



# Specifications

## IPv6 Multicast - RENATER-4

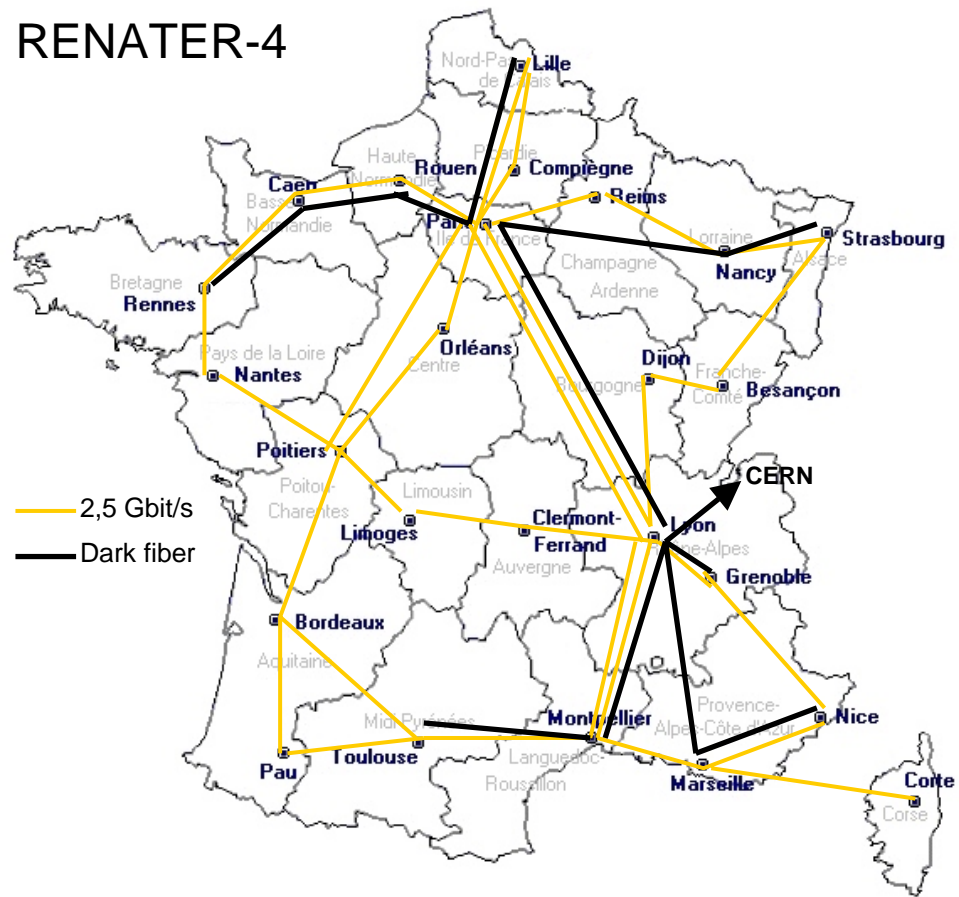
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# Backbone RENATER-4

RENATER-4



— 2,5 Gbit/s  
— Dark fiber





# Services

- ASM - Any Source Multicast
- SSM - Source Specific Multicast
  
- Customers can ask for SSM only or ASM+SSM service
  
- A single protocol: PIM-SMv2
  - Configured on all routers of the backbone
  - Automatically configured on all interfaces
    - Or do we want to enable it only when users subscribe to the service?





# MLD

- Disabled on every interface where there is no host
  - POP to POP
  - POP to access networks / site
  - POP to ISP... any other network





# Scope management

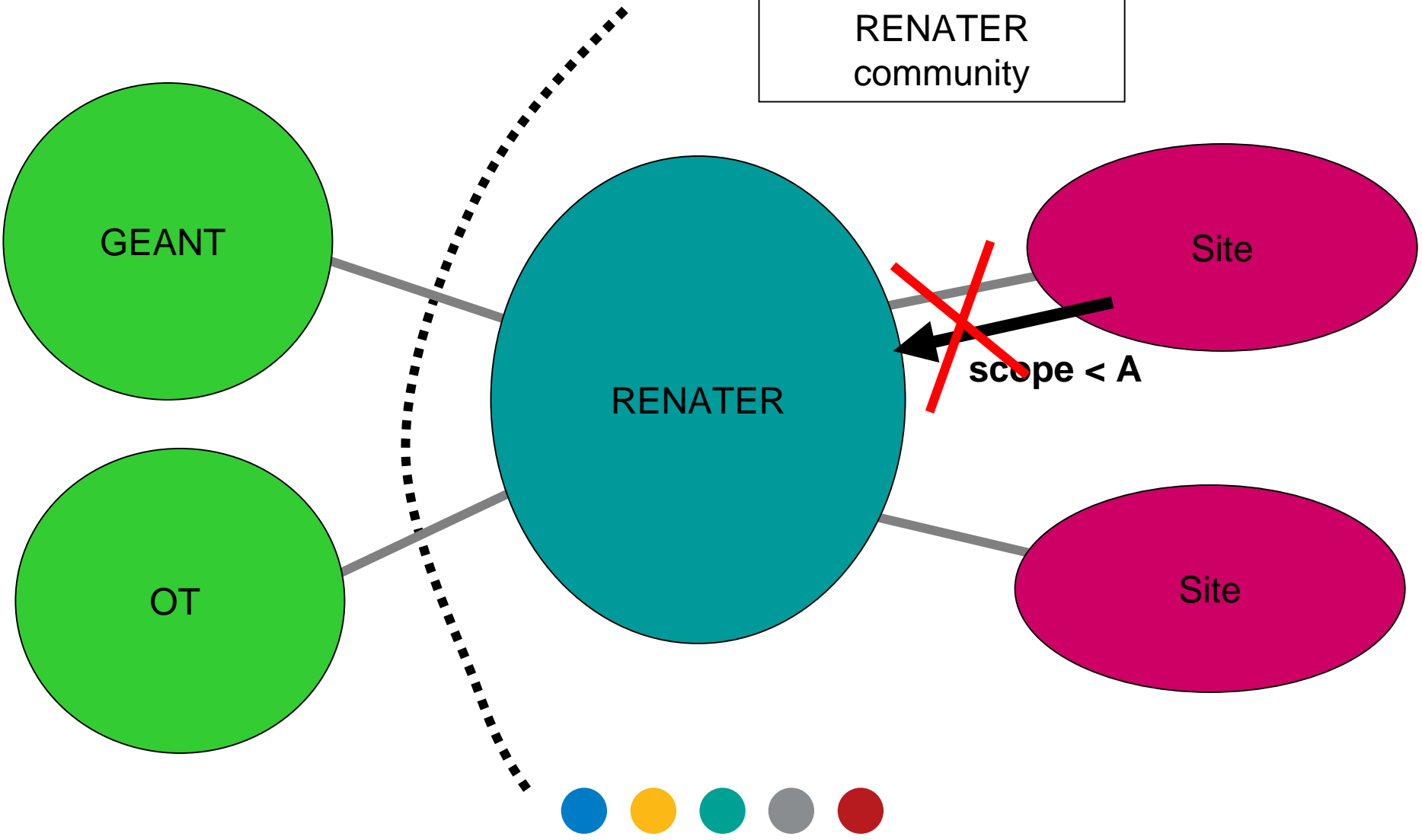
- For both ASM and SSM
- RENATER « manages » scope A
- No scope lower than A visible in the backbone
  - Inbound/outbound filtering on boundaries to sites and access networks
- No scope **equal** or **lower** than A should leak outside RENATER
  - Inbound/outbound filtering on boundaries to GEANT / OpenTransit / SFINX...





# Scope management

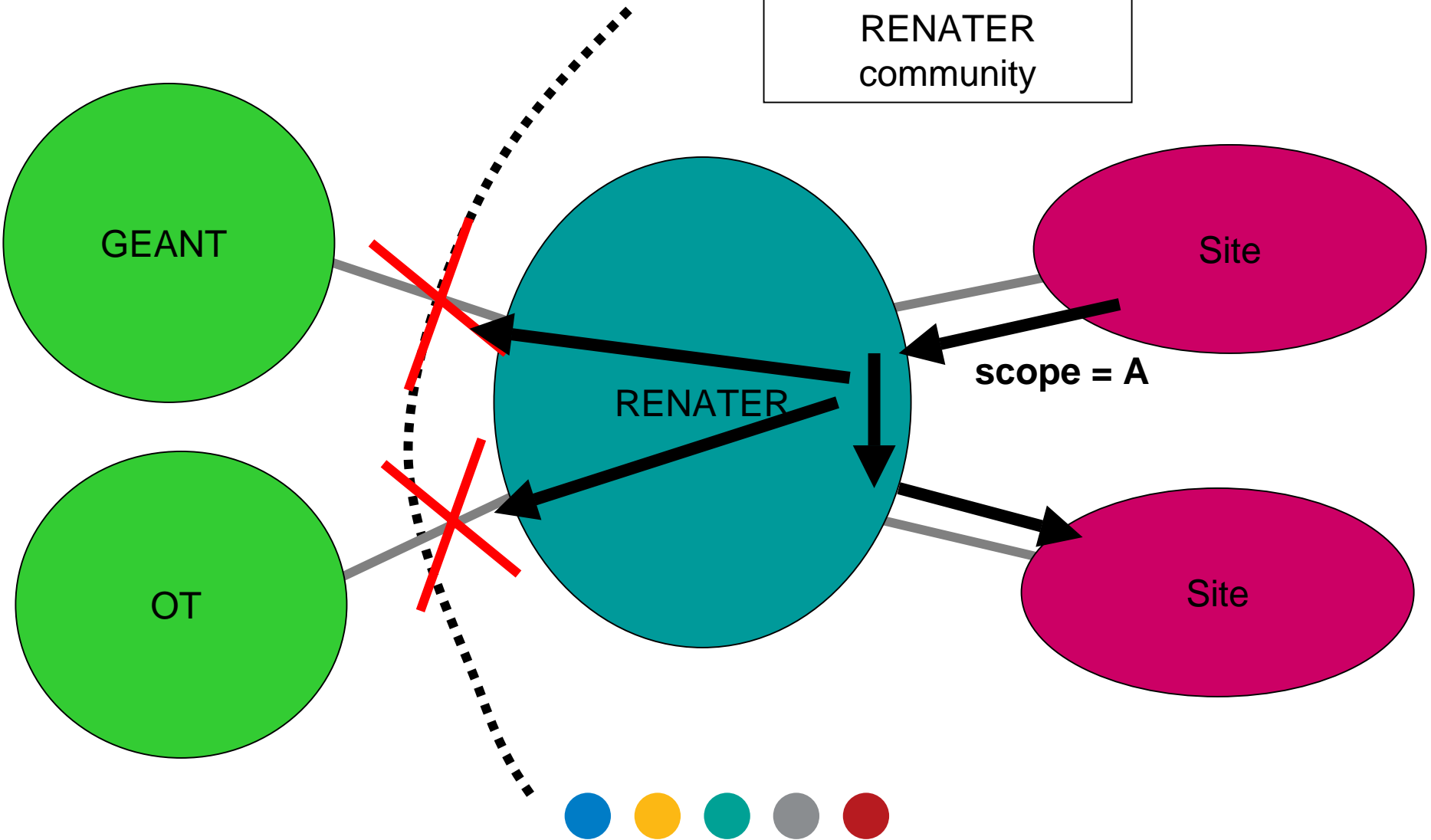
RENATER  
community





# Scope management

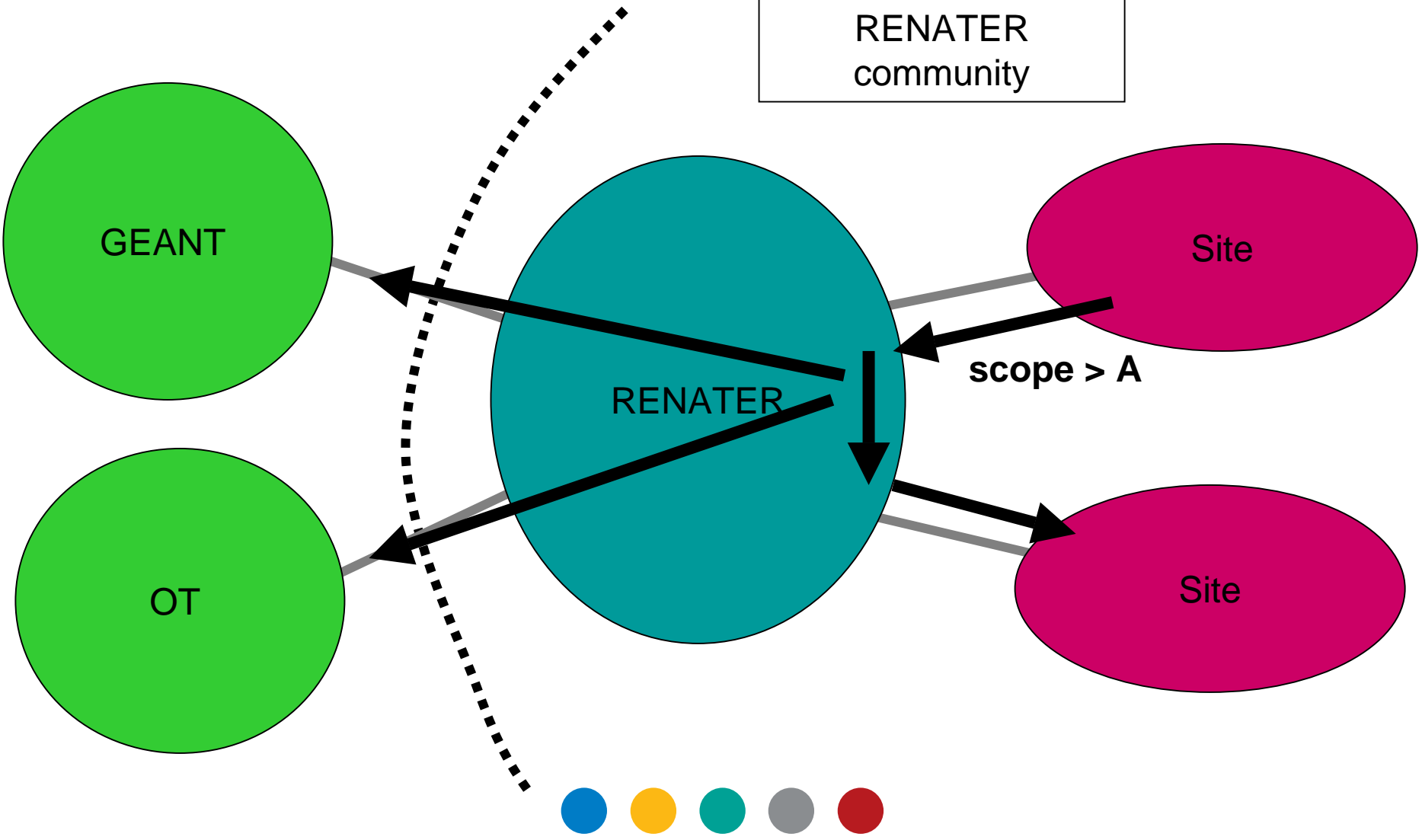
RENATER  
community





# Scope management

RENATER  
community





# ASM

- Embedded-RP (RFC 3956)
  - No BSR, no static RP
  - To be deployed on all core routers
  - Sites can deploy their own RPs
  - An RP service will be deployed on R4 for sites that can't deploy their own RP
    - For global and RENATER scope
    - Requires multicast address allocation





# ASM

- 2 RP's
  - RENATER scope (A)
    - Accepts registers from 2001:660::/32 only
  - Global scope (E)
    - Accepts registers from any valid global IPv6 address
- Configured on 2 different loopback interfaces of the same router
  - Then more flexible in case we want to put those 2 services on 2 different routers
  - RP's configured on a dedicated router, dissociated of CISCO 124xx used for forwarding. A CISCO 7200 could be used.





# ASM

- No RP redundancy
  - Anycast-PIM under study at IETF
  - Only solution for redundancy + embedded-RP
- No SAP
  - SAP group is FF0E::2:7FFE
  - Not embedded-RP compatible
  - web / mails to be used instead
  - Working on a web based interface to manage multicast sessions





# ASM

- For sites and access networks
  - For ASM, Embedded-RP support is a must
  - Interim solution, statically configure RENATER embedded-RP's on sites/access networks
- Global M6Bone RP will still be accessible for the sites
  - Embedded-RP is not yet supported everywhere
  - Need to educate sites so that they use embedded-RP
  - A session management interface is required !!!





# Multicast address allocation

- RP addresses should be of type
  - `2001:660:k1mn:0000::y` (only 48 significant prefix bits)
- Multicast prefix derived from the RP address is
  - `FF7X:y30:2001:660:k1mn>::/80`
- Multicast prefix allocated to a site will be
  - Site prefix `2001:660:<site_id>::/48`
  - `FF7X:y30:2001:660:k1mn:<site_id>::/96`
  - Is obtained directly from the `site_id`, no need to maintain a registry in RENATER
- 2 prefixes allocated to sites
  - One for RENATER scope RP
  - One for global scope RP





# Connections

- GEANT - Same interface (as POS... when 10GE, question open)
- SFINX - VLAN created for IPv6 multicast
- Sites / access networks
  - Same interfaces
  - VLANs
  - Tunnels - nice to have a router for all IPv6 mcast tunnels.
  - Migration broker not IPv6 multicast enable yet - no official date from Hexago
- Testbed - same interface
- M6Bone - Through the testbed
- Other networks
  - Most of them through M6Bone
  - Or tunnel to a dedicated router in RENATER-4





# Hardware

- CISCO 7204 or 7206
  - Embedded-RP for RENATER scope
  - Embedded-RP for global scope
- CISCO 7204 or 7206
  - Tunnels to RENATER customers / access networks
- Merging features to save routers?
  - Open to discussions





# MRIB and MBGP

- For now MBGP only
  - IPv6 mcast SAFI





# Things under discussion...

- Allow IPv6 unicast SAFI for multicast RPF check
- Then between RENATER and sites/access networks
  - if topologies are the same for unicast and multicast
  - no need to deploy MBGP !
  - ipv6 multicast-routing : a single statement enables multicast in the RENATER community!





# Things under discussion...

- If BGP unicast used for RPF
  - If prefix in BGP ucast & mcast, then mcast SAFI is used anyway
  - If prefix only in ucast, then ucast is used for RPF check
  - Most specific prefix always chosen among all table





# IPv4/IPv6 mcast interaction

- 2 gateways provided by RENATER
  - Static gateway
  - Dynamic gateway (based on embedded-RP)
- Not under NOC's responsibility for now





# Monitoring

- DBeacon
- SSMPing
- QOSmetrics
- AS\_Path\_Tree
- Scripts for MBGP peerings
- Looking-glass
- Netflow where possible



