Mobility in a Dual Stack Internet

draft-tsirtsis-dsmip-problem-02.txt
draft-soliman-v4v6-mipv4-00.txt

The problem - 1

- MIPv4 allows IPv4 node to move in IPv4 networks
- MIPv6 allows IPv6 node to move in IPv6 networks
- Internet will be a mixture of IPv4, IPv6 and Dual Stack networks (IPv4 only and dual stack in the short – medium term)

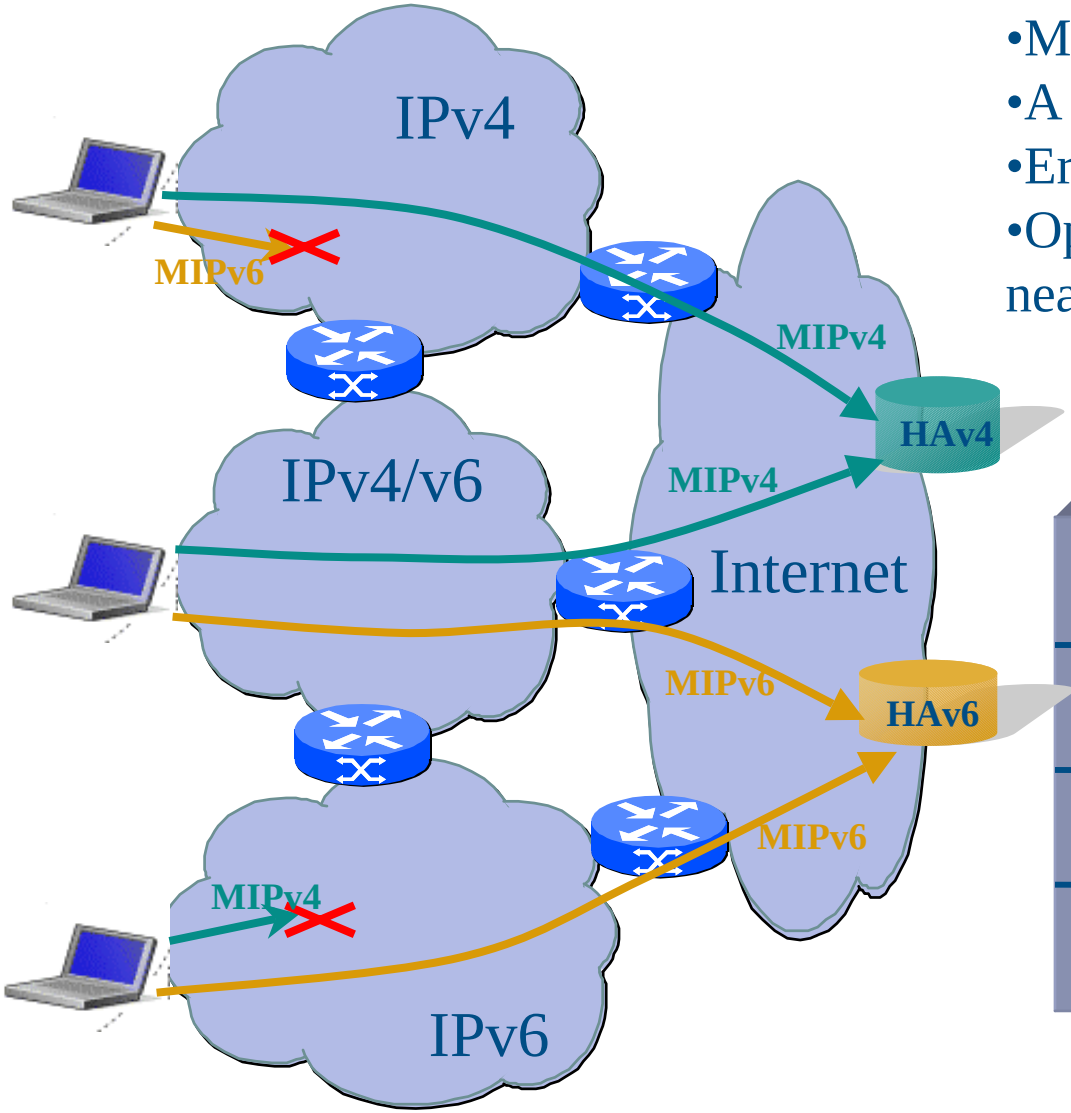
The problem - 2

- Overheads:
  - Double the signalling to HA and local (handover optimisations) every time a MN moves
- Inability to maintain sessions while moving: e.g. MIPv6 MN in an IPv4-only network
- Double the implementation and support if both MIPv4 and MIPv6 are implemented

Optimisation Overheads

- When both MIPv4 and MIPv6 are used, every handoff involves
  - MIPv4 signaling RREQ/RREP
  - MIPv6 signaling BU/BUAck
  - Route Optimization signaling
    - Multiple BUs/BUAcks for v6
  - Fast Handoff/LMM signaling
    - Various signals/processes for v4 and v6

Best Case scenario today



- MN supports both MIPv4 and MIPv6
- A lot of overheads
- Erratic connectivity
- Optimized Mobility Management near-impossible

	IPv4 network	IPv6 network	DS network
MIPv4	✓ ✗ IPv4 IPv6	✗	✓
MIPv6	✗	✗ ✓ IPv4 IPv6	✓
MIPv4 MIPv6	✓ ✗ IPv4 IPv6	✗ ✓ IPv4 IPv6	✓

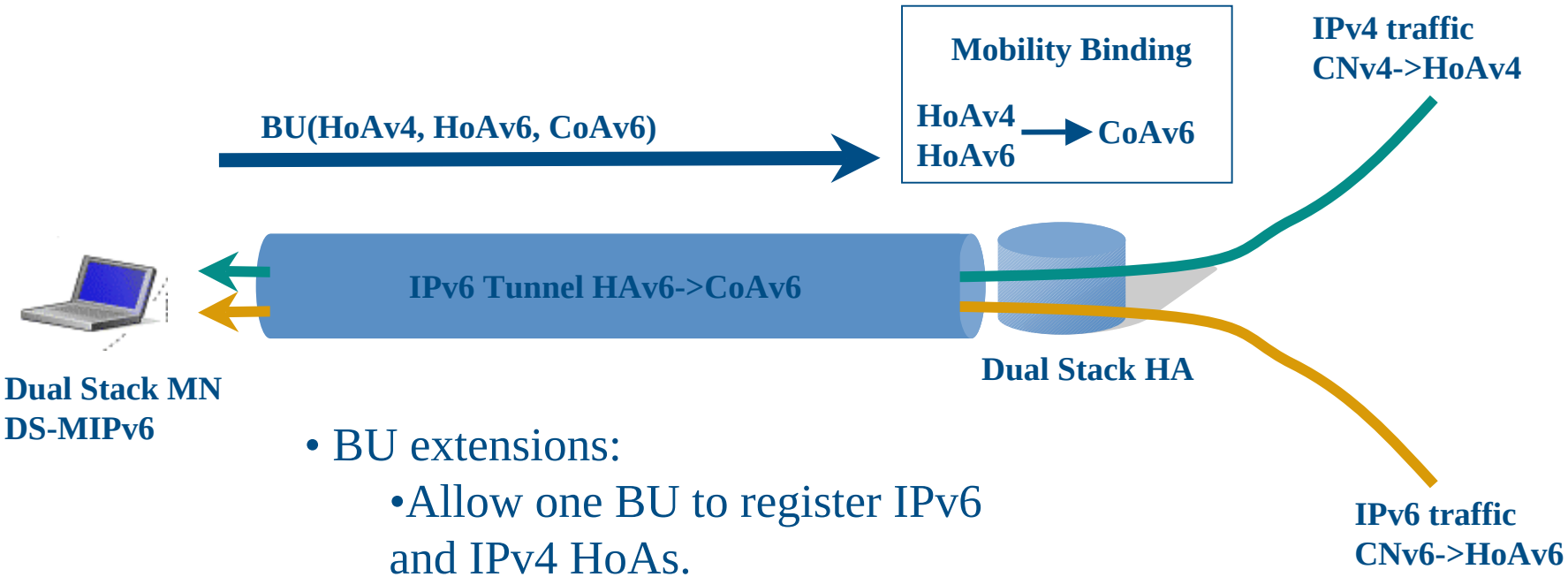
Overall Solution Strategy

- Use MIP as migration tool
  - Use the tunneling capability of Mobile IP to forward both IPv4 and IPv6 traffic over the same Mobile IP created tunnel.
- MIPv4
  - Allow IPv4 and IPv6 HoAs to bind to an IPv4 CoA
- MIPv6
  - Allow IPv4 and IPv6 HoAs to bind to an IPv4 or IPv6 CoA (We can't guarantee that IPv6 CoA is always available)
- MNs can use either MIPv4 only (initially) or MIPv6 only (in future) depending on the operator's preference.

MIPv6 Solution

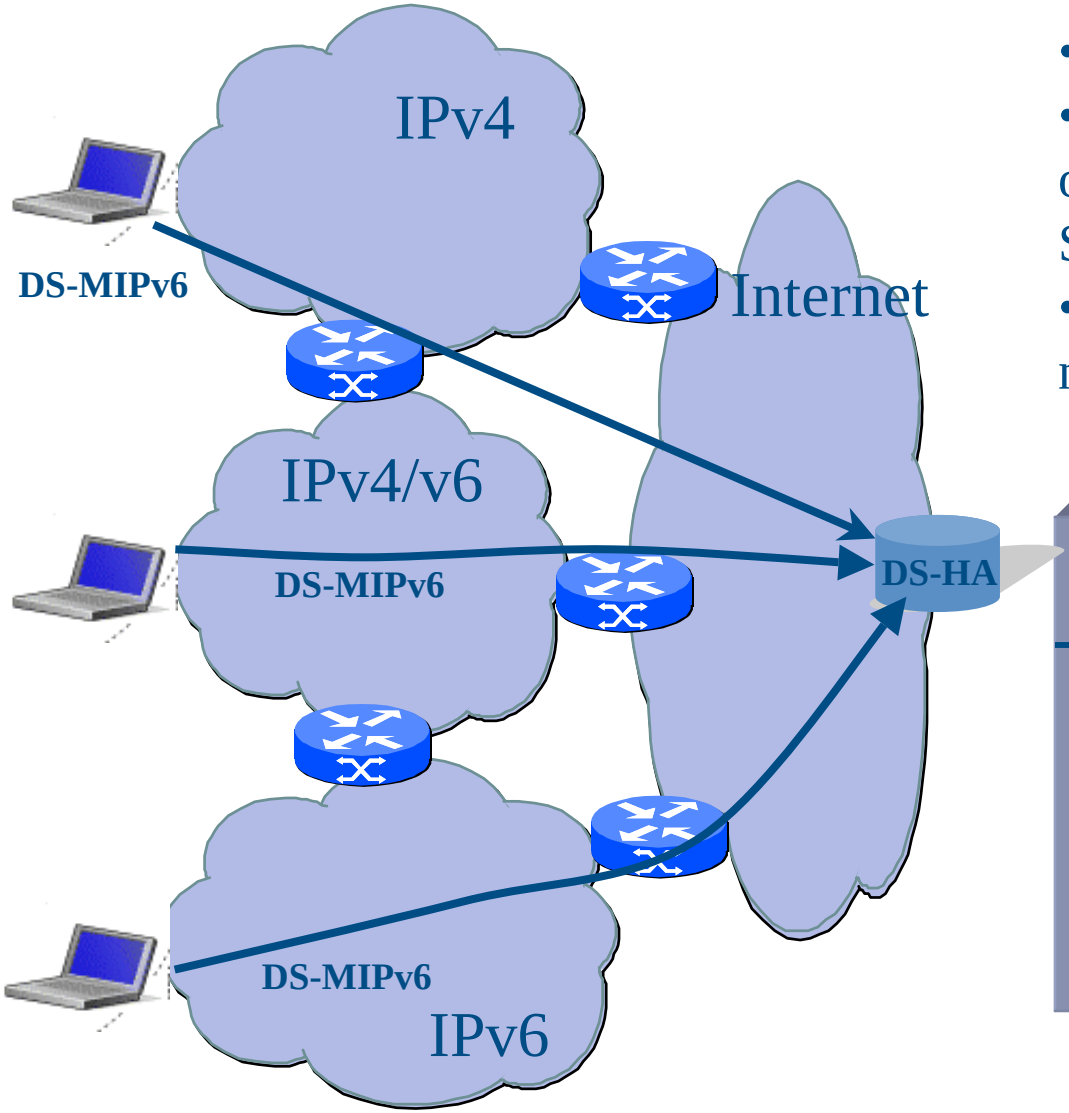
- Use MIPv6 as migration tool
  - Use the tunneling capability of Mobile IP to forward both IPv4 and IPv6 traffic over the same MIPv6 created tunnel.
  - Allow IPv4 and IPv6 HoAs to bind to an IPv6 CoA
  - MN – HA IPsec SA is based on IPv6 HoA (same as today)
  - Extensions require MIPv6 implementation to verify IPv4 HoA ownership. Every IPv4 HoA is associated with an IPv6 HoA for static IPv4 addresses
  - Allow for dynamic allocation of IPv4 home addresses.

Creating DS Bindings in MIPv6



- BU extensions:
  - Allow one BU to register IPv6 and IPv4 HoAs.
  - Allow the BU to request dynamic or static IPv4 addresses.
- BA extensions: Allow allocation of IPv4 address dynamically
  - New error codes

DS-MIPv6 scenario



- MN supports DS-MIPv6
- MN fully connected and mobility optimized in IPv6, IPv4, and Dual Stack Networks.
- No optimisations in IPv4-only networks

	IPv4 network	IPv6 network	DS network
DS-MIPv6	√	√	√

Discussion?