Edge Handovers

`draft-moore-mobopts-edge-handovers-00`

Nick 'sharkey' Moore	Monash CTIE / ATcrc
JinHyeock Choi	Samsung SAIT
Brett Pentland	Monash CTIE / ATcrc

... an interoperable enhancement to Mobile IPv6 to reduce handover latency for movement within an edge network, and to reduce handover signalling outside the edge network.

How this fits in: Four Delays

Movement Detection Delay	$\rightsquigarrow$	DNA WG
Router Advertisement Delay	$\rightsquigarrow$	Fast RA; FRD
Address Configuration Delay	$\rightsquigarrow$	Optimistic DAD
Binding Update RTT	$\rightsquigarrow$	HMIPv6; **Edge Handovers**

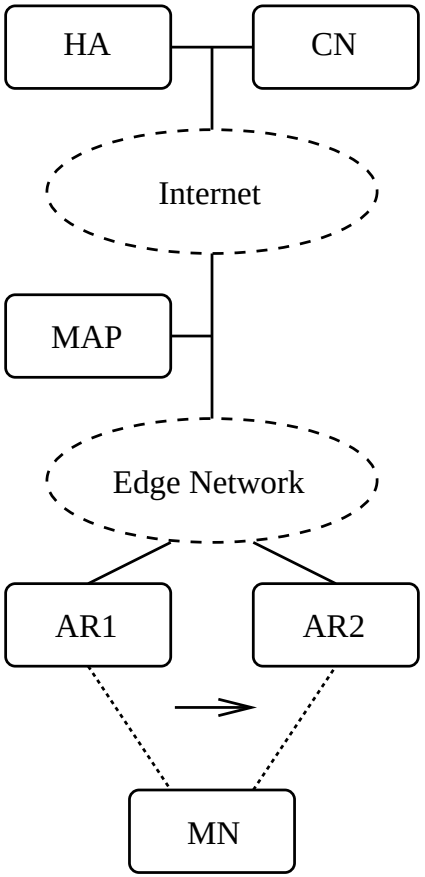
Edge Networks

We're making some assumptions about the characteristics of the Edge Network compared to the Internet:

- High bandwidth
- Low latency
- Low Cost

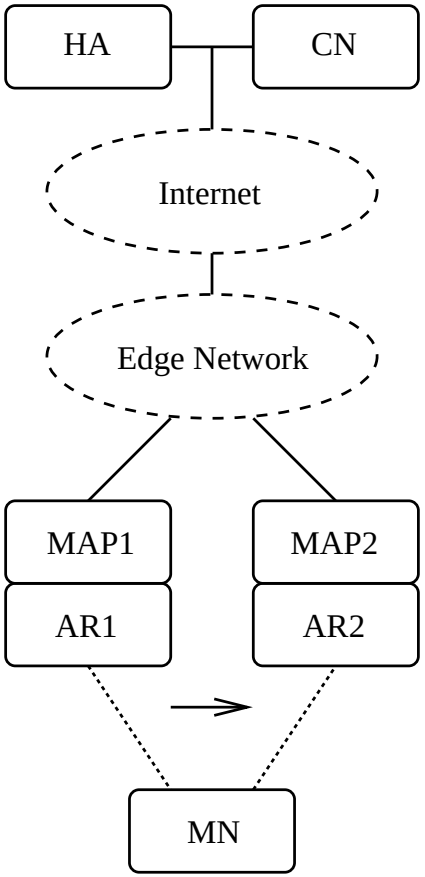
Edge Handovers trades spends Edge Network resources to save Internet resources.

HMIPv6



- `draft-ietf-mipshop-hmipv6-00`
- *Mobility Anchor Point* (MAP) between HA and MN.
- Signalling to HA only required when MN leaves coverage area of its MAP.
- Establishes *Bindings* from a *Regional Care-of Address* (RCoA) to a *Local Care-of Address* (LCoA).

HMIPv6 at the Edge



- Trend is towards a 'stupid network' with all the intelligence at the edge.
- Migrate MAPs down to access routers.
- Described in section 10.2 of the HMIPv6 draft.
- Degenerate case of HMIP?
  - ◇ 1-hop tunnels
  - ◇ RCoA and LCoA
- **To be useful, improved MAP-to-MAP handovers are needed.**

Forwarding

One very simple thing we can do to improve handovers is to forward traffic bound for the old address to the new address instead:

`MN: LBU(ORCoA, NLCoA)` $\rightarrow$ `OAR`

- Described in section 8 of the HMIPv6 draft.
- We've extended this behaviour.

Buffering

If we don't know where we're going, request the old MAP/AR to buffer traffic for us by sending an update to 'nowhere'.

`MN: LBU(ORCoA, ::)` $\rightarrow$ `OAR`

This could easily be introduced into HMIPv6, too.

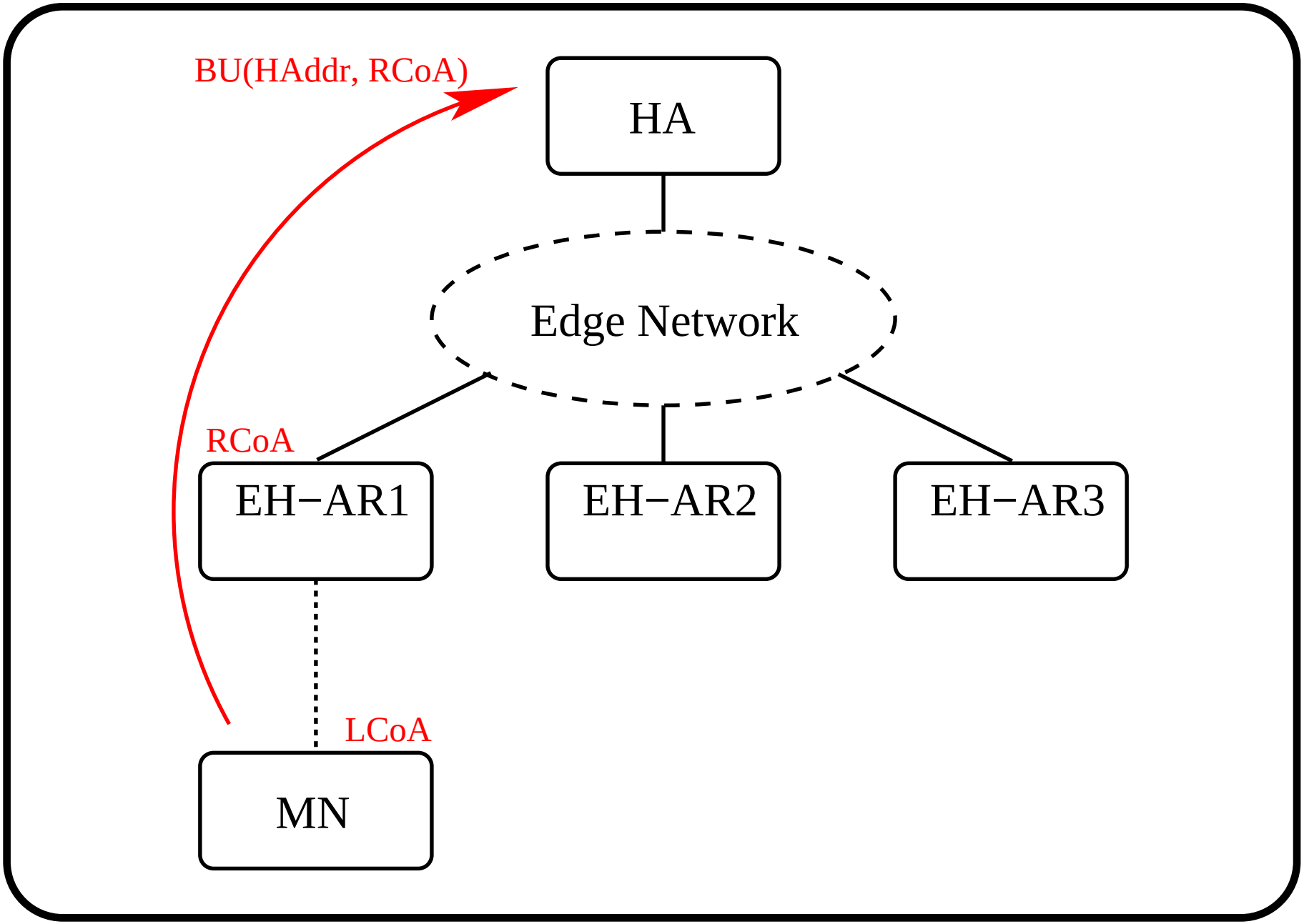
Precedent:

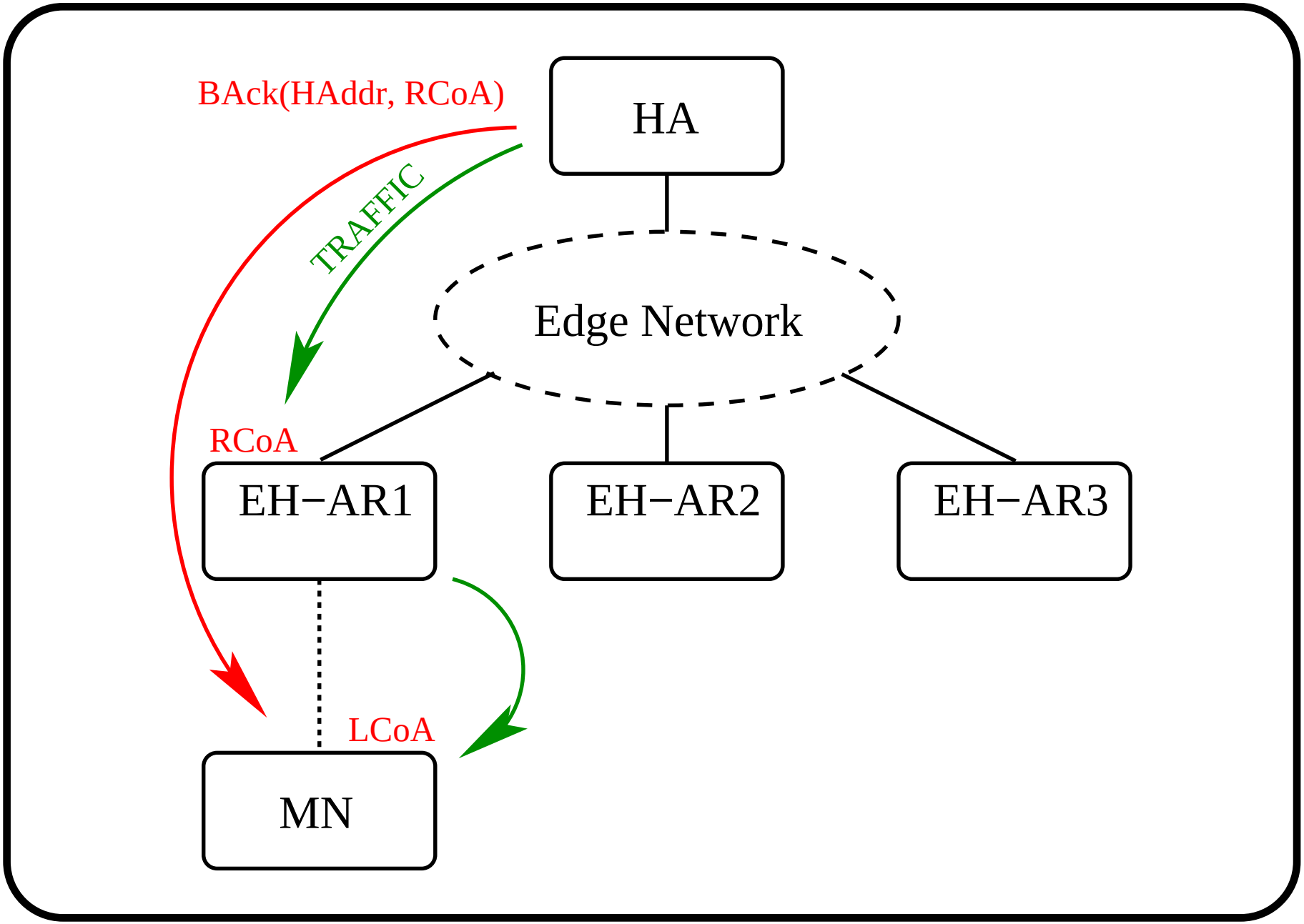
- Suggested to us by Richard Nelson (Waikato)
- `draft-krishnamurthi-mobileip-buffer6-01`

MAP-to-MAP-to-MAP handovers

The *Bound Regional Care-of Address* (BRCoA) is the RCoA for which you most recently received a BAck from your HA.

The *Bound Access Router* (BAR) is the AR which provided you with the BRCoA. It is the AR which is acting as your MAP.


BU(HAddr, RCoA)
HA
Edge Network
RCoA
EH−AR1
EH−AR2
EH−AR3
LCoA
MN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TRAFFIC
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EH−AR1
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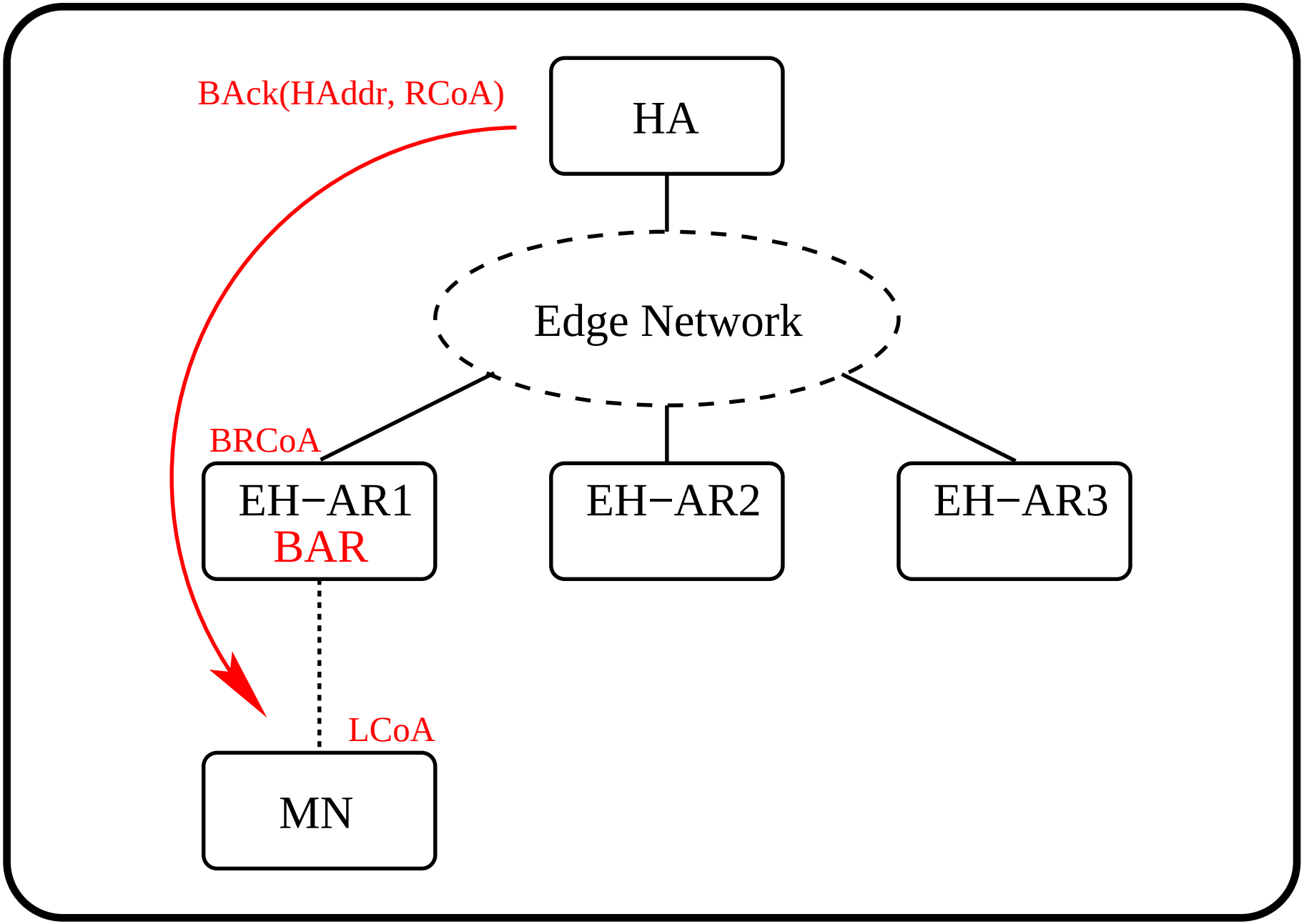
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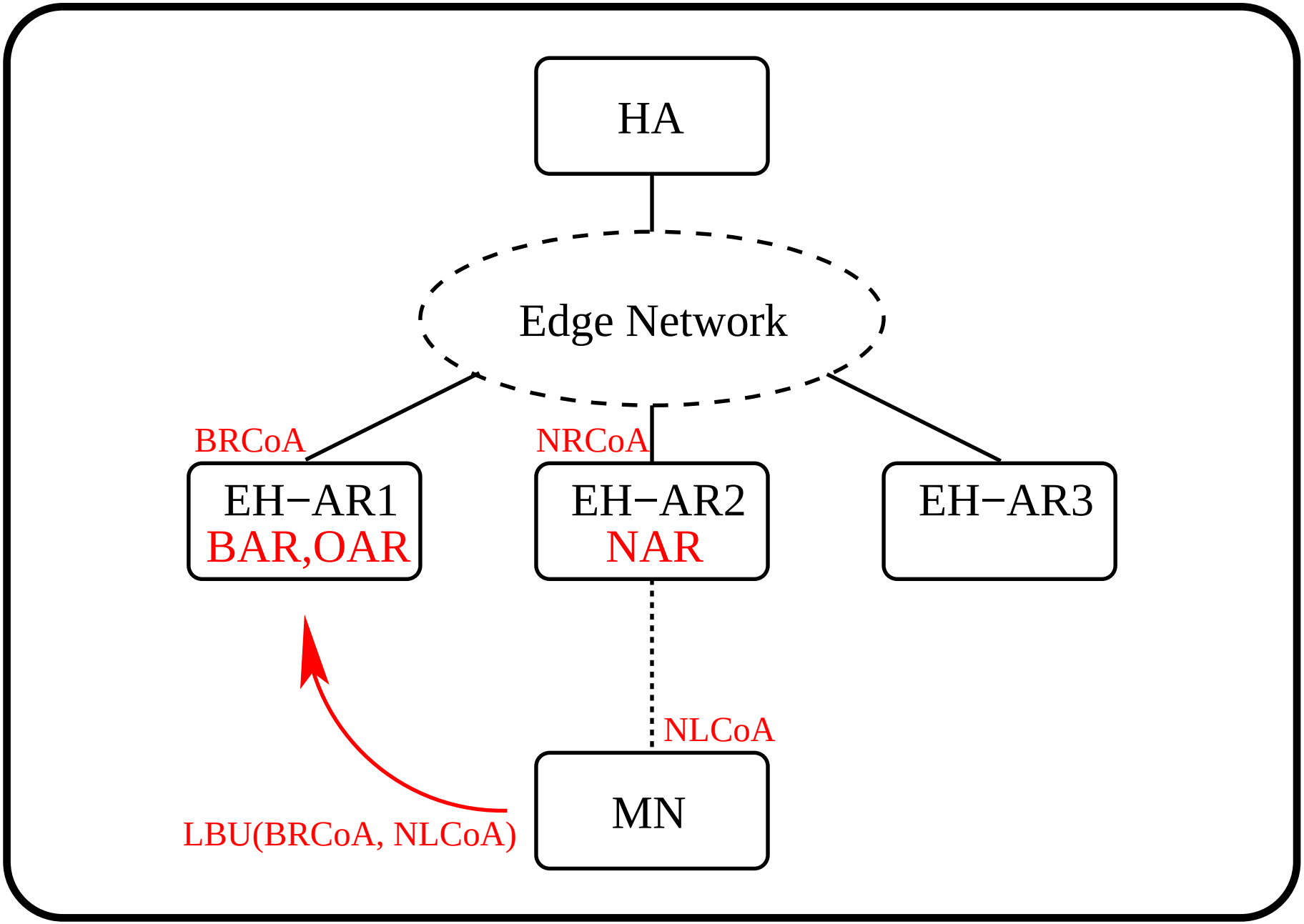
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NRCoA
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EH−AR3
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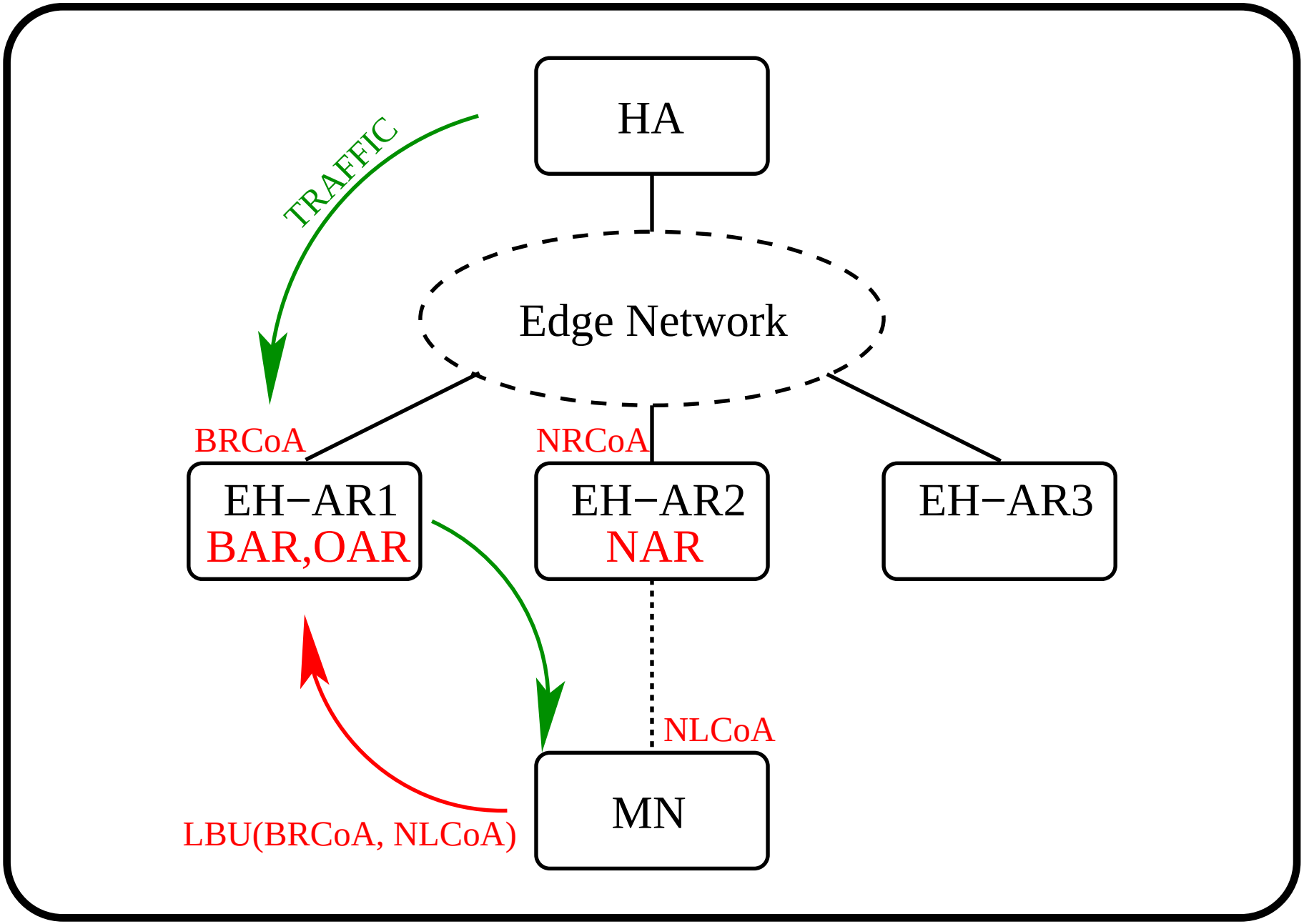
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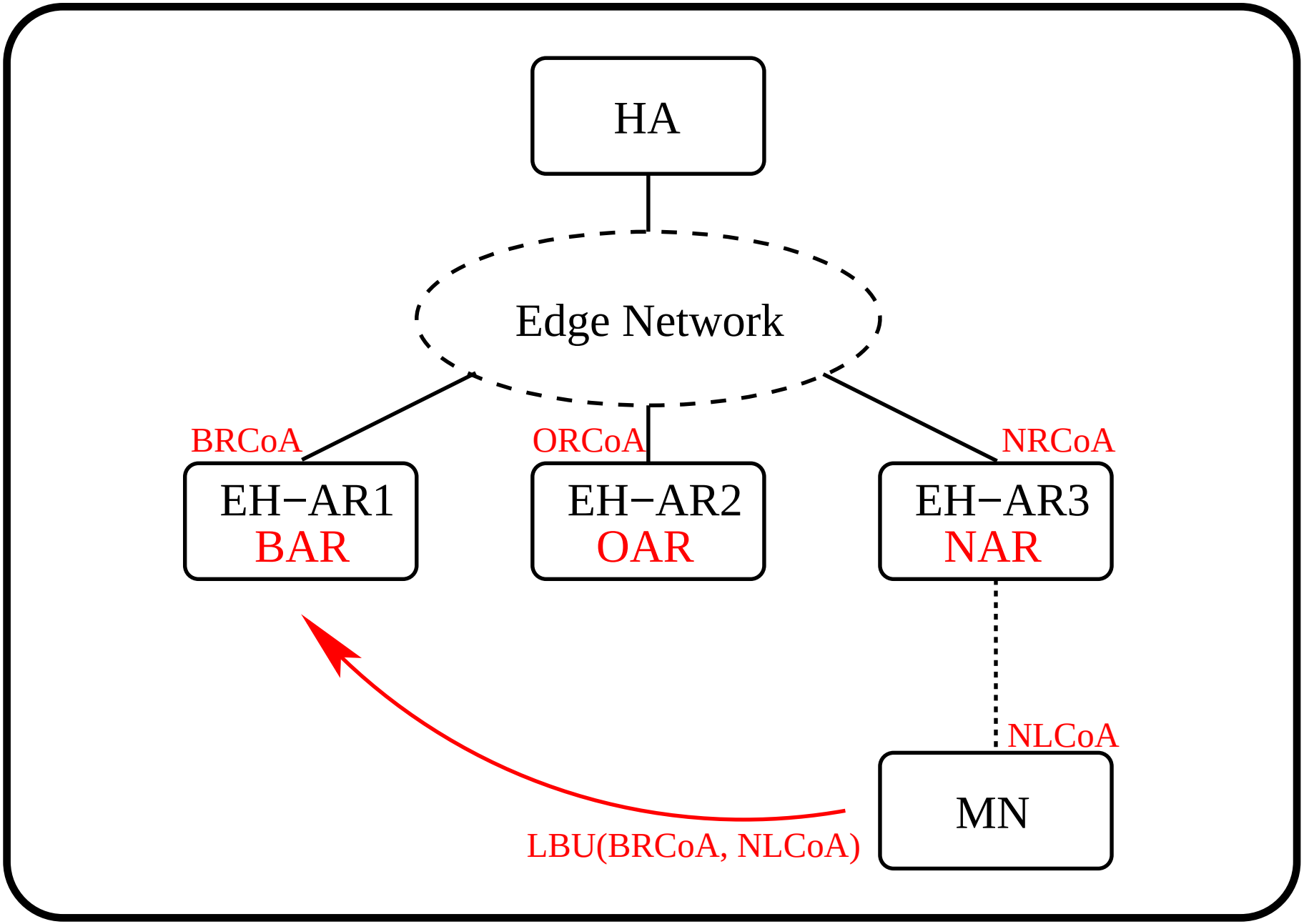
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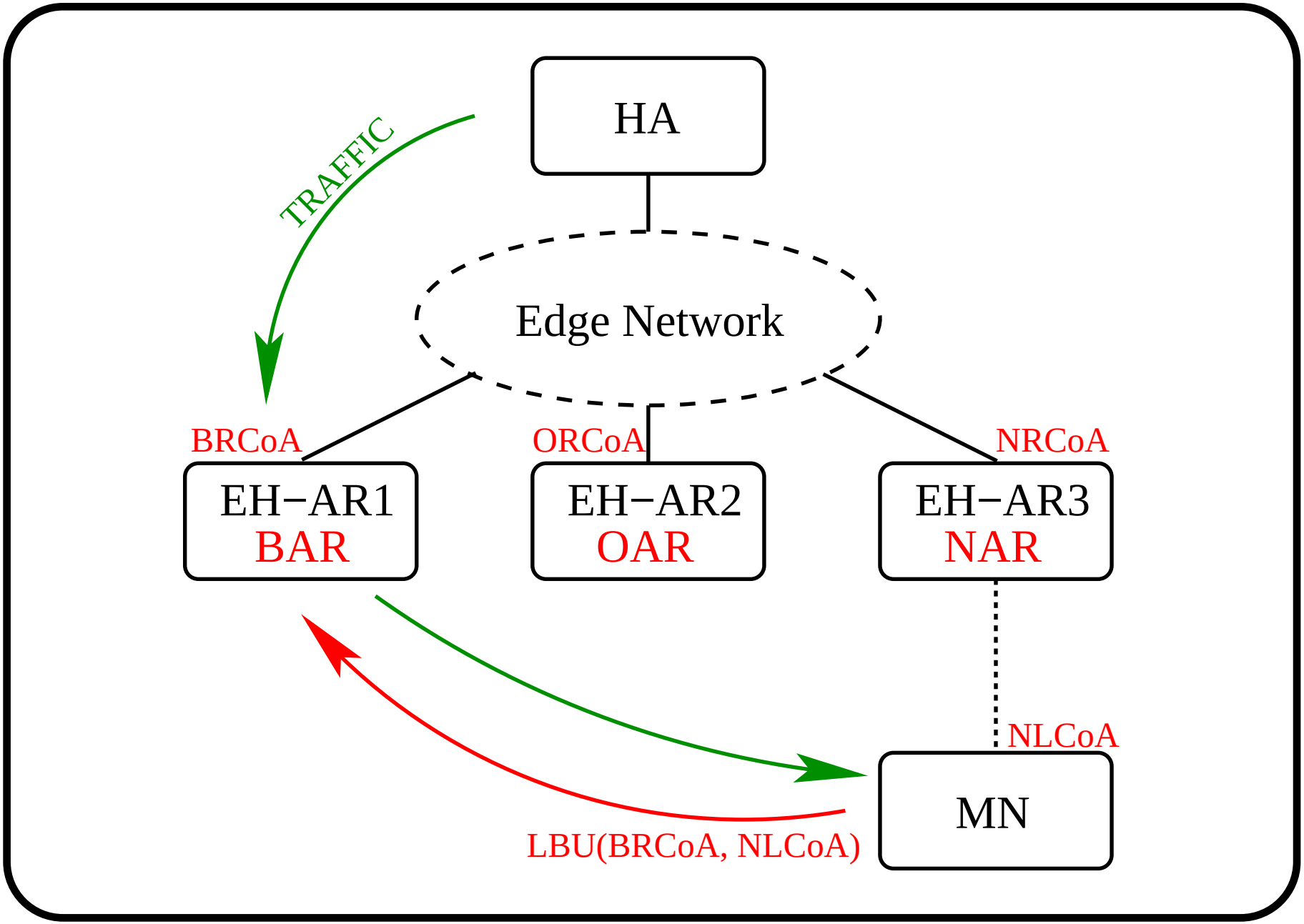
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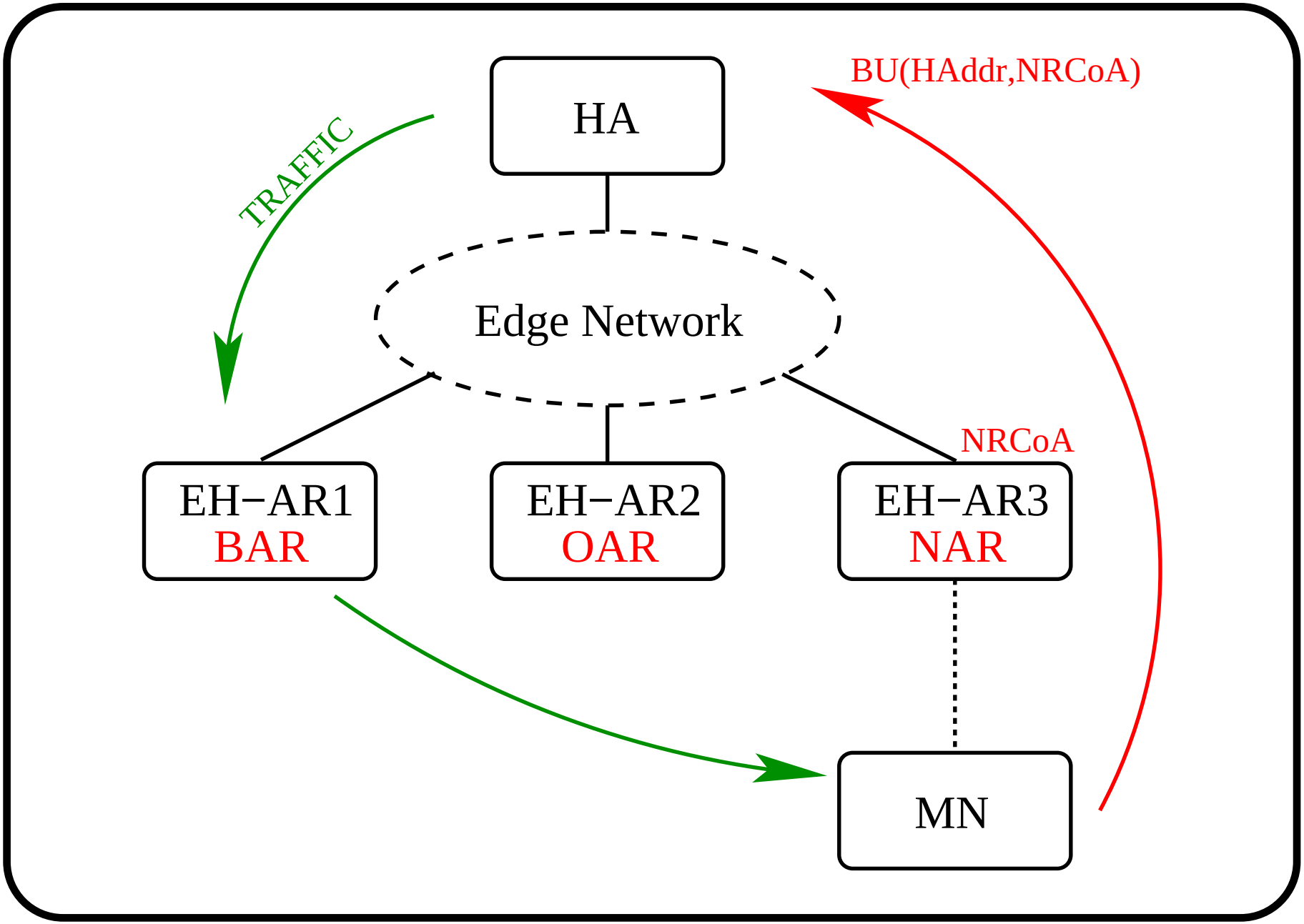
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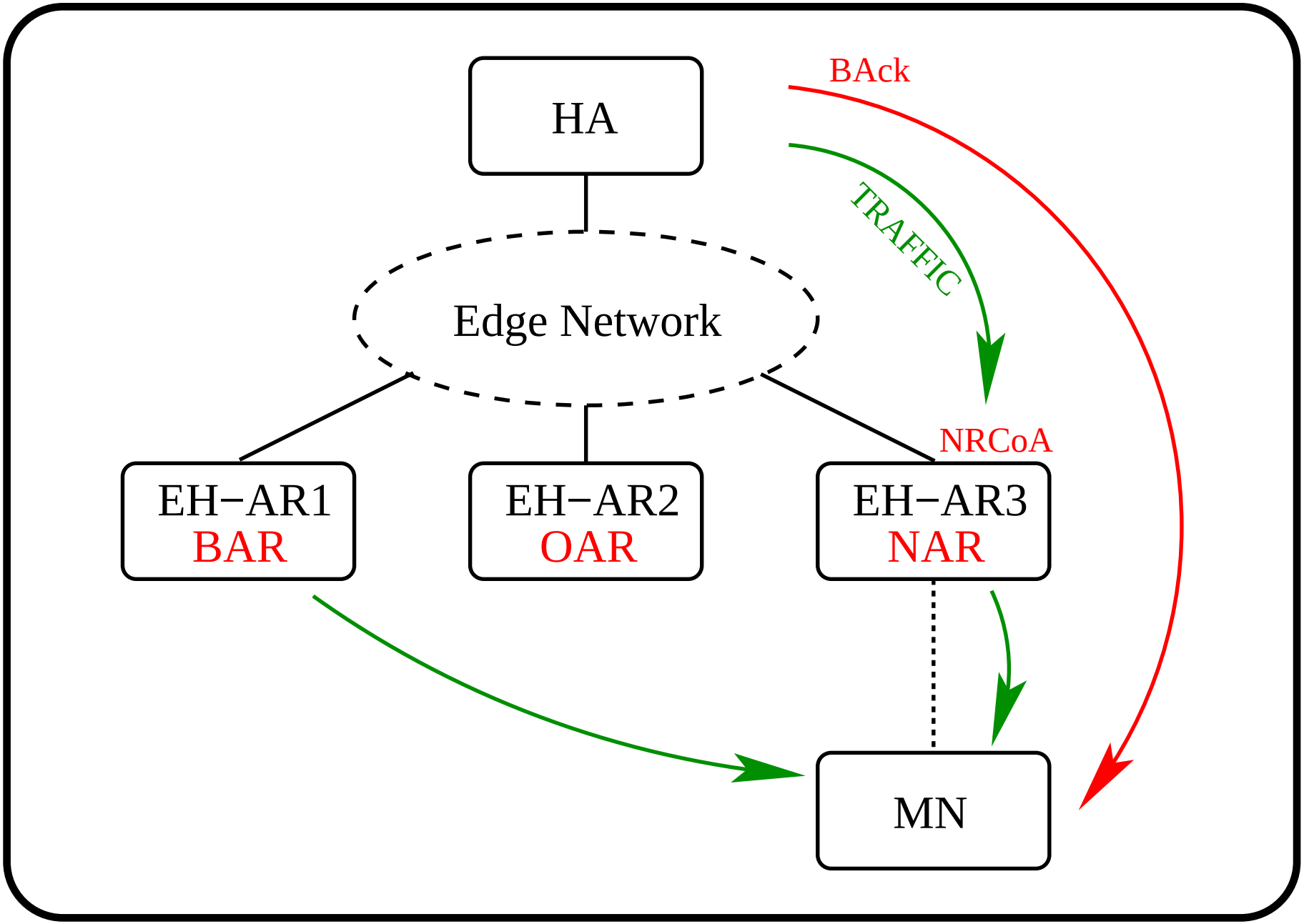
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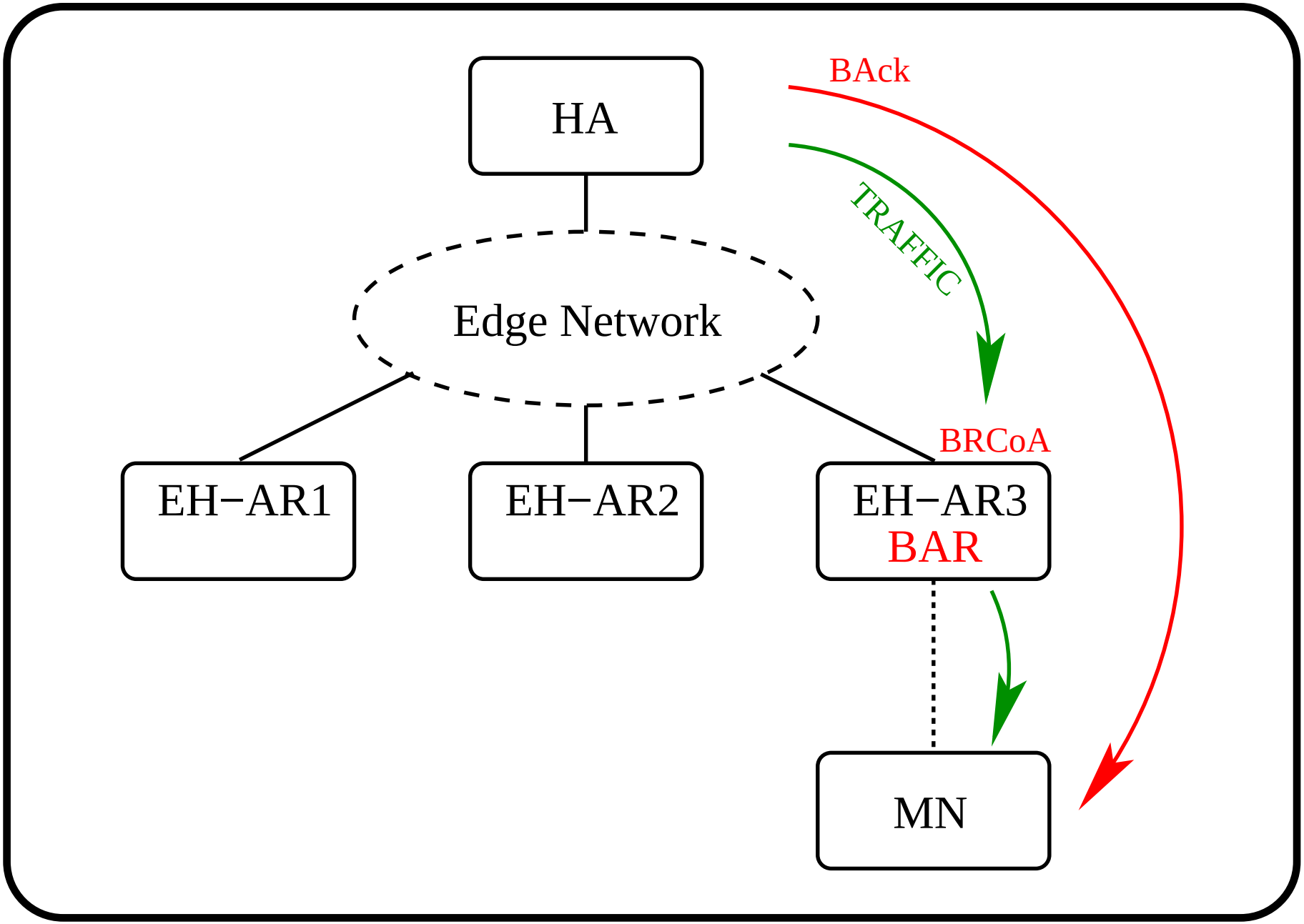
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Handover Heuristic

The MN must choose when to update its Home Agent and thus change its BAR.

- as soon as the critical path of the handover is complete.
- every N handovers.
- once the MN has been on the same AR for N seconds.
- if a handover has crossed an administrative domain.
- The LBAck has taken $> N$ routing hops.
- ???

Tuning of the heurisitic is an optimization beyond the scope of the draft.

Ongoing Work

- Implementation under Linux (based on our HMIP implementation)
- Simulation with `OMNeT++`
- A more streamlined “Alternative Version”.
- Work on Handover Heuristic.
- Testing in reality and in simulation.