RSVP Over ATM

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Draft Information

- Initial Draft:
  - draft-berger-rsvp-over-atm-00. {ps, txt}
    Postscript version contains drawings
- Intended Purpose:
  - Basis for complete RSVP over ATM UNI 3.x specification
    - WG milestone
  - Define a framework for interoperable RSVP over ATM implementations
  - Define a minimum set for required operation
  - Allow for differences in specific implementations

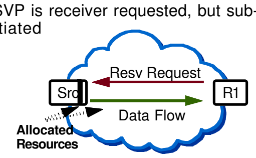
Draft Information (continued)

Draft Addresses:

- Encapsulation
- VC Usage
- QoS Renegotiation
- Routing Relationships
  - Short-Cuts (NHRP)
  - Multicast (MARS)
- Heterogeneity
- Best-Effort Receivers

Draft Non-Issues

- All INT-SERV Over ATM Issues
  - Mapping QoS Service Classes
  - Mapping QoS Parameters
  - Policing
- Receiver Vs Sender Initiation
  - RSVP is receiver requested, but sub-net sender initiated



Proposal Overview

Two parts to proposal:

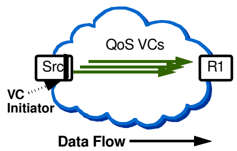
- Framework
  - VC Usage
  - Routing
- RSVP Over ATM UNI 3.x Method
  - Defines minimal required method
    - Allows for other additional specific approaches
  - Why not UNI 4.0?
    - Leaf Initiated Join (LIJ) not included

Framework Summary

- Multiple VC usage methods allowed
  - Supports multiple implementation choices for
    - Data flow-VC mapping
    - QoS renegotiation
- Only single service and best effort supported per RSVP flow
  - Per RSVP specification

Framework: Data VC Usage

- All QoS VCs established by sub-net senders
- Receiver accepts all
- No reuse of reverse path



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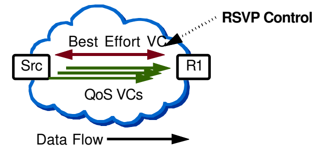
Framework: Control VC Usage

- RSVP signalling over best effort path (VC)
  - May have multiple VCs to a destination
    Best effort and one or more for QoS flows
    - Which should RSVP use?
  - Reliability provided by RSVP refreshes



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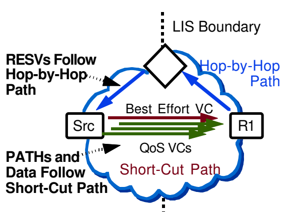
Framework: Routing

- Follow IP routing
  - No route pinning
  - No special short-cut handling needed



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RSVP Over ATM UNI 3.x Summary

- A specific implementable method
  - Defines minimal required operation
  - Allows for other additional specific approaches

Includes:

- Encapsulation
  - RFC 1483
- VC Mapping
  - One VC per RSVP reservation
- QoS Renegotiation
  - Replace with new VC

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RSVP Over ATM UNI 3.x Summary (continued)

- Short-Cut VCs
  - Always use same ATM end-point as BE
- Multicast Data Distribution
  - Use mesh mode distribution, no server (MCS)
- Heterogeneous Flows
  - Use largest request
- Best Effort Receivers
  - Reuse QoS VC
    Or
  - Separate best effort VC

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RSVP Changes

- No packet/object format changes required
- Addition of next-hop identification required for:
  - Traffic Control Interface
  - Routing Interface
  - Processing Rules
    - TCSB - Traffic Control State Block
    - Update Traffic Control Processing

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Future Extensions

- QoS Based Routing
- UNI 4.0
  - Leaf initiated joins
- Resolving Scaling Issues
  - VC usage
  - RSVP message implosion
  - Signaling rate limitations

Recommended Protocol Changes

- NHRP
  - NHRP per flow, for per flow short-cuts
- MARS
  - QoS extensions for use with MCS
- ATM UNI 5.x
  - QoS renegotiation
  - Possibly, variegated VCs
- LANE
  - QoS extensions
  - Possibly, multicast mesh

RSVP Over ATM

UNI 3.x Details

Encapsulation

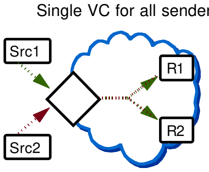
- Options:
  - LANE
    - LANE 1.0 doesn't provide any QoS control interface
    - LANE 2.0 probably will, but still in development
  - RFC 1483
    - QoS control via UNI3.x
    - Same encapsulation as Classical IP (RFC 1577) and NHRP
- Proposed Solution:
  - RFC 1483 is the only current option

VC Mapping

- One VC per RSVP reservation
  - Style dependent

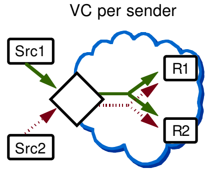
Shared: (SE, WF)

Single VC for all senders



Explicit: (FF)

VC per sender



QoS Renegotiation

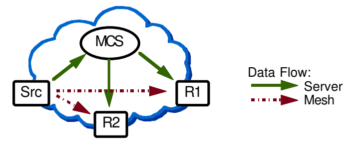
- RSVP supports changes in requested QoS
- VC QoS parameters cannot be changed in UNI 3.x (or UNI 4.x)
- Proposed Solution:
  - Request replacement VC
  - On failure, continue using old VC

    and:
    - If old VC larger, handle as success and retry later
    - If old VC smaller, handle as failure

Short-Cut VCs

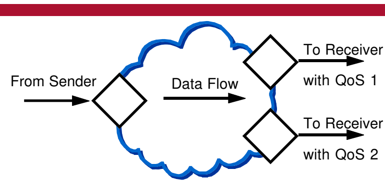
- Short-cuts supported by framework
- Options:
  - Initiate short-cuts on reservation (RESV)
  - Initiate short-cuts on advertisements (PATH)
  - Reuse best effort short-cuts
- Proposed Solution:
  - Always use same ATM end-points as best effort VCs

Multicast Data Distribution



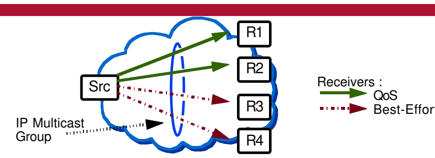
- Multicast Options:
  - Server (MCS)
    - Currently does not support QoS
  - Mesh
- Proposed Solution:
  - Use mesh mode distribution

Heterogeneous Flows



- Handling of next-hops requesting different FlowSpecs
- Proposed solution:
  - Use single VC
    - Same QoS to all next-hops
    - Use largest requested QoS

Best Effort Receivers



- Need to support QoS and best effort receivers
- Options:
  - Reuse QoS VC
  - Create BE VC to non-QoS receivers, replicate data at source
- Proposed Solution:
  - Support both
  - Allow user to choose based on network type