Issues in Tunnel Convergence Solutions

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Two Types of Tunnelling Problems

1. Convergence
   - Multiple tunnels terminate at MAG, possibly transporting duplicate traffic
   - Inherent to the PMIP base solution
2. Avalanche
   - Tunnel head serves many MAGs causing a high replication load of identical traffic
   - Inherent to the M-Head (M-LMA) proposal

Further Objectives

1. Enhance Service Availability
   - Extend access to multicast channels
2. Reduce Service Cost
   - Optimize access / routing to reduce network load
3. Remain transparent with respect to PMIP evolution
   - In particular: Cross-domain access

Use Cases

- Case 1:
  - User wants to have access to home subscription channels while moving to a visited network
- Case 2:
  - User may want (to pay extra fees) to access local content depending on location (e.g., pay-TV in hotel)
- Case 3:
  - If content can be accessed from more than one location, MAG could select the best path based on routing cost

Current Solutions / Proposals

- Base Solution:
  - Covers use case 1, tunnel convergence problem
- Direct Routing:
  - Covers use case 2, optimized – but requires local mcast routing
- M-Head/M-LMA:
  - Covers use case 1, avalanche problem
- All-PIM Domain:
  - Unclear: depends on non-PMIP unicast routing at MAGs, most likely equivalent to direct routing

Path to Solution & Problems

Objective from Use Cases:

Combine base solution (home subscription) with local service access

Problems to solve:

1. Multicast routing intelligence at MAGs
   - How to access which group?
2. Make handover smooth & policy-compliant
   - Handle mixed access seamless without access violations