3Com Multicast IP Update

MBONE BOF

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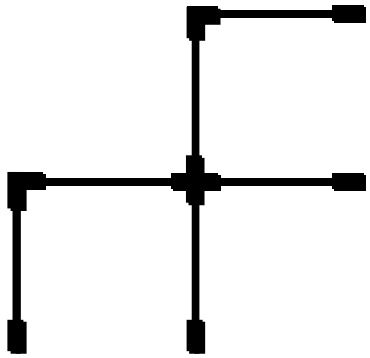

Shipping Support for Multicast IP

- NETBuilder II and NETBuilder Remote Office
- Release 8.3
  - Shipping since 16 November 1995
    - » IGMP version 2
    - » M-OSPF
    - » DVMRP 3.8++
      - ++ = pruning enhancements
    - » Route exchange between M-OSPF and DVMRP
    - » Multicast IP over SMDS support

Features to be in Next Release

- NETBuilder II and NETBuilder Remote Office
- Release 9.0
  - Scheduled to ship in March 1996
  - Beta starts 8 January 1996
    - » DVMRP route summarization
    - » Destination Group-based forwarding policies between M-OSPF and DVMRP
      - In addition to route-based policies
    - » Broad-spectrum pruning

DVMRP Details

- Roots of code from `mrouted 3.5`
  - DVMRP runs…
    - » "native" over any IP subnetwork we support
    - » and over tunnels (up to 32)
- Bugs found in `mrouted 3.5`
  - Pruning doesn't work in the presence of redundant routers
    - » `mrouted` 3.x bug found at Networld+Interop '95 Atlanta
      - Simple fix for this bug in 8.3
      - "Broad-spectrum pruning" fix for this bug will be in 9.0
  - Pre-hop gets stuck
    - » This has been fixed in `mrouted` 3.7 and 3.8
- Non-contiguous mask on default route was never a problem
  - Implemented several checks in our code beyond what was in `mrouted`, including a mask check

DVMRP Details, cont.

- Route Policies
  - Redistribute routes to sources learned by DVMRP into M-OSPF
  - Can export source subnets from M-OSPF into DVMRP (route summarization is optional)
- SNMP-manageable
  - There is no standard MIB for this yet, so as with all our proprietary MIBs, we give them away free
  - <URL:ftp://ftp.3com.com/pub/docs/3com-mibs/>

DVMRP Details, cont.

- A NETBuilder **will not** import the 32,000+ unicast routes to the MBONE (even if we know them all via BGP-4)
  - » We might relax this in the future, but we believe that this is too dangerous to allow in today's MBONE
- We don't crash when all the routes are accidentally imported somewhere else

M-OSPF Details

- Implemented per RFC 1584
- In nets that are already using OSPF, there is no requirement for another routing process
  - Can use OSPF for unicast routing along with DVMRP for multicast routing
  - Can use M-OSPF and DVMRP on the same router at the same time (even on the same interface...)
- Route Policies
  - Redistribute routes learned by DVMRP into M-OSPF
  - Also, can just enable M-OSPF to look in the DVMRP routing table without having to import all of DVMRP's routes as externals

M-OSPF Details, cont.

- During internal development and testing, we found a bug in the current OSPF v2 spec (RFC 1583)
  - As written, M-OSPF wouldn't work over virtual links
  - Notified John Moy who concurred and fixed the spec
  - `<URL:ftp://ds.internic.net/internet-drafts/draft-ietf-ospf-version2-06.txt>`
- SNMP-manageable
  - There is no standard MIB for this yet, so as with all our proprietary MIBs, we give them away free
  - `<URL:ftp://ftp.3com.com/pub/docs/3com-mibs/>`

Deployment Experience

- Code running on the MBONE for almost 6 months… and no one noticed :-)
  - At 3Com HQ in Santa Clara
    - » First 8.3, starting with alpha, up through production code
    - » Now 9.0 alpha code
  - Beta customers
- DVMRP interoperability tested with Bay Networks on 1995 InteropNet in Paris and Atlanta
  - Plan to continue to use the InteropNet as a great beta site through 1996 and beyond
- Local 3Bone (uses M-OSPF)

Future Plans (in no particular order)

- DVMRP 4.0
- RSVP
- SD client
- IPv6 Multicast
- IGMP v3
- CBT
- PIM

Observations and Issues

- Developing IP multicast was/is a lot of fun!
- M-OSPF was **very** easy to implement
- Commercial applications are immature
  - Many application writers are horribly unaware of multicast routing issues
- DVMRP code was reasonably portable, but…
  - **It needs a spec!**
  - True meaning of RFC: “Read the ____ Code”!!