

MANEMO GOALS

Scenarios and Requirements

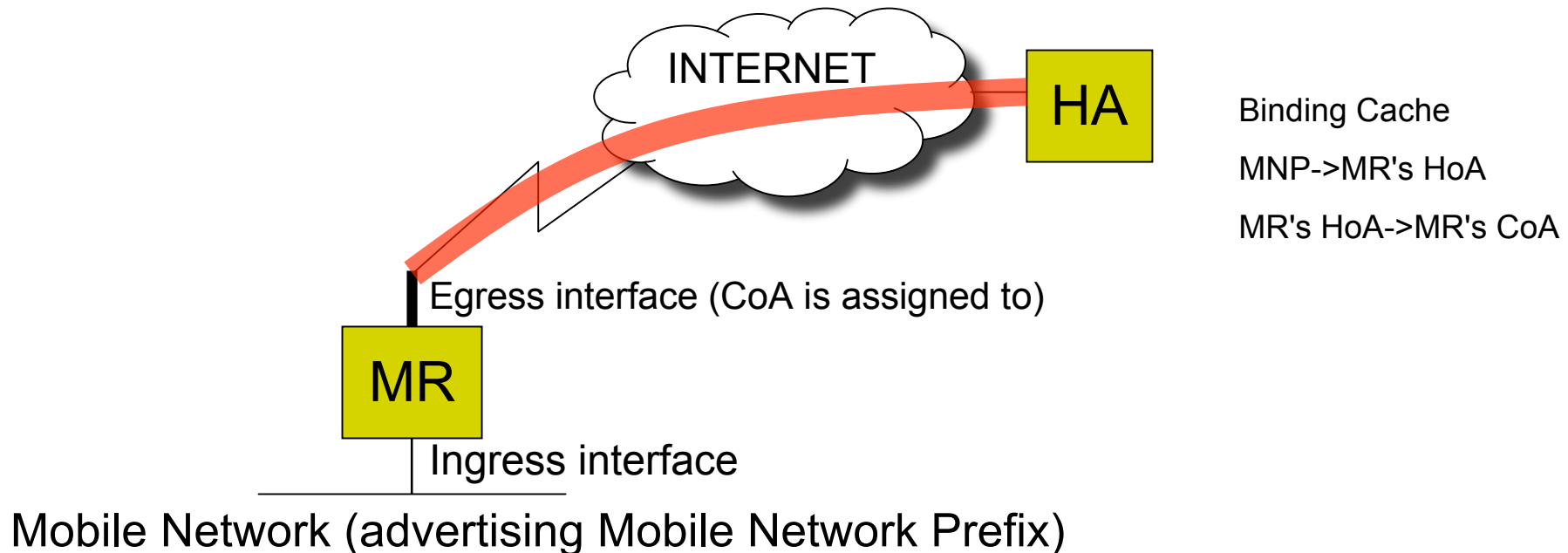
RFC3753

Mobility Related Terminology

- Mobile network
 - An entire network, moving as a unit, which dynamically changes its point of attachment to the Internet and thus its reachability in the topology. **The mobile network is composed of one or more IP-subnets and is connected to the global Internet via one or more Mobile Routers (MR).** The internal configuration of the mobile network is assumed to be relatively stable with respect to the MR.
- Mobile Router (MR)
 - A router capable of changing its point of attachment to the network, moving from one link to another link. The MR is capable of forwarding packets between two or more interfaces, and possibly running a dynamic routing protocol modifying the state by which it does packet forwarding. A MR acting as a gateway between an entire mobile network and the rest of the Internet has one or more egress interface(s) and one or more ingress interface(s). Packets forwarded upstream to the rest of the Internet are transmitted through one of the MR's egress interface; packets forwarded downstream to the mobile network are transmitted through one of the MR's ingress interface.
- Ingress interface
 - The interface of a MR attached to a link inside the mobile network.
- Egress interface
 - The interface of a MR attached to the home link if the MR is at home, or attached to a foreign link if the MR is in a foreign network.

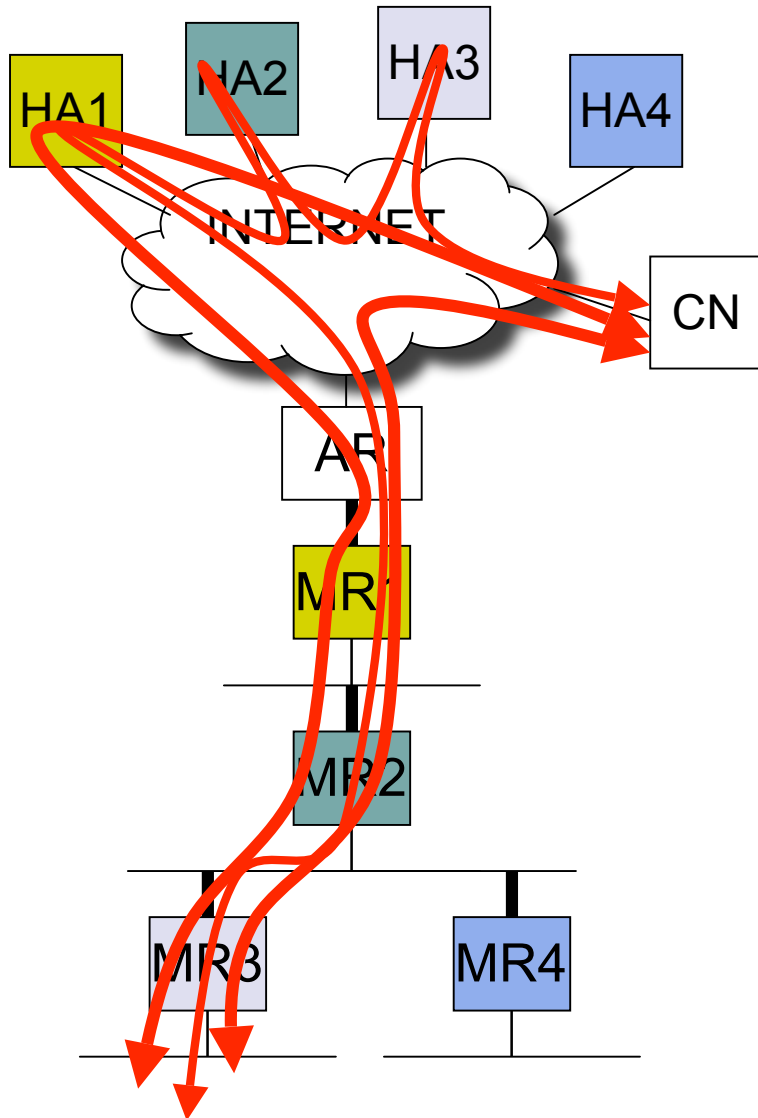
What is NEMO?

- Mobile Router has
 - two interfaces: egress is for Internet connectivity, and ingress interfaces is for a mobile network.
 - an permanent prefix called mobile network prefix assigned to the ingress interface
- Mobile Router sends a Binding Update for its mobile network prefix to its Home Agent and creates bi-directional tunnel with the HA for the mobile network prefix.
- Mobile Network is seen as normal IPv6 link so that mobile network nodes attached to the mobile network is not aware of mobility at all.



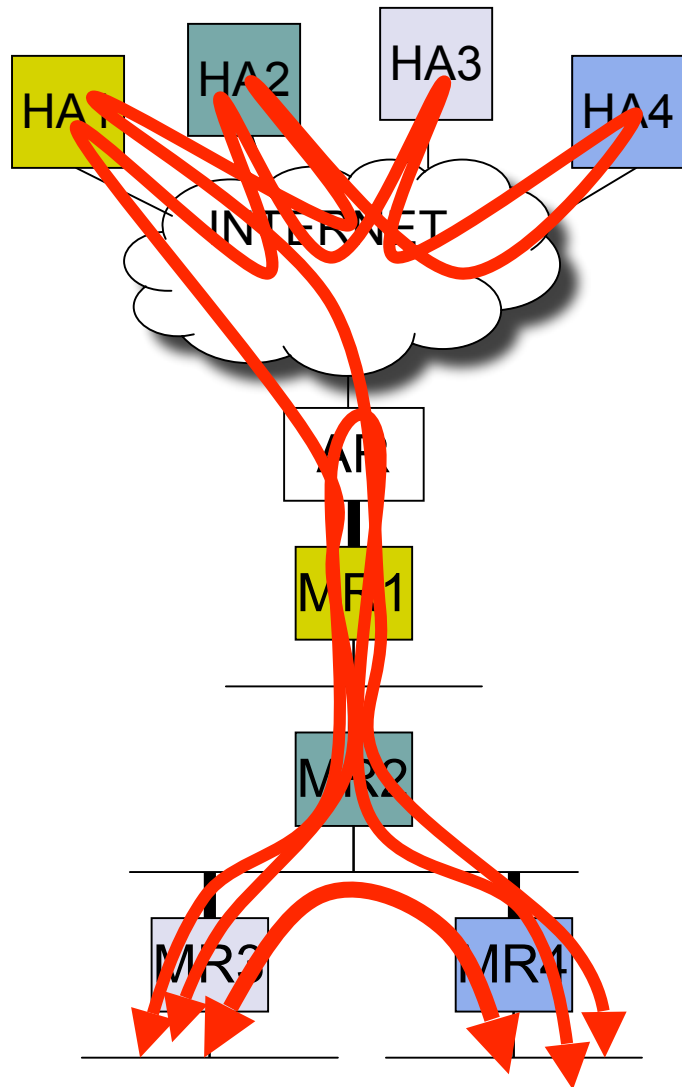
NEMO RO problem

Optimized Path from Nested NEMO to the Internet (vice versa)



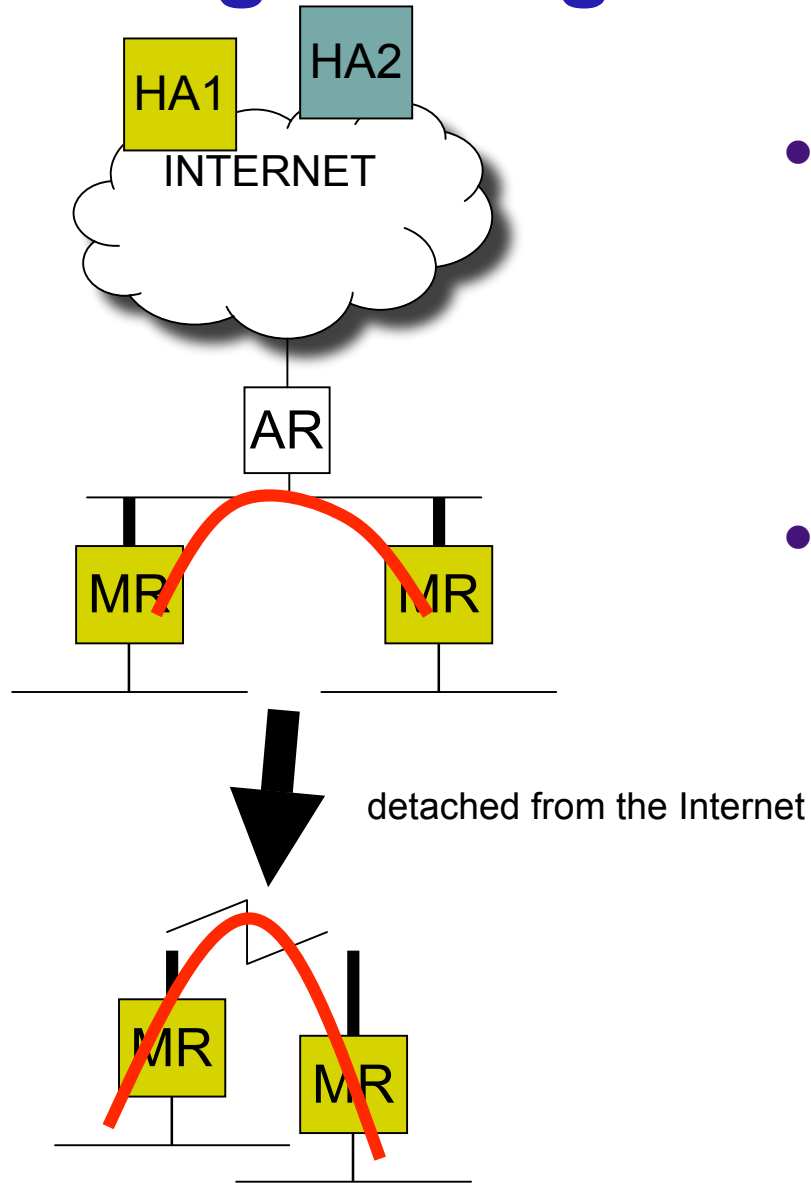
- *A mechanism to route packets over nested NEMO without multiple IP encapsulations and ping-pong routing among HAs.*

Optimized Path inside Nested NEMO



- The Path From MR1 to MR4
 - MR1->AR->HA1->HA4->HA2->HA1->AR->MR1->MR2->MR4
- The Path from MR3 to MR4
 - MR3->MR2->MR1->AR->HA1->HA2->HA3->HA4->HA2->HA1->AR->MR1->MR2->MR4
- ***A mechanism to exchange "Mobile Network Prefix" inside a nested NEMO and to provide certain optimized path.***

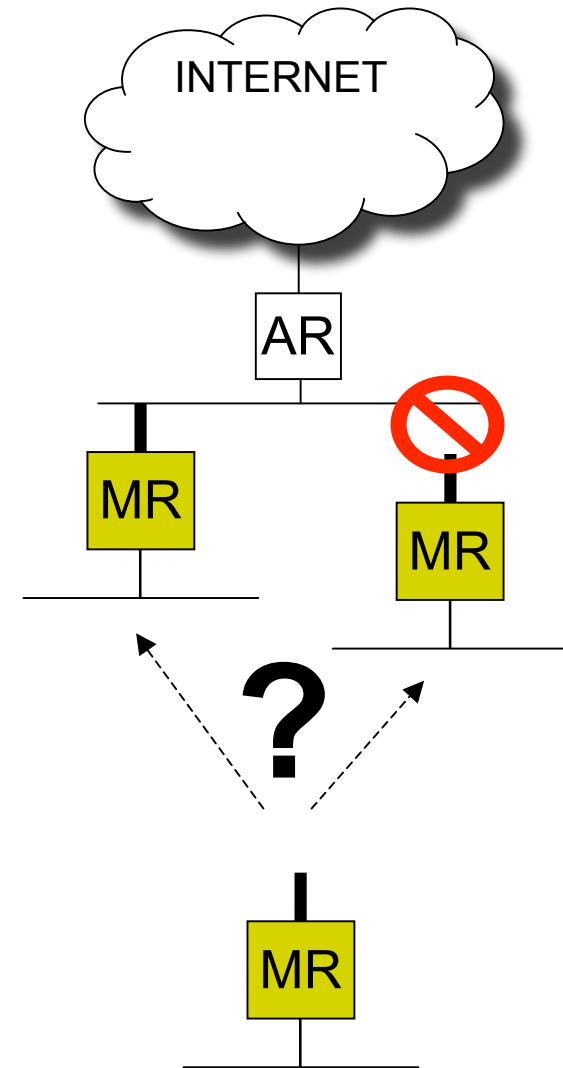
Egress-Egress connection



- Communication capability between nearby MRs
 - without Internet reachability
 - without HA involvement
- RO capability depending on topology of MRs
 - multi-hop?
 - one hop?

Exit Router Discovery

- Attaching node is unaware of mobility and reachability to the Internet.
 - Mobile Network is seen as an IPv6 link.
 - A mobile network is not always reachable to the Internet due to movements.

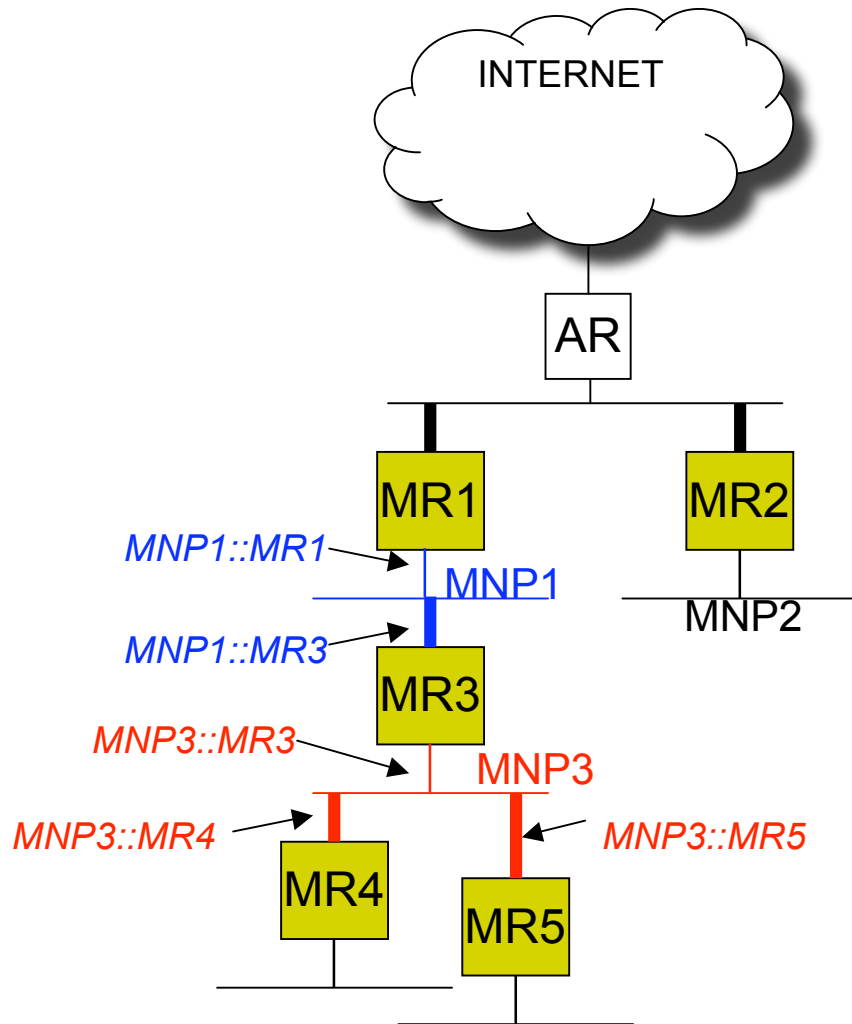


NEMO RO requires

- Formatting the MRs topology
 - Into a Loopless Logical Topology
 - Oriented towards the “nearest” Exit Router
- Routing among MRs
 - Routing Scope depends on bandwidth and stability
 - A decision when and how RO is used.
- Managing multicast
 - Seamless support of inner movement
 - MLD proxy type of interaction with the infrastructure

Relationship with AUTOCONF?!

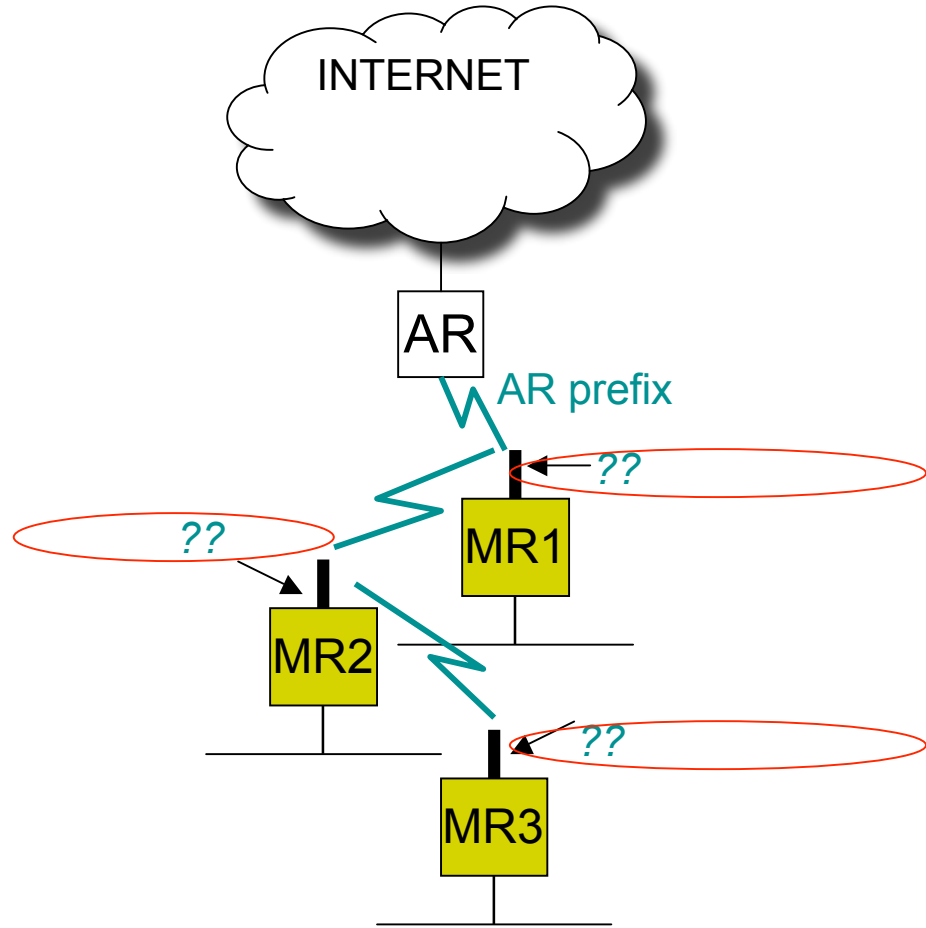
Route Optimization for Nested NEMO



Egress-Ingress
known as "nested NEMO"

- No requirement to AUTOCONF WG
 - An care-of address is
 - generated from a mobile network prefix of a mobile router
 - assigned to an egress interface

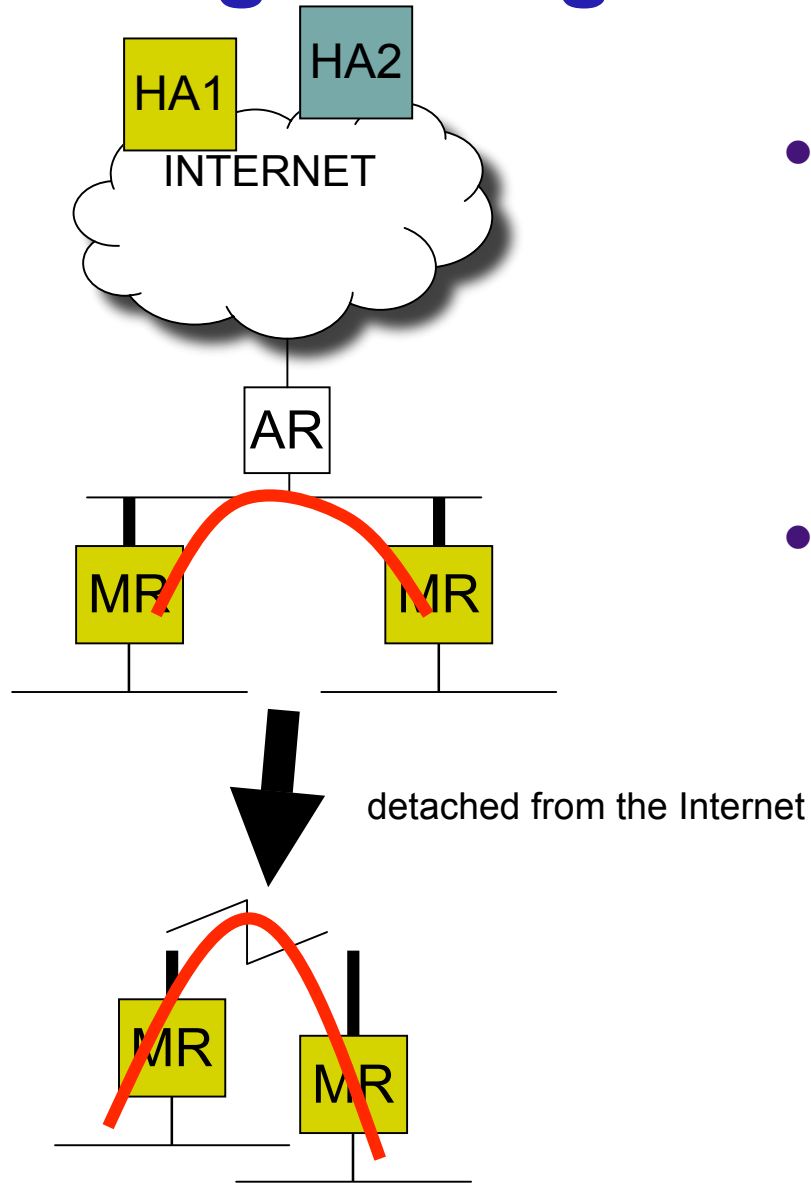
Egress-Egress connectivity for NEMO RO



Egress-Egress (E2E)
general manet like topology

- Requirement
 - an global IP address assignment to an Egress interface as a care-of address
- Assumption
 - Each MR carries a mobile network prefix as RFC3963
 - As soon as a MR detaches from a network, assigned address will be detached, too.
- Possibility
 - address generated from
 - a mobile network prefix of an upper MR
 - the global prefix advertised by AR

Egress-Egress connection



- Communication capability between nearby MRs
 - without Internet reachability
 - without HA involvement
- which address is assigned to MR's egress interface?
 - link-local address
 - home address of MR
 - ?

Related drafts

- ✓ **draft-wakikawa-manemo-problem-statement-00.txt**
- ✓ **draft-clausen-nemo-ro-problem-statement-01.txt**
- ✓ **draft-boot-manet-nemo-analysis-00.txt**
- ✓ **draft-baldessari-c2ccc-nemo-req-00.txt**
- ✓ **draft-chakrabarti-mobopts-lowpan-req-01.txt**
- ✓ **draft-ietf-nemo-ro-space-analysis-03.txt**
- ✓ **draft-ietf-nemo-ro-problem-statement-03.txt**
- ✓ **draft-ietf-autoconf-manetarch-01**
- ✓ **draft-thubert-tree-discovery-04.txt**
- ✓ **draft-thubert-nina-00.txt**
- ✓ **draft-petrescu-manemo-nano-00.txt**
- ✓ **draft-thubert-nemo-reverse-routing-header-07.txt**
- ✓ **draft-templin-autoconf-dhcp-05.txt**

More info

- MANEMO Web
 - document lists, agenda for pre-BOFs, ML information

<http://www.mobileip.jp/MANEMO/>

- *Pre BOF Thursday 19:30- 21:00 in Tyrolka.*
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