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

QoS Customers (MyQoSApp, Enterprise Gateway, SP’s Service Plane)

- 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

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.
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