# Reservations on Explicit Paths with RSVP


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# Outline

- Why is explicit route support in RSVP useful?
  - Benefits in MPLS environment
  - Benefits to QoS routing
- What does it means for RSVP?
- Summary and extensions

# Scope and Motivations

- Why explicit routes?
  - Provisioning for and differentiating traffic from different users with MPLS
  - Tighter and simpler control of path and resource usage with QoS routing
- But also want ability to *reserve* resources on explicit routes
  - Would rather not invent another protocol
  - RSVP is obvious candidate but some extensions are needed

⇒ Allow reservations on explicit routes using RSVP with the *least* impact

# Explicit Routes and Resource Reservation with MPLS

- Sample ISP network

```
          S2
           \
S1--A---B---C---D
        |       |
        E-------F
```

- ISP provisioning requirements:

1. Packets from S1 on A-B-E-F-D, and packets from S2 on B-C-D
2. Reserve resources for each "flow"

- MPLS enables 1
- Use of RSVP for 2 requires that RSVP PATH messages follow explicit (MPLS) path

# Explicit Routes and Resource Reservation with QoS Routing

- QoS routing tries to pick paths that "best" match flow (and network) requirements
- Explicit routes make sure the path actually followed is the one that was selected (single vs multiple decision points)
  - Eliminates loop problem
  - Simpler accounting of existing reservations
  - Tighter control of actual usage of network resources
- Explicit routes facilitate enforcement of high level admission control policies

# RSVP Extension - Explicit Route Object

- RSVP carries opaque object specifying explicit route generated by path selection
  - Exact object(s) format to be finalized, but should support IPv4 and IPv6 addresses, path recording ability, simple parsing, possible "expansion", etc.
- RSVP passes object to routing (together with other relevant information)
- Routing returns (modified) outgoing route object along with next hop information

# Summary

- Reservations on explicit routes supported with RSVP through addition of *opaque* routing object
  - Passed to routing by RSVP
  - Returned to RSVP by routing with next hop information
- Maintains decoupling between RSVP and routing but enables support of wide range of routing mechanisms
  - Of benefits to MPLS and QOS routing
- Follow-up
  - Finalize definition of explicit route object(s)
  - Loose source routes and error scenarios
  - Possible combination with path setup for MPLS