Enabling Soft Vertical Handover for MIPv6 in OMNeT++

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Outline

- Motivation and Goal
- Challenges
- xMIPv6
- Management at the Link Layer
- Modifications at the Network Layer
- Simulations
- Conclusions and Outlook

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Motivation

- Heterogeneous Networks.
- Always Best Connected (ABC).
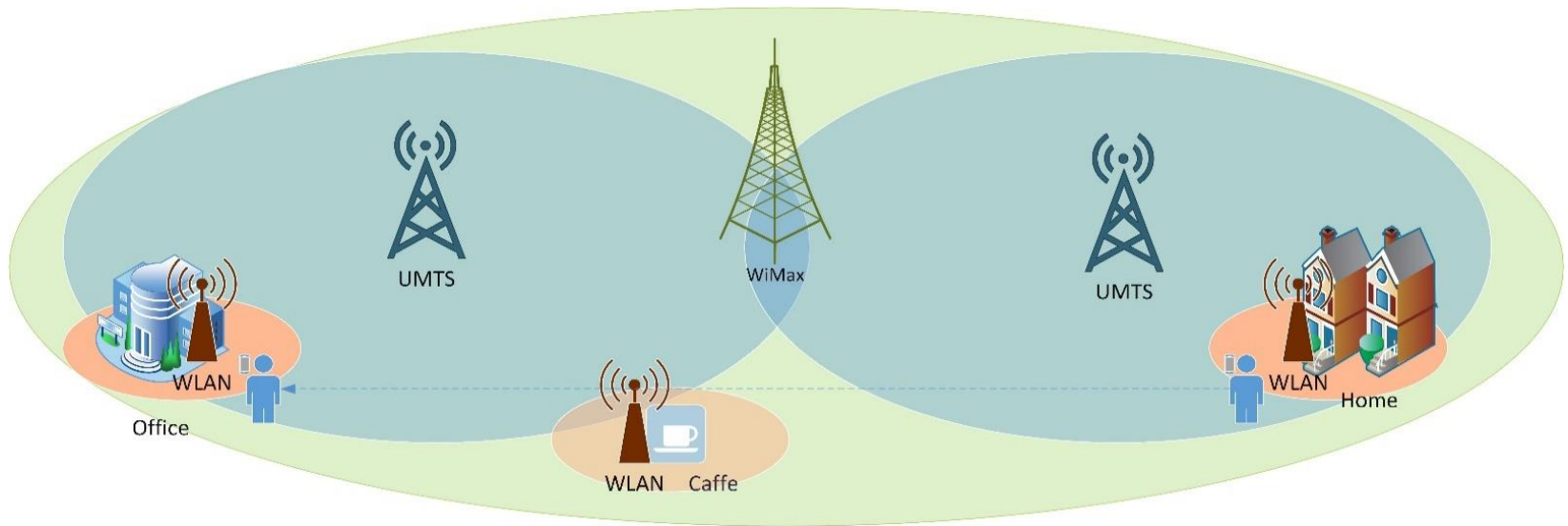
The Goal: Seamless Soft Handover (make-before-break)

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Challenges

Having multiple interfaces is not enough.

Further objectives:

1. Gathering of information.

2. Decision making.

3. **Management of interfaces.**

   ▪ **Softly switch traffic in between (make-before-break).**

4. **Address resolution.**

   ▪ **MIPv6 (with support to multiple interfaces)**

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xMIPv6

- An MN has HoA as fixed ID
- Reachable through CoA when roaming
- HA is the anchor point, should always notified upon HO.

➢ Multi-interface is not implemented !
➢ Sophisticated mobility model !

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Management at the Link Layer
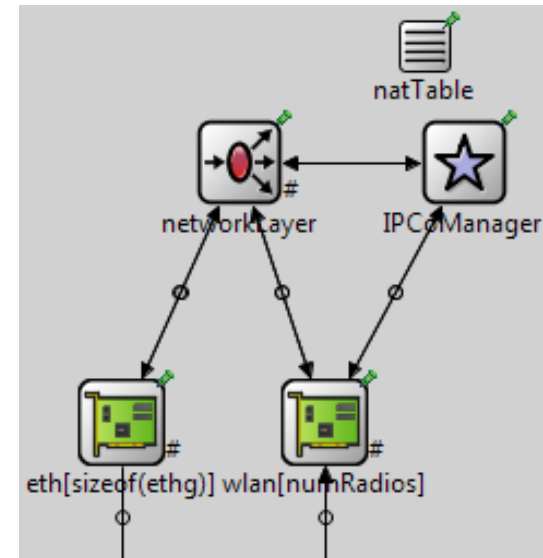
VHO-Controller

- **Overlay manager**
  - A simple module inside `IPCoManager`
  - Grants Interface highest management entity (`Agent`) a *permission-to-connect (msg).*

- **Make-before-break.**
  - HO in overlap area
  - Switching when the 2nd interface is associated and configured
  - Disconnect the prev. interface.

- **Maintains a structure for interfaces attributes.**

Modifications at the Network Layer

- `vhoCtrler` updates the routing table upon DAD completion.
- xMIPv6 queries `vhoCtrler` to identify the active interface.
- Retrieves the Home-related info. accordingly for BU.
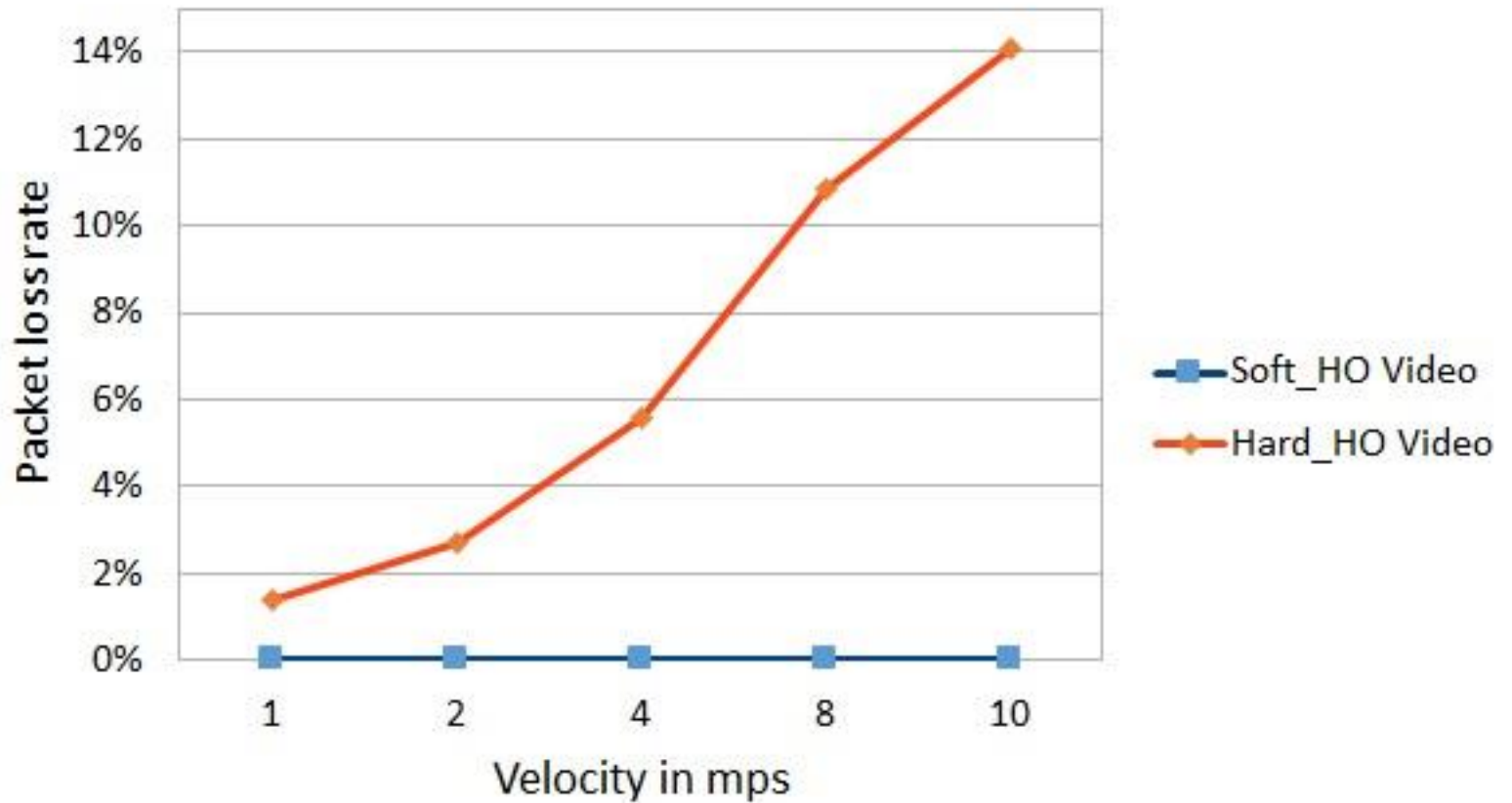
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Simulations

- Home and foreign networks.
- MIPv6, Hard HO vs Soft HO.
- Tractor mobility
- A constant speed (1, 2, 5,10 mps).
- Video sending rates (0.5, 2 Mbps).
- VoIP with 20 ms packetization
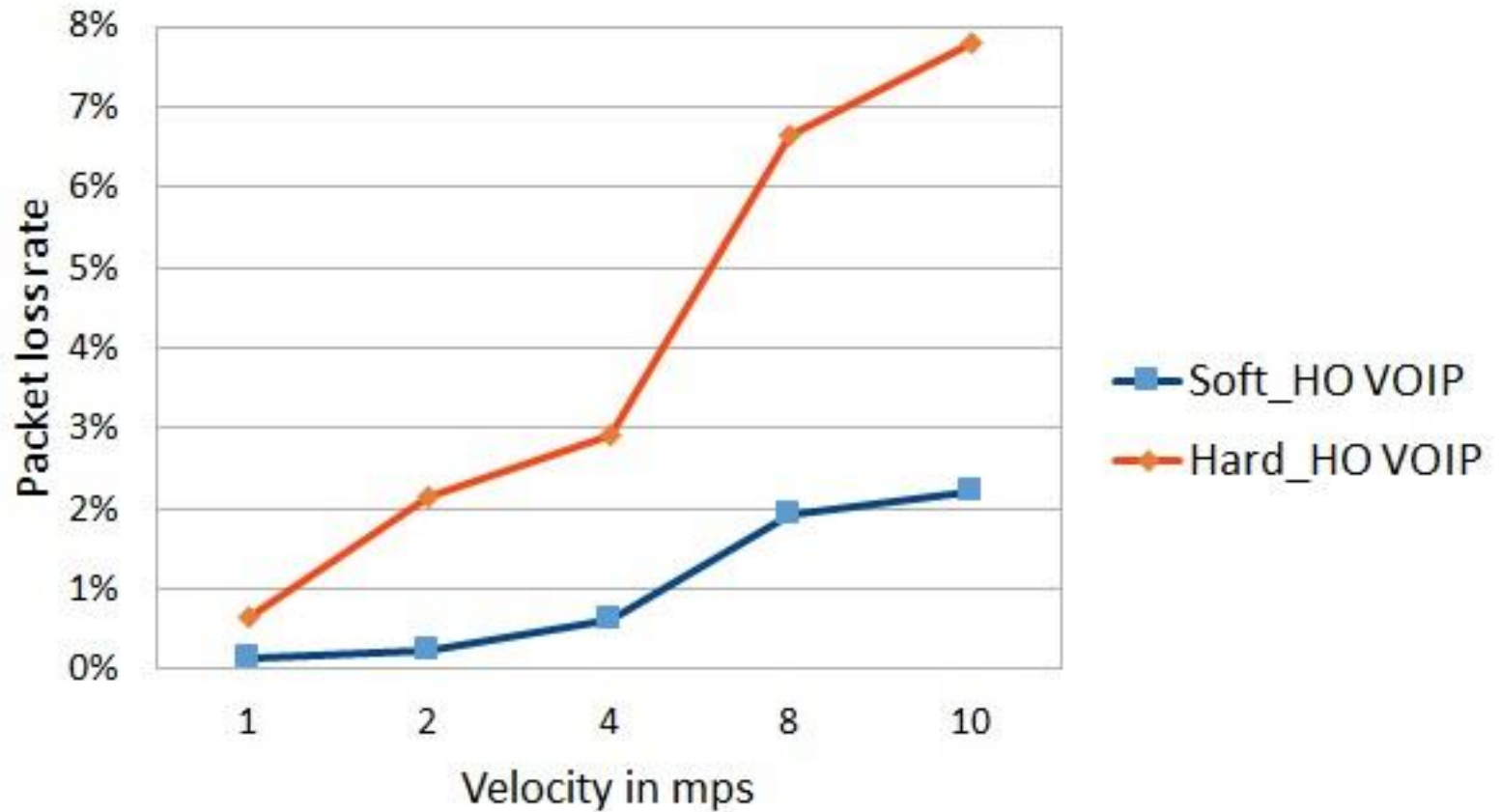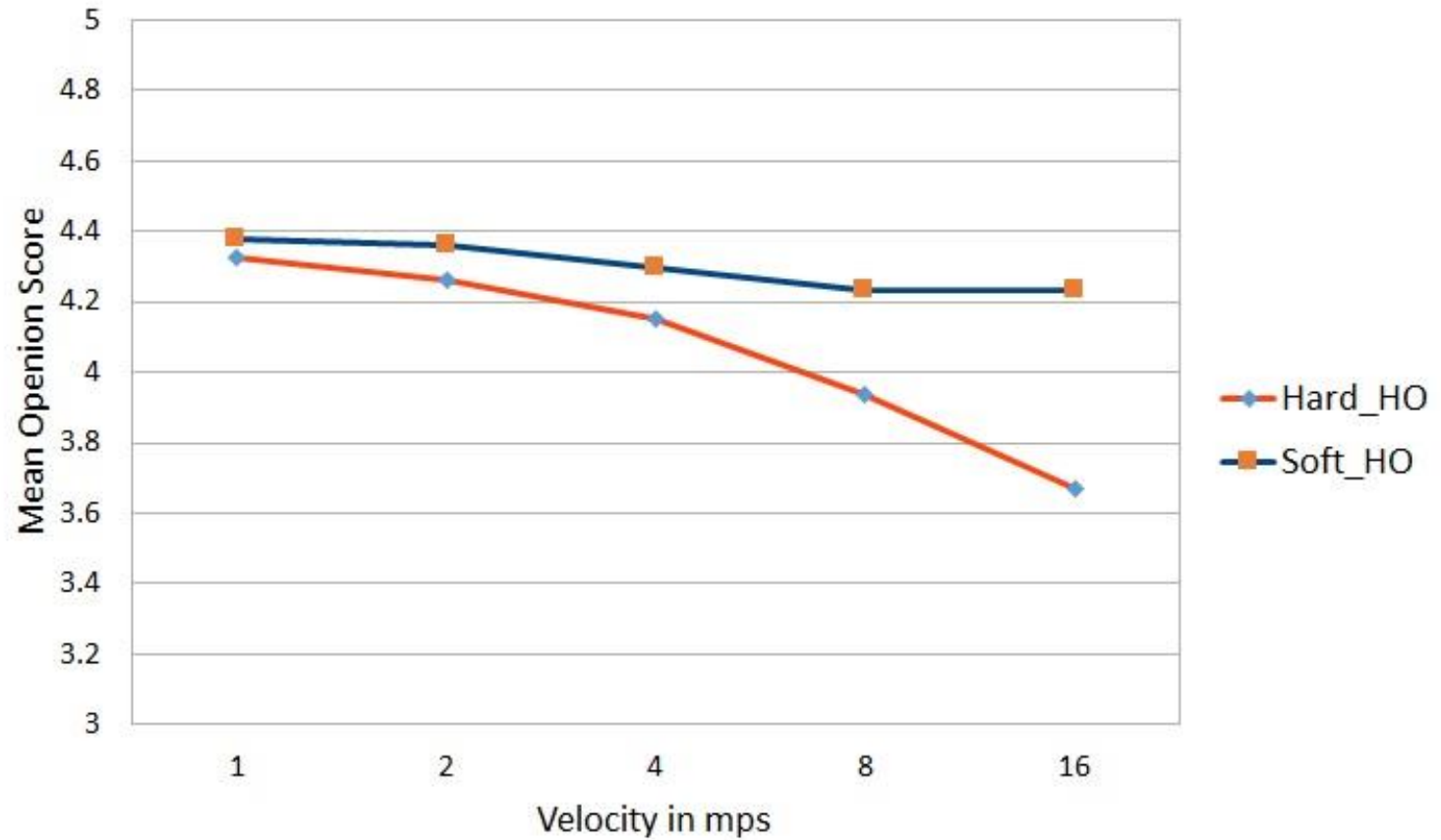- MN with 1, 2 interfaces.
- Sim. time (200 – 2000 s)
- 10 HOs.

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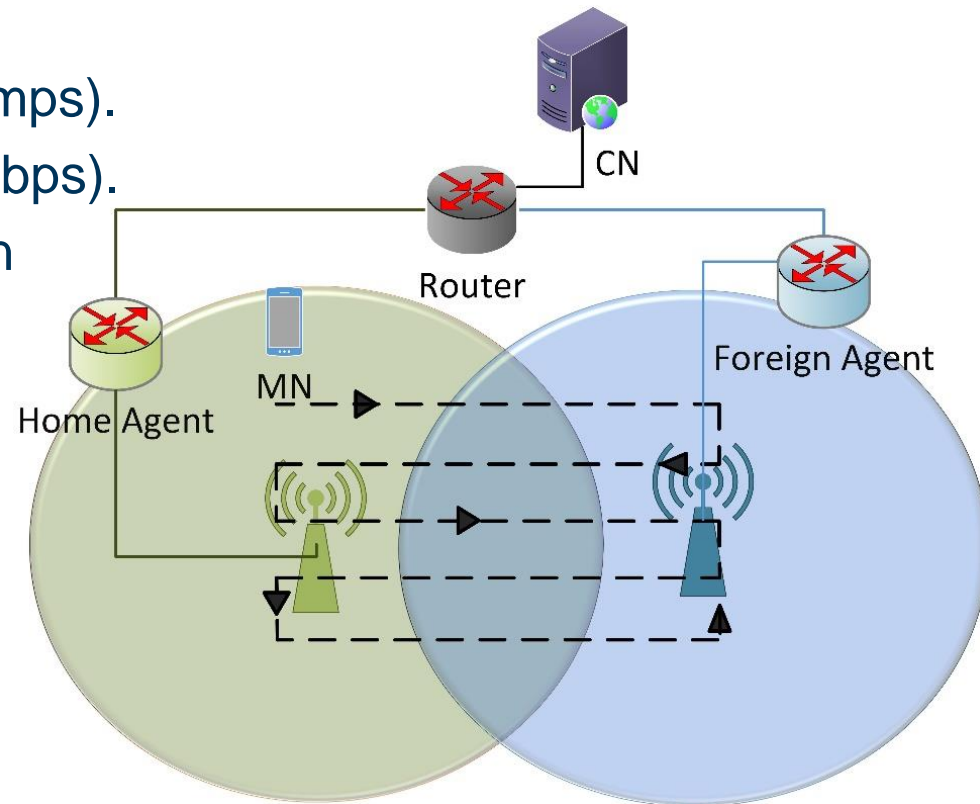
Simulations

Simulations

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Simulations

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Conclusions

- Enhanced performance due to soft handover.
- No modifications are needed beyond the MN.

Outlook

- More sophisticated simulation scenarios
- Battery life consideration.
- Significant contributions: HMIPv6 and PMIPv6 in xMIPv6

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Thank you

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