mrouted -- set up and administration

o JOINING the MBone

the multicast routing s/w:

- mrouted ftp://ftp.parc.xerox.com/pub/net-research/ipmulti/
- CISCO IOS 11.x ftp://ftp-eng.cisco.com/ipmulticast.html
- pimd http://catarina.usc.edu/ahelmy/pimsm-implem/
- gated http://www.gated.org/

the protocols

- DVMRP
- PIM
+ IGMP

references

Deering S., Cheriton D., "Multicast Routing in Datagram internetworks and Extended LANs", ACM Transactions on Computer Systems, Vol. 8, No. 2 May 1990

RFC1058 C.Hedrick "Routing Information Protocol", June 1988

T.Pusateri "Distance Vector Multicast Routing Protocol", Work in Progress, August 1997

mrouted man page

omrouted(multicastroutingdaemon)

ftp://ftp.parc.xerox.com/pub/net-research/ipmulti/

- version:
mrouted3.8, 3.8.2 (SNMP support, RSRR)
mrouted3.9-beta2 (route filtering) **

- Platforms :
sparc-solaris2, i386-bsd, sgi-irix6, sparc-sunos41x

- kernel multicast support
FreeBSD already there in new releases
Solaris 2.5.1 multicast patches from:
ftp://playground.sun.com/pub/multicast/
standard in 2.6 (?)

o Distance Vector & Reverse Path Multicasting Concepts

- Basic Concept
  Every router has a table with all networks
  and their respective distance.

  D(i,j) metric of best route from i to j
  d(i,k) metric to reach neighbor k

  $D(i,i) = 0 \quad \text{all } i$
  $D(i,j) = \min_k [d(i,k) + D(k,j)]$

-Keywords
 Routes:
  RR (Route Reports)
  network/netmask metric
  Route Updates
 Dependencies:
  upstream, downstream (parent/child in tree rooted
   at the source)
  Poison Reverse
  leafs
 Operations:
  Graft, Prune, Flood,
 Forwarding Cache Entries

- multicast VS unicast routing

in the mrouted case multicast routing depends on the unicast routing but DVMRP has its own routing table.

- how the multicast distribution tree (wrt S,G) is created

Reverse Path Forwarding (the shortest path !!from the receiver back to the source, routing assymetry(?))

Pathologies inherent to distance vector routing

Route flaps,
Black Holes,
Counting to infinity
Convergence delays

o Steps involved in setting up mrouted

- where to run mrouted (local MBone POP)
  more than one mrouted on the same Ethernet (?)
  encapsulation/members on the same interface

- what the remote tunnel endpoint (IP address)

- what network interfaces are used by the tunnels:
  point to point links (e.g ATM PVCs)
  shared medium (e.g Ethernet)

- static route (to host or interface for p2p links)
  (man route)
  links reserved only for multicast traffic

- determine IP connectivity/routing (ping/traceroute)

- create /etc/mrouted.conf

- run mrouted (with appropriate debug option if needed) o Administration

howto configure/start/stop/debug

- manually or on system start-up (e.g rc.local)

- debugging options (-d option)
  packet, prunes, routes, peers, cache, timeout
  interface, membership, traceroute, igmp

- signals
  HUP, INT, TERM, USR1, USR2

- files
  /etc/mrouted.conf
  /etc/mrouted.pid
  /tmp/mrouted.dump (/var/run in FreeBSD)
  /tmp/mrouted.cache

- commands, tools
  mtrace, mrinfo, mstat, (mview)
  ping, netstat, ifconfig, route, tcpdump
  traceroute

- <phyint>, <tunnel>, <metric>, <threshold>, <rate_limit>

- filtering
  "input" or "input and output"
  <accept> <bidir> <deny> <exact>

- administrative scoping
  <boundary>

- other configuration options
  <passive>, <noflood>, <rexmit_prunes>, <cache_lifetime>

- monitoring