

Inter Home Agents (HAHA) Protocol

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Problem Statement

-need for Reliability-

- Load balancing
 - A home agent could be serving a large number of mobile nodes
 - If MN does not use RO, HA becomes bottleneck of communication in terms of high load caused by tunneling. (specially on the NEMO basic support)
 - Multiple Home Agents sharing the load for the same home network
- Redundancy
 - If the link itself goes down (ex. or uplink goes down), multiple home agents at the same link do not help redundancy. Need for placing the home agents on topologically different links.
 - Multiple Home Agents so that one Home Agent can take over from another
 - MN can not currently register its binding to multiple home agents simultaneously

Problem Statement

- Serviceability
 - If mobile node loses state regarding home agent and picks another home agent when it does DHAAD next time, BU to new home agent is rejected
- HA Switching
 - A Mobile nodes cannot be directed by a Home Agent to switch to another Home Agent
 - if its primary HA goes down (the one that the MN reged to)
 - if its HA gets overloaded
 - A Mobile Node cannot switch to a closer Home Agent

Discussions on mailing list

- Applying existing protocols
 - VRRP/HSRP
 - Heart beat mechanism for one router to take over from another router
 - Still needs a standard mechanism for synchronizing the binding cache
 - BGP model (reflector) – like mechanism for state synchronization
 - CARP-like mechanism for predictive mode

Goal

- Redundancy
 - Multiple home link can be defined in different physical locations
 - Home Agents need not be on the same link. There could be multiple Home Agents attached to different links serving the same home prefix
 - MN/MR can register its binding to multiple HAs simultaneously
- Load Sharing
 - Multiple HAs can serve MNs who has the same Home Prefix
 - Multiple HAs can tunnel packets meant for a particular MN at the same time
- The flexible HA selection
 - Flexible and efficient HA selection for each MN (MN initiated selection)
 - MN/MR can select the best HA depending on MN's location, MN's preference, etc
 - HA can control HA allocation for each MN (HA controllable management)

HAHA protocol

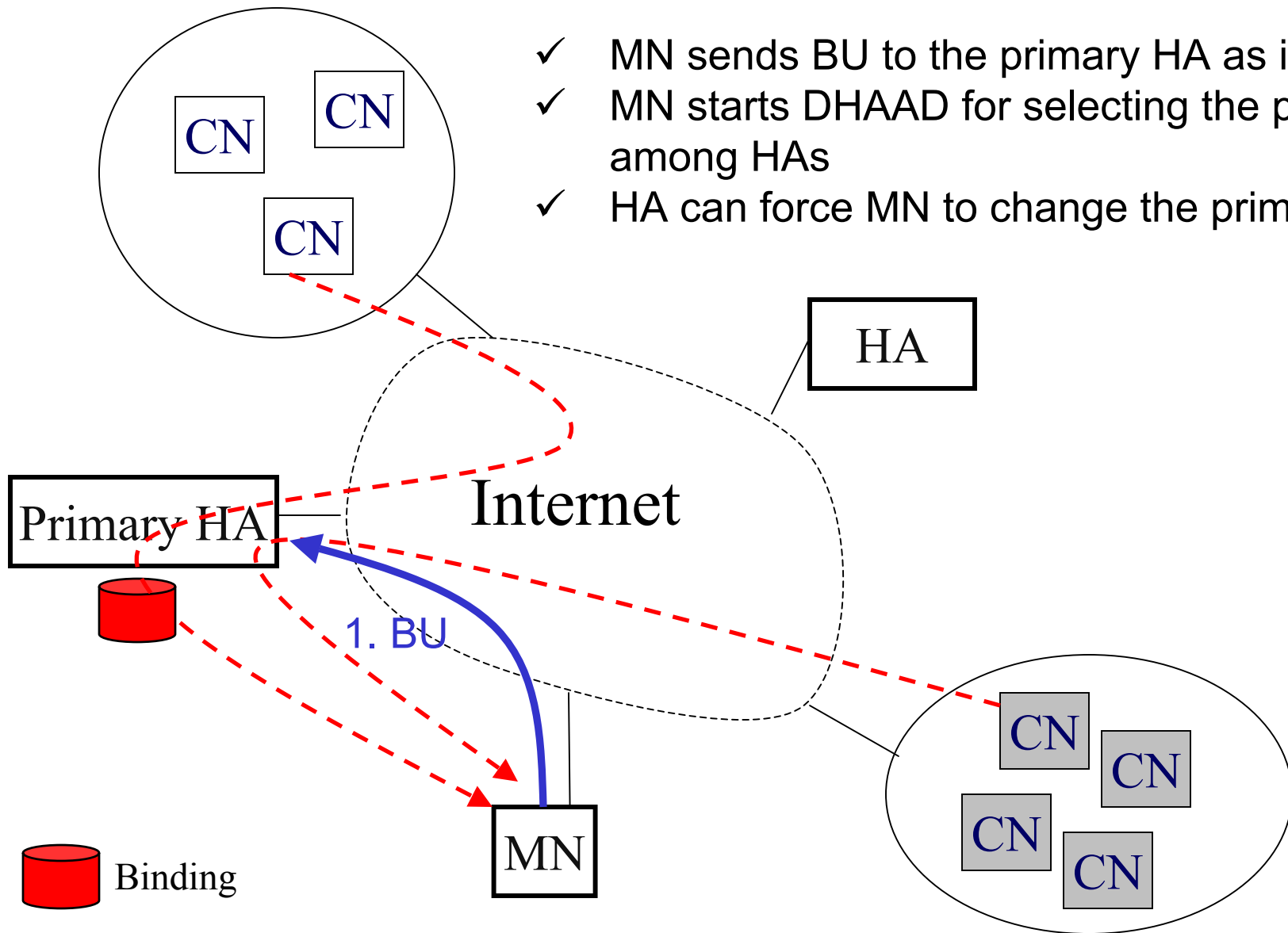
- Assumption
 - Multiple Home Agents are placed in either same link or different link.
 - Each home agent sets up a secure connection with other home agents
 - full mesh flooding through the secured paths
- Home Agent List Management
 - Each HA has to manage other HAs configured at a different link (RA scheme can't be used)
 - new defined ICMP message which is similar to RA but can be unicasted to other HAs
 - Home Agent Solicitation ICMP Message
 - Home Agent Advertisement ICMP Message
 - Remote HA uses the message for HA list management
- Binding Synchronization
 - HA can proactively synchronize a particular MN's binding among HAs by
 - Binding Information Reply MH Message
 - Home Address Mobility Option
 - Binding Cache Entry Information Mobility Option
 - HA can get the binding reactively by
 - Binding Information Request MH Message

HAHA protocol contd.

- Home Agent Selection
 - The generic Mobile IPv6 scheme of HA selection
 - MN/MR uses DHAAD to select the best HA with known preference for each HA
 - MN/MR initiated HA switching
 - MN/MR sends a new DHAAD request and selects the best home agent from the reply
 - When HA receives DHAAD request, it returns the current home agents list
 - HA initiated HA switching
 - HA sends a new MH message to MN/MR
 - Home Agent Switch Request Message
 - If the new HA address is included in the message, MN/MR uses the new HA
 - Otherwise, MN/MR re-starts DHAAD to request a better HA

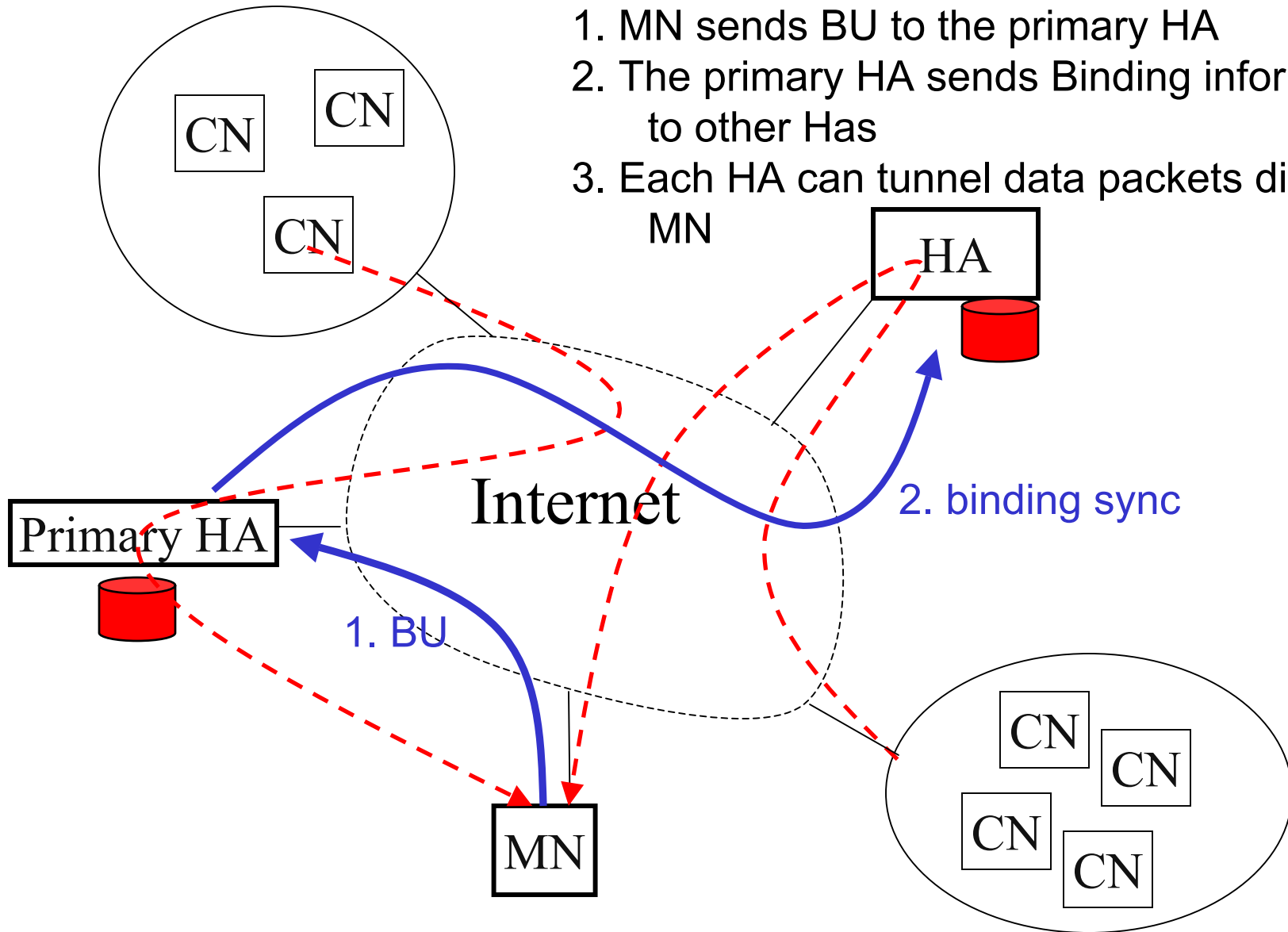
Single Home Agent Activation

- ✓ MN sends BU to the primary HA as it is
- ✓ MN starts DHAAD for selecting the primary among HAs
- ✓ HA can force MN to change the primary HA



Multiple Home Agents Activation

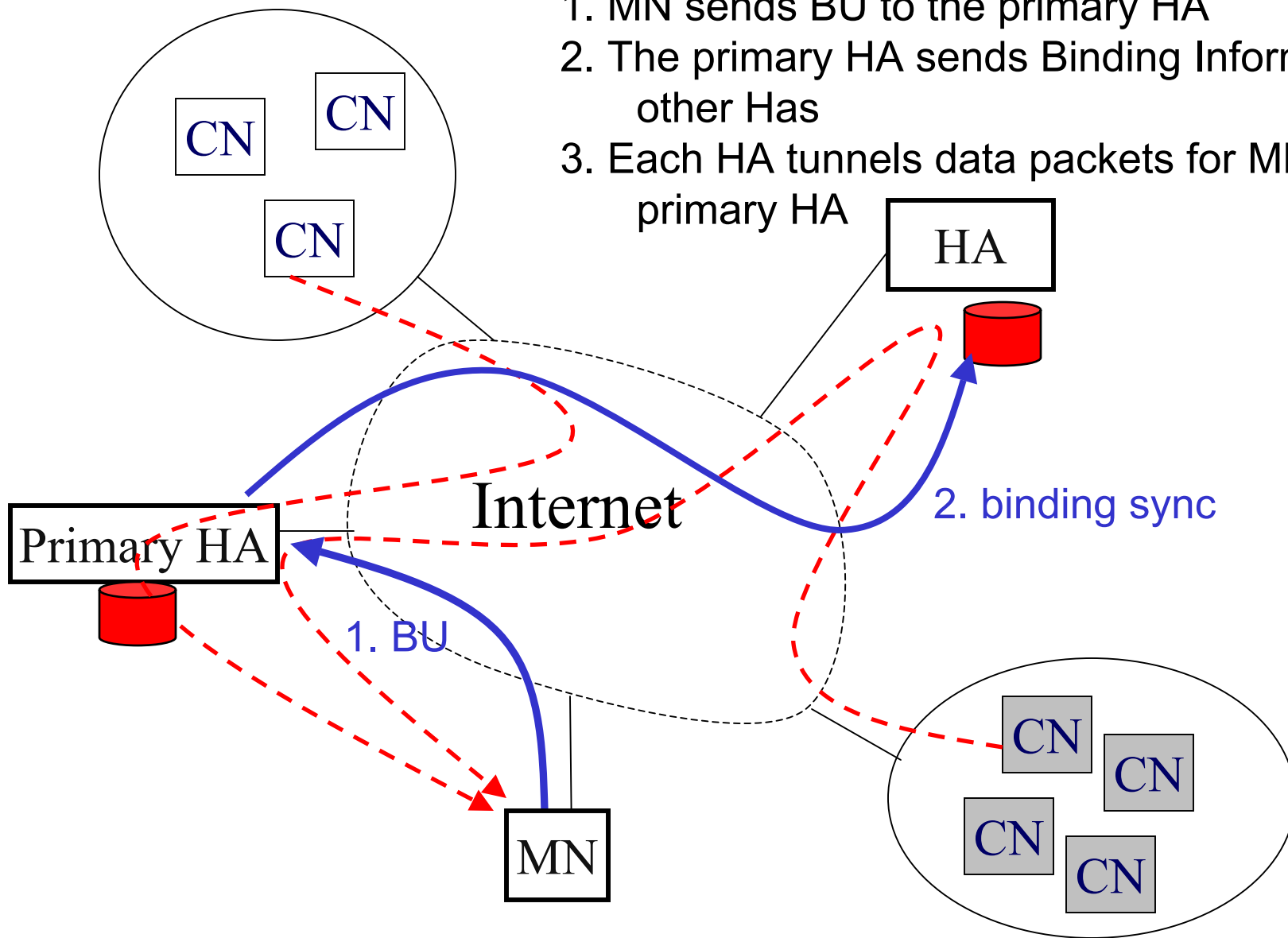
1. MN sends BU to the primary HA
2. The primary HA sends Binding information to other Has
3. Each HA can tunnel data packets directly to MN



yet another

Multiple Home Agents Activation

1. MN sends BU to the primary HA
2. The primary HA sends Binding Information to other Has
3. Each HA tunnels data packets for MN to primary HA



End

- Question??