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# Scalable QoS Support Mobile Resource Reservation Protocol for Real-time Wireless Internet Traffic

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GLOBECOM 2002

徐延源

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# Outline

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- Introduction
  - Related works
  - The proposed protocol
    - Mobile QoS Path
    - Route optimization
    - Fast and smooth handoff
    - Scalability
  - Performance evaluation
  - Conclusion
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# Introduction

- Due to the network mobility, wireless networks' QoS requirements are different from those of wireline networks
  - In the wireless environment:
    - Route-optimized path must be set and made as stable as possible during the mobile session flow
    - Changes in routing paths should be as few as possible and be restricted to within the area near the MN
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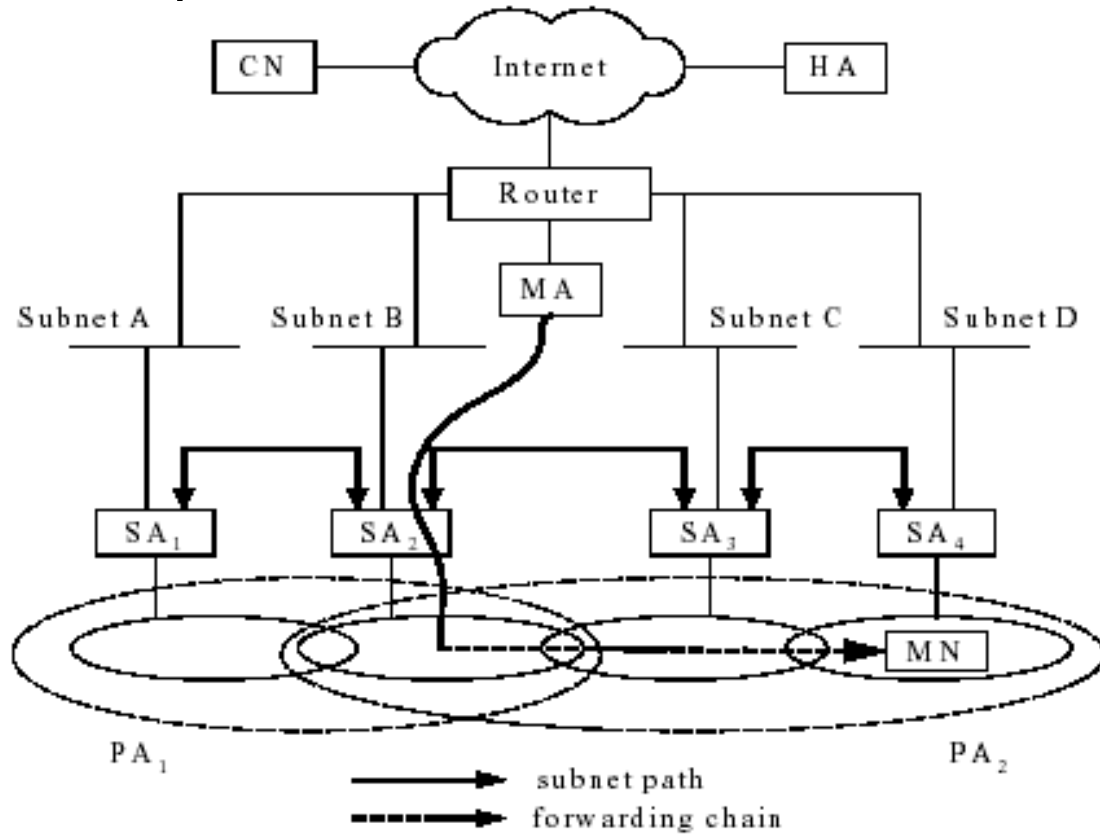
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# Related works

- RFAR (Regional Forwarding and Aggregate Reservation)
    - A bi-directional and QoS guaranteed path called Subnet path is used between any two subnet agents
    - Horizontal approach
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# Related works (cont'd)

- RFAR (cont'd)



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# The proposed protocol

- The major different requirement for wireless networks is the **handoff QoS**
  - The proposed protocol offers:
    - Mobile QoS path
    - Route optimization
    - Fast and smooth handoff
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# The proposed protocol (cont'd)

- Mobile QoS path
    - Conventional RSVP session is identified by the triple: (DestAddress, ProtocolId, DstPort)
    - Usually the DestAddress is the CoA of the MN, thus if the MN changes its CoA in the handoff process, a new RSVP session must be set
    - A new parameter **Home IP Address** is introduced to maintain the RSVP session when handoff occurs
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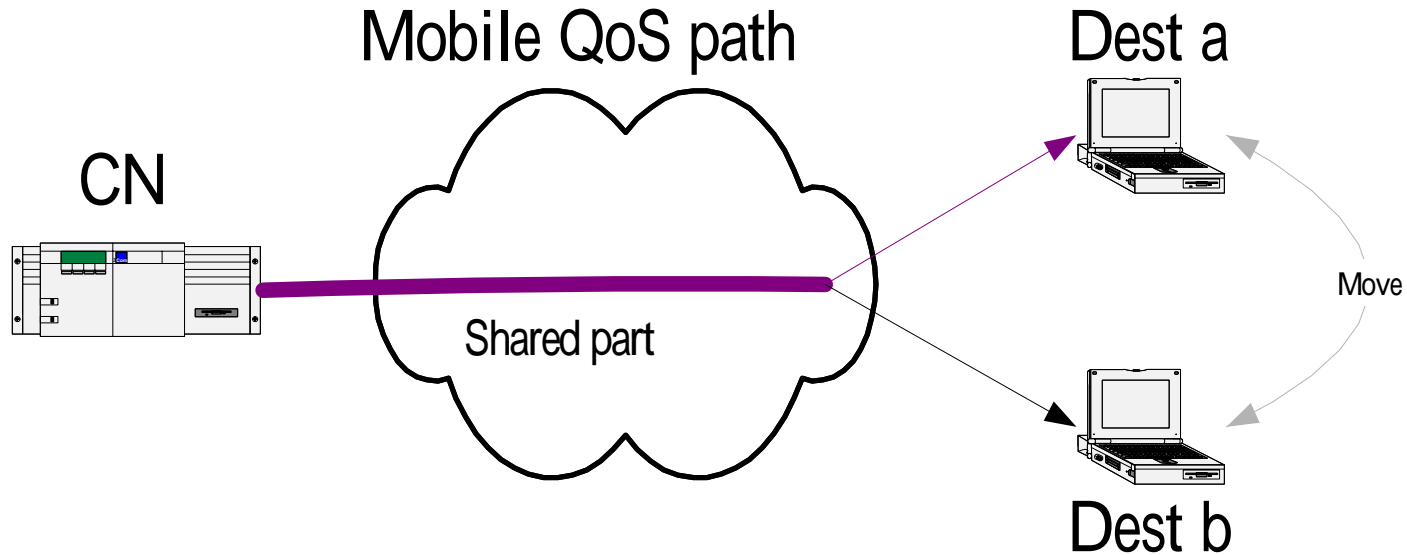
# The proposed protocol (cont'd)

- Mobile QoS path (cont'd)
    - There are three reservation styles in the conventional RSVP:
      - Fixed Filter (FF)
      - Shared Filter (SF)
      - Wildcard Filter (WF)
    - A new reservation style **Share Destination Filter (SDF)** is introduced to allow different destination addresses to share the same QoS path
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# The proposed protocol (cont'd)

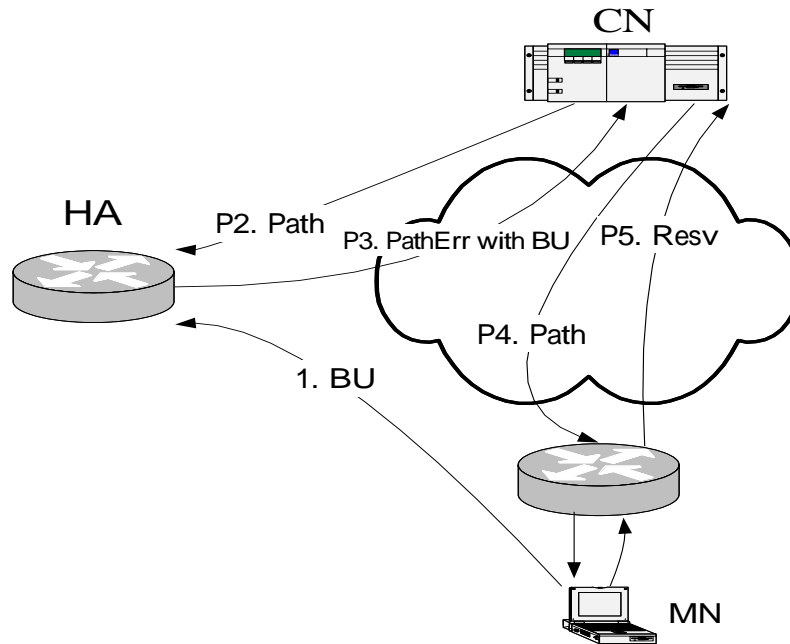
- Mobile QoS path (cont'd)



# The proposed protocol (cont'd)

- Route optimization

- Route optimization is done prior to the data transmission
- Mobile IPv6 path optimization is used



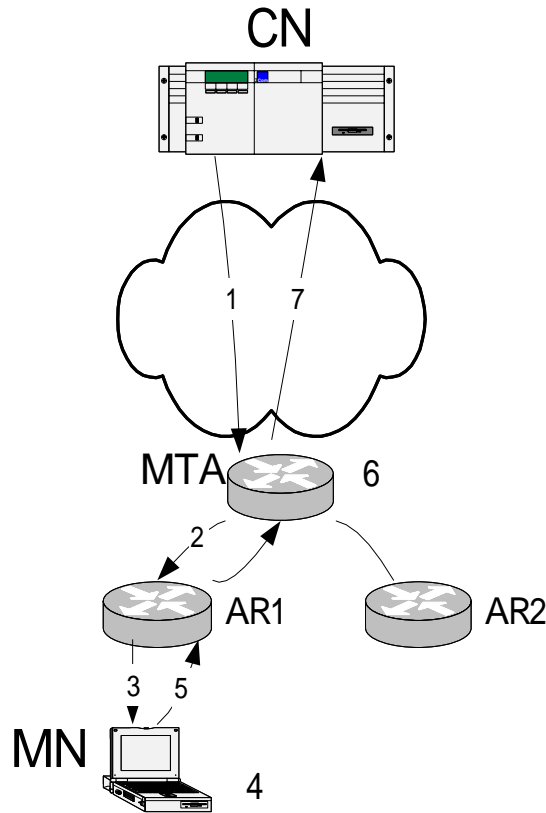
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# The proposed protocol (cont'd)

- Fast and smooth handoff
    - A new agent called **Mobile Transit Agent (MTA)** is introduced
    - The MTA acts as an anchor point for the MN
    - The MTA is selected dynamically according to the routing path between the CN and MN
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# The proposed protocol (cont'd)

## ■ Fast and smooth handoff (cont'd)



1. Path, CoA(AR1)

2. Path, CoA(AR1), MTA address

3. Path

4. MN records the MTA as its anchor point

5. Resv, APR, Home IP address

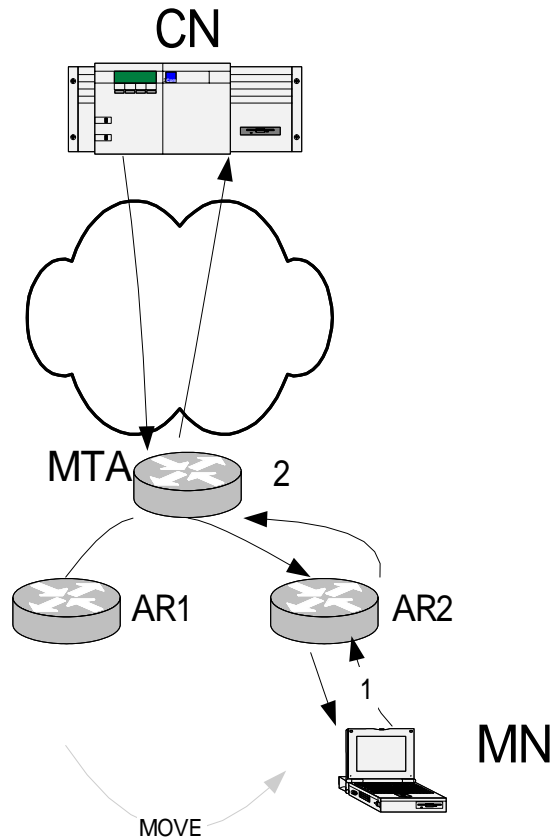
6. AP registration

7. Resv

**MTA Registration process**

# The proposed protocol (cont'd)

## ■ Fast and smooth handoff (cont'd)



1. Resv, APR, HomeIP Address, CoA(AR2)
2. AP registration

The new QoS path MTA->AR2->MN is merged to previous QoS path

**Fast handoff process**

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# The proposed protocol (cont'd)

- Fast and smooth handoff (cont'd)
  - To achieve smooth handoff, RSVP's copy capability is used to construct a bi-casting tree during the handoff process



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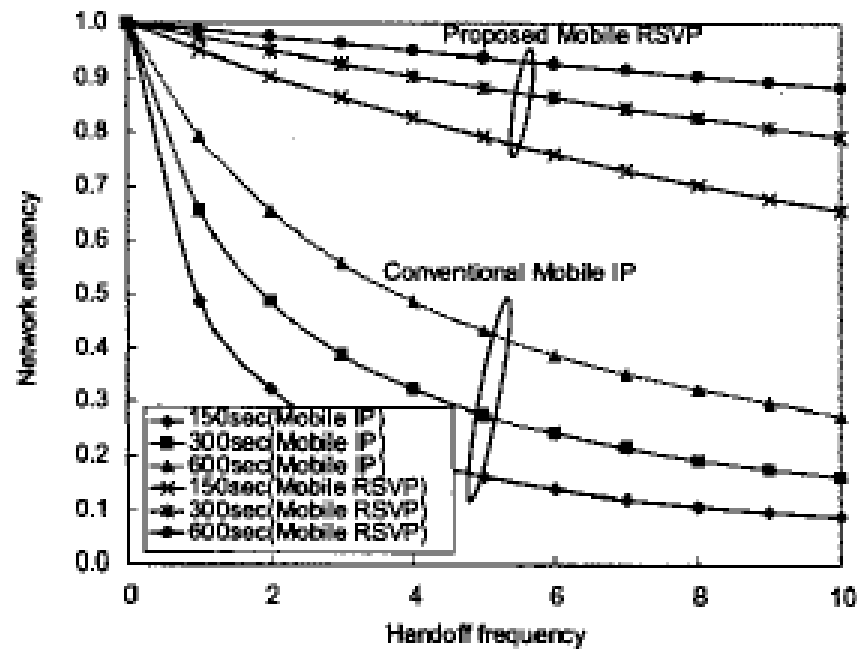
# The proposed protocol (cont'd)

## ■ Scalability

- ❑ The proposed protocol has the common RSVP scalability problem
  - ❑ Use MPLS and Diffserv as core network technology
  - ❑ The proposed protocol is used only within the access network
  - ❑ The QoS path is mapped into MPLS path or Diffserv class in the core network
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# Performance evaluation

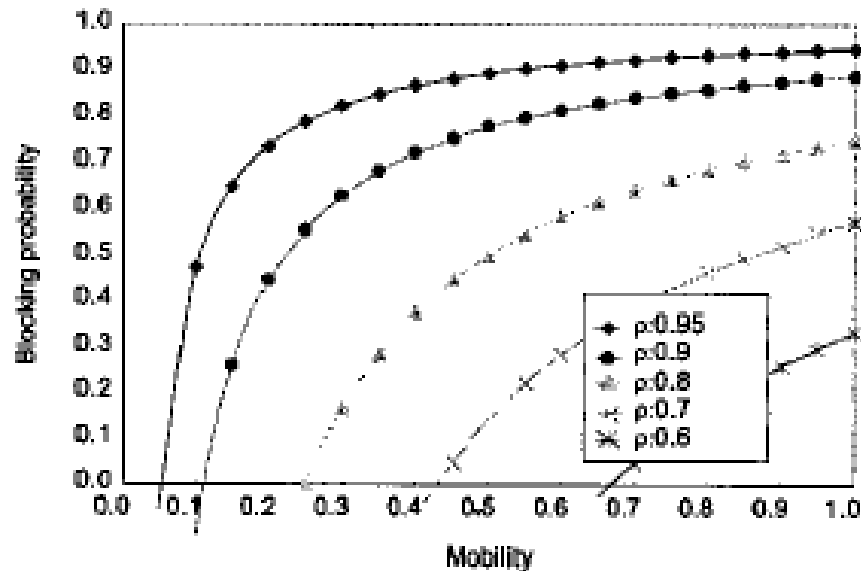
- Network efficiency





# Performance evaluation (cont'd)

- Blocking probability of conventional RSVP



- The proposed protocol does not suffer from blocking thanks to SDF reservation style

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# Conclusion

- A scalable QoS support mobile RSVP is proposed for wireless networks
    - Mobile QoS path
    - New RSVP reservation style: SDF
  - The protocol provides route optimization and fast/smooth handoff
  - QoS is guaranteed in wireless networks even the handoff occurs frequently
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