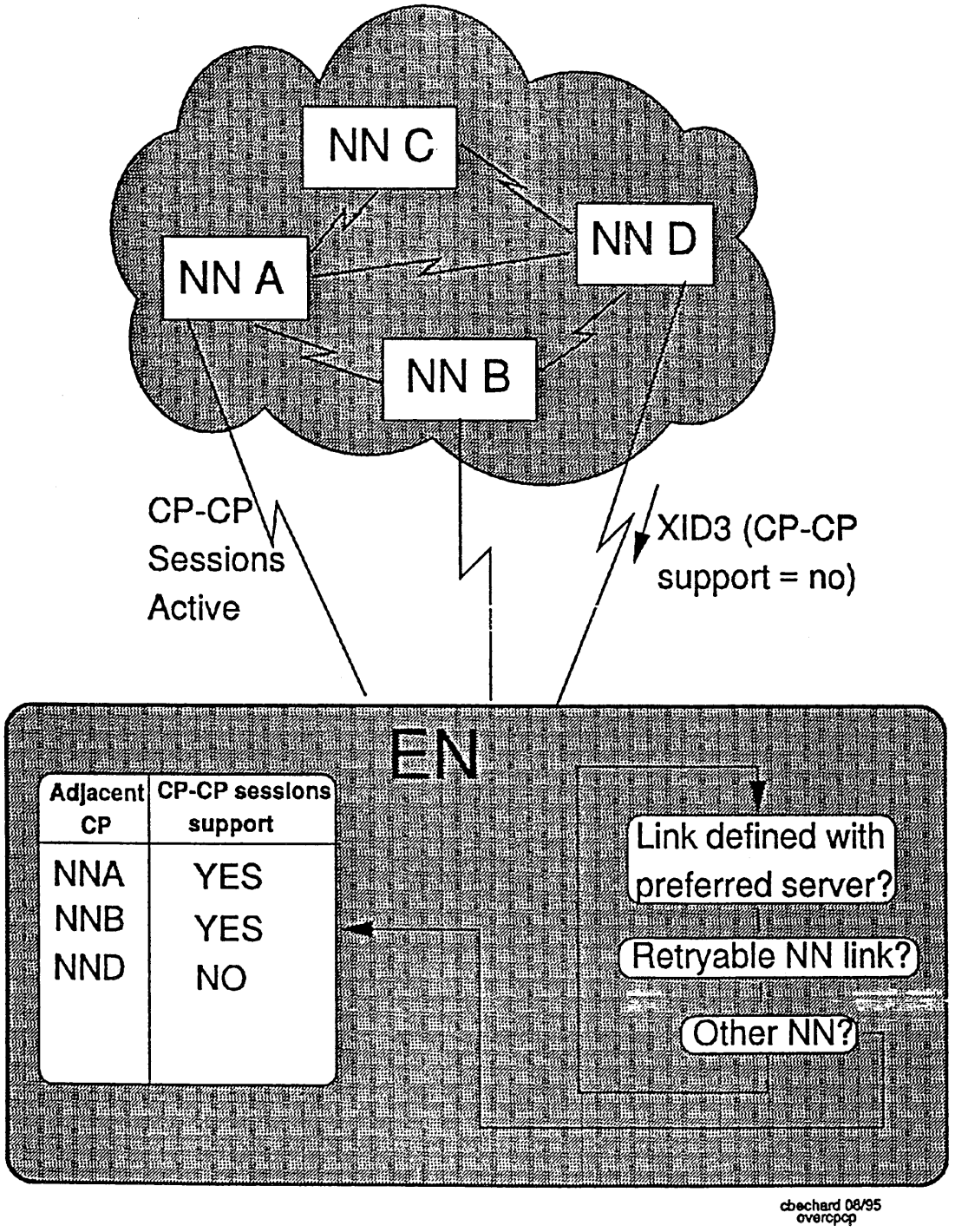


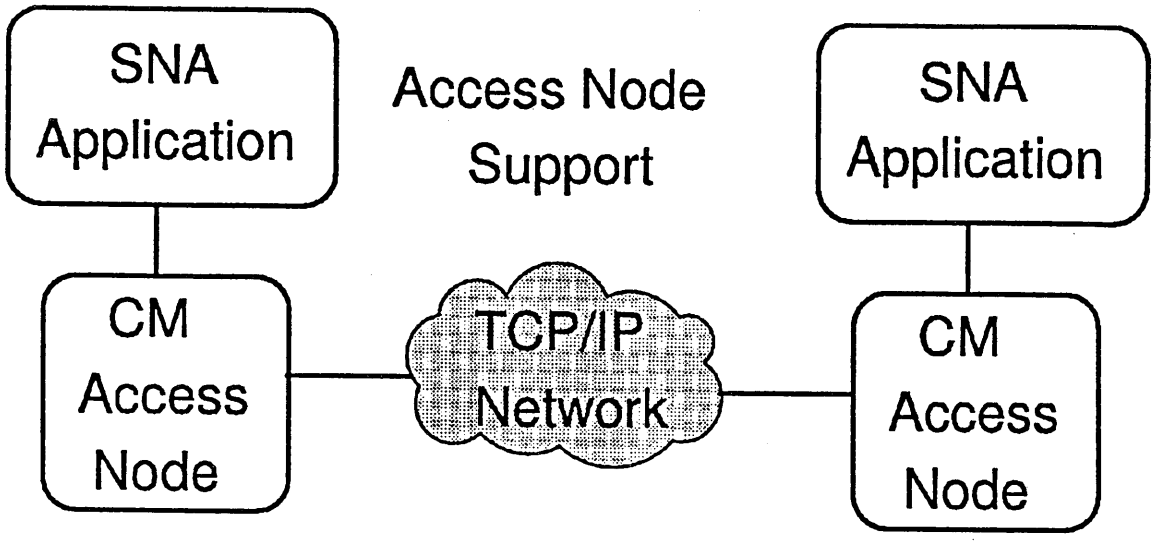
SDDLU Overview

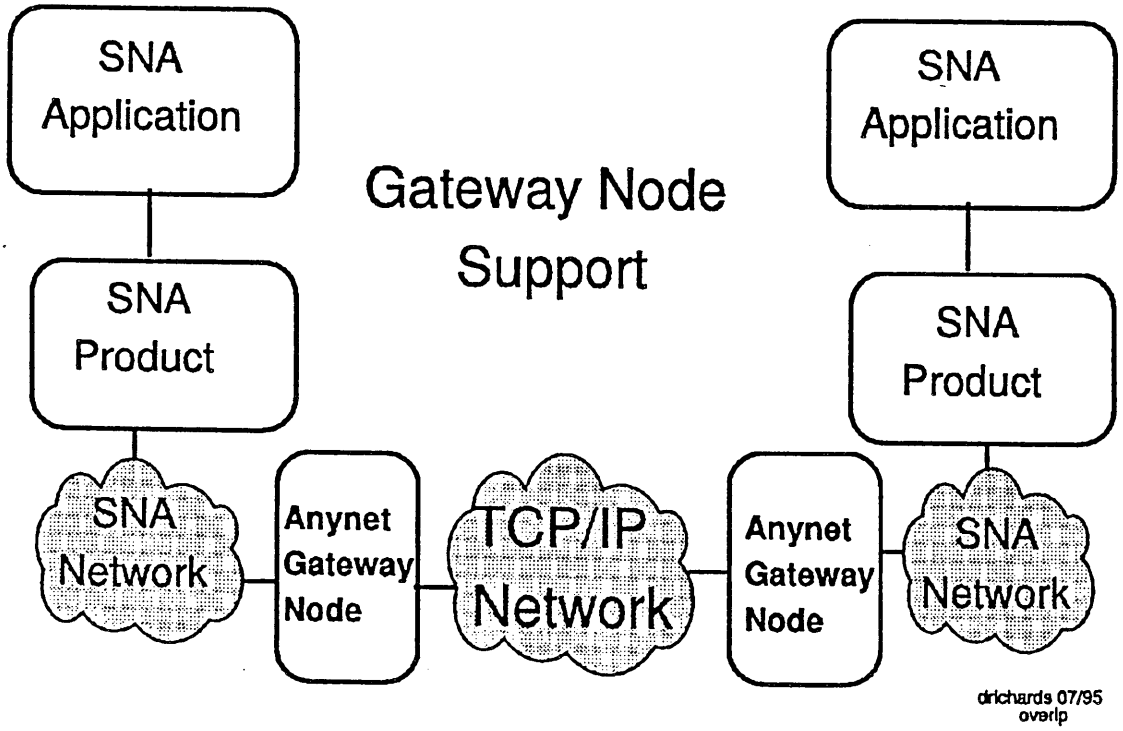


CP-CP Session AutoReactivation

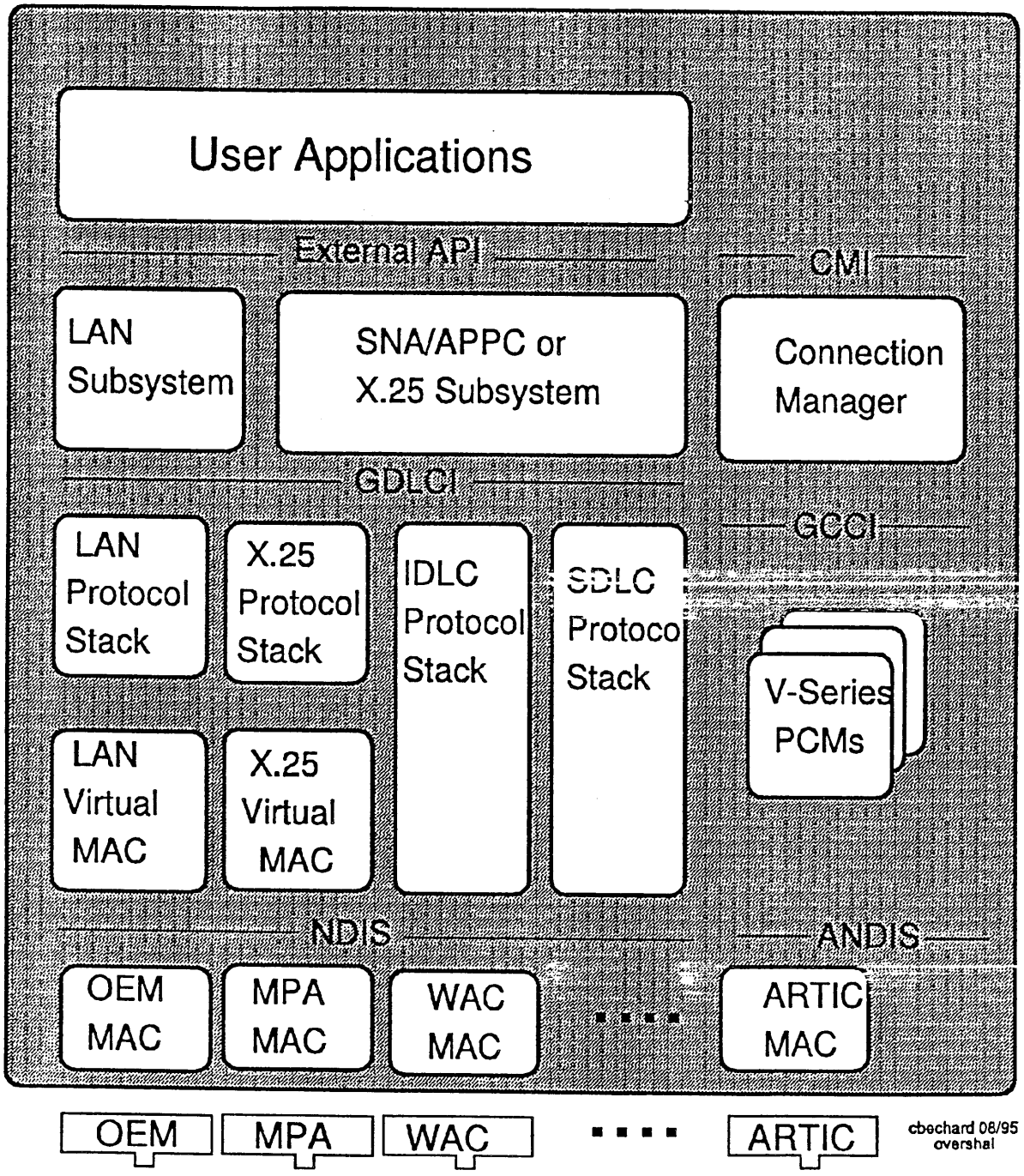


AnyNet SNA over TCP/IP

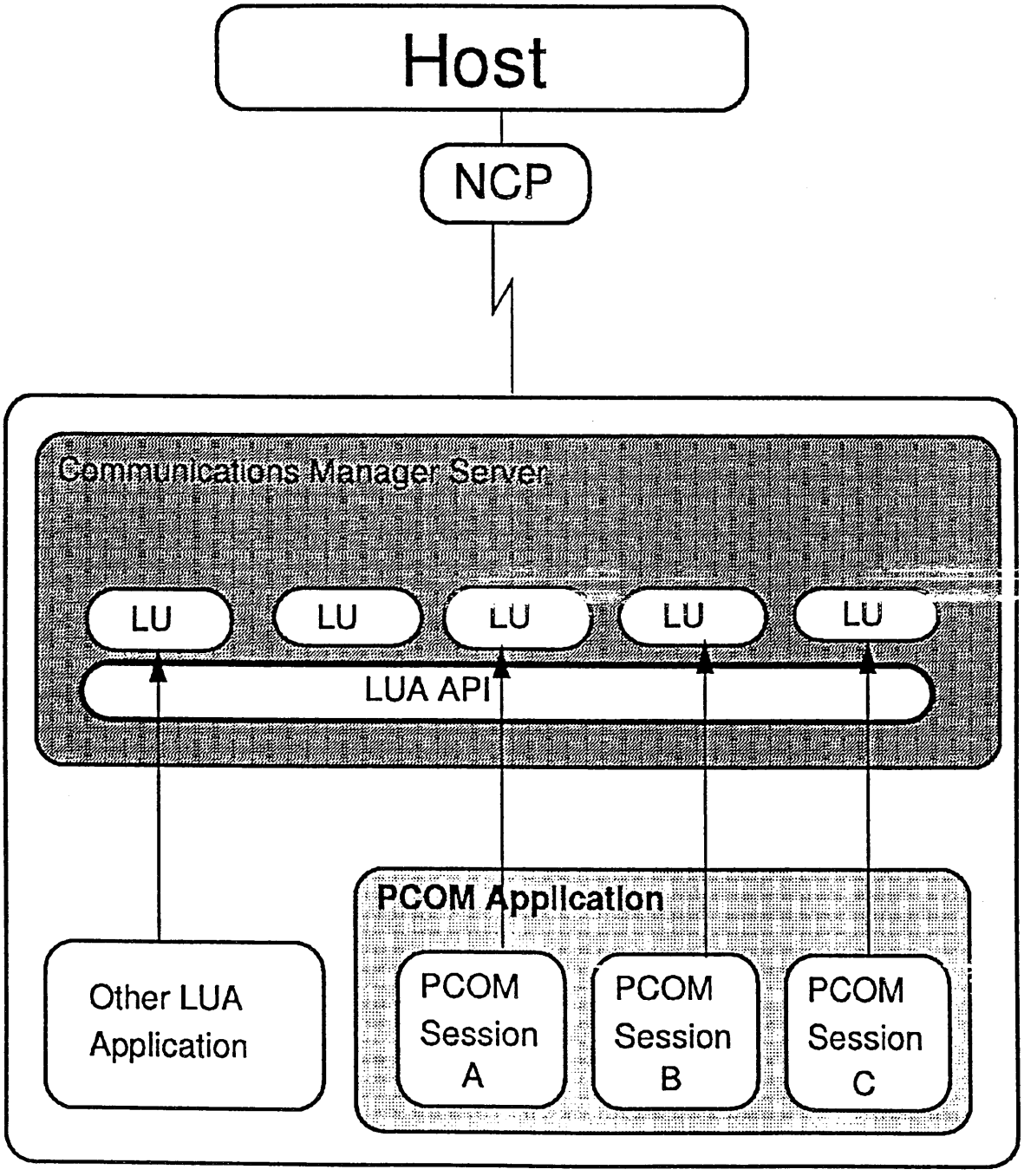




Shallow Adapter Support



Emulator Support



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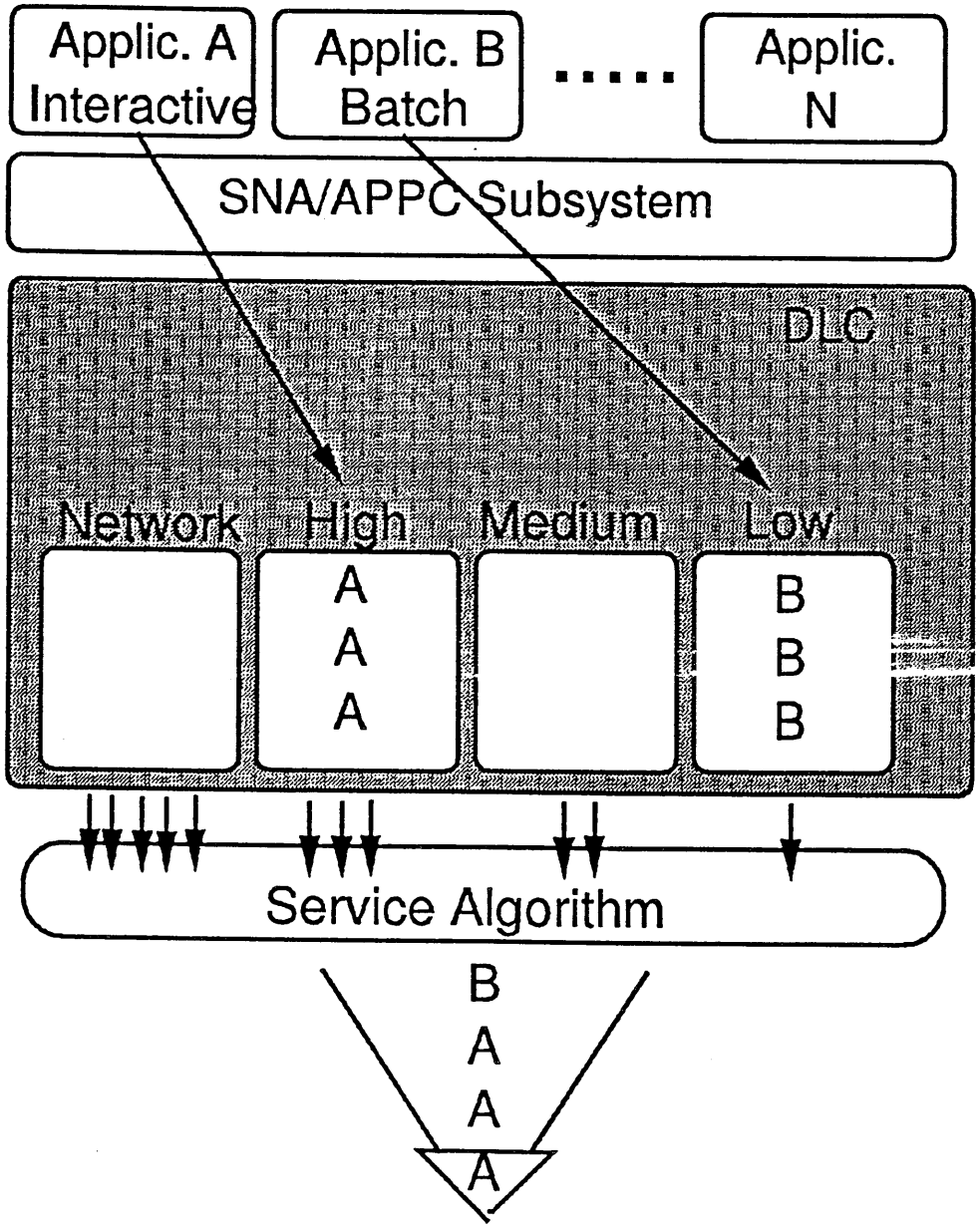
SNA Transmission Priority



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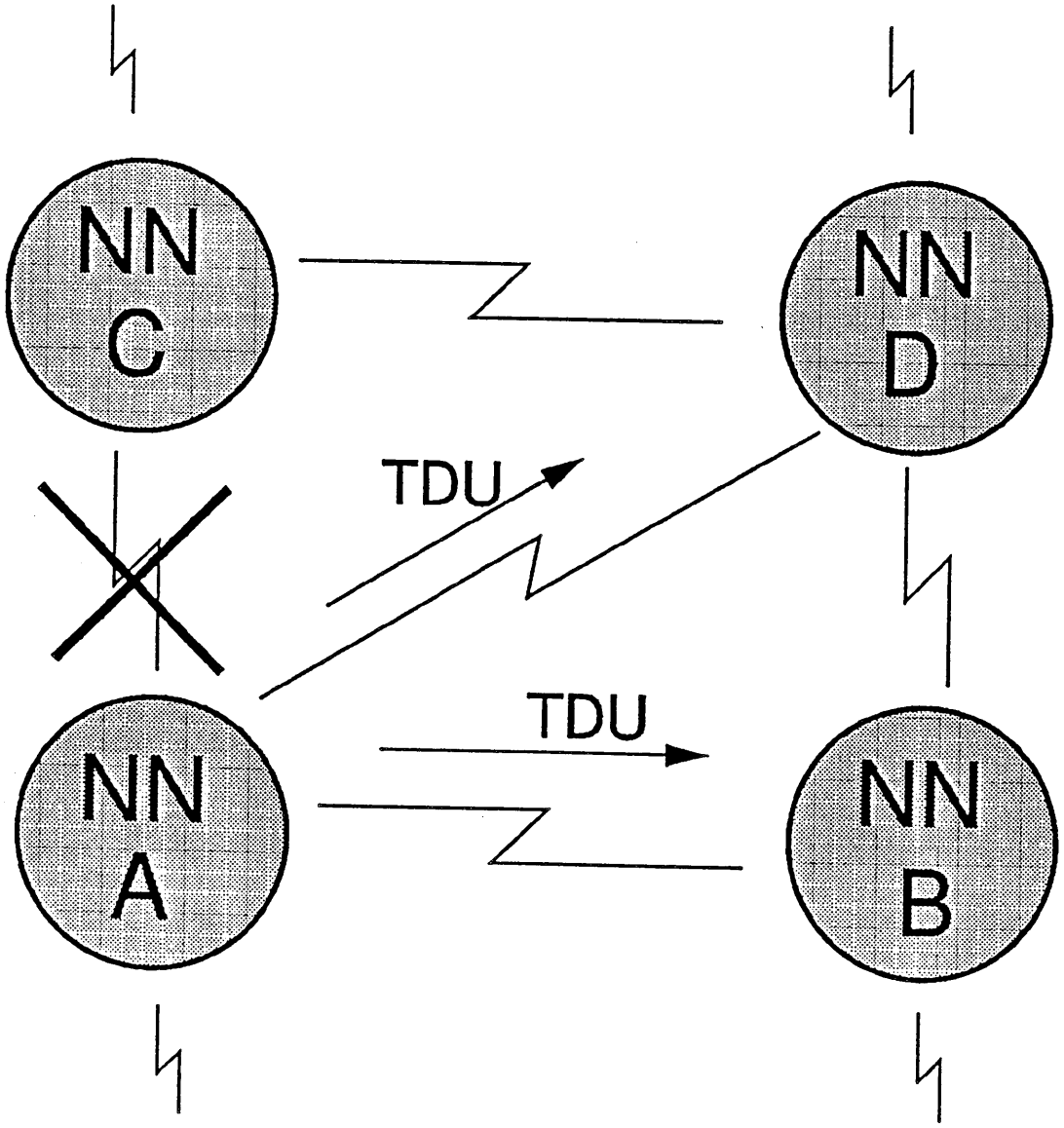
Topology Database Updates



OS/2-Aktuell Symposium

IBM OS/2 WARP

Ziele und Teilnehmer

Das Betriebssystem OS/2 erleichtert mit seiner neuen Version OS/2 Warp Connect das Bedienen und Anpassen der objektorientierten Arbeitsoberfläche und vereinfacht deutlich die PC-Integration in verschiedene Netzwerkumgebungen. Dabei spielt es keine Rolle, ob Sie mit Ihrer Workstation als Client direkt, sozusagen per Kabel in das Netz eingebunden sind oder ob Sie über eine remote Verbindung, z. B. per Modem Kontakt zu Ihrem Netz suchen (IBM LAN Distance). In dieser Veranstaltung wollen wir Ihnen auch OS/2 Warp auf der neuen IBM PowerPC Plattform vorstellen.

Die neuesten Informationen und Trends zum Thema OS/2 möchte Ihnen dieses Symposium durch mehrere, parallel ablaufende Vorträge anbieten. Einen genauen Ablaufplan erhalten Sie 14 Tage vor Beginn der Veranstaltung.

Mit dieser Veranstaltung, die mit Beteiligung der IBM PSM durchgeführt wird, wenden wir uns an Manager und Verantwortliche in den EDV-Abteilungen, aber auch an alle, die an neuesten Informationen zum OS/2 Betriebsystem interessiert sind.

Inhalt

- OS/2 Warp Connect und OS/2 Warp Server
- LAN Distance Connection Server für OS/2
- Kommunikation im OS/2 Client-Server-Umfeld
- OS/2 Strategie und neue Versionen
- Vergleich Personal Communications und CM/2
- Lotus Notes unter OS/2
- VisualAge C++ 3.0 unter OS/2 Warp
- neue OS/2 Produkte (DB2 für OS/2 V. 2.x, u. a.)
- Installation und Konfiguration OS/2 Warp Connect
- OS/2 Problem Determination, Tips und Tricks
- Überblick und Architektur IBM PowerPC
- OS/2 Warp Connect (PowerP[illegible] Edition)
- Erfahrungen bei Portierungen nach OS/2 für PowerPC

Termin

20. 11. 1995, 13.00 Uhr bis 22. 11. 95, 13.00 Uhr

Veranstaltungsort

Estrel Residence Hotel
Sonnenallee 225
12057 Berlin
Telefon 030/68 31-0
Telefax 030/68 31-23 45

Wir bitten Sie, die Zimmerreservierung im Hotel unter dem Stichwort „OS/2 Aktuell" selbst vorzunehmen. Der Preis beträgt pro Nacht 159,– DM (incl. MwSt). Sie können ohne Aufpreis Ihre Partnerin/Ihren Partner mitbringen (nur Frühstückszuzahlung à 18,– DM). Sie haben auch die Möglichkeit, bereits am Samstag, den 18. 11. 95 zu den gleichen Konditionen anzureisen. Die Veranstaltung findet im gleichen Gebäudekomplex in den Kongreßräumen statt.

Teilnehmerpreis

DM 1630,– zzgl. MwSt.
Die Gebühr enthält sämtliche Veranstaltungsunterlagen, zwei Mittagessen, ein Abendessen und Getränke während der Ver[illegible]nstaltung.

Anmeldung (Kurs-Nr. 78J17)

IBM Deutschland
Bildungsgesellschaft mbH
Bildungsservice, Laatzener Str. 1
30532 Hannover
Tel. 05 11/5 16-45 55
Fax 05 11/5 16-39 40 bzw.
DIAL IBM oder
Btx *528 222 012#

Durchführung

IBM Deutschland
Bildungsgesellschaft mbH
und
WBI WeiterBildungsgesellschaft für Informationstechnik mbH
Wolfener Str. 22, 12681 Berlin
Antje Webel Tel. 030/9 38 94-226
Joachim Schulze Tel. 030/9 38 94-228

Communications Manager/2 Tuning

Martin Braun
IBM Deutschland Informationssysteme GmbH
FI Vertrieb Kredit NW 27
Nevinghoff 3
48147 Münster

CM/2 Tuning

- Tuning: notwendig und sinnvoll ?
- Externe Einflußgrößen auf die CM/2 Performance
- Tuning-Stellschrauben in CM/2
- Tuning für spezielle Einsatzzwecke
- Literatur zum Thema

CM/2 Tuning-Motivation

- Zielsetzung:
  - Durchsatz verbessern / maximieren
  - Antwortzeit für Emulatoranwendungen verbessern
  - benötigte Ressourcen minimieren
  - Anwendungsverhalten optimieren
- Maßnahmen:
  - Plattenplatz einsparen ?
  - PC-"Geschwindigkeit" verbessern ?
  - Datenkompression einsetzen ?
  - dediziertes CM/2-System anstatt "allround Server" einsetzen ?
  - OS/2, MPTS/LAPS tunen ?

Externe Einflußgrößen

- Hardware:
  - Prozessortype und -takt ! Extrem wichtig für Gateway !
  - Ausstattung des PC mit Hauptspeicher
  - LAN-Adaptertype (z.B. Shared RAM vs. Busmaster/DMA)
- Software:
  - OS/2:
    - *CM/2 {NN, Gateway} möglichst **nicht zusammen mit anderen prozessorintensiven Anwendungen** auf dem gleichen System laufen lassen*
    - *Gesamtressourcenbedarf ermitteln, Hardwareausstattung entsprechend wählen*
  - MPTS/LAPS (in LAN Umgebungen)

Externe Einflußgrößen

- Mainframe-Umgebung (System/390)
  - VTAM/NCP Parameter
  - Einzelbenutzer-Arbeitsplatz oder SNA Gateway
- AS/400-Umgebung
  - OS/400 Parameter
- Alle Umgebungen:
  - DFV-Netztopologie (hierarch. SNA, APPN, TCP/IP)
  - WAN-Leitungsgeschwindigkeit
  - lokal oder entfernt angeschlossene Partnersysteme
  - Datenübertragungsprotokoll
  - LAN: Ethernet, Token Ring, PC Netzwerk (Geschwindigkeit)
  - Anwendungen für LU 6.2 oder non-LU 6.2

MPTS/LAPS Tuning

- Adapter-Parameter
- IEEE 802.2-Parameter
- NetBIOS-Parameter

MPTS/LAPS Tuning

- Adapter-Parameter
  - Early Token Release (bei 16 Mbit/s)
  - Max. number of queued transmits (MAC MAXTRANSMITS)
  - Number of adapter transmit buffers -2
  - Transmit buffer size
    - *auf den größten zulässigen Wert einstellen, wenn größtmöglicher Durchsatz erzielt werden soll.*
    - *bei 4 Mbit/s: 4.456 Bytes*
    - *bei 16 Mbit/s: 17.952 Bytes*
    - *Empfehlung: Max. I-Field + 36 Bytes (MAC Header)*

Dynamische Anpassung auf I-Field.

MPTS/LAPS Tuning

- IEEE 802.2-Parameter
  - Maximum SAPs
  - Maximum number of users (of 802.2 API)
  - Timer Values
  - Maximum transmits (LLC MAXTRANSMITS)
  - Minimum transmits
  - Timer Control Blocks (Default 64 beachten)
  - Maximum queue elements

↓
um erhöhen für Gateway > 64 Stations

MPTS/LAPS Tuning

- IEEE 802.2 - Parameter
  - **Timer** werden multipliziert mit Timer Multipliers (1-5 Gruppe 1, 6-10 Gruppe 2) und einem Wert von 40 Millisekunden (nicht veränderbar)
  - Timer Multiplier für CM/2 sind:
    - *Ti = 10*
    - *T1 = 5*
    - *T2 = 2*
  - Berechnungsbeispiele
    - *Ti = ((10-5) * **255** * 0.04) = 51 Sekunden*
    - *T1 = (5 * **15** * 0.04) = 3 Sekunden*
    - *T2 = (2 * **3** * 0.04) = 0.24 Sekunden*

Tuning des CM/2 Plattenplatz-Bedarfs

- Ziel: Einsparungen durch Änderungen in der CM/2 Installation und Konfiguration
- Empfohlene Vorgehensweise:
  - Remove communications features (deutsch: Nur Mindesteinrichtungen ...)
    - *CMSETUP /K*
    - *CMUpdateType=6*
  - Distributed Feature Workstations einsetzen
    - *Einsatz nur in LAN*
    - *Voraussetzung: LAN Requester/Server bzw. NetWare Requester/Server*
  - Zusätzliche Funktionen entfernen ...
- Unbedingt berücksichtigen: mögliche Einsparungen an Plattenplatz bei MPTS/LAPS, HELP-Files, Anwendungen etc.

CMSERVER ⇒ LS Server
CMLAN ⇒ LS Requester

Tuning-Stellschrauben in CM/2

- Data Link Control
  - Free unused links
    - *i.V.m. Link Timeout Values (T1, Ti, N2)*
  - Send Window Count
    - *DLC Level, nur PU T2.0*
  - Receive Window Count
    - *i.V.m. T2 Timer*
  - Retransmission Threshold (N2 Timer)
  - Maximum I-field size
    - *36 Bytes weniger als Adapter Transmit Buffer Size*
  - Connection Network Name
  - SDLC: Line Mode Full Duplex

Tuning-Stellschrauben in CM/2

- Mode Definition
  - Class of Service (COS)
    - *z.B. #CONNECT*
    - *Transmission Priority, Cost, Security, Propagation delay, Effective capacity, Logical link weight*
  - Mode Session Limit
  - Receive Pacing Window
    - *Session level pacing (end-to-end)*
    - *Default: Adaptive pacing*
    - *APAR JR08131 für CM/2 V1.11 (in CM2AP111 PACKAGE) für Fixed pacing*
  - Datenkompression
  - RU size (!!!)
    - *Abhängigkeiten bei Datenkompression*

Tuning des SNA Gateways in CM/2

- Fixed Pacing
  - *VTAM Logmode Table*
  - *Switched Major Node Definition*
- Abhängigkeiten / Wechselwirkung mit anderen CM/2 Funktionen
  - *Network Node*
  - *Communications Server (für Dist. Feature Workstat.)*
- Anzahl der LAN-(TR-)Adapter
  - *bei 2 Adaptern: DLC Werte aufeinander abstimmen*
- WAC Adapter für SDLC-Leitungsgeschwindigkeiten größer als 19,2 kbaud
- Multi-drop Lines vermeiden
- Datenkompression: für Gateway ohne Bedeutung

CM/2 Tuning - Zusammenfassung

- immer die Gesamtsystemumgebung betrachten, nie CM/2 isoliert
- zuerst Vorgaben von Partnersystemen (VTAM/NCP, OS/400) erfragen und verifizieren
- im LAN: Wirkungsweise und Zusammenwirken mit LAPS berücksichtigen, Kapazität der eingesetzten Brücken analysieren
- WAN-Verbindungen: bei niedrigen Leitungsgeschwindigkeiten möglichst keine Modem-Multiplexer o.ä. einsetzen
- PCs für einzelne Aufgaben (NN, Gateway) dedizieren, wenn möglich

GG24-3553	OS/2 EE V 1.2 Cookbook: Communications SNA Environment
GG24-3602	OS/2 EE V 1.3 Enhancements: Performance and Capacity Optimization
ZZ81-0234	LAN SNA HOST Gateways: Design for Throughput, Performance and Availability
GG24-3876	IBM Extended Services for OS/2: Communications Manager New Features and Enhancements
SC31-6168	Network Administration and Subsystem Management Guide
GG24-3958	CM/2 Version 1.0 New Features
GG24-4005	Integration of Common OS/2 Communications Products
GG24-4142	CM/2 V 1.11 V 1.11 Enhancements
GG24-4183	CM/2 Concepts, Scenarios and PD Examples
GG24- 4385	CM/2 SNA Phone Connect (V 1.11)
GG24-2537	A CM/2 APPC/APPN Tutorial

GG24-3669	APPN Architecture and Product Implementation Tutorial
GG24-4485	Multi-Platform APPC Configuration Guide
GG66-3243	IBM Extended Services for OS/2 Communications Manager Tuning Guide for the LAPS Feature
ZZ81-0257	Performance Tuning in an X.25 Environment
GG24-3178	LAN Concepts and Products
GG24-2520	NCP Tuning with NTune
SC31-6404	VTAM Network Implementation Guide
GC30-3073	Systems Network Architecture Technical Overview

2217PERF PACKAGE on MKTTOOLS

In Vorbereitung:

GG24-2548	Communications Manager Tuning Guide

ARTe

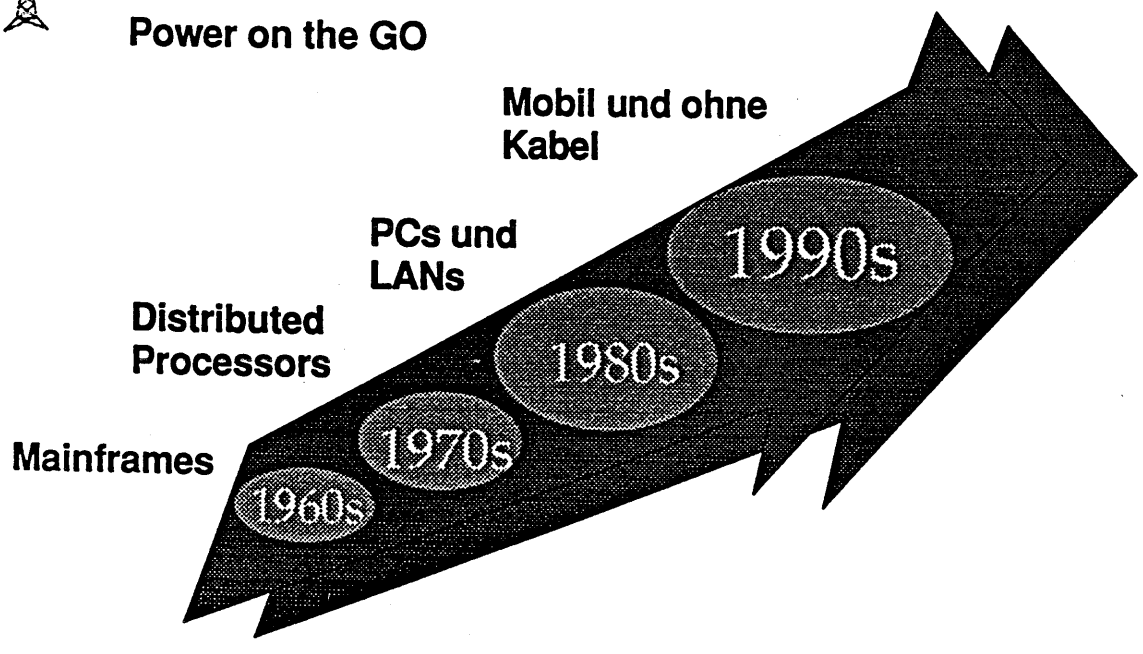
IBM ARTour

die Plattform der IBM für die mobile Datenkommunikation

IBM ARTe
WZ Heidelberg

Systemstrukturen und Netzwerke

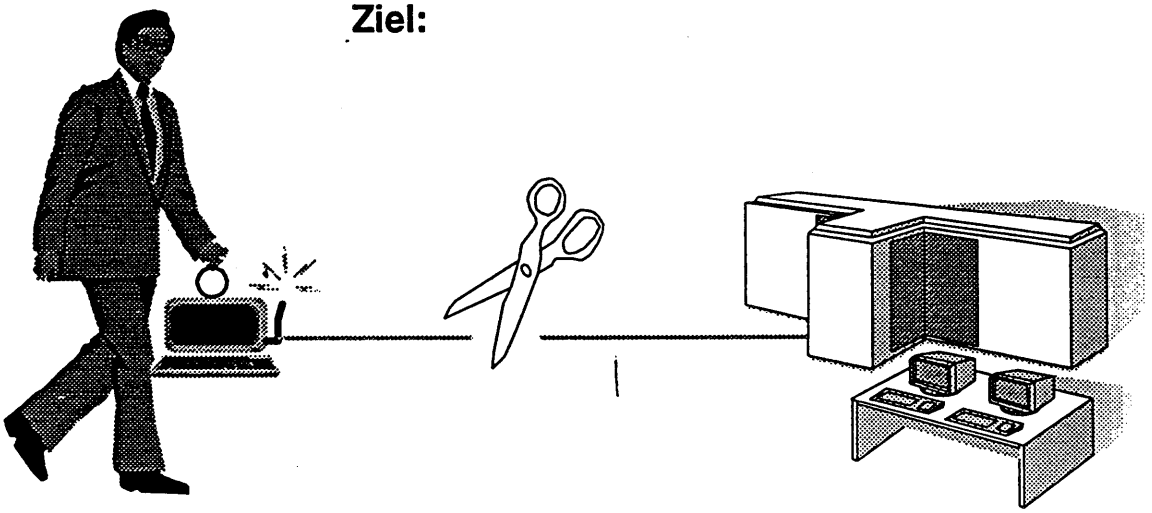
ARTe



Wir machen mobil

ARTe

Ziel:

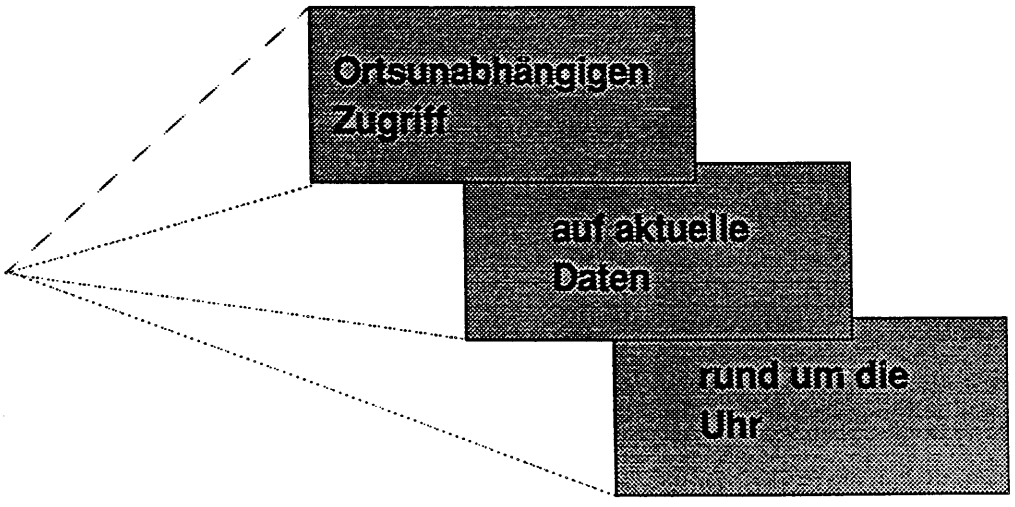


Warum Wireless?

ARTe

"Be mobile and stay in touch!"

Die Mobile Explosion verlangt:



Applikationen

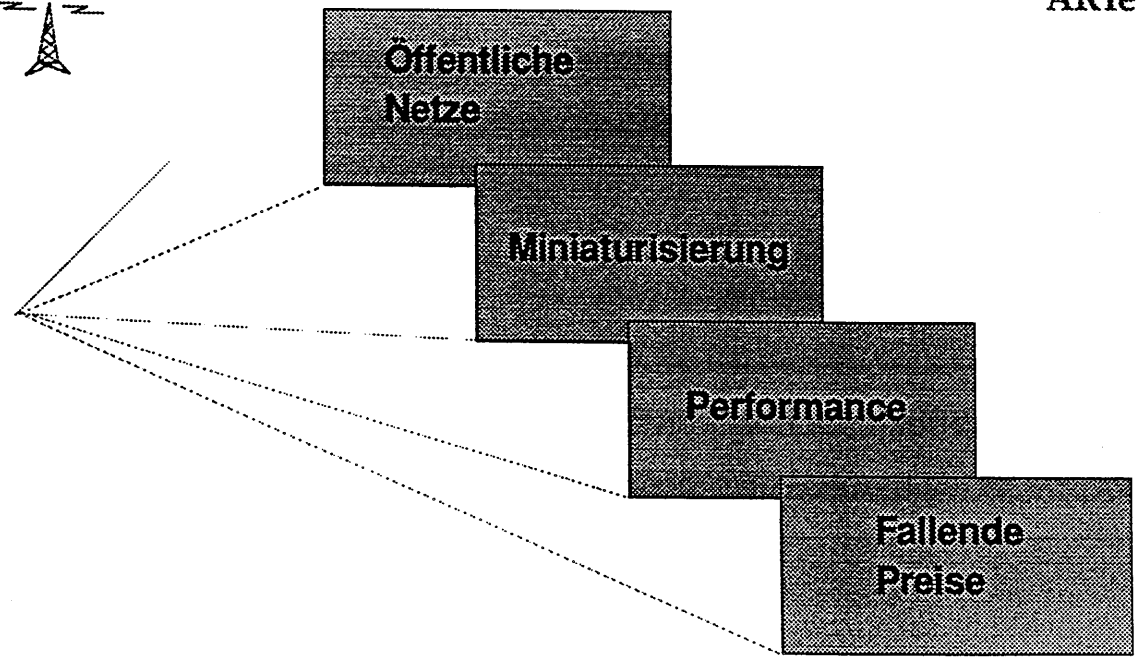
ARTe

- Technischer Außendienst (Wartungstechniker, ...)
- Kaufmännischer Außendienst (Versicherungen, ...)
- Sicherheitskräfte
- Speditionen
- Journalisten
- abgelegene Stationen
- u.a.

- Datenbank-Zugriff
  - Kundenprofil, ...
  - Lagerbestand, ...
  - Produktinformationen, ...
- Flotten-Management
  - Einsatzpläne
  - Status-/Notfallmeldungen
  - Positionsmeldung (GPS)
  - Verkehrsinformation
- E-Mail, File Transfer
- u.a.

Warum jetzt?

ARTe

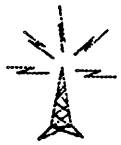


DataTAC (MODACOM)

ARTe

- proprietäre Technologie von Motorola
- Netze in Deutschland, Australien, Singapur, Thailand, ...
- Datendienst
- Paketorientiert
- 9600 bit/s und Zelle
- Übergang ins X.25-Netz (Datex-P)
- Betreiber in Deutschland: DeTeMobil (MODACOM) mit Regelbetrieb seit 6/93

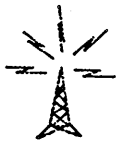
Mobitex



ARTe

- proprietäre Technologie von Ericsson
- Regelbetrieb in UK, NL, Skandinavien, Frankreich, Kanada, (Deutschland)
- Datendienst
- Paketorientiert
- 8000 bit/s und Zelle
- Übergang ins X.25, Mietleitungen
- Betreiber: z.B. RAM in UK, NL, GfD in Deutschland

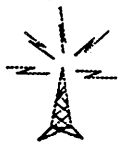
GSM



ARTe

- Europaweiter Standard, verabschiedet durch ETSI (European Telecommunications Standards Institute)
- Heute in Europa, Osteuropa, Asien, China, Indien, Golf-Staaten, Australien, Neuseeland, Afrika
- Sprach- und Datenübertragung
- Übergang ins Telefonnetz
- leitungsvermittelt
- Frequenzbereich: 900 MHz
- Datendienst mit 9600 bit/s
- Betreiber in Deutschland: DeTeMobil (D1) und Mannesmann Mobilfunk (D2)

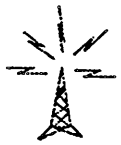
Inmarsat



ARTe

- Organisation der nationalen PTTs
- 4 (8) geostationäre Satelliten
- Weltweite Funkabdeckung
- Inmarsat-A, B, M für gerichtete Satellitenempfänger (z.B. auf Schiffen) konzipiert
- Inmarsat-C mit 600 bps und rundstrahlender Antenne
- Nur Datendienst
- Virtuelle Verbindungen möglich

Modacom Gebühren



ARTe

- einmalige Anschlußgebühr:
  65.-- DM
- volumenabhängige Gebühr:
  0.8 Pfg. pro 36-byte-Segment
- monatliche Grundgebühr pro mobilem Anschluß:
  70.-- bis 80.-- DM bei 1.000 freien 36-Byte-Segmenten
- monatliche Grundgebühr pro Feststation:
  300.-- DM bei 100.000 freien 36-Byte-Segmenten

Gebührenvergleich

ARTe

Datenbankabfrage

mit GSM		mit MODACOM	
ca. 1 min.	140.0 Pfg.	Anfrage: SQL 40 byte	~~1.6 Pfg.~~ 1.9
		Antwort: 300 byte	~~6.6 Pfg.~~ 8.55
		Transaktion	~~8.2 Pfg.~~ 10.45

Filetransfer 150kbyte

mit GSM		mit MODACOM	
500 byte/s:	7.00 DM	150 kbyte	~~33.33 DM~~ 40.54

Gebühren Dialog

ARTe

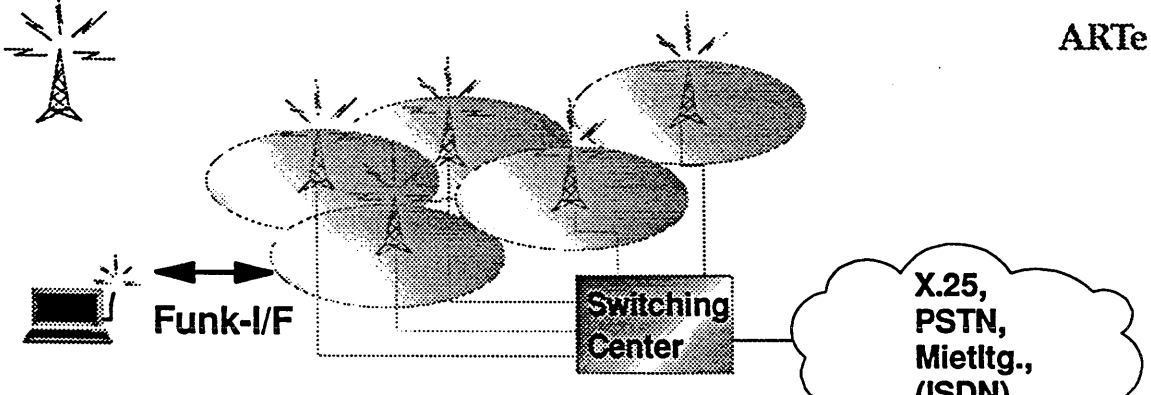
Szenario Beratungsgespräch:

150 kbyte Übertragung verteilt auf eine Stunde

Modacom:	**33.33 DM**
GSM:	**84.00 DM**

Zellulare Funknetze

ARTe



Asymmetrische Konfiguration:

- mobiler Zugang oft verschieden von stationärem Zugang
- z.B. MODACOM: RD-LAP/Modem ⇔ X.25 SCR

Stand der Technik

ARTe

Netzwerkabhängige Programmierung
→spezielle Komm.-funktionen in der Applikation

Keine Maßnahmen zur Verringerung des Datenvolumens
→zu hohe Kosten, zu schlechte Performance

Vernachlässigung von Sicherheitsaspekten
→kein Schutz gegen Mißbrauch und Abhören

ARTour Entwurfsziele

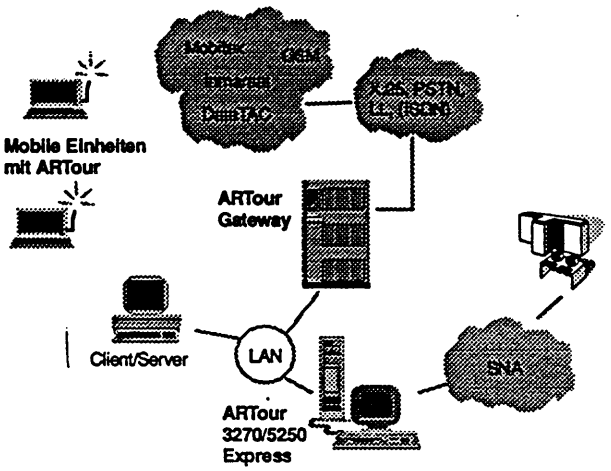
- **Einheitliche, offene Kommunikationsplattform** ARTe
  - für existierende (Term. Emu., E-Mail, Datenbank, ...) und neue Anwendungen (Flottenmanagement)
  - Anwendungsentwicklung im LAN, ohne Modifikation übertragbar in mobile Umgebung
  - **→TCP/IP Protokoll-Familie über Funknetze**
- **Kostengünstig, schnell, zuverlässig und sicher**
  - Funk ist "yet another network"
  - **→Protokoll-Vereinfachung, Datenkompression und -verschlüsselung, Benutzer-Authentifizierung**
- **Integration verschiedener Funknetze**
  - Kunde wählt das Funknetz nach Anwendungsstruktur, Funküberdeckung und Diensten (Sprache, Daten)
  - **→Betrieb verschiedener Netze über gemeinsames Gateway**

ARTour "auf einen Blick"

ARTe

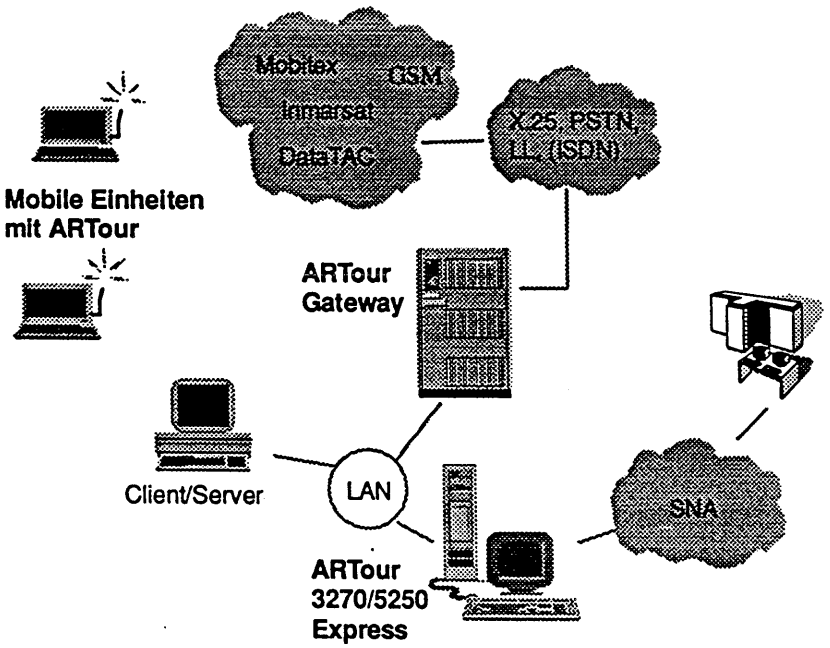
Die Plattform für mobile Datenkommunikation

- Offener Standard: TCP/IP
- Unterstützung der Funknetze GSM (D1, D2), DataTAC, Mobitex, Inmarsat
- Globale Host-Erreichbarkeit mit 3270/5250-Emulation ("ARTour Express")
- Client/Server-Applikationen
- Kompensation der geringeren Leistungsfähigkeit von Funk



ARTour Netzwerkkonfiguration

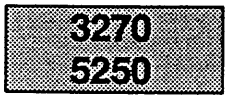
ARTe

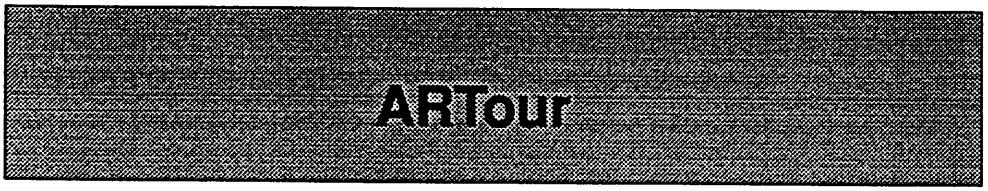


ARTour Schichtenmodell

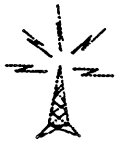
ARTe

Anwendungen





ARTour Leistungsmerkmale



ARTe

Offener Komm.-Standard: TCP/IP
- Transparente Migration LAN/mobile Umgebung
- Client/Server-Support

Datenkompression mit unterschiedlichen Verfahren
- LZ77-deflate, LZW, V.42bis

Protokollreduktion
- TCP/IP-Header-Reduktion

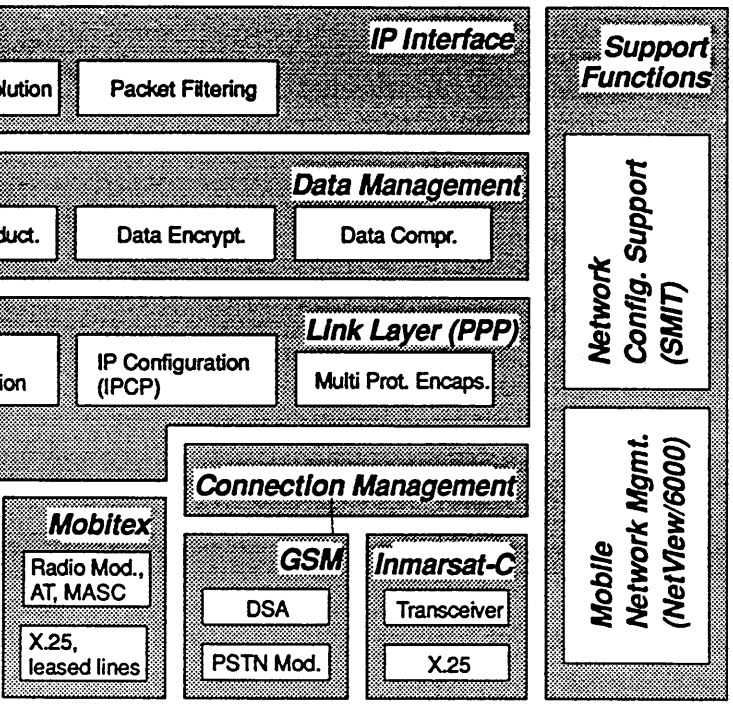
Benutzer-Authentifizierung
- zwischen mobiler Einheit und ARTour-Gateway

Datenverschlüsselung
- Data Encryption Standard (CBC)

Integration verschiedener Funktechnologien und modulare Einbettung neuer Funktechnologien

ARTour Architektur

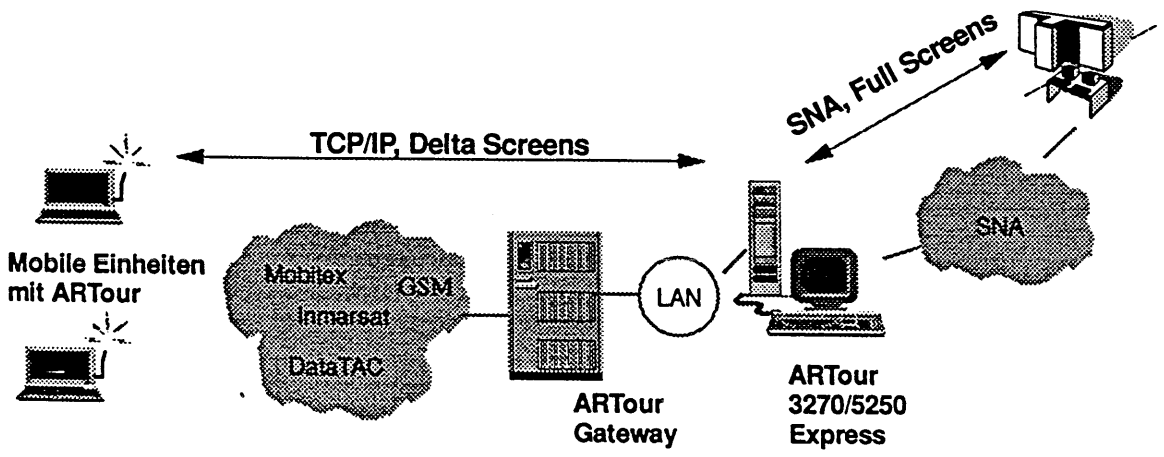
ARTe



ARTour Express

ARTe

- Schlüsselanwendung zum Übergang in SNA-Netze: Terminalemulation 3270/5250
- gleichzeitig drastische Reduzierung des Datenvolumens



ARTe

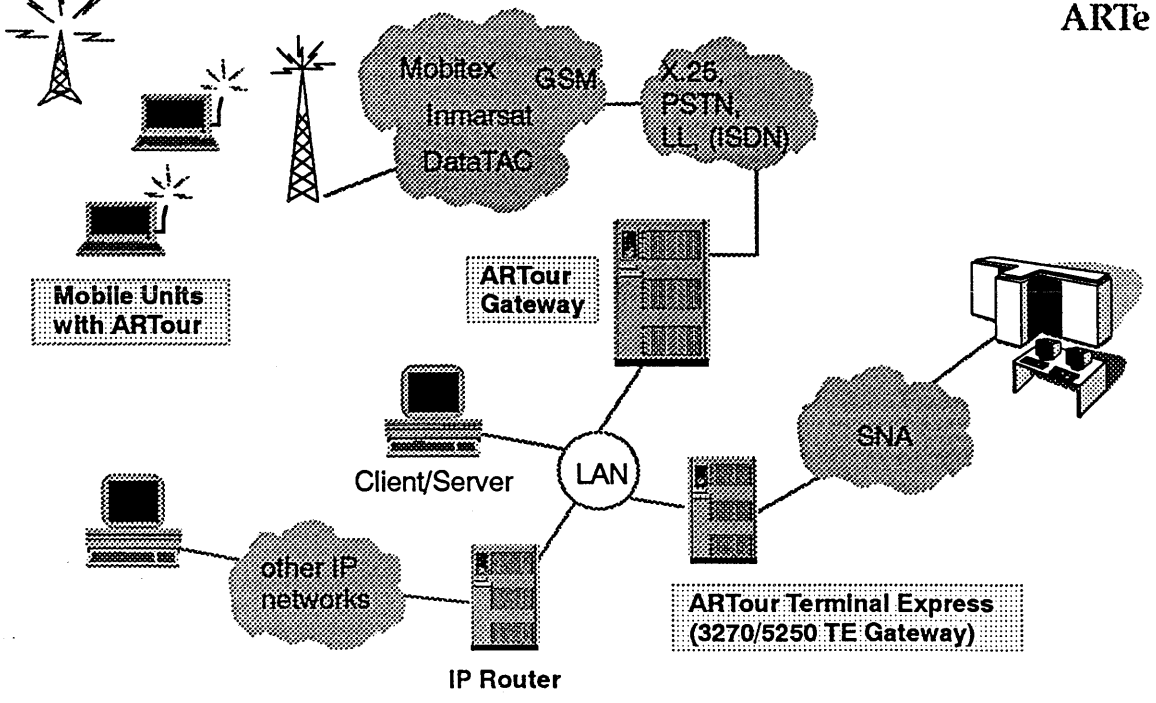
IBM ARTour

Technical Overview

IBM ARTe
WZ Heidelberg

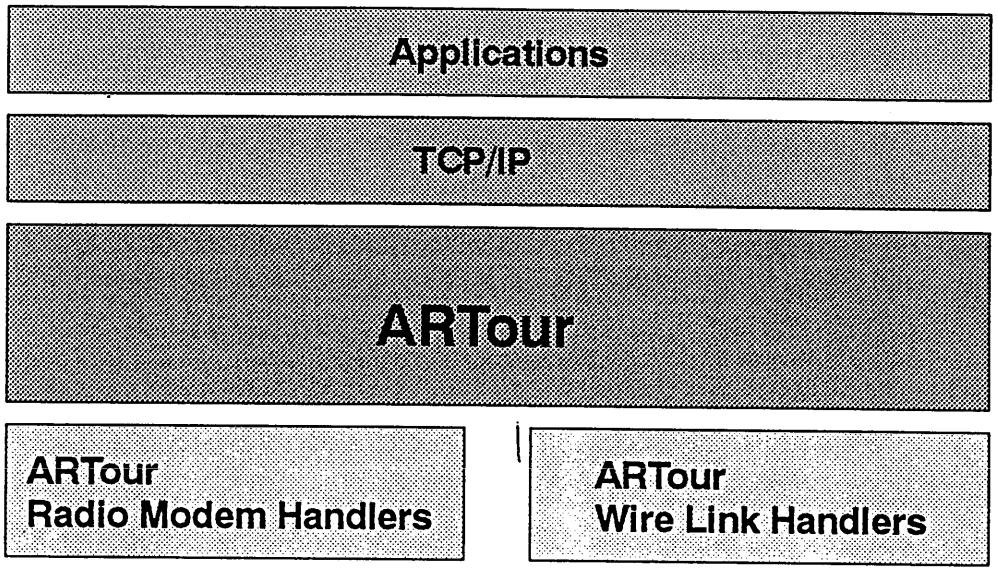
ARTour Network Configurations

ARTe



ARTour Layering

ARTe



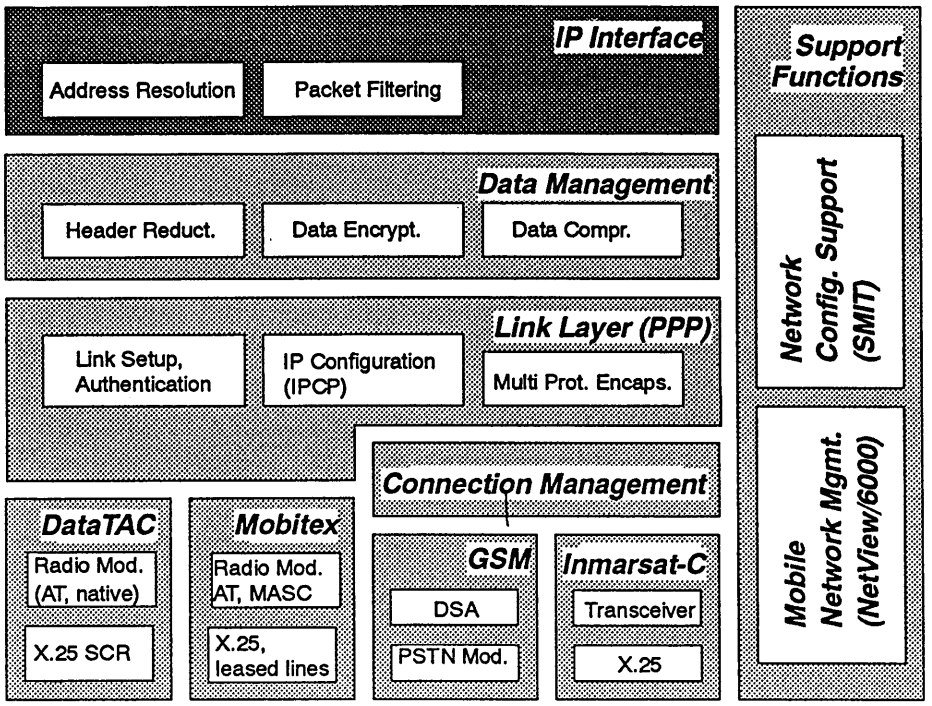
IBM ARTour Features

ARTe

- **Open communication standard: TCP/IP**
  - Transparent migration LAN/mobile environment
  - Client/Server support
- **Data compression with different algorithms**
  - LZ77-deflate, LZW, V.42bis
- **Protocol header reduction**
  - TCP/IP header reduction
- **Data encryption**
  - Data Encryption Standard (DES CBC)
- **User authentication**
  - between mobile unit and IBM ARTour Gateway
- **Integration of radio networks with different technologies**
- **Modular imbedding of new radio network technologies**

ARTour Architecture

ARTe



ARTour Technical Overview

ARTe

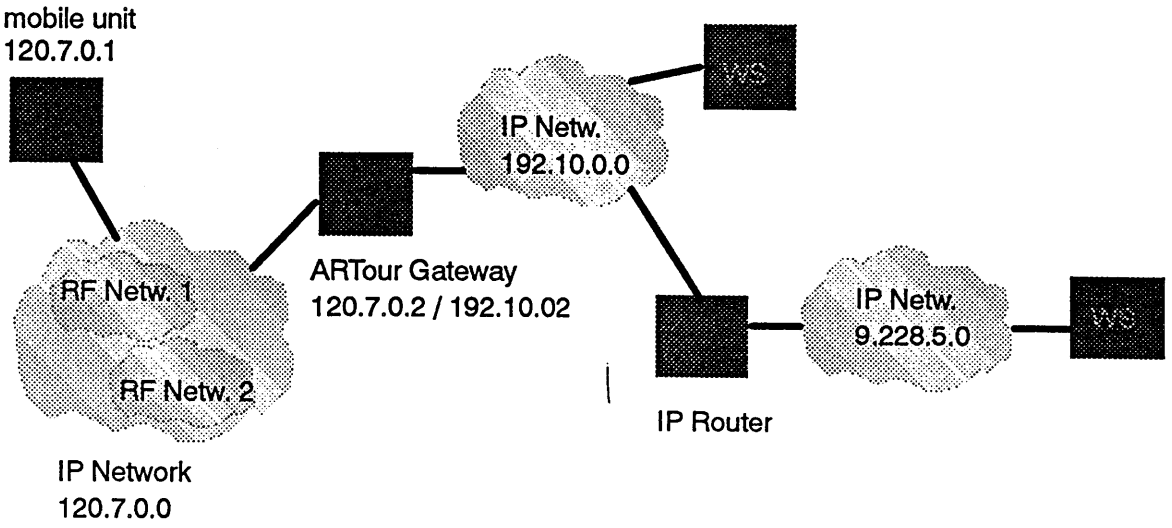
IP Address Resolution

- **Standard Internet (IP) addresses** used for addressing between mobile and stationary units
- **Static address resolution table** used for mapping between IP addresses and radio network addresses
- **Same IP address for mobile unit** in all supported radio networks
- **integration into IP/SNA/X.25 networks of stationary WAN and LAN**

ARTour Technical Overview

ARTe

IP Addressing



ARTour Technical Overview

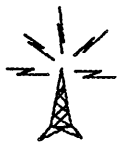
ARTe

Filtering

- **Reduce traffic on radio network link;**
  no delivery of
  - selected ICMP messages
    e.g. Route Change Request
  - selected SNMP requests
  - selected SNMP manager

ARTour Technical Overview

ARTe



Data Management

1. **Data Compression**
   - save cost on high tariff radio networks
   - optimize performance on low bandwidth
2. **Protocol Header Reduction**
3. **Data Encryption**
   - necessary on radio networks
   - broadcast medium
   - prevent eavesdropping

ARTour Technical Overview

ARTe

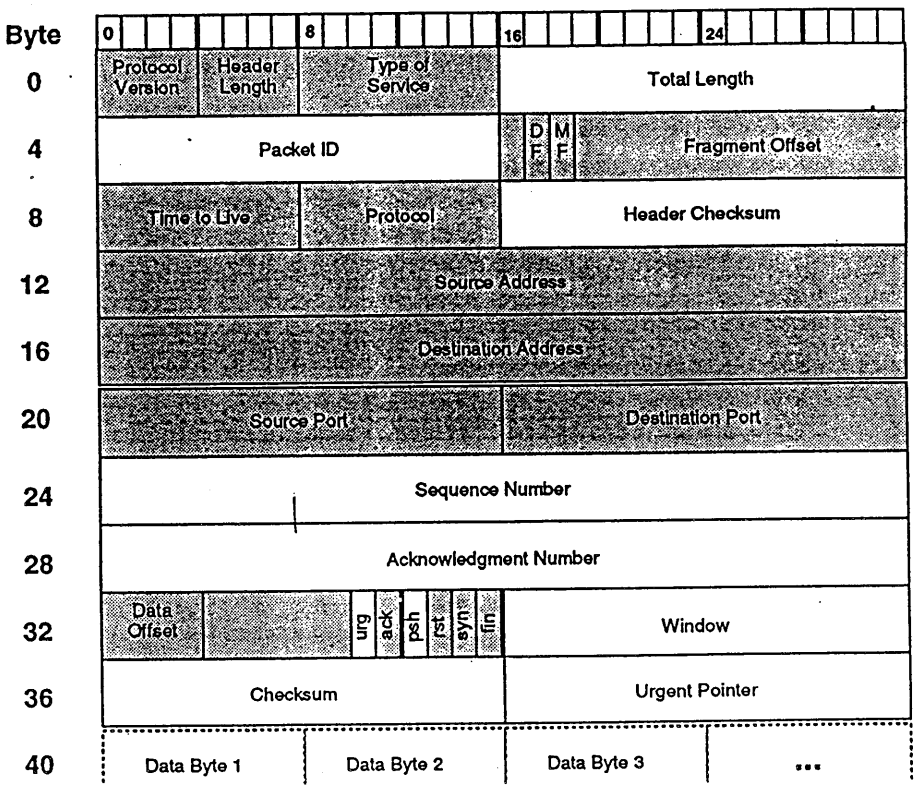
Protocol Header Reduction

- **Point-to-point IP Connection between ARTour Gateway and Mobile Unit**
- **only specific TCP/IP fields may ever change**
- **TCP/IP Header Reduction from 40 bytes to 3 bytes avg.**
- **implemented according to RFC 1144**

Data Reduction

ARTe

- TCP/IP Header



ARTour Technical Overview

ARTe

Point-to-Point Protocol

- **PPP includes authentication**
- **Authentication has two functions:**
  - mutual authorization check
  - Gateway distributes *session key* for data encryption
- **Authentication uses *Two Party Key Distribution Protocol (2PKDP)***
  - Challenge- Response protocol
  - new session has always different session key
  - keys are never sent over radio network "in the clear"

ARTour Technical Overview

ARTe

Point-to-Point Protocol

Challenge/Response dialogue

- involved are:
  - **a *secret key* known to mobile unit user and stored on gateway disk**
  - **a *session key* to be distributed**

1. **Mobile unit requests challenge packet**
2. **Gateway sends challenge packet with "hidden" session key**
3. **If mobile unit knows secret key, it can compute session key; it sends back an indication of its knowledge of both keys**
4. **Gateway acknowledges correct response**

ARTour Technical Overview

ARTe

Device Driver

- **Radio network specific drivers available for**
  - DataTAC (Motorola)
  - Mobitex (Ericsson)
  - GSM
  - Inmarsat
- **uses serial line interface of mobile device**
- **controls connection between mobile device and modem**
- **support for different modems/command sets**
  - InfoTAC transparent/native mode
  - MRM-420
  - Mobidem MASC
  - ...

ARTour Technical Overview

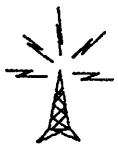
ARTe

Accounting

- **not implemented yet**

ARTour Technical Overview

ARTe



Data Compression

- **LZ77-deflate and LZW algorithms** recommended for file transfer applications
- **modified/enhanced V.42bis compression** recommended for dialogue applications (20 to 30 % compression improvement)
- **no compression for small packets for efficiency**

ARTour Technical Overview

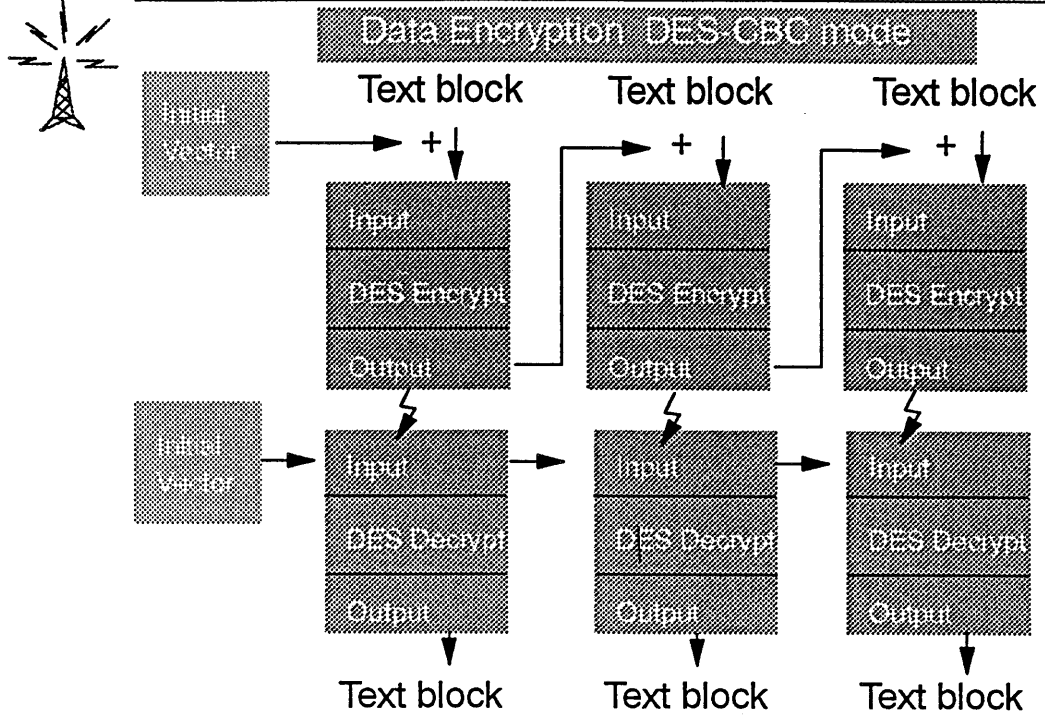
ARTe

Data Encryption

- **Goal: Two way security**
  - broadcast data comprehensible only by partner
  - correct encryption possible only by partner
- **Data Encryption Standard - Cipher Block Chaining mode (DES-CBC)**
  - DES uses two keys for encryption: *secret key* and *session key*
  - text block encrypted with previous encrypted block
- **Session key distribution per session**

ARTour Technical Overview

ARTe



ARTour Technical Overview

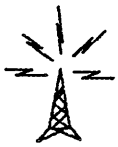
ARTe

Point-to-Point Protocol

- **Key Features**
  - "the" Internet link layer protocol for serial links
  - connection-oriented protocol
  - multiprotocol encapsulation
  - versatile link configuration and testing
  - additional framing protocol required
  - no error correction

ARTour Technical Overview

ARTe



Terminal Express Emulator

- **Two functions:**
  - *Terminal emulation gateway* between IP network and SNA network
  - Reduction of 3270 and 5250 data stream
- **Client/Server architecture using UDP/IP stack**

ARTour Technical Overview

ARTe

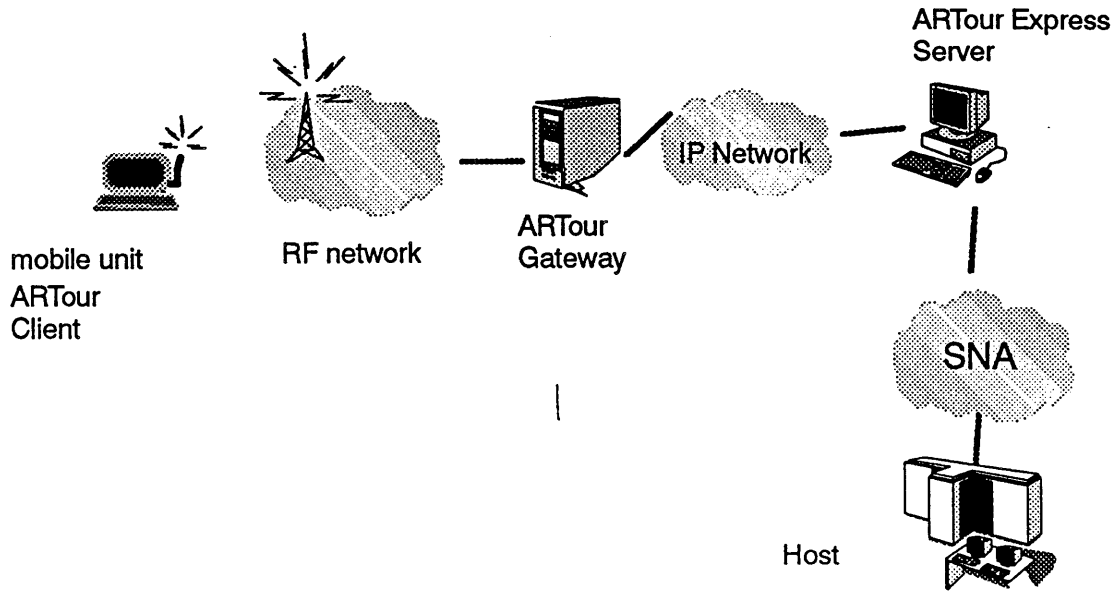
Terminal Express Emulator

- **Gateway function**
  - connection to ARTour Mobile Units through IP network
  - Connection to SNA Host through Communication Manager/2 (OS/2) or HCON (AIX)
  -
- **Data reduction function**
  - additional to ARTour compression
  - Screen caching: Dictionary of Full-Screens built and updated dynamically
  - Client (mobile) and server exchange only information differences

ARTour Technical Overview

Terminal Express

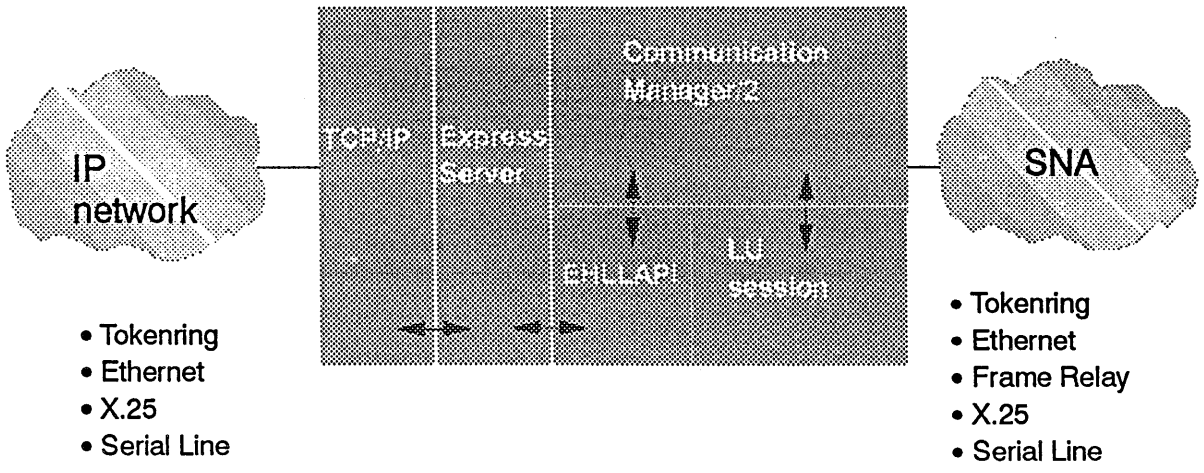
ARTe



ARTour Technical Overview

Terminal Express Server OS/2

ARTe



- Tokenring
- Ethernet
- X.25
- Serial Line

- Tokenring
- Ethernet
- Frame Relay
- X.25
- Serial Line

ARTour Technical Overview

ARTe

Terminal Express Server

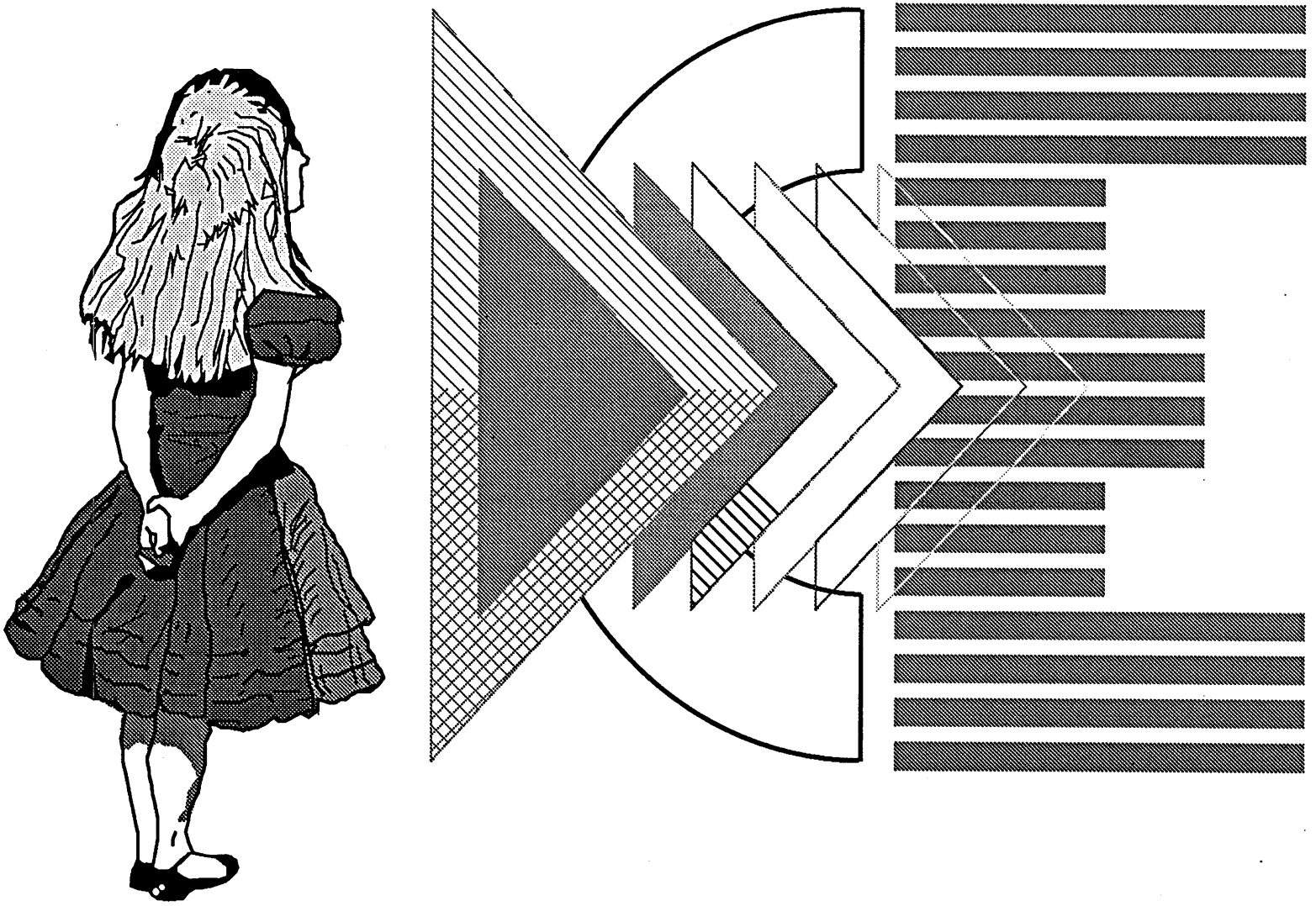
- **OS/2 version**
  - Communications Manager/2
  - up to 26 parallel host sessions
  - 3270 and 5250 emulation
- **AIX version**
  - HCON, SNA Services/6000
  - up to 255 parallel host sessions per HCON
  - 3270 emulation only

ARTour Technical Overview

ARTe

Terminal Express Client

- **Optimized UDP application for terminal emulation (3270, 5250)**
- **Version for OS/2 available**
- **Version for DOS available**
- **Version for DOS/Windows in preparation**



Agenda

Open and Distributed Computing

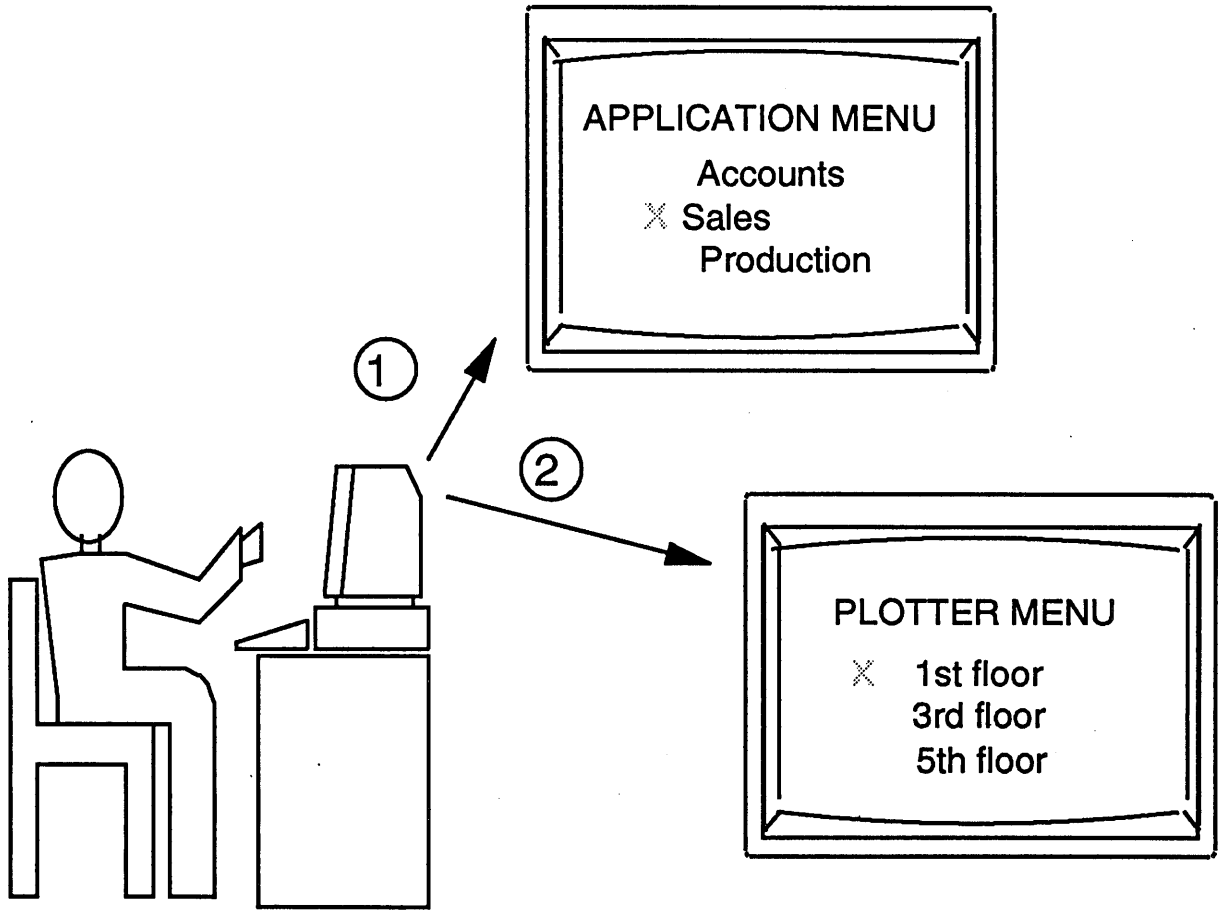
Open Software Foundation

DCE Structure

DCE Components

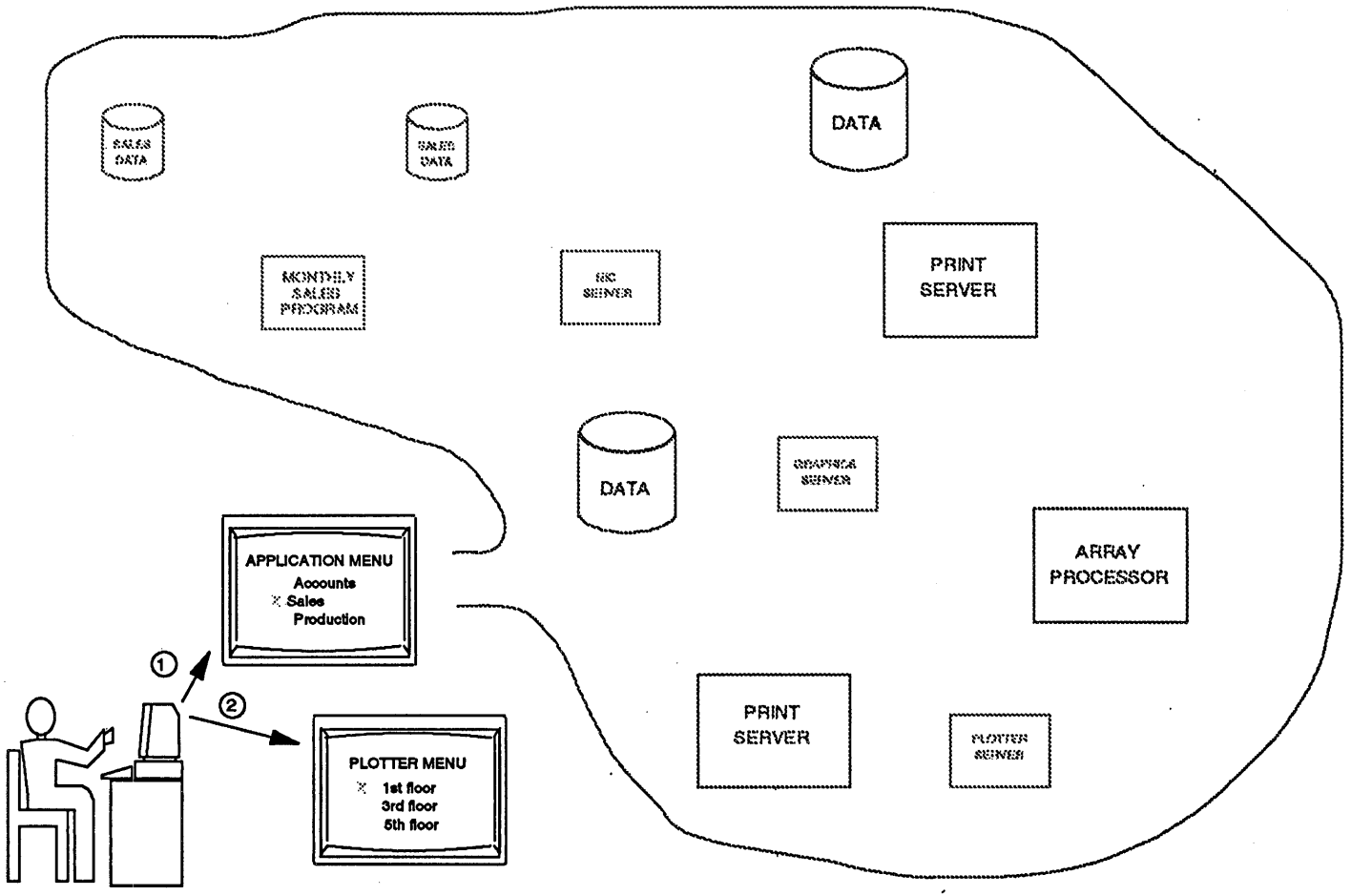
- Directory
- Remote Procedure Call
- Distributed Time Services
- Security

Desired Environment - End User's View

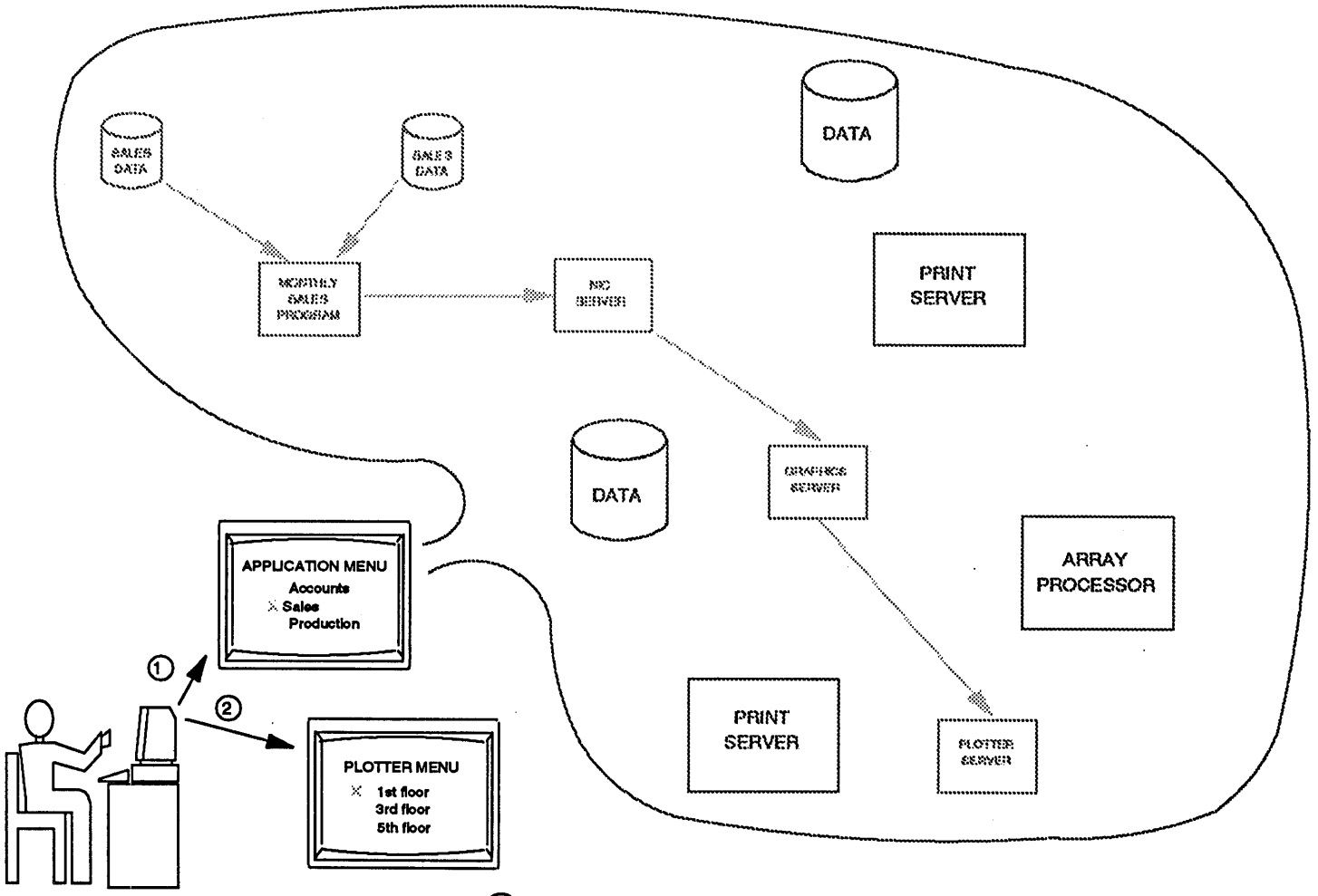


Distributed Computing Environment

Sophisticated End User View

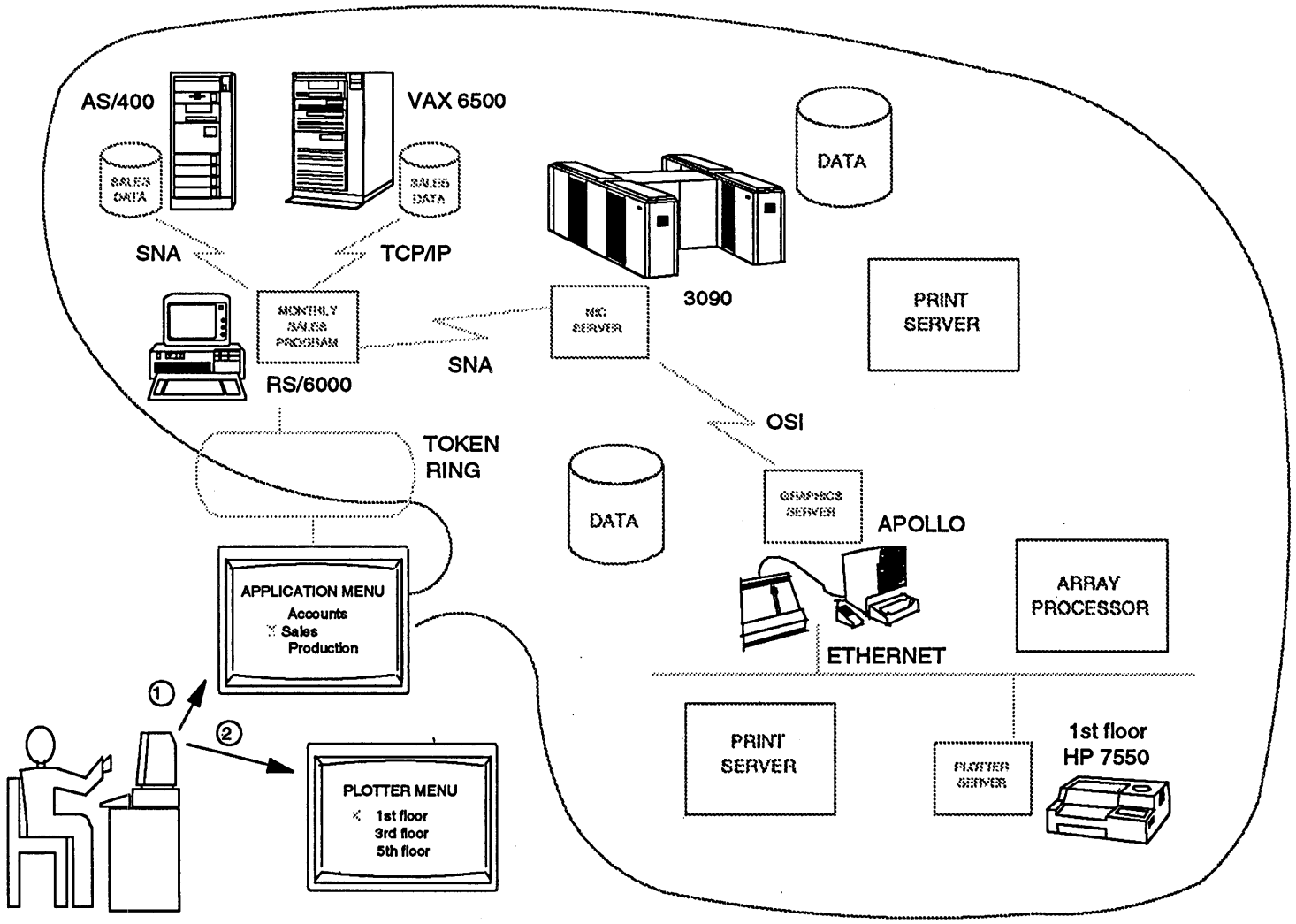


Application Programmer View



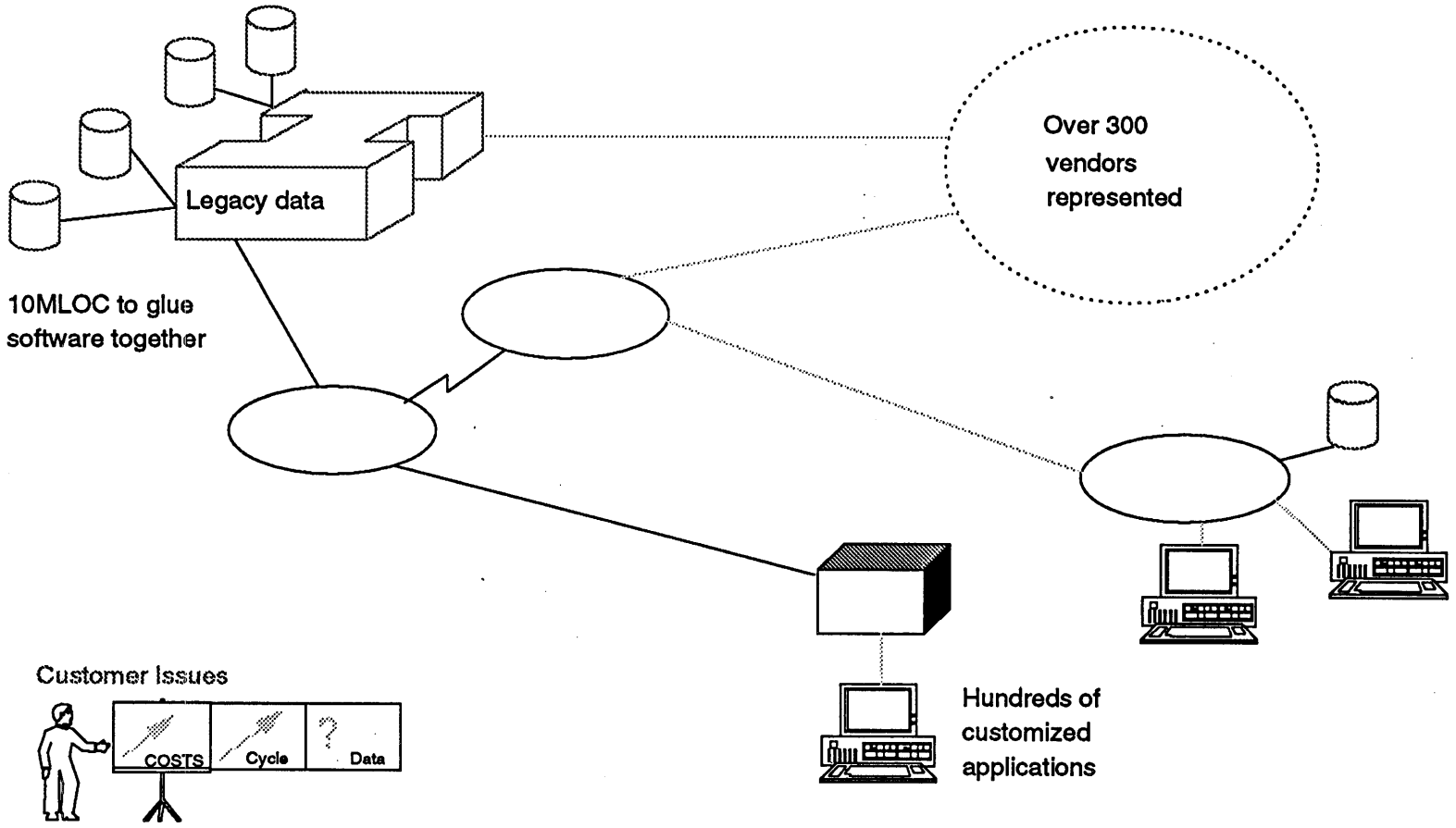
MMAPVIEW

Distributed Computing Environment



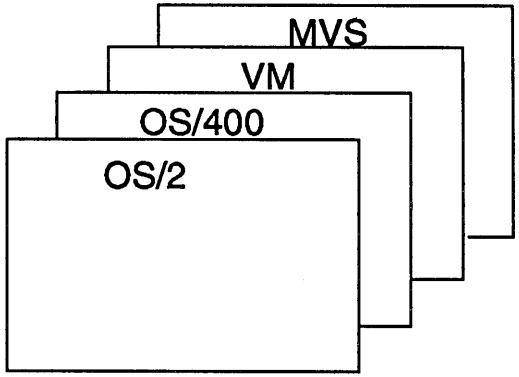
MMRWVIEW

A Customer View



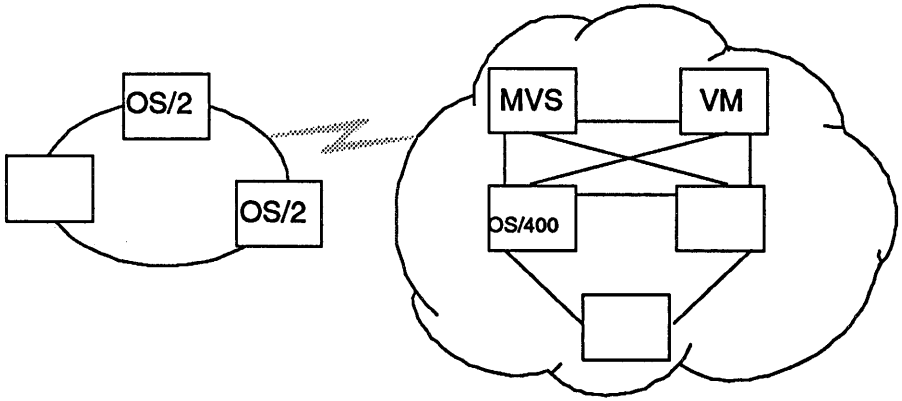
SAA in the 1980's

Software Interfaces
CUA, CPI, CCS,
across a family of
operating systems



SAA in the 1990's

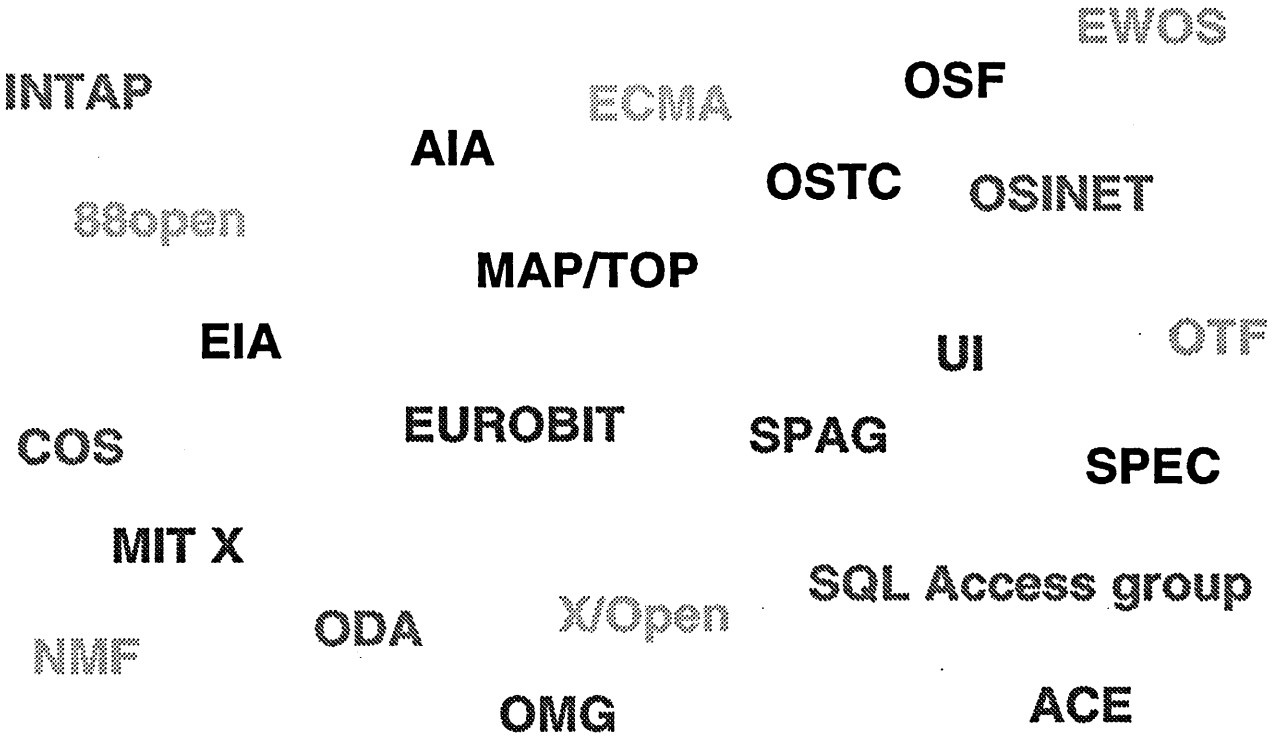
Software Interfaces
CUA, CPI, CCS,
where a system
consists of workstations
or LAN workgroups
connected to hosts
Interoperability to
non-SAA and non-IBM
workstations and hosts



Consortia

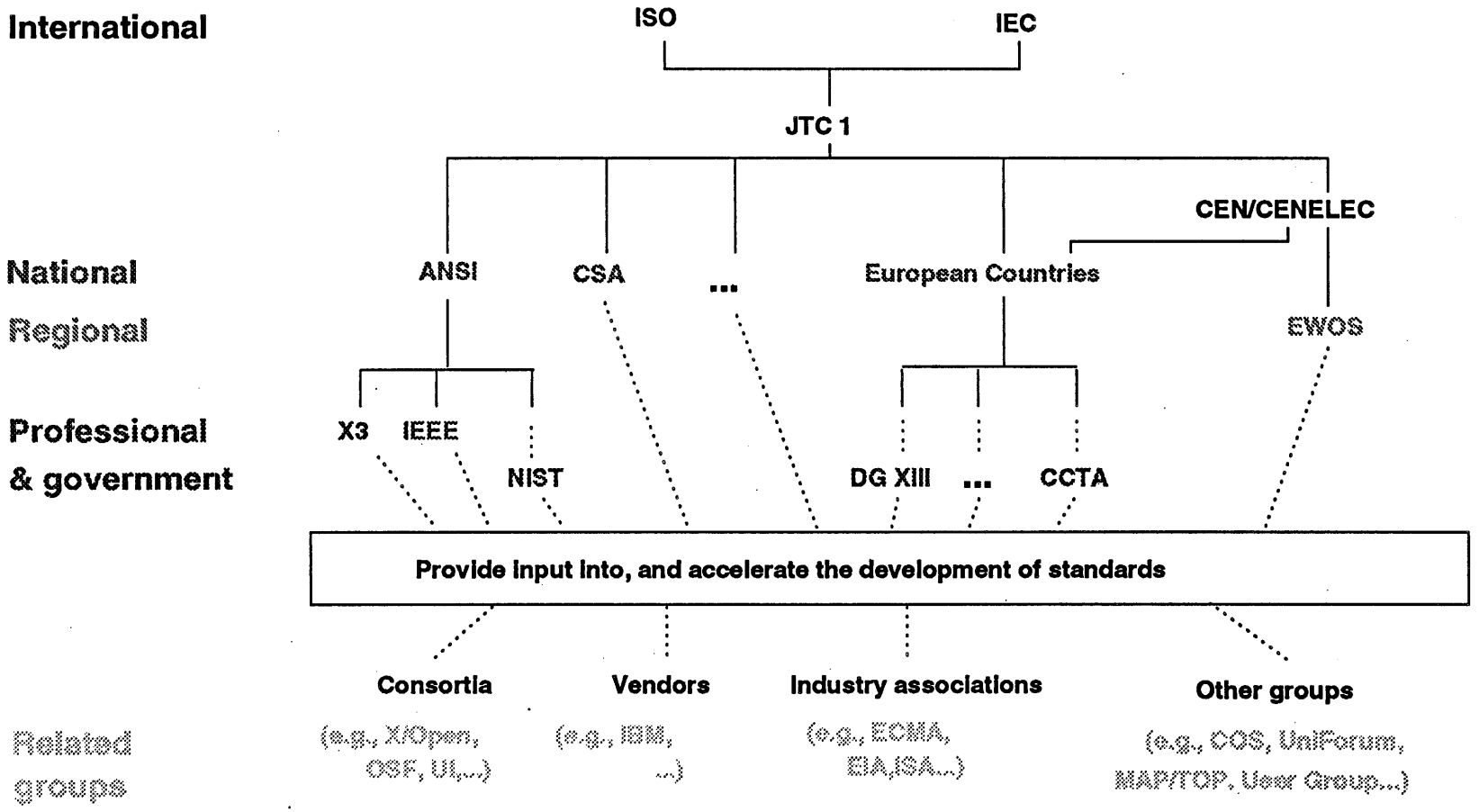
(and trade associations)

Groups formed to serve a common interest



IBM is an active member of most of these groups

Standards Organizations



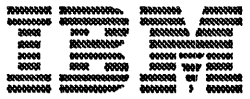
Open Software Foundation

Who are the Open Software Foundation?

- Research and Development organisation
- Members from computer industry segments worldwide
  - System vendors, Software vendors, Government agencies, Universities and users

Purpose of OSF

- Create an open computing environment
- Survey/solicit industry for problems and needs
  - Interoperability and portability are major concerns
- Provide vendor-neutral solutions
  - Specification of protocol and interfaces
  - Reference implementation and validation suite



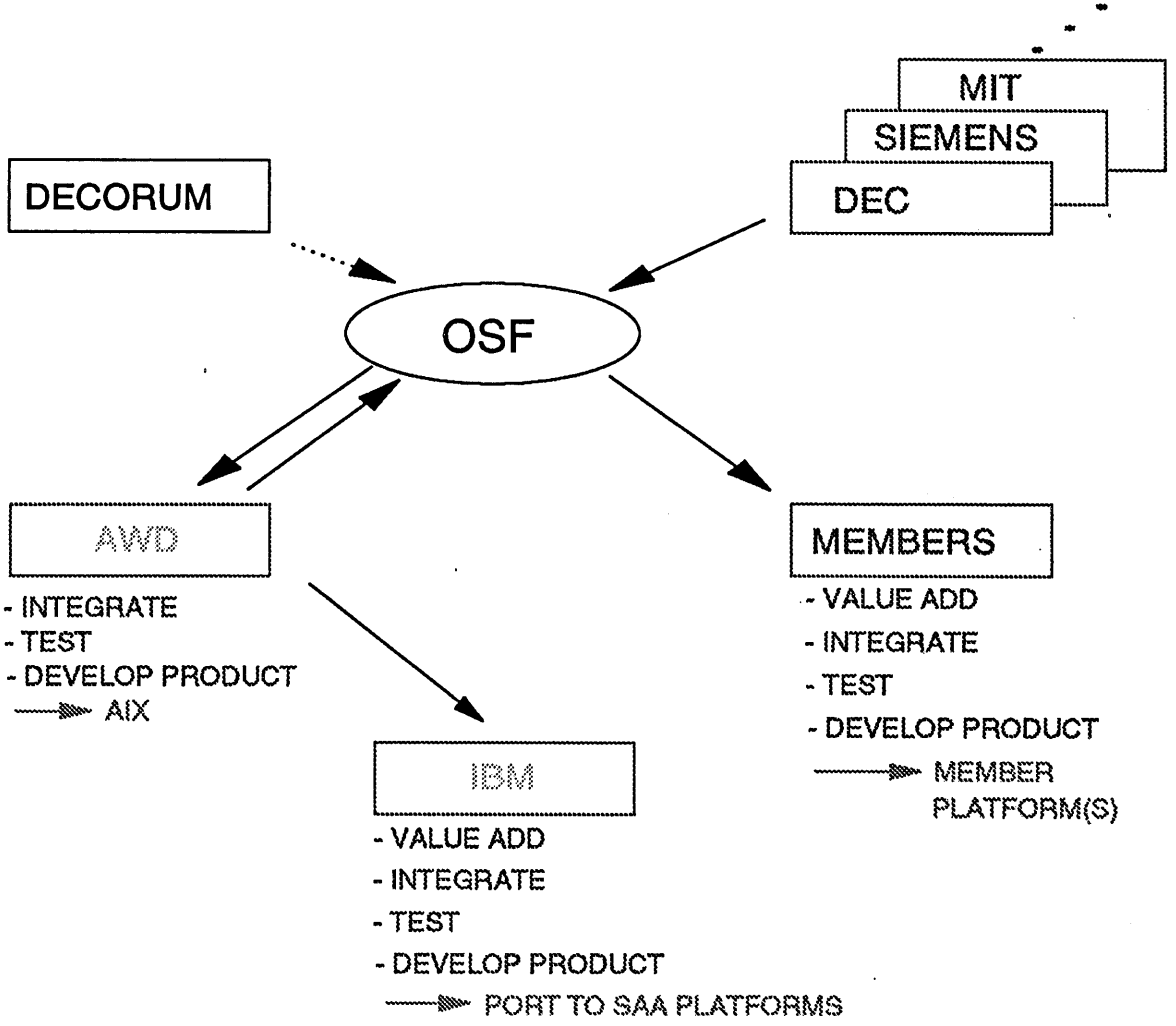
OSF Mechanisms

- Open technology aquisition process (RFT)
- Research Institute
- Member meetings (more than 350 members)
- Special interest groups (SIGs)

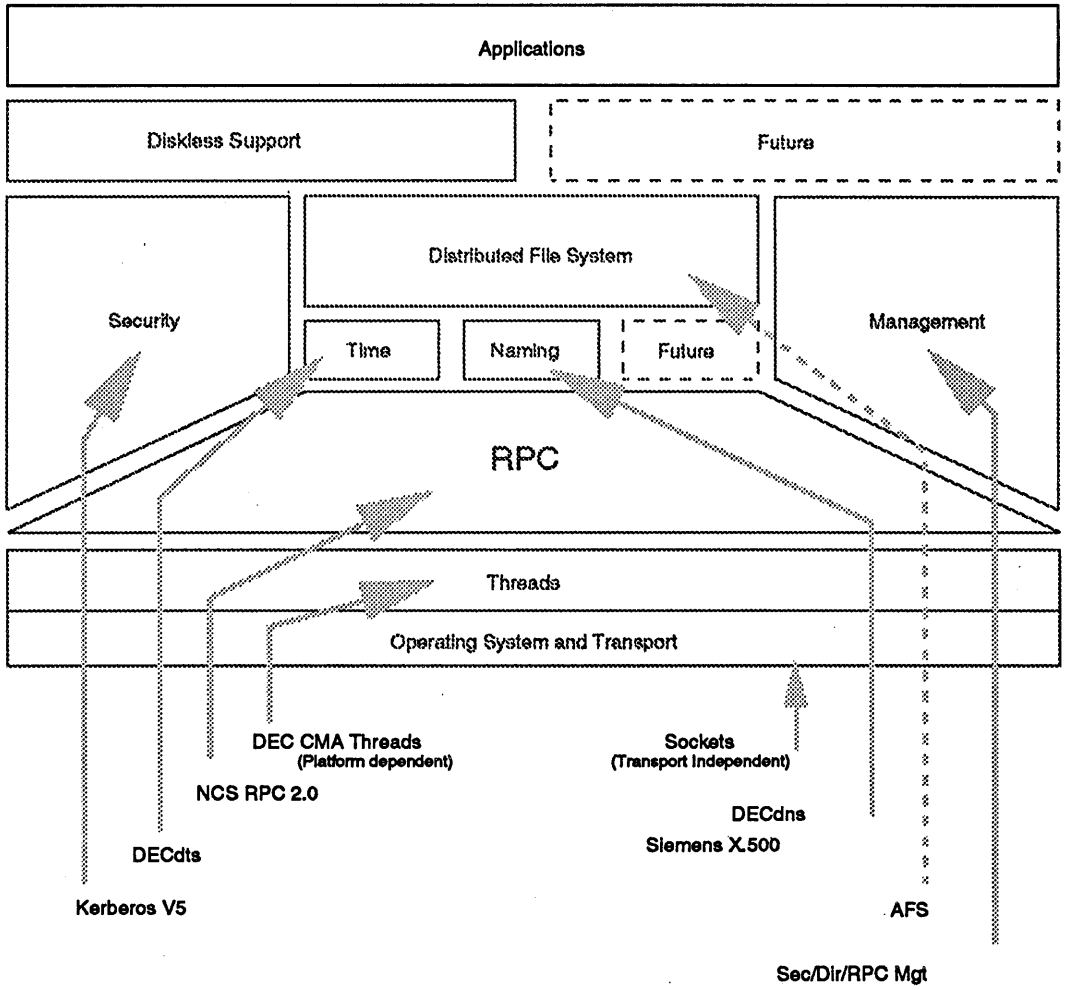
OSF Solutions

- Open Unix System (OSF/1)
- Motif Graphical User Interface
- Distributed Computing Environment
- Distributed Management Environment

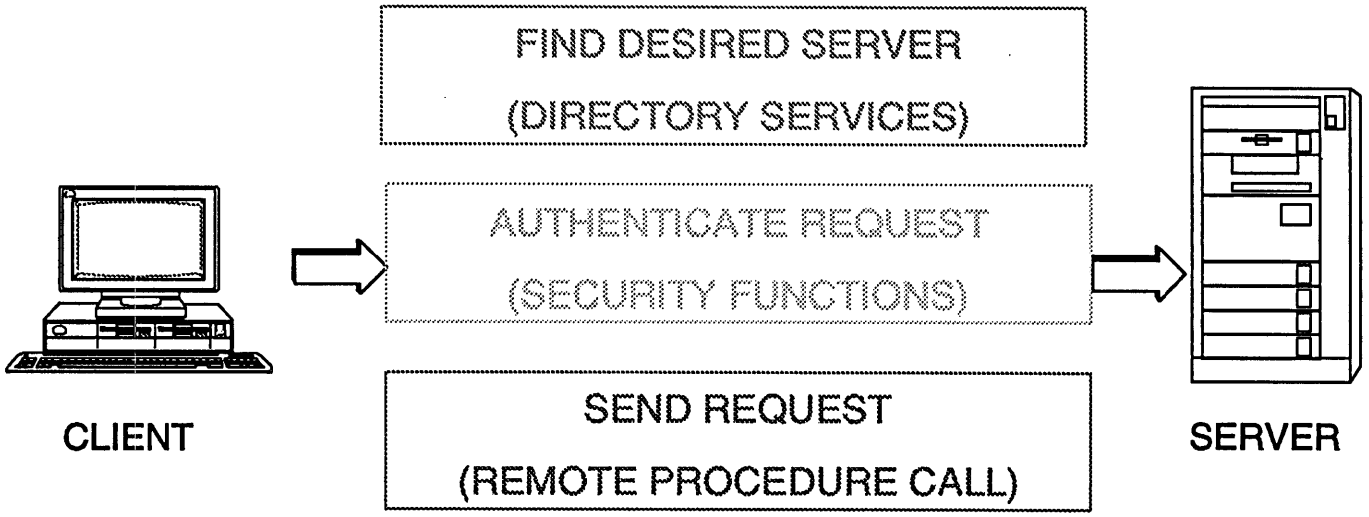
Distributed Computing Environment



Distributed Computing Environment

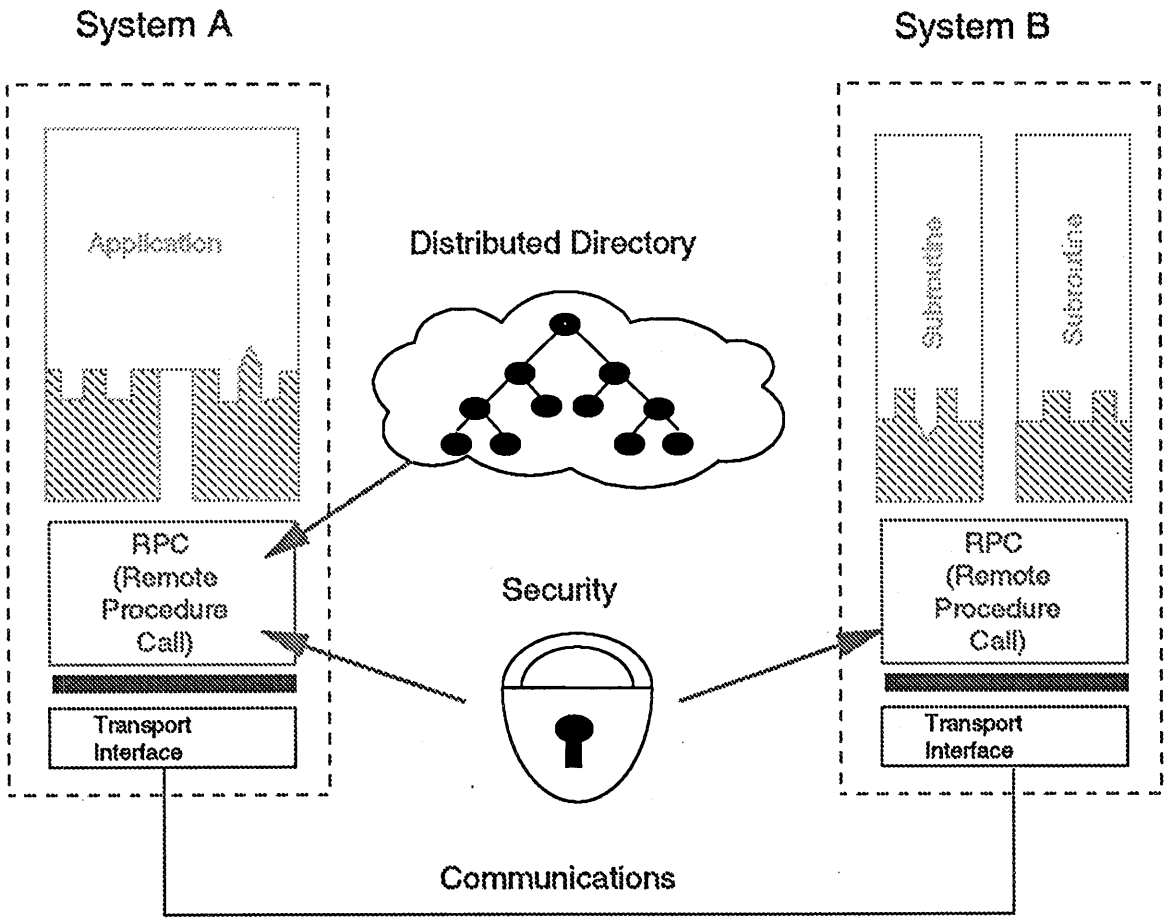


INDUSTRY STANDARD DISTRIBUTED SERVICES
TO BUILD CLIENT/SERVER ENVIRONMENTS

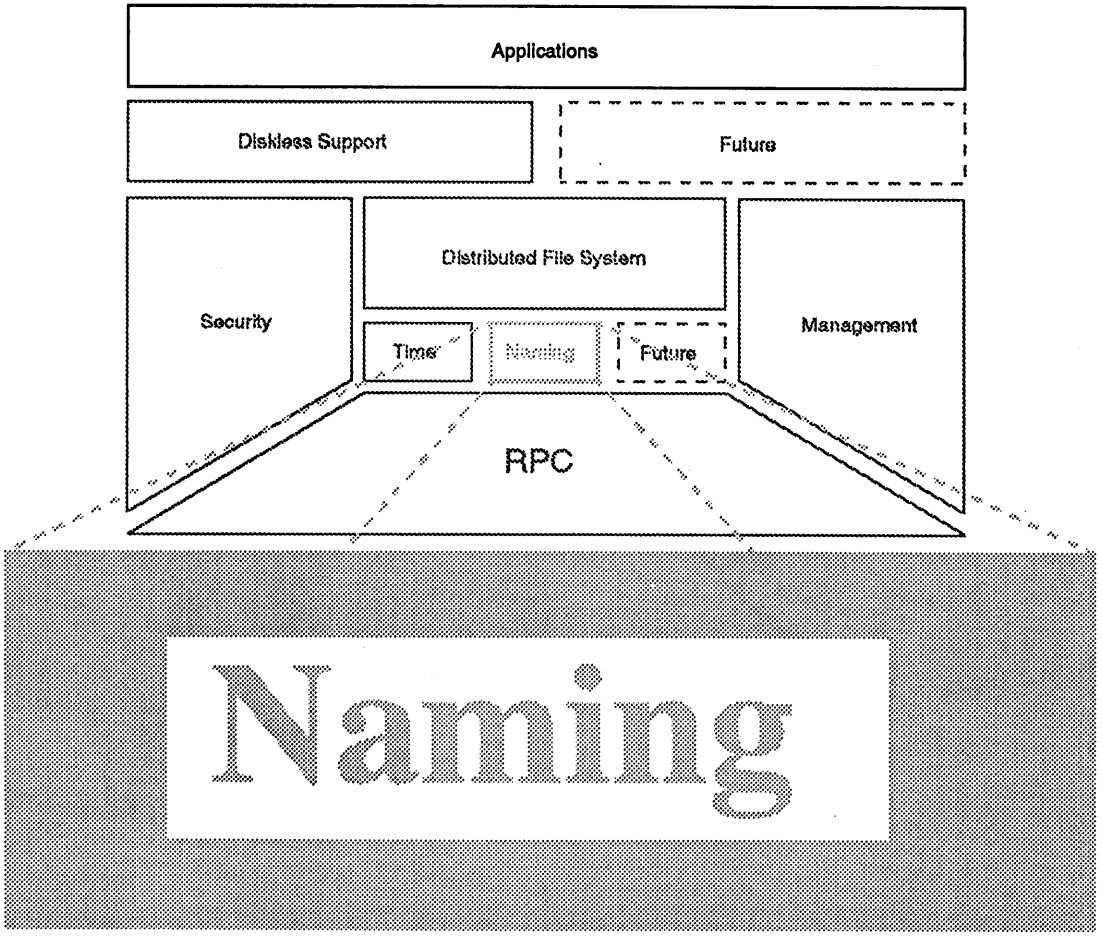


- Interoperability between heterogeneous systems.
- Simplifies and standardizes programming of distributed applications.

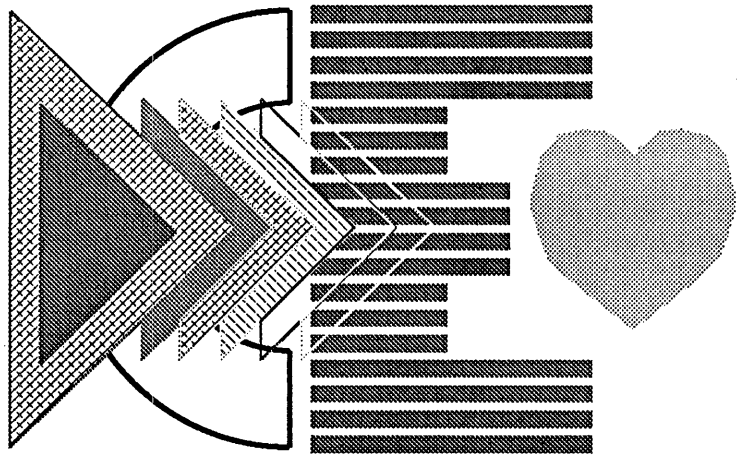
Distributed Computing Environment

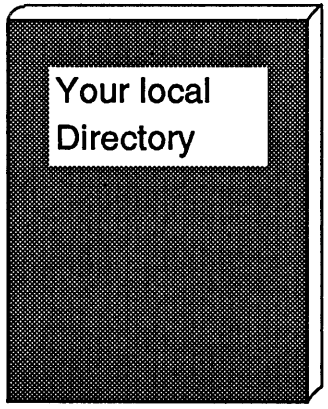


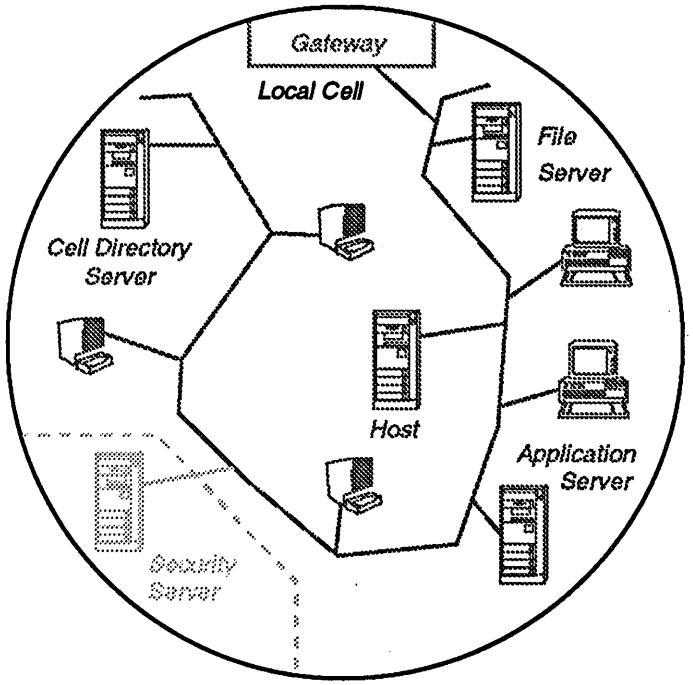
Directory



Directory

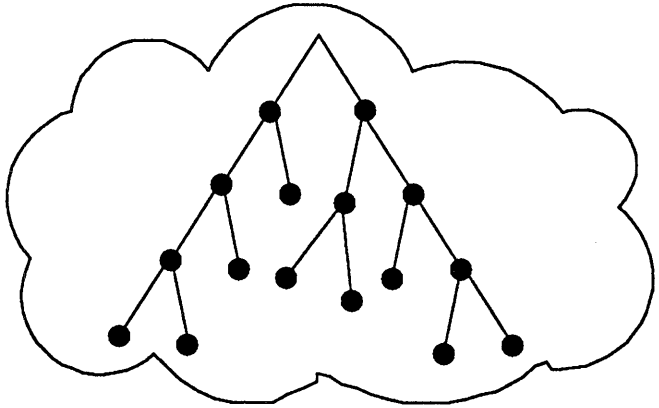




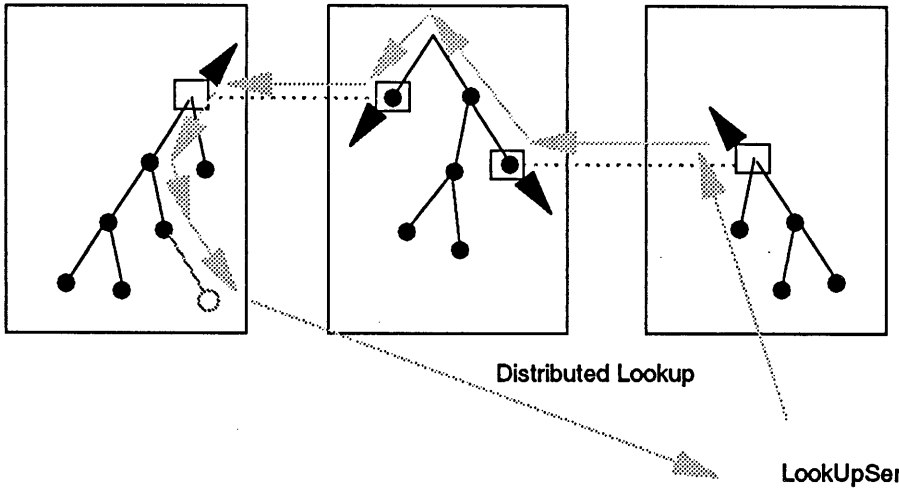


Directory

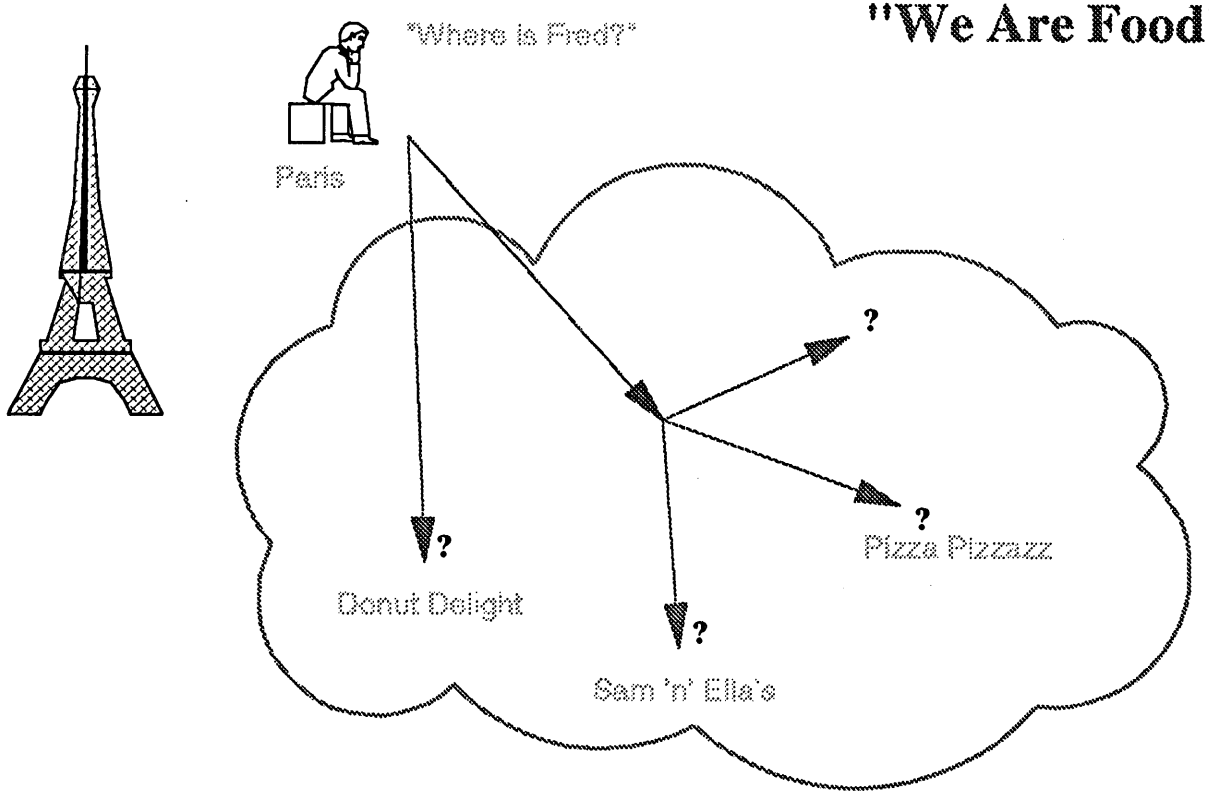
Conceptual
Global
Hierarchical
Namespace



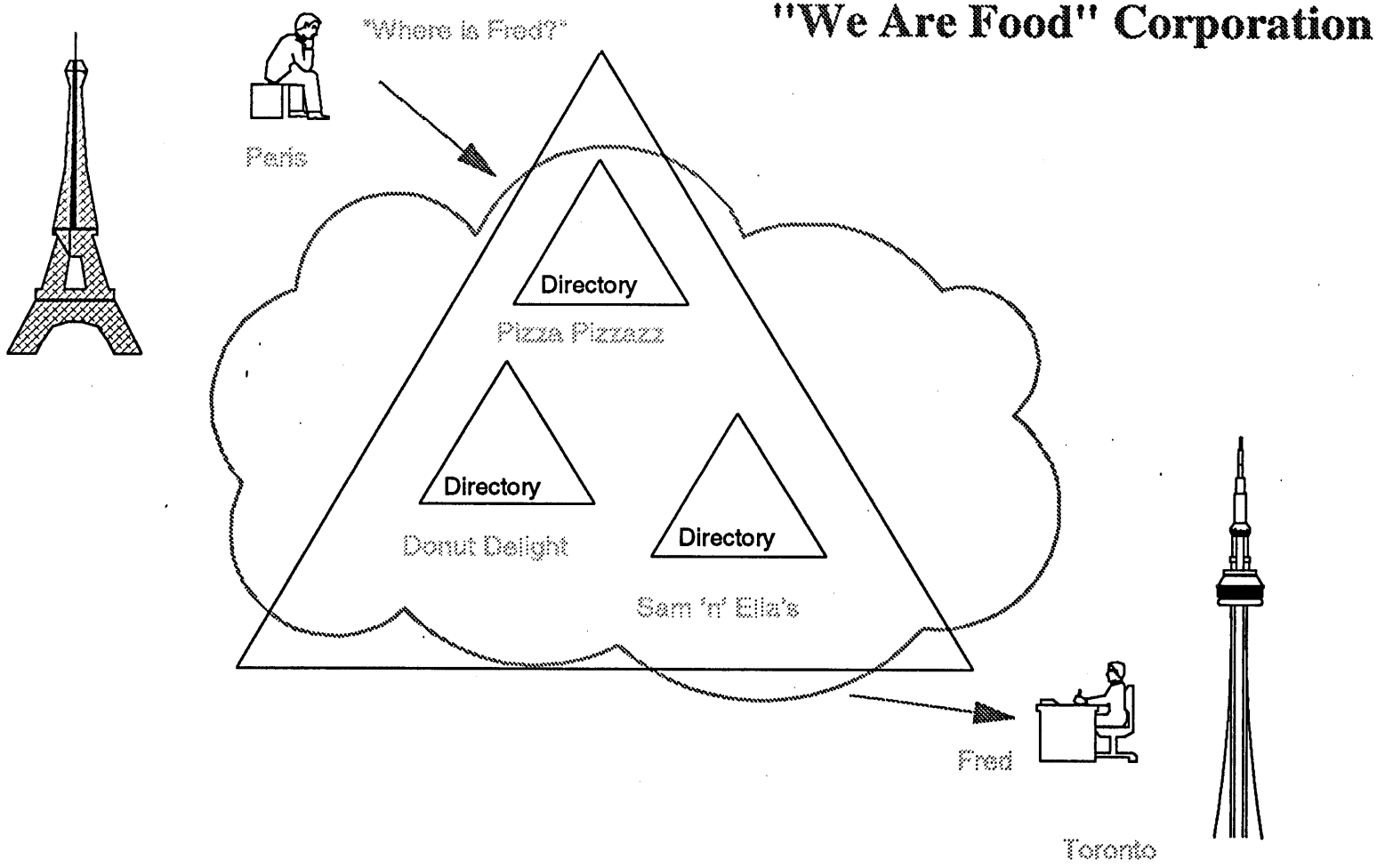
Physically distributed across the network
Nodes have Partial knowledge and Pointers



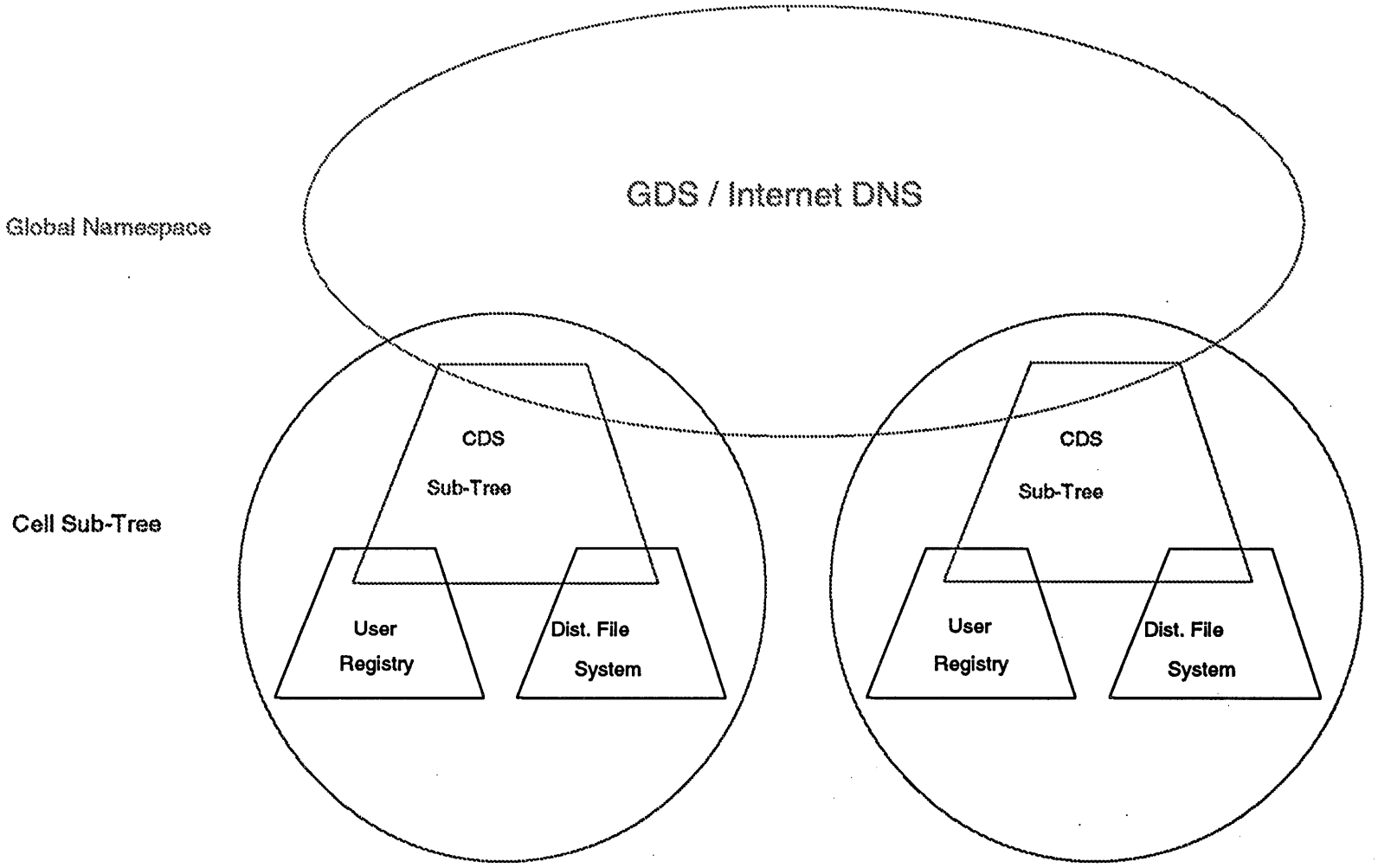
Directory



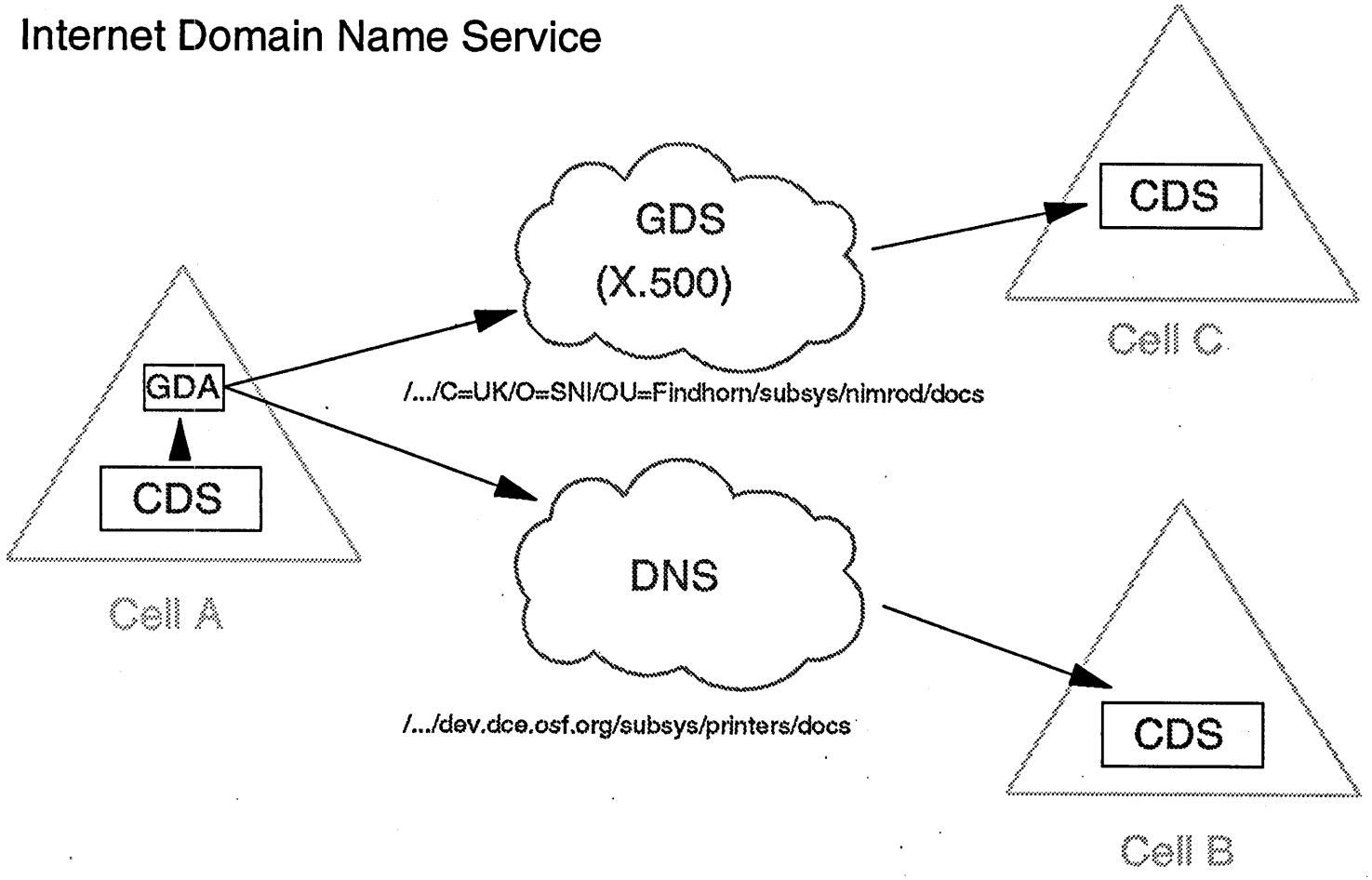
Directory



Directory

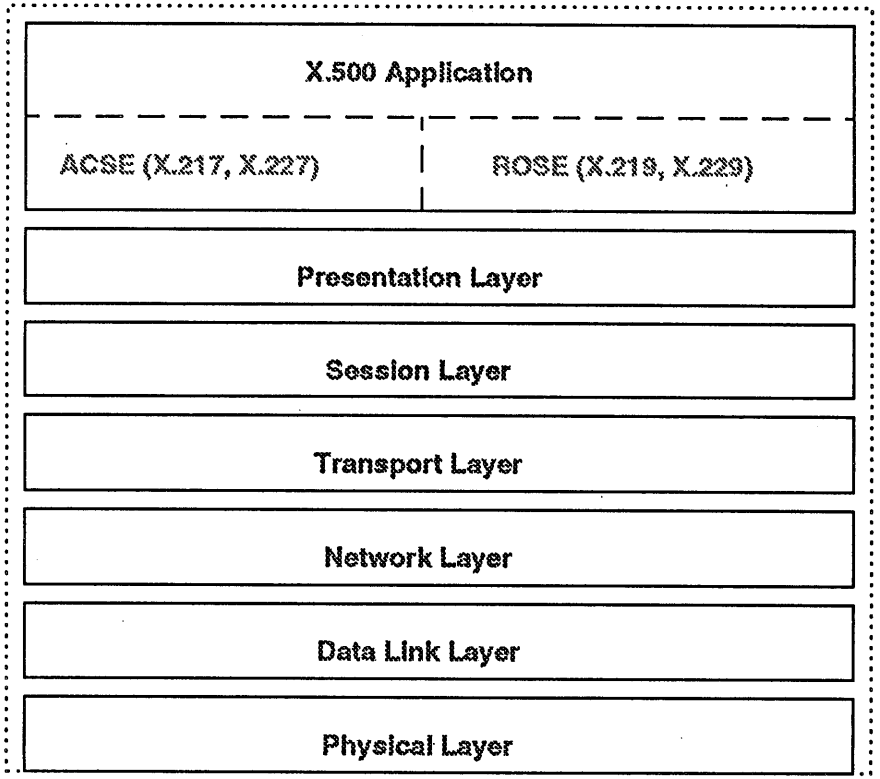


X.500 Names
Internet Domain Name Service

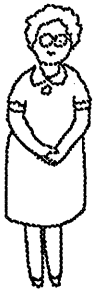


Directory

X.500 within the OSI Architecture

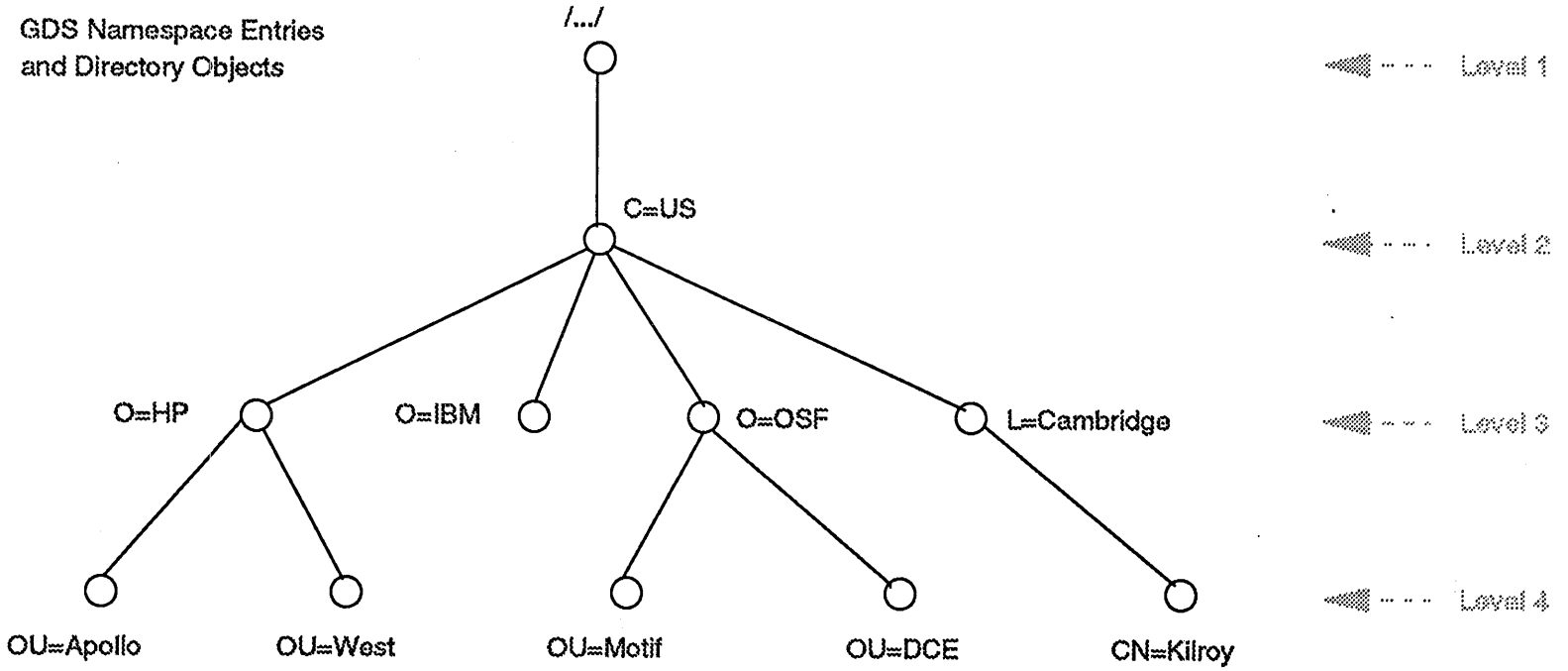


ACSE: Association Control Service Element
ROSE: Remote Operation Service Element



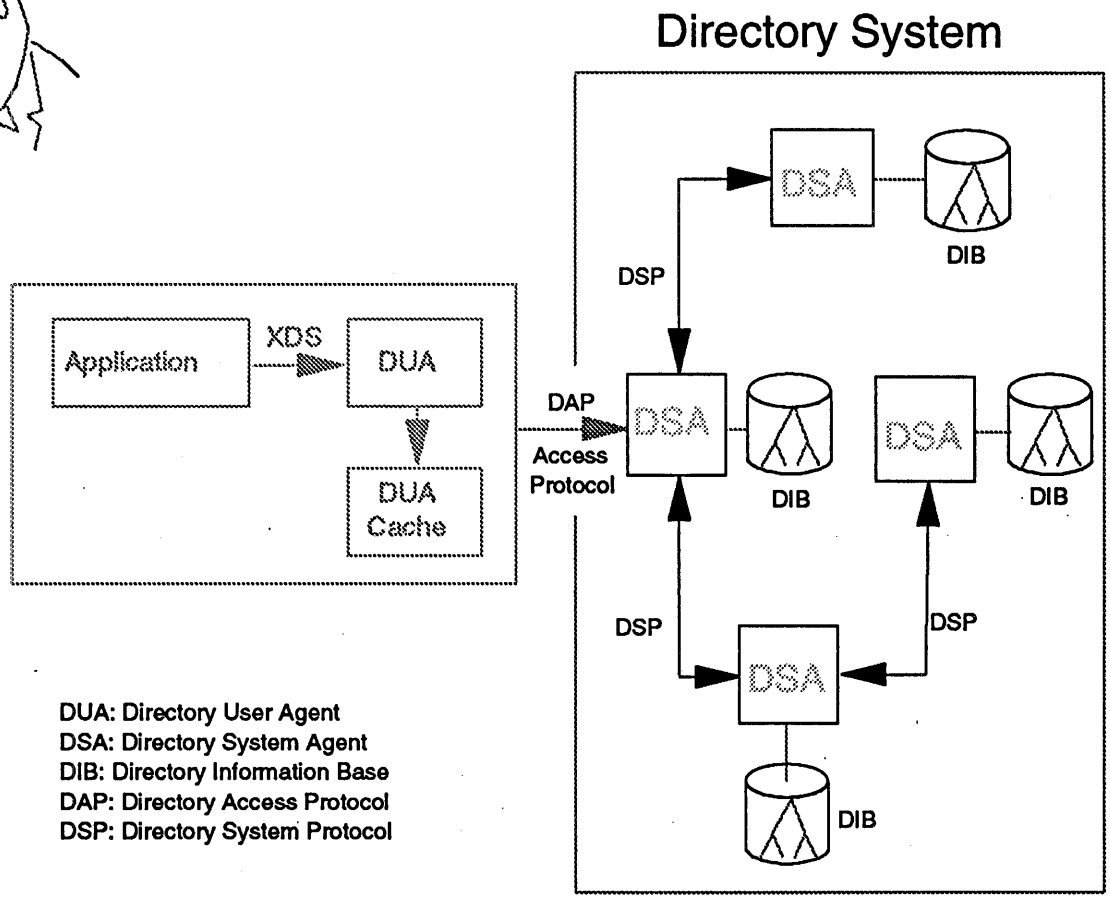
Directory

GDS Namespace Entries
and Directory Objects



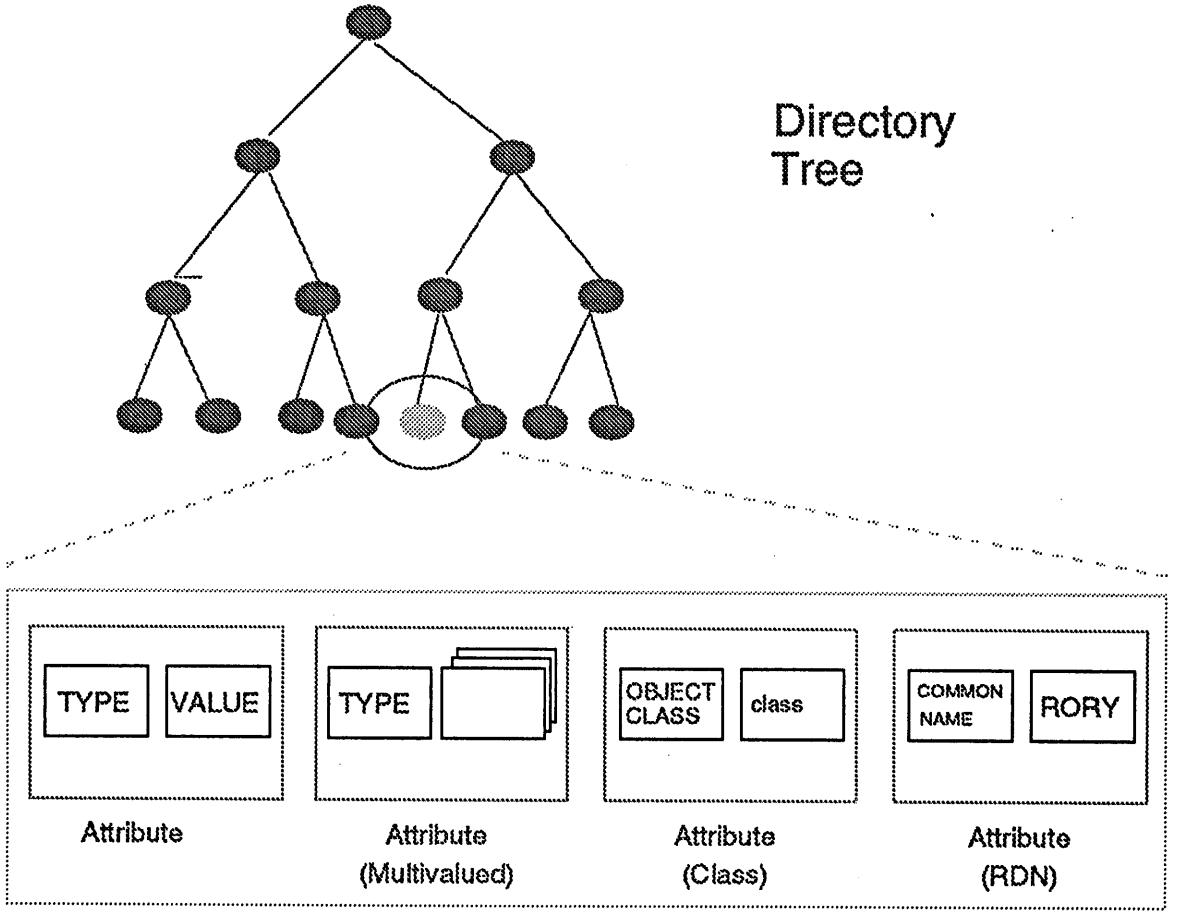
Level 1	Global root
Level 2	Country name and schema
Level 3	Organisation or locality name
Level 4	Organisational unit or common names

Directory



DUA: Directory User Agent
DSA: Directory System Agent
DIB: Directory Information Base
DAP: Directory Access Protocol
DSP: Directory System Protocol

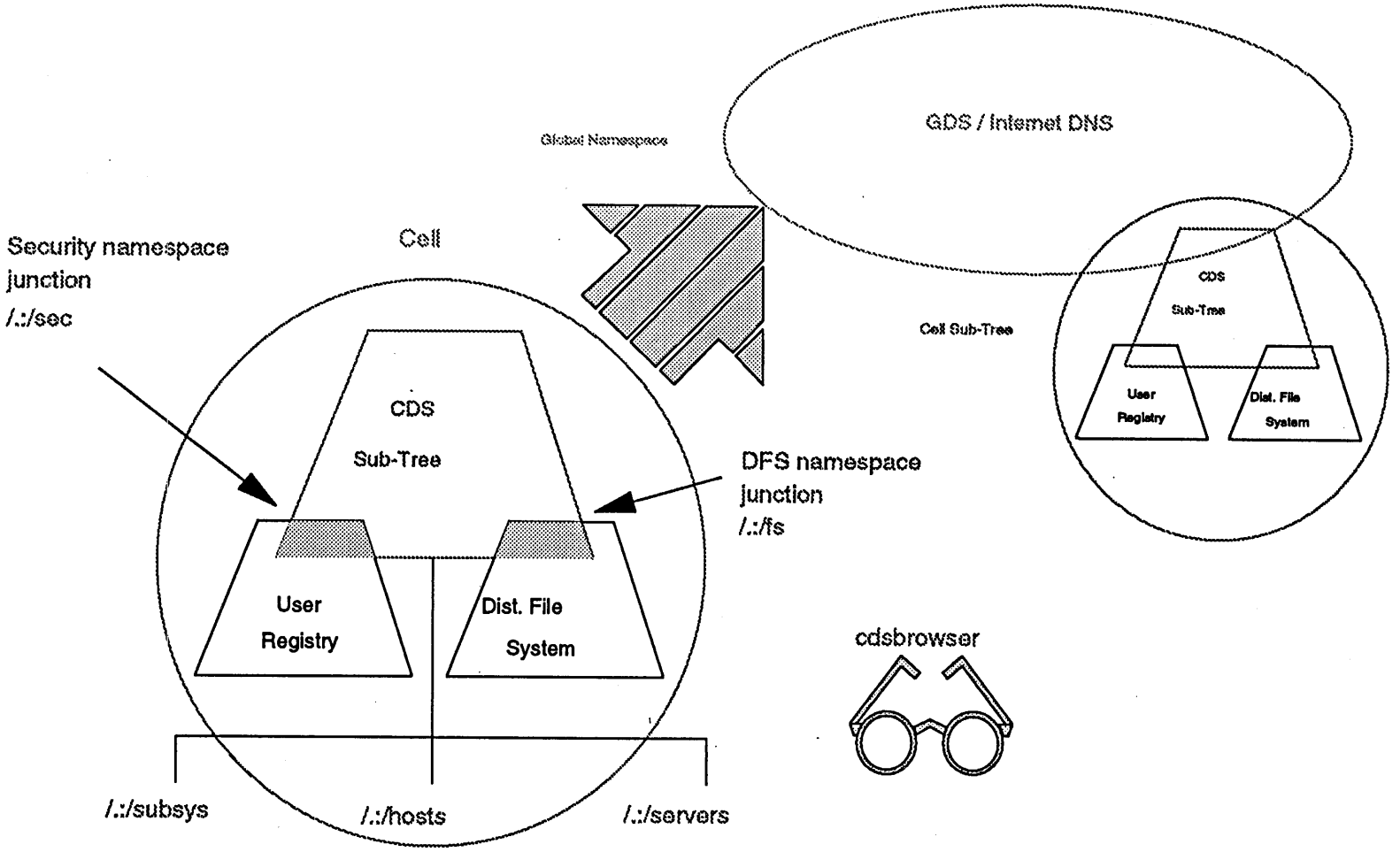
Directory



Directory

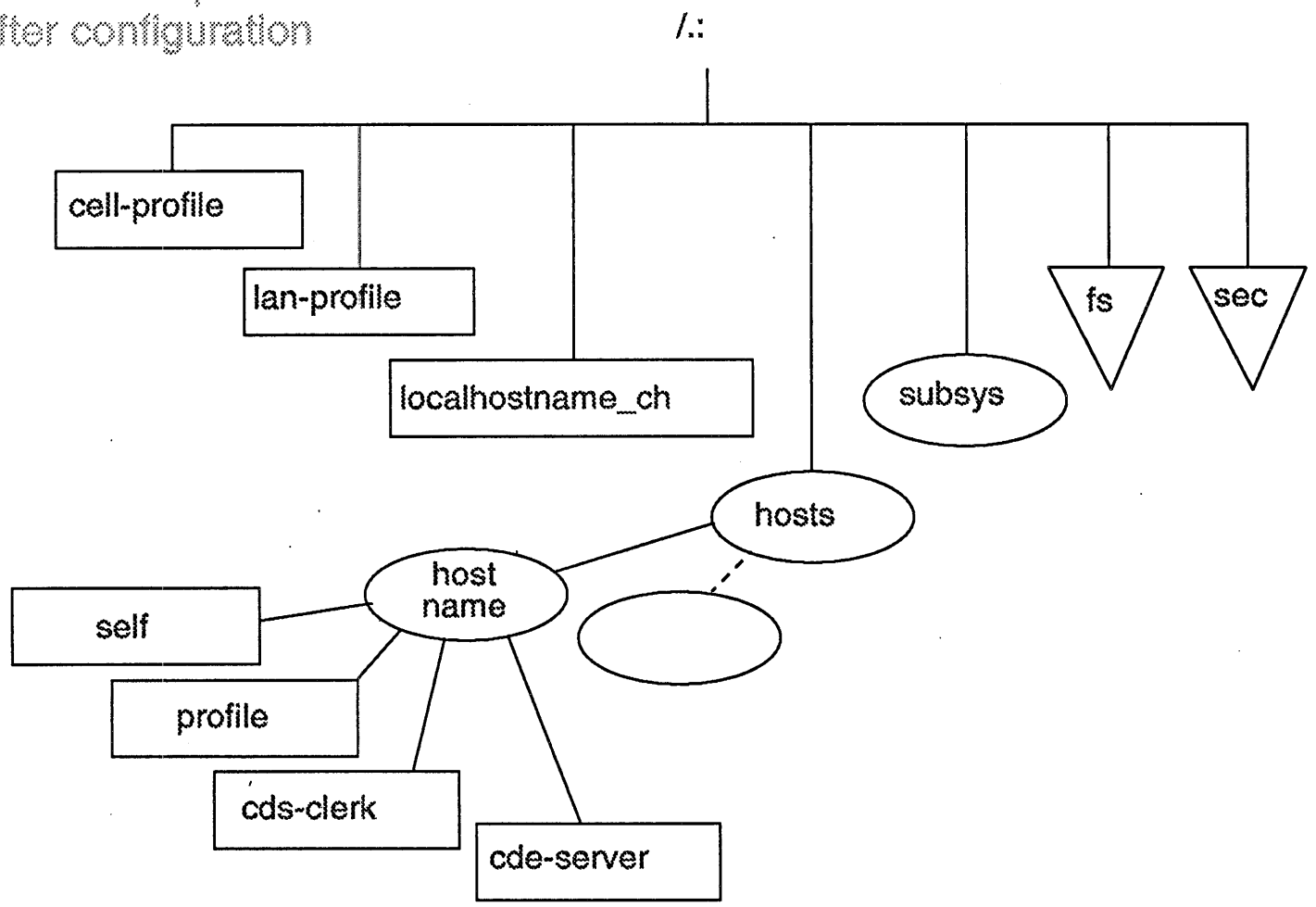
Global root name	/...	
X.500 global name	/.../C=ECOSSE/O=MJM/OU=sales/CN=rory stuart	TYPED
X.500 global cell name	/.../C=ECOSSE/O=MJM/OU=sales	TYPED
DNS global cell name	/.../mjm.com	UNTYPED
Global name with a DNS cell name	/.../mjm.com/edin/admin/fast_printer	UNTYPED
Cell root name	/.:	
CDS name	/.:/mainframe/bigjoe	
Cell-relative name	/.:/edin/admin/fast_printer	
Security Service junction name	/.:/sec	
DCE principal name	/.:/principals/fred_bloggs	
File Service junction name	/.:/fs	
DCE filename	/.:/fs/depta/graphics/london	
Filesystem root name	/:	
DCE filesystem name	/:/depta/graphics/london	

Directory

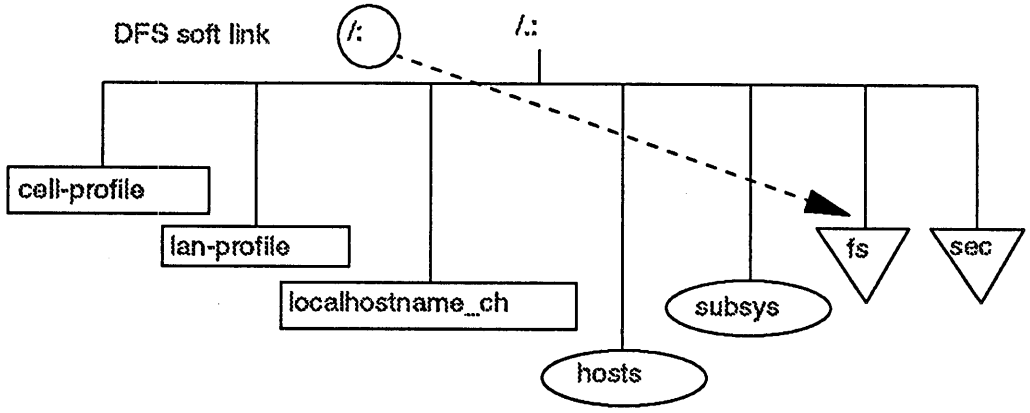


Directory

Cell Namespace
after configuration



Directory

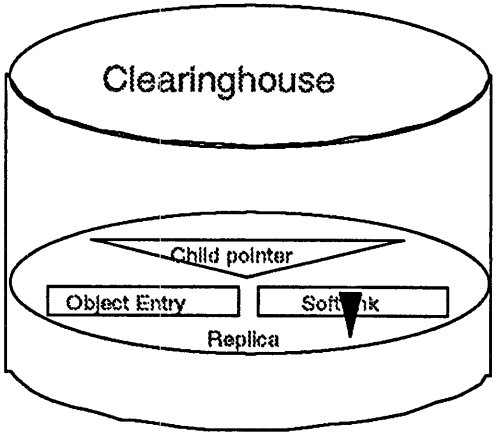


Directories

Entries

Soft links

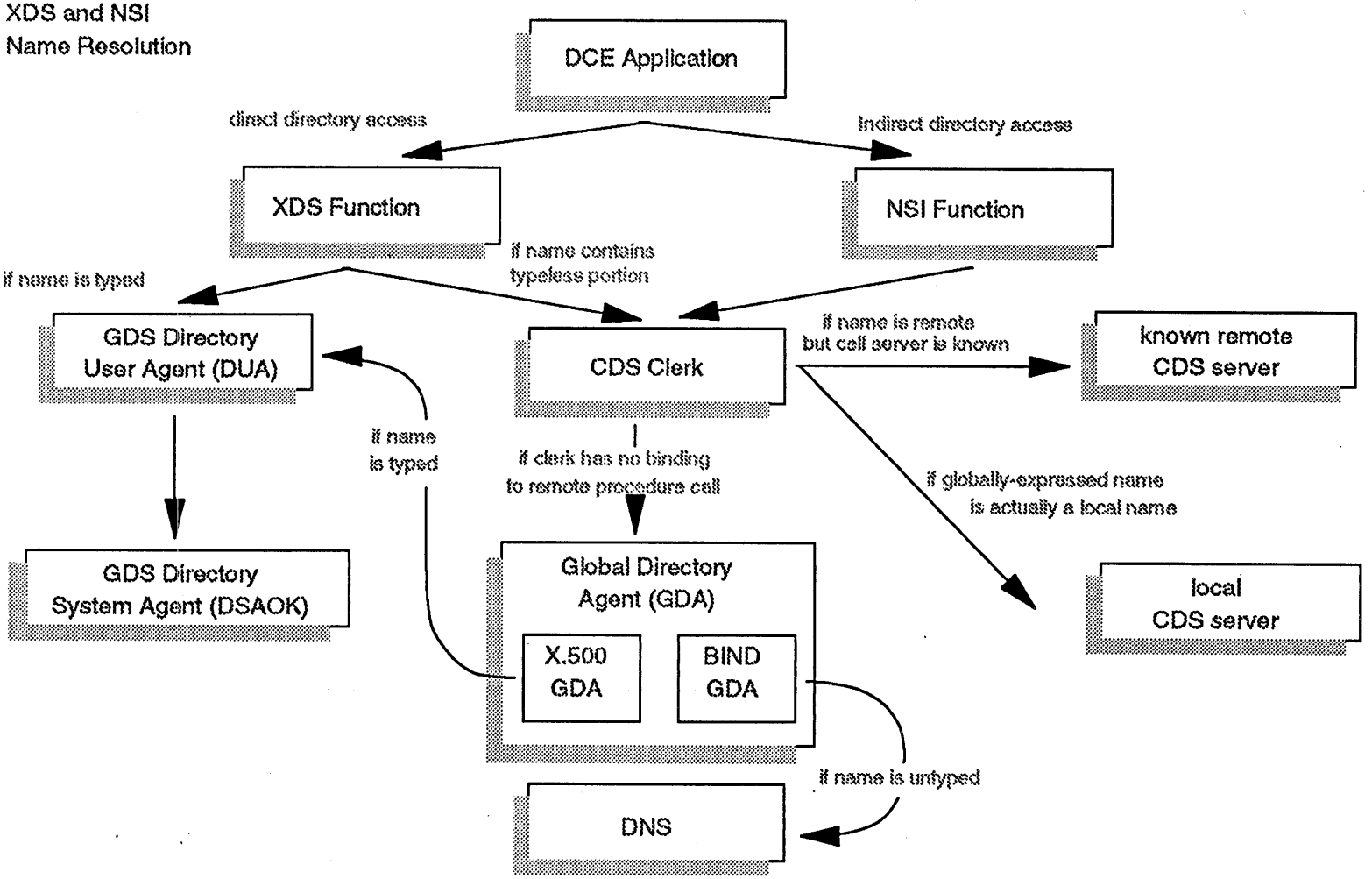
Namespace Jn



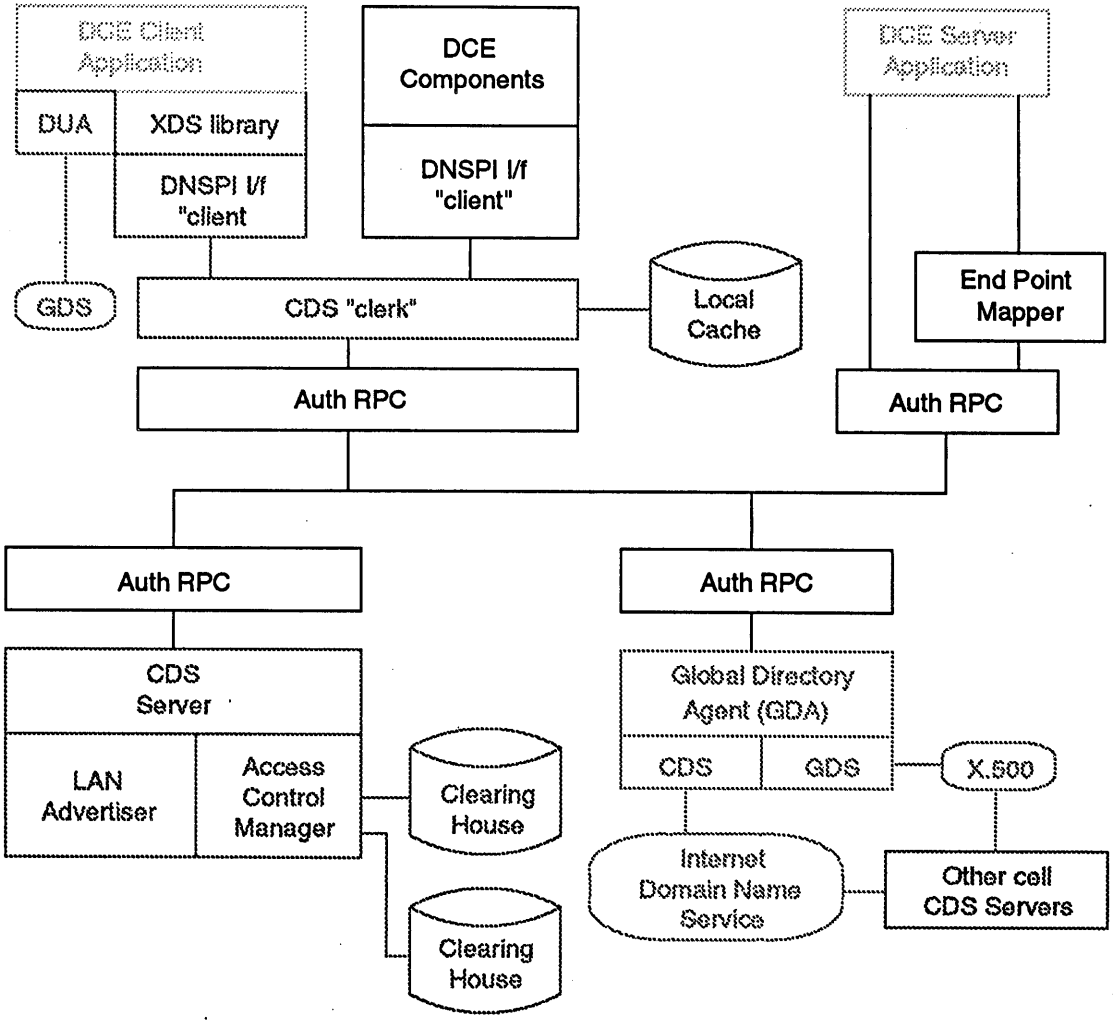
- Replication
- Child Pointers
- Cell root directory copy
- Soft links
- Update propogation
- Skulking
- RAS

Directory

XDS and NSI
Name Resolution



Directory



MMDIR150

Directory

How the CDS works

"Where is /.:/TOR/JOE ?"

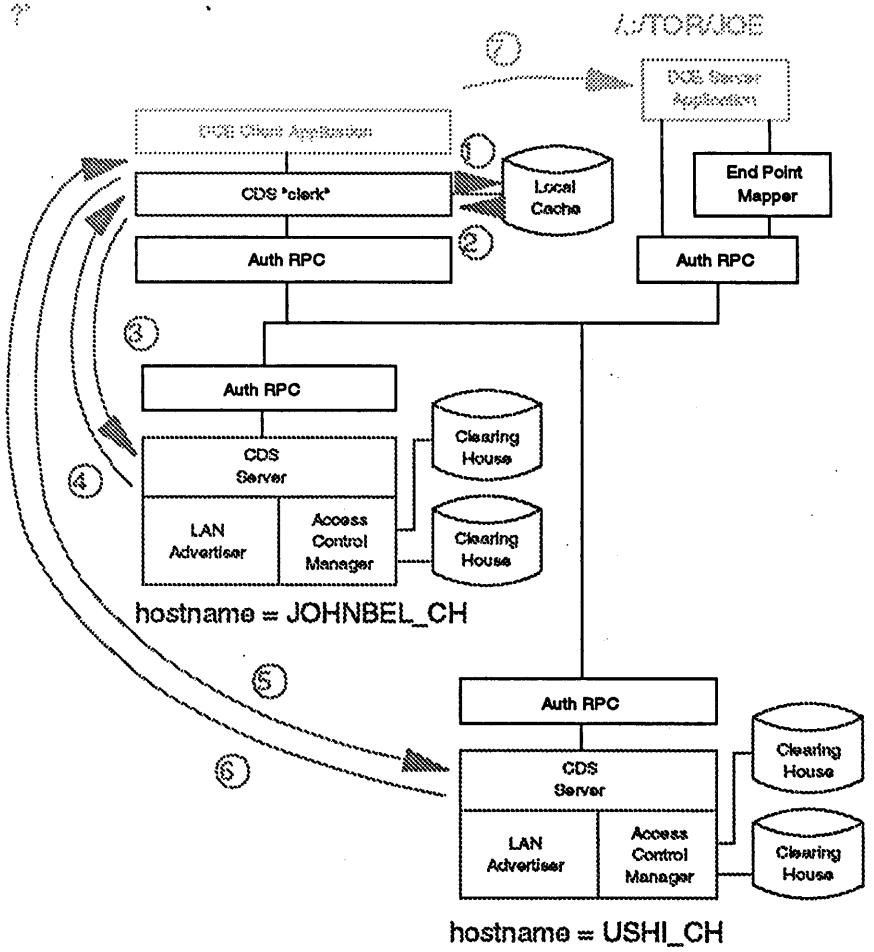
CDS servers are found

- through solicitation and advertisement

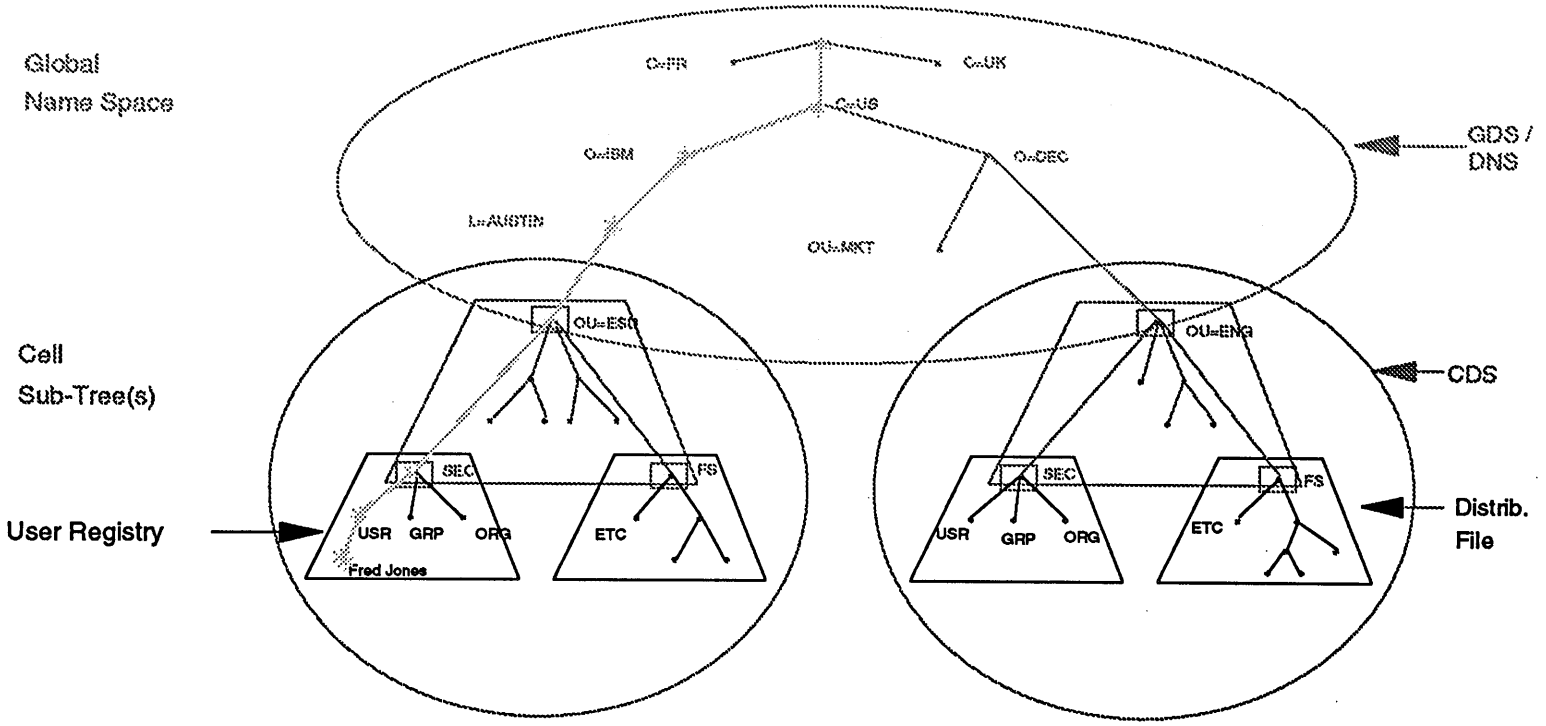
CDS Server data stored in local cache

Example: "Where is /.:/TOR/JOE ?"

1. Is Joe in the cache?
2. No
3. Where is /.:/TOR/JOE ?
4. /.:/TOR is in USHI_CH, can't resolve rest
5. Where is /.:/TOR/JOE ?
6. /.:/TOR/JOE/ is at 192.110.200.4
7. Gotcha !!



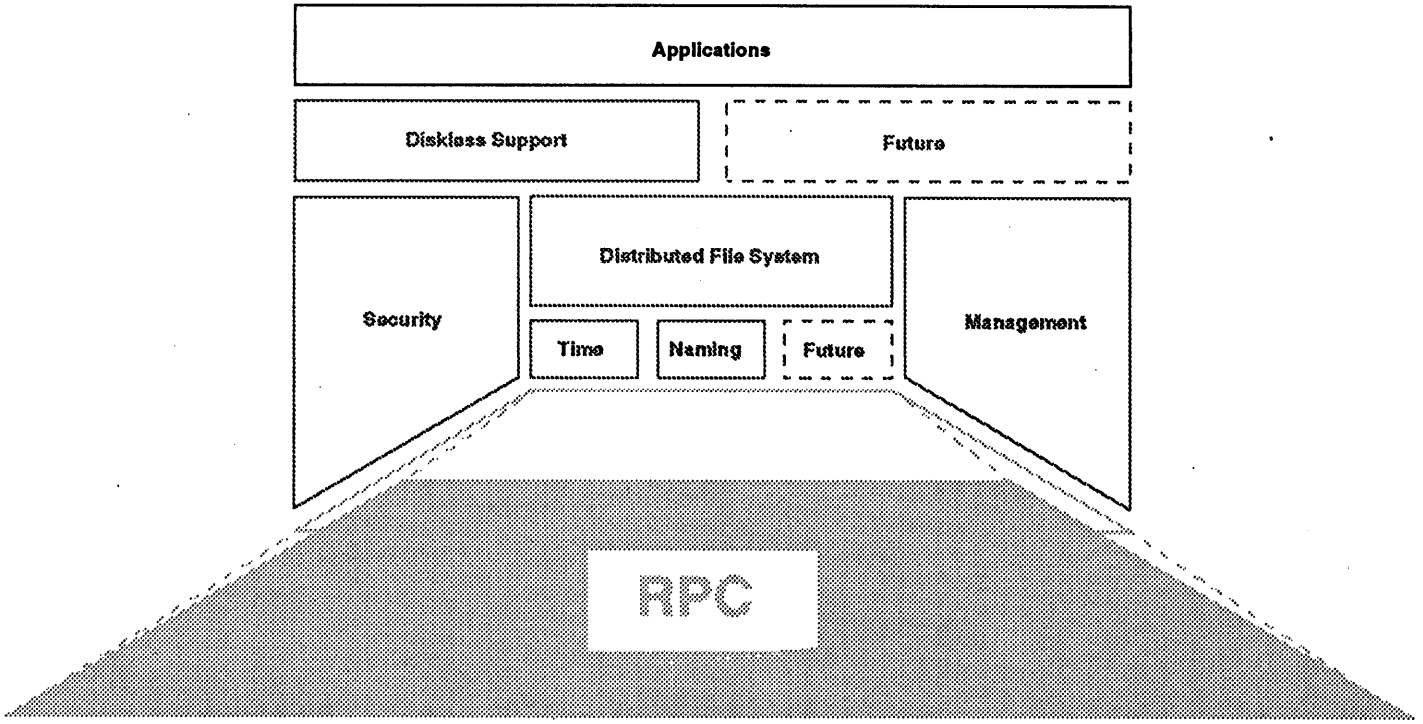
Directory



/.../C=US/O=IBM/L=AUSTIN/OU=ESD/SEC/USR/FRED JONES

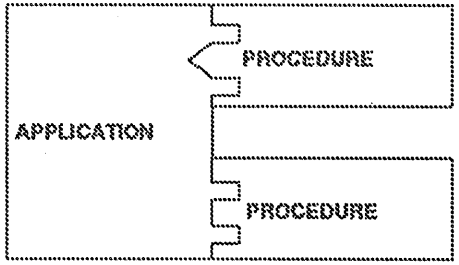
- Global Name Space provides a homogeneous naming framework
- Name Services are provided
  by a collection of "name providers":
  - GDS (X.500)
  - CDS
  - User Registry
  - Distributed File System
- Providers are linked together via junctions
  - Big Junction = Mixed Name Support
  - Small Junction = Subdirectory Manager

Remote Procedure Call

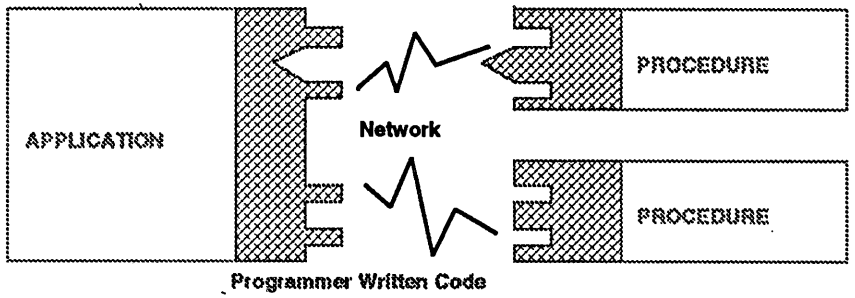


Remote Procedure Call

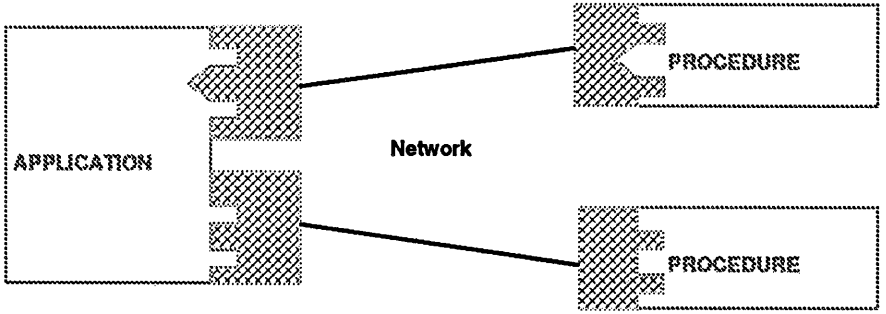
Structured Programming



Distributed Processing without RPC

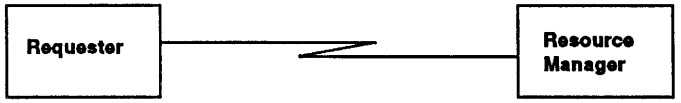


Distributed Processing with RPC

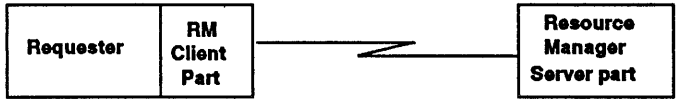


Resource Manager Distribution Models

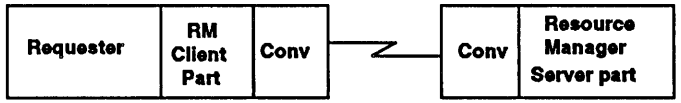
1. Requester explicitly invokes communications



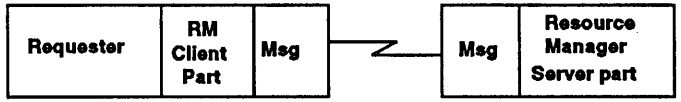
2. Requester does not explicitly invoke communications



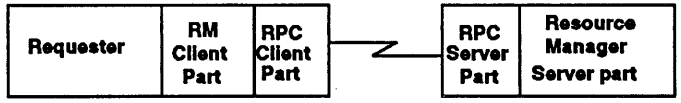
2A. Resource Manager uses conversations



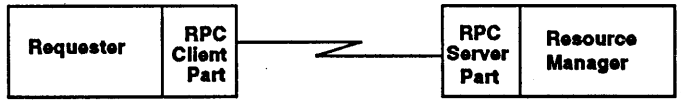
2B. Resource Manager uses message



2C. Resource Manager uses RPC

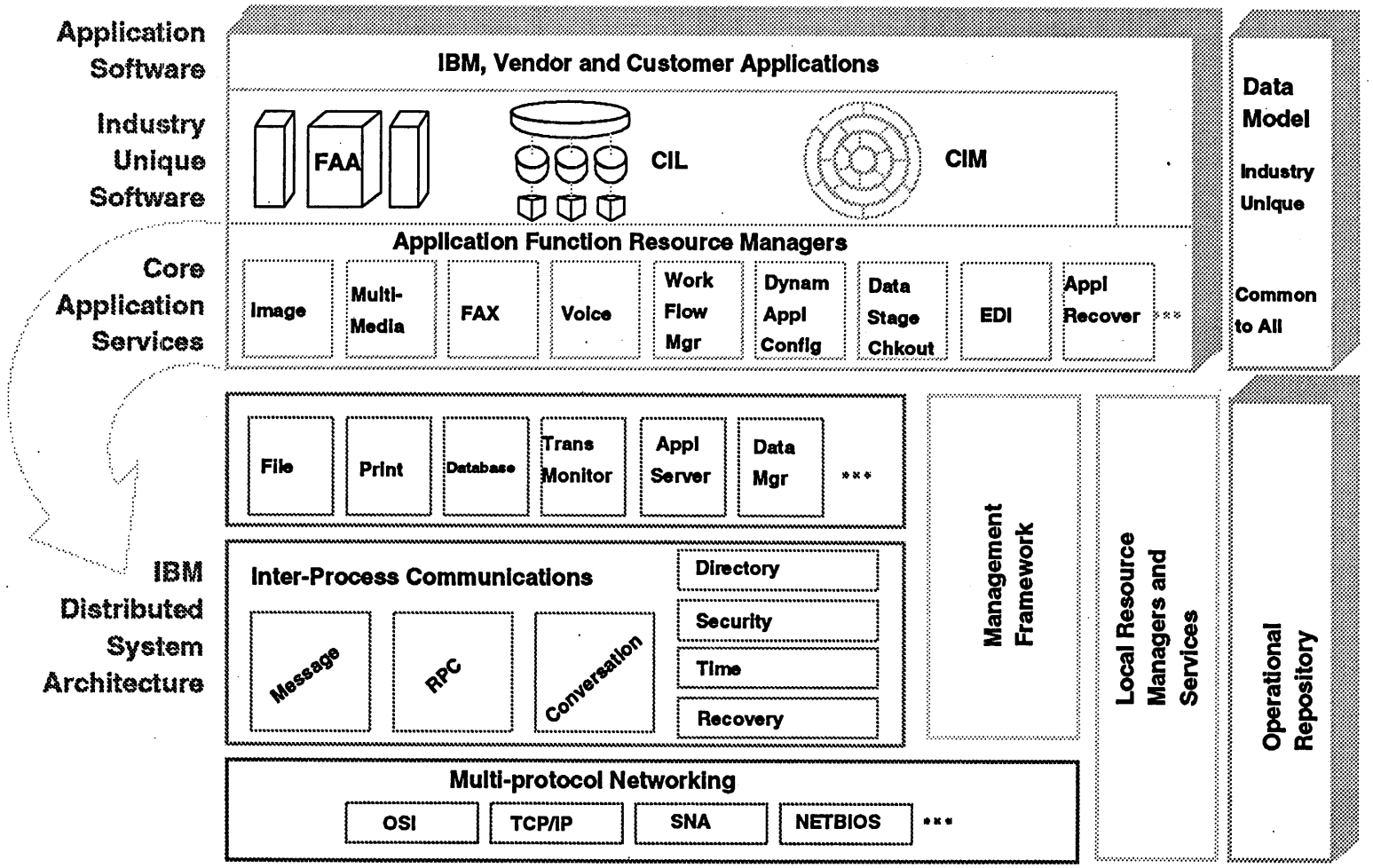


2C'. Resource Manager's interface is RPC-callable



Remote Procedure Call

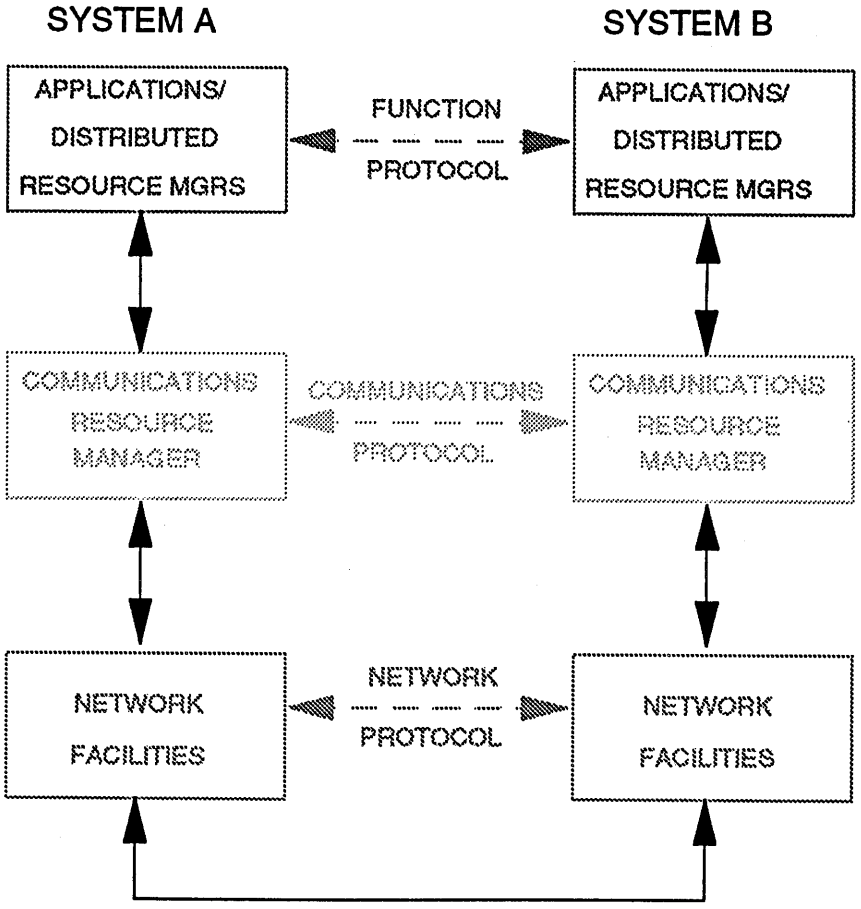
IBM OPEN SYSTEMS DISTRIBUTED ARCHITECTURE



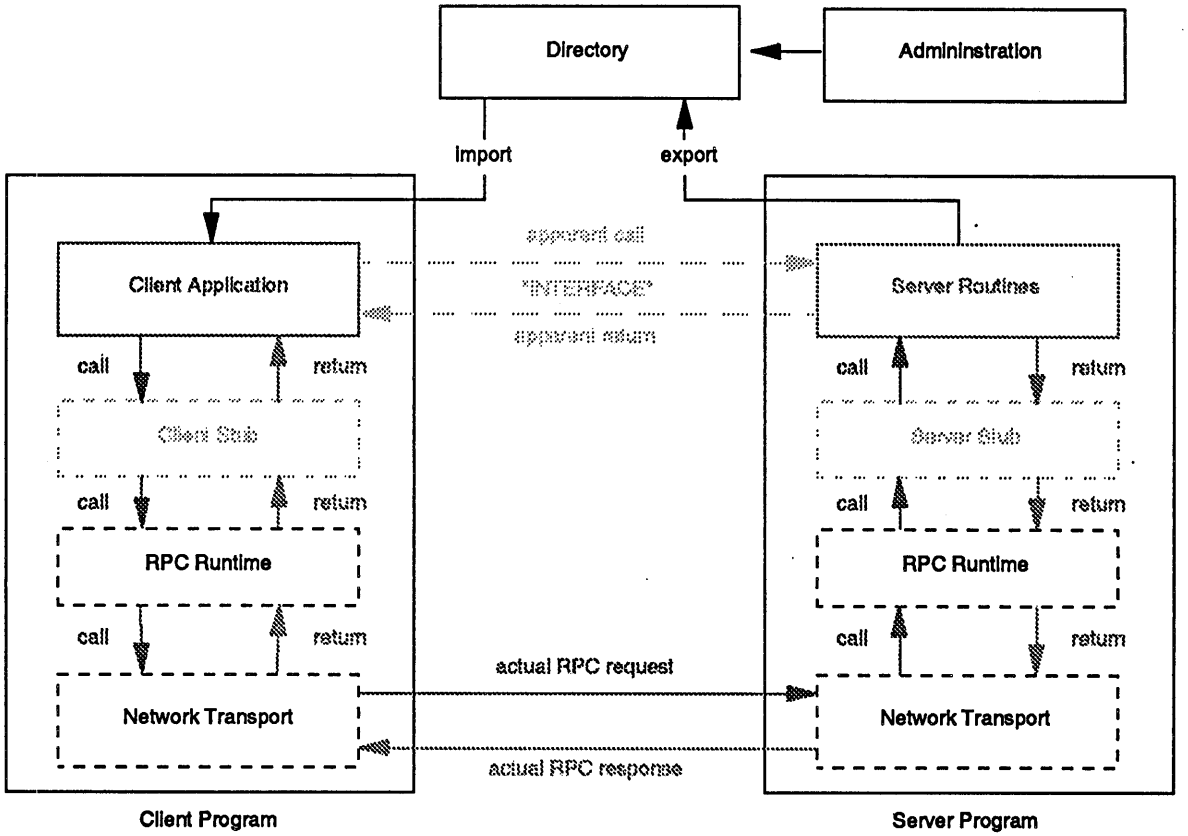
MMRPC40

Remote Procedure Call

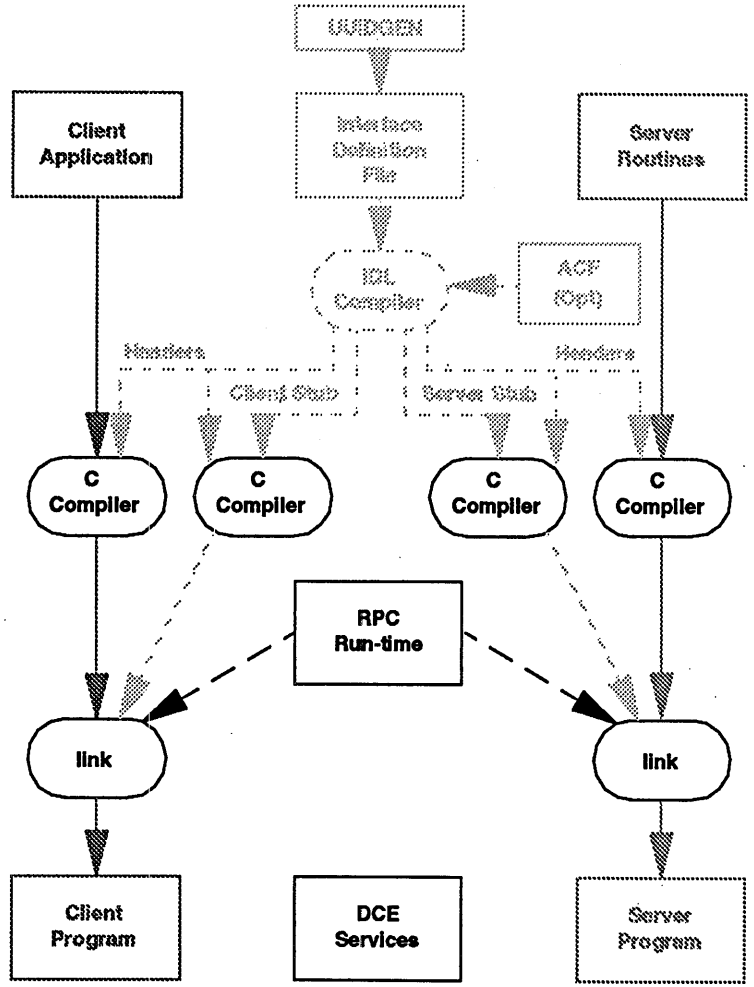
Interoperation Requires Protocols to Match



Remote Procedure Call



Remote Procedure Call



UUIDGEN defines UUID and base IDF template Interface Definition File

- defines what Server 'expects'
- data values, data types, input and output arguments
- constant, type and operation declarations
- IDL - Declarative HLL similar to ANSI C

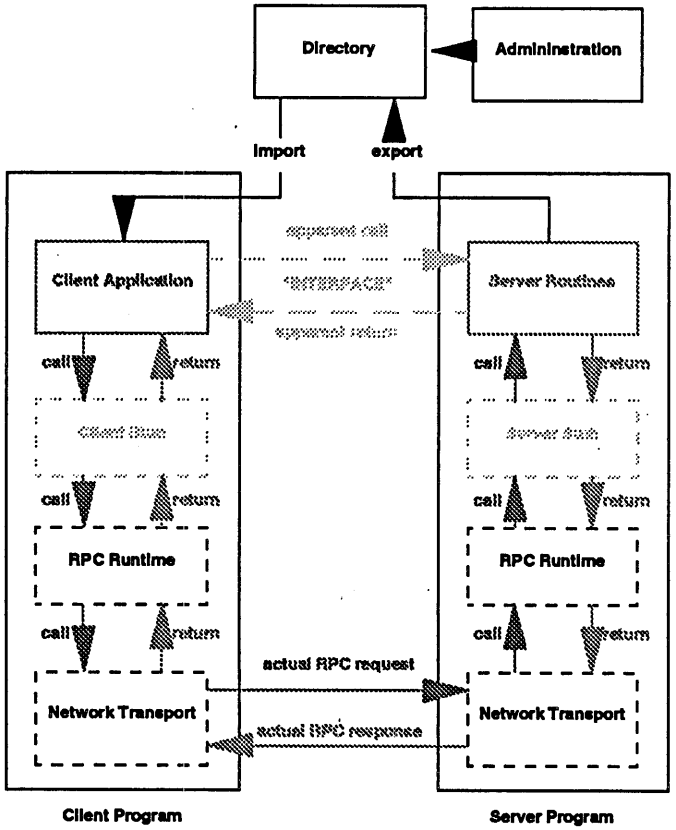
Optional Attribute Configuration File

- to modify interface behaviour eg. Client

Languages other than C can be used

- If object code is linkable with C object code of the stubs
- If procedure declarations conform to operations declarations in IDF
- calling sequence is compatible

RPC Requirements



Resolve data representation differences

- 'Receiver makes it right'
- Can use Canonical schemes
  eg. ISO ASN.1 BER

Support multi-threaded programming

RAS

Integration with other DCE services

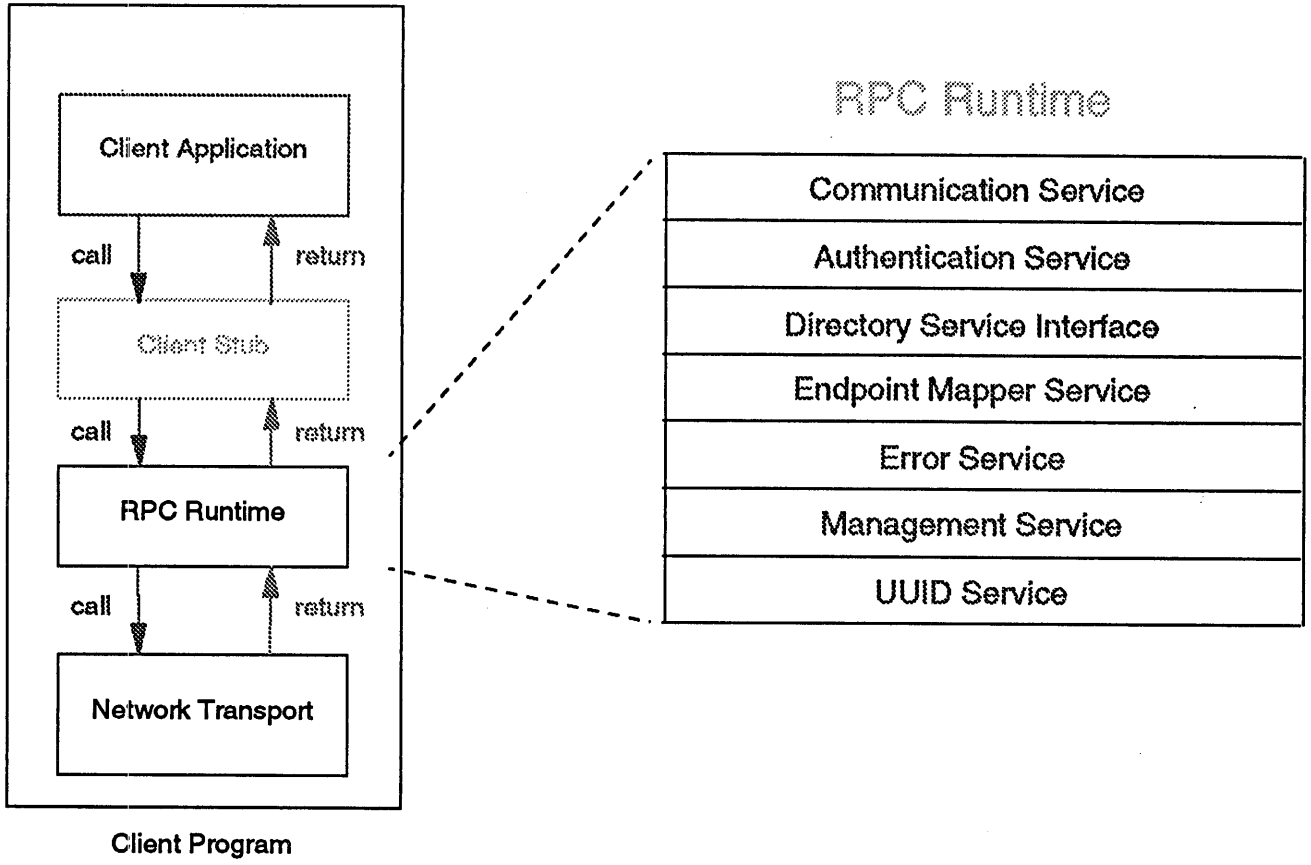
- Directory
- Security

Independence from network protocols

Support variety of execution semantics

- 'At most once'
- Idempotent
- Broadcast

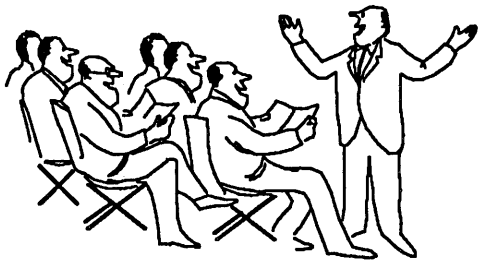
RPC Runtime Services



Remote Procedure Call

Communication Service
Authentication Service
Directory Service Interface
Endpoint Mapper Service
Error Service
Management Service
UUID Service

Communication Service



Communications protocol

Transport

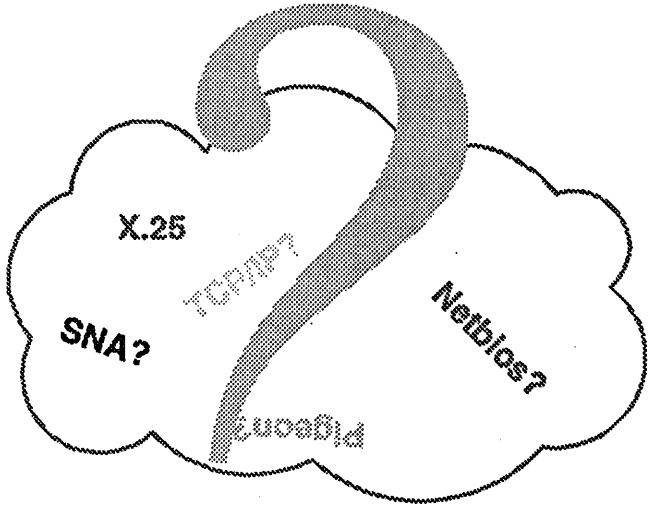
- TCP
- UDP

Network

- Internet Protocol

RPC Protocol

- Connectionless (Datagram) - ncadg
- Connection-orientated - ncacn



Remote Procedure Call

Communication Service
Authentication Service
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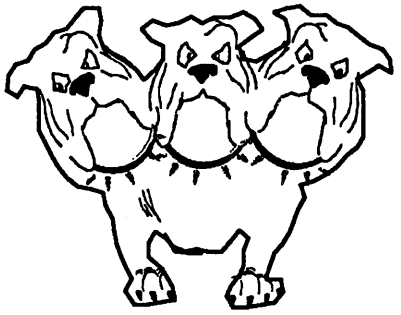
UUID Service

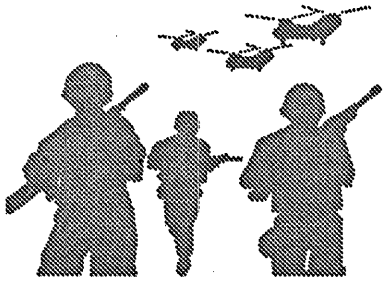
Authentication Service



Applications use Authenticated RPC for

- **Authentication**
- **Authorisation**
- **Data Integrity checking**
- **Privacy**

Can choose from 6 levels of protection



Remote Procedure Call

Communication Service
Authentication Service
Directory Service Interface
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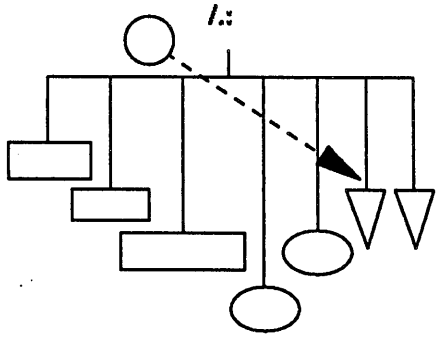
Management Service
UUID Service

Directory Service Interface



RPC uses the NAME SERVICE INTERFACE

- look up servers that support a given interface
- determine server location and protocol to be used

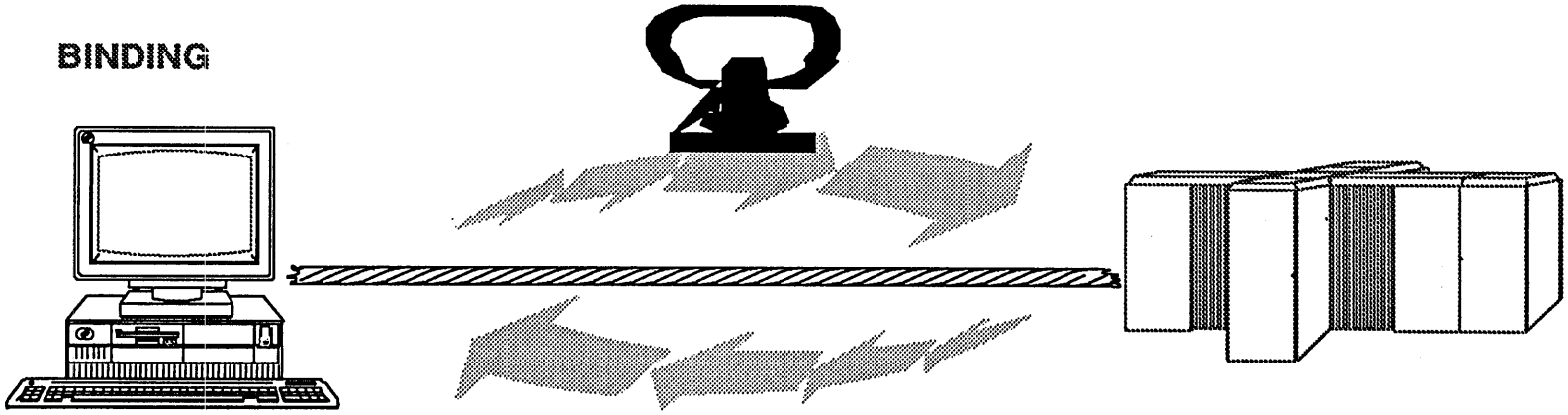
NSI provides specilaised routines to

- allow RPC Servers to advertise themselves to RPC Clients
- For Clients to find and to Servers

Three types of NSI Name Service Entries

- Server Entry
- Group Entry
- Profile Entry

Remote Procedure Call



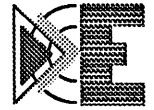
BINDING INFORMATION

- Describes network relationship between Client and Server
  - Protocol sequence
  - Host address
  - Endpoint
  - Other network options

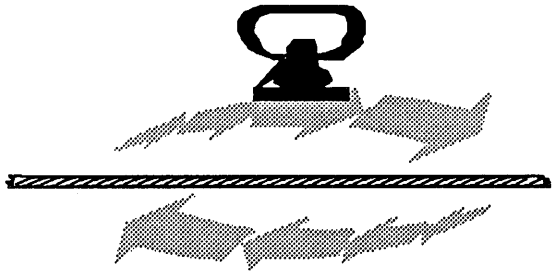
BINDING HANDLE

- Runtime local reference to Binding information

Remote Procedure Call



Binding Handle



BINDING INFORMATION INCLUDES..

Protocol Sequence

- RPC, network and transport protocols

  eg. ncadg_ip_udp

Host Address

- Identify specific host system

Endpoint

- address of a server instance on a host system (port)
- two types

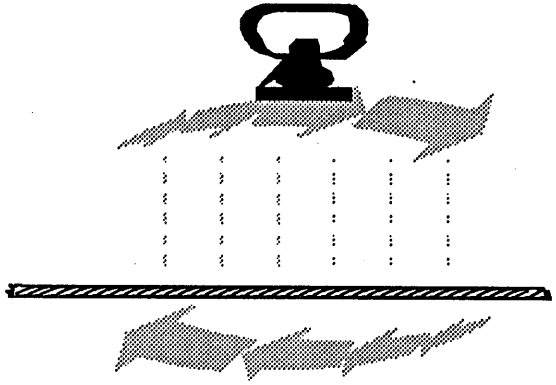
  Dynamic - assigned at runtime

  Well-known - assigned by a central authority eg. ARPANET

Remote Procedure Call

Communication Service
Authentication Service
Directory Service Interface
Endpoint Mapper Service
Error Service
Management Service
UUID Service

Endpoint Mapper Service

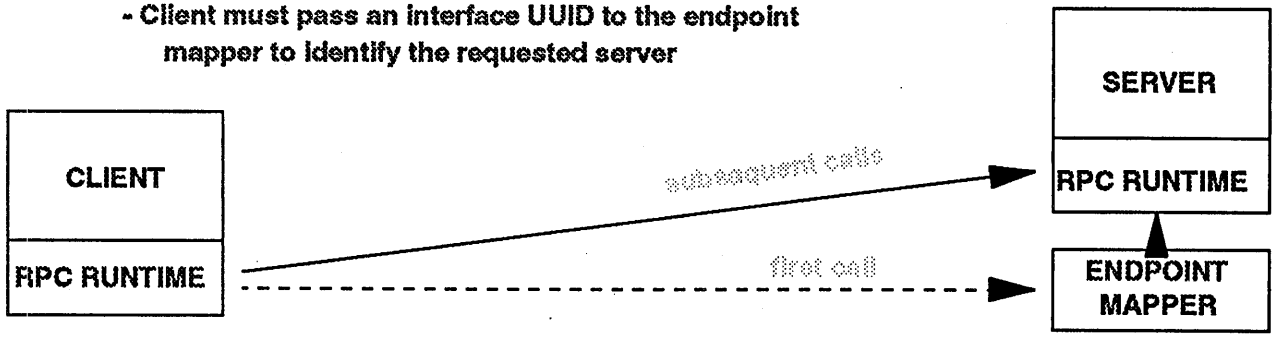


Partial Bindings

Includes protocol sequence and host address only

Endpoints must be obtained via Endpoint Mapping

- **Client uses partial binding handle to contact Server**
- **Server RPC Endpoint Mapper daemon (rpcd) maps dynamic endpoints at start-up**
- **returns dynamic endpoint to Client**
- **Client must pass an interface UUID to the endpoint mapper to identify the requested server**

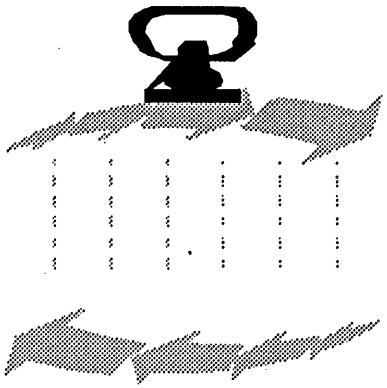


MMRPC150

Remote Procedure Call

Communication Service
Authentication Service
Directory Service Interface
Endpoint Mapper Service
Error Service
Management Service
UUID Service

String Bindings



Textual representation of a binding handle

- can include only protocol sequence and network address
- all components

0079634B-9C9E-1A01-AD15-10005AA881FD@ncacn_ip_tcp:192.100.100.2[2345]

String Binding information can be supplied

- a file
- a argument
- an environment variable
- hardcoded into an application

Does not require Directory Services

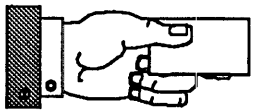
Can be used during development and testing

BINDING METHODS

RPC provides three methods for managing bindings

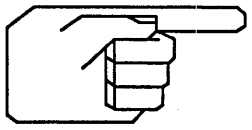
Automatic method (default)

- Client stub obtains binding handle via NSI
- passes binding handle to runtime
- Runtime uses handle to obtain binding information
- Automatic method calls can somtimes be automatically rebound if disrupted



Implicit Method

- Runtime routines invoked prior to RPC calls to intialise server binding handle (from Directory or String binding)
- Client application assigns handle to a global variable
- passes global variable to runtime on RPC invocation



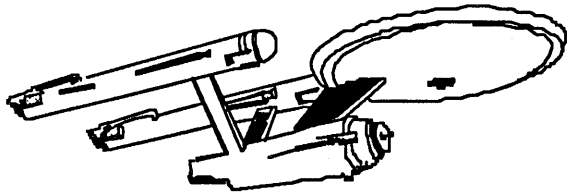
Explicit Method

- Runtime routines invoked prior to RPC calls to intialise server binding handle (from Directory or String binding)
- Binding handle supplied as a parameter by application to RPC

Remote Procedure Call

Communication Service
Authentication Service
Directory Service Interface
Endpoint Mapper Service
Error Service
Management Service
UUID Service

UUID Services



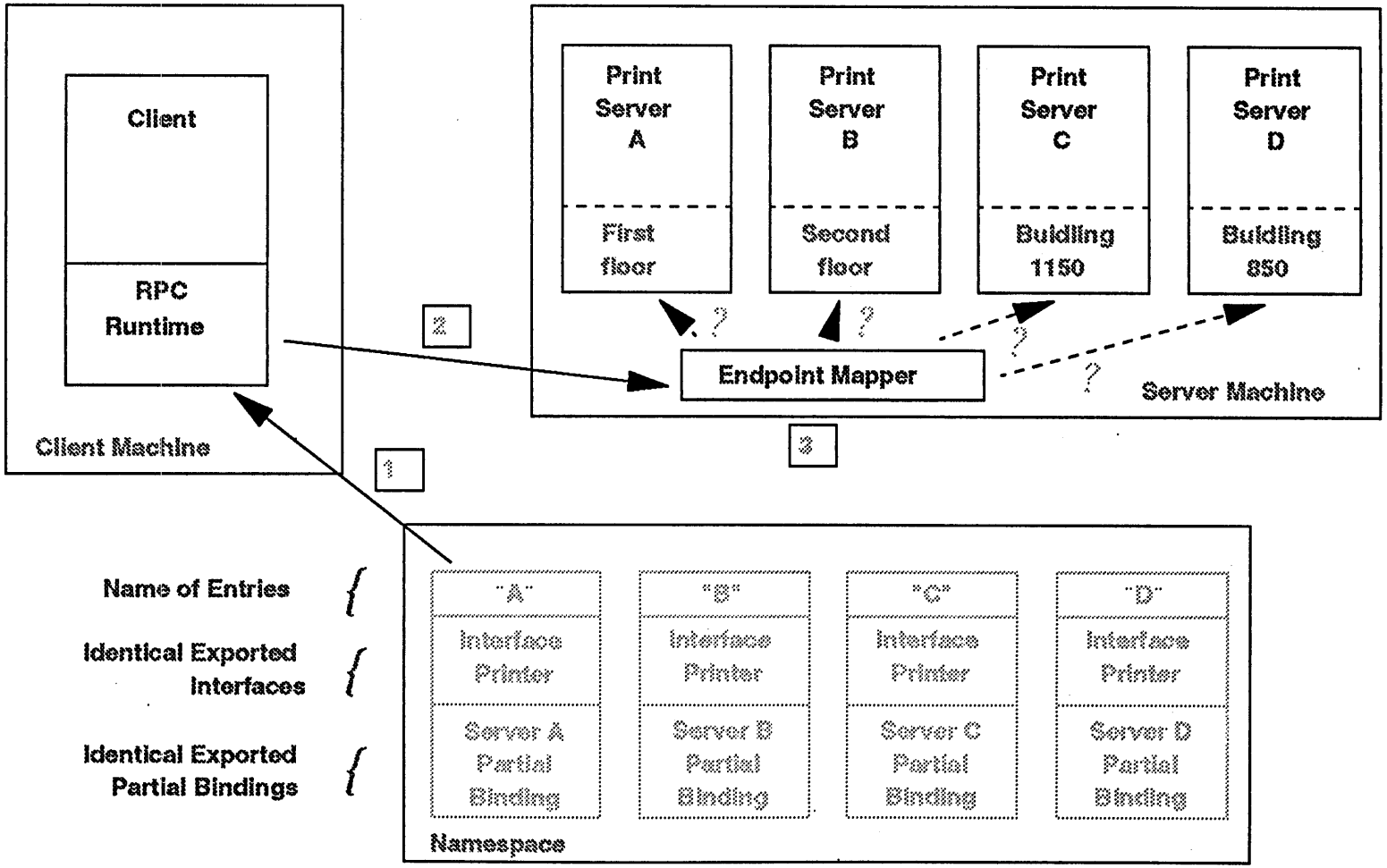
Universally Unique Identifier

- Names merely point at objects
- Objects are represented by a namespace entry and identified by a UUID
- Object UUIDs allow specification
  - what servers are bound to
  - what resources the server will use
- RPC interfaces are identified by UUIDs

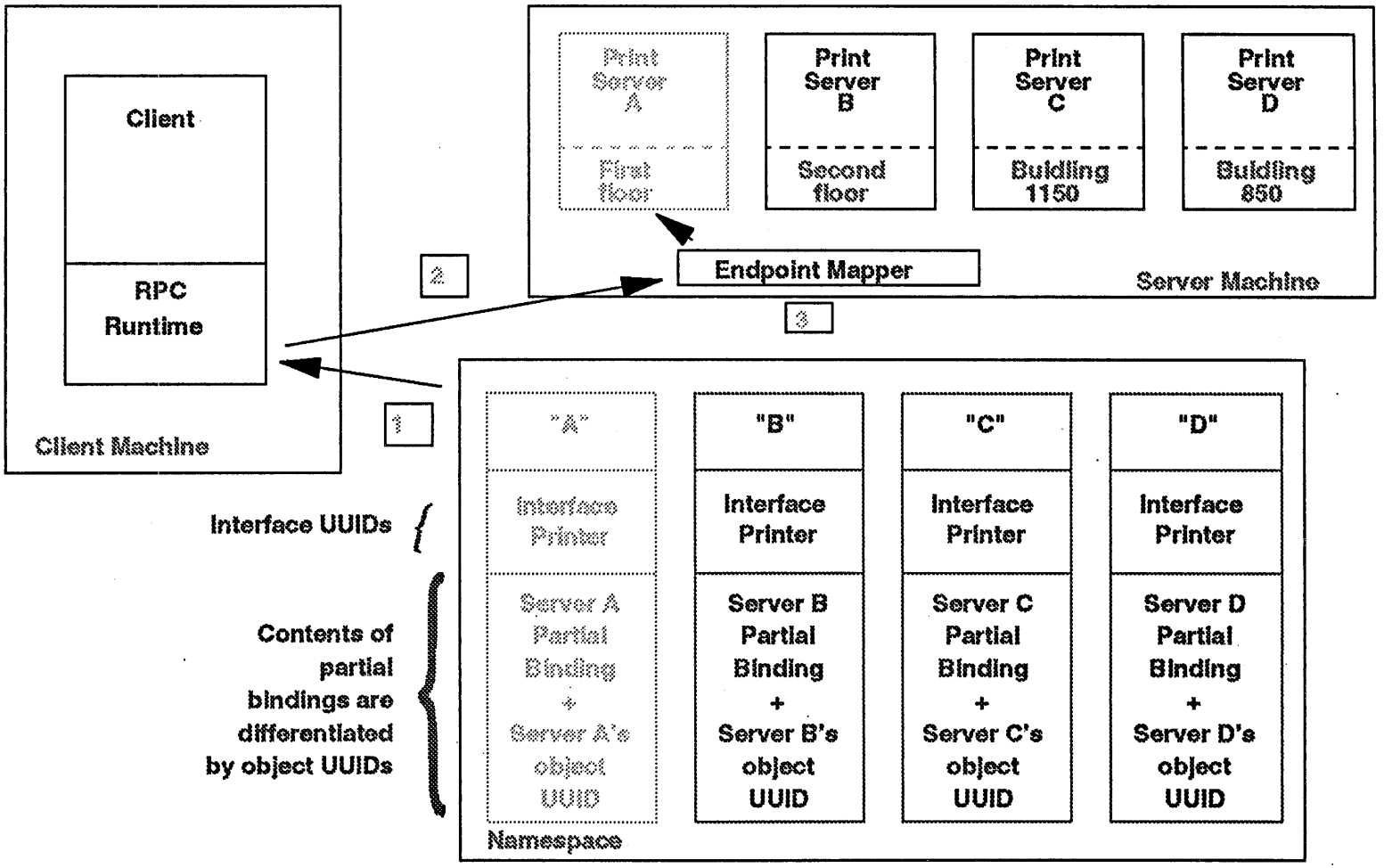
UUID Services

- Allow applications to create and manipulate UUIDs

Remote Procedure Call

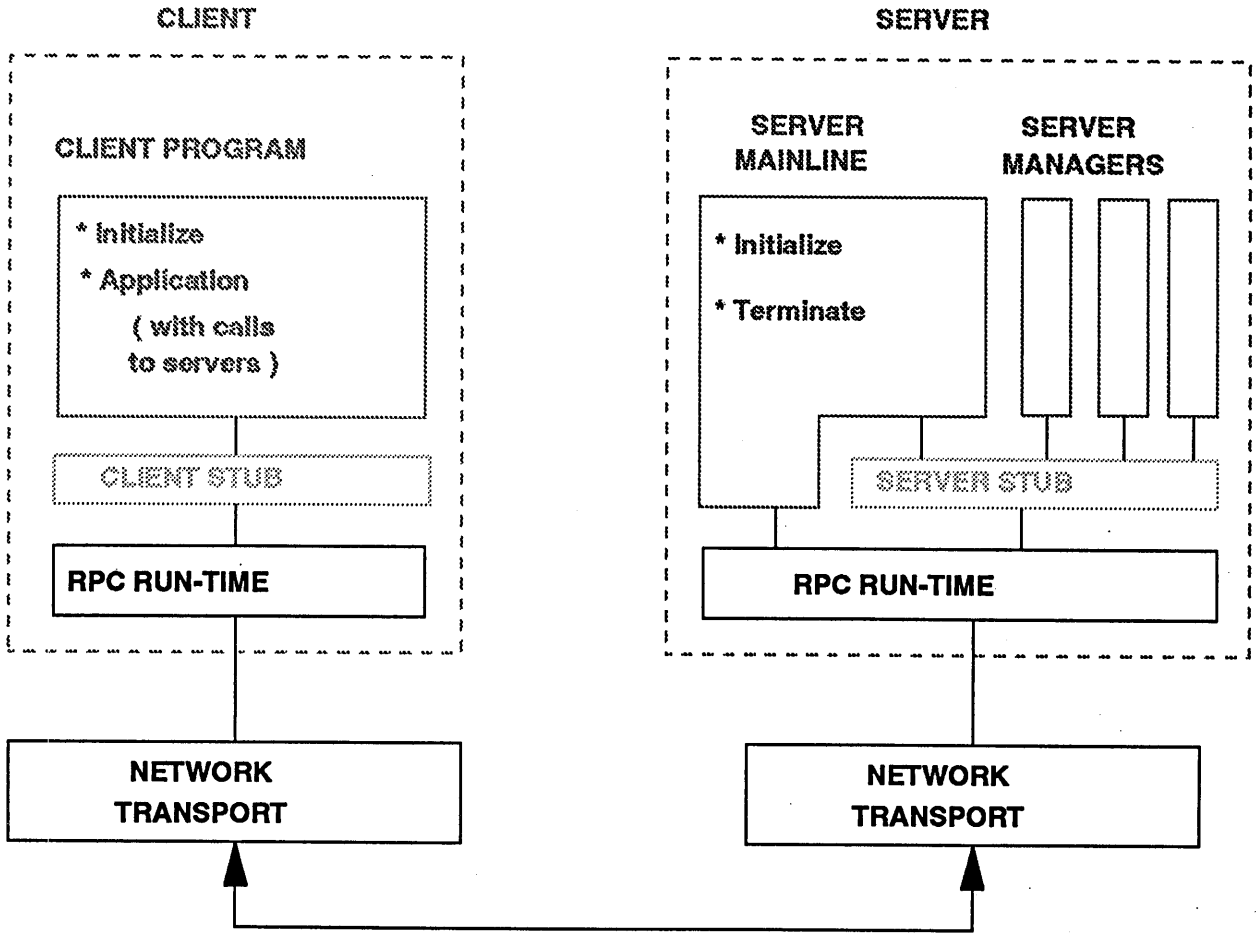


Remote Procedure Call

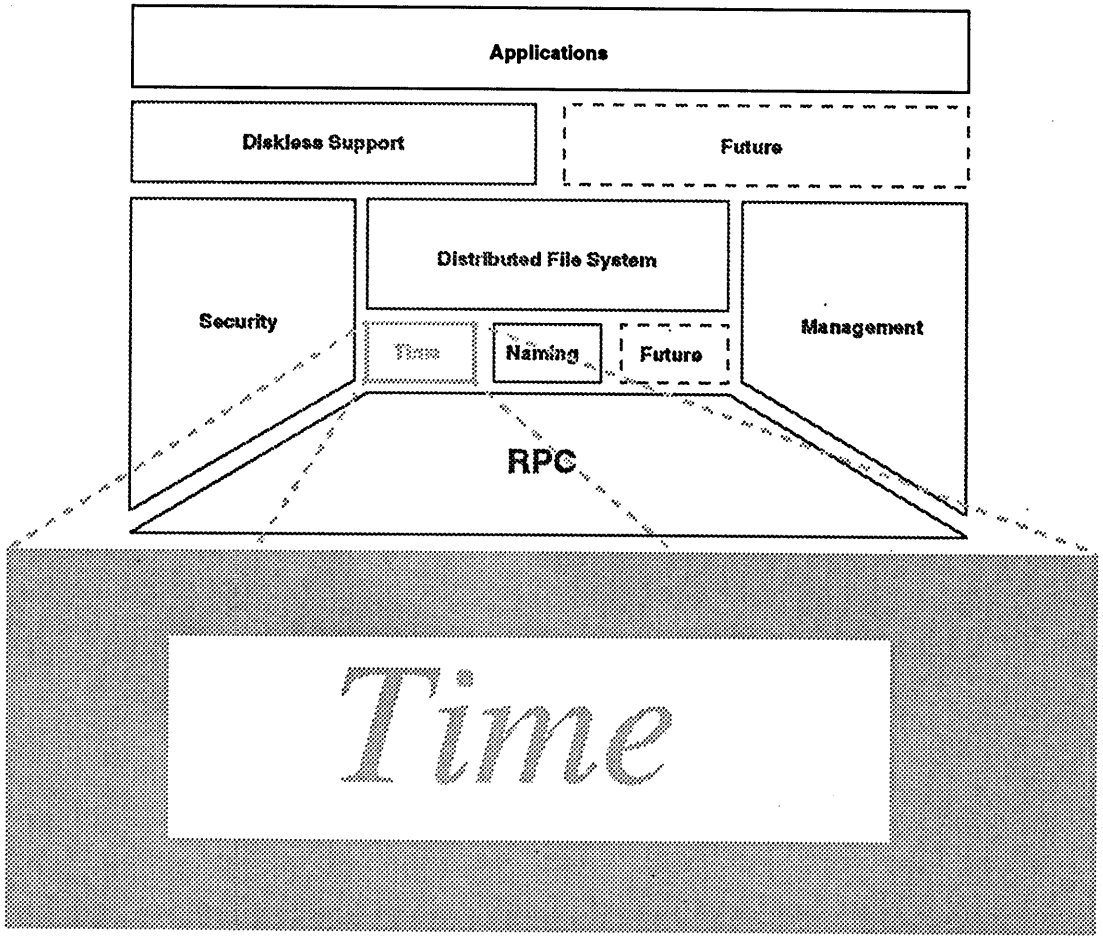


MMRPC200

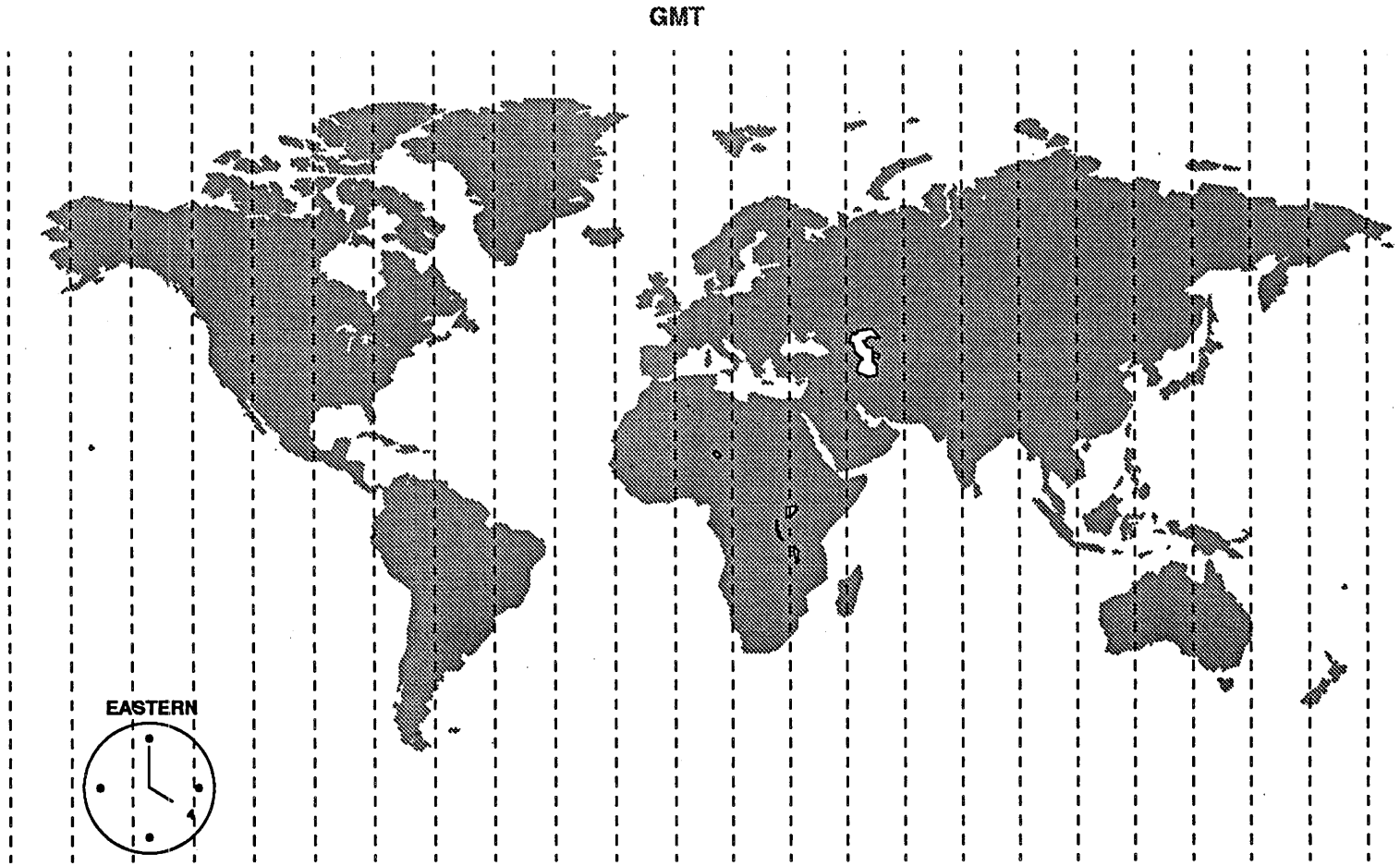
Remote Procedure Call



Distributed Time Services



Distributed Time Services

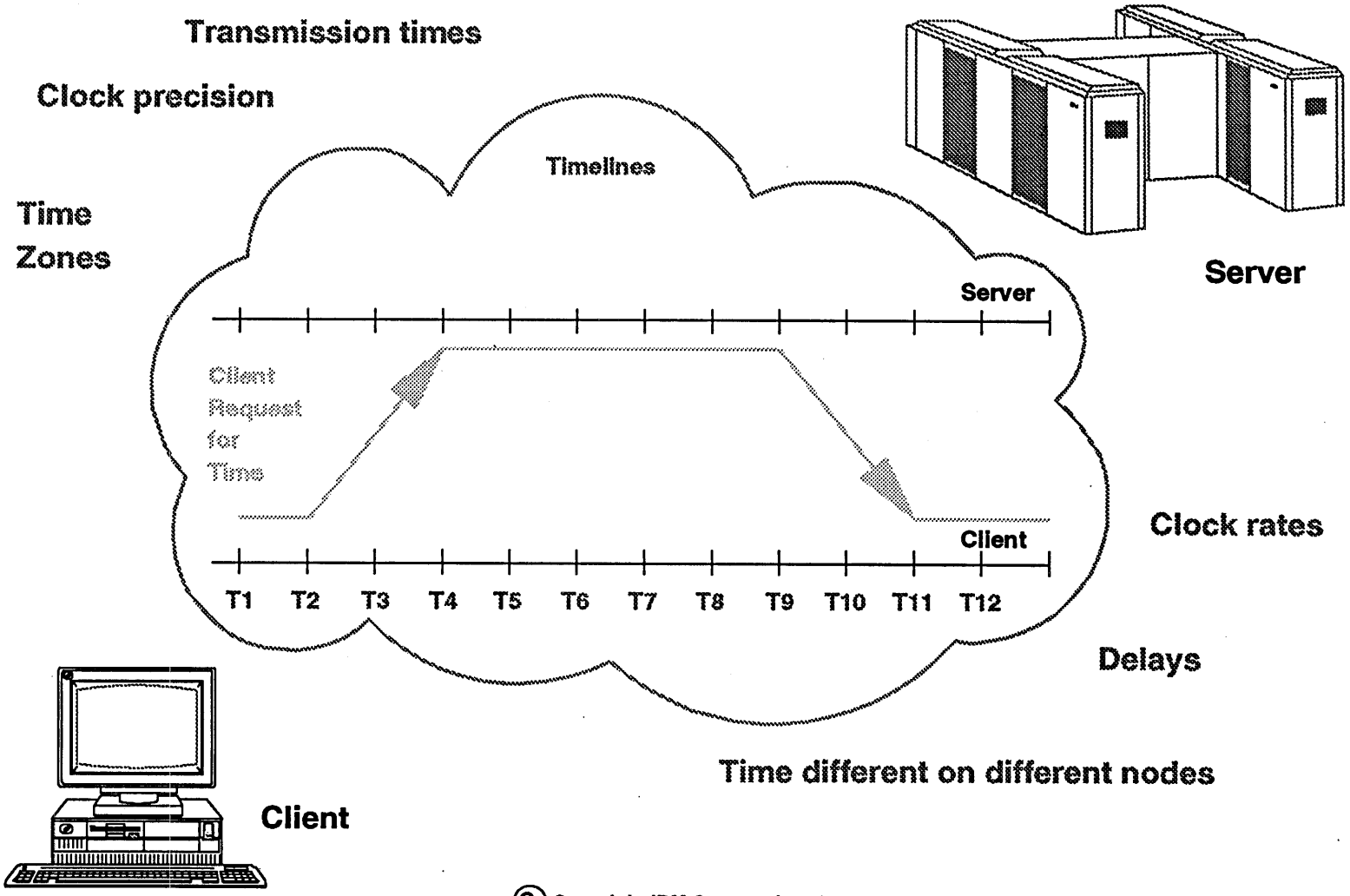


Distributed Time Services

Can't rely on manual
setting of all system clocks

Unattended Operations

Distributed Time Services



Distributed Time Services

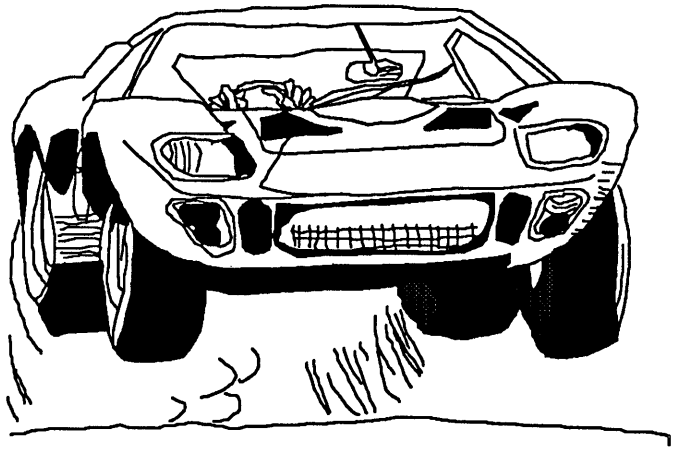
Why do we need it?

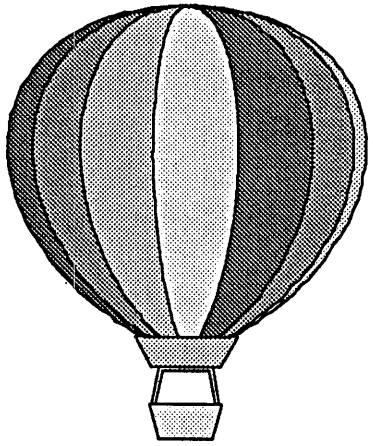
Event scheduling

Event sequencing

Event measurement

Event reporting





Two issues

Accuracy

Consistency

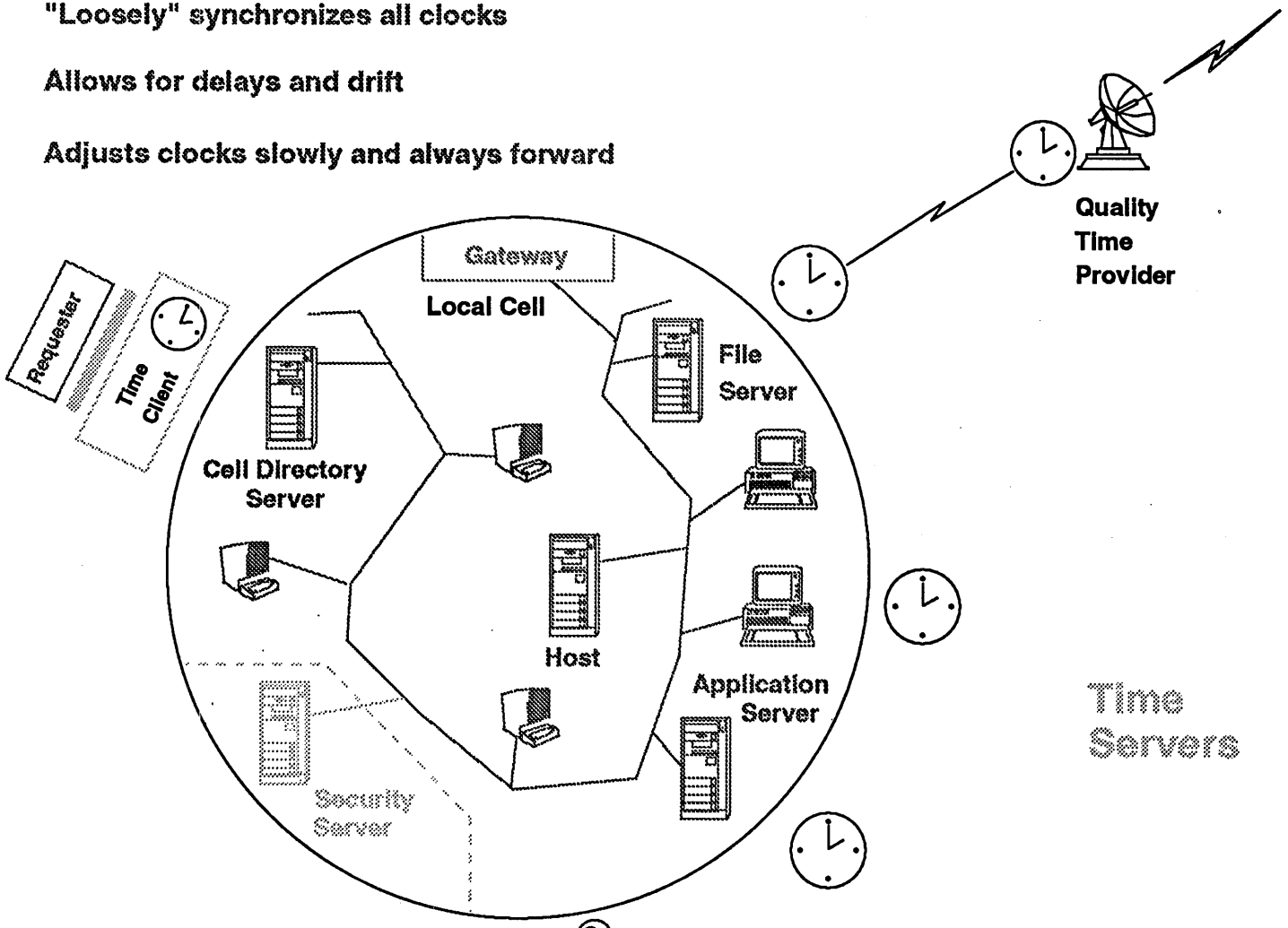
- **absolute**
- **speed**

Distributed Time Services

"Loosely" synchronizes all clocks

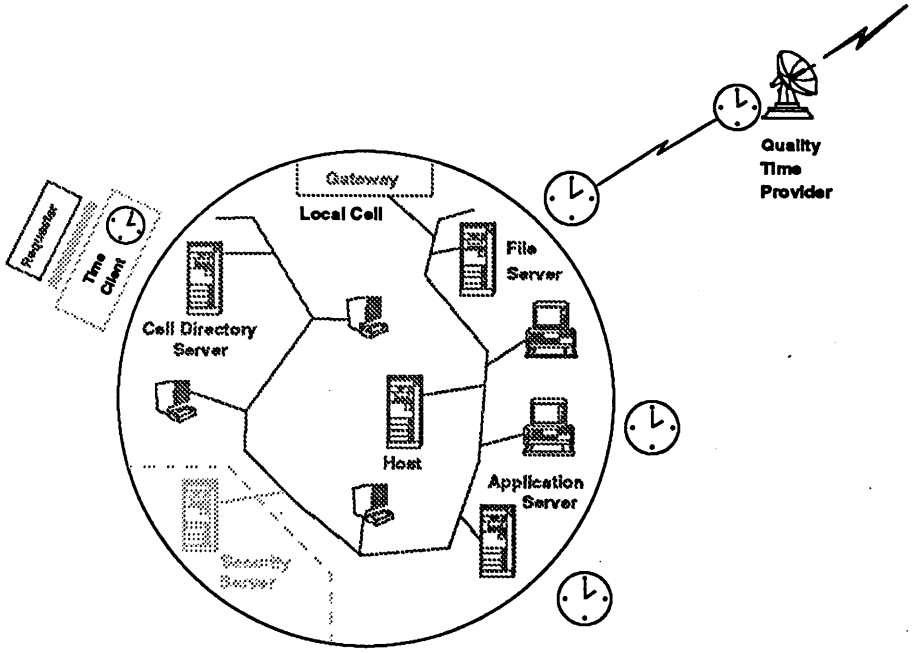
Allows for delays and drift

Adjusts clocks slowly and always forward



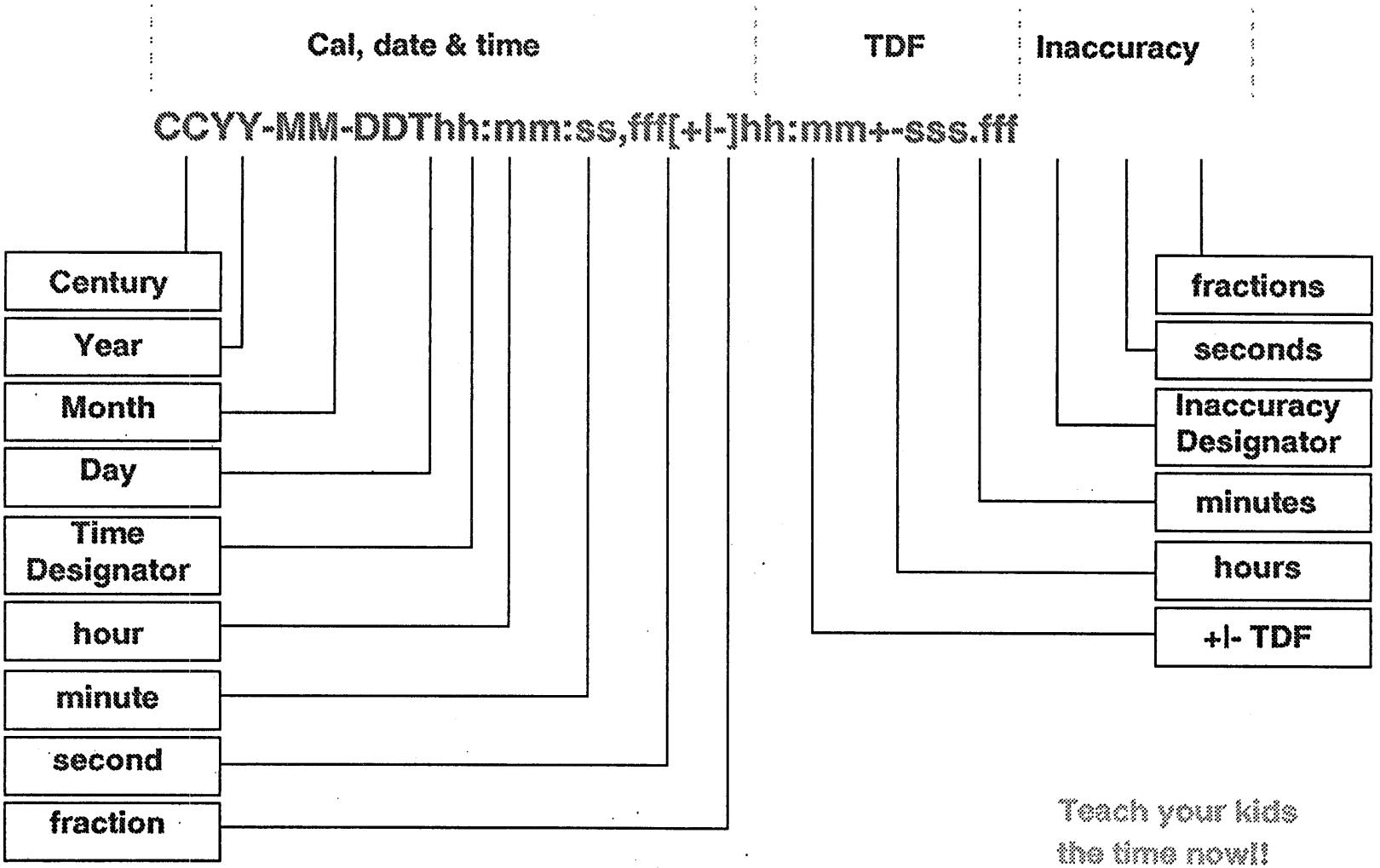
DTS Components

- Time Clerk
- Time Servers
  - Local Time Server
  - Global Time Server
  - Courier Time Server
  - Backup Courier Time Server
- DTS API
- Time Provider Interface
- Time format - including inaccuracy



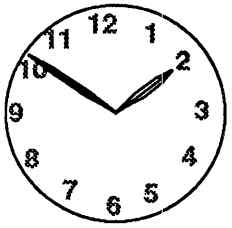
CCYY-MM-DDThh:mm:ss,fff[+|-]hh:mm+-sss.fff

Distributed Time Services

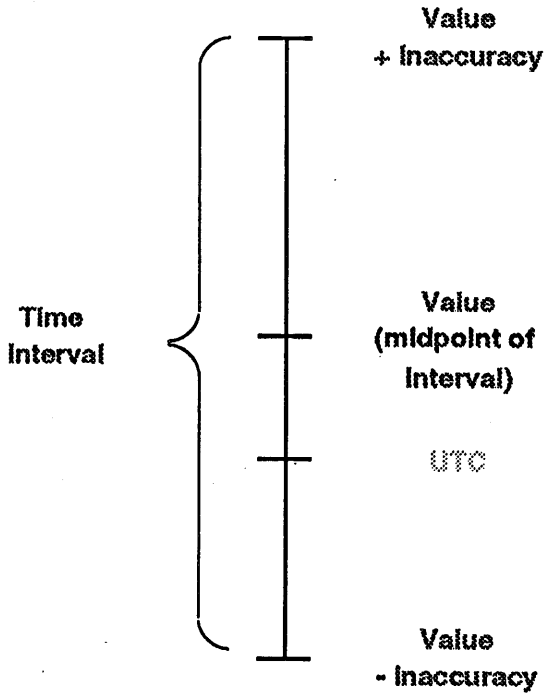


Teach your kids the time now!!

Distributed Time Services

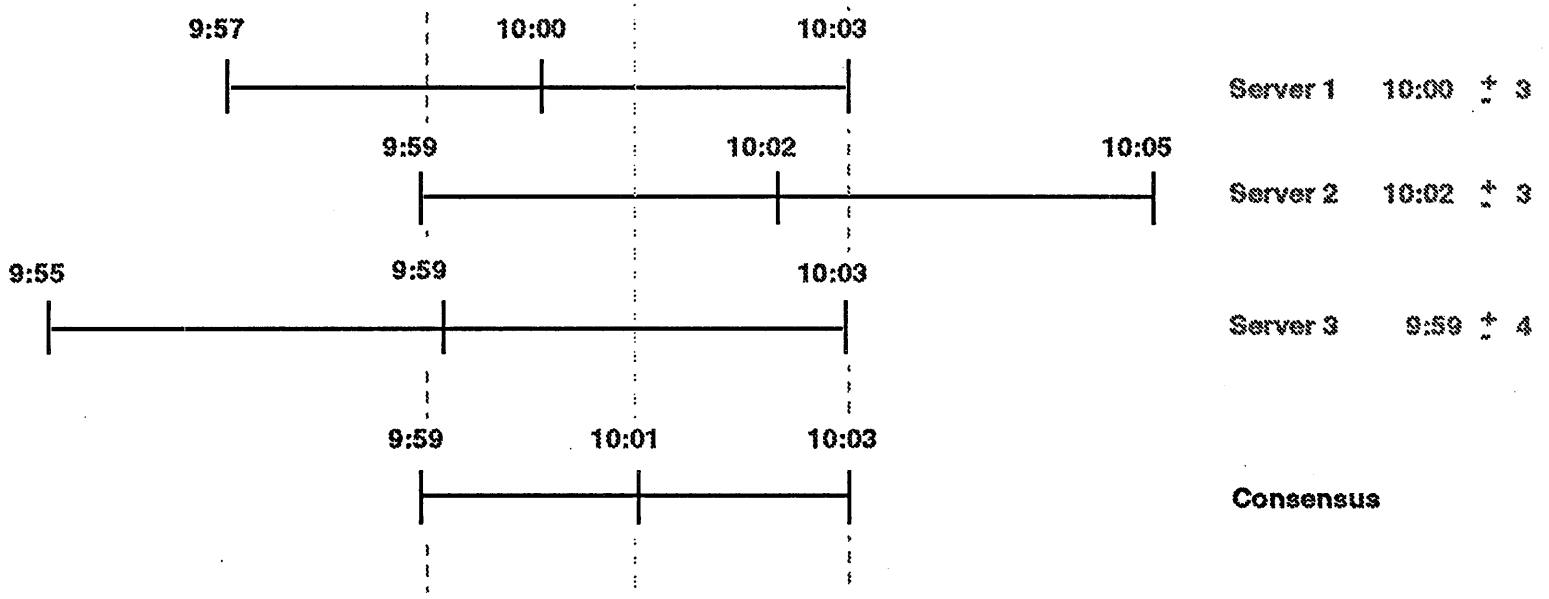


- Correctness
- Reliable operation
- Fault-tolerance
- Efficency
- Monotonicity
- Automatic Server location
- Local time translation
- Management support
- API



Distributed Time Services

Time evaluation

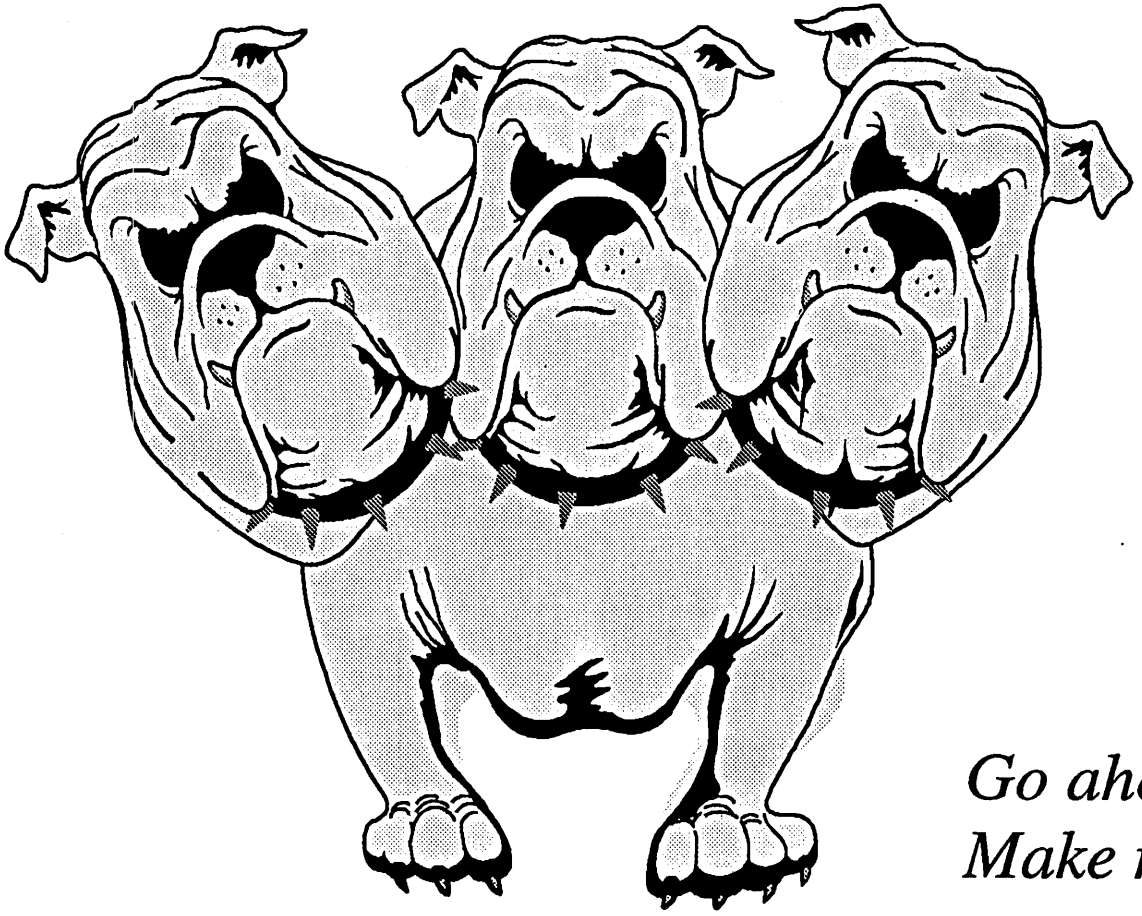


Client takes intersection of server provided intervals

If an interval falls outwith intersection of others (majority rules)
- deemed as faulty and ignored

Preferable to have an odd number of servers

KERBEROS



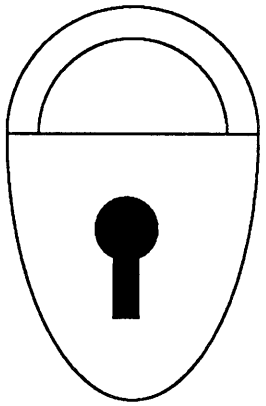
Go ahead...
Make my day

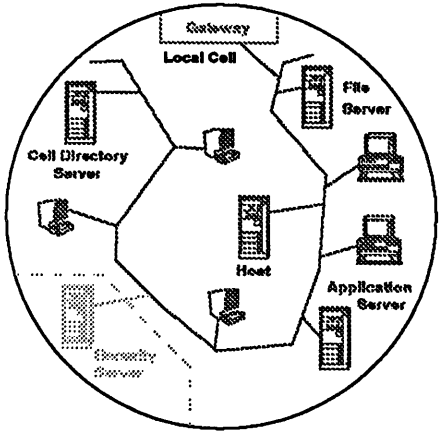
DCE Security

User Identification	JOE (+PASSWORD), BILL(+PASSWORD)
Identification	Who are you? JOE(+PASSWORD)
Authentication	Prove you are JOE!
Certification	He is JOE
Access Control	JOE is allowed to do it. BILL is not.
Authorization	Is JOE allowed to do it?

DCE Security

Rationale





Non-distributed systems - Security provided by operating system

Distributed Computing poses additional security considerations

- Eavesdropping
- Impersonation
- Forgery

Security in a distributed system at a cost

Requirement to be integrated with other DCE components

Currently no security rating system for distributed computing

DCE Security

DCE Security

Three Services

Registry Service

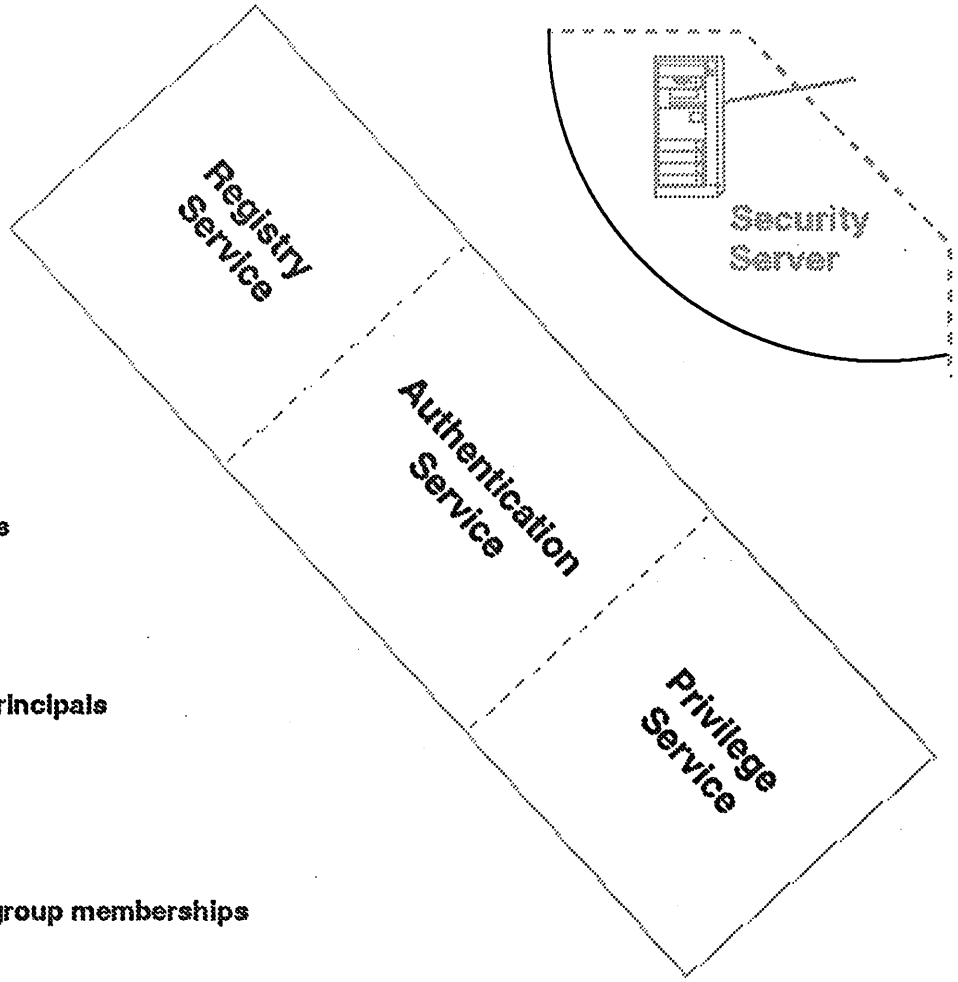
- Principals
- Groups
- Organisations
- Accounts
- Administration policies

Authentication Service

- Verifies identities of principals
- Issues tickets

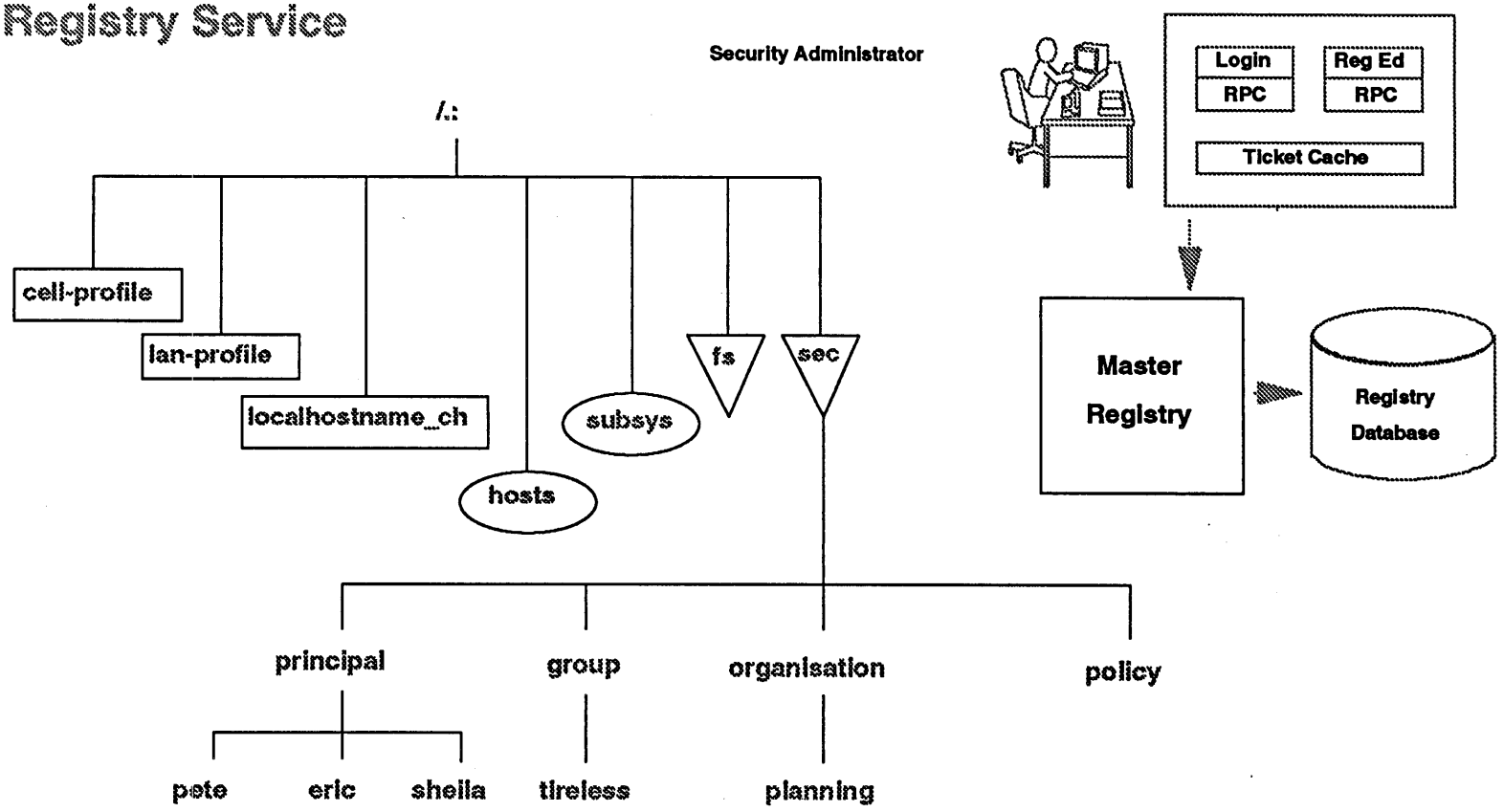
Privilege Service

- Principals name and group memberships



DCE Security

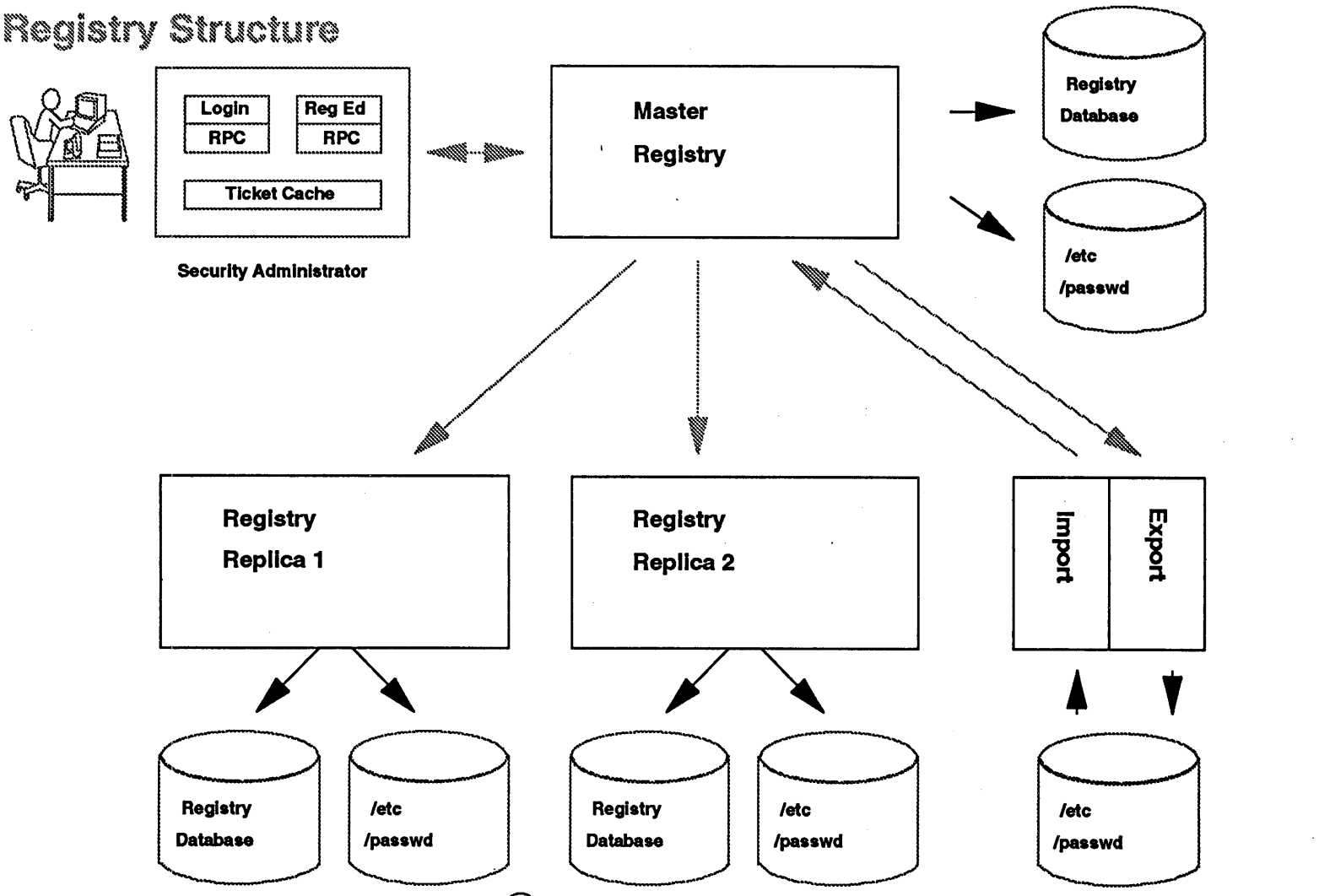
Registry Service



Principal Eric = /.../ibmprgs/sec/principal/eric

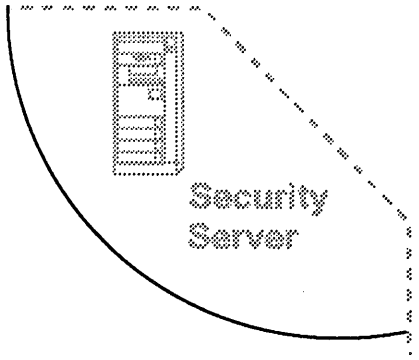
DCE Security

Registry Structure



MMSEC50

DCE Security



Four Facilities

Login Facility

- enable principal to establish network identity

Access Control List Facility

- Determines a principals ability to access an resource

Key Management Facility

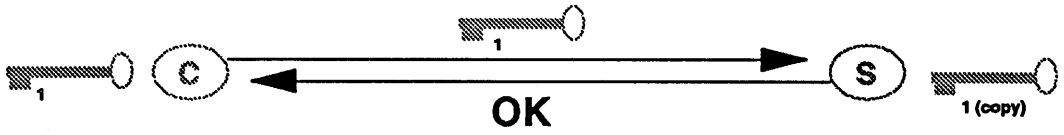
- Allows non-interactive principals (servers) to manage their keys

ID Map Facility

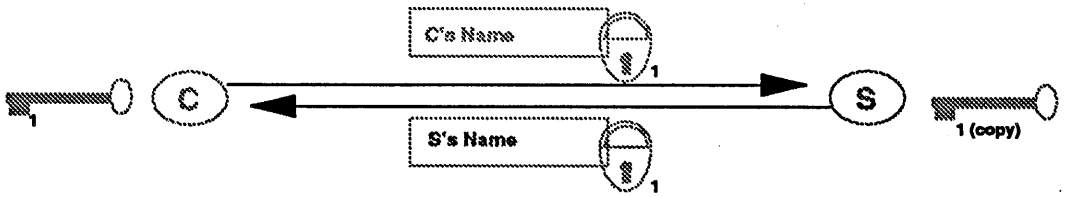
- Maps local to global names (vice versa) for security purposes

DCE Security

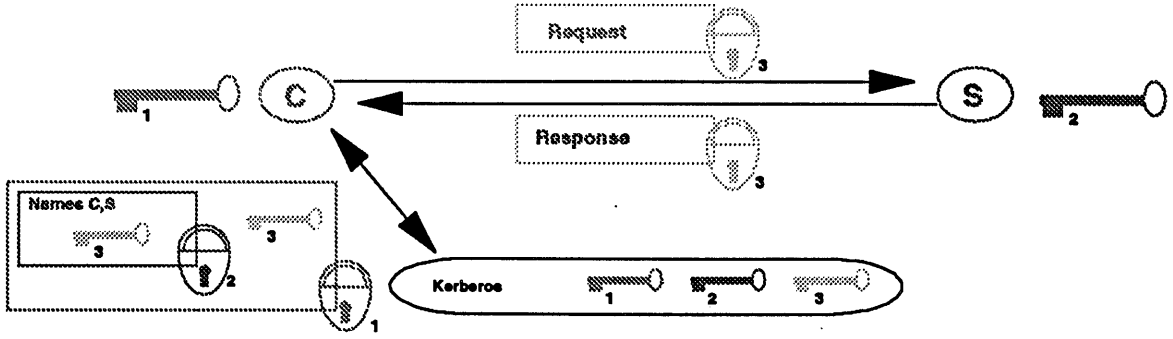
- **Two Party, One Way Authentication** (Transmits Key)



- **Two Party, Two Way Authentication** (Mutual Suspicion)



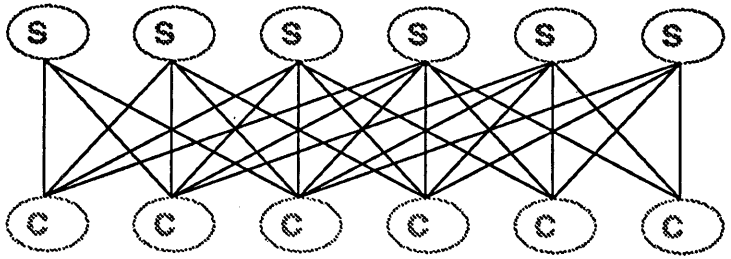
- **Third Party Authentication** (No Permanent Key Sharing)



DCE Security

Two-Party: Relationships, Passwords, Administration Operations

NxM



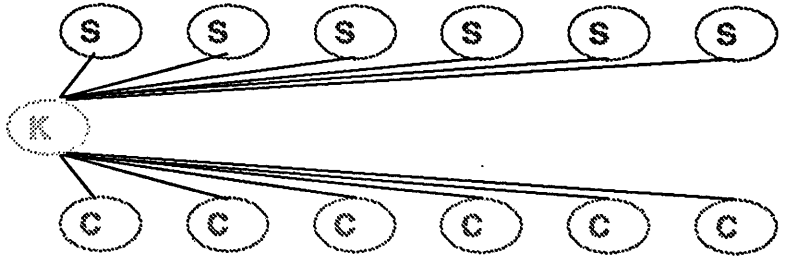
... 100

1,000,000

... 10,000

Third-Party: Relationships, Passwords, Administration Operations

N+M

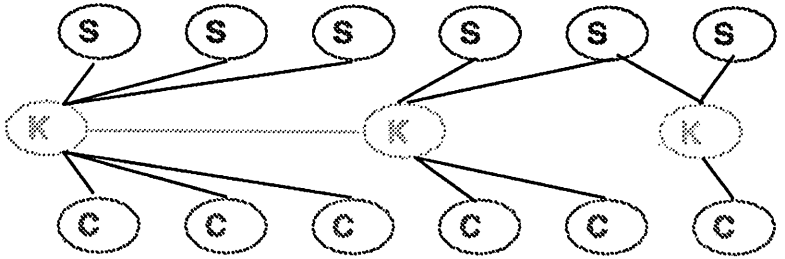


... 100

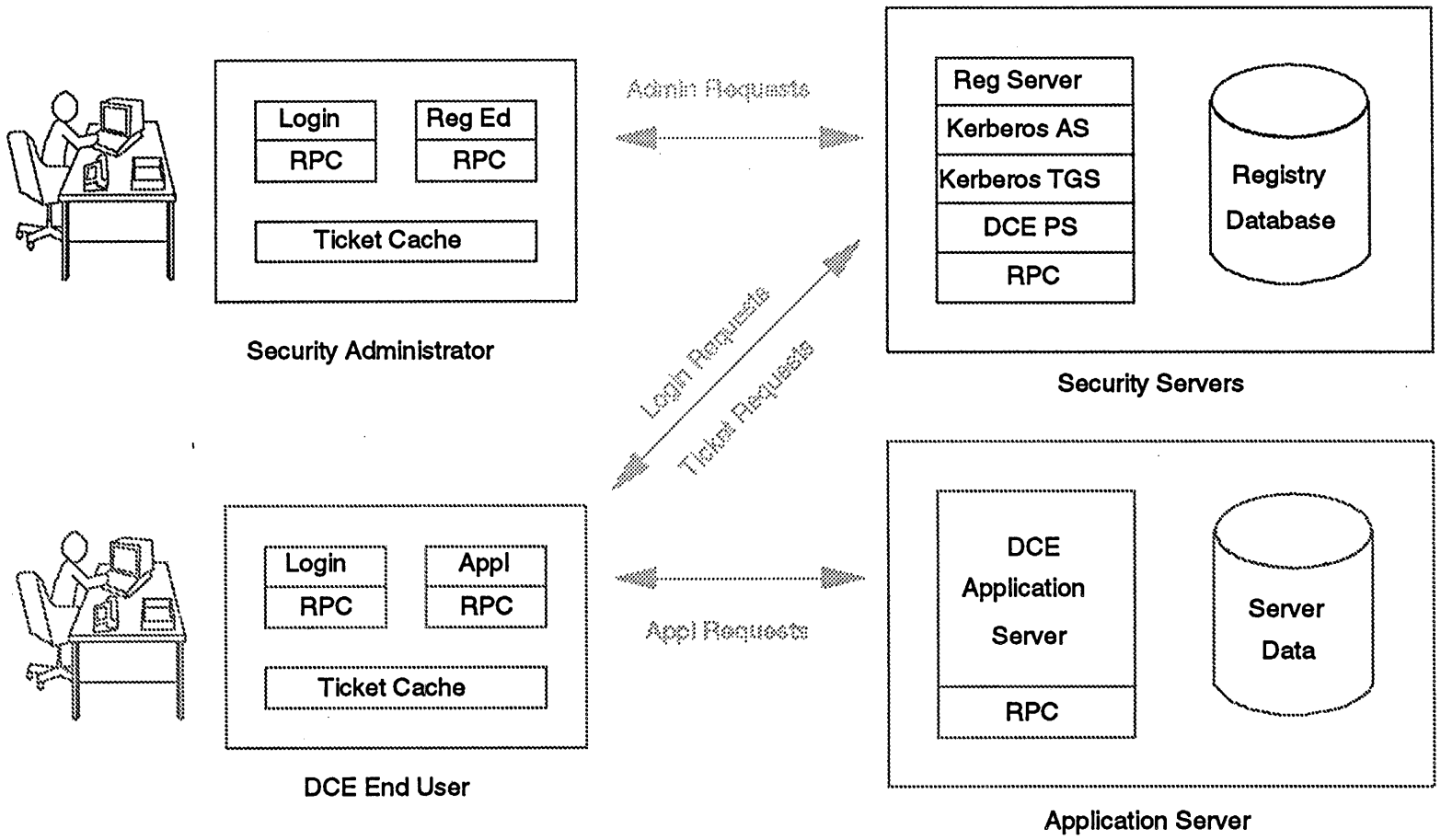
10,100

... 10,000

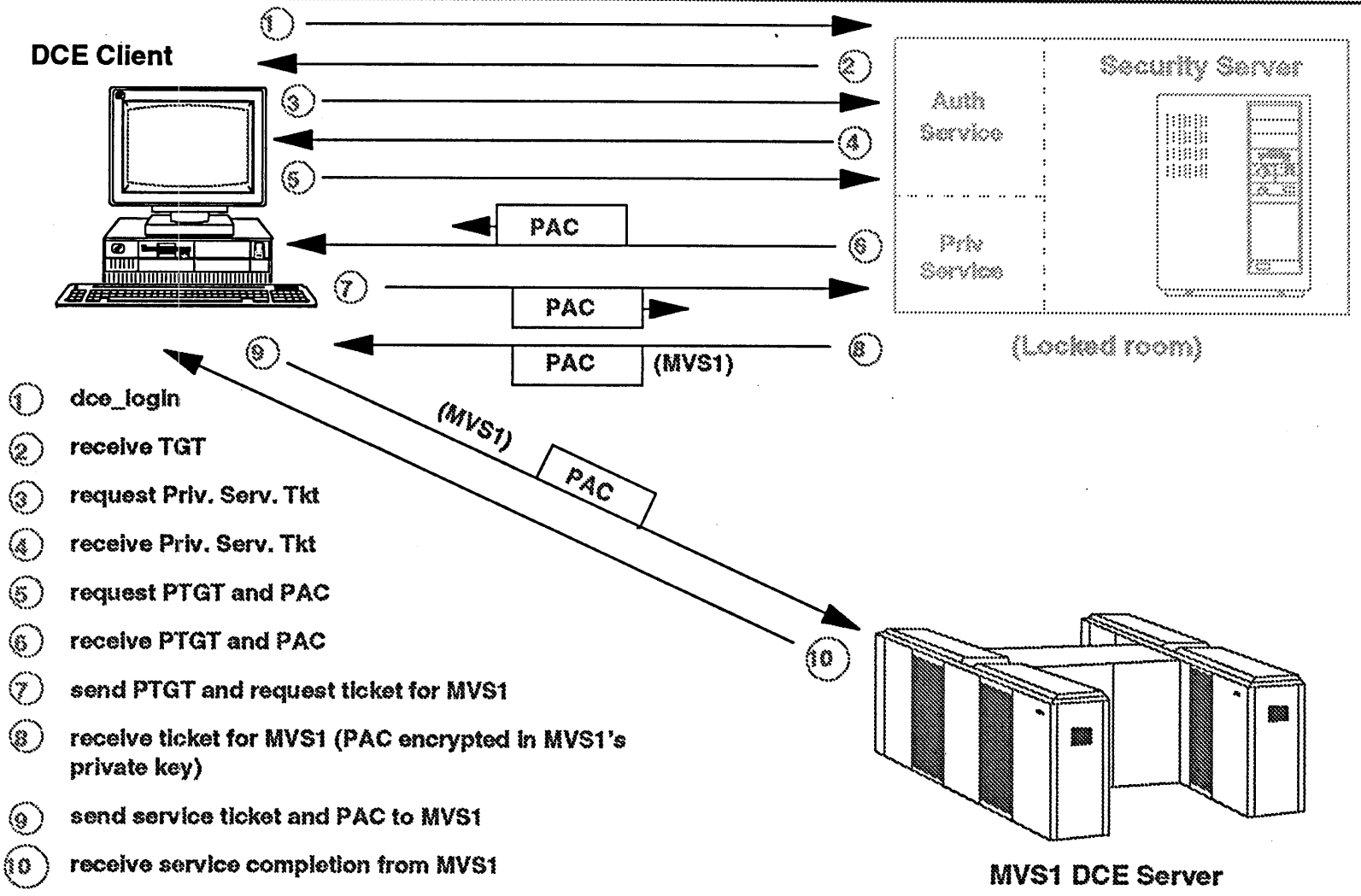
Third-Party: Delegated Administration, Autonomous Domains



DCE Security



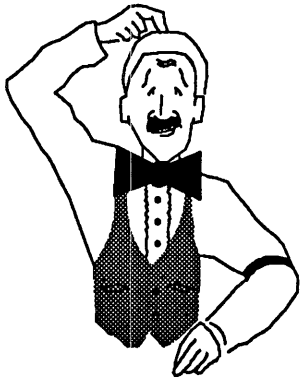
DCE Security

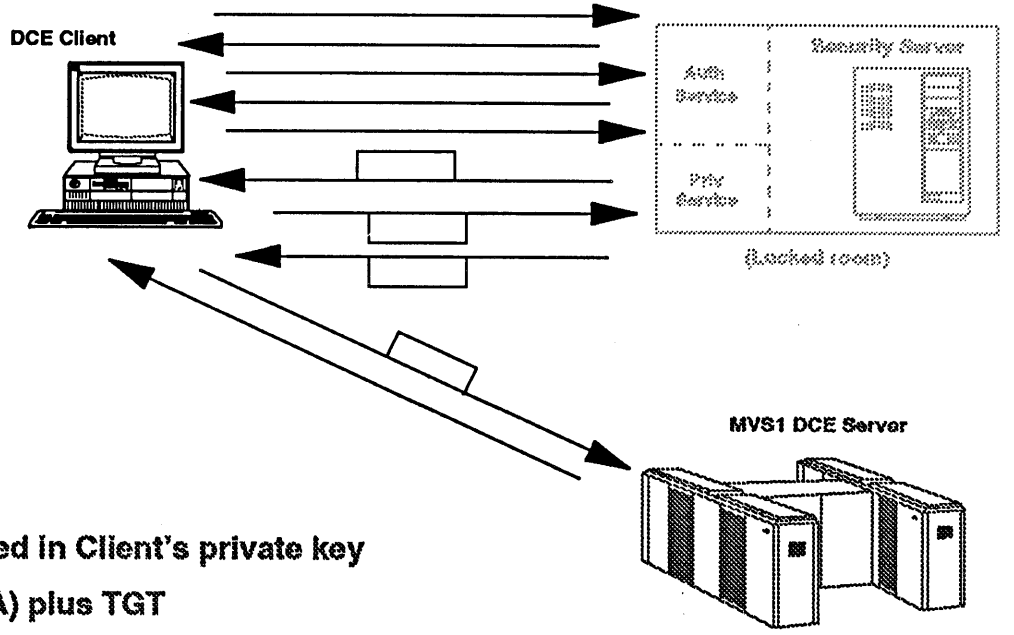


1. dce_login
2. receive TGT
3. request Priv. Serv. Tkt
4. receive Priv. Serv. Tkt
5. request PTGT and PAC
6. receive PTGT and PAC
7. send PTGT and request ticket for MVS1
8. receive ticket for MVS1 (PAC encrypted in MVS1's private key)
9. send service ticket and PAC to MVS1
10. receive service completion from MVS1

MMSEC100

DCE Security





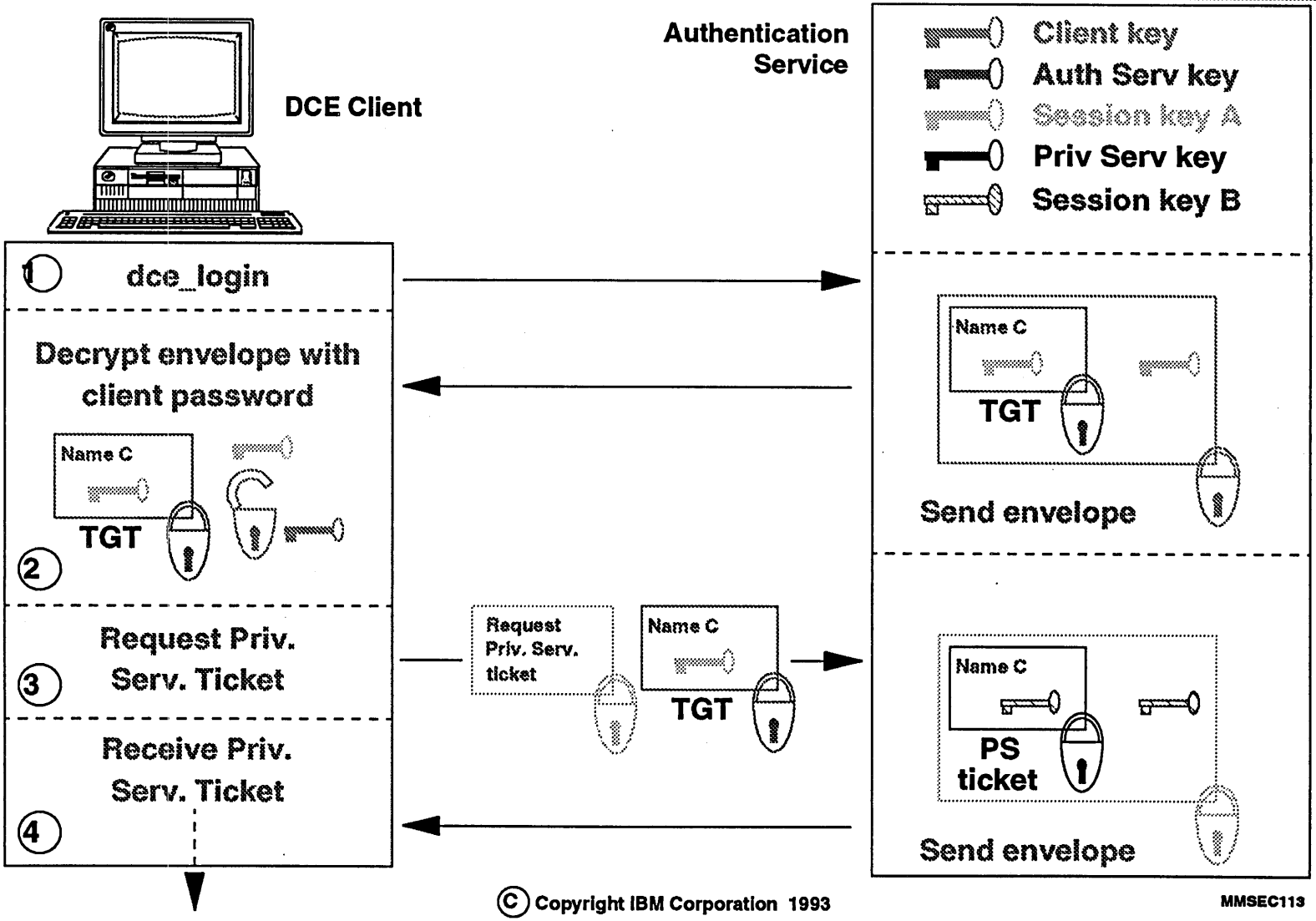
TGT - Ticket Granting Ticket

- Enclosed in an envelope encrypted in Client's private key
- Envelope includes session key (A) plus TGT
- TGT is encyrpted in Auth. Service private key

Privilege Service Ticket

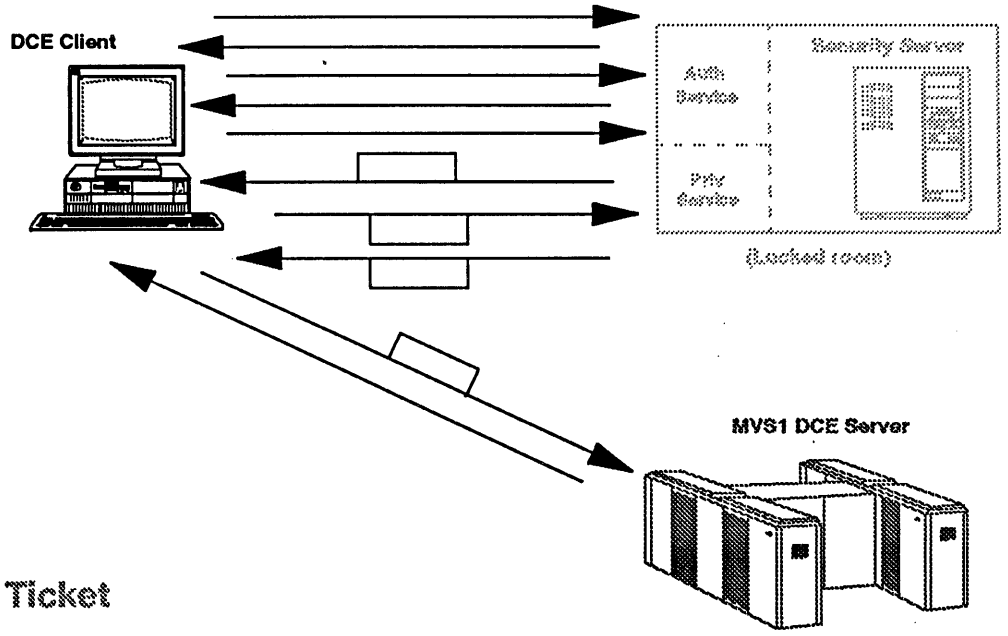
- Request for Priv. Servive Ticket made in session key (A) supplied with TGT
- Supplied by Auth. Service in envelope encrypted in session key (A)
- Envelope includes session key (B) plus Priv. Service Ticket
- Priv. Service Ticket is encrypted in Priv. Service Private key

DCE Security



MMSEC113

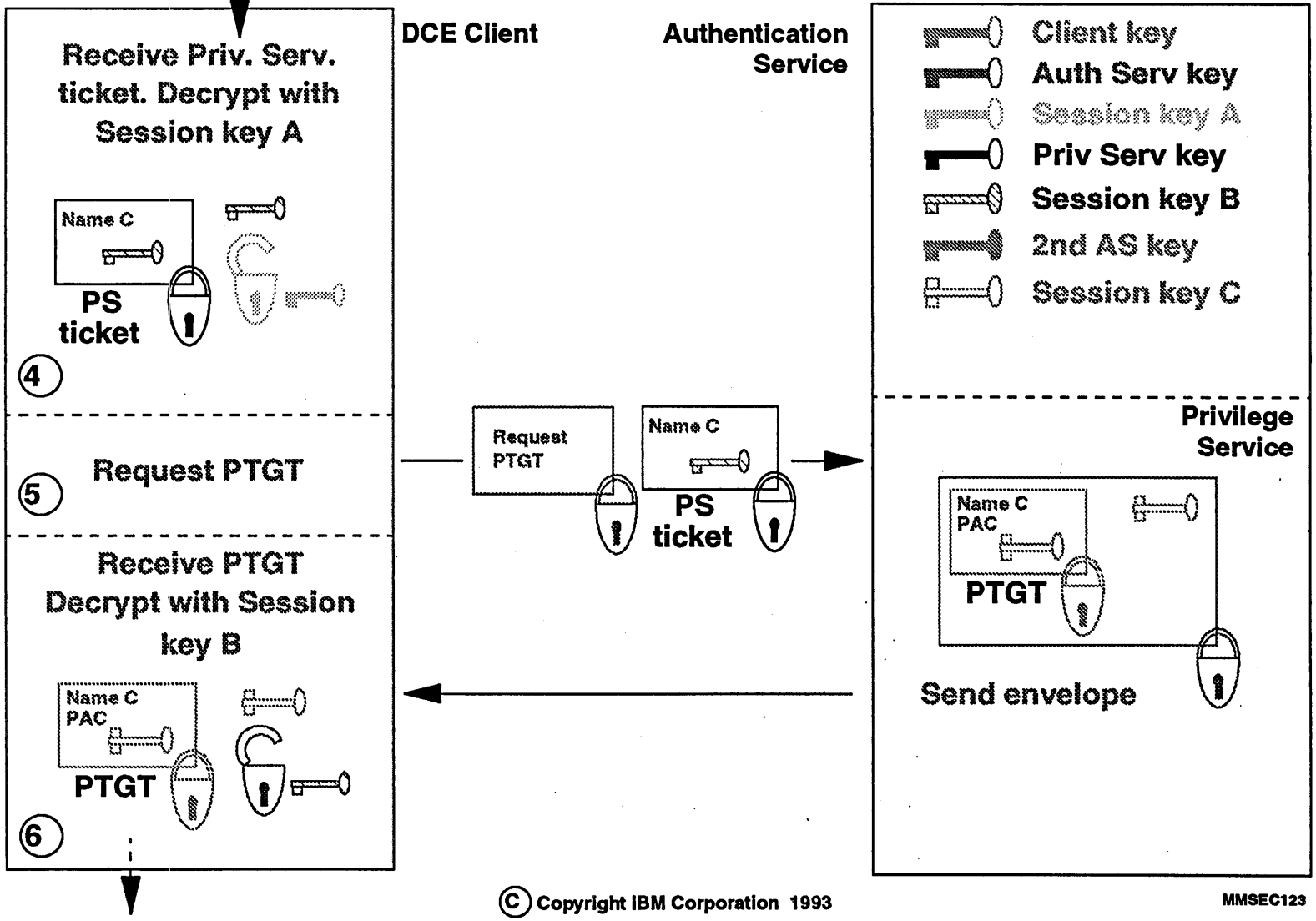
DCE Security



PTGT - Privilege Ticket Granting Ticket

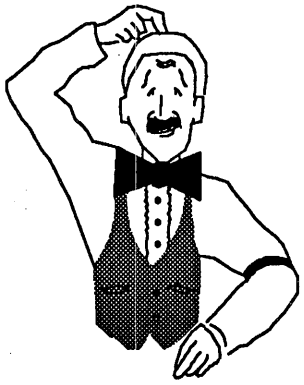
- Request for PTGT made in session key (B) supplied with Priv. Service Ticket
- Supplied by Priv. Service in envelope encrypted in session key (B)
- Envelope includes session key (C) plus PTGT encrypted in
  in private key supplied by Auth. Service
- PTGT includes Privilege Attribute Certificate (PAC)
- PAC includes principal name and group membership information

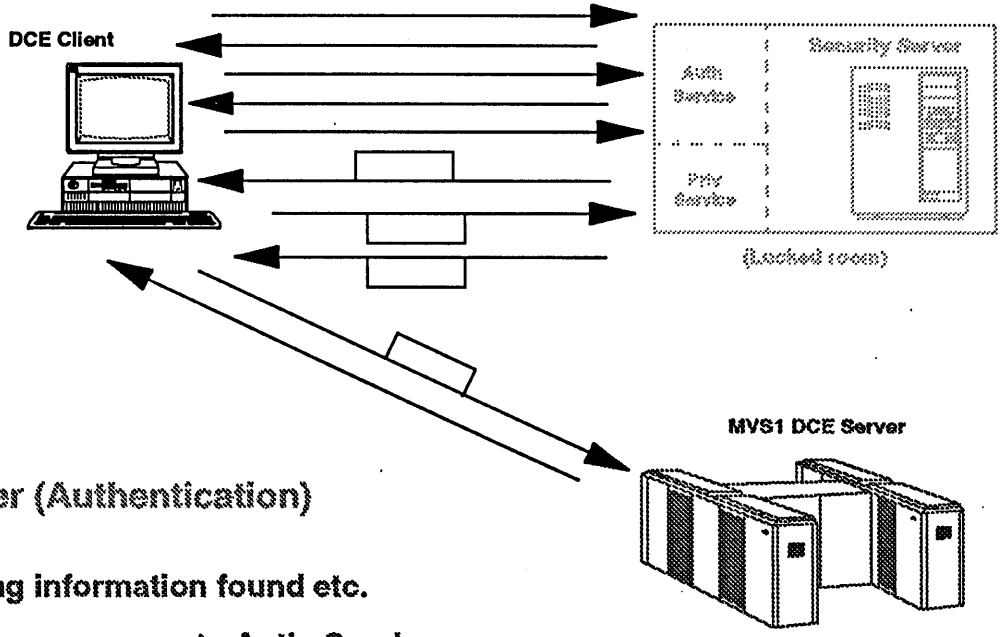
DCE Security



MMSEC123

DCE Security

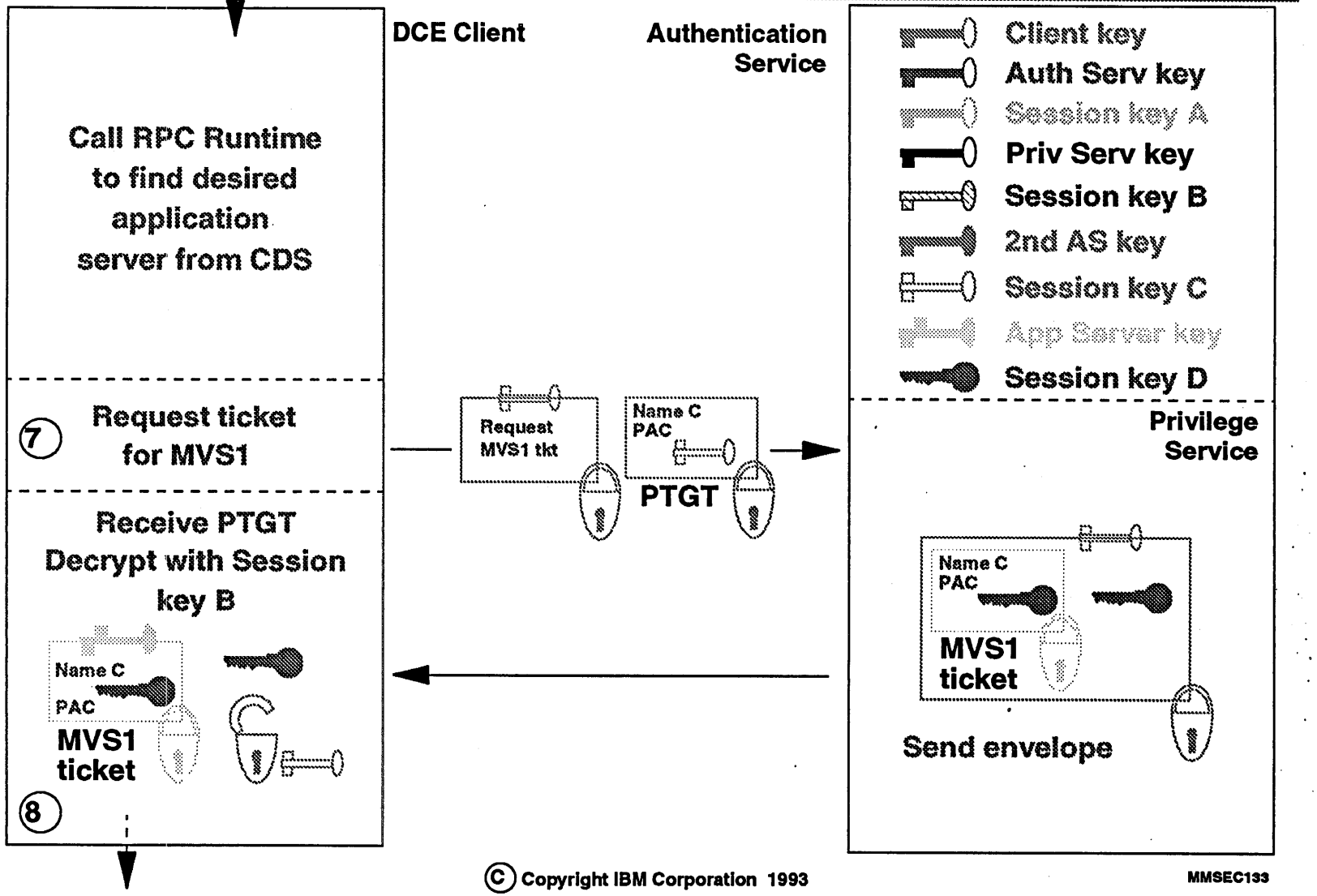




Access to DCE Application Server (Authentication)

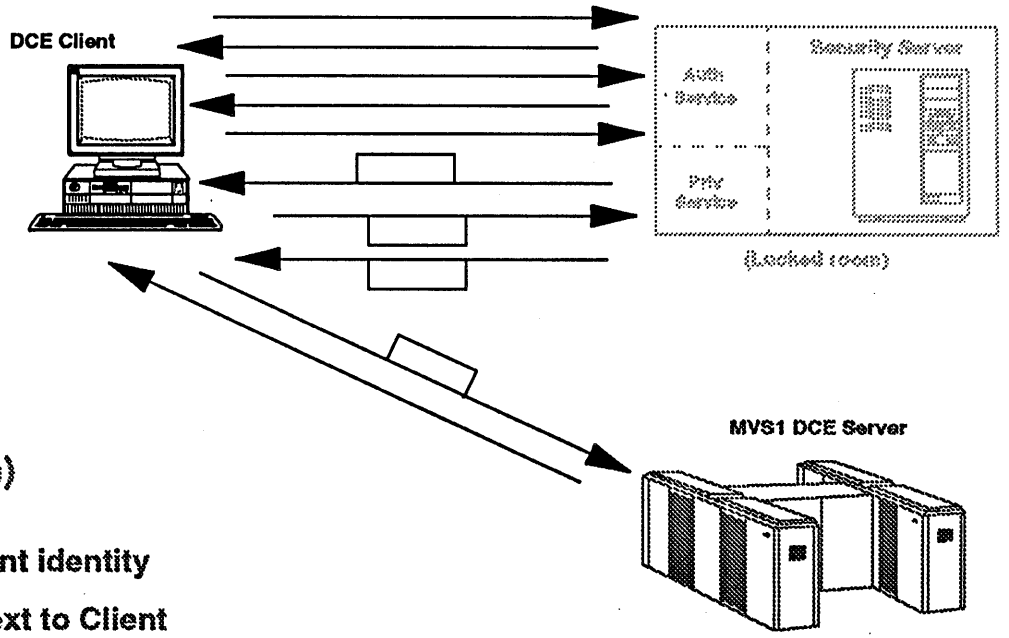
- Client application invoked, binding information found etc.
- Client Runtime sends PTGT plus server name to Auth. Service
- Client request encrypted in session key (C)
- Envelope returned includes session key (D) plus PAC encrypted in key of application server
- Envelope encrypted in session key (C)
- Client encrypts server request in session key (D) and sends request and PAC to Server

DCE Security



MMSEC133

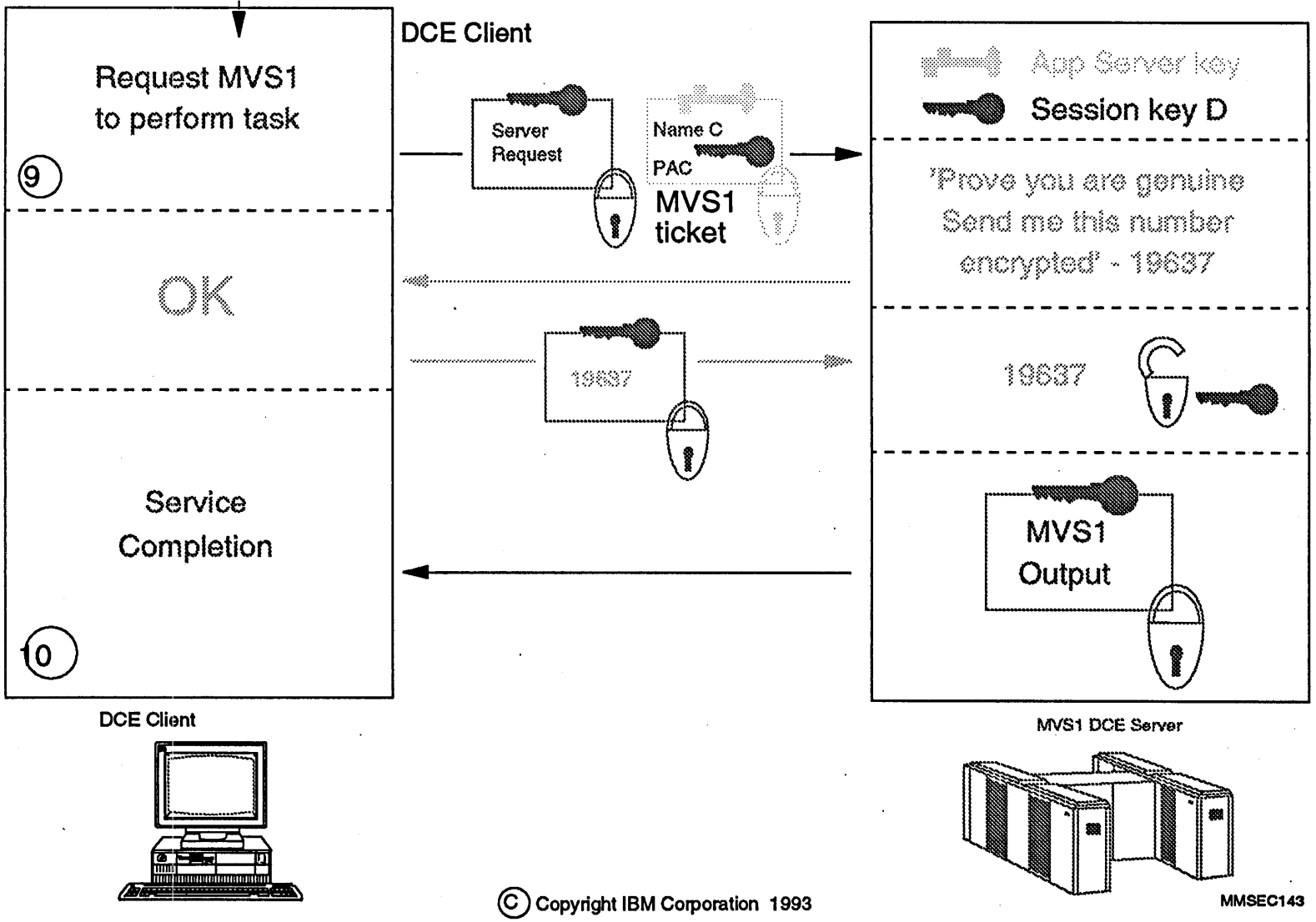
DCE Security



Client - Server (mutual suspicion)

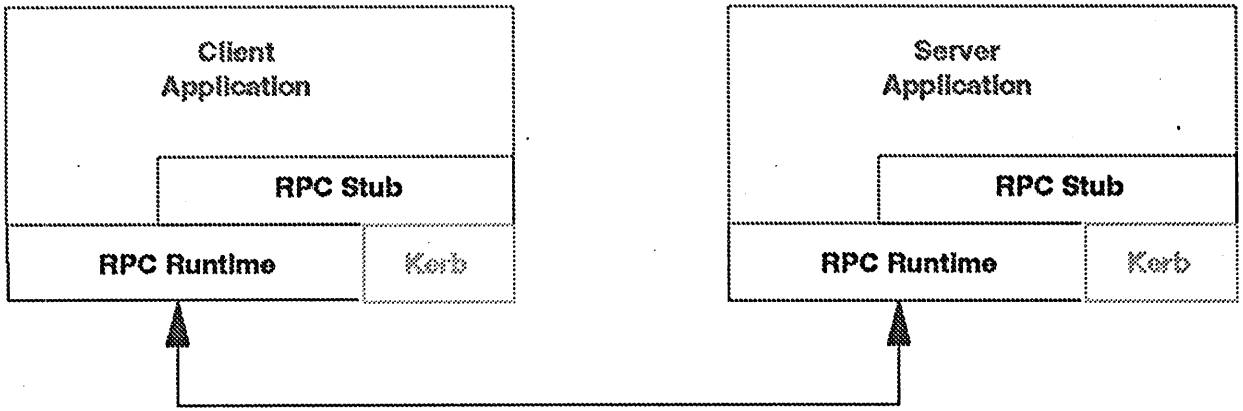
- Server attempts to revalidate client identity
- Sends random number in plain text to Client
- Client encrypts random number in session key (D) and returns it
- Server decrypts number with session key (D) and compares it
- Server uses PAC information to determine Client's authorisation
- Server performs requested action and sends response to client encrypted in session key (D)
- Further Client/Server conversations are encrypted in session key (D)

DCE Security



MMSEC143

Authenticated RPC



[RPC Header] [RPC Data] [Authentication Info]

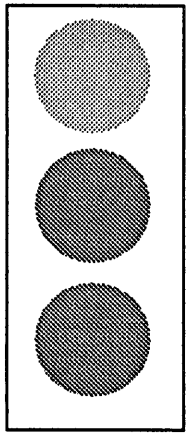
Byte in header selects level of authentication:

1) No Authentication
2) Authentication per connection
3) Authentication per call
4) Authentication per packet
5) Data integrity check
6) Data privacy (DES Encryption)

DCE Access Control Lists

ACLs control access to objects

- Files
- Directories
- Entries in Registry database
- Entries in Cell Directory Service



Controlled by an ACL Manager

- Various ACL Manager types
- Dependent on object 'type'
- The number of permissions
- The meanings of permissions

Based on POSIX 1003.6/Draft 3

ACL API to allow programmers to manipulate ACLs

ACL Managers must be written

Summary

Cost reduction

- Do it once, do it right
- Does not require armies of administrators
- One set of skills

Flexibility

- Function where it is best suited
- Making use of under-utilised systems

Scalability

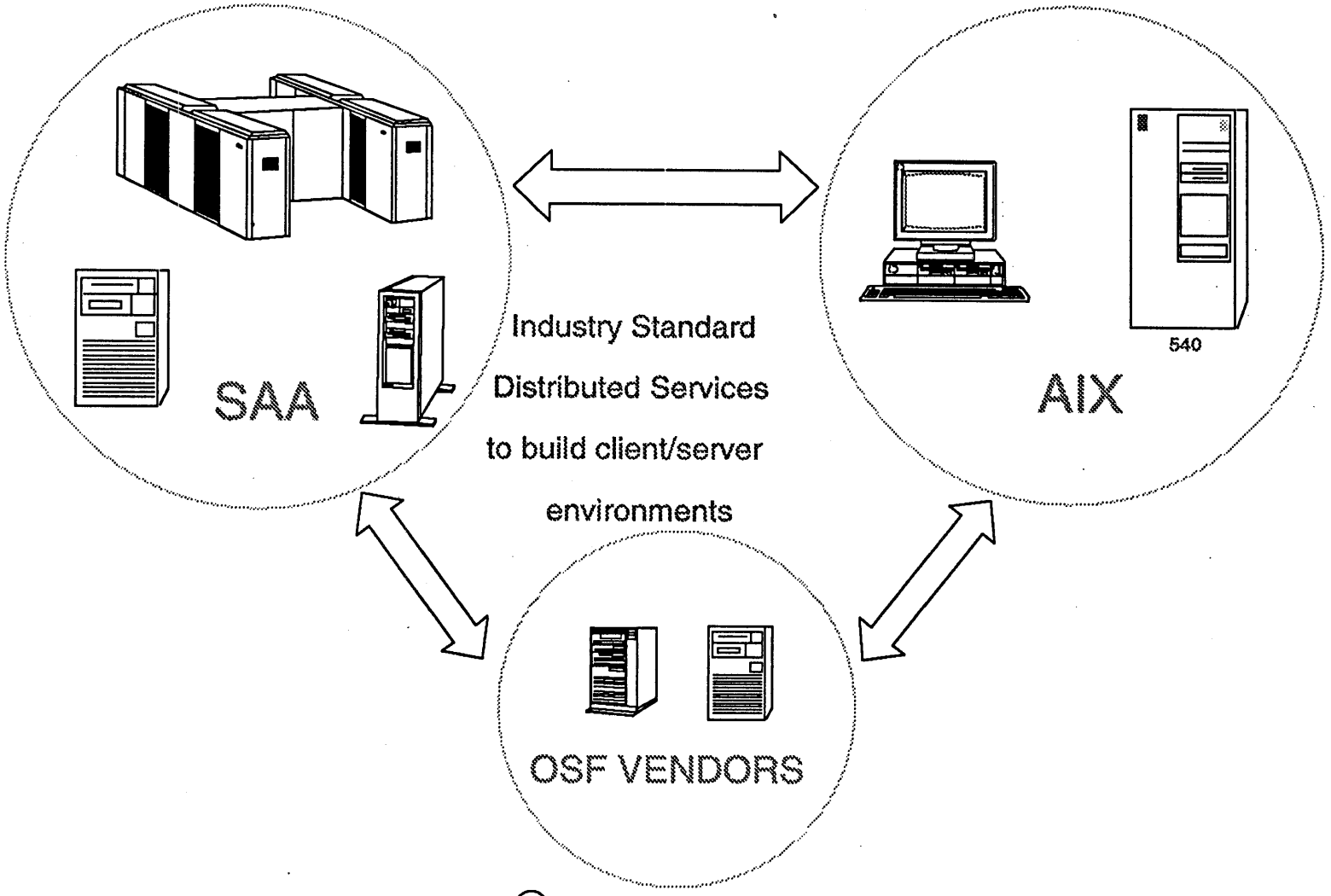
- Adding granular resources as required
- Non-disruptively

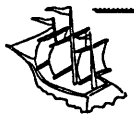
Reliability, Availability and Performance

Freedom of choice in a heterogeneous environment

Transparency

Distributed Computing Environment

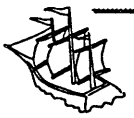




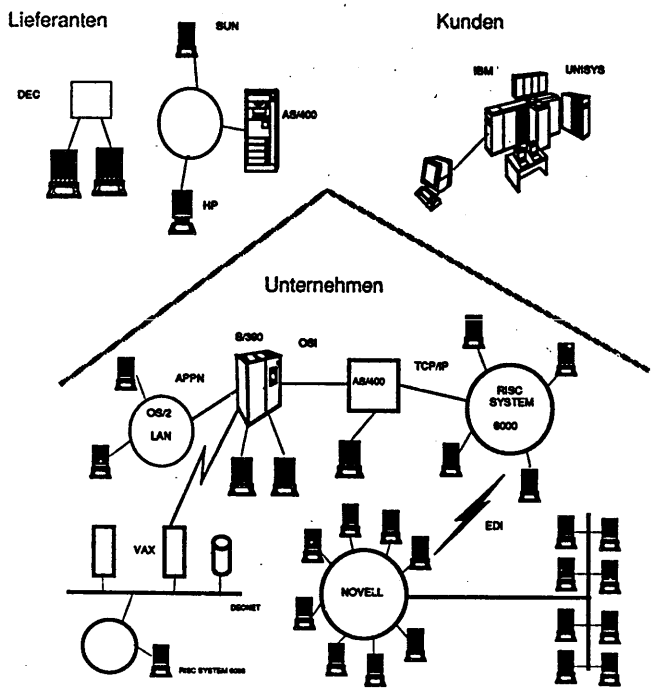
MQSeries

(TM)

Messaging and Queuing
Series



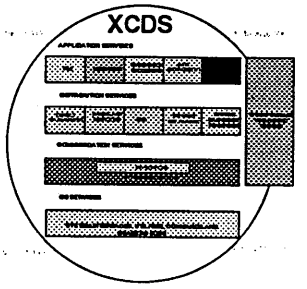
Verbindungen, Netze



- **Vernetzen von Rechnerumgebungen**
- **Verbinden von Insellösungen**
- **Verbessern der Effektivität**
- **Verbessern Gewinn**

- **Vorteile von Insellösungen:**
  - Einfache Handhabung
  - Zuordnung von Daten
  - Verbesserte Operationskosten
- **Nachteile von Insellösungen:**
  - Limitierte Design-Möglichkeiten
  - Hohe Implementierungskosten
  - Hohe Wartungskoten
  - Wenig flexible Lösungen

IBM Open Blueprint

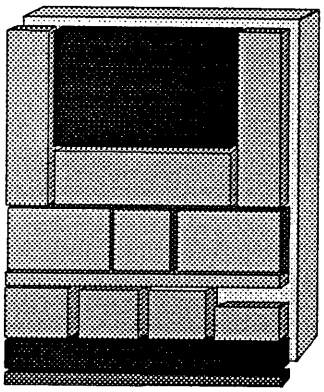


Innovative Dienste und Protokolle

- Objektdienste
- Multimedia
- Message Queuing Interface
- ...

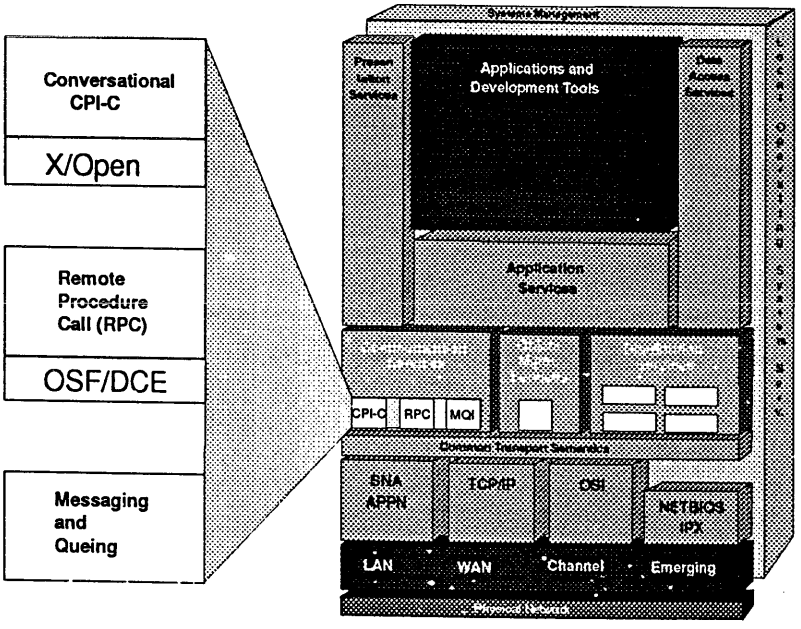
SAA Technologie

- CUA
- CPI-C
- DDM
- DRDA
- ...

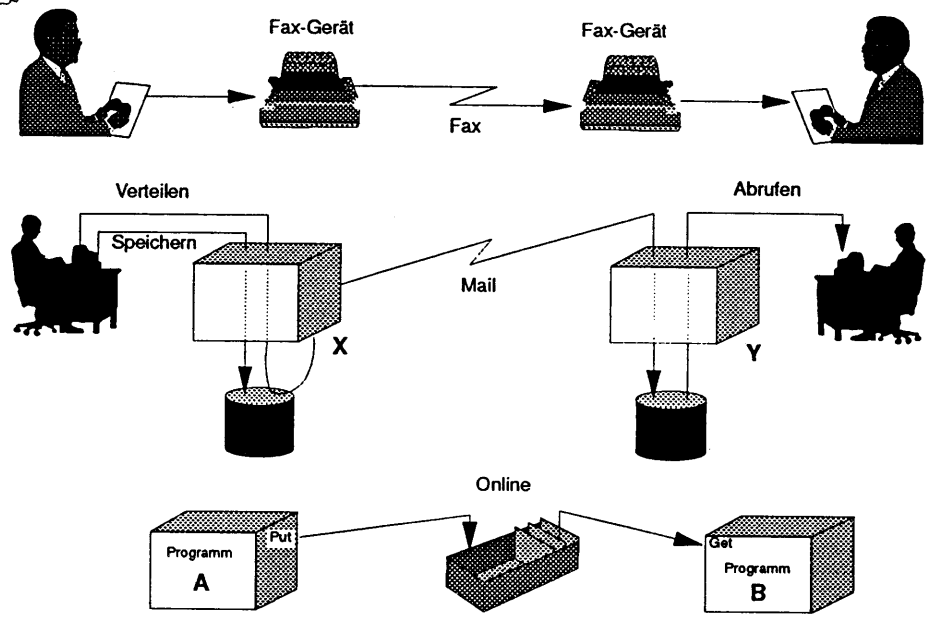


Open Blueprint

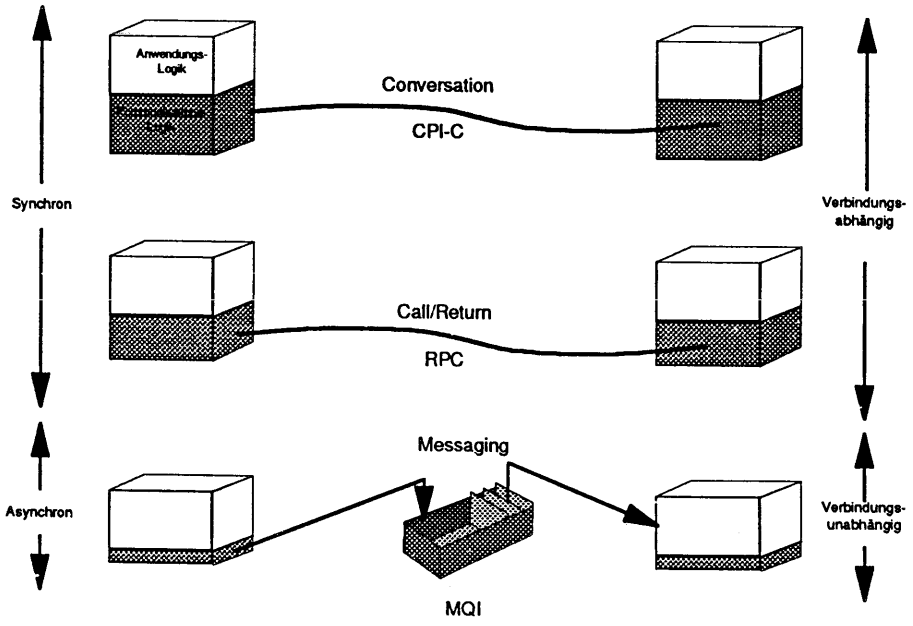
IBM Open Blueprint



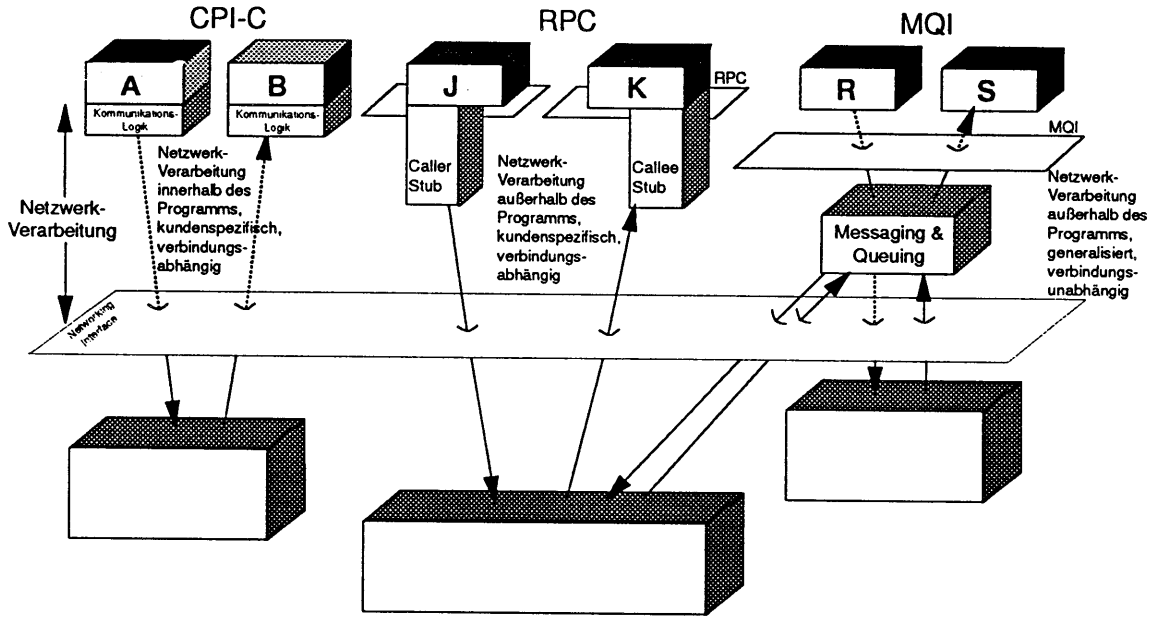
Arten der Message-Verarbeitung



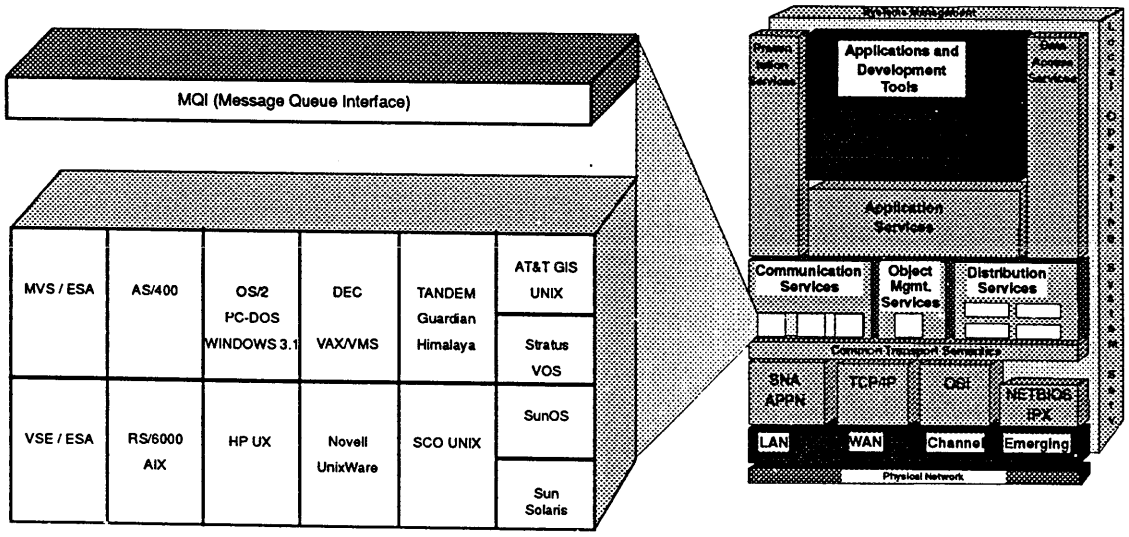
Drei Kommunikations-Arten



Drei Kommunikations-Arten

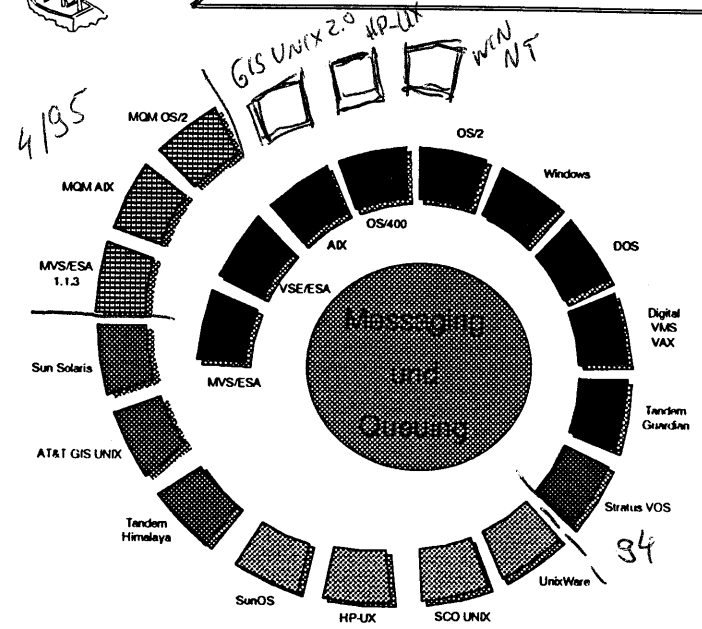


Messaging und Queuing Series



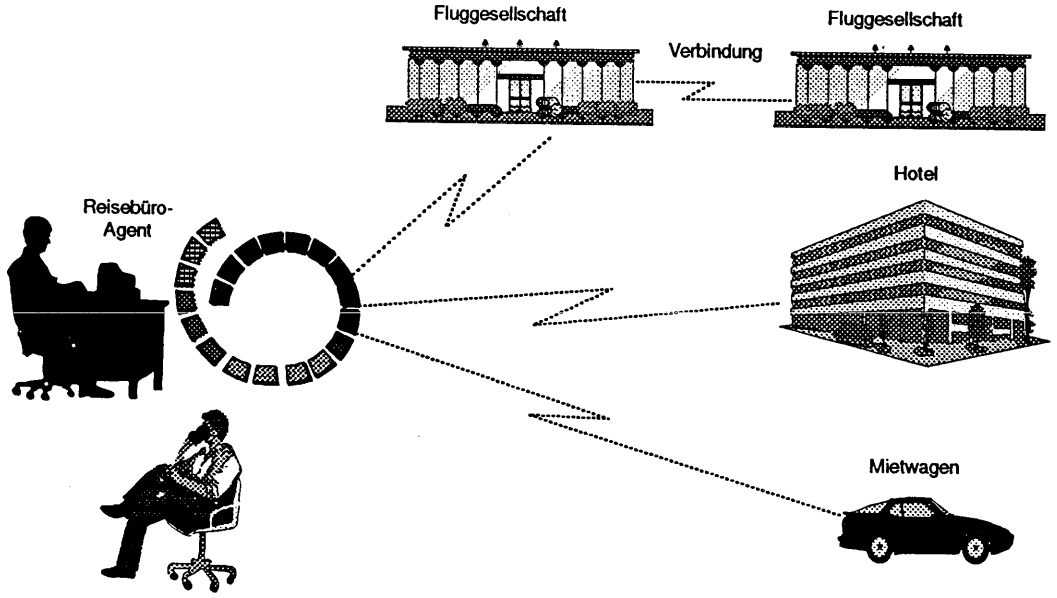
Messaging and Queuing Series

EIN Interface zwischen Plattformen



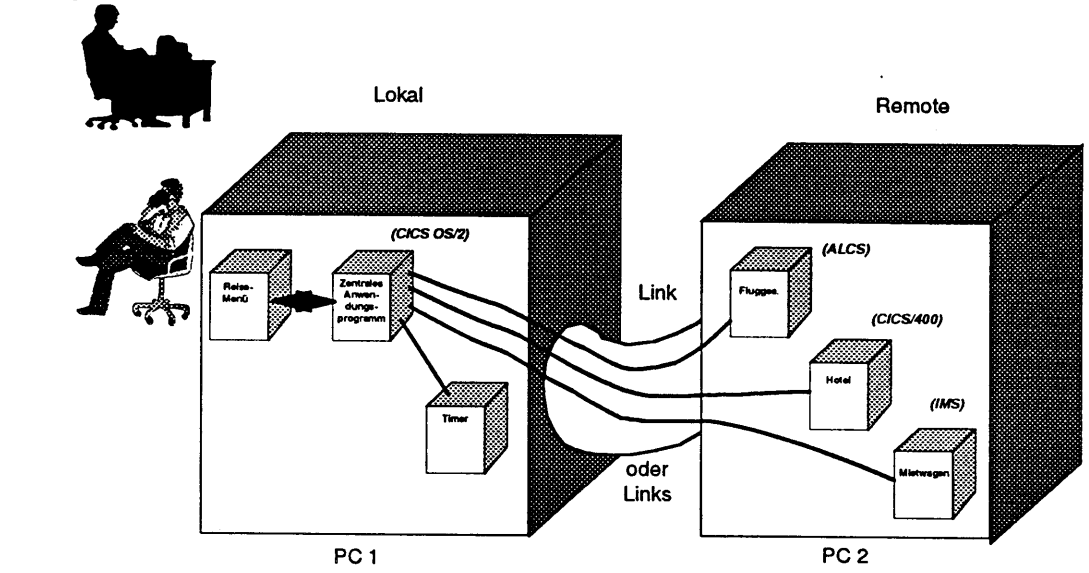
- EIN Interface über einen weiten Bereich von IBM- und Nicht-IBM-Plattformen
- Abschirmen der Entwickler von der Netzwerk-Komplexität
- Flexibilität durch zeitunabhängige Verarbeitung
- "Middleware" für robuste verteilte Anwendungen

Demo: Reisebüro-Szenario



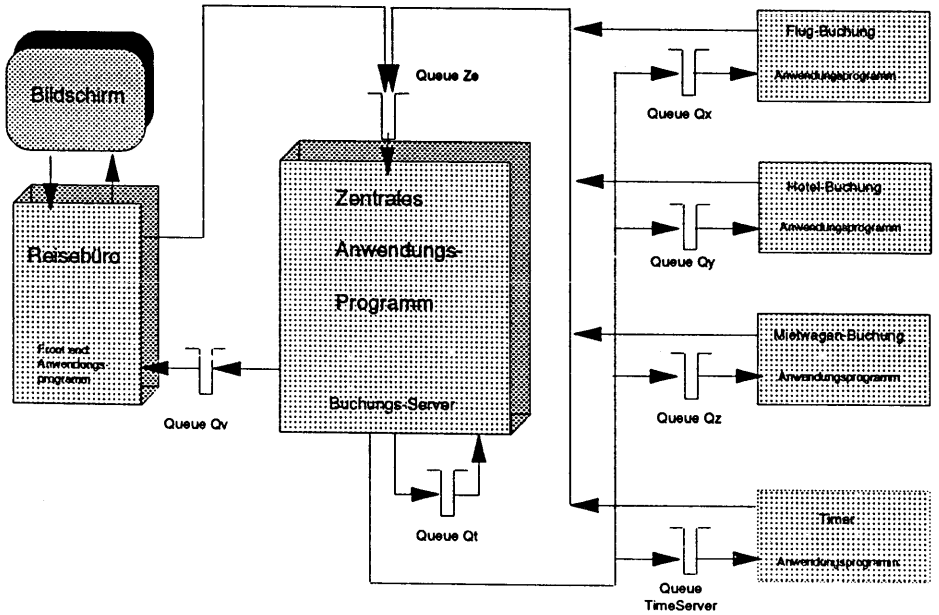
Reisebüro-Szenario

Demo: Reisebüro-Szenario



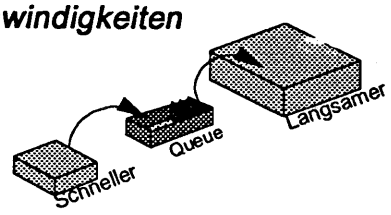
MQSeries-Simulator auf jedem PC

Demo: Reisebüro-Szenario

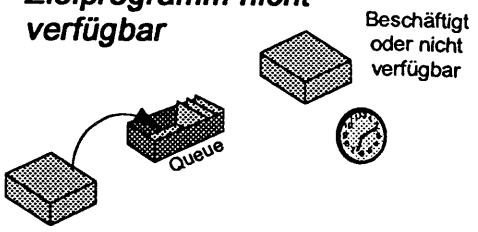


Einsatzmöglichkeiten

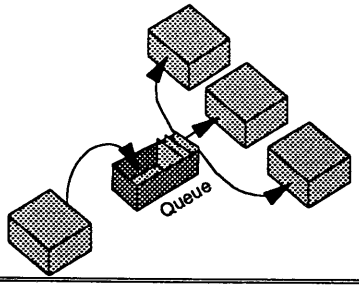
Unterschiedliche Geschwindigkeiten



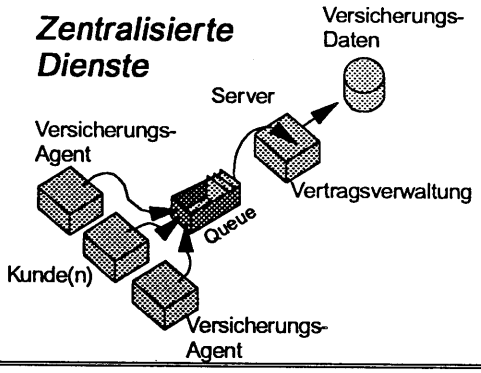
Zielprogramm nicht verfügbar



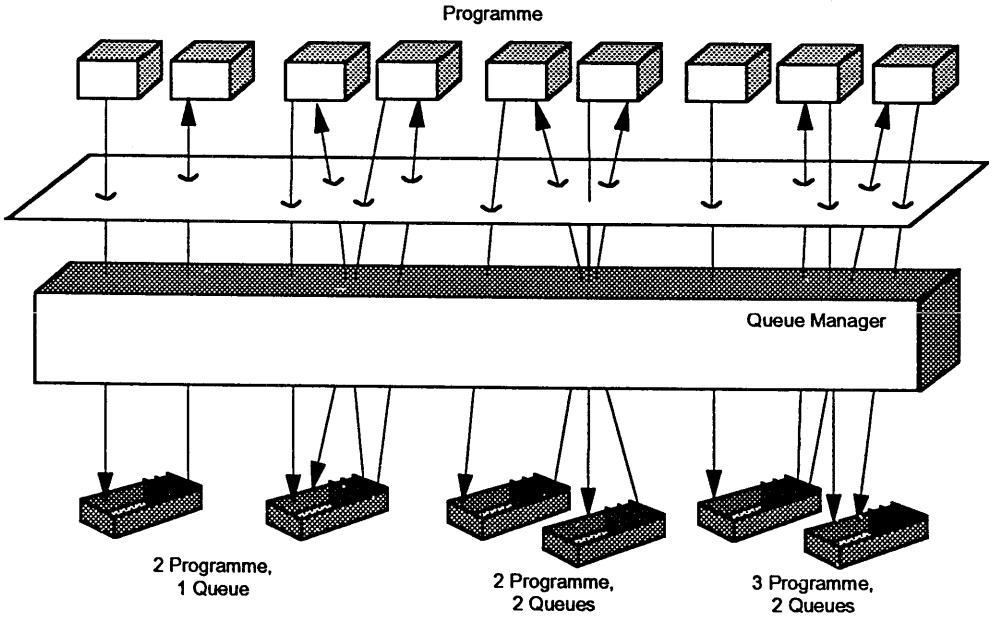
Last-Verteilung



Zentralisierte Dienste



Programme und Shared-Use Queues



Queues

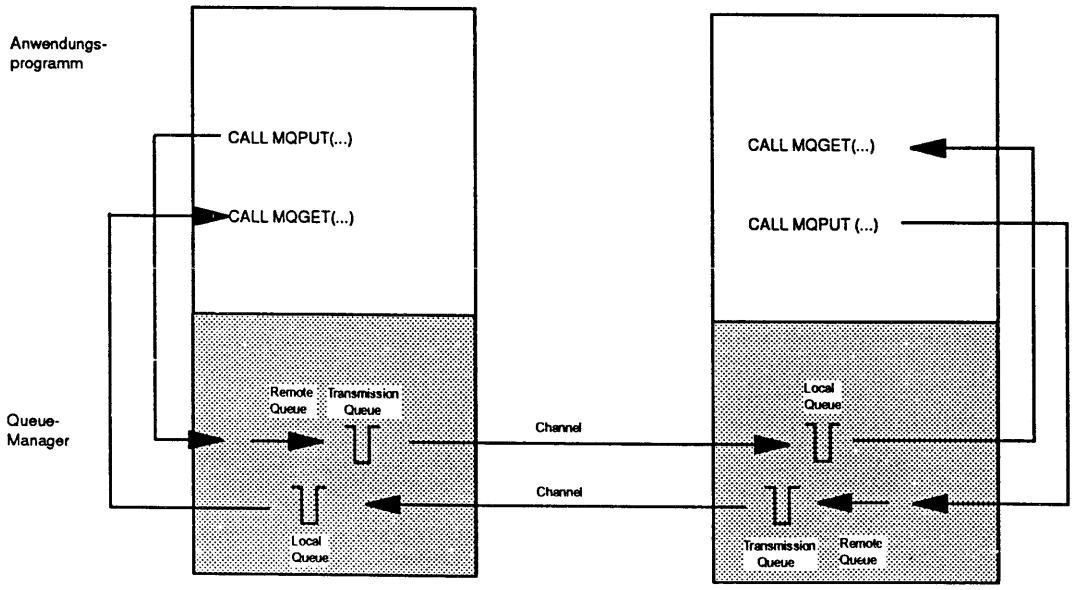
Local queues:
- Standard Local queue
- Transmission queue
- Dead-letter queue

Remote queues

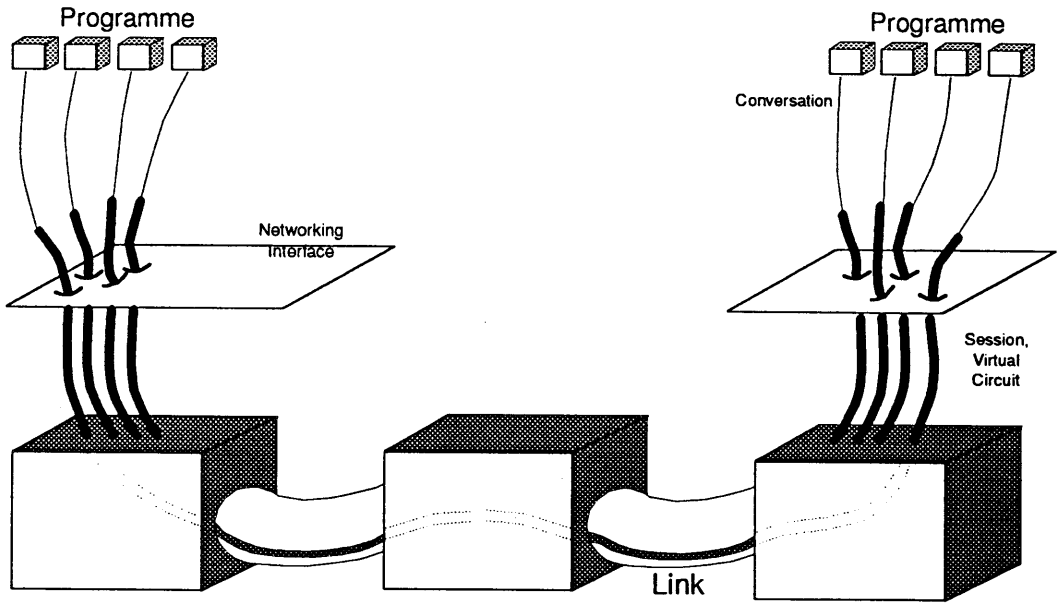
Alias queues

Spezielle queues:
- Model queues
- Dynamic queues
- System-command input queue
- System default queue
- Initiation queue

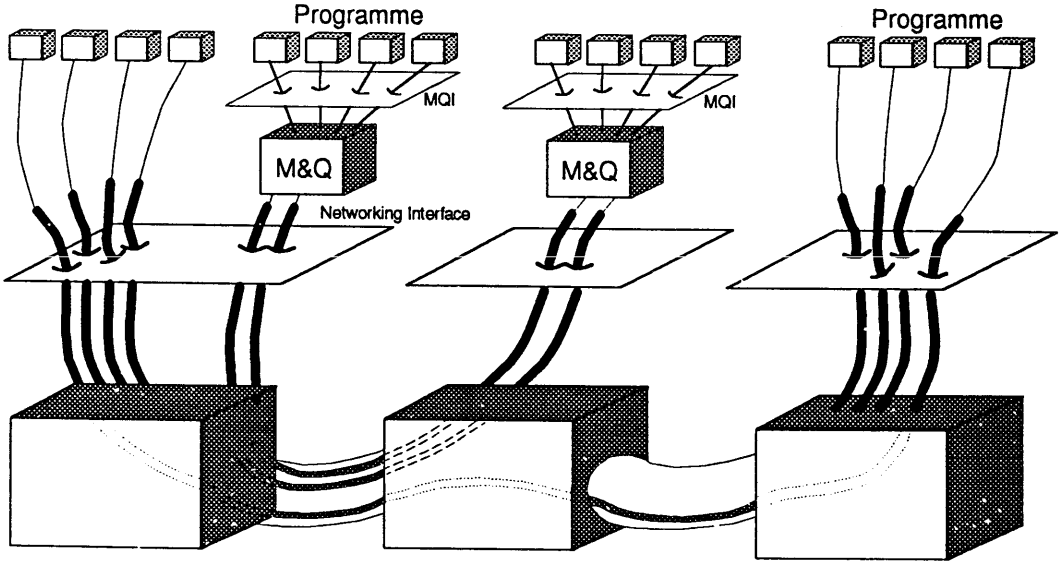
Queue Management



Netzwerk OHNE Messaging



Weniger Netzwerk mit Messaging



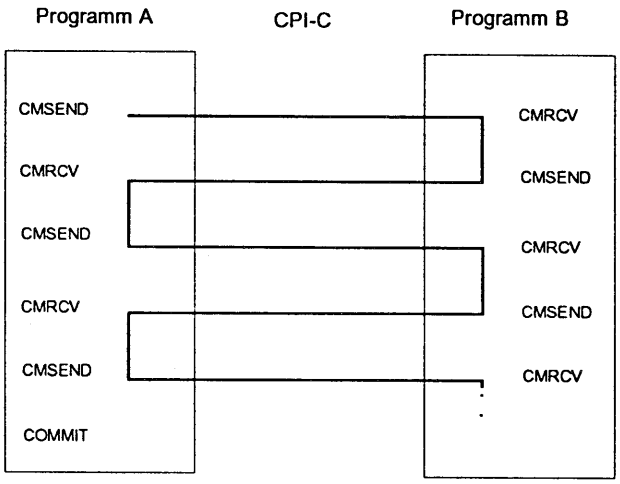
API - Application Program Interface CPI-C

6 wichtigsten Calls:

Aufbau Session:
- CMINIT
- CMALLC
- CMACCP

Senden/empfangen Daten:
- CMSEND
- CMRCV

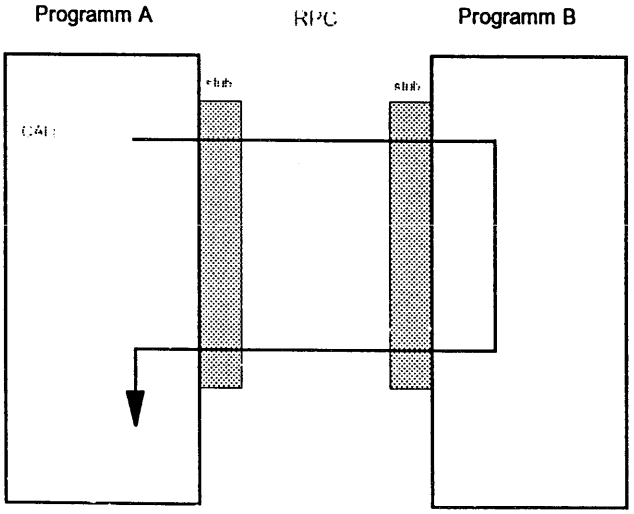
Verbindung beenden:
- CMDEAL



API - Application Program Interface RPC

Kein formelles API

CALL ist wie für ein lokales Unterprogramm



API - Application Program Interface MQI

9 wichtigsten Calls:

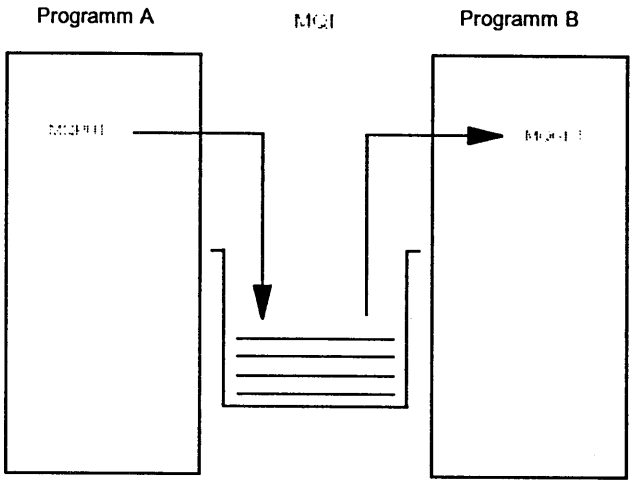
Verbindung zum QMgr:
- MQCONN
- MQDISC

Verbindung zur Queue:
- MQOPEN
- MQCLOSE

Msg in Queue stellen:
- MQPUT
- MQPUT1

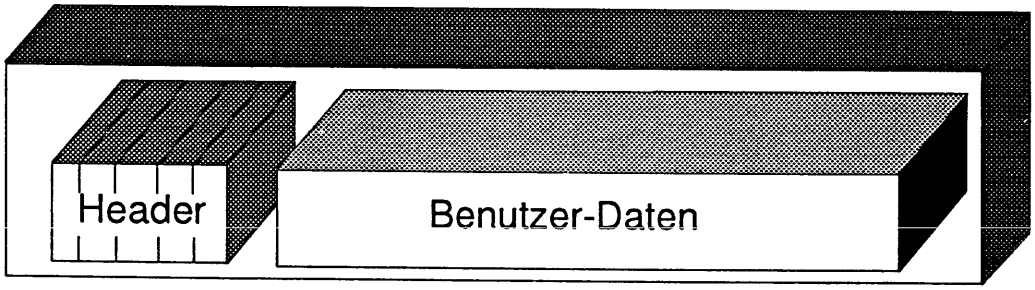
Msg von Queue holen:
- MQGET

Abfrage/Ändern Queue Attr.:
- MQINQ
- MQSET



Message

Message = Header + Benutzer-Daten



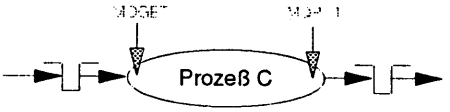
Message Attribute, die der Queue Manager verwendet:
- Name der Empfänger-Queue
- Länge der Benutzerdaten
- Message-Priorität
- Reply-to Queue-N
- Sequenz-Nummer
- usw

Eine beliebige Folge von Daten
- Struktur und Inhalt sind nur dem sendenden und empfangenden Programm bekannt
- Keine Bedeutung für den Queue Manager

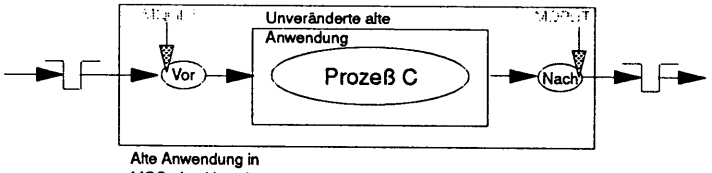
MQI - Anwendungsdesign

Synchron:

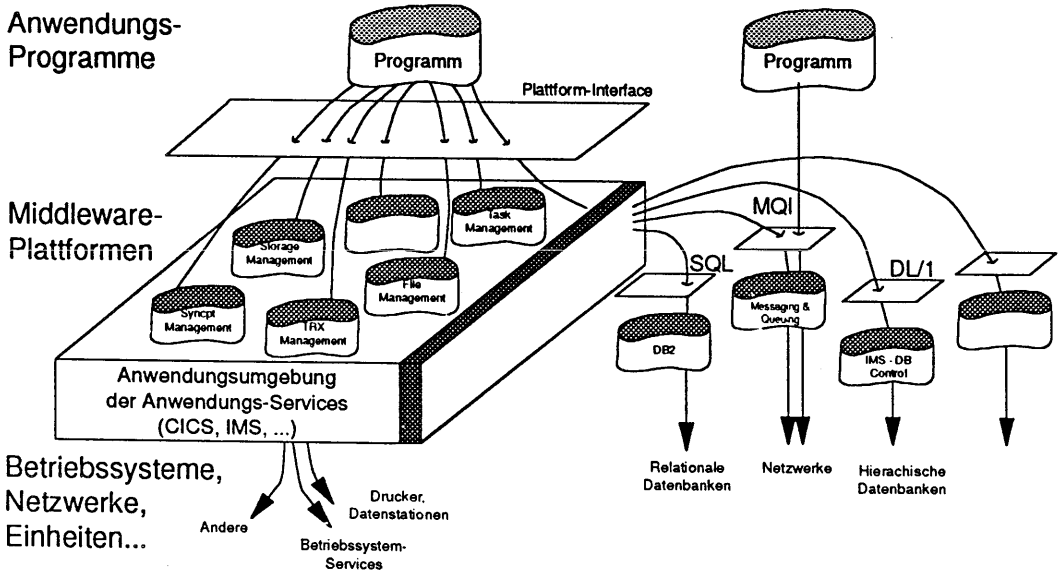
Asynchron:



Asynchron mit Shell:



Middleware-Variationen



Robuste Middleware

Vorteile:

- Geschäftsdaten sind konsistent
- Betrieb kann auch bei Leitungs-störungen weiter geführt werden

Features:

- "Assured delivery" von Messages
- Messages werden nur einmal übertragen
- Messages gehen nicht verloren

MQSeries - Mehr Partner

Application Providers
American Management Systems
American Software
Cincom Systems, Inc.
Dun and Bradstreet Software
J D Edwards
Emprise Technologies
First Data Corporation
Footprint (Canada)
Geminus (Germany)
Health Systems Integration Inc.
Information Builders, Inc.
Integral Systems, Inc.
Marshall & Ilsley
New Paradigm
Policy Management Systems Corporation
PRJ&, Inc. (now Uniquest)
SAP ag. (Germany)
SDM International, Inc.
Select Ticketing
Shared Medical Systems
Software ag of North America
Software 2000
Surecomp Ltd (Israel)
Systematics, Inc
The Continuum Company, Inc.

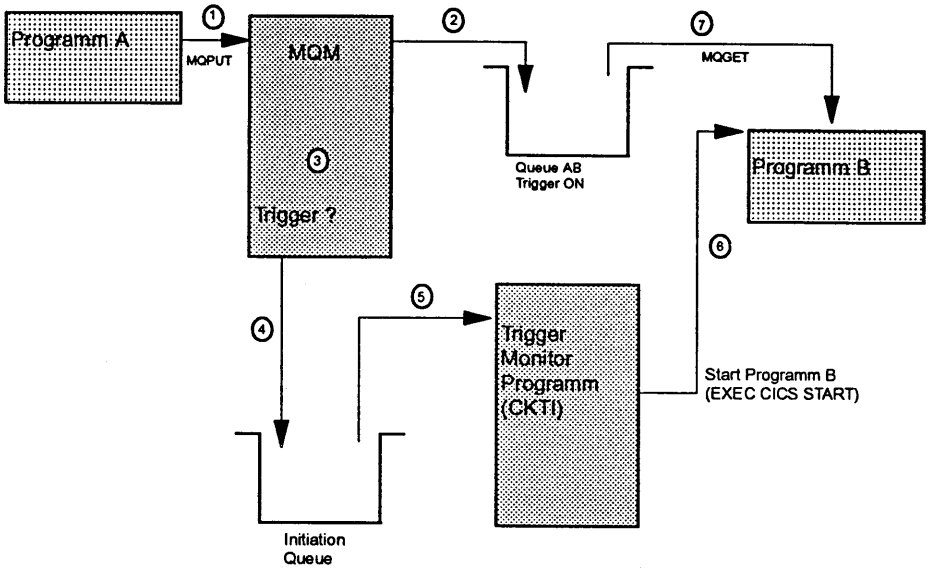
Application Development Tools
Compuware
Early, Cloud and Company
Programart Corporation
Knowledgeware, Inc.
McDonnell Information Systems
Network Software Associates
Seer Technologies
Uniface UK

System Management Tools
BMC Software, Inc.
Boole and Babbage
Candle Corporation
Computer Associates International, Inc.
Landmark Systems Corporation

Systems Integrators and Software and Services Organisations
Axime I.S. (France)
Charette Online Systems
Data Sciences B.V. (Holland)
Logica North America
Marben (France)
Science Applications International Corporation (SAIC)
SHL Systemhouse (Canada)
Sligos (France)
TCAM Systems, Inc.
Technology Solutions Company (TSC)
Weber Consulting

OSPG (Open Client/Server System Partners Group)
AST
Cresco
OGIS
Nomura Research Institute
Ricoh
TCS

Trigger - Operationen



Message-Typen

Datagram: Message, die keine Antwort erfordert

Request: Message, die eine Antwort erfordert

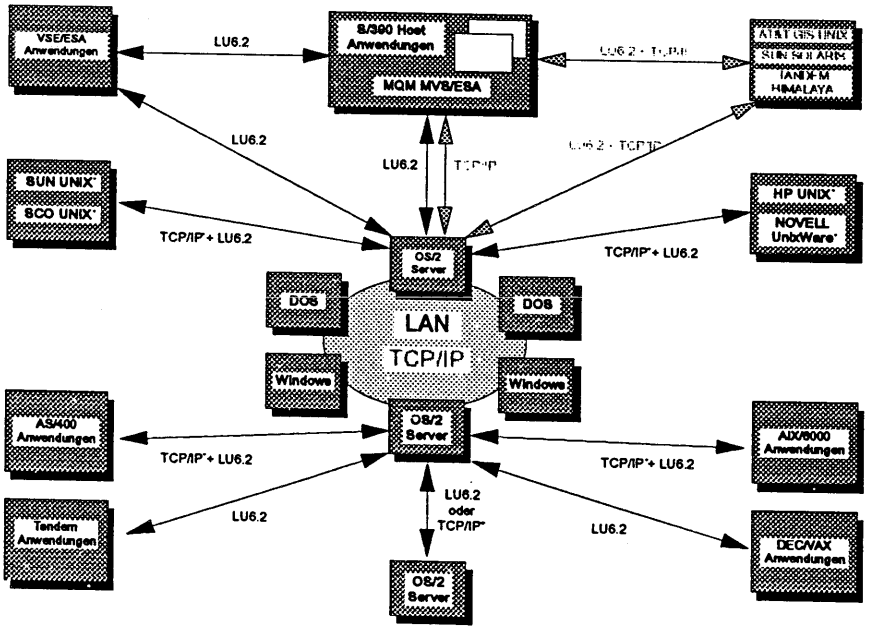
Reply: Antwort-Message auf Request-Message

Report: Vom Queue-Manager erzeugte (Fehler)-Nachricht

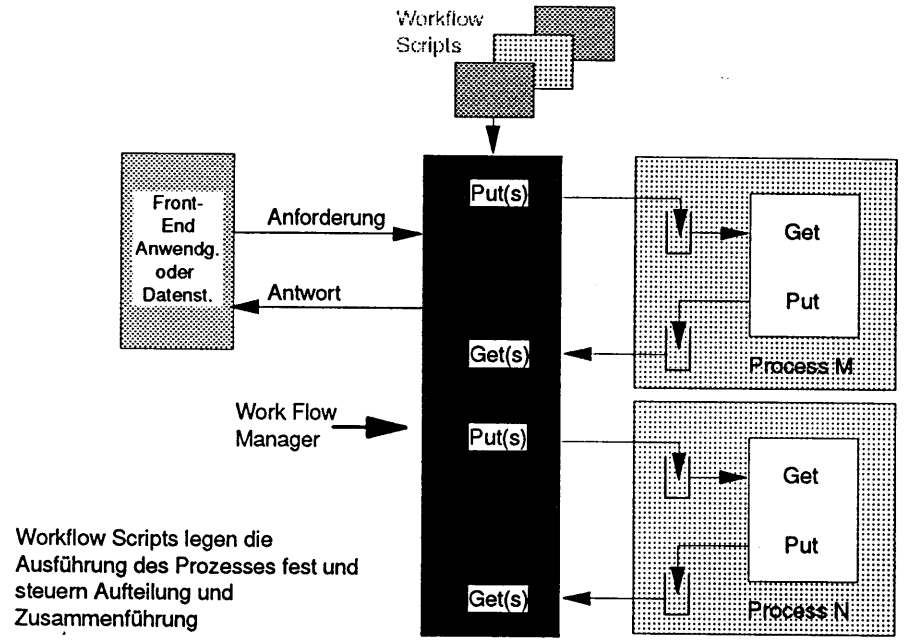
MQSeries - Programmiersprachen

Produkt	C	COB	PL/I	RPG	Ass.
MQSeries for MVS/ESA	J	J	J	N	J (BAL)
MQSeries for OS/400	J	J	N	J	N
MQSeries for OS/2	J	J	N	N	N
MQSeries for AIX/6000	J	J	N	N	N
MQSeries for VSE/ESA	N	J	N	N	N
MQSeries for DEC VMS	J	N	N	N	N
MQSeries for TANDEM	J	N	N	N	J (TAL)
MQSeries for UNIX	J	N	N	N	N

OS/2 - Verbindungen

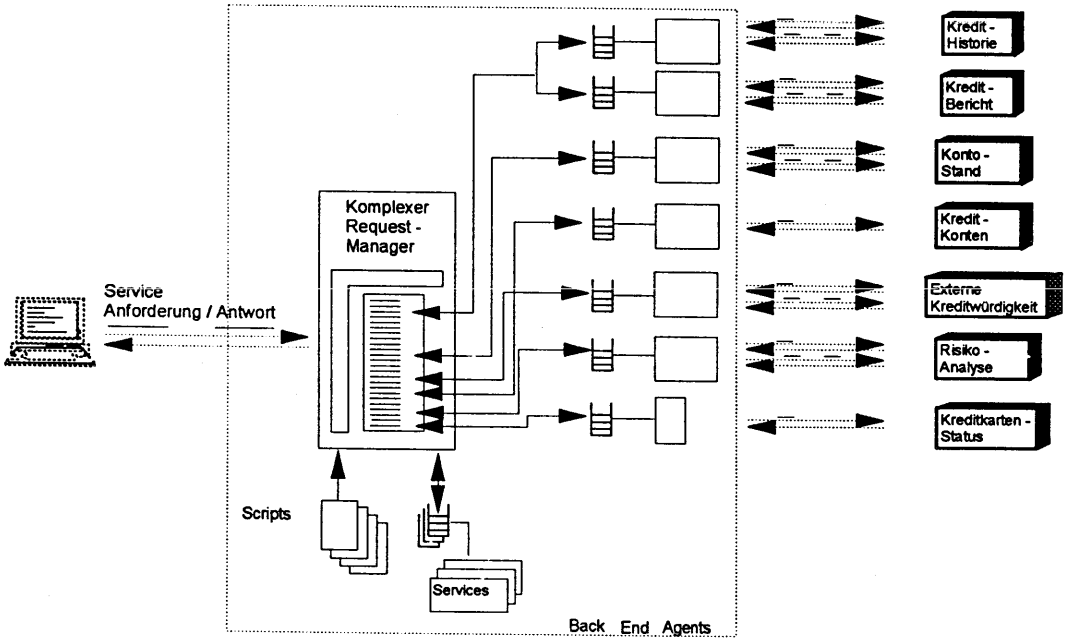


Work Flow Management



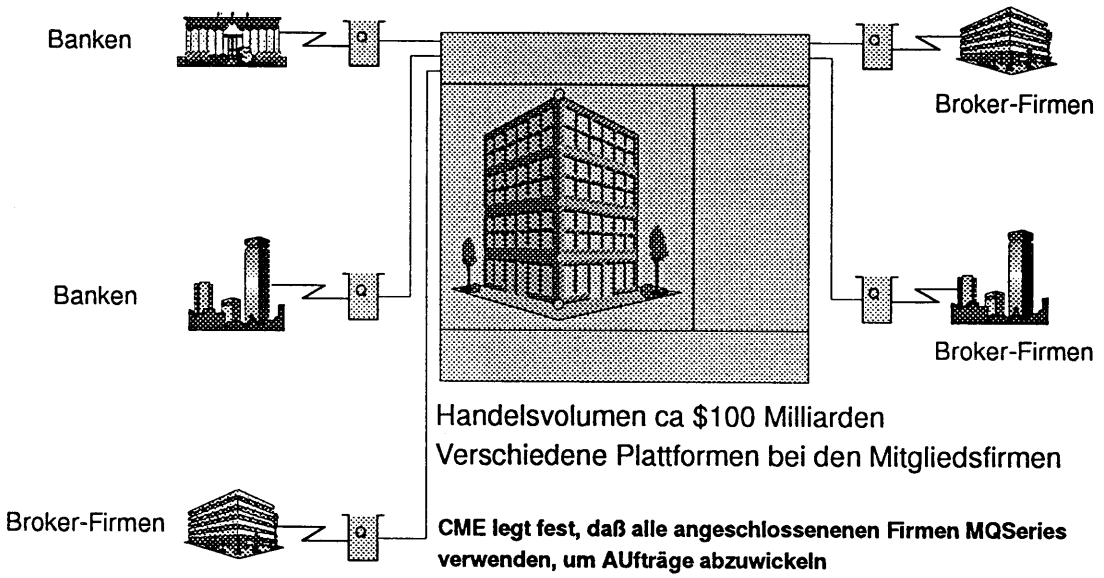
Workflow Scripts legen die Ausführung des Prozesses fest und steuern Aufteilung und Zusammenführung

Kredit - Bearbeitungssystem



MQSeries - Kunde: CME , USA

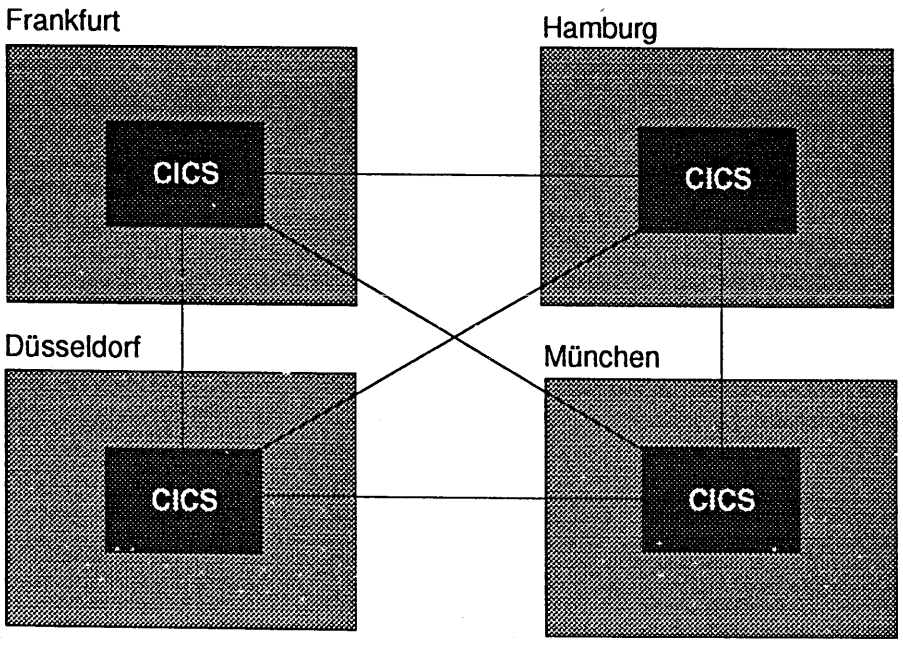
CME = Chicago Mercantile Exchange



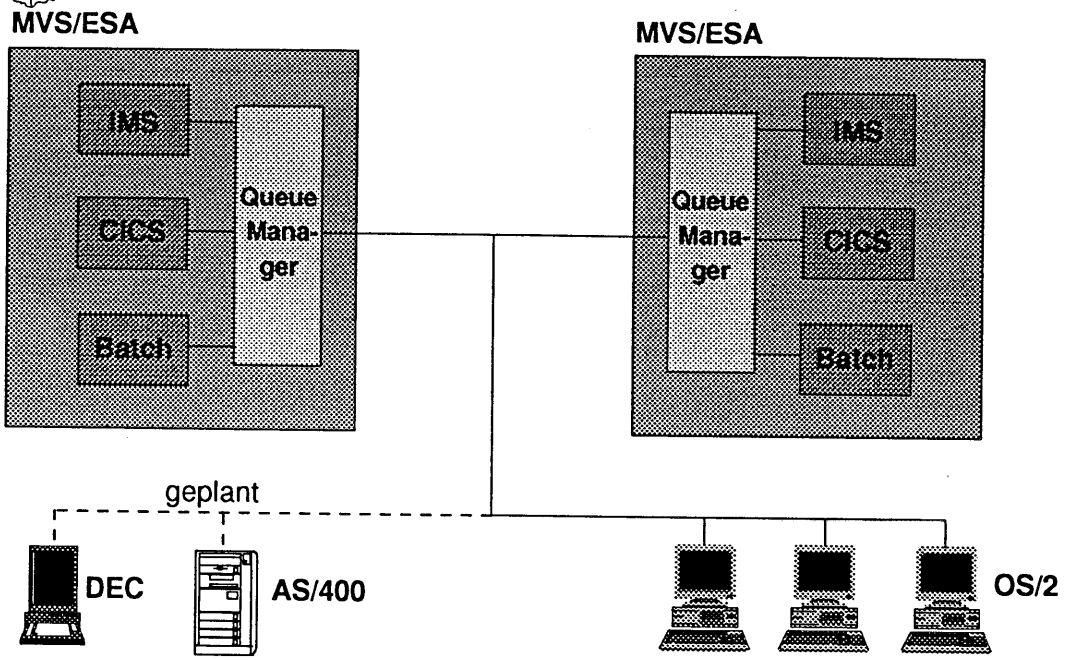
Handelsvolumen ca $100 Milliarden
Verschiedene Plattformen bei den Mitgliedsfirmen

CME legt fest, daß alle angeschlossenenen Firmen MQSeries verwenden, um AUfträge abzuwickeln

MQSeries - Kunde: Dresdner Bank, Deutschland



MQSeries - Kunde: Credit Suisse, Schweiz



Literatur

Allgemein:

GC31-7057 NETWORKING BLUEPRINT BROCHURE
GC33-0805 AN INTRODUCTION TO MESSAGING & QUEUING
SC33-0850 TECHNICAL REFERENCE
G511-1908 MQSERIES BROCHURE

MQM/MVS und MQM/400:

SC33-0807 MQSERIES APPLICATION PROGRAMMING GUIDE
SC33-1139 MQSERIES DISTRIBUTED QUEUE MANAGEMENT GUIDE
SC33-1228 MQSERIES PROGRAMMABLE COMMAND FORMATS
GC33-1349 MQSERIES PLANNING GDE
SC33-1369 MQSERIES COMMAND REFERENCE

MQM/MVS:

SC33-0806 MQM MVS/ESA SYSTEM MANAGEMENT GUIDE
SC33-0808 MQM MVS/ESA PROBLEM DETERMINATION GUIDE
SC33-0819 MQM MVS/ESA MESSAGES & CODES
SC33-1212 MQM MVS/ESA APPLICATION PROGRAMMING REFERENCE
GC33-1350 MQM MVS/ESA LICENSED PROGRAM SPECIFICATIONS
SC33-1351 MQM MVS/ESA COMMAND REF

Literatur

MQM/400:

SC33-1199 MQM/400 V.2.3 APPLICATION PROGRAMMING REFERENCE (RPG)
SC33-1334 MQM/400 V.2.3 APPLICATION PROGRAMMING REFERENCE (C and COBOL)
SC33-1352 MQM/400 V.2.3 ADMINISTRATION GUIDE
SC33-1353 MQM/400 V.2.3 LICENSED PROGRAM SPECIFICATIONS
SC33-1360 MQM/400 V.3.1 LICENSED PROGRAM SPECIFICATIONS
SC33-1361 MQM/400 V.3.1 ADMINISTRATION GUIDE
SC33-1362 MQM/400 V.3.1 APPLICATION PROGRAMMING REFERENCE (RPG)
SC33-1363 MQM/400 V.3.1 APPLICATION PROGRAMMING REFERENCE (C and COBOL)

MQSeries for AIX, OS/2, VSE, DEC, TANDEM. UNIX-SYSTEME:

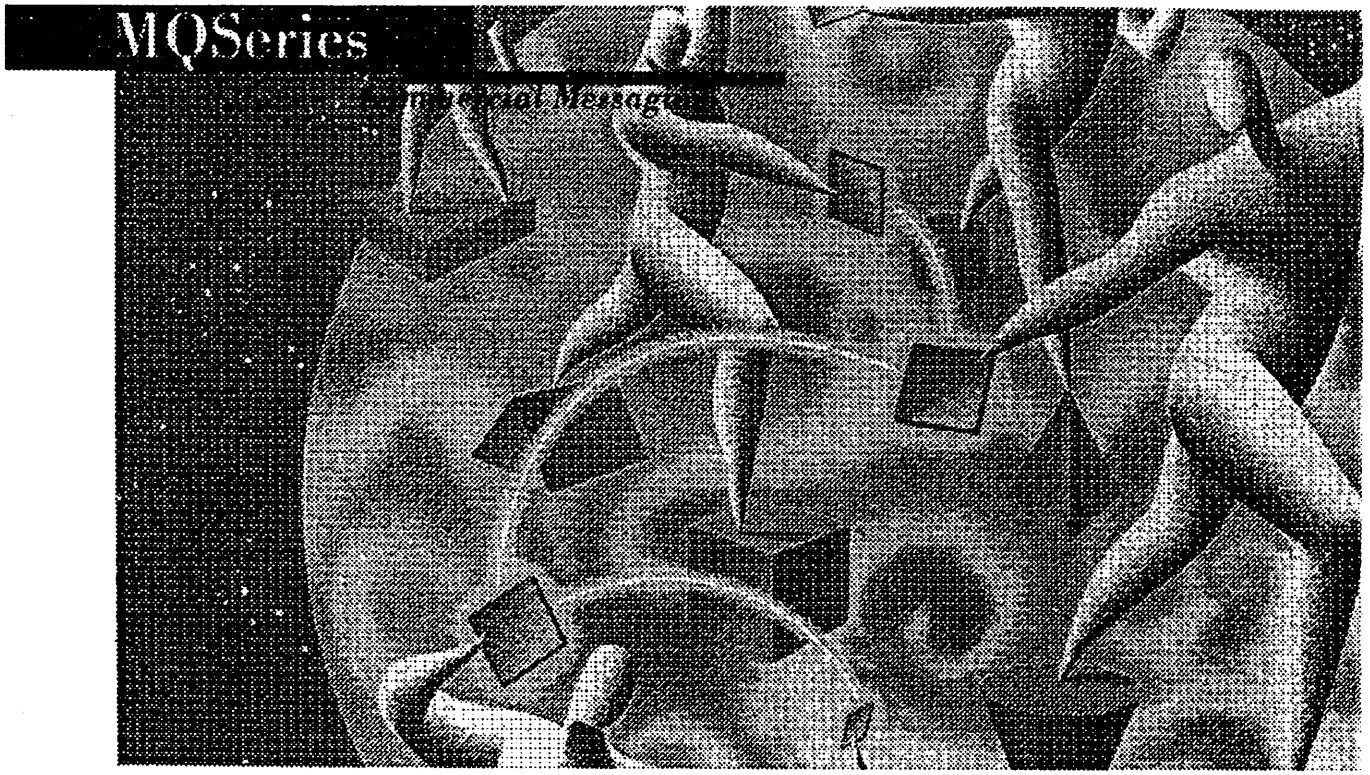
SC33-1141 MQSERIES OVERVIEW CONCEPTS & ARCHITECTURE
SC33-1142 VSE/ESA FOR IBM MQSERIES: USER'S GUIDE
SC33-1143 AIX/6000 FOR IBM MQSERIES: USER'S GUIDE
SC33-1144 DEC FOR IBM MQSERIES: USER'S GUIDE
SC33-1146 TANDEM FOR IBM MQSERIES: USER'S GUIDE
SC33-1148 OS/2 FOR IBM MQSERIES: USER'S GUIDE
SC33-1376 HP-UX FOR IBM MQSERIES: USER'S GUIDE
SC33-1377 SUNOS FOR IBM MQSERIES: USER'S GUIDE
SC33-1378 SCO UNIX FOR IBM MQSERIES: USER'S GUIDE
SC33-1379 UNIXWARE FOR IBM MQSERIES: USER'S GUIDE

REDBOOKS:

GG24-4062 INTRODUCTION TO USING THE MQI VIA MESSAGE QUEUE MANAGER/ESA
GG24-4167 SELECTED EXAMPLES OF DISTRIBUTED APPLICATION PORECESSING USING MQSERIES MQM MVS/ESA
→ GG24-4326 EXAMPLES OF USING MQSERIES ON S/390, RISC SYSTEM/600, AS/400 AND PS/2
VSE → GG24-4263 CICS/VSE C/S MQI SOLUTIONS

MQSeries for OS/2

Version 2.0



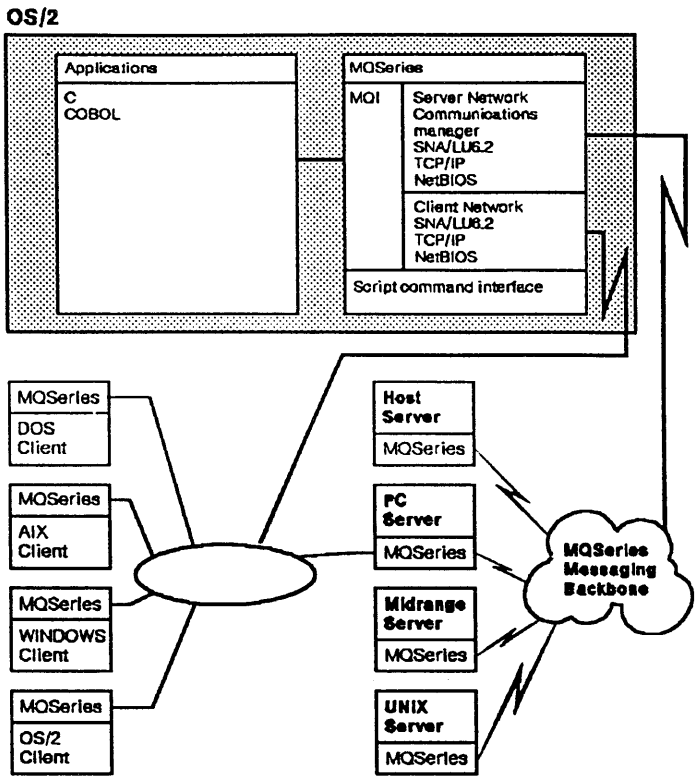
MQSeries products enable business applications to exchange information across different operating-system platforms by sending and receiving data as messages. MQSeries, via the message queuing interface (MQI), takes care of network interfaces, assures delivery of messages, deals with communications protocols, and handles recovery after system problems. Programmers can use their skills to handle your business requirements, rather than to solve the underlying complexities of your network.

A building block for distributed processing

MQSeries for OS/2 brings distributed processing to IBM's leading-edge multitasking PC operating system. A key factor is the time-independent processing - you know that your message will be dealt with even if one of the recipients is temporarily unavailable. MQSeries protects the integrity of your business data when it is sent across networks.

Highlights of MQSeries for OS/2 are:

- Provides a single point of control for administering MQSeries networks on OS/2, AIX, MVS, and OS/400 systems, improving your system management
- Transports data from one MQSeries platform, converting it if requested, so that it can be used on another
- Supports TCP/IP, LU 6.2, NetBIOS, and IPX (via NetBIOS emulation) communications
- Provides client support for OS/2, AIX, DOS, and Windows
- Provides various MQI extensions including memory-based messages, message priority, message expiration, and confirmation of message arrival and delivery
- Can operate with CICS for OS/2, providing coordination between MQSeries and CICS resources by allowing CICS for OS/2 transactions to issue MQSeries calls
- Can set message queues to trigger application programs to start remotely, giving more automation



Program name

The formal name of this product is IBM MQSeries for OS/2 (Version 2.0)

Program number: **5621-390**

Hardware requirements

- Any PC with a 386 or higher processor
  - Recommended minimum system memory: 16MB
  - Minimum disk capacity: 10MB plus an alowance for paging

Software requirements

- IBM OS/2 Version 2.1
- Communication software
  - IBM Communication Manager/2 Version 1.1 for OS/2
  - IBM TCP/IP for OS/2 Version 2.0
- For workstation clients (client support code is distributed with the server code):
  - OS/2 Version 2.1
  - AIX Version 3.2.5
  - DOS Version 5.0
  - Microsoft Windows 3.1

Or a later, upwardly compatible version.

Supported languages

- IBM C Set + + Version 2
- MicroFocus COBOL Version 3.0.54

Complementary products

- CICS for OS/2

For further information

For more information about MQSeries, please contact your IBM marketing representative.

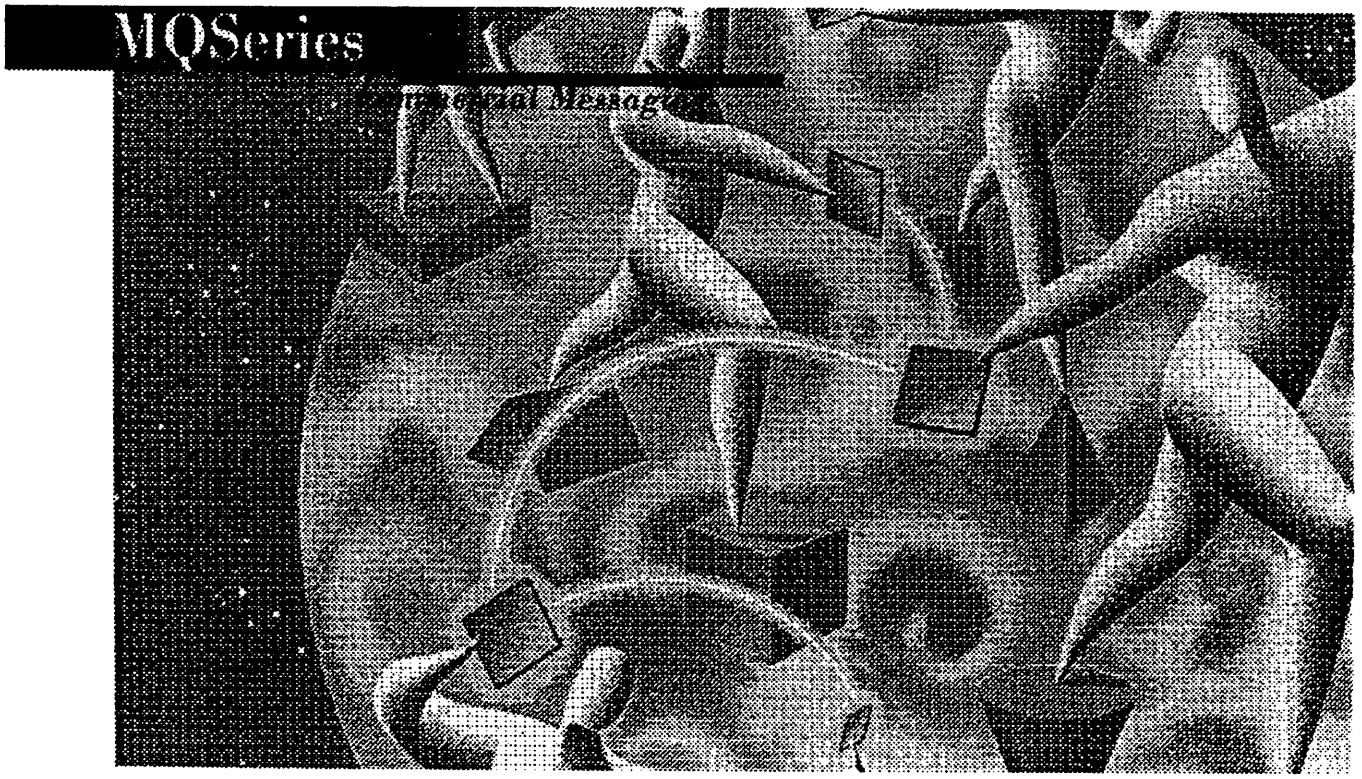
Produced by:
IBM United Kingdom
Laboratories Limited
TS Marketing, MP 186
Hursley Park
Winchester
Hampshire SO21 2JN
United Kingdom

PBMxxxxx

IBM

MQSeries for AIX

Version 2



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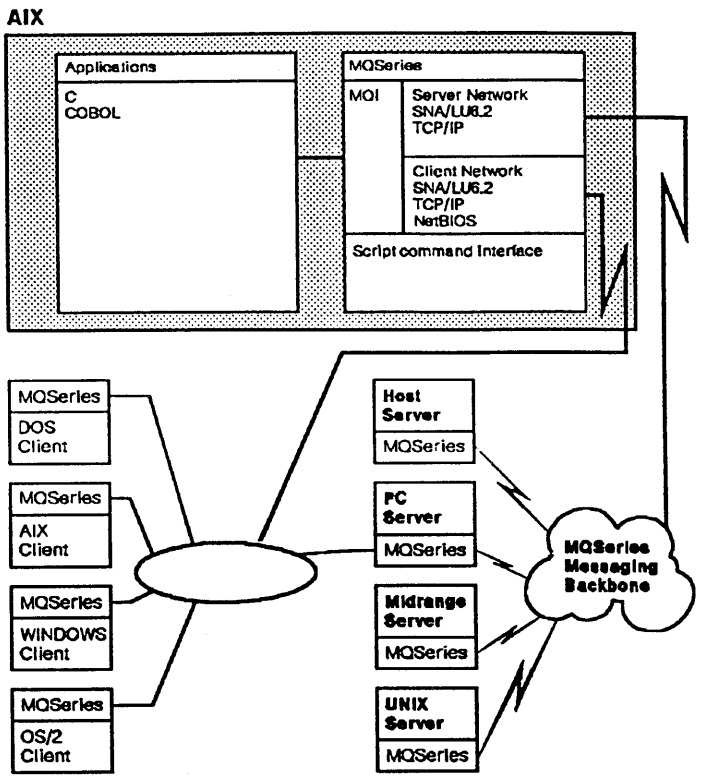
A building block for distributed processing

MQSeries provides a single, multi-platform programming interface (API). A key factor is the time-independent processing - you know that your message will be dealt with even if one of the recipients is temporarily unavailable. MQSeries protects the integrity of your business data when it is sent across networks.

Highlights of MQSeries for AIX are:

- Provides a single point of control for administering MQSeries networks on AIX, OS/2, MVS, and OS/400 systems, improving your system management
- Transports data from one MQSeries platform, converting it if requested, so that it can be used by another
- Provides client support for AIX, OS/2, DOS, and Windows
- Gives greater freedom to reconfigure your set up by being able to exploit DCE directories for queue names
- Can operate with CICS for AIX, providing coordination between MQSeries and CICS resources by allowing CICS for AIX transactions to issue MQSeries calls
- Provides various MQI extensions including memory-based messages, message priority, message expiration and confirmation of message arrival and delivery
- Can set message queues to trigger application programs to start remotely, giving more automation



Program name

The formal name of this product is **IBM MQSeries for AIX Version 2**

Program number: **5765-115**

Hardware requirements

- Any IBM RISC System/6000 or any scalable POWERparallel system

Software requirements

- AIX/6000 Version 3.2.5
- Communication software
  - IBM AIX SNA Server/6000 Version 2.1
    or
    IBM AIX SNA Services/6000 Version 1.2
  - For workstation clients (client support code is distributed with the server code):
    - AIX Version 3.2.5
    - OS/2 Version 2.1
    - DOS Version 5.0
    - Windows 3.1

    Or a later, upwardly compatible version.

Supported languages

- AIX/XL C Compiler Version 1.3
- MicroFocus COBOL compiler Version 3.1 for UNIX

Complementary products

- IBM AIX DCE/6000 Version 1.1
- CICS for AIX

For further information

For more information about MQSeries, please contact your IBM marketing representative.

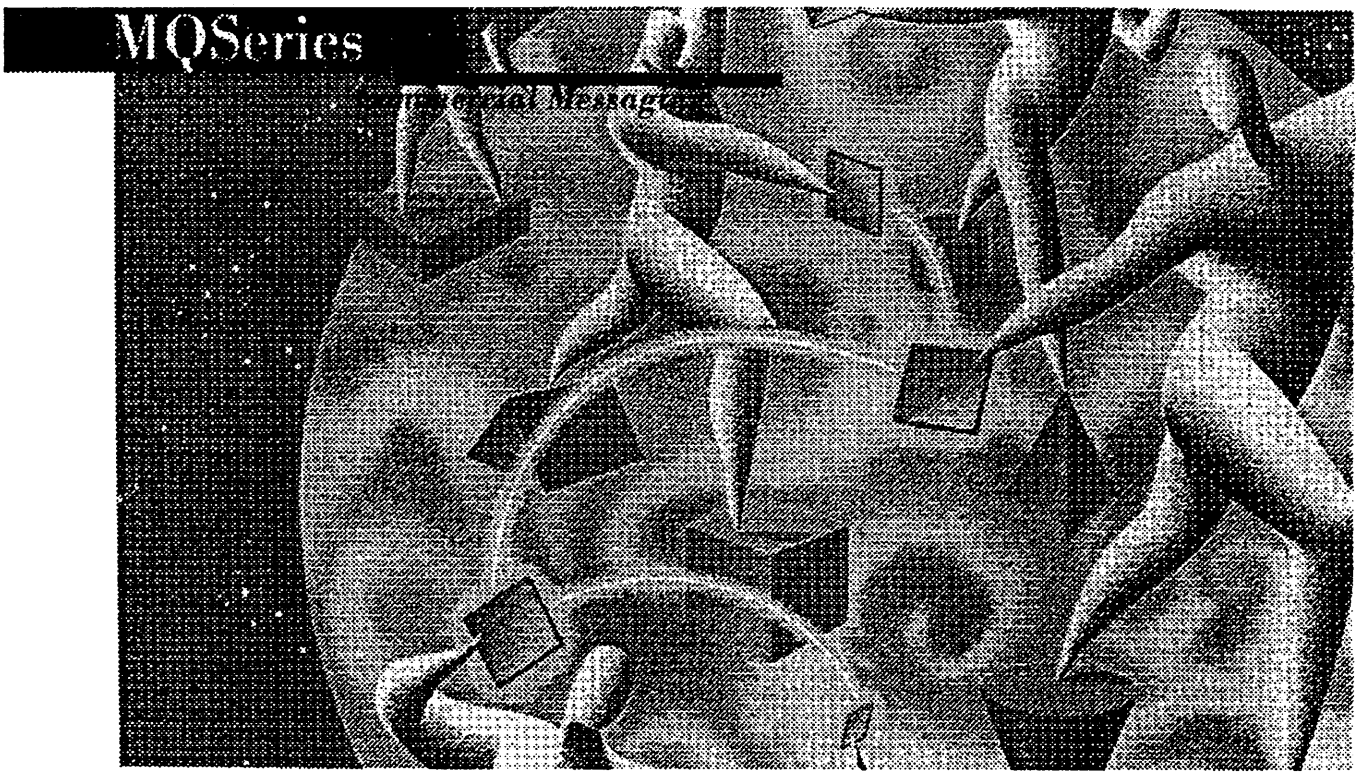
Produced by:
IBM United Kingdom
Laboratories Limited
TS Marketing, MP 186
Hursley Park, Winchester
Hampshire SO21 2JN
United Kingdom

PMQ621

IBM

MQSeries for OS/400

Version 3 Release 1



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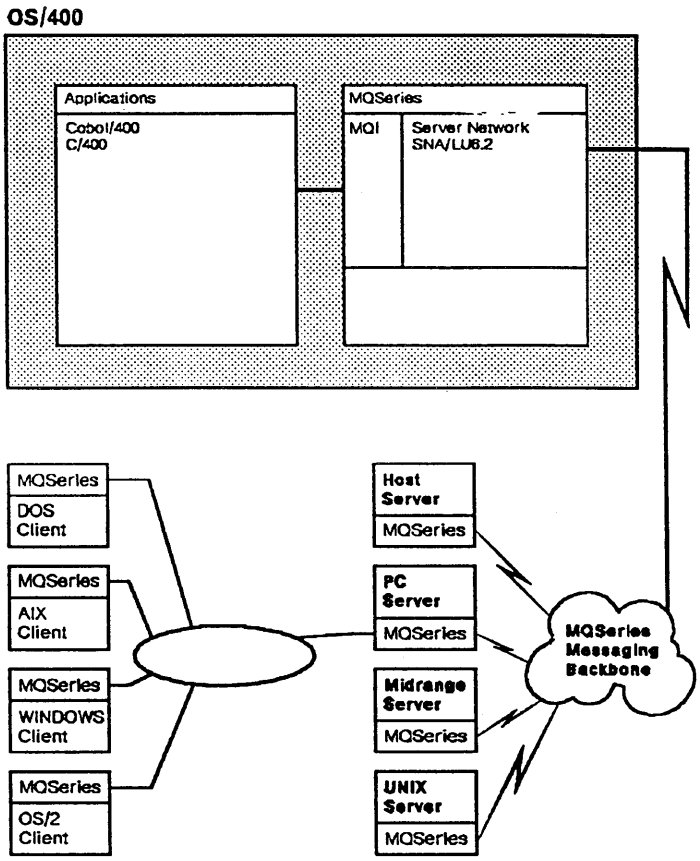
A building block for distributed processing

MQSeries provide a single, multi-platform application programming interface (API). A key factor is the time-independent processing - you know that your message will be dealt with even if one of the recipients is temporarily unavailable. MQSeries can be used as a mail transport offering the additional benefits of assured, real-time delivery and transactional recovery. It can improve your application efficiency and protect the integrity of your business data.

Highlights of MQSeries for OS/400 Version 3 are:

- Protects the integrity of your data by ensuring that it is delivered only once and not lost through system or network failure
- Provides a single point of control to administer a network of systems
- Converts data from one MQSeries platform so that it can be used on another
- Relieves programmers from the burden of low-level communication coding
- Supports the cross-platform Message Queue Interface (MQI) for easy development of business application programs
- Operates with CICS/400, providing coordination between MQSeries and CICS resources by allowing CICS/400 transactions to issue MQSeries (MQI) calls
- Supports LU6.2 and TCP/IP communications



Program name

The formal name of this product is **IBM MQSeries for OS/400**

Program number: **5763-MQ1**

Hardware requirements

- Any IBM AS/400 model capable of running the required level of OS/400
- Any communication hardware supporting IBM SNA LU 6.2 or TCP/IP

Software requirements

- IBM OS/400 Version 3 Release 1 or later
- IBM CICS/400 (optional)

Supported languages

- ILE COBOL/400
- ILE C/400
- ILE RPG/400

For further information

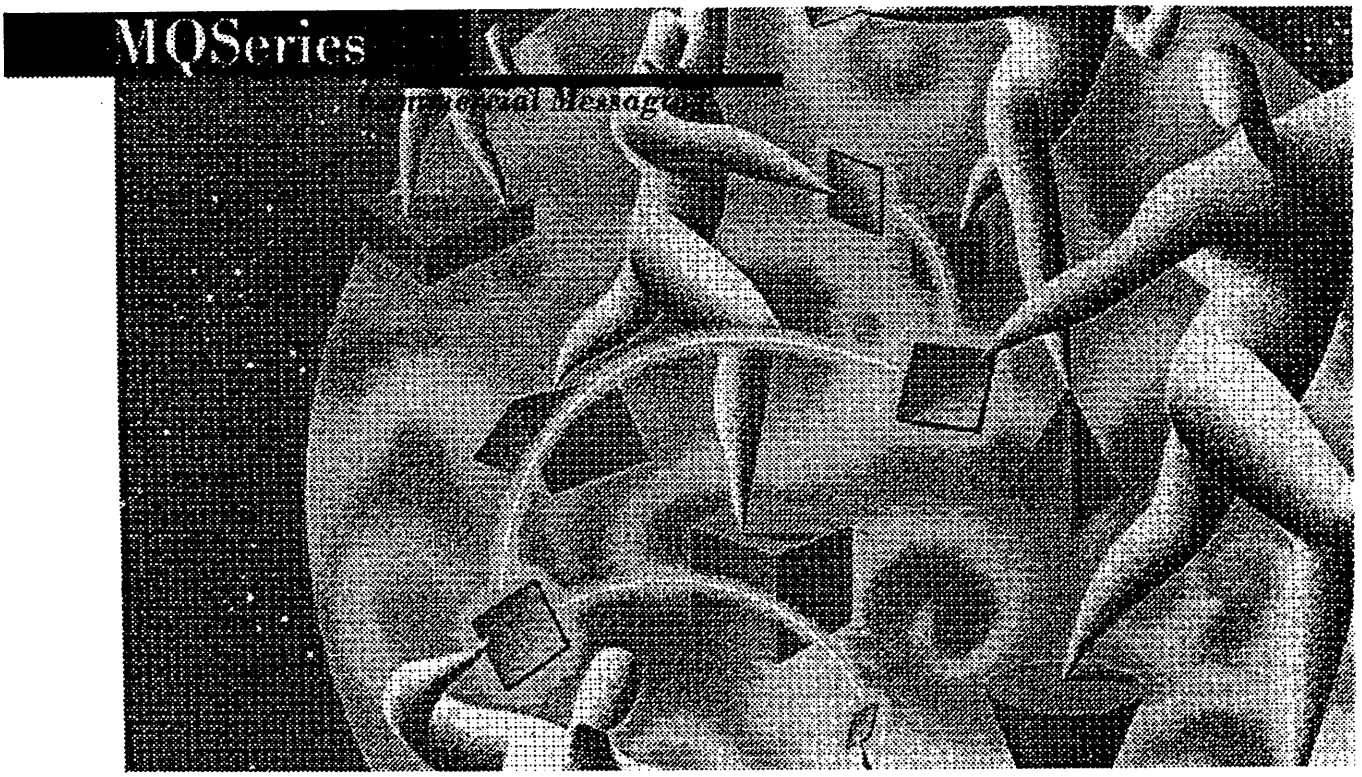
For more information about MQSeries, please contact your IBM marketing representative.

Produced by:
IBM United Kingdom
Laboratories Limited
TS Marketing, MP 186
Hursley Park
Winchester
Hampshire SO21 2JN
United Kingdom

PMQ431

MQSeries for VSE/ESA

Version 1 Release 3.1



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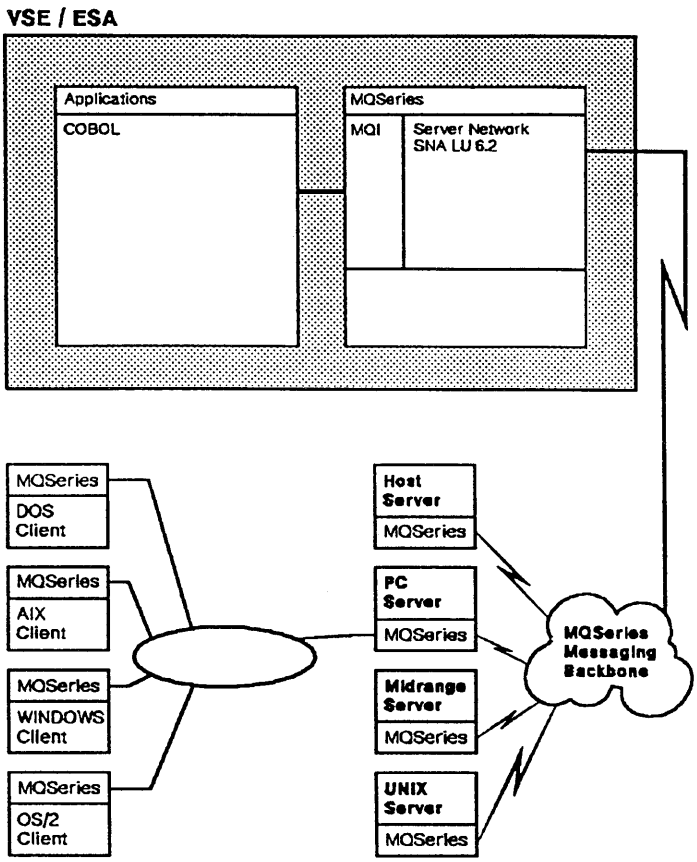
Highlights of MQSeries for VSE/ESA are:

- Protects the integrity of your data by ensuring that it is delivered only once and not lost through system or network failure
- Provides a single point of control to administer a network of systems
- Operates with CICS/VSE, providing coordination between MQSeries and CICS resources by allowing CICS/VSE transactions to issue MQSeries (MQI) calls
- Supports SNA/LU 6.2 communications



Program name

The formal name of this product is **IBM MQSeries for VSE/ESA.**

Program number: **5787-ECX**

Machine and Programming Requirements

For full service-related prerequirements, please see the *User's Guide* for this product.

(Connectivity is via SNA.)

- Any IBM System 370 or 390
  - Minimum system memory = normal memory as supplied with machine
  - Minimum system DASD = 2 cylinders (3390) + Size of Queues
- Any communications hardware supporting SNA/LU6.2

And the following software (later levels, if any, will be supported unless otherwise stated):

- VSE/ESA Version 1.2.0
- CICS/VSE Version 2.1
- VTAM for VSE/ESA Version 3.4
- VS Cobol II Run-Time Library

Supported language for application development:

- VS Cobol II Version 3.0

For further information

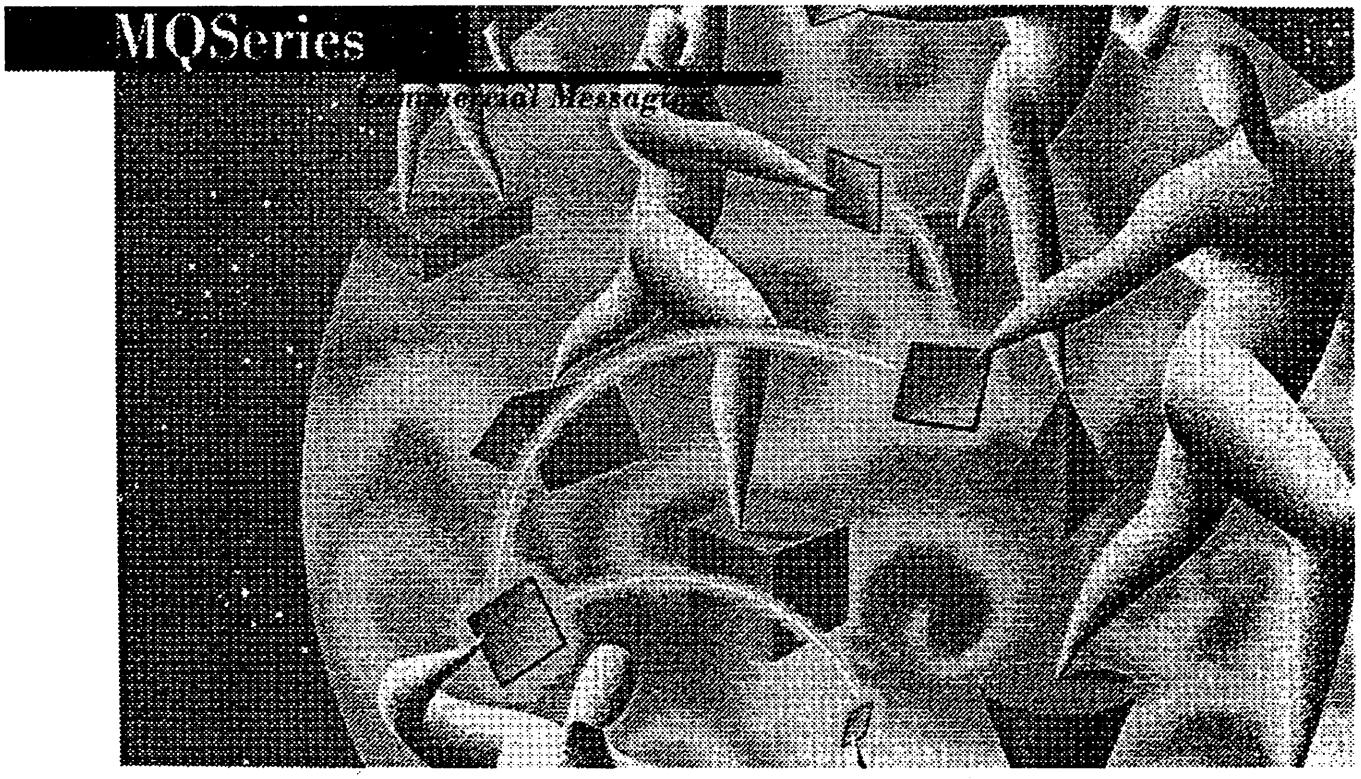
For more information about this MQSeries product, please contact your IBM marketing representative.

Produced by:
IBM United Kingdom Laboratories Limited
TS Marketing, MP 186
Hursley Park
Winchester
Hampshire SO21 2JN, United Kingdom

PMQV13

MQSeries for MVS/ESA

Version 1 Release 1.3



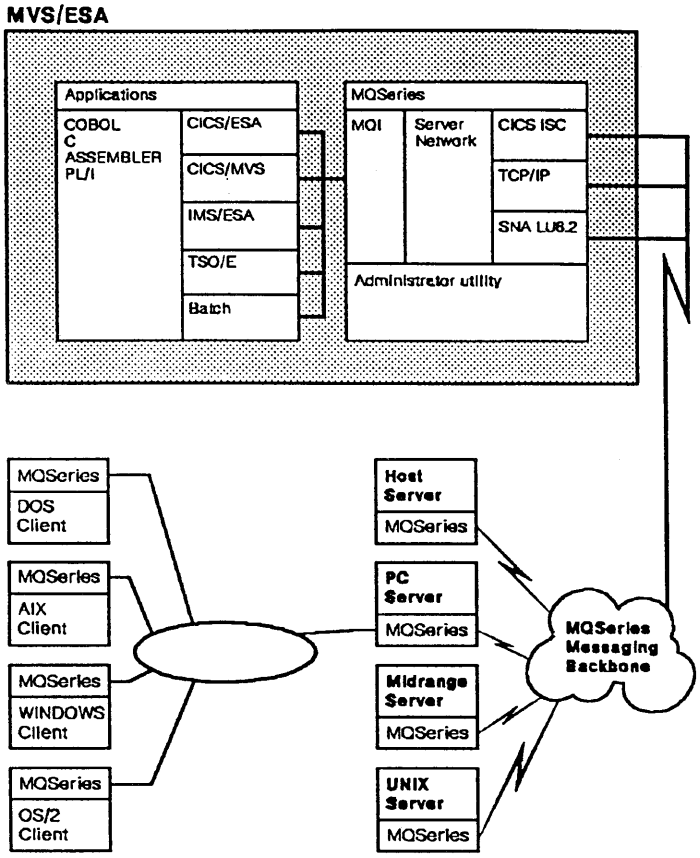
MQSeries products enable business applications to communicate across different operating-system platforms, by use of messages, in a way that is straightforward and easy for programmers to implement. They take care of network interfaces, assure delivery of messages, deal with communications protocols, and handle recovery after system problems. This lets programmers use their skills in handling your business requirements, rather than having each one solve the underlying complexities of your network.

Exploiting the integrity of MVS/ESA

This MQSeries product exploits MVS integrity, by using MVS reliability, availability, and serviceability techniques. As a stand-alone MVS subsystem, it provides additional system services that give a simple way of transferring messages between programs in different MVS address spaces—allowing communication between programs that operate under CICS/ESA, CICS/MVS, IMS/ESA, MVS Batch, and TSO. MQSeries ensures that data integrity and consistency are extended across the network to create a reliable distributed application environment.

Highlights of this MQSeries product are:

- Provides support for many System/390 environments including: IMS/ESA, CICS/MVS 2.1.2, CICS/ESA 3.3 or later
- Transports data from one MQSeries platform so that it can be used on another ("distributed queuing")
- Supports TCP/IP and SNA LU6.2 communications
- Gives confirmation of arrival and delivery of messages
- Can set message queues to trigger application programs to start remotely, giving more automation



Program name

The formal name of this product is **IBM MQSeries for MVS/ESA Version 1 Release 1.3.** Program number: **5695-137.**

Hardware requirements

Any IBM System/370 or System/390 processor (or equivalent) that can run the required level of MVS/ESA.

Software requirements

(minimum levels)

- MVS/ESA: MVS/ESA Version 3.1.3 with MVS JES2 or JES3 Release 3.1; Measured Usage License Charge (MULC) (optional); Data Facility Product (DFP) Version 3 Release 1; RACF Version 1 Release 9 or other SAF-compliant security product; SMP/E Version 1 Release 8
- Operations and control panels: ISPF/PDF Version 3 Release 2; TSO/E Version 2.0
- Communication with CICS: CICS/ESA Version 3 Release 3 or CICS/MVS Version 2 Release 1.2
- Communication with IMS/ESA: IMS/ESA Version 3 Release 1
- Distributed queuing:
  - CICS facilities and local administration of channels: CICS/ESA Version 3 Release 2.1; ACF/VTAM Version 3 Release 3
  - CICS facilities and remote administration of channels: CICS/ESA Version 3 Release 3; ACF/VTAM Version 3 Release 3
  - Without CICS (SNA LU6.2): MVS/ESA Version 4 Release 3; ACF/VTAM Version 3 Release 3; C/370 Version 2 Release 1 library
  - Without CICS (TCP/IP): IBM TCP/IP Version 2 Release 2.1 or IBM TCP/IP Version 3 Release 1; C/370 Version 2 Release 1 library

Languages and compilers

- C/370 Compiler or IBM SAA AD/Cycle C/370 Compiler
- VS COBOL II or SAA AD/Cycle COBOL/370 Compiler
- OS PL/I Optimizing Compiler V2 or IBM SAA AD/Cycle PL/I Compiler
- High Level Assembler/MVS or Assembler H Compiler

For further information

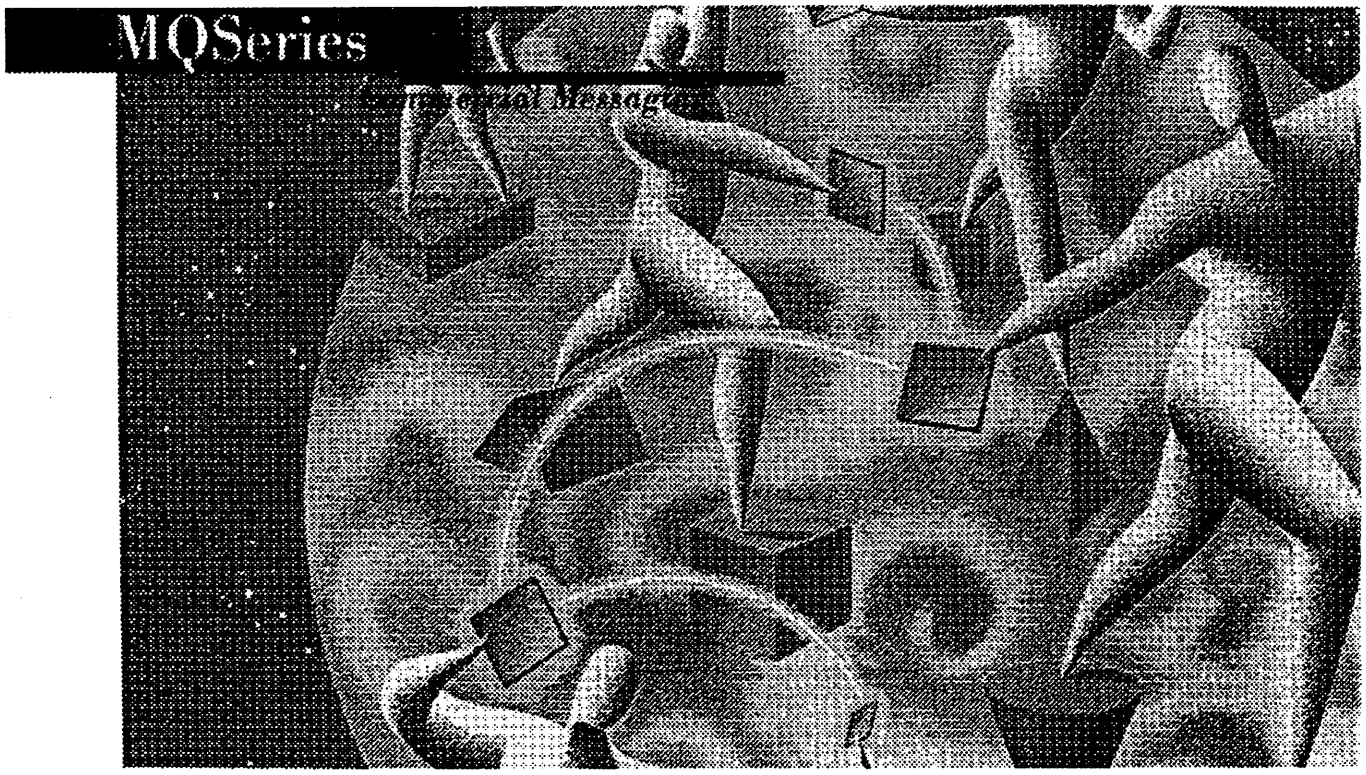
For more information about this MQSeries product, please contact your IBM marketing representative.

Produced by:
IBM United Kingdom Laboratories Limited
TS Marketing, MP186
Hursley Park
Winchester
Hampshire SO21 2JN
United Kingdom

PMQE113

MQSeries for AT&T GIS UNIX

Version 1 Release 1



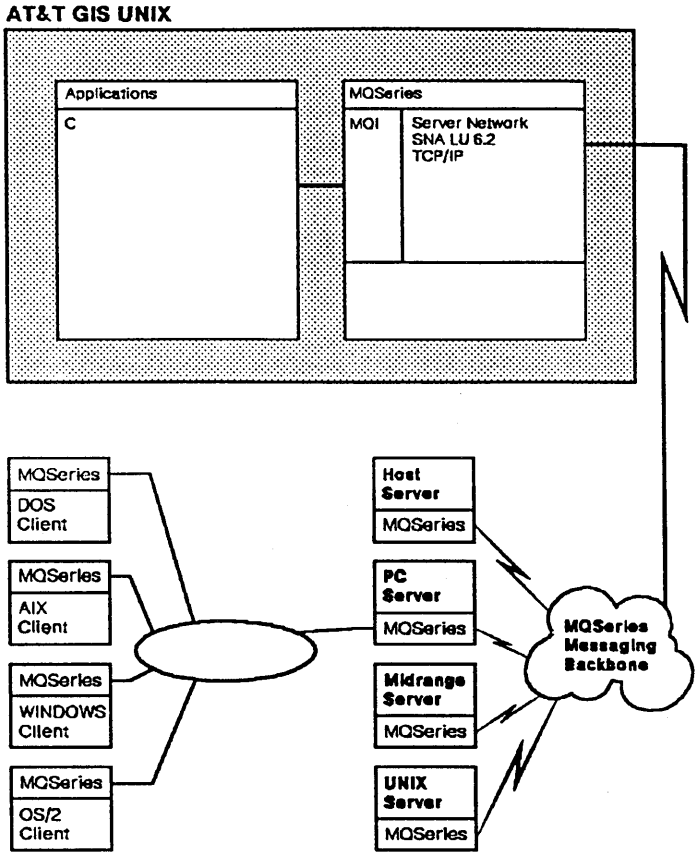
MQSeries products enable business applications to exchange information across different operating-system platforms by sending and receiving data as messages. MQSeries, via the message queuing interface (MQI), takes care of network interfaces, assures delivery of messages, deals with communications protocols, and handles recovery after system problems. Programmers can use their skills to handle your business requirements, rather than to solve the underlying complexities of your network.

A building block for distributed processing

MQSeries provides a single, multi-platform application programming interface (API). A key factor is the time-independent processing - you know that your message will be dealt with even if one of the recipients is temporarily unavailable. MQSeries protects the integrity of your business data when it is sent across networks.

Highlights of this MQSeries product are

- Protects the integrity of your data by ensuring that it is delivered only once and not lost through system or network failure
- Extends the range of MQSeries products to include support on another UNIX platform
- Allows the freedom and flexibility of the UNIX world to be united with the control and discipline of the host and mid-range environments
- Provides a single point of control to administer a network of systems
- Can be used within the UNIX environment as a general-purpose queuing system for process-to-process communication via recoverable queues
- Supports TCP/IP and LU 6.2 communications



Program name

The formal name of this product is **IBM MQSeries for AT&T GIS UNIX**

Program number: **5695-947**

Machine and Programming Requirements

For full service-related prerequirements, please see the *User's Guide* for this product.

(Connectivity can be via SNA or TCP/IP.) For the following configurations: Combined File/Communications Server, Communications Server only, File Server only or Client only:

- Any AT&T GIS 34XX or 35XX system
  - Minimum system memory = 16 MB
  - Minimum system disk space
    - Combined File/Comms server = 2MB + Size of Queues
    - File server = Size of Queues
    - Communications server = 2MB
    - Client = normal disk space supplied with machine
- Any LAN adapter and/or (for communications server)
- Any communications hardware supporting SNA/LU6.2 and/or TCP/IP

For Token-Ring connectivity (communications server):

- AT&T GIS 4/16 MB Token-Ring Adapter or
- Proteon 4/16 MB Token-Ring Micro Channel Adapter

And the following software (later levels, if any, will be supported unless otherwise stated):

- AT&T GIS UNIX SVR4 MP-RAS Version 2.0.2.01 or later Version 2 including TCP/IP
- Appropriate LAN software (file server or client) for example, NFS to match TCP/IP

For SNA connectivity (communications server):

- AT&T GIS SNA Services Version 2.06.01 or later Version 2 to match hardware system

For Token-Ring connectivity (communications server) with AT&T GIS 4/16 MB Token-Ring Adapter:

- AT&T GIS Integrated LAN Driver Version 2.01.00
- AT&T GIS Link Level Control Driver Version 1.02.10

Supported language for application development:

- AT&T GIS High Performance C Version 1.0b

For further information

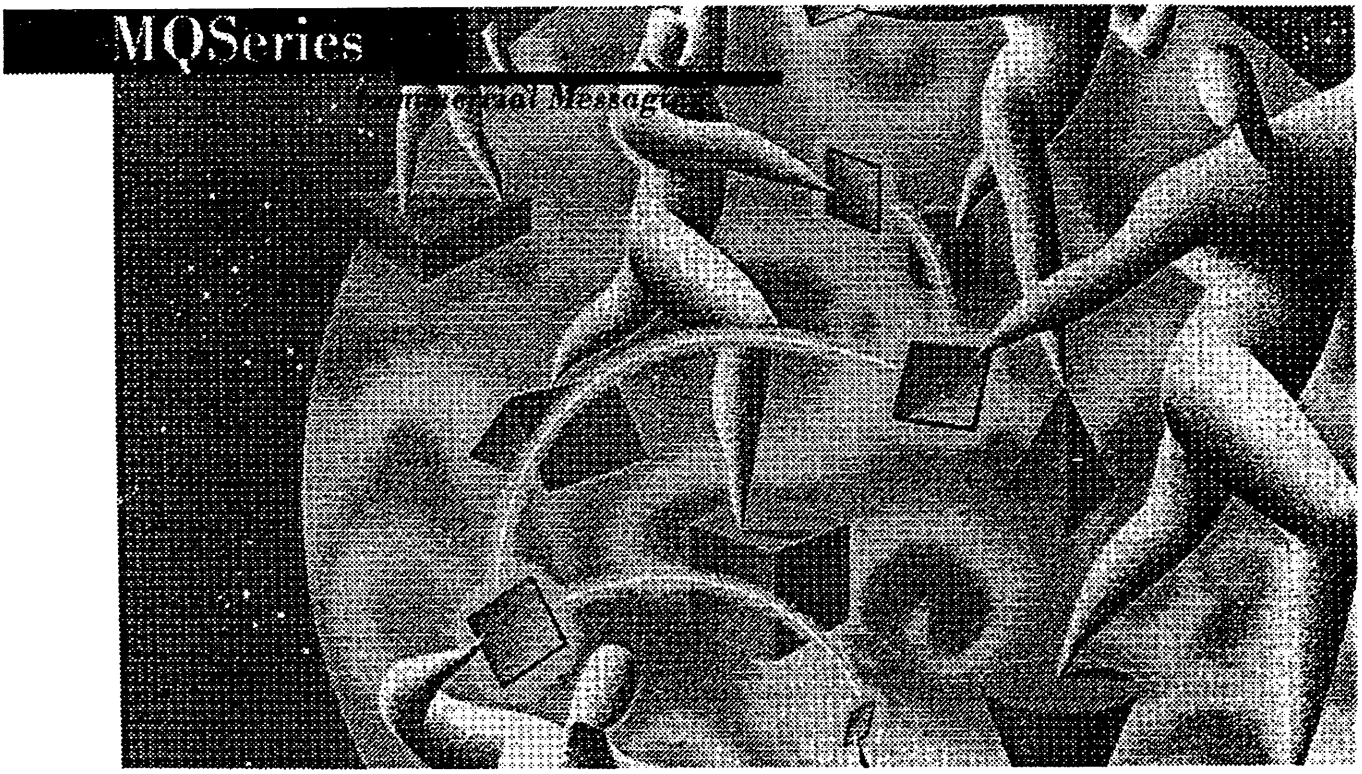
For more information about this MQSeries product, please contact your IBM marketing representative.

Produced by:
IBM United Kingdom Laboratories Limited
TS Marketing, MP 186
Hursley Park, Winchester
Hampshire SO21 2JN, United Kingdom

PMQATT11

MQSeries for Digital VMS VAX

Version 1 Release 3.1



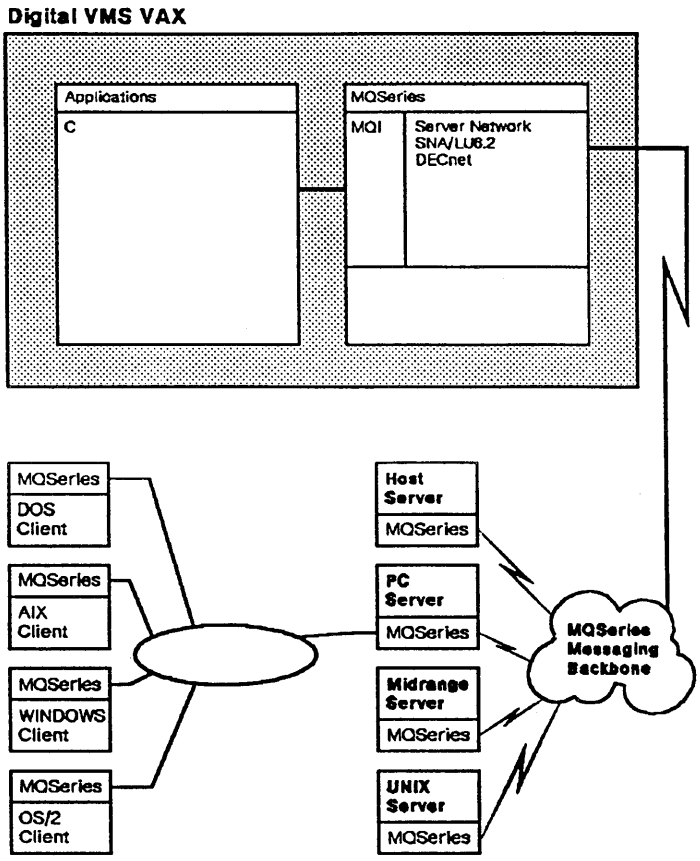
MQSeries products enable business applications to communicate across different operating-system platforms, by use of messages, in a way that is straightforward and easy for programmers to implement. MQSeries takes care of network interfaces, assures delivery of messages, deals communications protocols, and handles recovery after system problems. This lets programmers use their skills in handling your business requirements, rather than having each one solve the underlying complexities of your network.

A building block for distributed processing

Data integrity and consistency are essential in many businesses. MQSeries for Digital VMS VAX helps meet this need in the VMS environment. You can now build a client/server-based distributed application that encompasses your VAX cluster and other open and proprietary platforms. With MQSeries for Digital VMS you can create a network of reliable distributed applications.

Highlights of MQSeries for Digital VMS VAX are:

- Makes it easy to write distributed applications that maintain the integrity of your business data across all supported platforms
- Helps to extend access to database information on other platforms, in either front-end or back-end configurations
- Can be used within the VMS environment as a general purpose queuing system for program-to-program communication via recoverable queues
- Includes support for SNA LU6.2 and DECnet communications



Program Name: The formal name of this product is **IBM MQSeries for Digital VMS VAX**

Program number: **5787-ECZ**

Machine Requirements and Programming Requirements

For full service-related prerequirements, please see the *User's Guide* for this product.

(Connectivity can be via SNA or DECnet.)

Later levels of software, if any, will be supported unless otherwise stated.

- Any DEC VAX
  - Minimum system memory = 3 MB per application + 3 MB + 5 MB per MCA
  - Minimum system disk space = 2 MB + 25 KB + Size of Queues

with

- Digital VMS Version 5.0 or later VMS Version 5

For DECnet connectivity:

- DECnet communications adapter with
  - DECnet Version 5.5 or later Version 5

For SNA connectivity:

- DECnet/SNA Gateway -ST or -CT with
  - DECnet SNA VMS APPC/LU6.2 Programming Interface Version 2.2 or later Version 2
  - DECnet VAX Version 5.0 or later Version 5 (for Node Type 2.0)
  - Products listed above for DECnet connectivity

or

- SIMPACT communications adapter with
  - Express Data Transfer Services Version 3.06 or later Version 3 (for Node Type 2.1)

Programming Languages and Compilers

Supported languages for application development

- VAX C Version 3.1

For further information

For more information about MQSeries, please contact your IBM marketing representative.

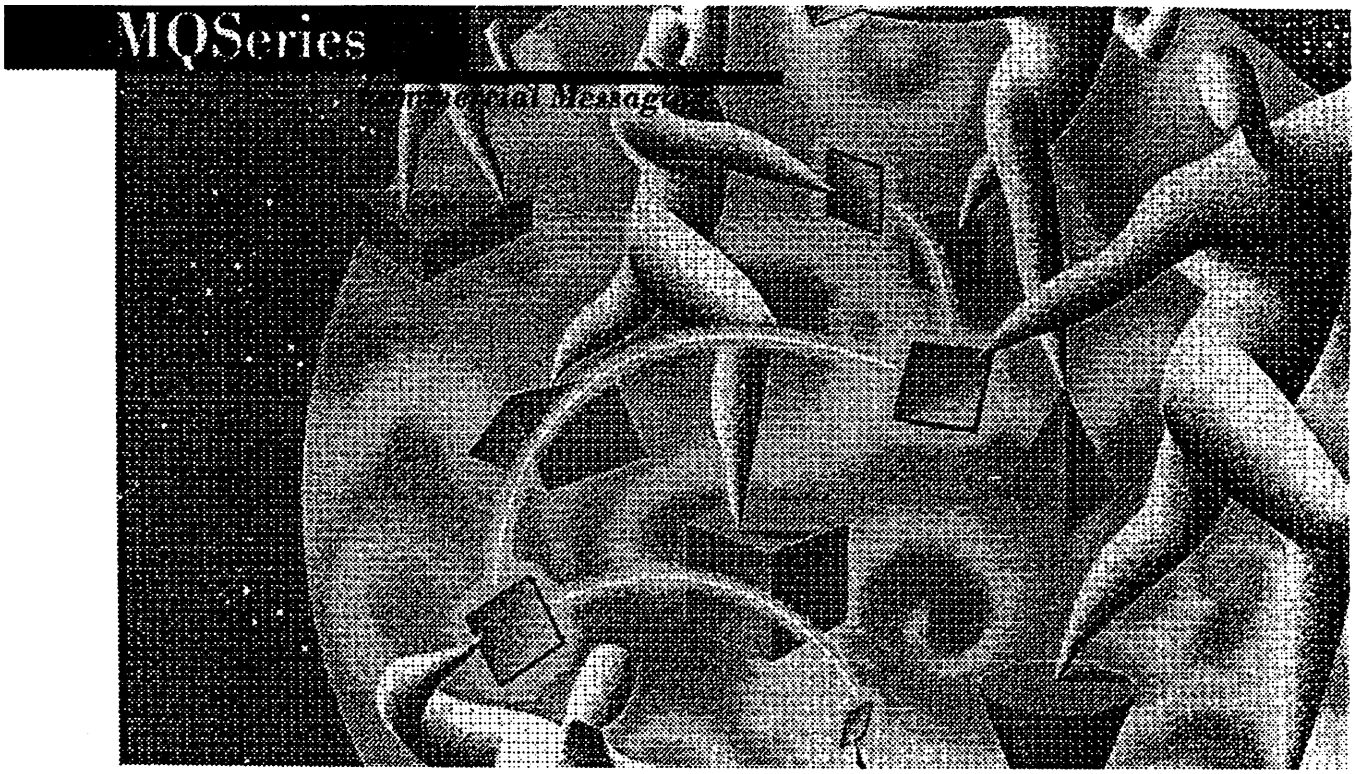
Produced by:
TS Marketing, Mail Point 186
IBM UK Laboratories Ltd
Hursley Park, Winchester
Hampshire SO21 2JN
United Kingdom

PMQD13

IBM

MQSeries for HP-UX

Version 1 Release 3.1



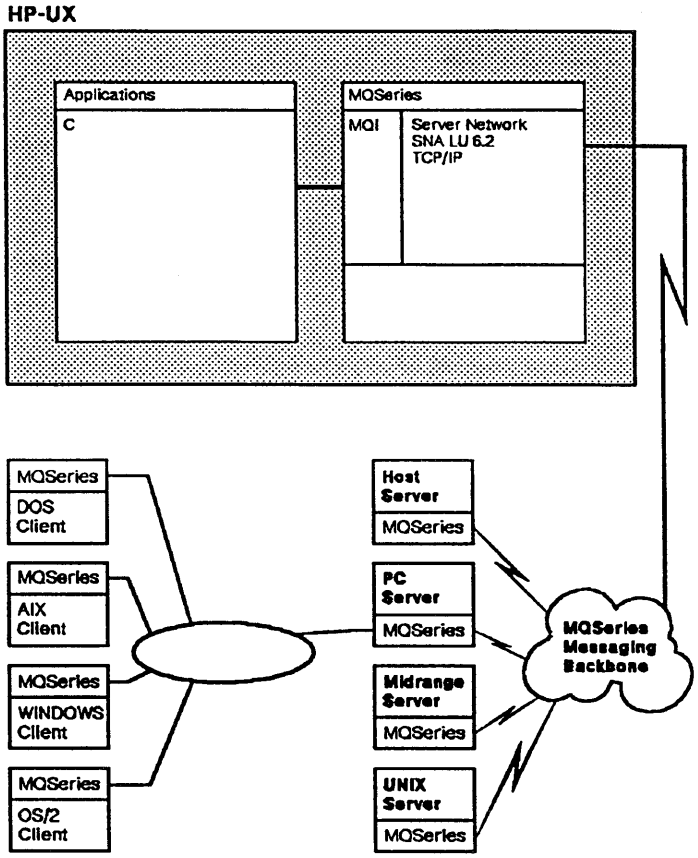
MQSeries products enable business applications to exchange information across different operating-system platforms by sending and receiving data as messages. MQSeries, via the message queuing interface (MQI), takes care of network interfaces, assures delivery of messages, deals with communications protocols, and handles recovery after system problems. Programmers can use their skills to handle your business requirements, rather than to solve the underlying complexities of your network.

A building block for distributed processing

MQSeries provides a single, multi-platform application programming interface (API). A key factor is the time-independent processing - you know that your message will be dealt with even if one of the recipients is temporarily unavailable. MQSeries can be used as a mail transport offering the additional benefits of assured, real-time delivery and transactional recovery. It can improve your application efficiency and protect the integrity of your business data.

Highlights of this MQSeries product are:

- Protects the integrity of your data by ensuring that it is delivered only once and not lost through system or network failure
- Extends the range of MQSeries products to include support on another UNIX platform
- Allows the freedom and flexibility of the UNIX world to be united with the control and discipline of the host and mid-range environments
- Provides a single point of control to administer a network of systems
- Can be used within the UNIX environment as a general-purpose queuing system for process-to-process communication via recoverable queues
- Supports TCP/IP and SNA/LU6.2 communications



Program name

The formal name of this product is **IBM MQSeries for HP-UX**

Program number: **5696-834**

Machine and Programming Requirements

For full service-related prerequirements, please see the *User's Guide* for this product.

(Connectivity can be via SNA or TCP/IP.)

For the following configurations: Combined File/Communications Server, Communications Server only, File Server only or Client only:

- Any HP 9000 Series 700 or Series 800
  - Minimum system memory = 16 MB (32 MB recommended for development)
  - Minimum system disk space
    - Combined File/Comms server = 2MB + Size of Queues
    - File server = Size of Queues
    - Communications server = 2MB
    - Client = normal disk space supplied with machine
- Any LAN adapter and/or (for communications server)
- Any communications hardware supporting SNA/LU6.2 and/or TCP/IP

And the following software (later levels, if any, will be supported unless otherwise stated):

- HP-UX for Series 700 Version 9.03 or later Version 9
  or
  HP-UX for Series 800 Version 9.04 or later Version 9
  including:
  - TCP/IP
- Appropriate LAN software (file server or client) for example, NFS to match TCP/IP

For SNA connectivity (communications server):

- HP SNAplusLink
  - J2226A for Series 700 9.03
  - J2220A for Series 800 9.03
- HP SNAplusAPI
  - J2229A for Series 700 9.03
  - J2223A for Series 800 9.03
- HP STREAMS/UX
  - J2232A for Series 700 9.00
  - J2237A for Series 800 9.00

For SNA connectivity, please contact your HP service representative to obtain Service Reference 5003222539.

For Token-Ring connectivity (communications server):

- HP Token-Ring
  - J2165A for Series 700 9.00
  - J2166A for Series 800 9.00

Supported language for application development:

- HP-UX ANSI C

For further information

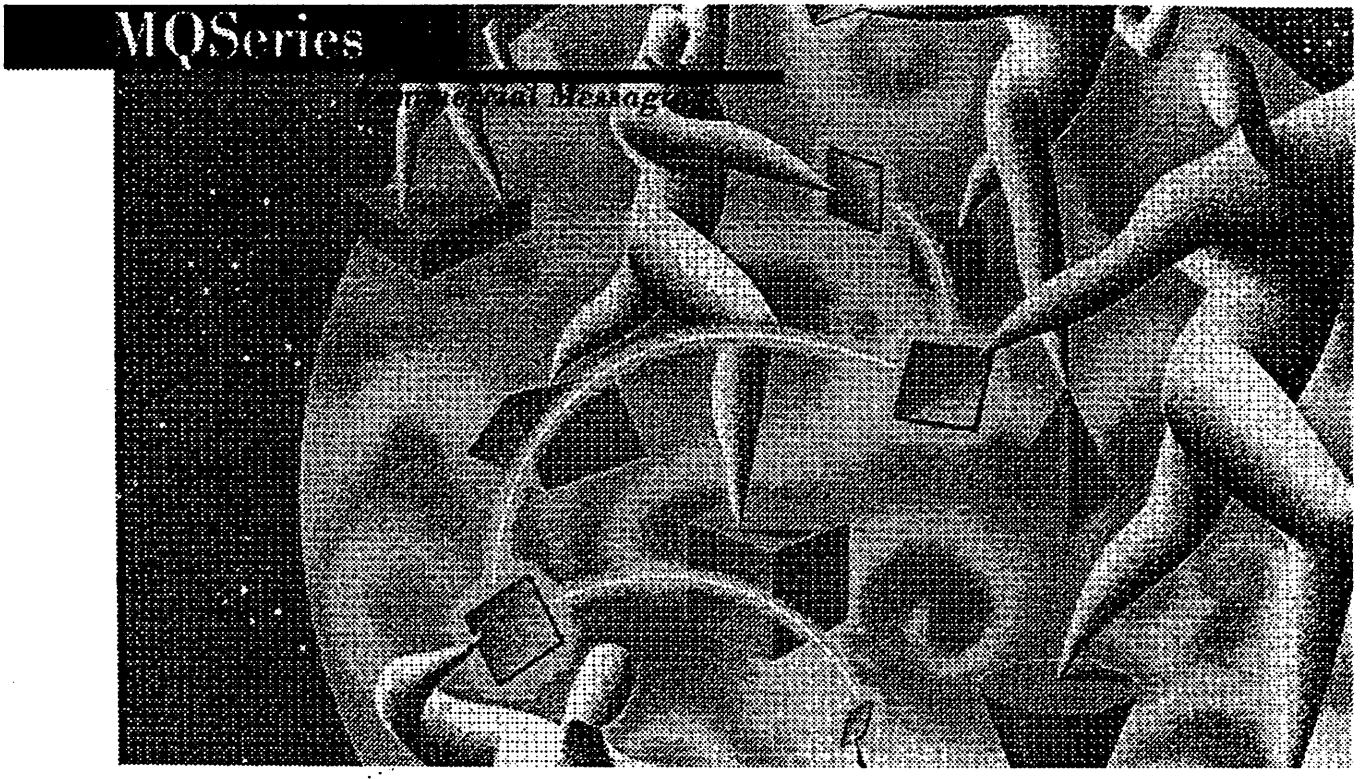
For more information about MQSeries, please contact your IBM marketing representative.

Produced by:
IBM United Kingdom Laboratories Limited
TS Marketing, MP 186
Hursley Park, Winchester
Hampshire SO21 2JN
United Kingdom

PMQHP13

MQSeries for SCO UNIX

Version 1 Release 3.1



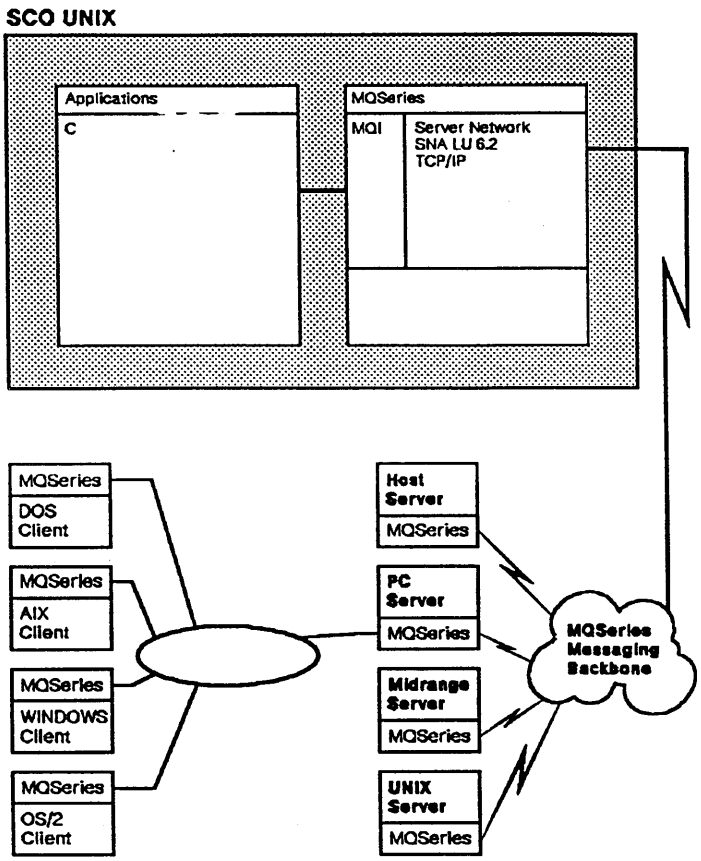
MQSeries products enable business applications to exchange information across different operating-system platforms by sending and receiving data as messages. MQSeries, via the message queuing interface (MQI), takes care of network interfaces, assures delivery of messages, deals with communications protocols, and handles recovery after system problems. Programmers can use their skills to handle your business requirements, rather than to solve the underlying complexities of your network.

A building block for distributed processing

MQSeries provides a single, multi-platform application programming interface (API). A key factor is the time-independent processing - you know that your message will be dealt with even if one of the recipients is temporarily unavailable. MQSeries can be used as a mail transport offering the additional benefits of assured, real-time delivery and transactional recovery. It can improve your application efficiency and protect the integrity of your business data.

Highlights of this MQSeries product are:

- Protects the integrity of your data by ensuring that it is delivered only once and not lost through system or network failure
- Extends the range of MQSeries products to include support on another UNIX platform
- Allows the freedom and flexibility of the UNIX world to be united with the control and discipline of the host and mid-range environments
- Provides a single point of control to administer a network of systems
- Supports TCP/IP and SNA LU 6.2 communications



Program name

The formal name of this product is **IBM MQSeries for SCO UNIX.** Program number: **5696-835**

Machine and Programming Requirements

For full service-related prerequirements, please see the *User's Guide* for this product.

(Connectivity can be via SNA or TCP/IP.)

For the following configurations: Combined File/Communications Server, Communications Server only, File Server only or Client only:

- Any 386 DX PC or better
  - Minimum system memory = 16 MB
  - Minimum system disk space
    - Combined File/Comms server = 2MB + Size of Queues
    - File server = Size of Queues
    - Communications server = 2MB
    - Client = normal disk space supplied with machine
- Any LAN adapter

For SNA connectivity (communications server):

- Any 486 PC or better (including an ISA bus)
  - Minimum system memory = 16 MB
  - Minimum system disk space = 50 MB plus Size of Queues (where appropriate)
- Apertus Technologies Inc/Systems Strategies Inc ELC Adapter (ISA)
  or
- Emulex Adapter (ISA)
  or
- Madge Token-Ring Adapter (ISA)

With the following software (later levels, if any, will be supported unless otherwise stated):

- SCO Open Desktop Version 3.0 or later Version 3 including
  - SCO Support Level Supplement UOD385A
  - TCP/IP

  or
- SCO Open Server Version 3.0 or later Version 3 including
  - SCO Support Level Supplement UOD385A
  - TCP/IP

  or, for Application Development (where appropriate)
- SCO Open Desktop Development System Version 3.0 or later Version 3 including
  - SCO Support Level Supplement UOD385A
  - TCP/IP
- Appropriate LAN software (file server or client) for example, NFS to match TCP/IP

For SNA connectivity (communications server):

- Express 2.04b (this product is shipped on ¼ inch tape)

Supported language for application development

- C

For further information

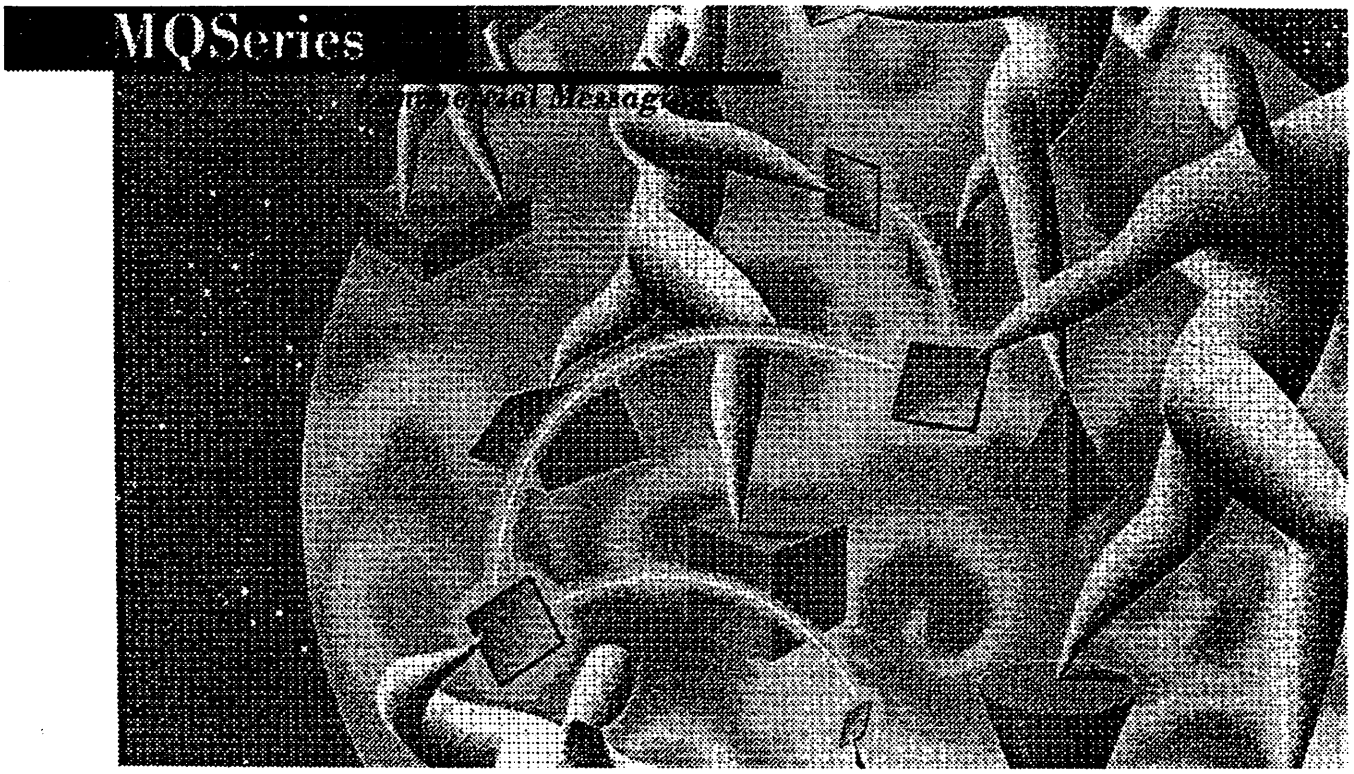
For more information about MQSeries, please contact your IBM marketing representative.

Produced by:
IBM United Kingdom Laboratories Limited
TS Marketing, MP 186
Hursley Park, Winchester
Hampshire SO21 2JN, United Kingdom

PMQSCO13

MQSeries for SunOS

Version 1 Release 3.1



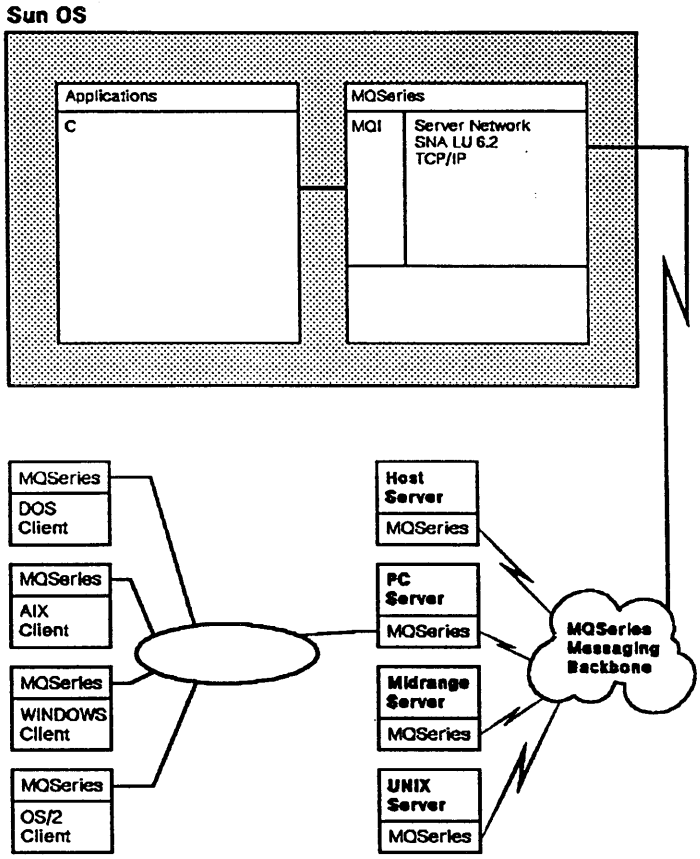
MQSeries products enable business applications to exchange information across different operating-system platforms by sending and receiving data as messages. MQSeries, via the message queuing interface (MQI), takes care of network interfaces, assures delivery of messages, deals with communications protocols, and handles recovery after system problems. Programmers can use their skills to handle your business requirements, rather than to solve the underlying complexities of your network.

A building block for distributed processing

MQSeries provides a single, multi-platform application programming interface (API). A key factor is the time-independent processing - you know that your message will be dealt with even if one of the recipients is temporarily unavailable. MQSeries can be used as a mail transport offering the additional benefits of assured, real-time delivery and transactional recovery. It can improve your application efficiency and protect the integrity of your business data.

Highlights of this MQSeries product are:

- Protects the integrity of your data by ensuring that it is delivered only once and not lost through system or network failure
- Extends the range of MQSeries products to include support on another UNIX platform
- Allows the freedom and flexibility of the UNIX world to be united with the control and discipline of the host and mid-range environments
- Provides a single point of control to administer a network of systems
- Can be used within the UNIX environment as a general-purpose queuing system for process-to-process communication via recoverable queues
- Supports TCP/IP and SNA/LU6.2 communications



Program name

The formal name of this product is **IBM MQSeries for SunOS**. Program number: **5696-837**

Machine and Programming Requirements

For full service-related prerequirements, please see the *User's Guide* for this product.

(Connectivity can be via SNA or TCP/IP.)

For the following configurations: Combined File/Communications Server, Communications Server only, File Server only or Client only:

- Any SPARC workstation (which includes a SPARC processor chip)
  - Minimum system memory = memory requirement for development
  - Minimum system disk space
    - — Combined File/Comms server = 2MB + Size of Queues
    - — File server = Size of Queues
    - — Communications server = 2MB
    - — Client = normal disk space supplied with machine
- Any LAN adapter and/or (for communications server)
- Any communications hardware supporting SNA/LU6.2 and/or TCP/IP

With the following software (later levels, if any, will be supported unless otherwise stated):

- SunOS Version 4.1.3 (or later Version 4) including TCP/IP
- OpenWindows Version 3.0 (or later Version 3)
- Appropriate LAN software (file server or client) for example, NFS to match TCP/IP

For SNA connectivity (communications server):

- SunLink SNA Peer-to-Peer Version 7.0 (or later Version 7)

and for SNA connectivity over Token-Ring:

- SunLink 2.1 TRI/S

Supported languages for application development:

- SPARCompiler C+ + Version 4.0 or
- SPARCompiler C Version 2.0.1

For further information

For more information about MQSeries, please contact your IBM marketing representative.

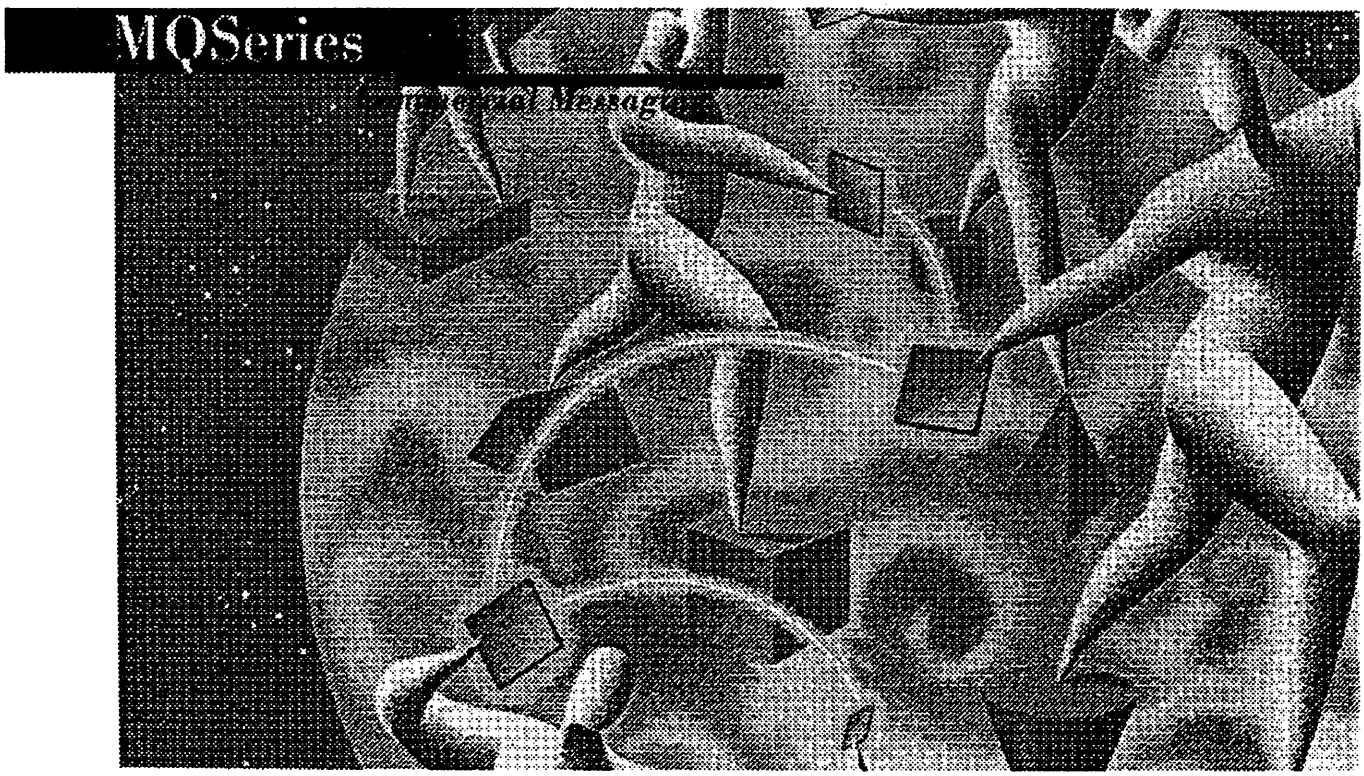
Produced by:
IBM United Kingdom Laboratories Limited
TS Marketing, MP 186
Hursley Park, Winchester
Hampshire SO21 2JN
United Kingdom

PMQSOS13

IBM

MQSeries for Sun Solaris

Version 1 Release 1



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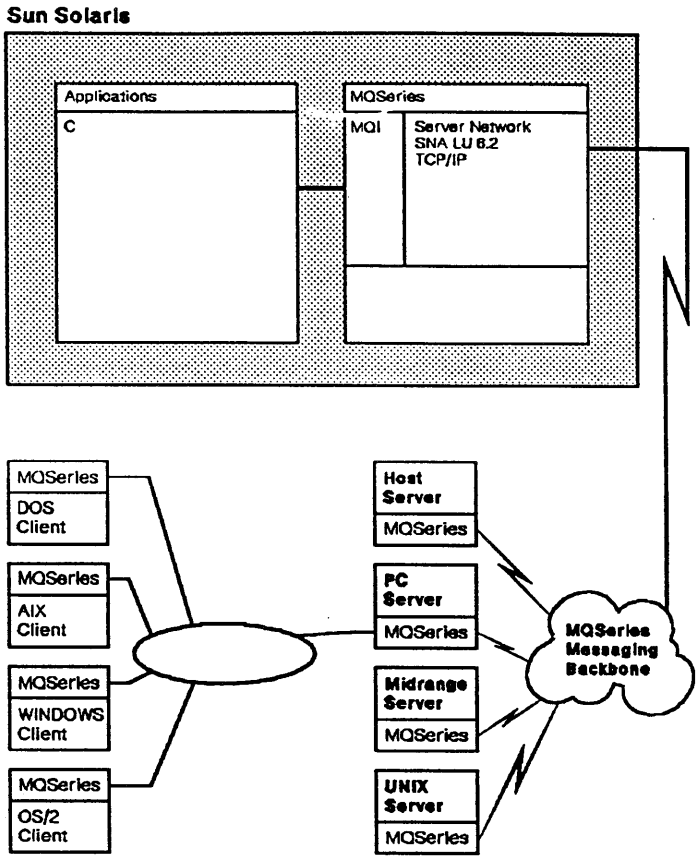
A building block for distributed processing

MQSeries products provide a single, multi-platform application programming interface (API). A key factor is the time-independent processing - you know that your message will be dealt with even if one of the recipients is temporarily unavailable. MQSeries can be used as a mail transport offering the additional benefits of assured, real-time delivery and transactional recovery. It can improve your application efficiency and protect the integrity of your business data.

Highlights of this MQSeries product are:

- Provides a single point of control to administer a network of systems
- Extends the range of MQSeries products to include support on a popular UNIX platform
- Provides for interoperation between UNIX platforms and computing environments such as IBM MVS/ESA, IBM OS/400, IBM OS/2, IBM AIX/6000, Digital VMS, and Tandem Guardian
- Allows the freedom and flexibility of the UNIX world to be united with the control and discipline of the host and mid-range environments
- Supports TCP/IP and LU 6.2 communications



Program name

The formal name of this product is IBM MQSeries for Sun Solaris

Program number: **5696-949**

Machine and Programming Requirements

For full service-related prerequirements, please see the *User's Guide* for this product.
(Connectivity can be via SNA or TCP/IP.)
For the following configurations: Combined File/Communications Server, Communications Server only, File Server only or Client only:

- Any SPARC workstation or SPARC server
  - Minimum system memory = memory requirement for development
  - Minimum system disk space
    - — Combined File/Comms server = 3MB + Size of Queues
    - — File server = Size of Queues
    - — Communications server = 3MB
    - — Client = normal disk space supplied with machine
- Any LAN adapter and/or (for communications server)
- Any communications hardware supporting SNA/LU6.2 and/or TCP/IP

And the following software (later levels, if any, will be supported unless otherwise stated):

- Solaris Version 2.3 or later Version 2 including TCP/IP
- OpenWindows Version 3.0 or later Version 3
- Appropriate LAN software (file server or client) for example, NFS to match TCP/IP

For SNA connectivity (communications server):

- SunLink SNA Peer-to-Peer Version 8.0 or later Version 8 and for SNA connectivity over Token-Ring:
- SunLink 3.0.2 TRI/S

Supported languages for application development

- SPARCompiler C+ + Version 4.0 or
- SPARCompiler C Version 2.0.1

For further information

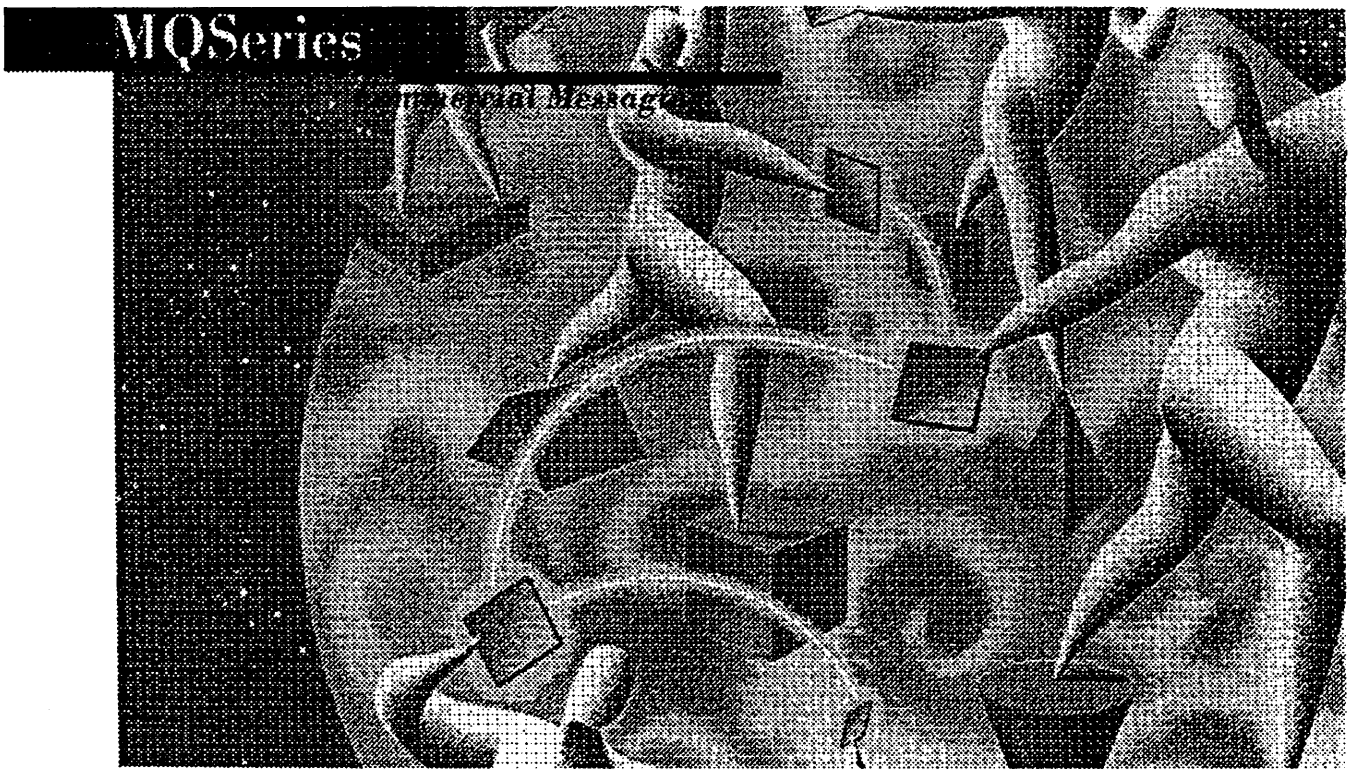
For more information about this MQSeries product, please contact your IBM marketing representative.

Produced by:
IBM United Kingdom Laboratories Limited
TS Marketing, MP 186
Hursley Park, Winchester
Hampshire SO21 2JN, United Kingdom

PMQSOL11

MQSeries for Tandem Guardian

Version 1 Release 3.1



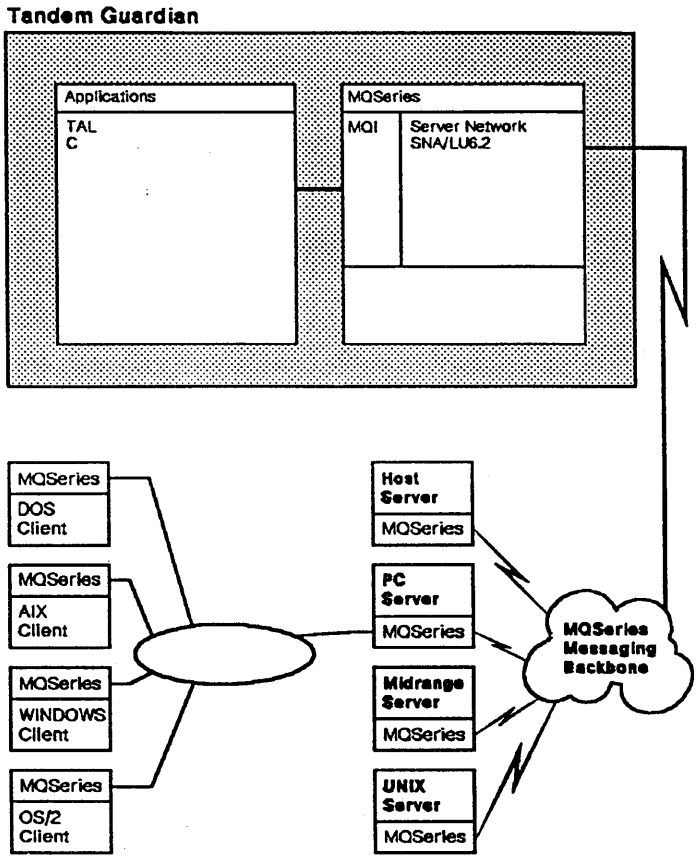
MQSeries products enable business applications to exchange information across different operating-system platforms by sending and receiving data as messages. MQSeries, via the message queuing interface (MQI), takes care of network interfaces, assures delivery of messages, deals with communications protocols, and handles recovery after system problems. Programmers can use their skills to handle your business requirements, rather than to solve the underlying complexities of your network.

A building block for distributed processing

MQSeries provides a single, multi-platform application programming interface (API). A key factor is the time-independent processing - you know that your message will be dealt with even if one of the recipients is temporarily unavailable. MQSeries can be used as a mail transport offering the additional benefits of assured, real-time delivery and transactional recovery. It can improve your application efficiency and protect the integrity of your business data.

Highlights of this MQSeries product are:

- Provides a single point of control to administer a network of systems
- Protects the integrity of your data by ensuring that it is delivered only once and not lost through system or network failure
- Supports SNA LU 6.2 communications



Program name

The formal name of this product is **IBM MQSeries for Tandem Guardian**

Program number: **5787-EDB**

Machine and Programming Requirements

For full service-related prerequirements, please see the *User's Guide* for this product.

(Connectivity is via SNA.)

- Any Tandem NonStop Cyclone or NonStop CLX (excluding Tandem NonStop Cyclone/R or NonStop CLX/R)
  - Minimum system memory = 16 MB
  - Minimum system disk space = 8 MB + Size of Queues
- Appropriate synchronous communications adapter to support SNAX/XF

And the following software (later levels, if any, will be supported unless otherwise stated):

- Guardian 90 C30 or later C3x including:
  - TMF
  - ENSCRIBE
  - EMS
- PATHWAY
- SNAX/APC for C30 Release 3
- SNAX/XF to match SNAX/APC and/or
- SNAX/CDF to match SNAX/APC

Supported languages for application development:

- TAL T9255C30
- C T9255C32

For further information

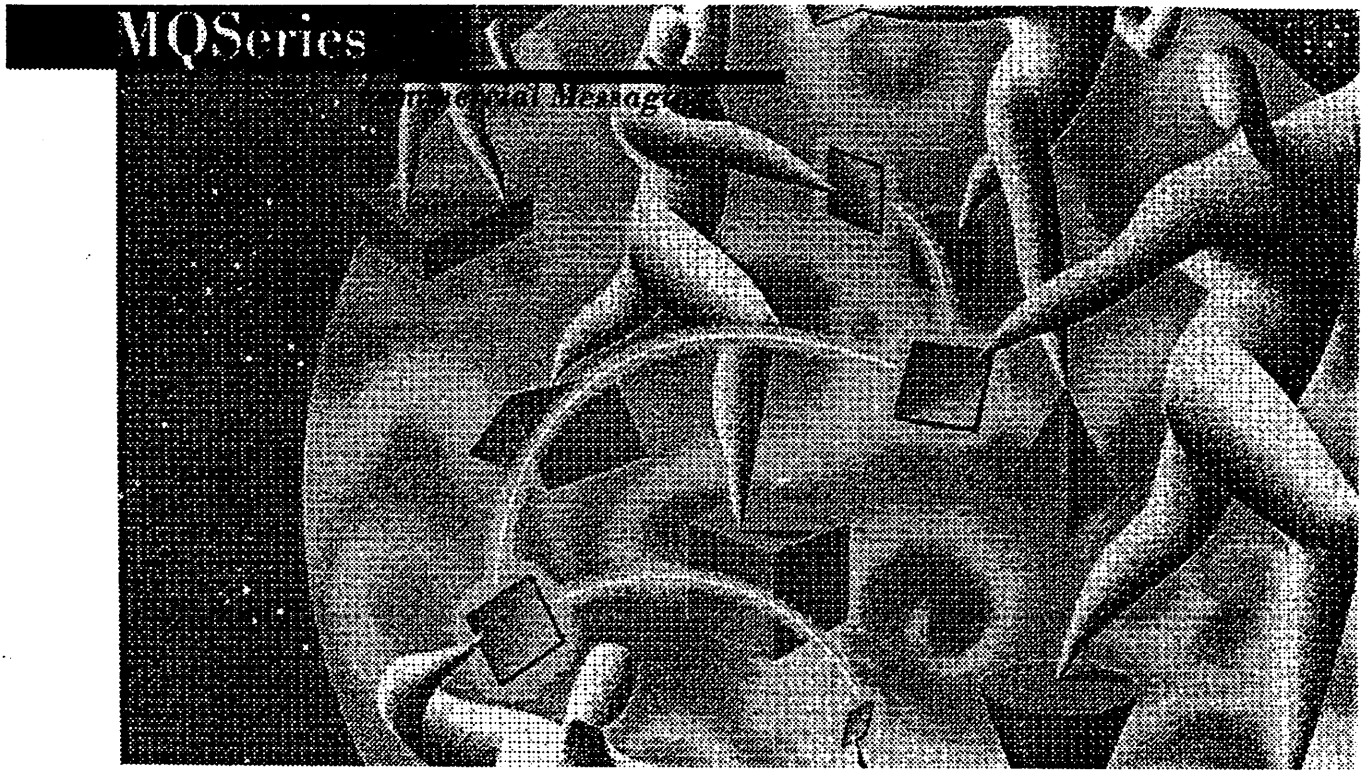
For more information about MQSeries, please contact your IBM marketing representative.

Produced by:
IBM United Kingdom Laboratories Limited
TS Marketing, MP 186
Hursley Park, Winchester
Hampshire SO21 2JN
United Kingdom

PMQTG13

MQSeries for UnixWare

Version 1 Release 3.1



MQSeries products enable business applications to exchange information across different operating-system platforms by sending and receiving data as messages. MQSeries, via the message queuing interface (MQI), takes care of network interfaces, assures delivery of messages, deals with communications protocols, and handles recovery after system problems. Programmers can use their skills to handle your business requirements, rather than to solve the underlying complexities of your network.

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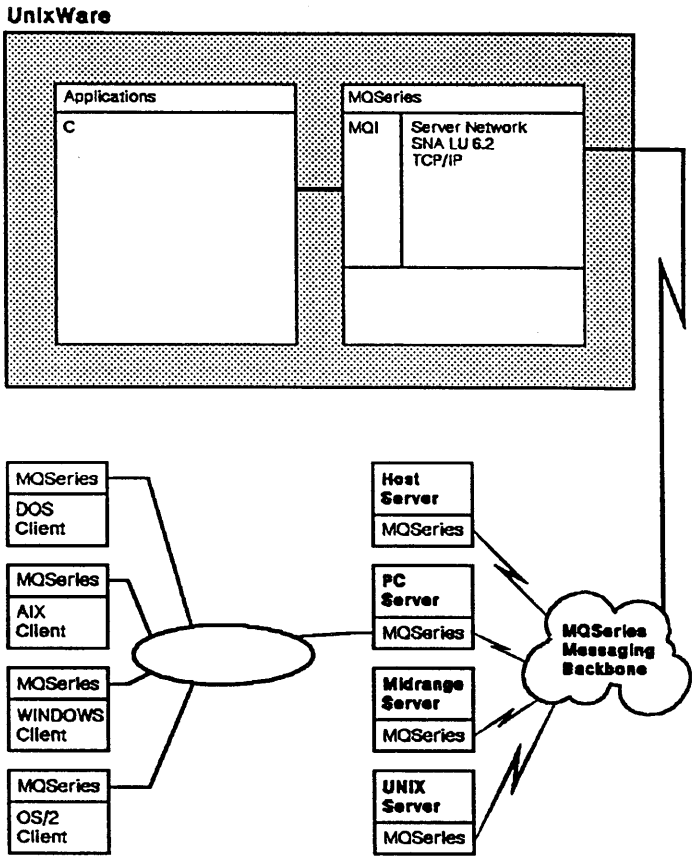
Highlights of this MQSeries product are:

- Protects the integrity of your data by ensuring that it is delivered only once and not lost through system or network failure
- Extends the range of MQSeries products to include support on another UNIX platform
- Allows the freedom and flexibility of the UNIX world to be united with the control and discipline of the host and mid-range environments
- Provides a single point of control to administer a network of systems
- Can be used within the UNIX environment as a general-purpose queuing system for process-to-process communication via recoverable queues
- Supports TCP/IP and SNA LU 6.2 communications



Program name

The formal name of this product is **IBM MQSeries for UnixWare**. Program number: **5696-836**

Machine and Programming Requirements

For full service-related prerequirements, please see the *User's Guide* for this product.

(Connectivity can be via SNA or TCP/IP.) For the following configurations: Combined File/Communications Server, Communications Server only, File Server only or Client only:

- Any 386 DX PC or better
  - Minimum system memory = 16 MB
  - Minimum system disk space
    - Combined File/Comms server = 2MB + Size of Queues
    - File server = Size of Queues
    - Communications server = 2MB
    - Client = normal disk space supplied with machine
- Any LAN adapter

For SNA connectivity (communications server):

- Any 486 PC or better (including an ISA bus)
  - Minimum system memory = 16 MB
  - Minimum system disk space = 28.5 MB plus Size of Queues (where appropriate)
- Apertus Technologies Inc/Systems Strategies Inc ELC Adapter (ISA)
  or
- Emulex Adapter (ISA)
  or
- Madge Token-Ring Adapter (ISA)

And the following software (later levels, if any, will be supported unless otherwise stated):

- UnixWare Application Server/SDK Version 1.1 or later Version 1 including TCP/IP
- Appropriate LAN software (file server or client) for example, NFS to match TCP/IP

For SNA connectivity (communications server):

- Express 2.04b (this product is shipped on ¼ inch tape)

Supported language for application development:

- C

For further information

For more information about MQSeries, please contact your IBM marketing representative.

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IBM United Kingdom Laboratories Limited
TS Marketing, MP 186
Hursley Park, Winchester
Hampshire SO21 2JN
United Kingdom

PMQUXW13

Open Blueprint
Messaging and Queuing Resource Manager

Open Blueprint Messaging and Queuing Resource Manager

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About This Paper

This paper describes the Messaging and Queuing Resource Manager component of the Open Blueprint and its relationships with other Open Blueprint components. The Open Blueprint expresses IBM's technical approach to distributed computing in a multivendor, heterogeneous environment.

The Open Blueprint (see Figure 1) structures the distributed systems environment and provides the base upon which to build, run, and manage distributed applications.

The Open Blueprint is based on a combination of existing and emerging industry standards. This standards base satisfies customer requirements for products and solutions which:

- Connect and work seamlessly
- Run on many industry hardware and software platforms
- Integrate with products and solutions from IBM and other industry providers

The Open Blueprint paves the way for a computing environment with a "single system image." The network appears to the user as a single system with all functions integrated and accessible.

Open, distributed computing or client/server computing is the cornerstone of current information technology: Any strategy for this rapidly changing environment must be flexible and dynamic to accommodate technological advances, while at the same time protect significant current investments. So, while this document is a snapshot at a specific point in time, the Open Blueprint and the details behind it will evolve as new technologies take hold. A good example is object-oriented technology that is influencing all aspects of open distributed computing. While work on the Open Blueprint began with the "procedural" model, the Open Blueprint has evolved to encompass object-oriented technologies as well.

The Open Blueprint serves several audiences:

- It helps *customers* develop their own architecture and organize products and applications in an open distributed environment.
- It informs *customers*, *software vendors*, *consultants*, *system integrators*, and *service providers* about IBM's directions for products and solutions.
- It guides *developers* as they meet users' needs by supplying products and solutions that include appropriate functions and that can be integrated and can interoperate with other installed products.

Who Should Read This Paper

This paper is intended for audiences requiring technical detail about the Messaging and Queuing Resource Manager in the Open Blueprint. These include:

- Customers who are planning technology or architecture investments
- Software vendors who are developing products to interoperate with other products that support the Open Blueprint
- Consultants and service providers who offer integration services to customers

Open Blueprint Structure

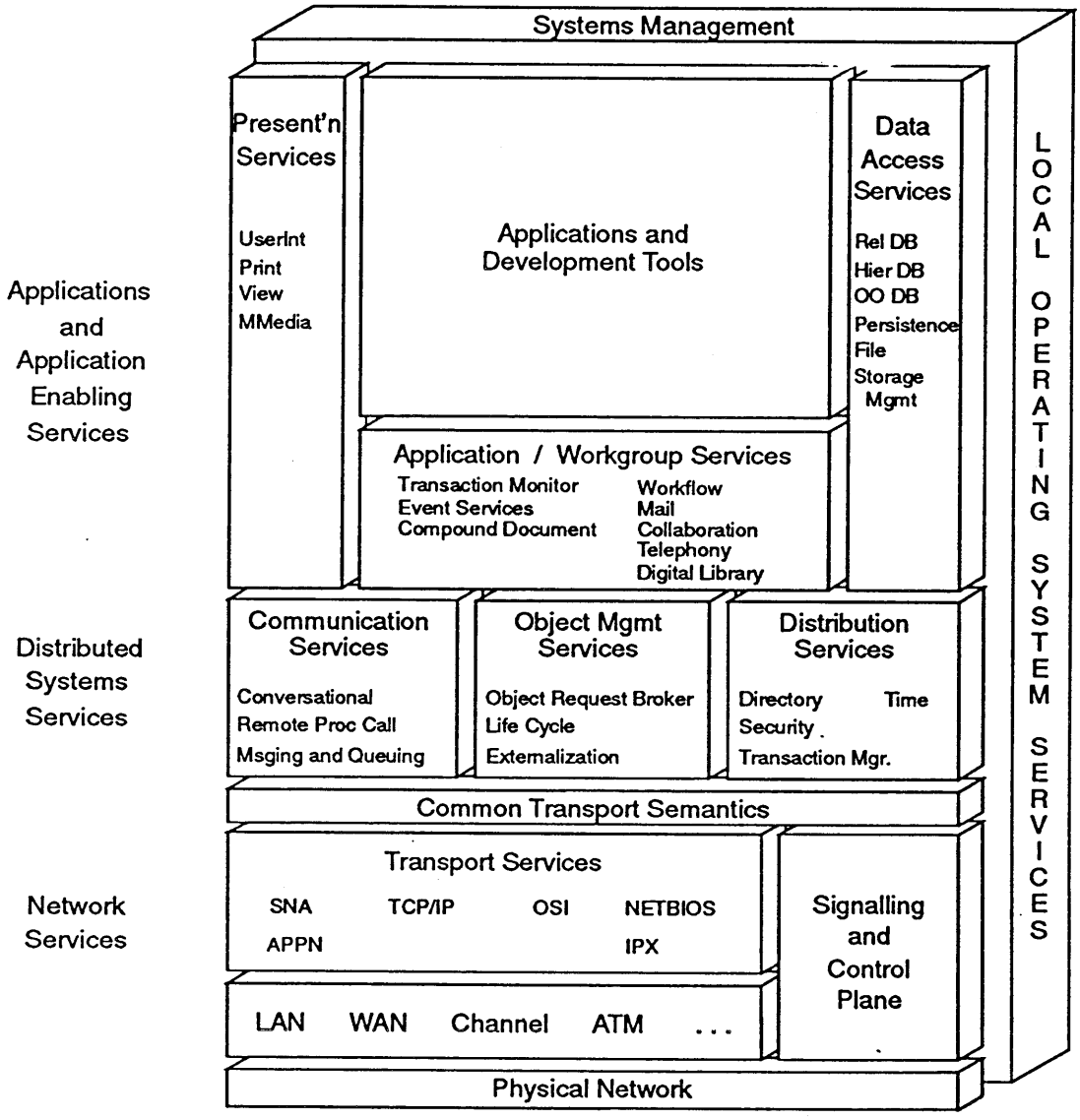

Figure 1. Open Blueprint Structure

This paper is one in a series of papers available in the *Open Blueprint Technical Reference Library* collection, SBOF-8702, (hardcopy) or SK2T-2478-00 (CD ROM), whose intent is to provide the most detailed level of information about each component. The authors of these papers are the developers and designers directly responsible for the components; therefore you may observe differences in style, scope, and format between this paper and others.

Readers less familiar with a particular component area may need to use some of the indicated reference materials to gain basic background knowledge not included in the papers. For a general technical overview of the Open Blueprint, see the *Open Blueprint Technical Overview*, GC23-3808.

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Messaging and Queuing Resource Manager

Introduction

Message Queuing (MQ) is a technique used to communicate from program to program. It can be used within any application where programs need to communicate with each other. This communication is done by the programs sending messages to each other using queues. The messages contain application data that is passed from one part of the application to another. The parts of the application can be on the same system, or on separate systems in a network.

The message queuing service is provided by a Messaging and Queuing Resource Manager which owns and manages the queues, and which provides the message queuing application programming interface (MQI).

Technical Overview and Concepts

Examples of application areas where the messaging model would be useful include:

- **Automated Teller Machines (ATMs)**. With modern banking facilities, it is common for wall-mounted ATMs to provide other facilities besides dispensing cash on request. With all these facilities, the ATM must make inquiries on data bases (to obtain the balance of an account, for example), or to request that a function be performed by another program somewhere. These inquiries and requests are passed on as MQ messages, sent to specific queues within the banking system.

  This type of application is characterized by short messages, very high message rates, with message delivery times on the order of tenths of seconds. It is critical for any application which involves monetary transactions that messages are not lost, and are delivered only once.

- **Travel Reservations**. Each travel operator (airline, hotel chain, rental car agency) would have their own queue to which reservations would be directed. Requests for seats, room or car reservations, and confirmations of bookings, would all be MQ messages, directed to the appropriate queues. This type of application is characterized by many users, short messages, very high message rate, and message delivery times on the order of seconds.

- **Multimedia Data Transmission**. Applications are beginning to appear that require many different types of data to be transmitted from one program to another. The data types involved can include textual data, image data (representing photographs or fax), graphics (line drawings, for example), and digital audio (voice annotation or music). This data could be transmitted as MQ messages. With this type of messaging, even though the data is often in a compressed data format, the messages may be very long (megabytes).

Though all these applications may well have vastly differing characteristics (such as message lengths, message rates, and performance requirements), they can all be designed using the facilities of the single model.

Applications and Programs

In the context of message queuing, an *application* is any set of programs that communicate with each other using messages. Each program performs a well-defined and self-contained function in response to a specific request, and executes within one node of a network, or within one operating system image within a node. The programs communicate requests to each other using messages placed on queues.

In a *distributed application*, each program that forms the application may be executing in different nodes in a network.

Message queuing can be used for most types of distributed application structure, from simple examples with a few programs in a client/server structure to much more complex structures involving many programs connected using combinations of client/server, chaining, and parallel execution.

Messages

A *message* is simply a string of bits and bytes that have some meaning to one or more programs.

The message is a block of data, in any form, that is being passed from one program to another. Some examples of typical messages are:

- A message sent from one program to another requesting that some service be performed, together with the input data that is required to perform the service.
- A reply from one program to another indicating that a service has been performed, together with some indication of the status of the initial request.
- A message that is sent from one program to another using the lowest-cost delivery mechanism. Failure of the target program, or a communication link, may result in the message being lost. Often, this type of message does not require a reply.
- One of a series of messages forming part of a dialogue between two programs.

The programs usually impose some structure on the string of bytes—that is, the programs use an agreed function protocol, and view the string as consisting of a sequence of *components*, each having a particular data type and meaning to the application. For example, the first component might be a four-byte unsigned binary integer containing an account number, the second component might be a 20-byte character string containing a customer name, and so on.

MQ has no architectural limitation on the length of the data that can be carried in a message. The data may be a small number of bytes, as in the case of an electronic transaction in a travel reservation system. Message queuing also allows messages to be extremely long. For example, messages may contain image data or audio data (such as voice or music).

Initially, implementations may place limits on the maximum size of message they can handle or may have path lengths optimized for messages within a specific range of lengths.

Message Queues

A *message queue* is a named storage area for the storing of messages. The messages on the queue are *in transit* between one program and another. They were placed on the queue by one program, and are waiting to be retrieved by another.

Message queues can exist without programs being active. Each queue belongs to an instance of the Messaging and Queuing resource manager, not to the program that might be retrieving the messages from the queue for processing. The queue manager maintains the queue; a queue manager can own many queues.

Each queue has a name, together with a set of *queue attributes*. The queue name is used by a program to identify the queue to be accessed. The queue attributes affect the way the queue is processed by the queue manager and includes the following:

- Permanent or temporary queue
- Storage space allocated to the queue
- The number of messages on the queue

Programs usually need to know only the names of the queues that they are using, and do not need to be aware of the detailed queue attributes. However, facilities are provided by the MQ resource manager to allow a program to query the values of certain queue attributes.

Each message has a *priority* associated with it, which affects how it is added to the queue. Messages within a queue are maintained in *first-in-first-out within priority* sequence. However, messages can be read from the queue in an order which is different from the order they occur on the queue. For example, a program may process the reply to a particular message that it sent earlier. The program can retrieve this reply from the queue even though it is not the first message on the queue.

Physically, a message queue can be represented in two ways:

- As a buffer or buffers in main storage
- As a file or files on disk or other permanent storage device.

A single queue may reside entirely in main storage, entirely on disk, or in both places. The physical management of message queues is entirely the responsibility of the queue manager, and such details are not made apparent to the programs. For the program, a message queue is simply a *black box* in which messages accumulate. Programs have no access to message queues other than using the MQI verbs.

Messaging and Queuing Resource Manager

The Messaging and Queuing resource manager is the component in the Open Blueprint that provides the message-queuing facilities used by application programs. The MQ resource manager consists of a client component which accepts MQI requests from programs, and a server component which provides the queuing function. When the application program and the queue manager are on the same system, the MQ client and server components are combined.

Logically, the full function of the MQ resource manager can be considered as being distributed across a set of interconnected *queue managers* within the network. Each queue manager services those MQI requests that are made by the programs that execute within its system or client systems. Depending on the request, a queue manager may need to communicate over the network with other queue managers.

For message-queuing services to be available, there must be at least one queue manager or MQ client on a system. However, more than one queue manager may be on a system (for example, to keep development work separate from production work).

The Messaging and Queuing resource manager has the following important characteristics:

- **Asynchronism**. Message queuing is *naturally asynchronous*; program A sends a message to program B, but program B need not be there to receive it. The message is not lost, but is retained by the message queuing service. Program B processes the queued message when it starts execution, which might be immediately but could also be some time later.

  Program A may or may not expect a reply from B, but A need not suspend execution waiting for B to reply. Instead, A can perform other work and then process the reply from B when it arrives. Program A can even terminate before the reply arrives; the reply is not lost—it is retained by the message queuing service for A to retrieve when it next executes.

Message queuing may be used for asynchronous communication between programs, and it can also be used for a synchronous communication as well. In the previous example, having sent a message to program B, program A could wait for a reply from B before continuing with its execution.

- **Assured Once Only Delivery**. When an application puts a message on a queue, the application can be sure that the MQ network will not lose the message. MQ also ensures that the message is only delivered once to the receiving application, which greatly relieves that application development burden, and which distinguishes MQ from other messaging systems.
- **Local/Remote Transparency**. Message queuing can be used between any two programs, whether those programs are executing within one machine or in different nodes within a network.

  If program A wishes to communicate with program B it does not need to know if B executes within the same node as A or in some other node. The programming statements that are necessary for program A to send a message to program B, where A and B execute within the one node, are identical to those that would be required if program B were in a different node from A. In fact, program B can be moved (by the network administrator) from one node to a different node without requiring the source code for program A be changed, or that the program be re-compiled.
- **Application Structure Support**. The MQ model supports many types of distributed application structure, ranging from simple structures such as client server that contains just a few programs, to complicated structures with many inter-communicating programs.
- **Ease of Use**. MQ has a simple model that requires only a small number of MQI verbs. The programming interface hides the underlying complexities that are involved in communication protocols, operating system services, and heterogeneous systems, and makes it easier for programmers to develop application programs.

  The fact that the MQI is a simple programming interface makes it very easy for an application designer to structure an application program into several separate program modules, with well-defined interfaces between modules. This encourages a very modular application design, which enables ease of programming and the re-use of program code.

Message Queuing Interface

This section is a summary of the principal MQI verbs used by application programs. It gives an outline of the various functions provided by the MQI.

The same message queuing programming interface is used, irrespective of which programming language writes the application programs.

MQCONN Establish a connection from a program to a particular queue manager. This function is necessary before any other MQI functions can be used.

MQOPEN Create or open a particular queue. This function is necessary before any function can be performed on the queue. MQOPEN checks that the program has the appropriate authority to access the queue.

MQPUT Put a message on a queue.

MQPUT1 This function is semantically equivalent to the sequence MQOPEN, MQPUT, MQCLOSE. It improves the usability of the programming interface because the function of sending a single message to a queue is a common function within some types of application programs.

MQGET Get a message off a queue. This function is used by a program to take a message off the queue so the program can process the message. This function allows several ways of selecting the next message that is to be obtained off the queue.

MQINQ Inquire on queue attributes. This function allows a program to inquire on the various attributes of a queue. For example, it can be used to determine the number of messages on a queue.

MQSET Set queue attributes. This function allows a program to change the value of certain queue attributes.

MQCLOSE Close a queue, and optionally request that a queue be deleted. This function is used when the program has finished accessing a queue.

MQDISC Break the connection that exists between a program and a particular queue manager.

The Message Queuing Interface is available as procedural calls and will be available as Object Oriented (OO) class libraries for System Object Model (SOM), C++ and other OO languages.

How Do Programs Communicate?

Programs communicate by agreeing to use particular named message queues.

For example, program A puts messages onto the queue with the name ABC, which is the queue that program B has agreed to read from, while program B puts messages onto the queue with the name XYZ, which is the queue that program A has agreed to read from. The location of these queues is not apparent to the programs because each program interacts only with its local Messaging and Queuing resource manager client and the network of interconnected queue managers is responsible for moving the messages around so that they eventually appear on the intended queues[1].

A message is put on a queue by a program using an MQI verb (MQPUT), with the program supplying the message data and some ancillary information that is carried with the message. The program may continue processing. A receiving program retrieves a message from a queue using another MQI verb (MQGET). This function returns the message data to the program with the ancillary information.

After putting a message to a queue, a program might later receive a reply to the message it sent, or the reply might be directed to another application program in the suite. This depends on the design of the application suite.

Local Applications: If programs A and B are connected to the same queue manager, the logical structure looks like Figure 2 on page 6.

Program A *puts* a message on the queue that it knows is being serviced by program B. Program B *gets* the message off the queue when it wishes to process the next message on the queue.

In this local case, both programs are interacting with the same queue manager (QM1). Routing a message from program A to program B does not involve sending data across any network connection.

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1 Of course, *someone* has to know where the queues reside, but that person is not the application programmer; it is the system administrator, who is responsible for defining the queues and their locations and installing the applications that use those queues.

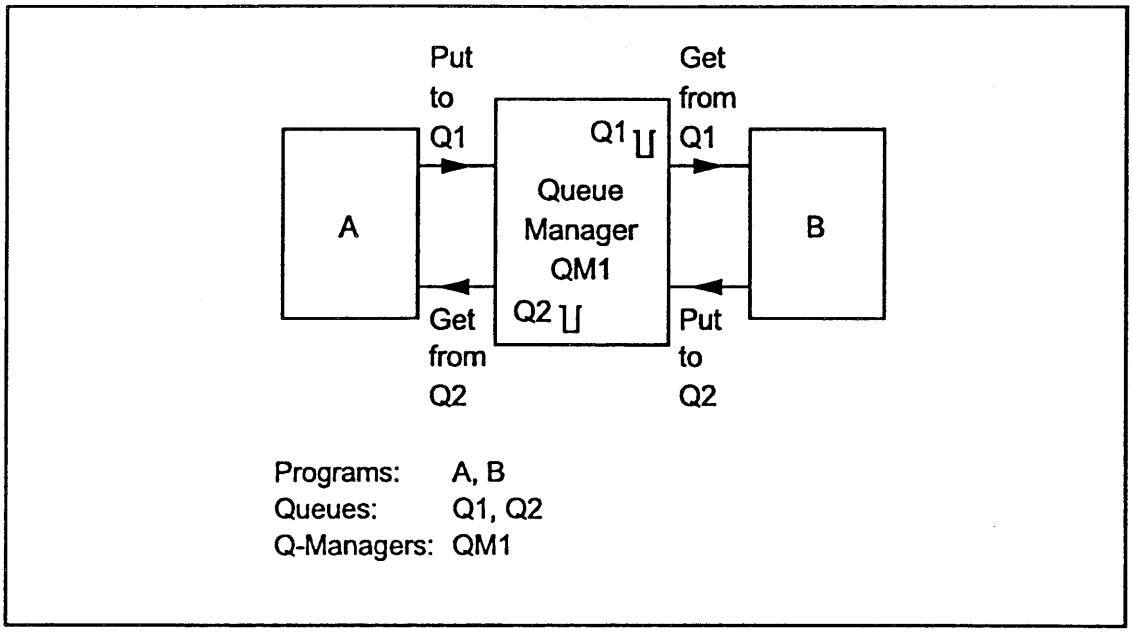


Figure 2. Logical Model of Local Applications

Programs accessing the queue manager using an MQ client are also considered local applications. Although they may be on different systems, only one queue manager is involved.

Remote Applications: If programs A and B reside on different nodes within the network, then the logical structure looks like Figure 3 on page 7.

As with the local application case above, program A *puts* a message on the queue that it knows is being serviced by program B, and program B *gets* the message off the queue. However, in this remote application case, A and B are interacting with different queue managers (QM1 and QM2). Sending a message from program A to program B now involves routing data across the network from one node to another.

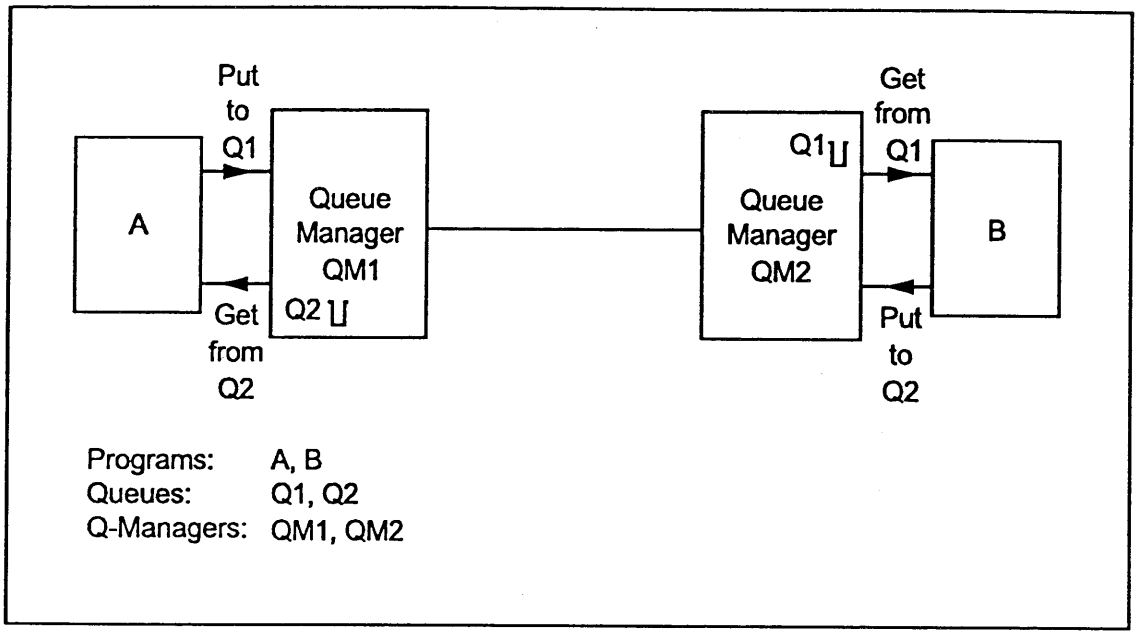


Figure 3. Logical Model of Remote Applications

Typical Applications

Message queuing can be used for most types of distributed application structure, ranging from simple structures with just a few programs involved, to much more complex structures with many programs connected using combinations of subroutining, chaining, and parallel execution.

A typical example of an application that uses subroutining and parallel execution of programs is illustrated in Figure 4 on page 8.

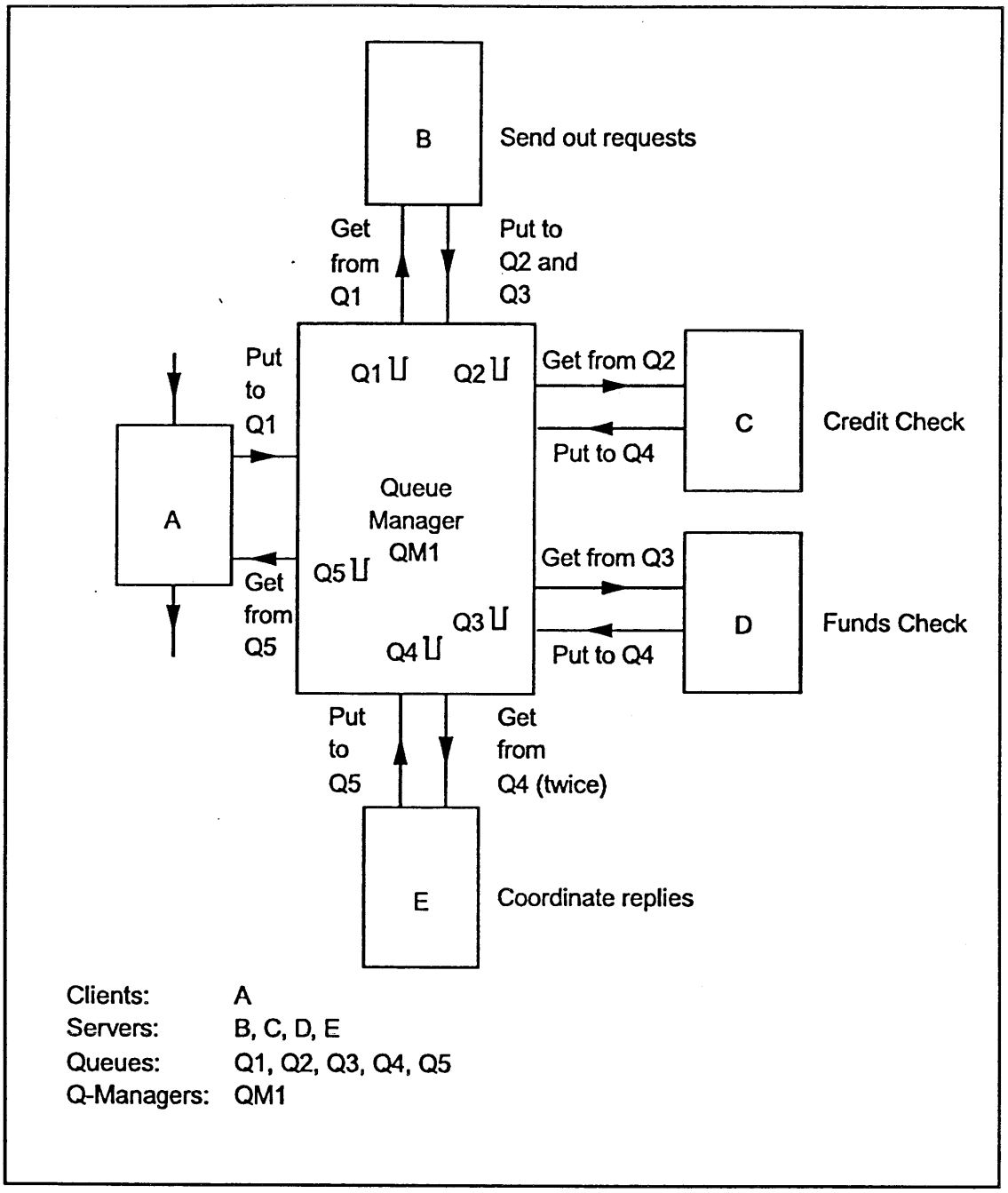


Figure 4. Program-to-Program Communication with Queues

In this example, program A determines from user input (not shown in Figure 4) that a certain service needs to be performed (for example, a loan application). Program A sends a message to queue Q1 requesting this service. Program B gets the message off the queue, and is aware that (1) two activities need to be carried out; the credit-worthiness check, and a check that sufficient funds are available, and that (2) the two activities can be performed in parallel. Program B sends messages to queues Q2 and Q3 requesting these activities. Programs C and D read these messages, and send their replies to queue Q4. Program E coordinates the replies, and sends the yes/no response back to queue Q5. Program A gets the reply, and takes the necessary action.

Figure 5 on page 9 is an application *designer's* view of Figure 4 using a lattice structure.

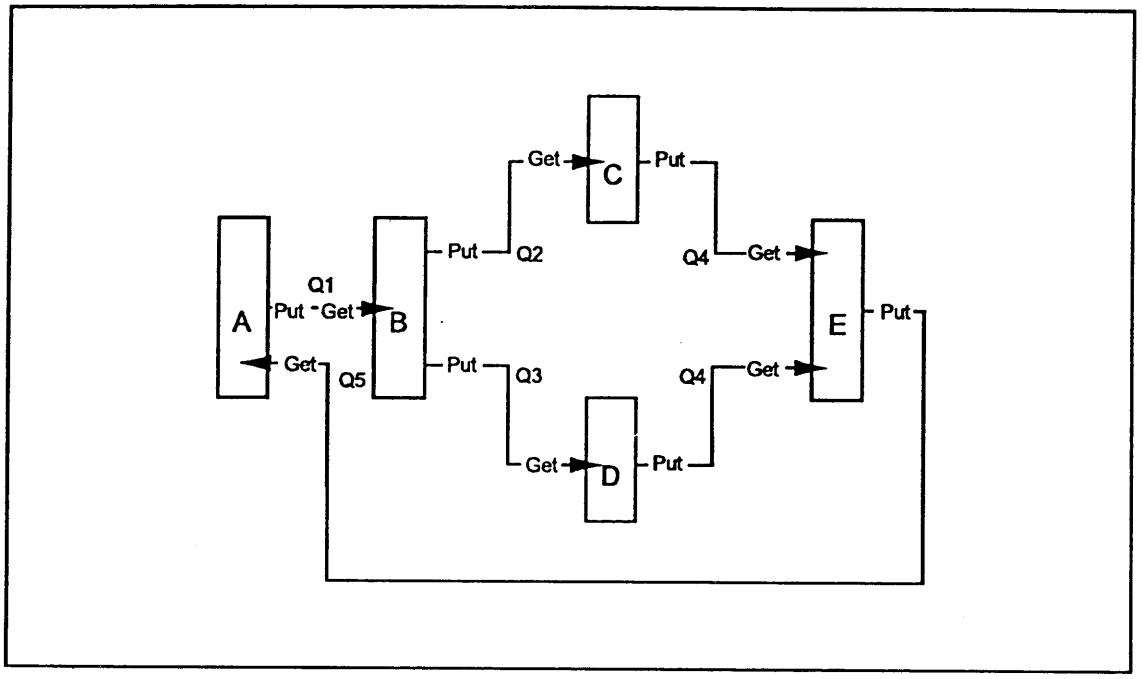


Figure 5. Application Designer's View of the Previous Figure

Client/Server Applications: Message queuing can be used for the client/server applications, where many client programs send messages to a single server program. Figure 6 on page 10 shows the case of three clients A, B, and C sending messages to the server S. The server replies to three different queues using the Reply to Queue name in the message sent by the originator of the request. Two clients (A and B) are remote from the server, while one client (C) is local.

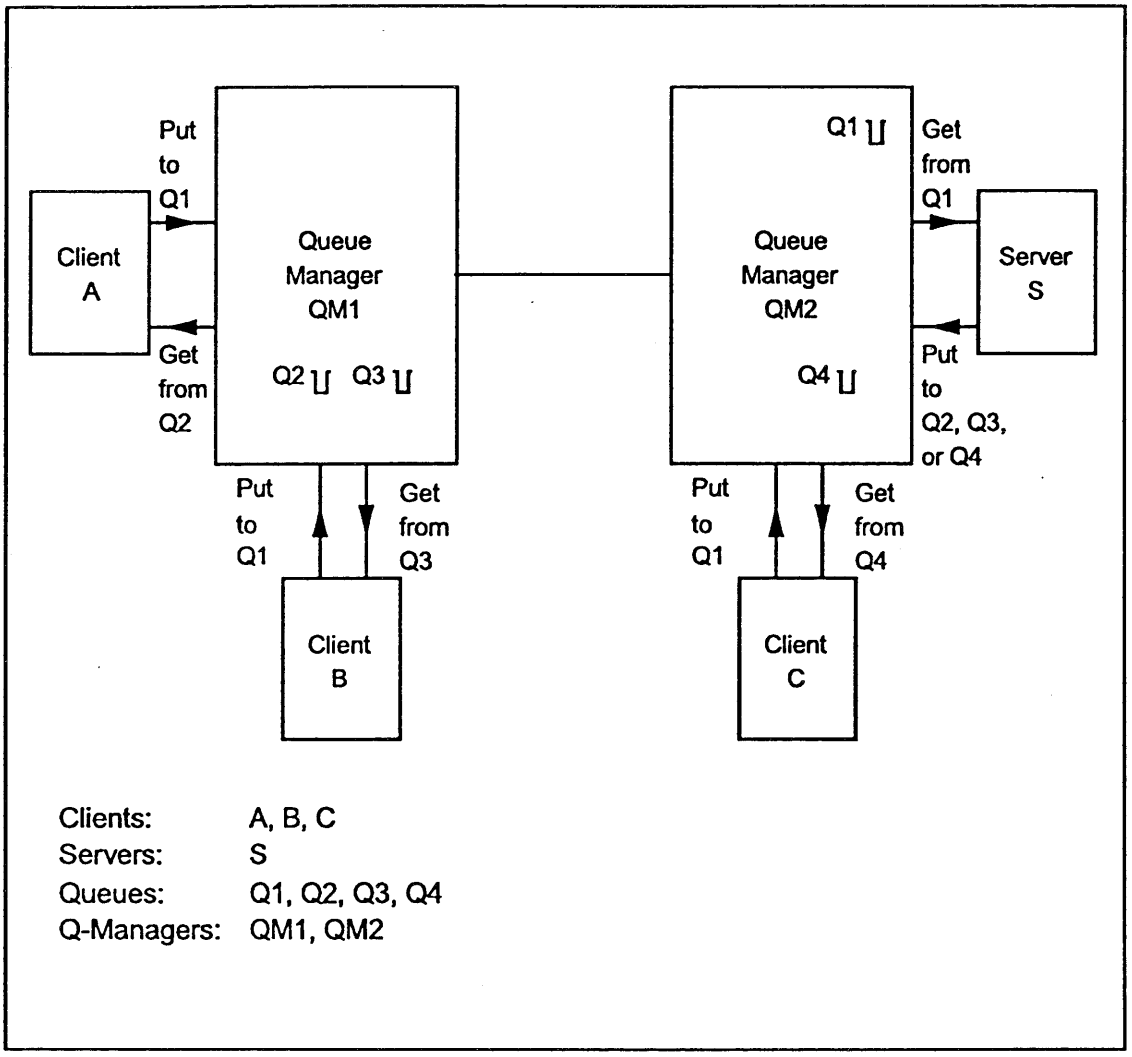


Figure 6. Logical Model of a Client/Server Application

Figure 7 is an application *designer's* view of Figure 6 on page 10 in tree structure (with the base on the right and the branches on the left) format.

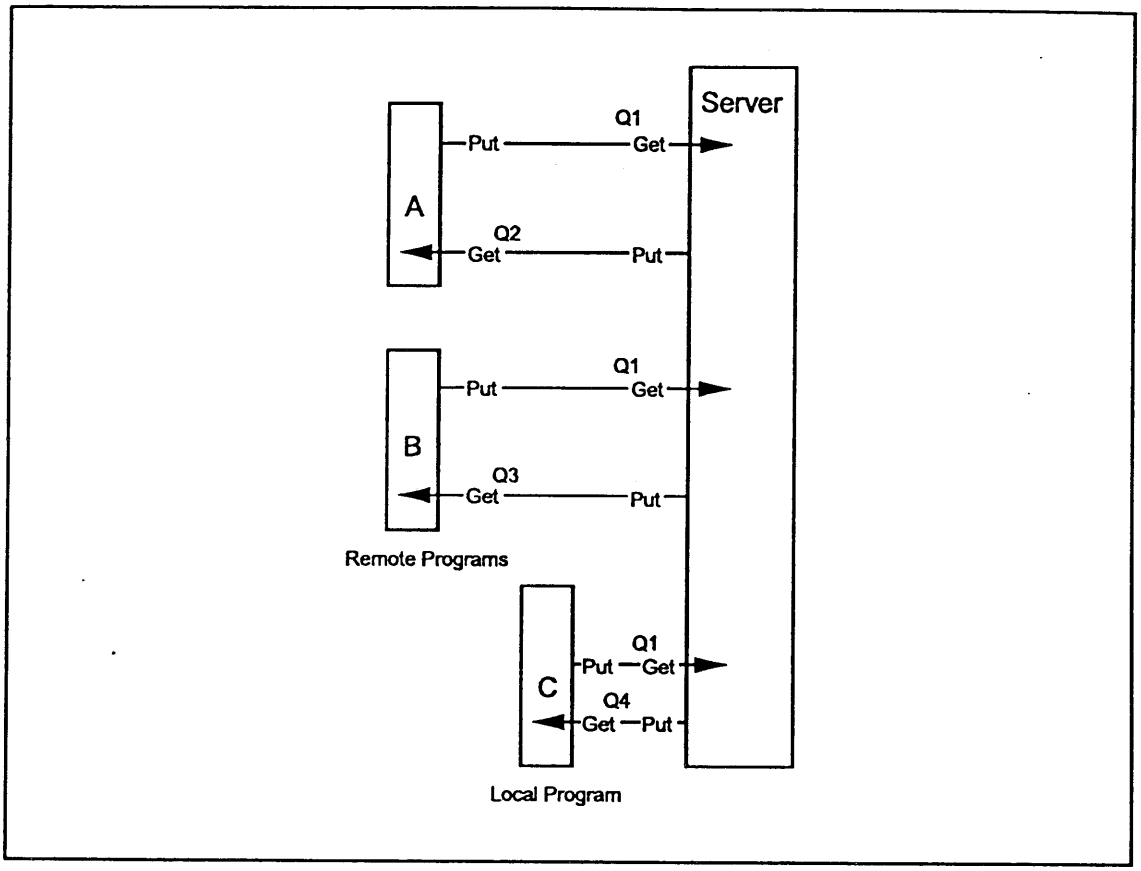


Figure 7. Application Designer's View of Client/Server Application

Programs

Starting Programs

A program which processes messages on a queue can be started in any of the following ways:

- By a user
- By the local operating system
- By another program

Programs which are started by the user and programs which are started by the operating system are similar; the execution of the program is not related to the status of the queue. For example, a user might start the program whenever the user logged on to the system—the program would run, drain the queue of messages (probably few in number) and then terminate. Alternatively, the operating system might start the program whenever the system is IPLed, or at some specific time of day. The program might run indefinitely, or might run until the queue is empty. The queue manager need not take any special action in either case.

However, many applications require a more sophisticated way to start programs, to process the arrival of messages on queues. For example, the application designer may want a particular program to start when a message arrives on a previously-empty queue, or when a high-priority message arrives on a particular queue.

The queue manager provides a mechanism, called *triggering*, that allows one application program to start one or more other programs in those situations. The mechanism works as follows:

1. The application design requires that a program, A, is to be started when a message of priority 3 or higher arrives in queue Q1. The programmer needs to define queue Q1, specifying that triggering is required, and provides:
   a. The name of the program that is to be started (that is, program A)
   b. A *threshold priority* value of 3
   c. The name of an *initiation queue* (for example, INITQ1)
2. At execution time, the queue manager monitors the arrival of messages on queue Q1. When a message with a priority value that is equal to or higher than the threshold of 3 arrives on the queue, the queue manager places a system-defined trigger message on the initiation queue INITQ1. This message contains the name of the queue (Q1) that was triggered with the name of the program (Program A) that is to be started.
3. Messages are read off the initiation queue by a *trigger program* which reads the trigger message off the queue and starts program A. Program A can then open queue Q1 and read the priority 3 message off the queue.

This is a simple example of the use of the MQ triggering mechanism. However, the decision made within the trigger program if program A is to be started may also use a complicated scheduling algorithm. This algorithm could consider the time of day, the depth of other queues, or the number of copies of program A that are running already. Because the trigger programs can be supplied by the customer, the algorithms used within trigger programs can be as simple or complicated as required.

The responsibility for starting programs belongs to the *trigger processing* programs. These can be customer-supplied or supplied by the messaging product.

Advanced Messaging Facilities

Besides providing the straight-forward queuing mechanisms described so far, MQI defines several other facilities useful to certain applications:

- **Alias Queues**. An alias queue provides a level of indirection to another queue, the target queue. The definition of the alias is maintained outside the program, so the target queue name can be changed without affecting the program itself.

  Multiple aliases can exist for the same target queue name allowing several programs to use different names for the same target queue.
- **Persistent Messages**. Optionally, a message can be defined as being *persistent*, that is, saved on permanent media. Persistent messages are recovered after system and queue manager failures.

Performance

Message queuing has several features that make it suitable for high-throughput, performance-critical applications. These features include the following:

- **Parallel Execution**. Message queuing allows an application to be designed so that some of its constituent programs can execute in parallel. These programs can execute in different nodes within the network. Parallel execution enables the application to provide an improved response to users and improved system utilization.
- **Load Balancing**. Message queuing allows multiple copies of a program to process a single queue, with the programs executing in parallel. These programs can be started dynamically, depending

on the number of messages on the queue, to provide extra queue processing capability at peak load times.

- **Session Concentration**. Message queuing allows applications to be designed so that no direct session connection is necessary between the programs that wish to communicate. This reduces the total number of sessions required by the application, reduces the time taken to start the network, and simplifies network control. This can be of particular advantage to applications that run on large networks. It also permits the MQ resource managers to optimize the movement of messages around the network using techniques such as batching of messages.
- **Multiple Connections**. MQ resource managers support multiple connections between them, allowing for the separation of messages with different performance requirements. For example, MQ managers can prevent high-priority messages from being delayed by the transmission of large, lower-priority messages.

Interoperability

Message Queuing will be available in a large number of environments so that programs that execute in the different environments will be able to communicate with each other.

Some MQ facilities are being proposed as an international standard. The Message Queuing interface has been proposed to X/Open as a standard interface for commercial messaging. The formats and protocols used between queue managers have been proposed to OSI as a standard to allow interoperability between programs that are using different MQ resource managers.

Systems Management

The Messaging and Queuing resource manager provides commands to create, start, stop, and destroy queue managers.

The resources of the queue manager, such as queues, are defined and managed using either script commands, a programmable interface, or a system administration tool. The programmable interface manages by using queues, so it is possible to administer both local and remote queue managers.

These interfaces will be used by systems management agents to allow Open Blueprint systems management services to control the queue manager.

Relationship to Other Resource Managers

Message Queuing provides the messaging infrastructure for other resource managers to use. These include:

- **Workflow Manager**. The Workflow manager uses Message Queuing as the underlying transport to control the workflow through the business process.
- **Mail**. Mail applications are those which create, store and manage messages or notes, and the transport layer which actually delivers those messages to the **desired** destination. Message Queuing provides the transport layer for the delivery of the messages. Message queuing provides:
  - MQ-enabled mail applications to communicate across an MQ network.
  - MQ-enabled mail applications to communicate across a remote mail network such as X.400, SMTP, VIM or MAPI. MQ provides the gateway to tunnel MQ messages across the other mail network to another MQ-enabled mail application.
  - MQ-enabled mail applications to communicate with mail applications on other mail networks. MQ provides the gateway to inject the message into the remote network to an application enabled for that network.
- **Transaction Monitor**. Message queuing can be used by transactions running in the Transaction Monitor environments.

Message Queuing also uses other resource managers as follows:

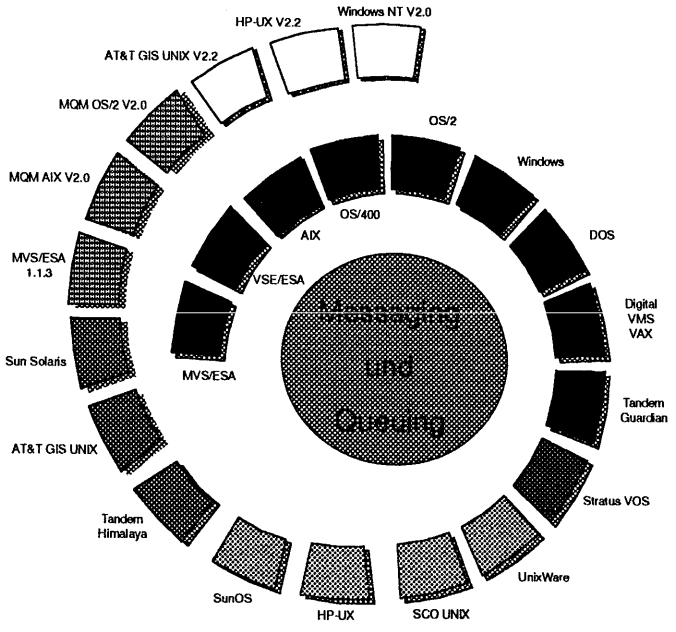
- **Transaction Management**. As an optional facility, message queuing can collaborate with the Open Blueprint Transaction Management resource manager to provide full recovery of message queuing resources on a logical unit of work basis. This allows updates to queues, for example, to be synchronized with the proper updating of other resources, such as data bases, even in situations where hardware or software may fail.

  Programs use the transaction manager API to invoke the commit, backout, and other recovery functions they require. MQ uses the X/Open XA interface, where appropriate, to the Transaction Management Services.
- **Directory**. Message queuing uses the Open Blueprint Directory resource manager to find out which queue manager in the network owns a particular queue. When a queue is defined to a queue manager, it also optionally stores the name of the queue and the owning queue manager in the directory. When an application in the network opens that queue name, its queue manager uses the information in the directory to discover which queue manager owns the queue.
- **Security**. The facilities provided by the local operating system and the Open Blueprint Security Services are used by the Messaging and Queuing resource manager to provide security for the resources it owns. These facilities are used, for example, to authenticate users, to guarantee that only messages from authorized users find their way onto particular queues, and to prohibit unauthorized programs from inspecting or changing the contents of queues or messages.

  The security services are also used to verify the connections between queue managers.

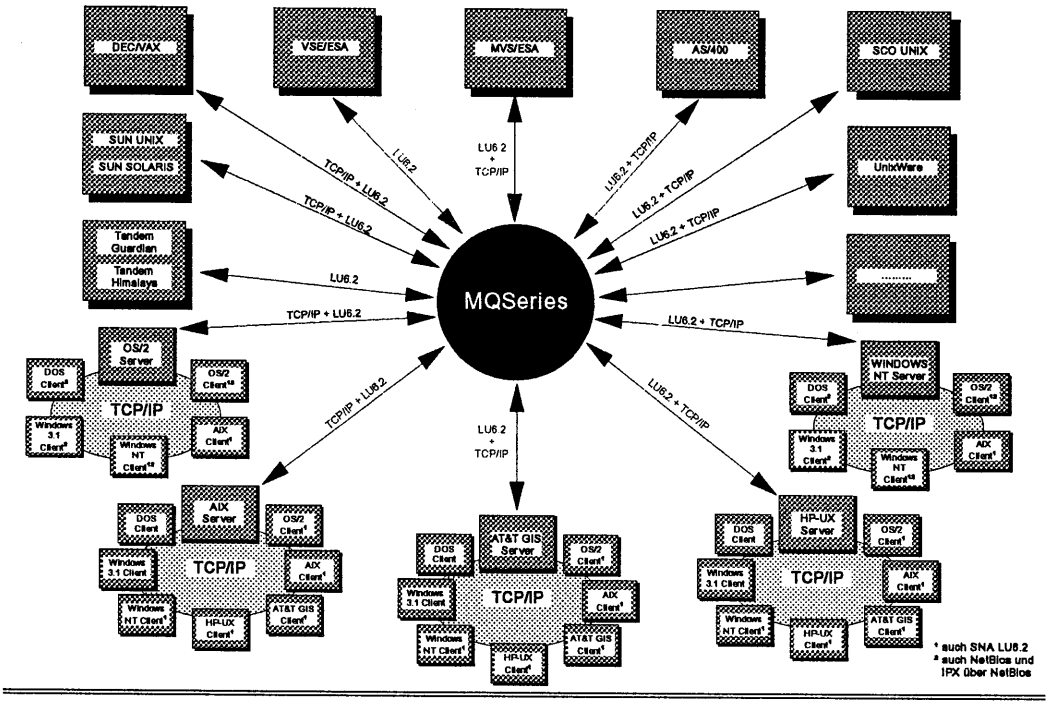
MQSeries Ankündigungen September 1995

EIN Interface zwischen Plattformen



- **EIN Interface über einen weiten Bereich von IBM- und Nicht-IBM-Plattformen**
- **Abschirmen der Entwickler von der Netzwerk-Komplexität**
- **Flexibilität durch zeitunabhängige Verarbeitung**
- **"Middleware" für robuste verteilte Anwendungen**

MQSeries - Verbindungen



MQSeries - Client/Server - Verbindungen

MQSeries Client / Server Verbindung Protokoll	MQSeries for AIX	MQSeries for OS/2	MQSeries for HP-UX	MQSeries for AT&T GIS UNIX	MQSeries for Windows NT**
AIX Client	Ja	Ja	Ja	Ja	Ja
LU 6.2	Ja	Ja	Ja	Ja	Ja
TCP/IP	Ja	Ja	Ja	Ja	Ja
OS/2 Client	Ja	Ja	Ja	Ja	Ja
LU 6.2	Ja	Ja	Ja	Ja	Ja
NetBIOS*	Nein	Ja	Nein	Nein	Ja
TCP/IP	Ja	Ja	Ja	Ja	Ja
DOS Client	Ja	Ja	Ja	Ja	Ja
NetBIOS*	Nein	Ja	Nein	Nein	Ja
TCP/IP	Ja	Ja	Ja	Ja	Ja
Windows 3.1 Client	Ja	Ja	Ja	Ja	Ja
NetBIOS*	Nein	Ja	Nein	Nein	Ja
TCP/IP	Ja	Ja	Ja	Ja	Ja
Windows NT Client**	Ja	Ja	Ja	Ja	Ja
LU 6.2	Ja	Ja	Ja	Ja	Ja
NetBIOS*	Nein	Ja	Nein	Nein	Ja
TCP/IP	Ja	Ja	Ja	Ja	Ja
HP-UX Client	Ja	Nein	Ja	Ja	Nein
LU 6.2	Ja	Nein	Ja	Ja	Nein
TCP/IP	Ja	Nein	Ja	Ja	Nein
AT&T GIS Unix Client	Ja	Nein	Ja	Ja	Nein
LU 6.2	Ja	Nein	Ja	Ja	Nein
TCP/IP	Ja	Nein	Ja	Ja	Nein

* IPX über NetBios Emulation möglich ** Intel Processor

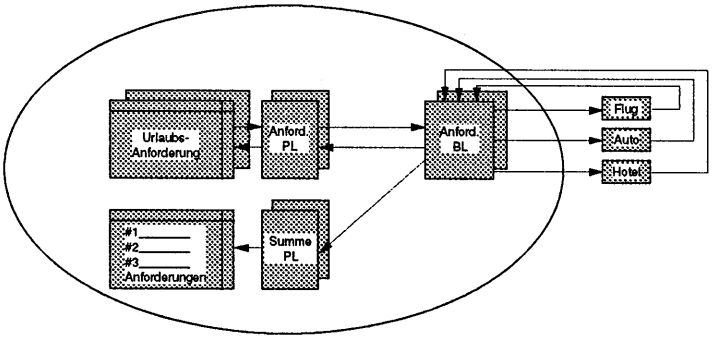
MQSeries - Plattformen

	C	COBOL	PL/I	Div.	Syncpt.	Trigger	Msg L.
MVS/ESA	X	X	X	Ass.	X	X	4 MB
VSE/ESA	-	X	-	-	X	X	30000
OS/400	X	X	-	RPG	X	X	4 MB
AIX/6000	X	X	-	-	X	X	4 MB
OS/2	X	X	-	-	X	X	4 MB
AT&T GIS V 2.2	X	-	-	-	X	X	4 MB
DEC VAX	X	-	-	-	-	-	11412
HP-UX V 2.2	X	X	-	-	X	X	4 MB
SCO UNIX	X	-	-	-	-	-	64000
Sun OS	X	-	-	-	-	-	64000
Sun Solaris	X	-	-	-	-	-	64000
Tandem Guardian	X	-	-	Ass. TAL	X	-	11412
Tandem Himalaya	X	-	-	Ass. TAL	X	-	10000
UnixWare	X	-	-	-	-	-	64000
Windows NT V 2.0	X	X	-	-	X	X	4 MB

3T

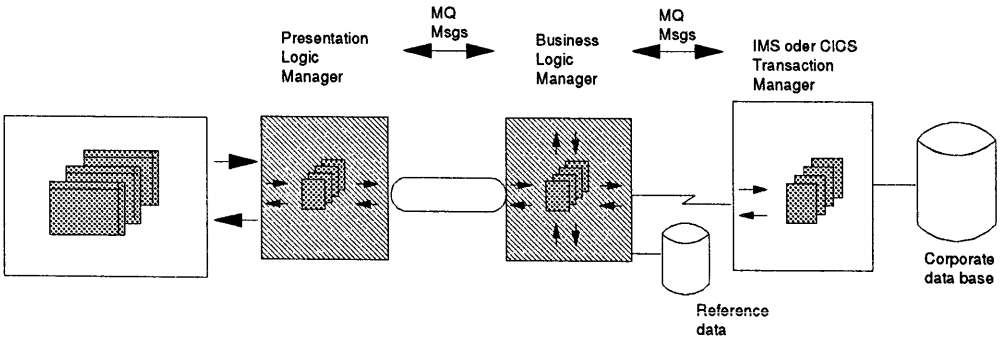
MQSeries Three Tier

Beispiel: Reisebüro



- Parallele Steuerung und Sysnchronisation
- Fortschreiben zugehöriger Fenster
- Firmenweit
- Mehrere Aktionen

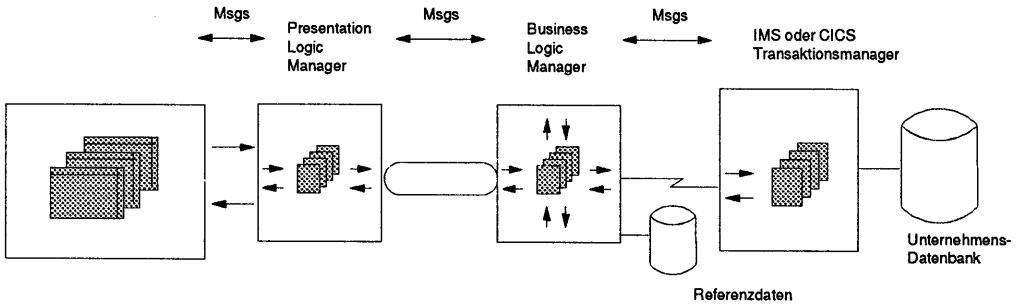
MQSeries - Three Tier Stuktur



- Erlaubt modernes C/S-Design
- Implementiert das Anwendungsmodell
- Steuert Anwendungskode
- Stellt APIs zur Verfügung
- Ermöglich Unabhängigkeit von Queue-Namen
- Stellt Werkzeuge für verteiltes Anwendungsdesign (AD) zur Verfügung

⇒ AD Produktivität + AE Funktion

3T MQSeries - Three Tier Lösung



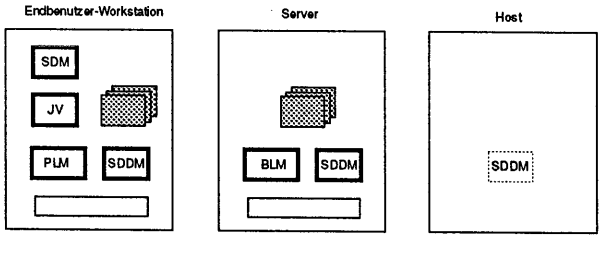
ENTWICKLUNG

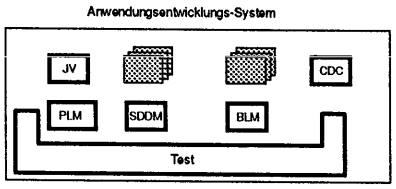
Design: REUSABLE	WINDOW Gruppen + Unterstützende Logik	REUSEABLE OBJEKT-KLASSEN + METHODEN	REUSEABLE OBJEKT-KCLASSEN + METHODEN
Werkzeuge:	VisualAge	COBOL, PL/1, C	COBOL, PL/1, C
	[SOM enabled]	[OO]	[OO]

MANAGEMENT

Integrierte SM Werkzeuge

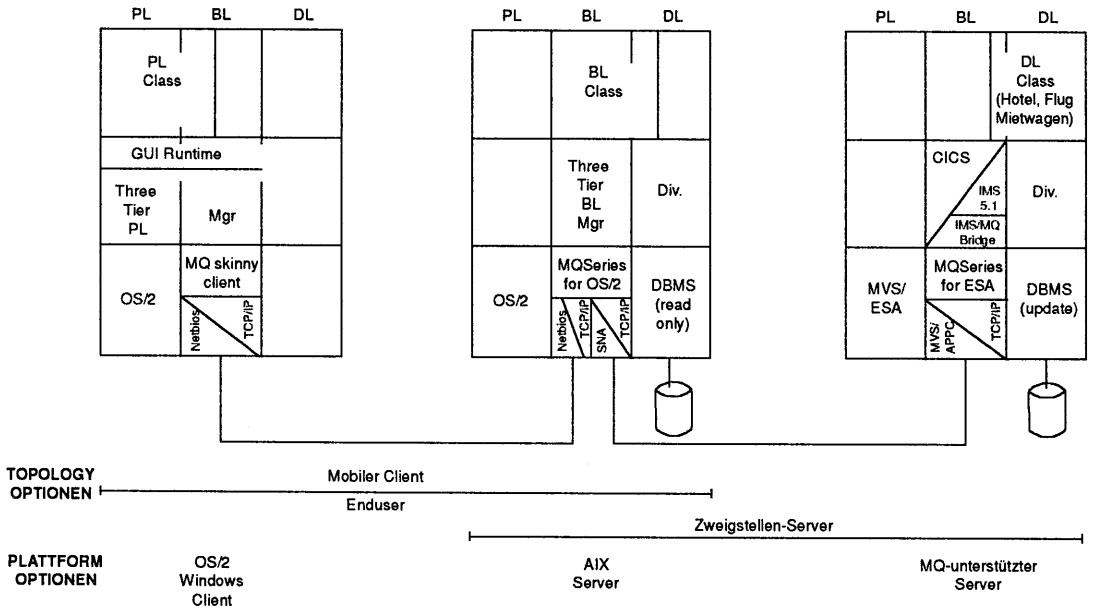
3T Three Tier Komponenten



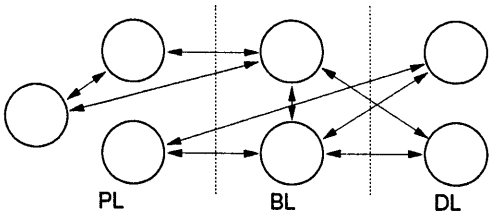


PLM	—	Presentation Logic Manager
BLM	—	Business Logic Manager
SDDM	—	Self-Defining Data Manager
SDM	—	Secure Desktop Manager
JV	—	Job Viewer
CDC	—	Class Definition Compiler & Cross Checker
Test	—	Test Harness

Eine Three Tier Lösung (AE)



Three Tier Anwendungs-Modell



○	=	eine "Klasse" eine Sammlung von "Methoden"
←→	=	ein Pfad für potentiellen Message-Fluß

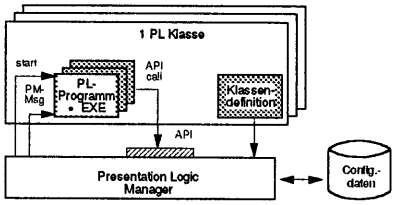
Die Ausführung eines Netzwerkes von Klassen wird ein "Job" genannt

Arbeitsspeicher, der einer Klasse in einem Job zugeordnet ist, wird "Instance"-Speicher genannt.

PL - Presentation Logic
BL - Business Logic
DL - Data Logic

Three Tier Komponenten

PLM



- PLM startet ein PL-Programm und schickt ihm eine PM 'message' wenn ein Three Tier "event" auftritt
- Standard-Funktionen in dem PL-Programm schicken den "event" an das entsprechende Fenster

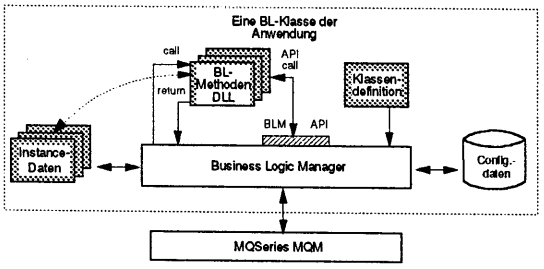
GUI Werkzeug:
- Der Programmierer hat einen normalen Werkzeug-spezifischen Weg, um Three Tier "events' zu empfangen

C++
- Standard-Funktion, die von Three Tier als Rahmen mitgeliefert wird

Ein PLM unterstützt mehrere Klassen

Three Tier Komponenten

BLM



BLM ruft eine "event" - spezifische **"Methode"** auf, wenn ein **"Three Tier Event"** auftritt. Parameter für die Methode sind:

- Message oder Messages
- "instance"-Daten
- Status

Die aufzurufende Methode ist in der **"Class Definition"** definiert
Eine BLM-Kopie pro **Klasse**

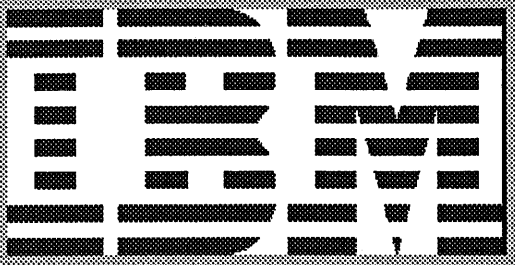
MQSeries - Preisbeispiele Stand 15.9.1995

Pgm-Nr	Programm	Gruppe	MLC	OTC Serv.	OTC CL.	GA
5695-137	MQS. for MVS/ESA	40	4645,00	222.930,00	---	ok
5787-ECX	MQS. for VSE/ESA	20	319,00	15,280,00	---	ok
5716-MQ1	MQS. for OS/400 V3 R.6	S.+1Cl.	---	2.670,00*	495,00**	ok
5621-390	MQS. for OS/2	S.+1Cl.	---	612,00*	122,00**	ok
5765-514	MQS. for AIX/6000	S.+1Cl.	---	2.670,00*	122,00**	ok
5697-176	MQS. for AT&T GIS V2.2	S.+1Cl.	---	2.670,00*	122,00**	12/95
5765-518	MQS. for DEC	S.+1Cl.	---	2.670,00*	122,00**	ok
5697-175	MQS. for HP UX V2.2	S.+1Cl.	---	2.670,00*	122,00**	9/95
5765-521	MQS. for SCO UNIX	S.+1Cl.	---	2.670,00*	122,00**	ok
5765-513	MQS. for Sun Solaris	S.+1Cl.	---	2.670,00*	122,00**	ok
5765-520	MQS. for Sun OS	S.+1Cl.	---	2.670,00*	122,00**	ok
5765-522	MQS. for UnixWare	S.+1Cl.	---	2.670,00*	122,00**	ok
5765-517	MQS. for Tandem Guard.	---	---	53.590,00	---	ok
5765-515	MQS. for Tandem G.Him.	---	---	53.590,00	---	ok
5697-177	MQS. for Wind. NT(Intel)	S.+1Cl.	---	2.670,00*	122,00**	3/96
5622-389	MQS. Three Tier for OS/2	---	---	12.340,00	---	10/95
5765-321	MQS. Three Tier for AIX	---	---	12.340,00	---	10/95

* plus Lizenzgebühren für weitere Clients ** Preise variieren je nach Anzahl zus. Clients

IBM

Ulrich Schwenk
SW SL Transaktionssoftware



TCP/IP

Warp Communication Seminar '95

Thomas Gödel, IBM Österreich

ÜBERSICHT

- TCP/IP & Warp Connect
  - TCP/IP Kits
- PPP
- Sicherheit im Internet
- IP New Generation (IPv6, IPng)
- Demo

... so können Sie mich erreichen ...

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- goedel@vnet.ibm.com
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- goedel@osc.tisc.vienna.ibm.com
- Thomas Goedel @ IBM Austria
- 61803090 at VIEVMA
- AT#03090 at ATIBM
- ATIBM689 AT IBMMAIL

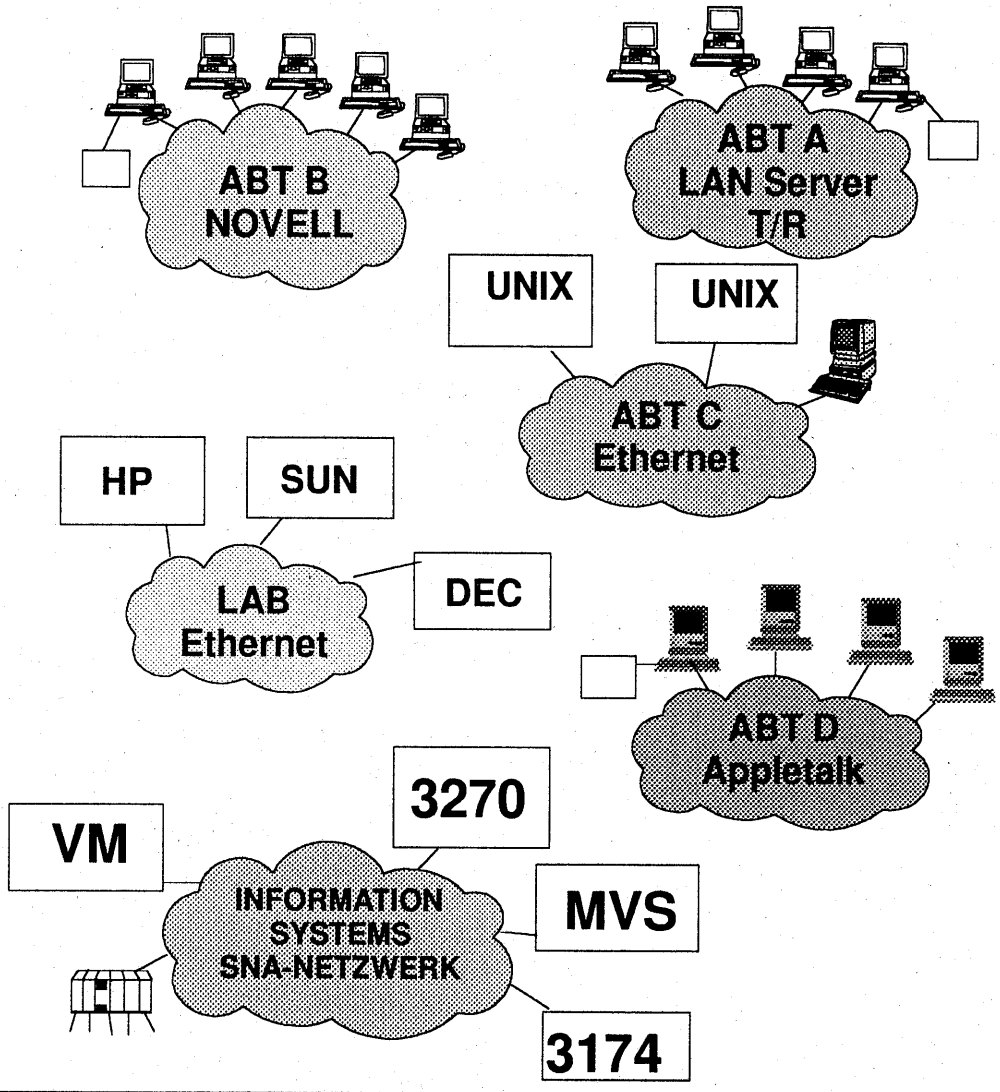
TCP/IP V3

TCP/IP V3 & WARP Connect

OS/2 WARP Communications Seminar '95

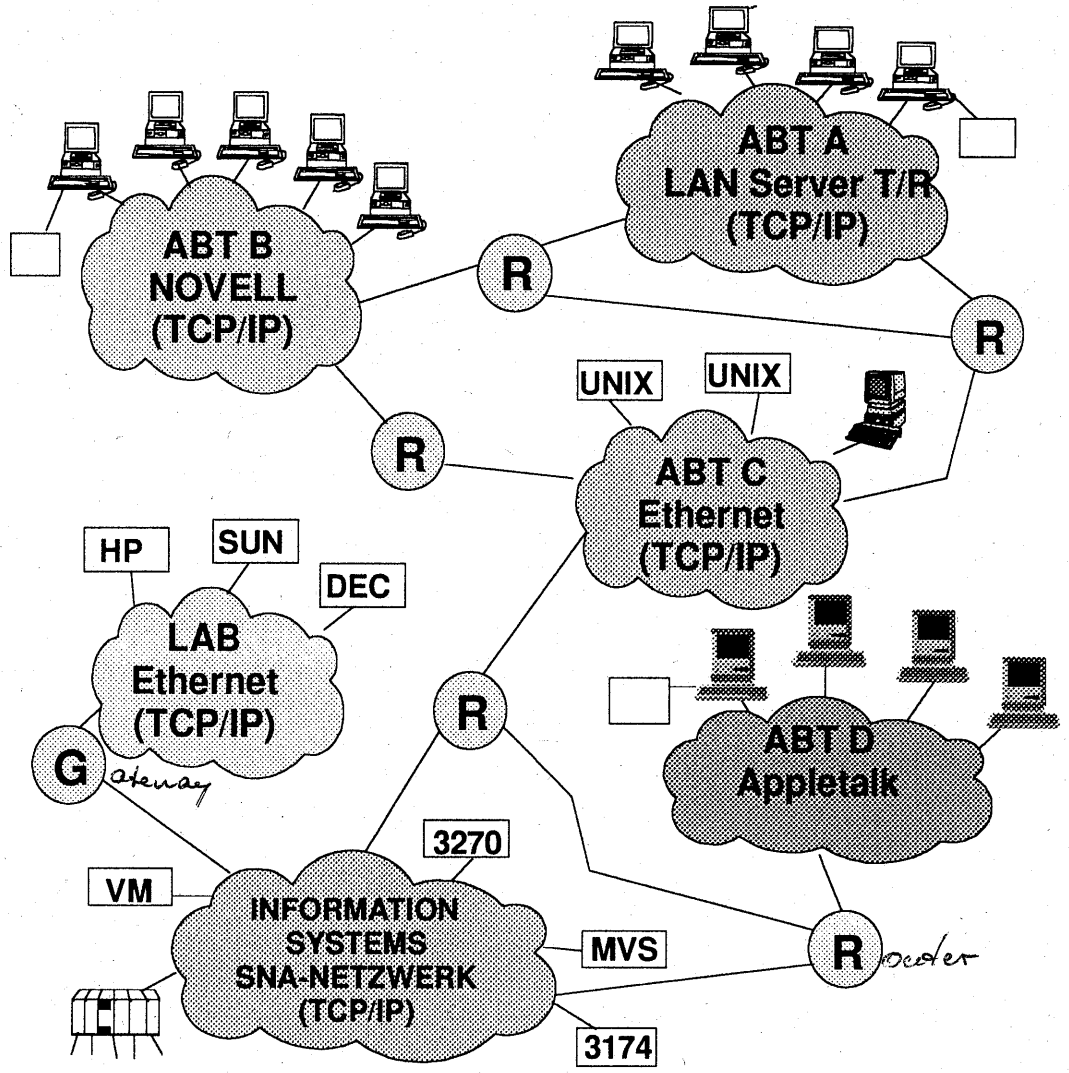
Wozu TCP/IP ?

- **Equipment verschiedener Hersteller**
- **Verschiedene Netzwerk Protokolle**
- **Redundante Einrichtungen**
  - Datenbanken
  - Drucker
- **"Computerinseln"**
  - Überlappende Netzwerke
  - Wenig Resource Sharing
  - Limitierte Zusammenarbeit



Internetworking - Internet

- **Verbinden aller Netzwerke**
  - Router
  - Gateways
- **Jede Maschine transparent mit jeder anderen verbunden**
  - Teilen sich ein großes Netzwerk
  - Einheitliche Adressierung
- **Mehrere Protokolle**
  - Original Protokoll
  - TCP/IP (Alle Hosts/Router)



Geschichte

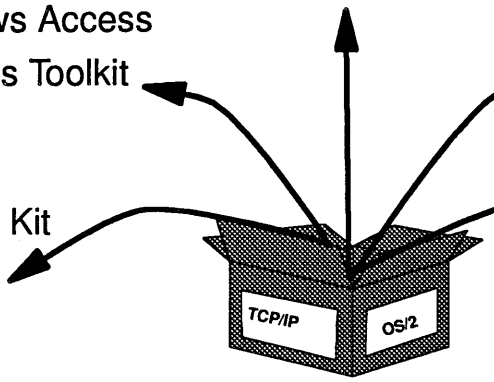
- 1990 TCP/IP 1.0, 1.1
- 1992 TCP/IP 1.2.1
- 1993 TCP/IP 2.0
- 1994 Internet Connection for OS/2
- 1995 TCP/IP 3.0 

TCP/IP 2.0 for OS/2
Basis Kit und Erweiterungen

- NFS
- Domain Name Server

- DOS/Windows Access
- Programmer's Toolkit

- NetBIOS
- Extended Networking

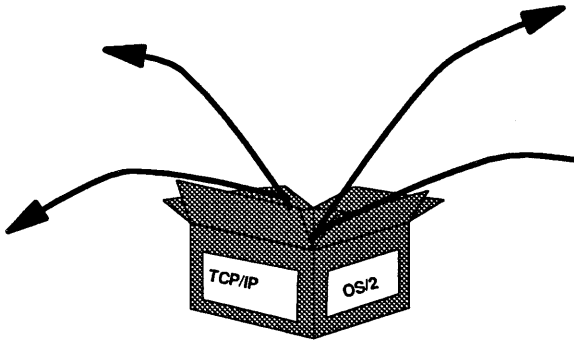


- Base Kit
- Applications Kit
- Total Kit
- Asia/Pacific

- X-Windows Server
- X-Windows Client
- OSF/Motif
- UltiMail

TCP/IP V2↔Warp Connect

- DOS/Windows Access (int)
- NetBIOS(int in LS4 & Connect)
- Base Kit (int)
- Applications Kit (int)
- Total Kit (Basis int.)
- Asia/Pacific (int)
- UltiMail (IBM Workgroup)



OS/2 WARP Communications Seminar '95

TCP/IP V3.0

- nur mit Warp Connect ausgeliefert
- gleichzeitiger Zugriff auf LAN und Modem
- Internet Applikationen sind integriert
  - WWW Browser,Gopher,NR/2,FTP Client, Ultimail Lite (statt LAMail), Telnet Clients, SLIP/PPP, LPR, LPD, SNMP
- nicht unterstützt mit OS/2 2.x !
- TCP/IP V2 für 2.x und 3.x unterstützt

Updates für Warp Connect

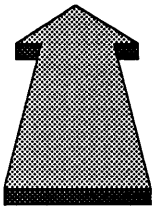
- Prog Toolkit
  - CSD UN57887
- NFS
  - CSD UN57064
  - APAR PN69745
- DNS
  - CSDUN60004
  - APAR PN69747
- Extended NW Kit
  - CSD UN60005
- X Windows Server
  - CSD UN68122
  - APAR PN70086
- X Windows Client
  - CSD UN59374
- OSF/Motif
  - CSD UN59376

Wo bekomme ich Updates ?

- CSDs
  - software.watson.ibm.com
  - /pub/tcpip/os2
- APARs
  - ps.boulder.ibm.com
  - /ps/products/tcpip/fixes/v2.0os2/<apar-#>

Internet Connection Family

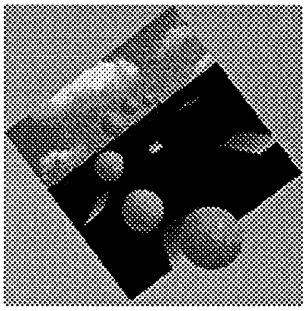
- OS/2 WARP Connect (Internet Connection)
- Internet Connection/Win
- Internet Connection Servers OS/2 & AIX
- NetSP Secured NW Gateway



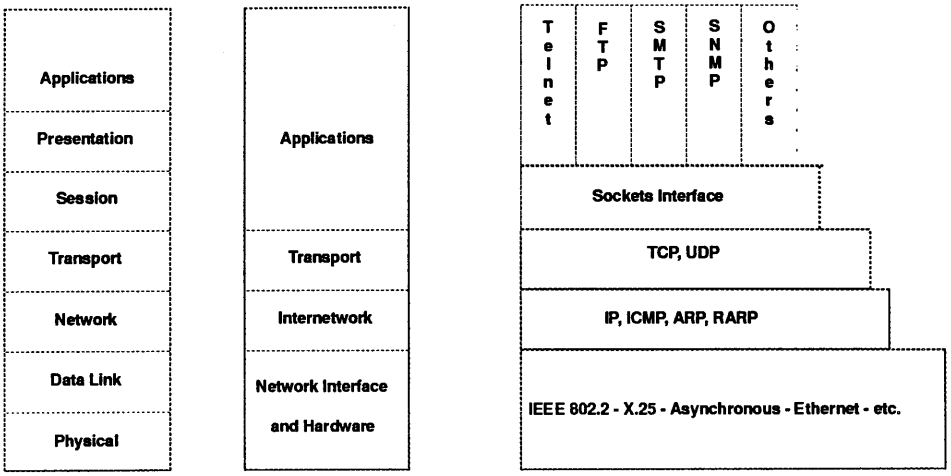
shttp, SSL, Dial Access, LAN Access, Home Pages, ...

TCP/IP Zukunft

- Internet Connection für PowerPC
- TCP/IP für Warp Server
- IPng Erweiterungen
- Wireless Unterstützung
- Neue Medien (ATM, ...)
- etc.



TCP/IP Schichtenmodell



OSI Reference Model

TCP/IP Reference Model

TCP/IP Protocol Stack

OS/2 WARP *Communications Seminar '95*

SICHERHEIT

OS/2 WARP *Communications Seminar '95*

Sicherheit im Internet

- Kryptologie
- Firewalls
- S-HTTP
- SSL
- PEM

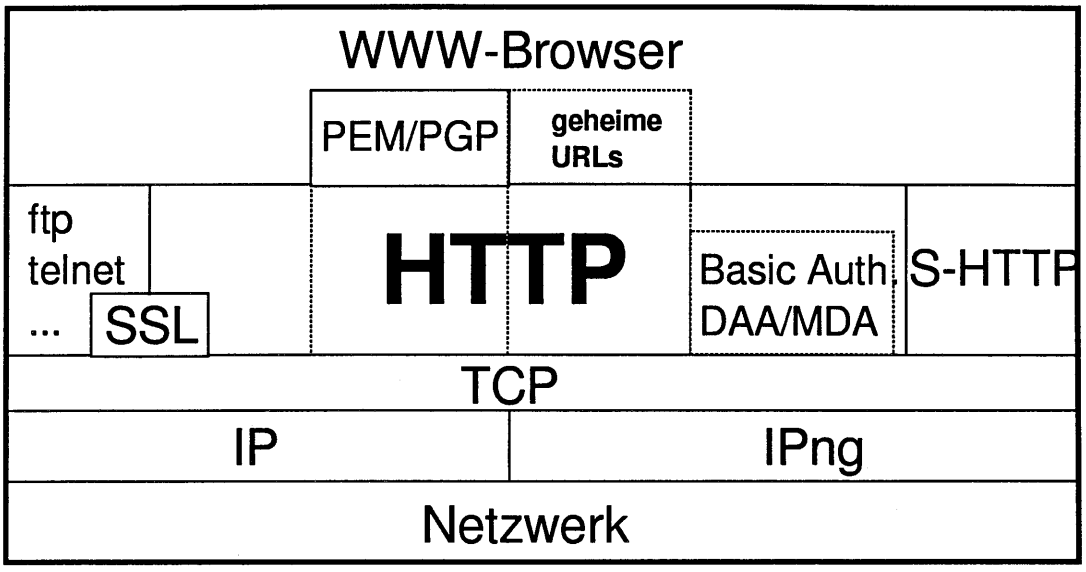
Kryptologie (1)

- Gefahren durch Netzwachstum (Mißbrauch, Hacker)
- D-Netz als Beispiel für verschlüsselte Übertragung
- Verschlüsselungsverfahren
  - symmetrisch
    - Sender und Empfänger haben gleichen Schlüssel
    - Schlüssel muß einmal sicher übertragen werden
    - Bsp. DES (Data Encryption Standard)
  - asymetrisch
    - öffentlicher Schlüssel zum Verschlüsseln für alle
    - geheimer Schlüssel beim Empfänger
    - Bsp. RSA Algorythmus, Fiat&Shamit Algorithmus

Kryptologie (2)

- Verschlüsselte Datenübertragung
- Authentifizierung von Sender und Empfänger
  - gegenseitige Überprüfung
- Digitale Unterschrift
  - vgl. "Fingerabdruck", Hashfunktion
- Anonymität
  - trotz Authentifizierung anonym bleiben (Mix)
- Zertifizierung
  - vertrautenswürdige, zentrale Instanzen

Sicherheitsmechanismen



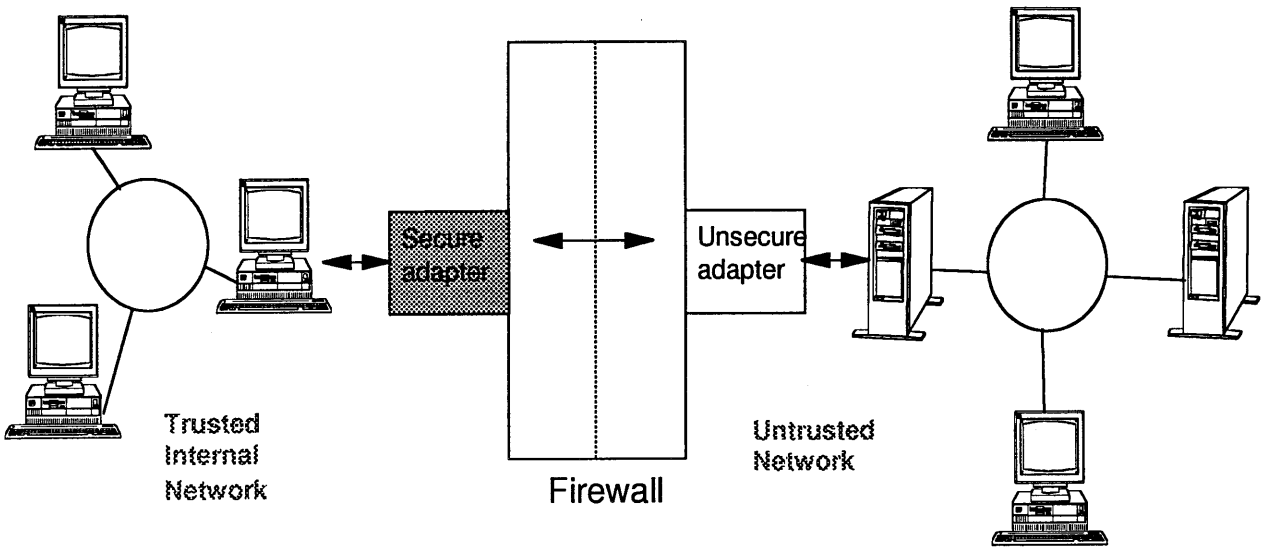
S-HTTP

- Erweiterung des HTTP Protokolls
  - Protokollerweiterungen (Kopfzeilen, URL Typ "shttp")
  - neue HTML Sprachelemente
- Jede Nachricht durch Kombination folgender Komponenten geschützt
  - Digitale Unterschrift
  - Datenverschlüsselung (sym und asym)
  - Authentifizierung
  - Schlüsselmanagement auch durch Kerberos

SSL

- gepusht durch Netscape Navigator
- unterstützt auch Transportprotokolle (tcp)
- ersetzt das Socket Interface durch eine erweiterte Version
  - Vertraulichkeit
  - Authentifizierung
  - Datenintegrität
- Handshake zu Beginn (Vereinbarungen)
- Verschlüsselter Datentransfer

Das Firewall Konzept



OS/2 WARP Communications Seminar '95

Das Firewall Konzept

- Trennung zwischen internem und externem Internet
  - intern = secure
  - extern=unsecure
- Check des Datenverkehrs zwischen den beiden Netzwerken
- Entscheidungen über Zugriffserlaubnis treffen
- mehrstufige Firewalls

Firewall Konzepte

- Filter
- Circuit Level Gateways
- Application Gateways
- Domain Name Server hiding
- Mail handling

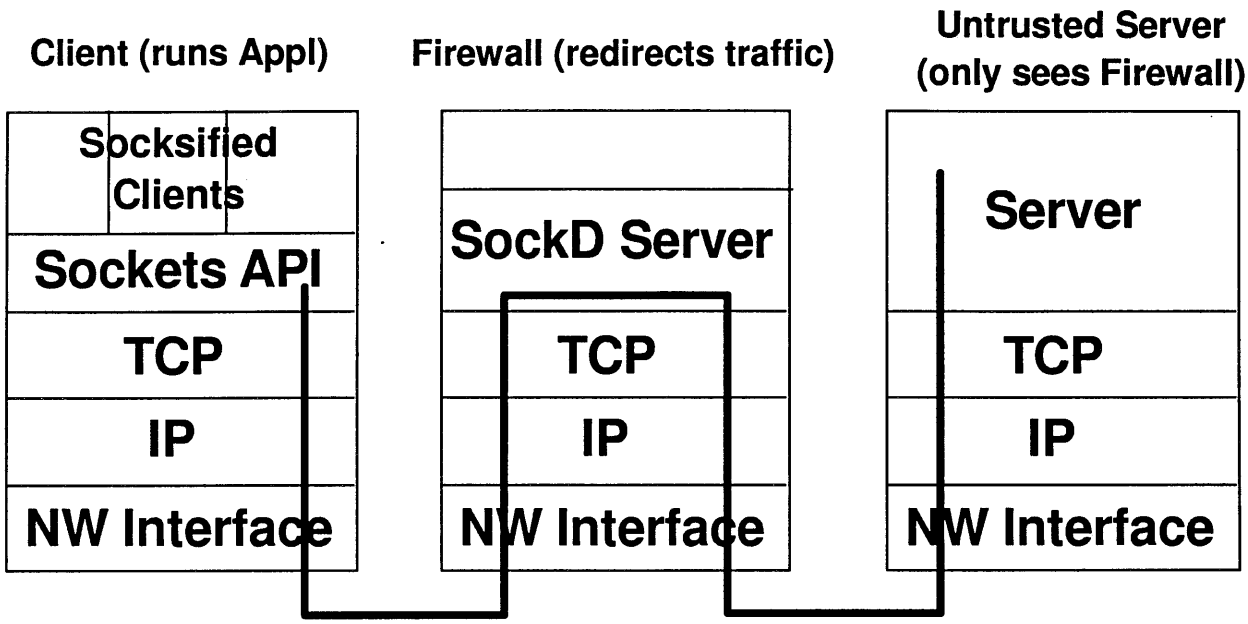
Filter

- überprüfen Sender und Empfänger
  - IP Adresse
  - Port (TCP, UDP)
- entscheiden pro IP Paket, ob übertragen werden darf
- laufen auf Routern
- für Anwender transparent

Circuit Level Gateways

- ähnlich Filter, auf Applikationsebene
- SOCKS
  - Client kontaktiert SOCKS Server
  - Überprüfung der Zulässigkeit
  - Server macht eigentlichen Vrbindungsaufbau und setzt den Paketstrom um
  - "SOCKSyfied Clients"

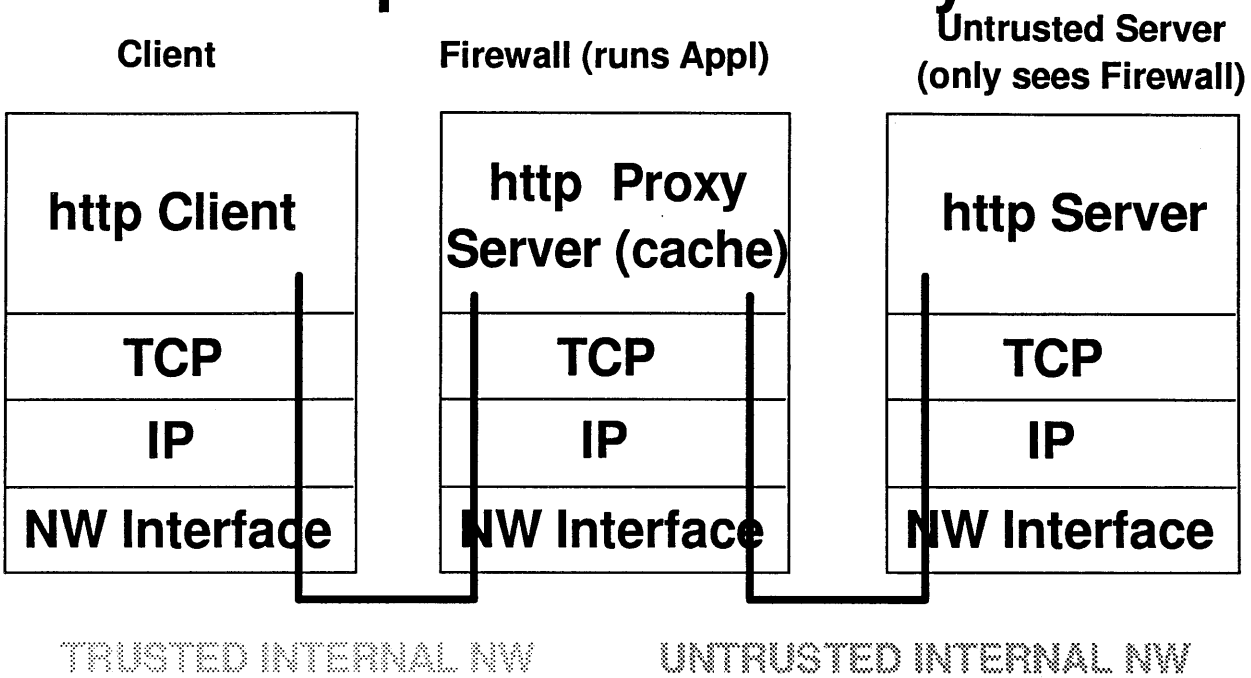
SOCKS


Client (runs Appl)
Firewall (redirects traffic)
Untrusted Server
(only sees Firewall)
Socksified Clients
Sockets API
TCP
IP
NW Interface
SockD Server
TCP
IP
NW Interface
Server
TCP
IP
NW Interface
TRUSTED INTERNAL NW
UNTRUSTED INTERNAL NW

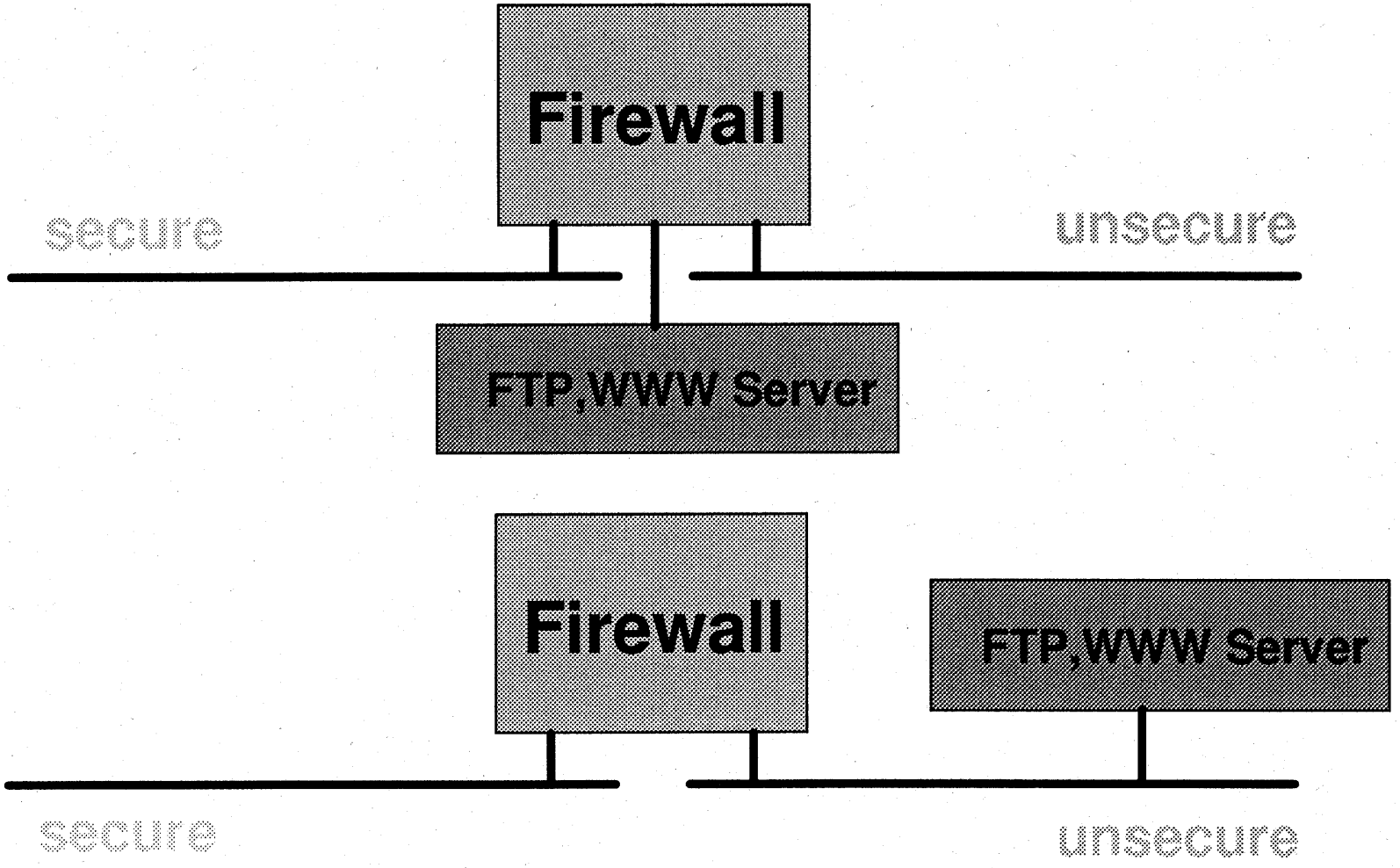
Application Gateways

- für jede Anwendung läuft auf der Firewall ein eigenes Gateway Programm
- PROXY
  - Client kontaktiert Proxy Server
  - Server überprüft Zulässigkeit
  - Proxy Server führt, stellvertretend für den Client, alle Aktionen durch
  - Caching möglich
  - http Proxy unterstützt http, ftp, gopher,WAIS,News

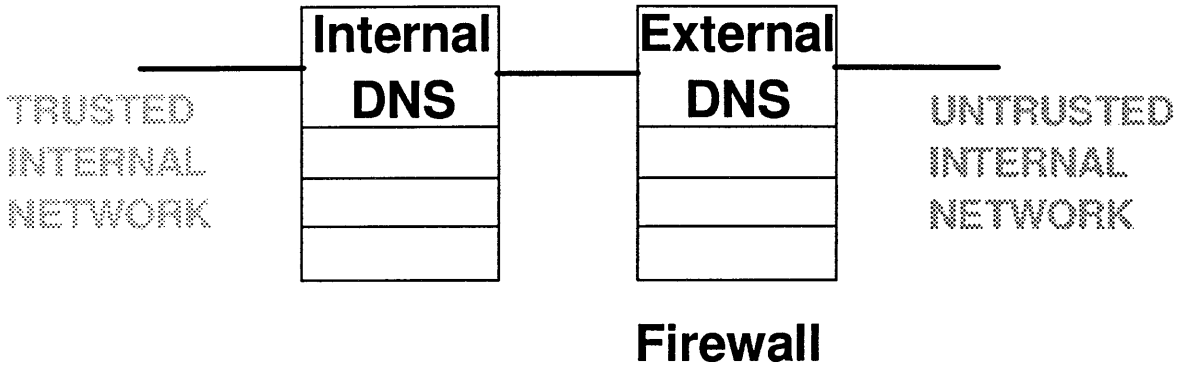
http PROXY Gateway

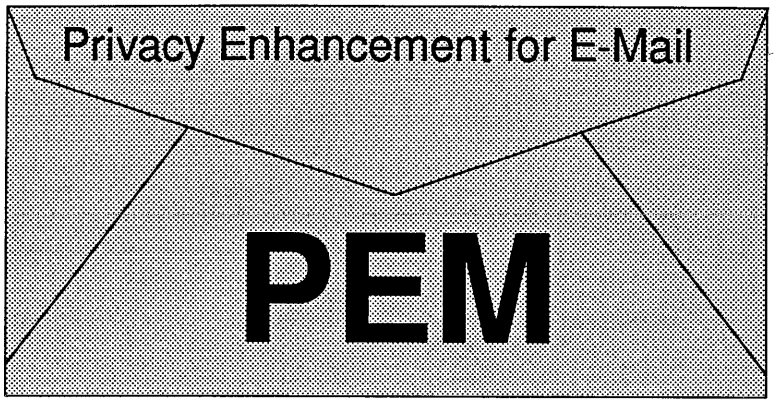


Firewall Anordnungen



Domain Name Service (DNS)





OS/2 WARP *Communications Seminar '95*

PEM

- als SMTP Erweiterung gedacht
- als Filter realisiert (Kooperation mit SMTP)
  - vor Senden Nachricht umformen (Header)
  - bei Empfang Header entfernen
- Goodies von PEM für EMail Protokolle
  - Vertraulichkeit
  - Integrität
  - Authentizität
  - Nichtabstreitbarkeit des Nachrichtenursprungs

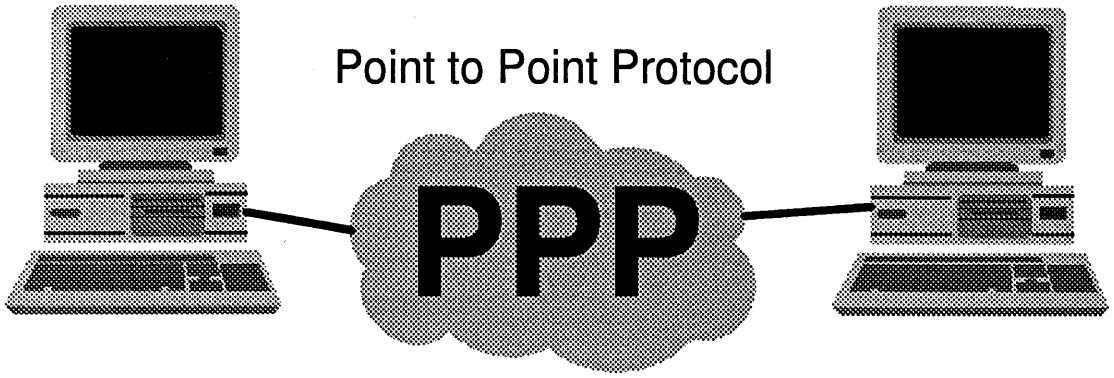
PEM

- 2 Nachrichtentypen
  - MIC (Clear und Only)
    - authentiziert und integer
  - Encrypted
    - verschlüsselung des Nachrichteninhalts
- Digitale Signaturen durch Fingerabdrücke
- DES zur Datenverschlüsselung
- Schlüsselmanagement mit RSA

PEM

Beispiel für einen PEM Header:

```
---BEGIN PRIVACY ENHANCEMENT
MESSAGE---
Proc-Type:4, MIC-CLEAR
Content Domain: RFC822
Originator-ID-Asymmetric:
MEUkUksjOJJPSLjsUkQtGjI
...
MIC-Info:RSA-MD5,RSA,
Shg895SKoOuiLL&D
Hi Tom,
wie tel. besprochen meine Infos
---END PRIVACY-ENHANCEMENT
MESSAGE---
```



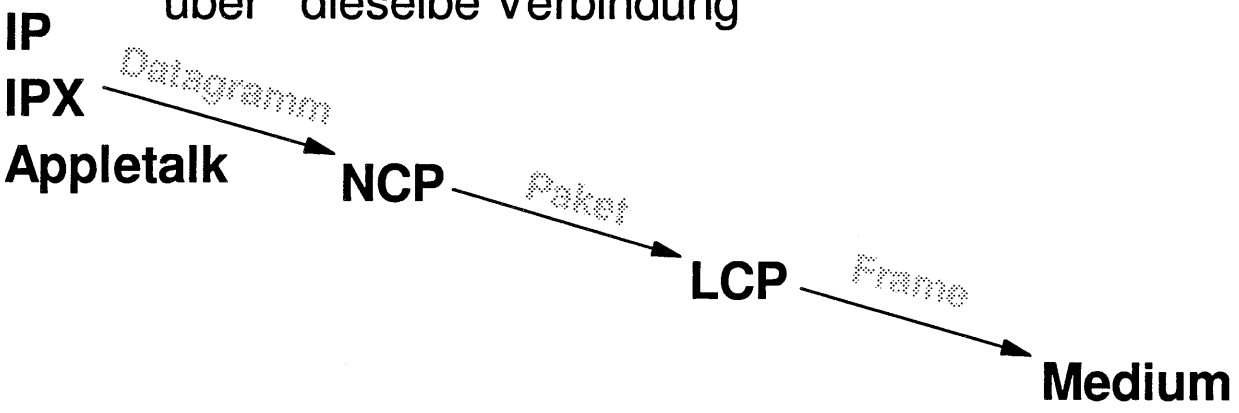
OS/2 WARP Communications Seminar '95

Point to Point Protocol (PPP)

- Standardmethode zum Transport von multiprotokoll Datagrammen über Punkt-zu-Punkt Verbindungen
- Hauptkomponenten
  - Encapsulation
  - Link Control Protocol (LCP)
  - Network Control Protocol (NCP)

PPP Datenkapselung

- Kapselung von multiprotokoll Datagrammen
  - multiplexen verschiedener Netzwerk Protokolle über dieselbe Verbindung

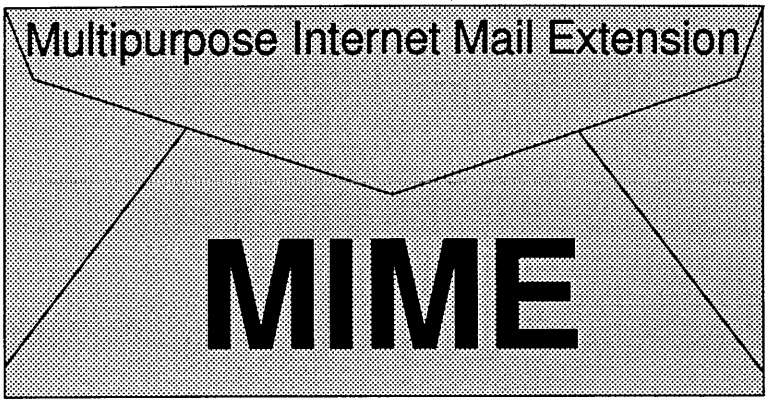


PPP Link Control Protocol (LCP)

- Aufbau, Konfiguration und Test von data-link Verbindungen
  - Diskussion des Kapselungformates
  - Aushandeln der Limits für die Paketgrößen
  - Fehlererkennung (loop back)
  - Abbau der Verbindung

PPP Network Control Protocol (NCP)

- Aufbau und Konfiguration verschiedener network-layer Protokolle
  - Zuordnung und Management von IP Adressen
  - IP, IPX, AppleTalk



OS/2 WARP *Communications Seminar '95*

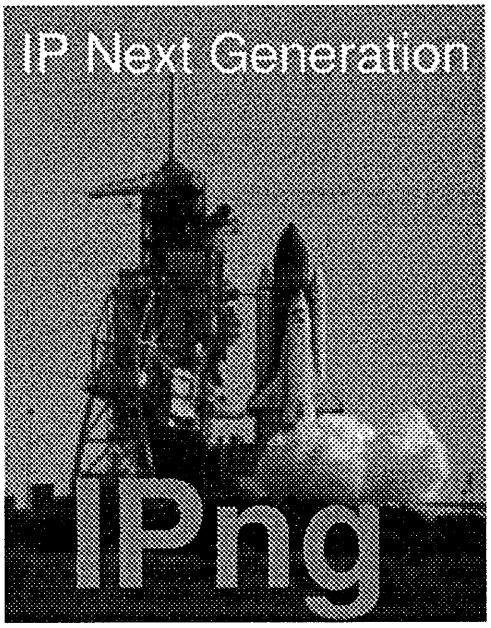
MIME

- früher nur ASCII Text als Nachrichteninhalt
- ==> Erweiterungen notwendig
  - RFC 1341
  - Nachricht bestehend aus mehreren Teilen (multi-part)
  - Nachricht bestehend aus textuellen und nicht textuellen Teilen
- Operates on SMTP

MIME Nachrichteninhalte

- Nachrichten bestehen aus Teilen von
  - ASCII Text (SMTP)
  - Enriched Text (Multi-Font, Farben)
  - Binärdateien
  - Image (Bilder)
  - Audio
  - Video Clips
- UltiMedia Mail/2 ' Lite'

IP Next Generation



OS/2 WARP Communications Seminar '95

Ziele von IPng

- Erweiterung des Adressraumes (128 bit)
- effizienteres Routing (>= IPv4)
- Robustheit (Murphy's Law!)
- Migration v4 -> v6 möglich
  - SIT (Simple Internet Transfer)
- Unabhängigkeit vom Transportmedium (LAN, WAN, MAN)
- Datagramm Service (unreliable)
- weitgehende Autokonfiguration

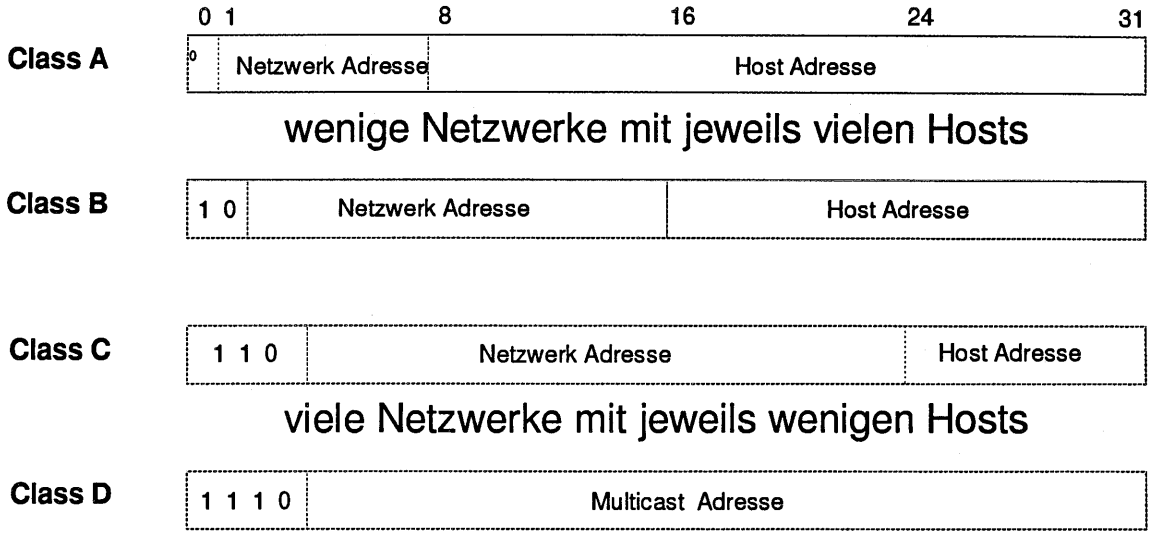
Ziele des IPng

- Sicherheit
- Eindeutige Namensvergabe
- alle Standards via RFCs kommunizierbar
- Multicast Fähigkeit auf IP Ebene
- Erweiterbarkeit
- Mobilität
  - online bewegbar sein
  - sich von mehreren Punkten anbinden können
- Kontrollprotokoll (Tests, Debugging)
- Private Netzwerke

IP Addressierung heute

- IP Adressen sind 32 bit lang
- Geteilt in 4 Byte
- Normalerweise in "dotted form" geschrieben
  - Beispiel: 9.244.5.12
- Zwei logische Komponenten
  - Netzwerk Adresse
  - Host Adresse
- IP Adresse = <NW Adresse><Host Adresse>
- Netzwerk Adresse ist eindeutig (NIC Vergabe)
- Host Adressen werden lokal administriert

Netzwerk Klassen

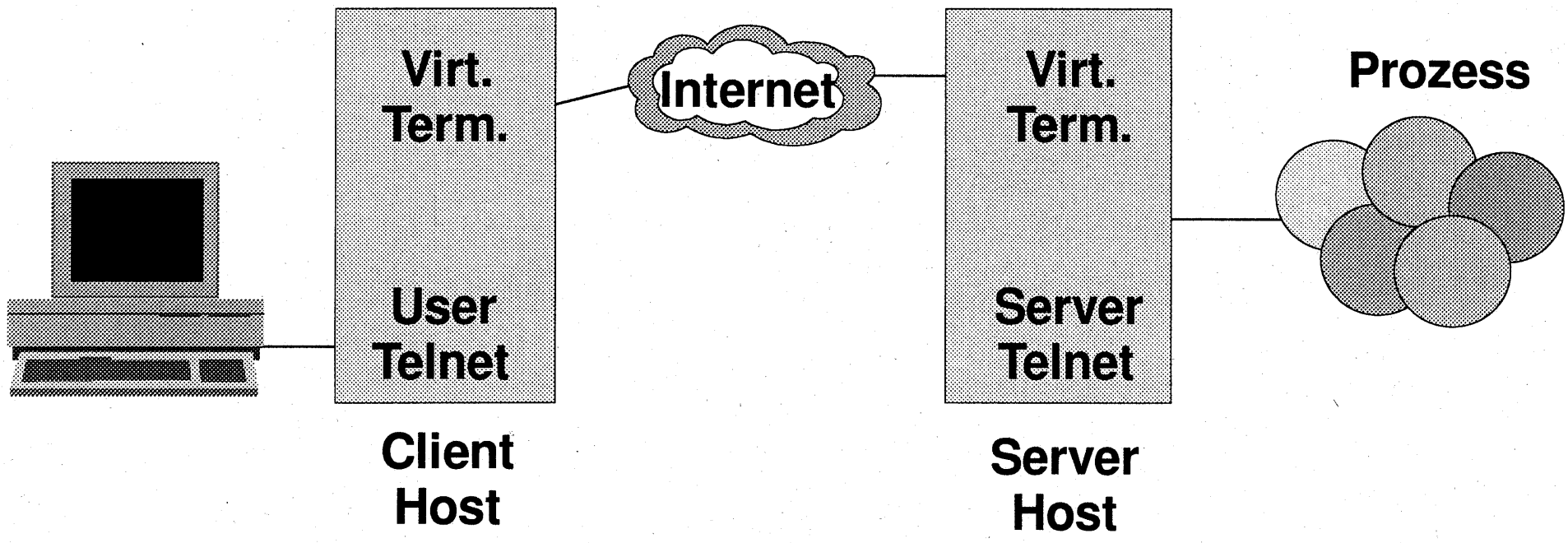


Netzwerk Klassen

- Alle Bit 0 und 1 ist ein Spzialfall
  - Adresse mit nur 0 ==> dieser Host oder dieses NW
  - Adresse mit nur 1 ==> alle Hosts oder alle NWs
- Klasse A Adressen
  - 2^7 -2-1 Netzwerke = 125 (127.0.0.1=loopback)
  - 2^24 -2 Hosts jeweils = 16.777.214
- Klasse B Adressen
  - 2^14 -2 Netzwerke = 16.382
  - 2^16 -2 Hosts jeweils = 65.534
- Klasse C Adressen
  - 2^21 -2 Netzwerke = 2.097.150
  - 2^8 -2 Hosts jeweils = 254

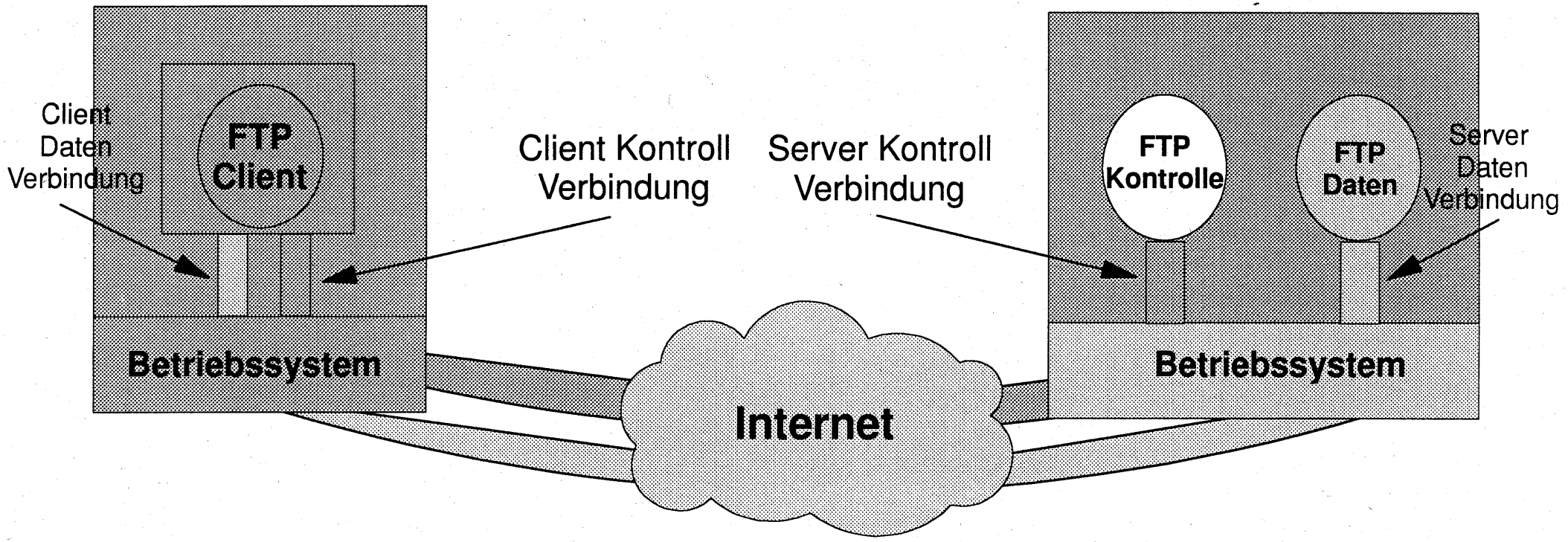
TELNET

Stellt ein Terminal Login zu einem fernen oder lokalen Host zur Verfügung



Das TELNET Protokoll stellt eine Standardschnittstelle zur Verfügung, mittels der der Telnet Client auf die Resourcen eines fernen Hosts so zugreifen kann, als wäre er ein lokales Terminal am Server.

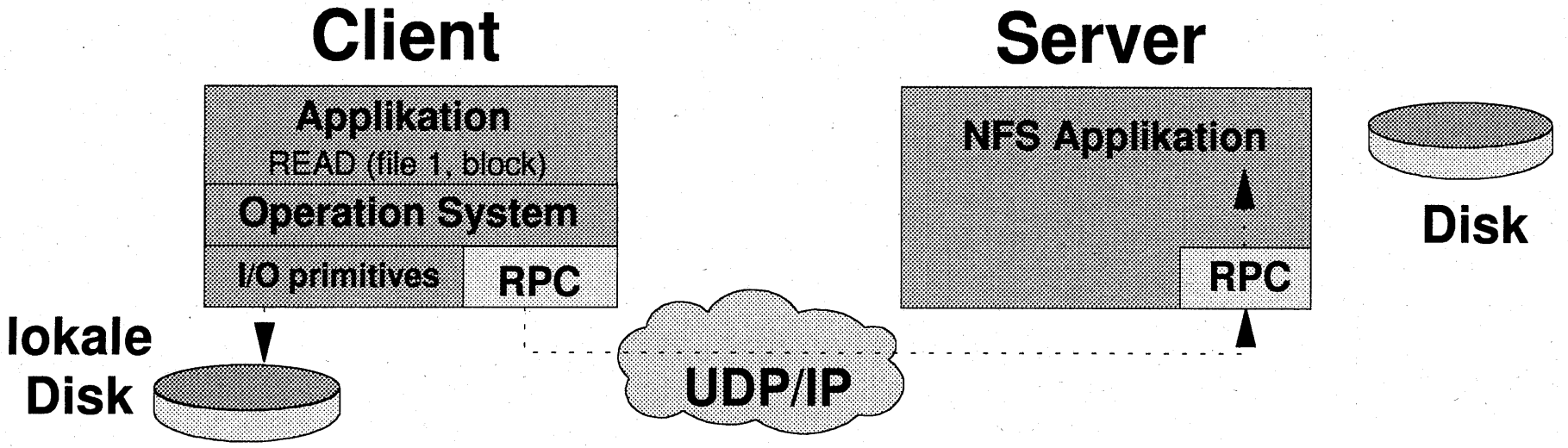
FTP - File Transfer Protokoll



FTP - erlaubt authorisierten Benutzern:

Anmelden an einem fernen System
Ferne Verzeichnisse aufzulisten
Datenaustausch zwischen lokalem und fernem System
Ausführen einiger Kommandos

NFS - Network File System



RPC (Remote Procedure Call) ist ein API (Application Programming Interface)

RPC kann TCP oder UDP als Transport Protokoll verwenden

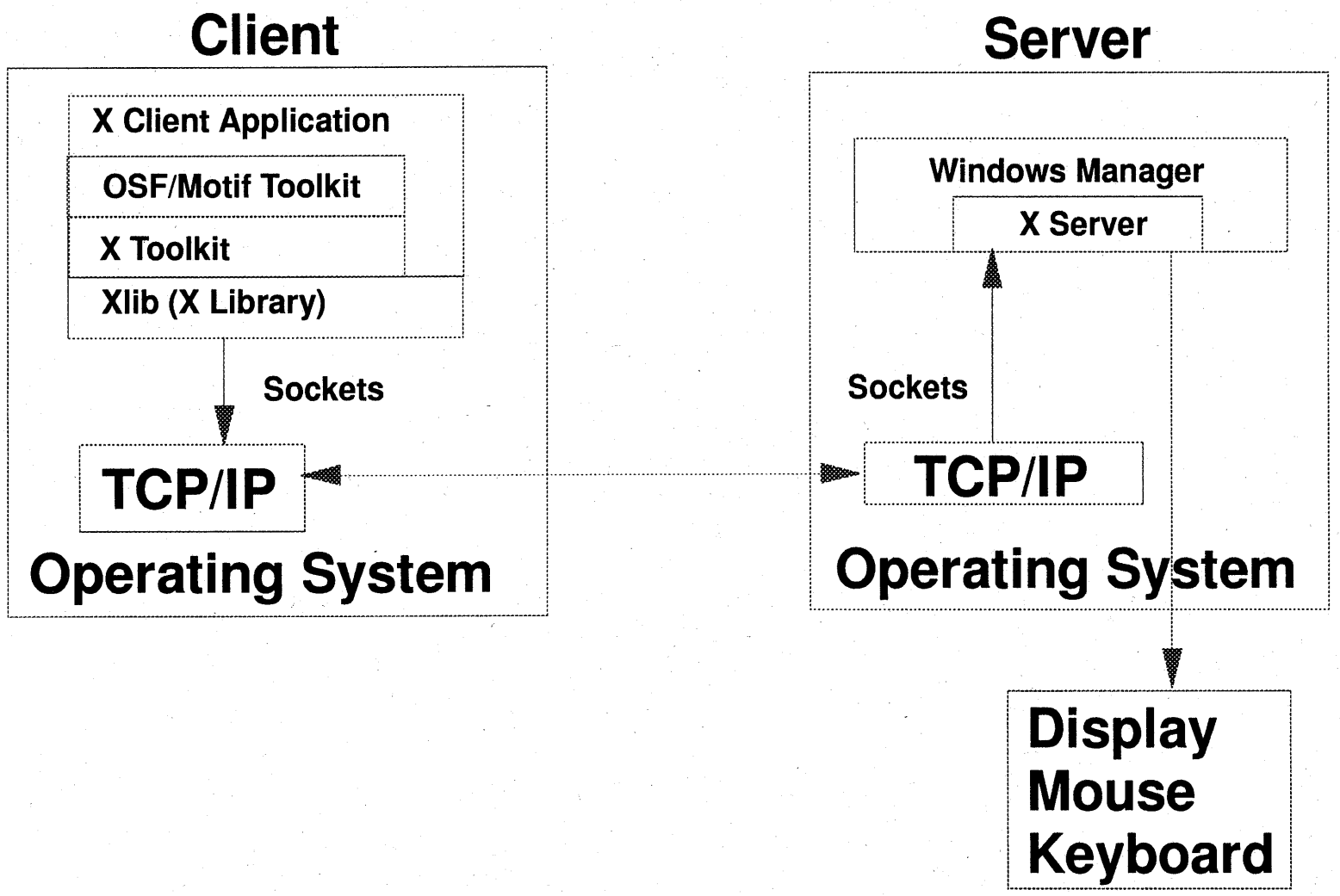
Mount - Protokoll

Ferner Host und fernes Dateisystem (Einordnen in lokales Dateisystem)

NFS-I/O

Lesen/Schreiben, transparenter Zugriff auf Files (wie lokal)

X Windows Server



Internet Connection

Hendrik H. Fulda

TeamOS/2

hhf@teamos2.de

Internet Connection

OS/2 InterNetNews NewsGoups:

comp.os.os2.announce

comp.os.os2.advocacy

comp.os.os2.setup.*

comp.os.os2.networking.*

de.comp.os.os2.*

Internet Realy Chat Channel:

#os/2

OS/2 Mailing Lists:

...

Internet Connection

Nützliche (und nicht so nützliche) Dienstprogramme:

PM-Mail	(pmmail11.zip)
Post Road Mailer	(prm103.zip)
Neologic NetSuite	(neosuiteXX.zip)
Lynn's WorkPlace FTP	(lwpftpXX.zip)
Internet Relay Chat	(irc2_XX.zip)
ISDN/PM	(isdnpmXX.zip)
CapiCom	(ccXXX.zip)
CFOS/2	(cf2bXX.zip)
VoiceChat/2	(vc2XXX.zip)
Assault	(asltXXX.zip)

Internet Connection

FTP Sites:

IBM ftp Server:

software.watson.ibm.com	(CSDs, Info, etc.)
ftp.europe.ibm.com	(Treiber ...)
ftp.ibm.net	(WebExplorer ...)
ftp.pcco.ibm.com	(CSDs, Info, ...)

OS/2 Public Domain / ShareWare ftp Server:

hobbes.nmsu.edu	(!!!)
ftp.cdrom.com	(!!!)
nic.funet.fi	(!!!)
ftp.leo.org	(/pub/comp/os/os2)

Internet Connection

Places to go:

IBM WWW Seiten:

www.ibm.com	(IBM International)
www.ibm.net	(IBM Netzdienste)
www.europe.ibm.com	(IBM Europa)

TeamOS/2 / OS/2 WWW Seiten:

www.teamos2.org	(TeamOS/2 int.)
www.teamos2.de	(TeamOS/2 Dt.)

Nachrichtendienste:

www.spiegel.de
www.timeinc.com

Und...

www.batmanforever.com, www.whitehose.gov
www.mtv.com, www.hotwired.com, ...

Internet Connection

Internet Dienste (Clients für OS/2)

World Wide Web	(WebExplorer)
NetNews	(NR/2, Neologic Netsuite, ..)
e-Mail	(Ultimail/2, PM-Mail, ...)
Internet Relay Chat	(IRC/2, irc_II, gtirc)
Gopher	(Gopher, Neologic Gopher)
Archie	(Archie)
3270 Telnet	(3270 Telnet)
5250 Telnet	(5250 Telnet)

TCP/IP Suite:

telnet	(Zugriff auf entfernte Rechner, telnet)
rlogin	(- " - , rlogin)
ftp	(File Transfer Protocol, ftp, pmftp, ...)
tftp	(trivial File Transfer Protocol, tftp)
finger	(Benutzerinformationen anzeigen, finger)

traceroute (tracerte.exe), ping, nslookup, rsh

Internet Connection

IBM Internet Connection:

Weltweit Einwahlknoten
>18 Einwahlknoten in Deutschland
Einwahlgeschwindigkeit 14.4 kbps / 28.8 kbps

Zugriff auf alle Internetdienste, z.B.

World Wide Web (WWW oder W3)
InternetNews (NetNews oder UseNetNews)
e-Mail (Post Office Protocol 3 Account)
IRC (Internet Relay Chat)

Abrechnung:

Grundgebühr + Stundentarif

Internet Connection

Enthalten in Warp:

Internet Access Kit
DATEX-J (Opalis)
Compuserve Information Manager

Internet Access Kit:

IBM Internet Dialer
Dial Other Internet Providers

Internet Dialer:

PPP / SLIP: TCP/IP Datenstrom zum PC
über asynchone Wählleitung

PPP: Point to Point Protocol
SLIP: Serial Line Internet Protocol

IBM

Fact Sheet

IBM Deutschland Informationssysteme GmbH

Personal Software Marketing

IBM INTERNET CONNECTION SERVICES

IBM Global Network bietet für die aktuelle, Internet geeignete OS/2 Version (OS/2 Warp Version 3) die IBM Internet Connnection Services an. Die IBM Internet Connection Services sind weltweite Dienste, die in jedem Land, in dem IBM Global Network angeboten werden, zugänglich sind. Sie bieten einen vollständigen Internet Zugang. Die notwendige Software, das IBM Internet Access Kit (IAK), ist im BonusPak von OS/2 Warp Version 3 enthalten.

Schwerpunkte

- o Uneingeschränkter Zugang zum Internet
- o Anwendungsdienste, die einfach die Informationsquellen des Internet zugänglich machen.
- o Software für E-Mail, Gopher, FTP, Telnet, WWW, Informationsbörsen usw.
- o Kundenunterstützung durch die IBM, um die Nutzung des Internet zu erleichtern

Beschreibung	Die IBM Internet Connection Service verknüpfen wirksam Software und Netzdienstleistungen für den Zugang zum Internet. Hierbei werden alle Standard - Internet - Funktionen, als auch die neuen 'Hypermedia' Dienstleistungen zur Verfügung gestellt, die einen interaktiven Zugang zu Text-, Bild- und Sprachdaten über eine Schnittstelle gestatten. Die IBM Internet Connection Services umfassen folgende Dienste: o Zugangsdienste: Wählzugänge, Sicherheit und Verbindungsmöglichkeiten o Anwendungsdienste: Navigations- und Anwendungstest-Hilfen o Unterstützende Dienste: Betreuung und Hilfen beim Umgang mit dem Service Diese Services wurden zur besseren Interaktion mit Internet entwickelt. Sie verringern die Komplexität im Internet-Umfeld.
Zugangsdienste	DER DIREKTE INTERNET ZUGANG erweitert die derzeitigen Möglichkeiten von Festleitungs- und Wählleitungs-Diensten zu umfassenden Anschlußmöglichkeiten eines TCP/IP Knotens DIE ZUGANGSSICHERUNG ermöglicht dem Benutzer ein sicheres Arbeiten in seinem Unternehmensumfeld. Dabei behält er die Kontrolle über den Zugang zu den Internet-Informationsquellen weiter in seiner Hand DER GLOBALE ZUGANG erweitert die Möglichkeiten zur Teilnahme an Internet-Diensten über das IBM Global Network mit seinen weltweiten Schwestergesellschaften und Joint Ventures. DIE ZUGANGSKNOTEN erlauben dem Benutzer über weltweit verfügbare Gateways die Internet Nutzung
Anwendungsdienste	TCP/IP PROTOKOLL UNTERSTÜTZUNG wie TELNET, File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), POP3, WHOIS, PING und weitere TCP/IP Anwendungen NEUIGKEITEN ÜBER DAS NETZ stehen dem IBM Kunden in speziell entwickelten Nachrichtenbörsen zur Verfügung. Er hat die Möglichkeit, an Diskussionsrunden teilzunehmen NAVIGATIONSMITTEL erleichtern dem Benutzer den Umgang mit dem Netz durch Anwendungen zur Auffindung von Information im Internet, wie Gopher, Archie und World Wide Web (WWW)

Unterstützungsdienste	DIE KUNDENBETREUUNG hilft den IBM Kunden bei Fragen zum Internet, als auch bei Fragen zu Zugang, Navigation, Einrichtung und zur Verwendung anderer IBM Global Network Services im Zusammenhang mit Internet Diensten DIE SERVER-UNTERSTÜTZUNG bietet ein Informationsumfeld für Benutzer der Internet Connection Services, die Internet Server Techniken wie FTP, Gopher und WWW einsetzen. DER DOMAIN-NAMENSDIENST führt die erforderlichen Funktionen für die primären und sekundären Domain-Namens-Server des Kunden aus.
Registrierung	Das OS/2 WARP enthält in seinem Bonuspaket ein Internet Access Kit. In ihm sind die Rufnummern zur elektronischen Registriereinrichtung gespeichert. Nach Anklicken des entsprechenden Symbols, wird von der Anwendung eine Wählverbindung zu einem Registrierungs-Server aufgebaut. Bei der Registrierung wird zur Aufrechterhaltung des Kontaktes mit dem Kunden nach Namen, Adresse und nach seinen Kreditkartendaten gefragt. Danach werden ihm eine Benutzernummer, eine E-Mail Adresse und ein Kennwort zugeordnet. Unmittelbar danach kann er den nächsten IBM Zugangsknoten anwählen, um zum Internet zu gelangen. Die Rufnummern der vorhandenen Zugangsknoten werden im OS/2 WARP in der Anwendung 'Internet Dialer' bereitgestellt. Der Benutzer wählt daraus die für ihn günstigste Rufnummer aus.
Preise	Die Service-Preise bekommt der Kunde während des Registrierungsprozesses auf seinem Bildschirm angezeigt. Für Testzwecke sind die ersten 3 Stunden kostenlos. Der Preis (Preisstand 1.8.95, zuzüglich MwSt.) besteht aus - einer einmaligen Anschlußgebühr von 60,--DM (bei Anmeldung bis 31.12.95 wird diese nicht erhoben) - einer monatlichen Gebühr von 26,--DM, bei 3 Stunden freier Nutzungszeit oder einer monatlichen Gebühr von 52,-- DM, bei 30 Stunden freier Nutzungzeit - einer zusätzlichen Gebühr von 7,--DM, für jede Stunde, die über die monatlichen 3 Stunden bzw. 30 Stunden hinausgeht
Abrechnung	Die Abrechnung erfolgt in nationaler Währung. Zusammen mit den nationalen Steuern bekommen alle Kunden in den Ländern außerhalb der USA ihr Kreditkartenkonto mit der für sie zutreffenden Forderung belastet.
Leistungsmerkmale	- World Wide Web (WWW oder W3) Browser - Gopher - FTP - Telnet - E-Mail (Ultimedia Mail/2 'Lite') - NewsReader/2 - SLIP Dialer - alle gängigen TCP-Kommandos (ping, finger, whois, ftp, telnet, etc.) - Online Software Update Tool - IBM Internet Registrierung / Customer Support online
Hardwarevoraussetzungen	• IBM Personal Computer oder kompatible • Hayes-kompatibles Modem
Softwarevoraussetzungen	• OS/2 Warp Version 3
Sprachen	• Englisch
Unterstützung	• HelpDesk: 0130-821141 (Montag bis Freitag zwischen 9:00 bis 24:00 Uhr)
Netzdienste	Der Zugang zum Internet wird durch IBM Global Network zur Verfügung gestellt. Auskünfte über Telefon 0130-829440

In folgenden Städten sind zur Zeit Internet Einwählknoten von IBM Global Network verfügbar:

030-7231021	Germany Berlin
0351-4903571	Germany Dresden
0211-432155	Germany Duesseldorf
07034-30705	Germany Ehningen
0361-6442450	Germany Erfurt
069-6668542	Germany Frankfurt
0761-2020932	Germany Freiburg
040-6301861	Germany Hamburg
0511-9524744	Germany Hannover
0341-9608340	Germany Leipzig
089-334781	Germany Muenchen
0911-813043	Germany Nürnberg
0381-4004800	Germany Rostock
0681-31362	Germany Saarbrücken
0711-7800264	Germany Stuttgart

Folgende Preisstruktur für IBM Global Network Internet Zugang ist ab 1.8.1995 gültig:

Die Service-Preise bekommt der Kunde während des Registrierungsprozesses auf seinem Bildschirm angezeigt. Für Testzwecke sind die ersten 3 Stunden kostenlos.

Der Preis (Preisstand 1.8.95, zuzüglich MwSt.) besteht aus

- einer einmaligen Anschlußgebühr von 60,--DM (bei Anmeldung bis 31.12.95 wird diese nicht erhoben)
- einer monatlichen Gebühr von 26,--DM, bei 3 Stunden freier Nutzungszeit oder

- einer monatlichen Gebühr von 52,-- DM, bei 30 Stunden freier Nutzungszeit

- einer zusätzlichen Gebühr von 7,--DM, für jede Stunde, die über die monatlichen 3 Stunden bzw. 30 Stunden hinausgeht

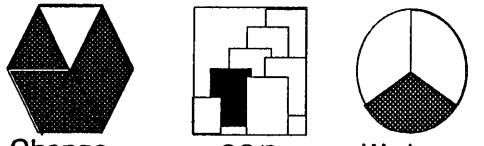
SAN MARINO	SM	SMR	674
SAO TOME AND PRINCIPE	ST	STP	678
SAUDI ARABIA	SA	SAU	682
SENEGAL	SN	SEN	686
SEYCHELLES	SC	SYC	690
SIERRA LEONE	SL	SLE	694
SINGAPORE	SG	SGP	702
SLOVAKIA (Slovak Republic)	SK	SVK	703
SLOVENIA	SI	SVN	705
SOLOMON ISLANDS	SB	SLB	090
SOMALIA	SO	SOM	706
SOUTH AFRICA	ZA	ZAF	710
SOUTH GEORGIA AND THE SOUTH SANDWICH ISLANDS	GS	SGS	239
SPAIN	ES	ESP	724
SRI LANKA	LK	LKA	144
ST. HELENA	SH	SHN	654
ST. PIERRE AND MIQUELON	PM	SPM	666
SUDAN	SD	SDN	736
SURINAME	SR	SUR	740
SVALBARD AND JAN MAYEN ISLANDS	SJ	SJM	744
SWAZILAND	SZ	SWZ	748
SWEDEN	SE	SWE	752
SWITZERLAND	CH	CHE	756
SYRIAN ARAB REPUBLIC	SY	SYR	760
TAIWAN, PROVINCE OF CHINA	TW	TWN	158
TAJIKISTAN	TJ	TJK	762
TANZANIA, UNITED REPUBLIC OF	TZ	TZA	834
THAILAND	TH	THA	764
TOGO	TG	TGO	768
TOKELAU	TK	TKL	772
TONGA	TO	TON	776
TRINIDAD AND TOBAGO	TT	TTO	780
TUNISIA	TN	TUN	788
TURKEY	TR	TUR	792
TURKMENISTAN	TM	TKM	795
TURKS AND CAICOS ISLANDS	TC	TCA	796
TUVALU	TV	TUV	798
UGANDA	UG	UGA	800
UKRAINE	UA	UKR	804
UNITED ARAB EMIRATES	AE	ARE	784
UNITED KINGDOM	GB	GBR	826
UNITED STATES	US	USA	840
UNITED STATES MINOR OUTLYING ISLANDS	UM	UMI	581
URUGUAY	UY	URY	858
UZBEKISTAN	UZ	UZB	860
VANUATU	VU	VUT	548
VATICAN CITY STATE (HOLY SEE)	VA	VAT	336
VENEZUELA	VE	VEN	862
VIET NAM	VN	VNM	704
VIRGIN ISLANDS (BRITISH)	VG	VGB	092
VIRGIN ISLANDS (U.S.)	VI	VIR	850
WALLIS AND FUTUNA ISLANDS	WF	WLF	876
WESTERN SAHARA	EH	ESH	732
YEMEN	YE	YEM	887
YUGOSLAVIA	YU	YUG	891
ZAIRE	ZR	ZAR	180
ZAMBIA	ZM	ZMB	894
ZIMBABWE	ZW	ZWE	716

List of changes applied, as specified in registration newsletters:

Newsletter III-1, 1989-12-5:

LAN Systems Management Platform

NetView for OS/2



QUESTIONS, QUESTIONS!

- What hardware/software is installed?
- Where is it?
- Who's using what and how is it being used?
- When do you need more disk space/memory?
- How do I proactively manage my network?
- Can I reduce support staff through automation?
- Are my servers at capacity?
- How can I utilize my budget and resources more effectively?

What is NetView for OS/2?

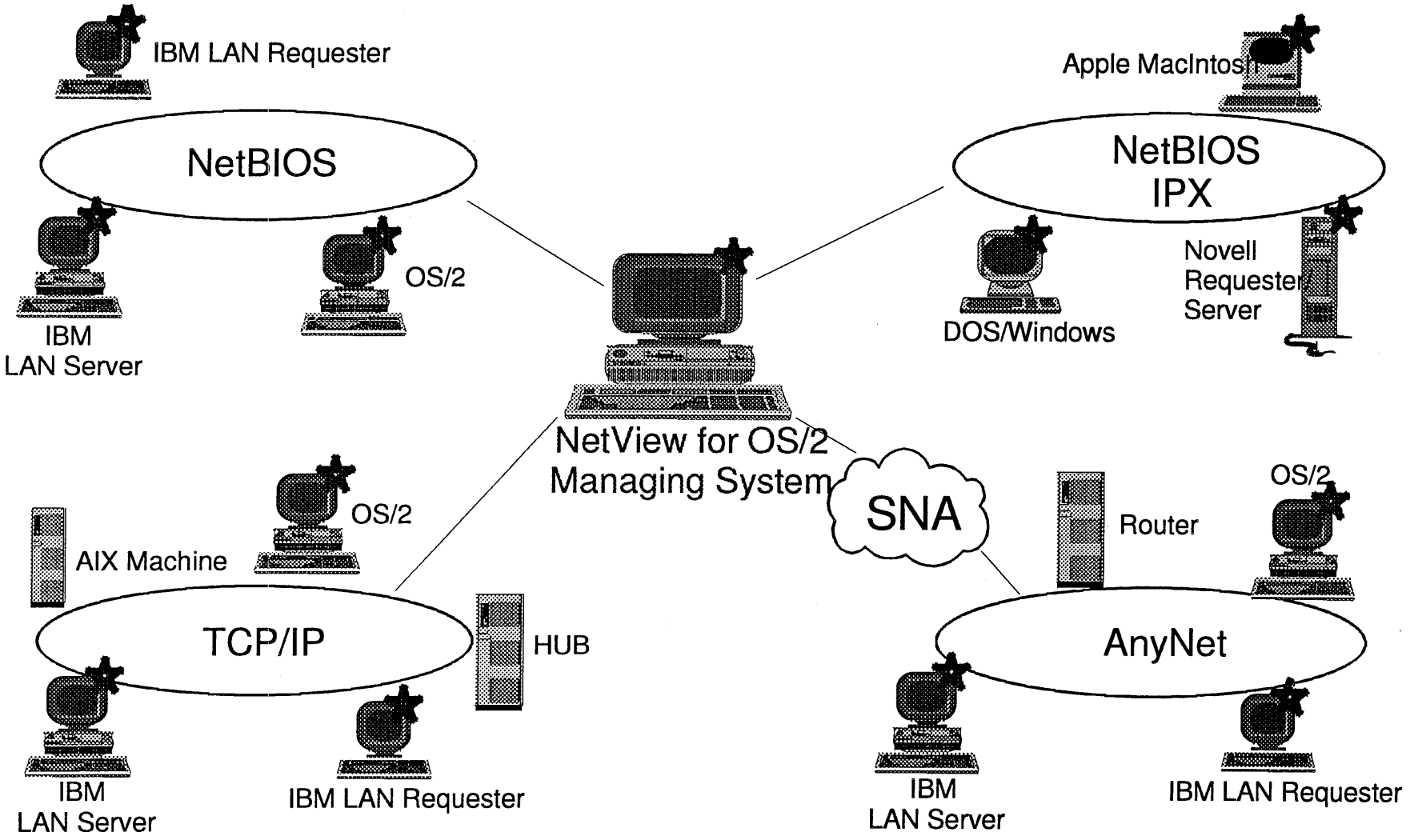
- The follow on product to LAN NetView
- A SNMP Management Platform
  - OS/2 based
  - provides built in Management Tools
  - provides management for any device with an SNMP Agent
- Centered on a Manager/Agent Relationship

What is NetView for OS/2?

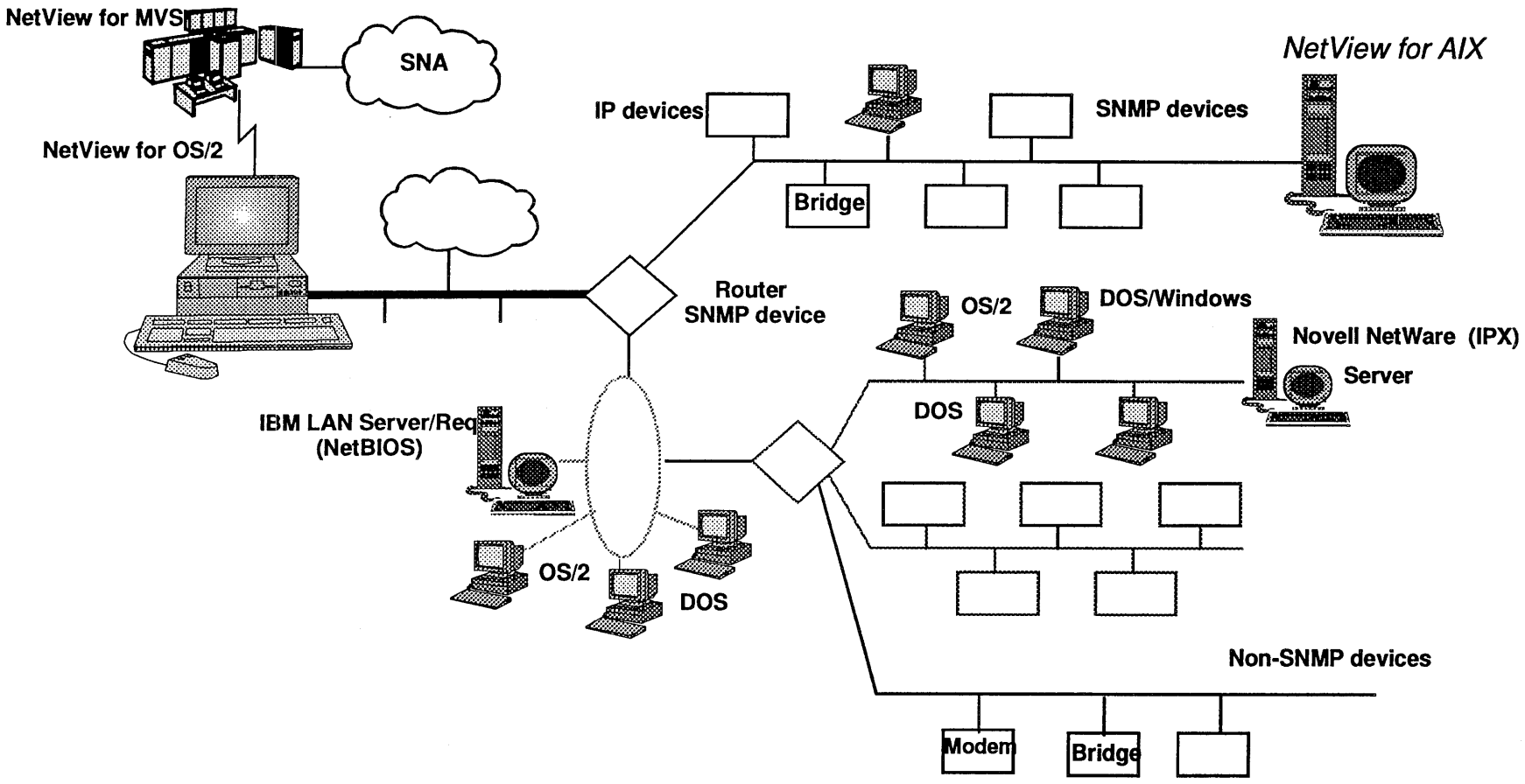
- A Management System for
  - administering
  - controlling and
  - monitoring devices that make up heterogeneous multivendor LANs and WANs

- A platform which allows users to write their own Management Applications
  - SNMP API's
  - Management Desk API's

NetView for OS/2 Overview

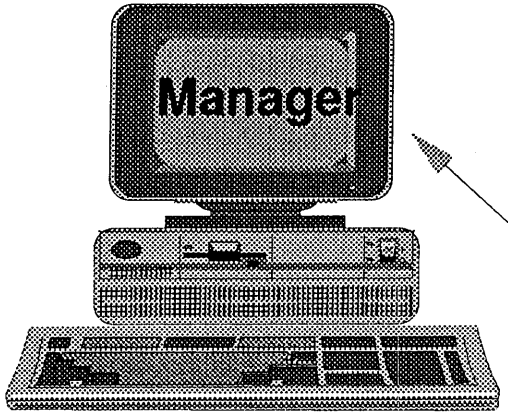


Heterogeneous Management

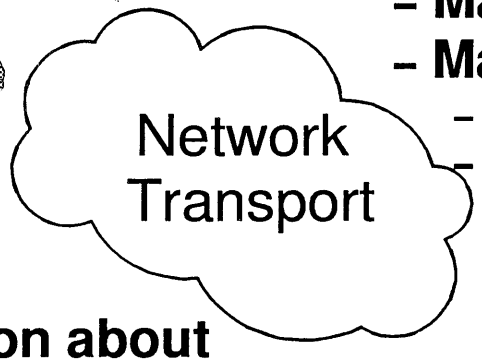


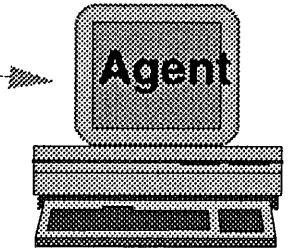
- Variety of devices/protocols
- Variety of Management methods
- How to manage?

Manager/Agent Relationship

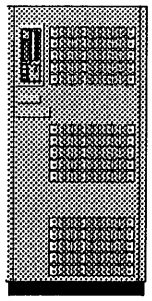


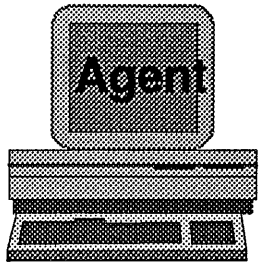
- Manager
  - Has a user interface (Admin)
  - Executes Management Applications
  - Gets information from Agent systems
  - Issues commands to Agent systems
  - May also be an Agent
  - May send information to Higher-Level Mgr
    - NetView for AIX or Other SNMP Mgr
    - NetView for MVS





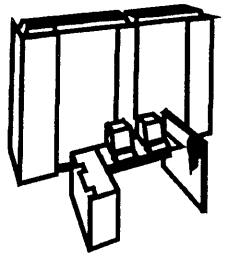
Agent





- Agent
  - Collects information about itself via Agent(s)
  - Keeps information in a Management Information Base (MIB)
  - Provides information to managing system
  - Takes actions as directed from the managing system (Policies, scheduled events)

NetView for OS/2 Overview



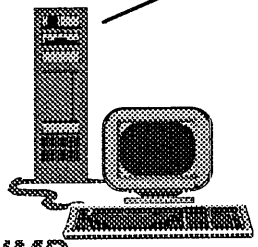
Host NetView
(NetView for MVS)

Management Desk

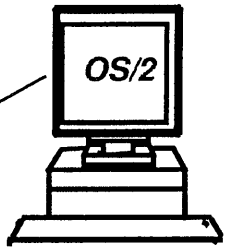
Fault Applications	*Performance Applications*
Configuration Applications	*SNMP /Operation Host Connect*

VENDOR APPLICATIONS

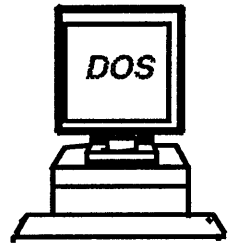
NetView for OS/2



Other SNMP Management Platform
- *NetView for AIX*
- *HP OpenView*
- *etc.*



SNMP Agents
Agents for OS/2,
LAN Server
LAN Requester



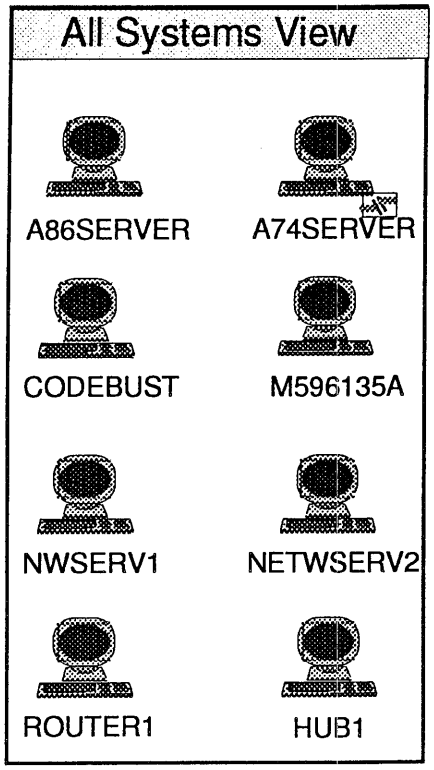
LMU Agents
OS/2 1.3
DOS, DOS/Windows
Novell Server/Req
Apple MacIntosh

Graphical User Interface
Supports Industry Standard SNMP APIs
SNMP Agents (OS/2 2.x, LS, LR)
LMU Agents (OS/2 1.3, DOS, Windows 3.1,
Novell NetWare Servers/Req 3.11+, MacIntosh

NetView for OS/2 Features

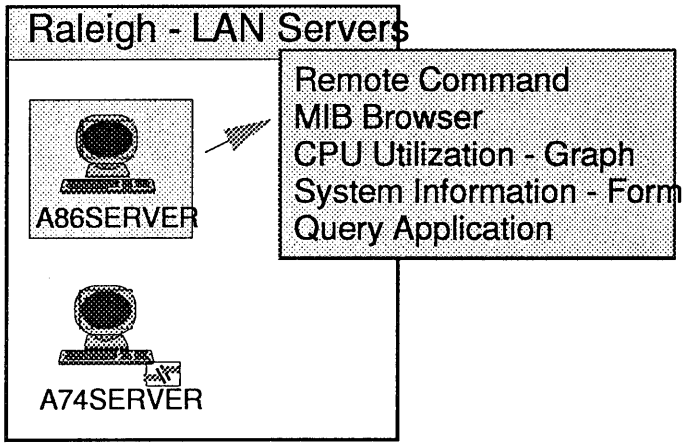
- Auto Discovery & display of resources
  Customizable views
- Dynamic Status updates
- Built-in Management Tools
  Fault, Config, Performance, Grapher
- Automation
- Multiprotocol Transport (SNMP)
  TCP/IP, NetBIOS, IPX
  SNA (w/AnyNet)
- SNMP Applications/Tools
  MIB Browsing
  MIB Application Builder
  MIB Loader
  Data Collector
- File Transfer & File Monitoring
- Asset Inventory
- Alert Connectivity to NetView for MVS
- ONE PACKAGE!!!!
  All Applications/Tools included
  LMU Included
  SNMP Agents included

Management Desk

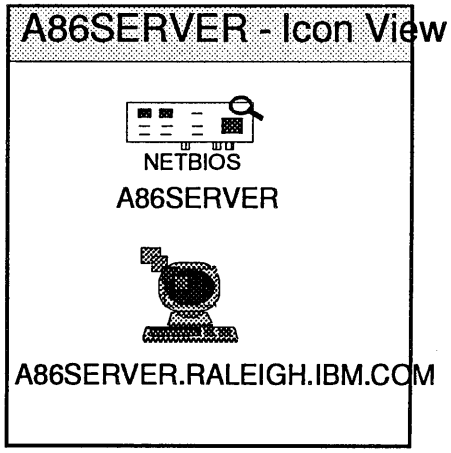


All Discovered Systems

Customized Management Collection
of LAN Servers located in Raleigh



Detailed View
of A86SERVER

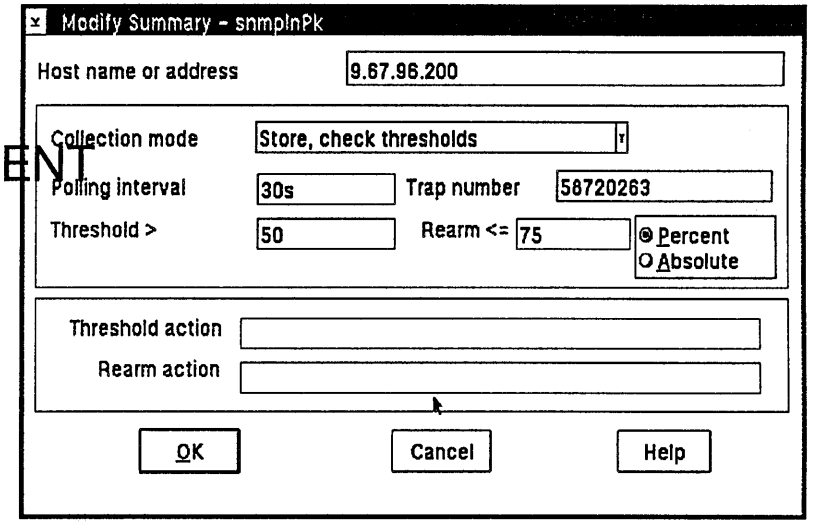


- CONSISTENT END-USER INTERFACE
- CUA 91 COMPLIANT
- BASED ON THE WORKPLACE SHELL
- APPLICATION INTEGRATION
- CUSTOMIZABLE VIEWS (Management Collections)

Performance Management

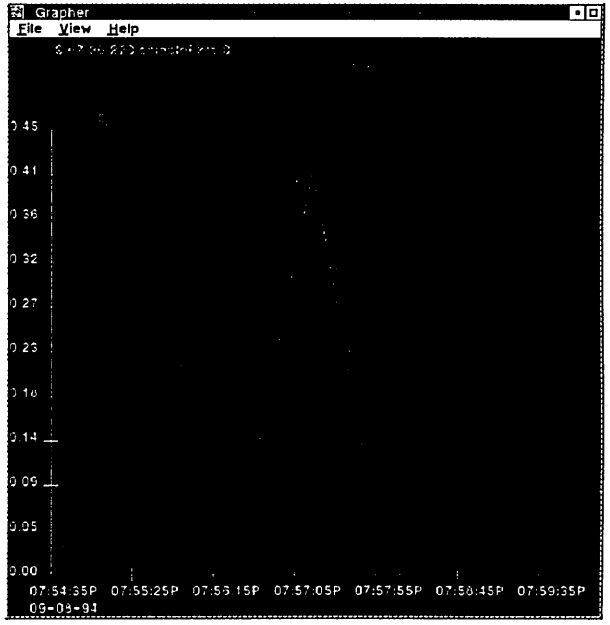
Data Collector

- POLICY-BASED PERFORMANCE MANAGEMENT
- DETAILED PERFORMANCE METRICS
  (using LS, LR, OS/2 Agents)
- THRESHOLD MONITORING
- GRAPHING--BOTH REAL TIME AND FROM STORED DATA
- SUPPORT FOR ANY SNMP AGENTS,
  (E. G. OS/2, WINDOWS NT, ROUTERS, HUBS.)
- REMOTE UNATTENDED SUPPORT



Scenario

- Watch CPU Utilization (>80%)
- When CPU threshold hit
  1) Set off Music Alarm
  2) Page Administrator
  3) NET STOP SERVER (?)

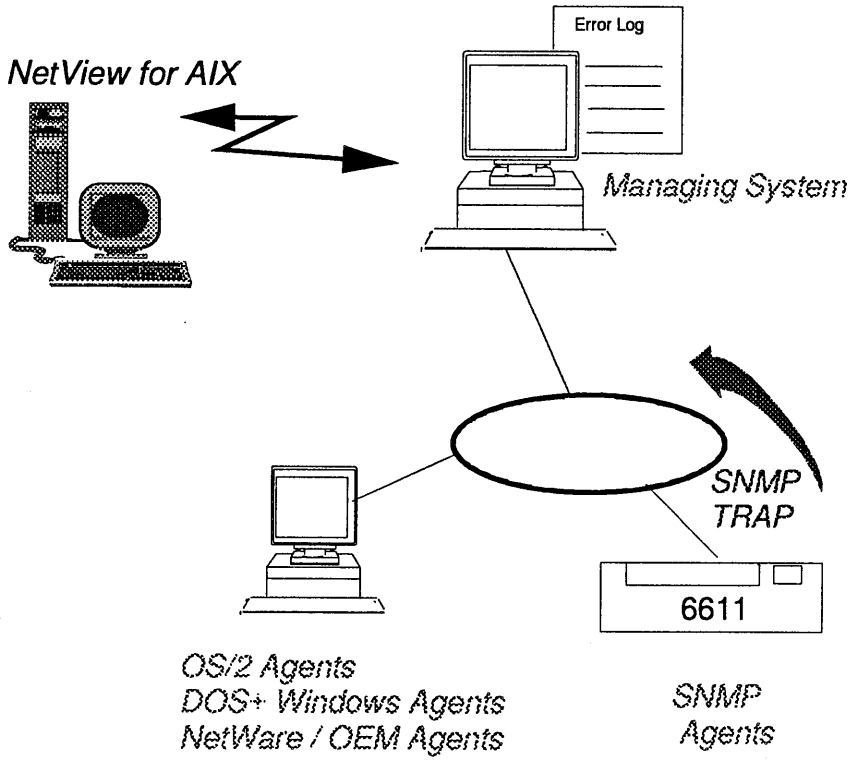


Fault Management

Event Display / Event Automation

NetView for OS/2 manages network resources by collecting and filtering events.

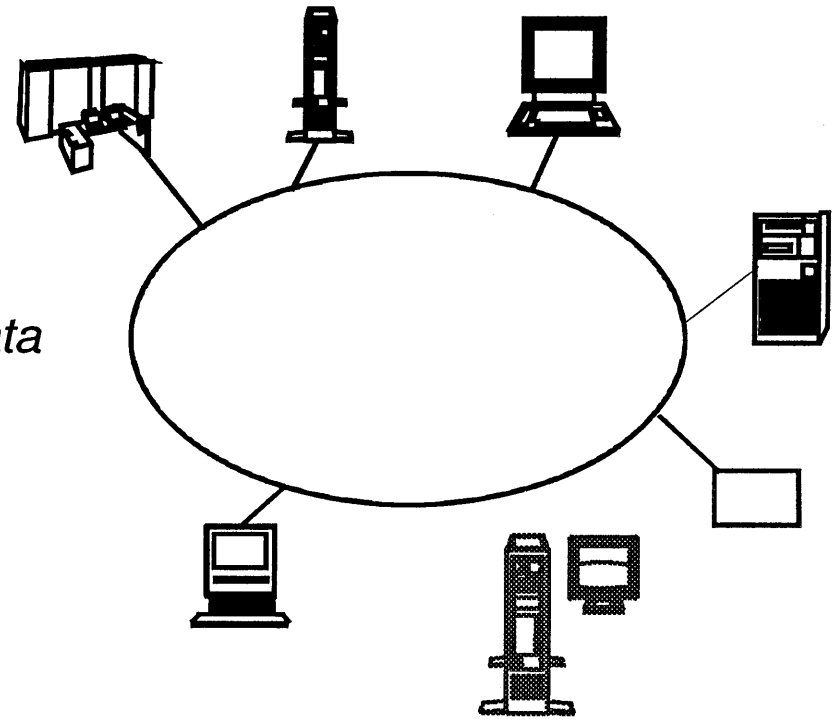
- *Receives hardware and software fault notifications via TRAPS*
- *Event Display: Creation, Display,Logging of TRAPS*
- *Automation : based on TRAP type (OID)*
- *Forwarding of TRAPS:*
  NetView for MVS
  NetView for OS/2
  NetView for AIX or any SNMP Manager



OS/2 System Policy

Configuration Management

Monitors and manages hardware and software workstation resources.

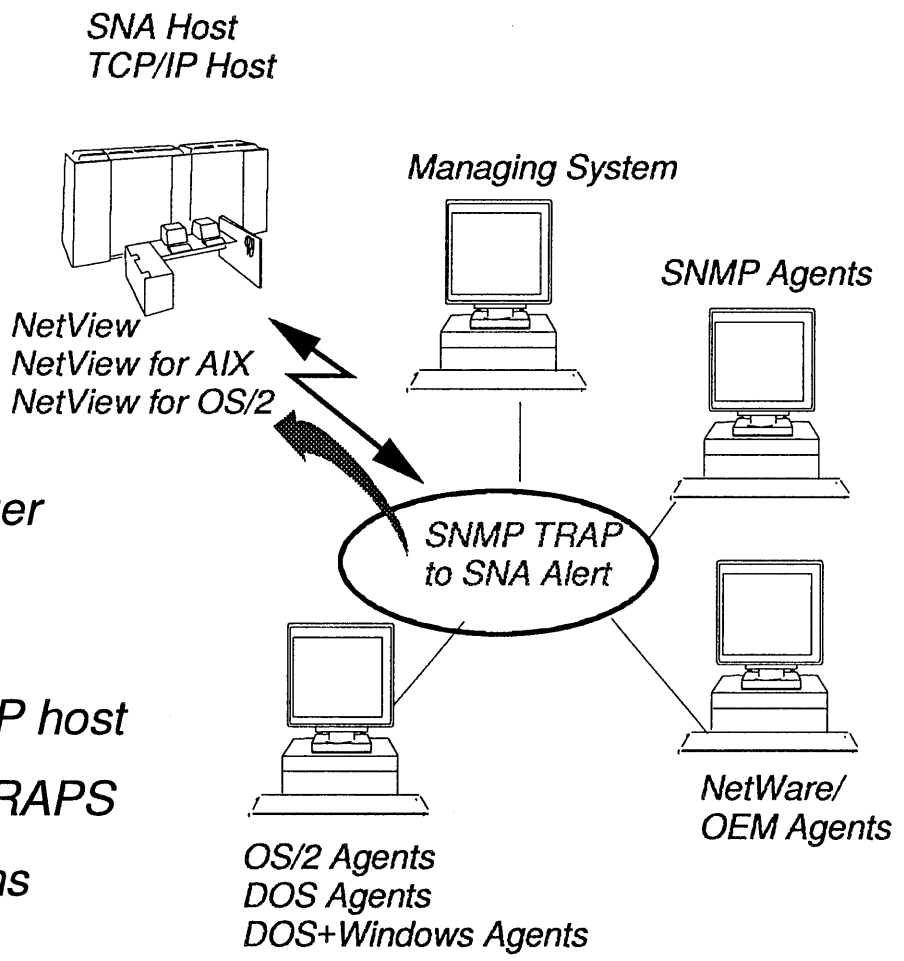


- *Collects hardware and software inventory data*
- *Monitors selected workstation files*
- *Scheduling:*
  - *-Will run programs ,commands, procedures*
  - *- File Transfer*
  - *- VPD data collect*
- *All above items scheduled or run immediately*

Alert and Trap Forwarding

NetView Host Connection

NetView for OS/2 allows a NetView operator to receive notifications from NetView for OS/2.



- *Transforms SNMP Traps into SNA alerts*
- *Forwards Traps to another SNMP manager*
- *Receives RUNCMDs from NetView host (CM/2 , ROPS required)*
- *Receives REXEC commands from TCP/IP host*
- *Enables NetView automation of SNMP TRAPS*
- *Allows a hierachy of management systems*

NetView for OS/2 - SNMP Agents

SNMP Daemon

Standard SNMP Agent (object)

MIB II Sys Object

SIA Sub-Agent

SIA (System Information Agent) - Sub-Agent

Host Resource MIB, System Monitor/6000 MIB

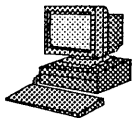
OS/2 Performance Metrics (CPU Utilization, etc)

LAN Server Sub-Agent

Operation State

LAN INI file

 # logons, LAN Server metrics



LAN Requester Sub-Agent

Operation State

LAN INI file

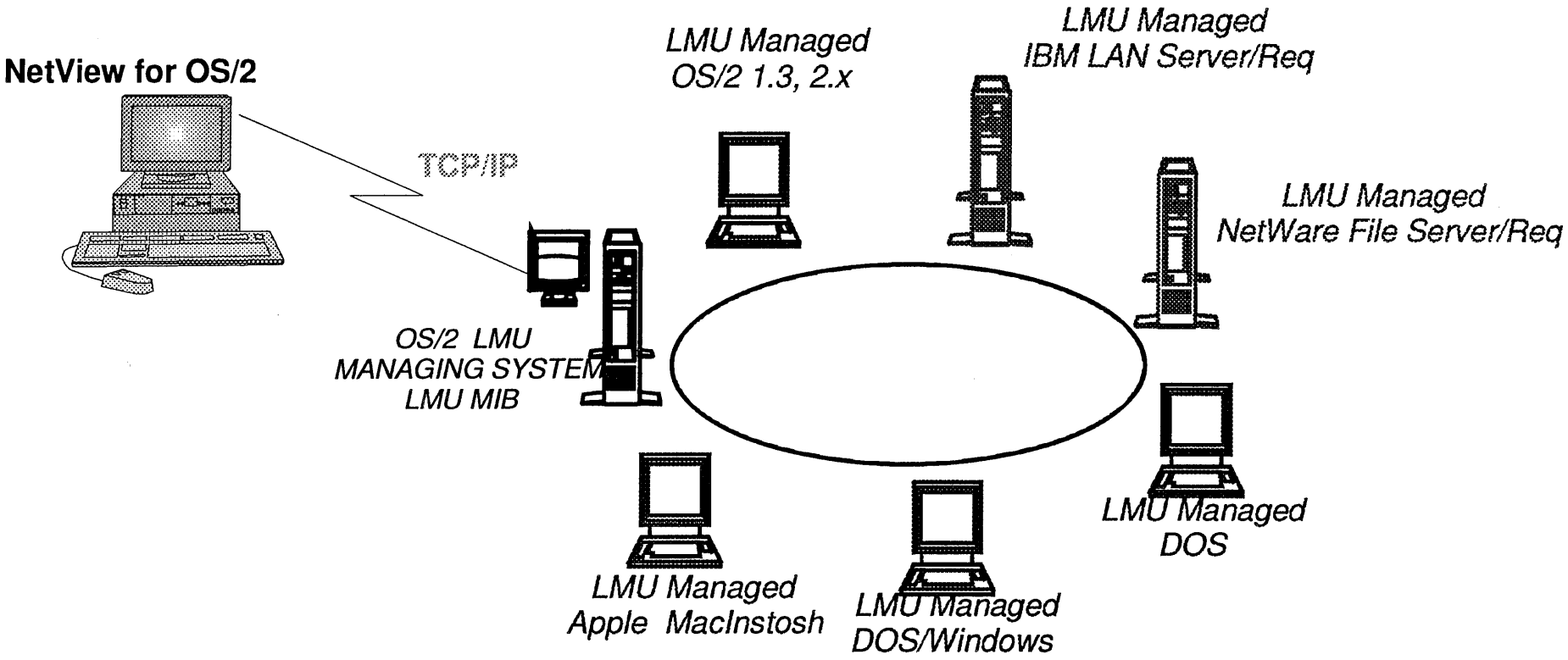
Version level, LR info

NetView for OS/2 SNMP Agents

- **All Sub-Agents generate TRAPS**
- **Agents can be monitored by any SNMP Manager**
- **Robust set of management objects for OS/2 Resources**

- **Vendor SNMP Agents**
  - **Support is based on SNMP agent capability**
  - **Novell NetWare (SNMP Agent - TRAPS)**

Non-SNMP Agent Support



- ***Agents above are from LAN NetView Management Utilities, provided with NetView for OS/2***
- ***Managed System Support for DOS 5.0+, Windows Clients***
- ***Minimal RAM/DASD Requirements***

NetView for OS/2 Positioning

NetView for OS/2 vs NetView for AIX vs NetView for Windows

- Operating System
- What can it Manage? (Device Specific Applications)
- How many can it manage? (Performance)
- Manager to Client Communications (Protocols)

NetView for OS/2 vs NetFinity

- Platform versus Element Management System

NetView for OS/2 vs DCAF

- Platform versus Application / Utility
- Remote Commands versus Remote Control

NetView for OS/2 Information

Announce Date

September 13, 1994

General Availability

November, 1994

Licensing

1 License per Managing System
Agents at NO ADDITIONAL charge
Includes LMU for Agent Support

For More Information

See your IBM representative, Dealer, or Service Provider
More info and materials to be on MKTTOOLS
- Flyers,Brochures, Storyboard, White papers
- NetView Association Members

Summary

IBM NetView for OS/2 Provides:

– *A single Focal Point for LAN-Based Systems Management.. for the Server and Desktop*

Single Piece of Glass

– *for IBM, Novell NetWare, IP Nodes*

IBM Systems Management Solutions:

– *Making it Easier to Install and Maintain your LANs , Workstations , and Servers*

– *Making Client/Server Computing a Reality with State-of-the-art Management Systems*

TRADEMARKS

The following trademarked products are referenced in this presentation:

IBM Trademarks

IBM	PS/2 (r)
MVS	Presentation Manager
NetView (r)	SNA
OS/2 (r)	NETBIOS
OS/2 ES (r)	SystemView
AIX	NetView for AIX
SAA	Systems Application Architecture
SQL	

NON-IBM Trademarks

DOS	Windows
Novell	NetWare
Hewlett Packard	OpenView
Open Software Foundation	
OSF	DME
X/OPEN	
ProTools	Protilizer
XCELLENET	XRAM
Cheyenne Systems	ARCServ
SYTRON	SYTOS+
MICROCOM	LANlord

(r) Indicates Registered Trademark

Additional Charts

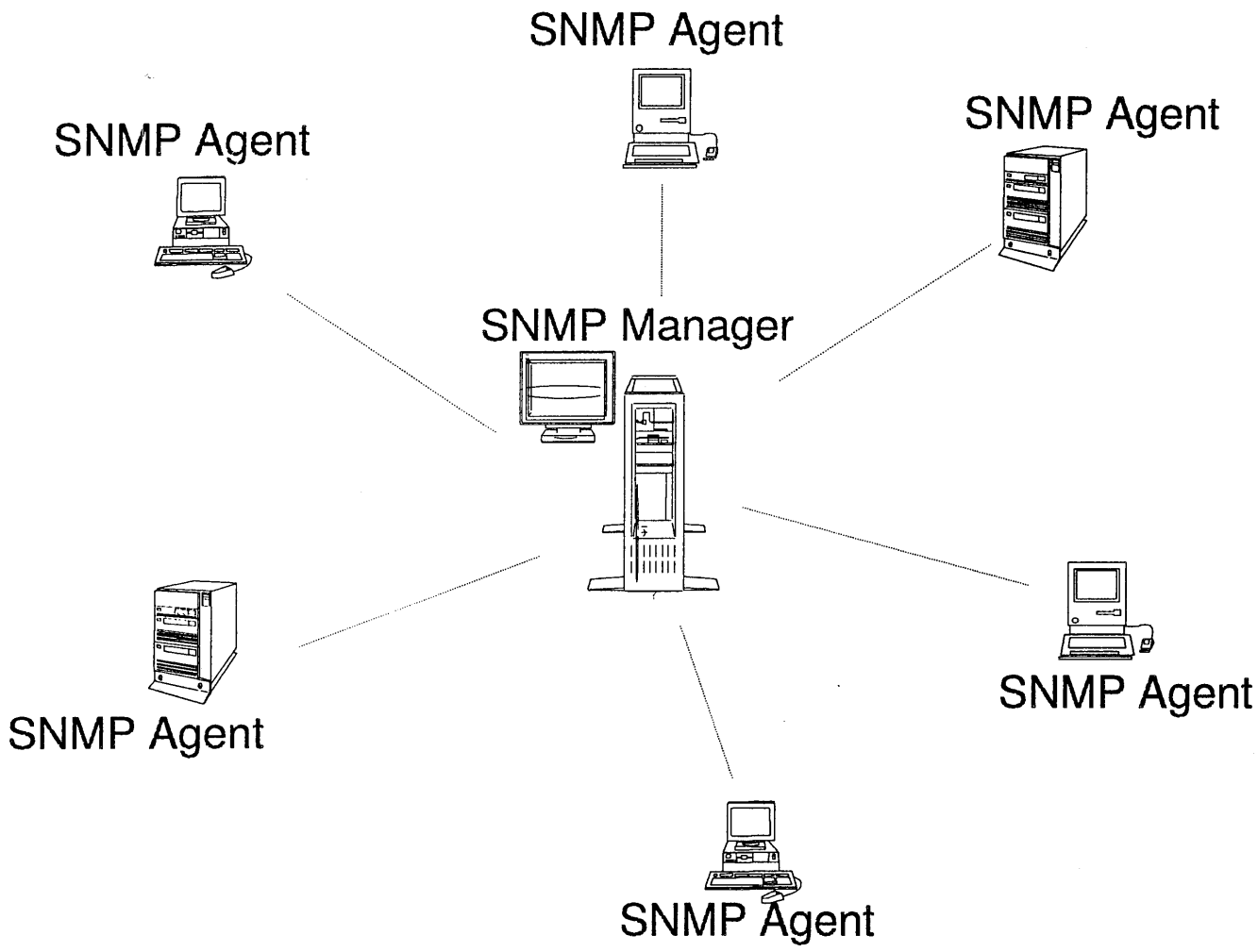
Simple Network Management Protocol

- Provides Centralized Network Management
- Designed to be Simple to Implement
- Has expanded to manage systems
- Statistics and Alarms
- Device Control (Vendor extensions)
- Broadly supported standard
- Industry Standard for Open Management Platform
- SNMP API's published for use by Vendors

SNMP Terminology

- Network Element - equipment in a network
- Client or Agent - Software in a network element that responds to SNMP
- Management Station or Management Platform - computer with software that generates requests to SNMP Agent
- Trap - Unsolicited message from Agent to Manager

SNMP Terminology



SNMP Manager/Agent Roles

SNMP Manager

Maintains centralized information

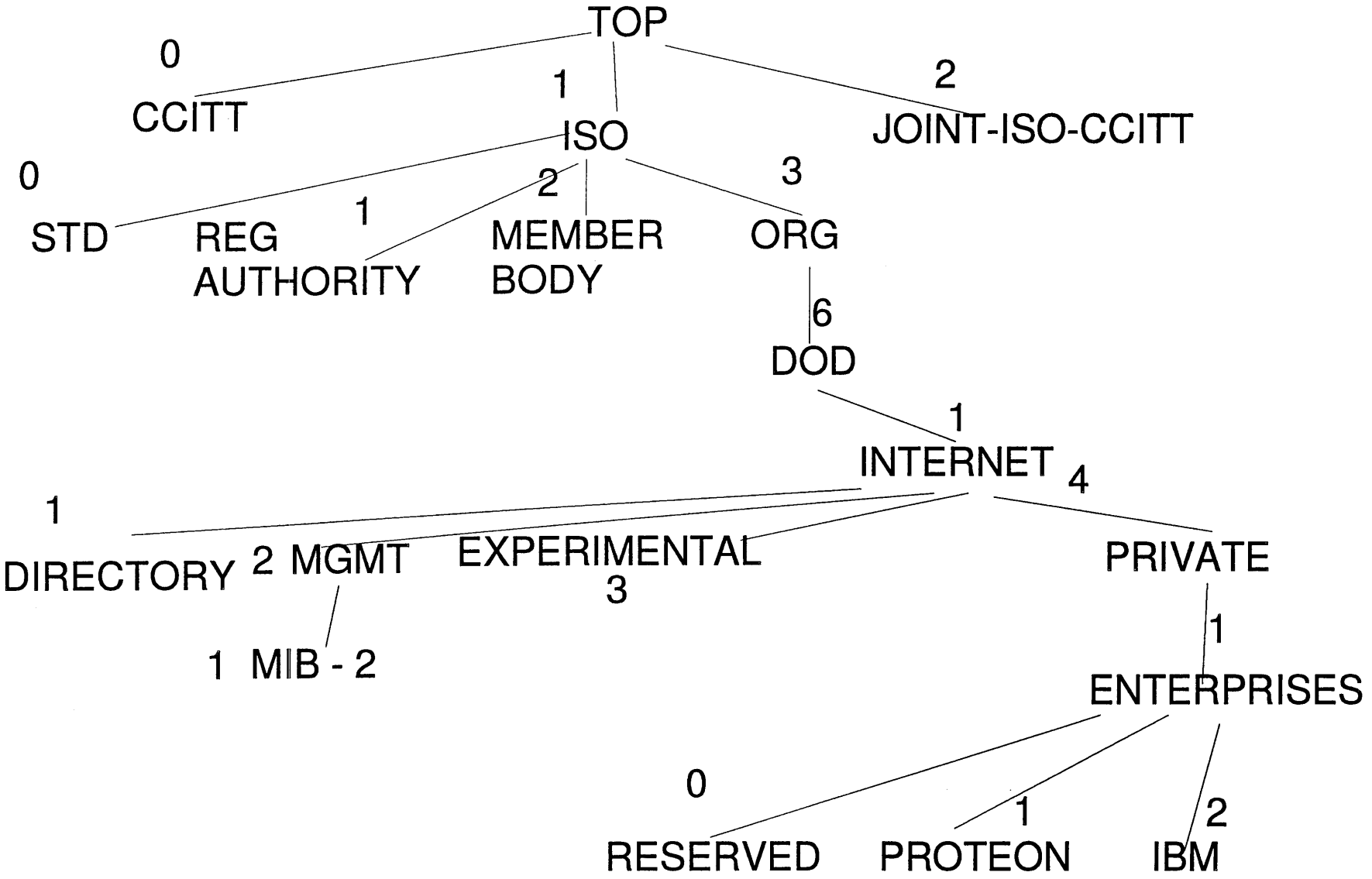
Executes management applications that monitor/control Agents

- Retrieves information from Agents
- May alter Agent information

SNMP Agent

- Maintains node information
- Defined in a Management Information Base
- Types of Information
  - Descriptive information (owner/contact)
  - System Performance
  - Software Installed
  - Software Running
  - Network Information
- Sends data to SNMP Manager
  - Solicited information
  - Unsolicited information (traps)
  - Allows access to MIB data

MIB Naming Hierarchy

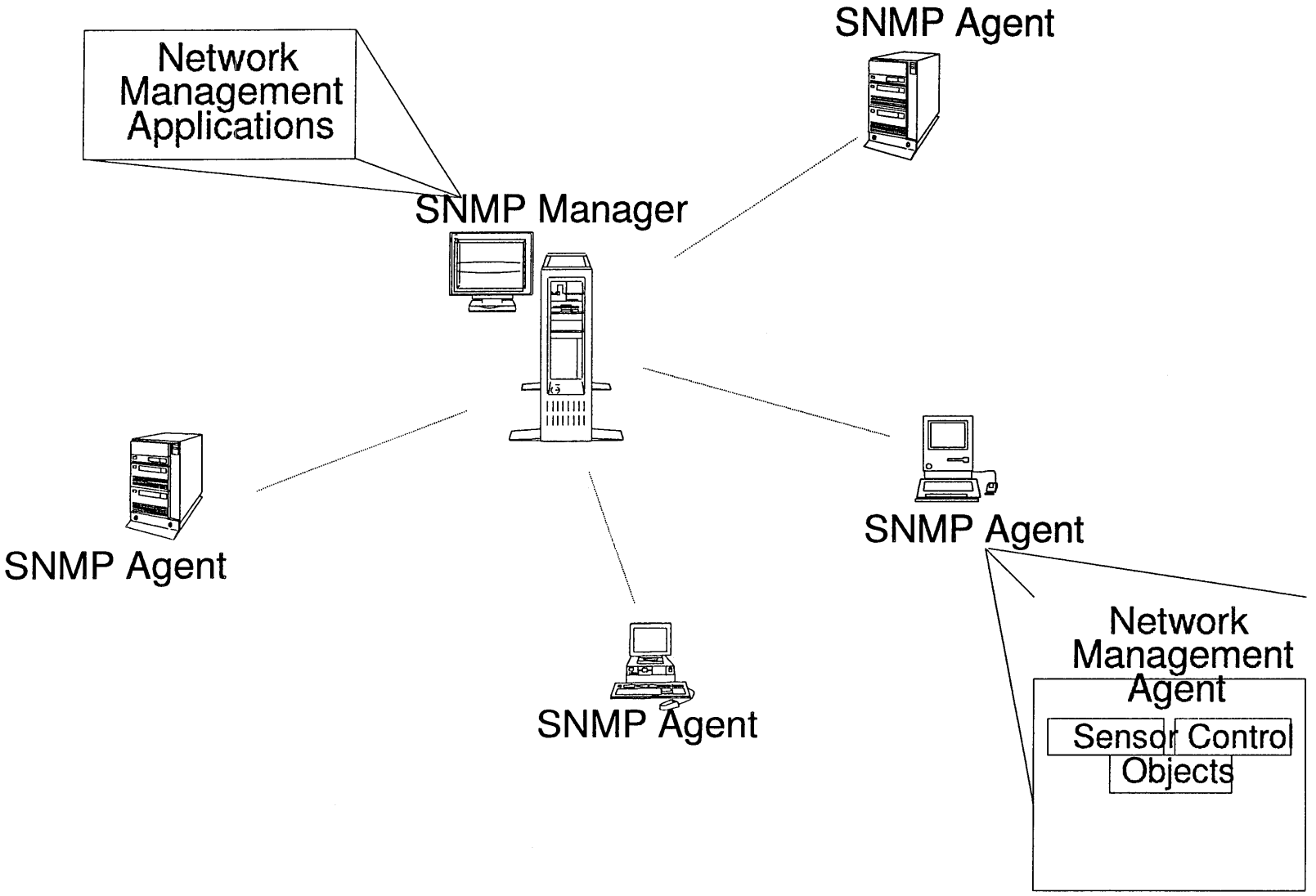


SNMP Messages

GET REQUEST - return current value of a MIB variable
GET NEXT REQUEST - return next MIB variable
SET REQUEST - change value of a MIB variable
GET RESPONSE - Agent response to GET, GETNEXT, or SET
TRAP - from Agent in response to status change

- 0 - Coldstart
- 1 - Warmstart
- 2 - Linkdown
- 3 - Linkup
- 4 - Authentication Failure
- 5 - Neighbor Loss
- 6 - Vendor/Enterprise Specific

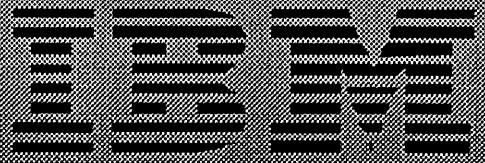
SNMP Structure



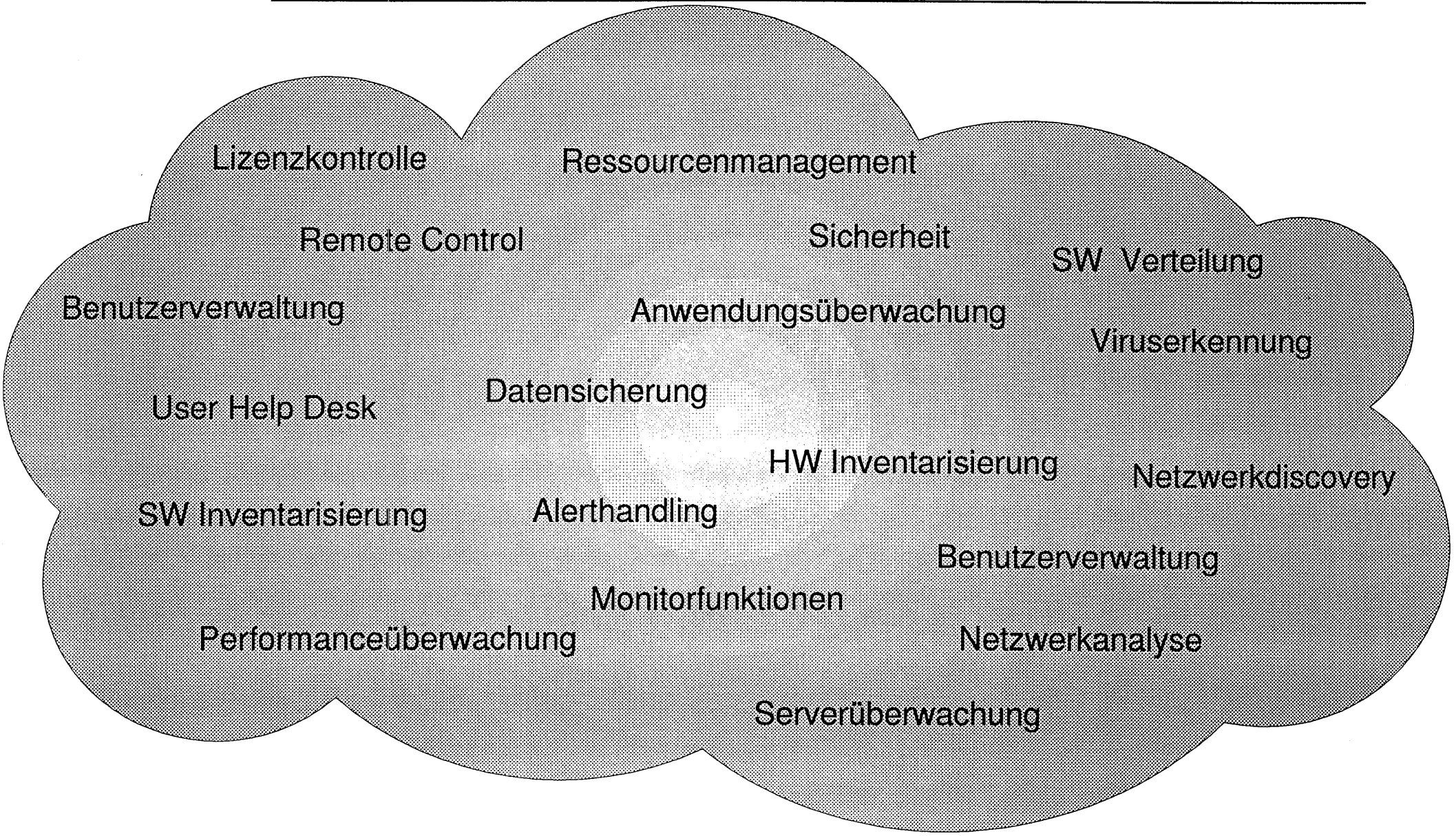
IBM SystemView Series

SystemView for OS/2

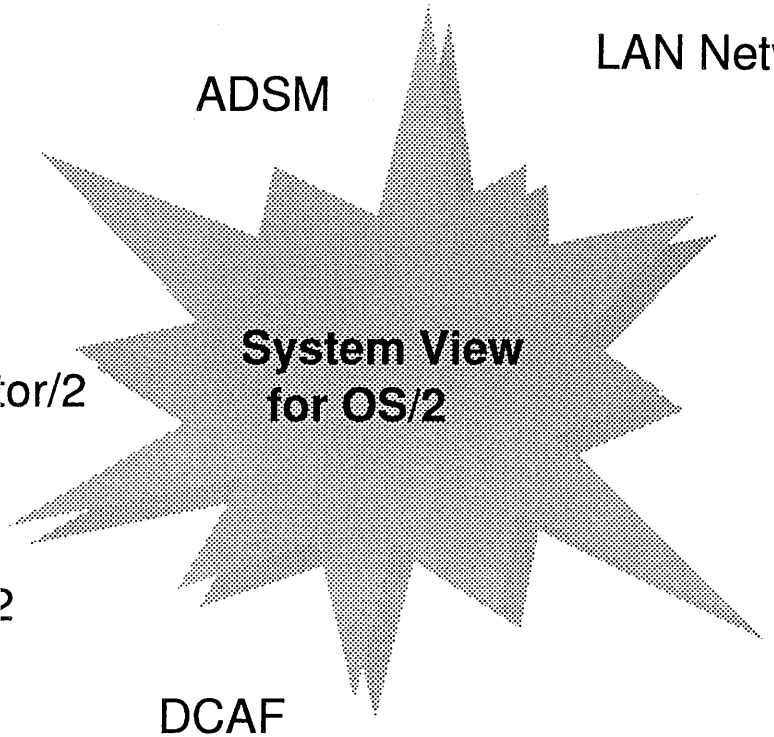
Thomas Ehmann
System-Management



Systems Management Aufgabenstellungen



OS/2 Systems Management Lösungen



LAN Netzwerk Manager/2

LAN Server

Netview for OS/2

ADSM

LAN Netview Management Utilities/2

Netview for Windows

Netfinity

Netdoor/2

System Performance Monitor/2

iFOR/LS

Netview Network Planner/2

Dataglance/2

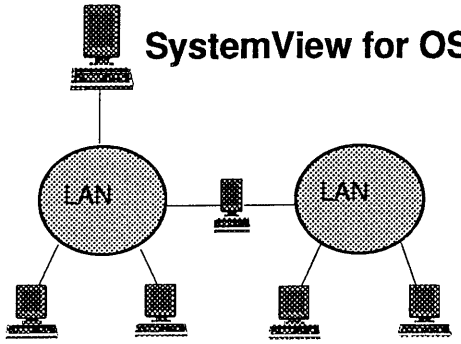
DCAF

Netview Distribution Manager for Netware

Netview Distribution Manager/2

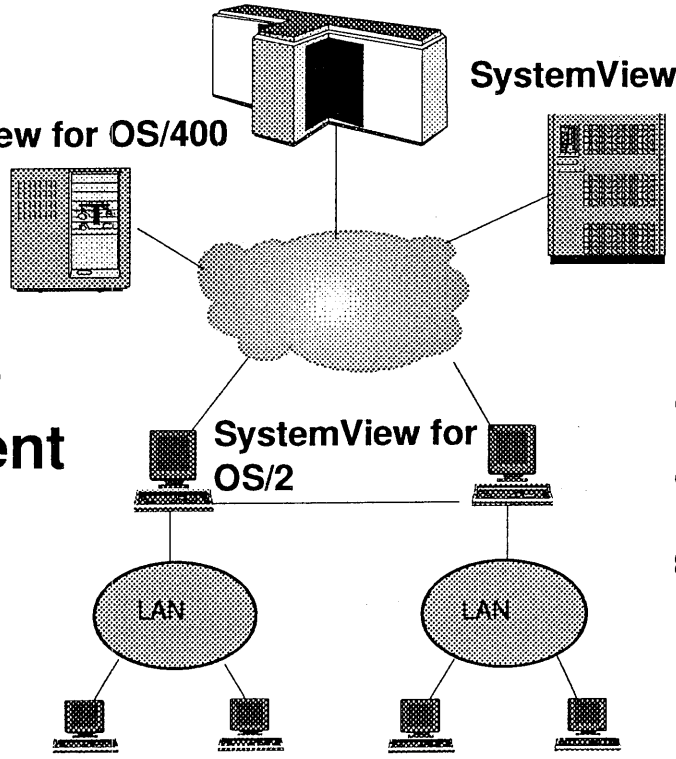
SystemView for OS/2 - Von der Workgroup zur Unternehmenslösung

Workgroup environment



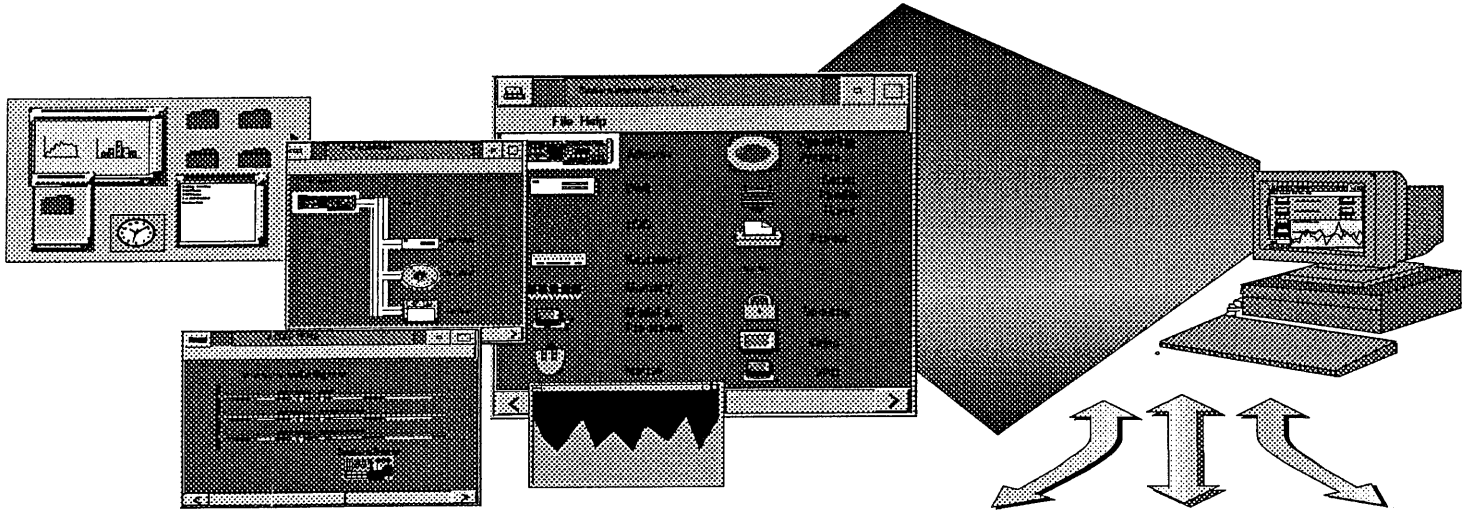
- Intelbasierende LAN's
- Logischer LAN Verbund
- Workgroup Server

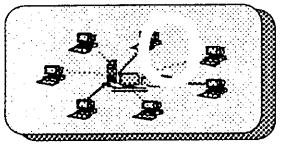
Enterprise environment



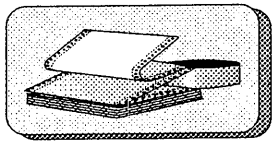
- Workgroup Teil des Unternehmen
- Zentralisiertes Management
- Anbindungsmöglichkeiten

SystemView LAN for OS/2 Warp

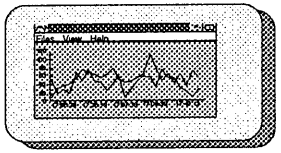




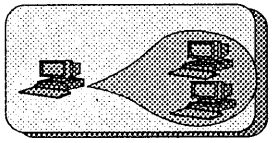
Network WS Discovery



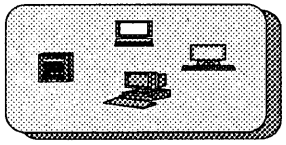
HW and SW Discovery and Inventory



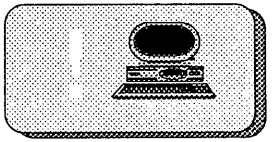
Performance



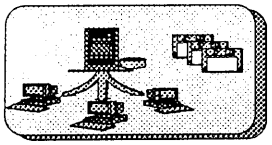
Remote WS Control



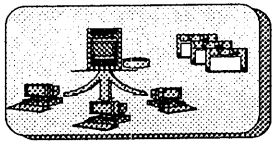
Scheduling

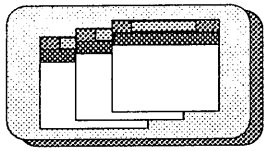


Alert Management

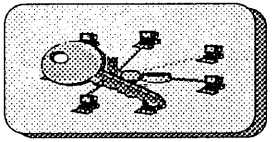


Software Distribution

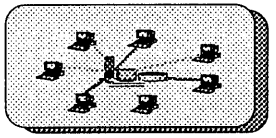




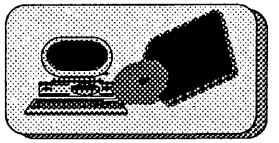
App Sharing



Security



License Management



System Profile

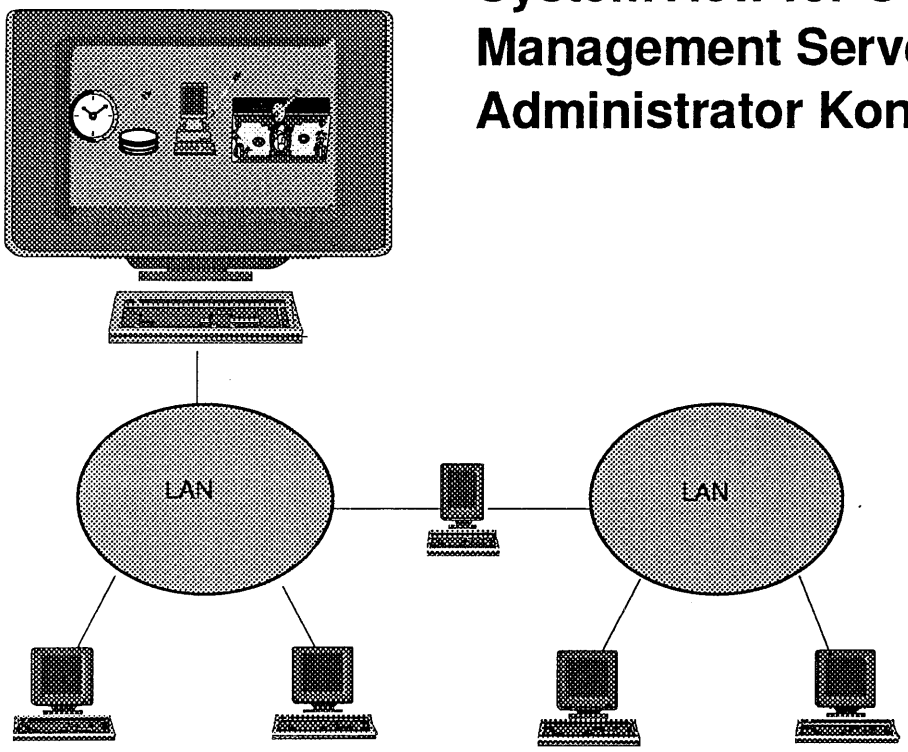
Integration heutiger Produkte

SystemView LAN for OS/2 Warp: Functionen	Heutige Produkte
Netzwerk Workstation Topologie	Netfinity
WS HW Discovery & Inventur	Netfinity
WS SW Discovery & Inventur	Netfinity
WS Monitorfunktionen	Netfinity
Remote WS Control	DCAF
Scheduling	Netfinity
Alert Manager	Netfinity
Security	Netfinity
Lizenz Management	iFOR/ls
System Profile	Netfinity
Software Verteilung	Netview DM/6000
Software Verteilung Vorbereitung	Easypreparer for OS/2
Application Sharing	Netdoor/2

Unterstützes Umfeld

- **Management Server:**
  - ✓ OS/2 Warp (Warp Server)
- **Administrator Konsole:**
  - ✓ OS/2 Warp
- **Clients:**
  - ✓ OS/2 2.1 ++
  - ✓ DOS/Windows 3.1 ++
- **Unterstüzte Plattformen:**
  - ✓ OS/2
  - ✓ Netware
- **LAN Protokolle:**
  - ✓ Netbios, IPX, TCP/IP, Async
- **Datenbanken:**
  - ✓ Flat DB
  - ✓ Optional DB/2 oder Lotus Notes (Export Funktionen)

SystemView for OS/2 Management Server / Administrator Konsole

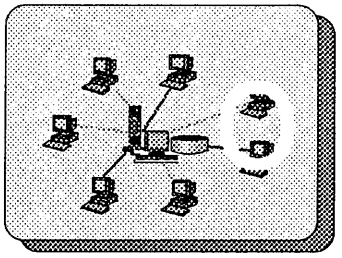


SystemView for OS/2 Clients

Active Clients
PAssive Clients

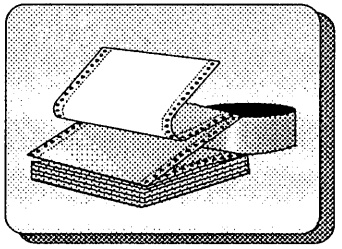
SystemView LAN for OS/2 Warp Funktionen

Automatische Netzwerkerkennung der Workstations



- ✓ Discovery über LAN Protokolle
- ✓ Einteilung in logische Gruppen ('Keywords')

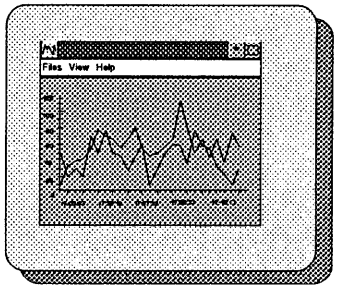
HW & SW Discovery und Inventarisierung



- ✓ System Information Tool (HW / SW Konfigurationsinformationen)
- ✓ Software Inventarisierung (erweiterbare Standardliste + Syslevel)
- ✓ Sicherung in ASCII Datei
- ✓ Export in DB2/2 oder Lotus Notes Datenbank

SystemView LAN for OS/2 Warp Funktionen

Workstation Monitioring



- ✓ Prozess Manager
- ✓ Sytem Monitor (Überwachung von Systemfunktionen)
  - ▸ Schwellwertüberwachung
  - ▸ Graphische Auswertung (Auswahl der Anzeigeform)
  - ▸ Konfigurierbare Monitorfunktionen
  - ▸ Alertgenerierung
  - ▸ Dateiüberwachung
  - ▸ Export der Daten in Datenbank

I/O Raten (Ports, Memory)

Swap File

Virtual Memory

Print Jobs Queued

Locked Memory

DASD Auslastung

CPU Auslastung

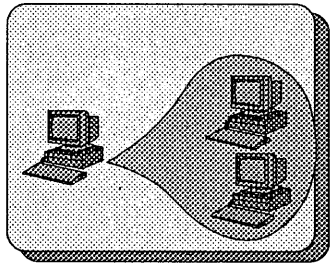
ECC Memory

Interrupt Raten

TCP/IP Interface

Remote Workstation Control

- ✓ Kontrollübernahme der Remote Workstation
  - **Aktiver und Monitormodus**
  - **One-to many Funktionalität**
  - **Unabhängig vom Bildschirmtreiber**
  - **Hot Key Funktionen**
  - **Gateway Funktionalität**

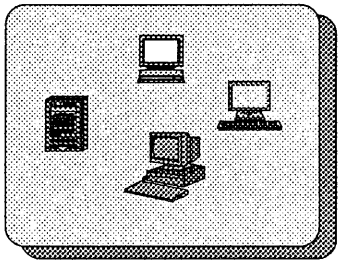


- ✓ Screen View Service
- ✓ Remote Session Service
- ✓ File Transfer
- ✓ Remote Reboot & Shutdown
- ✓ System Partition Access for PS/2 Maschinen

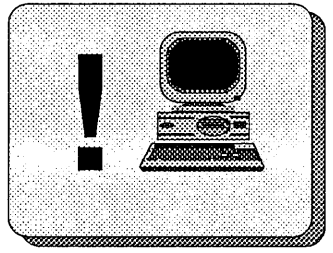
SystemView LAN for OS/2 Warp Funktionen

Scheduling

- ✓ Zeitsteuerung für Einzelsysteme, selektive Systeme oder Gruppen
- ✓ Zeitgesteuertes Ausführen aller Funktionen
- ✓ Logs in Datei, Datenbank oder Drucker



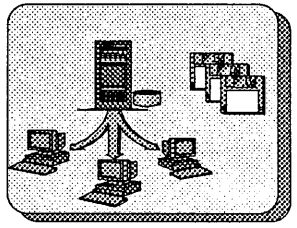
Alert Manager



- ✓ Ausführen des Alerts lokal oder zentral (oder beides)
- ✓ Umwandeln des Alerts in eine Datei
- ✓ Popup Windows
- ✓ Weiterleiten (Alertforwarding) an andere Station
- ✓ Umwandeln in SNMP Trap und Forwarding an SNMP Manager
- ✓ Ausführen eines Programms
- ✓ Pager aktivieren
- ✓ Detaillierte Alertdefinition und Zuordnung (Alert Types)

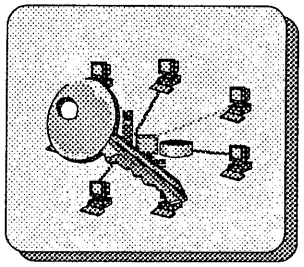
Softwareverteilung und Vorbereitung

- ✓ Portierung NDM/6000 Code
- ✓ Verteilung auch an NDM/6000 und NDM/Netware Agenten
- ✓ Verteilung nach CID oder generischem Prinzip
- ✓ Unterstützung DISKCAMERA Funktion
- ✓ Installation von Betriebssystem- und Anwendungssoftware
- ✓ Diverse Kontrollfunktionen (Install, Uninstall, Remove, Accept, ..)
- ✓ Pre- und Postprozeduren für Kontrollfunktionen
- ✓ Unterschiedliche Zielbereiche (Service Area, Active Area, ..)
- ✓ Schnittstelle zu Inventarisierungsfunktion von System View LAN for OS/2 Warp
- ✓ PUSH & PULL Konzept
- ✓ Graphische Benutzerschnittstelle zum Aufbereiten von Responsefiles und Change Files
- ✓ Erstellen von logischen SW Profilen



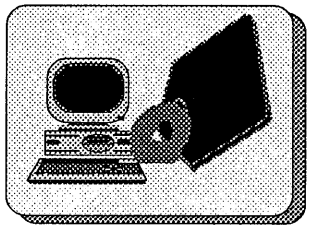
SystemView LAN for OS/2 Warp Funktionen

Security



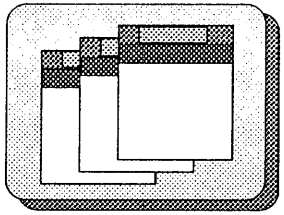
- ✓ Zugangsbeschränkung über Userid / Password
- ✓ Mehrere Zugangsprofile (Zugang zu untersch. Services) möglich
- ✓ Incoming / Outgoing UserID / Password Kombinationen

System Profile



- ✓ Einabemöglichkeit für verschiedene Informationen
- ✓ Eingabe in Notebook Format
- ✓ Ergänzung zu System Information Tool und Inventurdaten
- ✓ Auswertung in ASCII Datei oder Export in Datenbank

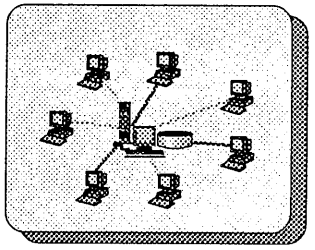
Application Sharing



- ✓ Gegenseitiges Bereitstellen von Daten und Anwendungen

SystemView LAN for OS/2 Warp Funktionen

Lizenzmanagement



- ✓ Technologie von Gradient Technologies
- ✓ Anwendungen müssen 'enabled' sein (Liicense Use Toolkit for OS/2)
- ✓ IBM Produkte ab '96 'enabled'
- ✓ Anwender liefert "Schlüssel' mit der SW aus (Registration Certificate File)
  - ▸ **Ablaufdauer**
  - ▸ **Anzahl Workstations, die zugreifen dürfen**
  - ▸ **evtl. Begrenzung auf spezielle Workstations (TargetKeys)**
- ✓ Ermöglicht Lizenzkontrolle (Auswertungen) und Anzeige der aktuell benutzten Lizenzen
- ✓ Automatische Vergabe von Lizenzen im Netz (Automatische Angebote bei freien Lizenzen)
- ✓ Lizenzserver (Verbund in Network Computing Systems Zellen)
- ✓ Lizenzserverkommunikation über Remote Procedure Calls
- ✓ Ausführliche Reports (Lizenzanforderungen, Lizenzablehnungen, usw.)

SystemView LAN for OS/2 Warp Funktionen

Predictive Failure Analysis

ECC Memory Setup

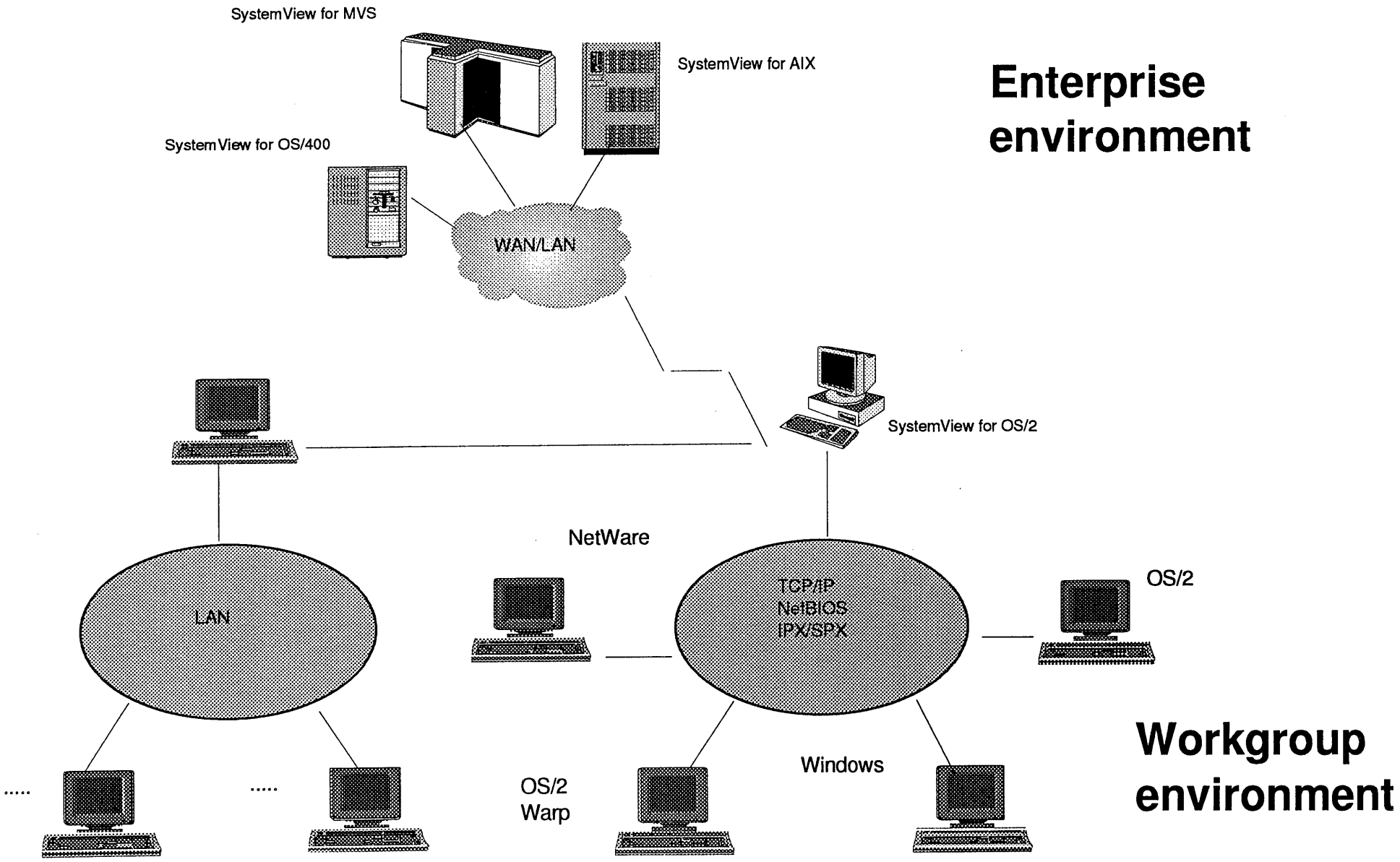
Serial Connection Control

Power-On Error Detect

RAID Management

DMI Browser

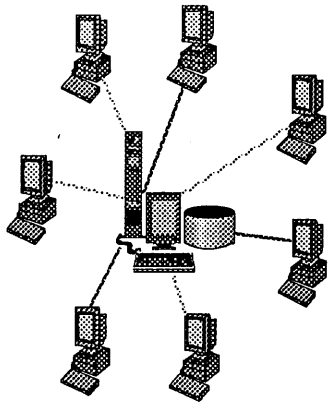
Eingliederung in Gesamtkonzept



Integrierte Tools für Workgroup Management

Einfaches und aufgabenbezogenes graphisches Benutzerinterface

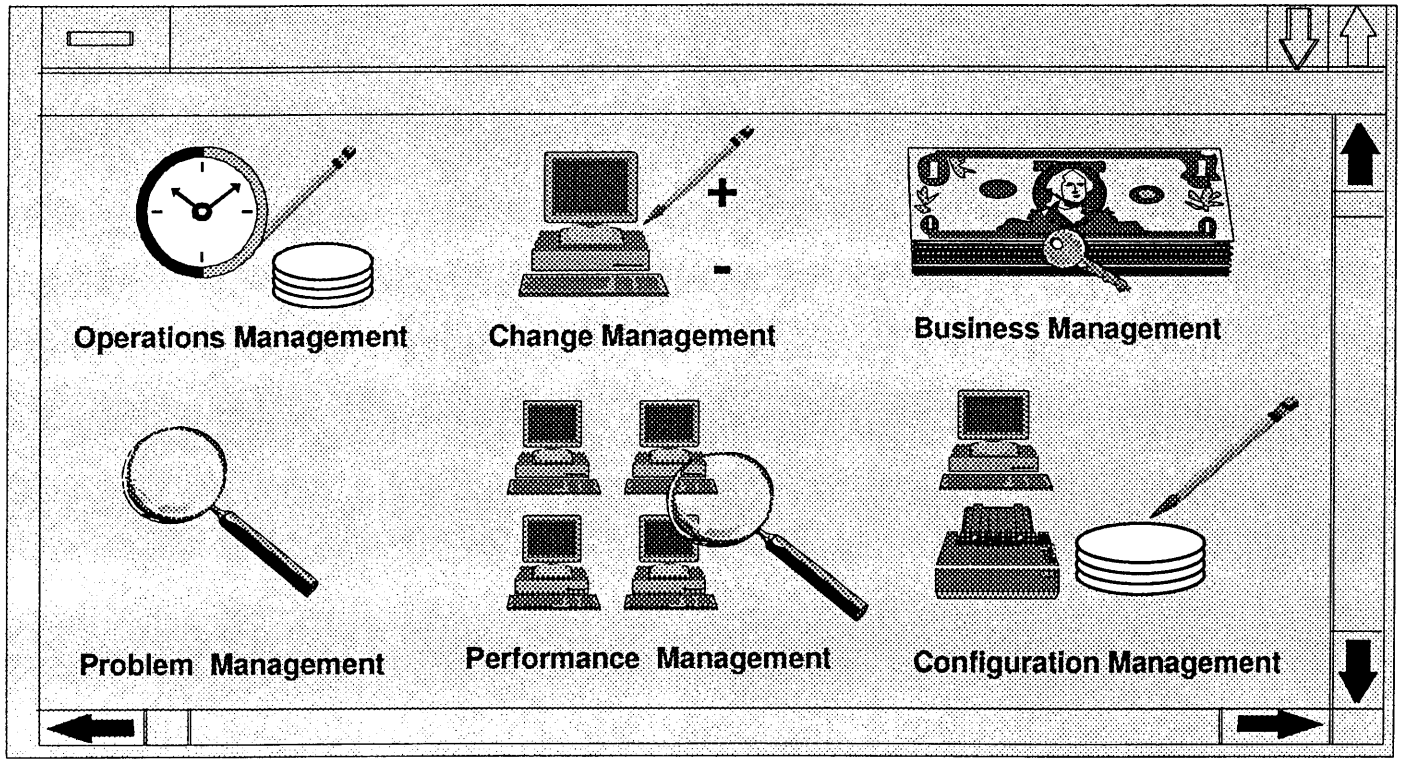
Kostengünstige Lösung



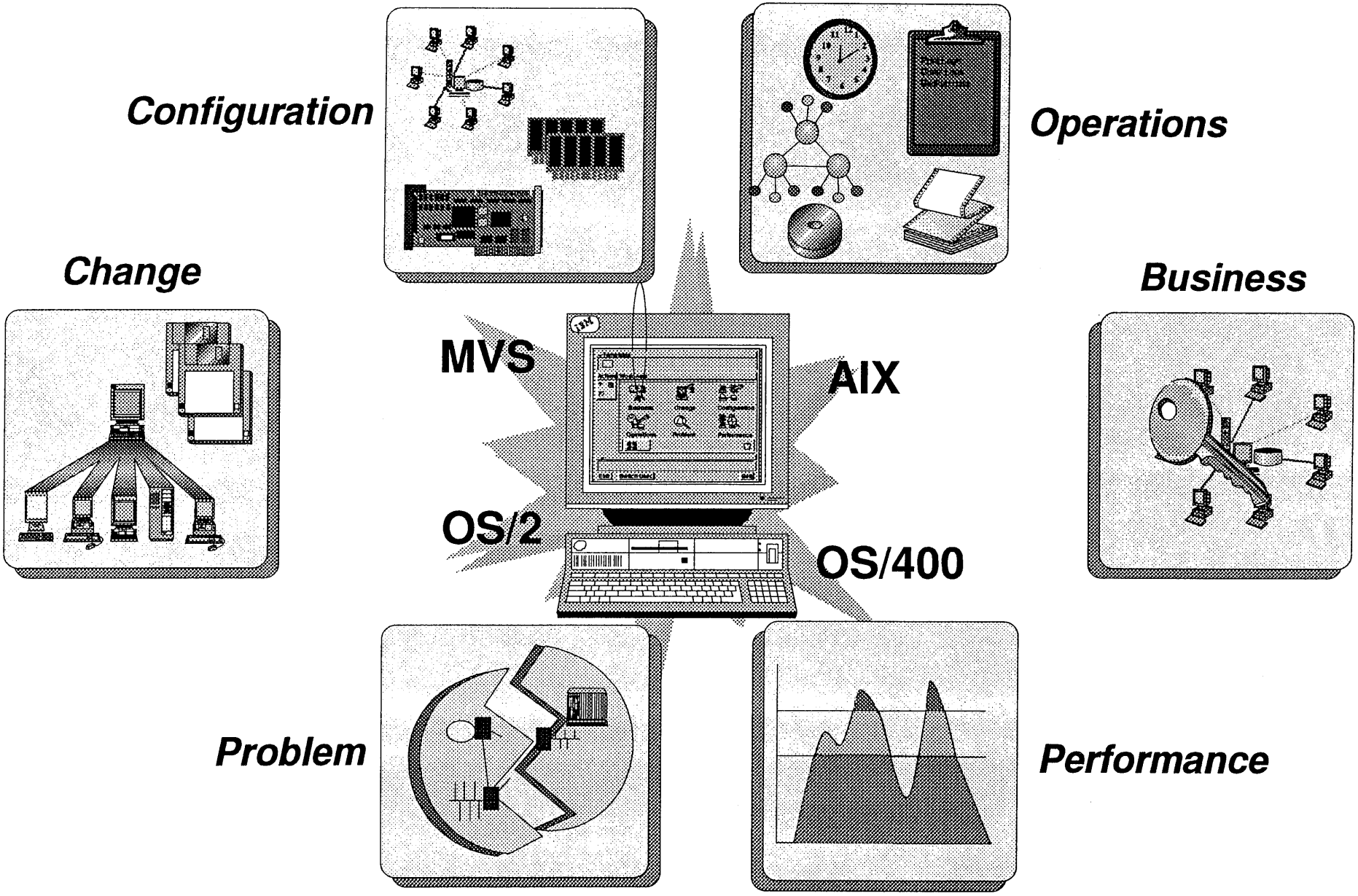
Workgroup Management

System View for OS/2 Enterprise

- SNMP Management
- Framework Netview for Windows und Netview for OS/2
- Management sämtlicher SNMP Devices (Hubs, Router, Switsches, ...)
- Zusätzliche Funktionalität (Datensicherung, Netzwerkanalyse, DB-Mgmt., Printmgmt., ...)
- Objektorientierter Framework
- Anlehnung an System View for AIX (vollständig Disziplineorientiert)



System View Series - Funktionale Integration



SystemView LAN for OS/2 Warp

Workshop

Paul Oechsle

SM System- Netzmanagement
Ehningen
POCHS at STUTVM3
DEIBMF3X at IBMMAIL

Sept 1995

IBM SystemView for OS/2
An Overview

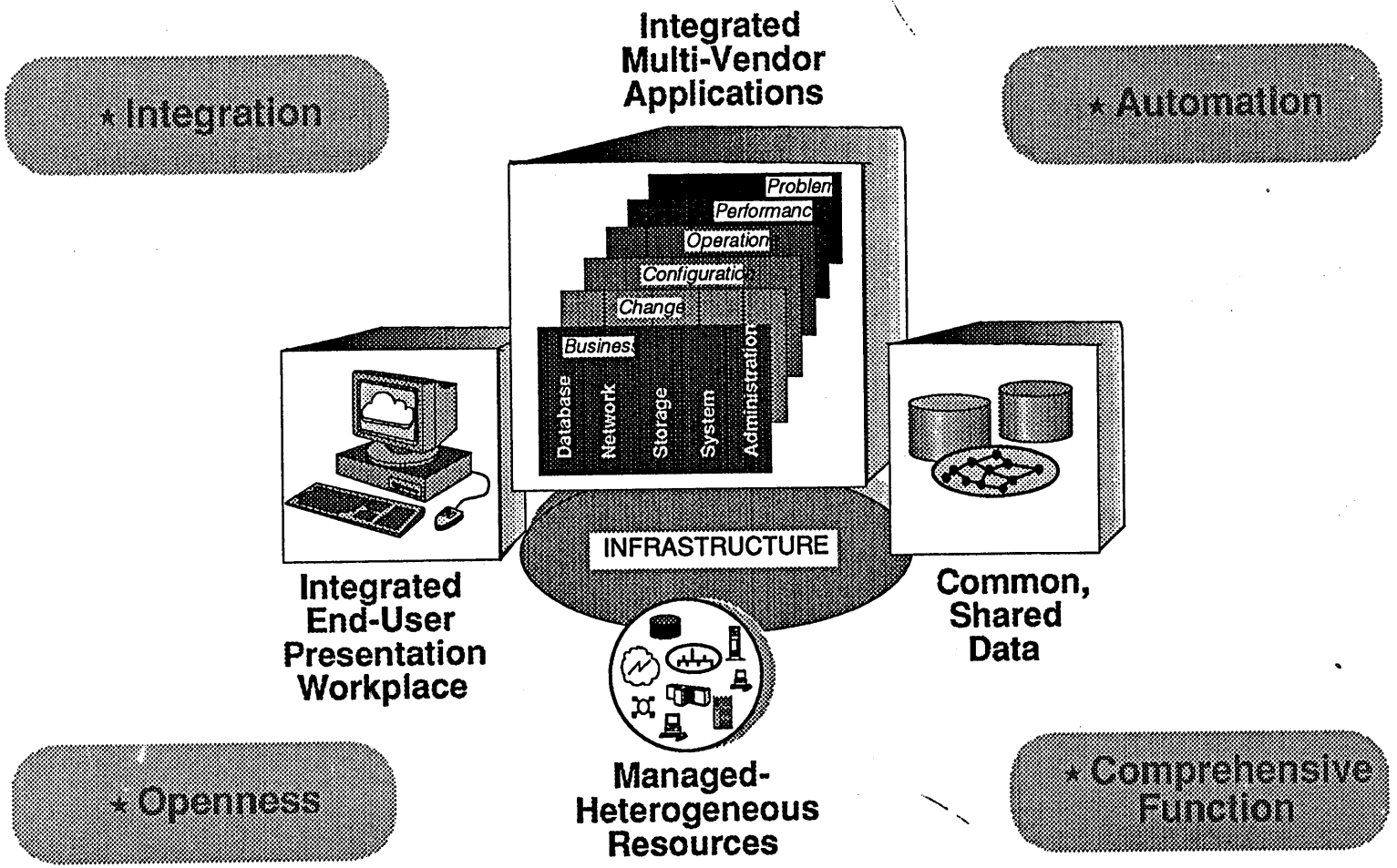
IBM

SystemView 010

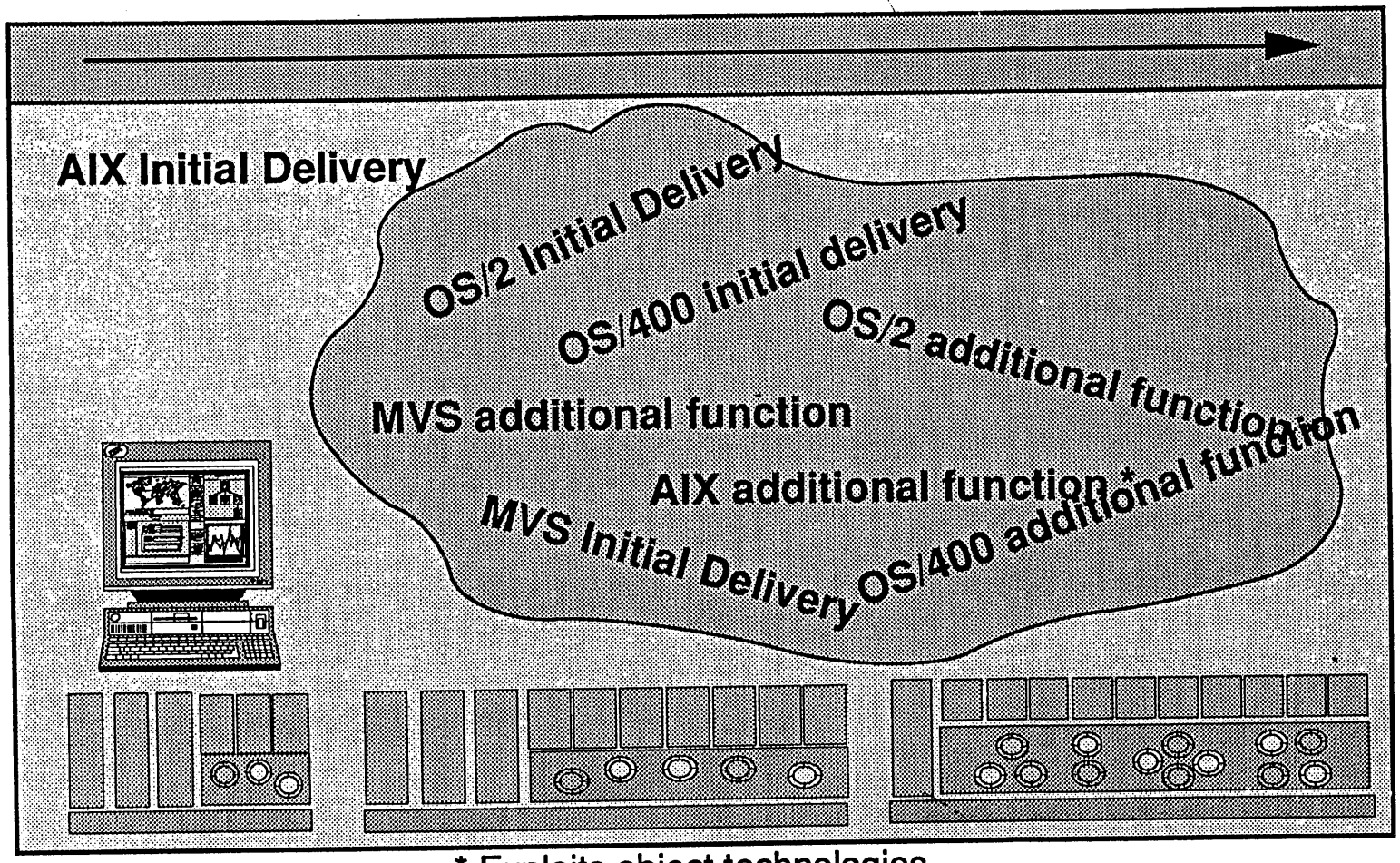
IBM SystemView for OS/2 - Agenda

- What is IBM SystemView
  - IBM SystemView Product Benefits
  - IBM SystemView Product Roll-out
- IBM SystemView for OS/2
  - From the Workgroup to the Enterprise
- SystemView for OS/2 Workgroup
  - Functional content
  - Supported environment
  - Trends and Directions

What is IBM SystemView



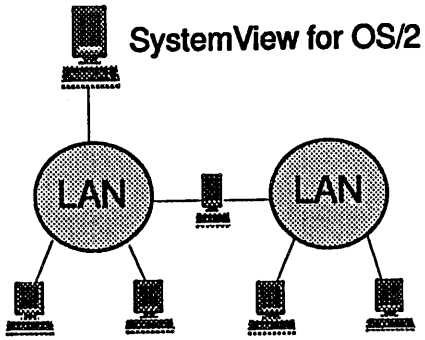
IBM SystemView Product Roll-out



* Exploits object technologies

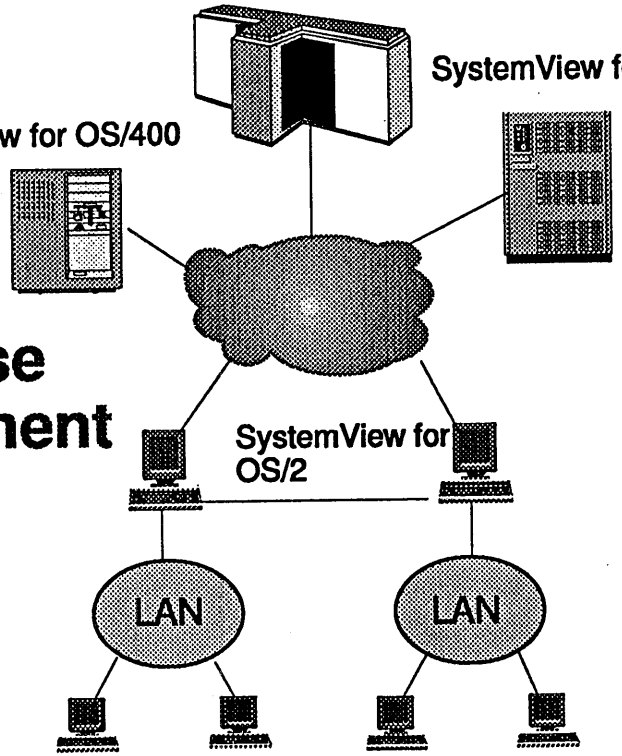
SystemView for OS/2: from the Workgroup to the Enterprise

Workgroup environment



For Intel based LANs and interconnected LANS: a single SystemView for OS/2 Management Server handles the workgroup.

Enterprise environment

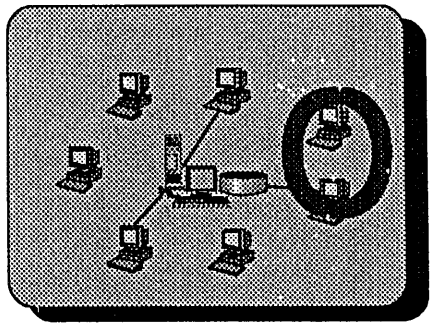


When the workgroup is part of an enterprise it is needed to centralize the management of the workgroup needs.
It will be possible to connect SystemView for OS/2 with SystemView for MVS, for OS/400, for AIX.

SystemView for OS/2 Workgroup

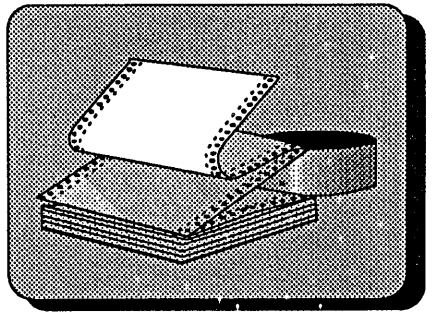
- **Network Workstation Discovery**

  Automatic discovery of network workstations.



- **Workstation HW and SW Discovery and Inventory**

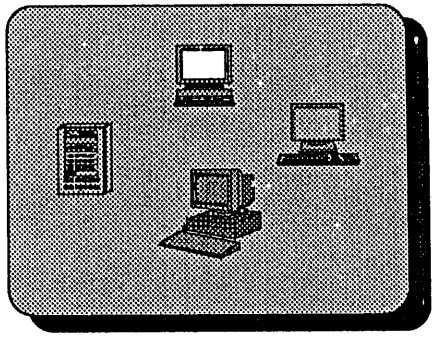
  Discover and collect workstation HW and SW information on a network, on the base of a standard part list and known application software list.



SystemView for OS/2 Workgroup

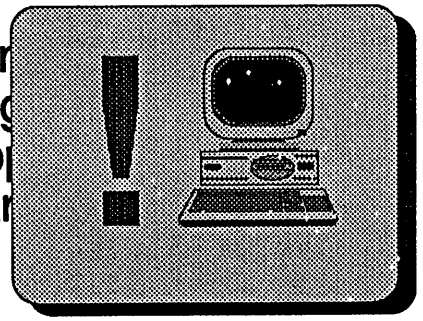
- **Scheduling**

Allows the manager to schedule activities on single systems, multiple systems or groups of systems.



- **Alert Manager**

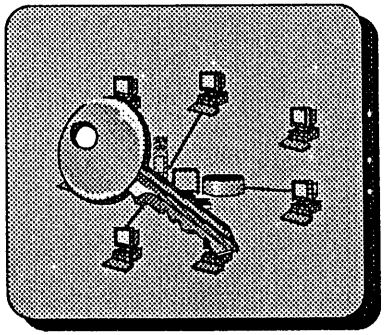
Allows alerts to be processed locally on the workstation where the alert was generated or centrally at the manag Possible actions can be to run a script, log the alert, pop a message, convert the alert to an SNMP trap or forwar alert to another system.



SystemView for OS/2 Workgroup

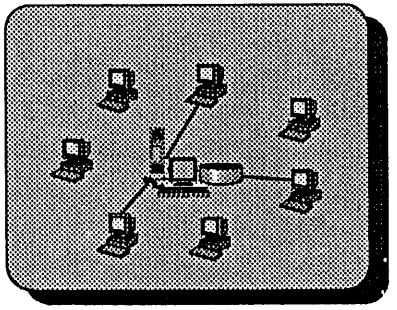
- **Security**

  Allows each remote workstation "service" to be individually controlled by a userid and password.



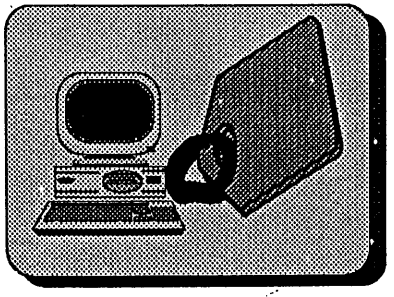
- **License Management**

  Ensure compliance with software licensing agreement.



- **System Profile**

  Allows administrative information, such as name of workstation user, phone number, dept, etc.., to be entered for each workstation on the network.

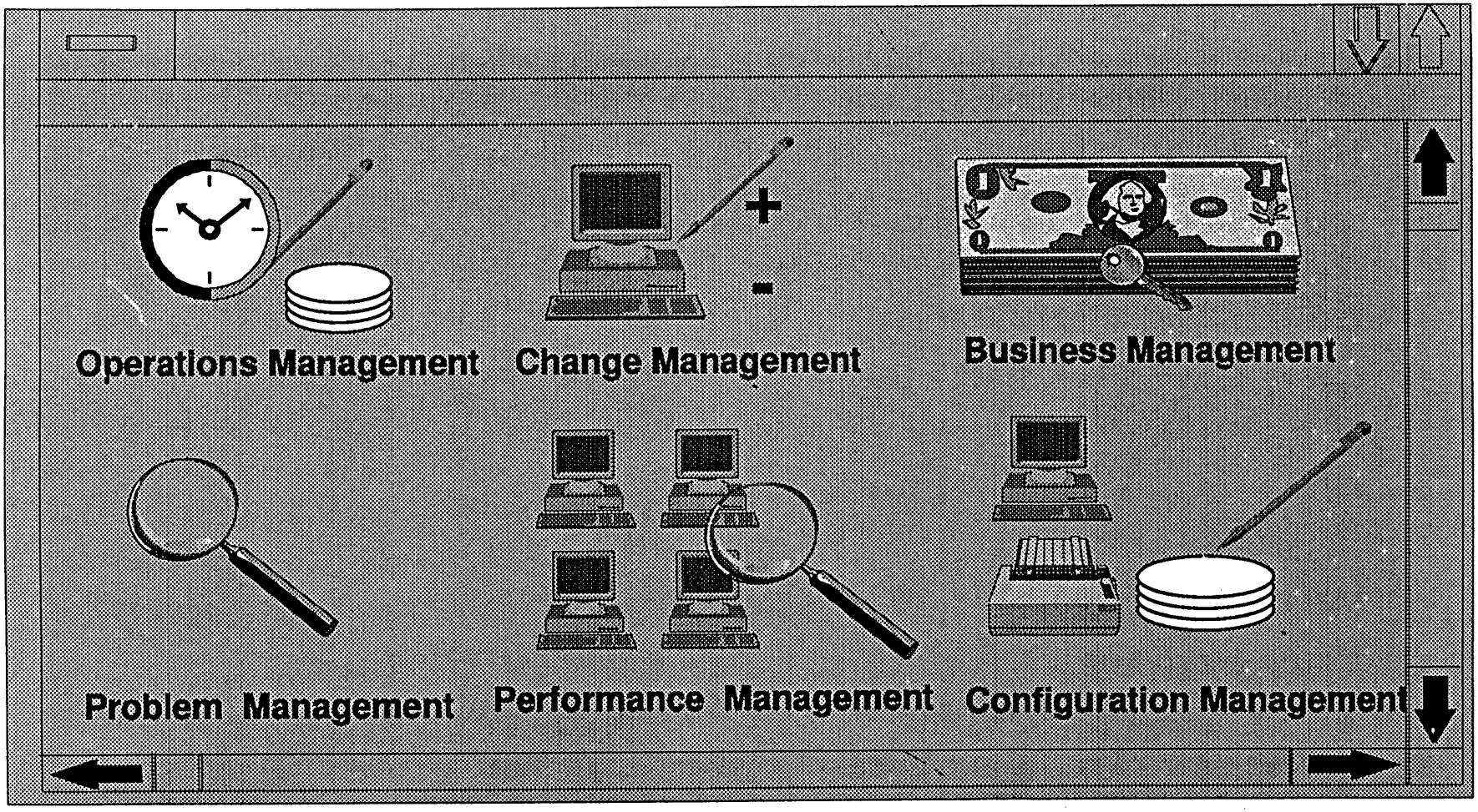


Trends and directions

- Improve Operations Management with the addiction of Backup/Recovery capabi
- Improve Business Management with the addiction of Virus Detection capability.
- Management Server on Warp for PPC.
- Administrator Console support:
  - Windows
  - Windows 3.1.1 (for Workgroup)
- Agents support:
  - NetWare
  - NT on PPC
  - NT on Intel
  - Windows 95
  - AIX
  - Unix
  - Mac
  - DOS.

Backup Foils

IBM SystemView for OS/2 Enterprise



Workgroup Offer: Level of Integration

Common Integration level

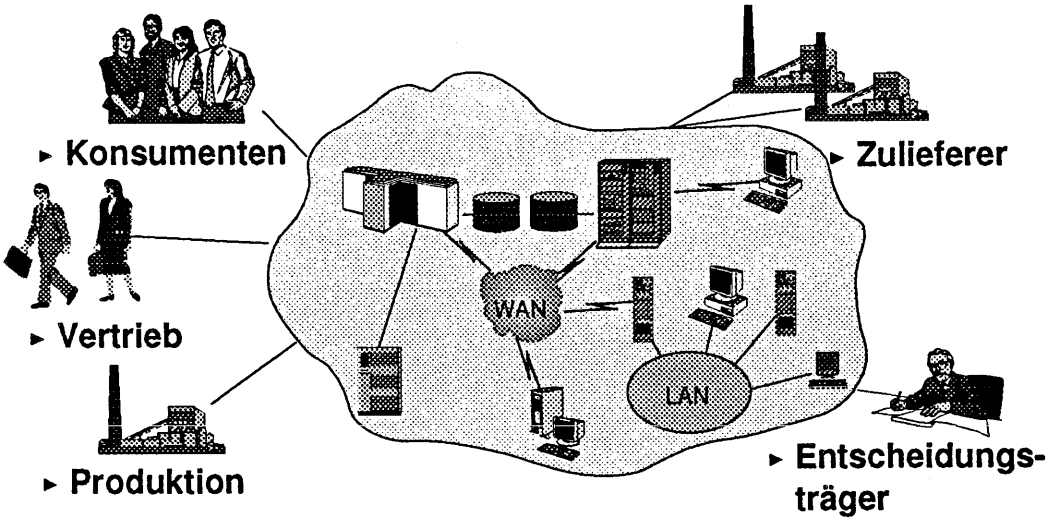
Common Launch Panel
Single Network Definition
Single Administrator Interface
Single Sign-on
Single User Interface
Consistent Look and Feel
Common Install
Common on-line Help
Full NLS
Manuals for Integrated Operations

OS/2 WARP Server

Einführung in IBM OS/2 Warp Connect IBM OS/2 Warp Server und Eagle Server Suites

OS/2 WARP Connect

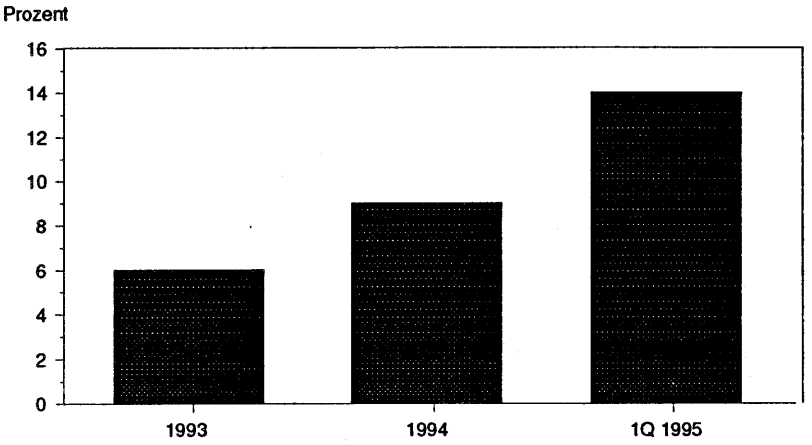
Die Herausforderung



- **Verbindungen herstellen zu jedermann - zu jedem Client, jedem Server, jedes Netzwerk**
- **Alles integrieren (kein doppelter Datenhaushalt)**
- **Alles verwalten (Systems-/ Network Management)**

OS/2 LAN Server: Schnellstwachsende Server Plattform

OS/2 LAN Server Marktverbreitung

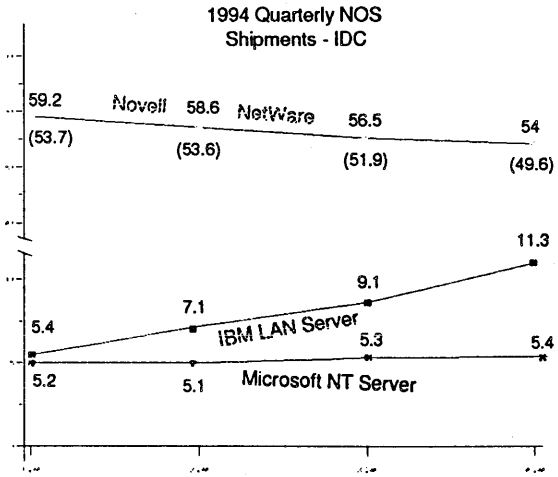


Qualle: IDC

OS/2 WARP Server

OS/2 WARP Server

IBM OS/2 LAN Server 1994 Marktverbreitung



° Percentage in parentheses for Novell indicate NOS share net of Personal NetWare (Peer) shipments

	Full Year '93	Full Year '94
Novell NetWare	58.1%	55.3%
IBM LAN Server	6.5%	9.1%
Microsoft NT Server (& LAN Mgr.)	4.7%	5.4%

** Warp Connect will start contributing to overall NOS market share (Peer) in 1995

OS/2: Market Leading Application Server Strategy

First Quarter 1995 Market Share

Server Licenses Shipped

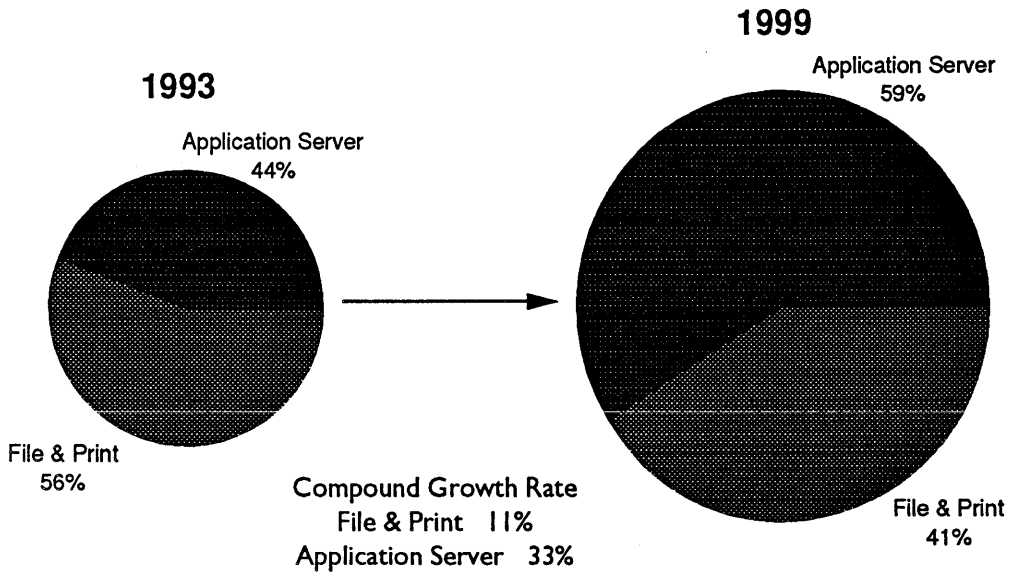
	OS/2 & OS/2 LAN Server	NT	WFW	NetWare	Unix
File & Print NOS	14%	8%	9%	45%	n/a
Application Servers	25%	19%	n/a	23%	34%
Total Servers	18%	12%	5%	37%	12%

OS/2 WARP Server

Source: IDC

80% aller Notes-Server auf OS/2

Shift to the Application Server Environment



OS/2 WARP Server

Source: IDC

Server Applications (Units)

IDC January, 1995
Server (LAN) Market Analysis

	1994	1998
File / Print	1,012	1720
Database	218	758
E-Mail	165	449
Communications	125	401
Workgroup	93	305
Fax	24	51
Other	40	90

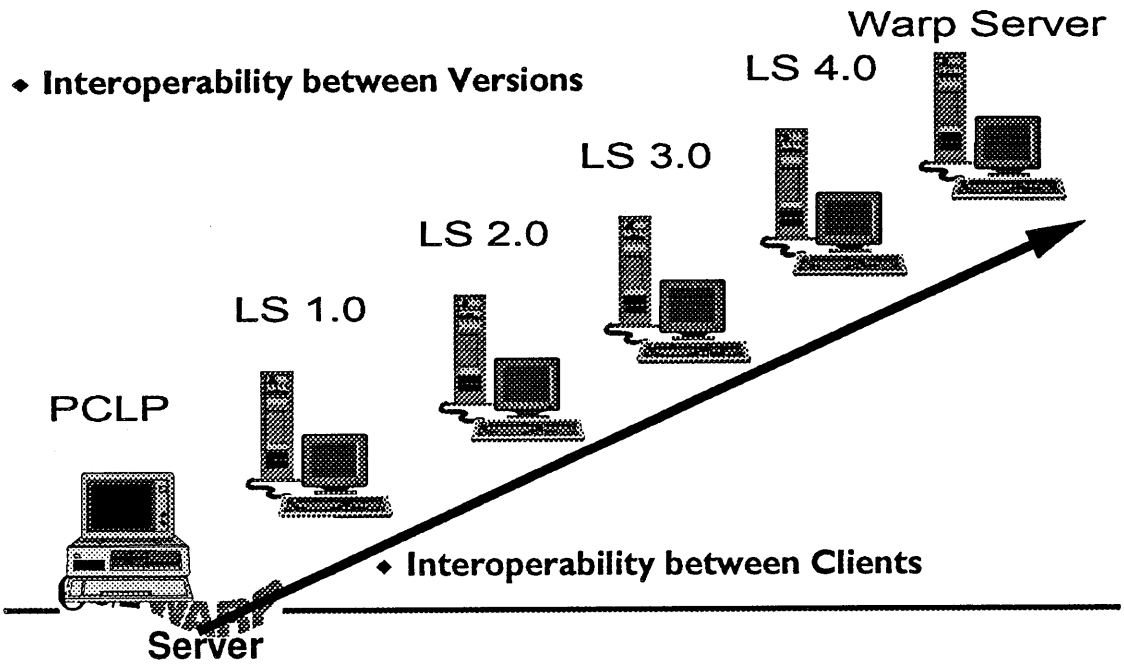
OS/2: Market Leading Application Server Solution

OS/2 Server Year End 1994 Application Install Base

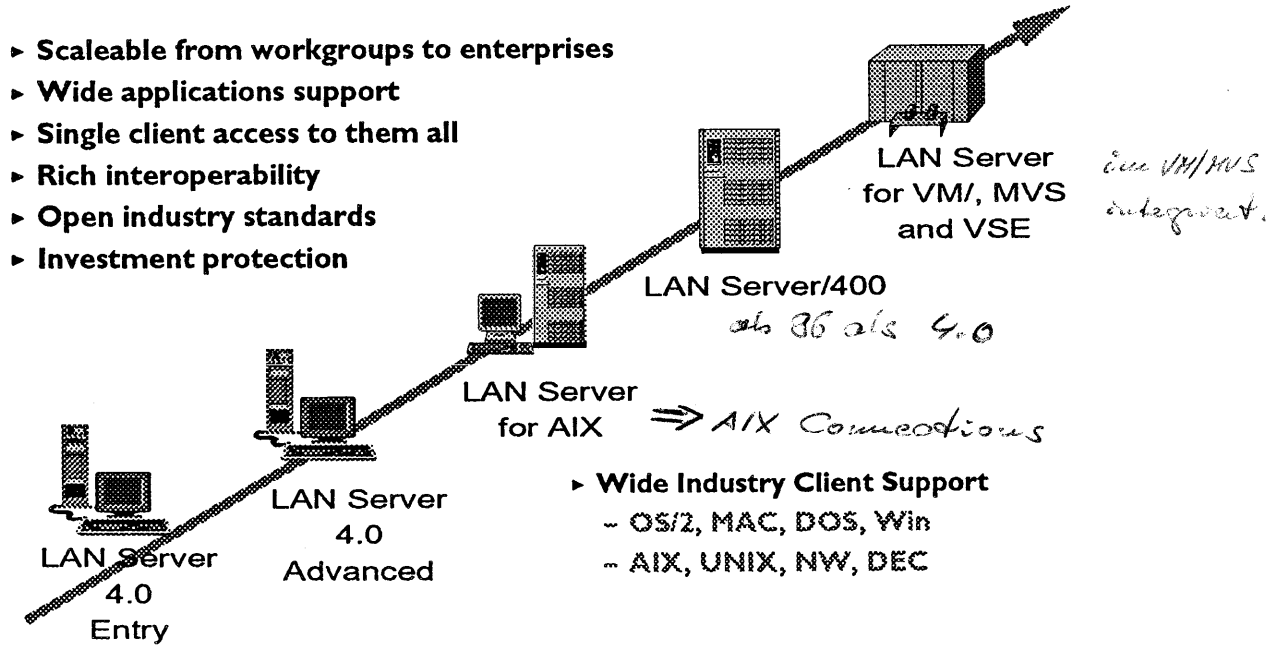
- 600,000 Server installations
- OS/2: 17.6% market share
- NT Server: 7.5% market share

Source: IDC

LAN Server Evolution



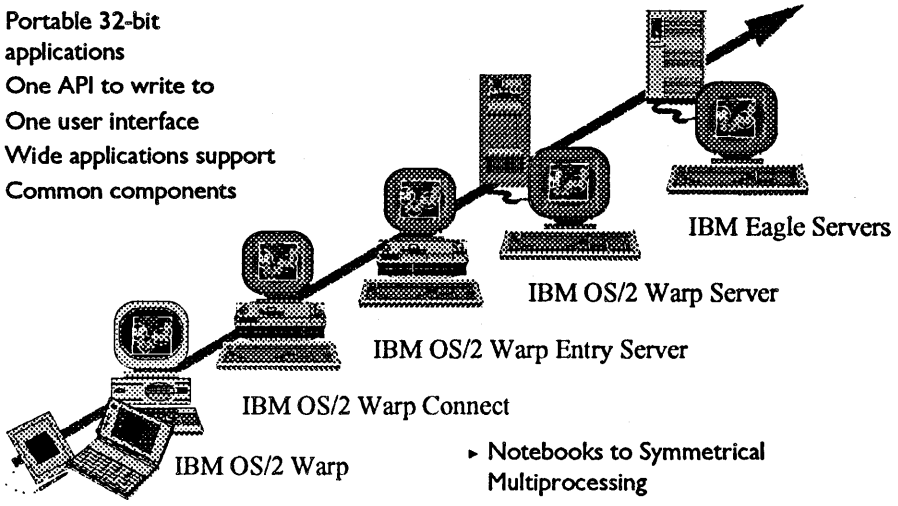
Cross Platform Interoperability



OS/2 WARP Server

The IBM OS/2 Warp Family

- Portable 32-bit applications
- One API to write to
- One user interface
- Wide applications support
- Common components



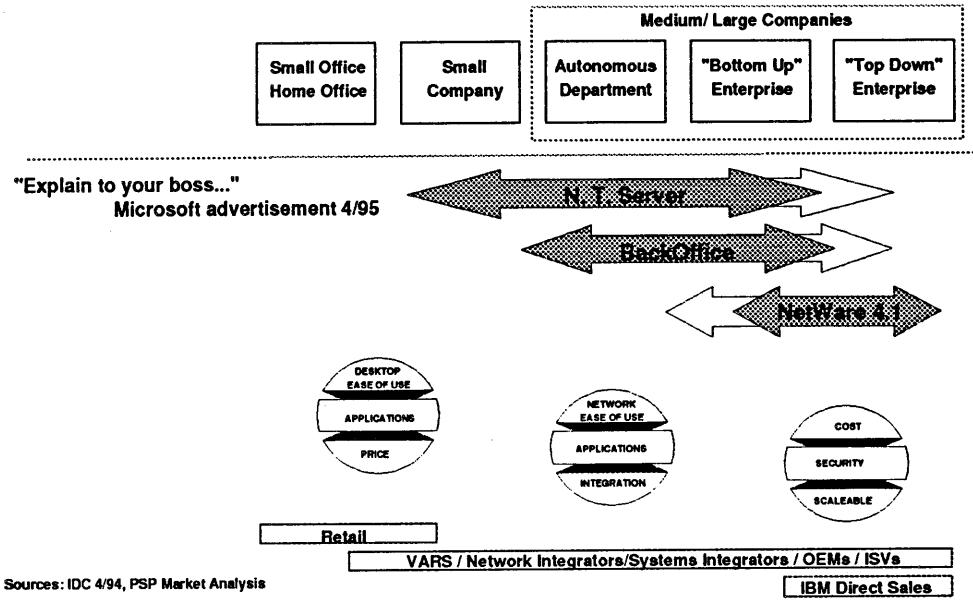
- Notebooks to Symmetrical Multiprocessing
- Packaged solutions for home to enterprise
- Platform Portability

Broad Market Appeal

- Small and medium sized businesses
- Departmental workgroups
- Large corporations and institutions

OS/2 WARP Server

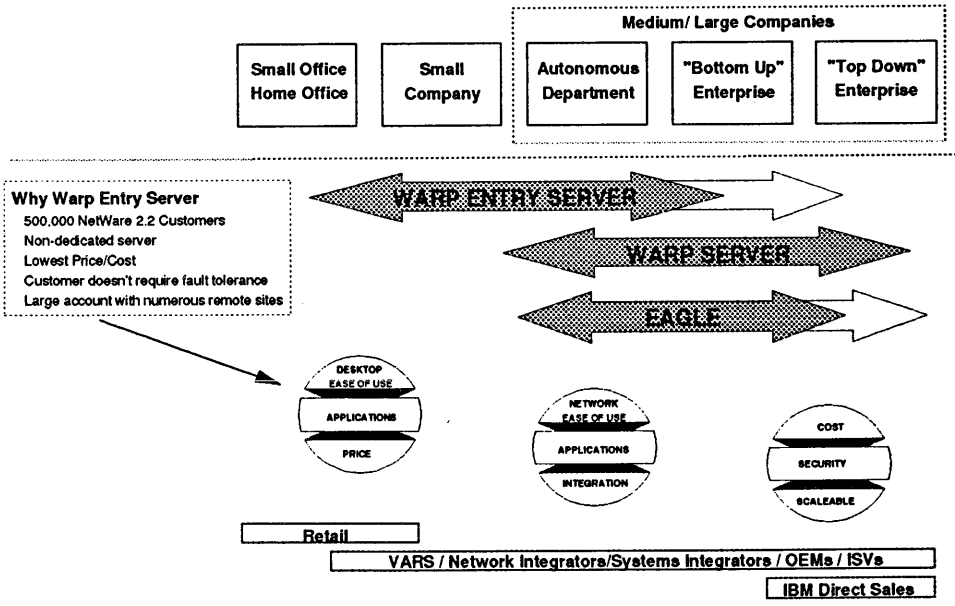
IBM Eagle - Competitive Positioning



Sources: IDC 4/94, PSP Market Analysis

OS/2 WARP Server

IBM Eagle - Warp Server Family Positioning



IBM OS/2 Warp Server

A Complete Business Server Solution

Single Integrated Package

- Base Operating System - OS/2 Warp
- File & Print Services - OS/2 LAN Server
- Sophisticated Systems Management - SystemView Workgroup
- Backup & Recovery - Personal Safe'n'Sound incl. ADSM Client
- Remote Access - LAN Distance
- Advanced Printer Functionality - PSF/2
- Internet Network Ready - TCP/IP V3

OS/2 WARP Server

Powerful Combination: OS/2 Warp+OS/2 LAN Server

- Integrated, modular installation
  `X:\INSTALL (where X: is CD ROM drive)`
- Autodetection of network adapters
- Easy drag-and-drop administration
- Based on a high-performance file system
  `HPFS386`
- Investment protection
  `consider backward compatibility`

OS/2 WARP Server

Warp Server: Client Remote Installation

- OS/2 and WIndows clients can be installed remotely from the Client Access Installation menu:

- CD \WARPSRV\OS2CLNT

  WSSETUP

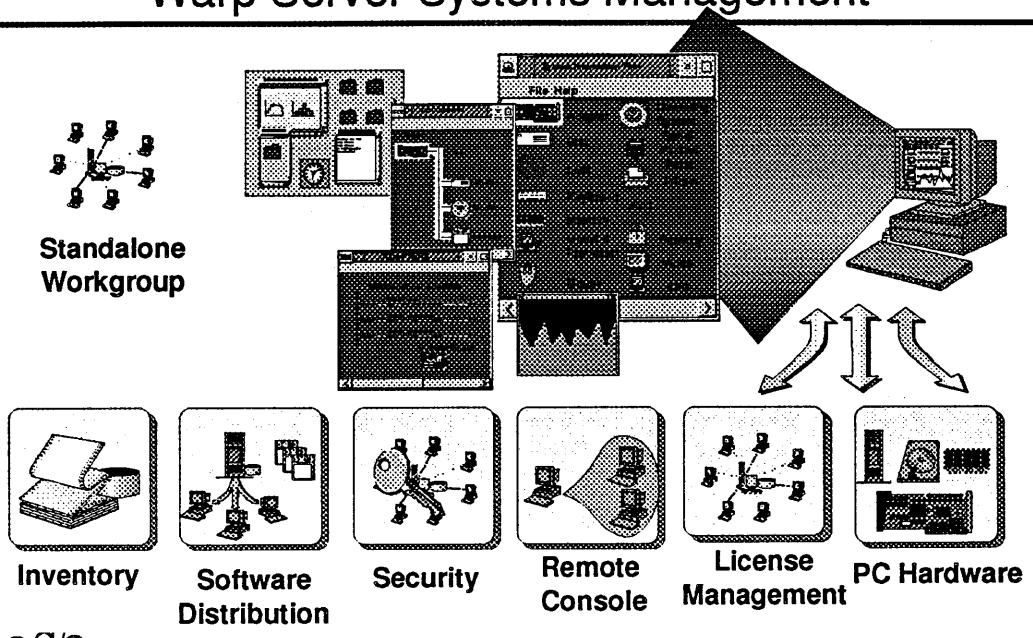
OS/2 WARP Server

Sophisticated Systems Management Services

- Software and hardware discovery
- Software licenses management
- Software distribution
- Resource monitoring
  - server utilization and performance
  - text and pager alerts
  - predictive failure capability

OS/2 WARP Server

Warp Server Systems Management



OS/2 WARP Server

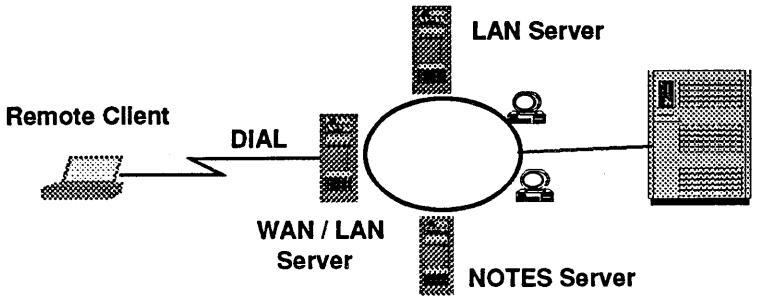
Warp Server ⇒ Remote Access Services

- Remote control support
  - remote systems management
  - monitor/control computer on the network (via LAN or dial-up)
  - command line
  - snapshot
- Remote node support
  - connect as though you were physically on the network
  - node to node
  - connect through high-speed modems, ISDN, X.25

OS/2 WARP Server

Warp Server Remote Access Services

- Remote node technology, software implementation
- Multi-vendor, multi-protocol support
- Excellent security with shared database capability
- Connection server and clients (OS/2 and Windows) included



OS/2 WARP Server

Backup & Recovery Services

- Backup Guide - intuitive user interface
- Scheduled, full and partial data backups
- Disaster recovery capability
- Data management
- Compatible with advanced multi-platform ADSM product
  - OS/2, AIX, AS/400, MVS
  - SUN, DEC & HP
- SIDF compliant

OS/2 WARP Server

Advanced Printing Capabilities

- Bi-directional printer support (Lexmark & HP)
- Postscript emulation
- Manage print queues
- Compatible with high-speed host printers
- Maximize printer throughput

OS/2 WARP Server

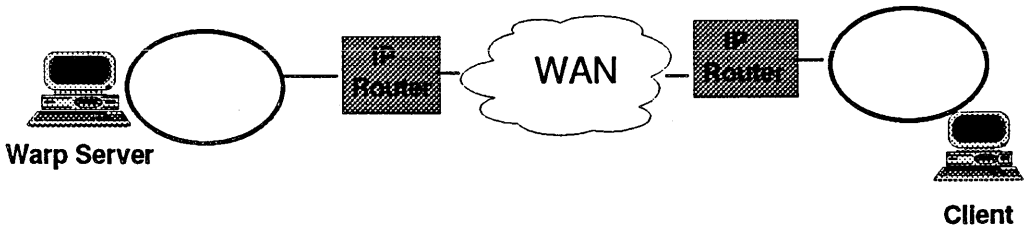
Warp Server TCP/IP Enhancements

Dynamic Host Configuration Protocol (DHCP)

- **Dynamic IP Address Allocation**
- **OS/2 and DOS/Windows Clients**
- **Dynamic Domain Name Server (DDNS)**

TCPBEUI Multiple Logical Adapter Support

- **Up to 1000 Sessions**
- **Single Physical Adapter**



OS/2 WARP Server

Warp Server TCP/IP Base Services

- **Internet Connection (LAN & dial-up)**
  Client Services: Web Explorer, Gopher, News Reader
- **SLIP & PPP dial-up support**
- **Telnet (Remote Logon)**
- **File transfer (FTP, TFTP)**
- **Remote Program Execution (Rexec, Rsh)**
- **Remote printing (Lpr, Lpd, LprPortD)**
- **E-mail incl. Multimedia Support (SMTP, MIME, POP)**
- **Network Management Agent (SNMP)**
- **Dynamic Routing of Diagrams (RouteD)**
- **Tools: Ping, Netstat, Iptrace, Tracerte, Finger,RPCinfo**
- **REXX programming interface for Sockets and FTP APIs**
- **Virtual TCP/IP stack and Winsocks 1.1 API for DOS & Windows**

OS/2 WARP Server

Warp Server Backup & Recovery

Backup Guide - intuitive user interface

Scheduled, full and partial data backups

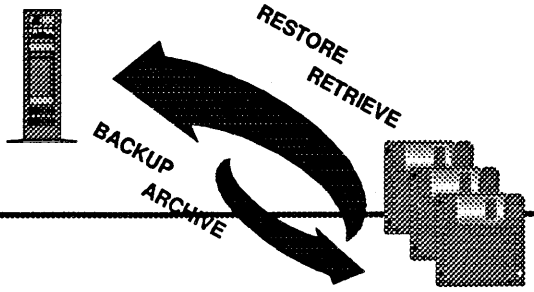
- **Including access control information**
- **Optional data compression**

Disaster recovery capability

Data management

Compatible with advanced multi-platform ADSM product

- **OS/2, AIX, AS/400, MVS**
- **SUN, DEC & HP**



OS/2 WARP Server

DOS LAN Services

For DOS

- **Basic and Full Redirector**
- **NETGUI**

For Windows

- **Virtual Redirector; TCPBEUI Real and Windows Protect-Mode**

```
[Boot]
NETWORK.DRV=DLSNET.DRV
[Boot.Description]
NETWORK.DRV=IBM DOS LAN Services
[386Enh]
NETWORK=vnetbios.386, vnetsup.386, vredir.386
```

For Windows 95

- Start - Settings - Control Panel - Add/Remove Programs - tab titled Windows Setup - Have diisk ... - X:\CID\CLIENT\DLS4W95 - OK - Mark DOS LAN Services for Windows 95 - Install

OS/2 Warp Server Gateway Services

LAN Server can be used as a gateway between LAN Server Clients and many different file sharing environments:

- **Netware mapped drives**
- **Netware connected print ports**
- **LPRMON connected print ports**
- **LAN Server Peer services connected print ports**

The following gateway services are possible with additional software:

- **NFS mounted drives (NFS Kit for TCP/IP V2.0 for OS/2)**
- **AS/400 PC Support connected drives (AS/400 PC Support + CM/2)**

Warp Server: Sharing Resources from WPS

- Warp Server Administration GUI is intergrated with the Workplace Shell
- Sharing resources can be done by selecting objects using mouse button 2
- Object's pop-up menus have network extensions

AUTOFAIL=YES
PAUSEONERROR=NO
REIPL=ON
NUMLOCK=ON

OS/2 Warp Server

/Y:2:\DOSLAN\DOS\EMM386.EXE

Warp Server: Sharing Resources from GUI

- GUI can be loaded from LAN Services folder or Network folder
- Drag-and-Drop Technique and CUA'89 standards (à la Windows) are supported
- Consider additional 6 MB of memory when loading the LAN Server GUI

\IBMLAN\DOSLAN\NET\UMB_CFG.SYS
DEVICE=A:\EMM386.EXE NOEMS
RIPL-DOS

OS/2 Warp Server

16 Stellen-Namen

UPHCSET /M (manual)
/E (xpanded)

NETCARD /ENABLE

OS2 TOOLS : LSMT PACKAGE

Warp Server: Sharing Resources from CL

- From an OS/2 command line you can issue the following NET command for example:

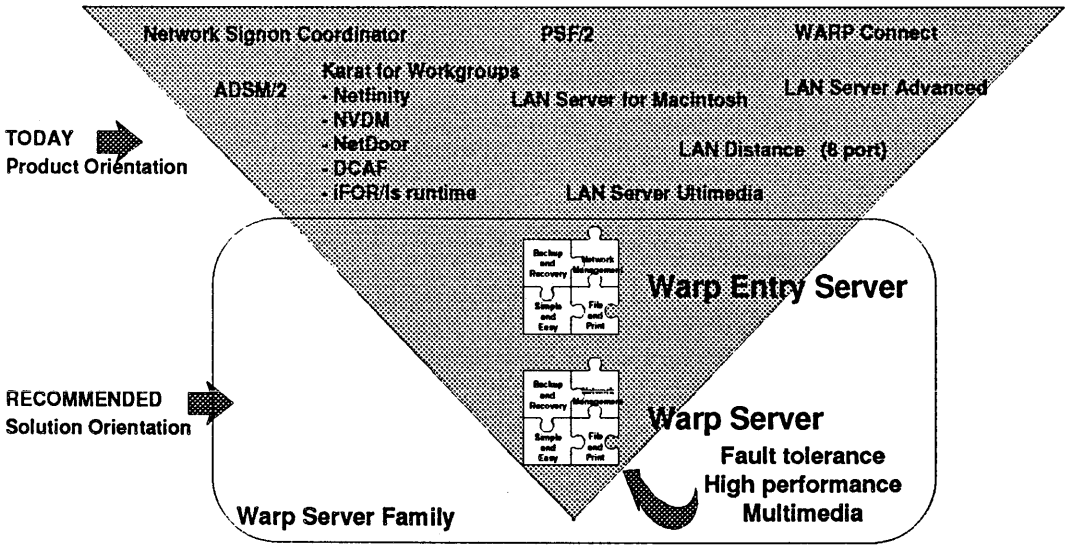
```
NET ALIAS TRANSFER \\SKYWALKER D:\TRANSFER
/DO:CONSTELLATION /W:STARTUP /R:"Transfer
Disk" /UN

NET ACCESS TRANSFER /ADD USERS:RWCDX

NET ACCESS TRANSFER /APPLY
```

OS/2 WARP Server

IBM Warp Server - Customer view



Warp Server is designed to provide a "single package solution" to targeted audiences

OS/2 WARP Server

Warp Server Integrates IBM technologies

- Multimedia Serving
- Server Application Access
- Systems & Network Mgt..
- Simplified printing
- Server backup and recovery
- Remote access
- File and Print sharing
- Advanced, network enabled O/S

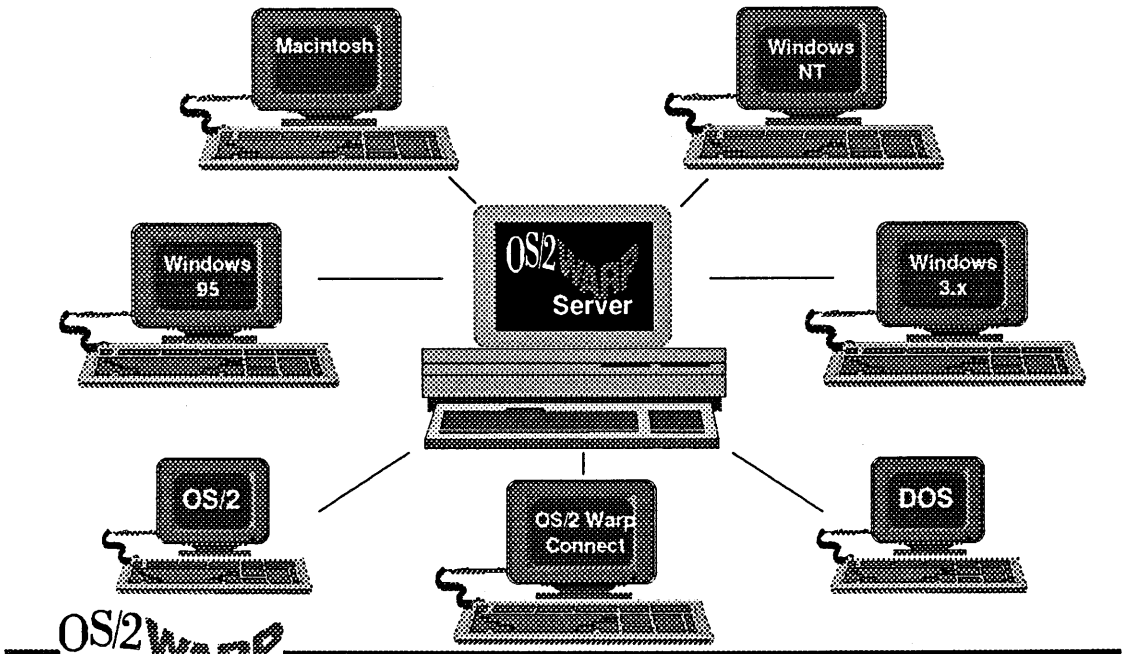
OS/2 Warp Server Entry

- NetDoor feature
- SystemView Workgroup
- PSF / Network
- ADSM Entry
- LAN Distance Server
- LAN Server 4.0 Entry
  - Improved usability
  - Improved TCP/IP support (DHCP, WINS)
- Warp Connect Fullpack

OS/2 Warp Server

- LS Macintosh
- LS Ultimedia
- NetDoor feature
- SystemView Workgroup
- PSF / Network
- ADSM Entry
- LAN Distance Server
- LAN Server 4.0 Advanced
  - Fault tolerance
  - High Performance File System
  - SMP
- Warp Connect Fullpack

Client Support



OS/2 WARP Server

Warp Server Clients

OS/2 LAN Requester

DOS LAN Services

NetWare for OS/2 Client

Systems Management
- **OS/2 and Windows Agents**

Remote LAN Access
- **OS/2 and Windows Clients**

Non-Family Client Support includes:
- **NT, WFW, LAN Manager, MS Networks**
- **Win95 (including logon assignments/home dirs)**
- **Macintosh**

Customer Benefits

- Increases employee productivity
  - file, print & application sharing
  - remote access
  - help desk
  - automation of routine tasks
- Protects business information
  - security
  - software & hardware failures
  - backup & recovery
- Reduces business costs
  - cost to manage/cost of ownership
  - printing costs
  - software distribution
- Tracks and maintains business assets
  - hardware & software discovery
  - licensed management
  - scheduler

OS/2 WARP Server

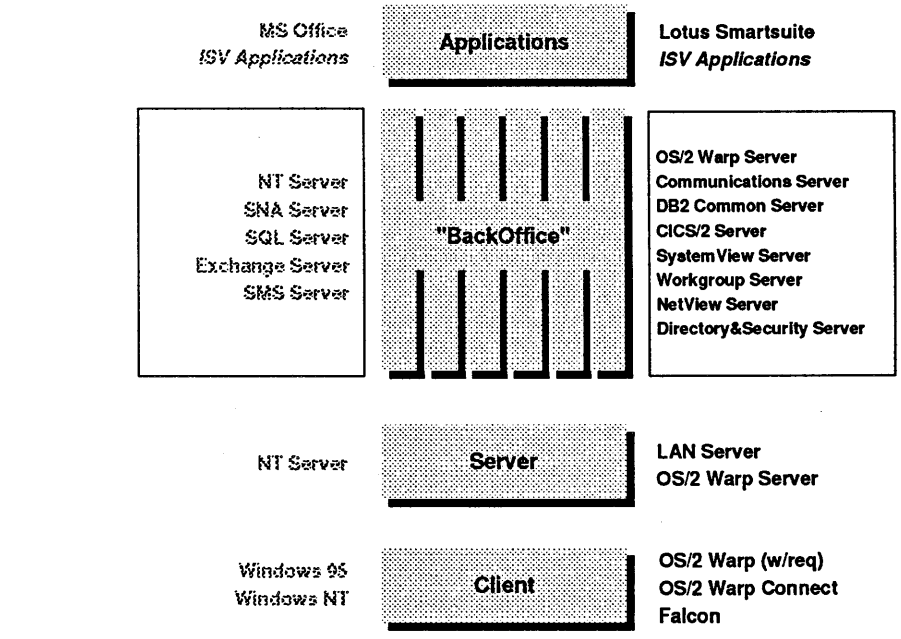
The *complete* business server solution

Warp Server Beta Program

- Beta cost: $15
- Beta availability: Septmeber 1995
- OS/2 Warp Server retail pricing: to be determined
- OS/2 Warp Server availability: 1Q 1996
- Available through normal sales channels

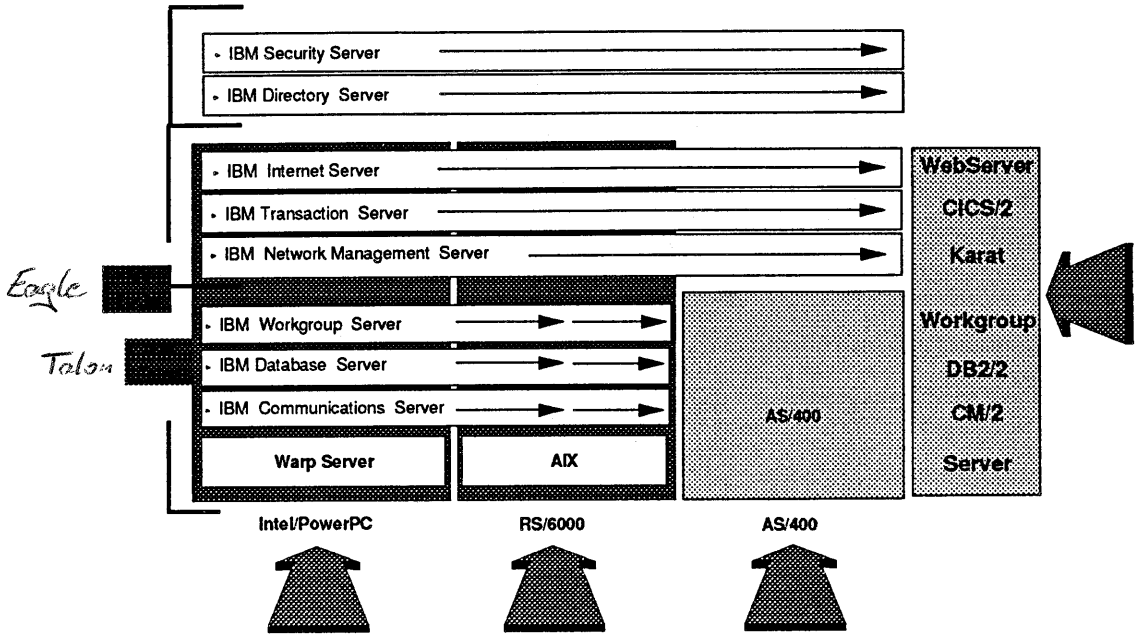
OS/2 WARP Server

OS/2 WARP Server **IBM Eagle - Product Packaging Strategy**



OS/2 WARP Server

IBM Eagle Server

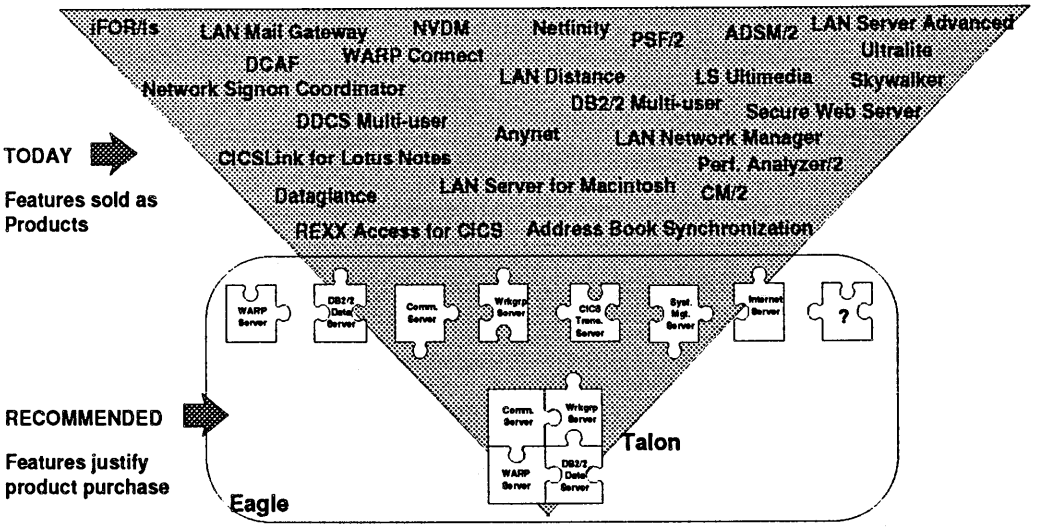


Large Account - Technology buyers

Autonomous and Bottom-up view of IBM Server Platforms

OS/2 WARP Server

IBM Eagle - Customer view

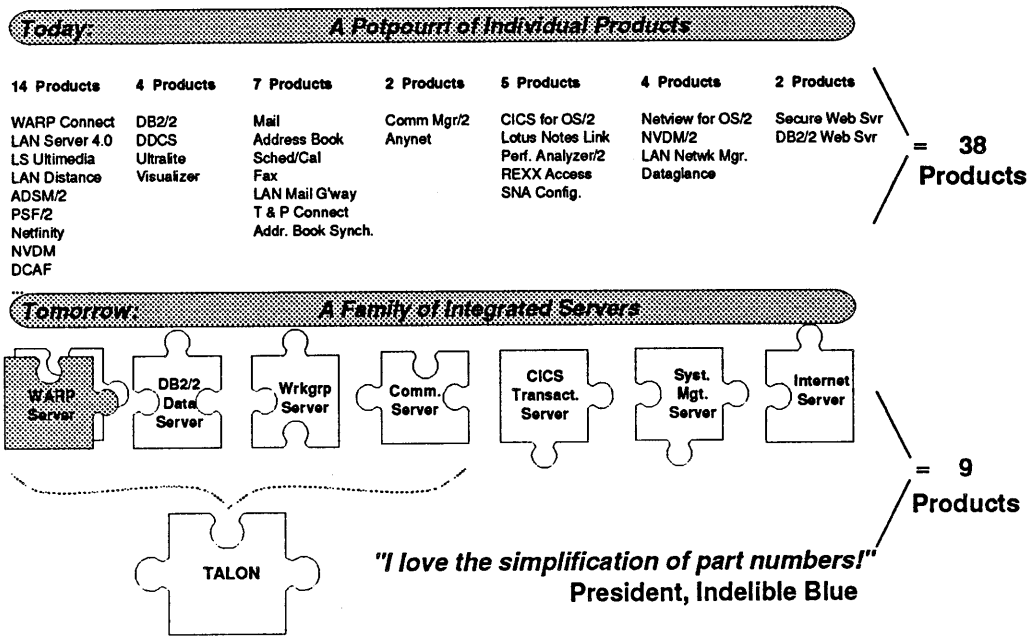


Eagle is a marketing strategy to easily communicate IBM solutions to the market

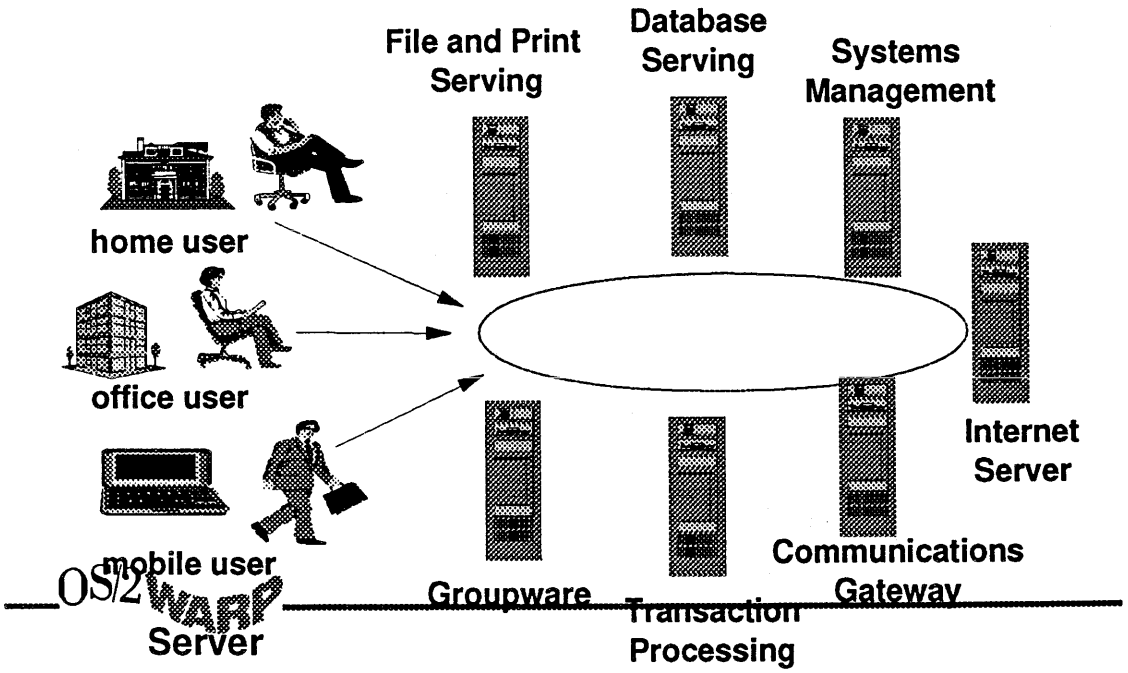
- It will expand over time to include other servers
- Dynamically change due to market requirements
- Showcase IBM solutions to the market

OS/2 WARP Server

IBM Eagle - Simplifying our portfolio of products

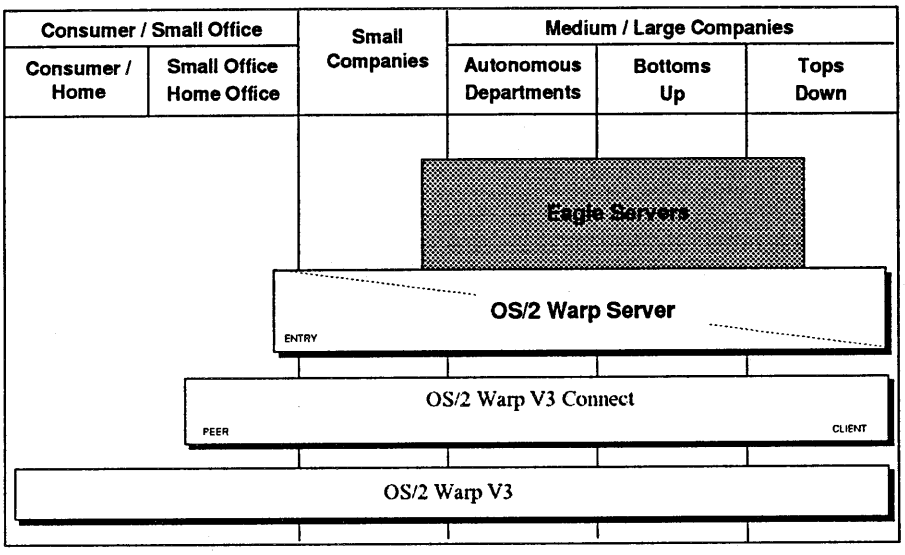


Family of Servers



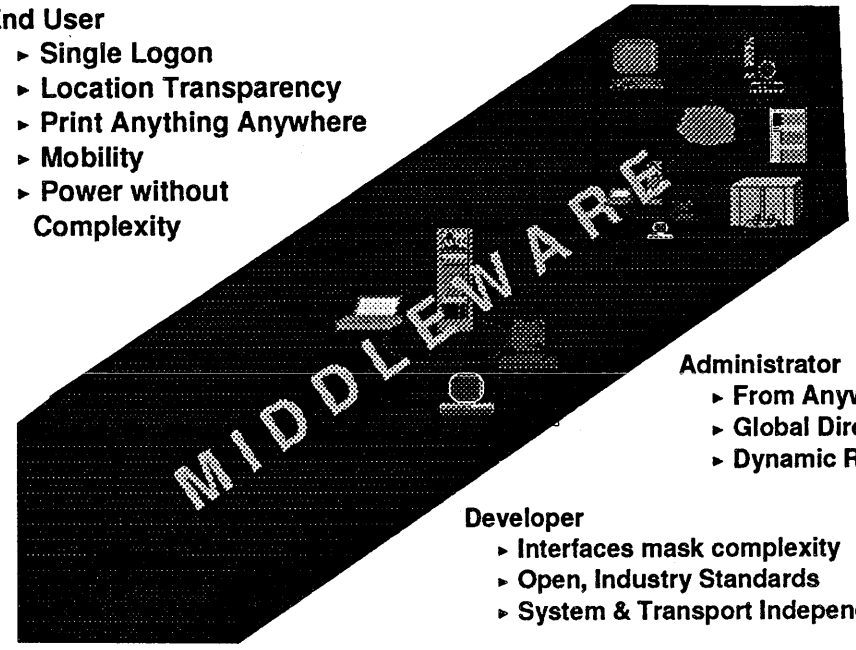
OS/2 Warp Server

OS/2 Warp Family Positioning



Single System Image

End User
- Single Logon
- Location Transparency
- Print Anything Anywhere
- Mobility
- Power without Complexity

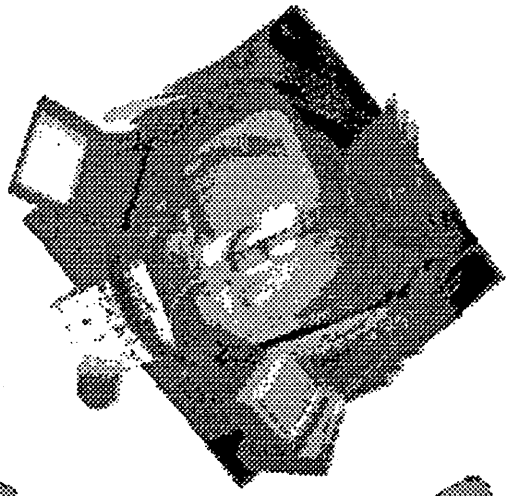


Administrator
- From Anywhere
- Global Directory
- Dynamic Reconfig

Developer
- Interfaces mask complexity
- Open, Industry Standards
- System & Transport Independence

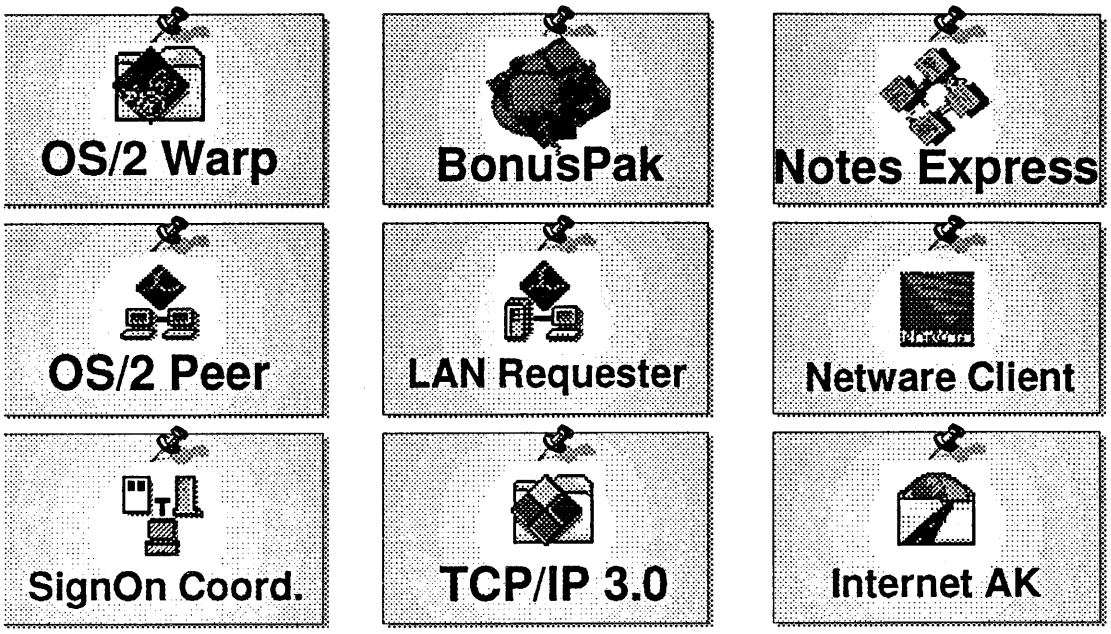
IBM Eagle Server - How we are going to win

- **Warp Server**
  - Dynamic load balancing and fault resilience
- **Database Server**
  - Install base - include DDCS
  - New accounts - include replication
- **Workgroup Server**
  - built around Lotus Notes
    - relational database (DB2)
    - cc:mail at clients
    - Lotus Approach w/Visualizer functions
    - Flowmark for Information Management
    - SmartSuite gets object oriented
- **IBM Communications Server**
  - Protocol gateways
- **SmartServer**
  - DataBase SmartServer for OS/2
  - Internet SmartServer for AIX
- **Internet Server**
  - New function to market quickly
  - WEB Server Gateway for CICS
- **Transaction Server**
  - Lotus Notes
  - CICS
- **IBM Network Management Server (SystemView Srv)**
- **Directory/Security Server**
  - DCE, CDS and security
- **Applications Developer's Toolkit**

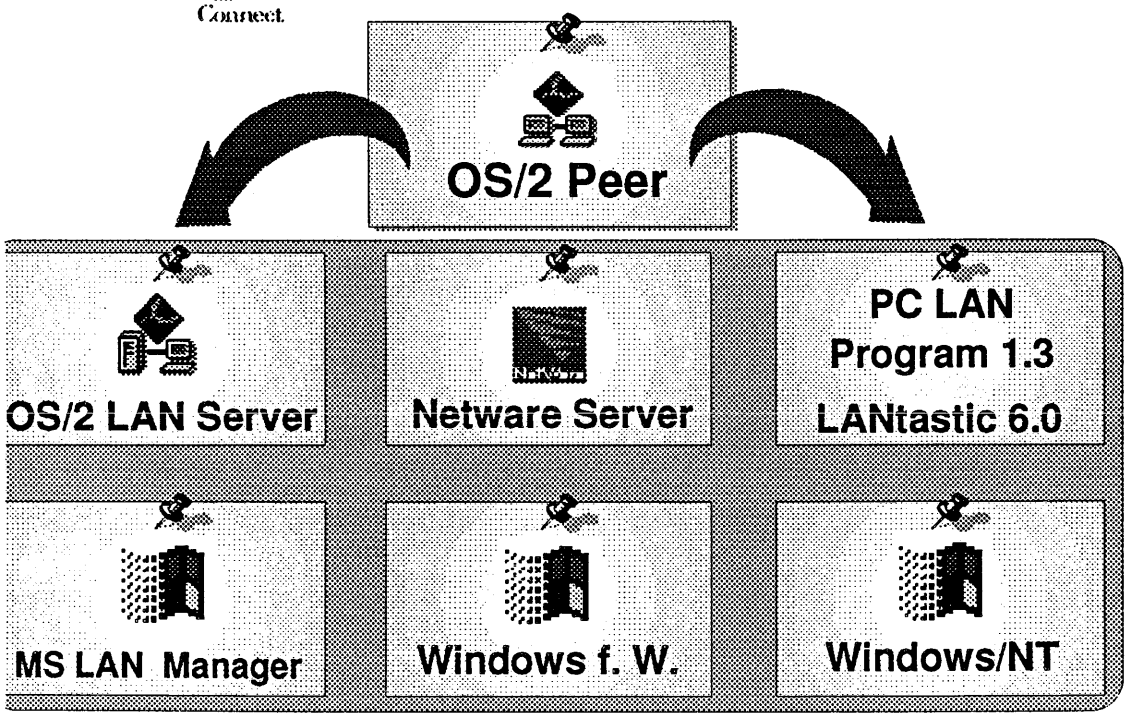


OS/2 WARP Connect

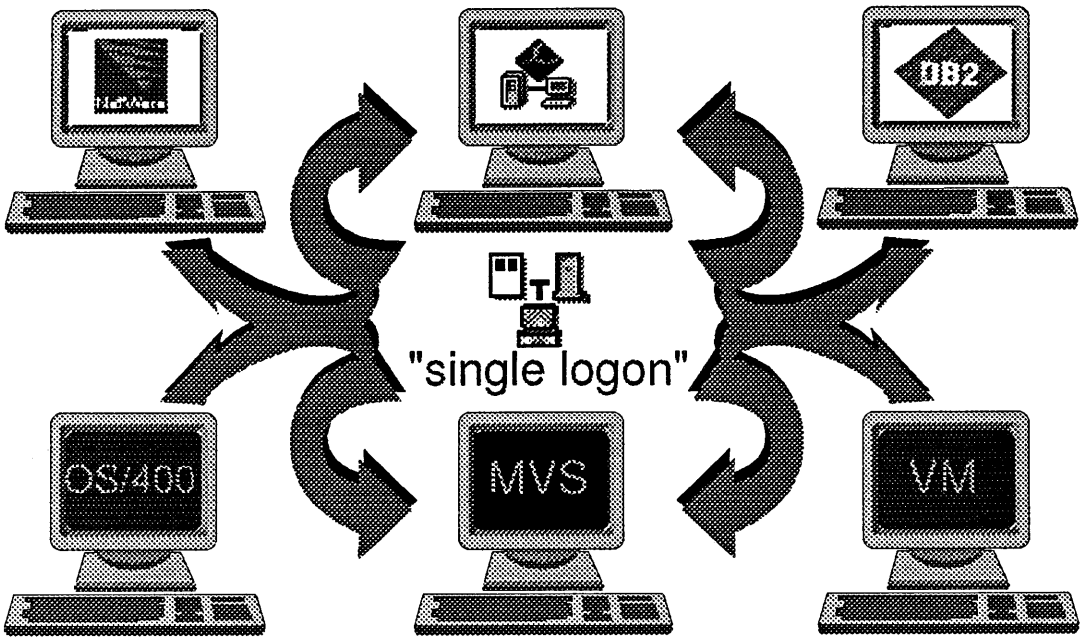
OS/2 Warp Connect: Contents



Peer Networking: Interoperability



Network SignON Coordinator "Single Logon"



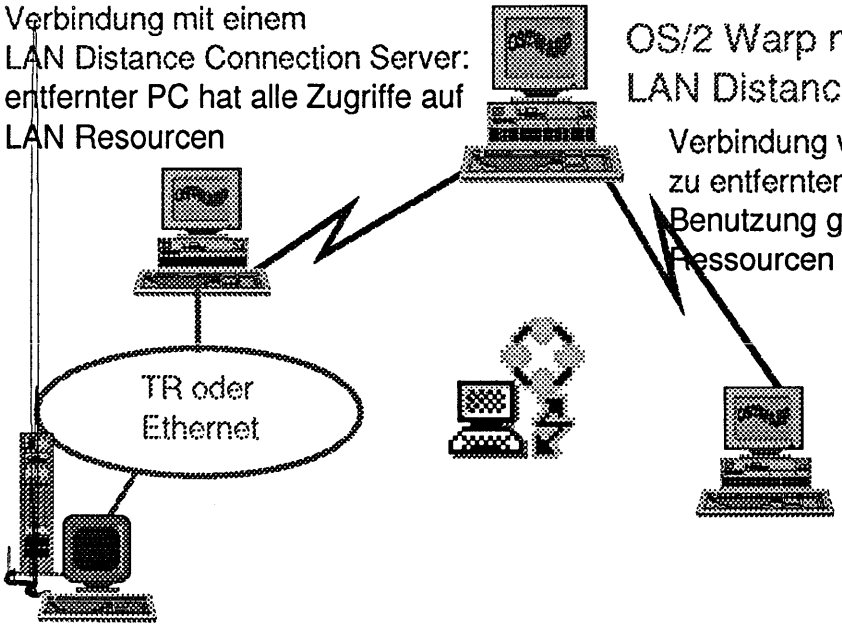
LAN Distance Remote

OS/2 Warp Connect

Verbindung mit einem LAN Distance Connection Server: entfernter PC hat alle Zugriffe auf LAN Resourcen

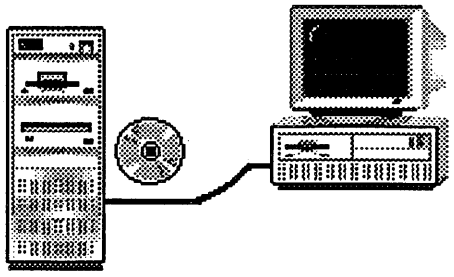
OS/2 Warp mit LAN Distance Remote

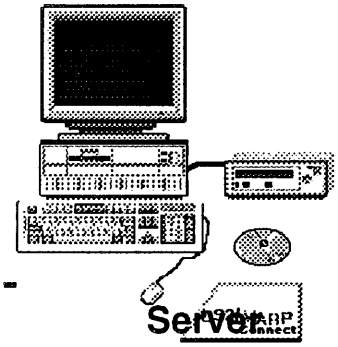
Verbindung von entferntem PC zu entferntem PC: Benutzung gemeinsamer Ressourcen



Installation

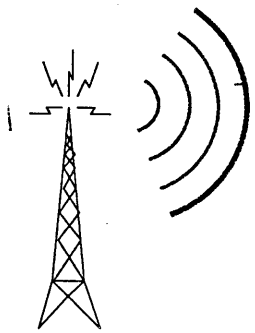
- Remote - über LAN von einer mit CD-ROM ausgerüsteten Maschine





- Lokal - direkt von CD-ROM

IBM Wireless LAN

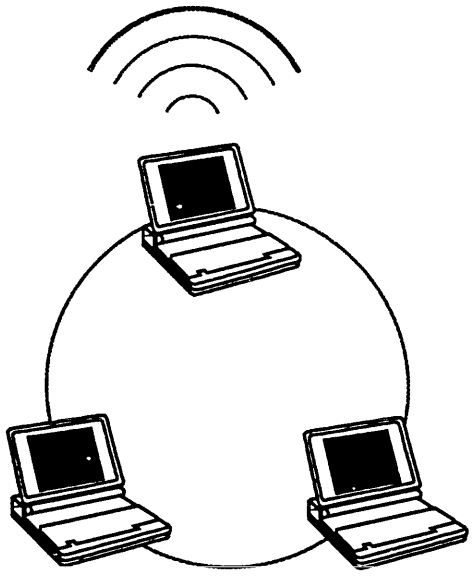


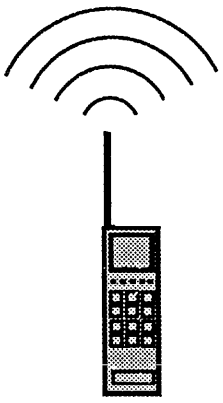
IBM Wireless LAN

Lokale Netze über Funk

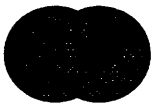
Integration in bestehende Netze

Herbst 1995



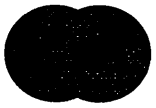


G. Waller M. DeCain



IBM Wireless LAN

Grundlagen



IBM Wireless LAN

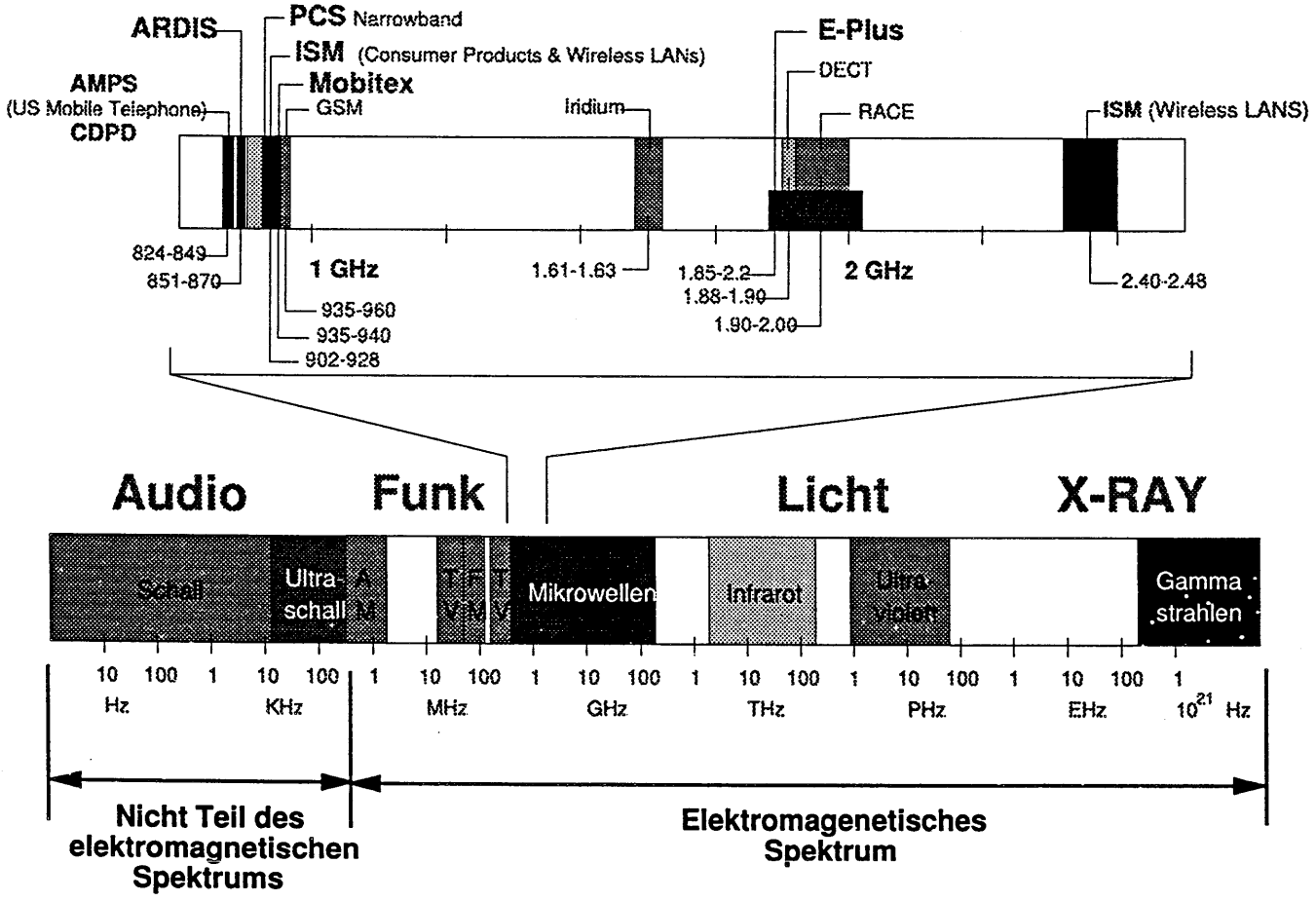
Grundlagen

Kapitel 1

IBM Wireless LAN

Grundlagen

Anwendungsbeispiele im Funkspektrum



WLGRUND

IBM Wireless LAN

Grundlagen

Anwendungsbeispiele im Funkspektrum

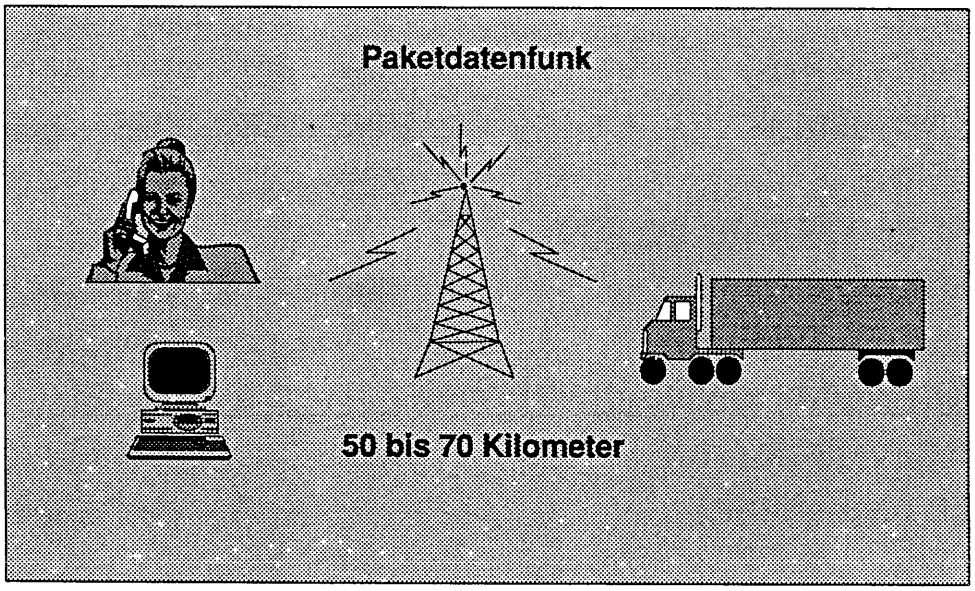
Anwendung	Frequenzen
AM Rundfunk	535 - 1605 KHz
FM Rundfunk (UKW)	88 - 108 MHz
Bündelfunk	410-430 MHz
Modacom	410-430 MHz
C-Netz	450-460 MHz
ARDIS (USA)	806 - 825, 851 - 870 MHz
US Mobilfunk	824 - 849, 860 - 894 MHz
Mobitex	896 - 901, 935 -940 MHz
ISM (in USA für WLAN)	902 - 928 MHz
GSM	890 - 915, 935 - 960 MHz
Motorola (Iridium)	1.61 - 1.63 GHz
ISM (WLAN weltweit)	2.4 - 2.5 GHz
Mikrowellenherde	2.43 - 2.46 GHz
Motorola (Altair)	18.8 - 19.2 GHz

IBM Wireless LAN

Grundlagen

Öffentliche Datenfunkdienste Paketorientiert

- Paketorientierte Funk-Datendienste
- Zellenbasierte Netze
- ca.50 km Reichweite
  - GfD (noch im Testbetrieb)
  - Modacom (Telekom)



WLGRUND

Grundlagen

Öffentliche Datenfunkdienste Paketorientiert

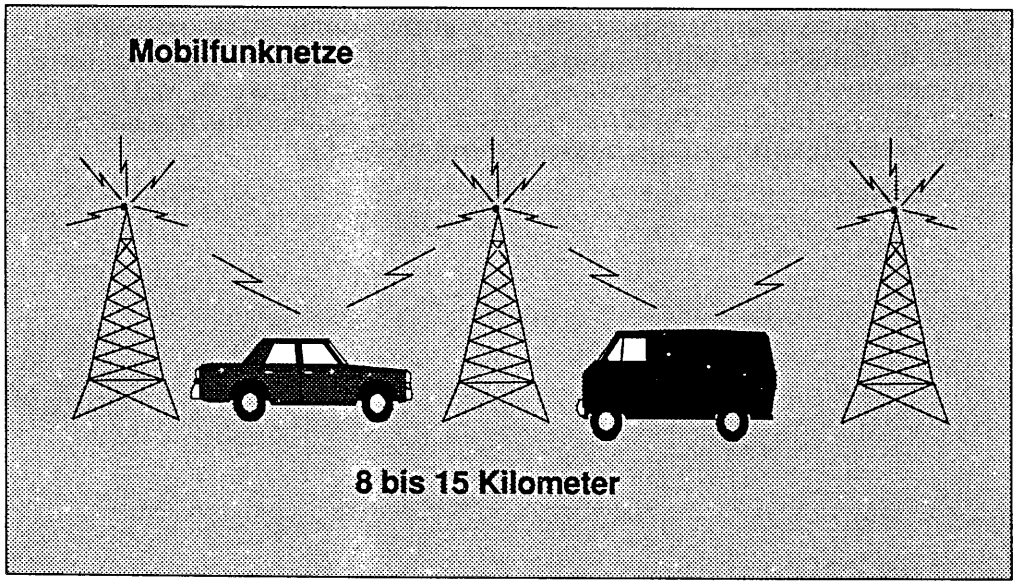
Notes:

In Deutschland gibt es zwei auf Datenübertragung spezialisierte Funknetze. Bereits seit 1991 betreibt die Telekom Tochter-DeTeMobil das Modacom-Netz. Die Netztechnik stammt von Motorola und ist ähnlich dem US-Netz ARDIS. Es gibt Übergänge ins X.25-Netz Datex-P. Modacom ist paketorientiert. Der Tarif ist mengenbezogen, d.h. insbesondere attraktiv bei kleinen Datenmengen.
Gemeinsam mit der DeTeMobil hat die IBM einen Service auf der Basis der Funkkommunikationsplattform ArTour für drahtlose Weitverkehrskommunikation angekündigt.
Das zweite Datenfunknetz wird betrieben von einem Konsortium namens Gesellschaft für Datenfunk (GfD) mit Sitz in Essen, die Hauptmitglieder sind RWE, Mannesmann und die Deutsche Bank. Die Lizenz wurde im Mai 1994 erteilt, zur Zeit läuft ein Testbetrieb im Ruhrgebiet. Der allgemeine Betrieb soll Ende '95 erfolgen, Flächendeckung soll bis Ende '97 erreicht sein.

Grundlagen

Öffentliche Datenfunkdienste als Zusatz in Mobilfunknetzen

- C-Netz und D-Netze (GSM)
  - spezielle Modems im C-Netz
  - Modems oder Datendienst im GSM
  - 8 bis 15 km Reichweite



Grundlagen

Daten in Mobilfunknetzen

Notes:

Die Mobilfunknetze (C, D1, D2, E-Plus) sind in erster Linie für mobile Sprachkommunikation gedacht und ausgelegt. Es lassen sich jedoch auch Daten übertragen. Im Unterschied zu den paketorientierten Diensten wird hier die Verbindungsdauer als Tarifgrundlage verwendet, nicht die Datenmenge. Durch die andere Kostenstruktur ergeben sich andere Anwendungsschwerpunkte.

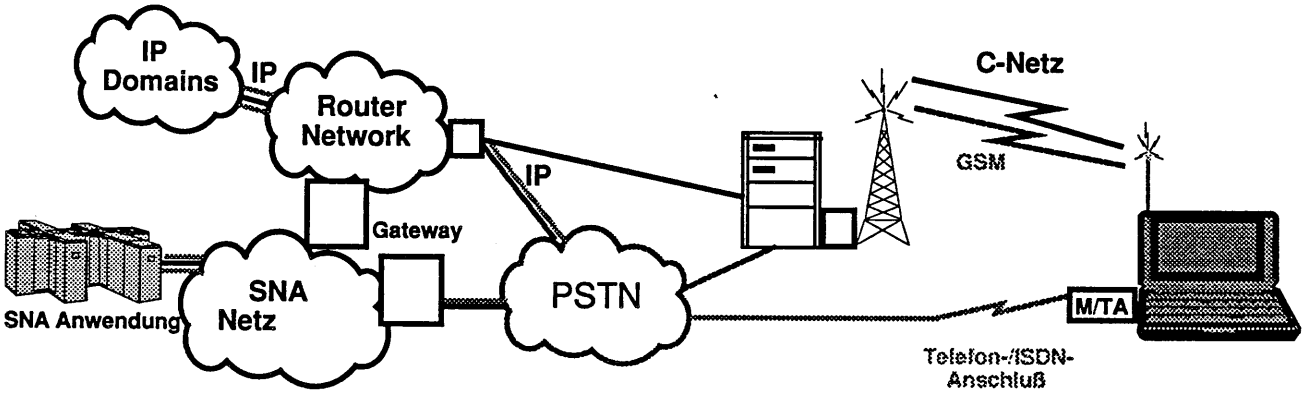
Im C-Netz gibt es die Möglichkeit, durch den Anschluß spezieller Modems eine Datenübertragung zu realisieren.
Neben dieser Option gibt es in den D-Netzen auch die Möglichkeit, einen im GSM-Standard definierten speziellen Datendienst zu nutzen.

Für analoge Mobilfunknetze wurde in USA der CDPD-Standard (Cellular Digital Packet Data) unter Mitwirkung der IBM definiert, da sich dort digitale Mobilfunknetze noch nicht durchgesetzt haben.

IBM Wireless LAN

Grundlagen
Mobile Kommunikation

Es gibt viele Optionen der mobilen Kommunikation



- **Mobilfunk**
- **Telefonnetz/ISDN**
- **Protokolle**
  - **IP**
  - **SNA**
  - **...**

Grundlagen

Mobile Kommunikation

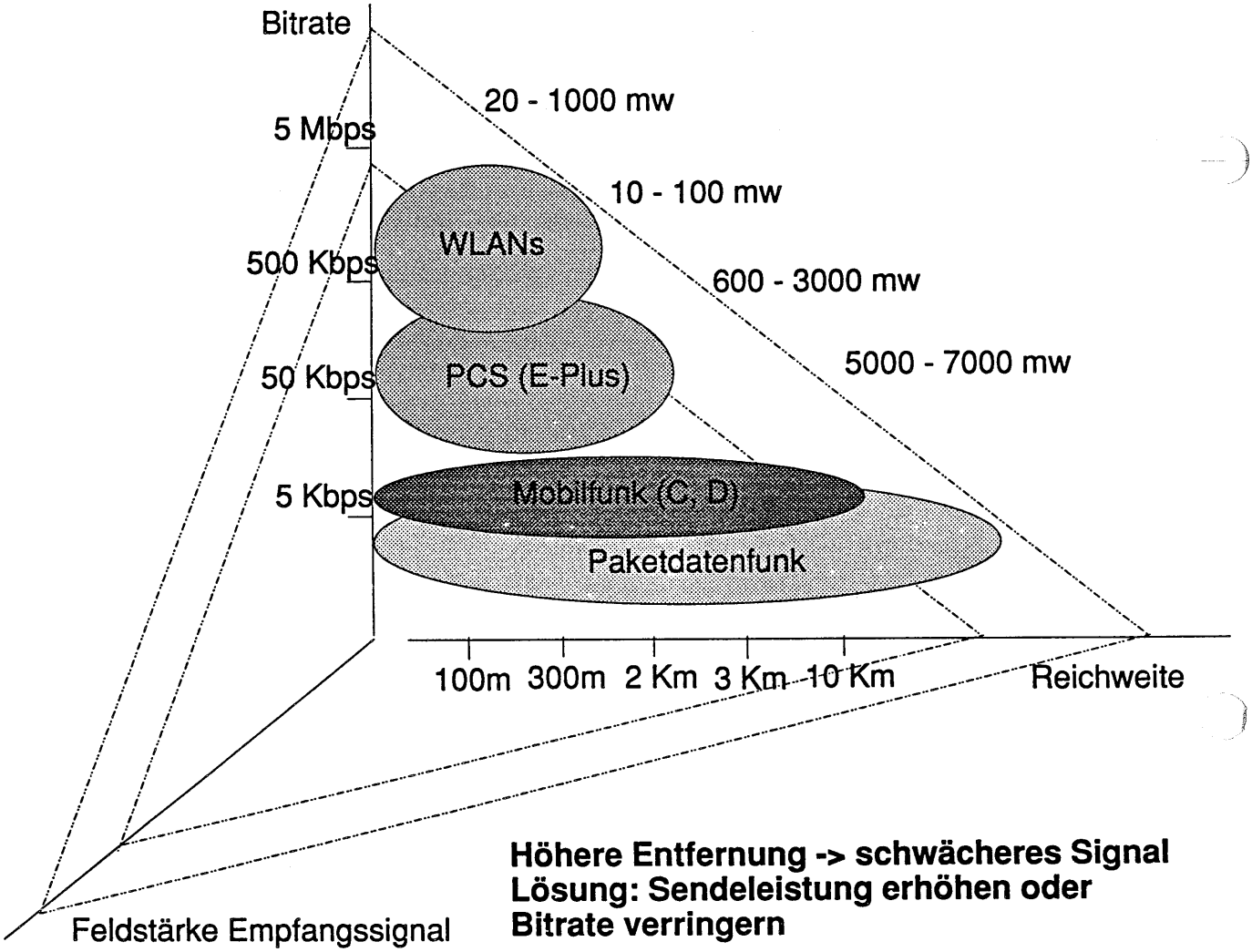
Notes:

Die drahtlose Kommunikation ist nicht die einzige Form der mobilen Kommunikation im Weitverkehrsbereich. Sie unterstützt jedoch den höchsten Grad der Mobilität, da sie von Leitungsanschlüssen unabhängig macht. Dafür bringt sie in der Regel höhere Kosten mit sich und ist langsamer als eine vergleichbare Modem- oder gar ISDN-Verbindung.
In beiden Fällen - drahtlos wie drahtgebunden - gibt es Lösungen für die gängigen Protokolle.

IBM Wireless LAN

Grundlagen

Reichweite, Signalfeldstärke, Bitrate



Höhere Entfernung -> schwächeres Signal
Lösung: Sendeleistung erhöhen oder Bitrate verringern

Grundlagen

Reichweite, Signalfeldstärke, Bitrate

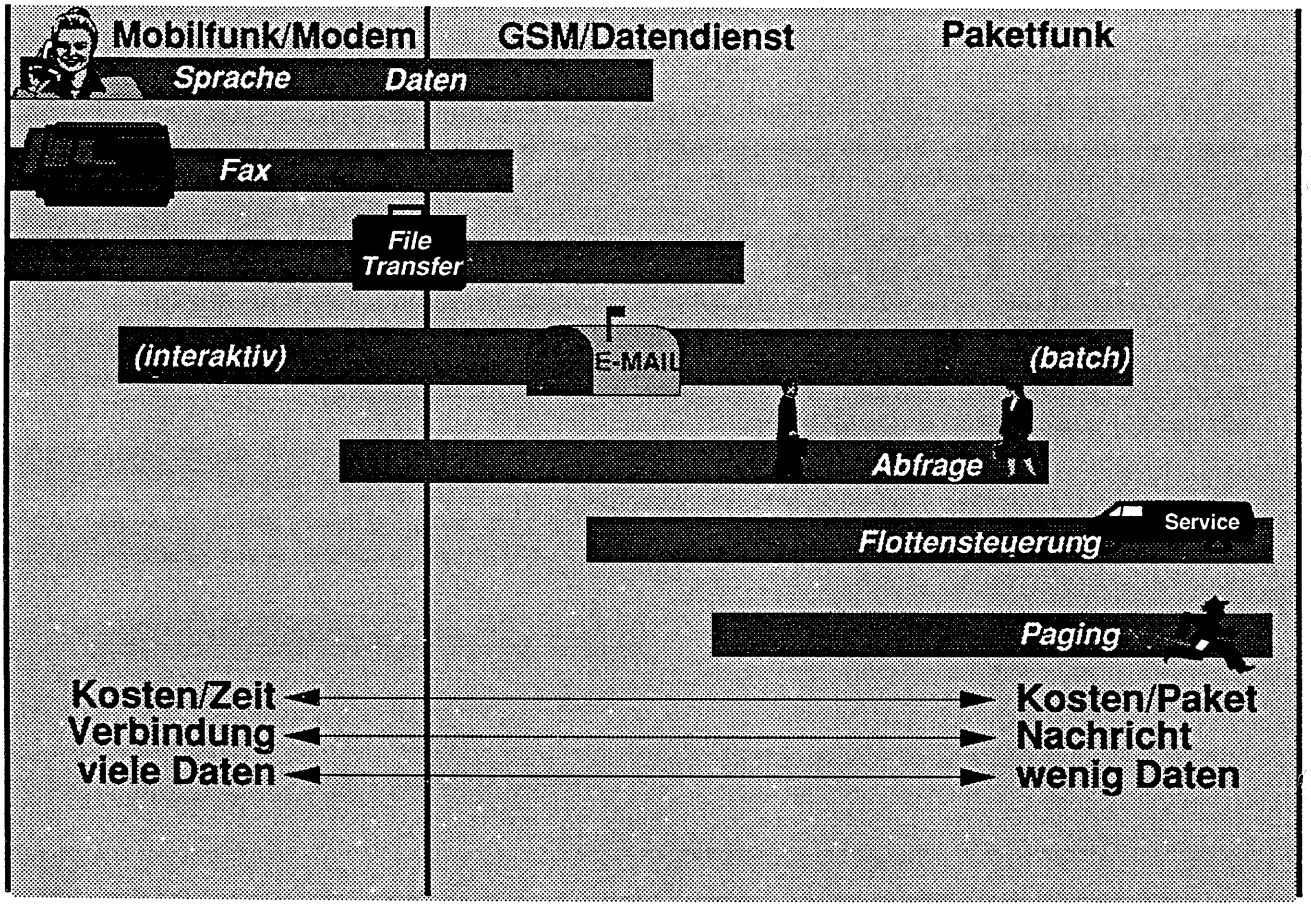
Notes:

Bei Datenübertragung über Funk gibt es unterschiedliche Kenngrößen, die nicht alle gleichzeitig maximiert werden können. Will man den Datendurchsatz erhöhen, muß man höhere Frequenzen verwenden. Dies geht zu Lasten der Reichweite, da die Sendeleistung nicht nach Belieben erhöht werden darf sondern behördlicher Regulierung unterliegt. Für Wireless LANs (WLANs, auch Radio LANs bzw. RLANs genannt) ist zum Beispiel in Europa ein bestimmtes Frequenzband (2.4 - 2.4835 GHz) und eine bestimmte maximale Sendeleistung (100 mWatt) vorgeschrieben (nach ETSI-Standard ETS 300 328).
Öffentliche Netze arbeiten auf anderen Frequenzen, woraus sich wesentlich geringere Datenraten ergeben (ca. 9.6 kbit/s gegenüber 1-2 Mbit/s).
Modacom arbeitet bei 410 - 430 MHz.

IBM Wireless LAN

Grundlagen

Wirtschaftlichkeitsbetrachtung



Grundlagen

Wirtschaftlichkeitsbetrachtung

Notes:

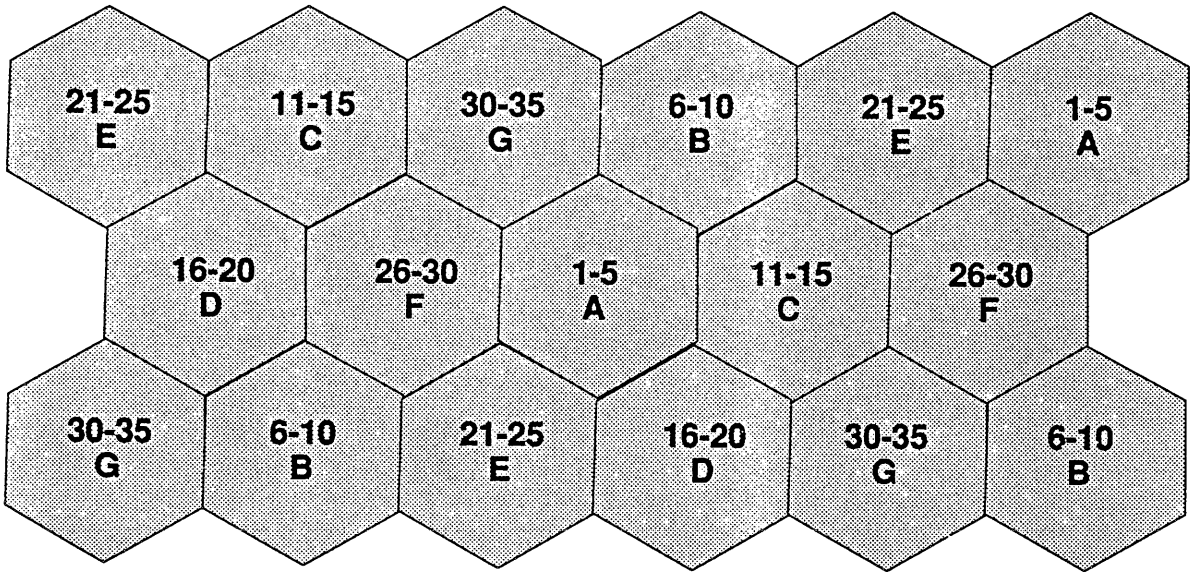
Das nebenstehende Bild faßt die Anwendungsformen und die jeweils zu bevorzugenden Netze bzw. Netzdienste zusammen.

IBM Wireless LAN

Grundlagen

Zellenstruktur

- Vollständige Abdeckung der Fläche
- benachbarte Zellen dürfen sich nicht stören



Grundlagen

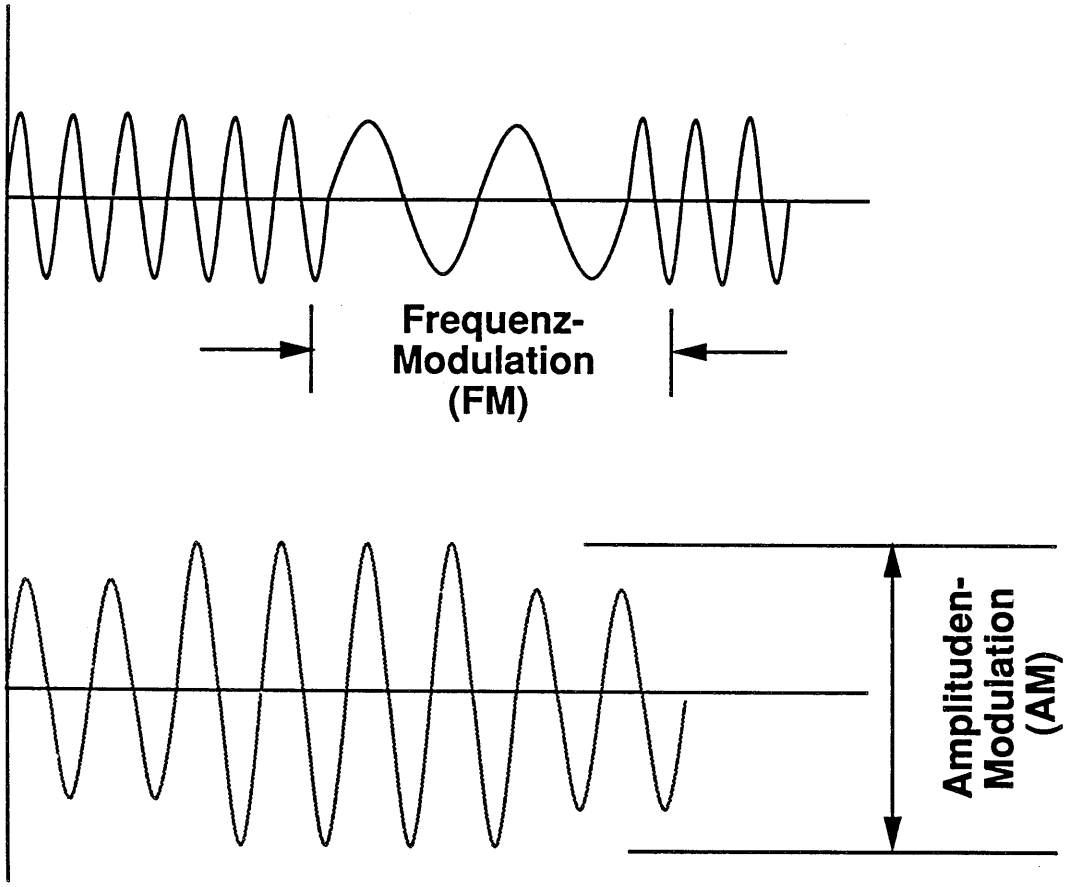
Zellenstruktur

Notes:

Bei öffentlichen Netzen besteht das Ziel, die gesamte Fläche lückenlos zu versorgen. Dadurch wird es erforderlich, daß benachbarte Funkzellen sich teilweise überlappen. Um dies zu erreichen, werden die verfügbaren Frequenzen so zugeordnet, daß ein möglichst großer Abstand zwischen Zellen liegt, welche die gleichen Frequenzen verwenden. Auf keinen Fall dürfen benachbarte Zellen die gleichen Frequenzen verwenden. zwischen 2 Zellen, welche die gleichen Frequenzen verwenden, sollten möglichst viele andere Zellen liegen.

Grundlagen

Modulationstechniken



Grundlagen

Modulationstechniken

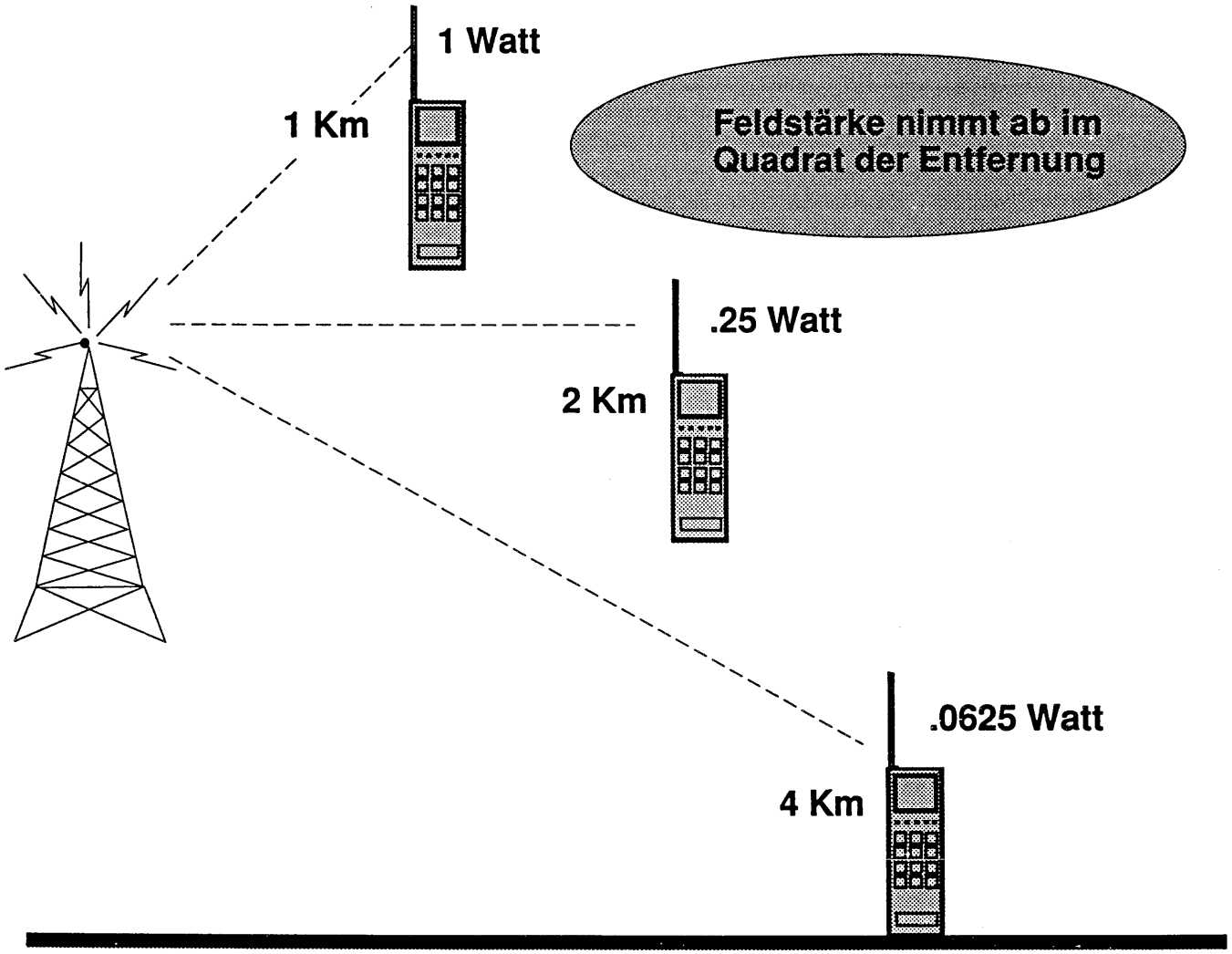
Notes:

Um Informationen über Funk zu übertragen, braucht man zunächst ein Trägermedium. Dies ist ein Funksignal, d.h. eine elektromagnetische Schwingung einer bestimmten Frequenz, der Trägerfrequenz. Von dieser Frequenz hängt ab, welche Menge an Informationen auf diesem Signal (Kanal) übertragen werden kann. Je höher die Frequenz, um so mehr Information kann übertragen werden.
Zur Übertragung der Informationen wird dieses - zunächst gleichförmige - Signal verändert (moduliert). Dazu gibt es verschieden Techniken. Die bekanntesten sind die Frequenzmodulation (FM), u.a. verwendet beim UKW-Rundfunk und die Amplitudenmodulation (AM), verwendet bei allen anderen Rundfunkbändern.
Ferner gibt es noch Phasenmodulation sowie verschiedene Varianten und Kombinationen dieser Techniken.

IBM Wireless LAN

Grundlagen

Signalstärke



WLGRUND

Grundlagen

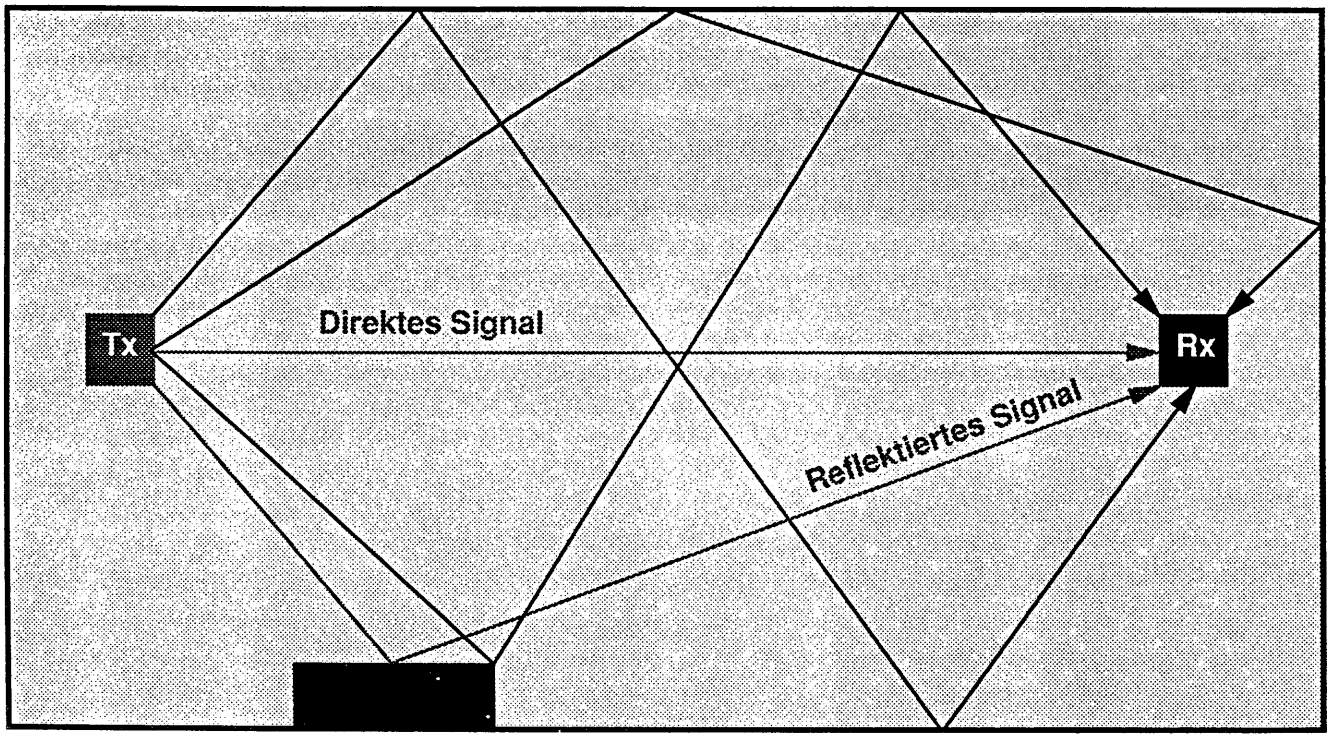
Signalstärke

Notes:

Grundsätzlich nimmt die Feldstärke eines Funksignals mit der Entfernung vom Sender ab, und zwar im Verhältnis zum Quadrat der Entfernung. Im dargestellten Beispiel ist gezeigt, wie bei doppelter Entfernung noch ein Viertel, bei vierfacher Entfernung noch ein Sechzehntel der Feldstärke übrigbleibt.
Darüber hinaus kann es eine Reihe weiterer Einfluß- bzw. Störfaktoren geben, die sich auf die Signalausbreitung auswirken. Abhängigkeiten bestehen von der Frequenz, den örtlichen Gegebenheiten (Reflexionen), den Wetterbedingungen, etc.

Grundlagen

Mehrwegeausbreitung



Mehrere Pfade vom Sender zum Emfänger führen zu verschieden starken Empfangssignalen, die zeitlich verschoben sind

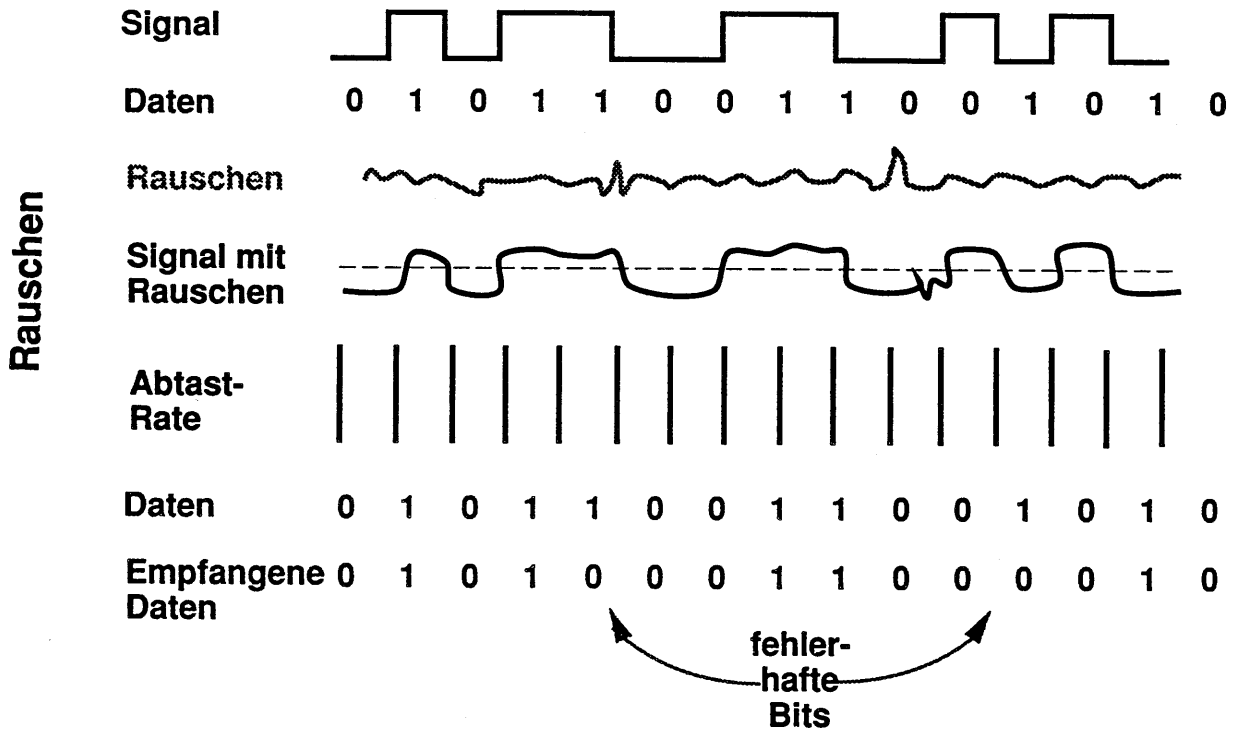
Grundlagen

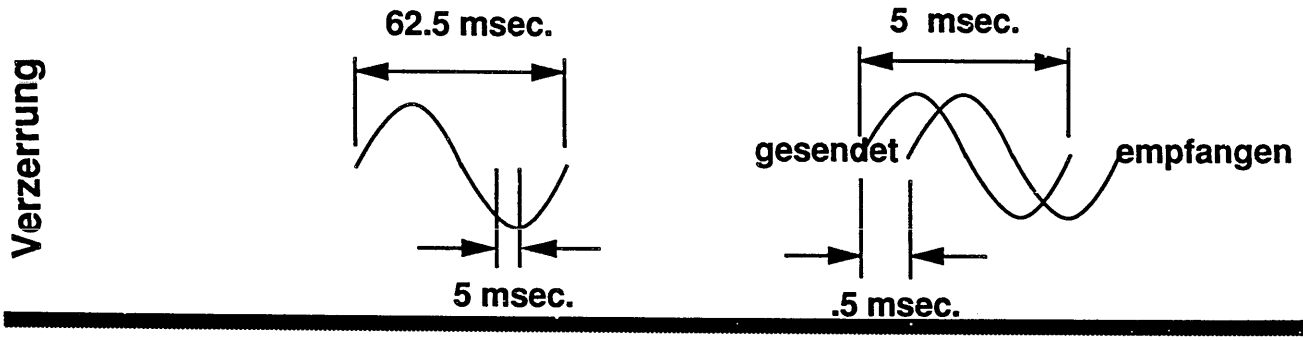
Mehrwegeausbreitung

Notes:

Funksignale breiten sich in der Regel in alle Richtungen aus. Insbesondere in geschlossenen Räumen werden sie von Wänden, Möbeln und sonstigen Objekten teilweise absorbiert, teilweise reflektiert und teilweise durchgelassen.
Am Empfänger kommen daher vom gleichen gesendeten Signal verschiedene "Kopien" an, die wegen unterschiedlicher Laufzeiten (durch die verschiedenen Pfade) zeitlich versetzt sind und unterschiedlich stark sind. Der Empfänger hat das Problem, hieraus die ursprüngliche Information wieder herauszufiltern.
Die Effekte der Mehrwegeausbreitung sind frequenzabhängig. Daher ist es für Datenübertragung, bei der kein einziges Bit verändert werden darf, nicht zu empfehlen, sich auf eine einzige Frequenz zu beschränken. Ferner ist es erforderlich, Verfahren zur automatischen Fehlererkennung und ggf. Fehlerkorrektur (Forward Error Correction) zu verwenden. Im ungünstigsten Fall muß eine Wiederholung der Übertragung auf einer anderen Frequenz erfolgen.

Grundlagen
InterSymbol Interference





Grundlagen

Intersymbol Interference

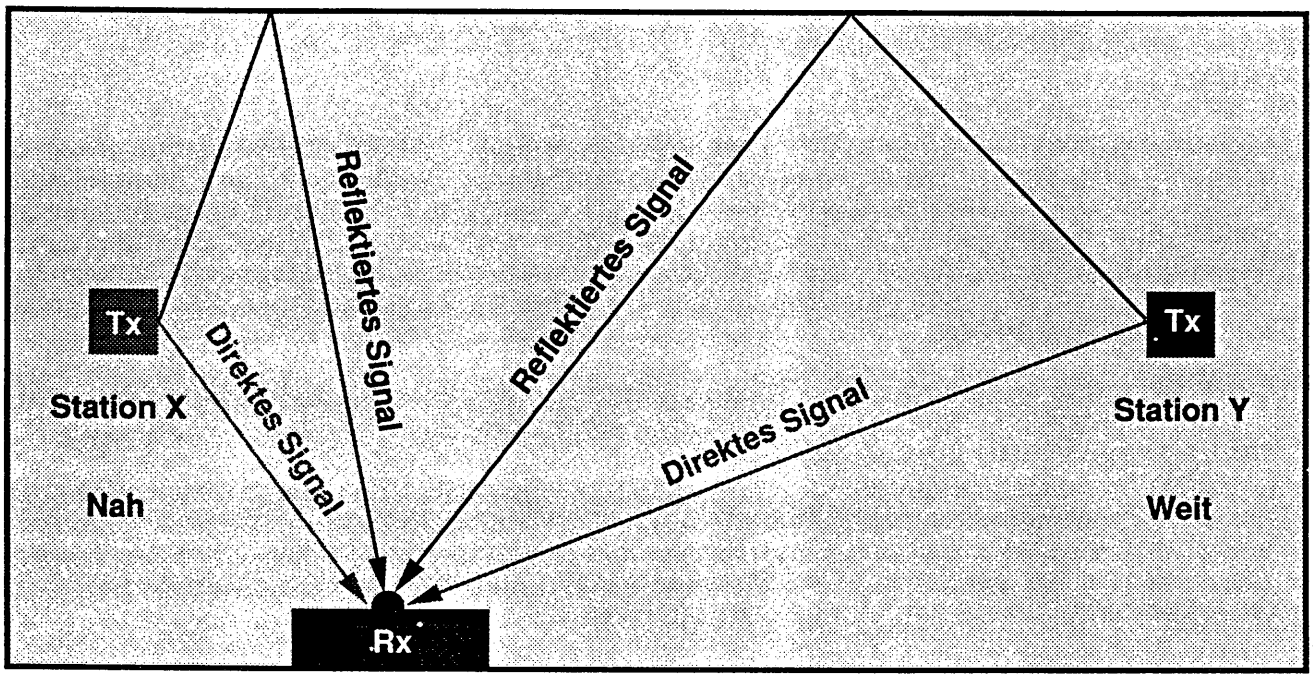
Notes:

Digitale Daten werden in Form von Symbolen übertragen. Symbole bestehen aus einem oder mehreren Bits, die in einer bestimmten Weise repräsentiert werden, z.B. von Rechteckimpulsen wie hier dargestellt. Diesem Signal überlagert sich das stets vorhandene Rauschen, so daß das empfangene Signal sich gegenüber dem gesendeten verändert. Aufgabe des Empfängers ist es das ursprüngliche Signal zu rekonstruieren, was durch Wahl einer geeigneten Codierung unterstützt wird. Wird das Rauschen zu stark, erkennt der Empfänger die Daten nicht mehr korrekt, es gibt Bitfehler.

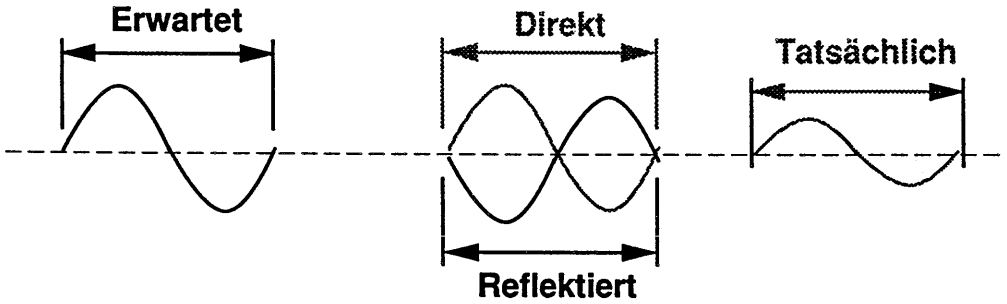
Durch die vorher erläuterte Mehrwegeausbreitung gibt es beim Empfangssignal Verzerrungen, d.h. unterschiedliche Signallaufzeiten führen ebenso wie das Rauschen dazu, daß die Form des Empfangssignals sich verändert.
Beispiel: Die Laufzeitunterschiede durch die Mehrwegeausbreitung seien 5 Mikrosekunden. Bei einer Symboldauer von 62.5 Mikrosekunden ist dies tolerierbar und führt nicht zu Fehlern. Erhöht man die Datenrate derart, daß die Symboldauer nur noch 5 Mikrosekunden beträgt, so entspricht sie der Verzerrung, das Signal ist gestört und nicht mehr rekonstruierbar.
Die tolerierbare Verzerrung beträgt jetzt nur noch 0.5 Mikrosekunden.

Grundlagen

Rayleigh Fading



Durch Phasenverschiebung löschen sich direktes und reflektiertes Signal gegenseitig weitgehend aus



Grundlagen

Rayleigh Fading

Notes:

Ein spezieller Effekt der Mehrwegeausbreitung ist die fast völlige Auslöschung von direktem und reflektiertem Signal, wenn die Laufzeitunterschiede zu einer Phasenverschiebung von einer halben Wellenlänge führen. Wenn es mehrere Sender gibt, kann dies dazu führen, daß der weiter entfernte Sender als näherliegend angenommen wird.
Da dieses mit Rayleigh Fading bezeichnete Phänomen sehr stark ortsabhängig ist, führt es bei mobilen Stationen dazu, daß bei einer geringen Standortveränderung eine Umkehr der Verhältnisse erfolgt, d.h. der näherliegende Sender wird wieder stärker empfangen.
Gibt es nur einen Sender, so ist der Effekt völliger Empfangsausfall.
Auch dieses Phänomen ist frequenzabhängig und hat daher besonders nachteilige Auswirkungen, wenn nur eine einzige Frequenz verwendet wird.

Abkürungen: Tx = Transmitter (Sender) Rx = Receiver (Empfänger)

Grundlagen

Spread Spectrum

- Funkübertragungstechnik, bei der das Signal im Rauschen versteckt wird
- Für militärische Zwecke entwickelt
- Verwendet verbreitertes Frequenzband
- Erlaubt Koexistenz von mehreren Signalen
- Unempfindlich gegen Störungen
- Niedrige Sendeleistung
- Wird in ISM Bändern eingesetzt
  - weltweit verfügbar

Grundlagen

Spread Spectrum

Notes:

Die Spread Spectrum Verfahren (Spreiztechnik) verwenden eine größere Bandbreite, als für die eigentlich zu übertragende Datenrate erforderlich ist. Diese Techniken sind ursprünglich im Militärbereich entwickelt worden, wo es gilt, den Funkverkehr derart zu verschleiern, daß er nicht einmal als solcher erkannt wird, geschweige denn abgehört werden kann.
Das Signal hebt sich nicht vom üblichen Rauschen ab, es sei denn, man hat den Schlüssel, mit dem es zu erkennen und dekodieren ist.
Für den zivilen Bereich ist dieses Prinzip übernommen worden, jedoch in einer Variante mit geringerem Aufwand, da hier die Anforderungen niedriger sind und die Wirtschaftlichkeit stärker beachtet werden muß.

Ein weiterer Effekt dieses Verfahrens ist, daß im gleichen Frequenzbereich gleichzeitig mehrere Spread Spectrum Übertragungen stattfinden können, die sich gegenseitig nicht stören, vorausgesetzt sie verwenden verschiedene Codes.
Die Nutzung der ISM-Frequenzbänder (Industrial, Scientific, Medical - 3 Bänder: 902-928 MHz, 2.4 - 2.4835 MHz, 5.75 - 5.825 MHz) erlaubt nahezu weltweite Nutzung, überdies genehmigungs- und lizenzfrei.

Grundlagen

Spread Spectrum

- Zwei Spread Spectrum Varianten
  - Direct Sequence (DS)
  - Frequency Hopping (FH)
- Direct Sequence verwendet 'Chipping'
- Frequency Hopping verwendet Sprungsequenzen
  - Hopping Patterns

Grundlagen

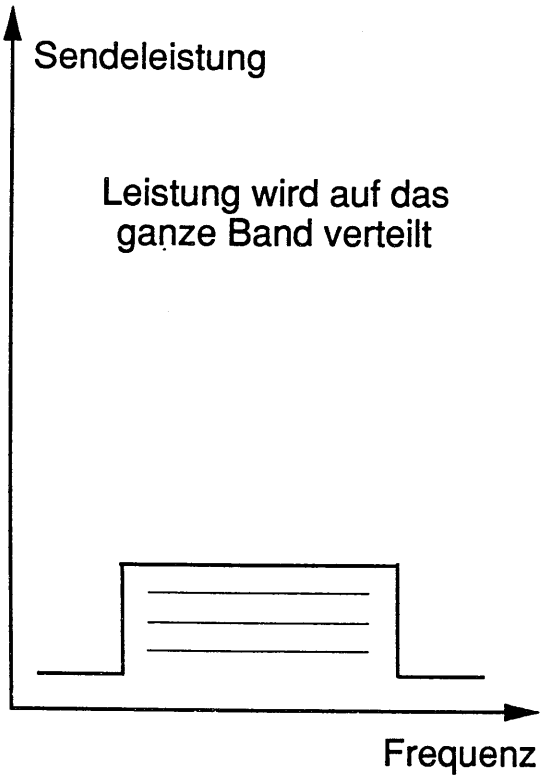
Spread Spectrum

Notes:

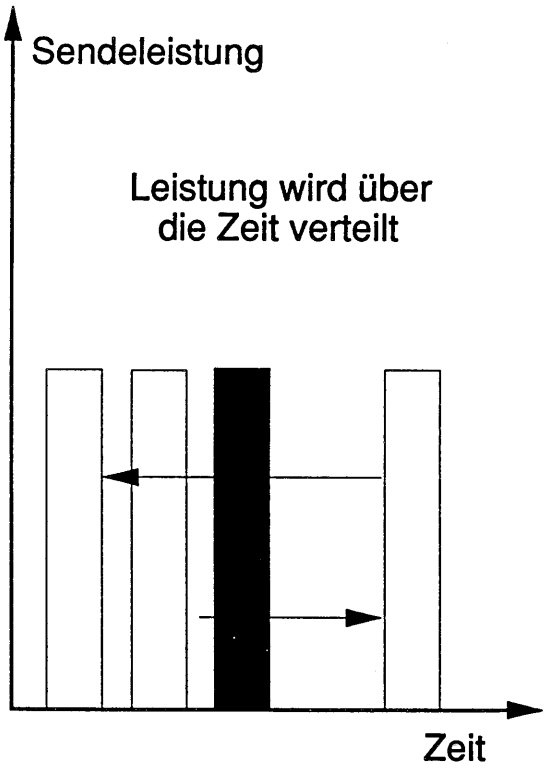
Es gibt zwei verschieden Spreiztechniken. Das Direct Sequence (DS) Verfahren verwendet sogenannte Chipsequenzen (Chipping Patterns), d.h. höherfrequente Signale, mit denen das Nutzsignal verschlüsselt wird. Übertragen wird dieses höherfrequente Signal, bei dem jedem Bit des Nutzsignals eine Anzahl von Bits entspricht, der sogenannte Spreizfaktor (Chip Rate). Der Empfänger muß das Chipping Pattern kennen und kann mit dessen Hilfe das Signal erkennen und entschlüsseln.
Beim Frequency Hopping (FH) wird das genutzte Frequenzband in Kanäle aufgeteilt, die ständig in einer beliebigen, aber festen Reihenfolge gewechselt werden.
Beide Verfahren finden in Lösungen für Wireless LAN Anwendung, jedes hat seine Vor- und Nachteile.

Grundlagen

Spread Spectrum
Direct Sequence vs Frequency Hopping



Direct Sequence



Frequency Hopping

Grundlagen

Spread Spectrum
Direct Sequence Vs Frequency Hopping

Notes:

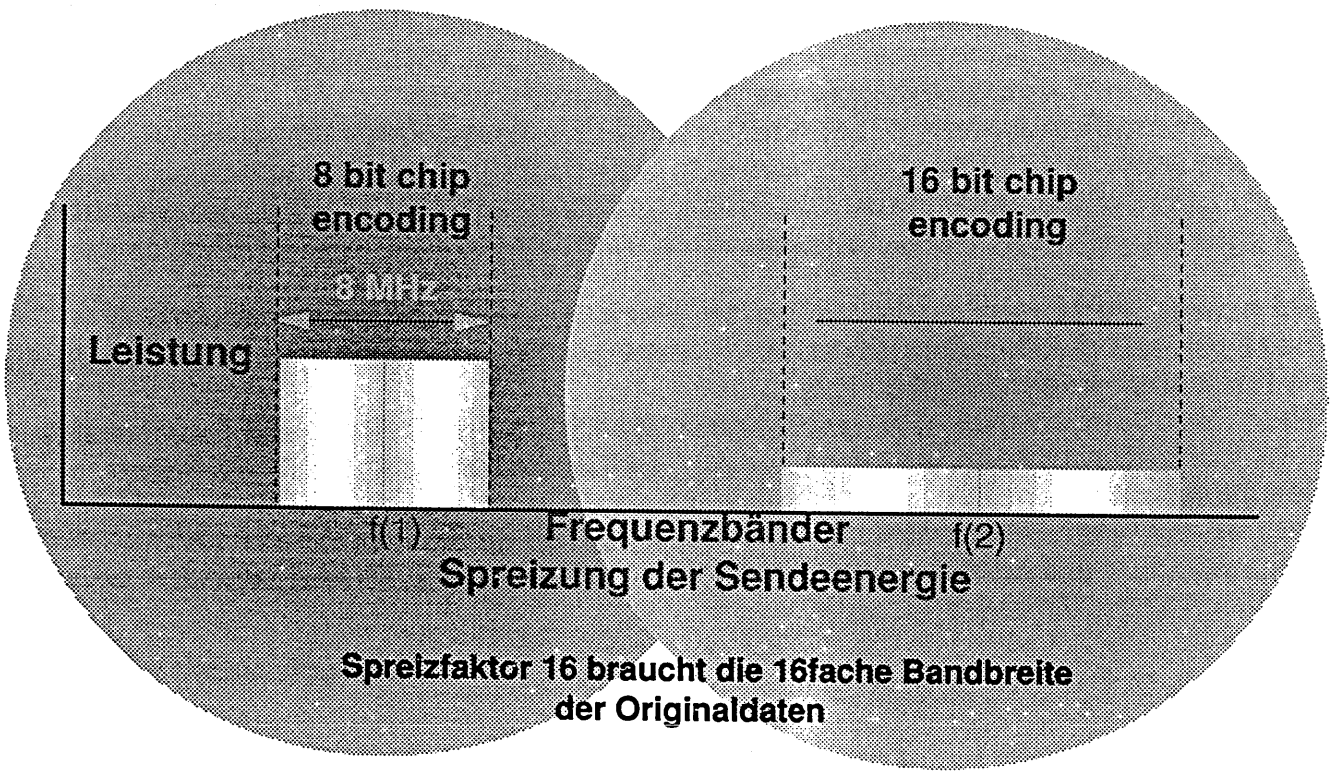
Spread Spectrum Systeme sind Breitband-Systeme bei denen die Bandbreite des übertragenen Signals erheblich größer ist als das Nutzsignal. Verschiedene Sender verwenden verschiedene Sequenzen oder Codes basierend auf Pseudo-zufallszahlen. Diese Codes werden verwendet, um das Nutzsignal zu spreizen. Das gespreizte Signal ist weniger störanfällig. (Siehe die vorher diskutierten Störeffekte wie Fading und Verzerrung, die frequenzabhängig sind)
Diese Unempfindlichkeit gilt sowohl gegenüber Anwendern der gleichen Technik, die eine andere Zufallssequenz benutzen, als auch gegenüber sonstigen Störern. So ist es möglich, daß die für das Nutzsignal zur Verfügung stehende Bandbreite am gleichen Ort mehrmals (mit verschiedenen Codes) genutzt werden kann.

Bei beiden Verfahren wird eine im zeitlichen Mittel niedrige Sendeleistung (bezogen auf die Bandbreite) erreicht, was das Signal für normale Funkempfänger im Rauschen verschwinden läßt.
Direct Sequence erzielt den Spreizeffekt durch Verwendung eines Funkkanals sehr hoher Bandbreite und nutzt diesen kontinuierlich, aber mit niedriger Sendeleistung.
Frequency Hopping sendet mit höherer Leistung, jedoch zu einem gegebenen Zeitpunkt nur auf einem schmalen Kanal. Der Spreizeffekt tritt durch das häufige Wechseln des Sendekanals ein.

Grundlagen

Spread Spectrum - Direct Sequence

- Jede Funkzelle verwendet eine eigene Chipsequenz, d.h.
  Originaldaten werden in veränderter Form gesendet
  - Z.B. kann eine binäre "1" mit Spreizfaktor 16 zu 1100110010101010 *werden)*
- Es wird erheblich mehr Information übertragen als in den
  Originaldaten enthalten ist (z.B. 16 MByte vs 1 MByte)



Spreizfaktor 16 braucht die 16fache Bandbreite der Originaldaten

Grundlagen

Spread Spectrum - Direct Sequence

Notes:

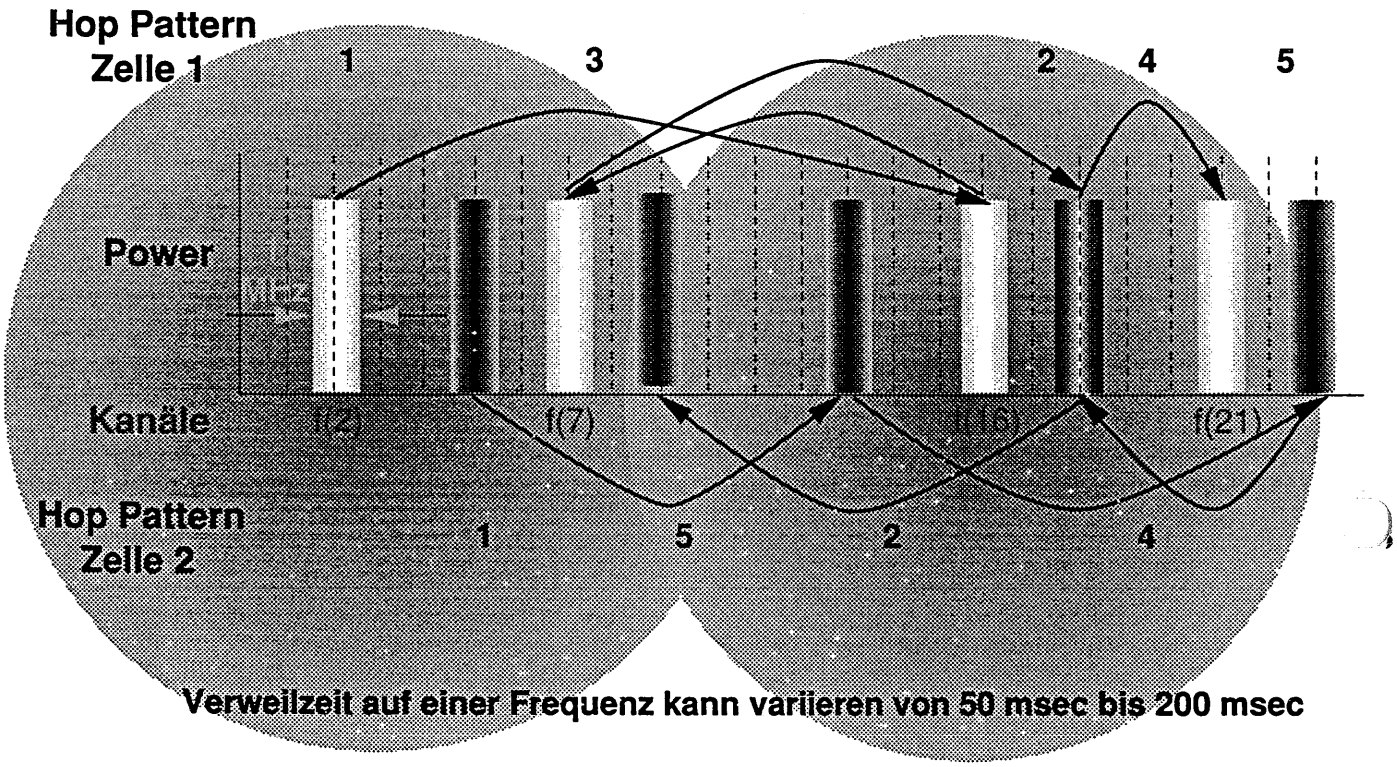
Die Chipsequenz muß allen Stationen einer Funkzelle bekannt sein. Benachbarte und überlappende Funkzellen müssen verschiedene Chipsequenzen verwenden um gegenseitige Störungen zu vermeiden.
Die Sendeleistung wird durch die Spreizung verringert. Dafür wird die Bandbreite des übertragenen Signals wesentlich erhöht.

IBM Wireless LAN

Grundlagen

Spread Spectrum - Frequency Hopping

- Überlappende Zellen verwenden verschiedene Hopping-Sequenzen
- Senden auf gleicher Frequenz kann vorkommen, gilt dann aber nur für einen Hop (im Beispiel Hop 4)



Verweilzeit auf einer Frequenz kann variieren von 50 msec bis 200 msec

Grundlagen

Spread Spectrum - Frequency Hopping

Notes:

Bei Frequency Hopping wird das Frequenzband in Kanäle aufgeteilt. Die Daten werden - ohne weitere Codierung - für eine bestimmt Zeit auf einem dieser Kanäle gesendet. Danach wird auf einen anderen Kanal umgeschaltet. Der nächste Datenblock wird dann auf dieser Frequenz gesendet.
Man unterscheidet zwischen Fast FH, wenn für jedes zu übertragende Bit der Kanal gewechselt wird und Slow FH, wenn mehrere Bits auf einem Kanal übertragen werden. Kommerzielle Systeme verwenden Slow Frequency Hopping.
Die Reihenfolge, in der die Kanäle gewechselt werden, kann zufällig bestimmt oder nach bestimmten Kriterien optimiert werden. Einmal festgelegt, bleibt sie für eine Funkzelle in der Regel gleich. Sender und Empfänger müssen, um in Kontakt zu bleiben, stets in der gleichen Weise umschalten.
Der besondere Vorzug dieses Verfahrens liegt in seiner Robustheit gegen Störungen:

Durch geeignete Wahl von Hoppingsequenzen überlappender Funkzellen, die nach dem gleichen Verfahren arbeiten, kann gewährleistet werden, daß zu einem gegebenen Zeitpunkt ein möglichst großer Abstand zwischen den gerade genutzten Kanälen besteht (orthogonale Hoppingsequenzen). Damit ist eine große Zahl von vollständig überlappten Funkzellen möglich.

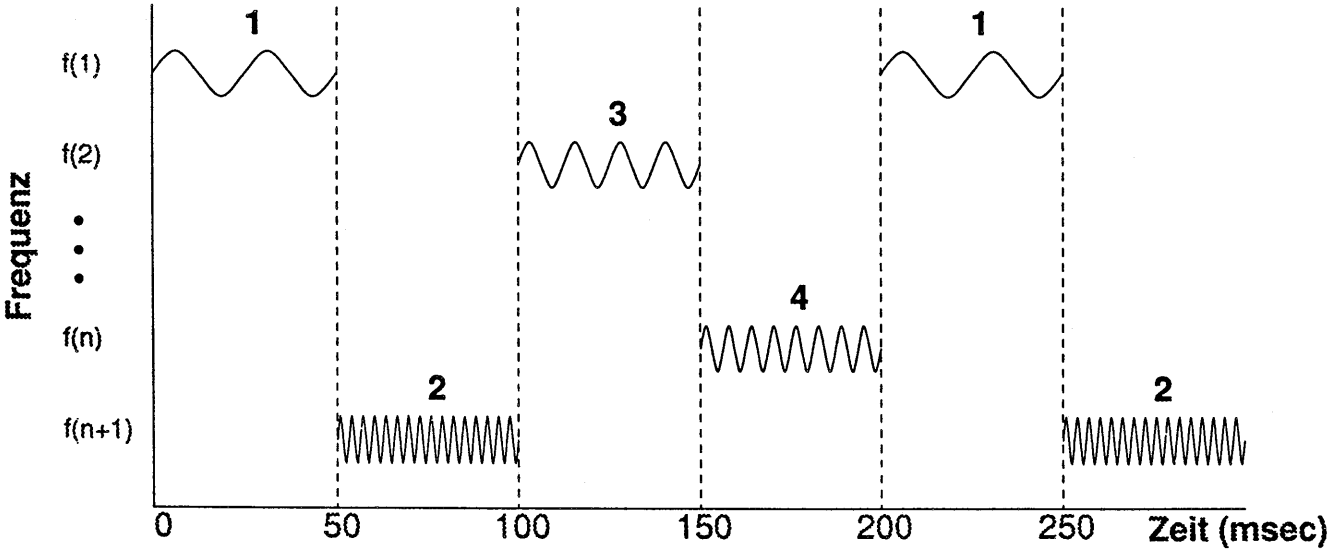
Zum anderen können einzelne Frequenzen, auf denen sich ein Störsignal befindet, von der weiteren Nutzung ausgeschlossen werden indem die Hoppingsequenz automatisch geändert wird.

Grundlagen

Spread Spectrum - Frequency Hopping

- **Trägerfrequenz des Sendesignals wird periodisch gewechselt**
- **Wenn die Gesamtbandbreite 75 mal höher ist als das Nutzsignal,**
  kann zwischen 75 Kanälen gewechselt werden.

Hop Pattern



Grundlagen

Spread Spectrum - Frequency Hopping

Notes:

Die Gesamtbandbreite im 2.4 GHz ISM-Band beträgt 83 MHz. Bei 1 Mbit/s Datenrate (für USA vom FCC vorgegeben) bedeutet dies, daß 82 Kanäle zur Verfügung stehen (2401 MHz - 2482 MHz). Auf den Randfrequenzen2400 MHz und 2483 MHz kann nicht gearbeitet werden, da sonst durch unvermeidbare Nebenaussendungen der zulässige Frequenzbereich überschritten würde.

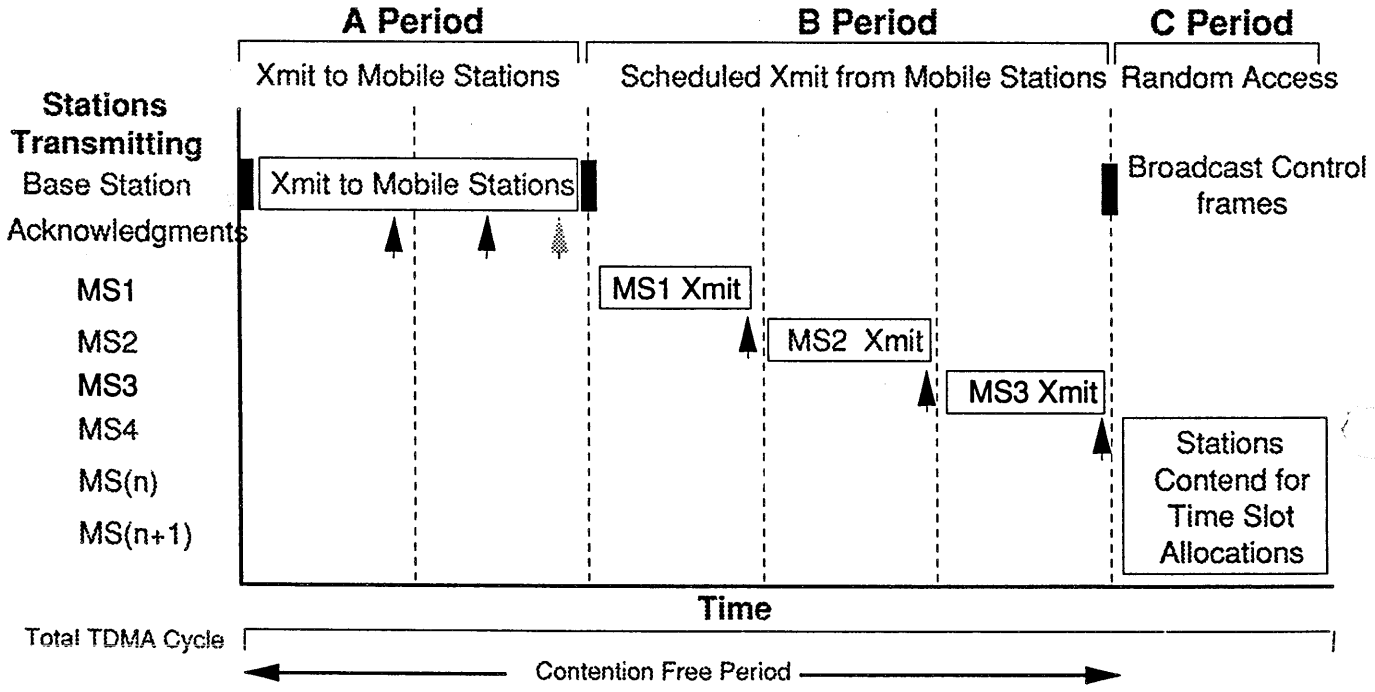
FCC schreibt für USA vor, daß mindestens 75 Kanäle genutzt werden müssen.
IBM Wireless LAN verwendet 79 Kanäle, und behält 2401 sowie 2481 und 2482 als Reserve.
(Dies gilt für die meisten Länder, insbesondere für Europa.)
Die Verweildauer auf einem Kanal beträgt 96 Millisekunden. Die Umschaltzeit beim Wechseln des Kanals beträgt 300 Mikrosekunden, d.h. 0.3 Millisekunden.

Grundlagen

Zugang zum Funkkanal - TDMA

- **Zeitintervall ist in 3 Abschnitte aufgeteilt**
- **Basisstation steuert Länge der Abschnitte und Zuteilung des Senderechts**
- **Dynamische Aufteilung nach Bedarf**

Base Station to/from Mobile Stations



Grundlagen

Zugang zum Funkkanal - TDMA

Notes:

IBM Wireless LAN verwendet ein Zeitschlitzverfahren (TDMA - Time Division Multiple Access), mit dem die Basisstation den Zugang zur Luftschnittstelle zwischen sich und den Remotestationen in ihrer Funkzelle steuert. Dieses Verfahren ist auf der logischen Ebene oberhalb des Frequency Hopping angesiedelt.
Ein Zeitintervall wird zunächst in drei Perioden unterteilt, die je nach Bedarf verschieden lang sein können.

In der ersten Periode (A) hat ausschließlich die Basisstation das Senderecht. Sie sendet zunächst Steuerinformationen, in denen die weiteren Perioden des laufenden Intervalls festgelegt werden. So wird bestimmt, welche Remotestation in welchem Teil der zweiten Periode (B) Senderecht hat. Ferner wird die gesamte Länge der zweiten und dritten (C) Periode festgelegt. Danach sendet die Basisstation vorhandene Nutzdaten für die einzelnen Remotestationen (Mobile Stations - MS).

In Periode B weiß jede Remotestation, wann sie senden darf und verhält sich entsprechend.

In Periode C können sich die Remotestationen um das Senderecht bewerben, indem sie der Basisstation einen Sendewunsch schicken. In dieser Periode können sich auch neue Remotestationen um den Zugang zum Netz bemühen. Periode C ist die einzige Phase, in der es zu Kollisionen kommen kann, d.h. zu Datenverlust durch gleichzeitiges Senden mehrerer Stationen. Die Kollisionen werden nach bestimmten Regeln für die Sendewiederholung aufgelöst.

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Produktbeschreibung

Kapitel 2

IBM Wireless LAN

Produktbeschreibung

Wireless: Vorteile gegenüber Kabel

- Mobile Anwendungen
  - Lagerhaltung, Baustellen, Krankenhäuser
  - Fabrikhallen, Inventur, Einzelhandel
  - ...
- Flexible Vernetzung
  - Zeitlich befristete Arbeitsplätze
  - Häufige Umzüge
  - Spontane Vernetzung: Versammlungen, Meetings
- Gebäudeverhältnisse
  - Denkmalschutz verbietet Kabelinstallation
  - Asbestverseuchung
- Kosten
  - Kabel hat höhere Wartungs- und Umzugskosten

Produktbeschreibung

Wireless: Vorteile gegenüber Kabel

Notes:

Jeder der genannten Gründe kann für sich ausreichen, um sich für eine kabellose Vernetzung zu entscheiden. Insbesondere der erste Aspekt, die Mobilität, setzt fast zwingend eine drahtlose Vernetzung voraus, will man nicht völlig auf eine Vernetzung verzichten (Offline-Betrieb) oder eine umständliche Handhabung in Kauf nehmen.

Bei der Entscheidung gilt es zu berücksichtigen, daß es auch Nachteile einer drahtlosen Lösung gibt. Die Datenübertragungsrate ist um eine Größenordnung (1-2 Mbit/s vs. 10-16 Mbit/s) geringer als bei den heute üblichen Netzen Token-Ring und Ethernet. An diesem Verhältnis wird sich auch in der jeweils nächsten Technologie-Generation nichts ändern. Das momentan in einer frühen Phase der Standardisierung befindliche Hiperlan (High Performance Wireless LAN) wird durch die Nutzung höherer Frequenzen ca. 5-10 Mbit/s übertragen können. Die nächste Generation der drahtgebundenen Netze (Fast Ethernet und ATM) liegen bei 100-155 Mbit/s.

Der Anschaffungspreis eines Wireless LAN Adapters ist heute höher als der eines herkömmlichen LAN-Adapters. Durch Einbeziehung der Portkosten bei strukturierter Verkabelung mit intelligenten Hubs sowie die Verkabelungskosten wird dies in etwa ausgeglichen. Es kann davon ausgegangen werden, daß ein Preisvorteil für Wireless LAN in den meisten Fällen erst durch Einbeziehung von Wartungs- und Änderungskosten entsteht.

IBM Wireless LAN

Produktbeschreibung

Wireless: besondere Anforderungen

- Elektromagnetische Verträglichkeit
  - Robustheit gegen Störung durch Andere
  - Vermeidung von Störungen bei Anderen
- Funk braucht Genehmigung
- Sicherheit
  - Abhören
  - Eindringen ins Netz
- Durchsatzoptimierung
  - Datenkompression
  - Vermeidung von Kollisionen
- Reichweite
- Verträglichkeit mit bestehenden Anwendungen
- Stromverbrauch

Produktbeschreibung

Wireless: besondere Anforderungen

Notes:

Grundsätzlich müssen alle elektrischen Geräte entstört sein. Bei Funkgeräten sind die diesbezüglichen Vorschriften jedoch besonders streng.
Das EMV-Gesetz enthält besondere Auflagen für "Sendefunkanlagen".
Bei EMV wird unterschieden zwischen Störfestigkeit gegenüber Einstrahlungen sowie der Begrenzung der eigenen Abstrahlungen.

Jede Funkanwendung braucht in Deutschland eine Genehmigung. Im Falle des IBM Wireless LAN besteht aufgrund des verwendete Verfahrens und des genutzten Frequenzbereiches eine Allgemeingenehmigung, d.h. der Kunde kann ohne weitere Administration sein Netz in Betrieb nehmen. Voraussetzung hierfür ist die BZT-Zulassung, die unter der Nummer G 116751 F besteht.

Der Aspekt der Datensicherheit wird bei Funk besonders deutlich wahrgenommen, ist jedoch auch bei drahtgebundenen Netzen relevant. Auch Kabel strahlen einen Teil der auf ihnen übertragenen Signale als elektromagnetische Wellen in die Umgebung ab und können daher "belauscht" werden. Verewendet man - wie IBM Wireless LAN - einen Verschlüsselungsalgorithmus für die Daten, so kehrt sich das Risiko um zu lasten des verkabelten Netzes, wo Datenverschlüsselung heute noch die Ausnahme darstellt.

Der Durchsatz wird durch eine Datenkompression verbessert, deren Verwendung da in Hardware ausgeführt - den Prozessor nicht belastet und daher keine Performanceeinbußen mit sich bringt.

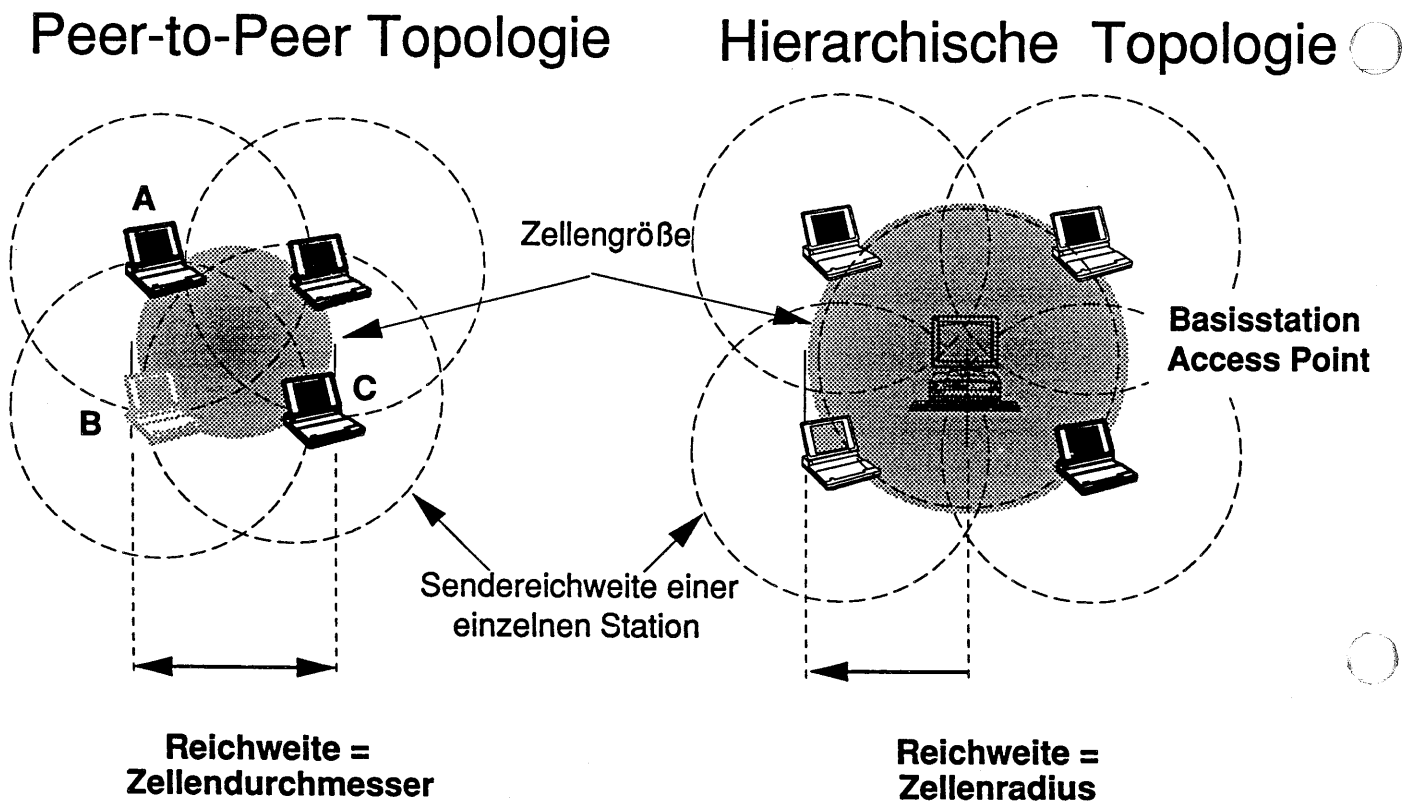
Das TDMA-Verfahren bringt sowohl Vorteile bei der Vermeidung von Kollisionen als auch beim Stromsparen auf mobilen Systemen, da die Funkkomponenten zeitweise abgeschaltet werden können.

Anwendungskompatibilität wird durch Einsatz von NDIS- und ODI-Treibern erzielt.

IBM Wireless LAN

Produktbeschreibung

Alternative Topologien



Produktbeschreibung

Alternative Topologien

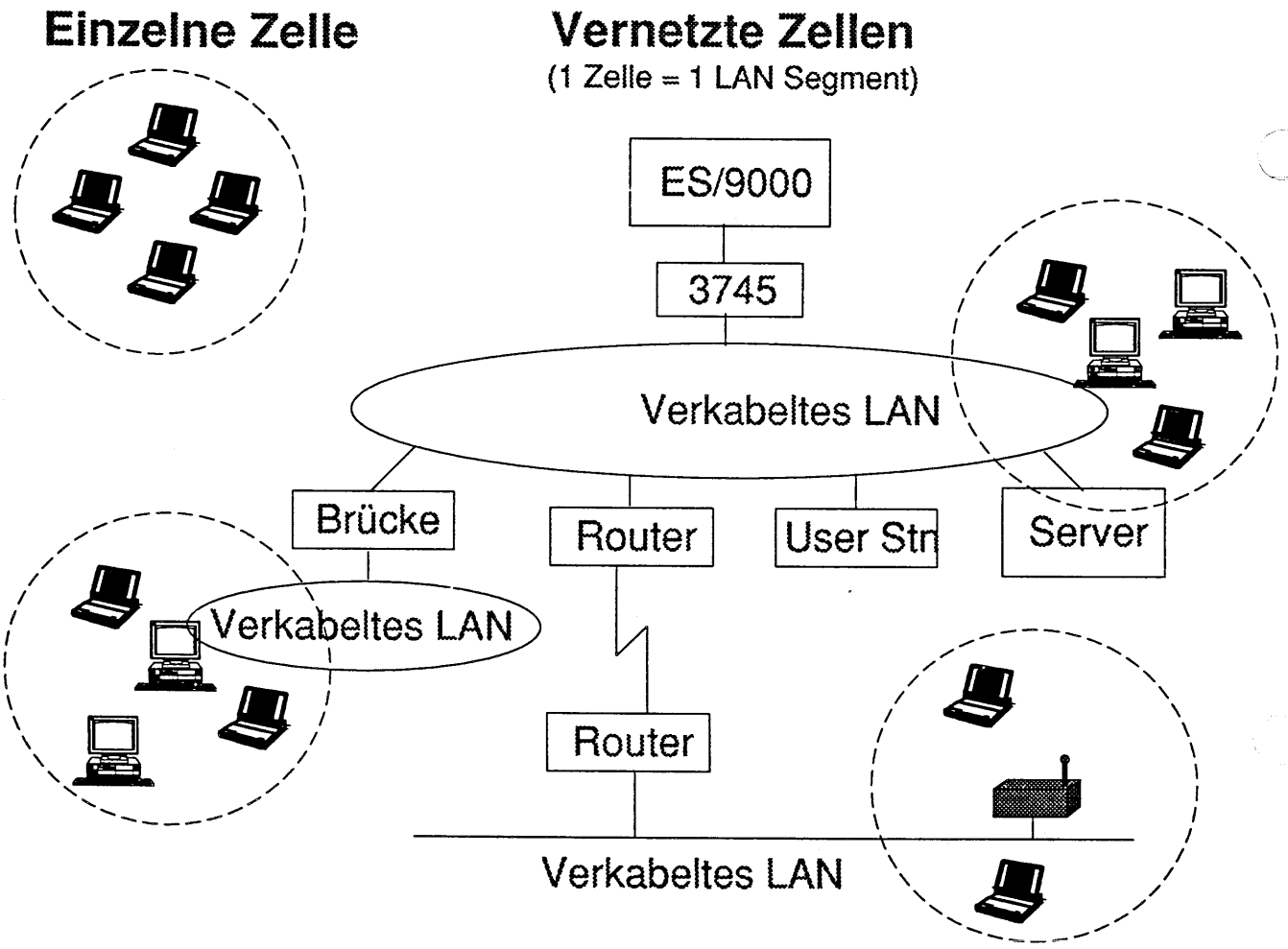
Notes:

Bei Peer-to-Peer Topologien gibt es das Problem der Hidden Terminals. A hat Kontakt mit B, B hat Kontakt mit C, wegen zu geringer Funkreichweite hat jedoch A keinen Kontakt mit C. Da diese Situation nicht der in einem verkabelten LAN entspricht, ist hier die Anwendungskompatibilität nicht mehr gegeben. Gelöst werden muß dies durch die Schaffung kleinerer Funkzellen als beim Konzept der hierarchisch gesteuerten Funkzelle. Auch das TDMA-Verfahren kann nur hierarchisch realisiert werden.

IBM Wireless LAN

Produktbeschreibung

Netztopologien



Produktbeschreibung

Netztopologien

Notes:

Die einfachste Form eines Wireless LAN ist eine eigenständige, isolierte Funkzelle ohne Verbindung zu anderen Netzen. Die gesamte Kommunikation findet drahtlos statt. Server außerhalb der Funkzelle können nicht erreicht werden.

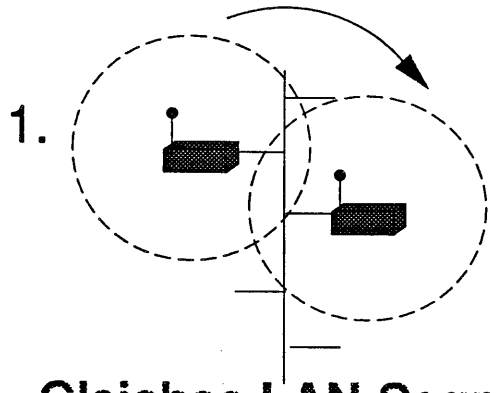
Will man mehrere Funkzellen zu einem größeren Netz verbinden, so geschieht dies bei IBM Wireless LAN über ein drahtgebundenes Netz. In gleicher Weise wie die Funkzellen untereinander kommunizieren, erfolgt auch die Kommunikation zwischen drahtlos und drahtgebunden angeschlossenen Stationen.

Beim IBM Wireless LAN erfolgt die Kommunikation zum verkabelten Netz über die Basisstation. Diese kann - je nach Systemplattform und Protokoll - als Brücke, Router oder Gateway arbeiten. Auch eine Kombination dieser Funktionen ist möglich.
Bei anderen drahtlosen Netzen, insbesondere bei Peer-to-Peer Netzen gibt es sogenannte Access Points, die die Übergangsfunktion ins verkabelte Netz realisieren.

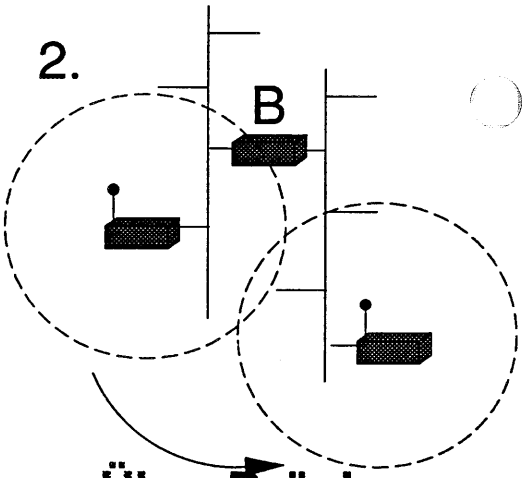
IBM Wireless LAN

Produktbeschreibung

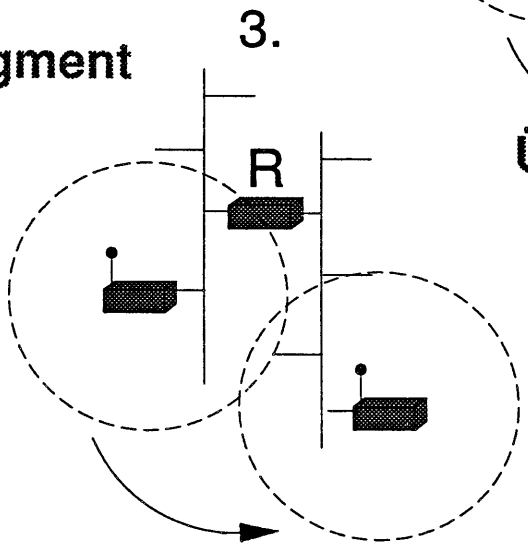
Roaming



Gleiches LAN-Segment



Über Brücken hinweg



Über Router hinweg

Roaming über Router hinweg nicht unterstützt

Produktbeschreibung

Roaming

Notes:

Mobile Anwender mit tragbaren Rechnern haben in Netzen, die aus mehr als einer Funkzelle bestehen, das Bedürfnis, von einer Zelle zur nächsten zu wechseln ohne dabei die Verbindung zum Netz unterbrechen zu müssen. Diese Funktion nennt man Roaming.
Ist der Übergang ins verkabelte Netz mit einer Brückenfunktion realisiert, so ist es für die Roamingfunktion unerheblich, ob es im drahtgebundenen Bereich weitere Brücken gibt.
Im Ethernet werden transparente Brücken verwendet. Bei dieser Technik haben die Stationen selbst keine Informationen darüber, in welchem Segment sie sich befinden. Daher ist es relativ einfach, einen Übergang in ein anderes Sement zu realisieren.
Bei dem im Token-Ring üblichen Source-Route-Bridging besitzen die Stationen die Information über den Weg, den die von ihnen gesendeten Daten nehmen (Routing Information Field). Bei einem Übergang in ein anderes Segment stimmen die Segment-Nummern in diesen RIF-Feldern nicht mehr. Es gilt nun, ein Verfahren zu schaffen, nach dem die Brücken in geeigneter Weise eine Umsetzung der RIF-Informationen vornehmen, ohne daß die Stationen eine Änderung auf der MAC-Ebene wahrnehmen. Dies ist erforderlich für die Anwendungskompatibilität.
In Netzen mit Routingfunktionen ist Roaming von einem Teilnetz über einen Router hinweg in ein anderes Teilnetz nicht unterstützt.

IBM Wireless LAN

Produktbeschreibung

Übersicht der Eigenschaften

- Störunempfindlichkeit
- Netzmanagement
- Sicherheitsfunktionen
- Übergänge ins verkabelte LAN
- Mobilität
- Softwarekompatibilität
- Performance & Zuverlässigkeit
- Einfache Installation
- Weltweite Einsetzbarkeit
- Genehmigungs- und lizenzfrei

Produktbeschreibung

Übersicht der Eigenschaften

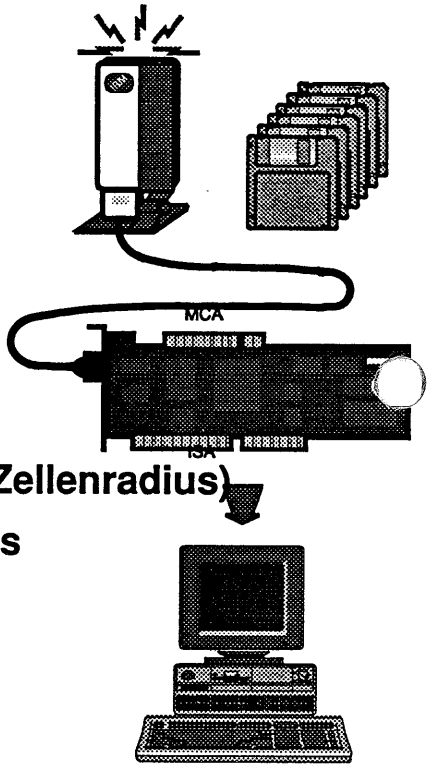
Notes:

Die Eigenschaften werden im Folgenden weiter erläutert.
Die weltweite Einsetzbarkeit beruht auf dem verwendeten ISM-Band 2.4 - 2.5 GHz, welches in den meisten Ländern zur Verfügung steht. Die IBM hat für die wichtigsten Länder die Zulassung durchgeführt oder eingeleitet.

IBM Wireless LAN

Produktbeschreibung

Eigenschaften im Detail



IBM Wireless LAN ISA/MCA

- Spread Spectrum/Frequency Hopping
- ISM-Band 2.4 - 2.5 GHz
- 1 Mbit/s Datenübertragungsrate
- Reichweite bei Sichtverbindung: Bis 130 Meter (Zellenradius)
- Isolierte Funkzelle oder drahtlose Ergänzung eines verkabelten LANs (Token-Ring, Ethernet)
- Zwei-Normen-Adapter für ISA and MCA
- Datenverschlüsselung und Zugangskontrolle (Access Control)
- SNMP und IBM Netzmanagement
- Datenkompression für erhöhten Durchsatz
- Bis zu 40 aktive Benutzer pro Zelle
- NDIS Treiber (für DOS, Windows, OS/2)
  IBM LAN Server , MS LAN Mgr, WFWG, LANtastic
- ODI Treiber (DOS, Windows, OS/2)
  Novell NetWare 3.x und höher, Personal NetWare

Produktbeschreibung

Eigenschaften im Detail - ISA/MCA

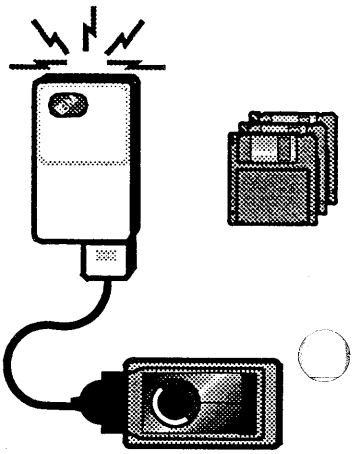
Notes:

Die Reichweite von 130 m gilt für den Fall, daß sich keine Hindernisse zwischen Sender und Empfänger befinden. In Gebäuden läßt sich keine allgemeingültige Aussage zur Reichweite treffen. Die Ausbreitung der Funkwellen hängt ab von der Beschaffenheit der Wände und Decken, der Türen sowie der Möbel. Zur Ermittlung der Funkversorgung im konkreten Fall kann ein zum Lieferumfang des Produktes gehörendes Meßprogramm RSSI (Received Signal Strength Indicator) verwendet werden. Durch geeignetes Plazieren und Ausrichten der Antenne läßt sich eine optimale Anordnung erreichen.
Die ISA/MCA-Karte wird mit einem 1,5 m langen Kabel zwischen Karte und Funk-/Antennenmodul geliefert. Als zusätzliche Ausstattung kann ein 4 m langes Kabel bestellt werden. Eine weitere Option ist das sogenannte Custom Cable Kit, bestehend aus 2 Verstärkereinheiten. Damit kann ein vorhandenes UTP-Kabel von bis zu 170 m Länge, an dessen Enden die Verstärker angeschlossen werden, zur Verbindung der Komponenten verwendet werden.
Die ISA/MCA-Karte kann sowohl zum Betrieb einer Basis-Station als auch für eine Remote-Station eingesetzt werden.
Datenkompression und Verschlüsselung erfolgen mit von IBM entwickelten Chipsets ohne Belastung des Hauptprozessors.
SNMP-Management (Standard-MIB und spezielle Wireless-MIB) ist unterstützt, ebenso die Anbindung an ein Netview-System auf einem Mainframe.
Die Zusammenfassung mehrerer Basisstationen zu einem Wireless-Netz erfolgt durch das NAP (Network Administration Program), welches einmal im Netz installiert sein muß und alle Basisstationen des Netzes koordiniert und steuert.
Dadurch bleibt es für eine Remote-Station gleichgültig, mit welcher der Basisstationen sie in Kontakt tritt.

IBM Wireless LAN

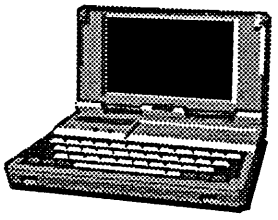
Produktbeschreibung

Eigenschaften im Detail



IBM Wireless LAN PCMCIA

- Spread Spectrum/Frequency Hopping
- ISM-Band 2.4 - 2.5 GHz
- 1 Mbit/s Datenübertragungsrate
- Reichweite bei Sichtverbindung: Bis 130 Meter (Zellenradius)
- Isolierte Funkzelle oder drahtlose Ergänzung eines verkabelten LANs (Token-Ring, Ethernet)



- PCMCIA Typ 2 Adapter
- Datenverschlüsselung und Zugangskontrolle (Access Control)
- SNMP und IBM Netzmanagement
- Datenkompression für erhöhten Durchsatz
- Bis zu 40 aktive Benutzer pro Zelle
- NDIS Treiber (für DOS, Windows, OS/2)
  IBM LAN Server , MS LAN Mgr, WFWG, LANtastic
- ODI Treiber (DOS, Windows, OS/2)
  Novell NetWare 3.x und höher, Personal NetWare

Produktbeschreibung

Eigenschaften im Detail - PCMCIA

Notes:

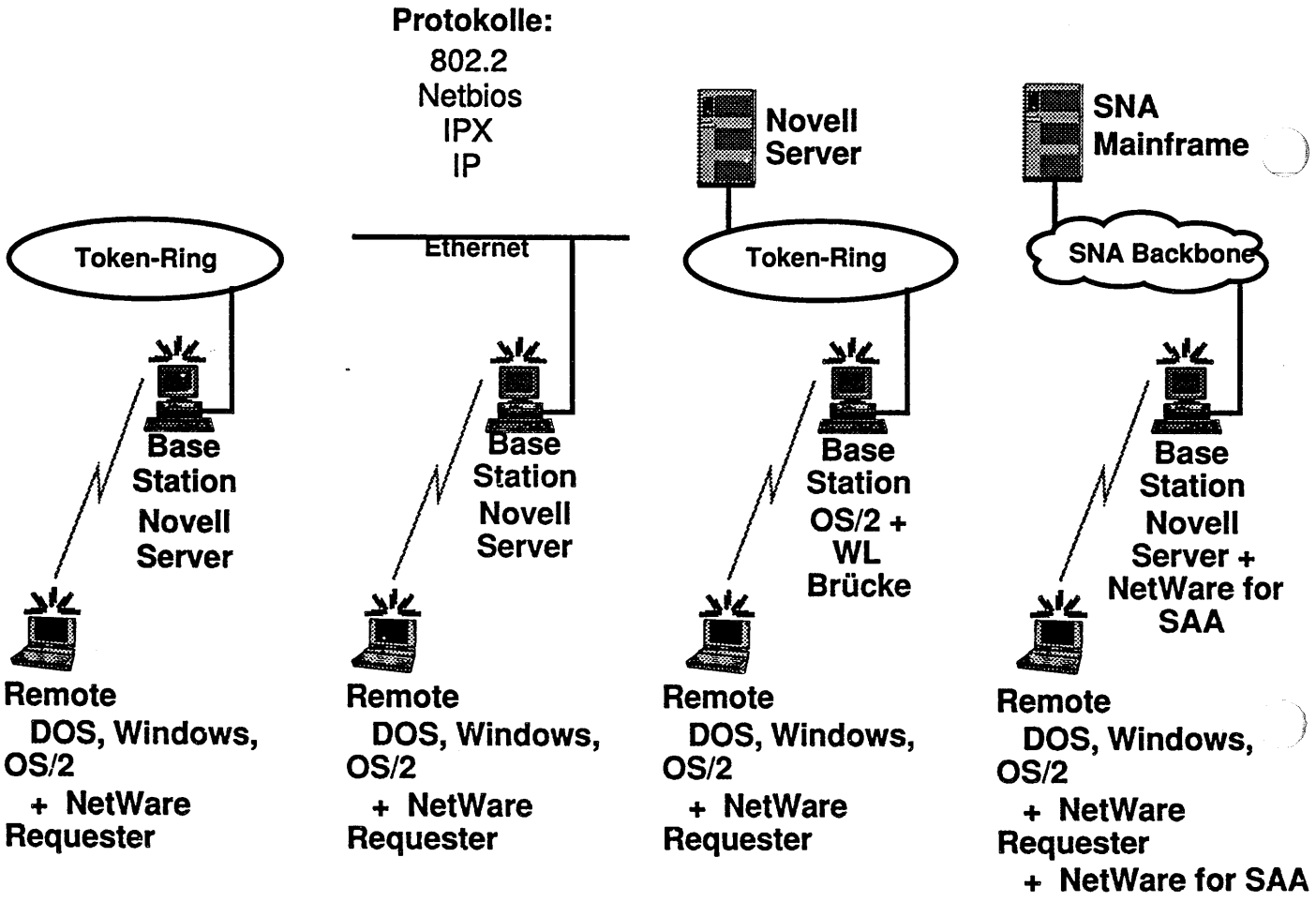
Die PCMCIA Variante des Produktes unterscheidet sich in folgenden Punkten von der ISA/MCA-Variante:

1. **Das Gehäuse des Funk-/Antennenmoduls ist unterschiedlich. Der Inhalt - das eigentliche Modul - ist identisch.**
2. **Das Kabel zwischen Adapter und Modul ist anders und kürzer.**
3. **Die PCMCIA-Karte unterstützt nicht die Funktionen der Basisstation. Sie kann nur als Remote-Station eingesetzt werden.**

IBM Wireless LAN

Produktbeschreibung

Netware-Umgebung



Produktbeschreibung

Netware-Umgebung

Notes:

Das Produkt IBM Wireless LAN unterstützt Novell Netware Umgebungen. Der Regelfall ist dabei, daß die Basisstation auf einem Netware Server Installiert wird. Dieser ist in der Lage, das bei Netware verwendete IPX Protokoll zu routen.

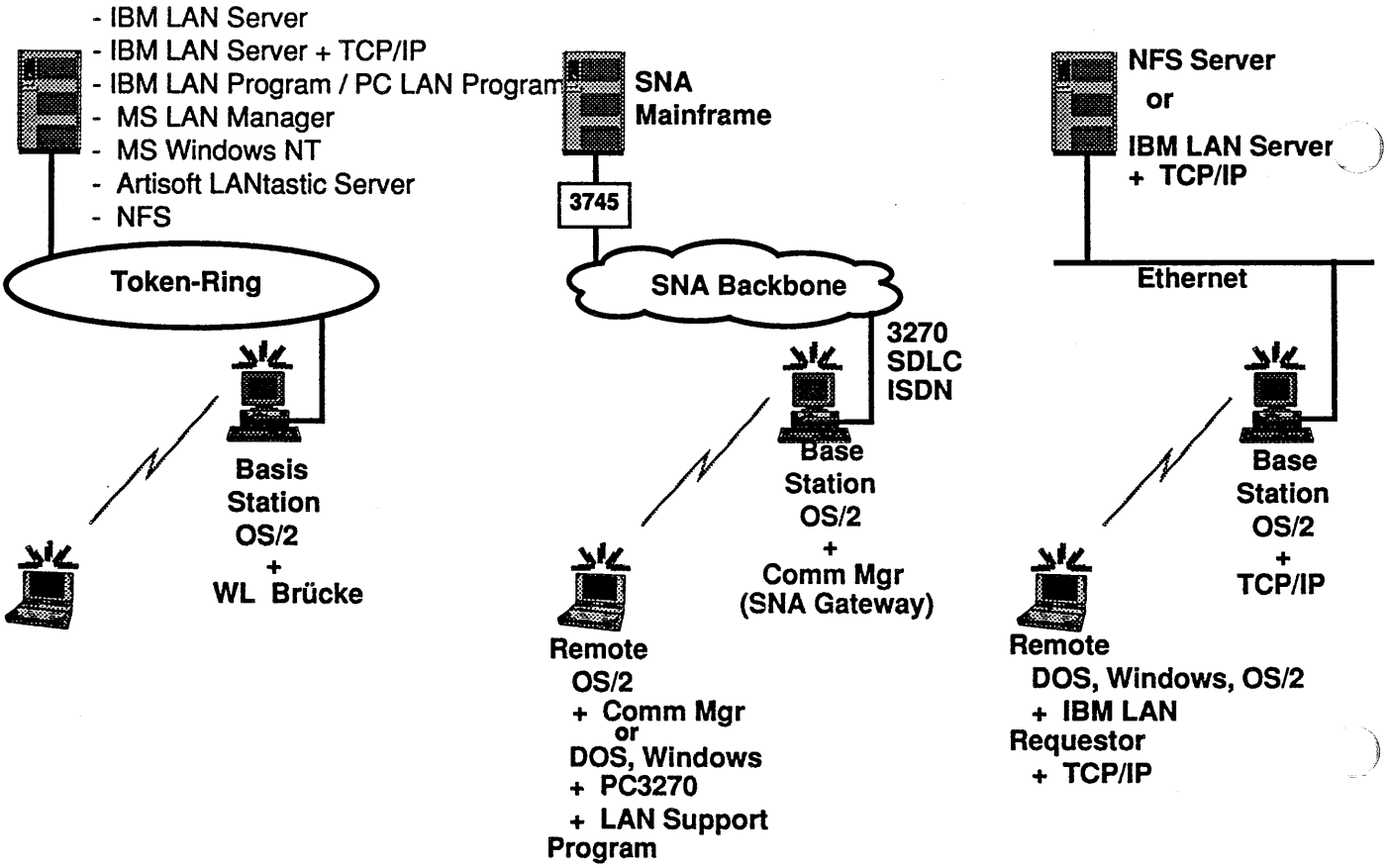
Ist das verkabelte Netz ein Token-Ring Netz, so kann die Basisstation auch unter OS/2 installiert sein. In diesem Fall muß die Brückenfunktion aktiviert sein, die Basisstation agiert nun für das IPX-Protokoll nicht als Router sondern als Brücke.

In Verbindung mit dem Netware-Zusatz Netware für SAA (SNA-Host Gateway) ist es möglich, die mit dem entsprechenden Requestor ausgestatteten Wireless Remote Systeme an einen Mainframe anzubinden.

IBM Wireless LAN

Produktbeschreibung

NDIS-Umgebung



Produktbeschreibung

NDIS-Umgebung

Notes:

Hier ist die Basisstation in jedem Fall OS/2. Im Falle eines Token-Ring Backbone Netzes wird sie als Brücke installiert und unterstützt alle Protokolle und Netzwerke, welche die NDIS-Schnittstelle verwenden, insbesondere die hier genannten.

Die SNA-Gateway-Funktion des Communication Manger/2 kann genutzt werden, um SNA-Mainframes zu ereichen. Dabei sind alle Verbindungsoptionen des CM/2 unterstützt, nicht nur über einen LAN-Adapter (z.B. SDLC, ISDN).

Für das Protokoll TCP/IP kann neben Bridging auch Routing eingesetzt werden, erforderlich ist in diesem Fall auf der Basisstation zusätzlich das Produkt TCP/IP für OS/2 (ab Rel. 2.0).

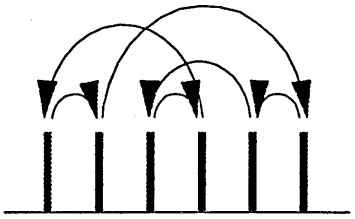
IBM Wireless LAN

Produktbeschreibung

Security

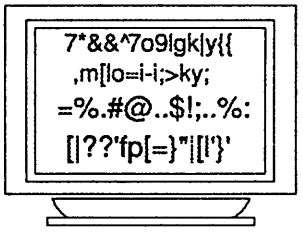
1) Das Frequency Hopping Verfahren an sich

- Schwierig zu erkennen/verstehen
- Psuedozufallsgenerierte Hopping Patterns
- 96 Millisekunden je Hop
- Teures Spezialgerät zum Abhören nötig
- Schützt vor ZUFÄLLIGEM ABHÖREN
- 79 Hopping Frequenzen / 83 MHz HF Bandbreite



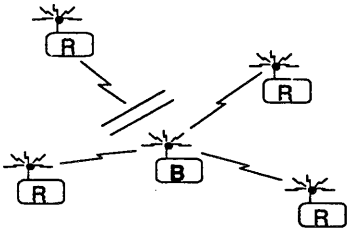
2) Datenverschlüsselung

- Patentiertes IBM Verfahren
- Kein komplexes Schlüsselmanagenment nötig
- Anwenderfreundlich (transparent für Endanwender)
- Schützt vor GEZIELTEM ABHÖREN



3) Zugangskontrolle

- Überprüfung erfolgt automatisch beim Log-In (d.h. transparent für Anwender)
- Basiert auf der MAC-Adresse
- Schützt vor gezieltem EINDRINGEN IN DAS NETZ



Produktbeschreibung

Security

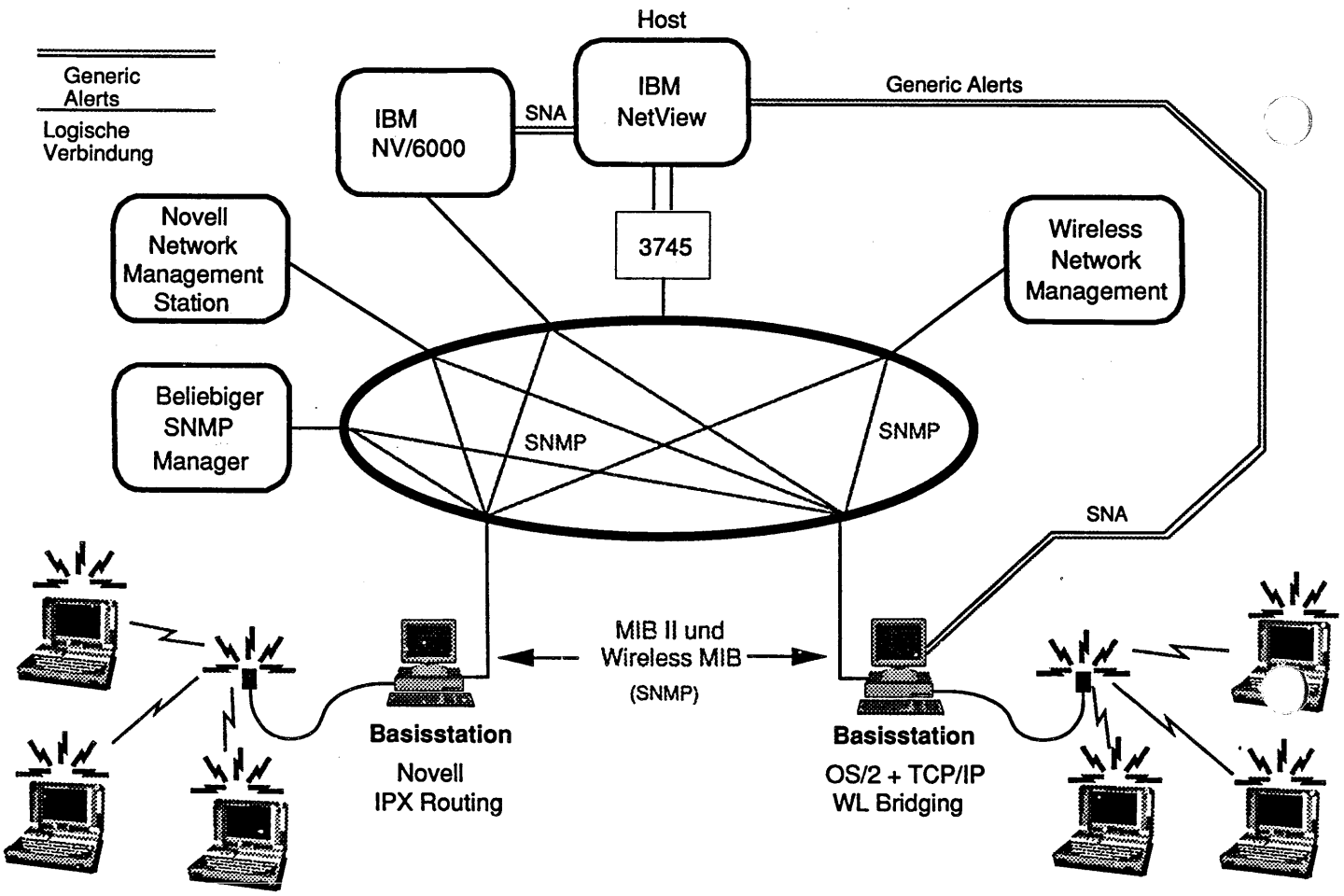
Notes:

Die Funktechnik an sich ist bereits eine erste Stufe der Sicherheit, denn das Frequency Hopping Verfahren kann durch einen handelsüblichen Scanner nicht erkannt, geschweige dann abgehört werden.
Die Verschlüsselung ist in speziellen Chipsets, d.h. in Hardware realisiert. Sie verursacht somit keine zusätzliche Systembelastung. Sie ist ebenso optional wie die Datenkompression. Beides wird auf dem Remote-System aktiviert, d.h. individuell eingesetzt, ohne daß das gesamte Netz einheitlich betrieben werden muß.
Die Zugangskontrolle ist in erster Linie eine administrative Funktion. Sie arbeitet wahlweise auf Basis der universellen (UAA) oder lokal vergebenen (LAA) MAC-Adresse. Mit ihr können Zugangsrechte festgelegt werden, in Abhängigkeit von Wochentag und Uhrzeit.
Die eigentliche Security-Funktion basiert auf einem Security-Code, der auf der Basisstation (im NAP) generiert wird für jeden Remote-Rechner, und zwar mit Hilfe von dessen globaler MAC-Adresse (UAA). Da diese eindeutig ist und nicht verändert werden kann, bietet diese Funktion wirkungsvollen Schutz vor Hackern.

IBM Wireless LAN

Produktbeschreibung

Netzwerk-Management



WLPROD

Produktbeschreibung

Netzwerk-Management

Notes:

Im Schwerpunkt wird SNMP-Management unterstützt. Die SNMP-Agent Funktion ist in der Basissoftware enthalten und muß nur aktiviert werden. Für Netview für AIX (ehemals Netview/6000) ist eine Beispielanwendung im Produkt enthalten.

Alternativ dazu gibt es die Möglichkeit, direkt Alerts an ein NetView System zu schicken.

Für die gemeinsame Verwaltung aller Basisstationen eines drahtlosen Netzes gibt es das Network Administration Program (NAP). Es muß je Netz genau einmal vorhanden sein, es wird in der Regel auf einer Basisstation installiert, kann aber auch auf einem beliebigen anderen OS/2 System im drahtgebundenen Netz installiert sein. Bei einer isolierten Funkzelle befindet es sich auf der Basisstation.
Die Funktionen des NAP beziehen sich auf die funktechnischen Aspekte. Sie umfassen: Netzname, Frequezverwaltung, Zugangskontrolle, Security Codes, Hopping Sequenzen. Das NAP ist hier nicht dargestellt.

IBM Wireless LAN

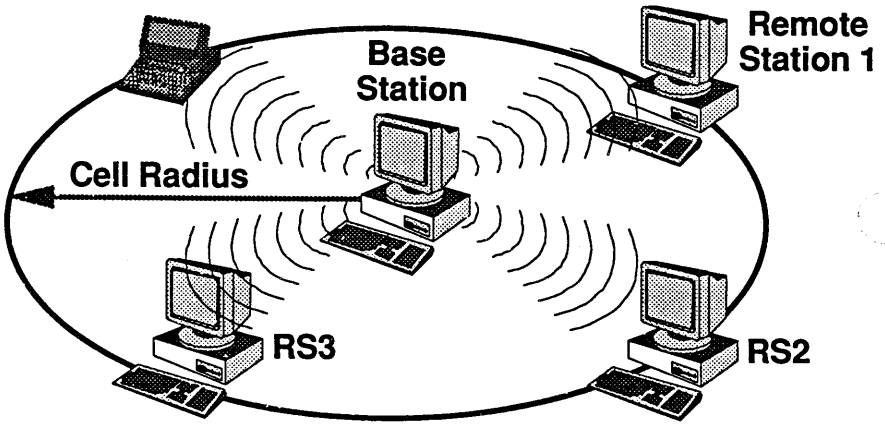
Produktbeschreibung

Nomenklatur

Cell:
One Base and several Remote or Wireless workstation(s)

Base Station:
A Base Station uniquely manages the data traffic within a cell - it may contain the Network Administration Program (NAP). A Base Station is also referred to as an Access Point (AP).

Remote Station:
A LAN workstation identified by the Base Station; it must communicate with other remote station(s) thru a Base Station



Standalone Cell

WLPROD

Produktbeschreibung

Nomenclature

Notes:

To understand the IBM Wireless LAN it is necessary to define some terms. A wireless Cell consists of one or more remote workstations and one Base station. The Base station is always required with the Wireless LAN as it does not support peer-to-peer wireless communciations (that is, without going through an Access Point). The Base station may be thought of as a relay point for the wireless cell. Peer-to-peer Network Operating Systems such as LANtastic from Artisoft and NetWare Lite from Novell, as well as peer-to-peer applications such as Person-To-Person from IBM are fully supported.

The Base station contains some software to enable the Wireless LAN functions. Multiple Base stations may coexist within a single network and extend the network. The cell radius determines the maximum geographic coverage or range of the cell. At least one Base station must have a software program referred to as the NAP (Network Administration Program), which is OS/2 based. Base stations may communicate with one another, using wireless and/or wired links.

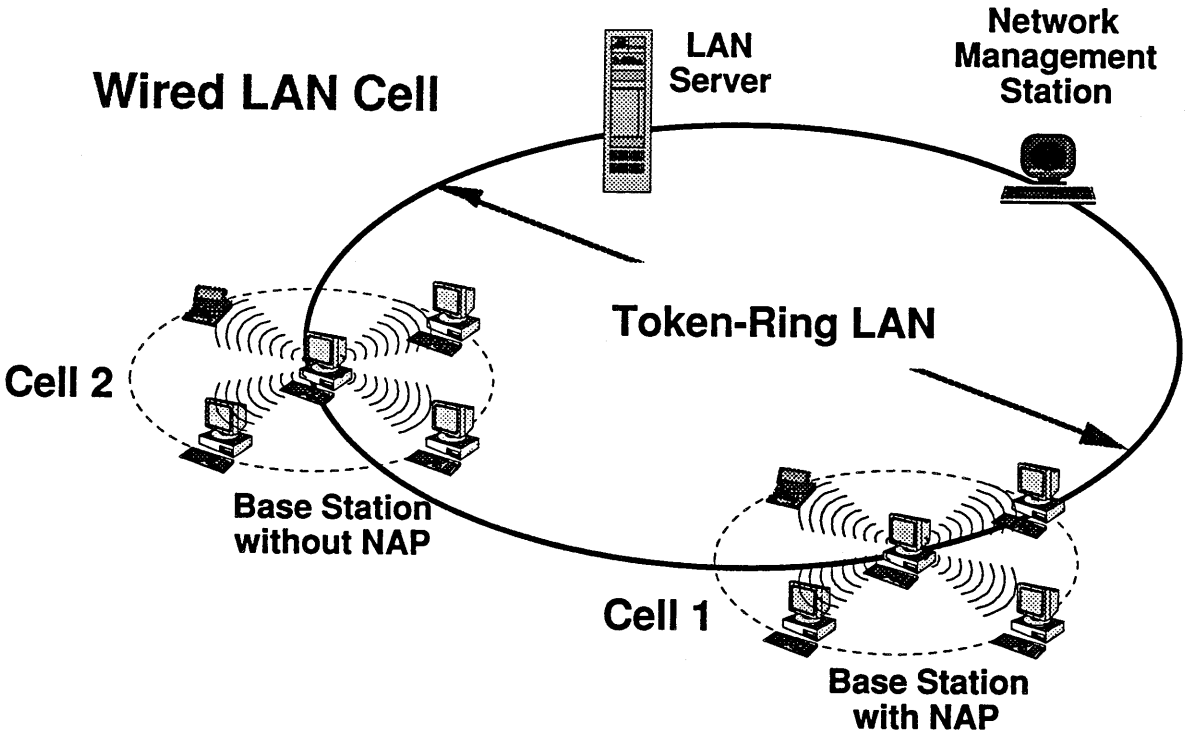
In the Wireless LAN a Remote station is one that is not a Base station but wishes to communicate through the Base station with other Remote stations. All of the above names for stations apply whether a Wireless LAN is installed to function by itself or with other cells through a wired connection.

Intracellular communications between stations is controlled by the Base station. For extracellular traffic an additional function is required which is either bridging or routing. This is also implemented in the Base station. Lastly, gateway functionality (such as NetWare for SAA or CM/2) may be resident in a Base Station.

IBM Wireless LAN

Produktbeschreibung

Nomenclature



Produktbeschreibung

Nomenclature

Notes:

An IBM Wireless LAN network consists of a collection of Remote stations and at least one Base station with the Network Administration Program. It may comprise several cells and each cell may have from 50 to 60 workstations in it. The Base station (Access Point) may implement a bridge function to connect the Remote stations to the wired world, or it may provide a routing function but not both.

Each cell in this environment may communicate with other cells by using the shared copper media. Every remote station may communicate within its own cell by using a Base station and to other cells across a different Access point, if each Access Point has a wired connection.

The stations in the wireless cells may be managed by a LAN Management station on the wired LAN as if they were in fact on the shared media themselves, provided that they have implemented the necessary protocol (SNMP, CMOL)

Produktbeschreibung

IBM Wireless LAN Functions

- System Features
  - Compression set in remote station
  - RSSI on remote station (Received Signal Strength Indicator)
  - RPL function for the remote station
  - Automatic Frequency Management for a base
- Network control
  - Available thru the Network Administration Program (NAP)
  - Network Access Control
  - Network Security
    Authentication
    Authentication and encryption
- Network Frequency Management
  - Delete/restore some specific frequency for the base

Produktbeschreibung

IBM Wireless LAN Functions

Notes:

The Wireless LAN features a rich set of functions. The system comes with an option to enable compression to increase throughput. This is hardware-level compression and is built on an IBM-unique, industry leading chip technology. A utility allows a mobile station to visually monitor the quality of the radio signal it is receiving. If clients require Remote Program Load this is also accommodated in the system design.

The Network Administration Program provides security at several levels. The network administrator can control time-of-day access for individual stations. A separate Security function may be implemented that is based on an algorithm that uses the clients network address. The NAP will generate a unique key for the client that is exchanged with the Base Station when the Remote Station initiates contact. The administrator may deny access to stations or it may require/enable them for encryption to increase security. In the unlikely event that there is a problem with interference on certain channels, or to restrict cells to certain ranges of frequencies, the NAP allows the restriction or denial of use for frequencies.

The Wireless LAN hops frequencies every 96 ms. The hopping patterns that stations use is determined by the Base Station. This protects against accidental interference and decreases the likelihood of deliberate interference or eavesdripping.

Produktbeschreibung

IBM Wireless LAN Functions
Network Management

- SNMP Network Nanagement
- Network Management Station: NV for AIX, Novell NMS
- Trap Sent From a Base to NV for AIX
  - Sends Host NV Generic Alert
- Get a Response from Each Base to an SNMP Request
- The Network Management Facility is Optional

Produktbeschreibung

IBM Wireless LAN Functions
Network Management

Notes:

Wireless LAN network management can be accomplished in several ways. There is a modest amount of management capability from the NAP. Unfortunately there is not a function to detail what stations are in the network at any given time. There is however the ability to implement SNMP for management, both in the clients and in the base station. Typical SNMP managers, such as NetView for AIX or Novell NMS may be used.

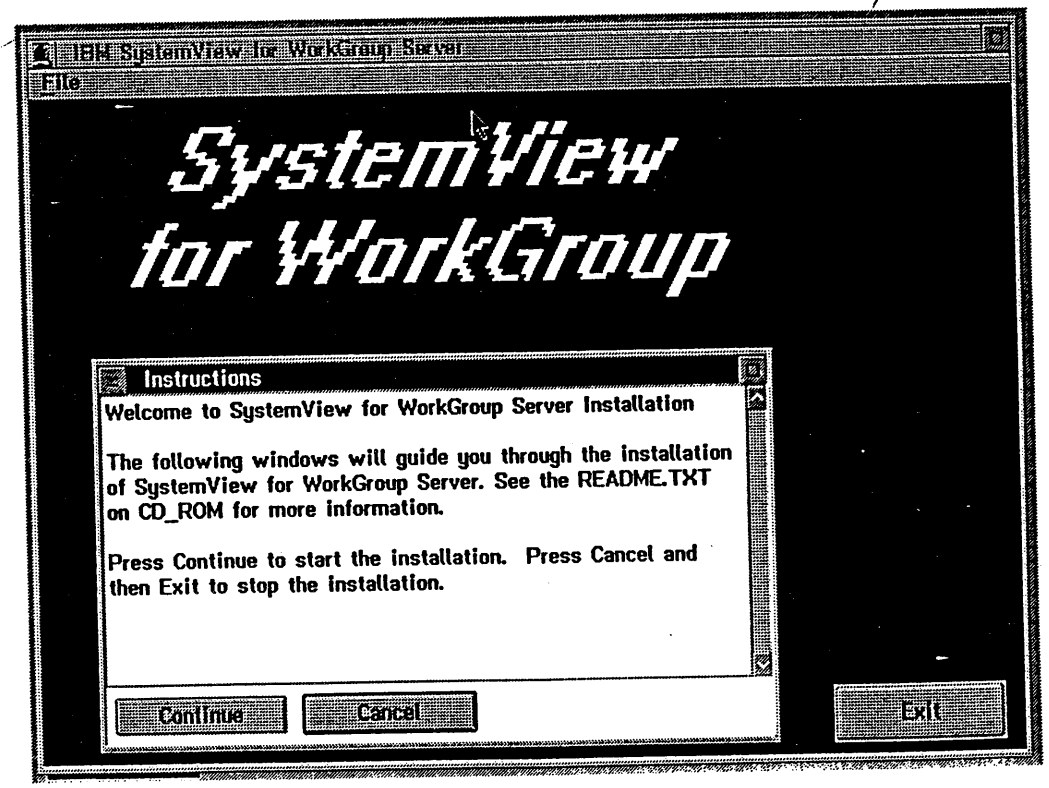
Traps sent to NetView for AIX from a client may be forwarded to a host-based NetView as a generic alert. SNMP functions such as 'gets' are possible as well with tools like for NetView for OS/2. LAN Network Manager can also work if a CMOL agent such as LAN Station Manager is employed.

Produktbeschreibung

This space intentionally left blank

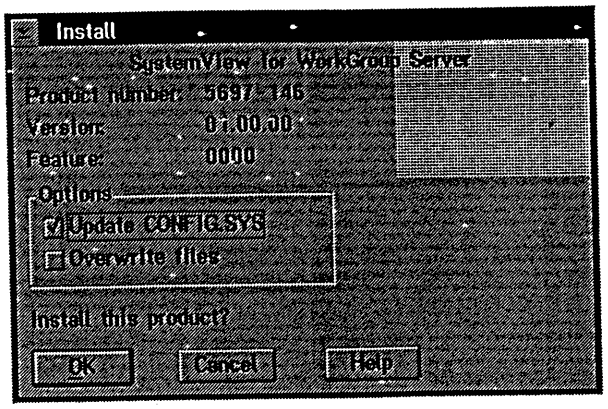
Server Installation

- To start the SystemView for OS/2 Installation:
- Change to the directory containing the SystemView code
- Type ***INSTALL***
- You are then presented with the panel shown below:



- Select ***Continue***
- and you will be presented with the following panel:

Installation - CONFIG.SYS



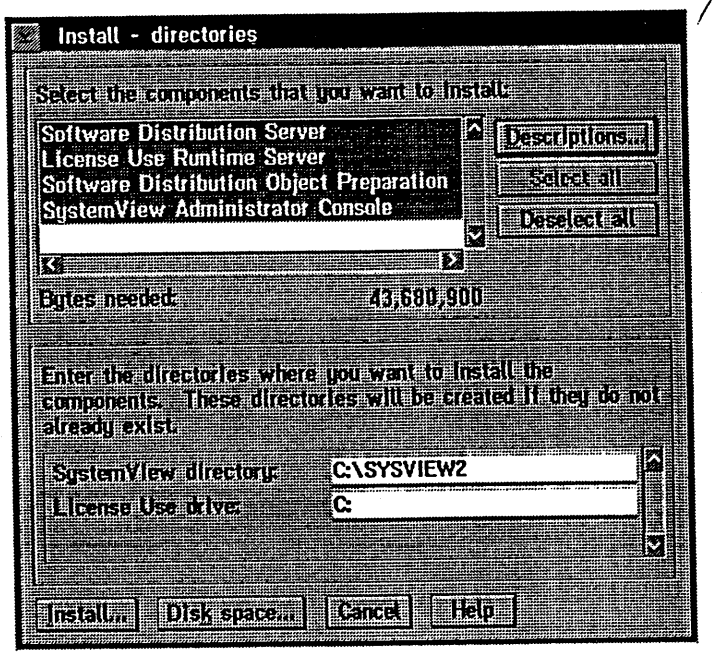
- The option ***Update CONFIG.SYS*** should always be taken unless you wish to verify, or manually update, the changes to CONFIG.SYS before they take effect.
- You will need to select ***Overwrite files*** if you are re-installing or updating SystemView.
- At the time of writing (7 July 1995) it is not possible to ***RE-INSTALL*** SystemView for OS/2 without first removing all SystemView elements from your system. Until further notice always:
  - Shutdown all SystemView functions
  - Issue the command "NETFBASE SHUTDOWN" to terminate the Manager Services.
  - Backup CONFIG.SYS before stating to re-install
  - Remove all lines which refer to SystemView from CONFIG.SYS
  - Save CONFIG.SYS
  - Delete "SYSTEMVIEW SERVER for OS/2" from the desktop
  - Delete the "SystemView directory" (not all files will delete)

IBM Installation - Component Selection

ISC

- Delete the "iFOR/ls directory"
- Remove SystemView from "STARTUP FOLDER" (if it's still there).
- Closedown and re-boot
- Delete the remaining files from the "SystemView directory"
- Re-install SystemView

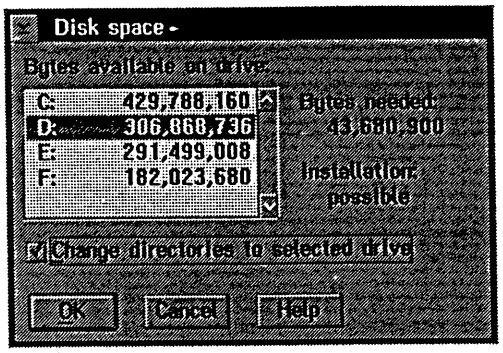
- Next you will be asked to specify ***WHAT YOU WANT TO INSTALL*** and ***WHERE YOU WANT TO INSTALL***



- You are able to choose:
  - which components to install
  - which drive to install them on
  - which directory to install SYSTEMVIEW into
  - at this time you are not able to select a directory for iFOR/ls. It defaults to IFOR.

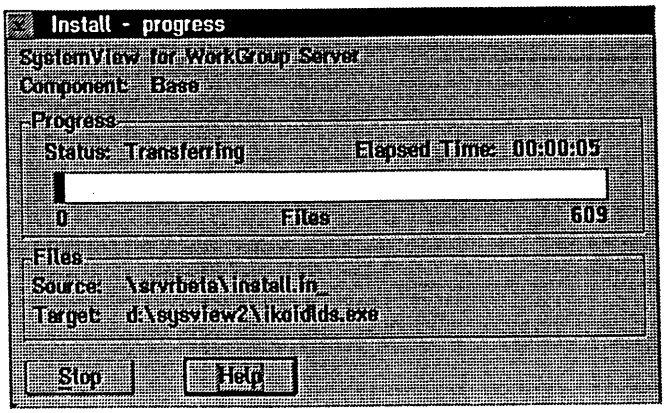
Installation - Disk Space

- If you choose to check ***Disk Space*** you are presented with the following panel:



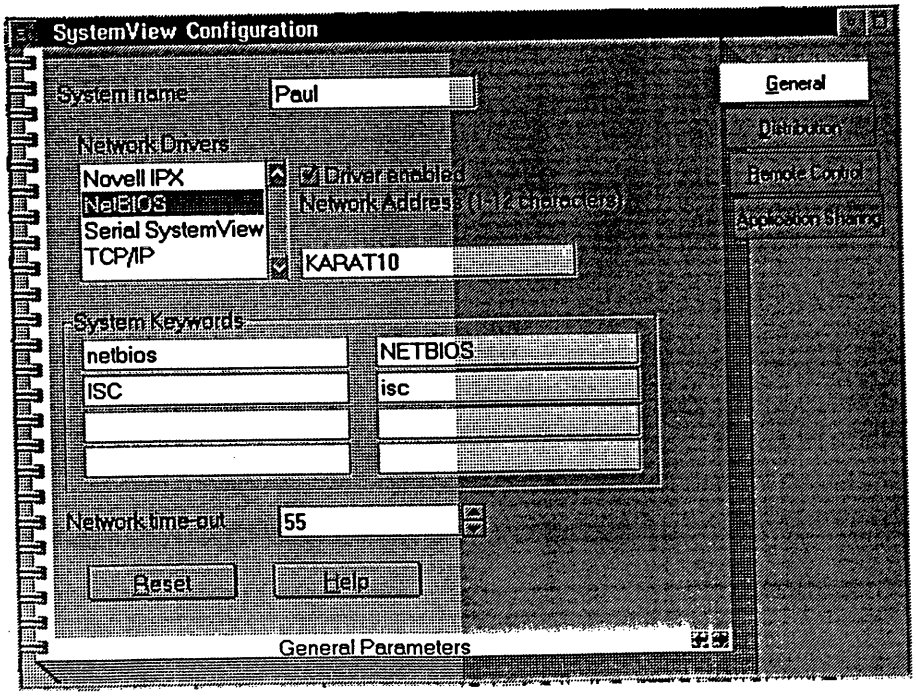
- By changing the "selected drive" and checking ***Change directories to selected drive*** you can overide the default drive.

- Once you have select ***INSTALL*** you are presented with an ***INSTALL PROGRESS*** panel as shown below:



Installation - Parameters

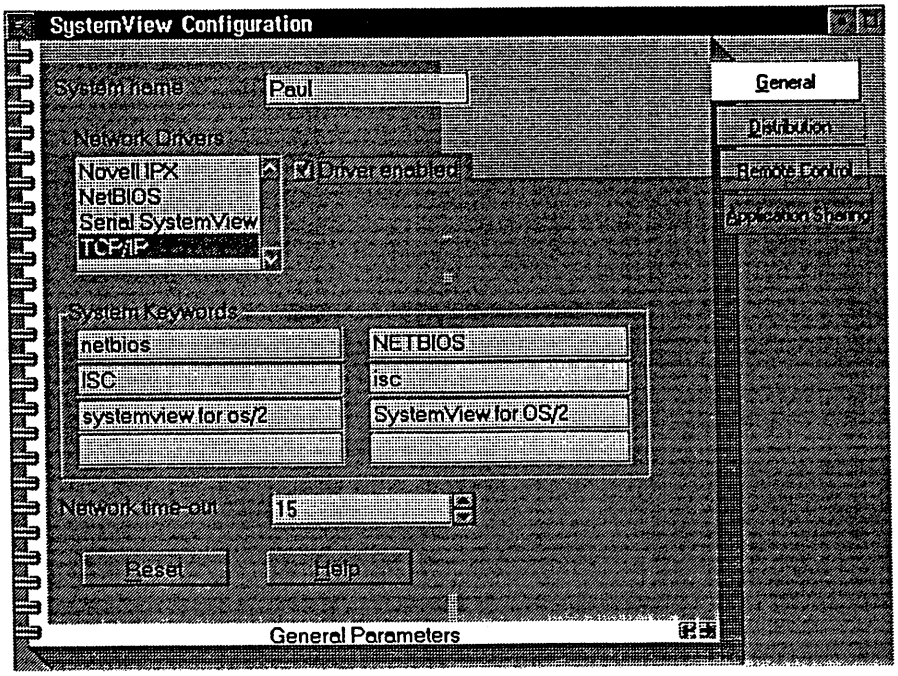
- During the installation process you will be asked to provide some configuration information.
- Firstly you will need to select a ***System name***
- and to specify the ***Network Drivers*** you wish to enable by choosing each driver and the ***driver enabled*** check box.
- Please note the ***System Keywords*** are CaSe SeNsItIvE.
- The keywords are used to group clients together
- ***Network time-out*** is the time SystemView will wait for a client response (in seconds).
- The following is an example for NetBIOS;



Installation Parameters

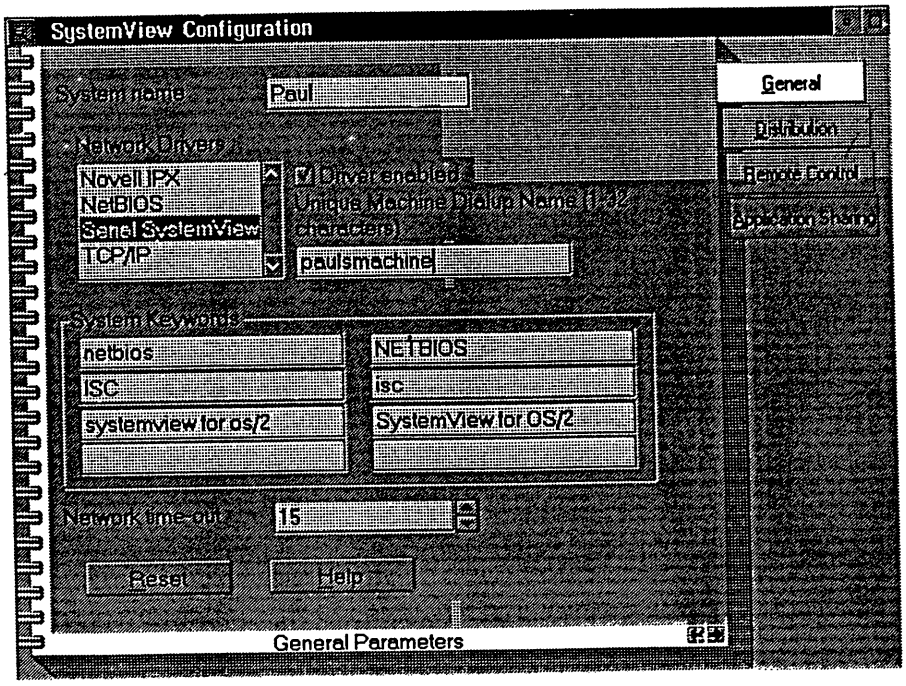
- For a NetBIOS Driver (previous page) the ***Network Address*** field defaults to the LAN Requester machine name or the last 8 characters of the adapter address.

- The following is an example for ***TCP/IP***



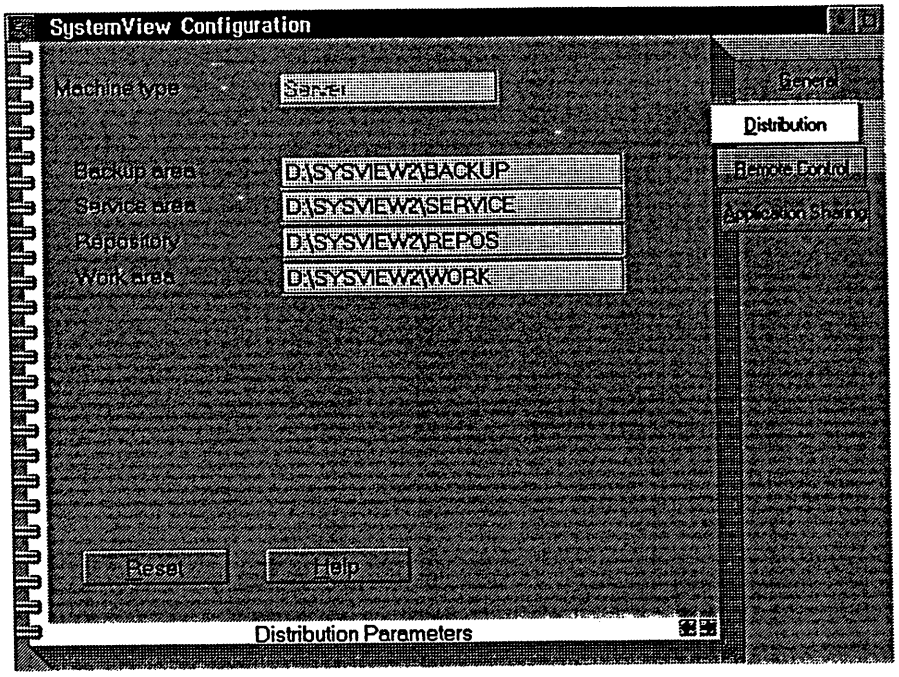
Installation Parameters

The following is an example for ***Seriai SystemView*** which will allow the Manager to communicate with Managed Stations via the ***Communication Port.***



Installation Parameters

- The next step is to specify the directories which will be used by ***DISTRIBUTION*** for maintaining key files.
- The ***DEFAULTS*** can be seen below:



- The machine type has defaulted to ***Server*** and is not changeable.
- ***Backup Area*** is used to store backup versions of products which are installed "removable". The backup is for products installed on this machine as a ***client*** and is not associated with the server role.

Installation Parameters

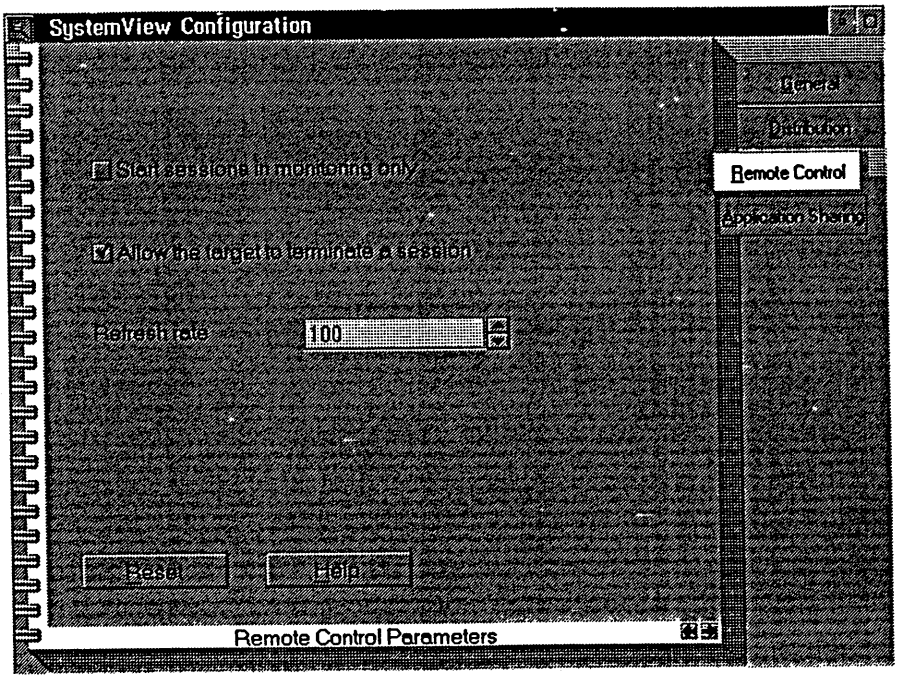
- ***Service Area*** is used as a temporary area for installations.

- ***Repository*** is used to store "profiles" and "change-files"

- ***Work Area*** is a work area for change management requests.

Installation Parameters

- The next section of configuration is for ***Remote Control***



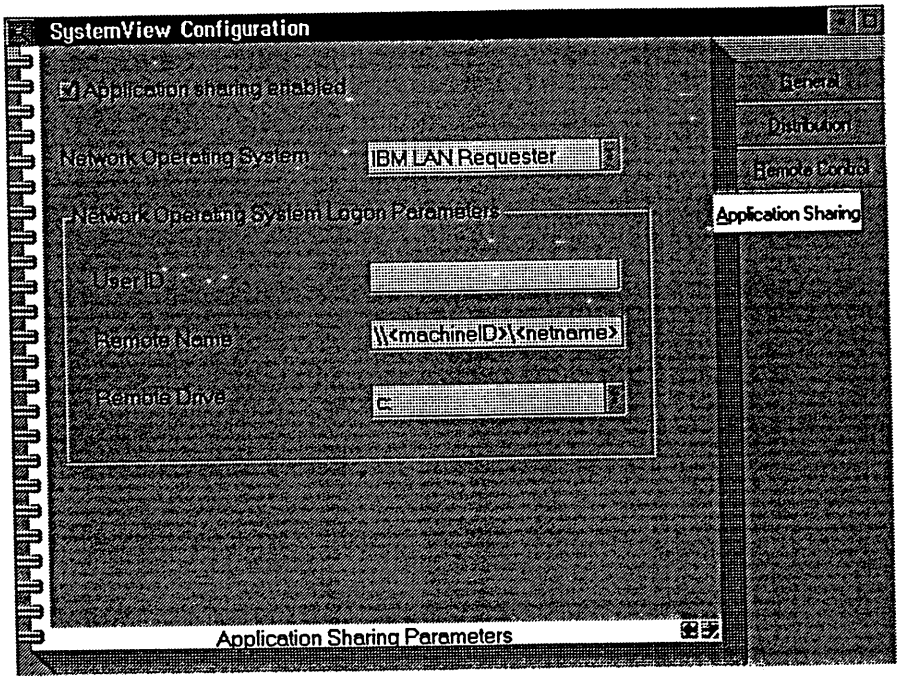
- If you check ***Start sessions in monitoring only*** workstations which are the target of "remote workstation control" will retain control of the keyboard and mouse.
- The default is to allow the OS/2 Manager to take full control of the remote workstation.
- By checking ***Allow target to terminate a session*** you are allowing the remote workstation to terminate the session by using the key sequence ***ALT*** and ***T***

Installation Parameters

- The ***Refresh Rate*** is the frequency (in milliseconds) at which the display of the remote workstation is refreshed on the managing station.

Installation Parameters

- To setup ***Application Sharing*** the following panel needs to be completed:

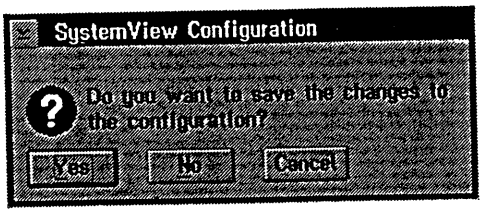


- The ***Network Operating System*** can be either
  - IBM LAN Requester
  - Novell Netware Requester

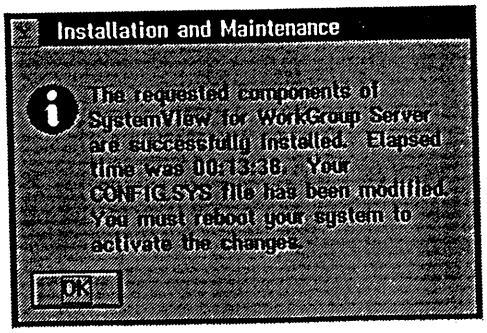
Completing Installation

- After making the changes to the configuration you should close (and implicitly SAVE) the configuration parameters.

- You will then be asked to confirm that you wish to ***Save the configuration changes*** as follows:

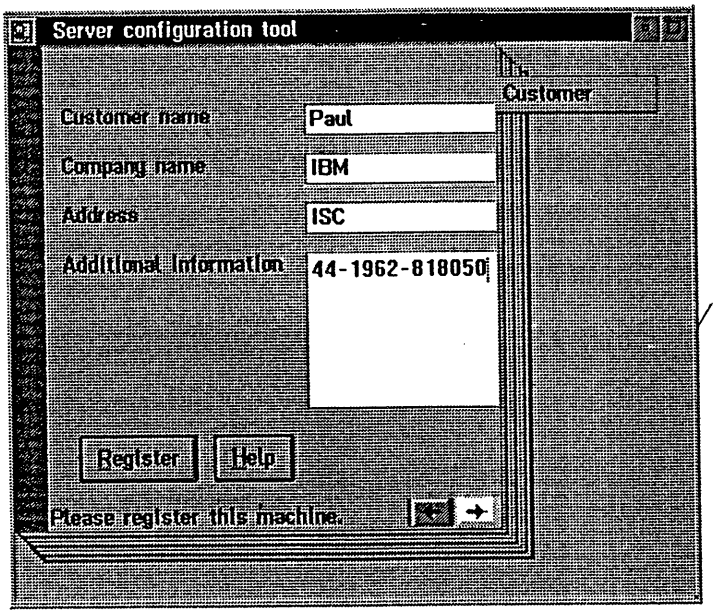


- You have now completed ***most*** of the installation and customisation.

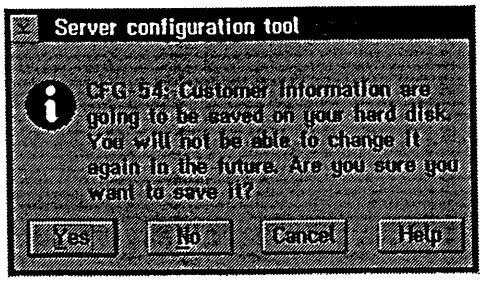


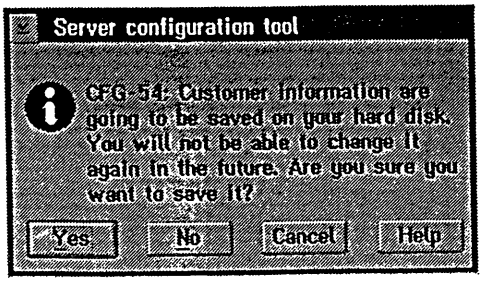
After Re-booting

- After you re-boot you will be given an opportunity to enter extra information which is used by ***License Management***

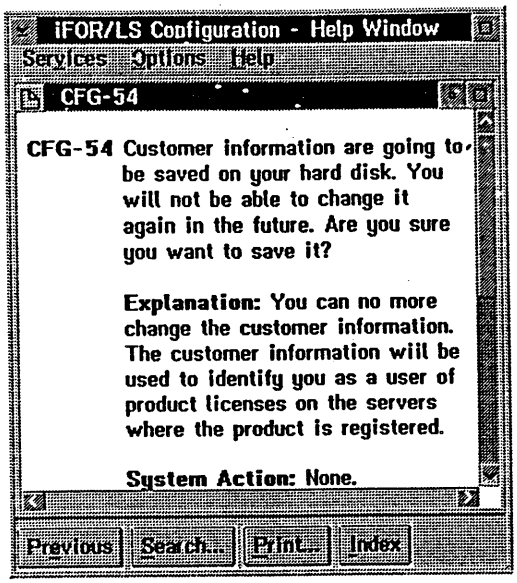


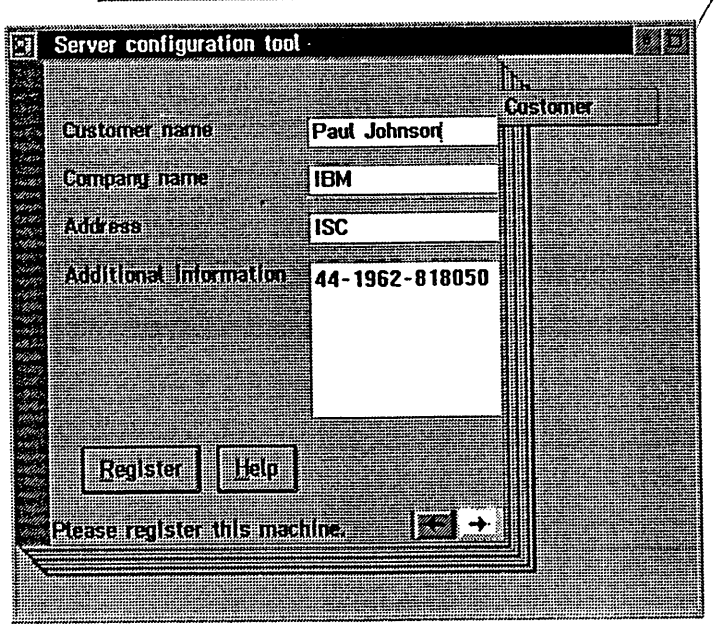
- After selecting ***OK*** you will be presented with the following two screens.

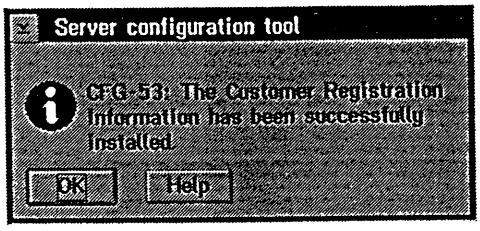




After Re-booting





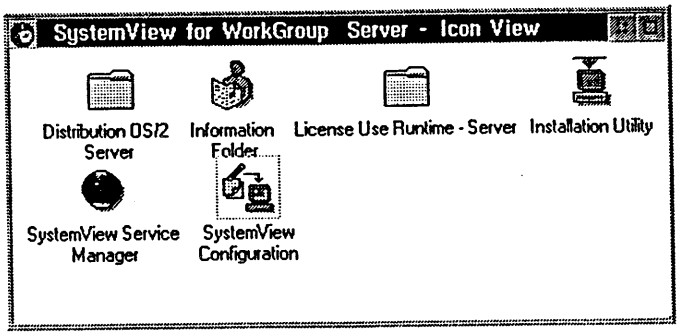


Part Five

Starting at the desktop

- On the desktop you will find an icon for the ***SystemView for Workgroup Server***, thus:

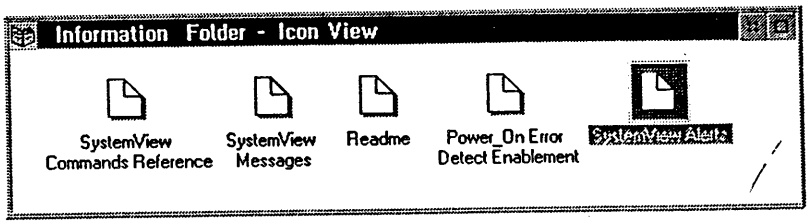
- This folder contains all of the SystemView components as shown below:



- Now we will take a deeper look into each of the individual items with the exception of the ***Distribution OS/2 Server*** and ***License Use Runtime - Server*** which will be covered in later sessions.

Information Folder

- The ***Information Folder*** contains the following items:



- The ***Readme*** 

contains important information not available at the time the normal documentation was produced.

- You have received a copy of the file ***readme.txt*** with your handouts.

- ***Always*** check the ***readme.txt*** with a refresh of the code.

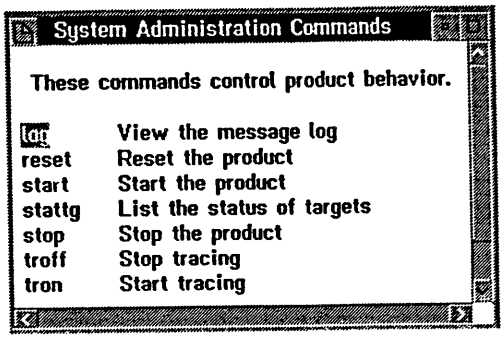
- You can look at the ***readme.inf*** from an OS/2 Window with the ***VIEW*** command - VIEW README.

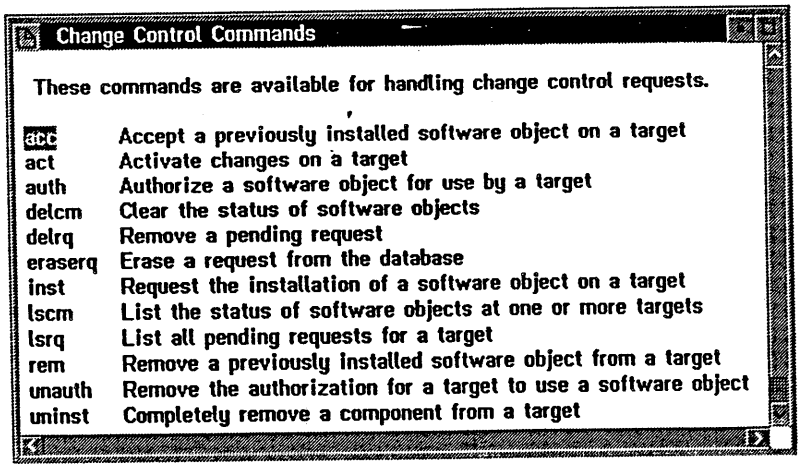
Information Folder ...

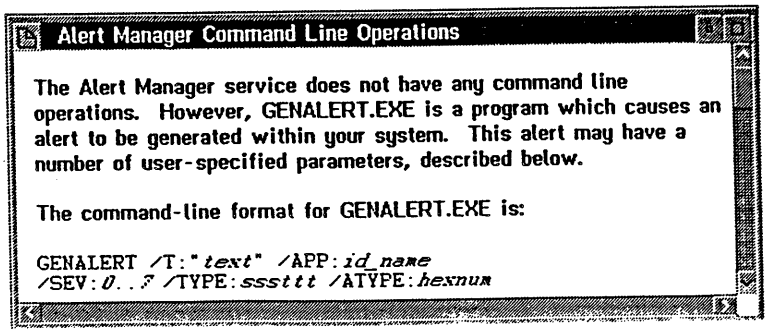
- The ***SystemView Command Reference*** 

contains:
  - Software Distribution Command Reference
    - Configuration Commands
    - Building Commands
    - System Administration Commands
    - Change Control Commands
  - Alert Manager Commands
  - System Information Tool Commands
  - ECC Memory Setup Commands
  - Starting and Stopping Service Programs

Examples of SystemView Commands







SystemView Commands cont....

System Information Tool Command Line Operations

The System Information Tool can be started from a command line, and supports five command line parameters. The command line format for System Information Tool is:

SINFG30 /P: *filename* /H: *filename*
/F: *history filename* /NOLOGO /B /DBDLL:DB2OS2FI
/DBNAME: *path and filename* or: /DBDLL:DB2OS2CI
/DBNAME:*databasename*

ECC Memory Setup Command Line Operations

All functions of the ECC Memory Setup can also be accessed from your OS/2 command line, using ECCMEM.EXE. The command line format for ECCMEM.EXE is:

ECCMEM /INIT /SCRUB: *ON or OFF* /THRESH: *ON or OFF*
/COUNT: *ON or OFF* /QUIET /COUNTVAL: *number*
/THRESHVAL: *number*

Starting and Stopping Service Base Programs Remotely

SystemView command line programs enable you to remotely start or stop any SystemView service's base program. These programs are named STRTBASE.EXE and STOPBASE.EXE.

Note: STRTBASE.EXE and STOPBASE.EXE can only start and stop the base programs for individual SystemView services. They cannot be used to remotely start or stop SystemView itself. SystemView must be running on the remote system for STRTBASE.EXE or STOPBASE.EXE to function properly.

SystemView Commands cont....

Starting Service Base Programs Remotely

Use STRTBASE.EXE to start a service's base program on a remote system from your system. The command line format for STRTBASE.EXE is:

STRTBASE \N:*networktype*::*networkaddress*
\BASE:*servicebase* [\BATCH] [\?]

where:

networktype	Name of the protocol to be used to send the message (for example, "TCPIP").
networkaddress	Protocol-specific address of the remote system on which the base program will be started (for example, "user.network.com").
servicebase	The service connection name of the program base to be started on the remote system. For a list of the service connection names that must be used with this command, see Service Connection Names.
BATCH	Program runs with no output. When STRTBASE.EXE is run in BATCH mode,

Service Connection Names

A list of the service connection names that must be used with the STRTBASE.EXE and STOPBASE.EXE programs follows.

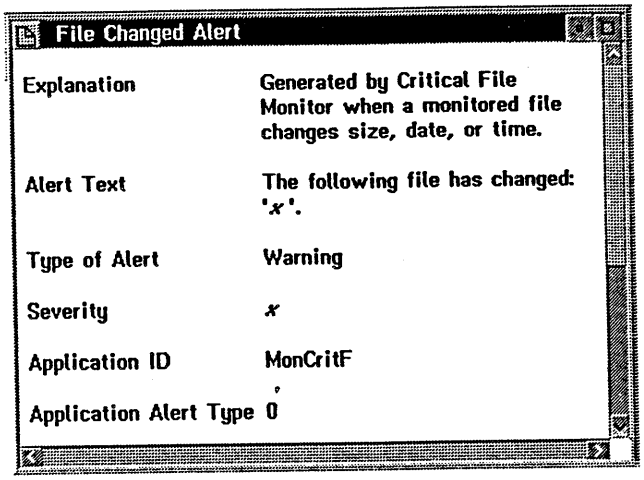
Service Connection Name	Service Name
CFMBase	Critical File Monitor
ProcMgr	Process Manager
ECCMemory	ECC Memory Setup
MonSvc	System Monitor
Gatherer3.0	System Information Tool
PFAServiceBase	Predictive Failure Analysis
ShriekerServiceBase	Power-On Error Detect

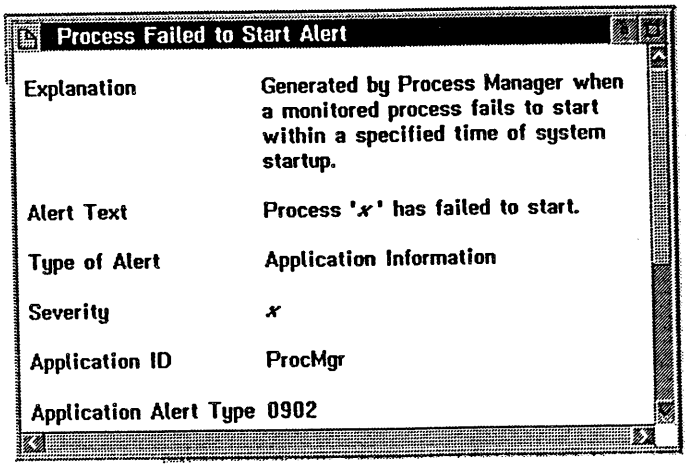
SystemView Alerts

- SystemView Alerts
  - Power-On Error Detect Alert
  - Predictive Failure Analysis Alert
  - Critical File Monitor
  - Process Manager
  - Remote System Manager
  - Security Manager
  - Service Manager
  - System Monitor
- RAID Alerts
  - ***R***andom ***A***rray of ***I***nexpensive ***D***isks
  - RAID Physical Drive Alerts
  - RAID System Disk Drive Alerts

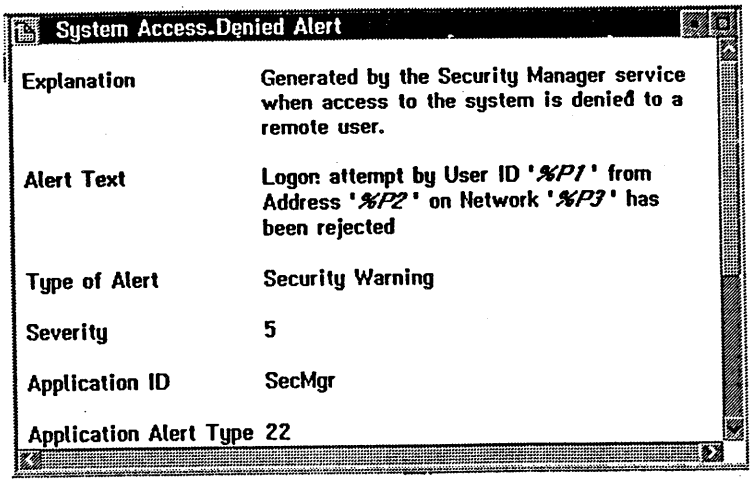
SystemView Alerts cont....

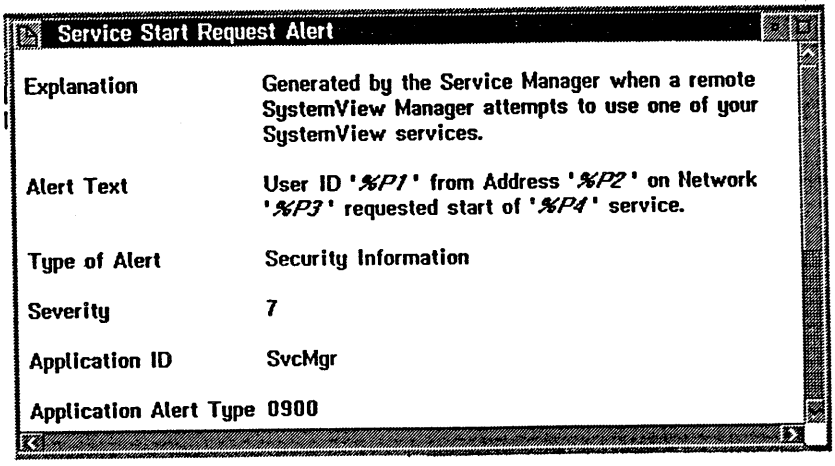
Examples from SystemView Alerts

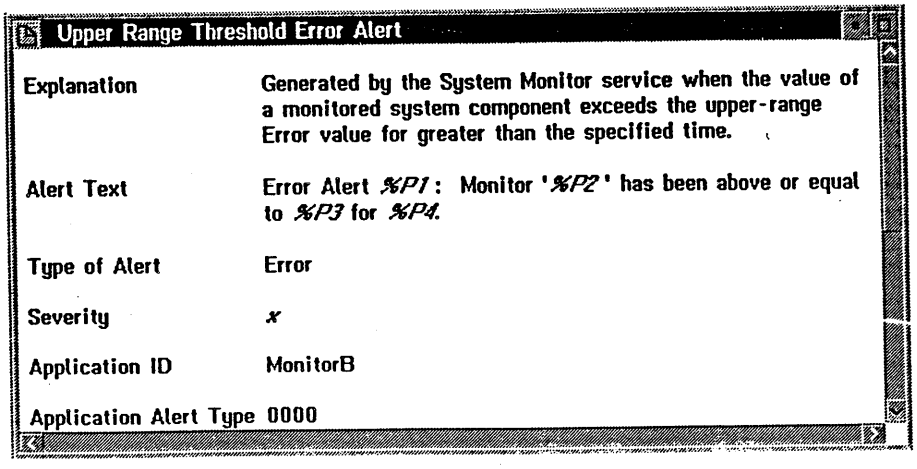




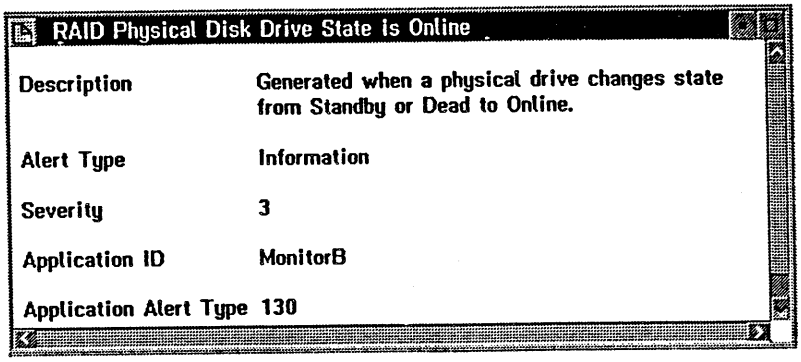
SystemView Alerts cont....

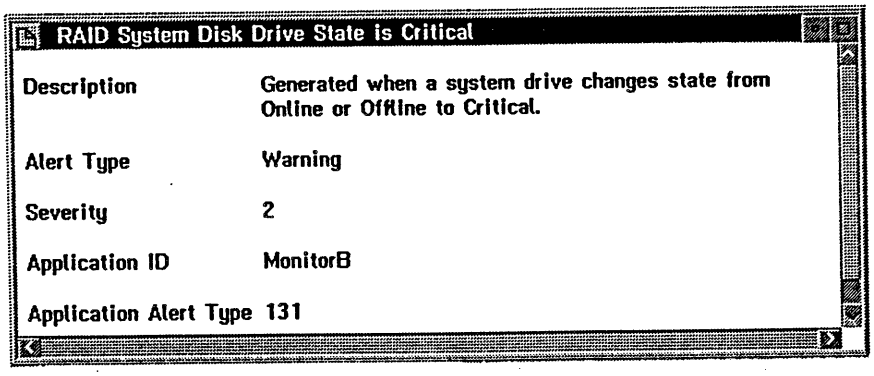


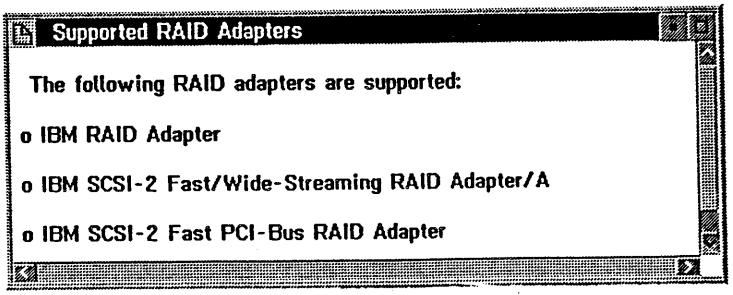




SystemView Alerts cont....



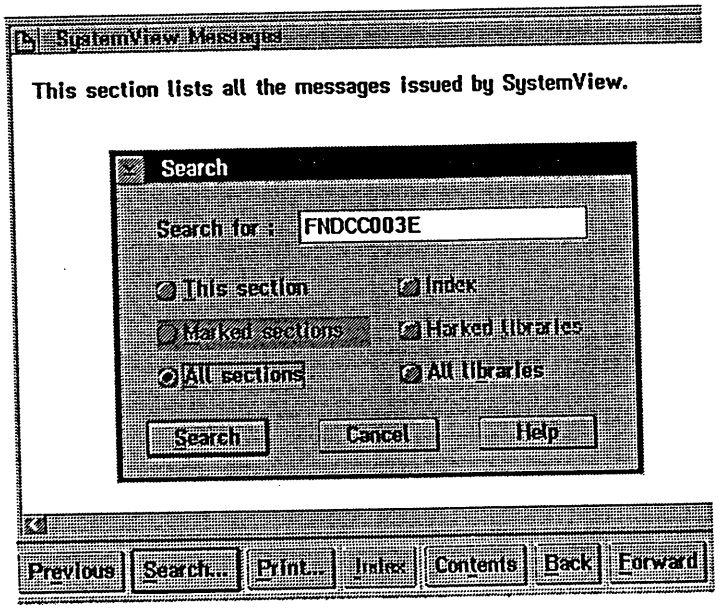




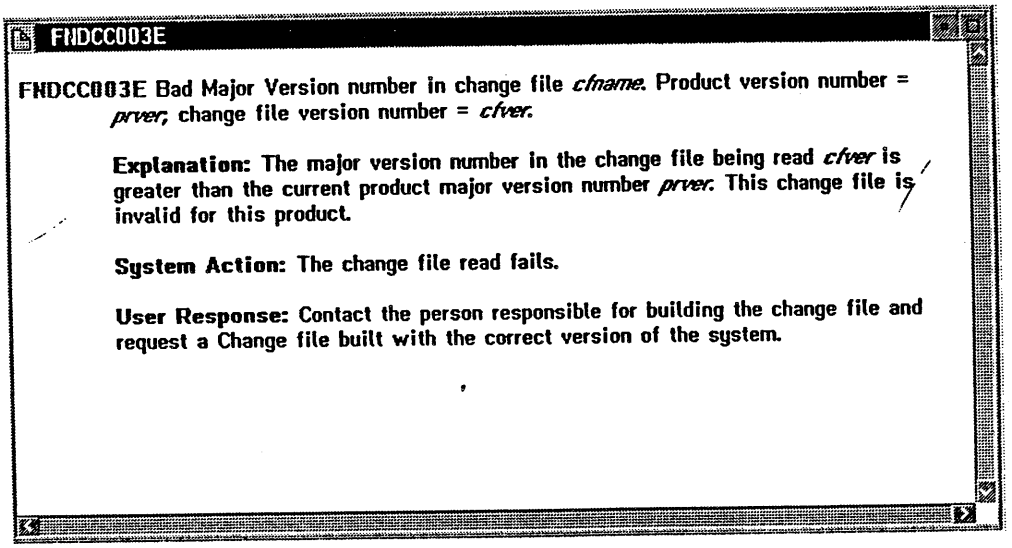
SystemView Messages

SystemView messages  can be searched:

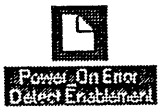
- but be aware that you can not search on a partial message number
- in the example below you could not specify ***FNDCC003***



An example of a SystemView Message



Power-On Error Detect Enablement

This section 

describes:

- System ***REQUIREMENTS*** for POED.
  - a System Partition on a MICRO CHANNEL machine
  - a supported network adapter
  - NetBIOS communication protocol
  - SystemView is not a requirement; but it helps ....
- how to ***INSTALL*** the POED drivers.
- how to ***UN-INSTALL*** the POED drivers.
- which ***ADAPTERS*** are supported by the POED drivers.
- NOTE: the POED drivers are not currently supplied with SystemView.

Installation Utility

The 

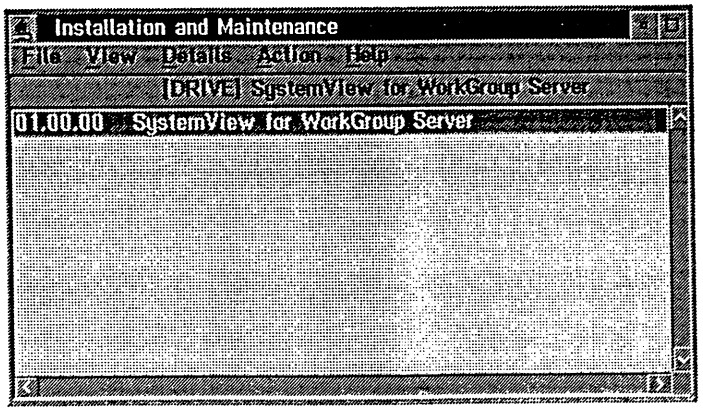
is used to:

- ***INSTALL***
- ***UPDATE***
- ***RESTORE***

and

- ***DELETE***

SystemView for OS/2 ***and/or*** other products which are installed using the OS/2 Installer Utility.



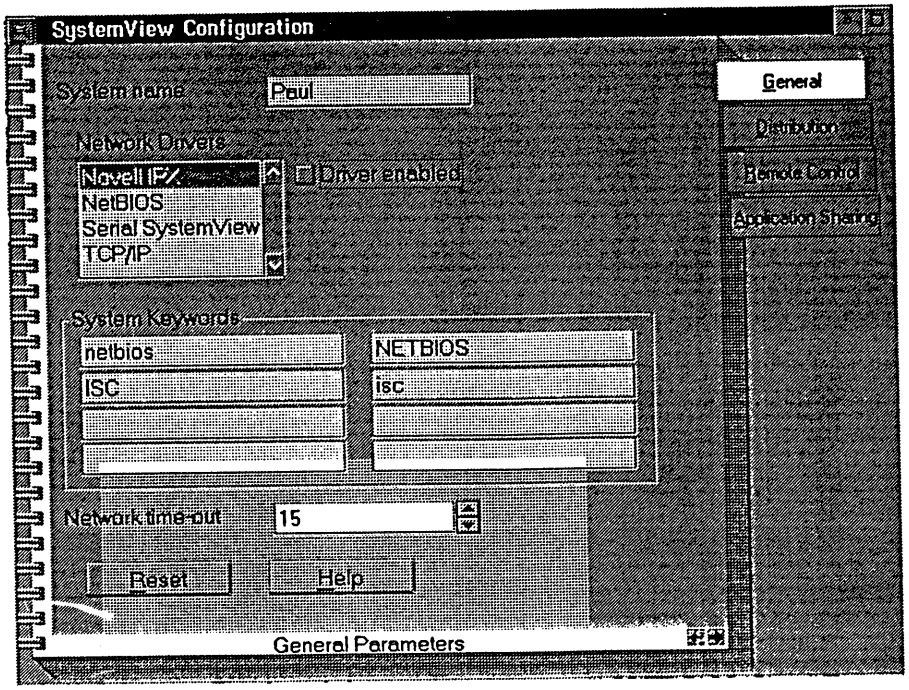
SystemView Configuration

The SystemView Configuration 

is used to:

- modify the:
  - General Parameters
  - Distribution Parameters
  - Remote Control Parameters
  - Application Sharing Parameters

which were specified when SystemView was installed



Part Six

Workstation Management

with

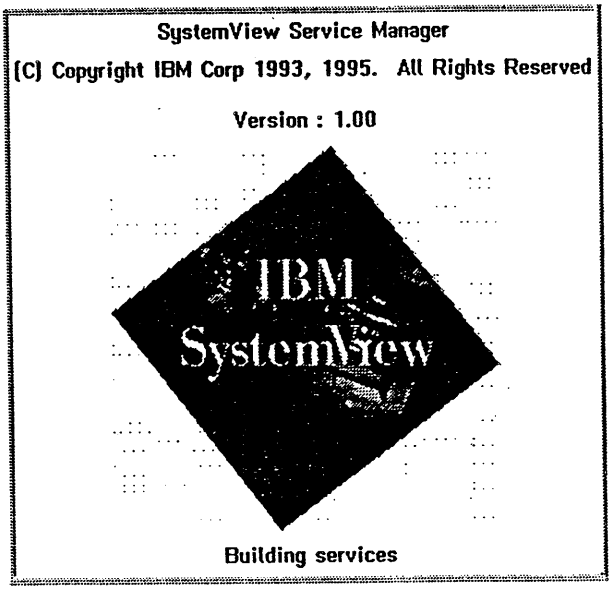
The SystemView Service Manager

SystemView Service Manager

SystemView Service Manager

Double-Click on the SystemView Service Manager Icon

to start and you will see the ***Building Service*** window, shown below, whilst the Service Manager is initialising:

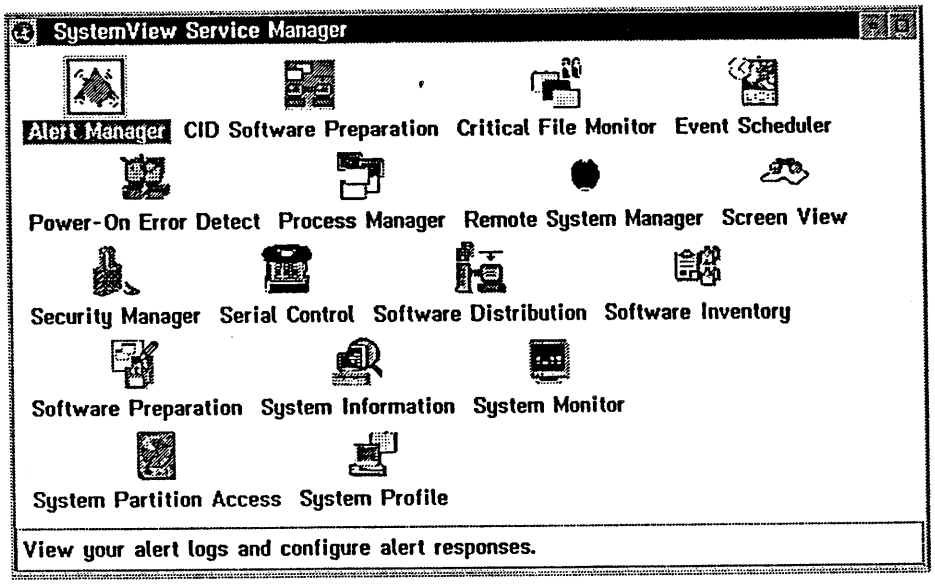


During initialisation the Service Manager is configuring the services which are appropriate for your workstation.

SystemView Service Manager

The first thing you should realise about this panel is that it is not customisable. The Symbols can not be dragged or arranged. The symbols you see represent all of the service that this particular workstation supports.

Therefore when you connect to a ***Client*** you will only see symbols for those services which are enabled on that client.



See the the following table for an explanation of the allowable service combinations.

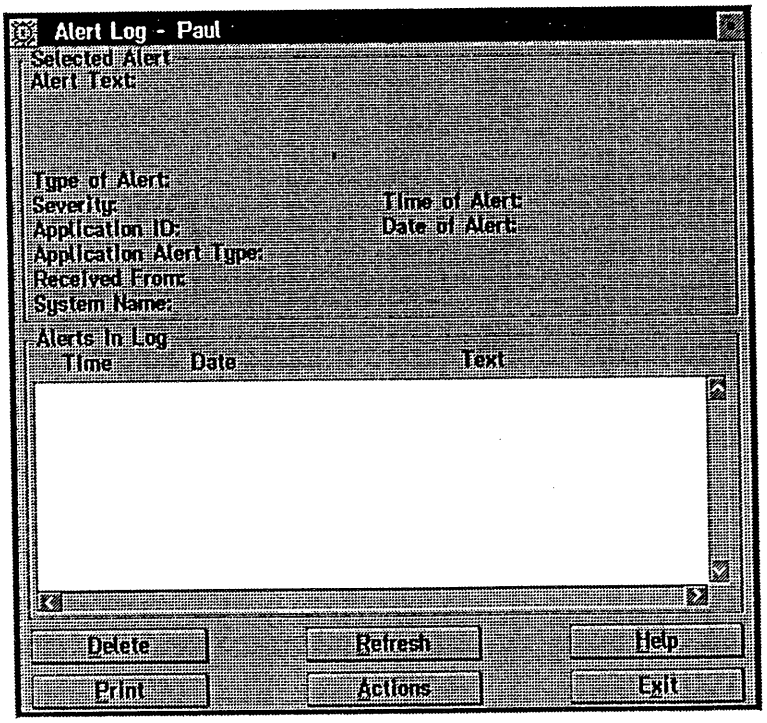
Table 1 (Page 1 of 2). SystemView LAN for OS2 Warp : Functional Matrix			
Function	**Manager**	**Active Client**	**Passive Client**
Alert Manager	 Alert Manager	 Alert Manager	 Alert Manager
CID Preparation	 CID Preparation	 CID Preparation	 CID Preparation
Critical File Monitor	 Critical File Monitor	 Critical File Monitor	 Critical File Monitor
ECC Memory Setup	 ECC Memory Setup		
Event Scheduler	 Event Scheduler		
File Transfer	 File Transfer		
Serial Control	 Serial Control	 Serial Control	 Serial Control
Power-On Error Detect	 Power-On Error Detect		
Process Manager	 Process Manager	 Process Manager	
Remote Systems Manager	 Remote System Manager		
Remote Workstation Control	 Remote Workstation Control		
Screen View	 Screen View		

Security Manager	 Security Manager	 Security Manager	 Security Manager
Software Distribution	 Software Distribution	 Software Distribution	
Software Inventory	 Software Inventory		
Software Preparation	 Software Preparation		
System Information	 System Information	 System Information	
System Monitor	 System Monitor	 System Monitor	
System Partition Access	 System Partition Access		
System Profile	 System Profile	 System Profile	
SystemView Configuration	 SystemView Configuration	 SystemView Configuration	 SystemView Configuration

Alert Manager

The Alert Manager's  function is to ***Collect*** and ***Respond to*** problems (or impending problems) at ***Managed Stations***.

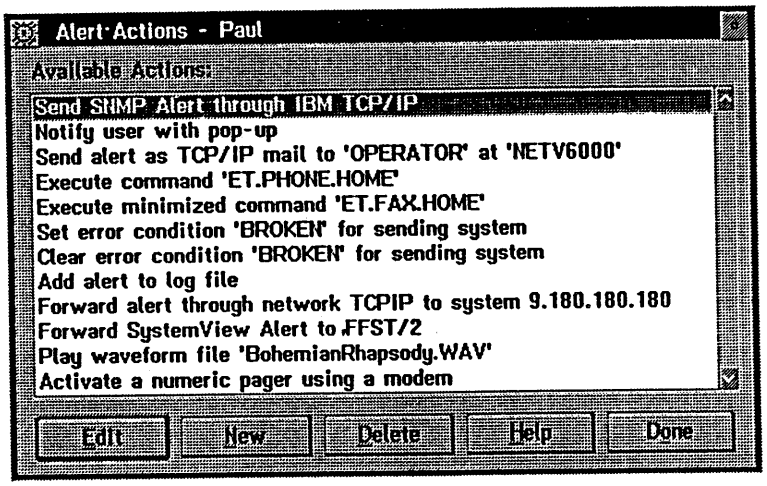
When you first open the Alert Manager you will be presented with the empty ***Alert Log*** as shown below:



To customise which alerts are processed select ***Actions***

Alert Manager - available actions

An example of the ***Actions*** which can take place as a result of an alert being received follow:

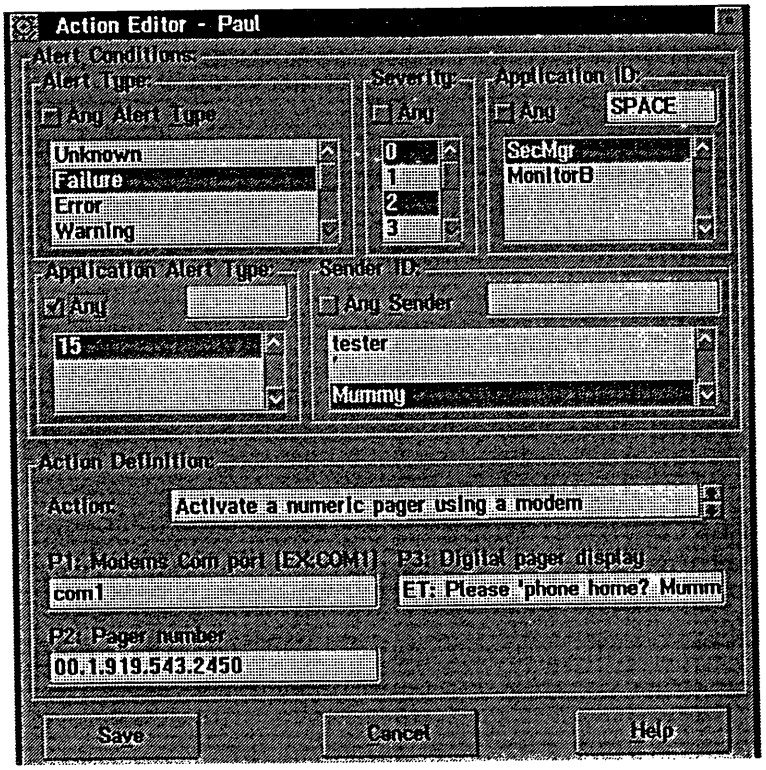


To Create a ***New Action*** select ***New*** and you will be placed in the ***Action Editor*** which follows:

Alert Manager: Action Editor

The same Alert generated by multiple workstations can be processed in multiple ways.

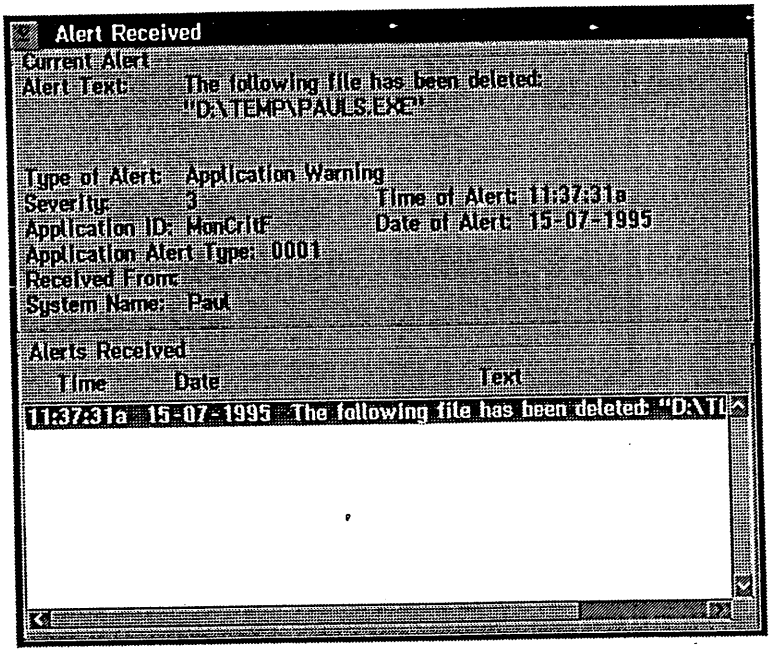
This is achieved through the ***Action Editor***

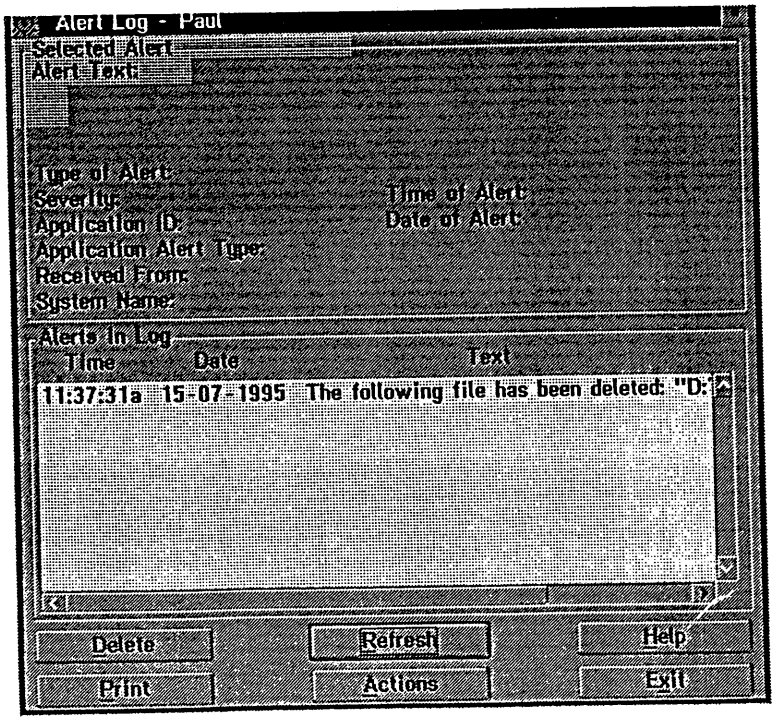


As can be seen in the example above you can choose a combination of ***Alert Type, Severity, Application ID, Application Alert Type*** and ***Sender*** and then select a specific ***Action*** for this combination.

Alert Manager: Receiving Alerts

In the examples below an alert has been received from the ***Critical File Monitor*** because a file has been deleted. ***NOTE*** that the first panel is the ***ACTION - "Notify User with pop-up"*** and the second panel is the ***Alert Log*** entry.

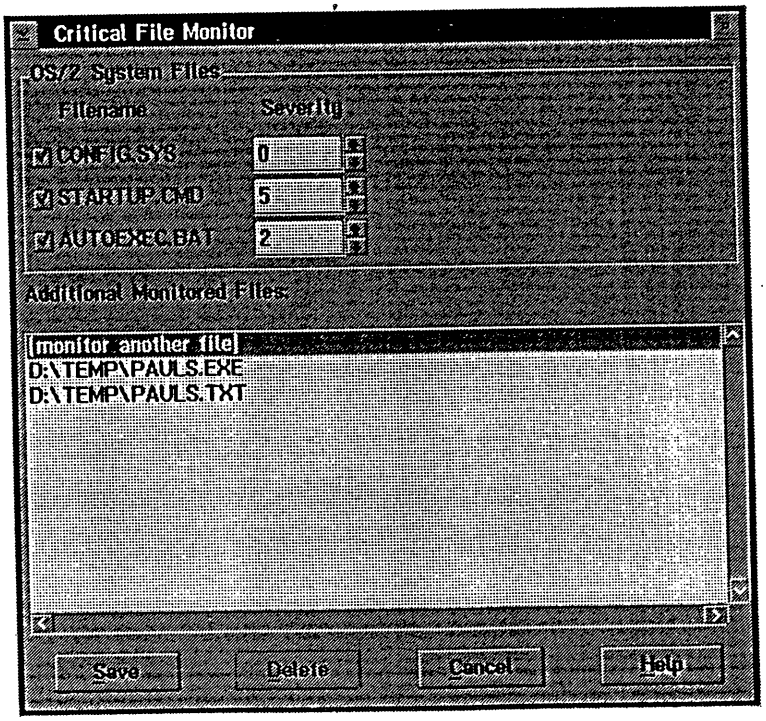




Critical File Monitor

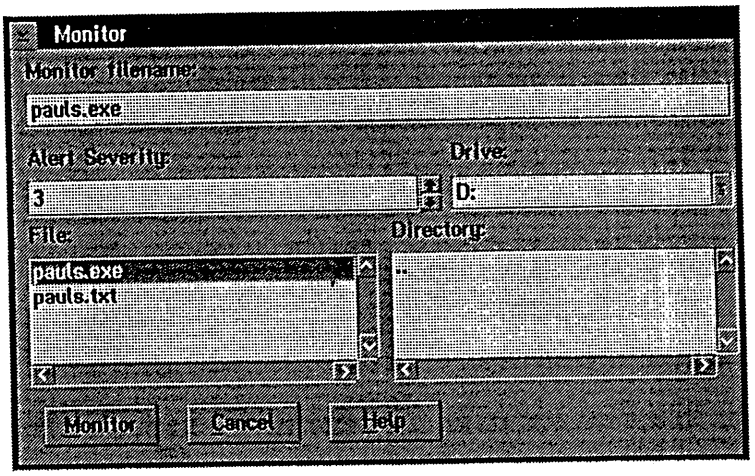
The ***Critical File Monitor***  Critical File Monitor is designed to allow you to monitor important files on ***Managed Stations***.

As can be seen in the panel below there are 3 System Files which are considered key components of OS/2 clients and as such they are pre-defined. Windows Clients also have ***WIN.INI*** pre-defined.



Critical File Monitor

In addition you can define other files to monitor by double-clicking on ***(monitor another file)*** which will cause the following panel to be displayed. In this panel you can specify the ***Filename*** and ***Location*** of any file you wish to monitor.



As we saw in the section on alerts an alert will be generated when a monitored file is ***DELETED*** or ***CHANGED***.

DMI Browser

This function is not yet available as it requires the ***Desktop Management Interface Service Layer*** implemented on a machine for it to function. The DMI structure has the following 3 separate elements:

- DMI Components
  - A ***DMI Component*** holds information about the product with which it is associated.
  - This information is organised into product specific groups.
  - The ***Component ID*** group for a software product might contain the following attributes:
    - Manufacturer
    - Product
    - Version
    - Serial Number
    - etc
  - This information is contained in a ***Management Information File (MIF).***
  - The MIF describes the ***manageable attributes*** of the DMI component or product.
- DMI Service Layer
  - The ***Service Layer*** is a program which gathers and organises the DMI component information into a standardised format and makes it available to a DMI compliant Management Application.
- DMI Compliant Management Applications
  - The SystemView LAN for OS/2 WARP ***DMI Browser*** is such an application.

ECC Memory Setup

ECC Memory Setup ***allows you to monitor and manage Error Correcting Memory.***

- ***Single-Bit Error Scrubbing*** allows single-bit errors to be corrected.

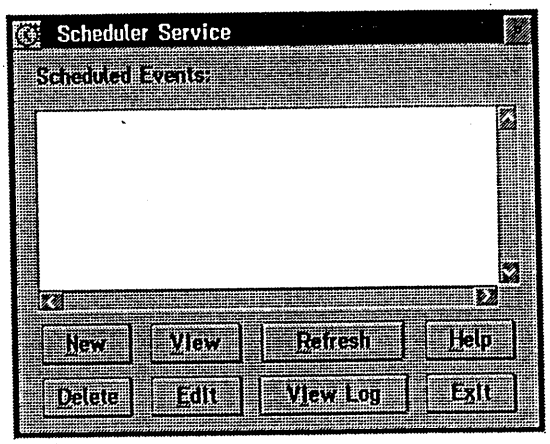
- ***Single-Bit Error Counting*** enables a count of single-bit errors to be maintained.

- ***Single-Bit Error Threshold NMI*** causes a nonmaskable interrupt (NMI) if the count of single-bit errors exceeds the user-specified threshold.

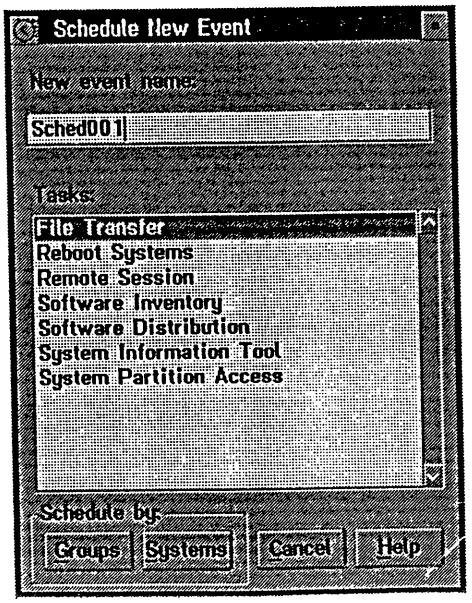
Be aware: an NMI can cause the ***system to halt***.

Event Scheduler

The ***Event Scheduler***  Event Scheduler is designed to allow you to automate systems management tasks on ***multiple managed systems*** or on ***a Group or Groups***.

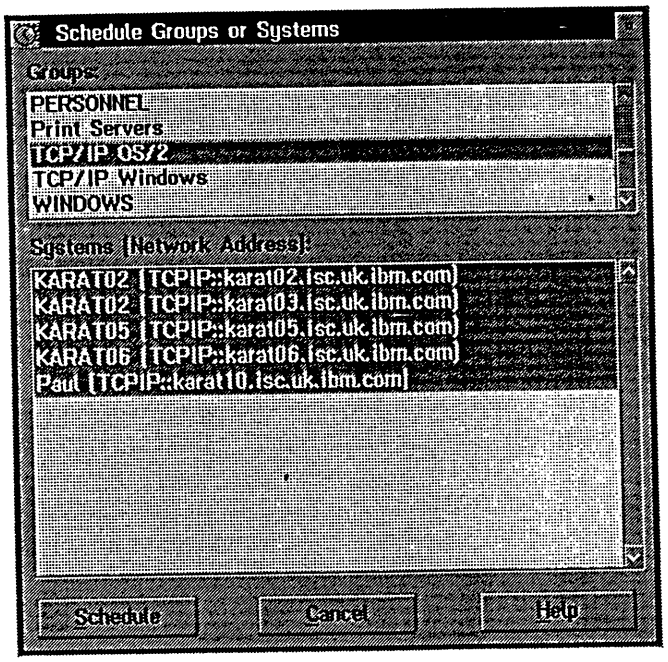


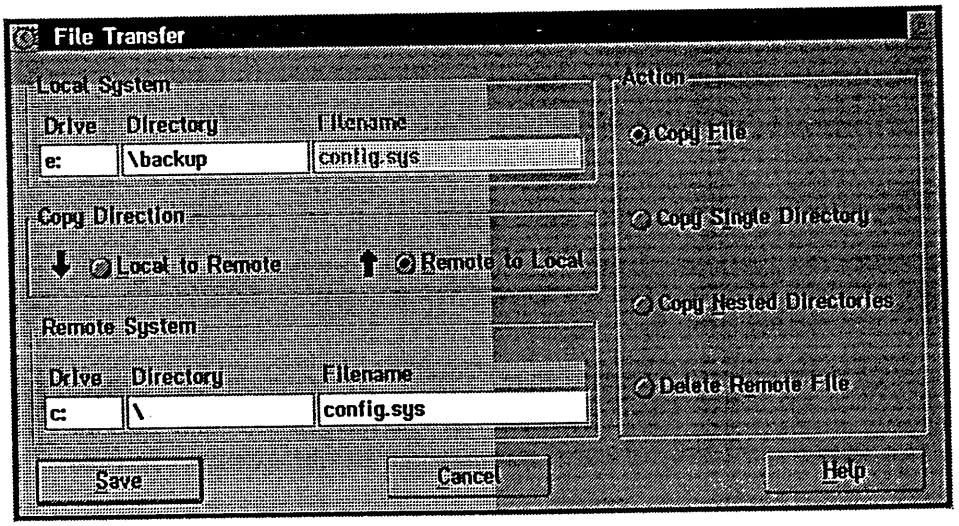
Select ***New*** to create a ***scheduled event*** and you will see the following panel:



Event Scheduler cont ...

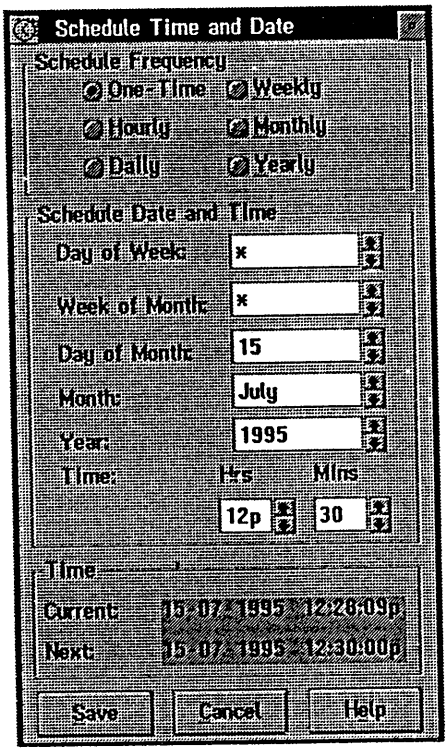
We will schedule a ***File Transfer*** event, ***Sched001***, against a ***Group*** of systems (TCP/IP OS/2) by selecting the group ***TCP/IP OS/2*** and ***Schedule***





Event Scheduler cont ...

We can now choose the ***Frequency*** and ***Time*** of the File transfer(s).



We can choose to schedule the event:

- One-Time

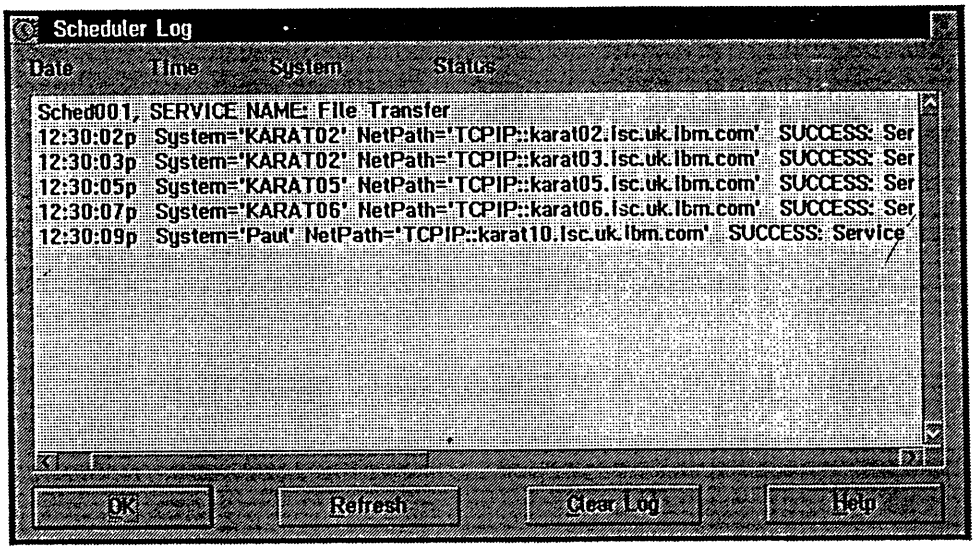
or

- Multiple-Times

Next will show when the event will run first. If the ***Date and/or Time*** is before the current date/time "next" will show ***Never***.

Event Scheduler cont ...

Here's the ***LOG*** after the events have completed:



Note: this event will not work correctly; ***why not?***

Groups

In the Event Scheduler we referenced ***Groups***. Now is the correct time to look at ***Defining Groups***

Groups are the ***logical*** or ***physical*** joining together of managed systems where a ***managed system*** is a system running a SystemView OS/2 Client or a SystemView Windows Client.

Examples of groups are:

- All OS/2 WARP 3.0 managed systems
- All TCP/IP managed systems
- All managed systems in the Payroll department

All workstations with the keyword ***payroll*** or ***PAYROLL***

- All Netware "managed" systems

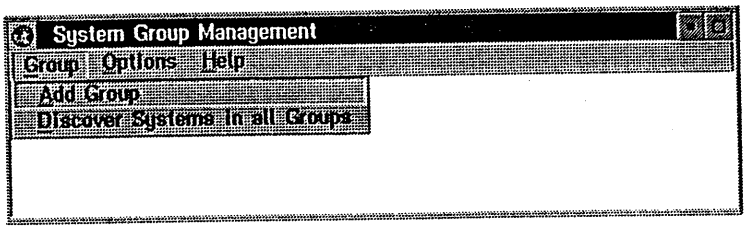
Why Netware? There's no Netware Client.

- All PS/2 Model 295 managed systems (with a keyword of ***Model295***).

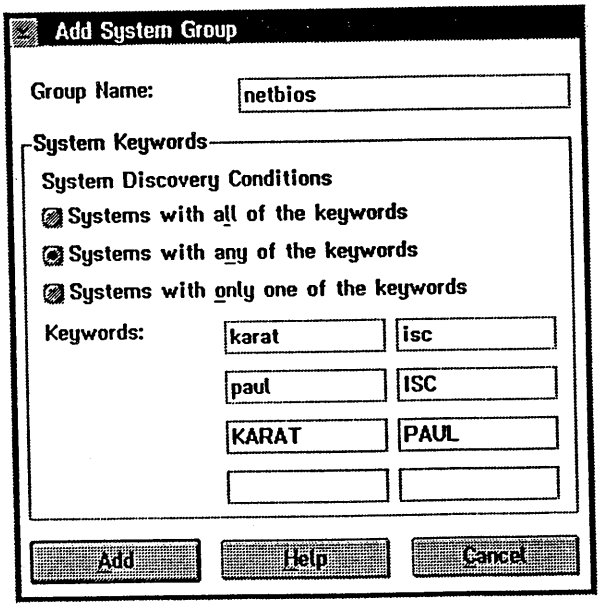
Defining Groups

To define a group we need to use the ***Remote System Manager*** Remote System Manager

We see below the first step in defining a new group:



When we choose to ***Add Group*** we are presented with the following panel where we can choose ***Group Name, Keywords*** and the ***"keyword rules"***.

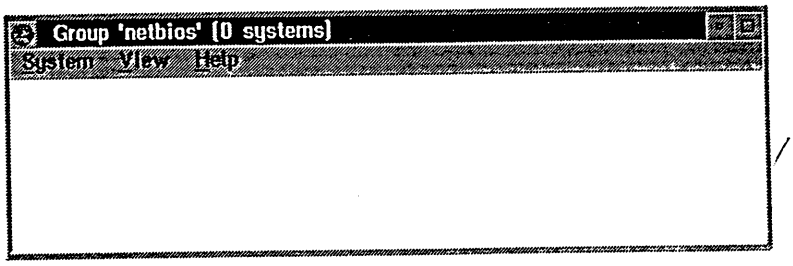


Please note: keywords are ***CaSe SeNsItIvE***.

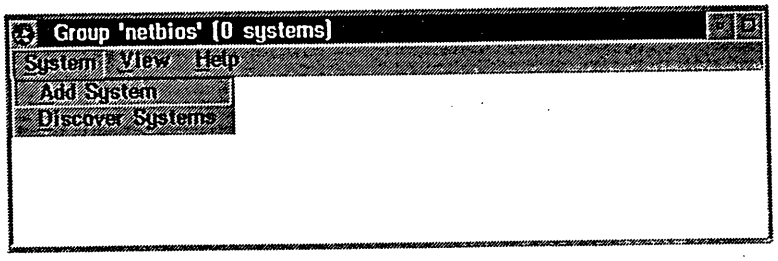
Discovering Groups

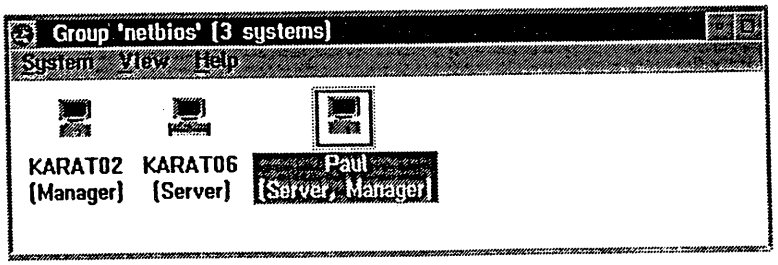
Now we have defined our group we need to ***Discover*** all stations that meet the criteria we have specified.

We open the group by ***"double-clicking"*** on it and we are then presented with a panel showing an ***empty group***



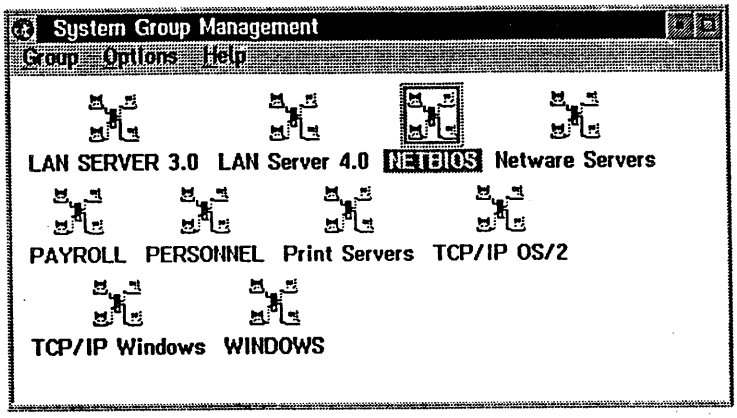
By clicking on ***System*** and ***Discover Systems*** we will find all systems which meet our criteria:



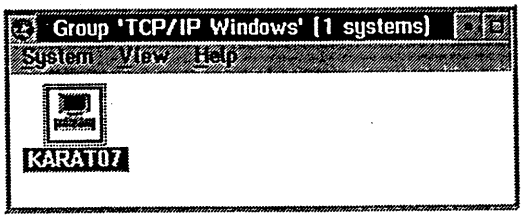


Discovering a System .. example

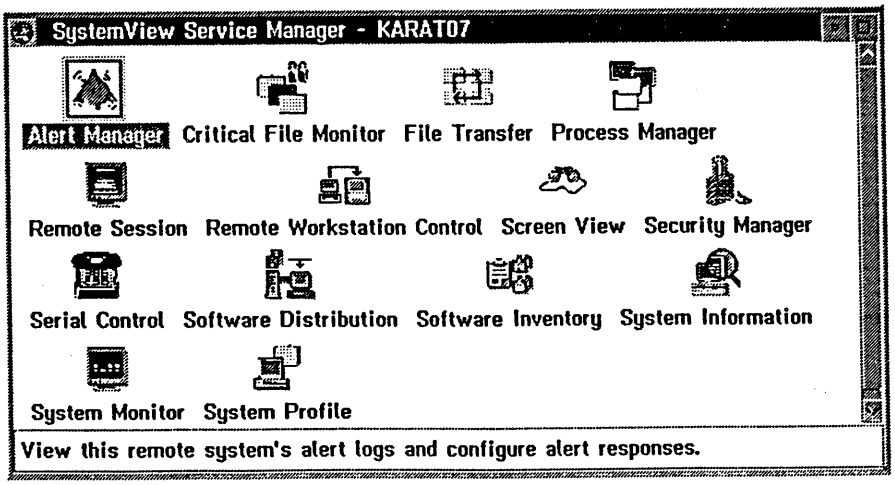
First we start with ***All defined Groups***



We open the ***NetBIOS*** group.

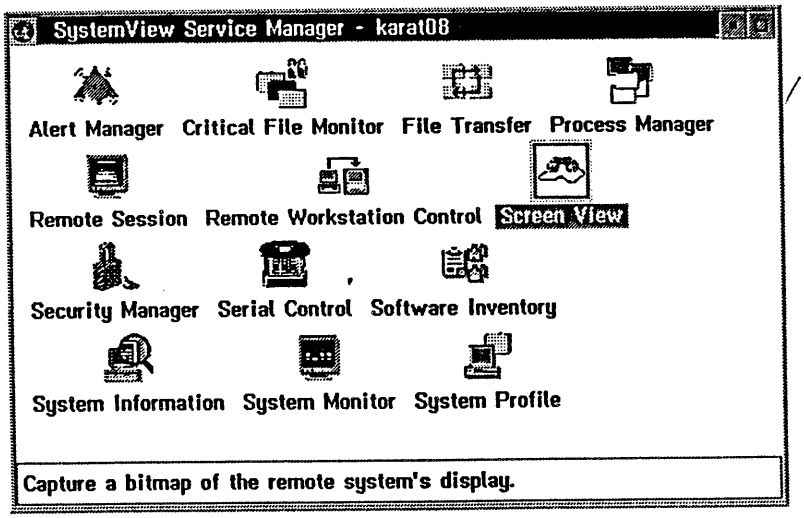


Now we see the ***Services*** available to us on KARAT07.



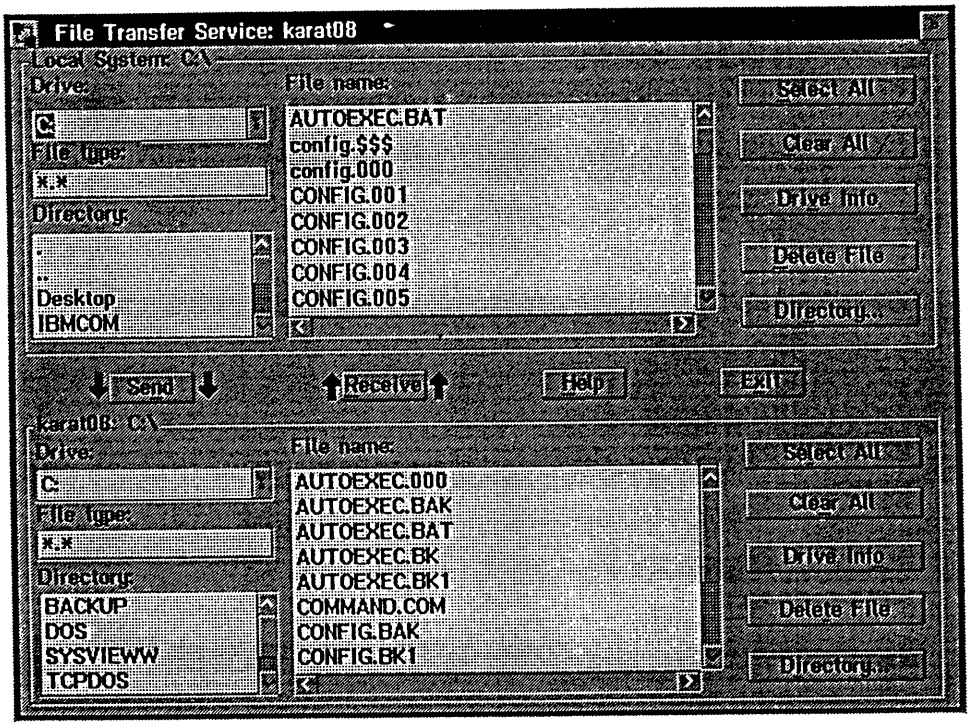
File Transfer

File Transfer  File Transfer is available when the manager is in session with a managed station.



File Transfer cont....

The panel below illustrates the available options, and selection choices, for ***File Transfer***.



Power-On Error Detect

Power-On Error Detect is used to identify "errors" on ***ANY*** workstation which has the drivers installed.

Two conditions cause these "shrieker" SOS messages to be generated:

- Failure during ***Power-On Self Test***
- ***System Partition Access*** during startup

The Power-On Error Detect drivers (which are shipped with Netfinity) are required for this service. The following are also required:

- A LAN attached Micro-Channel Machine
- A supported adapter (see product help for a list).
- A System Partition
- NetBIOS support

Once the POED drivers have been installed any SystemView Manager is capable of detecting, and logging an error even if the machine generating the error is not a SystemView Managed Station.

Double-Click on the ***Power-On Error Detect*** symbol

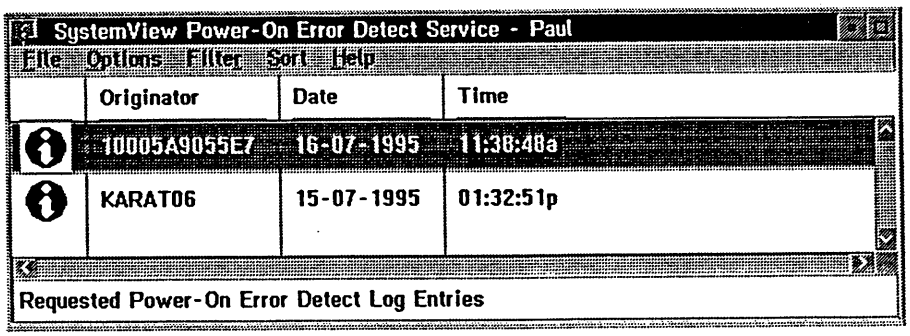
to start and you will see the ***Power-On Error Detect*** panel as overleaf:

Power-On Error Detect cont....

In the example below we can see two notifications for ***Access to the System Partition***. The first is only identified by an ***adapter number***, this tells us that the workstation is not defined in a group to this manager (although it could be in a group belonging to another manager). The second is identified as a ***managed station*** because we can see its name.

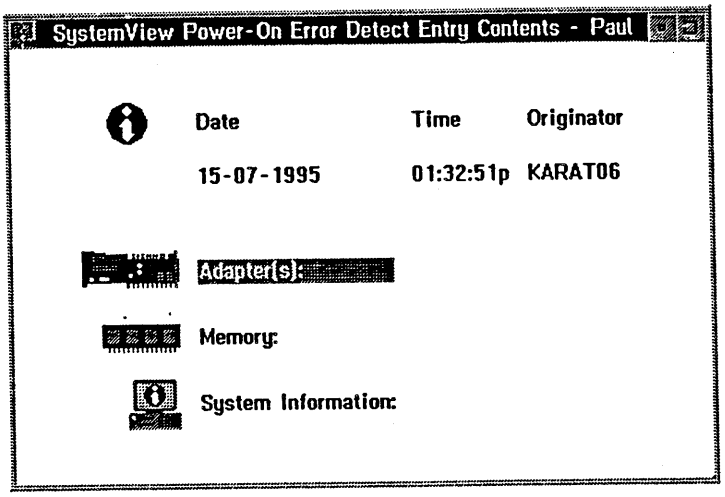
The two types of possible "errors" are identified as follows:

- POST ERROR - identified by a ***red circle*** containing an exclamation mark ***!***
- System Partition Access - identified by a ***blue circle*** containing the letter ***I*** (for "information").



By "double-clicking" on the entry we see the panel overleaf:

Power-On Error Detect cont....



Each of these items is also "selectable" and the information is similar to that provided by these components of ***System Information***

At the time of preparing this presentation we have not recorded a POST ERROR so we are not sure what you will see.

Predictive Failure Analysis

The ***Predictive Failure Analysis*** allows you to monitor PFA enabled disk drives on managed systems.

A PFA enabled disk drive will generate a PFA message which will indicate that a disk might be failing. This service can be configured to generate an ***alert*** when the message is received.

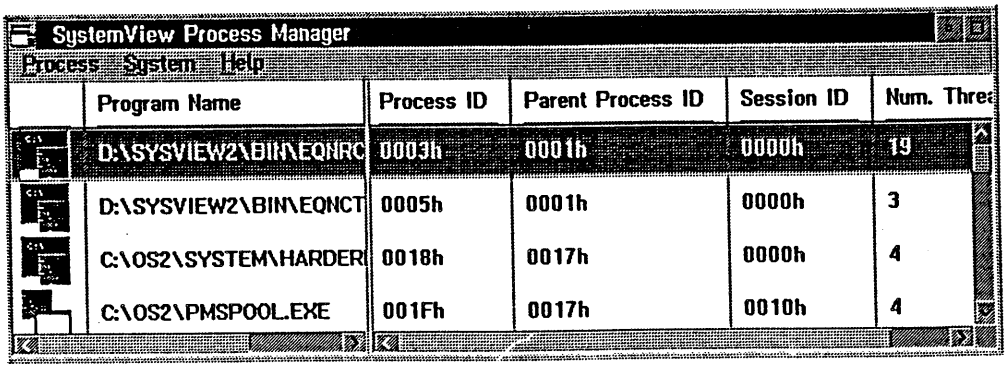
Process Manager

The Process Manager's  function is to remotely manage the processes which are running on a managed station.

In this situation ***Manage*** means:

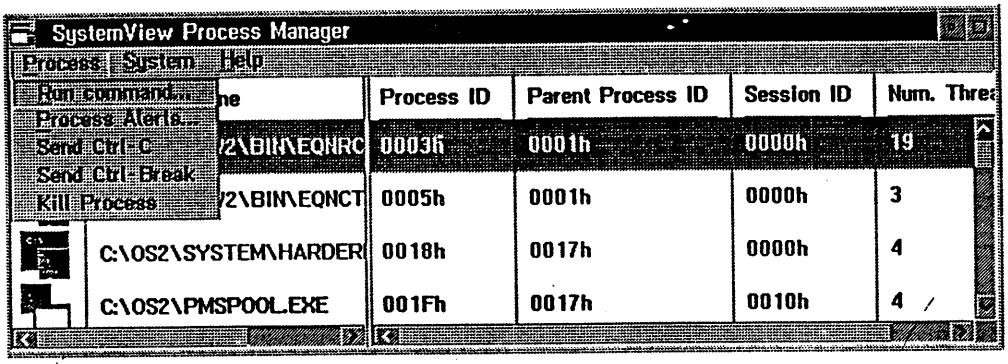
- Identify running processes
- Kill running processes
- Start new processes
- Generate Alerts for:
  - A process ***STARTING***
  - A process ***STOPPING***
  - A process ***NOT STARTED***

Below we see the first panel displayed:

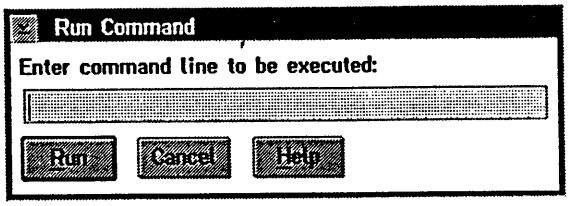


Process Manager cont.....

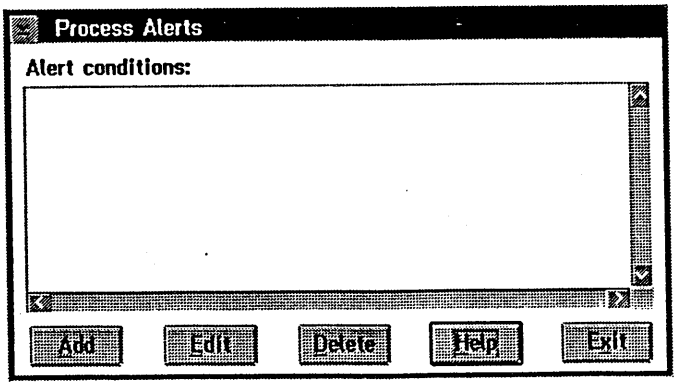
Below we see the ***actions*** which can be performed:



Next we see that we can ***Run a command***

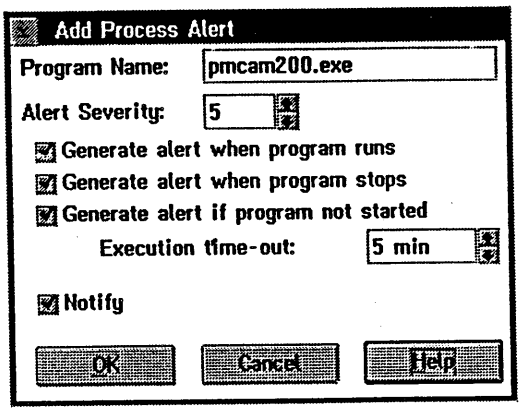


Finally we can ***Process Alerts*** which can be associated with specific processes

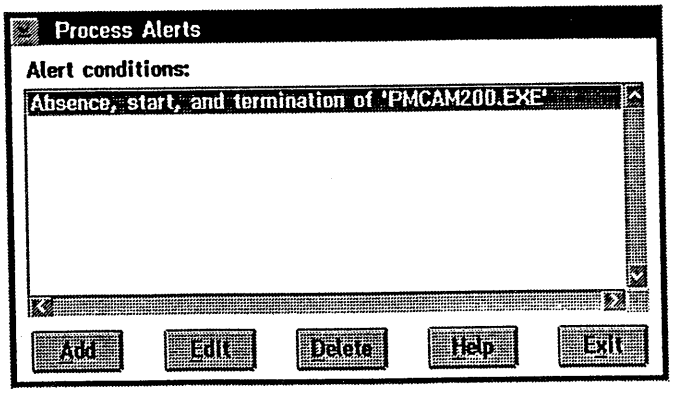


Process Manager cont....

Here we are generating alerts when ***PMCAM200.EXE*** starts, stops or doesn't start within 5 minutes (based upon the ***Execution time-out setting***). By checking ***NOTIFY*** you are ensuring that the alerts are forwarded to your ***Alert Manager***

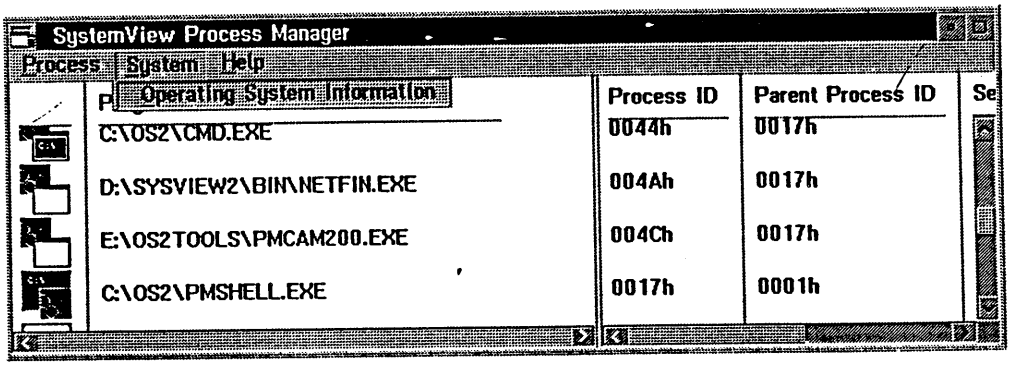


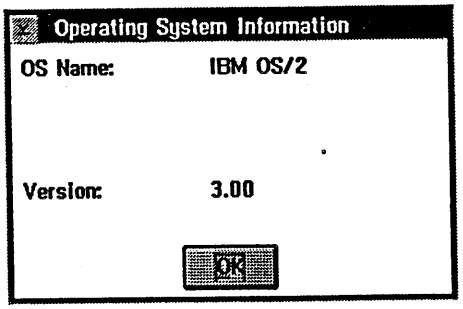
We now see the new process alert added



Process Manager cont....

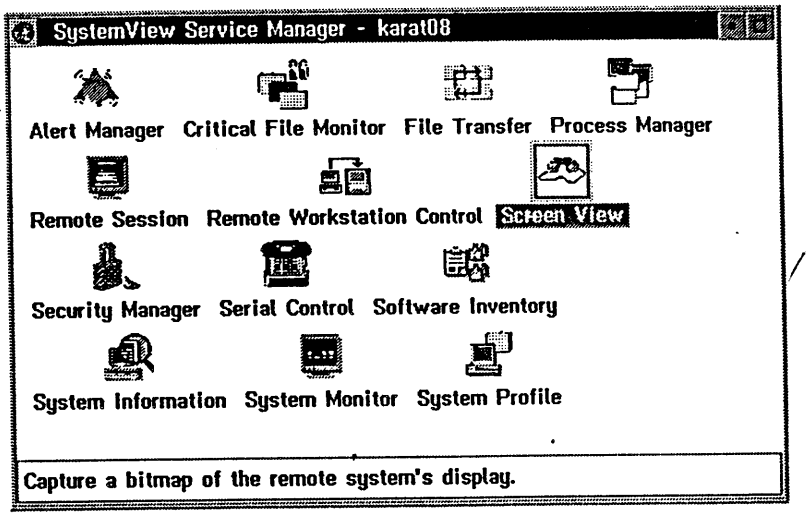
The other option you have is to display the ***Name*** and ***Version*** of the ***Operating System*** on which the process is running.



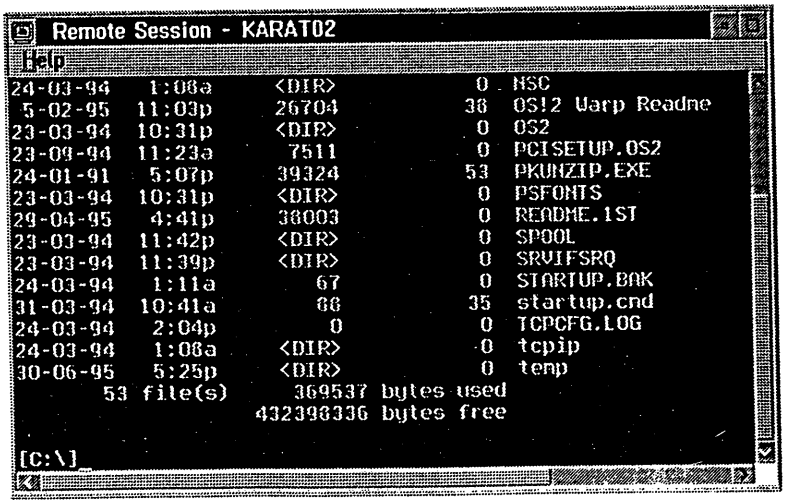


Remote Session

Remote Session  Remote Session is available when the manager is in session with a managed station and provides a ***Command Line*** interface.

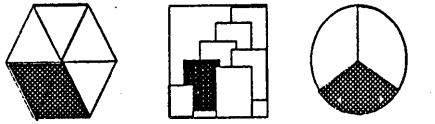


Here we see the ***Remote Session*** established with the managed station.

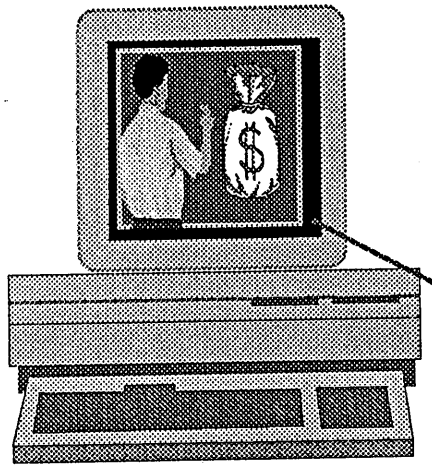


USE REMOTE WORKSTATION CONTROL (RWC)

SystemView for OS/2 Workgroup Remote Workstation Control



Remote Capabilities



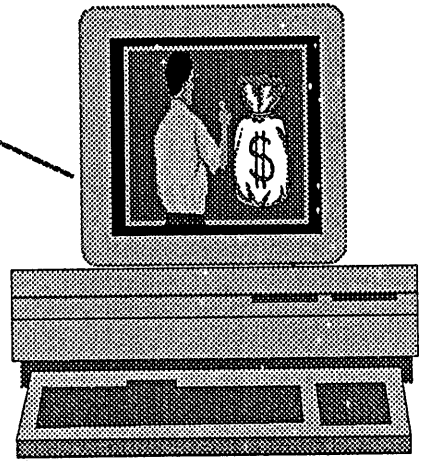
MANAGER

FACILITATES:
- - REMOTE "HELP DESK"
- - REMOTE PROBLEM DETERMINATION
- - REMOTE LAN ADMINISTRATION
- - REMOTE LAN MANAGEMENT

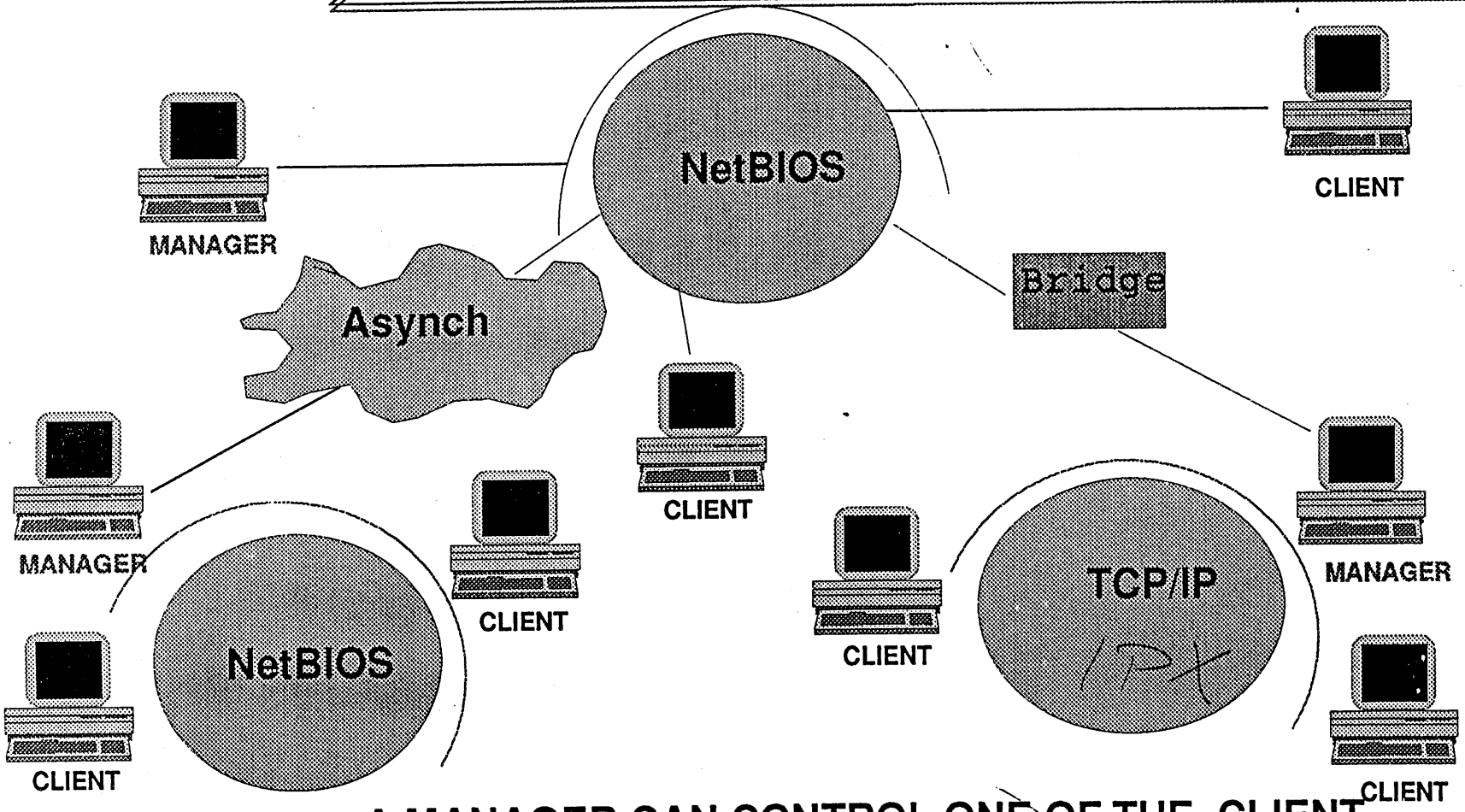
ACROSS DIFFERENT PROTOCOLS

REMOTE CONTROL OF:
- - OS/2 WORKSTATIONS
- - PM USER APPLICATIONS
- - DOS/WINDOWS APPLICATIONS

CLIENT



Flexible Configurations



A MANAGER CAN CONTROL ONE OF THE CLIENT VIA REMOTE SYSTEM MANAGER SERVICE

Functional Capabilities

- Remote control capacity
- Full screen interactive
- Active and monitor modes
- One-to-many capability
- On-line help
- Display Driver Independence

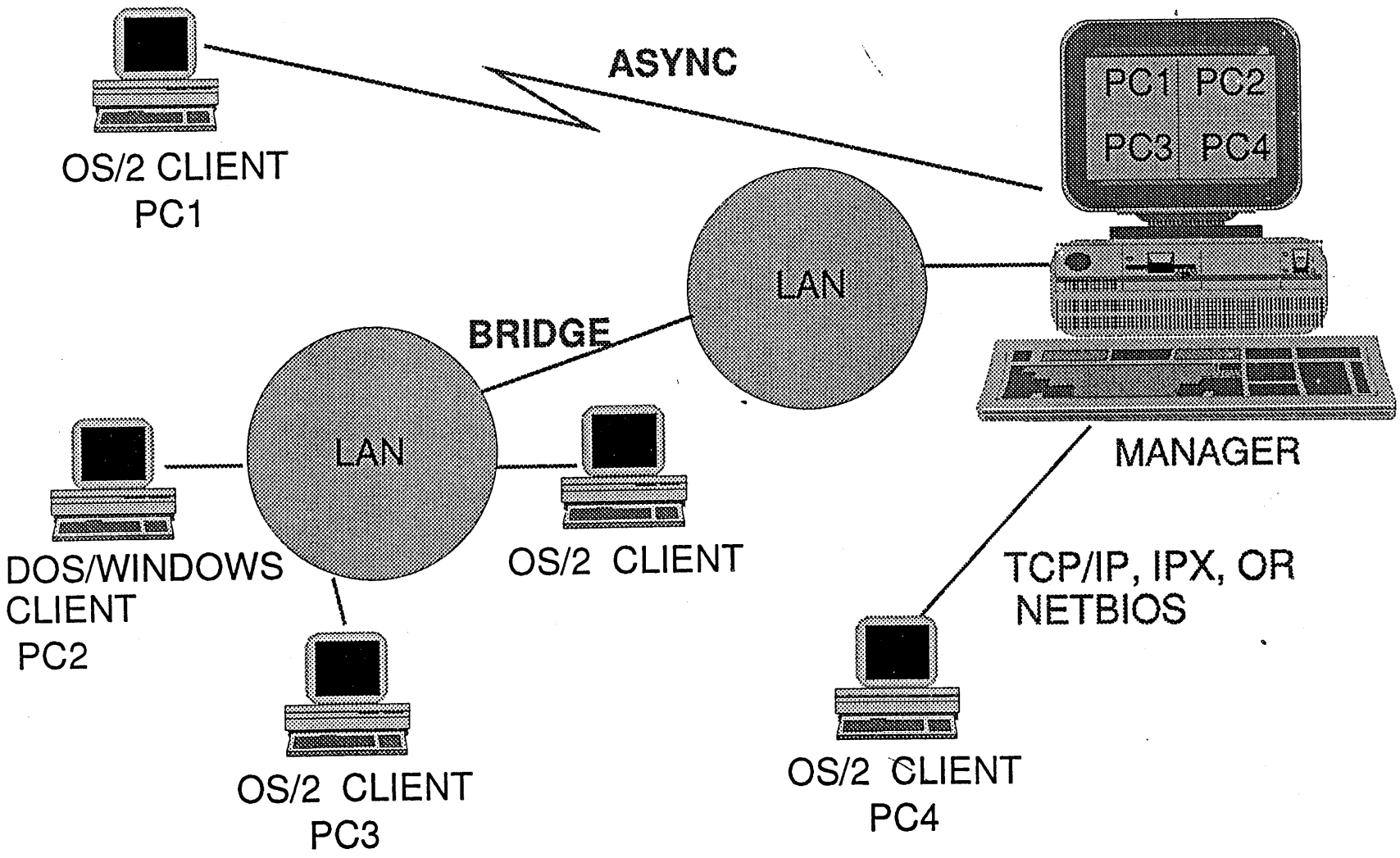
Manager

- OS/2 PWS that initiates session
- Select link record for a target through System Discovery
- Can switch active/monitor
- Can Personalise the PM refresh rate
- One-to-many support

Client

- Client types:
  - OS/2 direct
  - DOS/Windows
- Active/monitor modes
- Hot key control (Alt+T)
- Accesses controlled by Security Manager Service

One to Many

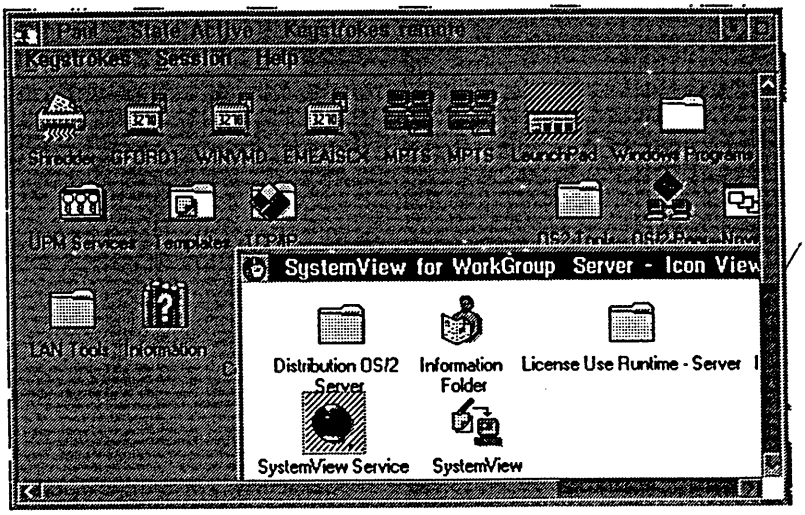


Place RWC Presentation here.

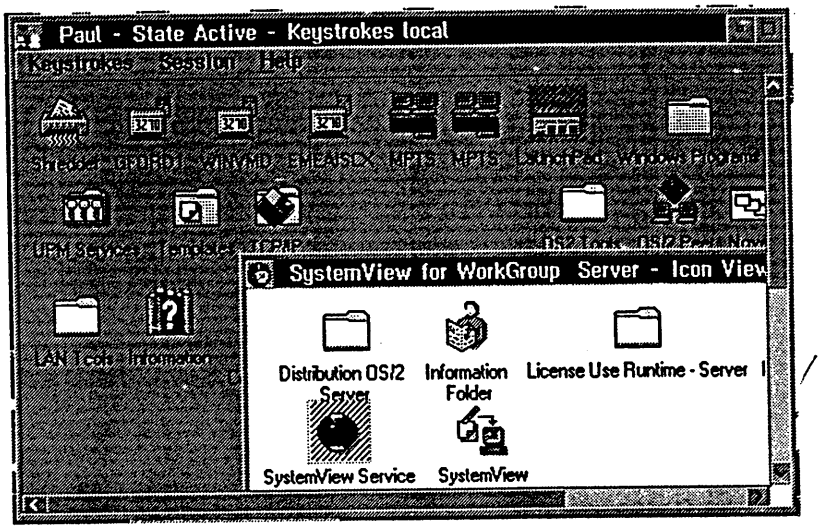
The following screen captures of ***Remote Workstation Control*** are provided as support material for the RWC presentation and demonstration.

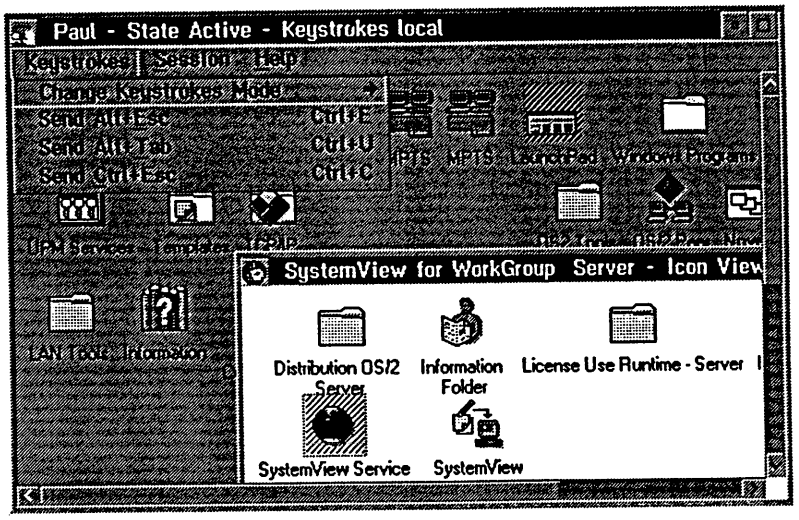
IBM Remote Workstation Control cont....

Remote Workstation Control

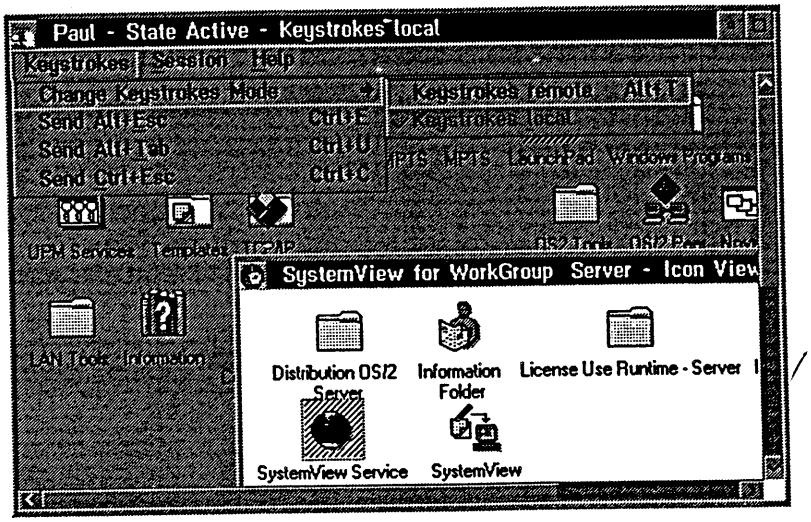


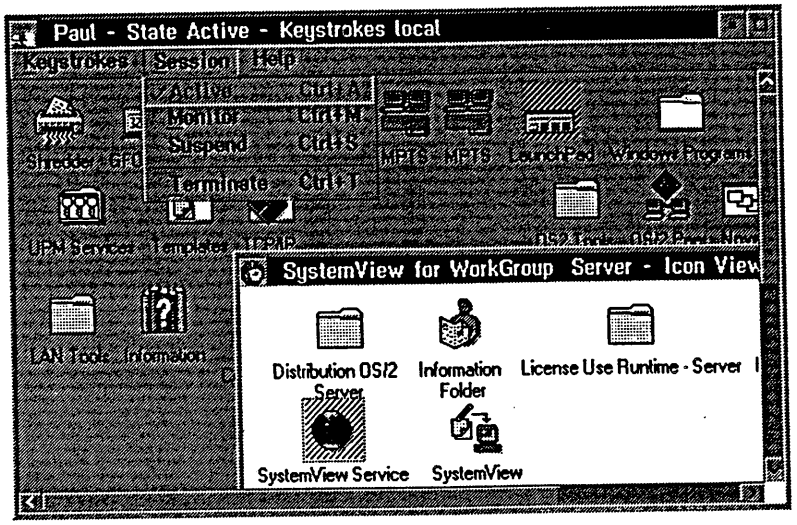
IBM Remote Workstation Control cont....



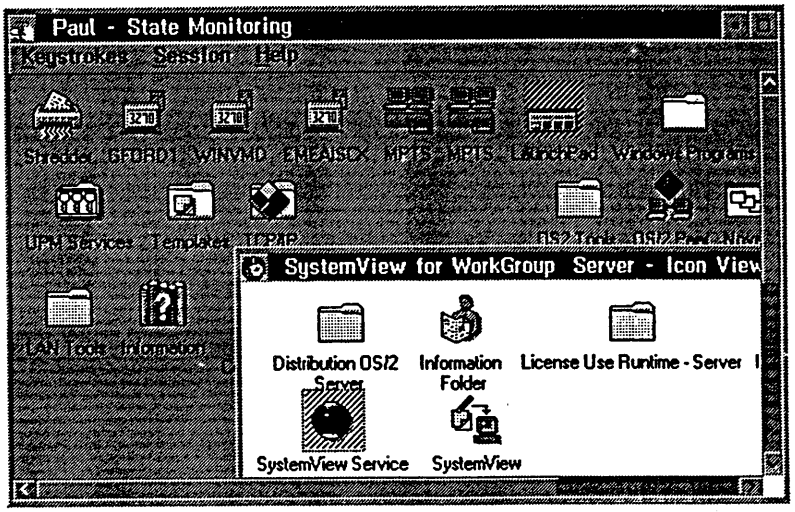


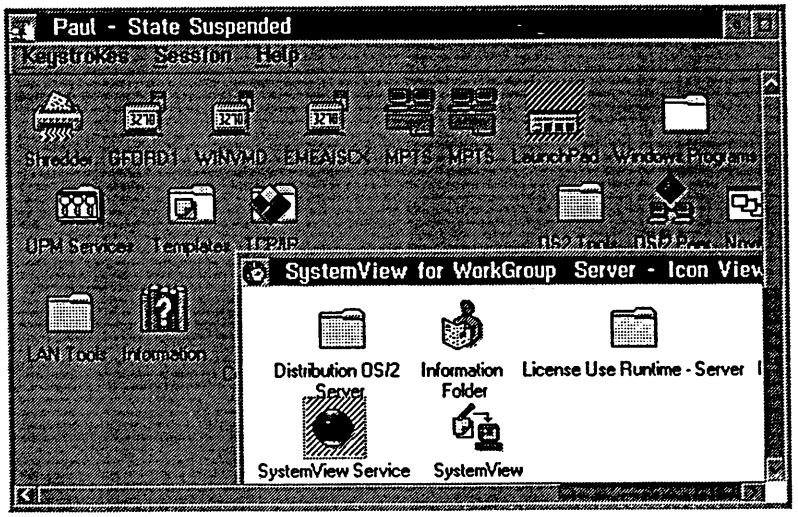
IBM Remote Workstation Control cont....





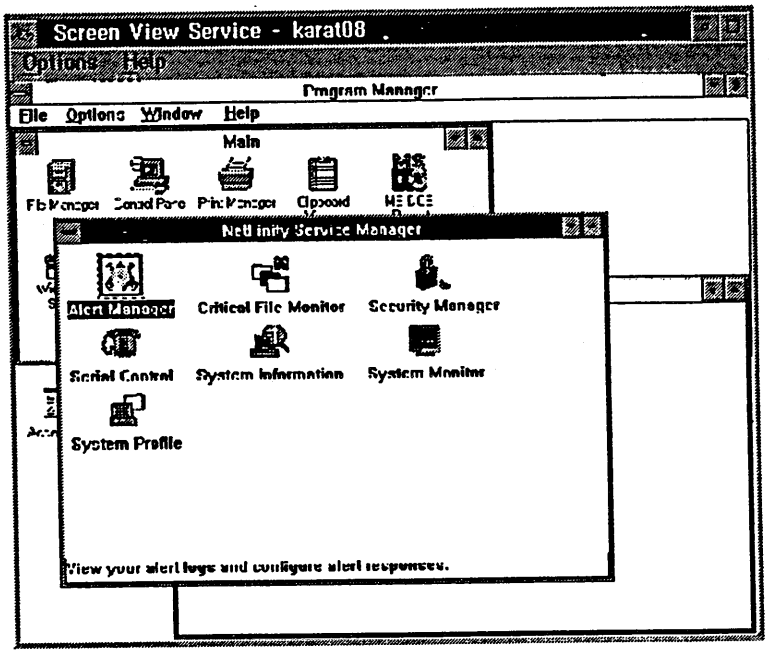
IBM Remote Workstation Control cont....





Screen View Service

The ***Screen View Service*** Screen View is used to capture, and if required store for future use, a screen view of a managed system.

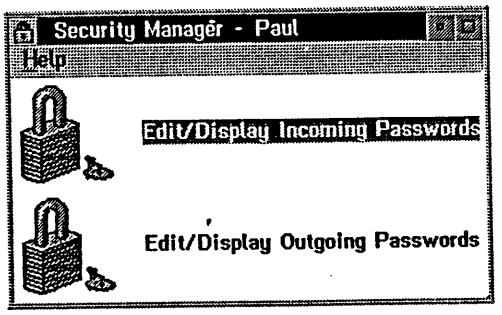


A ***saved screen shot*** can be viewed in the future by using the ***Load screen shot*** option

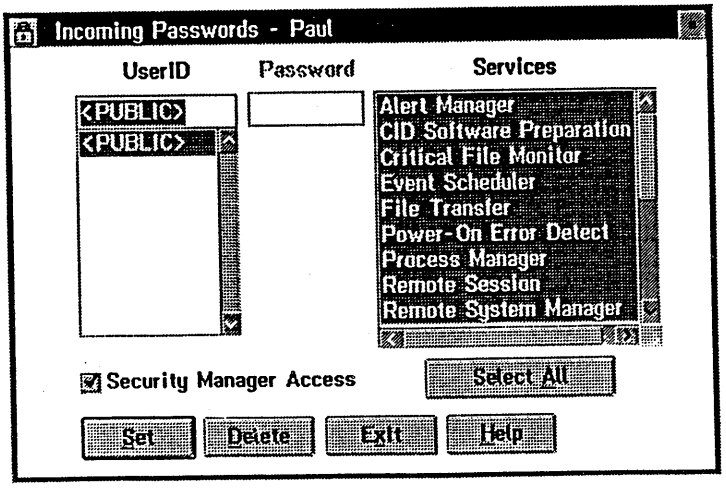
Security Manager

The ***Security Manager***  Security Manager is used to:

- Manage ***Incoming Passwords***
- Associate ***Services*** with Incoming Passwords
- Manage ***Outgoing Passwords***

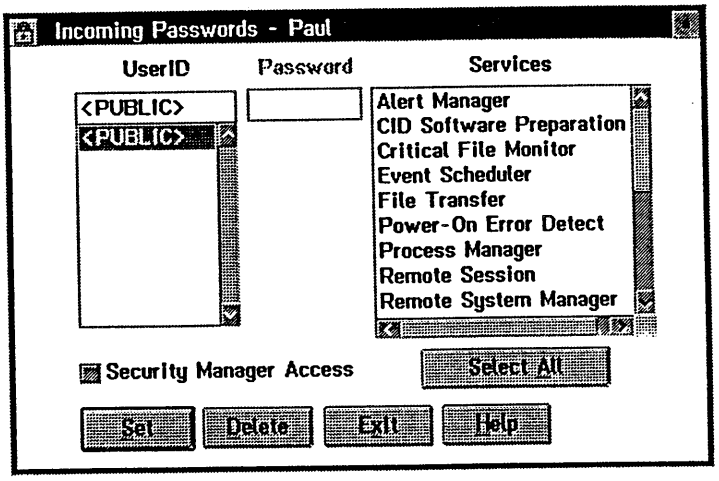


The display that follows shows the ***default*** security which is ***NONE***. You are advised to change this.

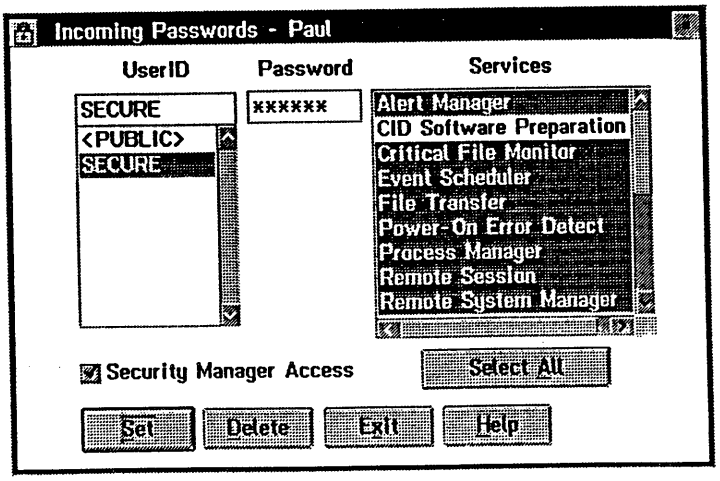


Incoming Passwords

Here we see that the default incoming userid ***PUBLIC*** has had all services removed. ***BUT*** do not forget to "uncheck" ***Security Manager Access*** otherwise userid PUBLIC can re-enable all of the services.

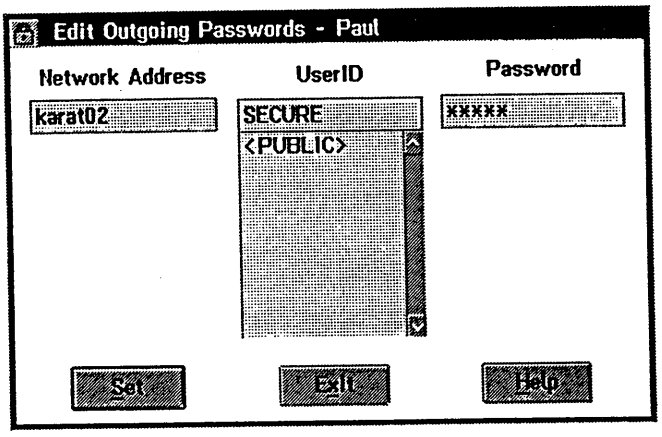


We can now create a ***SECURE*** UserID with a secure password and only the services we wish the managing system to have access to.

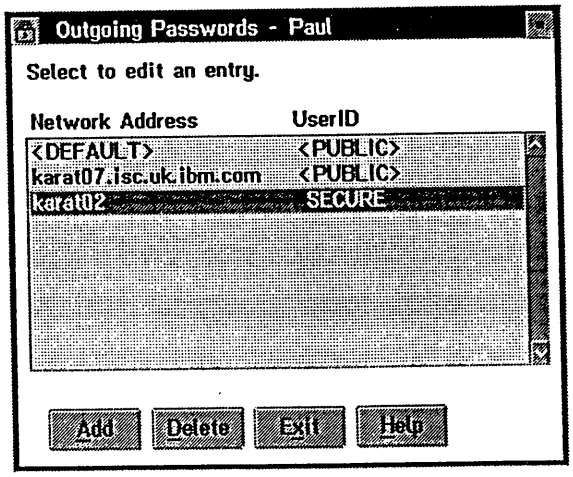


Outgoing Passwords

We are adding an ***Outgoing*** password for the userid ***SECURE*** when we connect to managed station ***karat02*** with a default password of ***"not_displayed"***



Here we see the "network addresses" and UserIDs which have been defined or added dynamically..



Password Rules

If we ***have not defined an Outgoing password*** for a particular network address the following occurs:

- if ***any SERVICE*** on userid PUBLIC is enabled on the network address we will be given access to those services without specifying a userid/password.

- If PUBLIC has ***all services disabled*** and another userid has been defined we will be asked to specify USERID/PASSWORD.

- We are then asked if we wish to save this Userid and Password as a default for this network address. If we specify ***YES*** then this password/userid is now the default for this network address.

Password Rules cont ...

Password Rules

If we ***have defined an Outgoing password*** for a particular network address the following occurs:

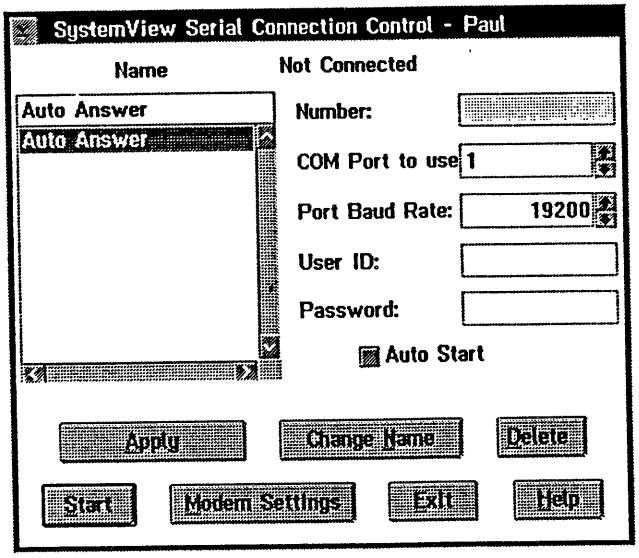
- If the Outgoing password ***matches*** an Incoming password on the managed station we are given access to the related services.

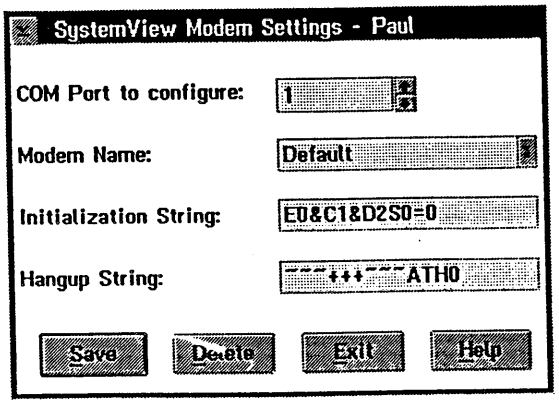
- If the Outgoing password ***does not match*** an Incoming password on the managed station we are given the opportunity to specify one and then save this as the default.

Serial Control

Serial Connection  Serial Control is used to manage remote workstations via a modem at speeds between 9600 baud and 57600 baud.

Note: Customisation shows a 4800 baud option but this will not work.





Serial Control cont....

A demonstration of Serial Control will be given at this point.

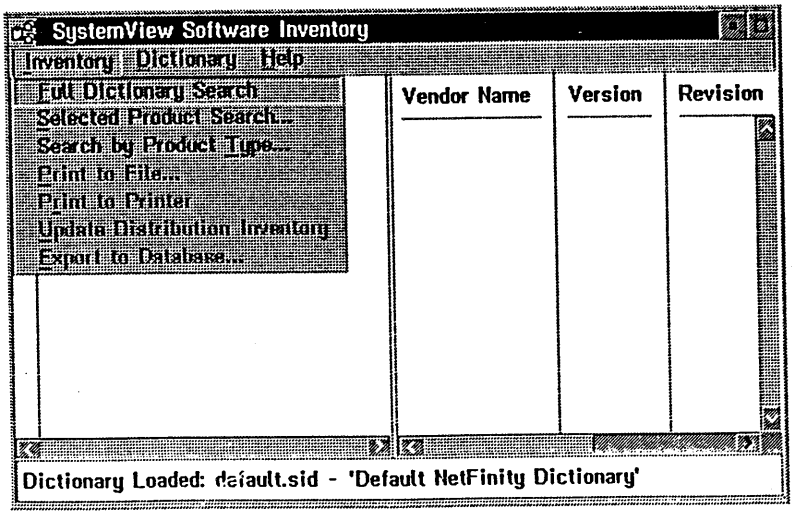
Software Inventory

Software Inventory  gathers and displays data about the software installed (or files found) on managed systems.

We can search for:

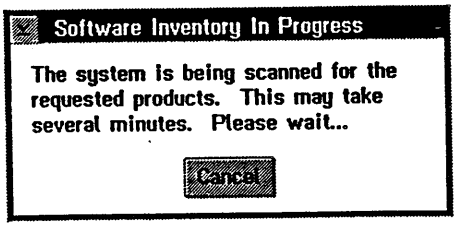
- ***Specific products***
- Specific ***levels of a product***
- ***Types of products*** (e.g. wordprocessors, games, etc)
- A specific ***"key file"***
- A file of a specific ***size*** or ***date***

This is done by searching against a ***dictionary*** which holds that characteristics of certain products.

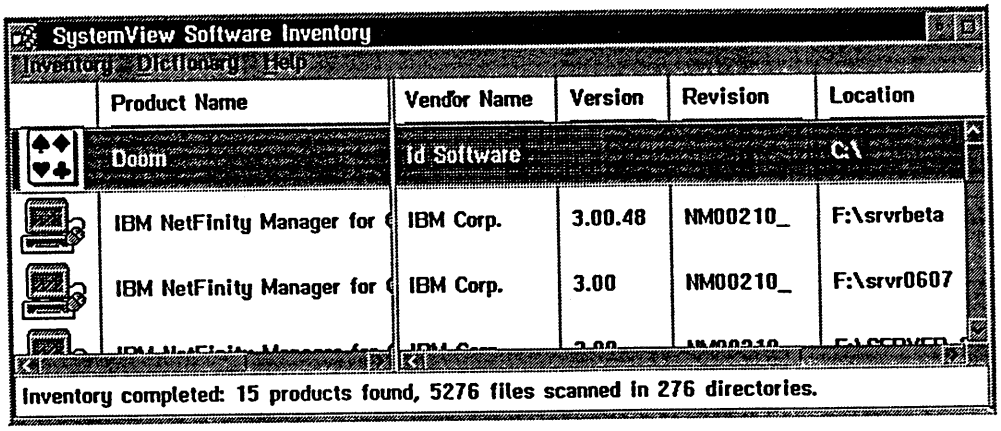


Software Inventory cont....

Here we are scanning against the ***default dictionary***



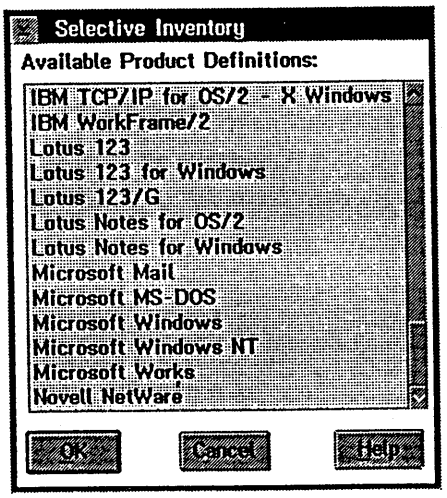
and here's an example of what we found



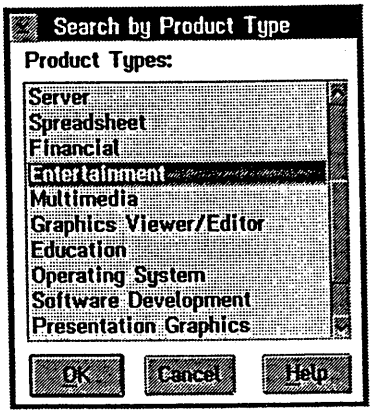
different types of product have different symbols to identify their product category. The symbols we see above are for ***Entertainment*** and ***System Management***.

Software Inventory cont....

When we choose to perform a ***Selected Product Search*** we are able to choose from a list as shown below:

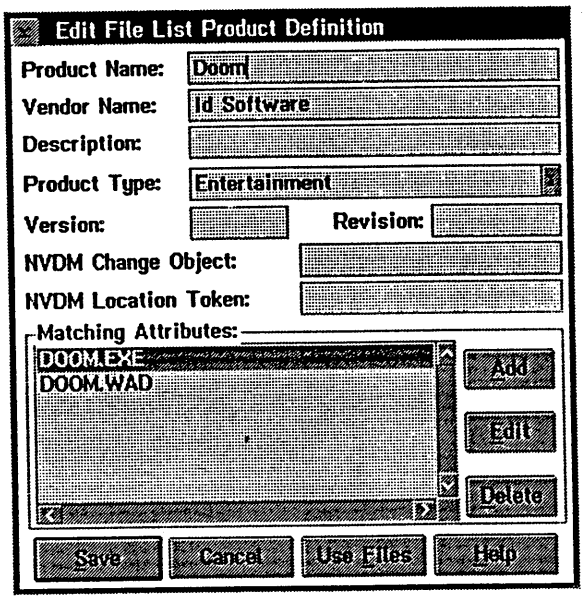


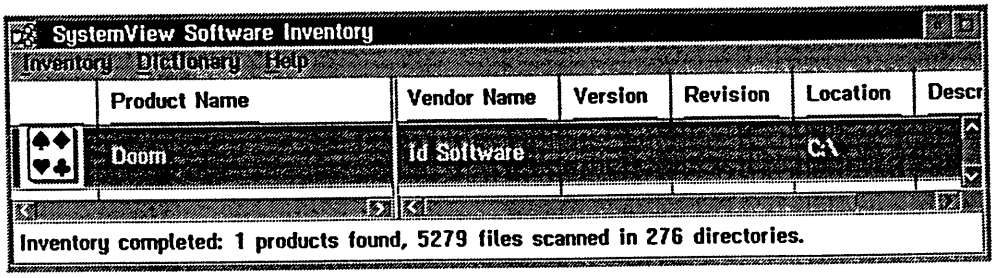
or we could search on ***Product Type***



Software Inventory cont....

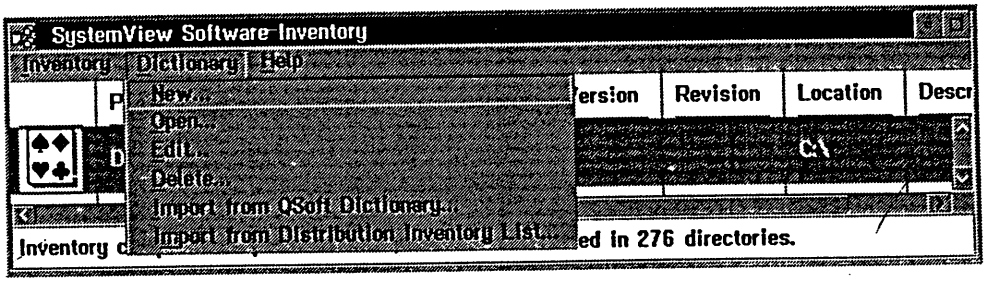
Here's the ***Dictionary Entry*** for a typical product:

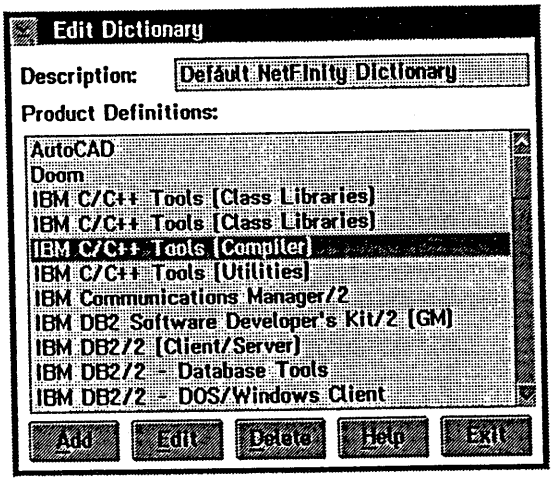


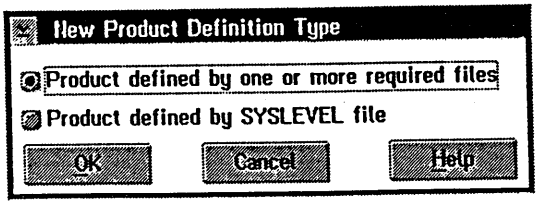


Software Inventory cont....

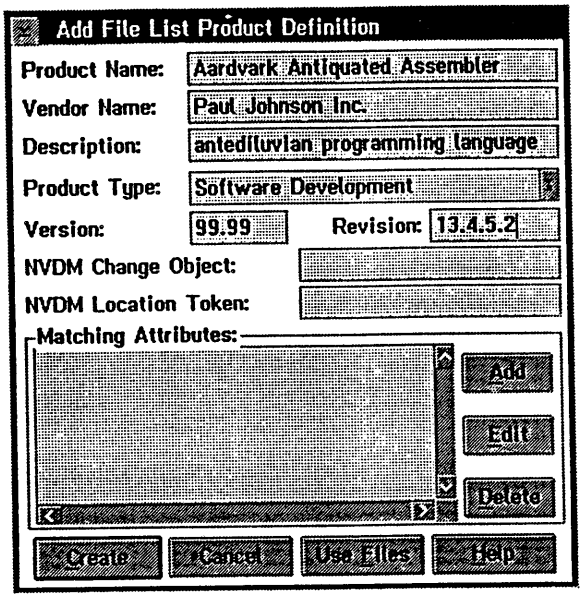
We can also use ***Edit*** to ***Add*** our own programs to the dictionary as follows on the next four pages:

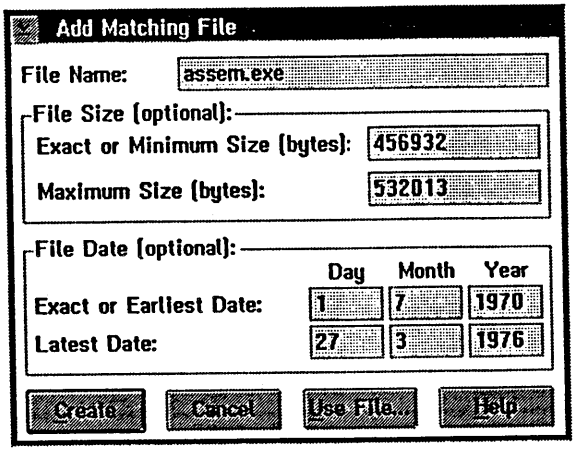




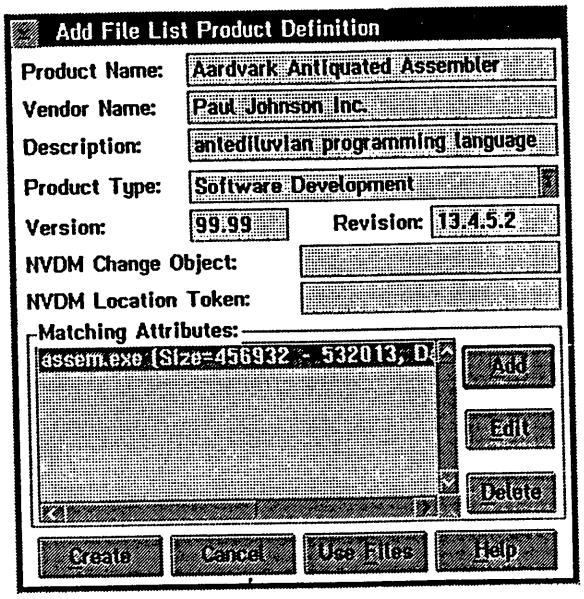


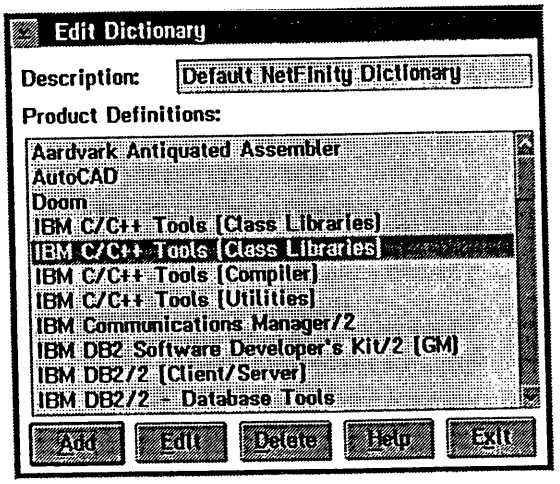
Software Inventory cont....



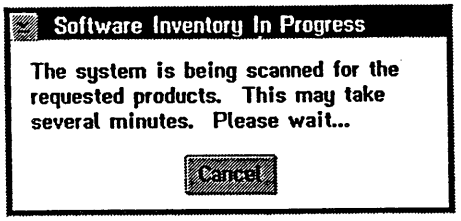


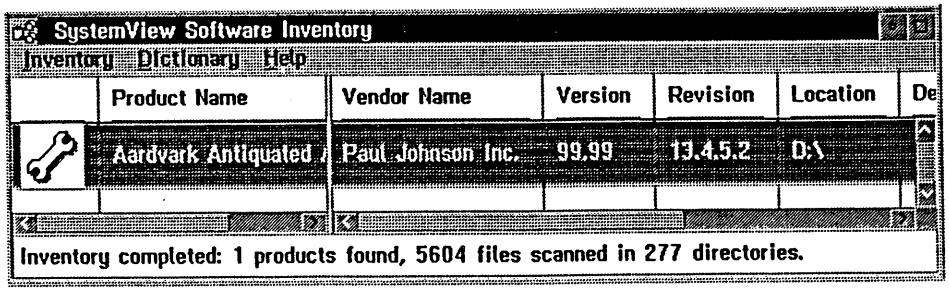
Software Inventory cont....





Software Inventory cont....



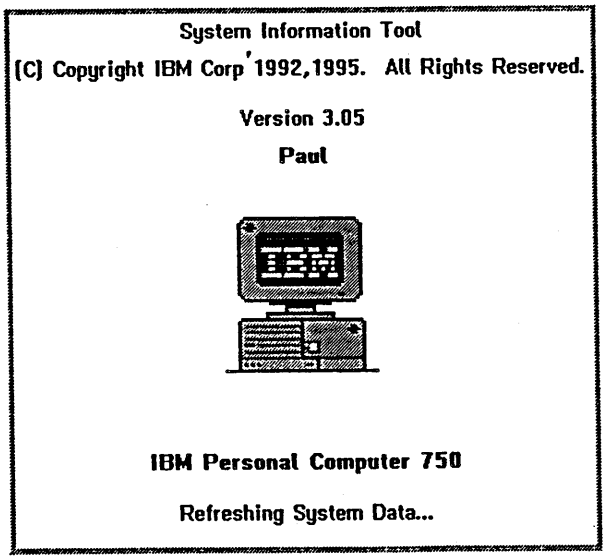


System Information Tool

The ***System Information Tool*** 

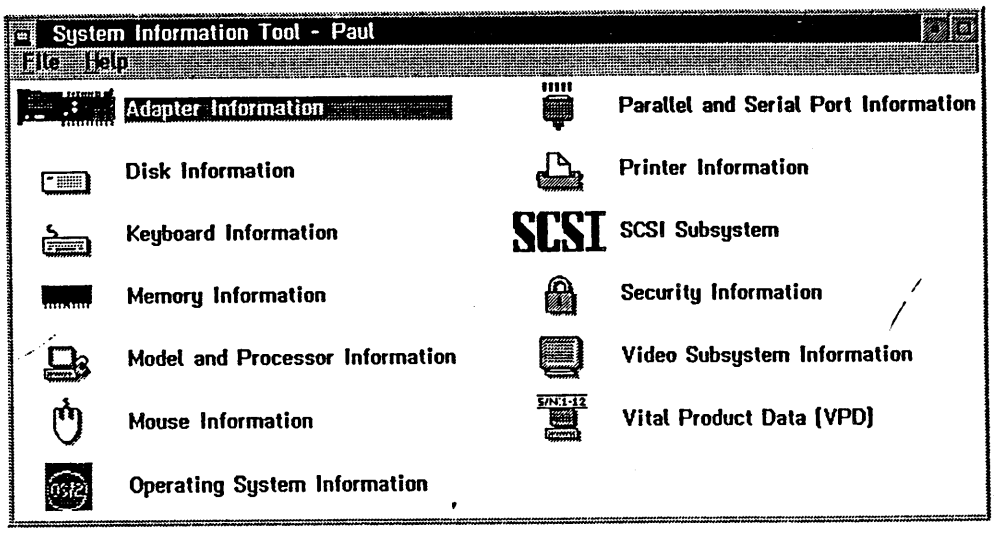
is used to provide, primarily, ***hardware information*** about the managed station; although there is some so ***software information*** available.

When the System Information tool starts it gathers information about the machine upon which it is running and displays the following panel:



System Information Tool cont....

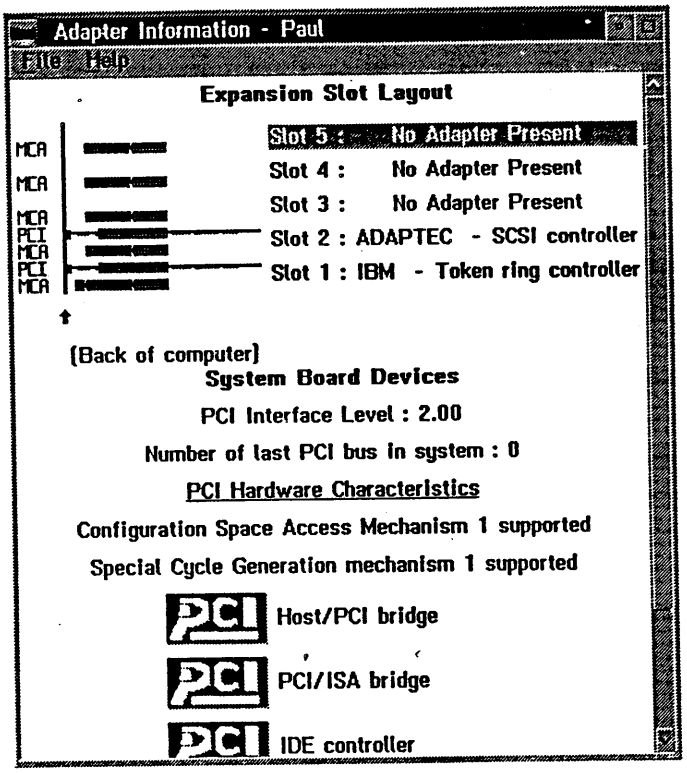
After initialisation has completed you are presented with a panel which contains a selection of ***subsystems*** you can query as shown below:

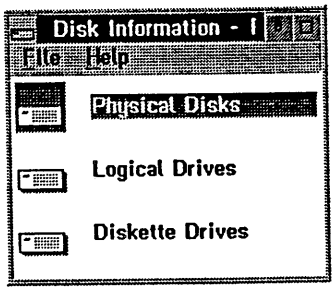


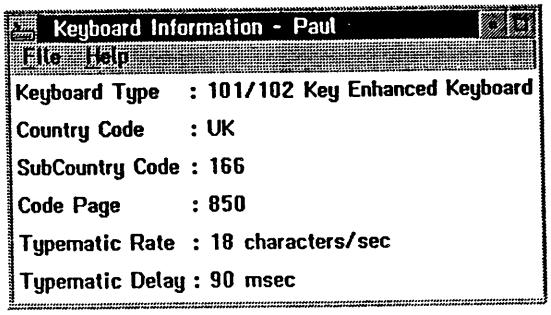
It is possible to perform the following actions against each of the subsystems from the ***File Pulldown*** of the subsystem.

- Print Subsystem Data to File
- Print Subsystem Data to Printer
- Generate History File
  - This will generate a file ***xxxxxxxx.hst*** which can be later processed from the commandline with ***SINFG30*** (see the Command Line Operations section of the online documentation for details).

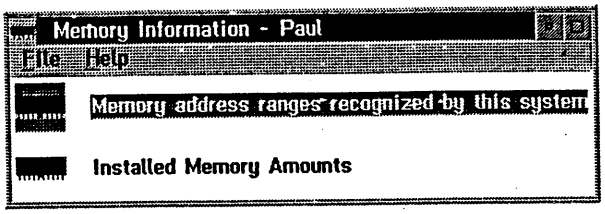
System Information Tool cont....

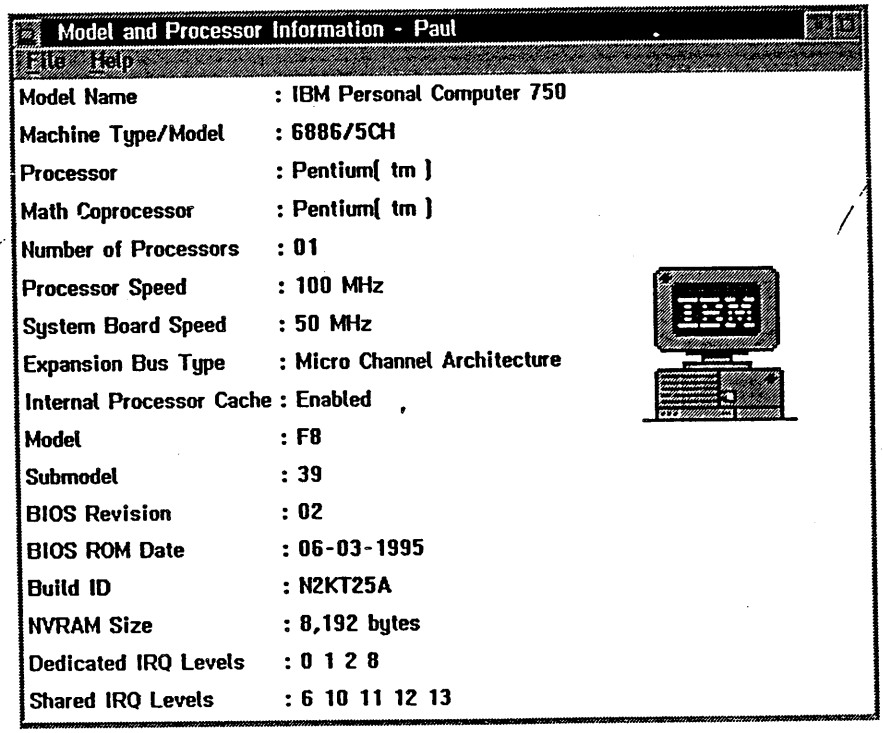


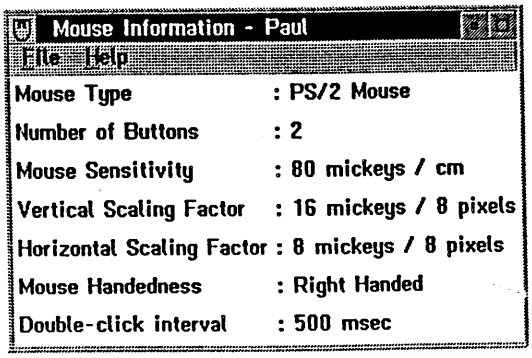




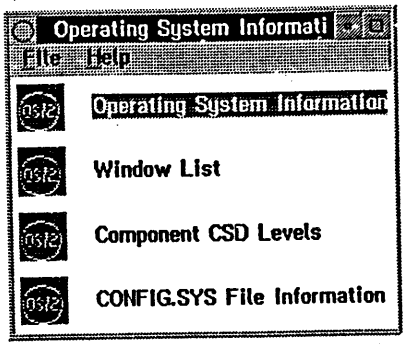
System Information Tool cont....

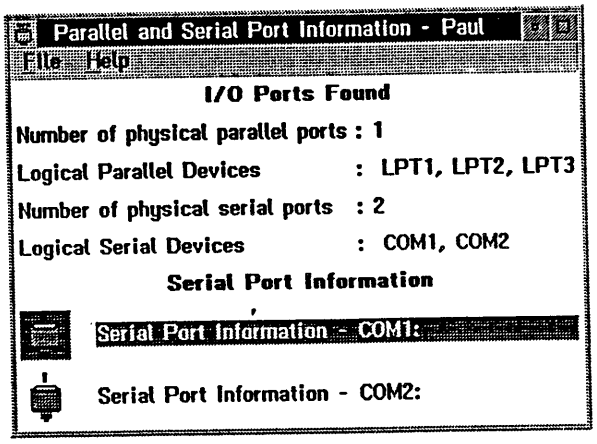


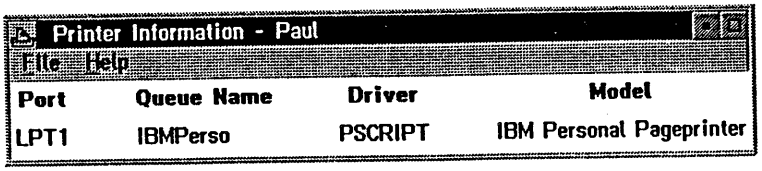


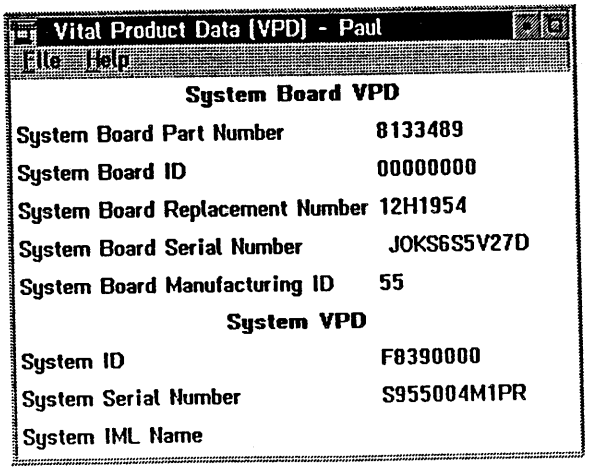


System Information Tool cont....

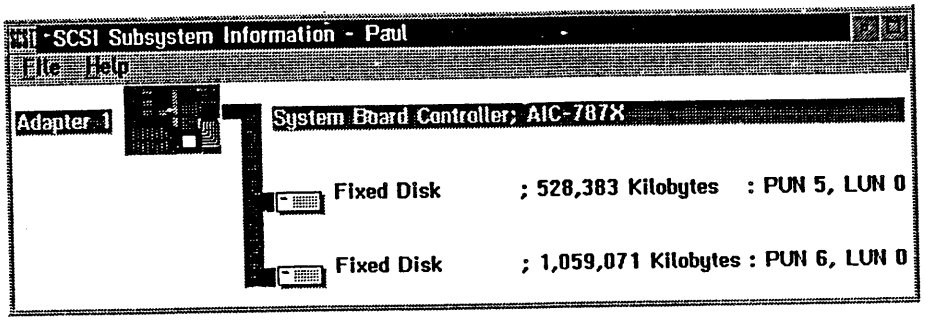


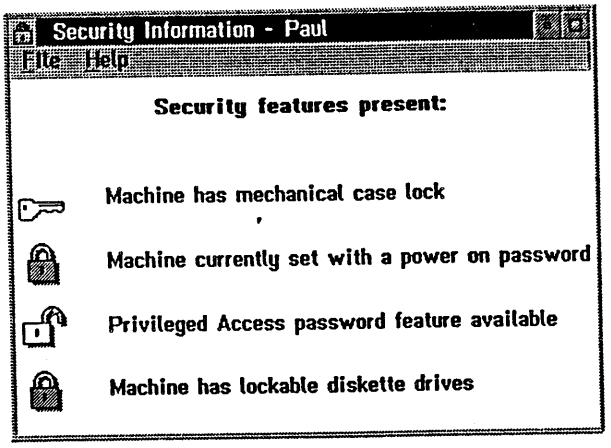


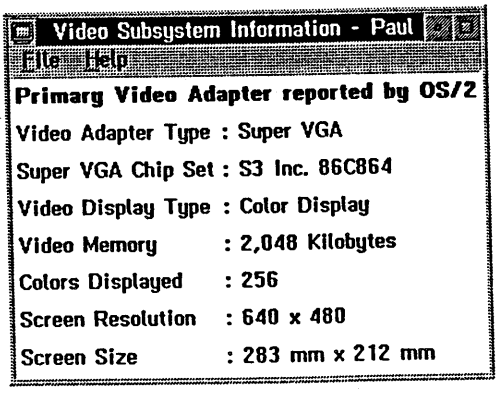




System Information Tool cont....







System Monitor

The ***System Monitor*** 

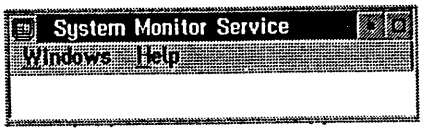
is used to:

- ***Gather*** system activity information on various system components.
- ***Display*** the system activity(s) as:
  - a line graph
  - text
  - realtime graphic
- ***Export*** the data to a database
- ***Generate Alerts*** when user defined thresholds are exceeded (or not met).

System Monitor cont....

When you select ***System Monitor*** you are presented with:

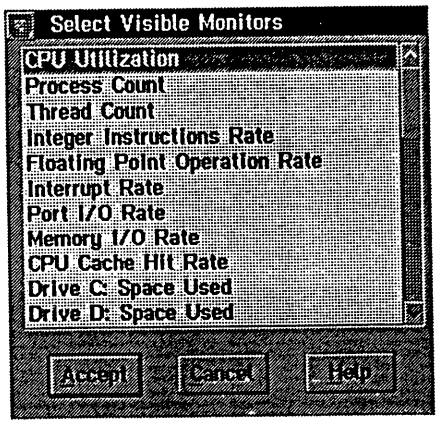
- All monitors currently set to be ***visible***
- The ***System Monitor Service Window*** as shown below:

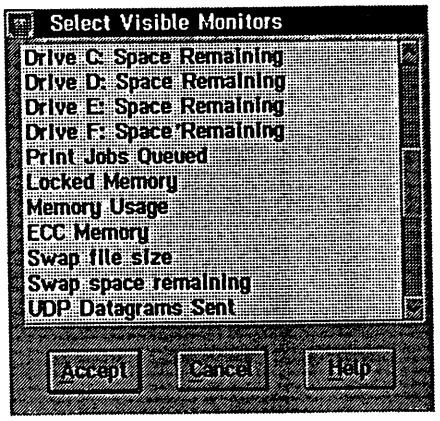


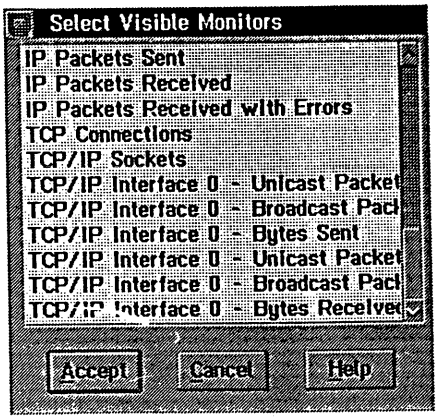
- By selecting the ***Windows pulldown*** and then the ***Show Monitors*** option you enable the monitors you wish to use.
- By selecting the ***Windows pulldown*** and then the ***Restack Monitors*** you will tidy all of the monitors on your desktop (for the specified managed system) into a single stack.
- By selecting the ***Windows pulldown*** and then the ***Export to database*** you are able to select:
  - Which monitors to export to the database
  - For what period of time the export should continue to export data (from 1 hour to 99 weeks).

System Monitor cont....

Below you can see all of available Monitor choices:

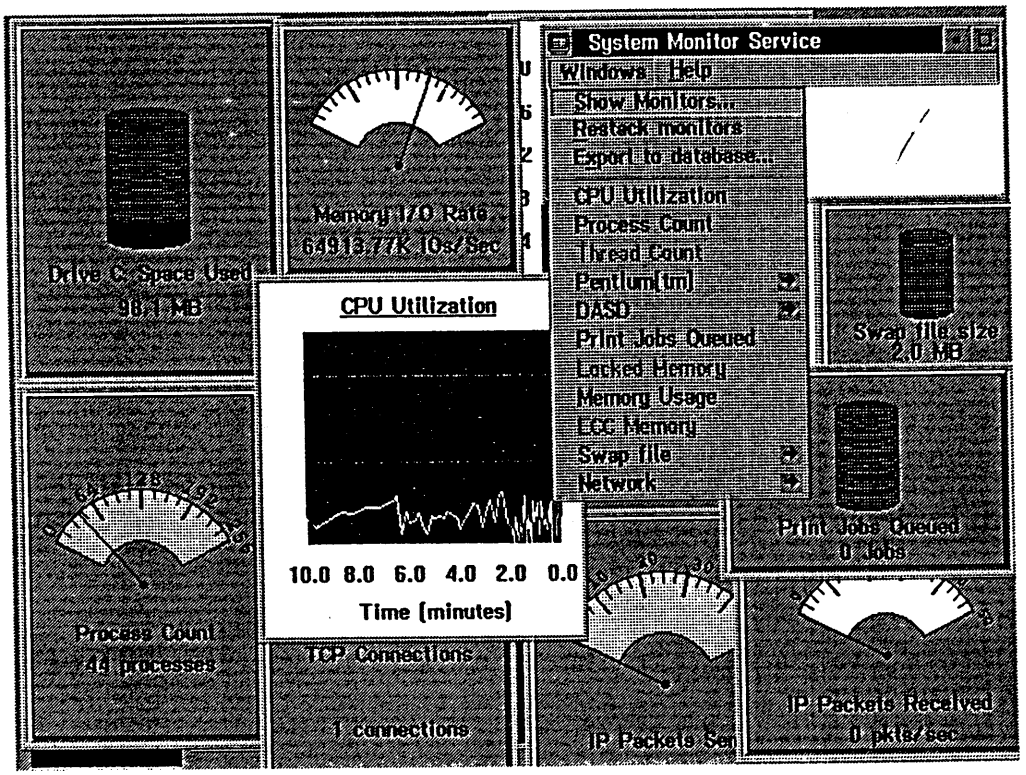




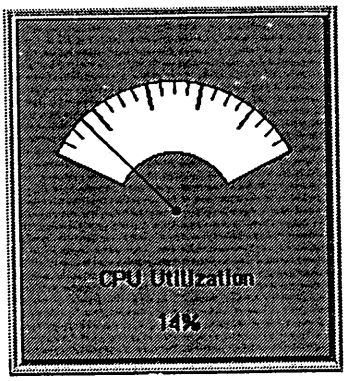


System Monitor cont....

Here we can see a selection of the various monitors, and monitor types, which are being used to monitor a managed station.



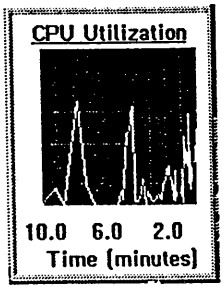
System Monitor cont....



If we start with a ***Real Time*** display of CPU Utilization we can click on it with the ***right mouse button*** and then choose on of the following options:

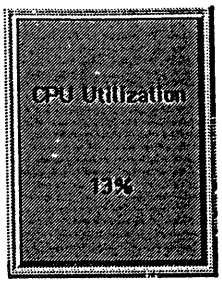
- View .... line graph
- View .... real time
- View .... text display

Line Graph will look like this :

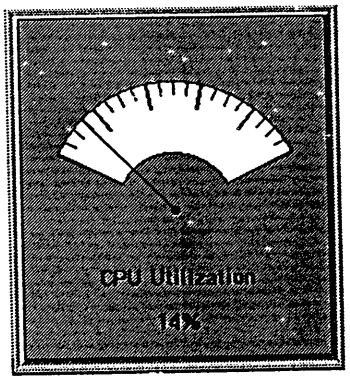


.hp3

Display will look like this :



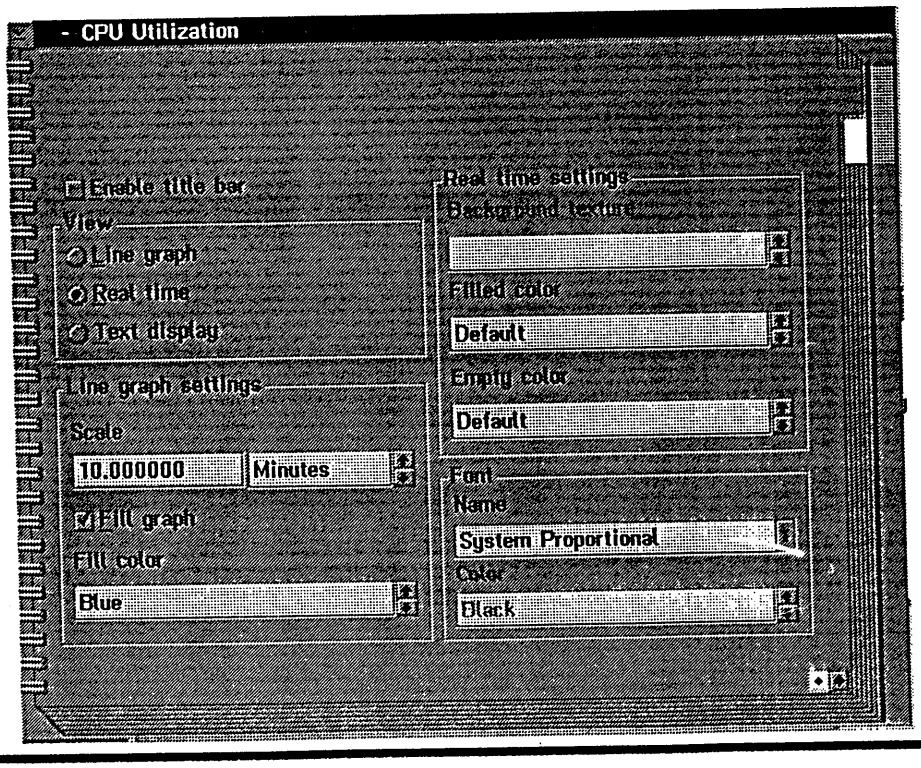
System Monitor cont....



If we start with a ***Real Time*** display of CPU Utilization we can click on it with the ***right mouse button*** and then choose on of the following options:

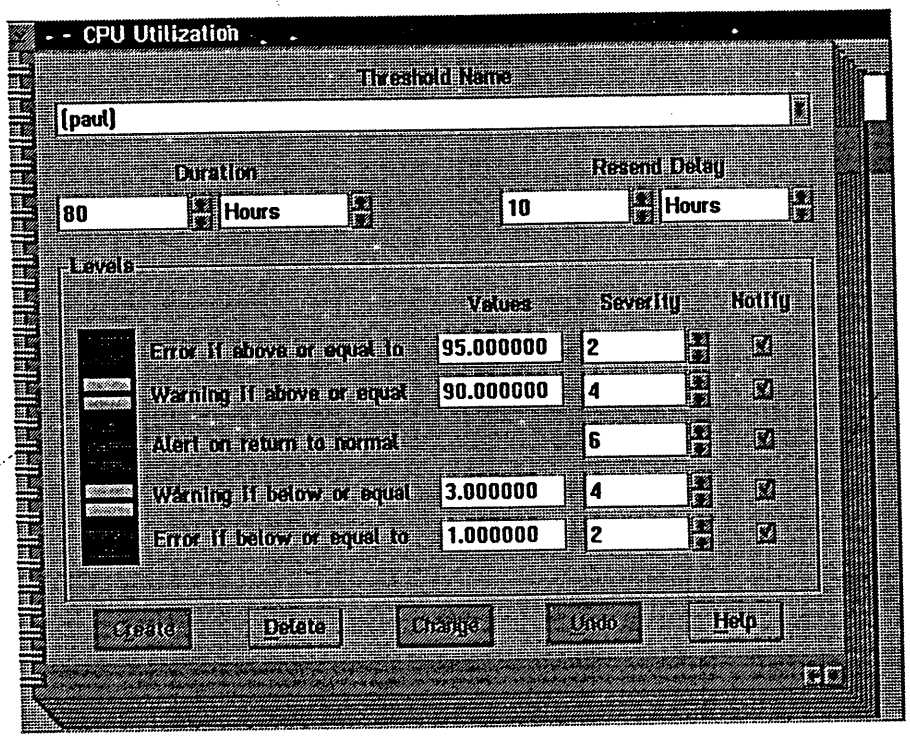
- Open .... settings
- Open .... thresholds

settings will look like this :



System Monitor cont....

thresholds will look like this :

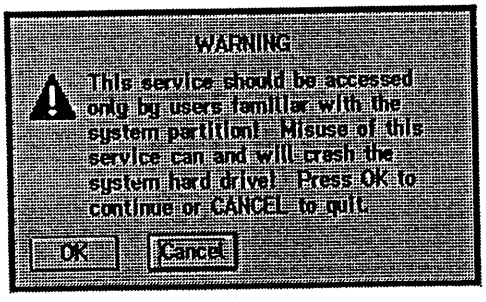


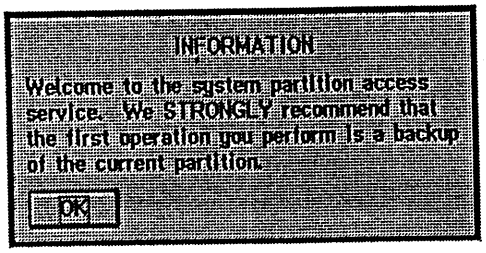
We can create a new ***Threshold*** by:

- giving it a ***name***
- specifying a ***duration: for the threshold to run***
- ***specifying a resend delay which is the delay between the sending of consecutive alerts for the same threshold.***
- ***specifying values for our thresholds and***
- ***the associated alert level***

System Partition Access

System Partition Access  is used to manage the system partition of a managed station. Because it is an extremely ***Powerful Tool*** you will always receive the following two warnings before you get to the application:

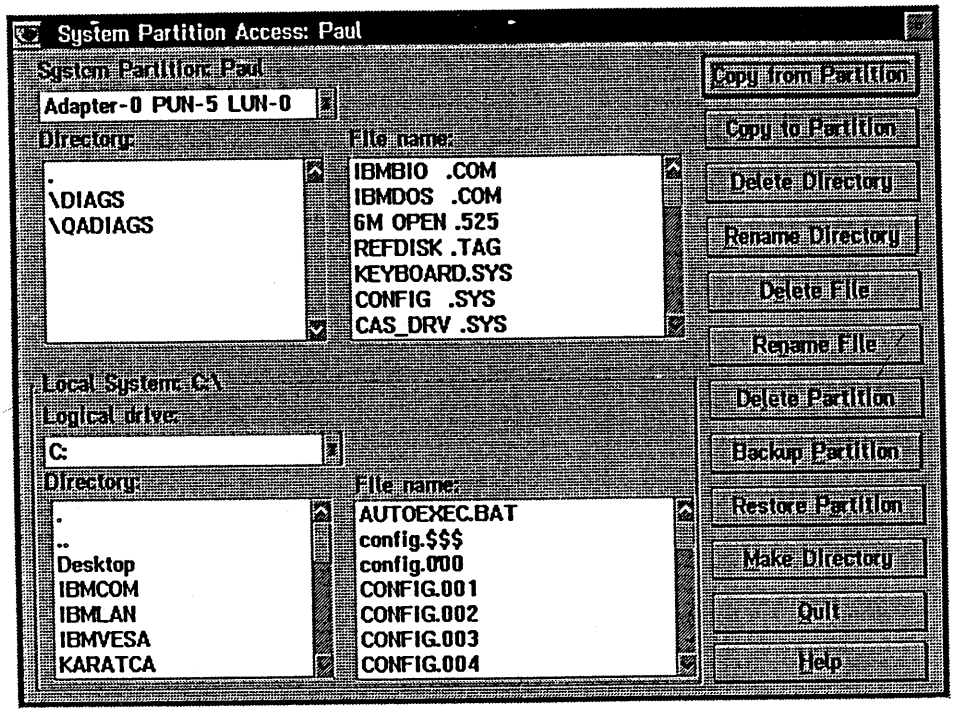




The following functions are available:

- File manipulation (Copy, Delete, Rename)
  - IML image updating
  - Adapter description program (ADP) updating
  - Adapter description file (ADF) updating
  - Diagnostic (DGS) updating
- Backup Partition
- Restore Partition
- Delete Partition
- Make New Partition Directory

System Partition Access cont....



System Profile Service

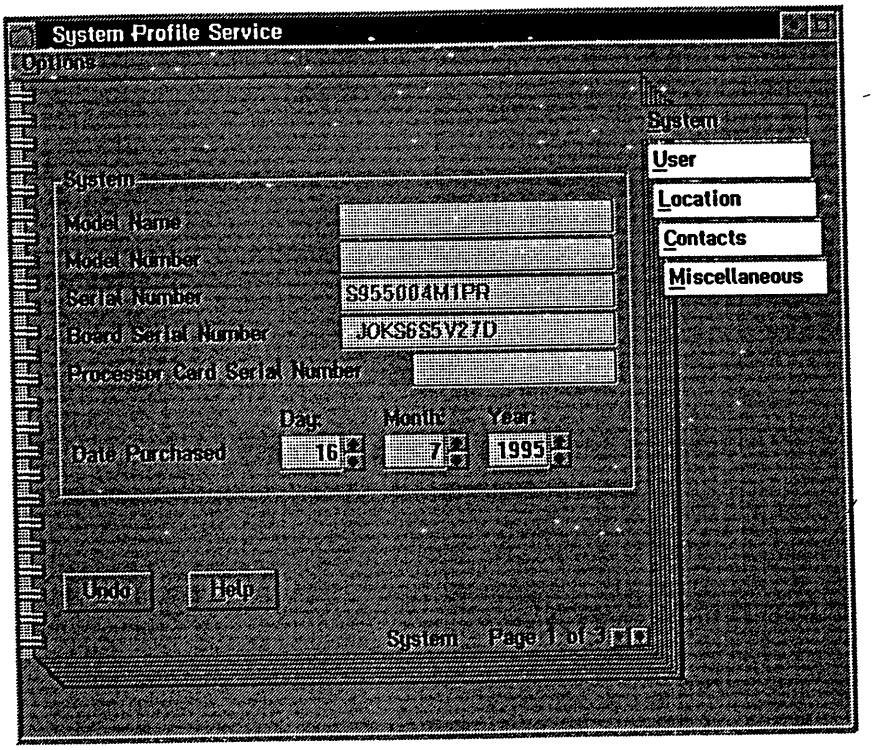
System Profile Service 

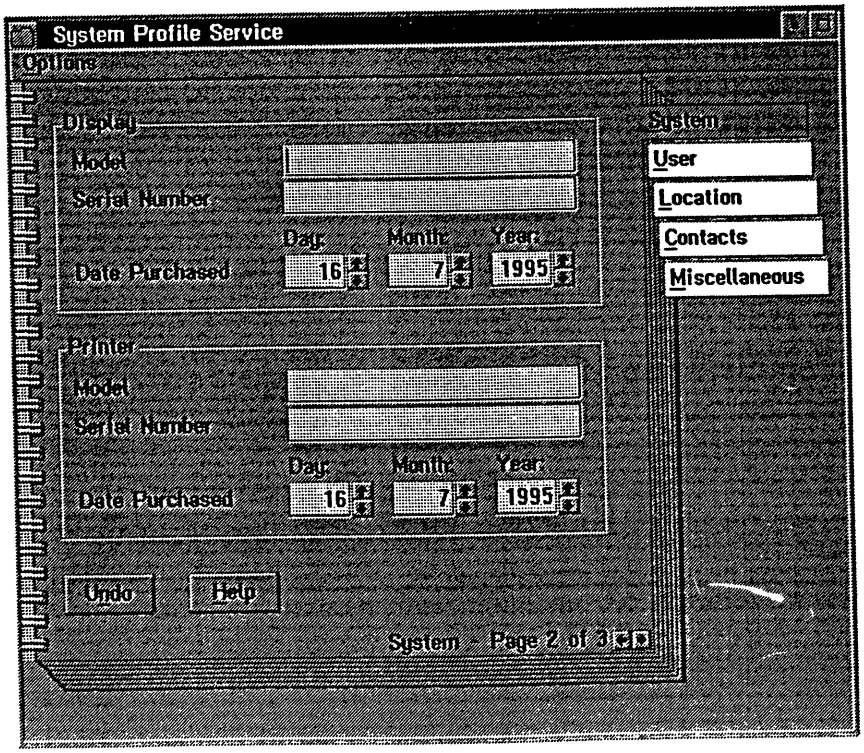
is used to store the following information about a managed station:

- ***System Information*** about the workstation
- ***User Information*** about the end user
- ***Location Information*** about the physical location of the workstation
- ***Contact Information*** (phone, fax, pager numbers etc)
- ***Miscellaneous Information*** for anything you wish

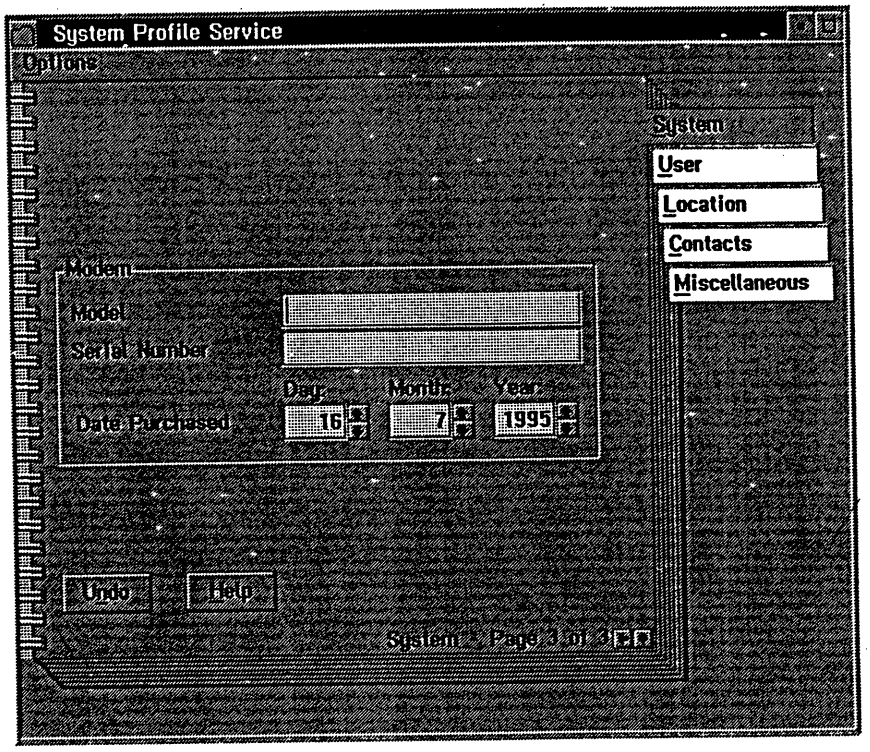
The data in the profile can be "printed" to an ASCII file as input into other programs.

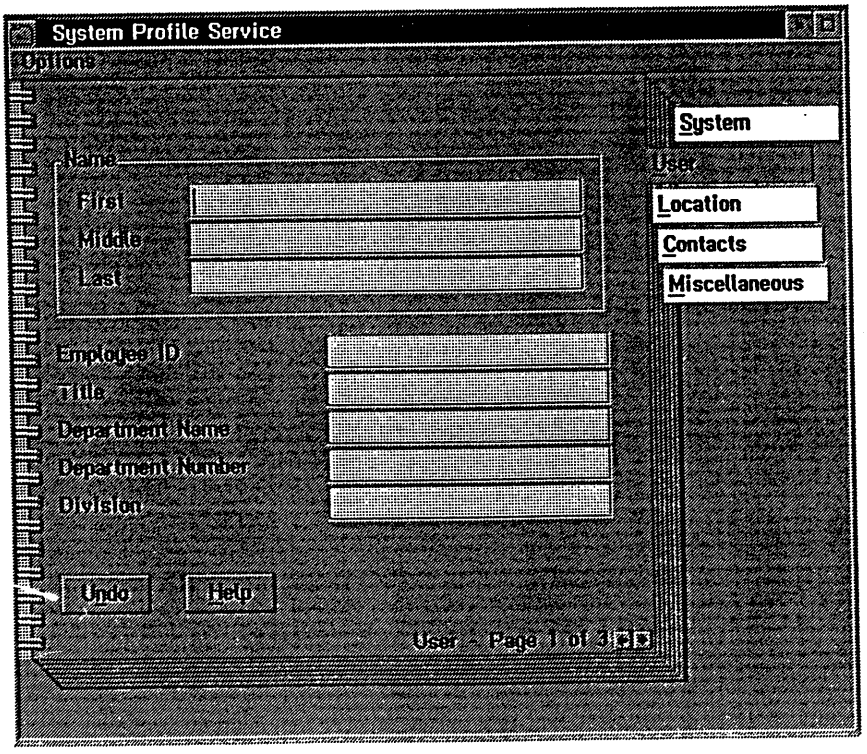
System Profile Service cont....



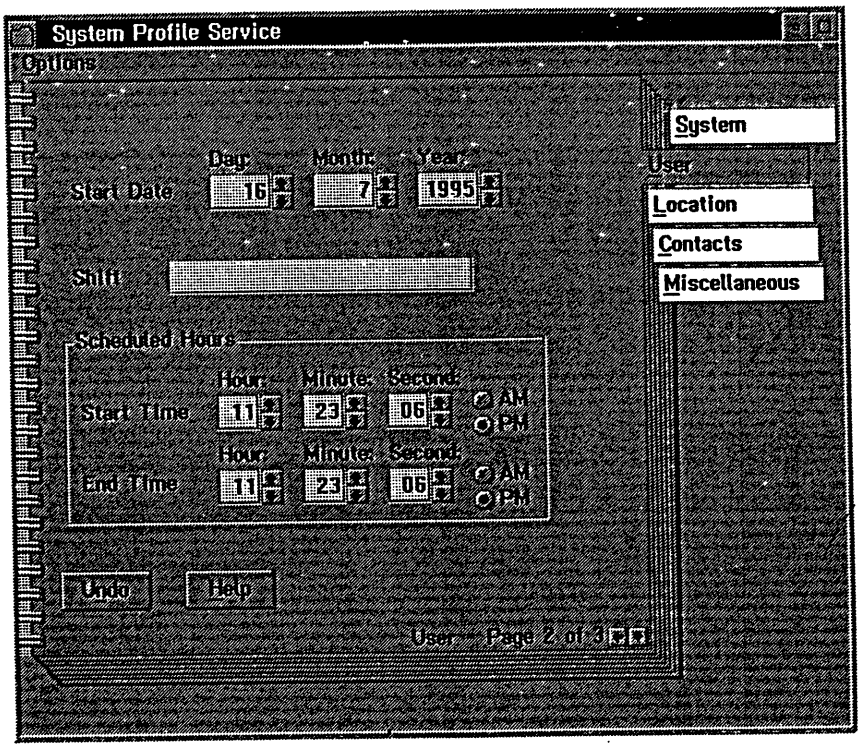


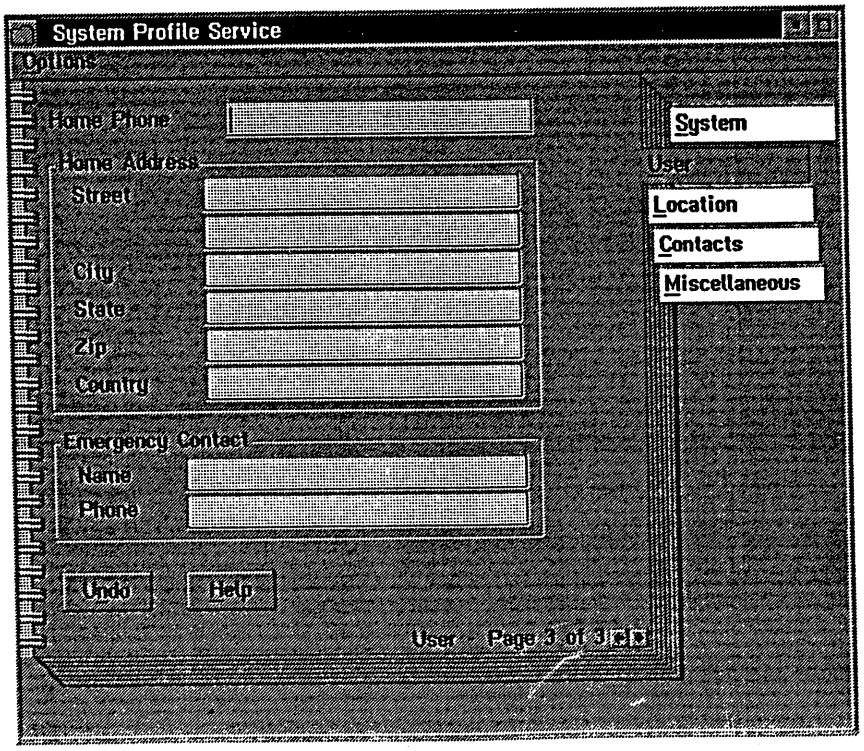
System Profile Service cont....



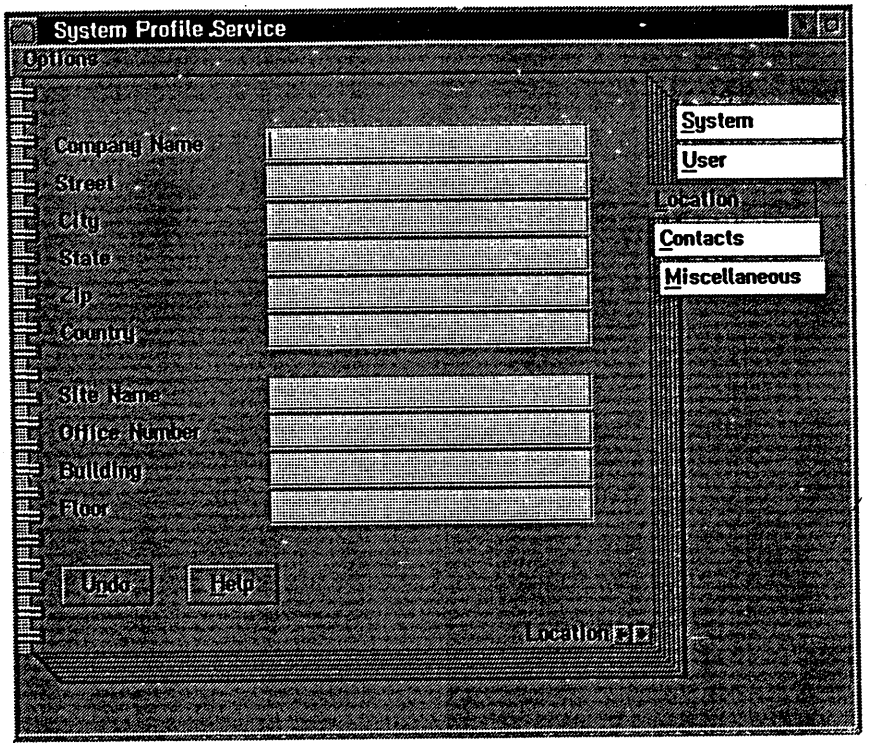


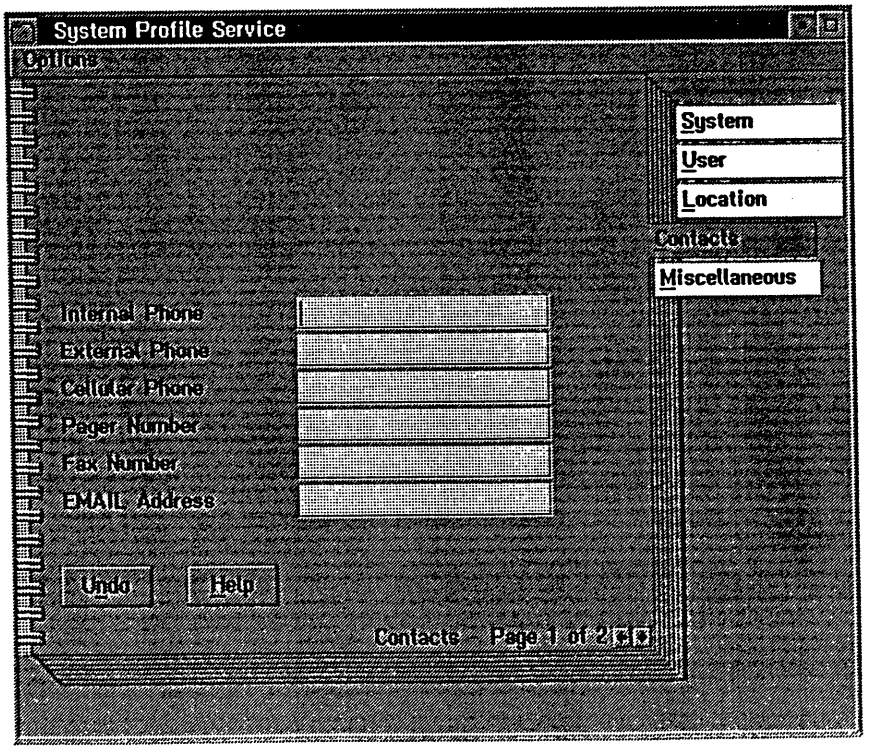
System Profile Service cont....



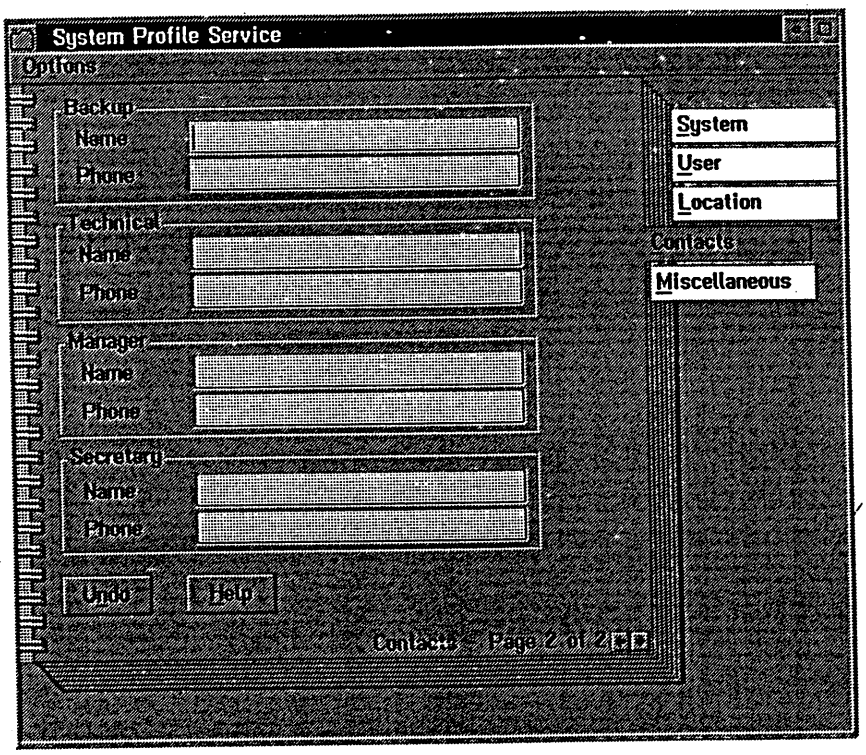


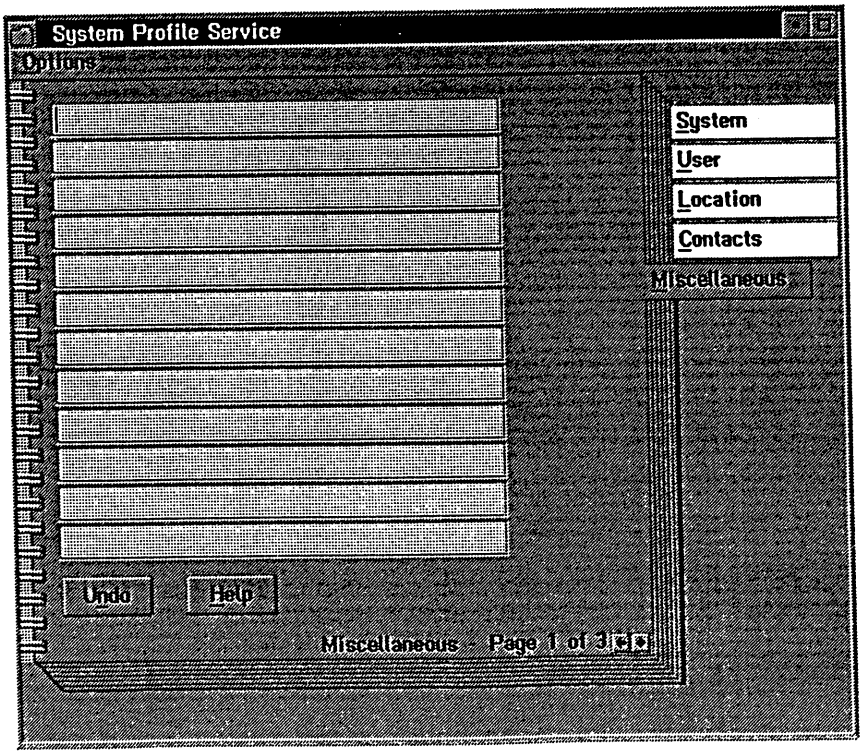
System Profile Service cont....





System Profile Service cont....





SystemView for Workgroup
Documentation Update

July 11, 1995

CONTENTS

CONTENTS

Introduction

This file (README.TXT) provides SystemView information and limitations.

NOTE: Certain characters in this file may not print correctly or at all, depending on your printer configuration, for example: the backslash (\), the square brackets ([,]), the pound sterling sign (£), and the "at" symbol (@). If these characters do not print, you can view this README.TXT file on your screen using an OS/2 editor in order to see them.

Setting the Environment to Use DiskCamera

Before selecting Disk Picture to use DiskCamera on a server, copy SYSLEVEL.SAC into SYSLEVEL.FND in the BIN directory.

Before selecting Disk Picture to use DiskCamera on a client, copy SYSLEVEL.SVC into SYSLEVEL.FND in the BIN directory.

HPFS Limitation

If you are running OS/2 Warp for Windows and you have a hard disk drive formatted in HPFS, make sure you have an OS/2 Warp for Windows version with kernel level 8.213; otherwise, the problem described in APAR PJ16973 will occur.

Working with Event Scheduler

You cannot define a software distribution event if the Software Distribution icon is open.

Authorize and Unauthorize

In the Event Scheduler graphical user interface, do not use AUTHORIZE... and UNAUTHORIZE....

Workstation Name

Do not define two workstations with names that have the same initials.

When you enter the -w parameter in a software distribution command, type the complete name. You cannot use a wildcard character.

Configuring TCP/IP

If you do not run Warp Connect, before you install SystemView, enter the following line at the end of the services file in the etc directory:

```
netviewdm1      729/tcp      #IBM SystemView for WorkGroup
```

Updating SystemView

To update SystemView, do not use the update function. Uninstall the product and reinstall.

DMI

The DMI instrumentation and browser service for OS/2 and Windows are very similar implementations. Differences in performance between these two platforms can result because of differences in the DMI Service Layers.

Predictive Failure Analysis (PFA) Service on RAID Systems

PFA events are presented using an attribute monitor in MONRAID.DLL (or MONRAID.NLM). The fact that the Predictive Failure Analysis service is not shown does not mean that PFA events are not being monitored.

Event Scheduler

If scheduled services fail for no apparent reason, increase the network timeout slightly (using the Network Driver Configuration). The timeout value should be changed at the system where the Scheduler log entries appear.

If a scheduled database export event fails for no apparent reason, be sure to check that the manager system that is exporting the data is correctly configured to enable access to the database server. For example, ensure that the manager has the correct server name and password to access the database system.

Serial Connection Control - Modems

The modem initialization strings may not be correct for every modem in the modem list. The initialization string must configure the modem for:

- Command echoing OFF
- Online character echoing OFF
- Result codes ENABLED
- Verbal result codes ENABLED
- All codes and connect messages with BUSY and DT detection
- Protocol identifier added - LAPM/MNP/NONE/V42bis/MNP5
- Normal CD operations
- DTR ON-OFF hangup, disable AA, and return to command mode
- CTS hardware flow control
- RTS control of receive data to computer
- Queued and nondestructive break, no escape state
- Auto-answer off

The documentation provided with your modem should provide detailed commands for each of these conditions. The HELP information for the Serial Control service provides additional details under Initialization String Guidelines.

SystemView Windows Client only: Be sure to close any serial connections that are currently active before closing the Program Manager. If you do not do this, the modem will not disconnect from the remote system.

System Information Tool - Security Passwords

On certain models of PC 300 and PC Server 320, the System Information tool will not detect that Power-On Passwords and Privilege-Access Passwords have been set.

Alert Manager - _Dial out to pager_ and _Dial out to Alphanumeric pager_alert Actions

The dial out alert actions are designed to function properly only with 100% Hayes-compatible modems. These alert actions may not work correctly on systems that do not have 100% Hayes-compatible modems.

RAID Manager

The Raid Manager is not keyboard-enabled. You must have a functional mouse to use the RAID Manager service.

Only single-enclosure RAID systems are supported.

Devices removed from the system may not be noticed (as empty) by the RAID Manager service.

European RAID systems (models 3516 and 9577) are not supported.

NFDASD.FLT and Adaptec SCSI Subsystems -

Workload Monitors, Error Rate Monitors, and Predictive Failure Analysis are not supported on Adaptec SCSI subsystems that use AIC7870.ADD adapter device driver.

SystemView Support for DMTF PC Systems Standard Groups

When available, SystemView will supply the following information to the DMI Service Layer. An "X" beneath the "OS2" or "WIN" column signifies that the information is provided by the SystemView DMI Browser service for OS/2 or Windows, respectively.

OS2	WIN	Group/Attribute
		COMPONENT ID
_X_	_X_	Manufacturer - "IBM Corp"
_X_	_X_	Product - system name
_X_	_X_	Version - "version 1.0"
_X_	_X_	Serial Number - Serial number or blank
_X_	_X_	Installation - release date. leave "" in the MIF and the service layer will fill in
_X_	_X_	Verify - "exists,functionality good"
		GENERAL INFORMATION
_X_	_X_	System Name
_X_	_X_	System Location
_X_	_X_	System Primary User Name
_X_	_X_	System Primary User Phone
_X_	_X_	System Boot Up Time
_X_	_X_	System Date/Time
		OPERATING SYSTEM
_X_	_X_	Operating System Index
_X_	_X_	Name
_X_	_X_	Version
_X_	_X_	Primary O/S

_X_ _X_ Boot Device Storage Type
- boot information actually filled in when disk drives are refreshed

_X_ _X_ Boot Device Index
- first device of first ADD for OS/2
- drive 80H for windows

_X_ _X_ Boot Partition Index
- drive A=1,B=2,...

SYSTEM BIOS

_X_ _X_ BIOS Index
- only one main BIOS for now

_X_ _X_ BIOS Manufacturer

_X_ _X_ BIOS Version
- BIOS revision level

_X_ _X_ BIOS Release Date
- BIOS ROM Date

_X_ _X_ Primary BIOS
- TRUE

PROCESSOR

_X_ _X_ Processor Index

_X_ _X_ Type Of Processor

_X_ _X_ Processor Family

_X_ _X_ Maximum Speed

_X_ _X_ Current Speed
- same as maximum speed

_X_ _X_ Processor Upgrade

_X_ _X_ Fru Index
- if available via Vital Product Data

SYSTEM MOTHER BOARD

_X_ _X_ Number of Expansion Slots

_X_ _X_ FRU Index
- possibly via Vital Product Data

PHYSICAL MEMORY DESCRIPTION

_X_ _X_ Physical Memory Index

_X_ _X_ Physical Memory Location

_X_ _X_ Physical Memory Starting Address

_X_ _X_ Physical Memory Ending Address

_X_ _X_ Memory Usage
- system RAM

_X_ _X_ Maximum Memory Capacity

SYSTEM CACHE

_X_ _X_ System Cache Index

PARALLEL PORTS

_X_ _X_ Parallel Port Index

_X_ _X_ Logical Name

SERIAL PORTS

_X_ _X_ Serial Port Index

_X_ _X_ Logical Name

_X_ Maximum Speed

IRQ RESOURCES

_X_		IRQ Number
_X_		IRQ Availability
_X_		IRQ Trigger Type
_X_		IRQ Shareable
		SYSTEM ENCLOSURE
_X_	_X_	System Asset Tag Number
_X_	_X_	Chassis Lock Present - security
		SYSTEM SLOTS
_X_	_X_	Slot Index
_X_	_X_	Slot Type
_X_	_X_	Slot Width
_X_	_X_	Current Usage
_X_	_X_	Slot Description
		VIDEO
_X_	_X_	Video Index
_X_	_X_	Video Type
_X_	_X_	Video Memory Size
_X_	_X_	Current Vertical Resolution
_X_	_X_	Current Horizontal Resolution
_X_	_X_	Number Of Bits Per Pixel
		DISKS
_X_	_X_	Storage Type
_X_	_X_	Disk Index
_X_	_X_	Storage Interface Type
_X_	_X_	Interface Description
_X_	_X_	Media Loaded
_X_	_X_	Removable Media
_X_	_X_	Device ID - PUN
_X_	_X_	Logical Unit Number - LUN
_X_	_X_	Number Of Physical Cylinders
_X_	_X_	Number Of Sectors Per Track
_X_	_X_	Number Of Physical Heads
_X_	_X_	Sector Size
_X_	_X_	Total Physical Size
_X_	_X_	Partitions - for non partitionable media, set to 1
_X_	_X_	Disk Physical Location - unknown
_X_	_X_	FRU Index - if possible
		DISK MAPPING TABLE
_X_	_X_	Storage Type
_X_	_X_	Disk Index
_X_	_X_	Partition Index
		PARTITION

_X_ _X_ Partition Name
- drive letter

_X_ _X_ Partition Size

_X_ _X_ Partition Label
- volume label

_X_ _X_ File System

_X_ _X_ Number Of Disks
- 1

LOGICAL DRIVES

_X_ _X_ Logical Drive Index

_X_ _X_ Logical Drive Name

_X_ _X_ Logical Drive Type

_X_ _X_ Logical Drive Size

_X_ _X_ Free Logical Drive Size

_X_ _X_ Logical Drive Path
- network drive

MOUSE

_X_ _X_ Mouse Interface

_X_ _X_ Mouse Buttons

_X_ _X_ Mouse Port Name
- if serial mouse

KEYBOARD

_X_ _X_ Keyboard Layout

_X_ _X_ Keyboard Type

FRU GROUP

_X_ _X_ FRU Index

_X_ _X_ Description

_X_ _X_ Manufacturer
- Vendor Field in SCSI

_X_ _X_ Model
- Product ID Field in SCSI Vendor Data

_X_ _X_ Part Number

_X_ _X_ Serial Number

_X_ _X_ Revision Level
- ProductRev Field in SCSI Vendor Data

_X_ _X_ Warranty Start Date
- blank Read/Write in the MIF

_X_ _X_ Warranty Duration
- blank Read/Write in the MIF

_X_ _X_ Support Phone Number
- blank Read/Write in the MIF

SystemView LAN
for
OS/2 WARP
License Management
Hursley July 17 - July 28/1995
ISC Hursley

Neil Moring

44-1962-816864
NMORING at WINVMD

Contents

Contents

Customers Requirements addressed

IBM

Customers:

- **Want to protect their organizations from inadvertent license agreement violations.**
- **Want to compensate vendors fairly for the use of their software.**
- **Want to efficiently, effectively use the software they have purchased**

License use management provides:

- **Control of access to and use of licensed programs.**
- **Tracking and management of use of corporate software resources.**

Customers Requirements addressed

Functions

IBM

Tools to monitor the compliance with licensing Terms and Conditions

- **Provides the administrator with the ability to:**
  - **Register the product (install licenses) in the License Server Database**

    A *license compound password* (or *"key"*) is shipped with the product within a *Registration Certificate* file, you will use the license password to install and distribute licenses to use the product

    The license password is an encrypted character string that specifies the actual functional characteristics of the license(s) that it contains

  - **Set the license usage treshold**

    When the defined treshold is reached a message specifying the percentage of licenses in use is displayed and logged

  - **Delete expired licenses**

Functions

IBM

- Display information about licenses

  Event reports based on a set of event filters are available, each filter allows you to display a different category of events

♦ Security levels for the License Database

- the administrator can install licenses , and in case of Registered products, distributes them
- the administrator has the option to disallow changes to the license database issued from a remote node
- the License Database contains the keys with encrypted data such as vendor and product identifiers, the number and type of licenses for each product and their dates

♦ Handling of remote License Database

♦ Configuration and Startup utilities are available to enable the end-user administrator to configure and start the iFOR/LS services

♦ Graphical User Interface and Command Line

♦ Audit File

Functions

IBM

- keeps an history of all product registrations and changes to initial registration
- this is a temper resistant file physically different from the license server database and from the log file

Introduction.

IBM

SystemView supports License Management. The license management that allows clients to runs applications on their workstation where the license maybe on a server somewhere in the network or on their workstation.

Vendors supply the application and license information based on the initial requirements.

An overall evaluation of the Licensing environment should produce an idea of the number of clients, license servers, license cells/groups, communication protocols etc.

License usage, monitoring, auditing, logging are available with SystemView.

Introduction.

Vendors and License.

IBM

The information the user supplies to the Vendor.

- **Which application they want.**
- **Which application characteristics are required.**
  - **Lifetime of license**
  - **Number of nodes/workstations..**
  - **Target IDs of nodes/workstations.**
  - **Type of license:**
    - **Nodelock.**
      - **Static.**
      - **Dynamic.**
    - **Concurrent.**
    - **Use-once.**

Vendors and License.

Vendors and License.

IBM

The Vendor supplies by whatever means they choose.

- **Application.**
- **Registration Certificate File containing**
  - **License.**
  - **License password/key.**
  - **and possibly the Compound License password/key.**

Vendors and License.

Registration Certificate File Sample

```
i4pass -d 100  -n 50 -l c -N "LEVEL3" -p 116 -r 1.3 -w 1

i4pass - iFOR/LS License Creation Tool,
 Version OS2 BETA 2.99.03

(c) Copyright 1991-1995
 Gradient Technologies Inc.,
  All Rights Reserved


ffLicenseCertificate"
CheckSum=31E81713DD679A3CAE1FC43386C17F5A
TimeStamp=162063982
VendorName=iFOR/LS Test Vendor
VendorPassword=kz5esmu69hzyw
VendorID=4ca0fd5cf000.0d.00.02.1a.9a.00.00.00
ProductName=LEVEL3
ProductID=116
ProductVersion=1.3
ProductPassword=9myp74kunz5v623uafmaaaa
ProductAnnotation=
LicenseStyle=concurrent
LicenseStartDate=02/14/95
LicenseDuration=100
LicenseEndDate=05/24/95
LicenseCount=50
RegistrationLevel=3
TargetType=OS/2
TargetID=ANY
```

Registration Certificate File Sample

License Summary.

IBM

The types of license are.

- **Nodelocked License.**
  - **Static.**
  - **Dynamic.**
- **Server Based License.**
  - **Concurrent Access.**
  - **Use-Once Access.**

License Summary.

To run a Licensed Application.

The sequence of events a product should go through in order verify it's license

1. **User invokes application.**
2. **Application has two options.**
   a. **Application checks for nodelocked license.**
   b. **Application requests license from license server.**
      1) **License server checks user's rights and license database.**
      2) **License server returns status of license request.**
3. **Application runs or informs user of license request status.**

To run a Licensed Application.

Nodelock license.

IBM

The Characteristics of the Nodelocked License.

- **Vendor supplies license based on Target ID of the node.**
- **Locked to the one single node/workstation**
- **To use another node get another license.**
- **Nodelock license files reside on node/workstation.**
- **Use NAT (Nodelock Administration Tool) for:**
  - **Installing.**
  - **Managing.**

EXAMPLE OF NODELOCKED ADMINISTRATION TOOL.

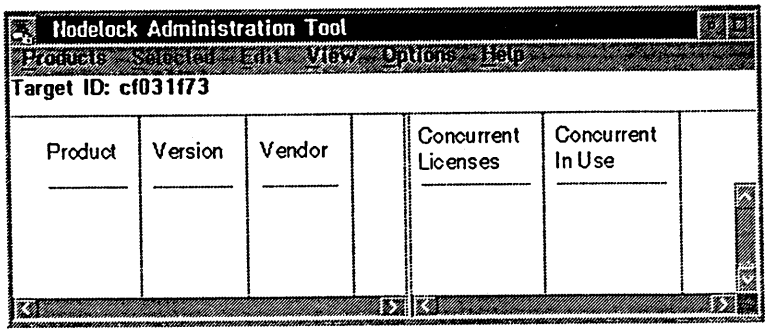


Figure 1.

Nodelock license.

Dynamic NodeLocked Licenses. **Here the license is held on the License Server. The first time a node requests a license from the server the license is transferred to that node. The node will no longer request a license since the license now resides on the node.**

This type of license is installed on the license server using the *License Administration Tool*. This is often referred to as the *Basic License Tool*

AN EXAMPLE OF THE BASIC LICENSE TOOL

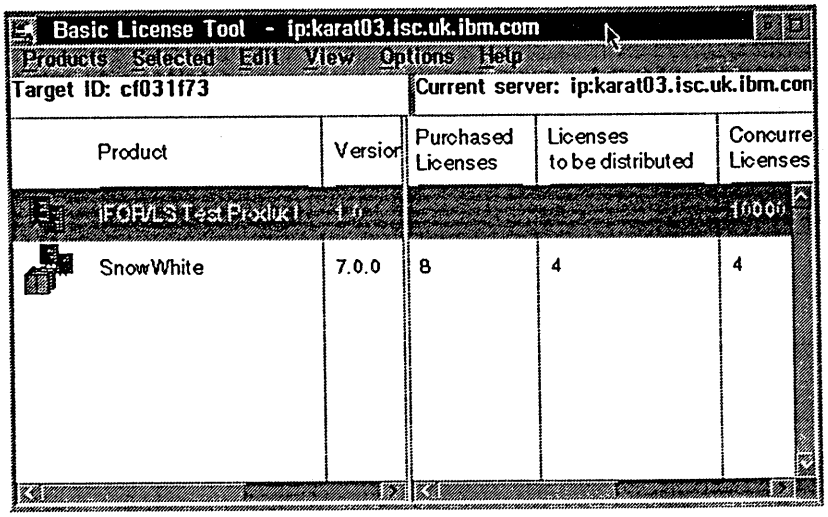


Figure 2.

Server Based License

IBM

Concurrent Use.

Concurrent access licenses allow as many users to run a licensed application as there are valid licenses for the application from the license servers in the licensing environment.

An example of which could be:

Say 5 application licenses have been bought, then only 5 nodes/workstations will have access at any one time to the application. Subsequent application requests will be be queued until a license is freed.

Use-once.

Under the conditions of the license ,use-once license could be invoked to supplement the concurrent use license. The one-use license would only be valid when no concurrent licenses are available and would complete on the termination of the product on the requesting node.

This type of license is often used for promotional and demonstration versions of a product.

Server Based License

License Security Levels

IBM

There are 3 license security levels:

- Restricted Registration (Vendor Managed).
  - Concurrent, Use-once and Nodelocked.
  - License bound to a particular license server.
  - Managed by either *NAT* or *BLT*
- Unrestricted Registration (Customer Managed).
  - Concurrent and Use-once.
  - Compound password used.
  - *NO* association with a license server.
  - No upper limit on licenses
  - Vendor may wish to view the audit Logs!!
- Controlled Registration (Access Control).
  - Initially limited Unrestricted Registration.
  - Compound password used.
  - *NO* association with a license server.
  - Contact vendor to increase upper license limit.
  - Vendor may wish to view the audit Logs!!

License Security Levels

Passwords

IBM

Passwords come in two types:

- **Simple.**
  - **Fixed number of licenses with finite life span determined at initial license request.**
  - **Concurrent and Use-once.**
- **Compound.**
  - **Allows subsequent creation of new concurrent and use-once licenses. Removes the need to contact original vendor.**
  - **Concurrent and Use-once.**

Licensing Environment.

IBM

The SystemView licensing environment is made up of one of more NCS cells. These NCS cells are a logically partition of the licensing environment.

Network Computing System (NCS).

- **NCS Cells.**
  - **Collection of License servers and nodes.**
  - **Node can only be in one NCS cell.**
  - **Node can only get it's license from a License Server within cell.**
  - **All nodes with cell have the same Universal Unique Identifier (UUID).**
  - **Universal Unique Identifier (UUID).**
    - **16 byte string.**
    - **Identifies the host and time on which the UUID is created.**

Licensing Environment.

Remote Procedure Calls(RPC) **and** *Location Brokers* **are the communications mechanism between the nodes within the NCS.**

Each node supplying a service will run the *broker* **process in background.**

The *brokers* **will communicate using the RPC calls.**

Remote Procedure Calls.

- **Run on each host/node of the NCS.**
- **Enable execution of programs on remote hosts.**
- **Transparent to license clients.**

Location Brokers.

IBM

The two types of location brokers are:

Global.

- **Maintains database of all License Servers on network.**
- **At least one node in a NCS cell must be a GLB..**
- **Any License Server changes within cell are picked up by GLB.**

Local.

- **Handles the communications between GLB and the License Servers.**
- **Runs on each node that provides a service.**
  - **i.e.Must run on a license server.**

There is one and only one administration database per cell. A license server node would be running a background process. The database contains the licensing servers license information in the cell. It should always be available. Once it is on a particular node, it must stay with that node.

Additional Processes.

IBM

These additional processes may be required depending on the NCS environment

If you are using NETBIOS instead of IP as your communication protocol then the *Netbios Socket Server* **must be running on the license server.**

The background process on the license server that handles the license communication is the *License Server Process*

If Windows clients are supported then the *Server Ally Process* **must be running on the license server.**

If in a multiple IP subnetted environment the IP Routers do not support NCS broadcasts, then the license server in the other subnets must be defined on the GLB in the file *glb_site.txt*

Additional Processes.

Addition Security.

IBM

License Management on the License Servers can be greatly enhanced by the installation of the NET/SP product.

This will provide a *userid* and *password* front end to any license management action on the license servers.

Addition Security.

Reports

IBM

Standard

Reports the event category (filter), the event type, the server on which it has occurred, the event time stamp, and other associated information, if any.

License requests by product

For each product, it reports the licenses requested, the licenses granted, and the percentage of rejections.

License requests by user

For each user, it reports the licenses requested, the licenses granted, and the percentage of rejections for each of the product he/she is using.

License distribution audit

Reports the following information:

- Vendor name
- Product name and version
- Time stamp of the event
- Number of licenses involved in the transaction
- Event list (product registered, license added, license deleted)

Standard Event Report

```
================================================================
S t a n d a r d   E v e n t   Page: 1
================================================================
Sequence    : 1                          Event Type   : SERVER
Time Stamp  :                            Event Subtype: Start
Server Name : ip:server2
----------------------------------------------------------------
Sequence    : 2                          Event Type   : LICENSE
Time Stamp  :                            Event Subtype: Granted
Server Name : ip:server2
Vendor  Name:                             User  Id: Alex
Product Name: iFOR/LS Test Product        Group Id: eut
Product Id  : 3                           Node  Id: ip:client1
Version     : 1.0                         Amount  : 1
Trans Id    : -653998940
Job Id      : 6cc5f2f7fa98.81.5c.71.57.0a.00.00.00
Machine Type: OS/2
----------------------------------------------------------------
Sequence    : 4                          Event Type   : MESSAG
Time Stamp  :                            Event Subtype: Vendor
Server Name : ip:server5
Vendor Name : iFOR/LS Test Vendor
Message     : You are now able to use the Graphics produ
----------------------------------------------------------------
Sequence    : 5                          Event Type   : SERVER
Time Stamp  :                            Event Subtype: Stop
Server Name : ip:server5
----------------------------------------------------------------
```

```
Sequence     : 6                          Event Type    : LICENSE
Time Stamp   :                            Event Subtype: Released
Server Name  : ip:server2
Vendor  Name:                               User  Id: alex
Product Name: iFOR/LS Test Product          Group Id: eut
Product Id   : 4                            Node  Id: ip:client1
Version      : 1.0                          Amount  : 1
Trans Id     : -651202660
Job Id       : 6cc61cd3fac4.81.5c.71.1f.0b.00.00.00
Machine Type:
-------------------------------------------------------------
```

License request by product report

```
=============================================================
L i c e n s e   R e q u e s t s   B y   P r o d u c t
=============================================================
```

Vendor/Product	Vrsn	Licenses Requested	Licenses Granted	Percent Rejecti
Universal Spredsheet	1.0	3388	1694	50

```
==========================================
*** End of License Requests By Product ***
==========================================
```

License requests by user report

```
=======================================================================
L i c e n s e   R e q u e s t s   B y   U s e r
=======================================================================
                                 Licenses    License    Percent
User/Vendor/Product     Vrsn     Requested   Granted    Rejection:

----------------------  ----     ---------   --------   -------
alex                    1.0         752         188       75
Nina
Calculator

rosa                    1.0         942         942        0
Nina
Calculator

stefy                   2.1         820         560       33
Mike
Editor A
      ==========================================
      *** End of License Requests By User ***
      ==========================================
```

License Related Events

License granted

A concurrent license was successfully obtained by a licensed product.

License release

A concurrent license was successfully released by a licensed product.

Check license

A licensed application has sent a check-in call to the license server to notify it that it is running.

Waiting

The license request could not be satisfied because no licenses were available, but the user is in queue.

Wait grant

The license request could not be satisfied because no licenses were available, but the user has been added to the queue.

Wait remove

A queued license request was removed from the waiting list.

License time out

The license was requested, but no answer came from the server.

License grant multi-use

A multi-use license was successfully obtained by a licensed product.

License Related Events

IBM

License release multi-use

A multi-use license was successfully released by a licensed product.

Use-once license used

A use-once licensed was consumed.

Compound license used

A simple license was successfully extracted from a compound license.

Installing and Configuring a Database

You can, optionally, provide one or more DB2/2 or Lotus Notes databases, to be used to:

- Export hardware and software inventory results
- Export Information from system profile notebooks
- Export system monitor information
- Send alerts from the alert manager
- Send alerts as e-mail (using the VIM interface) to Lotus Notes users from the alert manager (Lotus Notes database only).

The database can be installed on your SystemView Manager machine, or on a central database server. In the latter case, each SystemView Manager must be set up as a client to the database server.

You must create and configure the database so that it contains the correct tables before you can start to export data.

Installing and Configuring a DB2/2 Database

To install and configure a DB2/2 database:

1. Install the database.
   a. Select the SystemView installation directory from the Warp Server CD-ROM.
   b. Start an OS/2 window or full-screen session.
   c. Type the following command at the OS/2 prompt:

      `NETFINDB CREATE /DBNAME=databasename /DRIVE=d`

      where *databasename* is the name of your database and *d* is the drive where the database is to be located.

      Note: If any part of the database already exists, the program will create only the portions of the database that are missing.

   d. Press **Enter**.
2. Bind the package and the database.

   To prepare SQL statements stored in the bind file and store the package in the database:

   a. Select the SystemView installation directory from the Warp Server CD-ROM.
   b. Start an OS/2 window or full-screen session.
   c. Type the following command at the OS/2 prompt:

      `SQLBIND DB2OS2CI.BND databasename /I=CS /F=DEF`

      where *databasename* is the name of the database as specified in the previous step.

   d. Press **Enter**.

Note: /F = DEF is the default. See the *DB2/2 Command Reference* for further information.

3. Connect to the database.

   a. Make the database system hard disk drive the current drive.

   b. Type the following command at the database system's OS/2 prompt:

      ```
      DBM CONNECT TO databasename
      ```

      where *databasename* is the name of the database.

   c. Press **Enter.**

4. Use the GRANT EXECUTE command to enable SystemView to access the database.

   Type the following command at the OS/2 prompt:

   ```
   DBM GRANT EXECUTE ON PACKAGE NETFIN.DB2OS2CI TO PUBLIC
   ```

   and then press **Enter.**

   Note: You can specify PUBLIC or authorize only specific manager systems. If you want to limit access to the database, substitute the authorization name of the manager system for PUBLIC.

5. Disconnect current users from the database.

   Type the following command at the OS/2 prompt:

   ```
   DBM CONNECT RESET
   ```

   and then press **Enter.**

6. Grant (or revoke) database privileges.

   To grant or revoke table privileges:

   a. Select the SystemView installation directory from the Warp Server CD-ROM.

   b. Start an OS/2 window or full-screen session.

   c. Type the following command:

      ```
      NETFINDB GRANT /ID=id PUBLIC /DBNAME=databasename /PRIV=privilegecode
      ```

      where *id* is the user ID to be granted access, *databasename* is the name of the database as specified during NETFINDB execution, and *privilegecode* is one of the following privilege codes:

      - ALL
      - ALTER
      - CONTROL
      - DELETE
      - INDEX
      - INSERT
      - REFERENCES
      - SELECT
      - UPDATE

   d. Press **Enter** to execute the command.

      Note: You can use PUBLIC or authorize only a specific ID or group name. SystemView Manager update programs use the DB2OS2CI

package and do not require specific table privileges. However, you will need to authorize access for any other processes, such as QMF.

To revoke privileges, substitute REVOKE for GRANT in the command line.

7. Catalog the database in the SystemView Manager system.

   If the Manager is using a remote DB2/2 server, catalog the node where the database resides and then catalog the database to that node. Consult the *DB2/2 Command Reference* for the correct syntax.

After you have completed this step, the name of the database appears in the System Information Tool's Database Selection window and in the Database Entry Selection window for software inventory.

Deleting a DB2/2 Database

To delete the database:

1. Select the SystemView installation directory from the Warp Server CD-ROM.
2. Start an OS/2 window or full-screen session.
3. Type the following command at an OS/2 prompt:

   NETFINDB DELETE /DBNAME=databasename

   where *databasename* is the name of the database.
4. Press **Enter**.

For information on the SystemView database tables, use the SystemView Database Tables icon in the SystemView Information folder.

Installing and Configuring a Lotus Notes Database

During SystemView installation, a Lotus Notes database template file named NETFINDB.NTF was copied to the directory where you installed SystemView (by default, SYSV2). To install and configure the database:

1. Copy this file to a diskette, and then copy this file from the diskette to your server's Notes data directory.
2. Start Lotus Notes on your server.
3. Select _New Database..._ from the Notes _File_ pull-down menu. This opens the New Database window.
4. Select SystemView Database from the _Template_ selection list.
5. Select the Inherit Future Design Changes check box. This makes it possible for future releases of SystemView to automatically apply changes to this database.
6. Select Local from the _Servers_ selection list.

   Note: If you want to install the database on a remote server, select the name of the remote server from the _Servers_ list.
7. Type the _Filename_ field NETFINDB.NSF
8. Type the _Title_ field SystemView Database
9. Select _New_ to create the database and close the New Database window.
10. Select the SystemView Database icon from the Lotus Notes workspace.

11. Select _Database_ from the _File_ pull-down menu.
12. Select _Access Control..._ from the _Database_ pull-down menu.
13. Set the access level for all SystemView Managers that will be exporting data to this database to "Editor."
14. Select the Can Delete Documents check box.
15. Select _OK_.

Enabling SystemView Managers to Export to the Lotus Database

For the SystemView Manager, ensure that the Lotus Notes directories are included in the CONFIG.SYS file's LIBPATH, PATH, and DPATH statements. If the directories are not included in these statements, the Export to Lotus Notes Database selection will not be available.

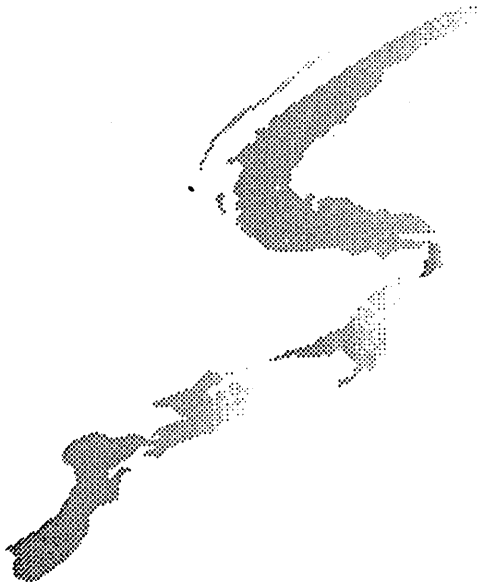
Browsing the SystemView Lotus Notes Database

To browse the data contained in the SystemView Lotus Notes database:

1. Open the SystemView Database object in the Lotus Notes Workspace.
2. Select from the _View_ pull-down menu the section of the SystemView database that you want to browse. The SystemView database is divided into sections that contain data gathered by specific SystemView services. Select the name of the service that gathers the data that you want to view (for example, Alert Logs).

   Note: Some menu selections will contain submenus.
3. Information contained in the part of the SystemView database that you selected is now listed in the window.

   For more detailed information about any displayed data item, double-click on the data item.
4. Some data items can be expanded to reveal additional information. These items are identified by a plus sign (+) in the left border of the Notes window, beside the name of the data item. To expand the data item select the item, and then select _Expand_ from the View pull-down menu.



SystemView LAN for OS/2 Warp

Software Distribution

Agenda

- Introduction
- Demonstration
- Exercises

Software Distribution

- Software Preparation
- Software Distribution

- Software Installation
- Change Control

Software Distribution - Machine Types

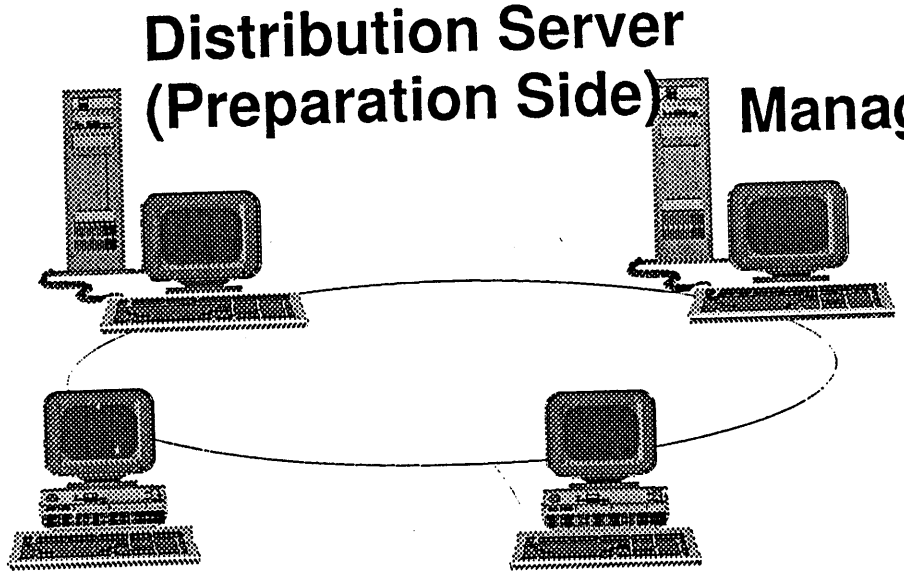
- Change Control (CC) Client
  A workstation to which software is distributed by a change control server.

- Change Control (CC) Server
  A CC server is a workstation that controls the distribution of software to other workstations (its change control clients). A CC server and all its CC clients must be either in the same TCP/IP or NetBIOS network.

- Preparation Side
  A workstation where the Software is preparated for the distribution.

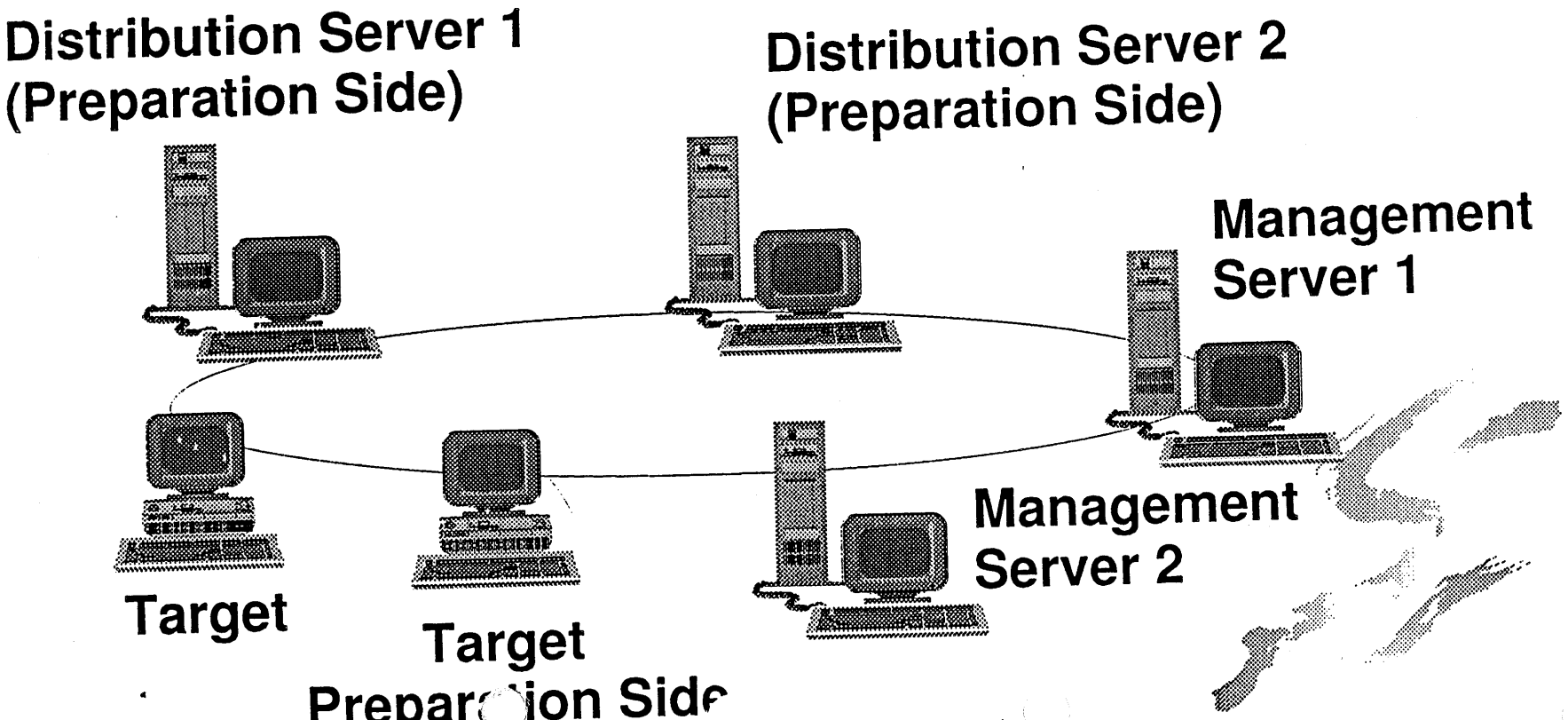
Network Configuration

Management Server, Distribution Server, Preparation Side on Different Machines



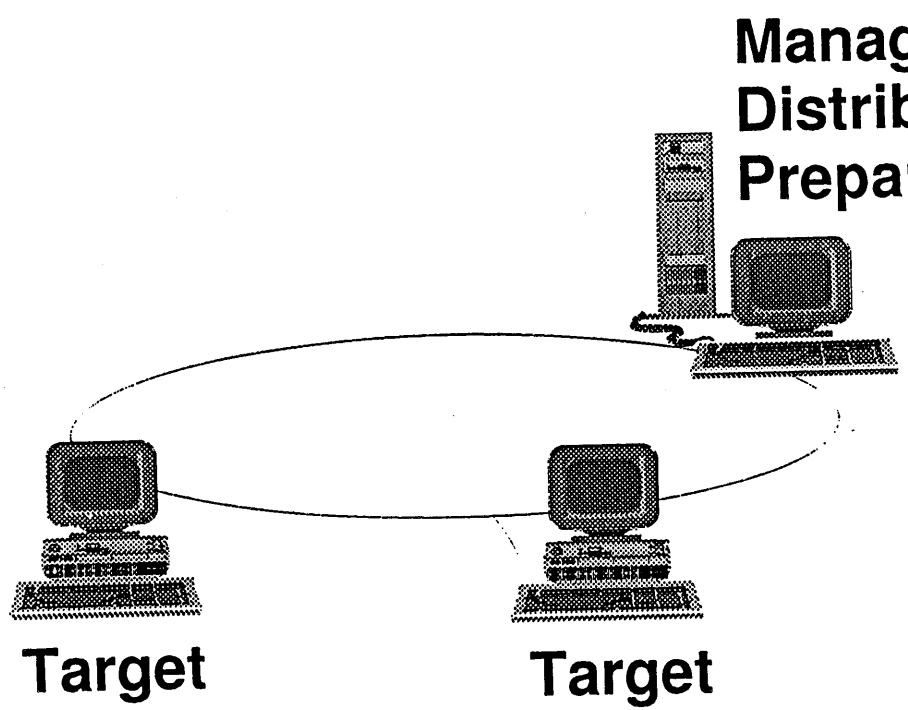
Network Configuration

2 Management Server, 2 Distribution Server
3 Preparation Sides



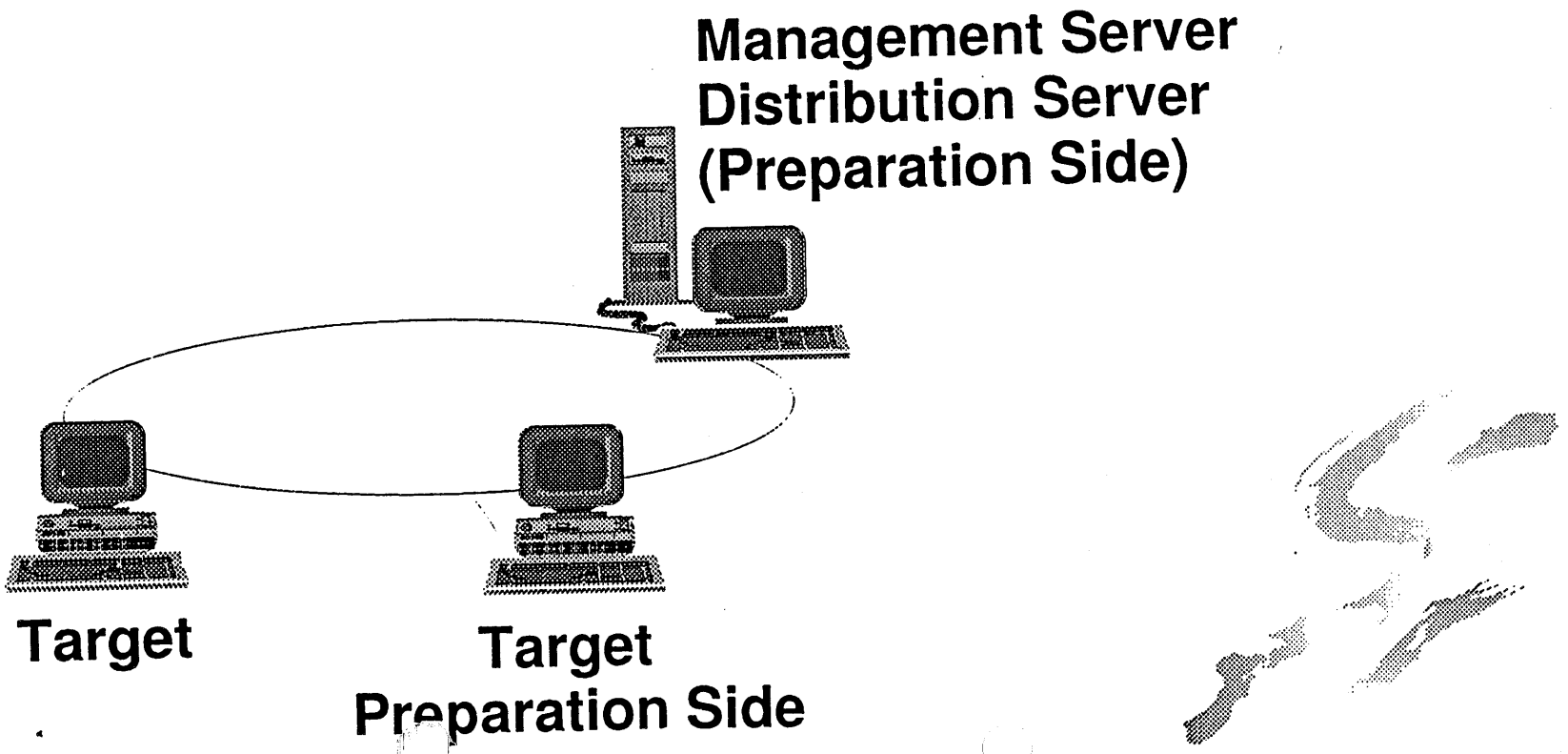
Network Configuration

Management Server, Distribution Server, Preparation Side on one Machine



Network Configuration

Management Server, Distribution Server,on one Machine, Preparation Side on a Client



CID (Configuration Installation Distribution)

- IBM-specified way to install/configure/remove Products
- Use of Response Files
- Redirected Installation and Configuration

  - > Reduction of User Interaction

- Response File
  - Contains a Set of predefined Answers to Questions asked by a Program
  - Used in Place of a User Dialog

Software Types

- **NON CID enabled Software**
  - Preparation in *Software Preparation* Window
  - Cloning
  - One Image for every Configuration
  - No Redirected Drives
  - Log Files will not automatically be created
- **CID enabled Software**
  - Preparation in *CID Preparation* Window
  - Installation, Configuration
  - One Image -> N different Configurations, for every Configuration one Response File
  - Redirected Drives
  - Log Files will automatically be created

Change File - Change File Profile

- Change File
  - Object used to apply Change Control in a Network
  - Includes Software together with Instructions how to install the Software

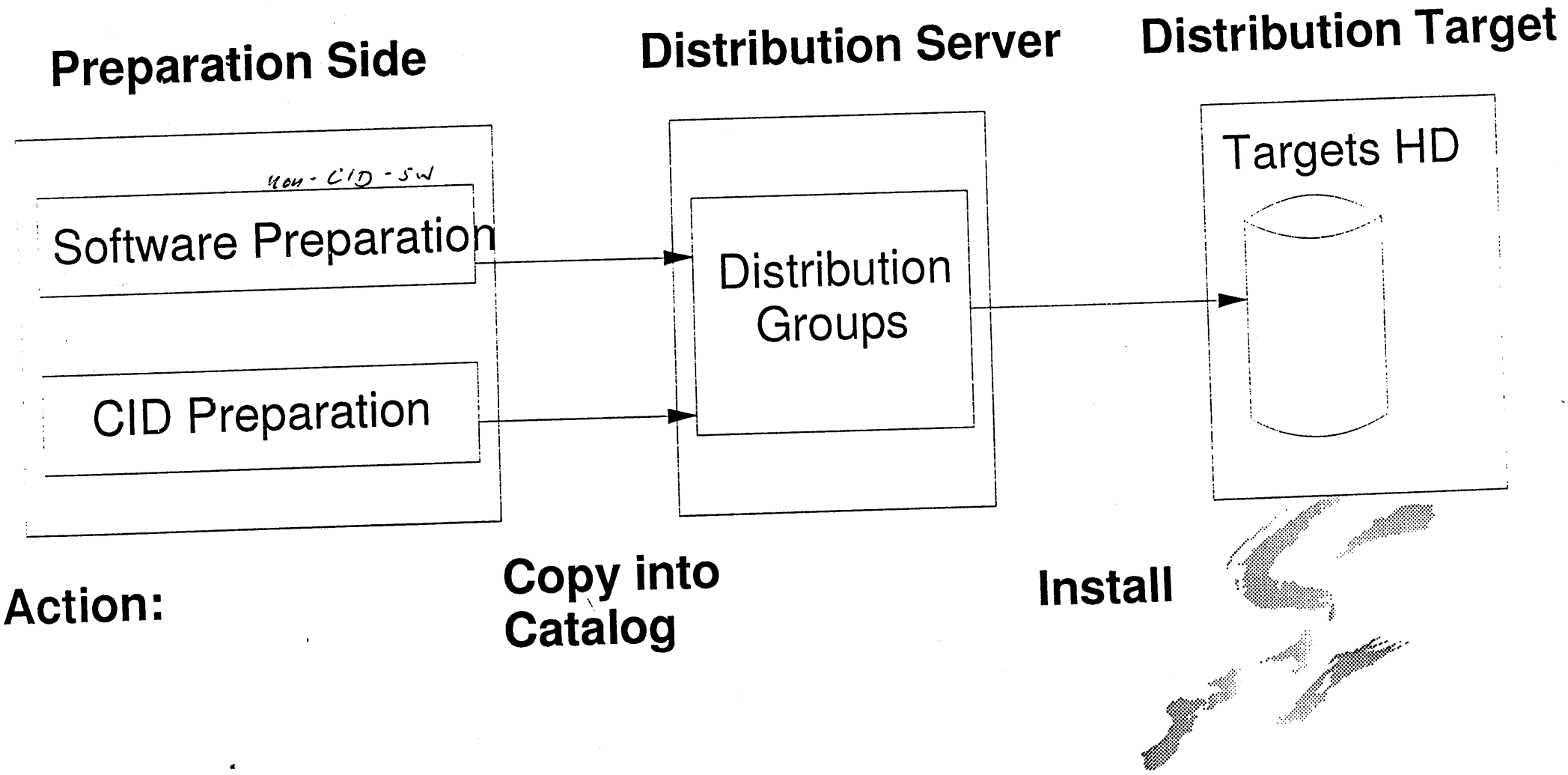
- Change File Profile
  - A list of statements that describes how to build a Change File
  - Include the Definitions for:
    - Files
    - Variables
    - Programs/Script
    - Global Name

Object Name - Global Name

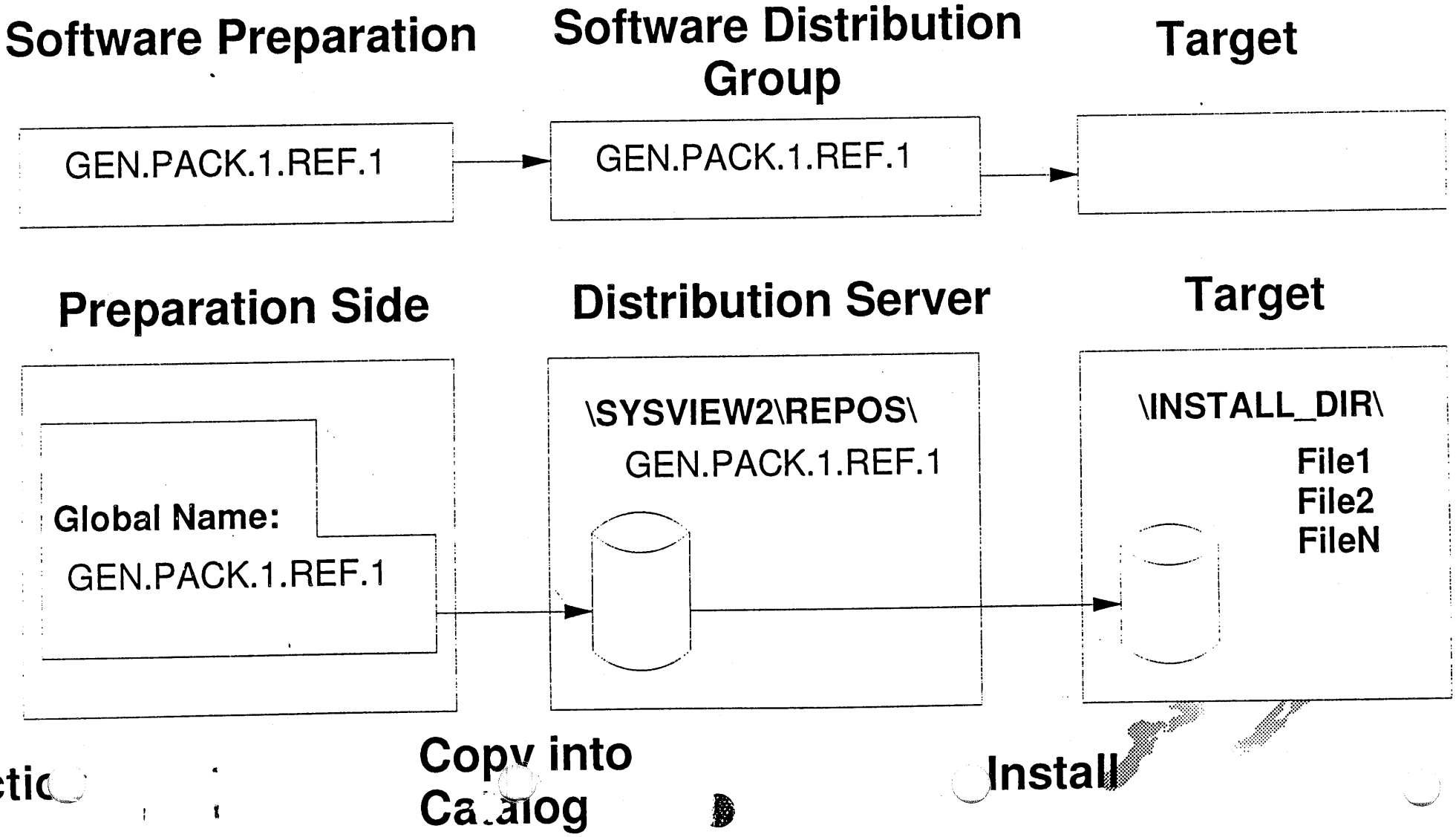
- Component Name
  - Used to distinguish change files for one software package from those of another
  - 2 to 6 tokens separated by dots. Each token up to 16 characters
  - e.g.: IBM.DB22 for IBM DB2 /2

- Global Name
  - Includes Component Name and some more Tokens to distinguish change files for one software package
  - e.g.: IBM.DB22.1.UPD.0.1

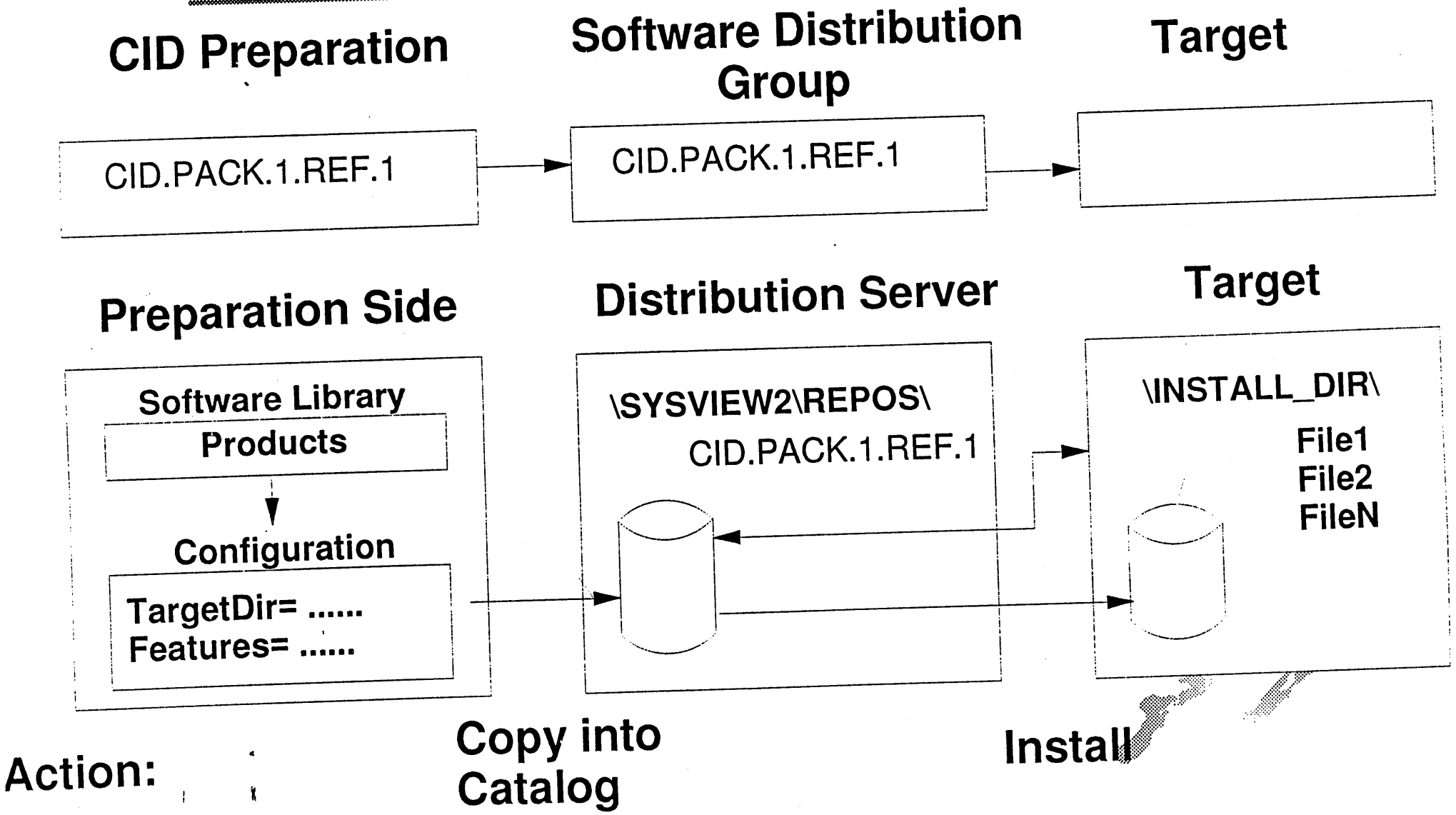
Software Preparation/Distribution Overview



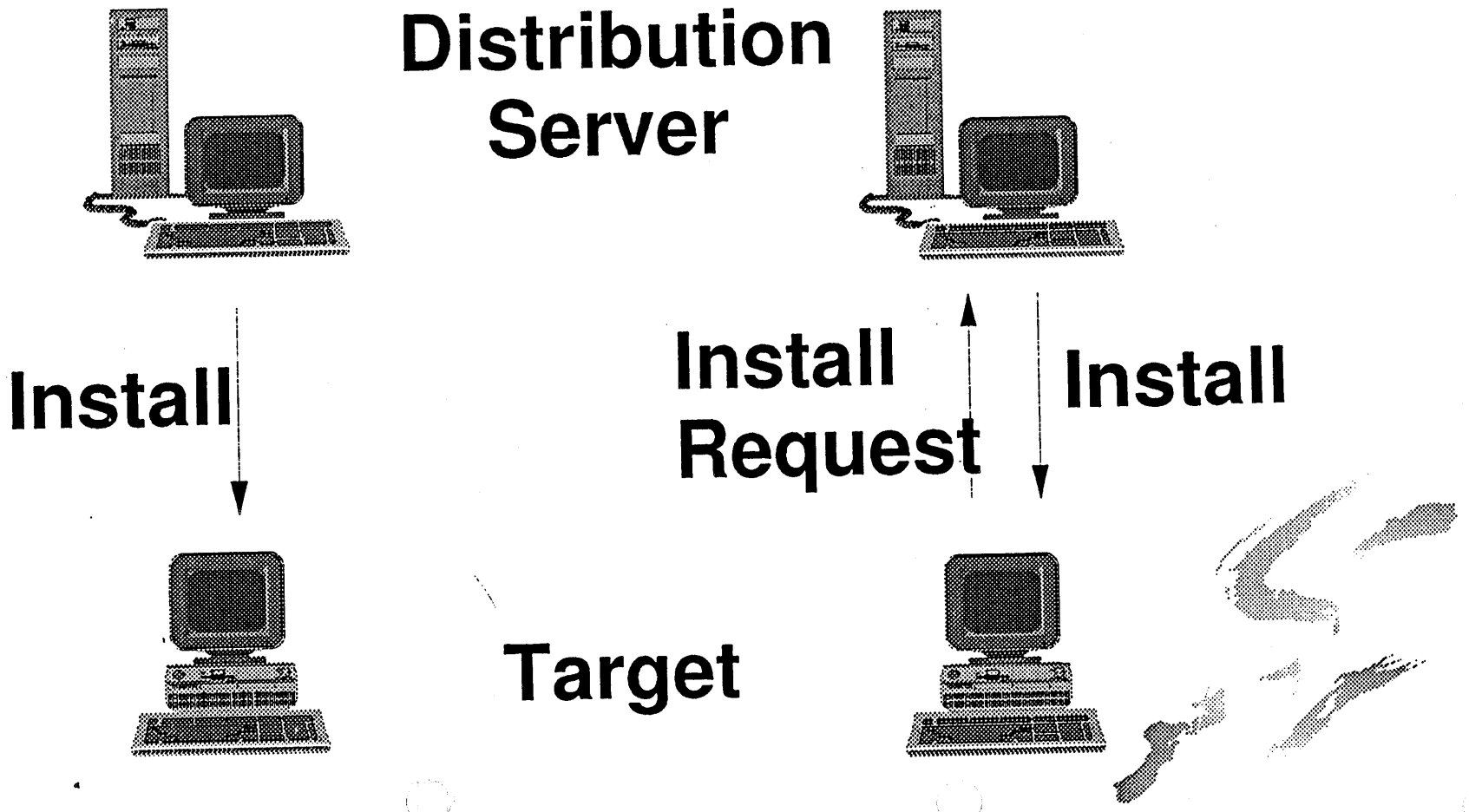
Software Preparation/Distribution for non CID enabled Software

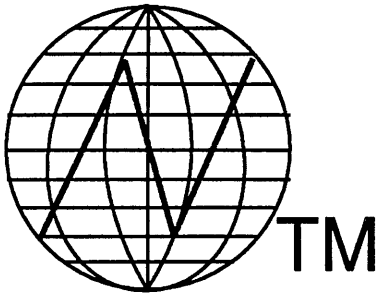


Software Preparation/Distribution for CID enabled Software



Push / Pull


Distribution
Server
Install
Install
Request
Install
Target



NetView for OS/2

SW PM System-/Netzmanagement

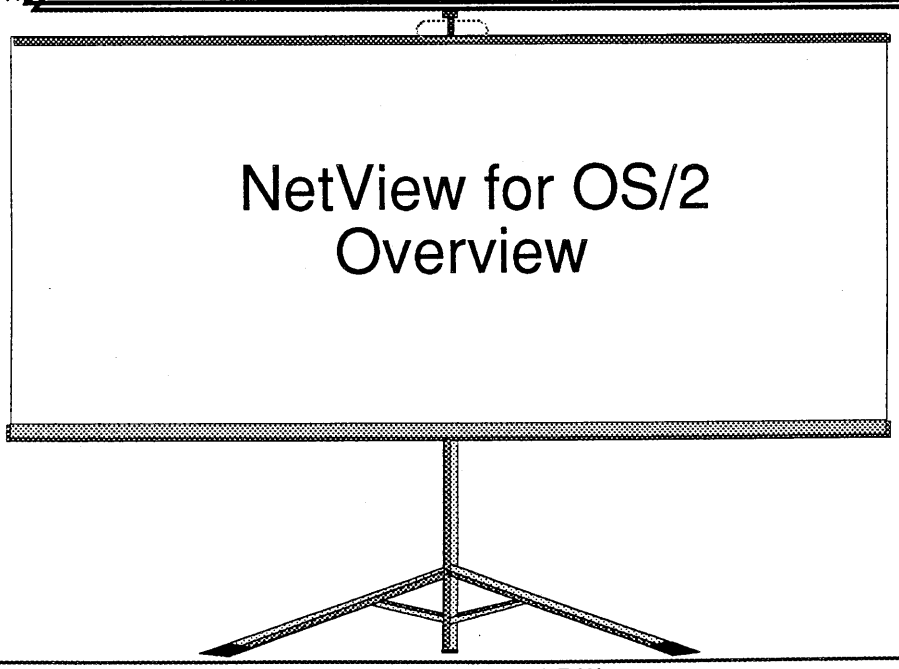
Course Agenda

- NetView for OS/2 Overview
- Installation
- NV/2 Configuration
  - Managing Components
  - Agents
- Applets
- Performance Management
- Fault Management

Course Agenda

- Host Connect
- Asset Management
- LAN NetView Management Utilities
- Planning
- Futures
- Product Considerations

Unit 1



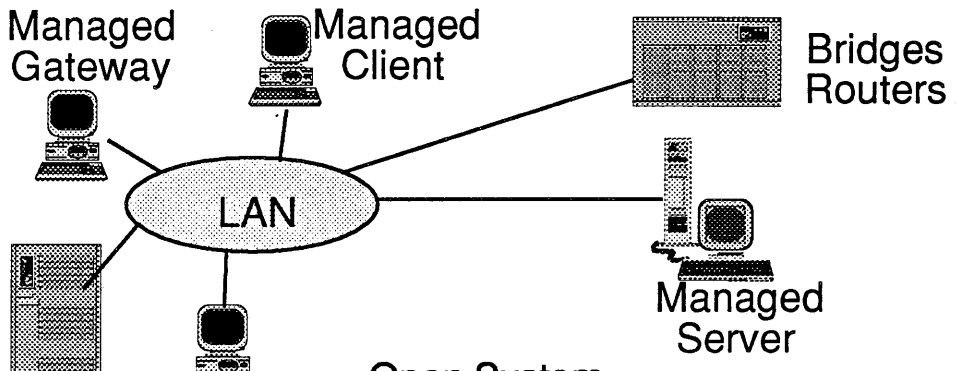
Unit 1 Agenda

- Systems Management Overview
  - What is Systems Management
  - Managed Resources
  - Management Tasks
  - The Management Model
  - Here We Are... Where We're Going
- NetView for OS/2
  - What is NetView for OS/2?
  - Application of NetView for OS/2
  - SNMP Management

What Is Systems Management?

- Tasks involved in maintaining the system in good working order
- Modifying the system to meet changing requirements.

Systems Management Requirements



- Open System
- Automated fault recovery
- Centralized management
- Reduced support/staffing requirements
- Remote software distribution/maintenance
- Unattended operations/remote administration

Managed Resources

Servers
- OS/2 LAN Server
- NetWare
- AIX
- ...

Clients
- OS/2
- DOS
- Windows
- Apple
- AIX
- NetWare
- ...

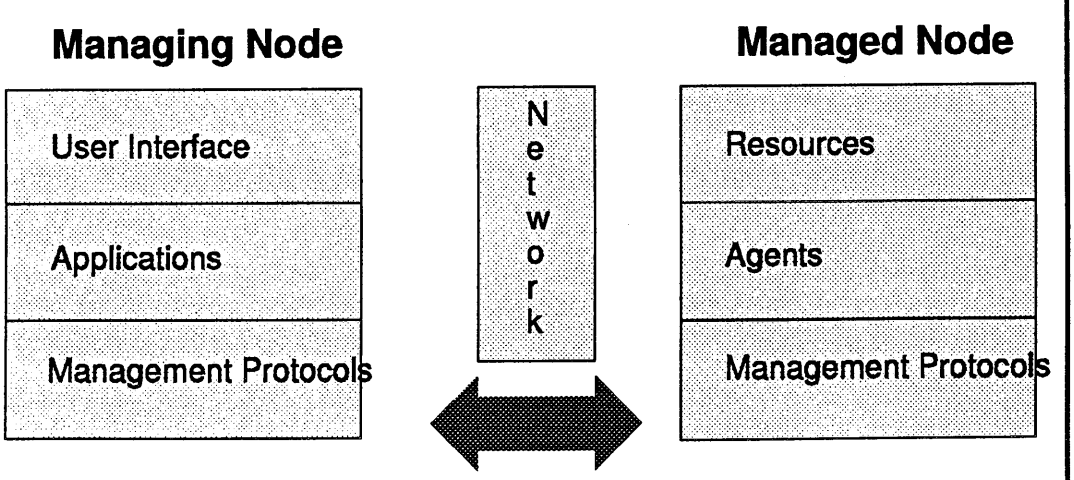
Gateways
- CM/2
- ...

Managed Hardware
- Bridges
- Routers
- Adapters
- ...

Management Tasks

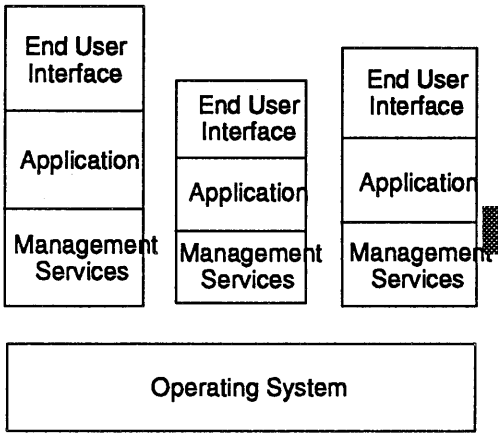
- Business Management
- Configuration Management
- Operations Management
- Performance Management
- Problem Management
- Change Management

The Management Model

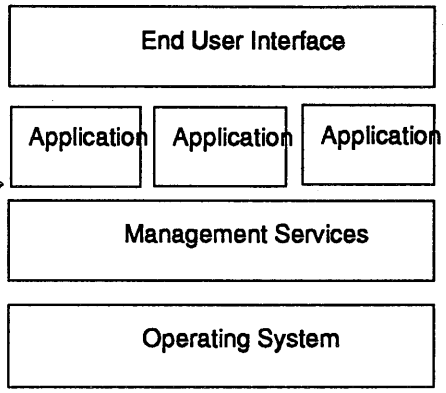


Here We Are... Where We're Going

Current Management Tools



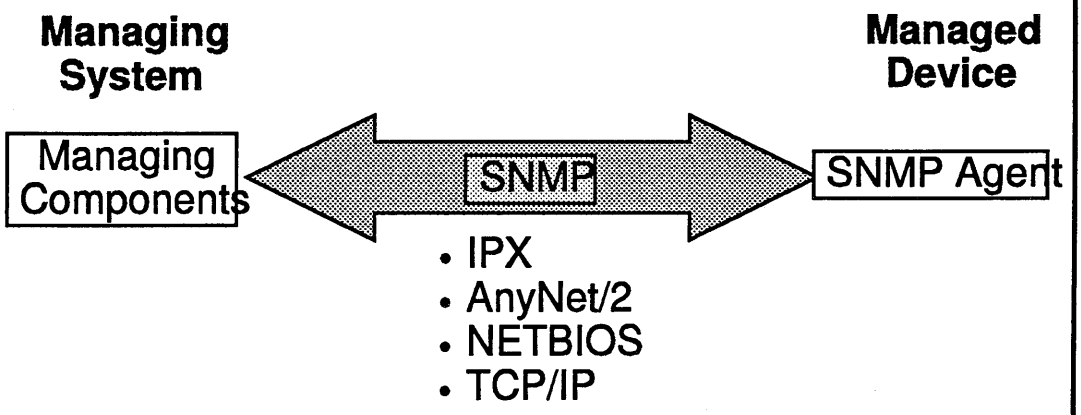
Standards for Management



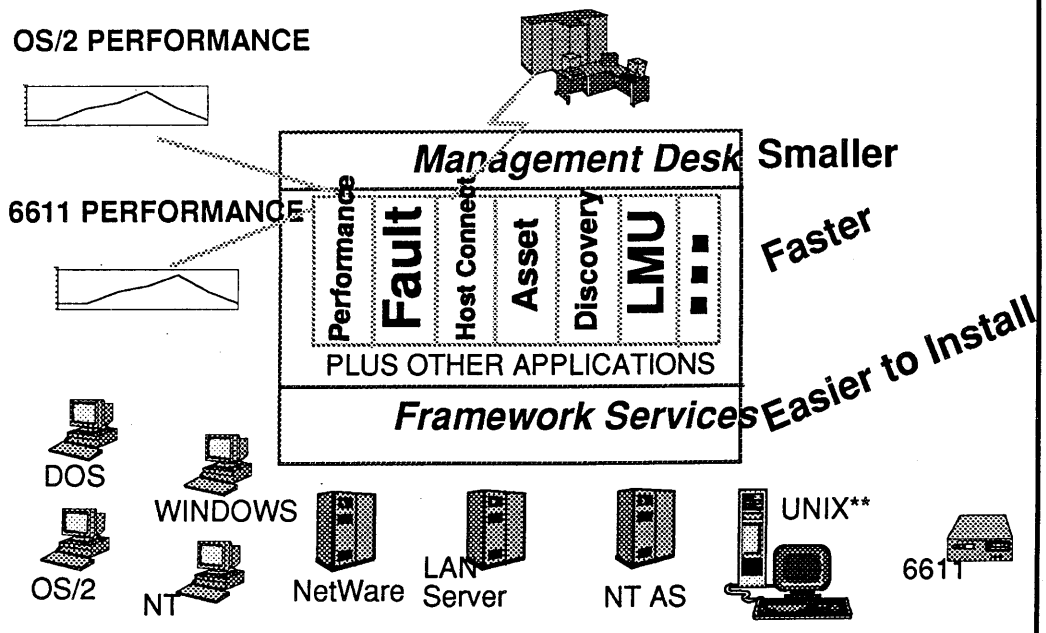
What Is NetView For OS/2?

- An SNMP Management Platform
  - Management Graphical User Interface
  - Discovery
  - Fault Management
  - Performance Management
  - Asset Management

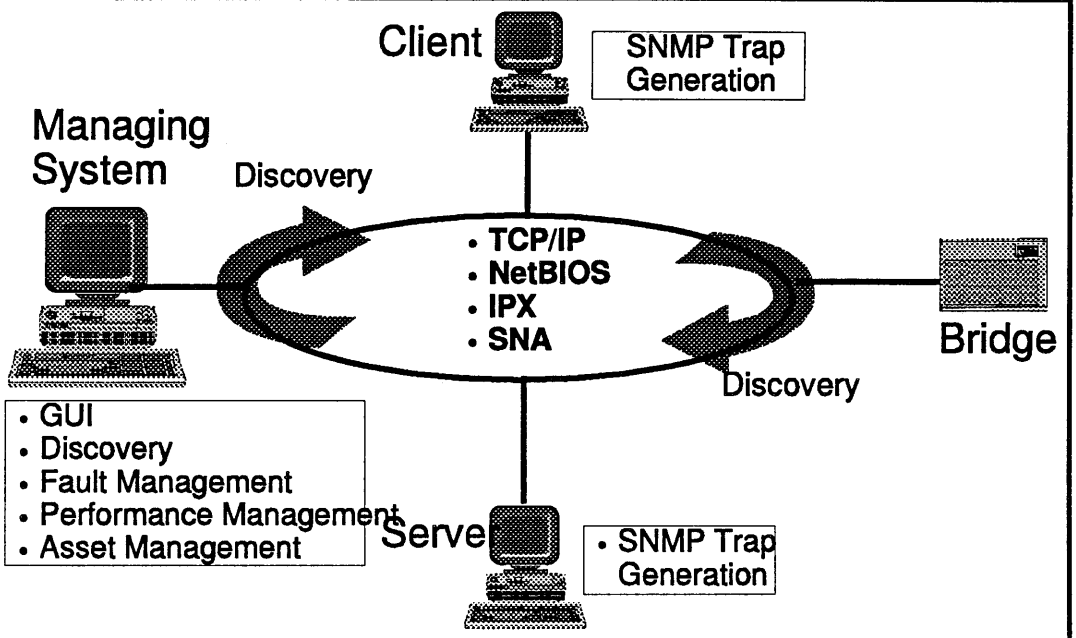
Basic Concept



NetView for OS/2

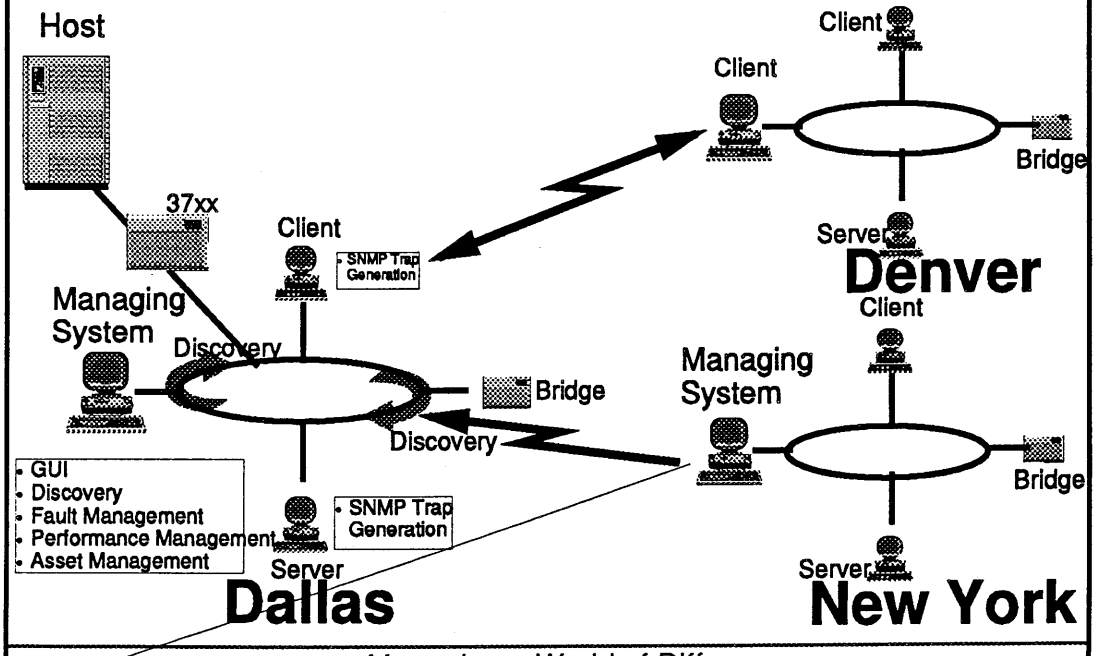


Local Site Management



Managing a World of Difference

Remote Site Management



Managing a World of Difference

Standard MIB Support

- System
- Interfaces
- Address Translation
- Internet Protocol (IP)
- Internet Control Message Protocol (ICMP)
- Transmission Control Protocol (TCP)
- User Datagram Protocol (UDP)
- Exterior Gateway Protocol (EGP)
- Transmission Group
- SNMP Group

Enterprise MIBs Provided

- System Information Agent
  - Storage and CPU
  - Program and file
  - ...
- LAN NetView Management Utilities

Enterprise MIBs Provided

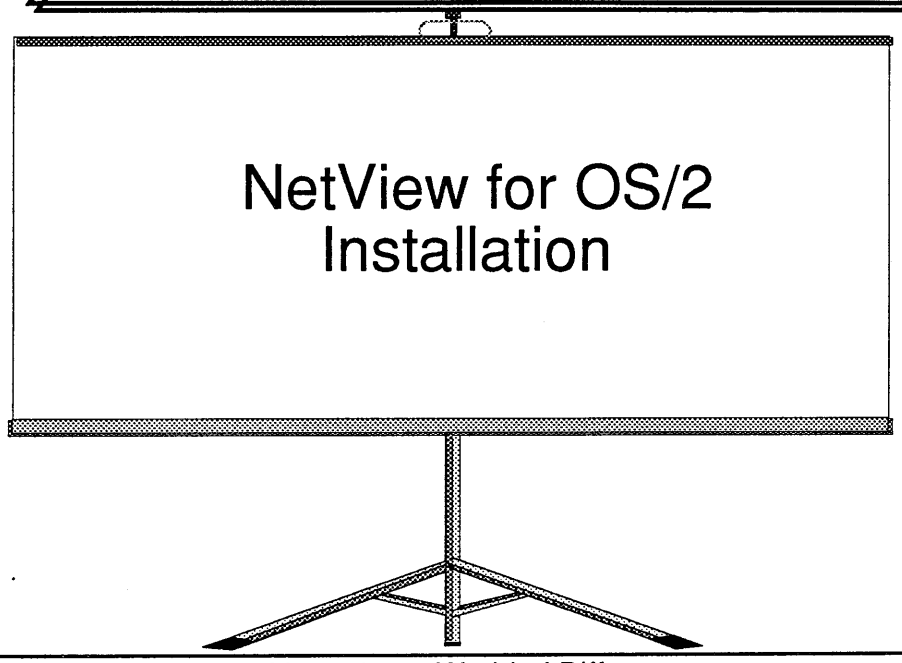
- LAN Server
  - LAN Server products and services
  - Server Performance
  - Statistics
  - Connection
  - ...
- LAN Requester
  - LAN Requester products and services
  - IBMLAN.INI
  - Requester Performance
  - ...

MIB Naming Examples

iso.org.dod.internet.private.enterprises.ibr

1.3.6.1.4.1.2.

Unit 2

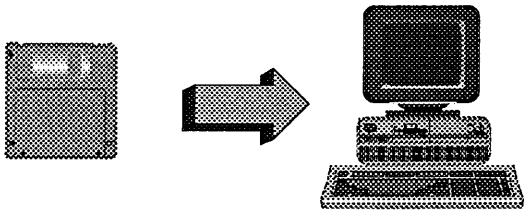


Unit 2 Agenda

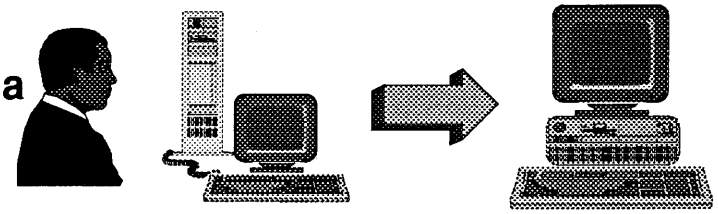
- Installation Methods
- Components
- Interactive Installation Process
- Desktop
- Setup & Startup

Installation Methods

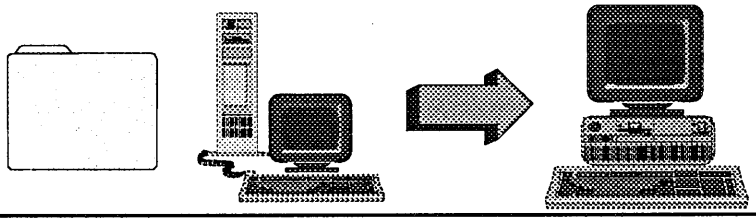
Interactively using diskettes



Interactive using a redirected drive



C.I.D.



Installable Components

Management Desk	Agent for OS/2
LMU Integration	Host Connection
IBM Library Reader	Developer's Toolkit

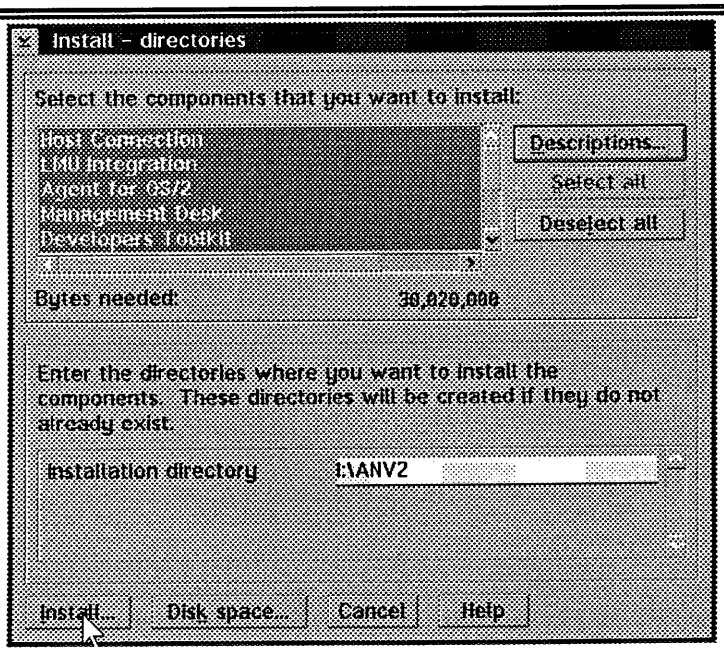
On-Line Documentation

NetView for OS/2
Agents Guide

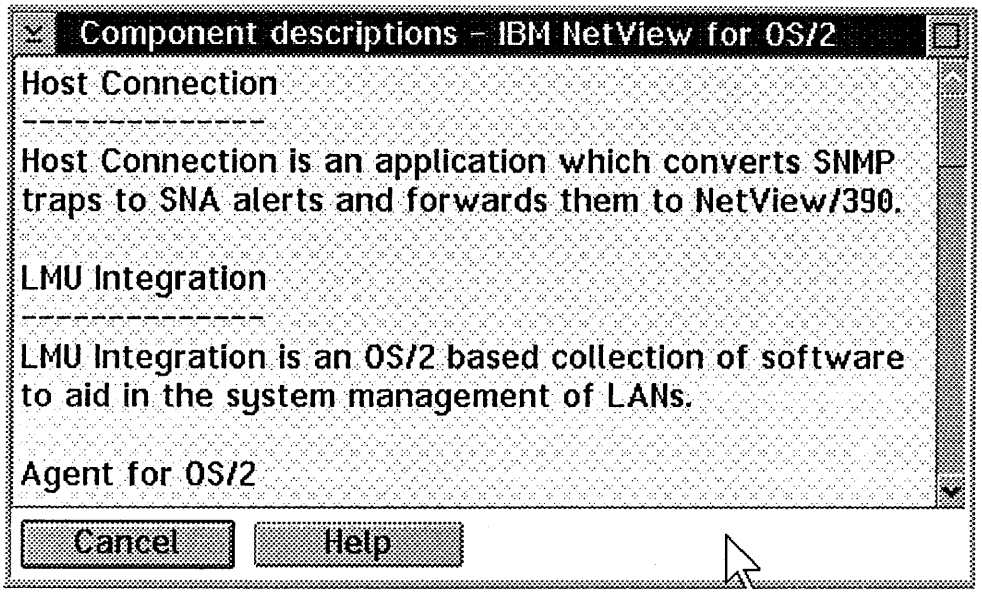
NetView for OS/2
User's Guide

NetView for OS/2
Installation
and
Administration
Guide

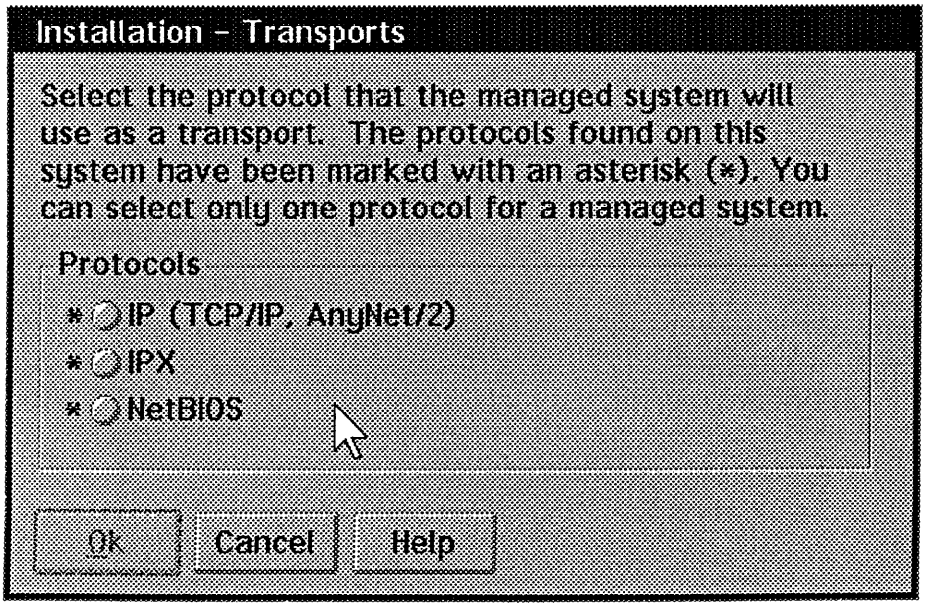
Components and Location



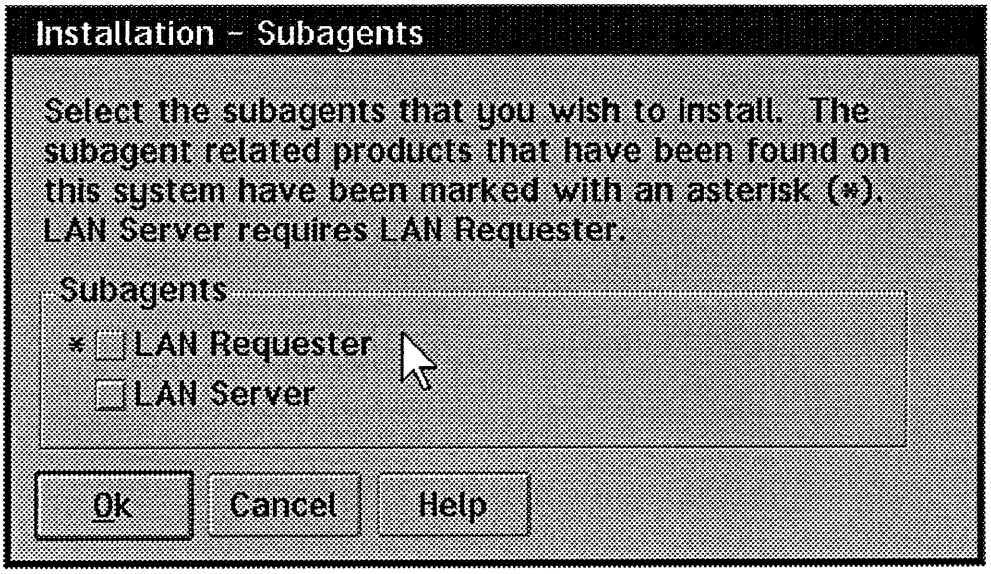
Component Descriptions



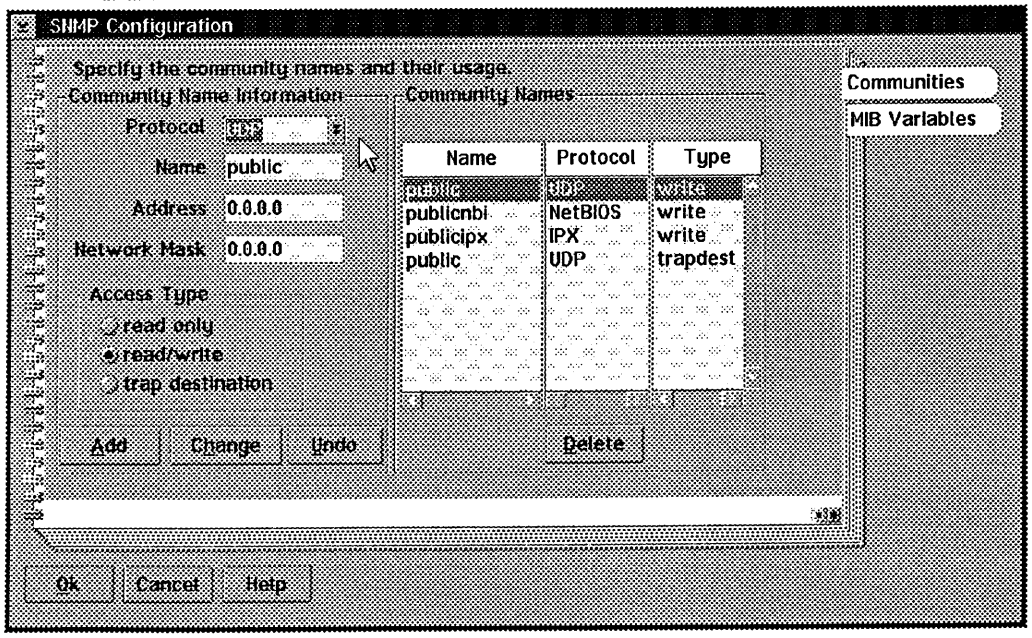
Managed System Transport



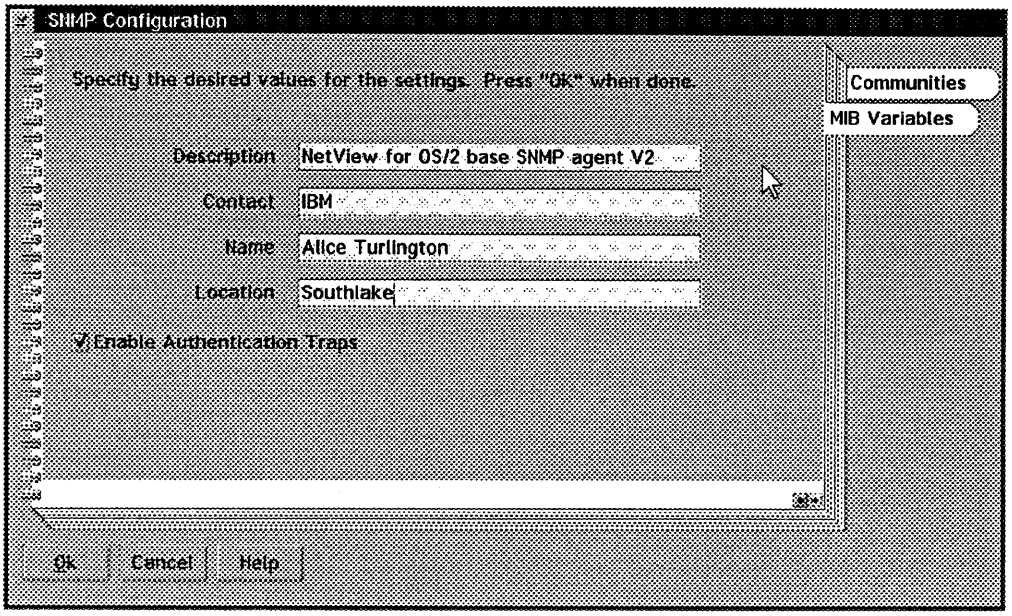
Managed System Subagents



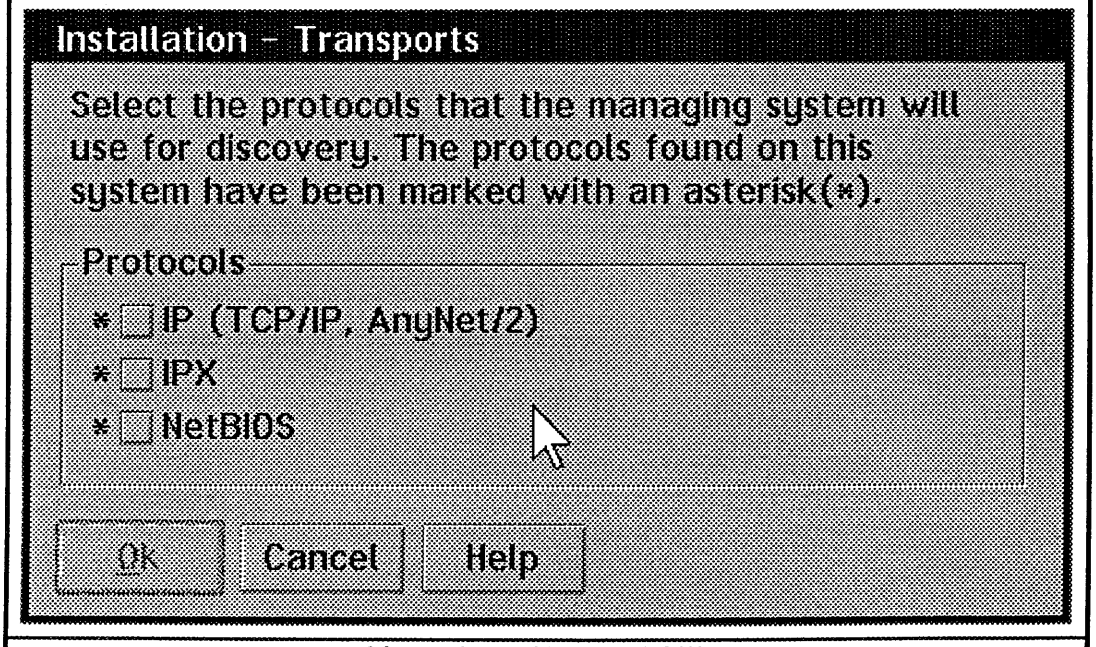
SNMP Configuration



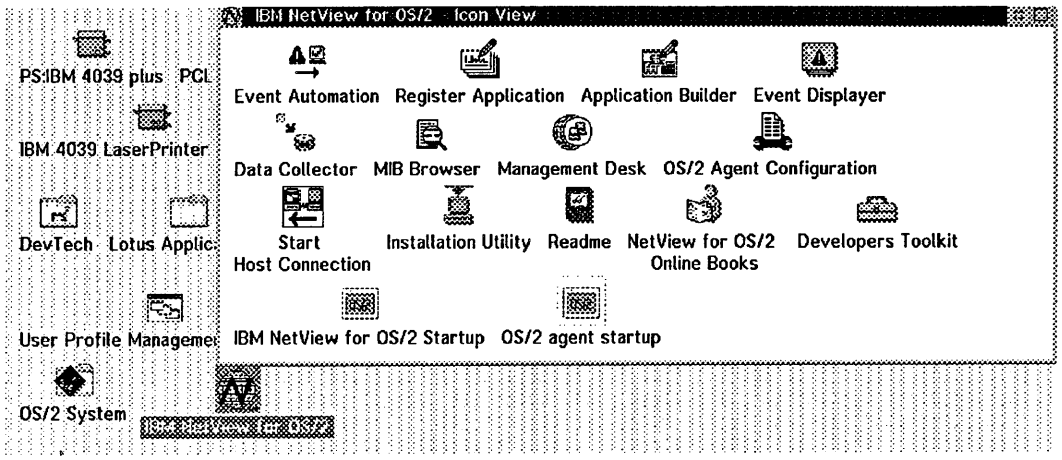
MIB Information



Managing System Transport



NetView for OS/2 Folder



What gets started?

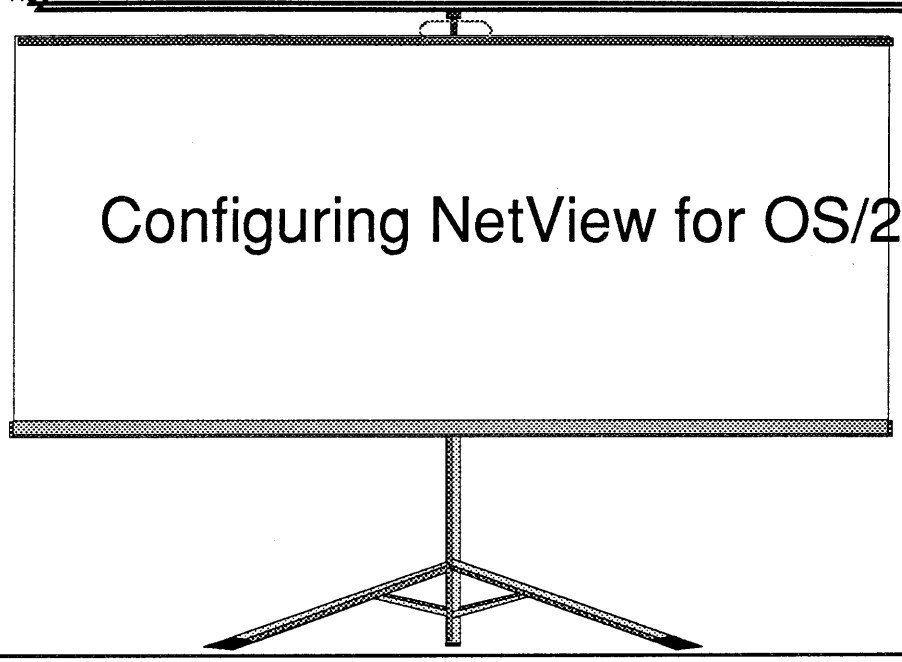
IBM NetView for OS/2 Startup

- NetView for OS/2 Process Manager
- Event Automation Daemon

OS/2 agent startup

- SNMP Multiple Protocol Daemon
- System Information Agent
- Requester Agent
- LAN Server Agent

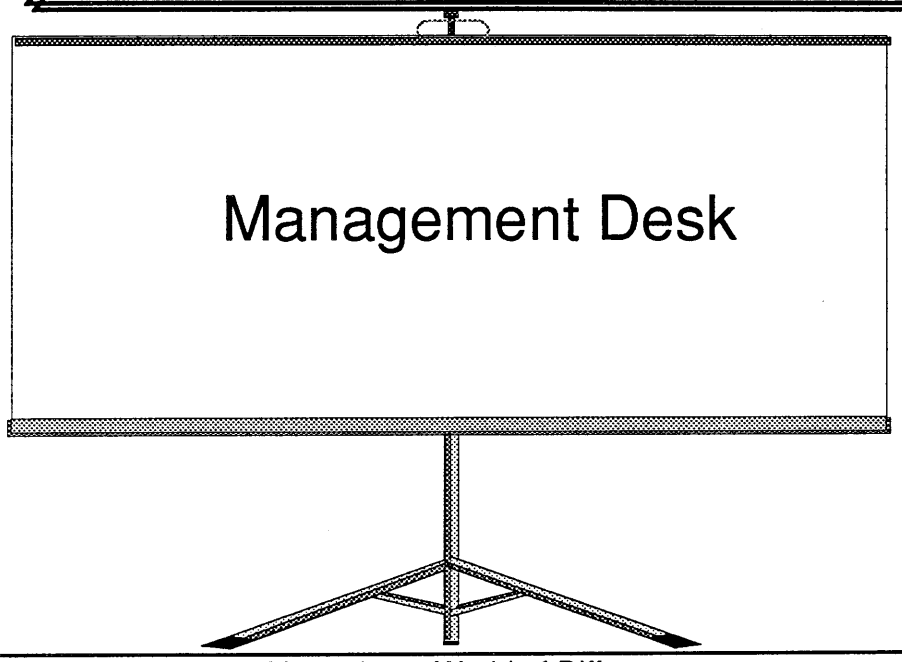
Unit 3



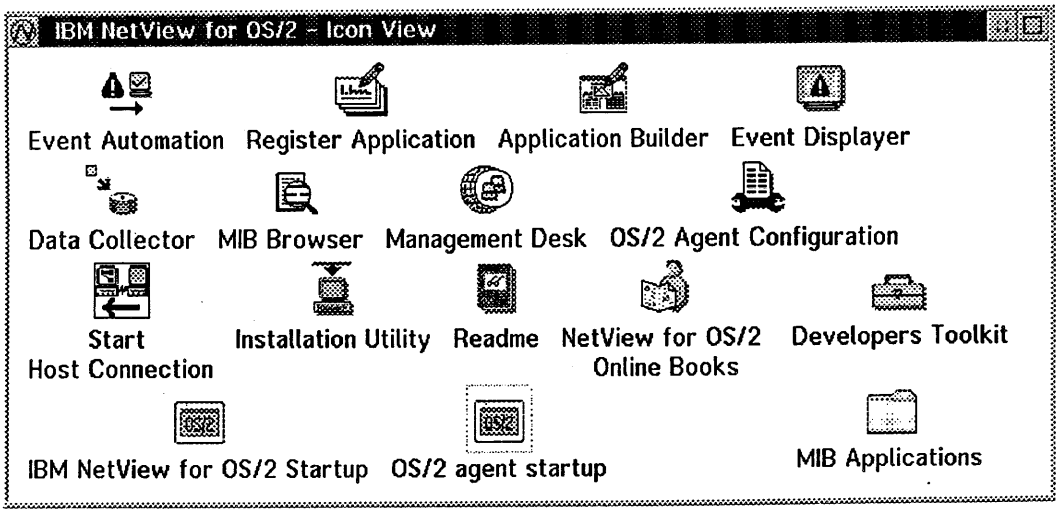
Unit 3 Agenda

- Management Desk
- Agent Configuration
  - OS/2
  - LAN Requester
  - LAN Server
- Process Manager
- Discovery

Part I



NetView for OS/2 Folder

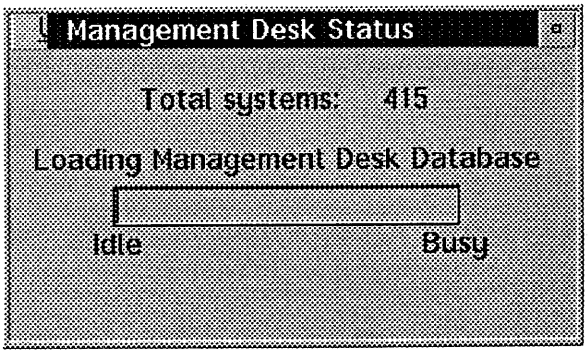


User Interface Overview

Management Desk

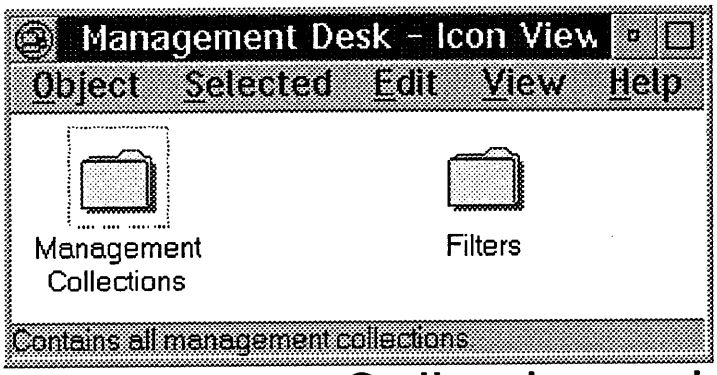
- Graphical User Interface
- Display Discovered Systems
- Launch Management Applications
  - NetView for OS/2 Applications
  - Vendor Written Applications
  - User Defined MIB Application.
- Manage Workstations From Logical Collections

Management Desk Status



- Display Number of Systems Built From Discovery Database
- Indicates If Management Desk User Interface is Busy or Idle

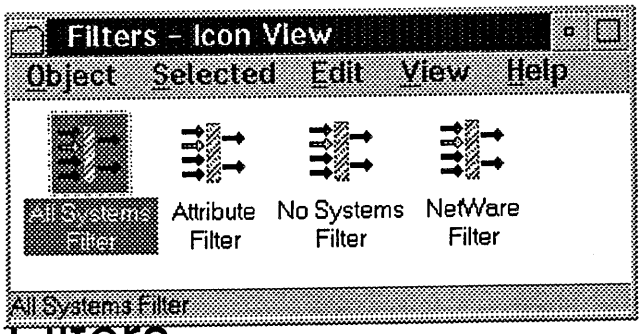
Graphical User Interface



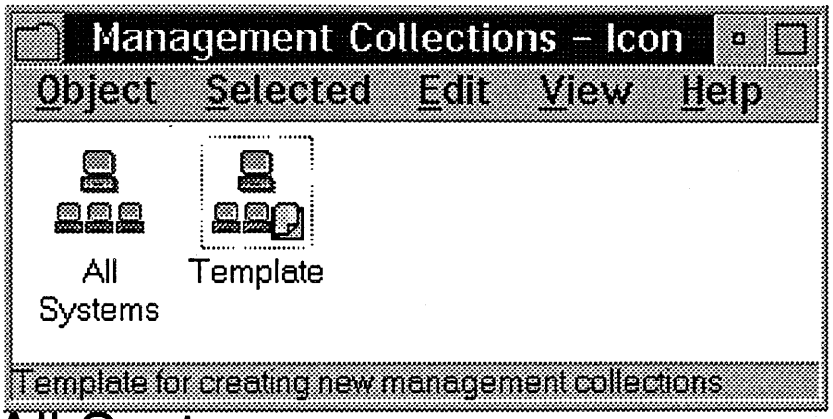
- Management Collections - logical grouping of nodes to be managed
- Filters - used to create management collections

Filters

- Default Filters
  - All Systems Filter
  - Attribute Filter
  - No Systems Filter
  - NetWare Filter
- User Created Filters
  - Based on Location, Contact, Status...etc.

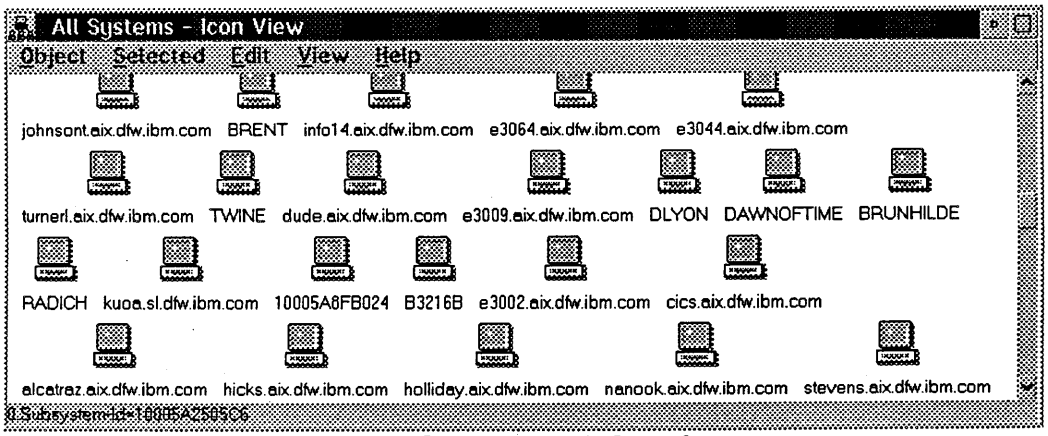


Management Collections



- All Systems
  - Contains All Discovered Systems
- Template
  - Create Logical Management Collection

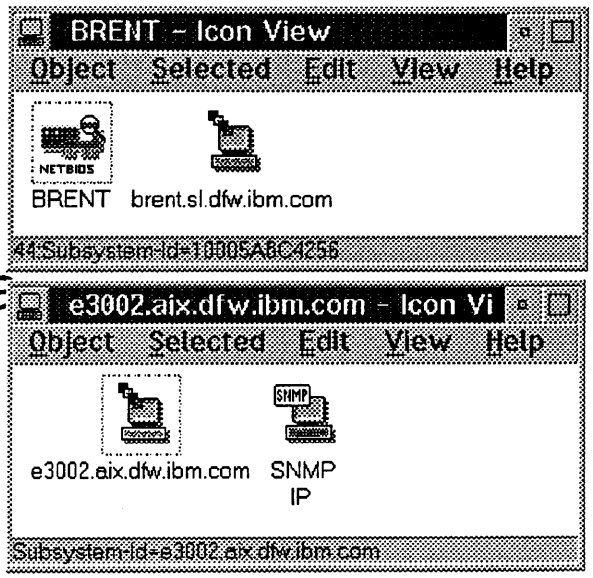
All Systems



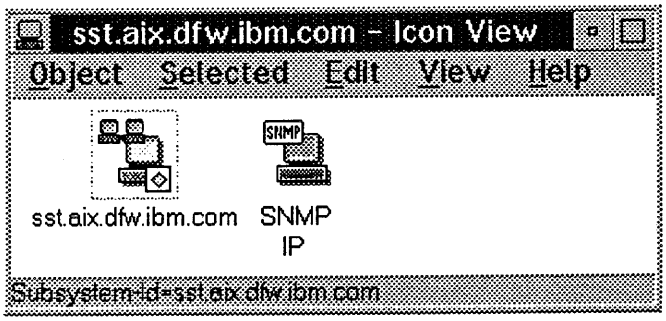
- TCP/IP Nodes
- NETBIOS Nodes
- IPX Nodes

Managed Resouces

Each managed resouce is represented by a different icon

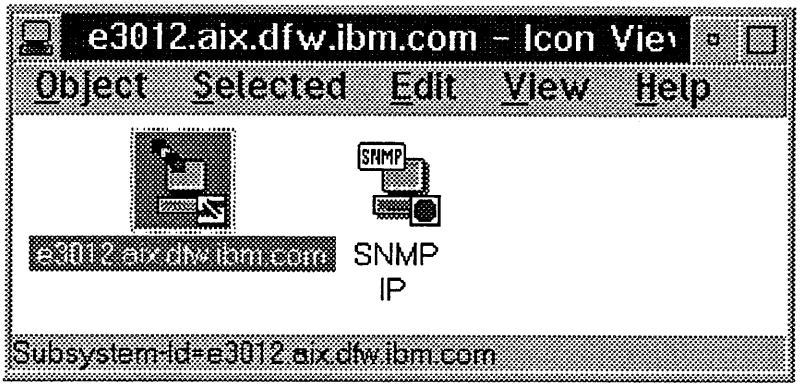


Degraded Device



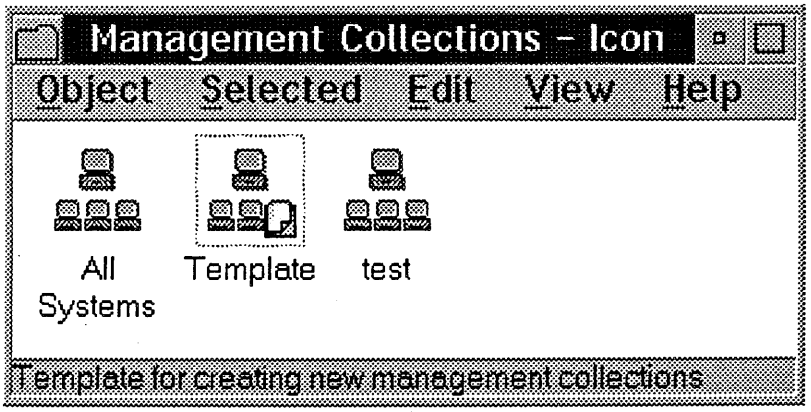
- One or more of the resources are off-line
- One or more of the resources have problems (Fault Management)

Off-Line Device



All Resources are unavailable

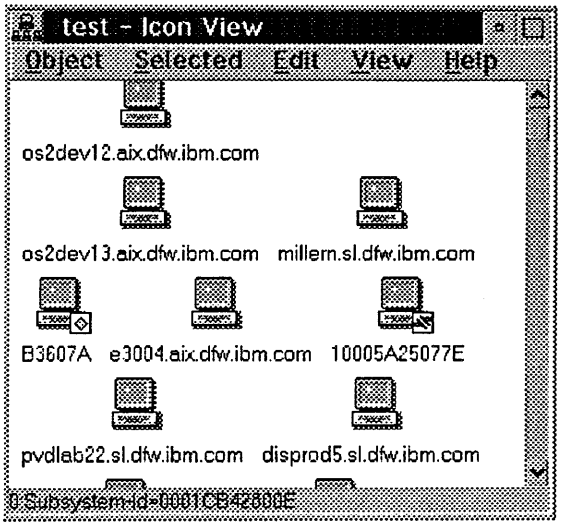
New Management Collection



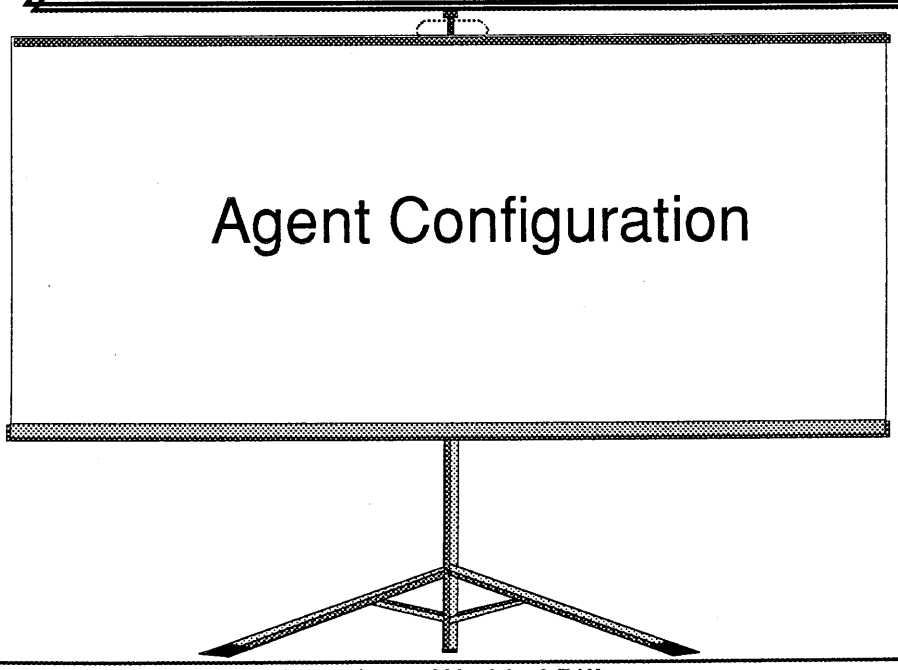
- Branch Offices - By Location
- Servers - By Workstation Type
- Problem Machines - By Status

New Management Collection

Shadows of All Systems Management Collection



Part II

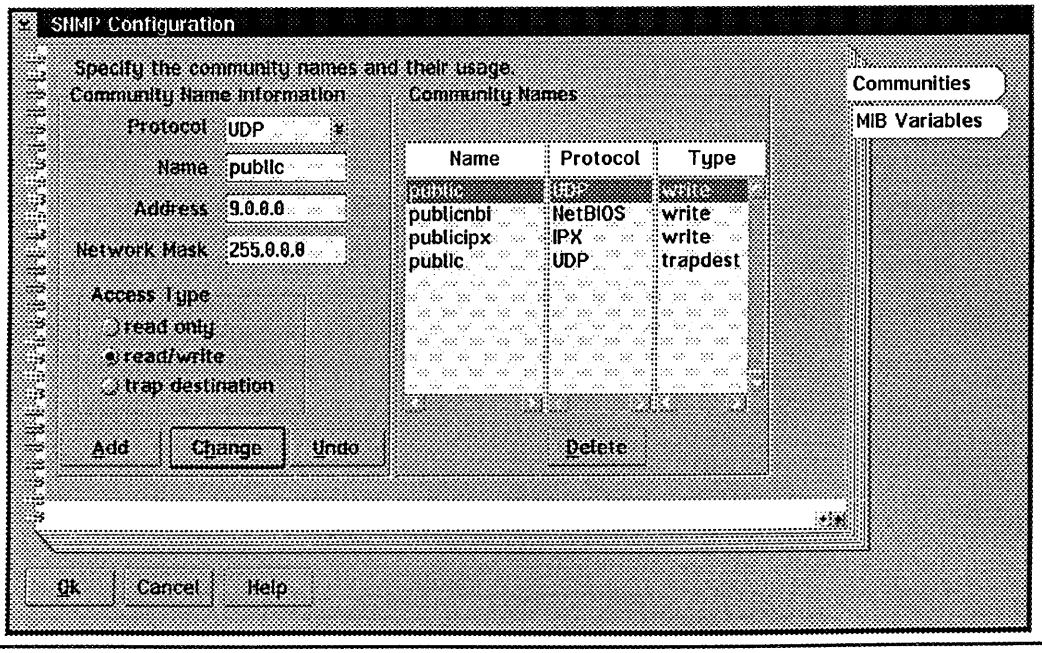


Agent Configuration

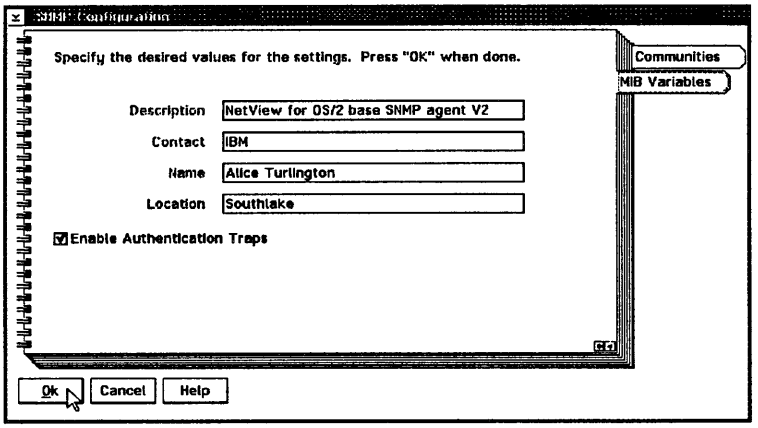
OS/2 Agent Configuration

- Installation Parameters
- User Information
- Community Names

OS/2 Agent Configuration



OS/2 Agent Configuration

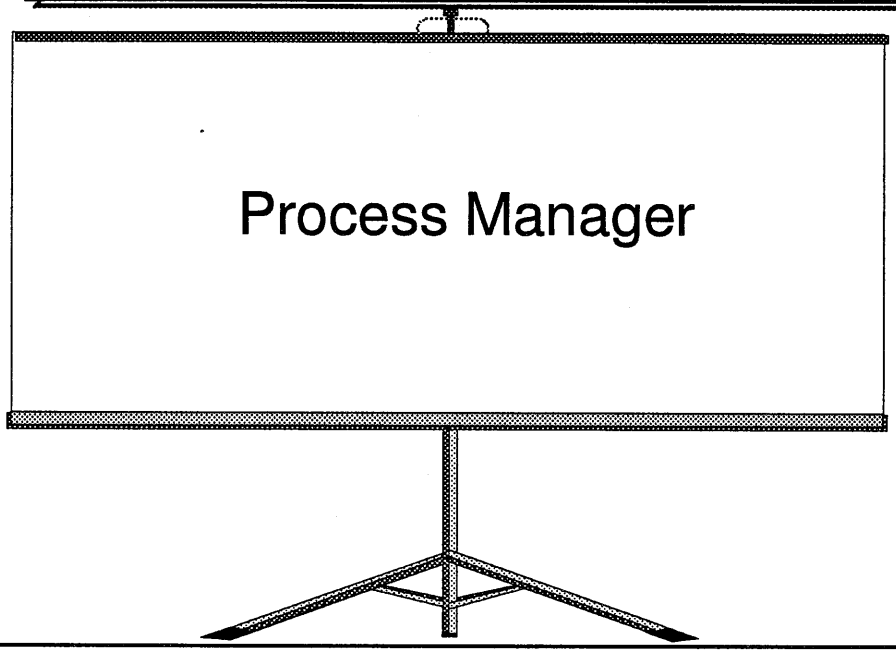


- Parameters Used to Create Management Collection Filters
- SNMP Request Authentication Traps

Agent Configuration Files

- Specify agent start-up defaults and polling intervals
  - Operational state polling
  - Performance information polling
- OS/2 Agent information
  - \anv2\etc\config\sia_base.cfg
- LAN Server Agent information
  - \anv2\etc\lsagent.cfg
- LAN Requester Agent information
  - \anv2\etc\lragent.cfg

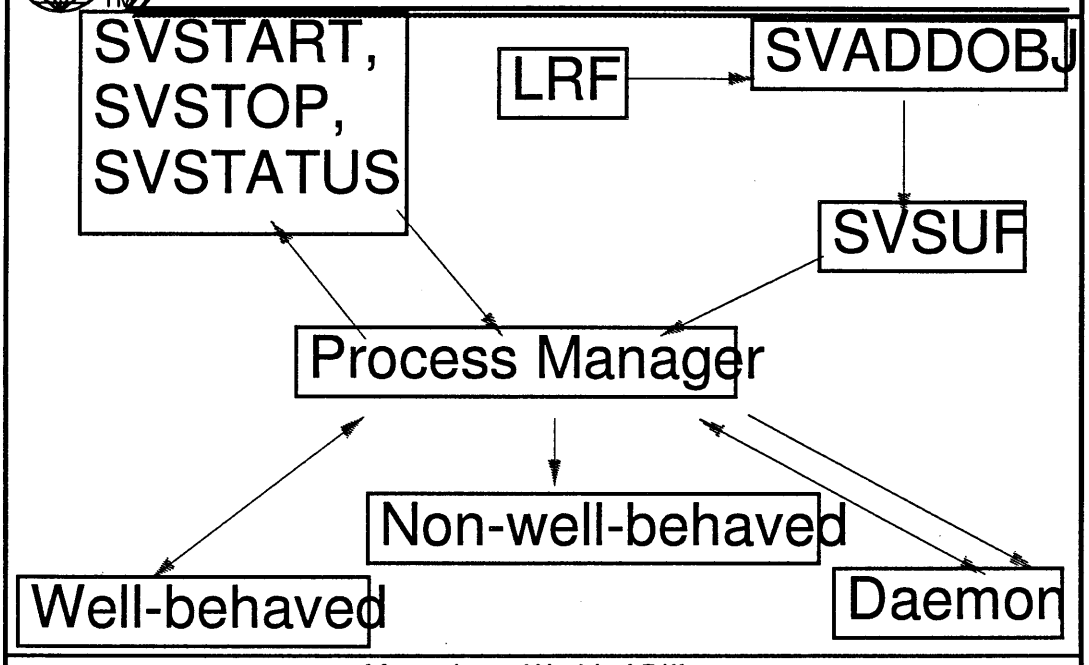
PART III



Process Manager

- Start Up NetView for OS/2 Components
  - Default components
  - Start/Stop Individual Components
- Provides Status Information

Process Manager Flow



Process Manager Commands

- SVSTART <component_name> : Starts a Specified Component
- SVSTOP <component_name> : Stops a Specified Component
- SVSTATUS <component_name> : Displays the Status of a Specified Component

Note: If no component_name is specified, it will start all, stop all and display all.

Startup File - SVSUF

- Registered Components to be started
  - Default Startup Option
  - Program Behavior
  - Any Dependencies
- Should NOT be Modified via Editor
- x:\ANV2\ORS Subdirectory

Example - SVSUF File

```
0:postmaster:LNPM.EXE:OVs_YES_START::
  :OVs_DAEMON:60:
0:topology:Intop.exe:OVs_YES_START:postmaster:
  :OVs_DAEMON::
0:tcpipdiscovery:LNTCPIP.EXE:OVs_YES_START:postmaster,topology:
  :OVs_DAEMON::
0:trapd:TRAPD.EXE:OVs_YES_START::
  :OVs_NON_WELL_BEHAVED:15:
0:snmpcollect:NV2KC.EXE:OVs_YES_START::
  :OVs_NON_WELL_BEHAVED:15:
0:eventdisplaydaemon:NV2KE.EXE:OVs_YES_START:trapd:
  :OVs_NON_WELL_BEHAVED::
0:eadaemon:EADAEMON.EXE:OVs_YES_START:trapd:
  :OVs_WELL_BEHAVED:15:
0:netwdiscovery:LNNETW.EXE:OVs_YES_START:postmaster,topology:
  :OVs_WELL_BEHAVED::
0:netbiosdiscovery:LNNETB.EXE:OVs_YES_START:topology,postmaster:
  :OVs_WELL_BEHAVED:15:
```

SUF File Entries

0:tcpipdiscovery:LNTCPIP.EXE:

- 0: Current/Comment Line
- tcpipdiscovery: Component Name
- LNTCPIP.EXE: Executable File Called

OVs_YES_START:postmaster,topology::

- OVs_YES_START: Automatic Start
- postmaster,topology: Dependencies
- : Startup Options

OVs_DAEMON::

- OVs_DAEMON: Program Behavior
- : Timeout

Local Registration File

- ASCII File
- Definitions for NetView for OS/2 Components
- Feeds into SVSUF File
- Can be Modified via ASCII Editor
- x:\ANV2\ETC\LRF

Local Registration Files

LNNETB.LRF	NetBIOS Discovery
LNNETW.LRF	NetWare Discovery
LNTCPIP.LRF	TCP/IP Discovery
LNTOP.LRF	Topology Manager
LNNV2KC.LRF	SNMP Collector Daemon
NV2KE.LRF	SNMP Event Display/Log Daemon
EADAEMON.LRF	SNMP Event Automation Daemon
TRAPD.LRF	SNMP Trap Daemon
TRALERT.LRF	Trap-to-Alert Daemon
LNPM.LRF	Process Manager

Example - LRF

```
# IBM Corp. 1994
#
# TCP/IP Network Monitor Registration File
#
tcpipdiscovery:LNTCPIP.EXE::
OVs_YES_START:postmaster,topology,agentdiscovery::OVs_DAEMON::
```

SVADDOBJ

- Registers a Management Component (Management Application)
- Comments Out a Line in the SVSUF File and Replace With the Most Current Information
- Called From x:\ANV2\ETC\LRF Subdirectory
- SVADDOBJ <LRF_file_name>
- Example: SVADDOBJ LNNETW.LRF

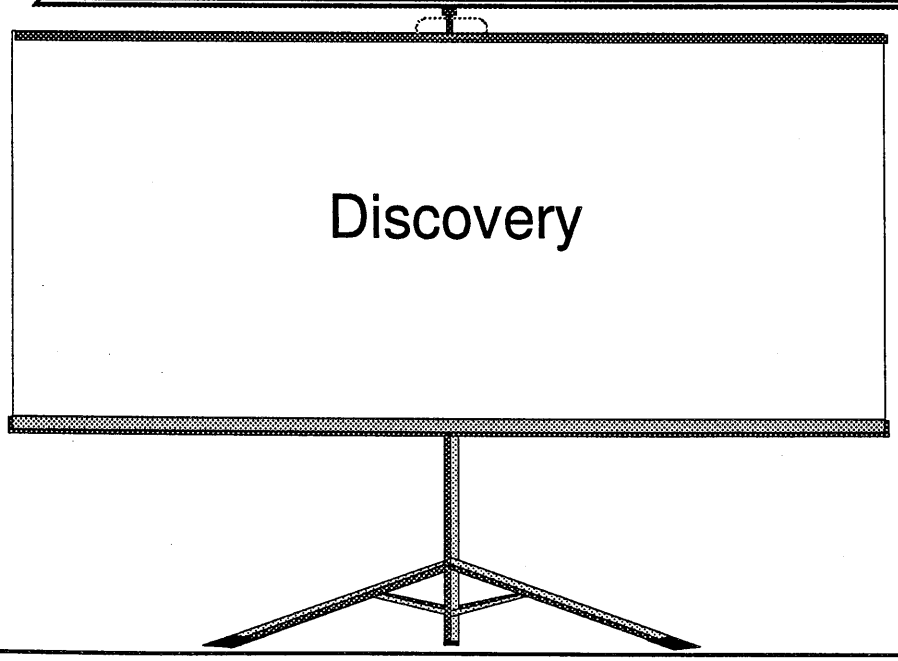
SVDELOBJ

- Deregisters a Management Component (Management Application)
- Comments Out a Line in the SVSUF File
- Called From x:\ANV2\ETC\LRF Subdirectory
- SVDELOBJ <LRF_file_name>
- Example: SVDELOBJ LNNETW.LRF

Changing a Component's Entry In SVSUF

- Find out if the process is currently running
- If the process the currently running, then stop it
- Edit the necessary LRF file to specify the new parameters
- Delete the entry from the startup file
- Add the new entry into the startup file
- Start the component just modified
- Look at the status of the newly started component

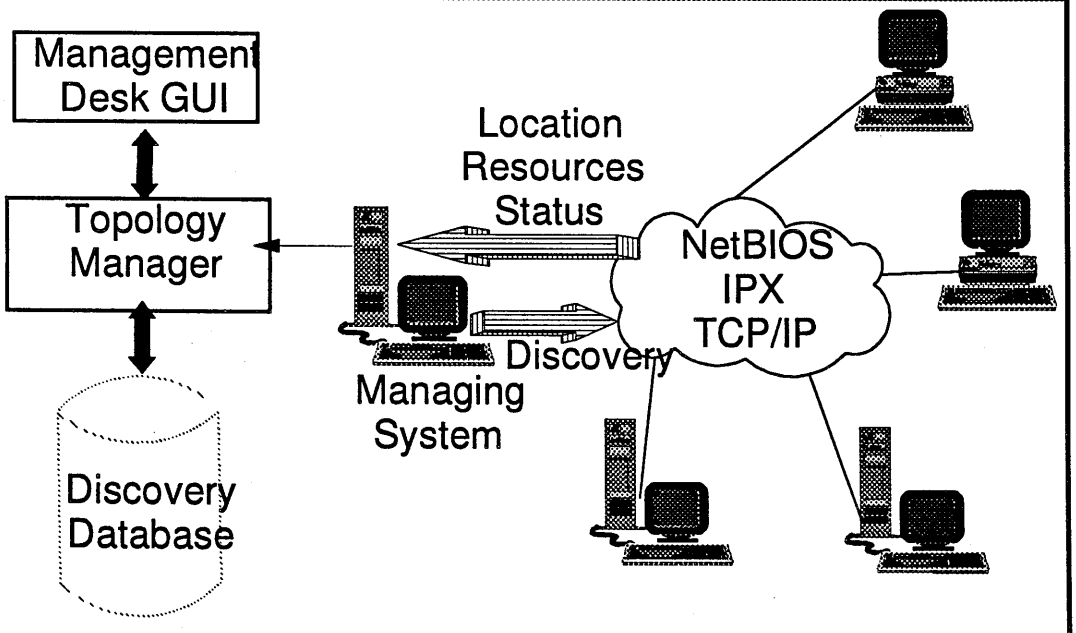
PART IV



Topology Management Service

- Topology Manager : Provides Access to Discovery Database
- Discovery Process
- Discovery Database : Stores Workstation, Resource, and Status Information

Discovery Data Flow



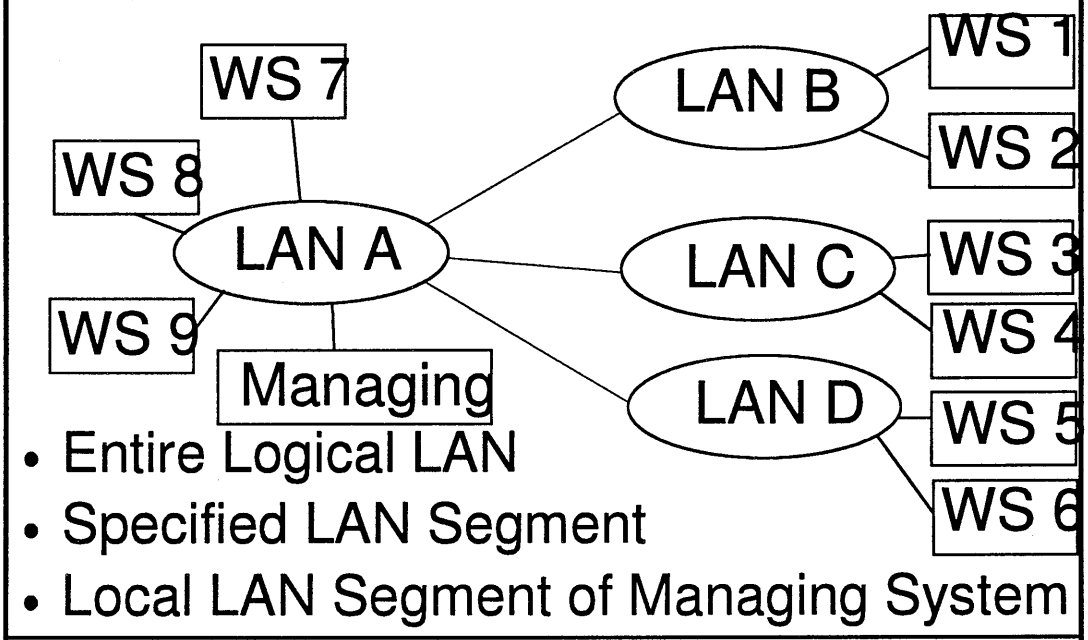
Discovery

- Automatic
- Node Discovery Protocols
  - NetBIOS
  - IPX(NetWare)
  - TCP/IP(or AnyNet/2:Sockets over SNA)
- Agent Discovery
- Discovered Nodes are corrolated via MAC address

NetBIOS Discovery Configuration

- Specifying the systems discovered
  - Seed File
- Limiting the systems discovered
  - Seed File
- Configuring the discovery intervals
  - Configuration File
- Disabling NetBIOS Discovery

NetBIOS Discovery Options



- Entire Logical LAN
- Specified LAN Segment
- Local LAN Segment of Managing System

NetBIOS Discovery Seed File

```
#
# Specify the ring segment number
#
022          #Second Floor B Pod
#
# Search the local segment
#
-
#
# Search all segments
#
# *
```

Using the NetBIOS Discovery Seed File

- Modify the .LRF file
  - Specify seed file as start-up option
- Update the SVSUF file
- Re-start NetBIOS discovery

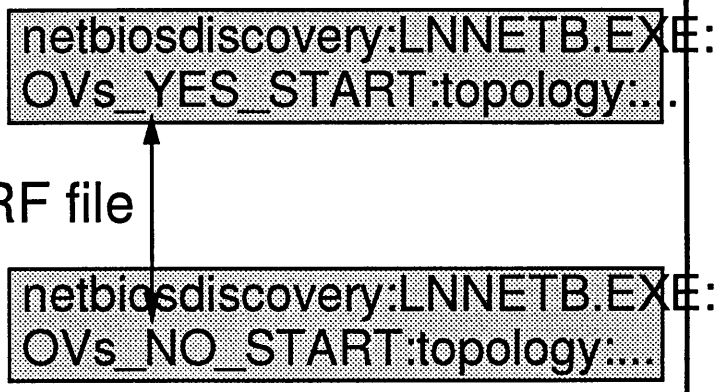
```
netbiosdiscovery:LNNETB.EXE:
OVs_YES_START:topology:-s \anv2\etc\seed...
```


NetBIOS Discovery Configuration File

\anv2\etc\lnnetb.cfg

```
Global_Polling_Switch=1
Status_Polling_Switch=1
Status_Polling_Interval=5
Status_Polling_Interval_Unit=m
New_Node_Switch=1
New_Node_Interval=1
New_Node_Interval_Unit=h
```

Using the NetBIOS Discovery Seed File



- Modify the .LRF file
- Update the SVSUF file

TCP/IP Discovery Configuration

- Specifying the initial systems to discovery
  - Seed file
- Limiting the systems discovered
  - Mask file
- Logging discovered systems
  - Log file
- Configuring the discovery interval
  - Configuration file
- Disabling TCP/IP Discovery

TCP/IP Seed File Example

```
#
# This is a sample TCP/IP Seed File
#
kuoa.sl.dfw.ibm.com
9.180.144.102
9.19.143.2
```


Using the TCP/IP Discovery Seed File

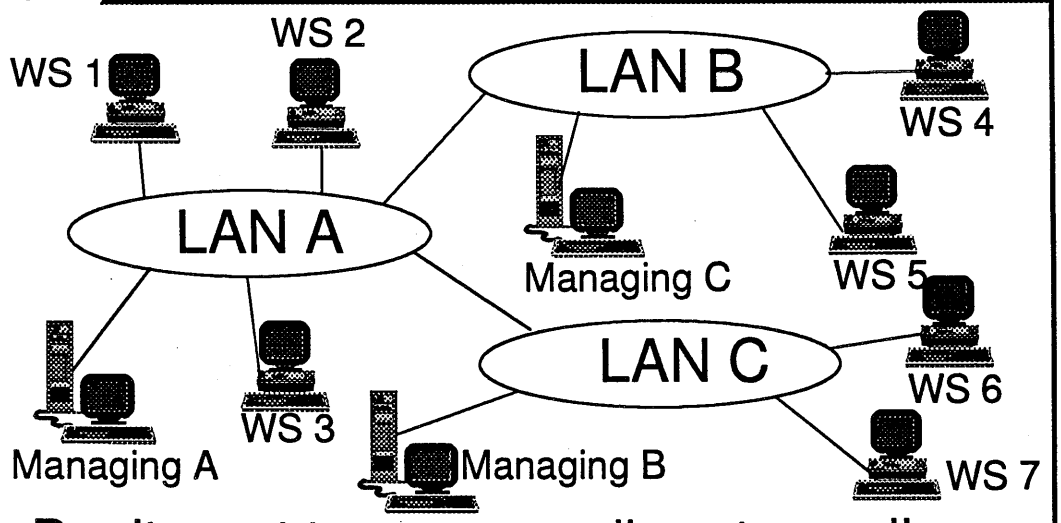
- Modify the .LRF file
  - Specify seed file as start-up option
- Update the SVSUF file
- Re-start NetBIOS discovery

```
tcpipdiscovery:LNTCPIP.EXE:
OVs_YES_START:topology:-s
                    \ANV2\ETC\NODELIST:...
```

TCP/IP Discovery Mask File

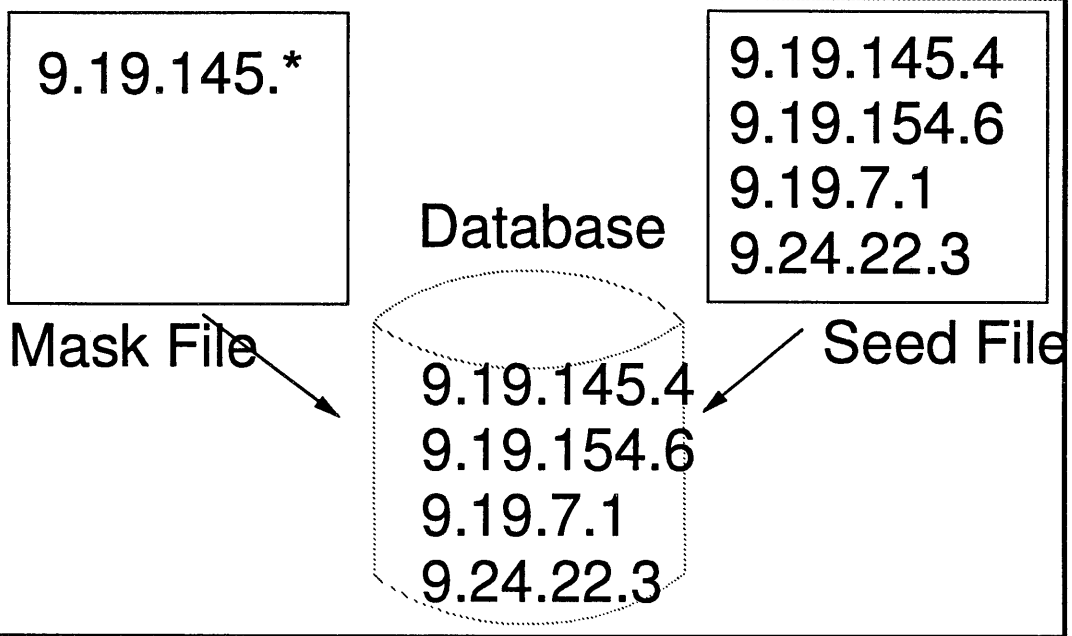
- Addresses of Systems to Add to Database (IP Addresses Only)
- Does not Mask Seed File Nodes
- \ANV2\ETC\LNTCPIP.MSK
- Takes Effect Immediately

TCP/IP Discovery Mask File



- Don't want to manage all systems discovered
- Multiple managing workstations

TCP/IP Discovery Mask File



TCP/IP Discovery Log File

- Not a dynamic file
- Logs Discovered Nodes
- ASCII File
- Can be Used as Seed File
- \ANV2\ETC\NODENAME.LOG

Using the TCP/IP Discovery Log File

- LNTCPIP.LRF

- tcpipdiscovery:LNTCPIP.EXE:
- OVs_YES_START:topology:-L:...

TCP/IP Discovery Configuration File

Global_Polling_Switch=1 \anv2\etc\lntcpip.cfg
Status_Polling_Switch=1
Status_Polling_Interval=5
Status_Polling_Interval_Unit=m
New_Node_Switch=1
New_Node_Auto_Switch=1
New_Node_Polling_Interval=15
New_Node_Polling_Interval_Unit=m
Config_Checking_Switch=1
Config_Polling_Interval=1
Config_Polling_Interval_Unit=d

Disabling TCP/IP Discovery

tcpipdiscovery:LNTCPIP.EXE:
OVs_YES_START:topology:...

- Modify the .LRF file

tcpipdiscovery:LNTCPIP.EXE:
OVs_NO_START:topology:...

- Update the SVSUF file

IPX Discovery Configuration

- Limiting the systems discovered
  - CONFIG.SYS
- Logging discovered systems
  - Log files
- Disabling TCP/IP Discovery

IPX Discovery Configuration

- CONFIG.SYS File
  - SET NMSADMIN = IPXSEARCH
    (Discovers all IPX Systems)
  - SET NMSADMIN = NOSEARCH
    (Discovers only NetWare Servers)

- Log Files
  - NetWare Servers - MAPSRV.DAT
  - NetWare Clients - MAPWF.DAT
  - NetWare Error Messages - MAPINIT.ERR

Disabling IPX Discovery

```
netwdiscovery:LNNETW.EXE:OVs_CMOT_TCP:
OVs_NO_START:postmaster,topology::
                                OVs_WELL_Behaved::
```

Agent Discovery Configuration

- Enabling the discovery of SNMP Agents
  - LNAGNT.LRF startup option
- Configuring the discovery interval
  - Configuration file

Customizing Agent Discovery

- LNAGNT.LRF start-up option
  - -x

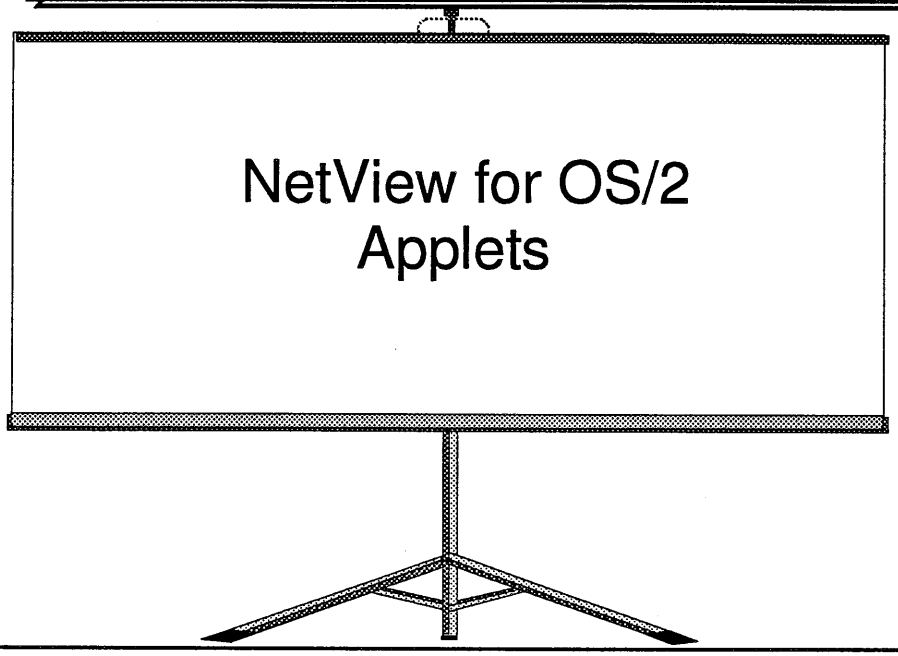
```
# IBM Corp. 1994
#
# Netview for OS/2 Topology Interface for NetBIOS Discovery
#
#
agentdiscovery:LNAGNT.EXE::
OVs_YES_START:topology,postmaster:-x:OVs_DAEMON:15:
```

Agent Discovery Configuration

- \anv2\etc\LNAGNT.CFG

```
Global_Polling_Switch=1
Status_Polling_Switch=1
Status_Polling_Interval=30
Status_Polling_interval_Unit=m
```

Unit 4



Unit 4 Agenda

- Execute Remote Commands
- View Information From NetWare Systems
- Query and Display MIB Information
- Creation and Use of MIB Applications
- Adding new MIBs

Remote Command Execution

- Executes commands on
  - Managed system
  - Management collection
- Text-based commands
  - Not interactive
- Command chaining
  - [E:\ANV2] C: & CD\IBMLAN & TYPE IBMLAN.INI
- Output displayed locally
  - STDOUT, STDERR, return code redirected

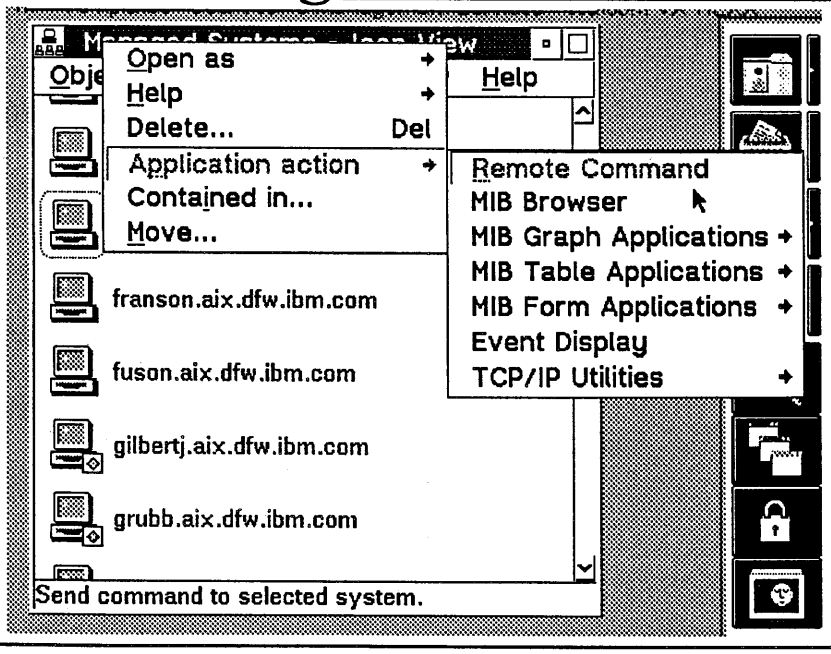
SVRUNCMD

- Command line based
- svruncmd -d *destination* -com *"command string"*
  - -c *community*
  - -delimit *delimitor*
  - -showstdout
  - -showstderr
  - -showrc
  - -t *timeout value*
  - -h
  - -?

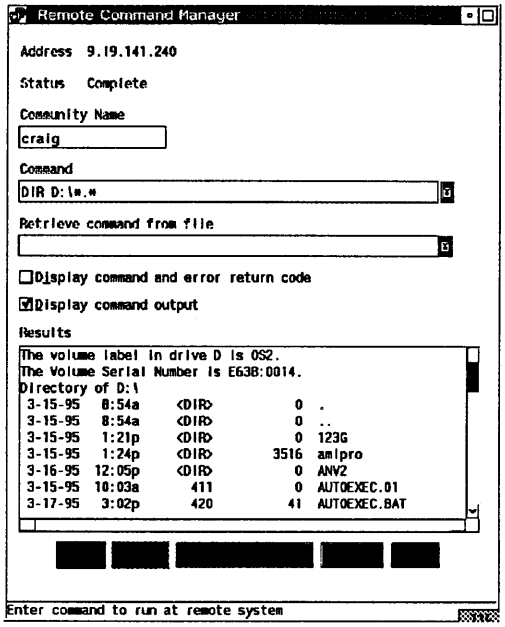
Remote Command Manager

- Graphical user interface
- Commands can be saved
- Output saved to a file
- Parameters
  - Community name
  - Command
  - Display command and error return code
  - Display command output
- Maximum output limited

Invoking Remote Command Manager



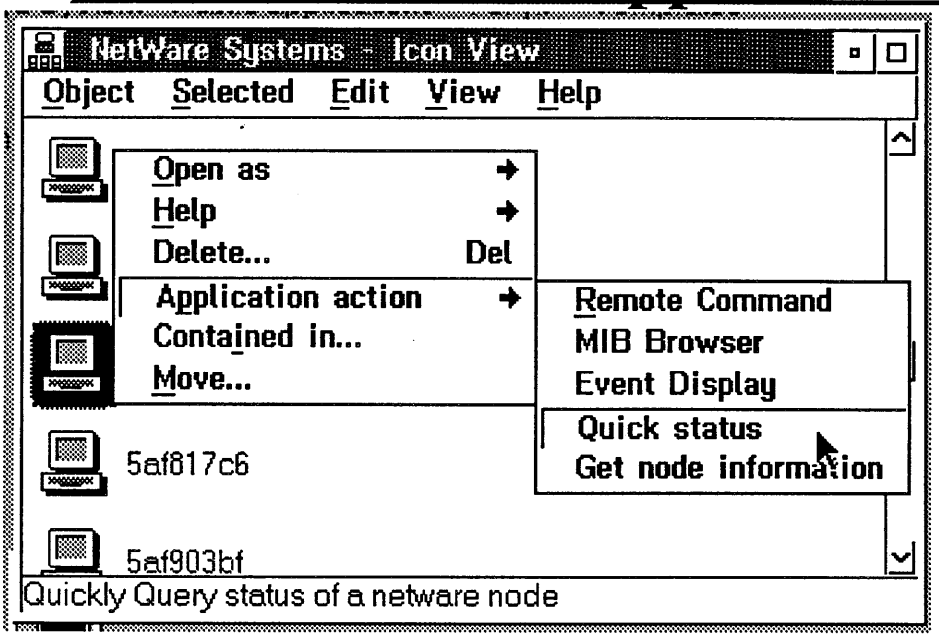
Remote Command Manager Interface



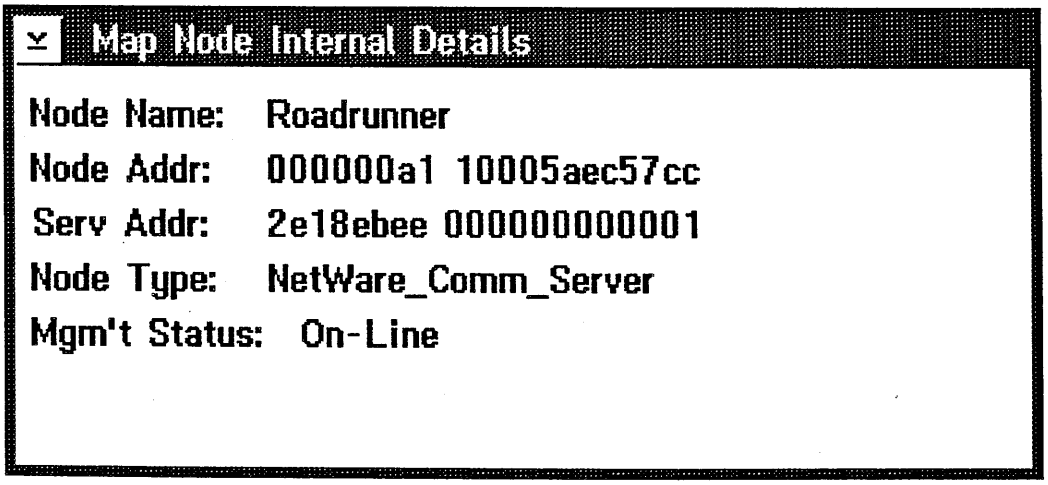
NetWare System Information

- Quick Status
  - "Snap-shot" of system
- Get Node Information
  - Detailed system information
  - Address
  - IPX/SPX information
  - Adapter address
  - Adapter packet information
  - Adapter configuration information
  - ...

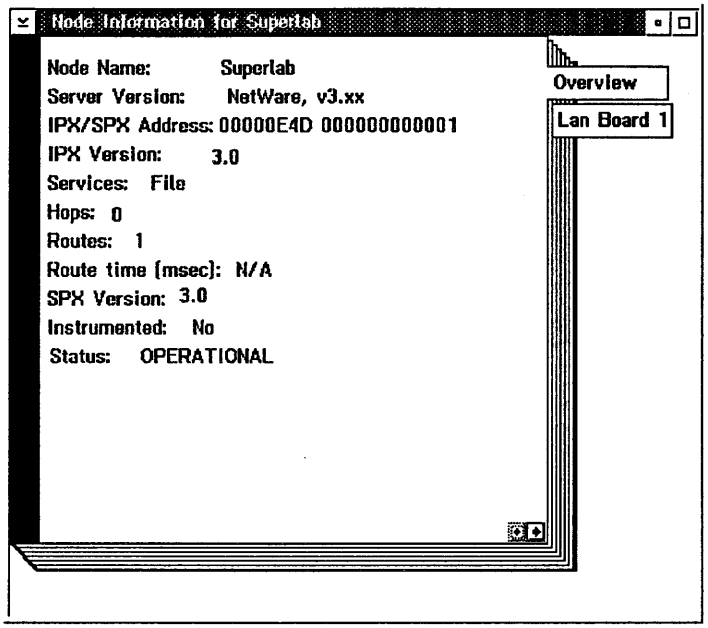
Invoking NetWare Information Applets



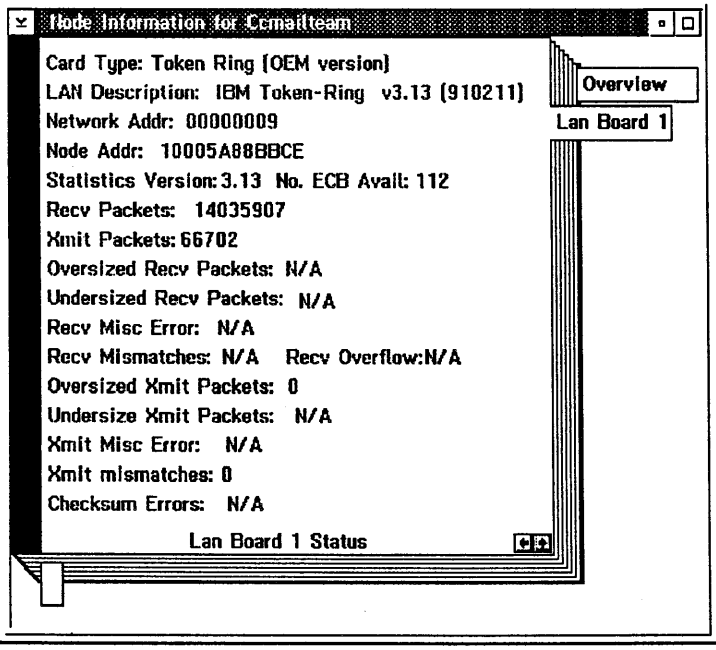
Quick Status



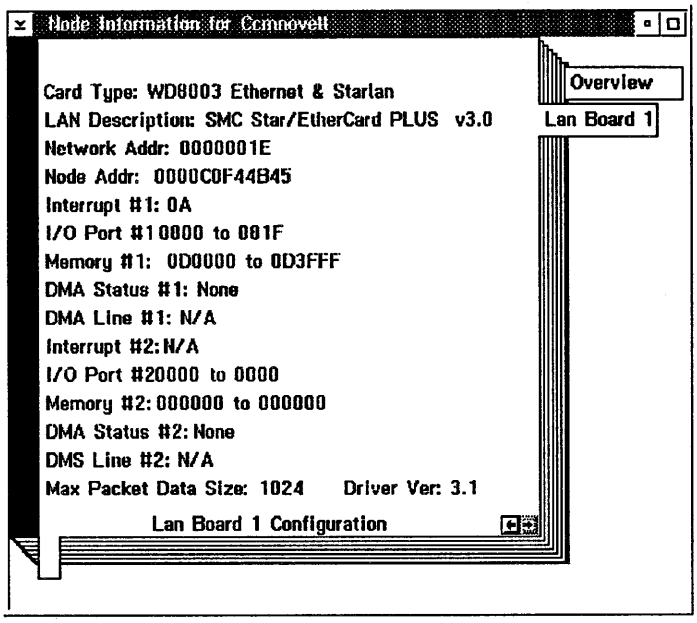
Get Node Information - Overview



Get Node Information - Status



Get Node Information - Configuration



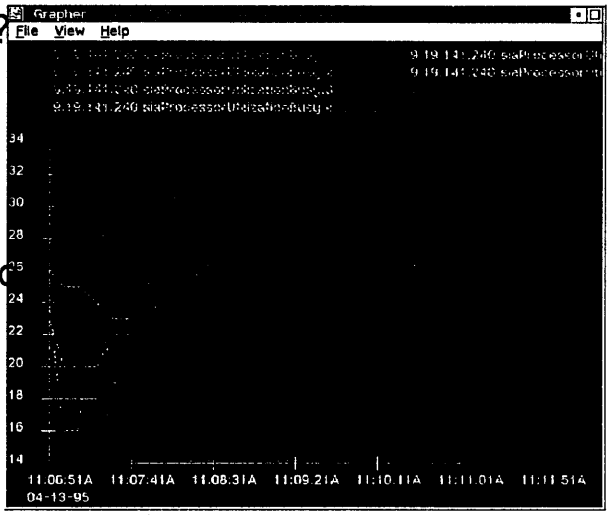
Grapher - Overview

- Displays data in graphical format
  - Real-time
  - Historical
- Started by
  - MIB Browser
  - MIB Application Builder
  - MIB Data Collector

Grapher Interface screen

What CAN be customized?
- Polling interval
- Line characteristics
- Display
- Grid
- Counter Values

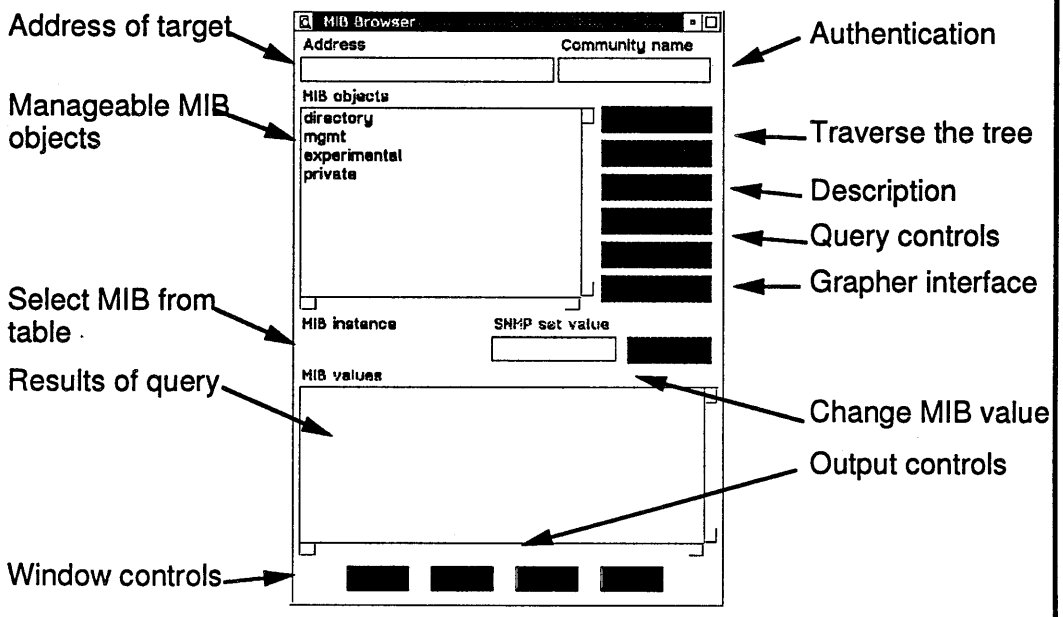
What CAN'T be customized
- Scale
- Legend
- Background color
- Screen width



MIB Browser - Overview

- Query and set value of MIB's
  - Standard
  - Enterprise Specific
- Queried data
  - Displayed
  - Graphed
  - Saved

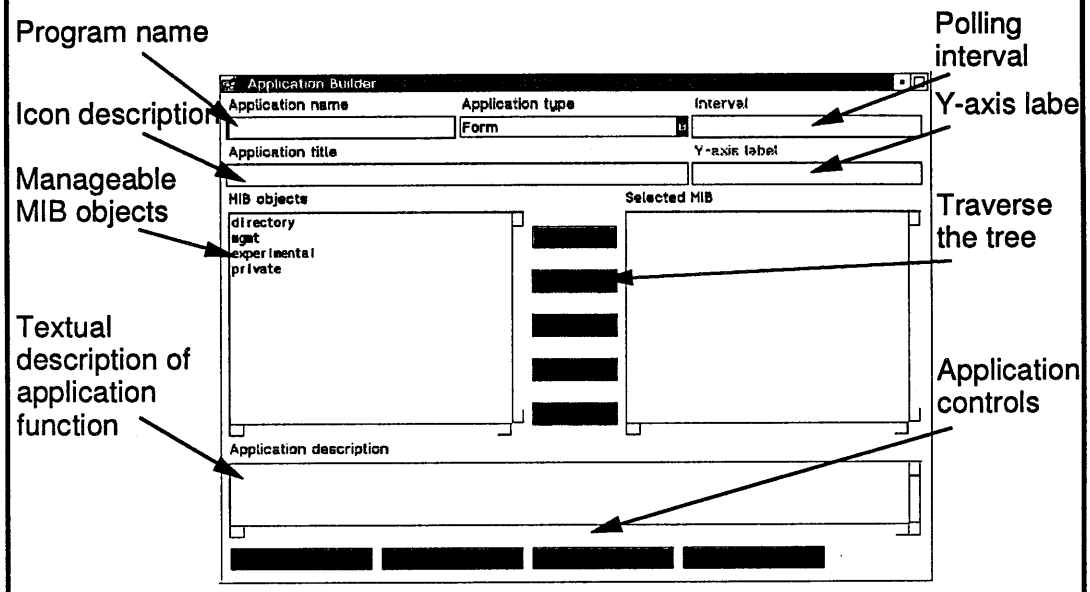
MIB Browser Screen



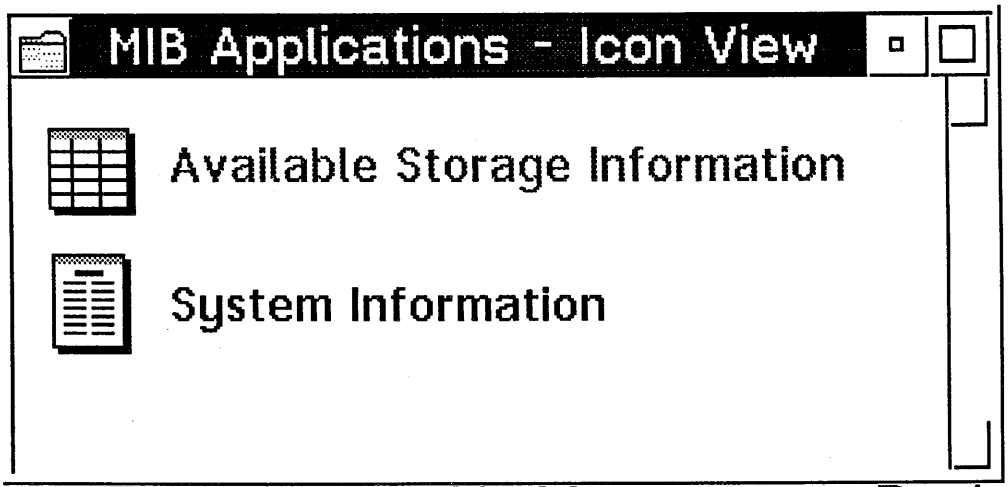
Application Builder

- Creation of applets
  - CPU performance
  - SNMP Traffic
  - ...
- No programming
- Applets saved for future use
- Types of applets
  - Form
  - Table
  - Graph

Application Builder Screen

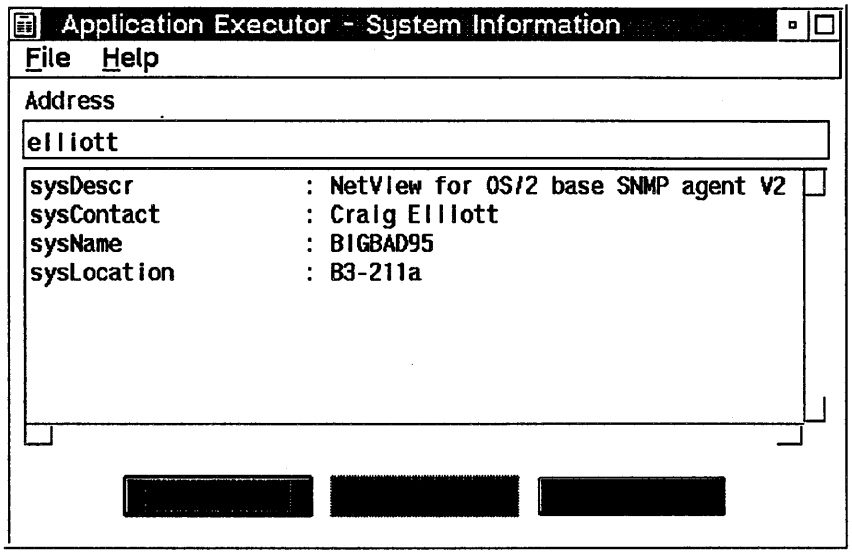


Built Applications



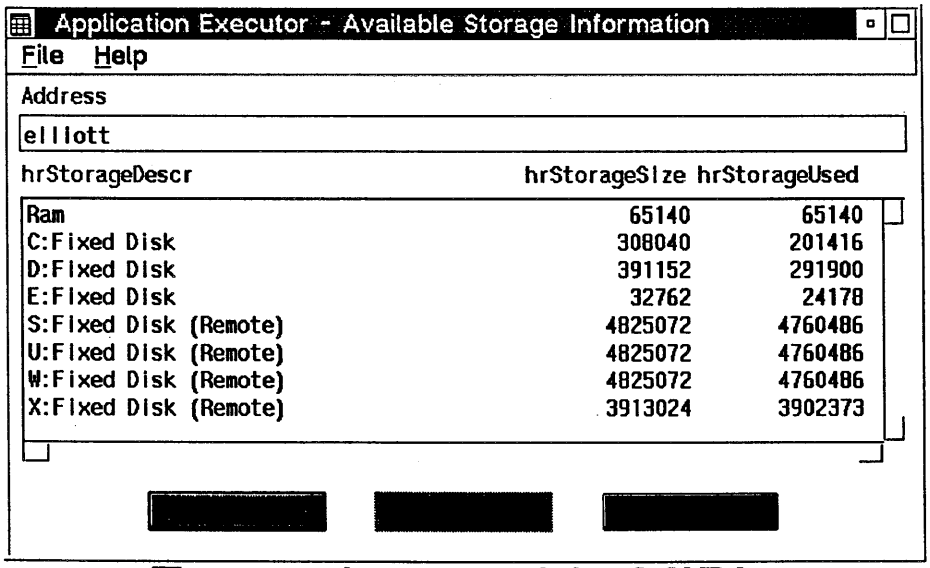
- Folder created in Management Desk
- Icons added when applets are "built"

Sample Form Applet



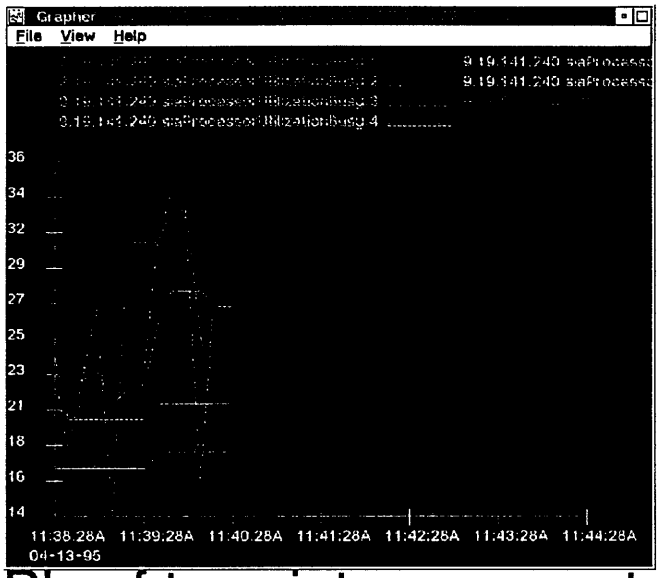
- Only for scalar MIB's

Sample Table Applet



- For scalar or table MIB's

Sample Graph Applet



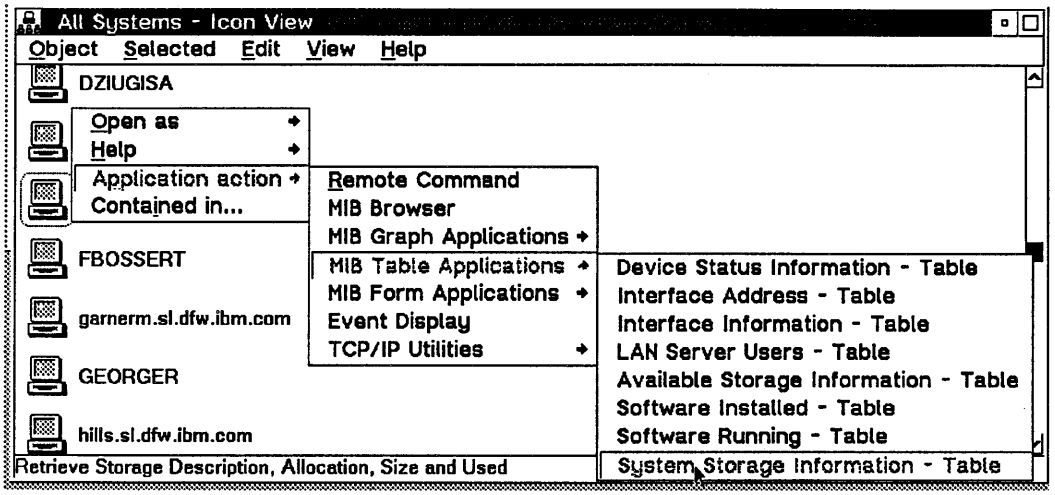
- For MIB's of type integer, counter, or gauge

Register Applications

Register Application

- Registers applets with Management Desk GUI
- Eases use of applets
- Applets available from Object pop-up menu
- Management desk must *not* be running

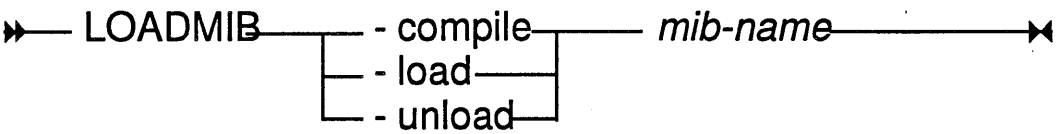
Sample Management Desk Menu



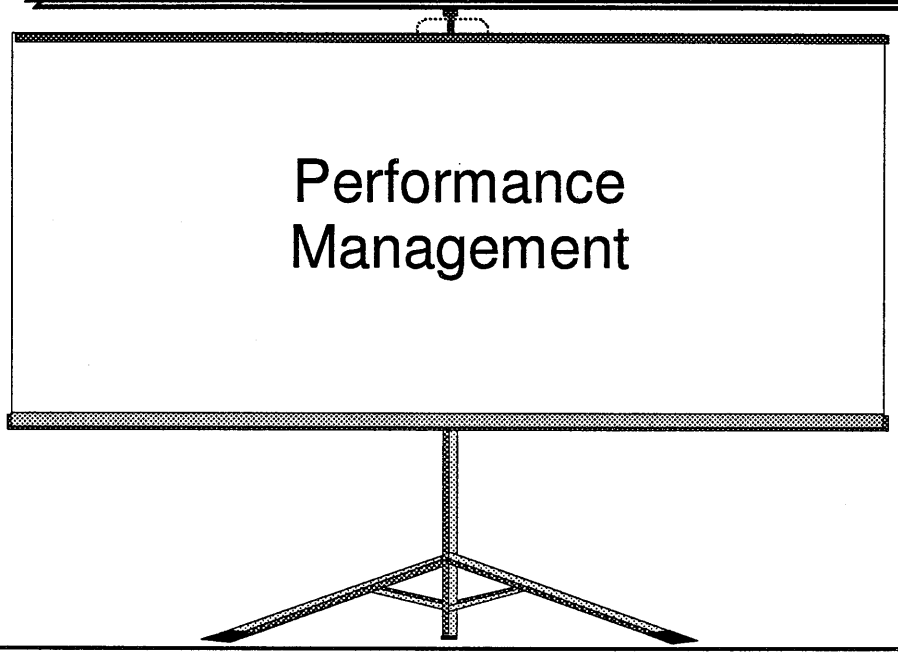
MIB Loader

- Defines MIB objects
- Compiles and loads enterprise-specific MIB's
- Unloads MIB's
- Command line execution
- Adds a sub-tree to the MIB tree structure
- MIB's provided by vendors

Running MIB Loader



Unit 5



Unit 5 Agenda

- Performance Management Functions
- MIB Application Builder
- Data Collector
- OS/2 performance management
- Implementing performance management
- Performance management applications

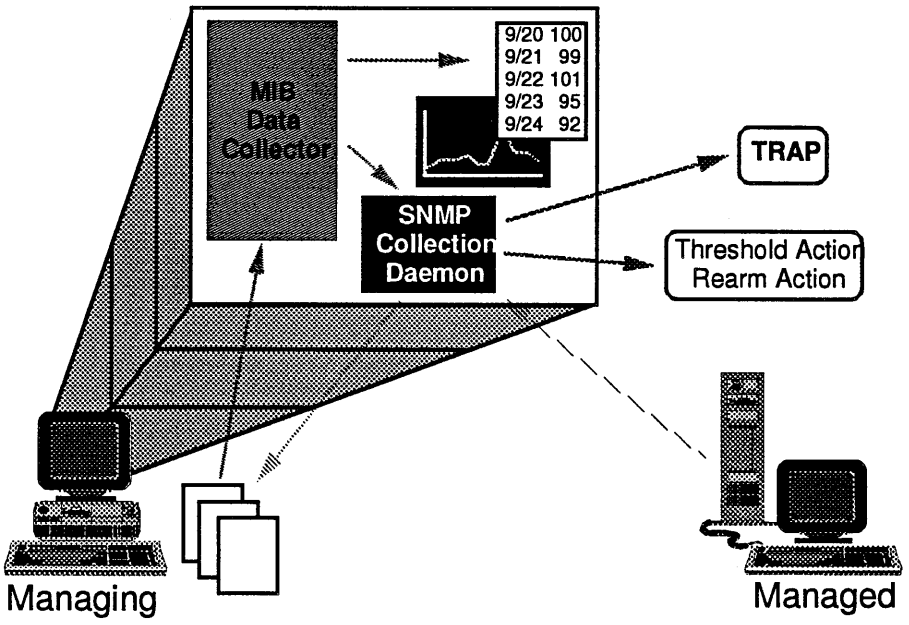
Performance Management Functions

- Gather performance data
  - CPU utilization
  - Memory usage
  - ...
- Watch for performance problems
  - Thresholds
- Plan for resource enhancements
  - Trending analysis

MIB Data Collector

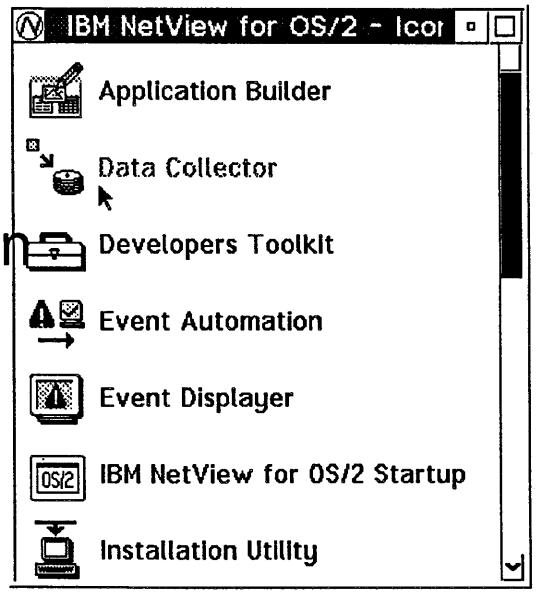
- Define MIB variables to collect
- Collects at intervals
- Stores MIB data in file
- Define thresholds
  - Specify threshold actions
  - Specify re-arm actions
- Display collected data
  - Table
  - Graph

How the MIB Data Collector Works

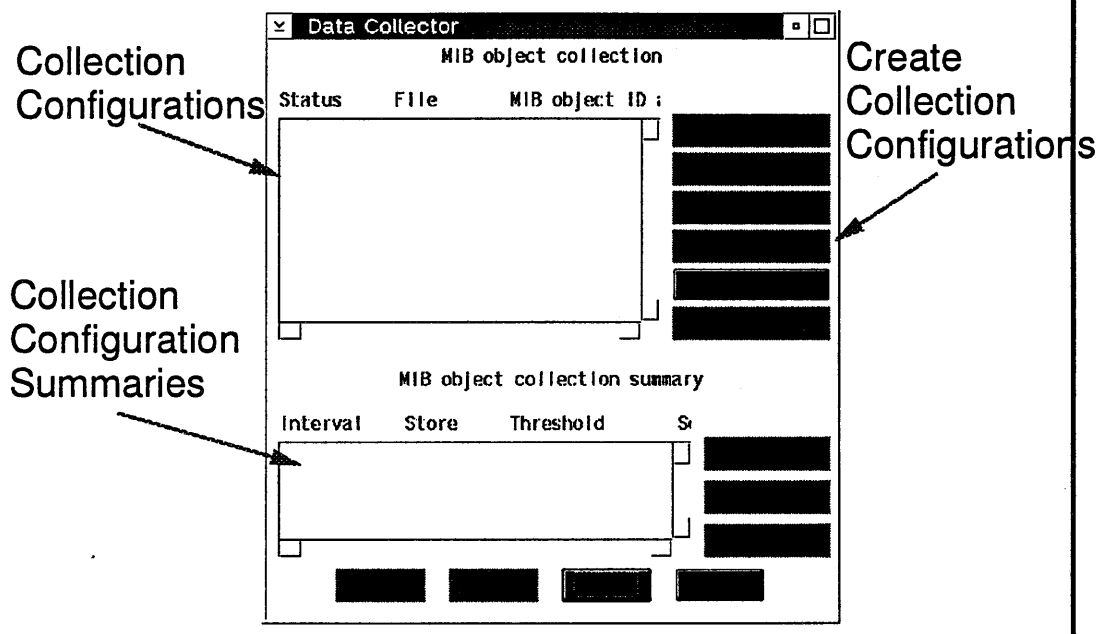


Invoking the MIB Data Collector

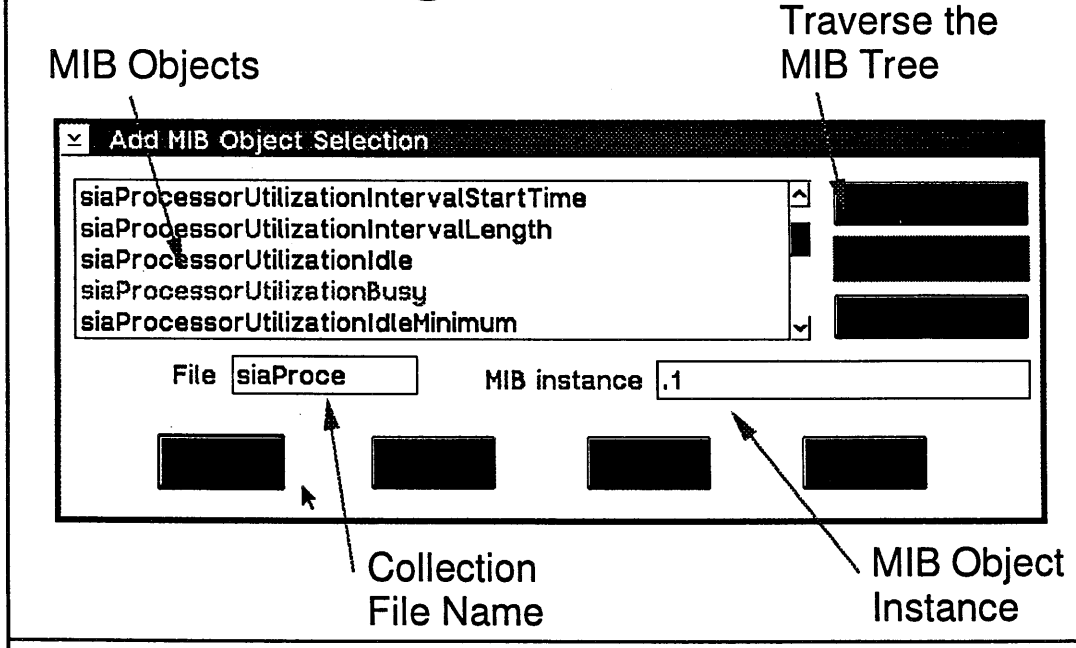
- Double-click on **Data Collector** icon



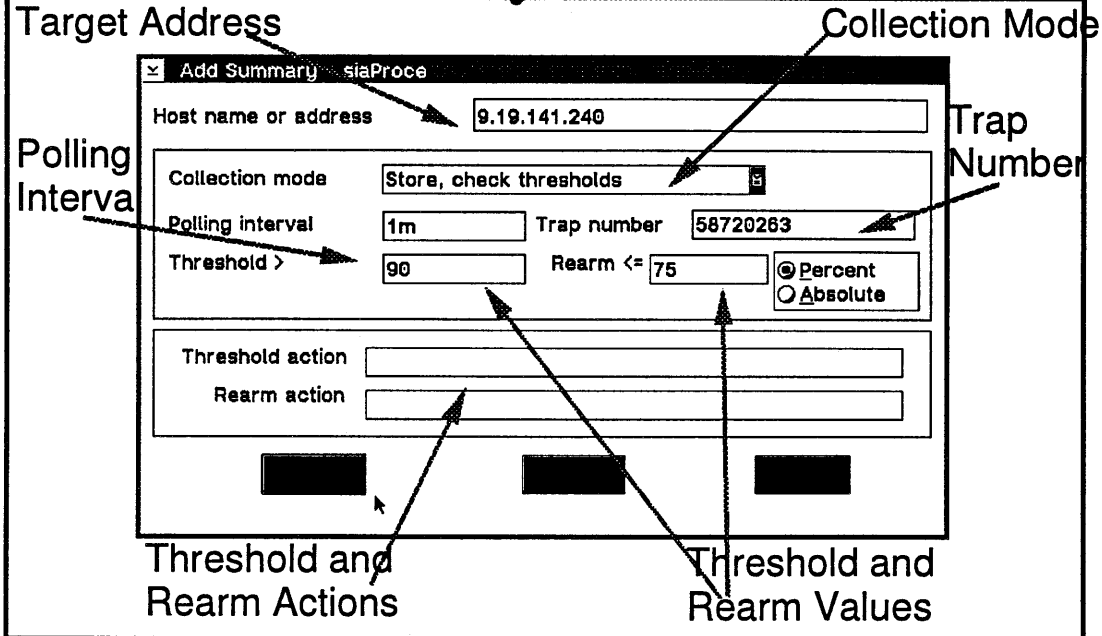
MIB Data Collector



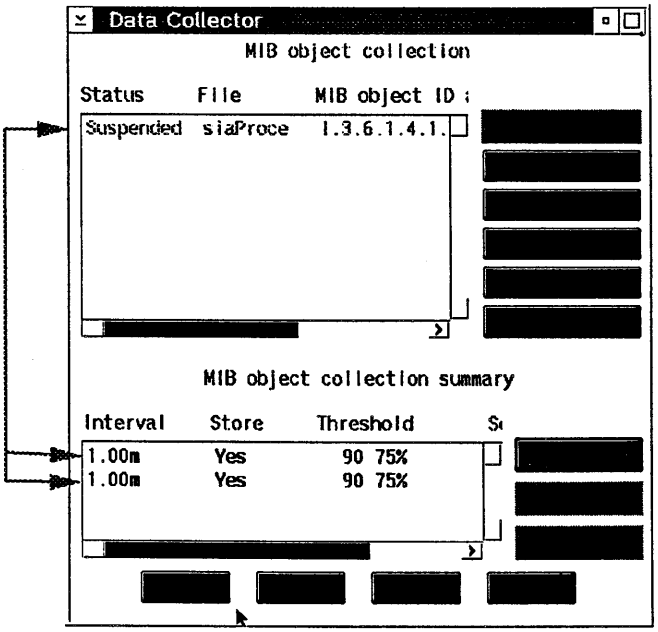
Add Collection Configuration



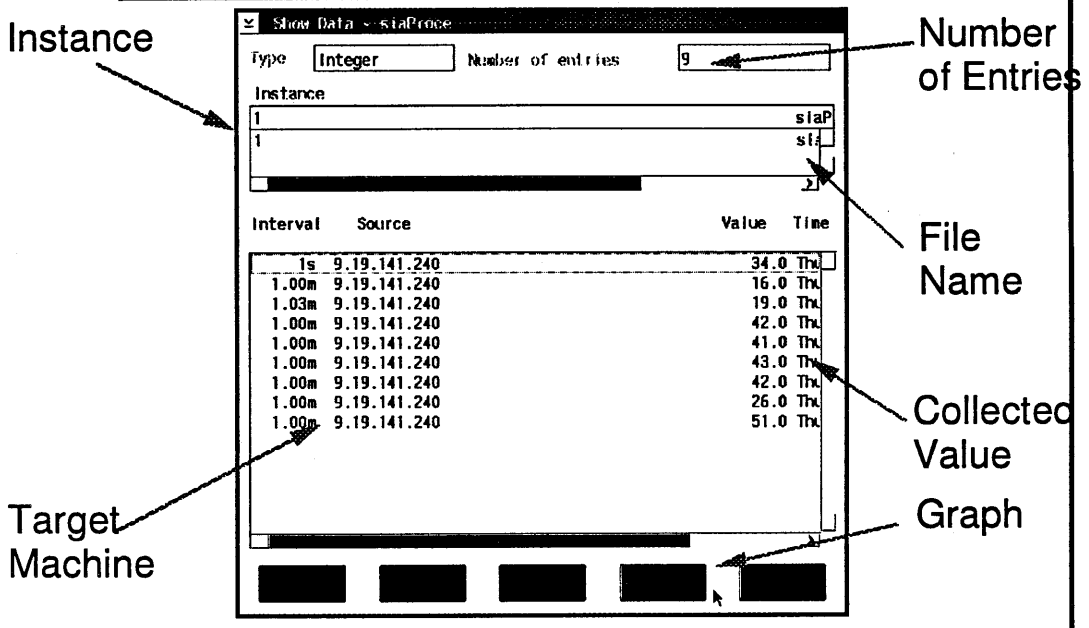
Collection Configuration Summary



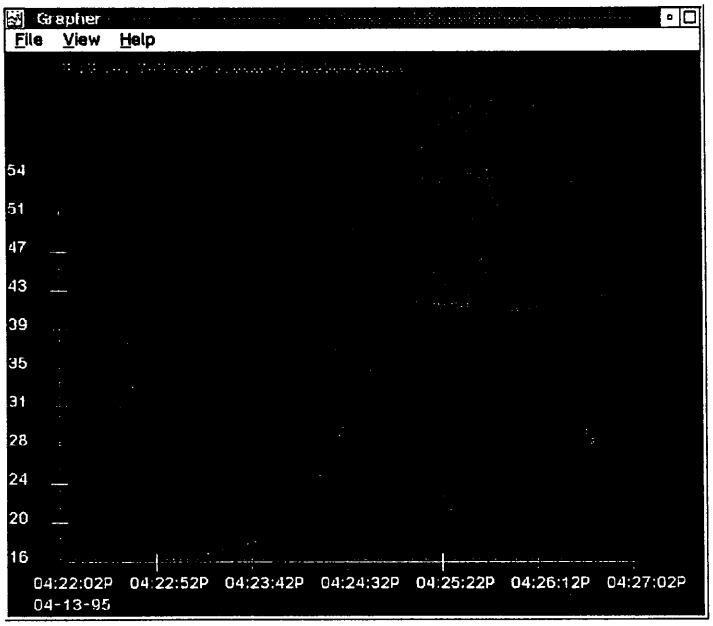
MIB Data Collector



Show Collected Data



Data Collector Graph



OS/2 System Performance Management

- System
  - CPU utilization, memory used, etc.
- Operating System
  - Software running, software memory usage, software CPU usage, etc.
- LAN Requester
  - Bytes/second read/write, buffer allocation failure, etc.
- LAN Server
  - Server response time, buffer requests, heap space, etc.

System Performance MIBs

Host Resources MIB

- hrStorageDescr
- hrStorageSize
- hrStorageUsed

System Information Agent MIB

- siaProcessorUtilizationBusy
- siaProcessorUtilizationIdle

LAN Requester Performance MIBs

OS/2 LAN Requester MIB

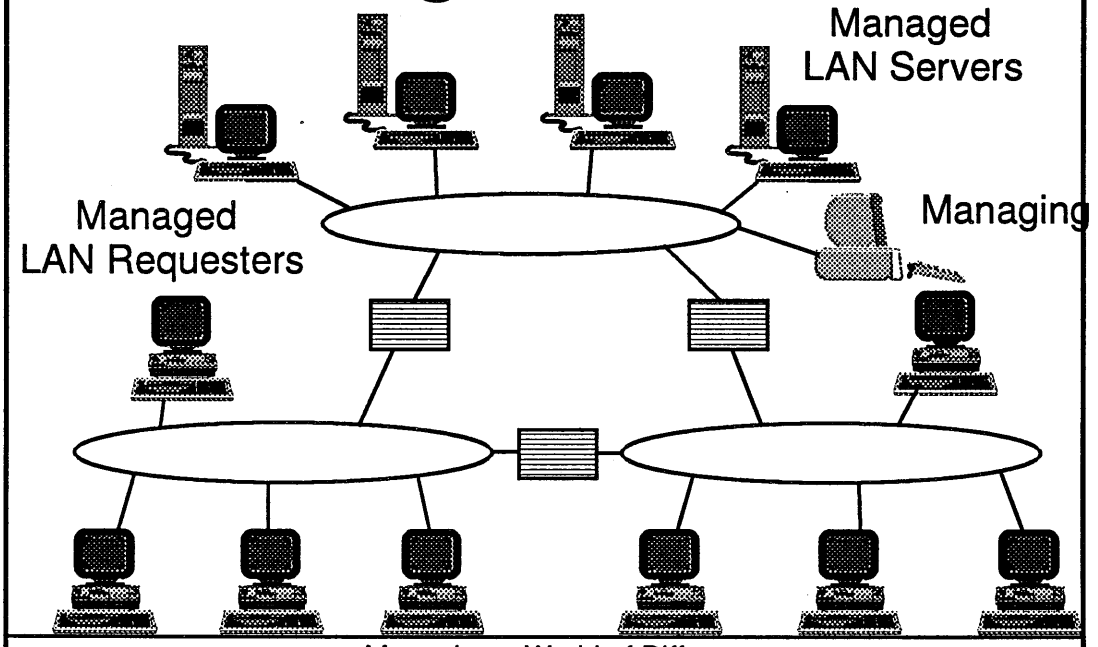
- rBigBufNfeed
- reqBufNfeed
- sessBroke
- usefail
- bcRqRawByR
- bcRqRawByW

LAN Server Performance MIBs

OS/2 LAN Server MIB

- avresponse
- sbigbufneed
- sreqbufneed
- ctCaForceL
- ctHpFull
- ctR0BBufEx
- rtR0Bytes
- rtR0Transactions

Implementing Performance Management



Performance Management Applications

MIB Browser

- Single MIBs
- Single machine
- No file management
- Pre-configuration
- Form
- Graph

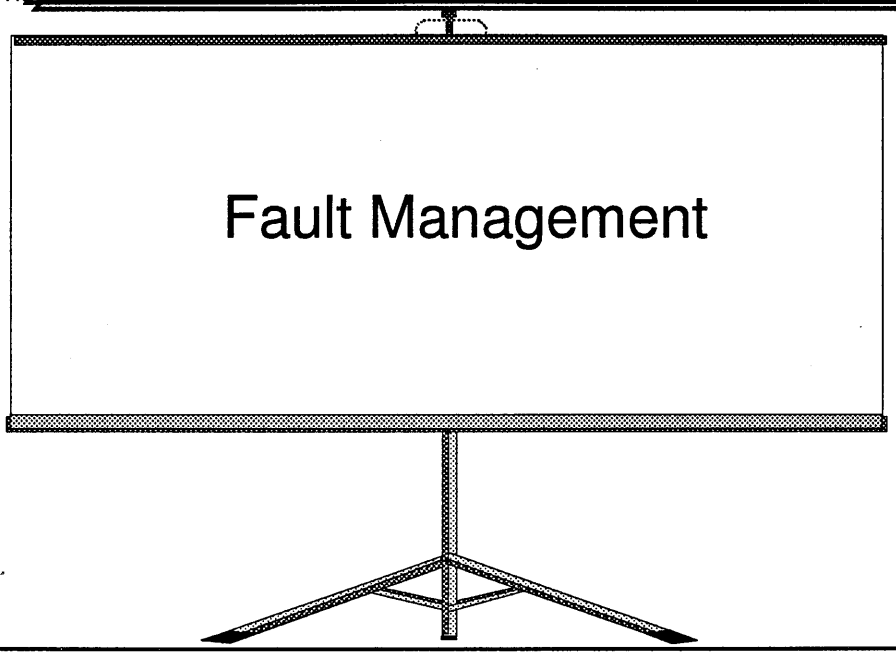
MIB Application Builder

- Miltiple MIBs
- Single machine
- No file management
- Pre-configuration
- Form
- Graph
- Table

MIB Data Collector

- Multiple MIBs
- Multiple machines
- File management
- Pre-configuration
- Table
- Graph

Unit 6



Unit 6 Agenda

- Fault Management Functions
- Event Types
- Event Displayer
- Event Displayer LAB
- Event Processing
- Event Automator
- Event Automator LAB

Fault Mangement Functions

- Issue messages without requests
- Receive event notifications
  - Errors
  - Changes
- Process received events
  - Log
  - Display
  - Automation

Default Events

snmp

0 - coldStart
1 - warmStart
2 - linkDown
3 - linkUp
4 - authenticationFailure
5 - egpNeighborLoss

os2LReq

1 - lroperationalStateTrap
2 - lrtrap2InitError
3 - lrtrap3ConfigError

lmu

1 - lmuTrapStart
2 - lmuTrapStop
3 - lmuTrapTopology
4 - lmuTrapAlert

os2LS

1 - lsOperationalStateTrap
2 - lstrap2PCFail
3 - lstrap3PWerror
4 - lstrap4Unauth
5 - lstrap5AccDenied
6 - lstrap6NoPrimPart
7 - lstrap7AccLimit
8 - lstrap8NoSecPart
9 - lstrap9DiffPrSec
10 - lstrap10CompFail
11 - lstrap11ExcessFail
12 - lstrap12SysRes
13 - lstrap13RdrLimit
14 - lstrap14UPS
15 - lstrap15UPSlow
16 - lstrap16UserStore
17 - lstrap17ATfile
18 - lstrap18CpRestore
19 - lstrap19RdrFail
20 - lstrap20ClsFile
21 - lstrap21ExcessErr
22 - lstrap22LogErr
23 - lstrapLostErr
24 - lstrap24NCBlimit
25 - lstrap25diskCap
26 - lstrap26NoThread
27 - lstrap27maxaudit
28 - lstrap28IOlimit
29 - lstrap29syserr
30 - lstrap30AudLog
31 - lstrap31AudLog
32 - lstrap32MaxErr
33 - lstrap33FailNoAlt
34 - lstrap34BadSector
35 - lstrap35IntError

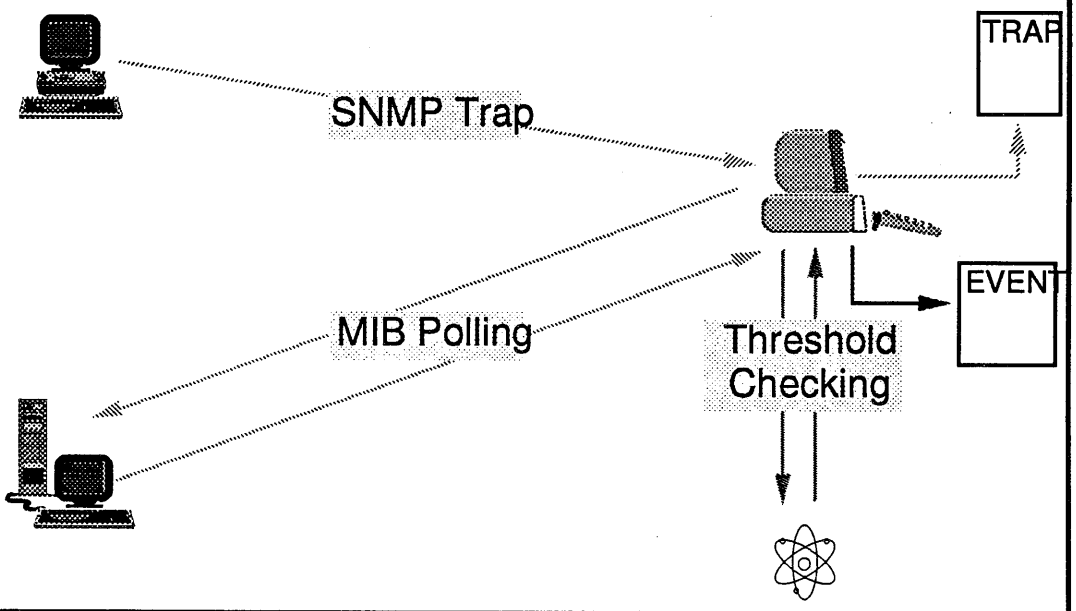
Enterprise Specific Events

- \ANV2\LOG\TRAP.LOG
- Threshold exceeded
  - Generated by MIB value
  - Not resent until value reset
- Rearm
  - Generated by MIB value
  - Resets threshold event

SNMP Traps

- \ANV2\LOG\TRAP.LOG
- Information provided
  - Affected object
  - Agent's address
  - Event description
  - Time
  - Optional identification
  - Descriptive variables
- Trap destination name

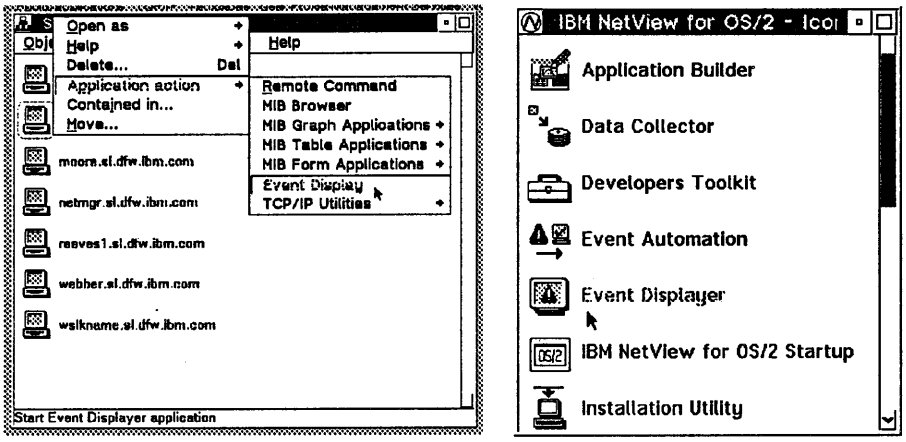
Flow of Events



Event Displayer

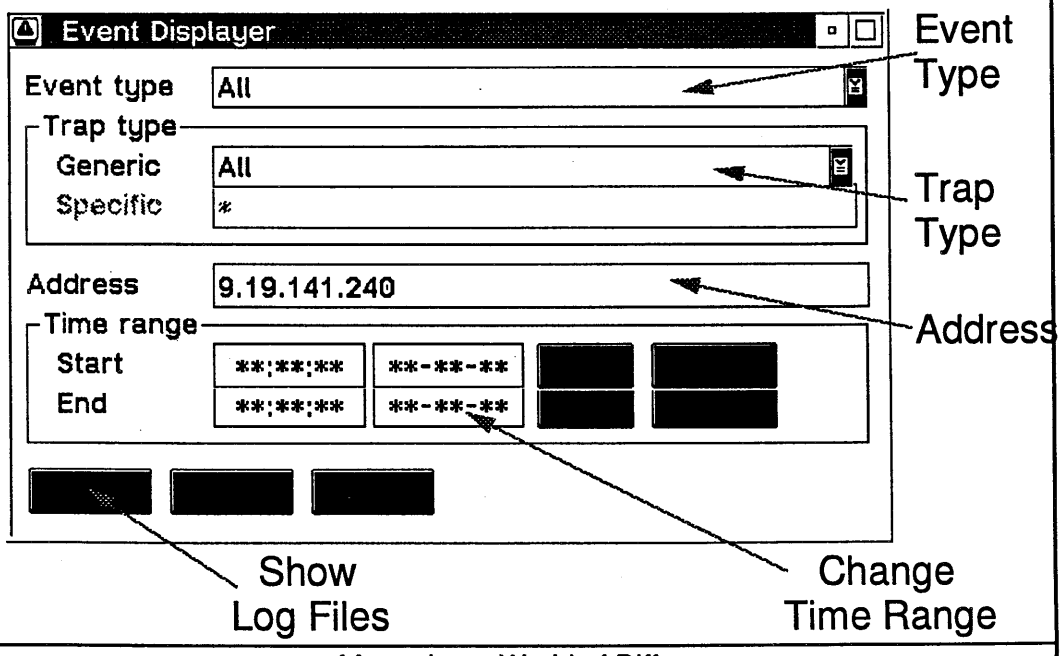
- View log files
  - \ANV2\LOG\TRAP.LOG
- Event filtering
  - Event type
  - Generic trap type
  - Specific trap number
  - System object generating event
  - Time range

Invoking the Event Displayer

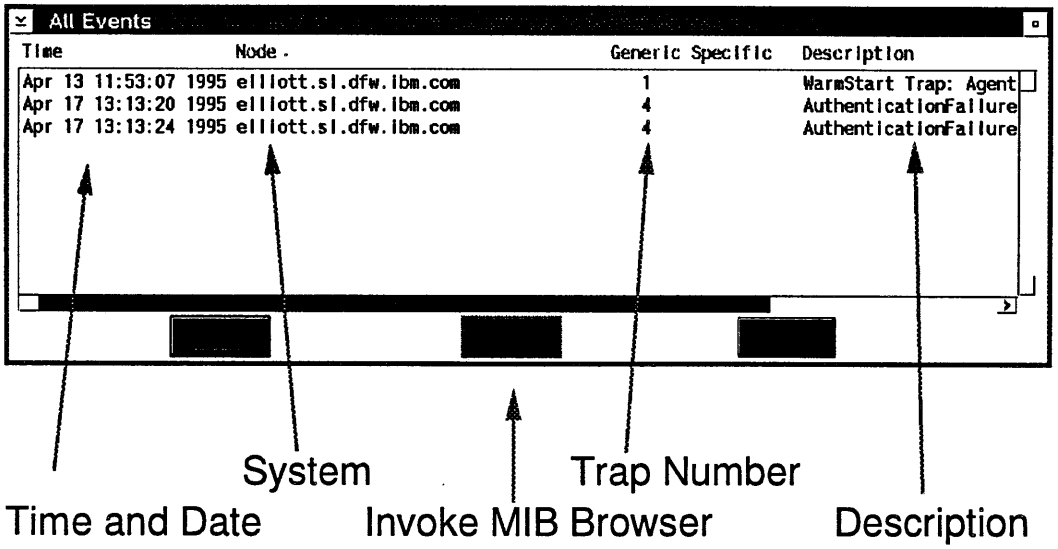


- Selecting **Event Display** from menu
- Double-click on the **Event Displayer** icon

Event Displayer Initial Screen



Displayed Logs

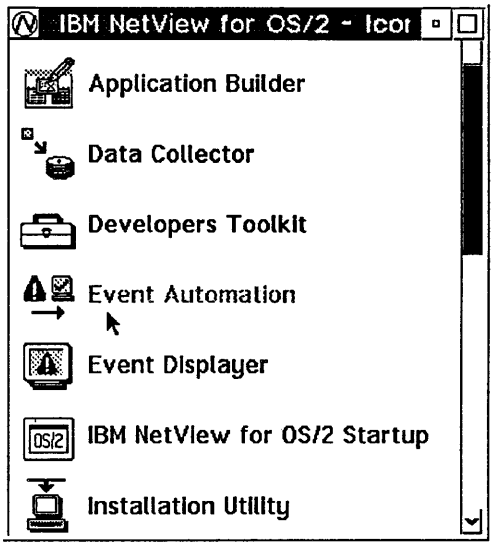


Event Processing

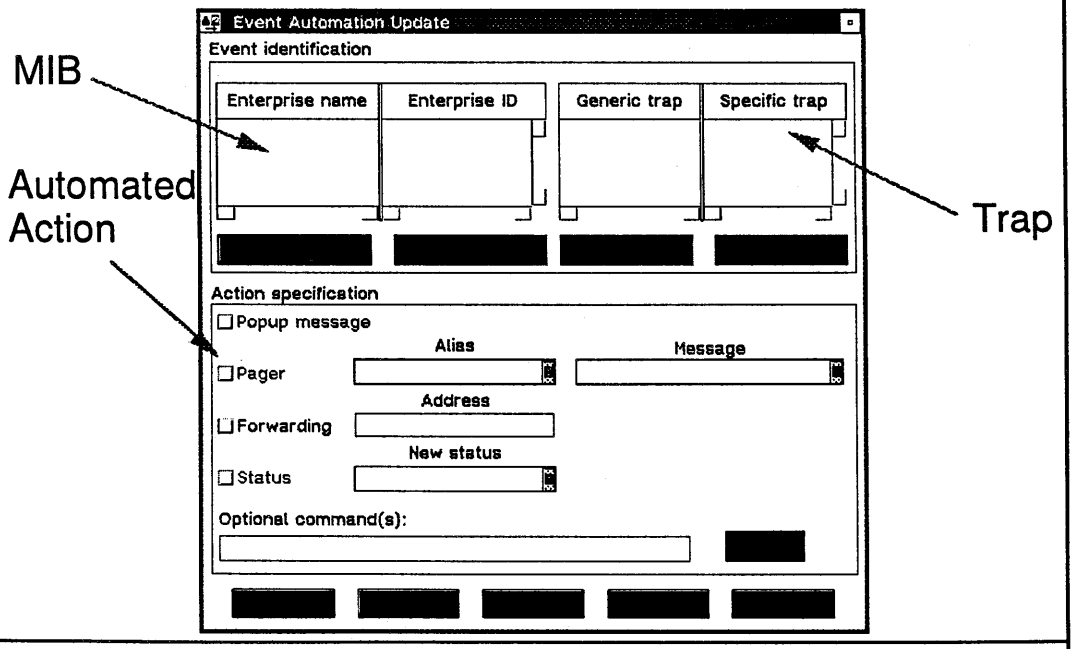
- Pop-up messages
- Pager
- Forward to another manager
- Change status
- Execute a command
- ...

Invoking the Event Automator

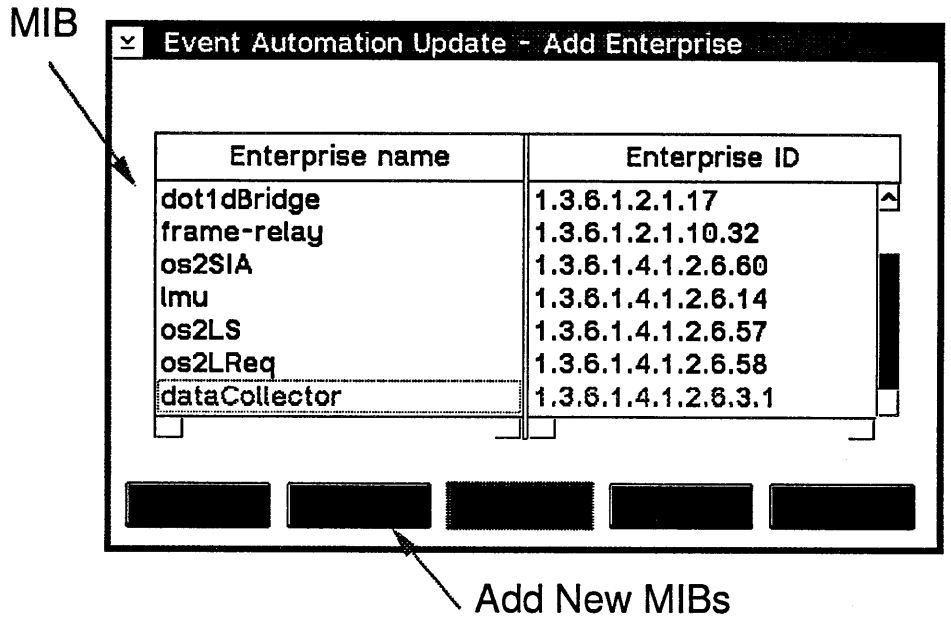
- Double-click on the **Event Automation** icon



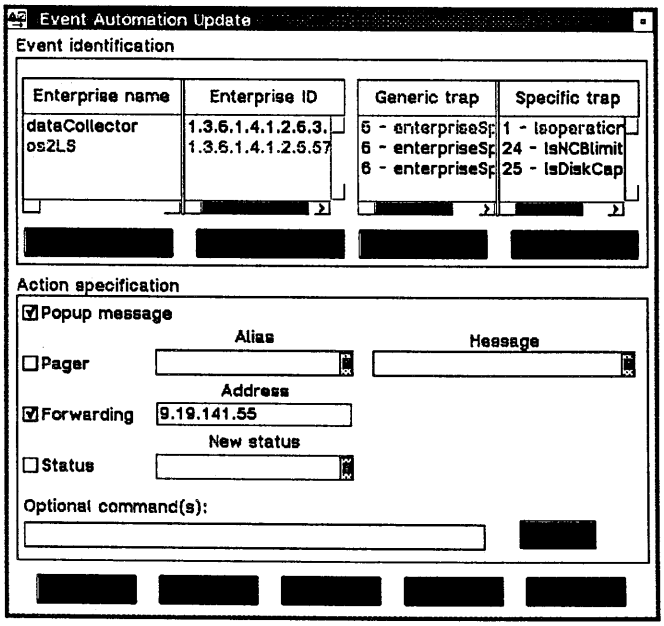
Event Automator



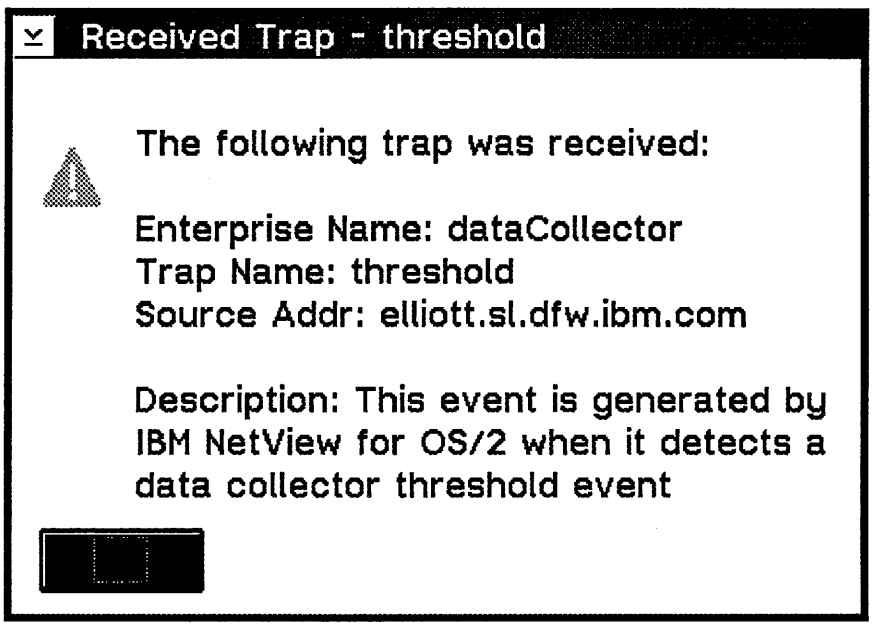
Add Enterprise



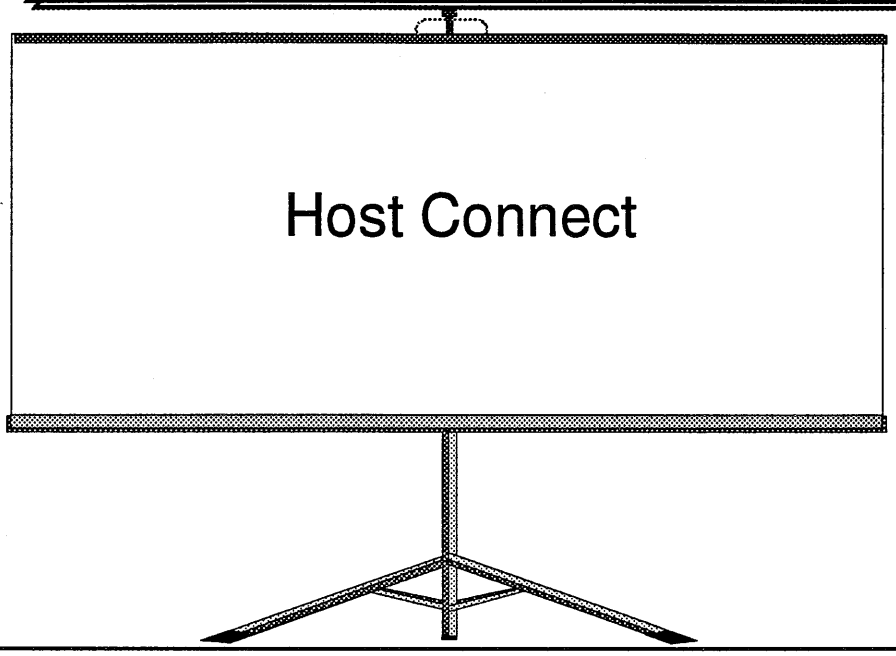
Complete Configuration



Pop-Up Window



Unit 7



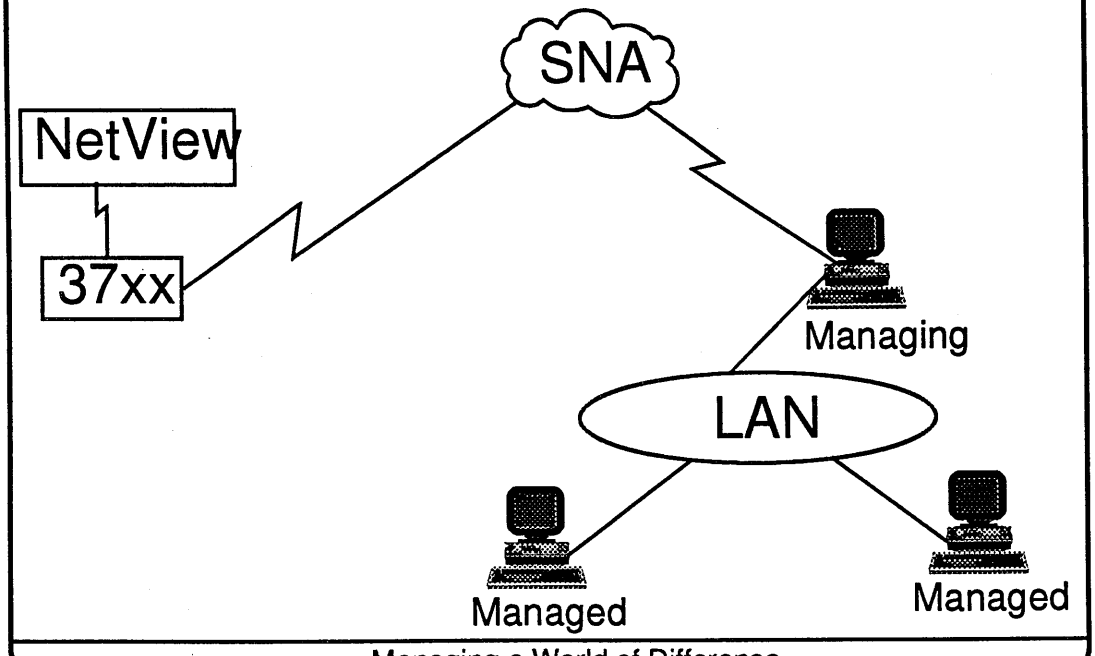
Unit 7 Agenda

- Overview Host Connect
- Installation/Configuration
- Alerts
- Remote Operations
- Scenario

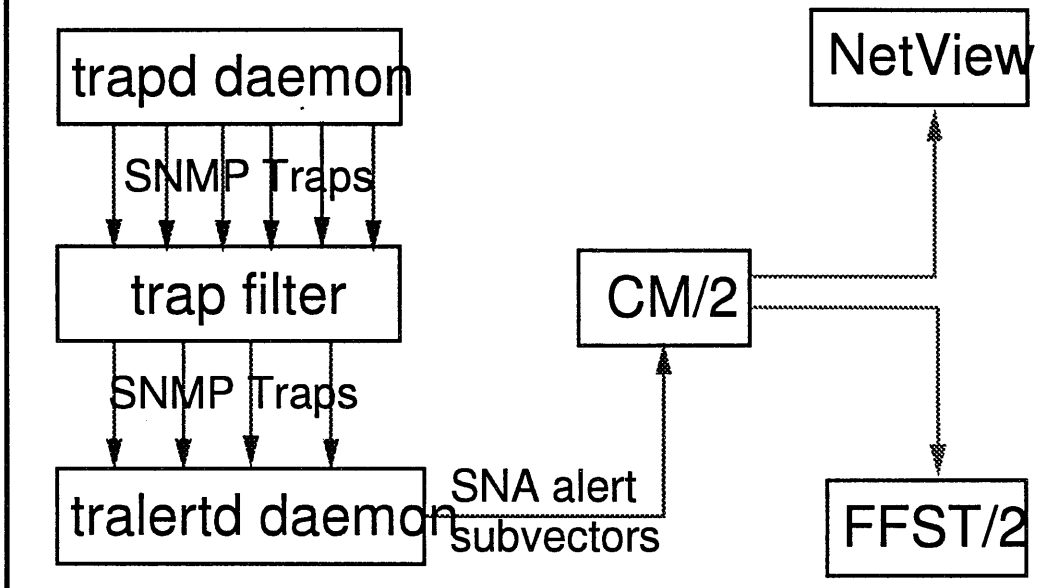
Part I

Overview

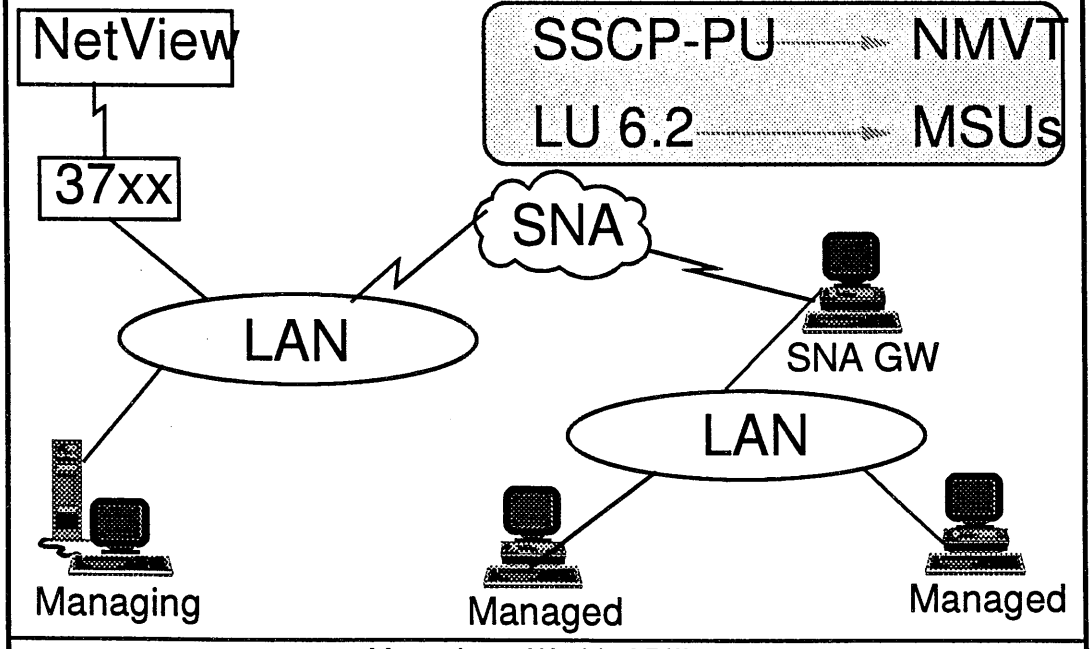
Host Connection Overview



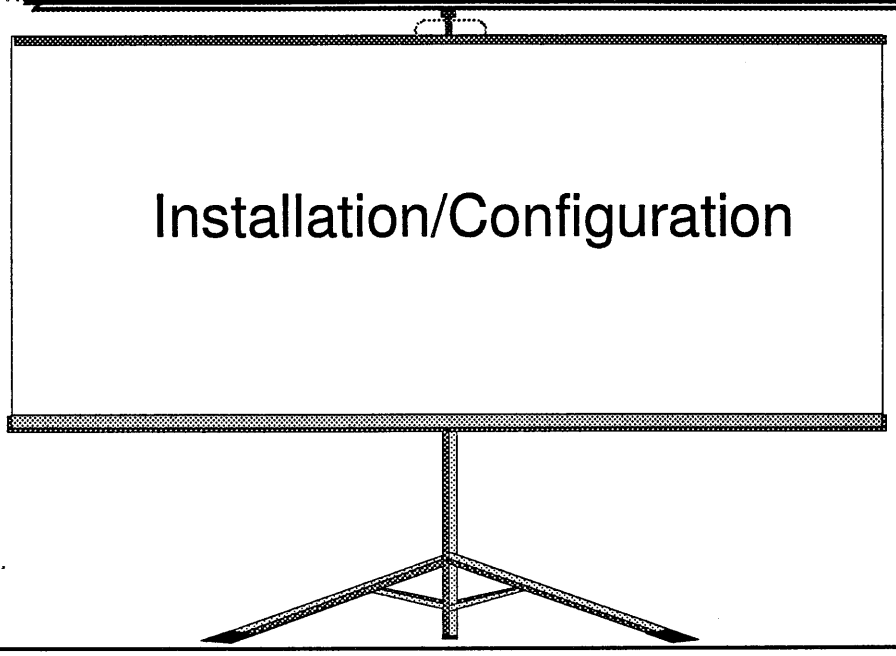
How does it work?



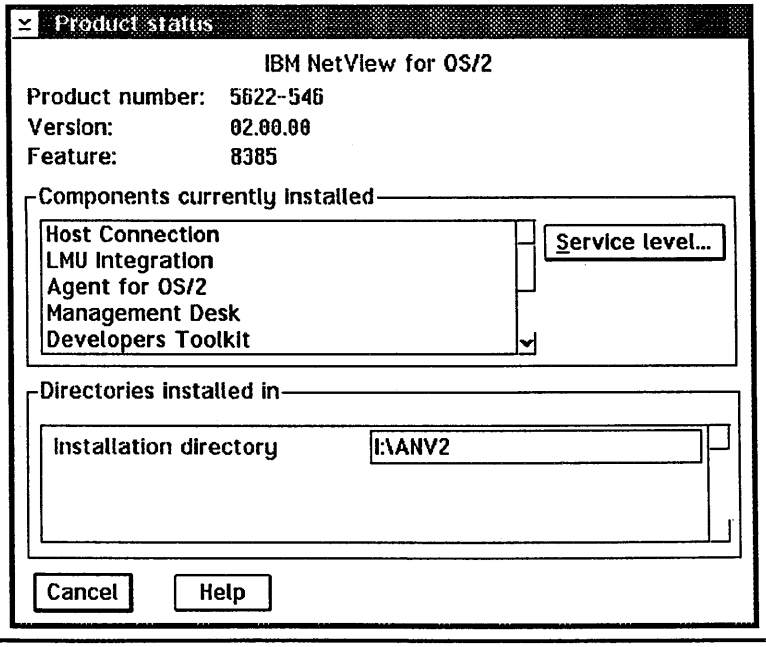
Data Flow



Part II



Installation



Configuration

- Managing
  - Filter File
  - Configuration File
  - Startup File
  - CM/2
- NetView
  - LU 6.2 Definition
  - Start NetView Task

Filter File

\anv2\etc\tralert.flt
tralert.cfg

Start TRALERT

TRALERT.CFG

Filename Filter_name

Filter_name

TRALERT.FLT

Example TRALERT.FLT

```
RuleName=Trap_to_Alert_Default_Filter
RuleDescription=Default filter for trap-to-alert conv. on startup of tralertd
RuleContent=(SNMP_TRAP=0 || SNMP_TRAP=1 ||
SNMP_TRAP=2 || SNMP_TRAP=3 || SNMP_TRAP=4 || SNMP_TRAP=5 || SNMP_TRAP=6)
RuleName=Trap_to_Alert_Filter_Sample
RuleDescription=Sample filter for trap-to-alert
RuleContent=((CLASS=1.3.6.1.4.1.2.6.3 && (SNMP_TRAP=0 || SNMP_TRAP=1 ||
SNMP_TRAP=2 || SNMP_TRAP=3 || SNMP_TRAP=4 || SNMP_TRAP=5 ||
SNMP_SPECIFIC=58720256 || SNMP_SPECIFIC=58720257 || SNMP_SPECIFIC=58720258 ||
SNMP_SPECIFIC=58720259 || SNMP_SPECIFIC=58720260 ||
SNMP_SPECIFIC=58720261 || SNMP_SPECIFIC=58720262 || SNMP_SPECIFIC=58720263 || SNMP_SPECIFIC=58720264
|| SNMP_SPECIFIC=58851330 || SNMP_SPECIFIC=58916864 || SNMP_SPECIFIC=58916865 ||
SNMP_SPECIFIC=58916866 || SNMP_SPECIFIC=58916867 || SNMP_SPECIFIC=58916868 || SNMP_SPECIFIC=58916869))
|| (CLASS=1.3.6.1.4.1.2.6.4)
|| (CLASS=1.3.6.1.4.1.2.6.2))
RuleName=Receive_from_6611_router_sample
RuleDescription=Receive enterprise-specific events from 6611 router
RuleContent=((CLASS=1.3.6.1.4.1.2.6.2 && (SNMP_SPECIFIC=1 || SNMP_SPECIFIC=2 ||
SNMP_SPECIFIC=3 || SNMP_SPECIFIC=4 || SNMP_SPECIFIC=5 || SNMP_SPECIFIC=6 ||
SNMP_SPECIFIC=7 || SNMP_SPECIFIC=8 || SNMP_SPECIFIC=9 || SNMP_SPECIFIC=10 ||
SNMP_SPECIFIC=11 || SNMP_SPECIFIC=12 || SNMP_SPECIFIC=13 ||
SNMP_SPECIFIC=14 || SNMP_SPECIFIC=15 || SNMP_SPECIFIC=16 || SNMP_SPECIFIC=17 ||
SNMP_SPECIFIC=18 || SNMP_SPECIFIC=19 || SNMP_SPECIFIC=20))) &&
(IP_ADDR=9.67.14.24 || IP_ADDR=haydn || IP_ADDR=9.67.8.4)
RuleName=Trap_to_Alert_Threshold_sample
RuleDescription=convert trap to an alert
RuleContent=PRESENT=SNMP_TRAP
```

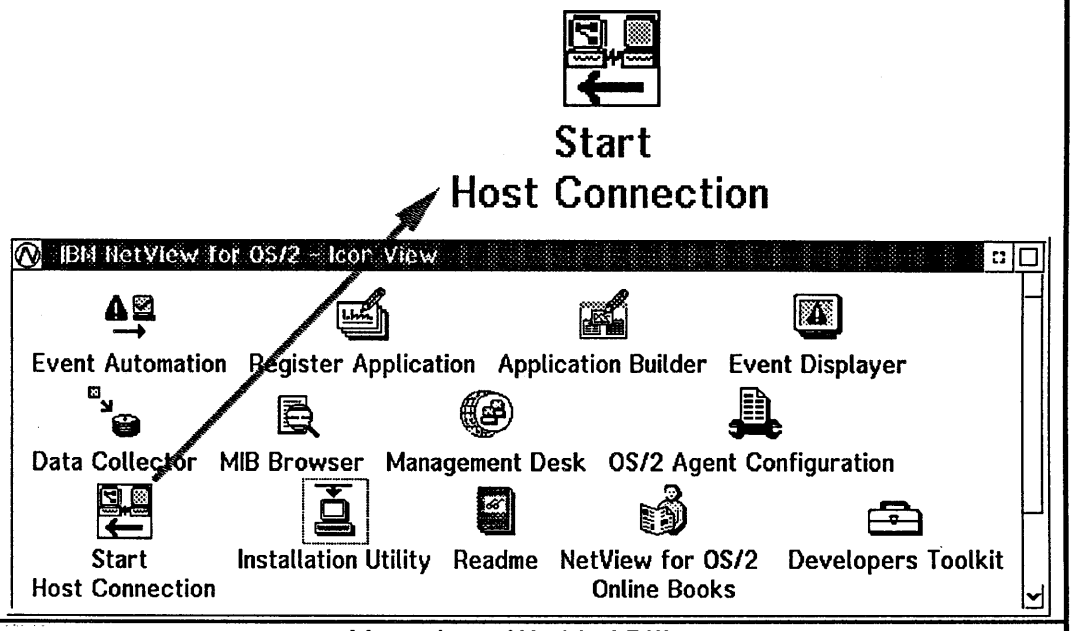

Invoking - Start Up File

- Default : No_Start
- TRALERT.LRF

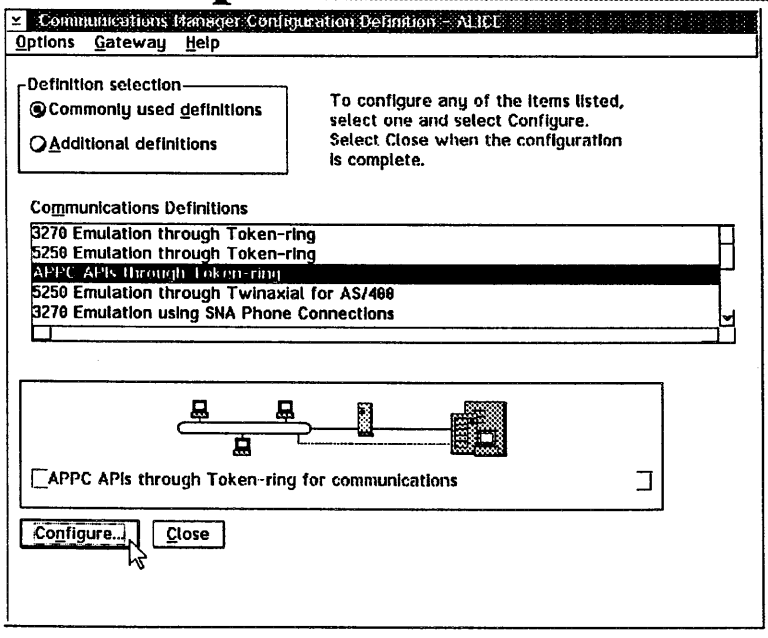
```
TRALERT:TRALERTD.EXE::
OVs_YES_START:trapd,topology::OVs_...
```

- SVSTART TRALERT

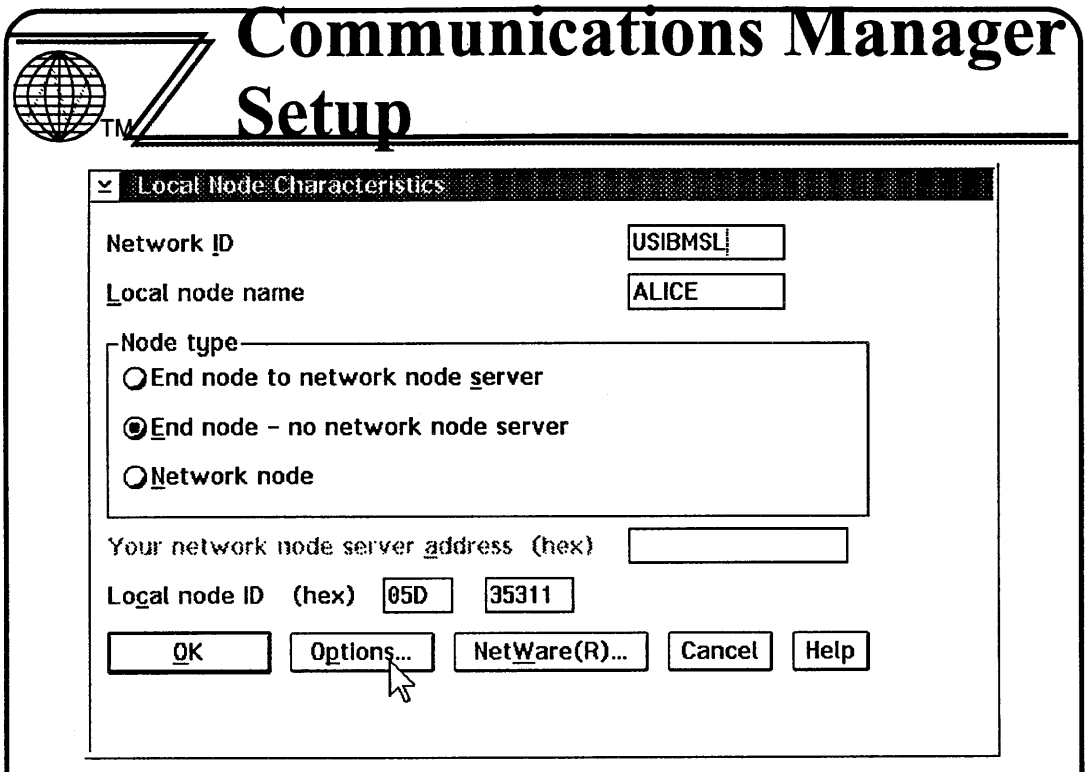
Invoking - Management Desk



Communications Manager Setup

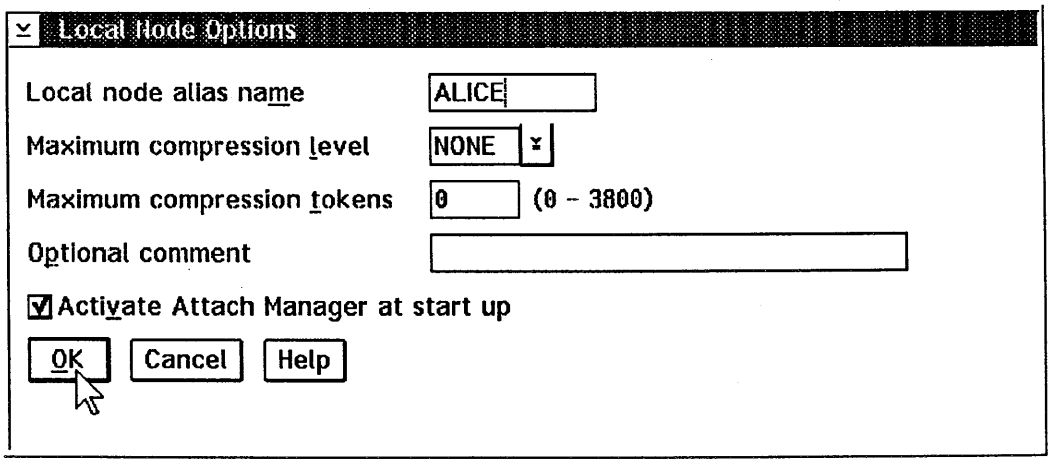


Communications Manager Setup



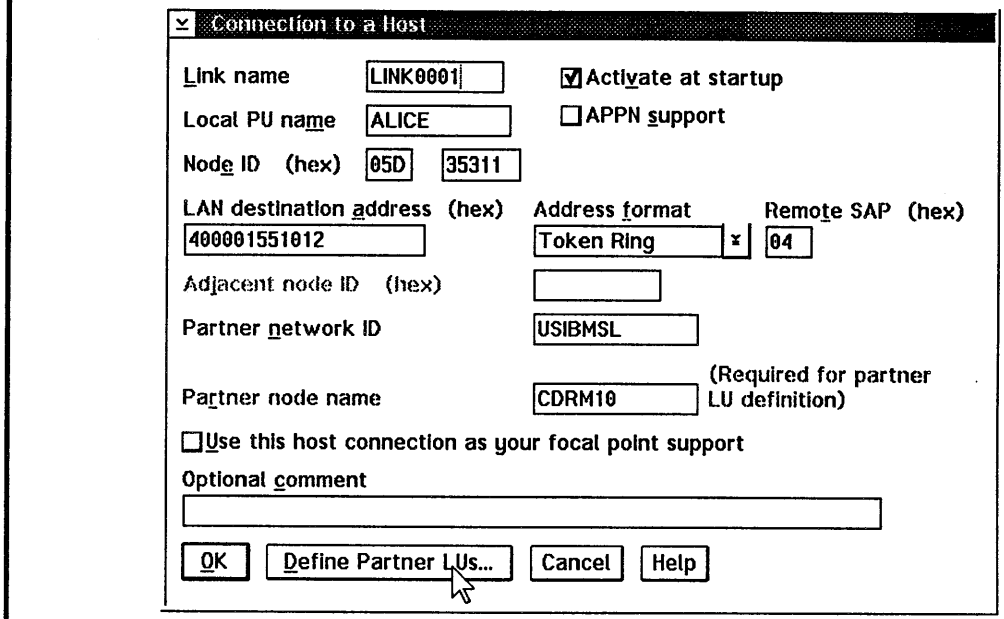
Managing a World of Difference

Communications Manager Setup



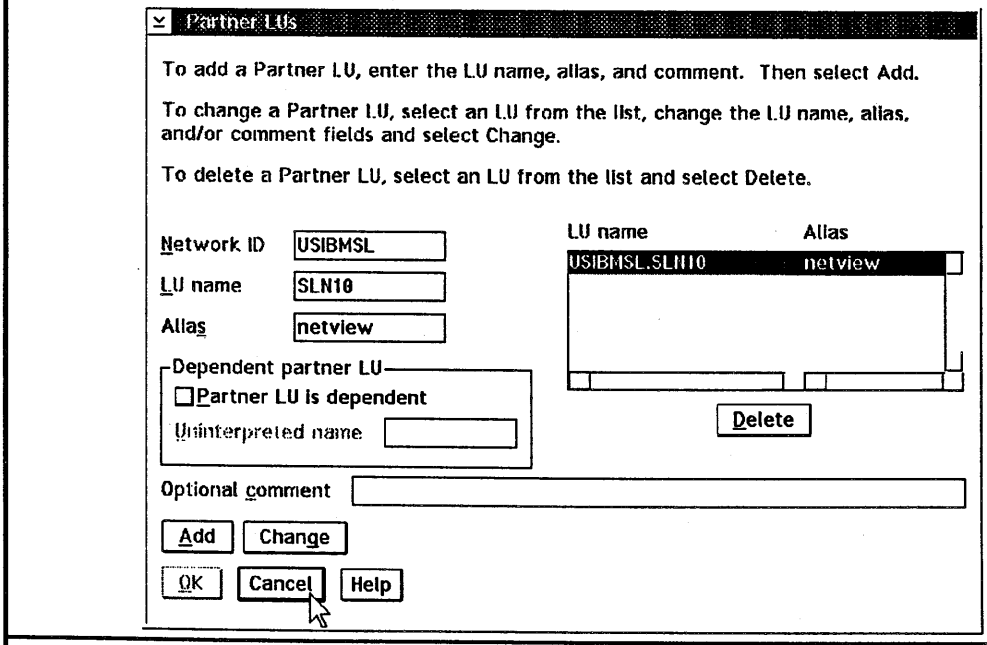
Managing a World of Difference

Communications Manager Setup



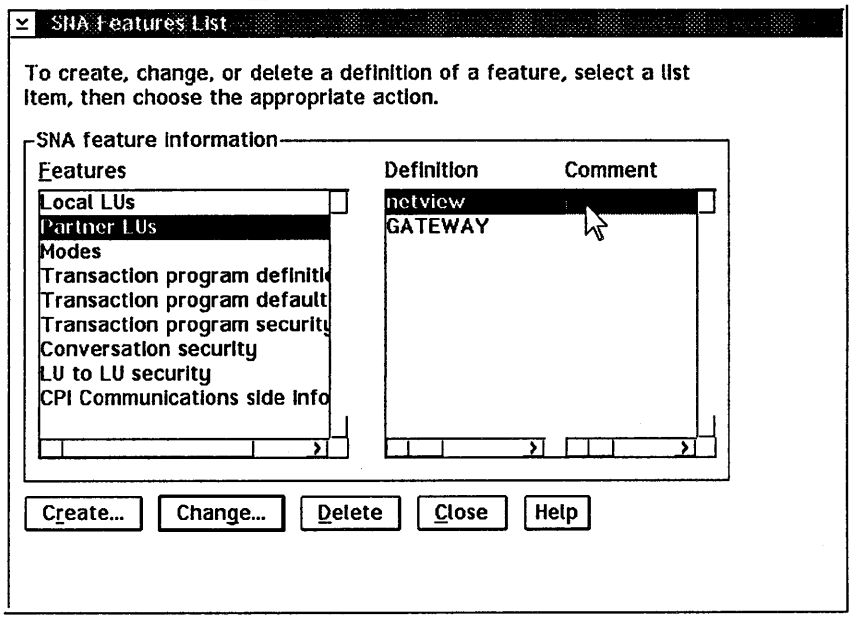
Managing a World of Difference

Communications Manager Setup



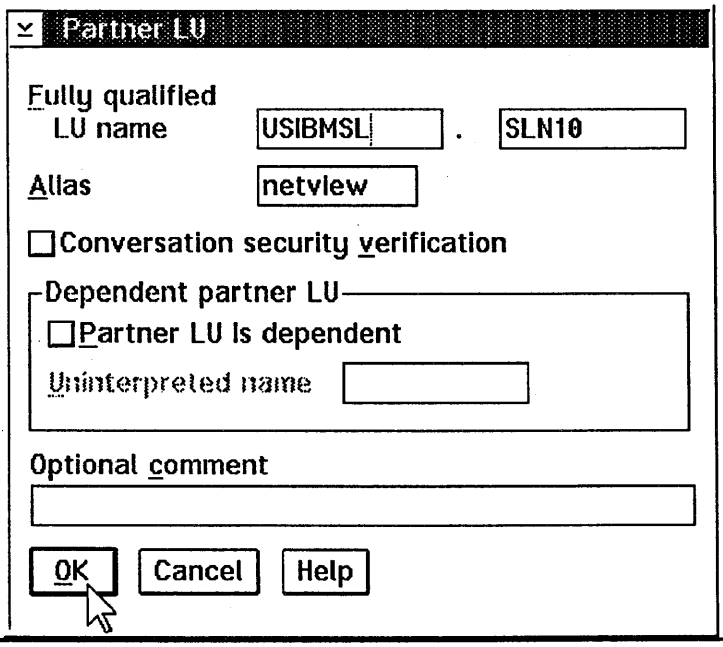
Managing a World of Difference

Communications Manager Setup



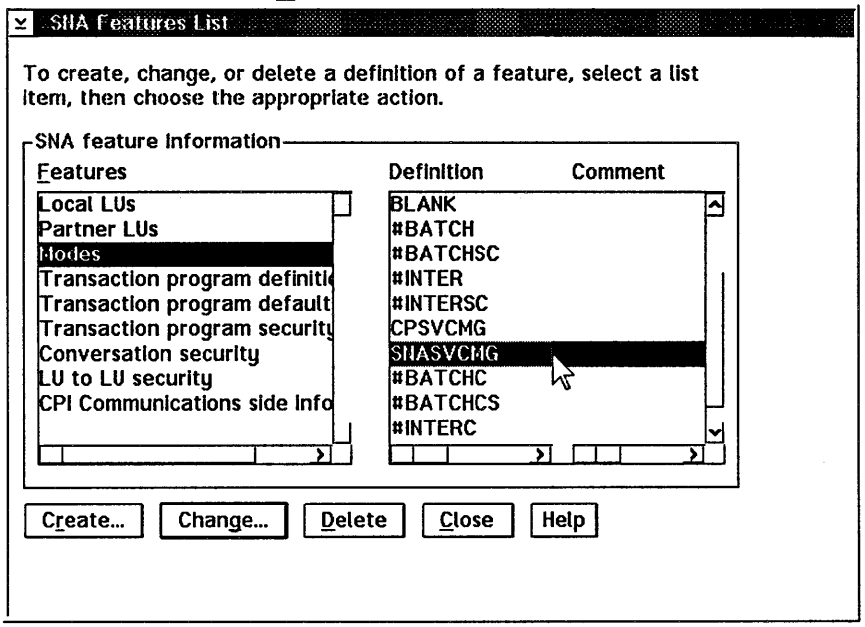
Managing a World of Difference

Communications Manager Setup



Managing a World of Difference

Communications Manager Setup

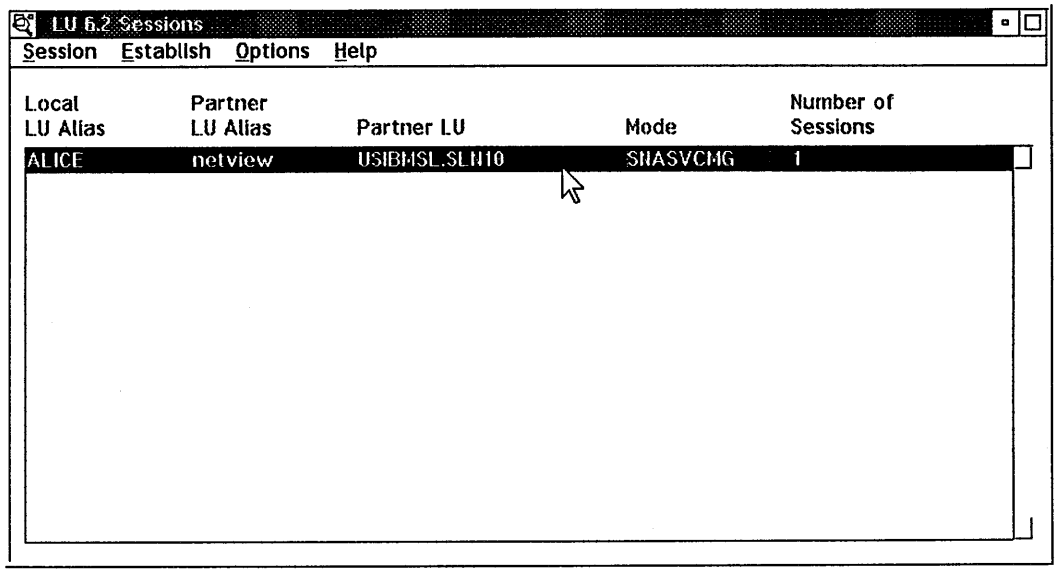


Communications Manager NDF File

- Define Remote Focal Point
- \cmlib\config_file.NDF

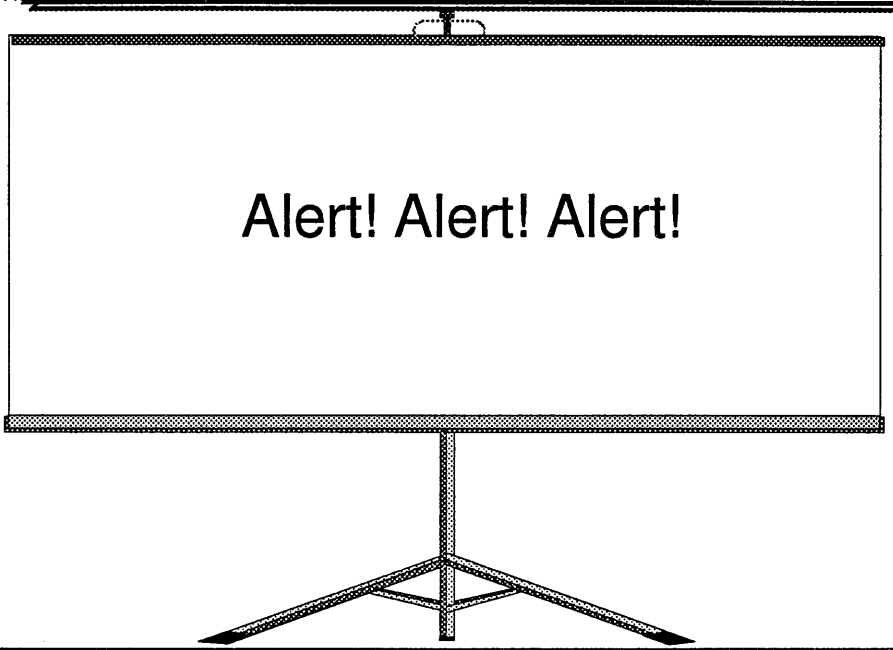
```
DEFINE_REMOT_FOCAL_POINT
SNA_Defined_MS_CATEGORY(X'23',031)
DESCRIPTION(ALERT CATEGORY)
FQ_PRIMARY_FP_NAME(USIBMSL.SLN10)
```

Verify Connection

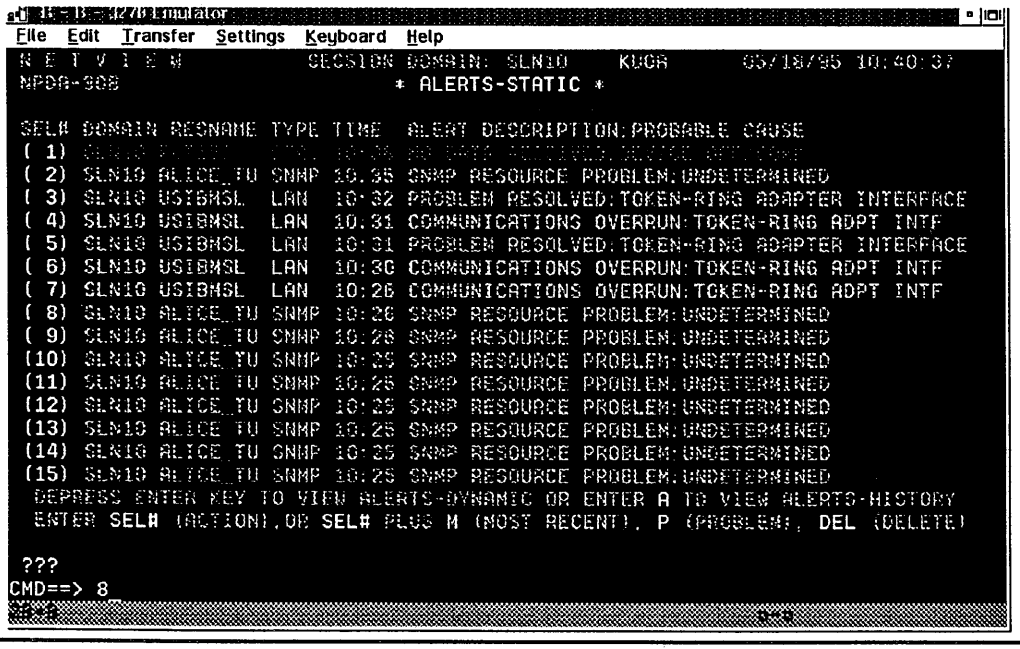


Managing a World of Difference

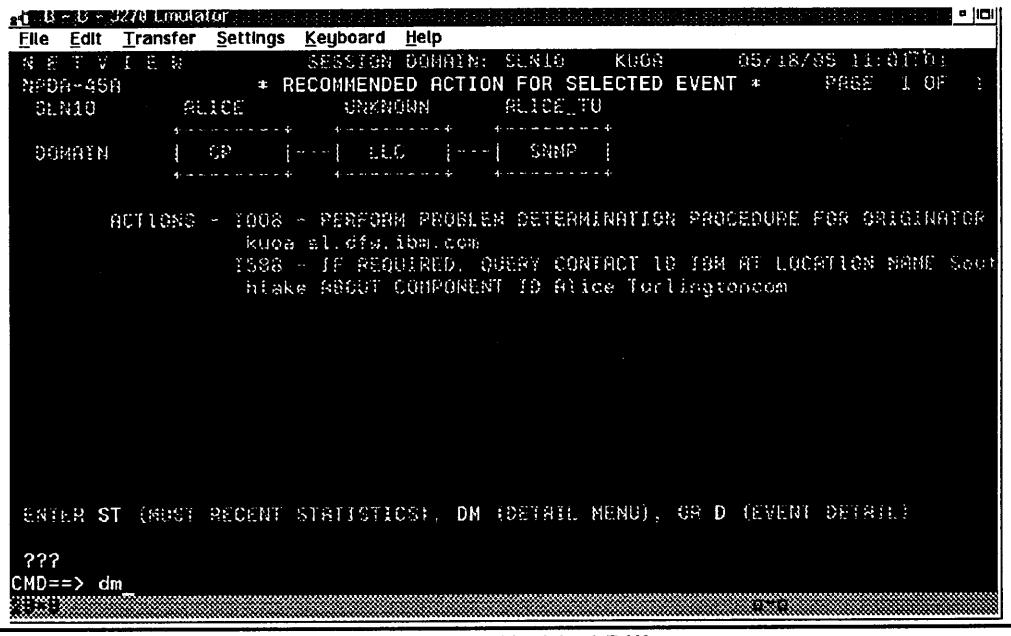
Part III



NetView

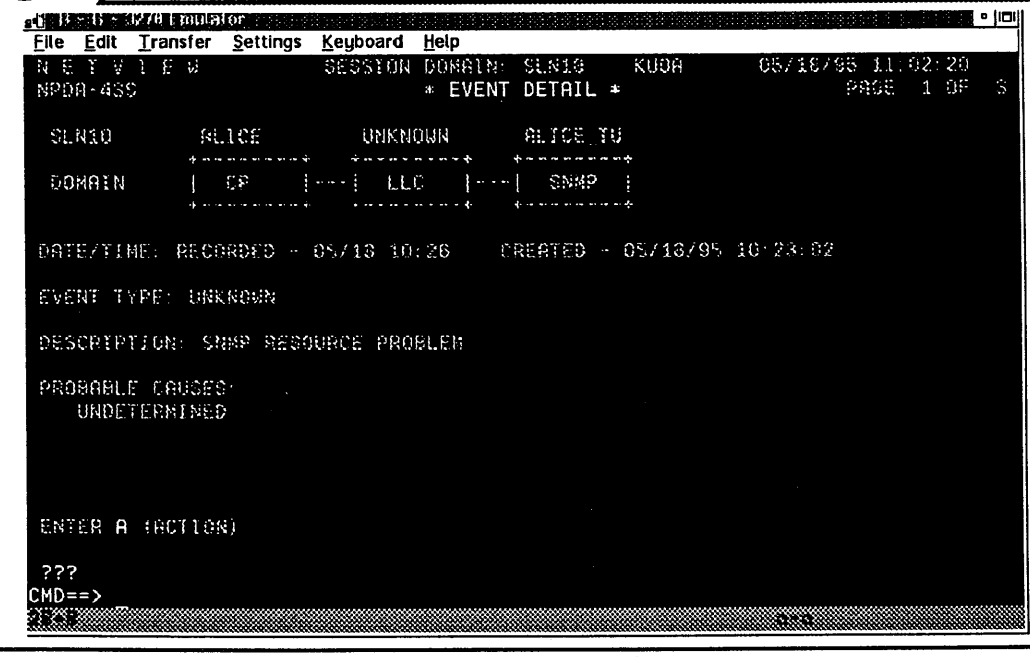


NetView



Managing a World of Difference

NetView

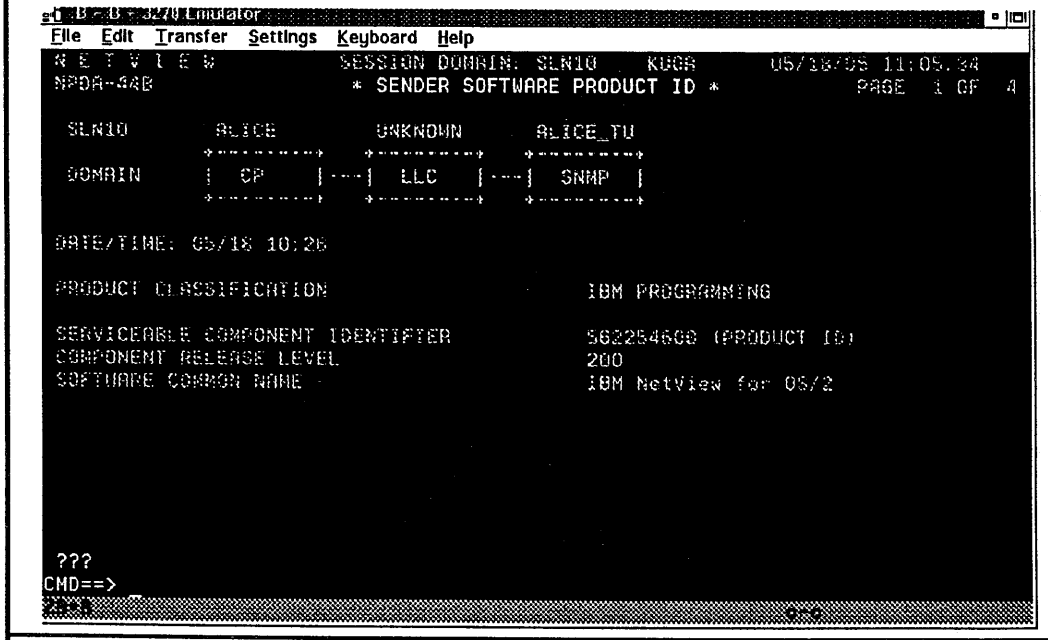


Managing a World of Difference

NetView

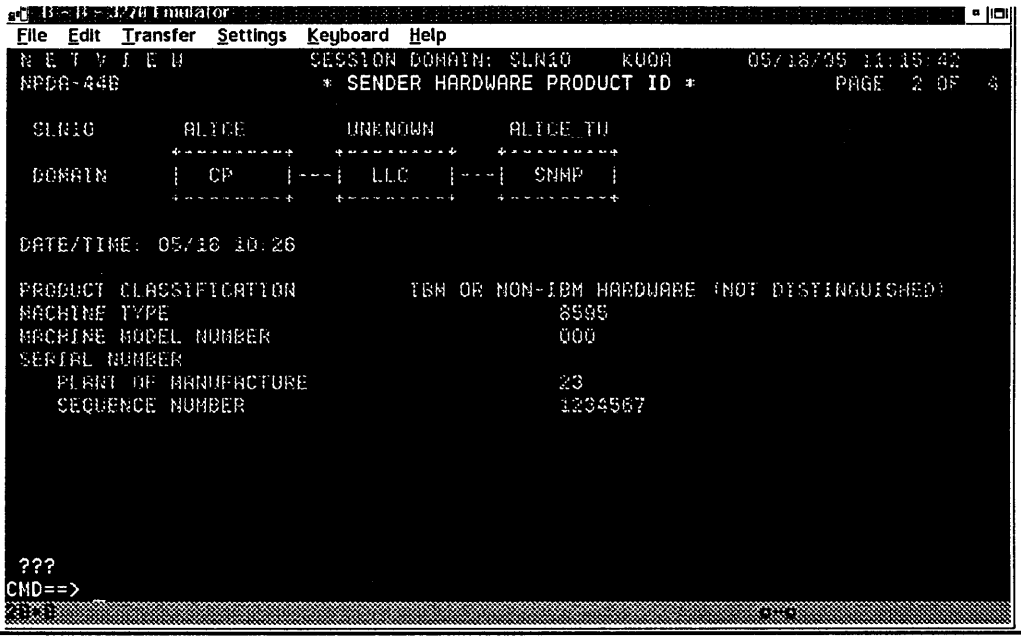
Managing a World of Difference

NetView



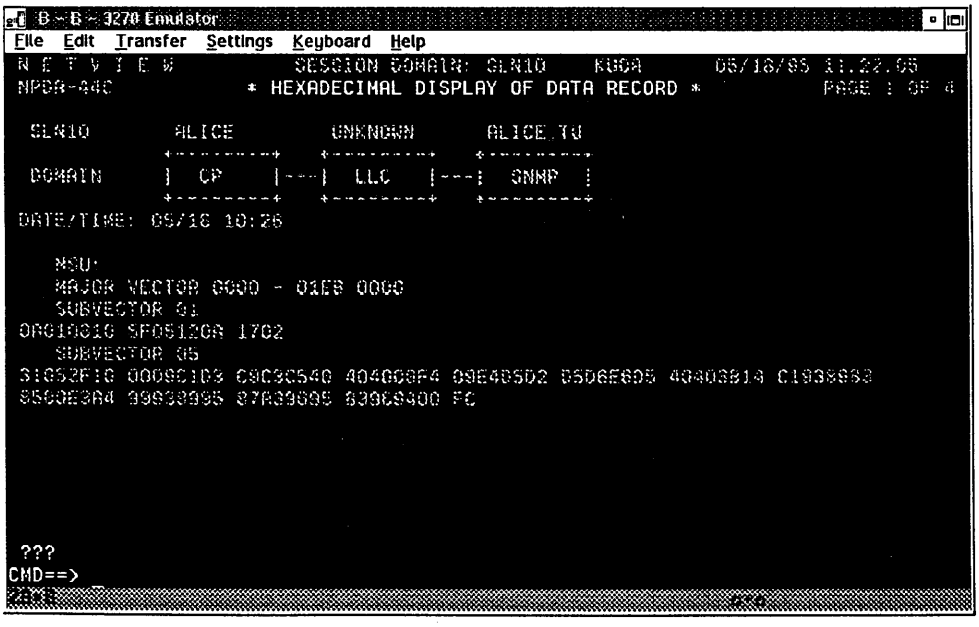
Managing a World of Difference

NetView



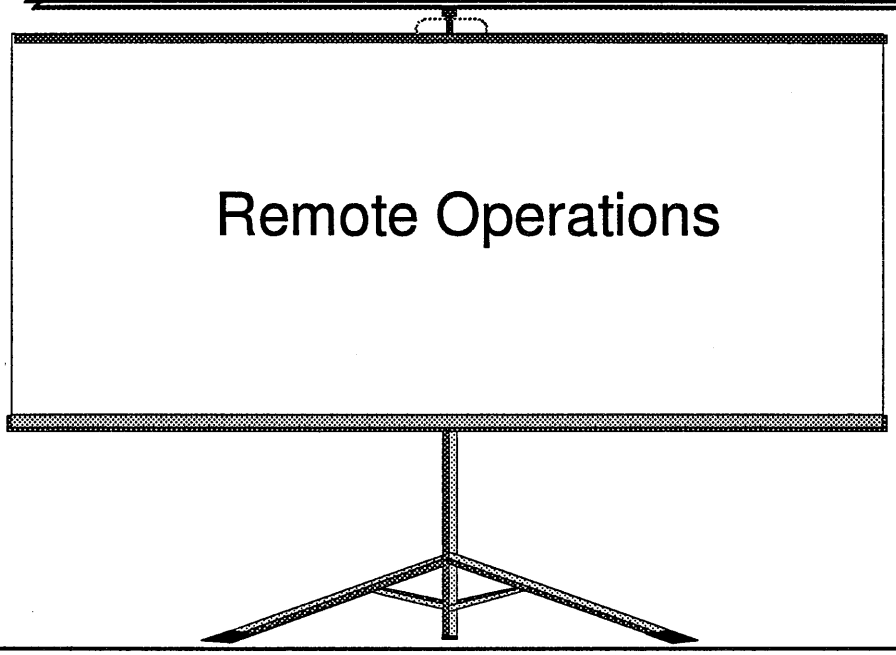
Managing a World of Difference

NetView



Managing a World of Difference

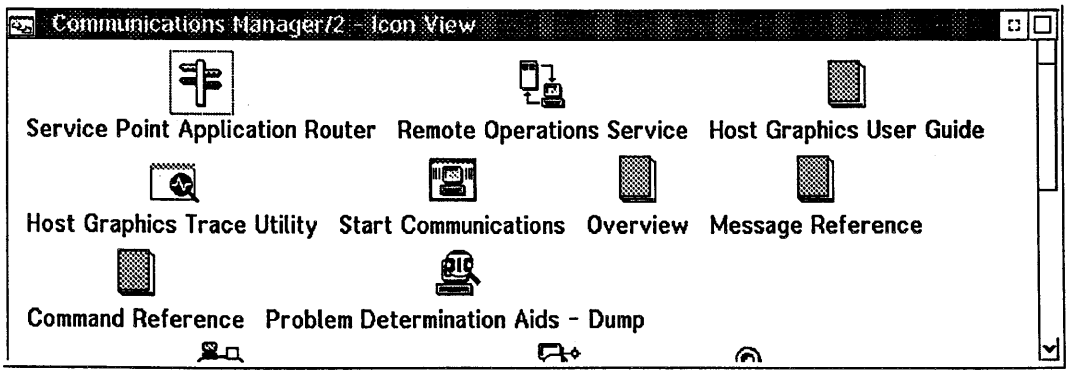
Part IV



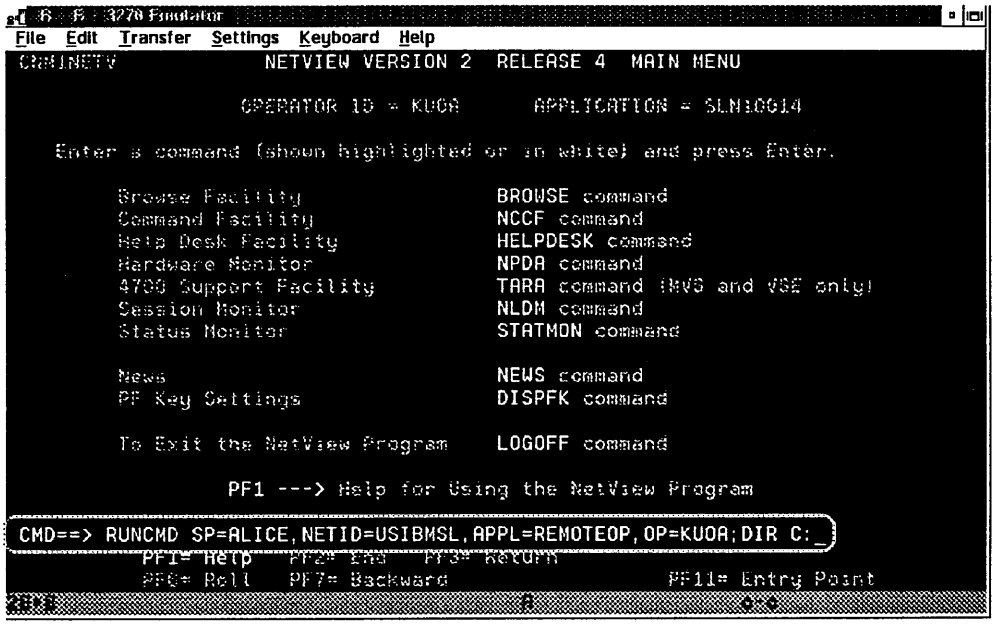
ROPS

Remote Operations Service

Service Point Application Router

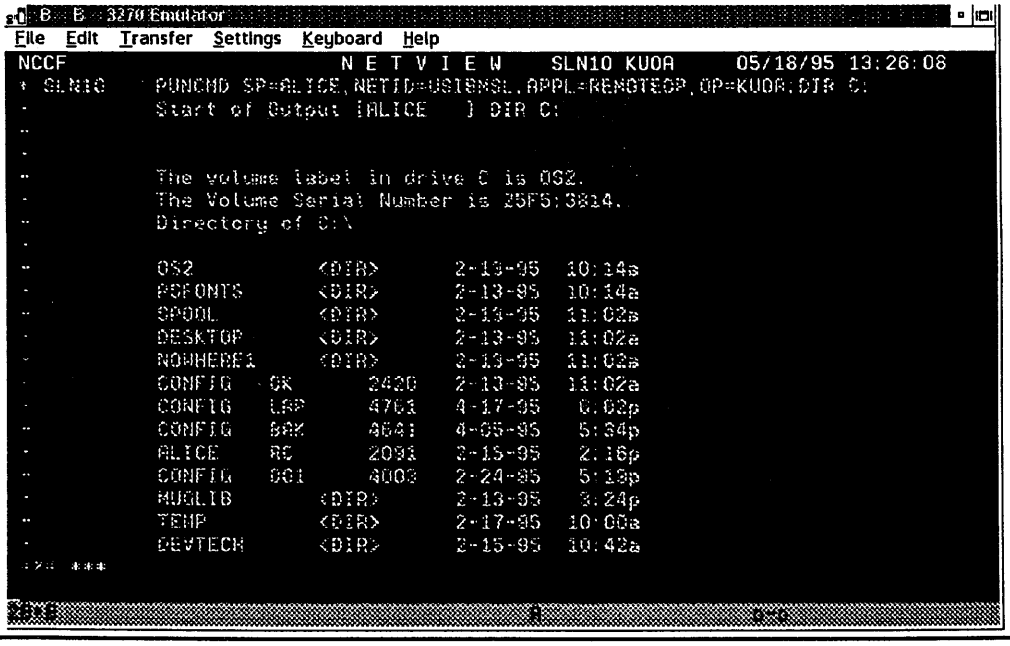


ROPS



Managing a World of Difference

ROPS

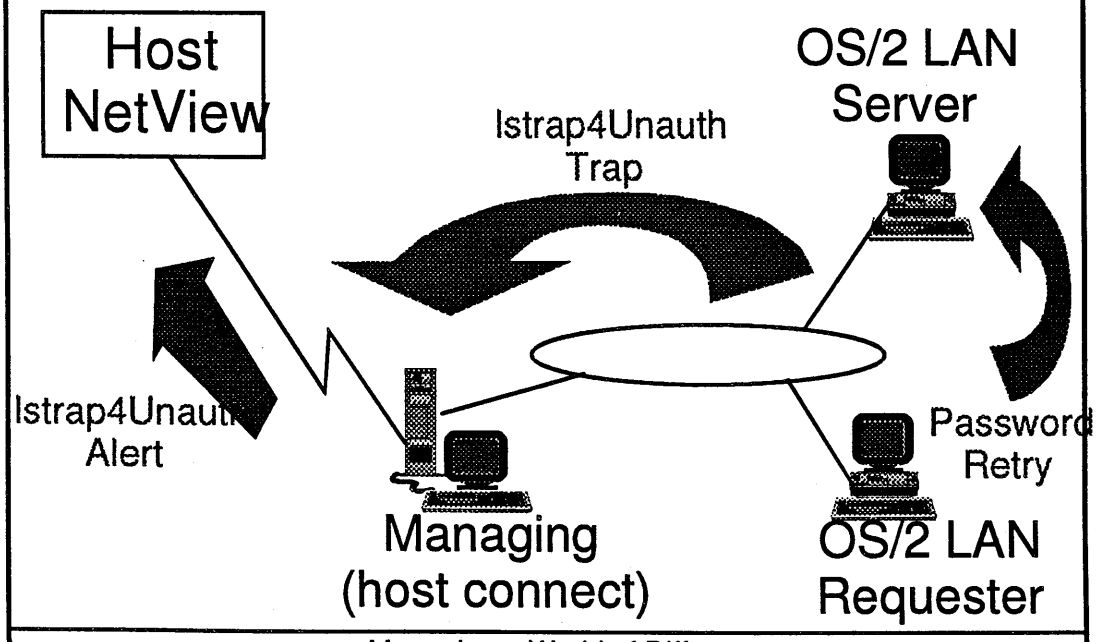


Managing a World of Difference

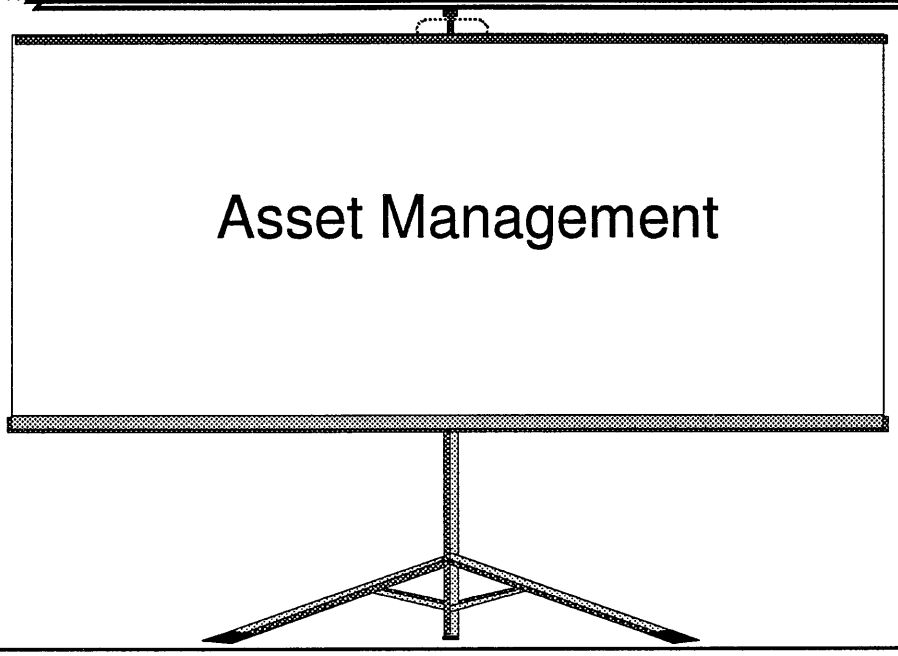
Part V

Scenario

Scenario



Unit 8



Unit 8 Agenda

- Capture Vital Product Data (VPD)
- Monitor/Store Files
- Scheduler
- Examples

Vital Product Data

- QUERYVPD/QDOSVPD
- ASCII File
  - SCANVPD.ASC
  - SDOSVPD.ASC
- DB2/2 Database
  - SCANVPD.BIN
  - SDOSVPD.BIN

Vital Product Data

- Operating System
- Hardware
- Logical Drives
- SYSLEVEL information
- User Defined Files (Optional)
  - Adapters File
  - Critical Files

Hardware Information

- Machine Type
- Processor Type
- Bus Type
- Memory
- Equipment List
- Diskette Drives
- Fixed Disks
- Keyboard Type
- Micro Channel Expansion Slots
- Micro Channel LAN Addresses

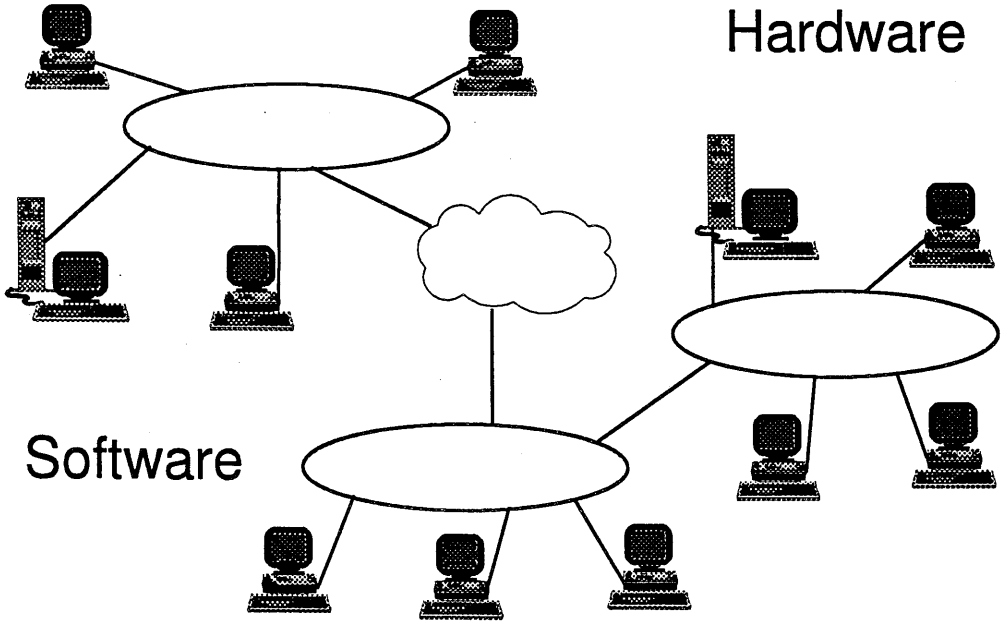
CRITFILE.DEF

- Returns File information
  - Path
  - Size
  - Date and time last modified
- Includes a list of File names
- Stored in
  - DPATH specified subdirectory
  - Root directory

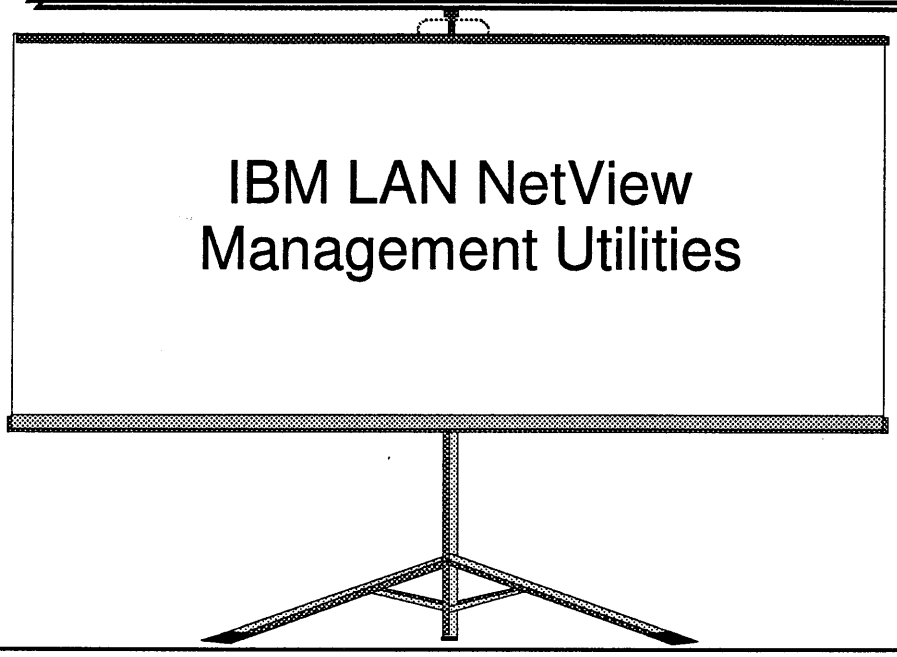
Example CRITFILE.DEF

```
c:\config.*
\\myserver\cmlib\*.cfg
\cmlib\3270*.cfg
*\ibmcom\*.*
d:\mystuff\file.x?z
```


Asset Management Scenario



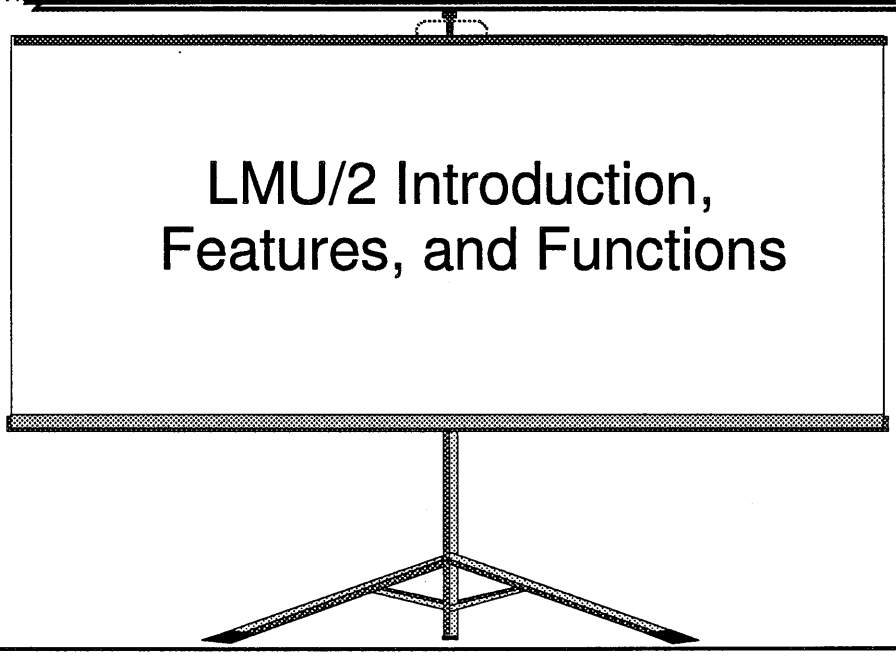
Unit 9



Unit 9 Agenda

- LMU/2 Introduction, Features, and Functions
- Performance Management
- Fault Management
- Other Management Functions
- Using LMU/2 Integration Component

Part 1

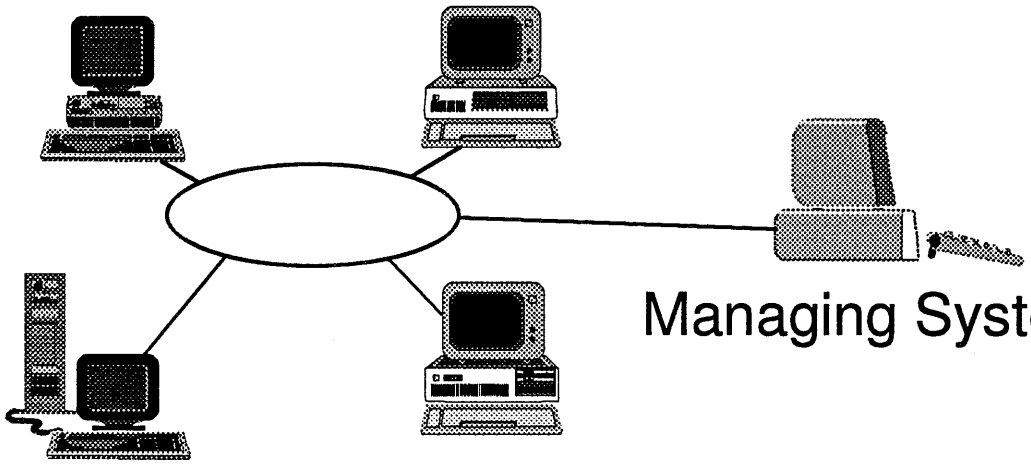


LAN NetView Management Utilities

- OS/2 based
- Collection of software applications
- Graphical user interface
- Remotely start applications
- Collect configuration/performance data
- Store system information
- Detect system problems

Managing - Managed Relationship

Managed Systems



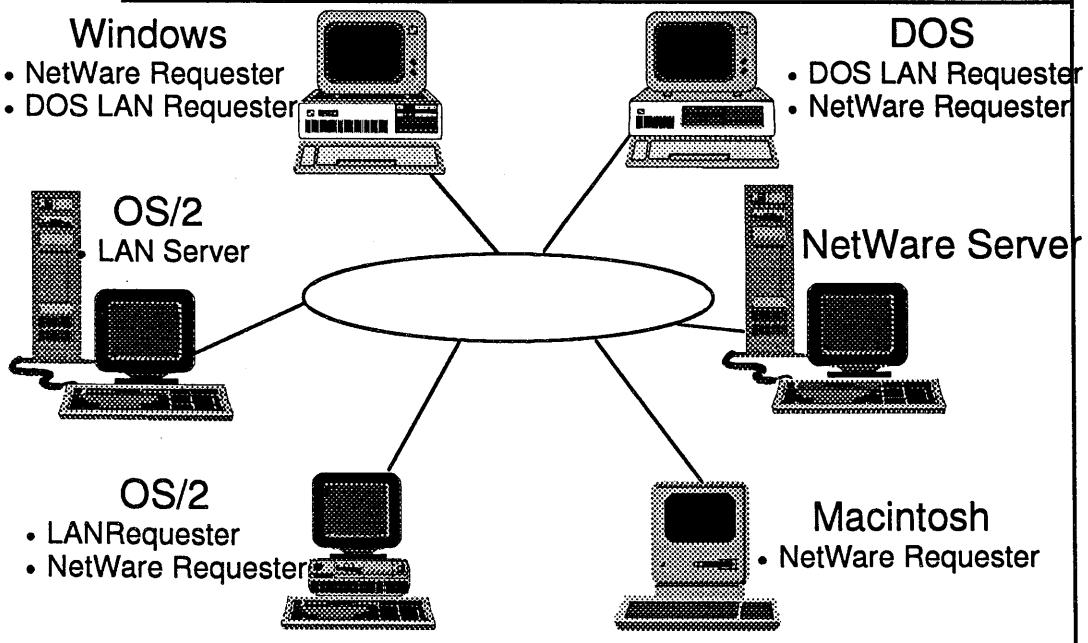
Managing Components

- Administrator Workstation
- Managing System
- Managing System w/ Database
- Fault Manager
- SNMP Proxy Agent

Management Functions

- Performance Management
- Fault Management
- Other Functions
  - Remote program execution
  - VPD collection
  - ...

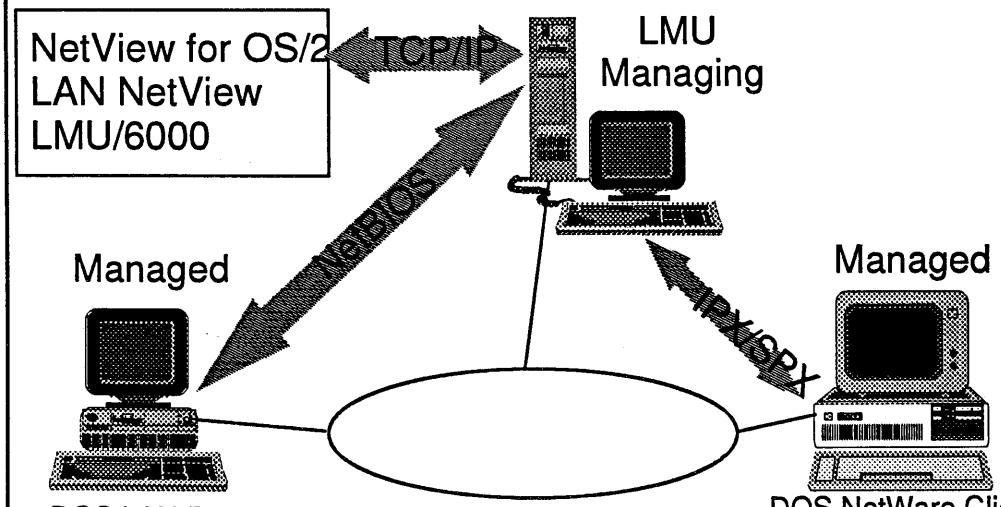
Managed Workstations



Functions of Managed Systems

- Collects Configuration Information
- Forwards Information to Managing System
- Performance Monitoring
- Generates and Forwards Alerts
- Issues Heartbeats
- Executes LMUCMD Commands

Protocols



- DOS LAN Requester
- OS/2 LAN Requester
- OS/2 LAN Server

- DOS NetWare Client
- OS/2 NetWare Client
- NetWare Server
- Macintosh NetWare Client

Software Requirements

- OS/2 1.3 or above
- DOS 3.3 or above (1)
- Macintosh System 7 (2)
- OS/2 LAN Server (3)
- Novell NetWare 3.11 (3)
- OS/2 LAN Requester (4)
- Novell NetWare Requester (4)
- Database2/2 (5)

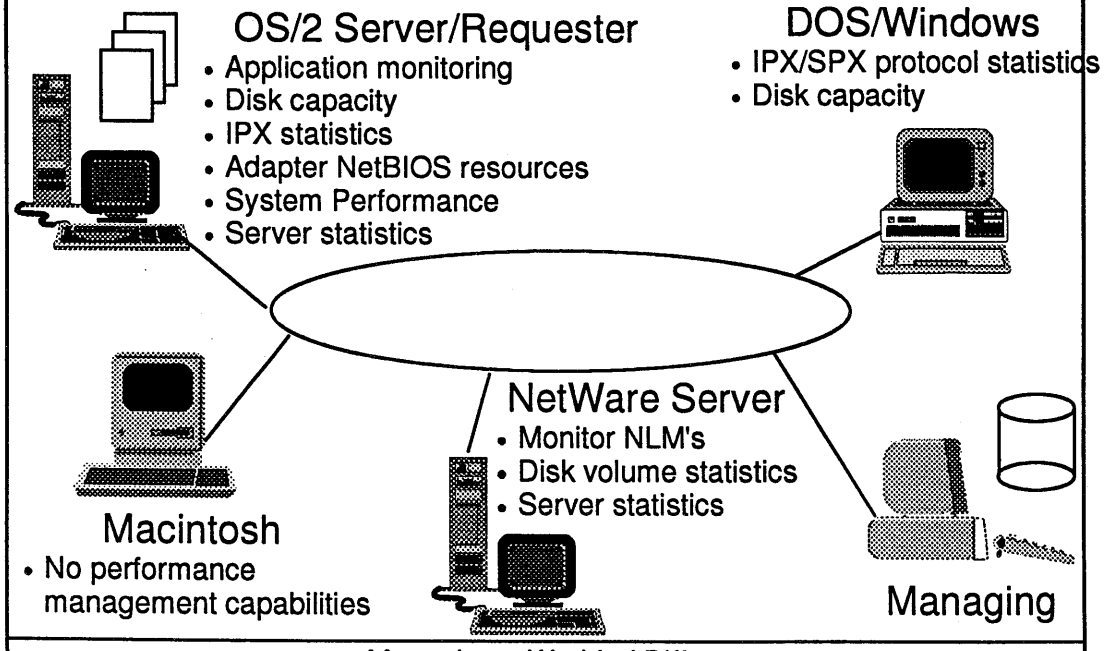
Hardware Requirements

- LAN Adapter
  - Token-ring
  - Ethernet
- 10MB DASD OS/2 Systems
- 500KB DASD DOS Systems (1)
- 100KB DASD Machintosh Systems

Part 2

Performance
Management

Performance Management



Performance Management - OS/2

- Monitoring IPX statistics requires Novell NetWare requester for OS/2.
- NetBIOS resources are monitored for ALL systems logged on to a particular domain.
- Monitoring system performance requires SPM/2. This can only be done remotely in an OS/2 LAN Server environment. System performance data can be stored in a DB2/2 database.

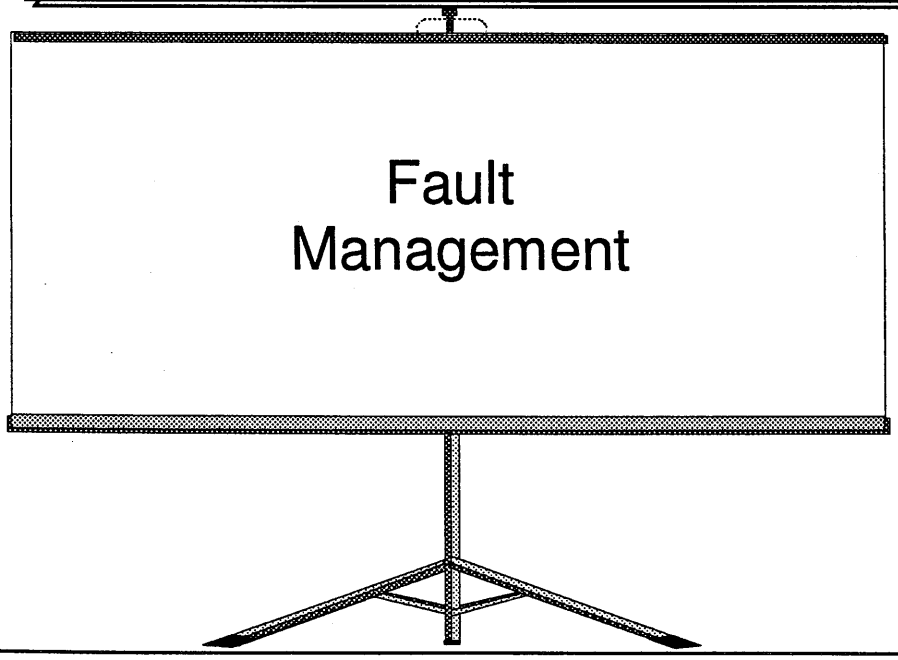
Performance Management - DOS

- Monitors the IPX statistics of ALL (DOS and OS/2) requesters logged on to a NetWare server.

Performance Monitoring - NetWare

- Monitoring server statistics requires the SS.NLM from Novell.
- Volume and Server statistics can be stored in a DB2/2 database.

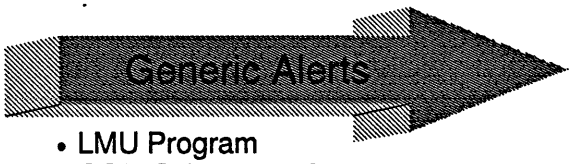
Part 3



Fault Management

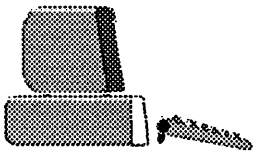
Fault Reporter

- Managed
- Managing
- Administrator



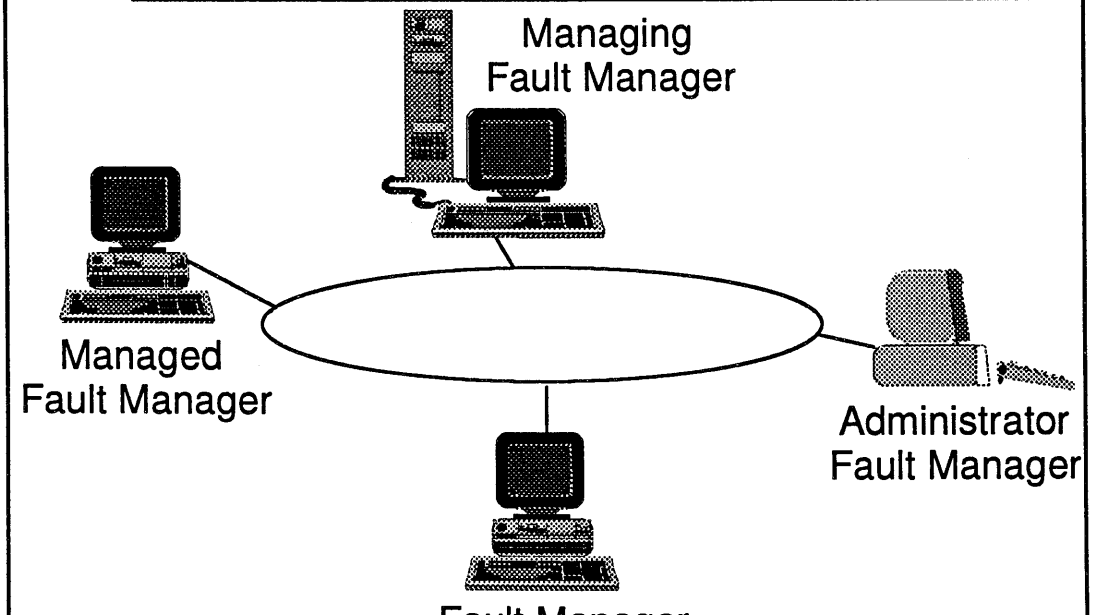
- LMU Program
- OS/2 Subsystem Agents
- User-written

Fault Manager

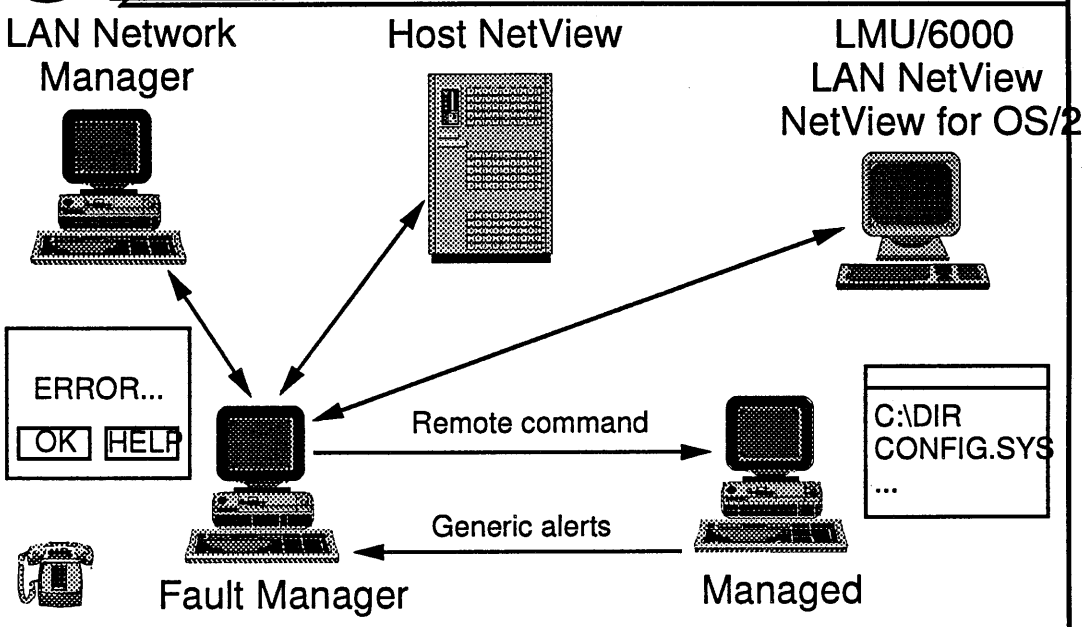


- Managed
- Managing
- Administrator

Fault Manager Systems

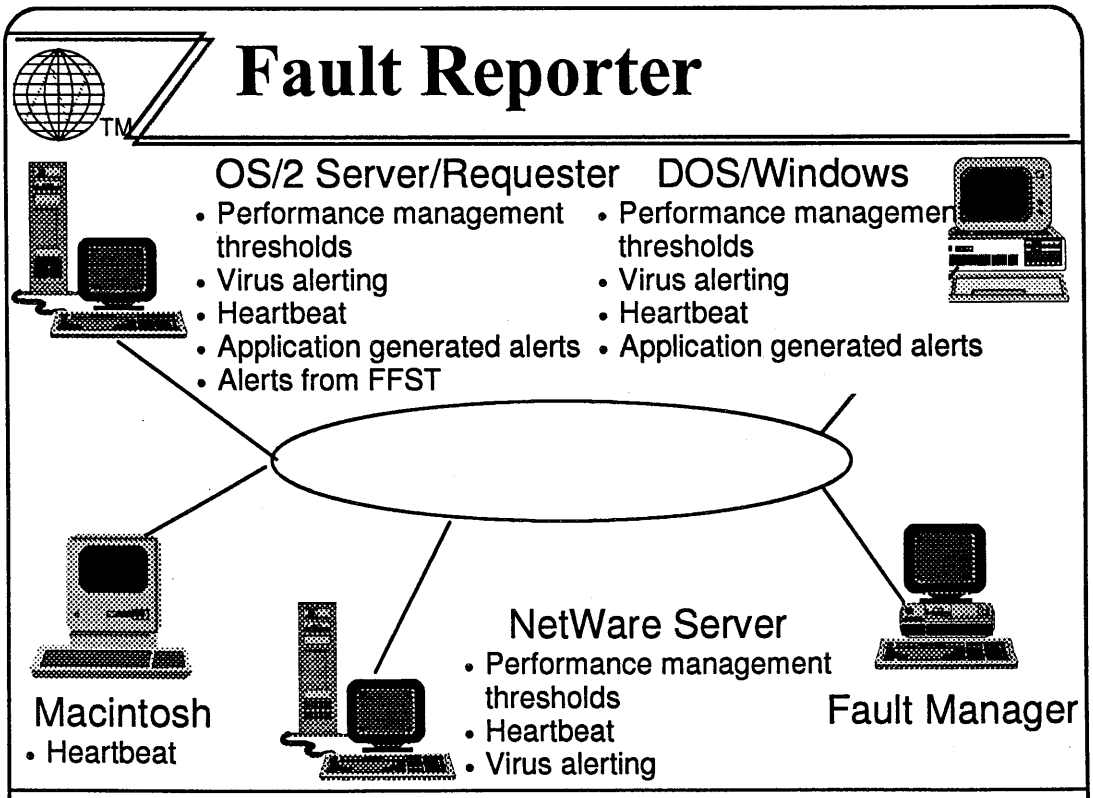


Fault Manager



Managing a World of Difference

Fault Reporter

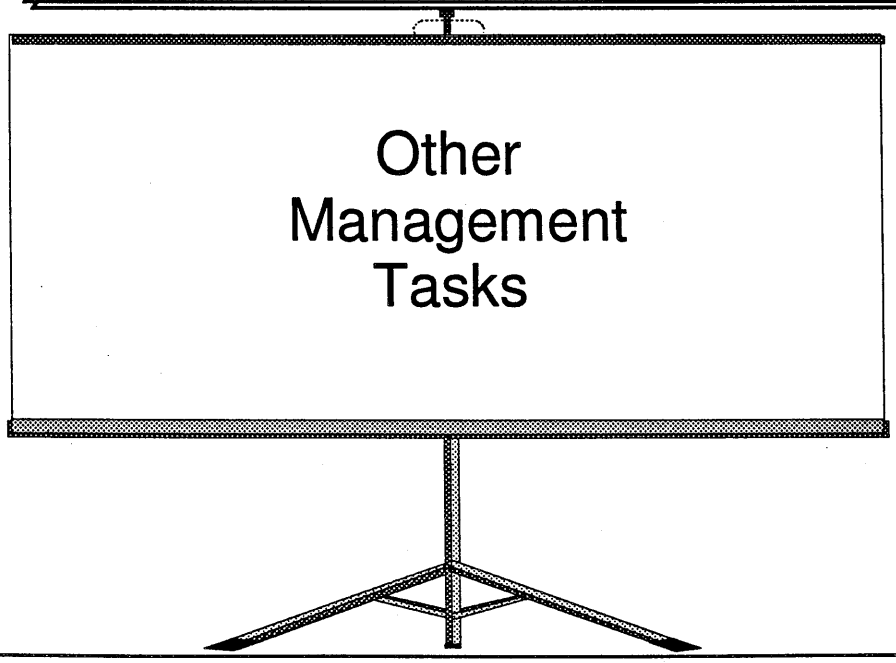


Managing a World of Difference

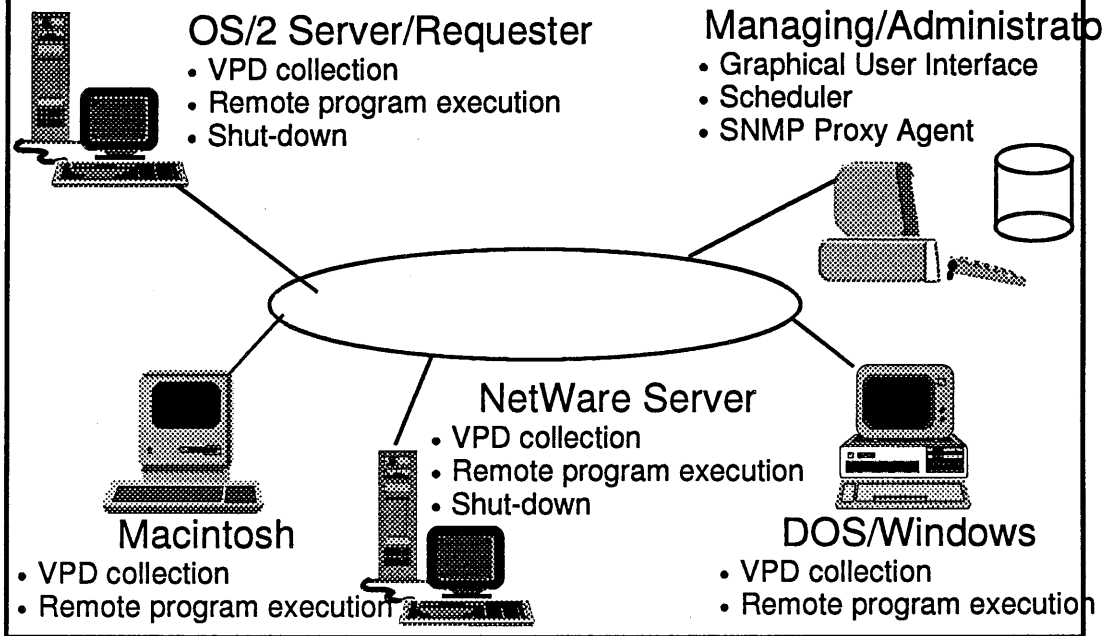
Fault Reporting

- Virus alerting (1)
  - Called by virus scanner.
- Heartbeats (2)
  - On-Line
  - Off-line
  - Status
- Application Alerts (3)
  - C
  - REXX

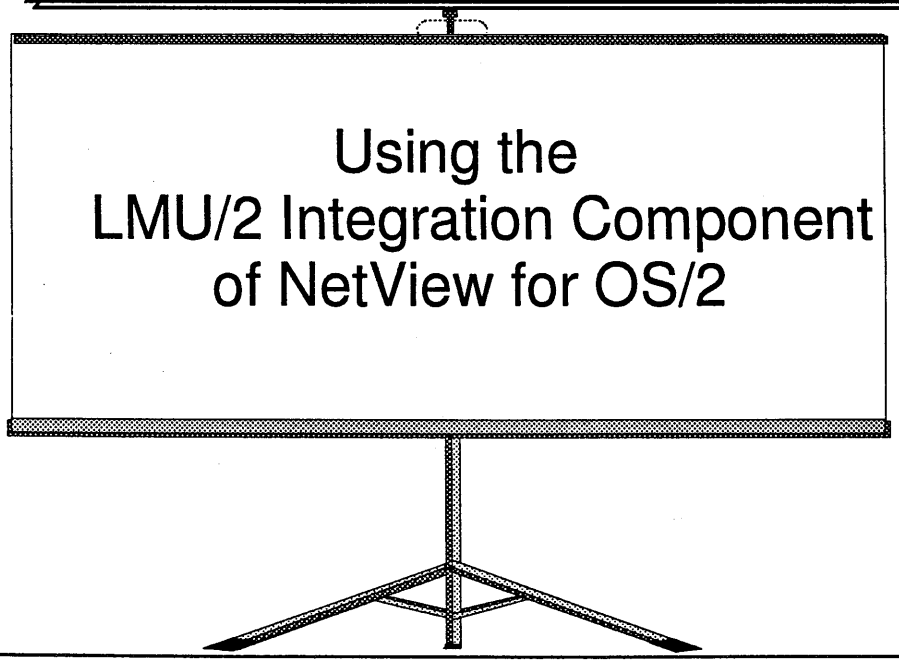
Part 4



Other Management Functions



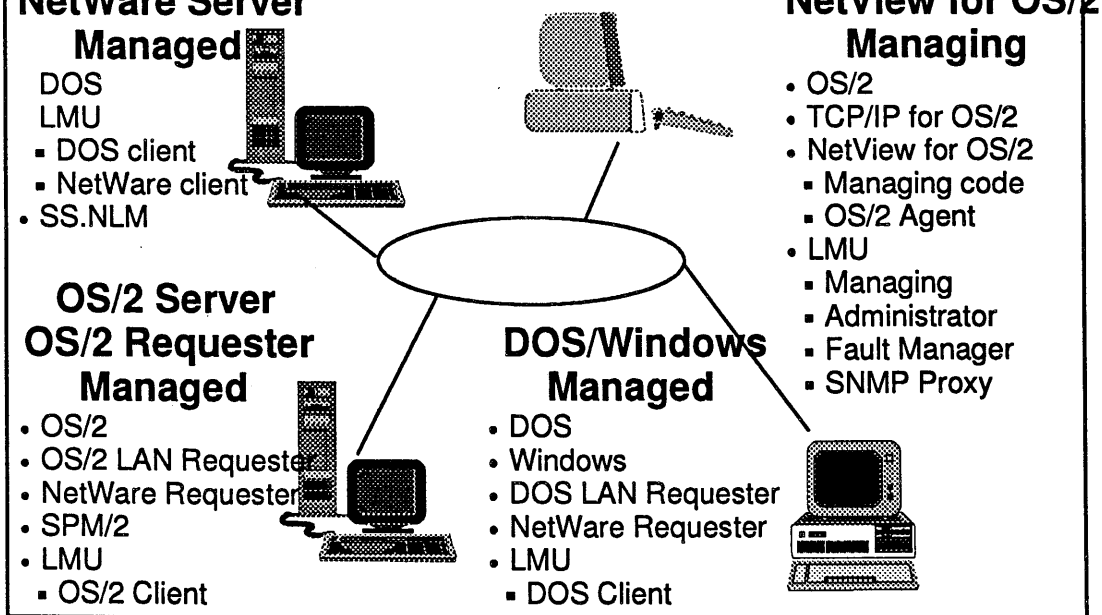
Part 5



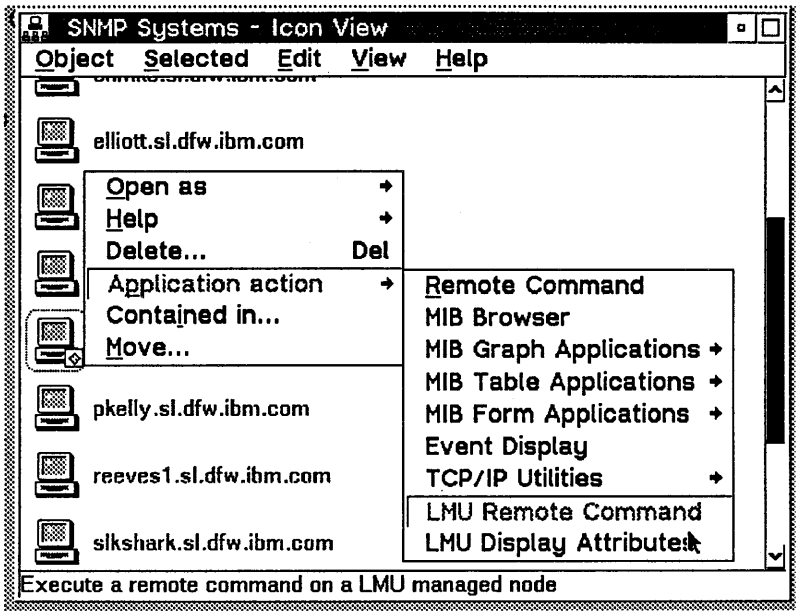
Configuration

- TCP/IP
  - LMU MIBs added to TCP/IP MIB-II
  - Auto-start and enable REXEC
  - User ID, Password for REXEC
  - Trap Destination
  - Auto-start SNMP daemon
- LMU
  - SNMP proxy agent name
  - Alert table destination

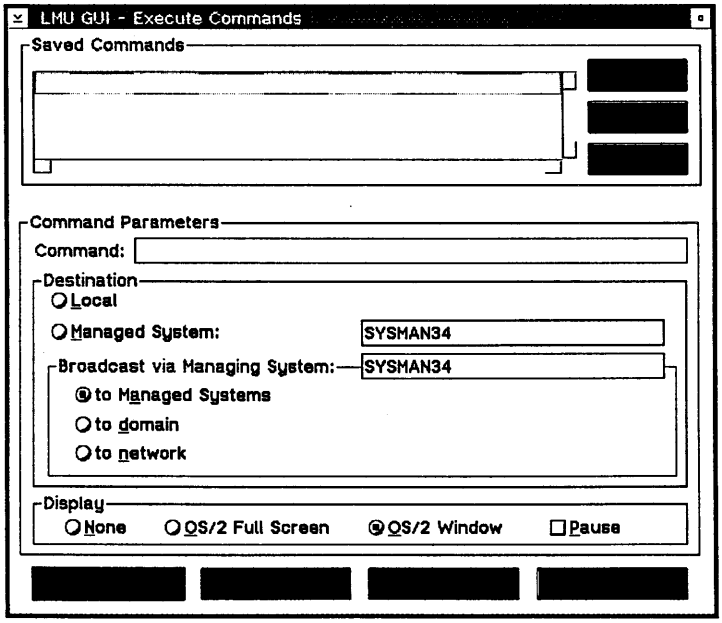
Installed Components



Sample Management Desk GUI



LMU Remote Command Line

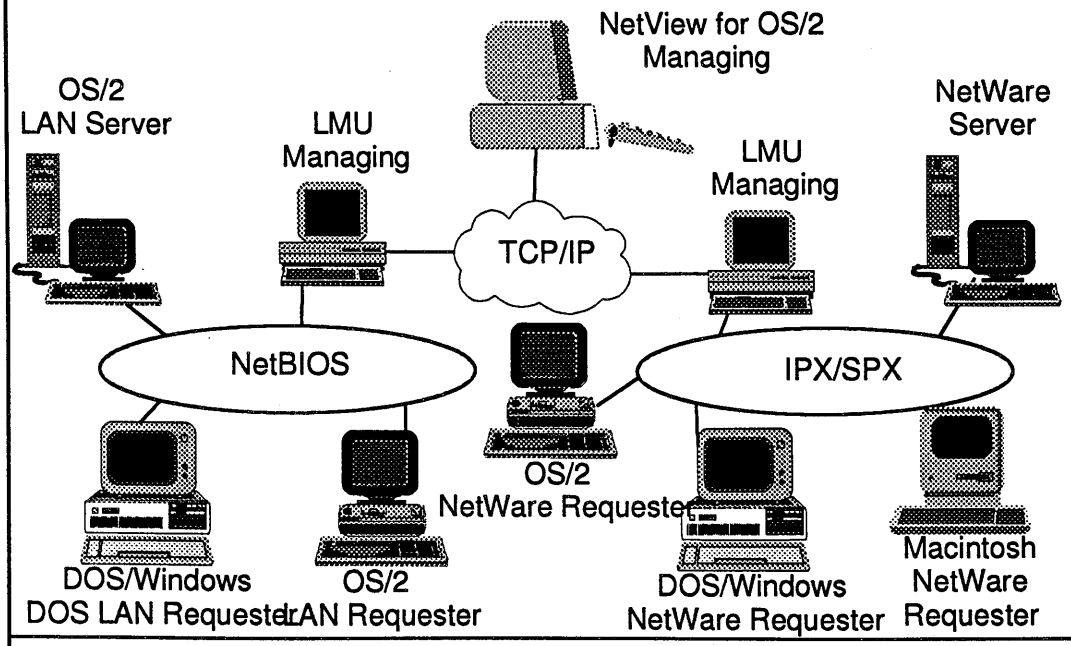


LMU Display Attributes

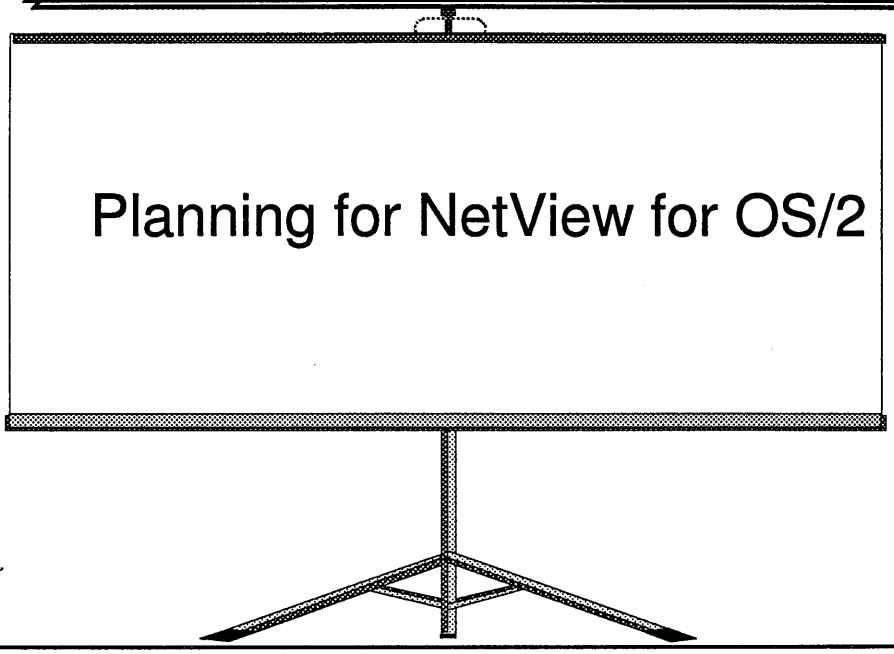
LMU Display Attributes

Name:	SYSMAN34
Domain:	SYSMGMT
Userid:	LAB34
Type:	Managing
Status:	Pending
Node Address:	10005A89DB50
Node Type:	LAN Server
Managing System:	N/A
Proxy IP Address:	9.19.140.133

Mid-Level Manager



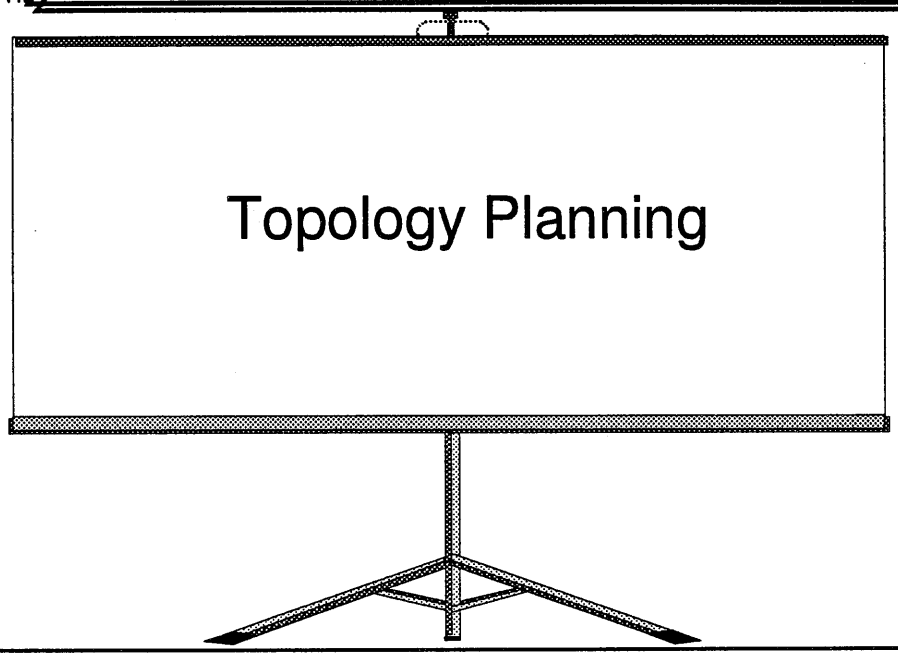
Unit 10



Unit 10 Agenda

- Topology Planning
- Software Requirements
- Hardware Requirements
- Packaging

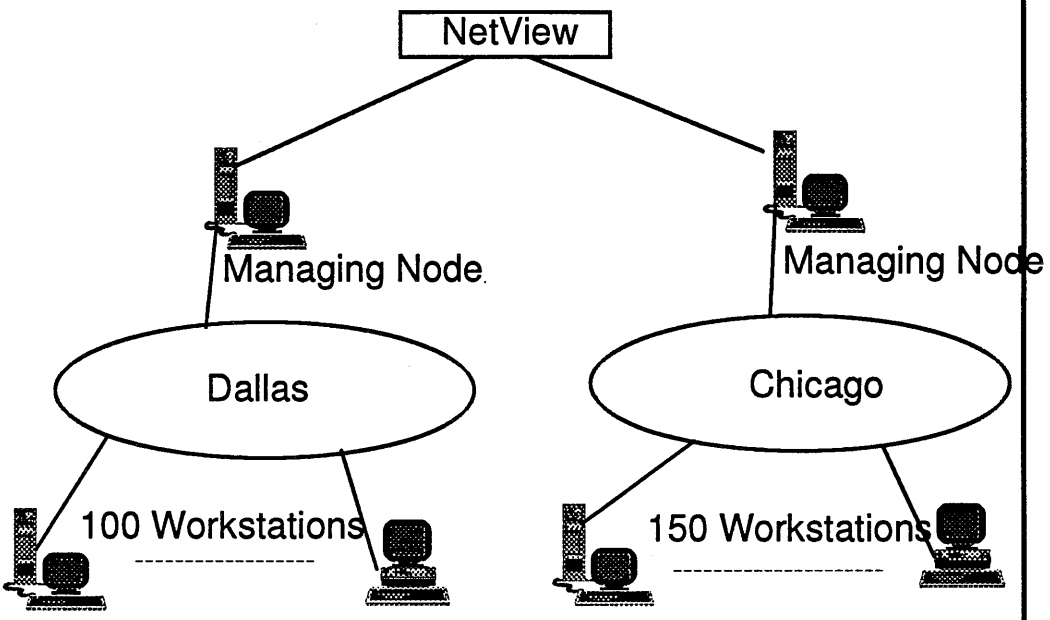
Part I



Managing Nodes

- Number of nodes in the network
- Location of the workstations
- Hardware requirement
- Software requirement
- MOM (Manager of Manager) nodes
- Backup manager nodes
- Type of information to gather

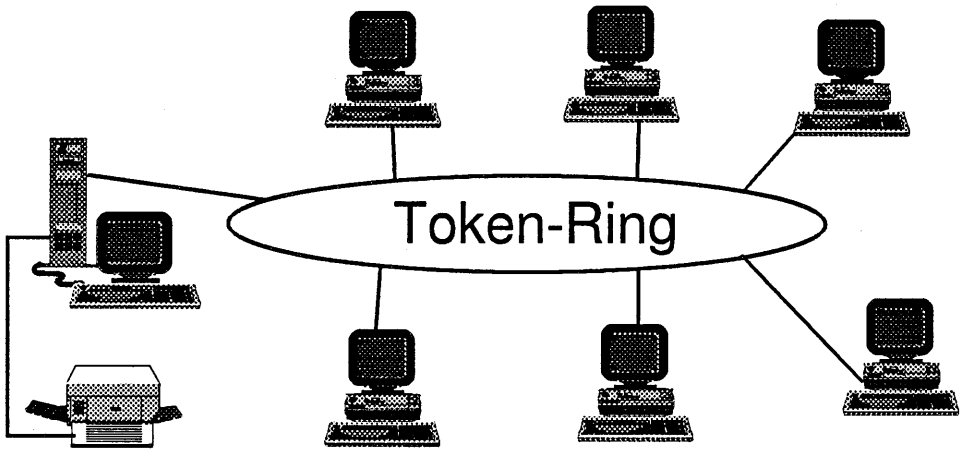
Managing Nodes Example



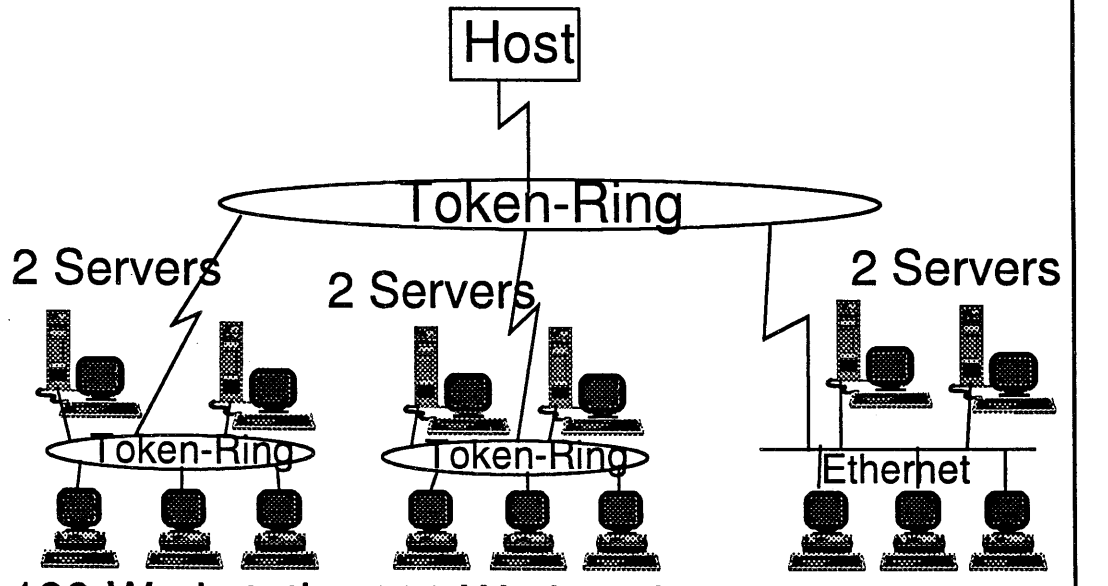
Managed Nodes

- Critical Resources
  - IBM LAN Servers
    - Print Servers
    - File Servers
  - Communications Manager SNA Gateways
  - Database Servers
  - Novell Servers
- Remote nodes
- Remote helpdesk support
- Inventory nodes

Nodes Example 1

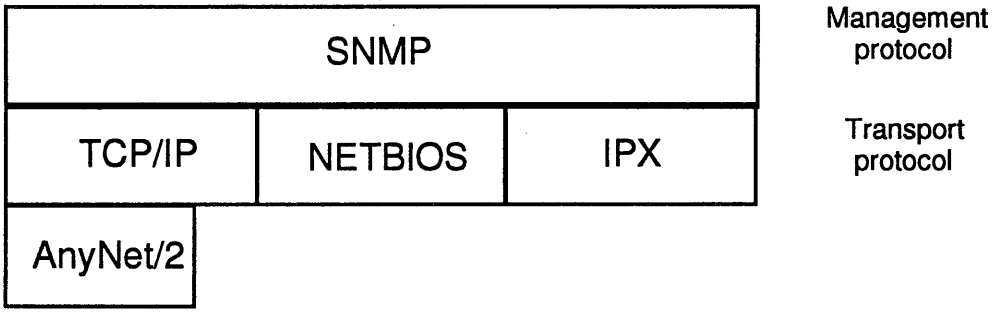


Nodes Example 2

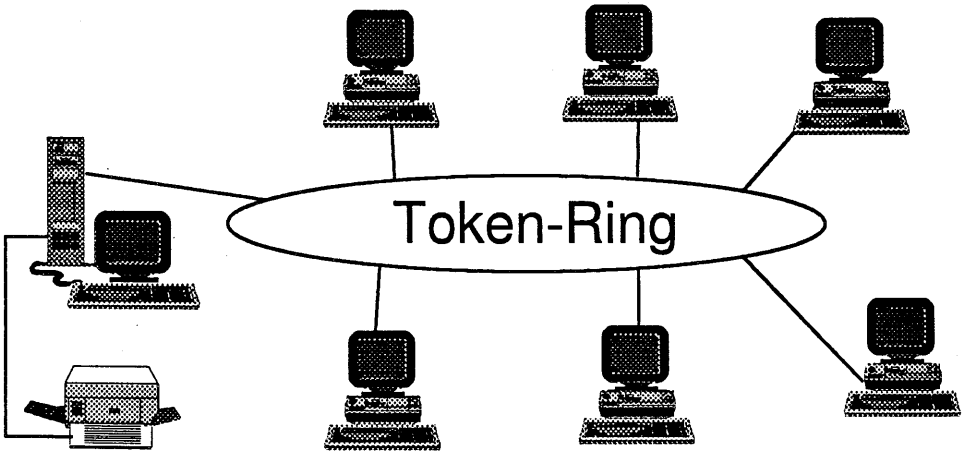


Transport Protocols

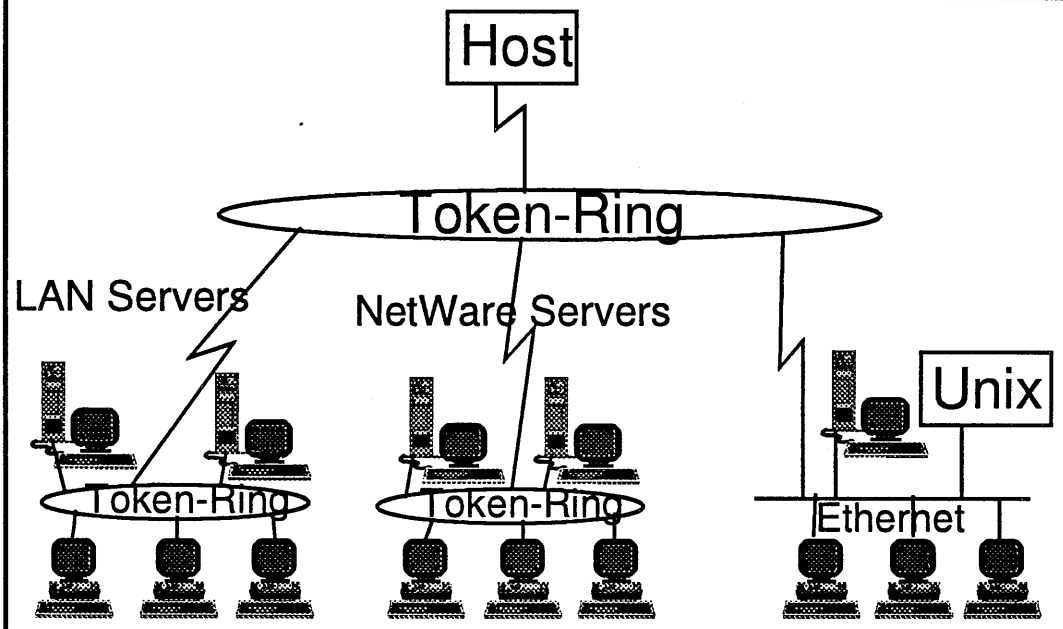
- LAN transport software needed
  - NTS/2 (NetBIOS)
  - TCP/IP for OS/2 V 2.0
  - NetWare IPX
  - AnyNet/2
  - LAN Support Program



Transport Protocol Example



Transport Protocol Example



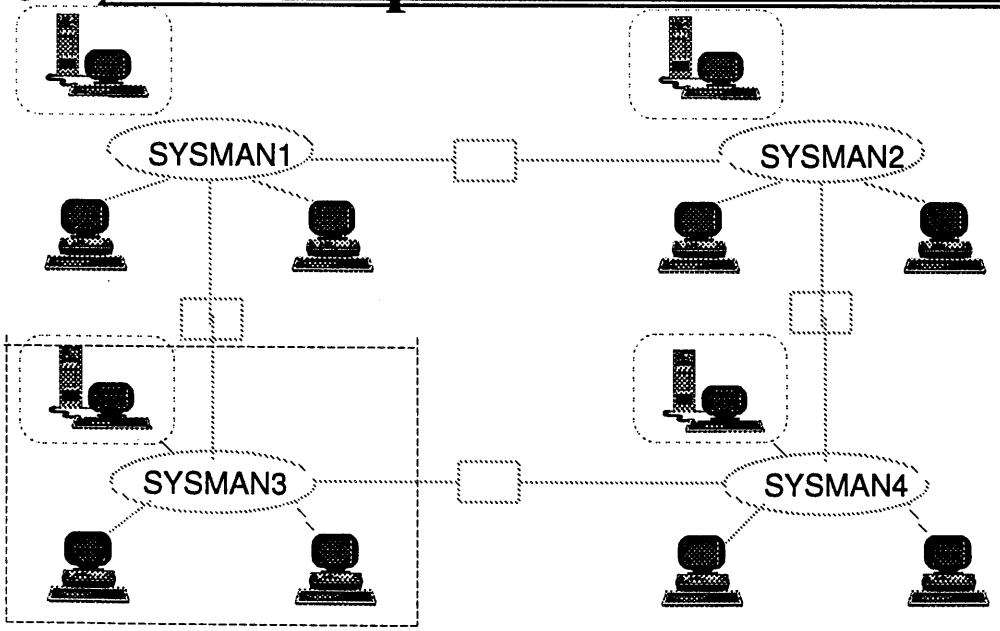
Network Discovery

- NETBIOS - nodes with NETBIOS
  - Discovers once
- TCP/IP
  - Continuous discovery
- IPX
  - Continuous discovery

NETBIOS Discovery

- Disabling NETBIOS Discovery
- Changing the scope of discovery
  - Seed File
- Polling intervals

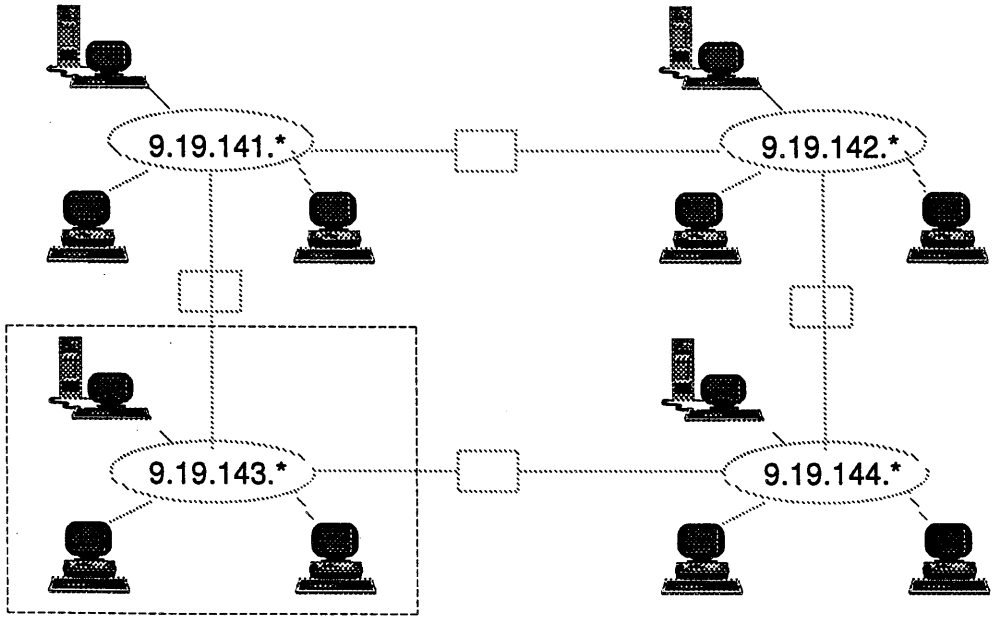
NETBIOS Discovery Example



TCP/IP Discovery

- Disabling TCP/IP Discovery
  - SVSTOP tcpipdiscovery
- Changing the scope of discovery
  - Seed file (-s)
  - Log file (-L)
  - Mask file (LNTCPIP.MSK)
- Polling intervals
  - Configuration
  - New node

TCP/IP Example

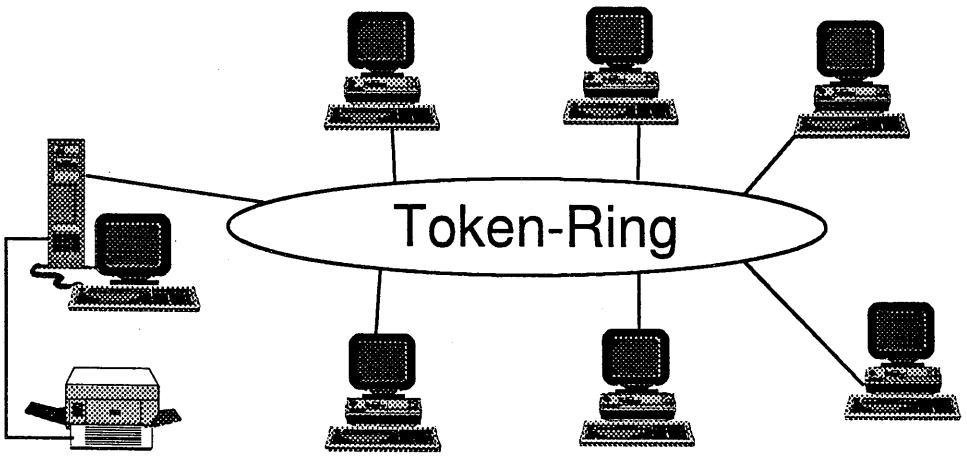


IPX Discovery

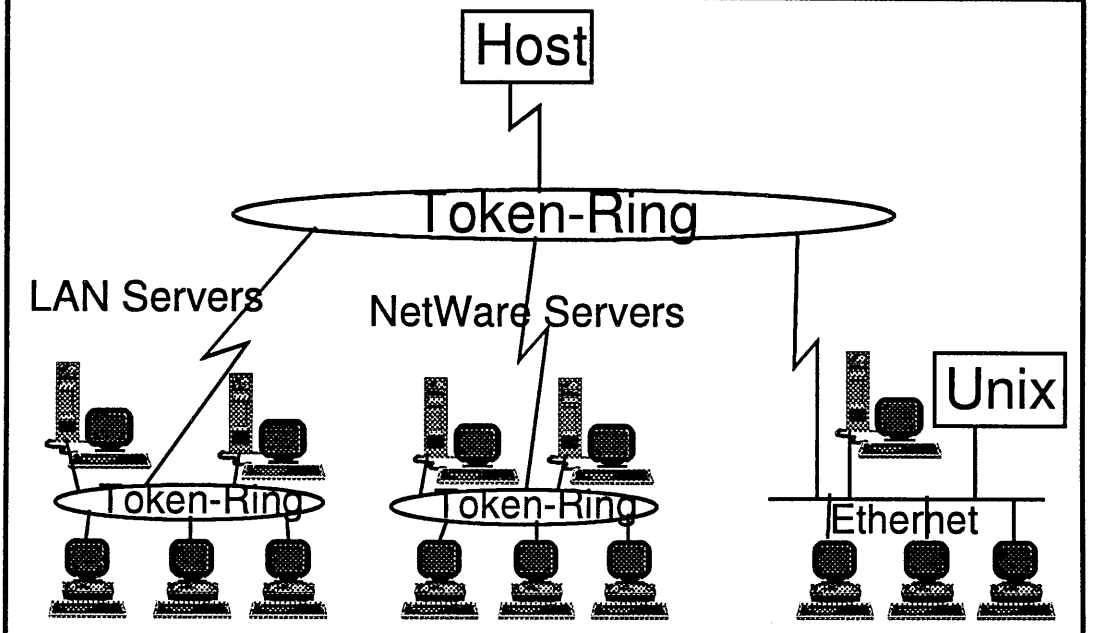
- NetWare discovery
  - Finds nodes running NetWare IPX protocol
  - Adds these nodes to the discovery database

Node Discovery Example 1

1 LAN Server 100 Requesters



Node Discovery Example 2



Community Names

- Incomming Requests
  - Security
  - Read Only
  - Read/Write
- Out going Traps
  - Trap Destination
- If name is not public, use Community Name File

Development Environment

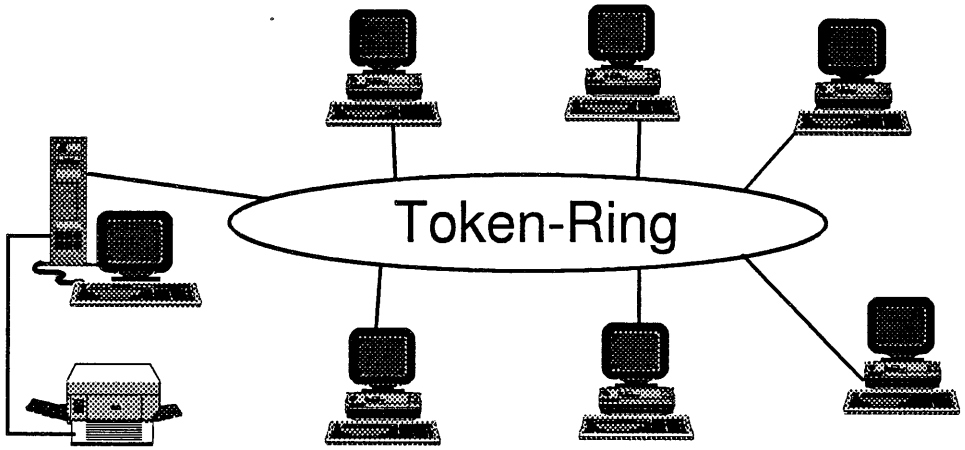
- Requires
  - Management Desk
  - NetView for OS/2 Developer's Toolkit
- Documentation
  - NetView for OS/2 Developer's Guide
  - Sample programs

Management Functions

- Performance Monitoring
  - Critical resources
  - Heavily utilized workstations
- Host Connect
  - Central host alert notification
- Fault Management
  - Trap notification
- Asset Management
  - Vital Product Data
  - Critical file comparison

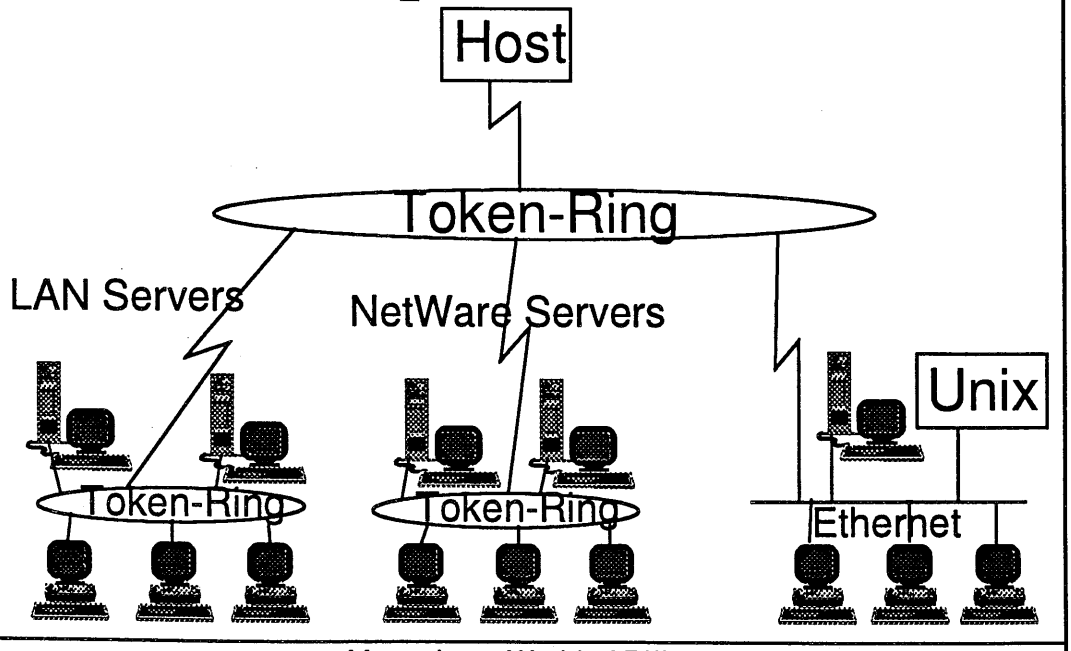
Management Function Example 1

1 LAN Server 100 Requesters



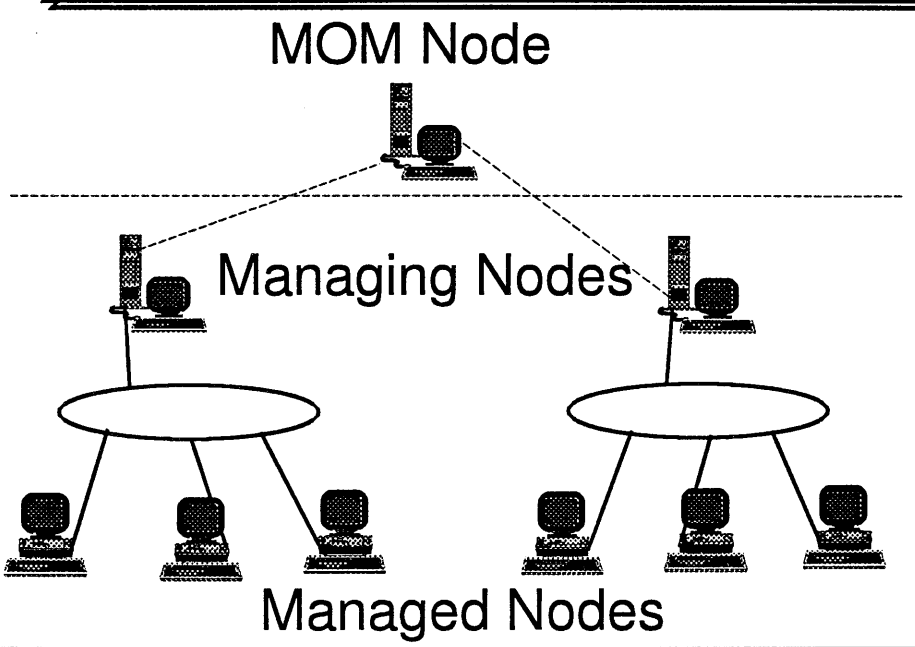
Managing a World of Difference

Management Function Example 2

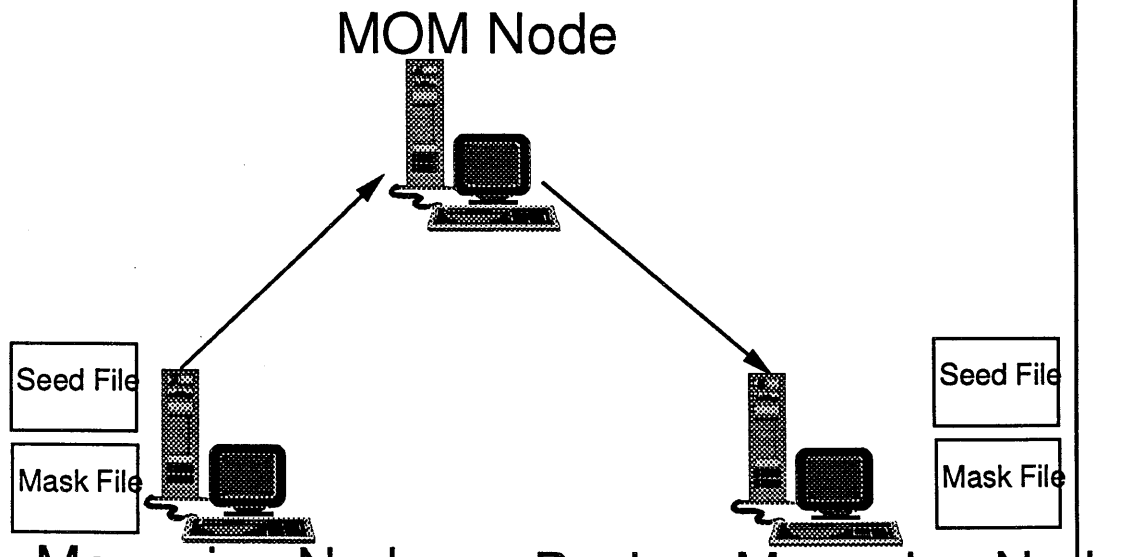


Managing a World of Difference

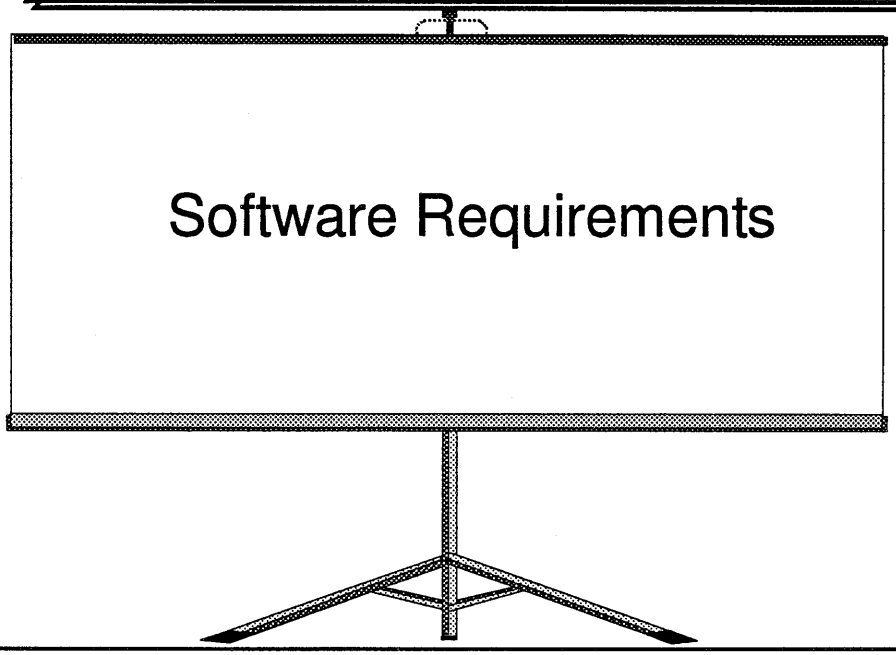
Manager of Managers



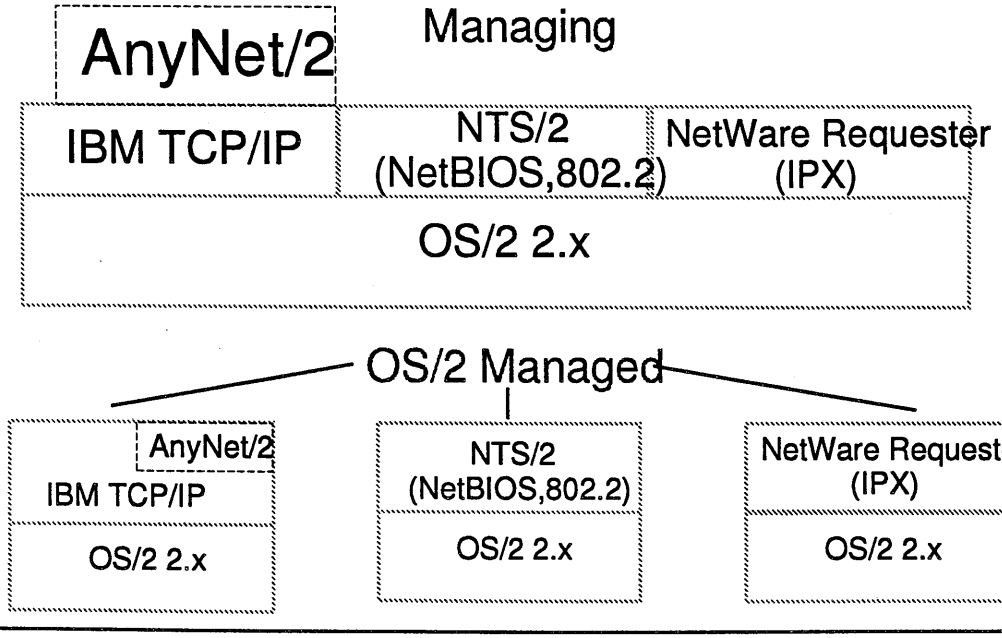
Backup Managing Nodes



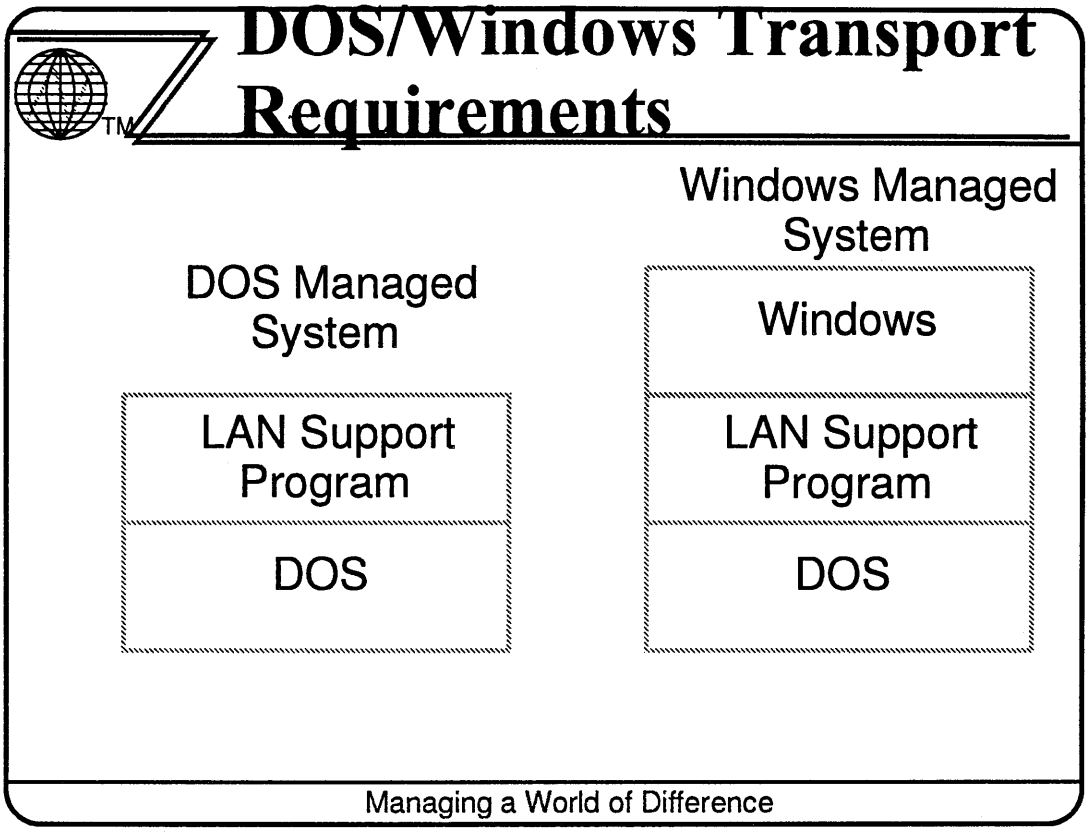
Part II



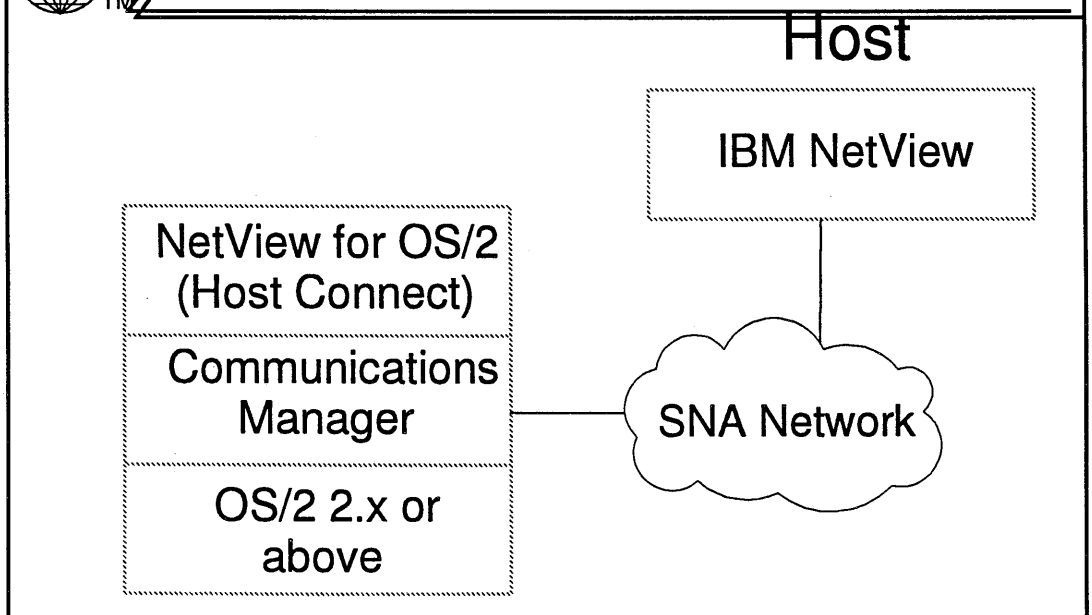
OS/2 Transport Requirements



DOS/Windows Transport Requirements



Host Connect



LMU Integration - Managing

Managing a World of Difference

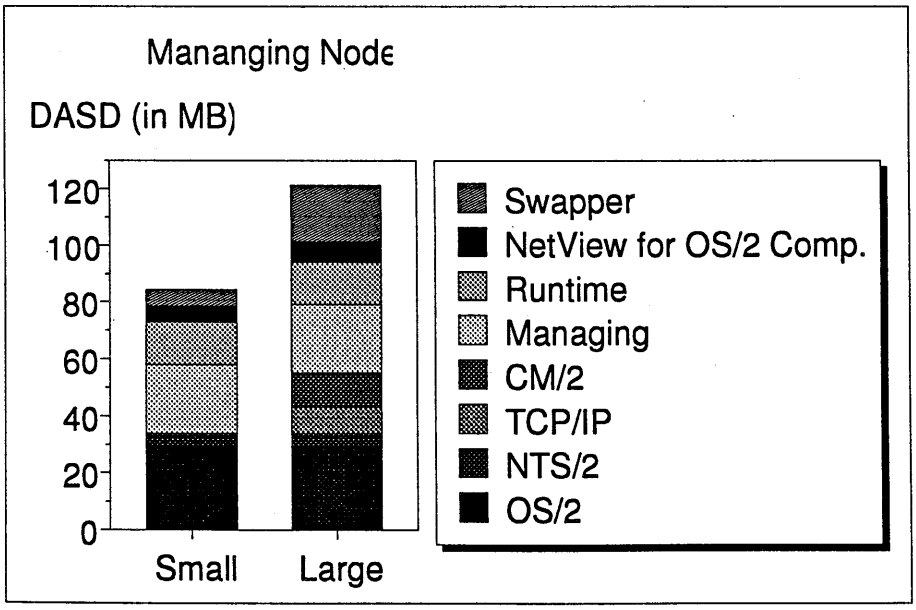
LMU DOS/Windows Agents

Managing a World of Difference

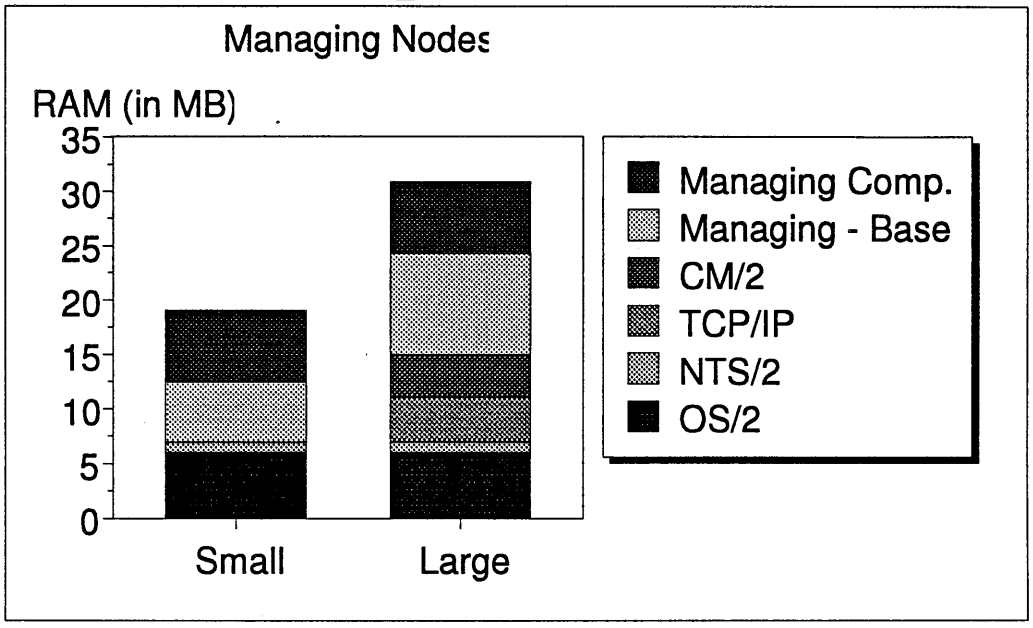
Part III

Hardware Requirements

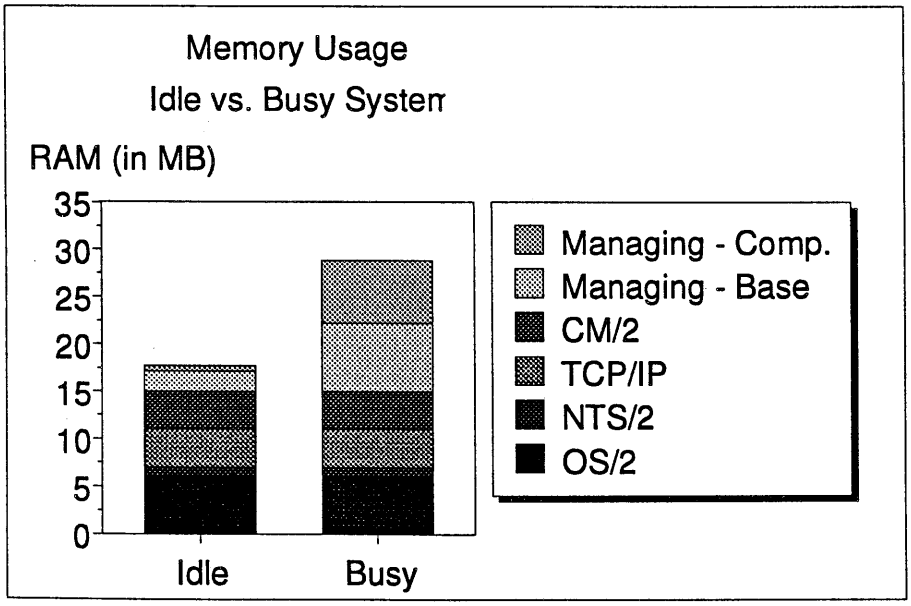
Fixed Disk Requirements - Example



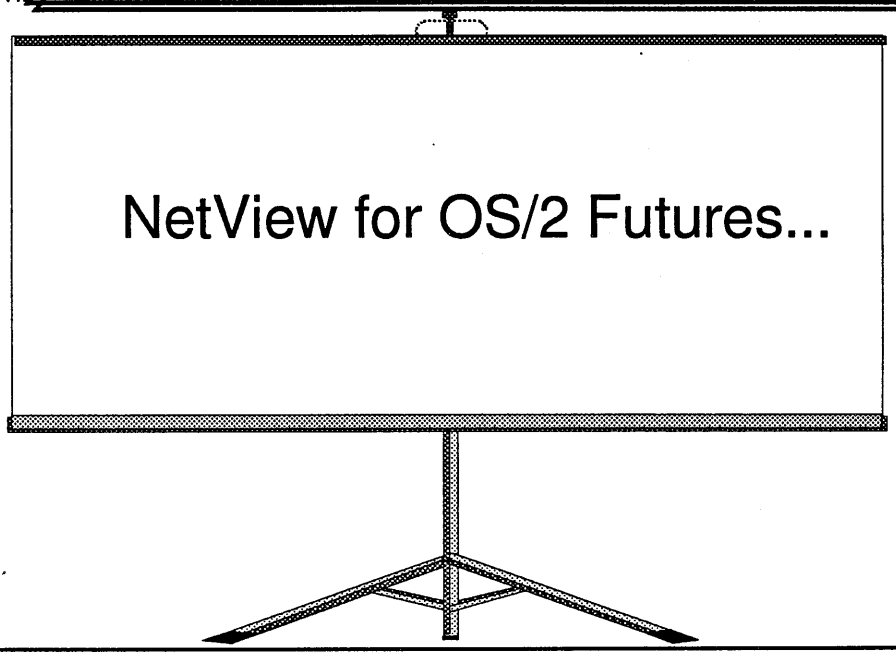
Memory Requirements - Example



Memory Requirements



Unit 11



Unit 11 Agenda

- Known Requirements
- NetView for OS/2 V 2.1
- SNMP Applications
- Futures...

Known Requirements

- System Policy
- CM/2 Agent
- DB2/2 Agent
- Print Queue Management
- Forward Topology/Status to NV/AIX
- Key Router/Hub Applications
  - IBM 8250, 8260, 6611 router family
  - Cisco, Wellfleet, Bay Networks, 3COM

Known Requirements

- Forward Topology/Status to NetView MultiSystem Manager
- Webbing Support
- Window NT Agent Support
- Windows 95 Agent Support

NetView for OS/2 V 2.1

- Communications Manager/2 V 1.1 SNMP Agent
- Database 2 OS/2 V 1.1 (DB2/2) SNMP Agent
- Systems Policy
- Better print queue management

Communications Manager/2 Agent

- Managed Component
  - Dependent LUs
  - APPC Sessions
  - APPN Nodes (EN and NN)
- Management Function
  - Link Error Notification
  - Adapter Error Notification

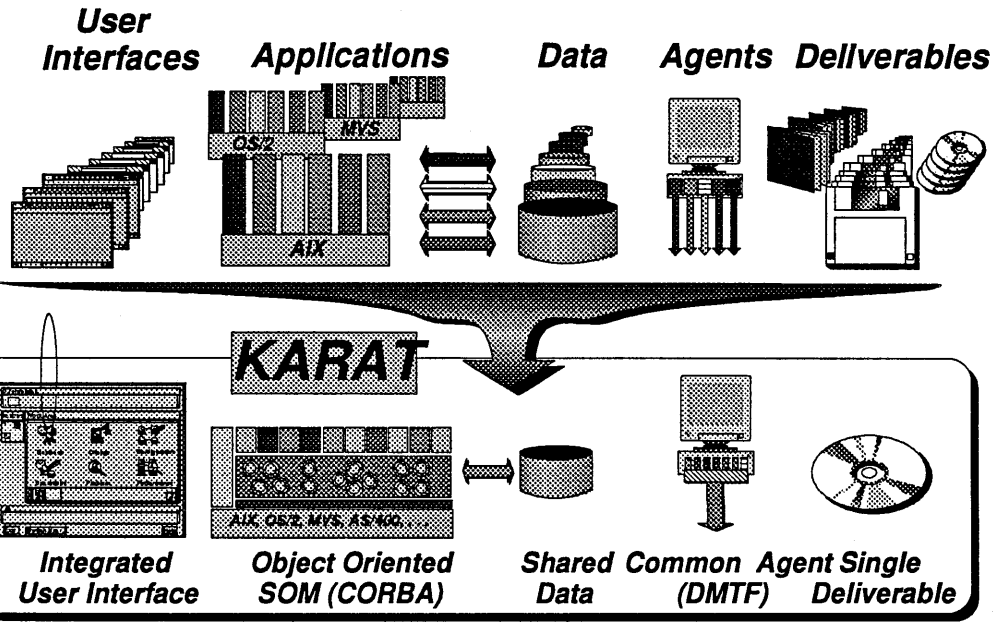
DB2/2 Agent

- Managed Nodes
  - Database Server
  - Database Reqester
  - DDCS Gateway
- Management Function
  - Backup/Restore/Roll-Forward Database
  - Catalog/Uncatalog Database, Remote Database, and Node information
  - Database Status : number of users connected...
  - Performance Information

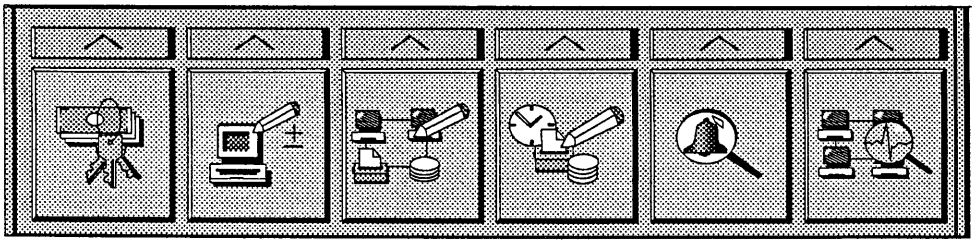
Product Specific Modules (PSMs)

- Migration of NetView for Windows PSMs to NetView for OS/2 applications
- Types of PSMs
  - Product Specific shipped with device (8230 etc.)
  - Generic MIB I/II PSM
  - Miscellaneous Products PSM
    Generic IP device
    Generic SNMP device
    Generic non-manageable device
    ...

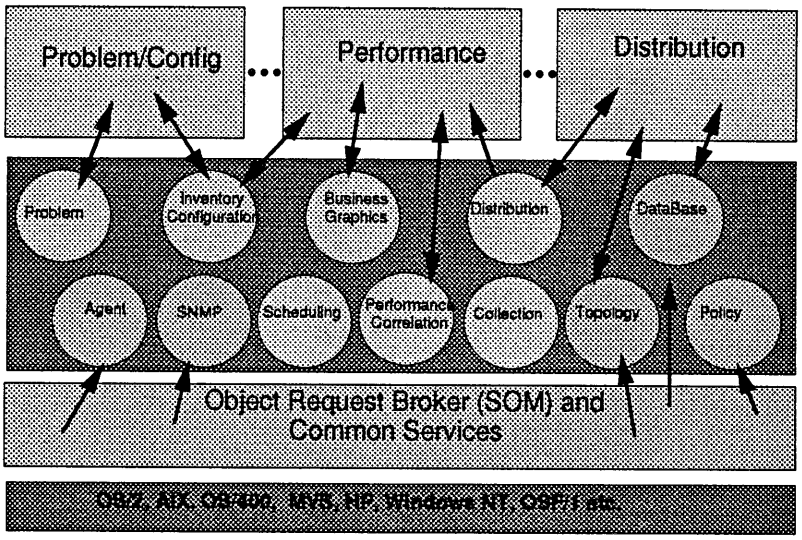
Karat Systems Management S



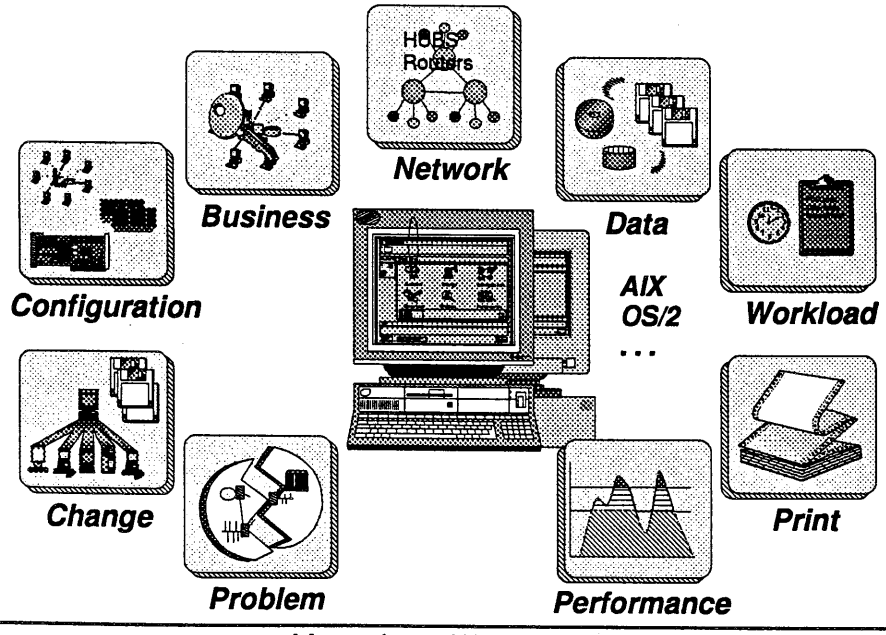
Karat Common GUI



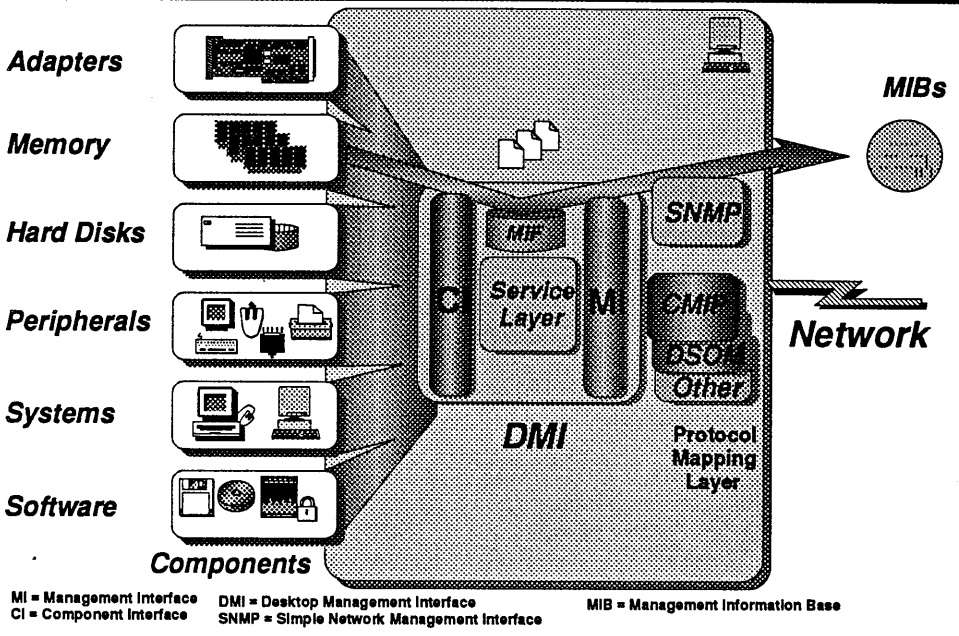
Karat Object Oriented Servic



Karat Functional Integration

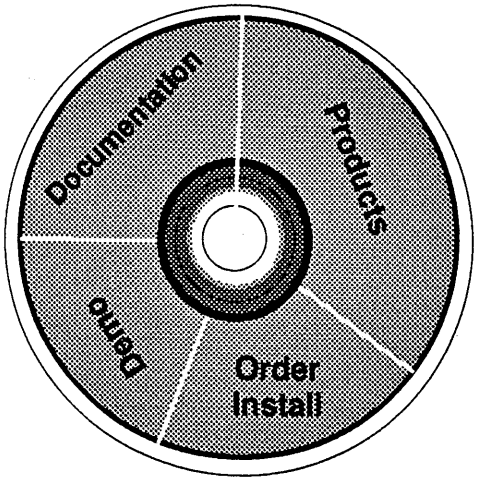


Desktop Management Interfac



Karat Integrated Deliverables

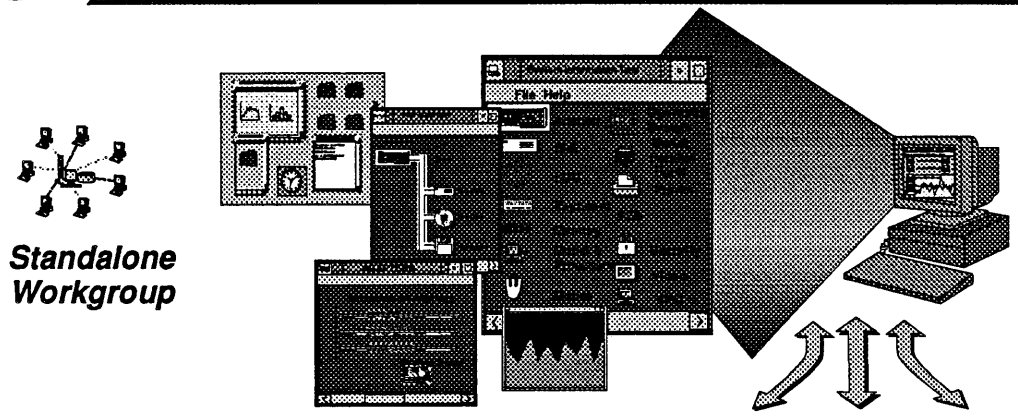
Integrated Deliverables

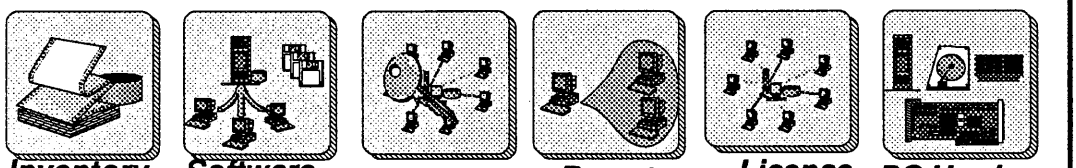


Customer selects functions
- Translates to products
- Pays for what is selected

- **Install directly from CD/Tape**
  - Single delivery vehicle
- **Product Information**
  - Demo
  - Documentation
- **CD Showcase technology**

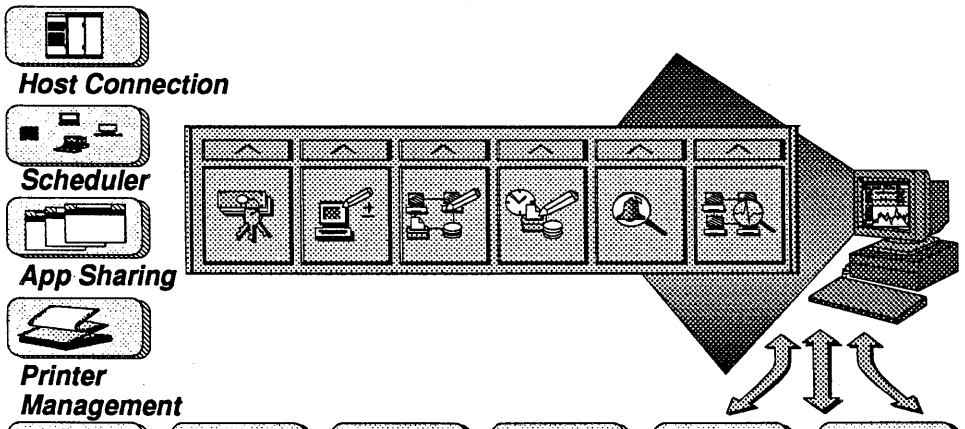
SystemView for OS/2





Managing a World of Difference

SystemView for OS/2



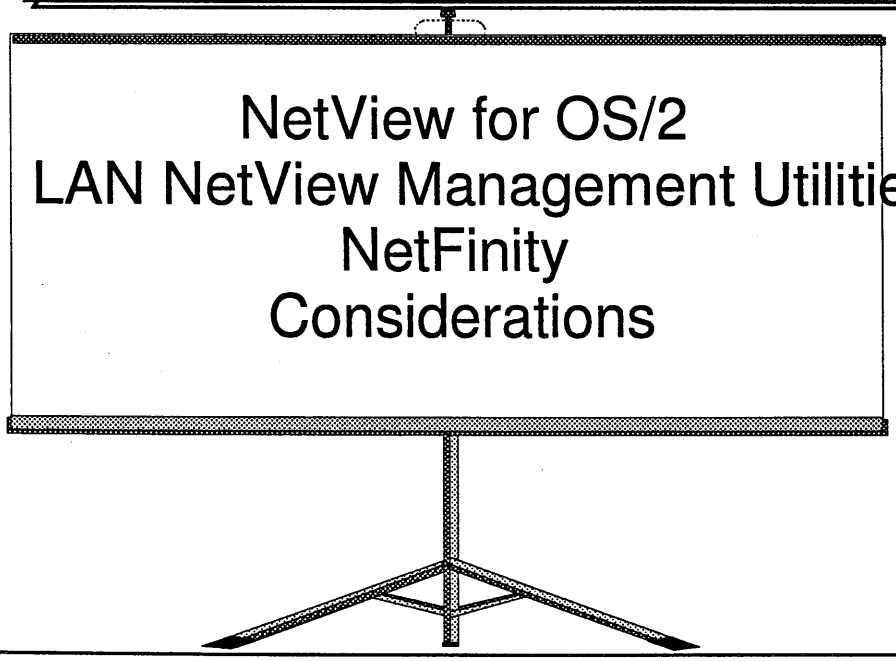
Managing a World of Difference

Karat Integrated Deliverables

Integrated Deliverables

- Many OS/2 products available today to meet your LAN management needs
- System View for OS/2 will:
  - Eliminate redundant functions
  - Integrate complementary functions
  - Provide additional function to fill the gaps
  - Leverage 00 technology
  - Protect your investment

Unit 12



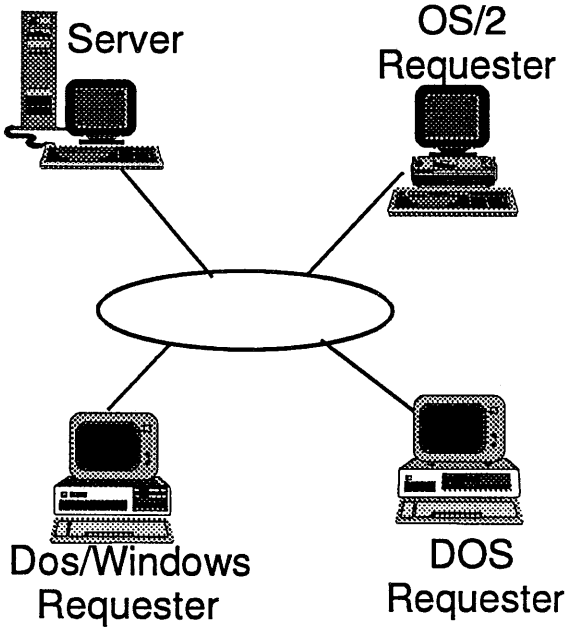
Common Management Tasks

- Performance Management
- Fault Management
- Asset Management
- Remote Command Line
- Graphical User Interface
- Remote Shut-Down
- Connectivity to a higher level manager

Functionality Differences

- Management Protocol
  - Proprietary - vs - Industry Standard
- Availability Checking
  - Heartbeats - vs - Polling
- Installation/Configuration
  - ASCII Files - vs - PM Interfaces
- Performance Management
  - Additional application - vs - included functionality
- Communication
  - Server - vs - SNMP
- Discovery

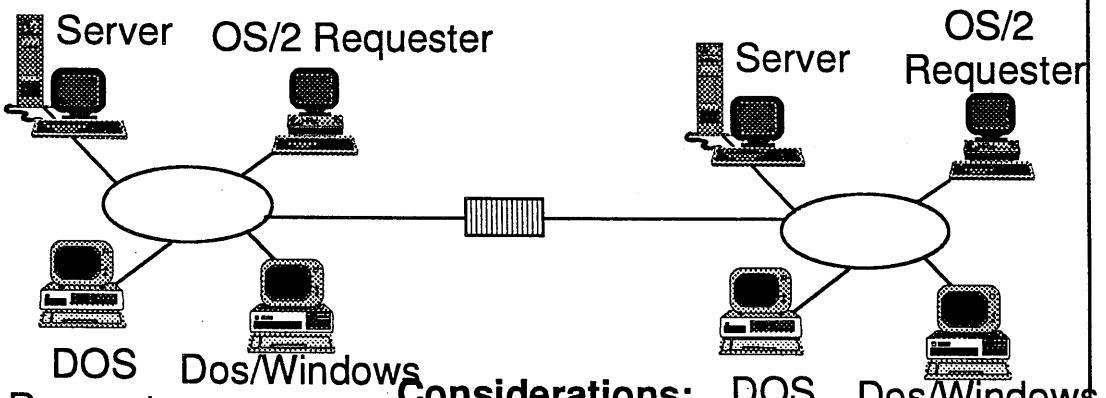
Workgroup LAN Scenario



Considerations:

- Protocols
- Managed Devices
- Managed Applications
- Management Functions
- Available Resources

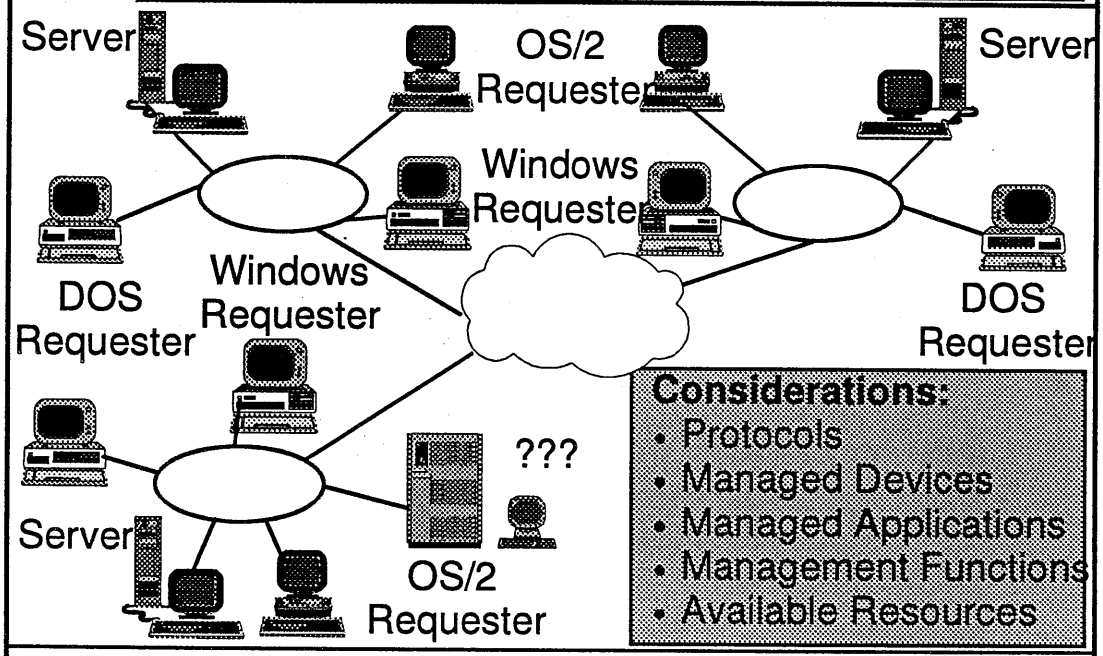
Interconnected LAN Scenario



Considerations:

- Protocols
- Managed Devices
- Managed Applications
- Management Functions
- Available Resources

Enterprise LAN Scenario



Course Summary

- Installation/Configuration
- Applets
- Performance Management
- Fault Management
- Host Connection
- Asset Management
- LMU
- Planning
- Futures
- Product Considerations