

M6Bone



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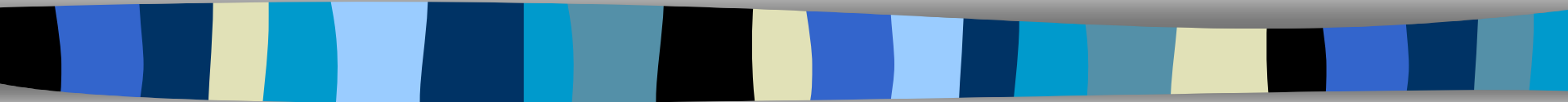
What is M6Bone ?

- An IPv6 Multicast test network
- M6Bone started in July 2001 (Aristote association, G6 and RENATER)
- 28 networks & 50 sites

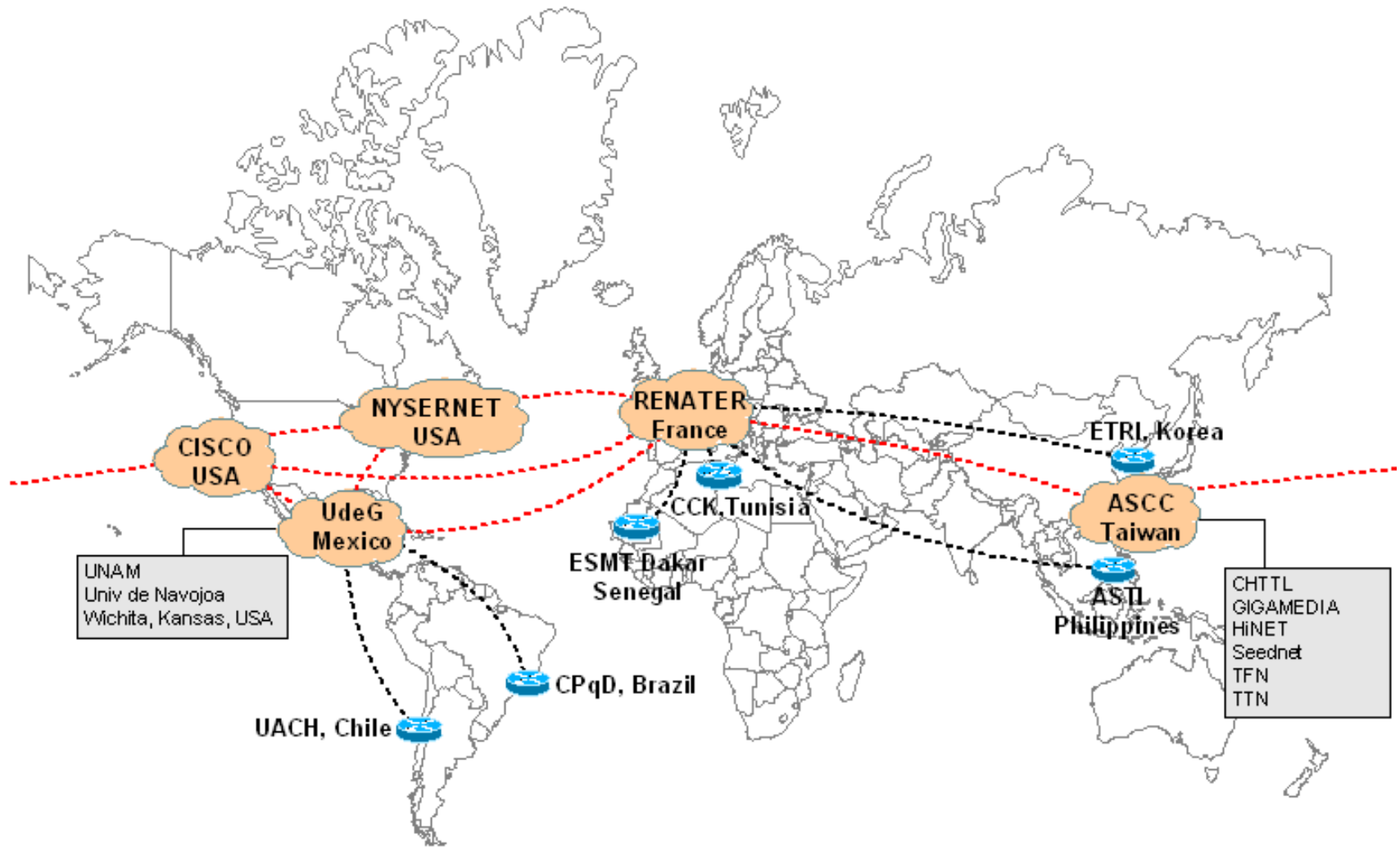
Goals

- To offer IPv6 Multicast connectivity to interested sites
- Test and develop soft and equipments related to IPv6 Multicast technologies
- Be active in IPv6 multicast standardization and provide deployment recommandation (e.g. interdomain multicast)
- To deploy an advanced service on IPv6, in order to participate in the promotion of the protocol

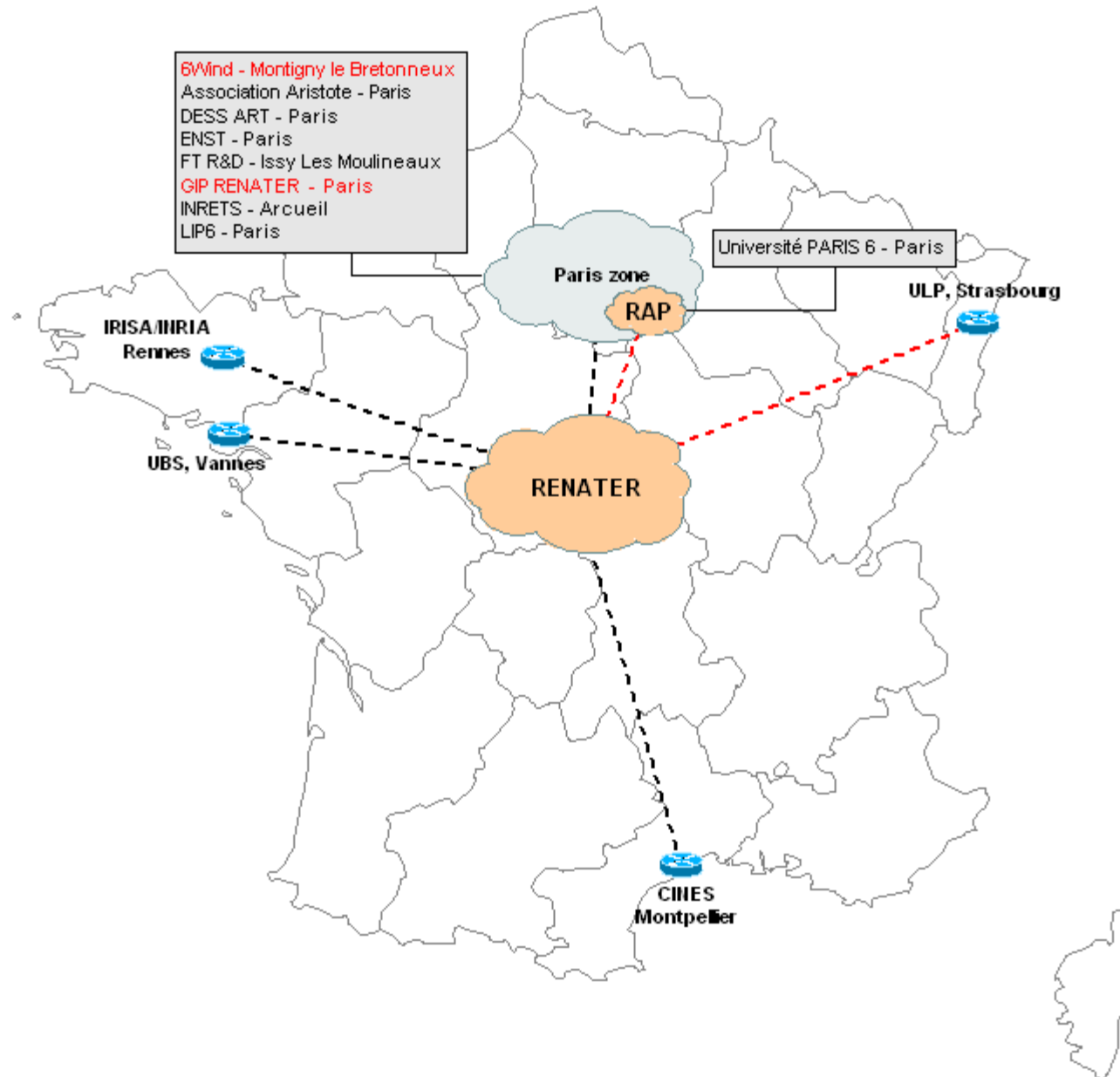
Overview...



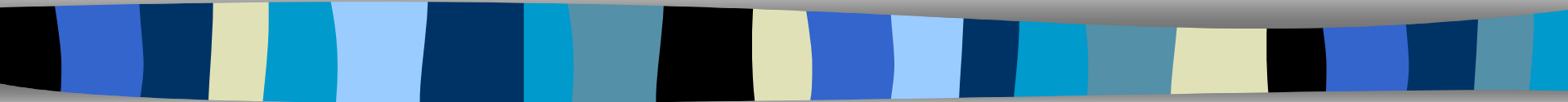
M6Bone



M6Bone (France)



How to connect...



How to connect...

1. Setup an IPv6 multicast router
2. Connectivity
3. Routing (MBGP, static...)
4. PIM – Multicast topology
5. Applications and services
6. Monitoring

1. Setup an IPv6 multicast router

■ MRIB implemented (static + MBGP)

- 6WIND
- CISCO IOS 12.3(7)T , 12.0(26)S
- JUNIPER JUNOS 6.0
- ... ?

■ No MRIB

- PC BSD + Kame pim6sd daemon
- PC BSD + Xorp
- Hitachi
- ... ?

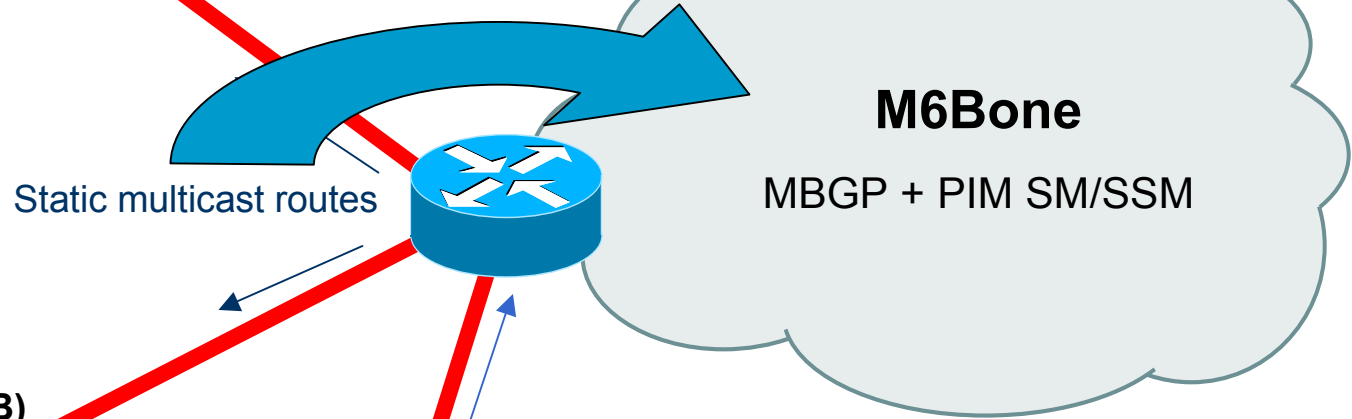
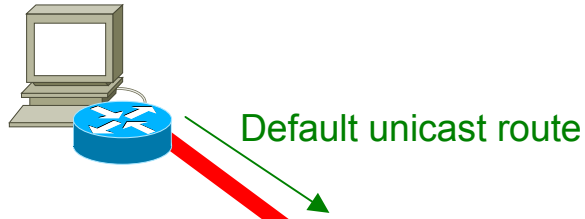
2. Connectivity

- IPv6 multicast not available in most of the networks
- Need to bypass the routers not supporting IPv6 multicast
 - **IPv6 over IPv6 tunnels**
 - **IPv6 over IPv4 tunnels**
 - IPv6 over GRE over IPvX tunnels
 - Dedicated ATM PVC
 - MPLS LSPs
 - ...
- Connection to an M6Bone POP

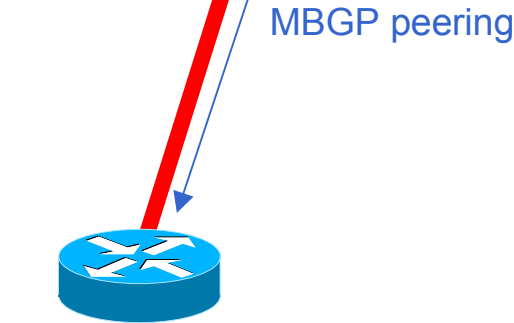
3. Routing

- MBGP (IPv6 multicast address family)
- Static IPv6 multicast routes
- Unicast routing table
 - If unicast and multicast topologies are the same. Can be used for example inside a site.
 - If unicast and multicast topologies are different, dedicated equipments for multicast must be used (M6Bone deployment started with RIPng: the MRIP)
- Routing is explained in details in the next slides

1 Equipment with no support of multicast routes (MRIB)

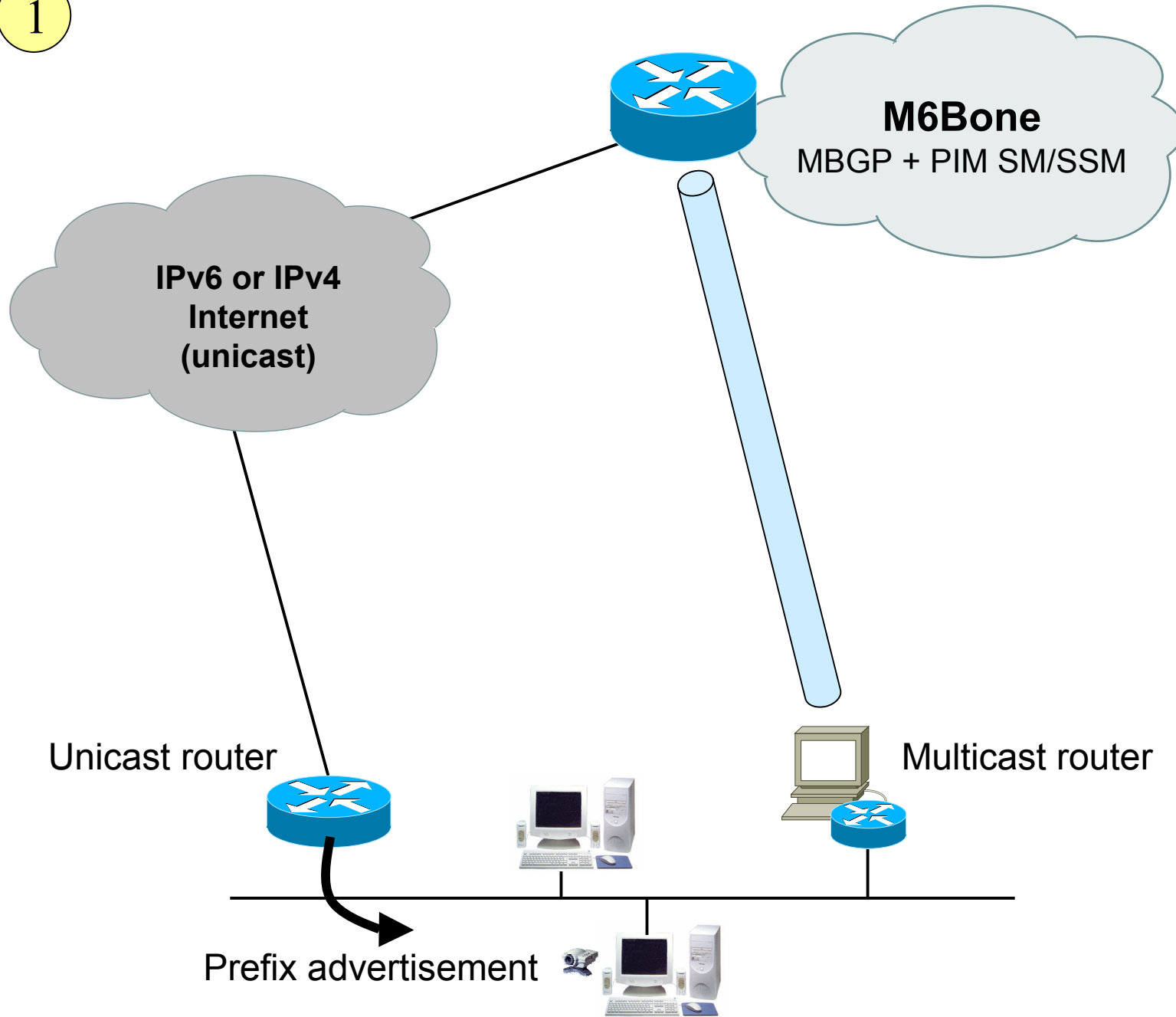


Equipment with support of static multicast routes (MRIB)

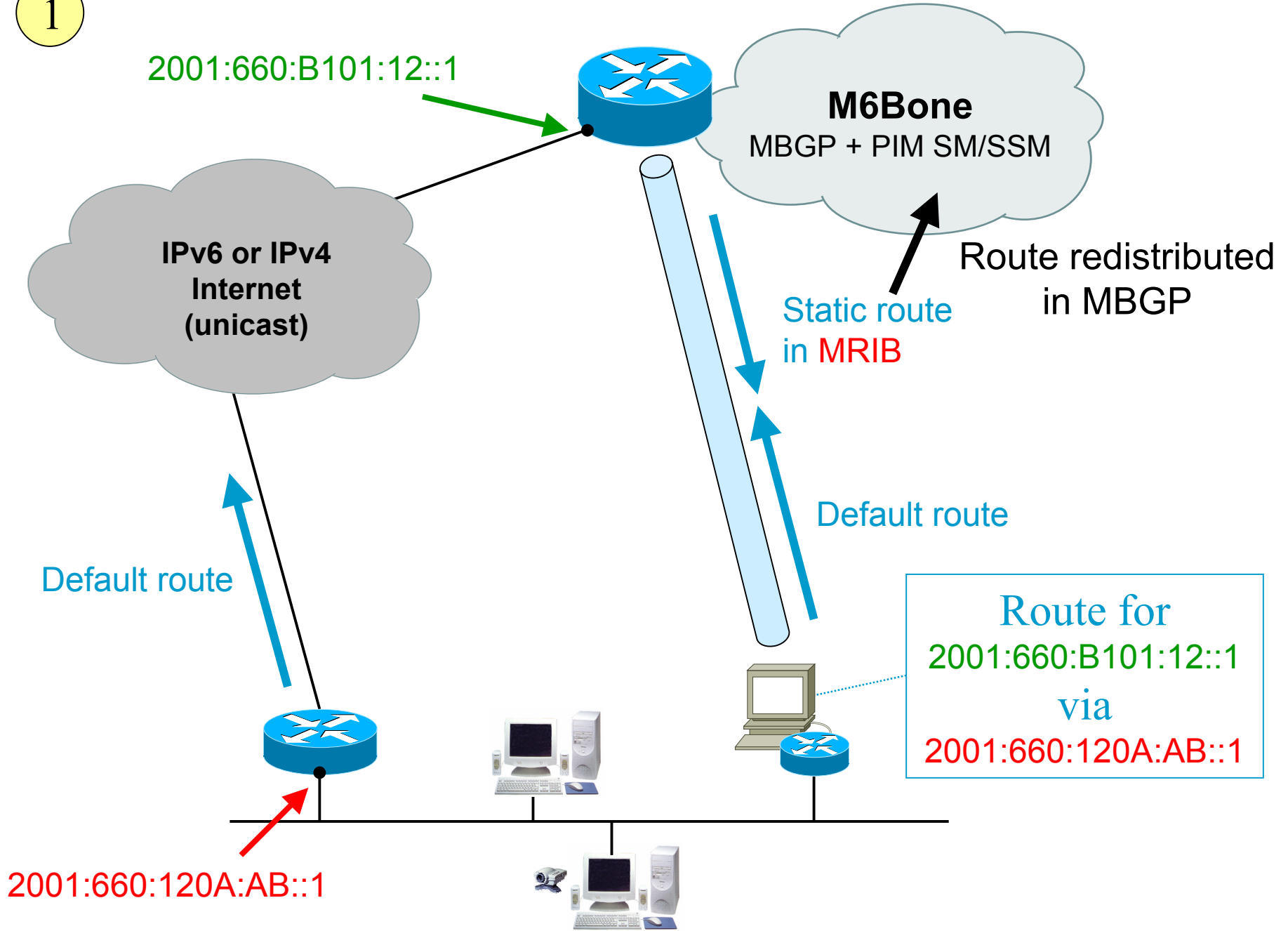


3 Equipment with support of MBGP for IPv6 multicast

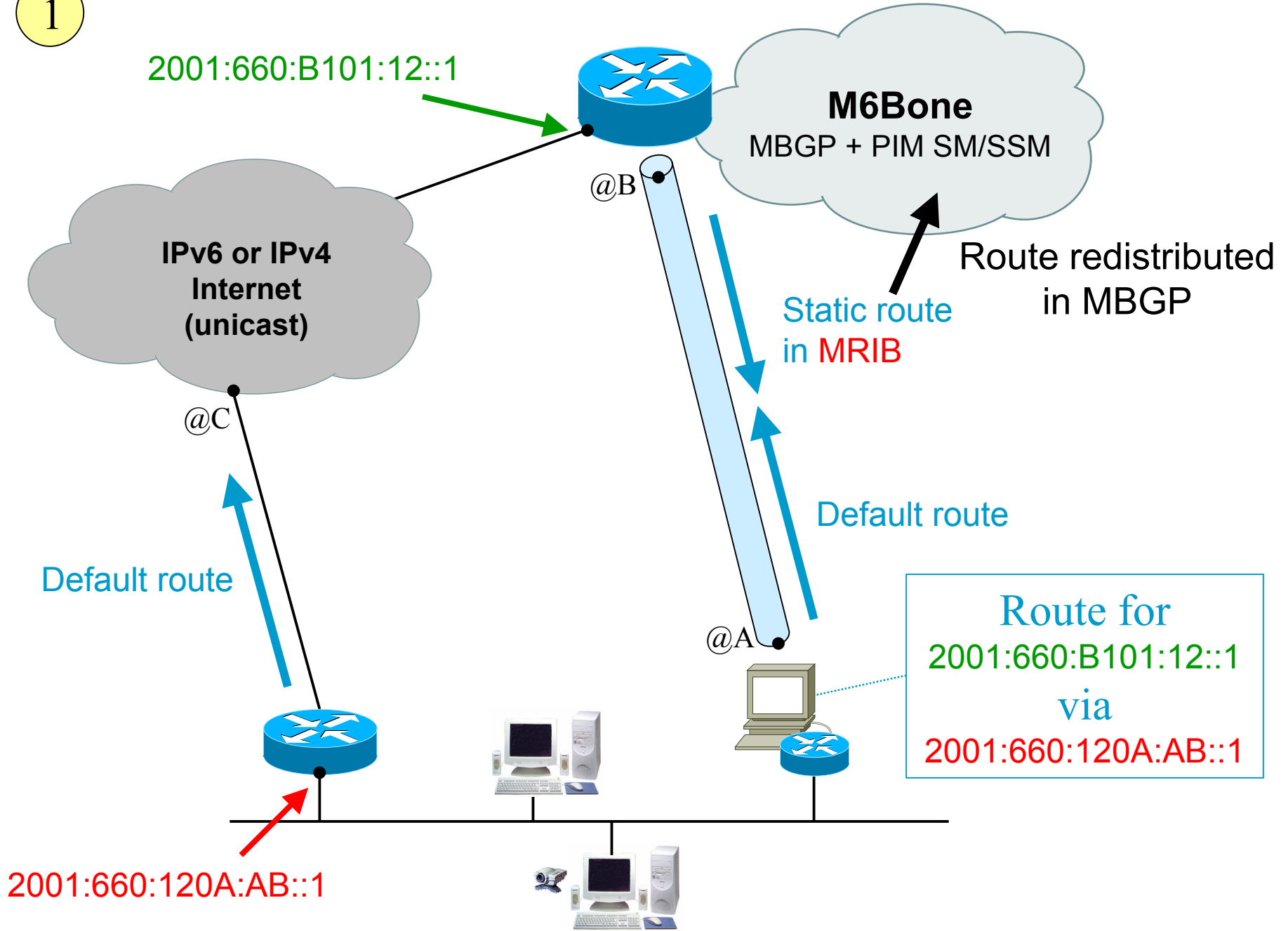
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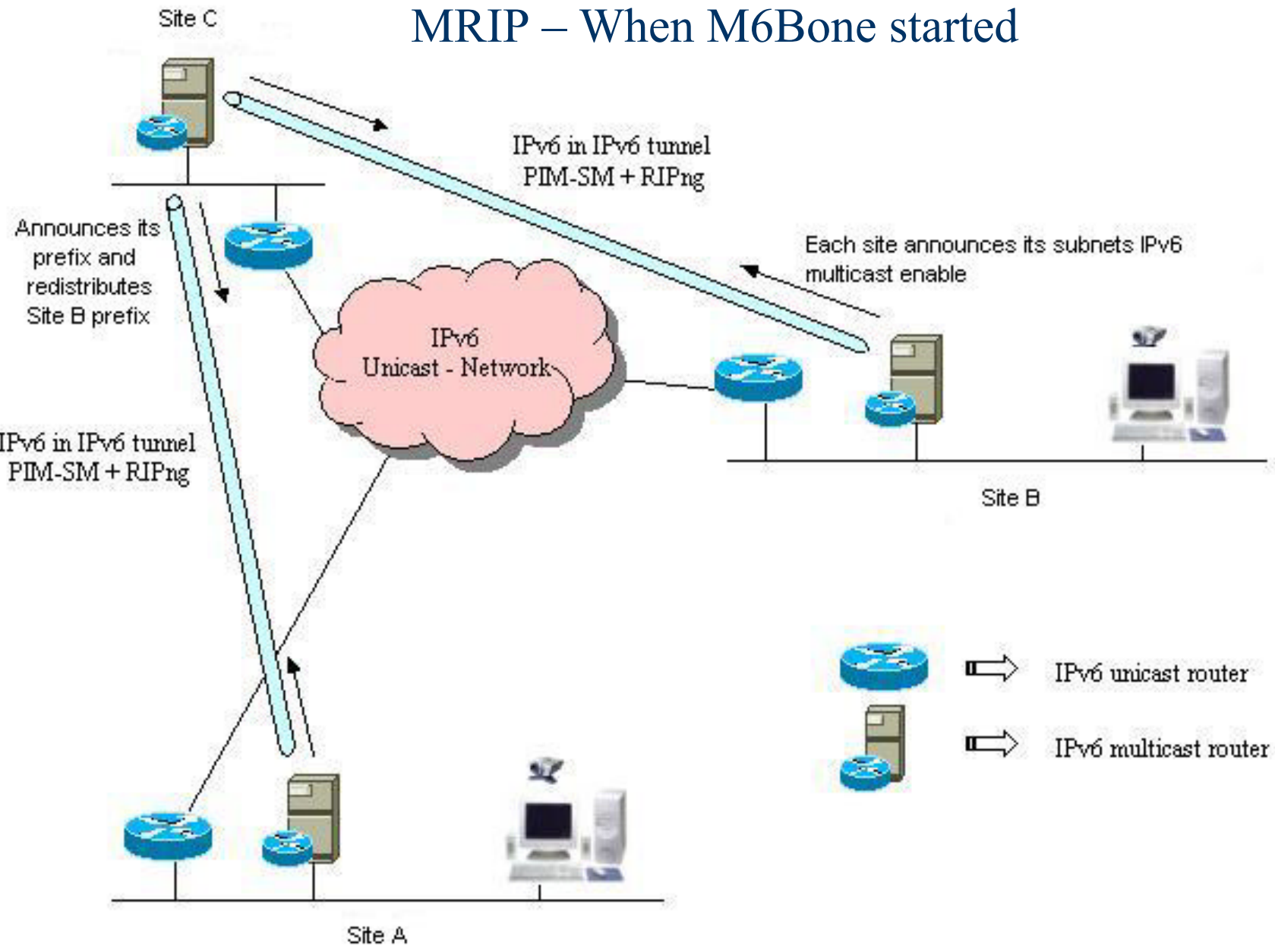


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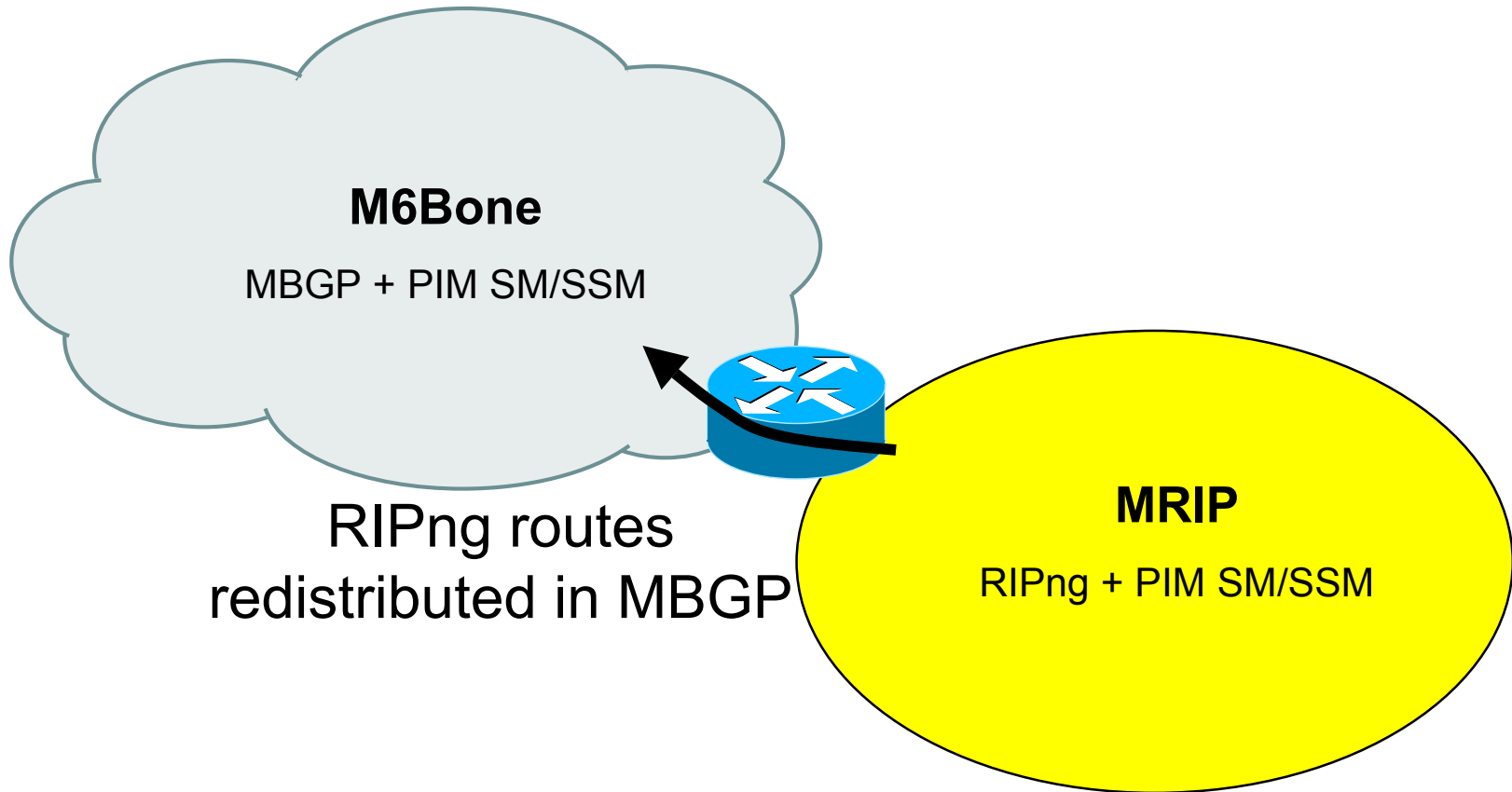
Special case: MRIP – When M6Bone started



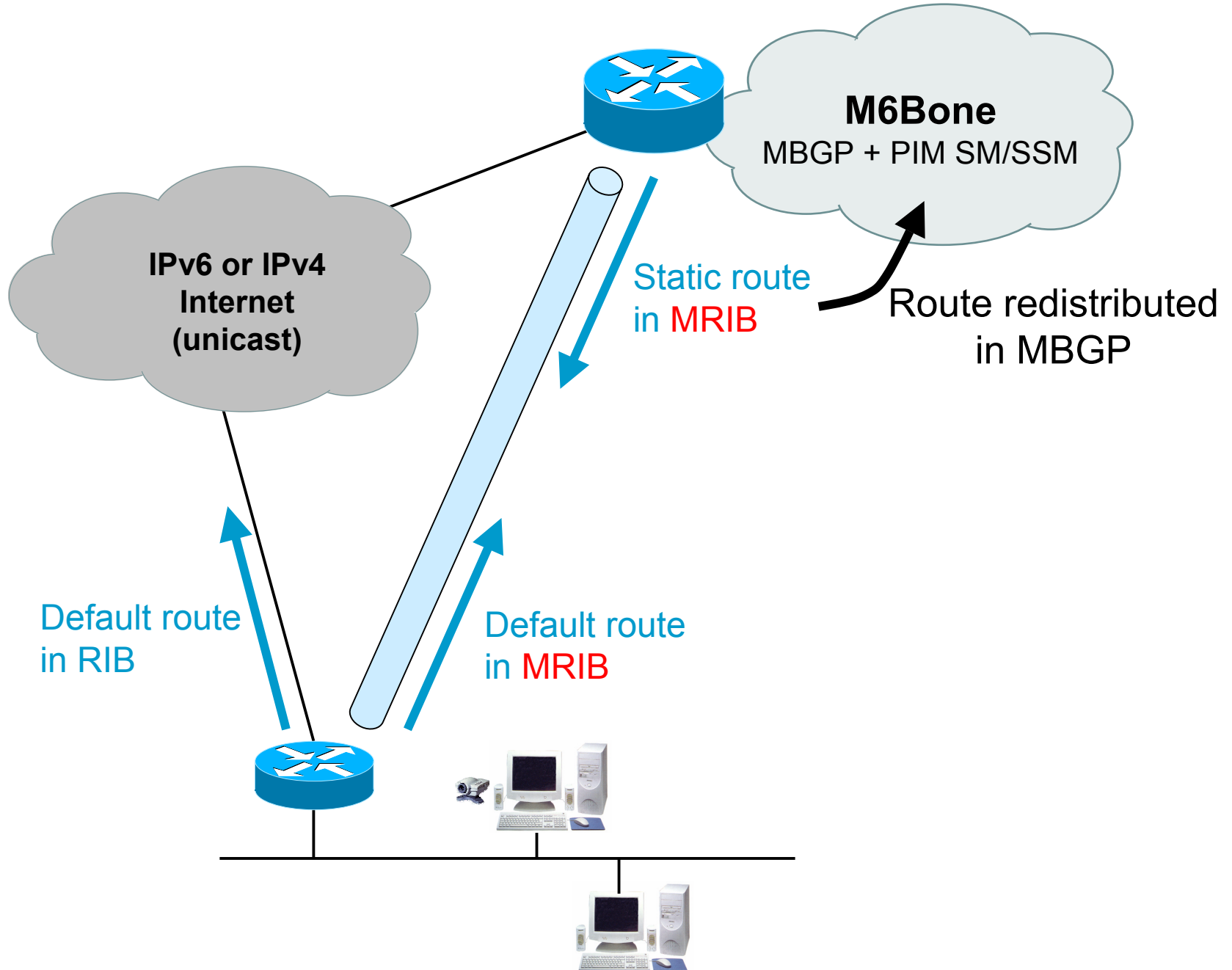
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Special case:

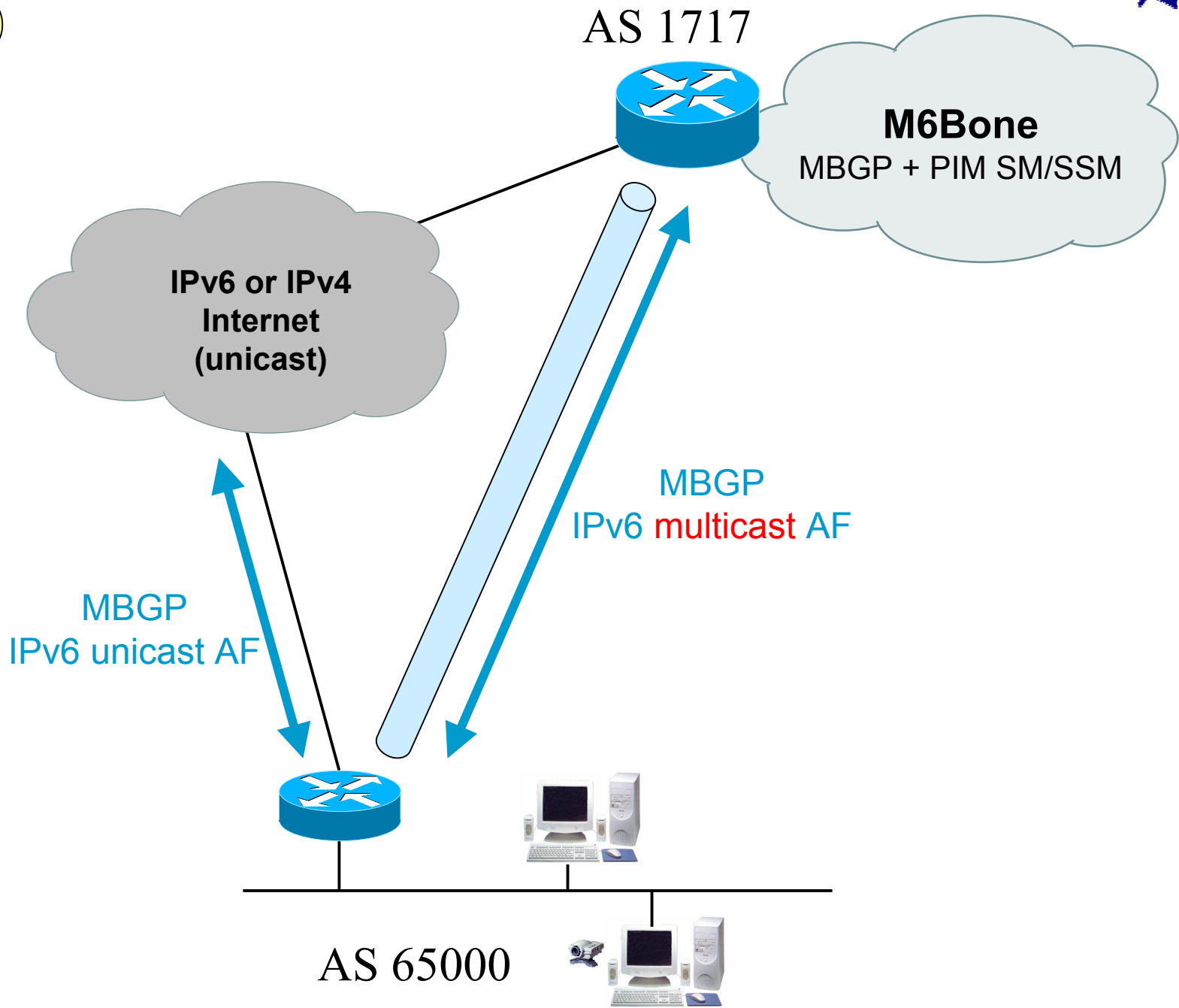
MRIP – When M6Bone started



2



3



Routing policy

- Few ISPs provide IPv6 multicast service
 - No possible to do the same aggregation for unicast and multicast
 - Transit networks must allow up to /48 prefixes
 - Sites must aggregate to /48 prefixes

- BGP peerings
 - No private AS advertised in M6Bone

4. PIM – Multicast topology

- PIMv2 SM / SSM
 - SSM for FF3X::/96 group-range
 - SM for others

- No MSDPv6 available
 - Will never be as bottleneck in IPv4 world

- M6Bone is a single PIM domain

- Hierarchical RPs for the moment
 - Global RP managed by RENATER
 - 6NET RP managed by SURFnet
 - Site RP in Université de Bretagne Sud
 - ...

4. PIM – Multicast topology

■ Global RP in RENATER

- Must be known on all the M6Bone routers
 - Statically configured, the safe way
 - BSR
 - Scoped BSR deployed in 6NET. Some 6NET partners use BSR to receive RP information
 - Old BSR deployed in MRIP
- Works as few sites connected

■ UNINETT RP

- IPv6/IPv4 multicast dynamic gateway
- No need of IPv4 multicast anymore

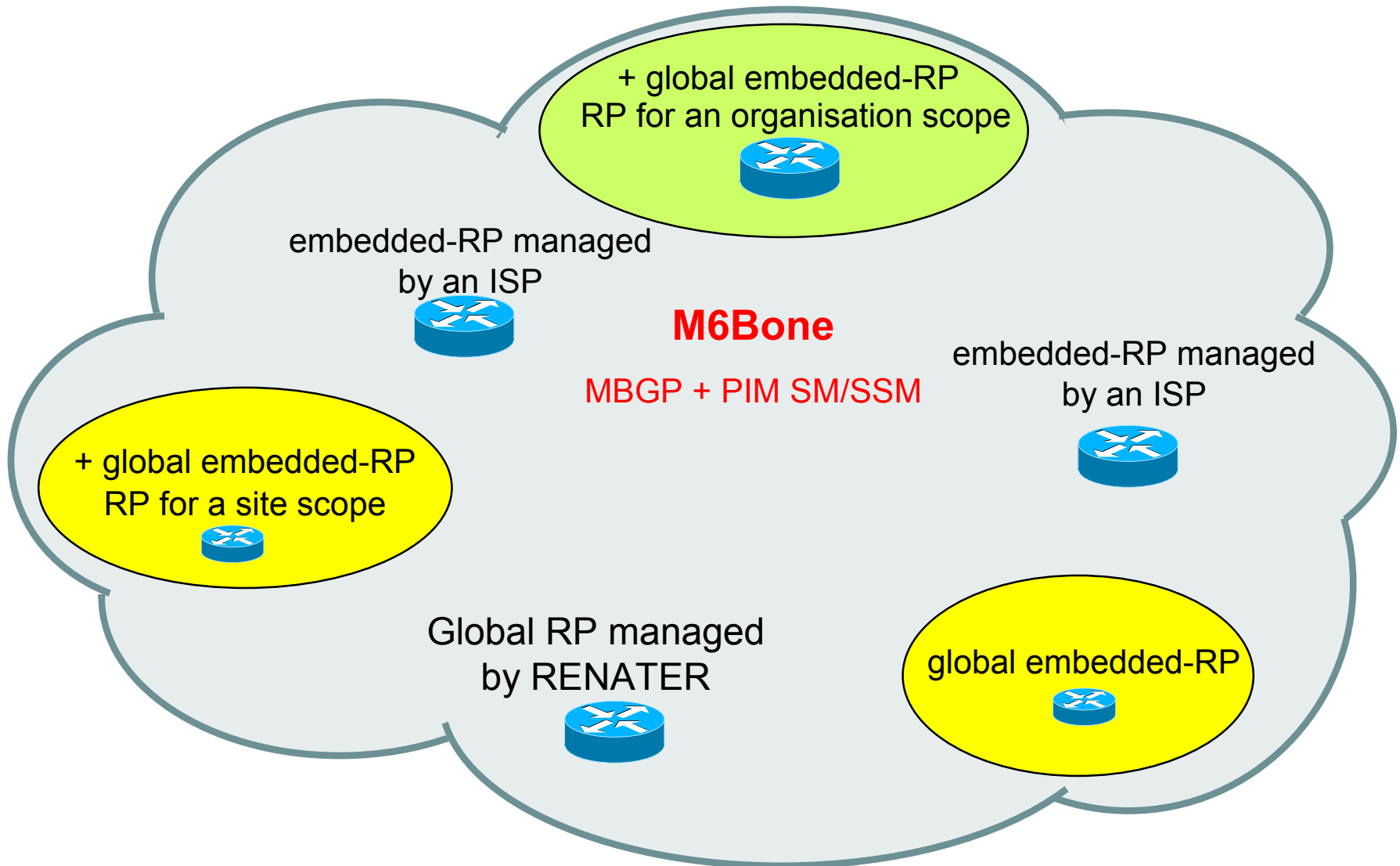
4. PIM – Multicast topology

- Embedded RP for the future
 - I-D under discussion at IETF
 - A new group-to-RP mapping mechanism
 - RP address embedded in IPv6 multicast address
 - FF7X::/12 address space

- Tests being made within 6NET project framework

- Changes the model
 - Need to understand consequences for ISPs and clients

4. PIM – Multicast topology



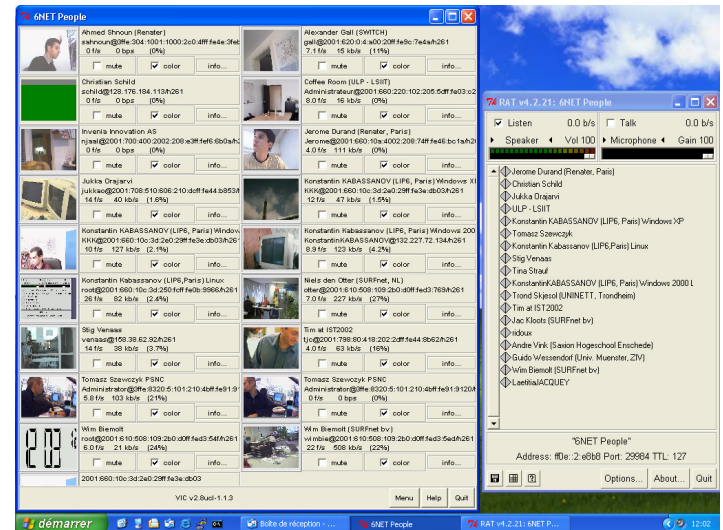
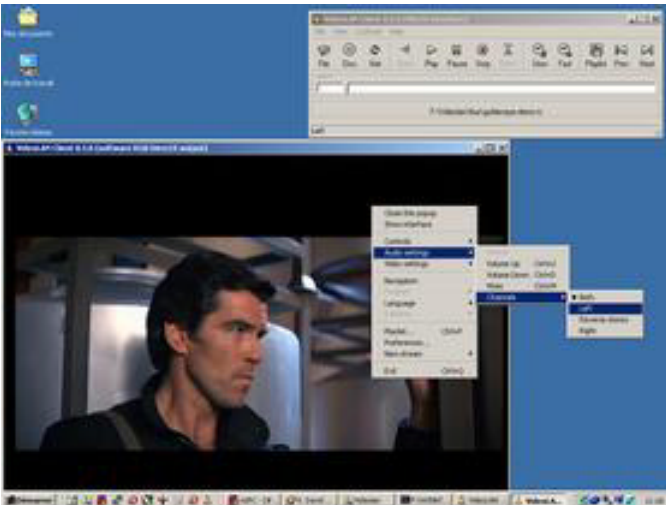
5. Applications and services

- Every IPv6 stack supports MLD
 - Necessary to run IPv6 multicast applications
 - MLDv2 on Linux, FreeBSD, Solaris
 - No MLDv2 support on Windows
 - Any platform can be used for IPv6 multicast

- Almost no application supports MLDv2
 - Is relatively new
 - Implementations will come with the need

5. Applications and services

- Videoconferencing : VIC/RAT, Videolan, Isabel, WM player 9
- Radio broadcast : Freeamp
- Others : NTE, WB, MAD, SDR
- Reflectors
 - To IPv4 multicast
 - To IPv6 unicast

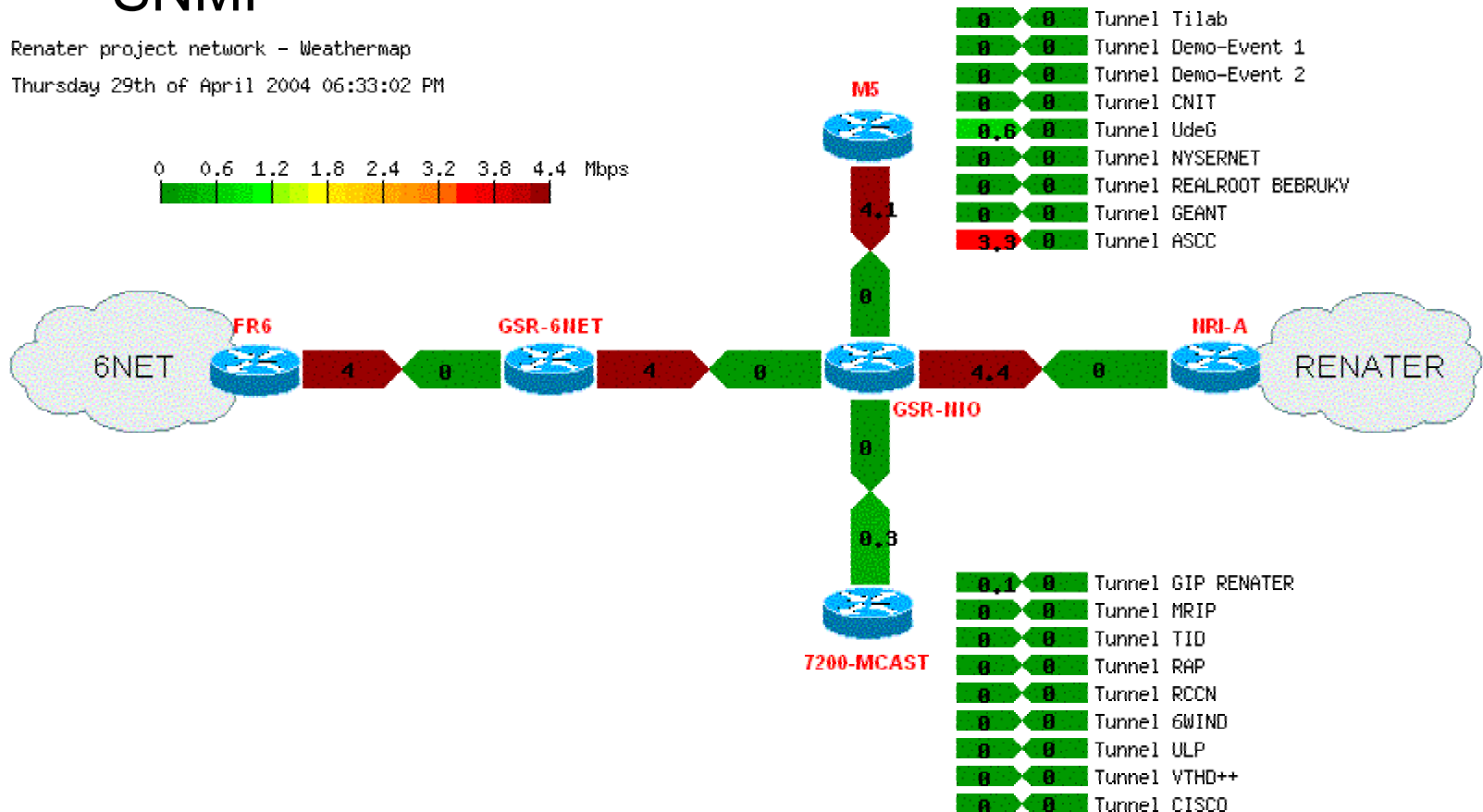


6. Monitoring

■ Connectivity / Traffic

- ping6
- SNMP

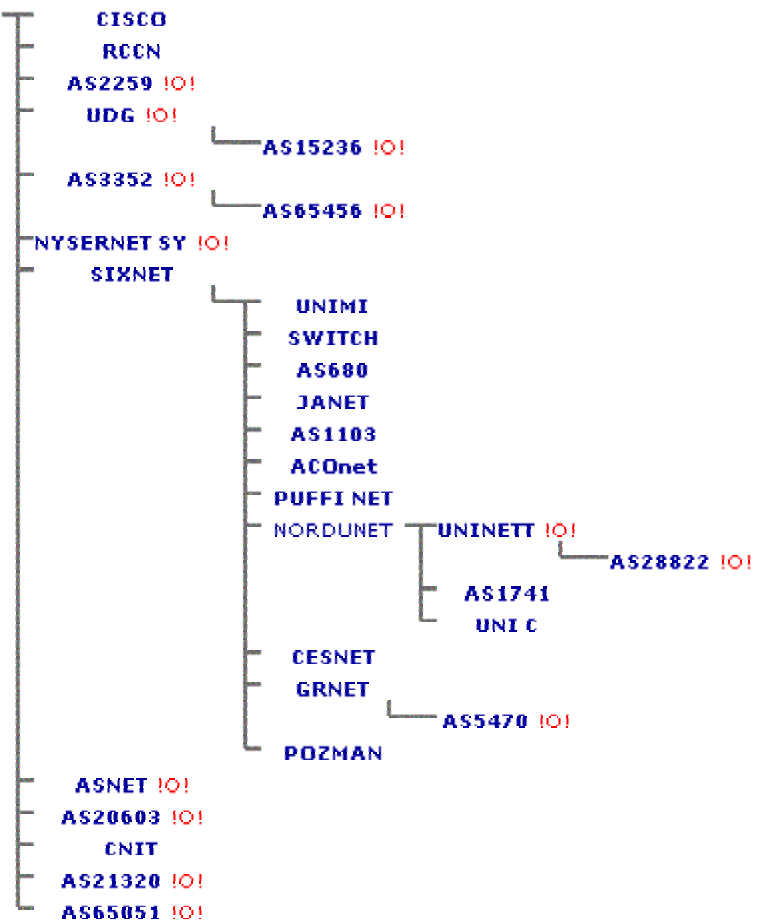
Renater project network - Weathermap
 Thursday 29th of April 2004 06:33:02 PM



6. Monitoring

- Routing
 - AS-Path-Tree

RENATER Project Network



6. Monitoring

- PIM – Multicast topology
 - Beacon

Loss [%]	S0	S1	S2	S3	S4	S5	S6
R0 zephyr.ipv6.unige.ch							
R1 UoS			0.0	0.0	2.0	0.0	
R2 merapi.switch.ch		0.0		0.0	0.0	0.0	
R3 UdeG-Mexico		0.0	0.0		0.0	0.0	
R4 tut.fi_telecom_lab		0.0	0.0	0.0		0.0	
R5 RENATER		0.0	0.0	0.0	0.0		
R6 beacon-test.geant.net		0.0		0.0	0.0	0.0	

Contacts

- M6bone-team@renater.fr

- Web-site : <http://www.m6bone.net>
 - Collaborative web-site
 - Architecture of the network
 - Information about equipment's configuration
 - Subscription form

- Mailing list : m6bone@ml.renater.fr
 - More than 170 active and experienced people ready to help you



See you soon on the M6Bone !