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BUSINESS WITHOUT BOUNDARIES

An Approach to Multi-Provider Services

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Agenda

- Issues with Current Approaches
- Our Approach based on Two Principles
  - Multi-Provider communication of capabilities
  - Embrace heterogeneity through “Service-Plane”
- Benefits and next steps

Current Piece-meal attempts to solve E2E QoS

- **Applications are able to predict and signal their QoS requirements in advance**
- **Admission control at edges is aware of current network load all along the path**
  - **Including Multi-Provider**
- **Comprehensive Inter-provider agreements**
  - **Agree on packet treatments, service profiles, service access, billing**
- **Sophisticated per-domain service measurement techniques**
  - **Eliminate “no-responsibility” attitudes on failures**

Our Approach based on Two Principles

- **Routing and reservation decisions made on an end-to-end perspective**

- **Heterogeneity in Provider technology and business policies addressed through Service-level semantics**

Inter-Provider Communication Today

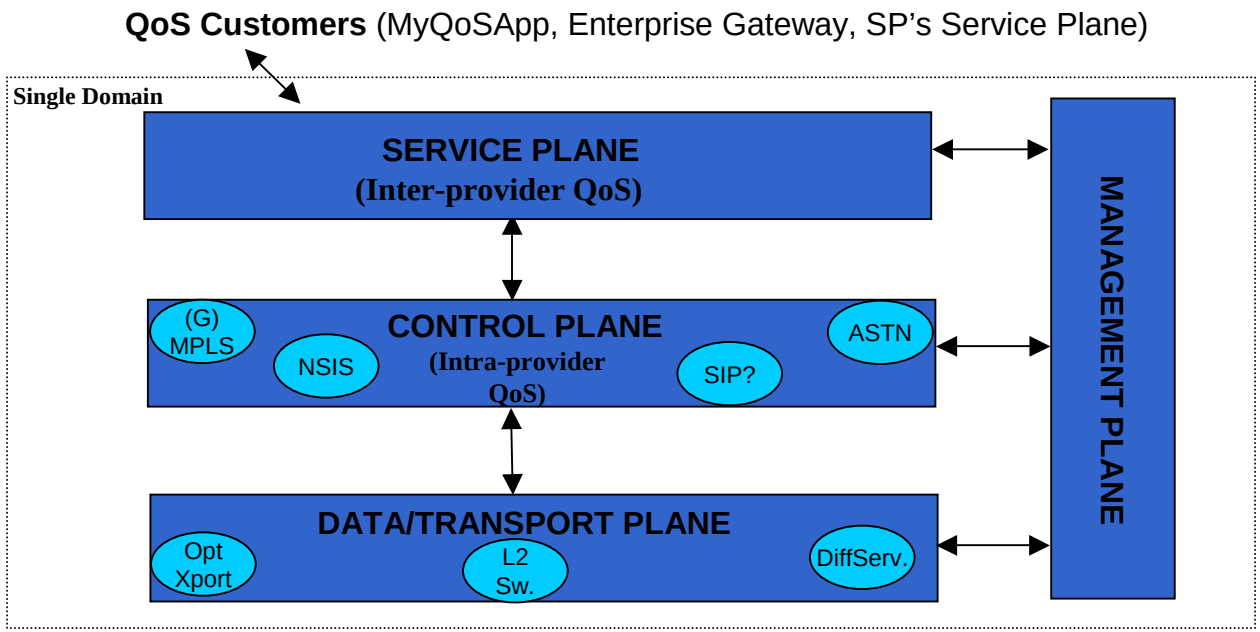
Current dissemination of routing info between SPs:

- **Summarize reachability info**
- **Filter the summary according to internal policy**
- **Advertise filtered summary to impose policy on external routing**
- **Justified by SP's business decisions based on:**
  - **Bilateral agreements**
  - **Traffic is Best Effort, route selection doesn't matter**
  - **SPs try to minimize forwarding of third party traffic**
  - **Bilateral agreements have little flexibility for compensating for actual traffic forwarded (especially third party) or for asymmetric traffic**
- **Issues:**
  - **Local knowledge cannot produce good/ optimum end-end routing& resv decisions**
  - **No possibility of customer choice and control**

Proposed Model of Routing and Reservation for Inter-Provider QoS

- **Changes in service requirements..**
  - Traffic with QoS objectives benefits from/ needs path selection
  - QoS traffic is associated specific revenue
- **Result in policy changes..**
  - Advertising path and resource availability becomes desirable
- **Provided additional features are available**
  - Resource summarization and advertisement
  - Enhanced authorization and accounting
  - Business relationships between non-adjacent SPs
- **Objective: Routing and Reservation decisions**
  - Are based on multi-domain knowledge
  - Optimize end-end objectives (price/ performance)
  - Benefits: service flexibility, value, reliability of service

“Service Plane” Approach to QoS



Service Plane establishes an e2e, multi-domain differentiated data service by translating policy-driven negotiations of QoS requirements into traffic treatment at data transport layer.

- **Advertises abstracted QoS Service Capabilities**
- **Accepts admission control requests from**
  - **Peer Provider Service Planes**
  - **Enterprise Applications/Gateways**
- **Applies AAA to QoS requests**
- **Determines preferred Routes across Service Domains based on QoS Service Capabilities**
- **Requests the network control plane admit and treat the traffic**
- **Monitors service quality, notifies peer Service Planes**

Benefits of the Service Plane Approach

- **Embrace heterogeneity in SP technology and business policies**
  - **Agree to the WHAT while providing policy flexibility to each SP**
  - **Encourage innovation and competition among vendors on the HOW.**
- **Increase SLA resolution utilizing advances in software technologies**
  - **Late binding semantics, Web Services, XML based data representation, UDDI etc.**
- **Decouple complexity of e2e QoS federation when spanning service provider domain boundaries**
- **Future-proof solution, leads to further innovation**
  - **Dynamic SLA negotiations by leveraging new approaches such as WS-Agreement**
  - **Toward a "knowledge plane" (David Clark)**

Conclusion

- **Summary**
  - Routing and reservation decisions made on an end-to-end perspective
  - Heterogeneity in Provider technology and business policies addressed through Service-level semantics

- **What Next**
  - Anybody resonating with this approach?
  - Exploring convergence, alignment to further define this architecture