

QoS-enabled Inter-Provider MPLS VPN Services

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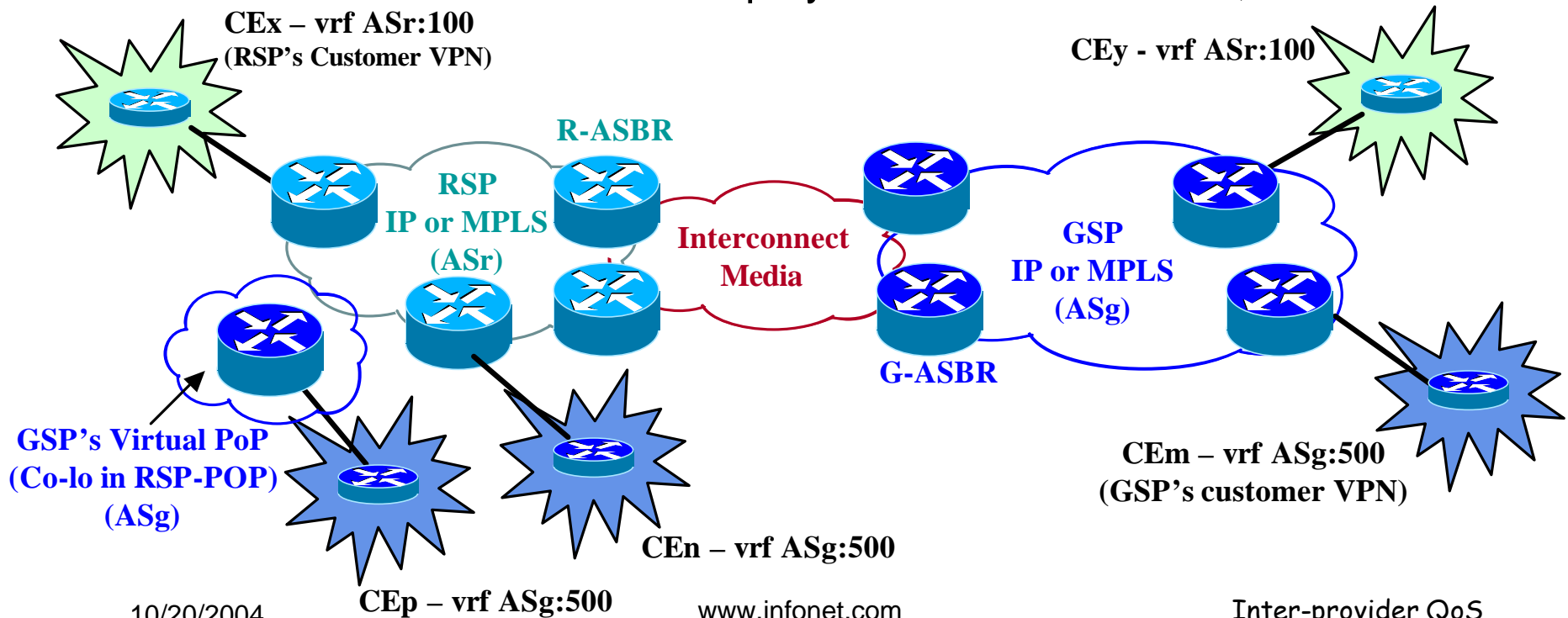
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October 20, 2004

**Inter-provider QoS Workshop
MIT, Cambridge, MA**

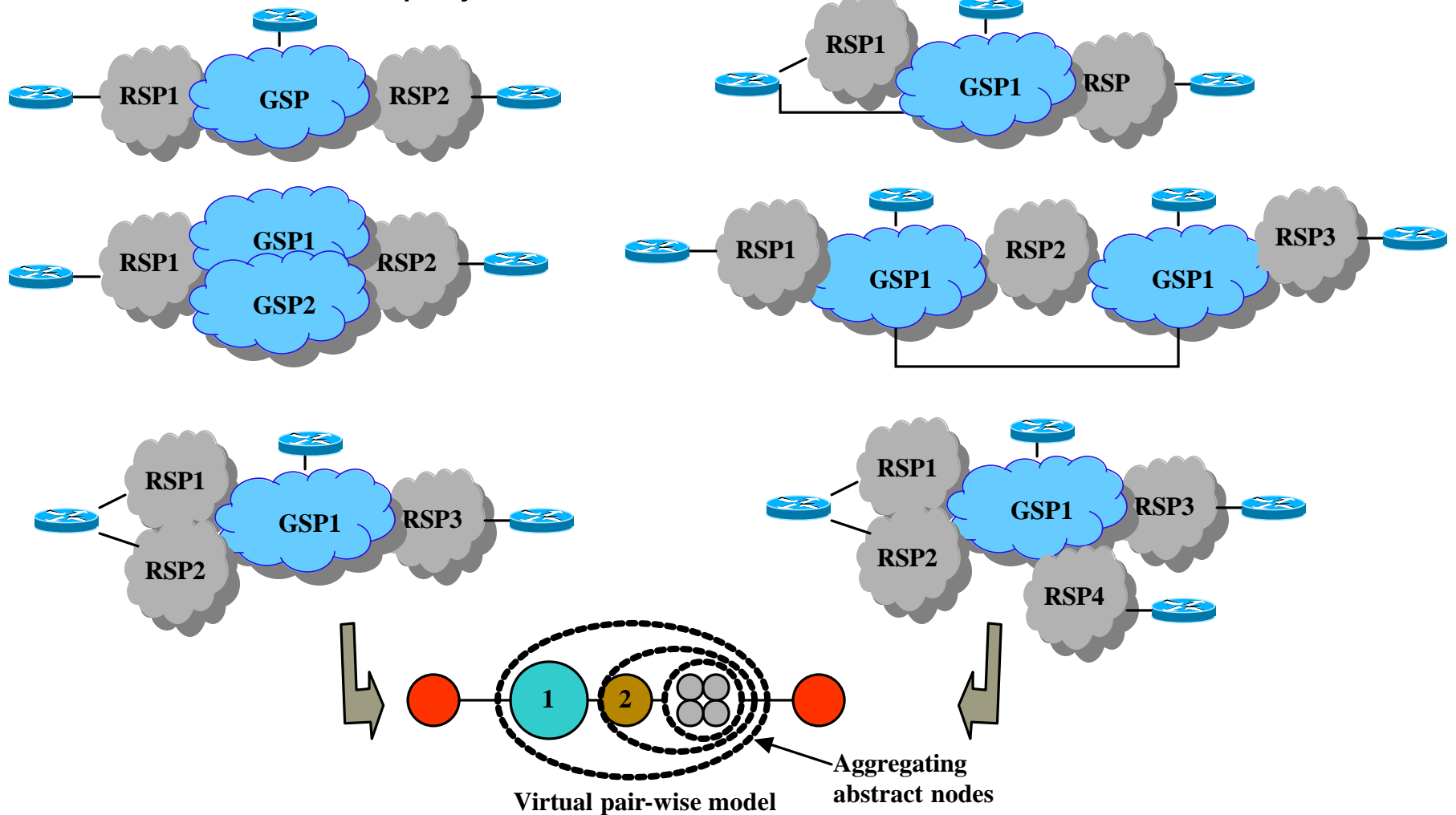
Requirements for Inter-provider QoS

- Model 1: Regional Service Provider (RSP) requiring extended reach via a Global Service Provider (GSP)
- Model 2: GSP expanding local reach via a RSP
- A number of service deployment scenarios exist, as illustrated:



Requirements for Inter-provider QoS

- Other deployment models:



Virtual pair-wise model

Aggregating abstract nodes

Requirements for Inter-provider QoS

- End-to-end QoS
 - path oriented service.
 - as good as the weakest segment of the path
 - but “weakness” is a relative term
 - p2p (VPN) and p2cloud (Internet)
- Single point of accountability (PSB, etc) – VPN
 - Difficult if having non-adjacent providers on the path
 - More plausible over a pair or virtual pair-wise model !
- CE – PE provisioning for the managed CE option
 - Common inter-provider QoS classes
 - SP specific QoS classes (connecting SP's or owning SP's)
- Customer code point transparency

Requirements for Inter-provider QoS

■ Performance

- Common set of classes that may represent:
 - Aggregating traffic flows sharing similar characteristics or traffic profile (e.g. Video over IP)
 - Service type specific (e.g. ATM pseudo-wire services)
 - Flow specific (Streaming or IPTV)
- Option 1: Segmented SLA performance path with no end-to-end SLA
- Option 2: End-to-end performance:
 - Availability (per network and per-site)
 - Statistical SLA boundary concatenation and metrics budget allocation

■ Measurement and reporting

- Concatenated SLA reporting is not enough
- Trust model more plausible again over a pair-wise arrangement
- Multi-domain management
 - Inter-provider events/root causes/exceptions via pub/sub mechanisms
 - Historical data availability for post-mortem analysis
- Management access to CE devices connecting to partner SP's networks
- QoE over multi-provider QoS paths...

Requirements for Inter-provider QoS

- Traffic management
 - Esp. for real-time resources (e.g. VoIP over priority queues)
 - Very expensive to over-engineer, depending on the region of the world
- Interconnect polices and enforcement
 - More pronounced over dynamic interconnections
- Provisioning scalability
 - Current eMail or manual forms of order fulfillment process may soon become unmanageable...
 - Inter-provisioning system request/fulfillment services over common service bus (e.g. XML)
- So where are we at today ?

Requirements for Inter-provider QoS

- Multi-SP VPN service ubiquity can be achieved today
- However, multi-SP end-to-end QoS services ubiquity – very difficult to achieve due to the following:
 - Inconsistent QoS provisioning over extended paths (PE <- CE and PE->CE)
 - Ambiguous performance statistical numbers due to dissimilar measurement bases
 - Inadequate inter-provider QoS profile/class mappings (variety of PHB definitions)
 - Lack of performance path visibility with no reporting system interoperability
 - Issues of consistent segment SLA enforcement are somewhat addressed via ad hoc engineered solutions, but not scalable nor manageable as the scale of requirements grow...

Thanks...