

GN3+ services for L3VPN and L2VPN transparency design

**LHCOPN and LHCONE joint meeting
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Transparent multi-domain VPN multiplexing



- The “Transparent multi-domain VPN multiplexing” service allows
 - **Setting-up a L3 or L2 VPN spanned/extended over several domains only by configuring the edge router** – the backbone and all the domains crossed are **transparent**
 - Setting-up **as much as you want VPNs**, once again, the backbone and all the domains crossed are transparent
 - Multi-point multi-domain L3VPN (see demonstration)
 - Point-to-point multi-domain L2VPN (see demonstration)
- The “Transparent multi-domain VPN multiplexing” service should allow too
 - Multi-point multi-domain L2VPN (to be demonstrated)
 - **Traffic-Engineering** (to be demonstrated)
 - *Path selection (see transatlantic usage)*
 - *Fast Re-Route*
 - *Potentially bandwidth guarantee (not on demand) (see MPLS-TE DiffServ-aware)*

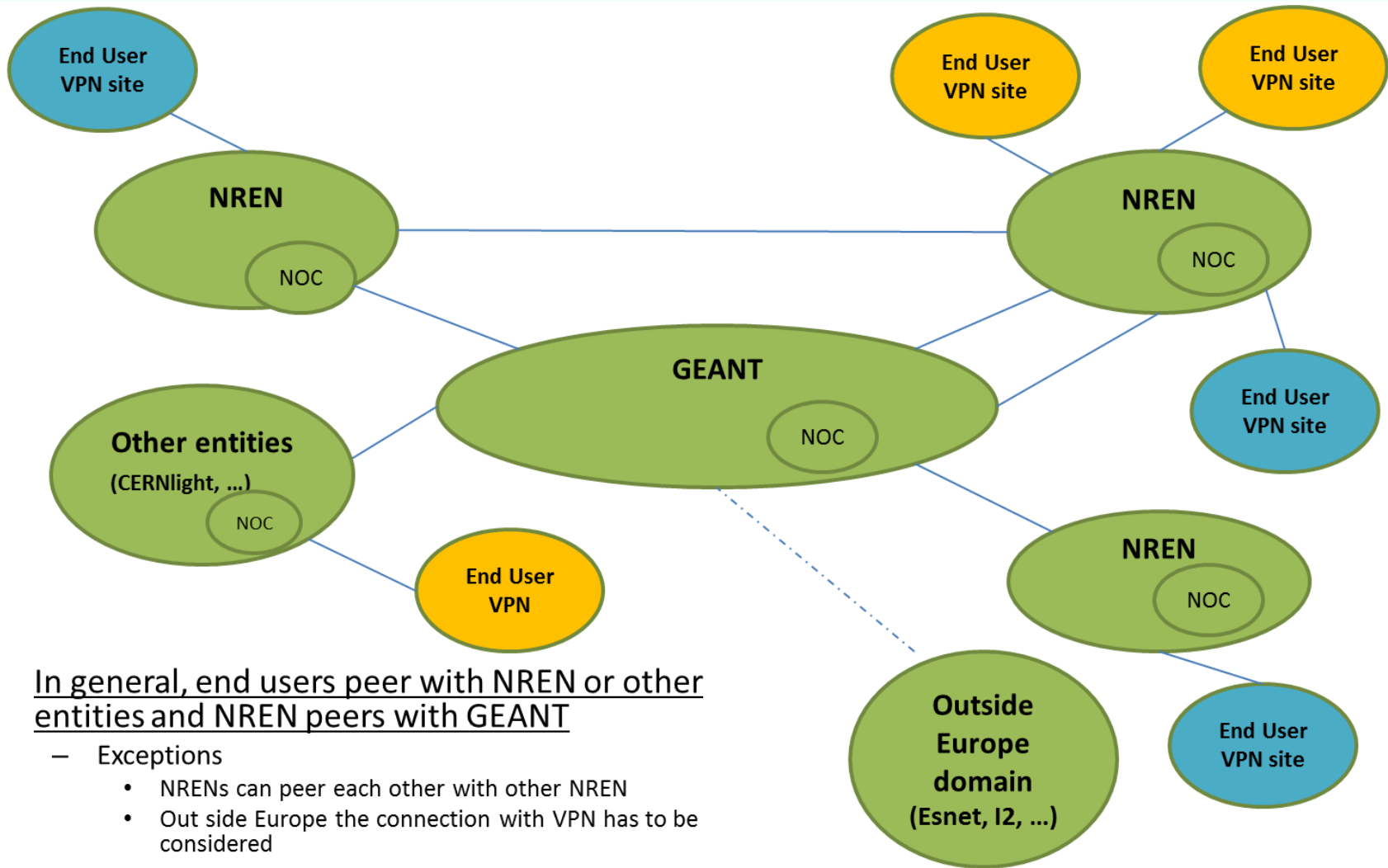
Would all these features be useful for LHC community?

Transparent multi-domain VPN multiplexing



- Solution based on RFC 4364 (BGP/MPLS IP VPNs) and RFC 3107 (BGP Labeled Unicast)
 - Available in almost all box and right now
 - No material investment only configuration
- Base on MPLS and BGP standard
 - Already deployed in some NSPs and a proved solution for a long time
 - All mechanism of BGP and MPLS are available
 - *Load balancing*
 - *Traffic Engineering (Fast-Re-Route, ...)*
- Service supported over Carrier of Carrier
 - MPLS L3 VPN (IPv4, IPv6)
 - MPLS L2VPN: P2P and Multi-Point (VPLS)
 - MPLS-TE
- QOS is available (MPLS Traffic Class field) but manually configured

- GN3+ start the 1st, april 2013 – duration 2 years
 - SA3T3 – MP-VPN
- NRENs involved: PIONEER, DFN, NordUNET, DANTE, AMRES, FCCN, RENATER
 - Interested: GARR, Forskningsnettet, FUNET, Heanet
- Objectives
 - Build Multi-domain Multi-point L3VPN service for GEANT
 - **But much more will be done**, since the design will also provide the following services
 - *at least P2P-L2VPN (see demonstration)*
 - *MP-L2VPN (VPLS) (to be tested and confirmed)*
 - *And in the future, we could test Traffic Engineering (MPLS-TE)*

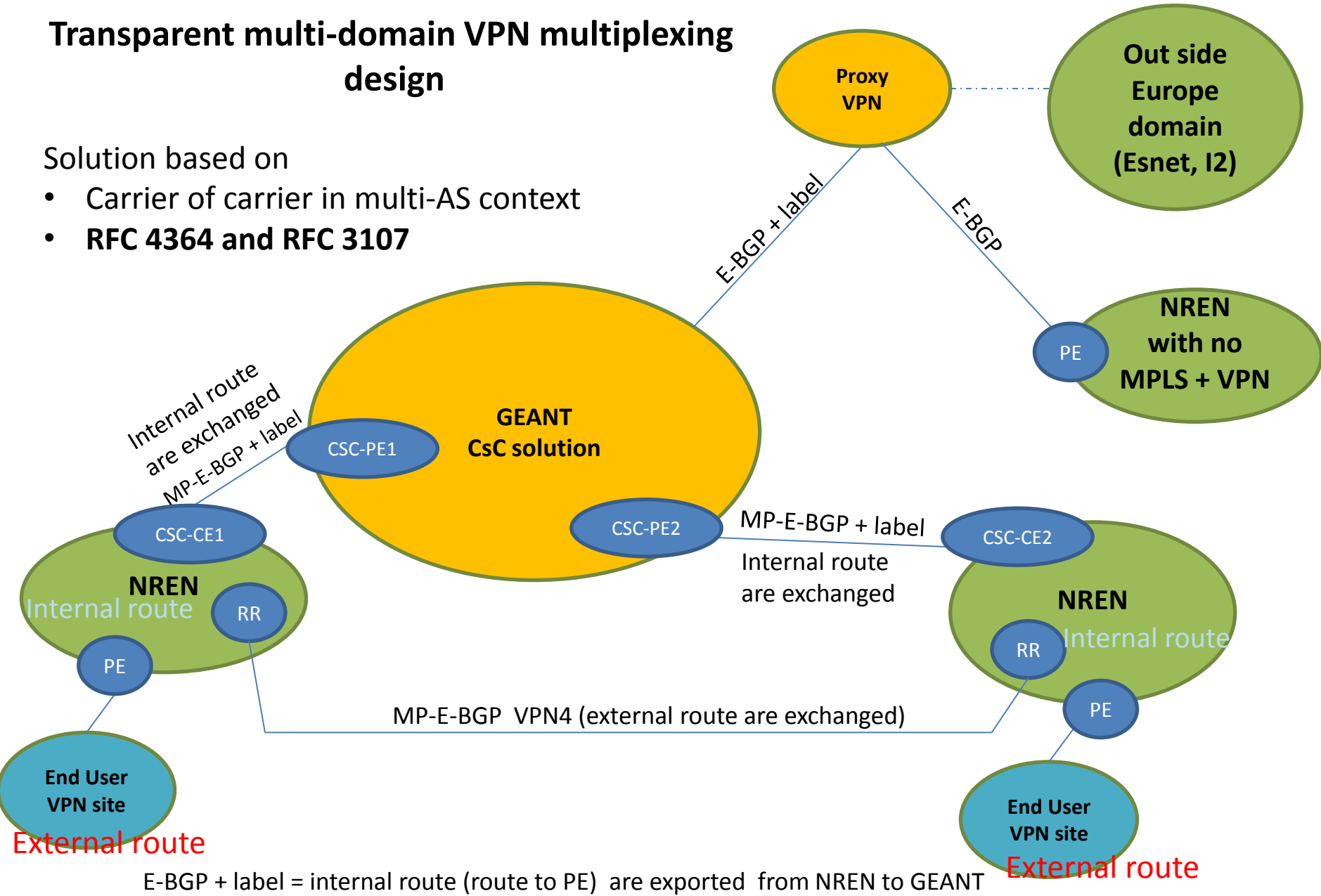


- In general, end users peer with NREN or other entities and NREN peers with GEANT
 - Exceptions
 - NRENs can peer each other with other NREN
 - Out side Europe the connection with VPN has to be considered

Transparent multi-domain VPN multiplexing design

Solution based on

- Carrier of carrier in multi-AS context
- **RFC 4364 and RFC 3107**

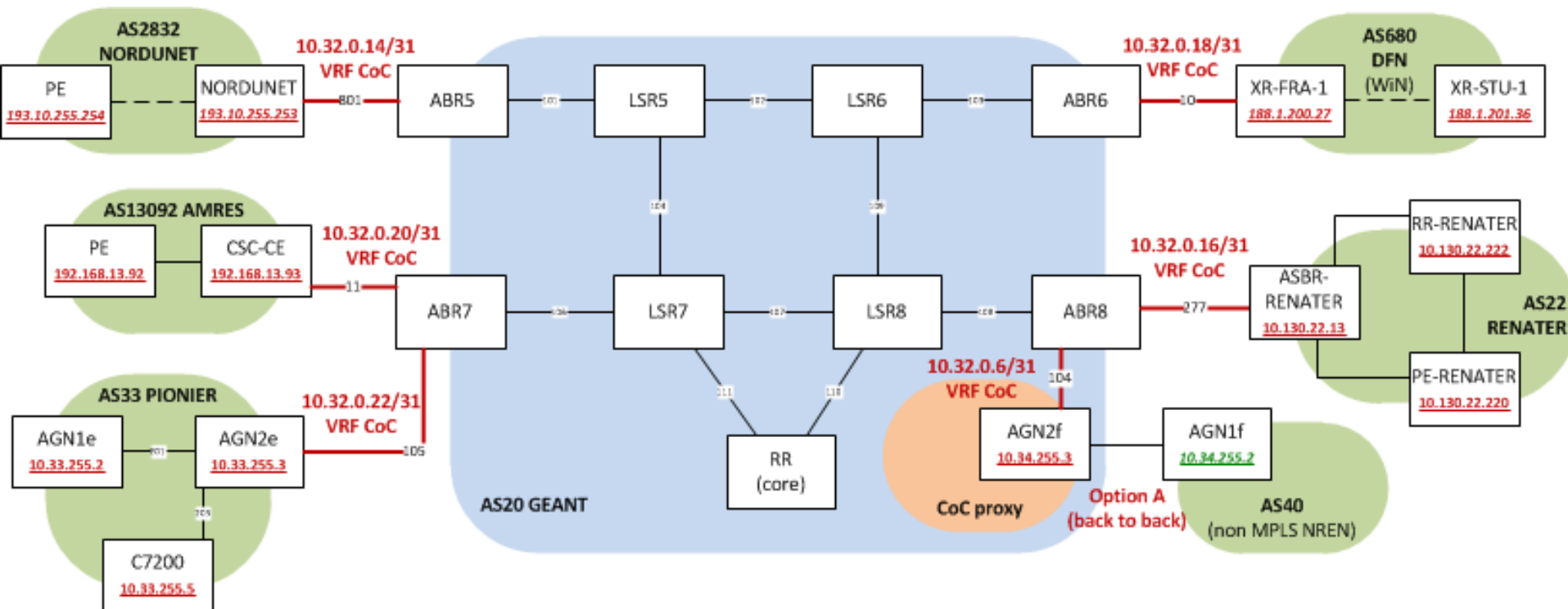


E-BGP + label = internal route (route to PE) are exported from NREN to GEANT

— Peering BGP

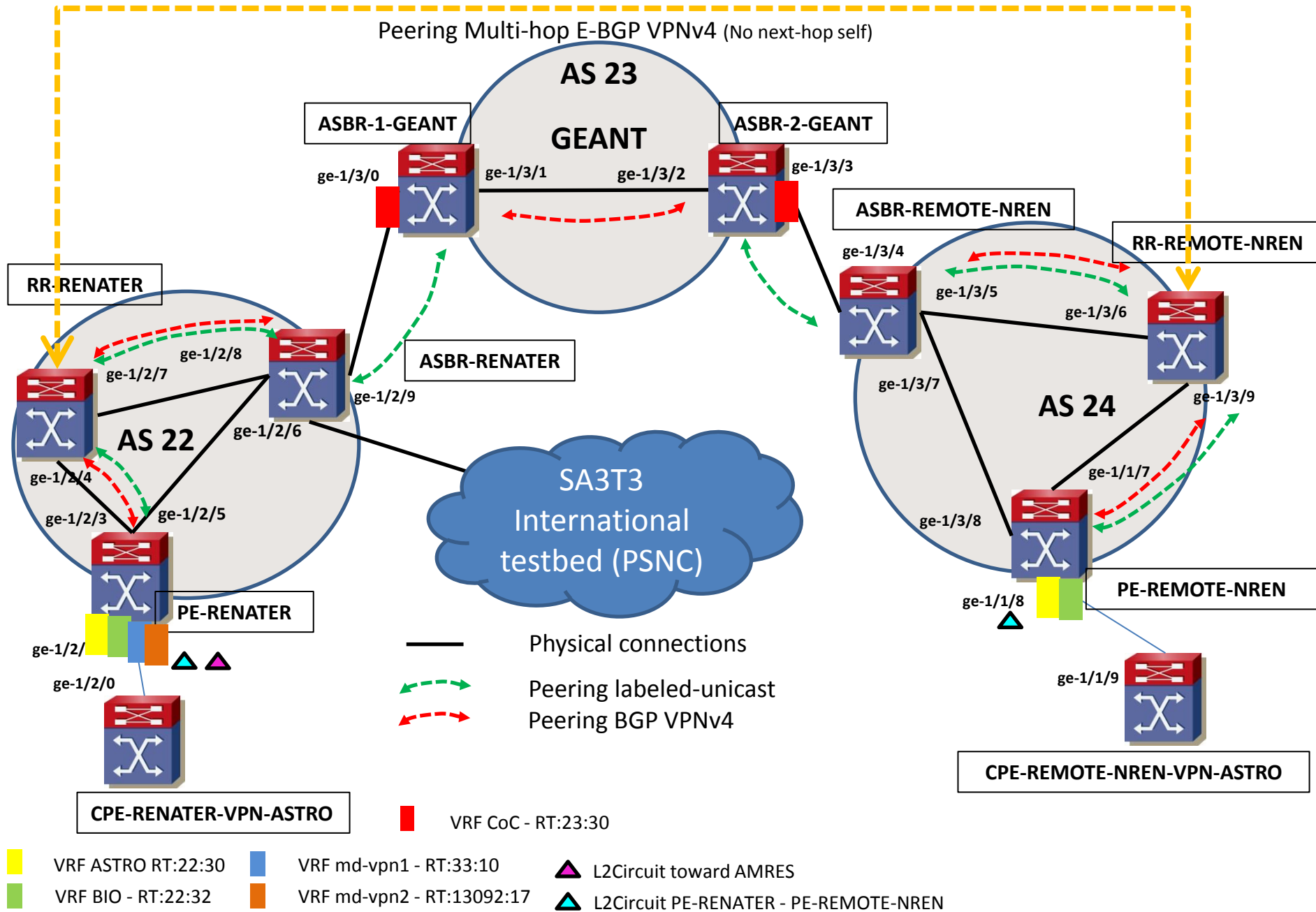
SA3T3 International testbed

15th, June 2013

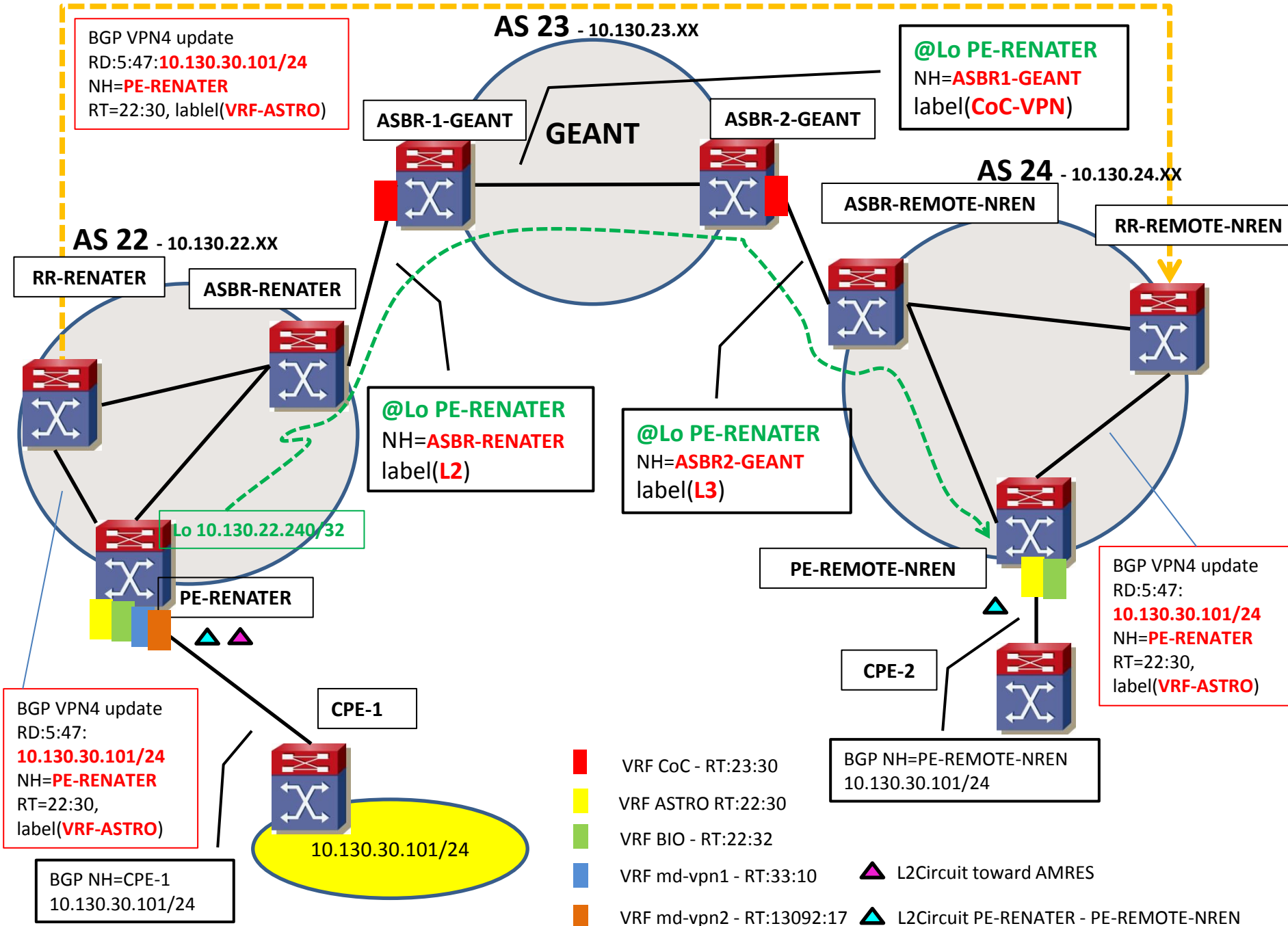


More detail on control plane and data plane

Detailed design of the solution



Peering Multi-hop E-BGP VPNv4 (No next-hop self)

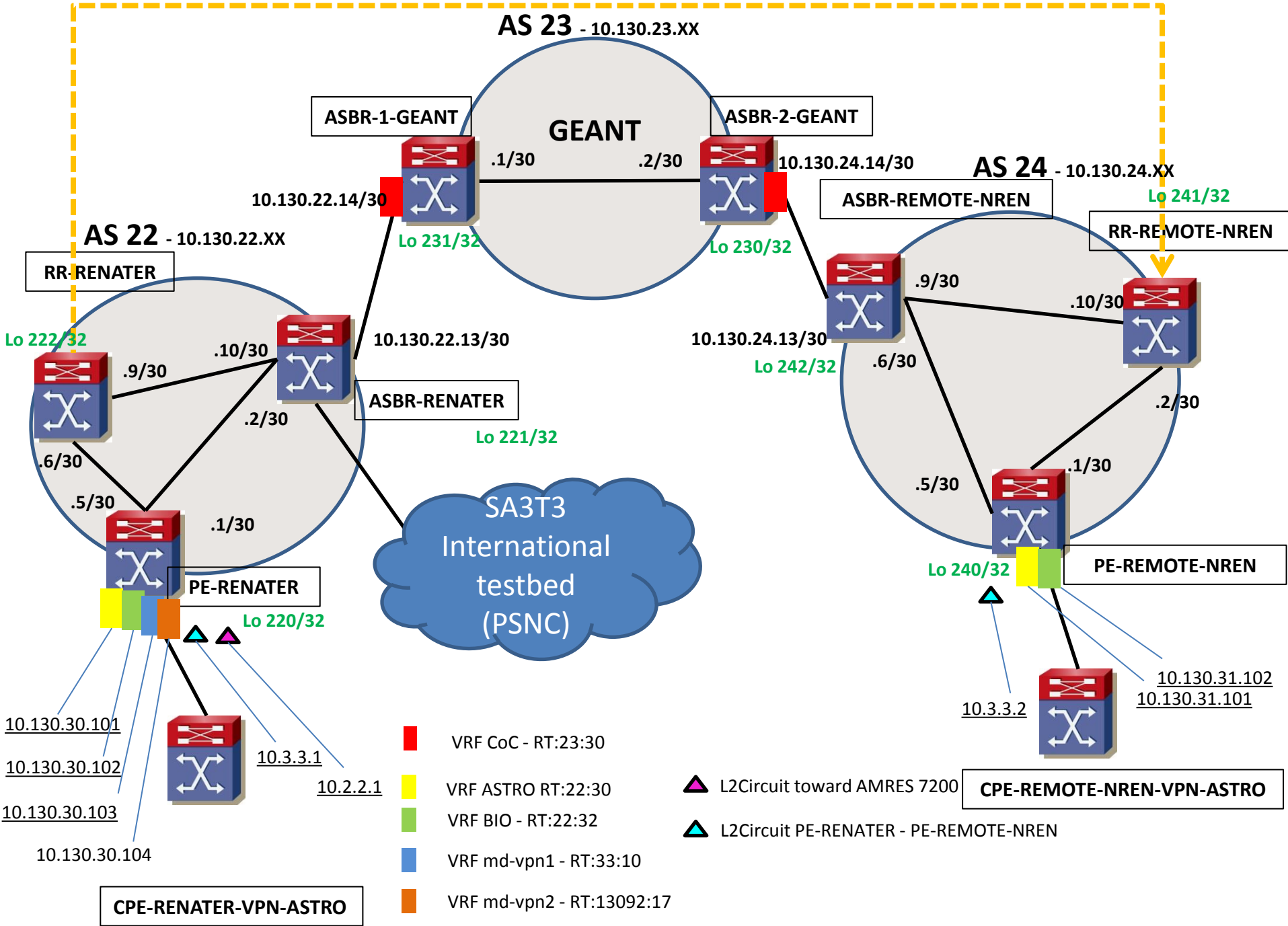


Demonstration



- **Focusing on proving it works**
- **No time for technical configuration but SA3T3 is keen for explaining our approach, just contact us.**

Peering Multi-hop E-BGP VPNv4 (No next-hop self)



● L3VPN

- Show configuration of VRF CoC on ASBR-GEANT
- Ping from site CPE-RENATER to CPE-REMOTE within VPN-ASTRO
- Ping from site PE-RENATER to CPE-REMOTE within VPN-ASTRO
- Ping from site CPE-RENATER to CPE-REMOTE within VPN-BIO
- Ping from site PE-RENATER to CPE-REMOTE within VPN-BIO
- Ping toward AMRES (Serbia) through Poland acting as carrier provider backbone

● L2VPN

- Ping from site CPE-RENATER to CPE-REMOTE within L2circuit
- Ping from site CPE-RENATER (**Juniper MX480**) toward AMRES (Serbia) (**Cisco 7200**) through Poland acting as carrier provider backbone

- Lot of fields to investigate, among them:
 - L2VPN: P2P L2VPN (detailed study), MP L2VPN (VPLS)
 - Serial of CoC/CsC
 - Load balancing
 - MPLS-TE
- Open a wide collaboration with other interested NRENs in order to test and deploy this solution
- Next meeting Wednesday afternoon 19th and Thursday morning 20th June in Paris at RENATER headquarter
 - At 2:00PM–4:00PM – a detailed explanation and big demonstration - Video conference available



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- Ping 192.168.17.30/32 in VPN-ASTRO
- Ping 192.168.17.32/32 in VPN-BIO
- Show l2circuit connection
- Ping 10.2.2.1