



Networking Futures

Things to watch for in the networking world that may help Access Grid

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IP Multicast Deployment

- Starting to see IP Multicast moving out of the research arena into commercial use
 - <http://www.on-the-i.com/cmnn/cmnninfo.html>
 - <http://www.broadcast.com/broadband/television/fashiontv>
- Finding and squashing corner case bugs and operational vulnerabilities in protocols and code
 - MSDP RPF rules
 - MSDP SA flooding rate limits



IP Multicast Deployment

- More institutions and networks are getting multicast deployed and working properly
- SC Global will be a major driver for IP Multicast deployment internationally.



IPv6

- Much larger address space: 128 bits
- Starting to be supported by mainstream operating systems and network vendors:
 - Cisco: unsupported code out now; first unicast-only and slow production version due out in 1Q2001. Faster and multicast later.
 - Microsoft: experimental drivers available now for Windows 2000. (Be careful!)
 - Linux, AIX, others: full host support.
- IPV6 Multicast routing standards are not yet complete, especially those that work across Autonomous Systems.



IPv6

- Experimental IPv6 networks up and running
 - 6bone, 6tap
 - Generally use IPv6 over IPv4 tunnels
- IPv6 address assignments are available from major networks participating in IPv6 trials
 - ESNet, Abilene, vBNS+, and others



Quality of Service

- General idea: preferred queuing and/or discard policy for “special” packets.
- Not yet clear how to define “special” for QoS purposes. (Biggest problem, IMHO)
- Hardware implementations are slowly becoming available.
- Signaling standards very much in flux—especially those that cross administrative boundaries.



Quality of Service

- Questions: what Access Grid traffic can be thrown away first, minimizing impact on the experience? Which need to be preserved? Which can't be delayed?
- Given the answer to that, how can the packets be marked so they can be detected by the network?
 - AG software tools may need enhancements



Source Specific Multicast

- Current IGMPv2: Join (G), which implies: (*,G)
- SSM lets receivers specify from which sources they want to receive traffic.
- SSM requires IGMPv3 (or some ugly hacks).
- IGMPv3: Join (S,G), Prune (S,G), etc.
- Application must know about all active sources without the network helping.
- See Jeff Eschbach's talk for more detail.