IP Multicast over ATM: System Architecture Issues

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draft-ietf-ipatm-arch-00.txt

Characteristics of IP Multicast

Distribution Model:

- **Logical Address**
- **No registration needed for senders**
- **Registration required for receivers**
- **Support broadcast**
- **Support subnet mc scope (TTL=1)**
  administrative scope

Real-Time Requirements: QoS support (RSVP)

Priority levels

Others...

2nd generation mc applications: multiple flows & low latency

Link sharing

Basic IP mc over ATM Service Model

Subscription:

- **Hosts can send anytime. Must register to receive.**
- **Routers can receive all mc packets on their subnets can determine what mc groups subnet hosts are member of.**
- *Routers must support the functional requirements of knowing which mc groups are active on their subnet.*
- **Hosts must register to the subnet broadcast grp.**

Distribution:

- **Must support restricted distribution to the subnet (TTL=1)**
- **Must support the "all-hosts" mc grp (224.0.0.1) for IGMP.**
- **Must support broadcast distribution w/in the subnet.**

Quality of Service:

- **Must use RSVP to provide QoS to IP mc grps.**
- *QoS support either thru direct ATM QoS or thru RSVP.*
- *Must be able to support RSVP for hosts which want to use it.*

Major Issues for IP mc over ATM

Subscription:

- **Join requests for a host to become a group member**
- **Address resolution mechanism to map IP addresses to ATM addresses.**
- **Is ARP necessary ?**
- **Distribution of required info for senders to reach all receivers..**
- **Two approaches exist currently: IGMP-based w/ ATMARP**
  MARS
- **Cut-through routing: Should mc subscription be required to work in a cut-through environment ?**
- **Support of subnet broadcasting:**
  Modify RFC1577 (+?) or
  Use ATMARP database w/ the MARS or
  Use ATMARP database w/ IP mc router sln. or
  Use the MARS (see "draft-smith-ipatm-bcast-01.txt").

Major Issues for IP mc over ATM (cont.)

Distribution over ATM:

- Source based or multicast server based.

- UNI 3.1: pt-mpt (unidirectional, root-driven) & pt-pt (bidirectional)

- UNI 4.0: pt-mpt w/ LIJ, mpt-mpt support ?
LIJ not very useful since IP source unknown (GCID = ?).

- Multicast servers & Routers: problem w*/* reflected packets

- Possible slns: all MCS must be implemented by routers
new encapsulation (see "draft-armitage-ipatm-encaps-02.txt")

- Support of administrative scope in a cut-through environment ?

ATM (cont.)

& pt-pt (bidirectional)

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Major Issues for IP mc over ATM (cont.)

Quality of Service:

- **IP mc traffic taxonomy: "best-effort" & "real-time"**
- **"best effort": shrt sessions, low volume, often local**
  need for ATM VC setup ?
- **"real-time": long sessions, high volume, local or WAN**
  VC setup very desirable
- **Conclusion: QoS support must be included in IP mc systems over ATM.**
- **IP QoS = RSVP**
  Rely on ATM QoS or use RSVP

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WAN

mc systems over ATM.

Major Issues for IP mc over ATM (cont.)

RSVP over ATM:

- **RSVP interaction w/ ATM: not very simple**
- **RSVP resv is receiver driven. ATM resv is source driven.**
- **Transmission of path msgs requires a VC from S to D**
- **Resv msgs establish a new QoS-based VC**
- **Support of heterogenous receivers in ATM (VC teardown/setup)?**
- **"On-the-fly" change of QoS parameters in RSVP.**
- **ATM doesn’t support dynamic re-negotiation of QoS parameters.**