

IPv6 Multicast Deployment Experience

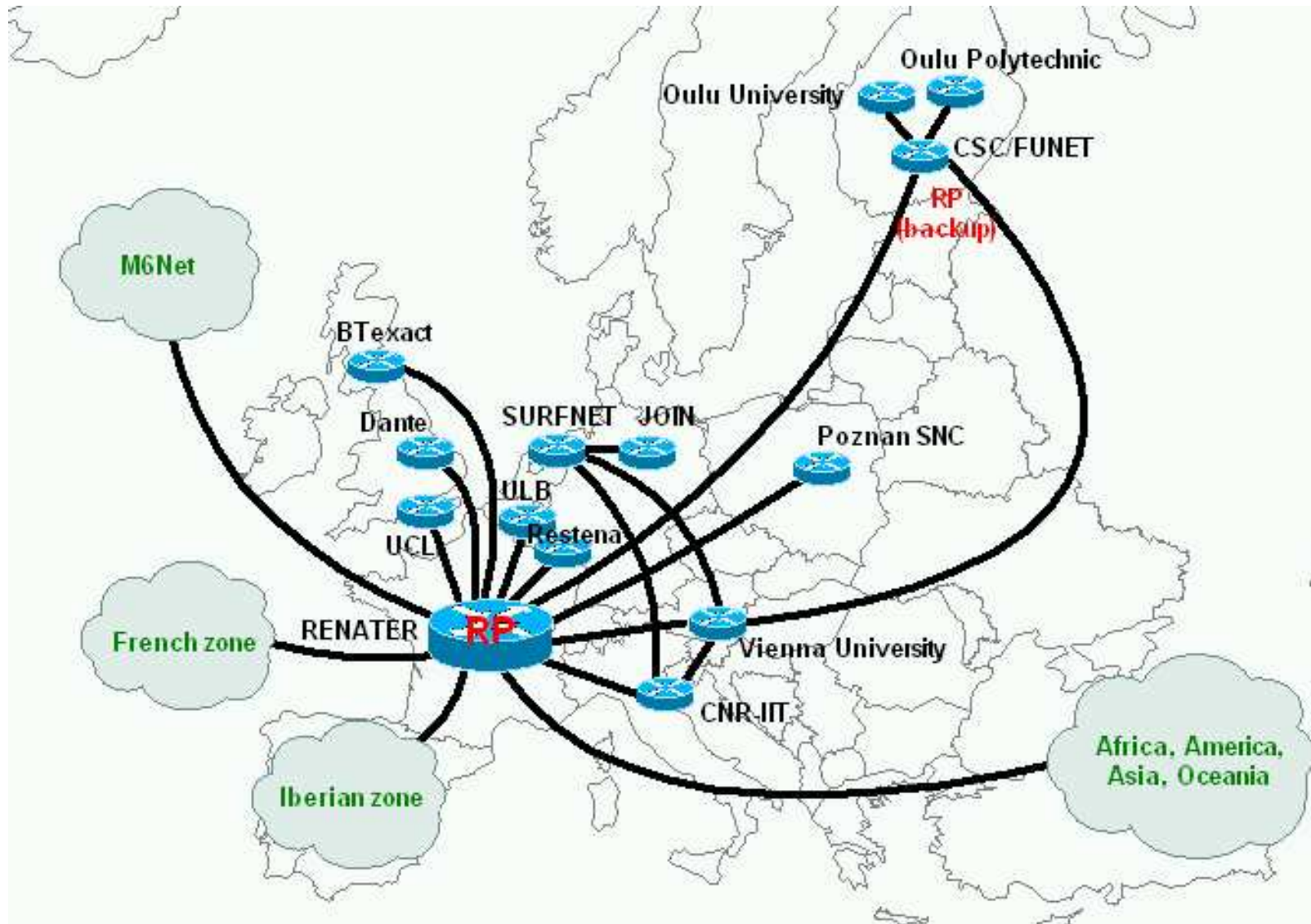
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M6Bone

- First IPv6 multicast initiative
 - Driven by RENATER (French research network)
- Single PIM-SM domain
- Separate from IPv6 unicast topology
 - Tunnels (often IPv6 over IPv6) & separate LANs
 - RIPng for routing exchange
- BSR for RP discovery
- Routers mostly NetBSD +Cisco/6WIND/Juniper/Hitachi
- <http://www.m6bone.net/>

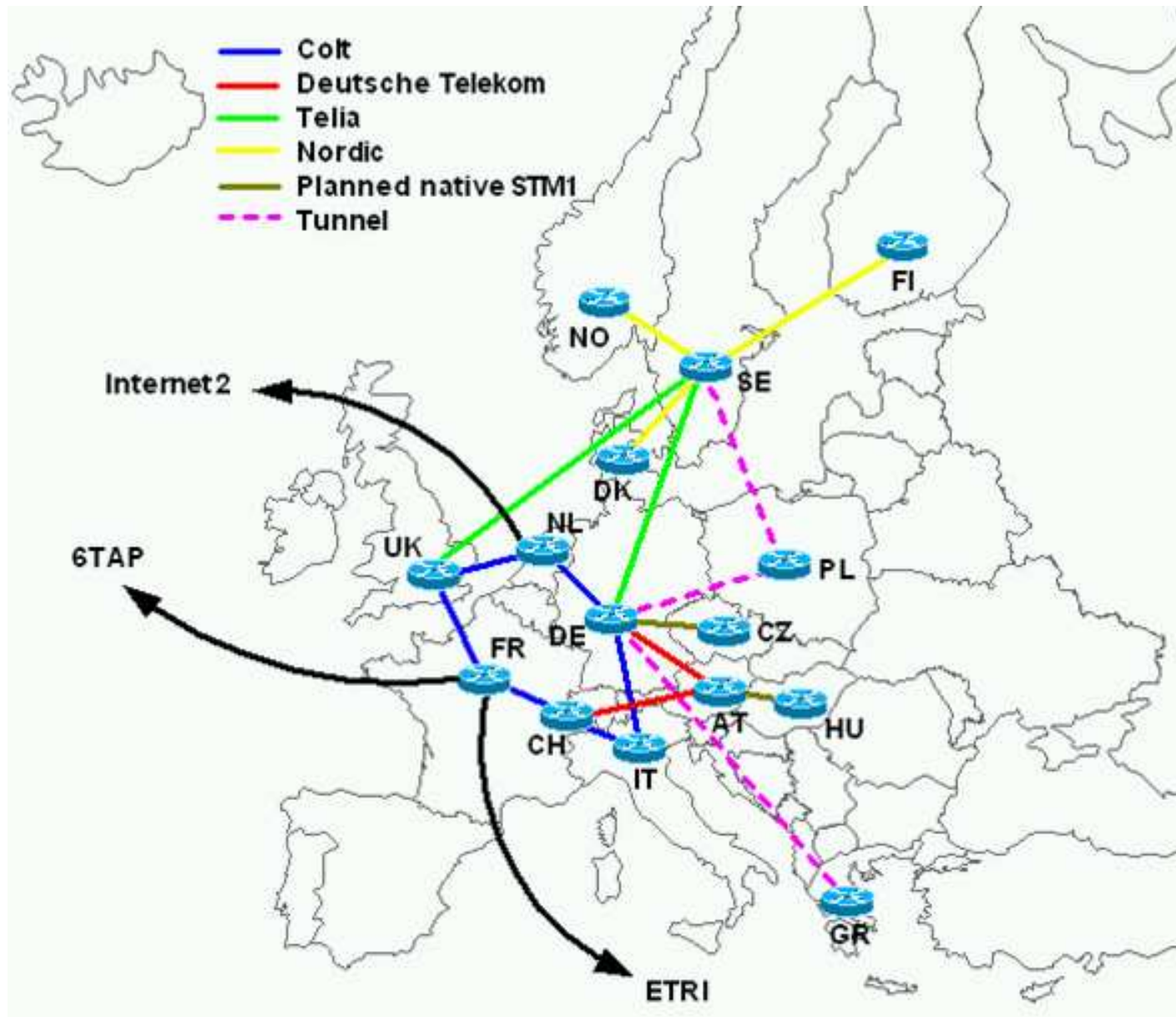
M6Bone



6NET

- Experimentation-oriented IPv6 (-only) network
- Sponsored by the European Union IST program
- Participants
 - Many research networks in European countries (NRENs)
 - DANTE (operators of the GEANT backbone)
 - Cisco
- Equipment used
 - Cisco 12400 GSR (core and some NRENs)
 - Cisco 7500/7200/... (NRENs)
 - Various types of hosts (Linux, BSD, Solaris, AIX, XP)

6NET



6NET Multicast Deployment

- PIM-SM
- MBGP (ipv6 multicast SAFI)
- Various scopes:
 - "B" (M6NET): map to M6NET RP (at SURFnet, NL)
 - default: map to M6Bone RP
 - intra-domain scopes
- Embedded RP address
 - not yet available on all 6NET routers
- Debugging Tools
 - Beacon, Looking Glass, e-mail, vic/rat

draft-suz-pim-upstream-detection-00

PIM upstream detection among multiple addresses

□ Problem

- PIM spec specifies that LL address be announced in Hellos
- But the routing table may point to non-LL next-hop
- This can cause RPF failures

□ Solution

- New PIM Hello option to announce all interface addrs

□ Experience

- Used both in M6Bone and in M6NET
- Important for your own and your router config's sanity

Still Missing

- Embedded RP
 - Still missing from the core as of today (July 15)
 - Some testing done between domains (NO/DK works)
- mtrace
 - Will become important in "real" inter-domain
- SSM testing
 - Lack of MLDv2 host support (or alternatives)
- Bi-dir PIM?
- MSDP?
 - Not really, but... intra-domain anycast RP would be useful (draft-farinacci-pim-anycast-rp-00?)

Helpful Hacks

- pim6d modifications
 - BSR boundary mechanism
 - Really want scoping support as in draft-ietf-pim-sm-bsr-xx
 - Embedded-RP
- Reflector
 - Can reflect IPv4 group to IPv6 group
 - (also works for unicast UDP streams)
 - Used to multicast this meeting to IPv6
- IPv4-IPv6 Multicast Gateway
 - draft-venaas-mboned-v4v6mcastgw-00.txt
 - Bridges entire IPv4 multicast to IPv6

Operational Observations

- Frequent RP address changes in M6Bone
 - No-brainer for BSR users
 - Breaks everything for statically configured domains

IPv6 Multicast at this IETF Meeting

- Local operator let us connect a multicast router
 - ...but only to terminal room wired LAN
 - Linked to Vienna (M)6NET node
- Mbone transmission reflected to IPv6
 - <http://videolab.uoregon.edu/events/ietf/ietf57.html>
- M6NET connectivity
- M6Bone connectivity
 - pending latest RP change in M6NET core
- Play with it in the terminal room!