Enhanced mobility anchoring wt

Teleconferences since IETF92

- May 22 9:30-10:30 CDT
- May 27 9:30-10:30 CDT
- Attended: Jong-Hyouk Lee, Seil Jeon, Carlos Bernardos, Fred Templin, H Anthony Chan

- draft-yhkim-dmm-enhanced-anchoring
  - AF split into AF-CP and AF-DP
- draft-chan-dmm-distributed-mobility-anchoring-02
  - session → flow
- draft-chan-dmm-distributed-mobility-anchoring-03
  - relate to examples of existing proposed solutions
  - IP address/prefix is anchoring to …
- draft-chan-dmm-distributed-mobility-anchoring-04
  - improved security discussion
  - clarified FM-DP being distributed, FM-CP, LM each being distributed or centralized

Background: Functions involved in anchoring

- The following functions seem essential to anchoring:
  - Allocation of IP prefix/addr and Route advertisement.

- Other functions of anchor in different proposals: each function is not necessarily present in all the solutions:
  - (1) packets to/from the MN traverse through.
  - (2) indirection, e.g., set up tunnel
  - (3) information, e.g., binding HoA and CoA
  - (4) sends route update, e.g., using BGP

New

Description of IP address/prefix anchoring

- An IP address, i.e., Home Address (HoA), or prefix, i.e., Home Network Prefix (HNP) allocated to a mobile node is topologically anchored to a node when the anchor node is able to advertise a connected route into the routing infrastructure for the allocated IP prefix.

LM and FM in RFC7429

- Internetwork Location Management (LM) function: managing and keeping track of the internetwork location of an MN. The location information may be a binding of the IP advertised address/prefix, e.g., HoA or HNP, to the IP routing address of the MN or of a node that can forward packets destined to the MN. It is a control plane function.
  - LM may be a logical function at CPA and CPN
- Forwarding Management (FM) function: packet interception and forwarding to/from the IP address/prefix assigned to the MN, based on the internetwork location information, either to the destination or to some other network element that knows how to forward the packets to their destination.
  - FM-CP may be a logical function at CPA and CPN
  - FM-DP may be a logical function at DPA and DPN

- FM-DP may be distributed in distributed mobility management
- LM, FM-CP may each be centralized or distributed

Functions involved in anchoring

- The following functions seem essential to anchoring:
  - Allocation of IP prefix/addr and Route advertisement.

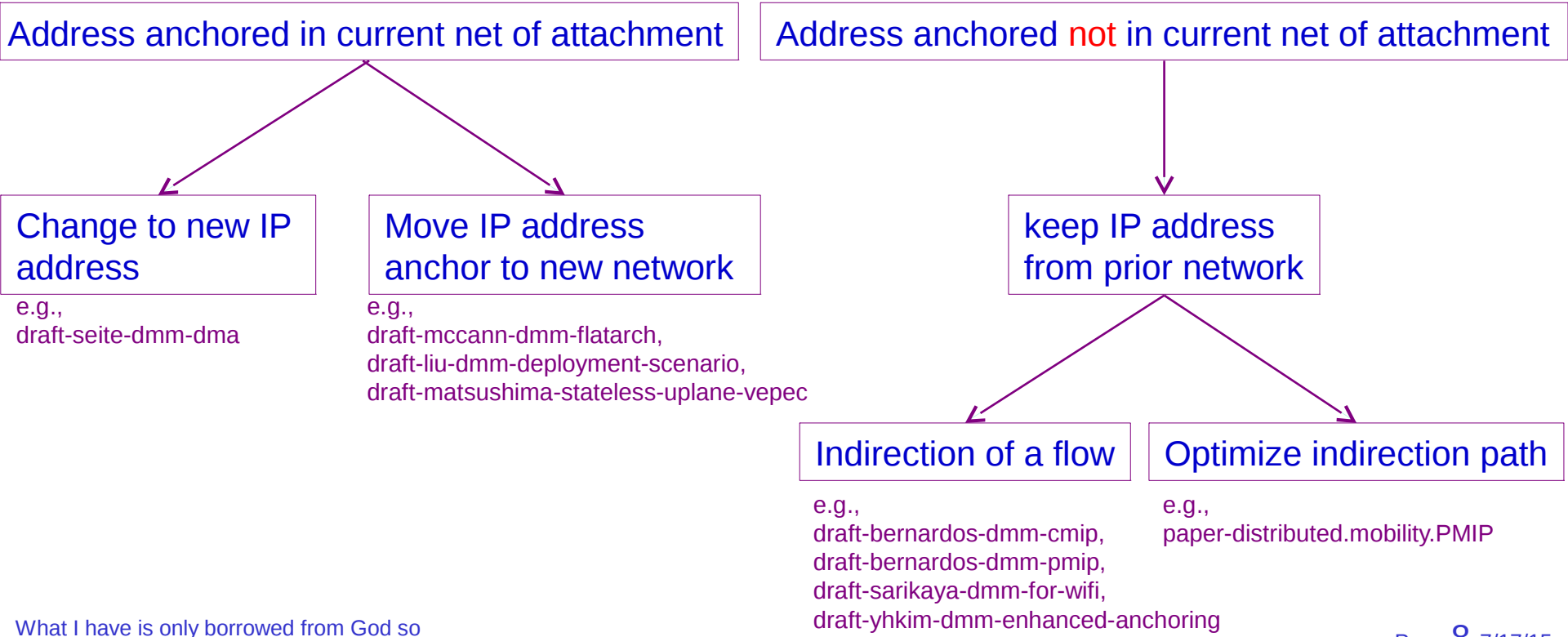
- Other functions of anchor in different proposals: each function is not necessarily present in all the solutions:
  - (1) packets to/from the MN traverse through.(DPA)
  - (2) indirection, e.g., FM-CP at CPA and CPN to set up tunnel between DPA and DPN
  - (3) information, e.g., binding HoA and CoA (LM at CPA and CPN)
  - (4) sends route update, e.g., using BGP

Example solutions

- draft-bernardos-dmm-cmip
- draft-bernardos-dmm-pmip
- draft-liu-dmm-deployment-scenario
- draft-matsushima-stateless-uplan-vepc
- draft-mccann-dmm-flatarch
- draft-sarikaya-dmm-for-wifi
- draft-seite-dmm-dma
- draft-yhkim-dmm-enhanced-anchoring
- paper-distributed.mobility.PMIP

Categorization (unification) of different approaches

New



Address anchored (to AR2) in current network of attachment

Before moving:
MN in Net1 is allocated IP1 from AR1

After MN moves to Net2
MN in Net2 is allocated IP2 from AR2
MN starts a flow(IP2,IPCN, …) .

IP2 is in current network of attachment

Changing to new IP address
address anchored (to AR2) in current network of attachment

Before moving:
MN in Net1 is allocated IP1 from AR1
MN and CN has flow using IP1 and IPCN, … .

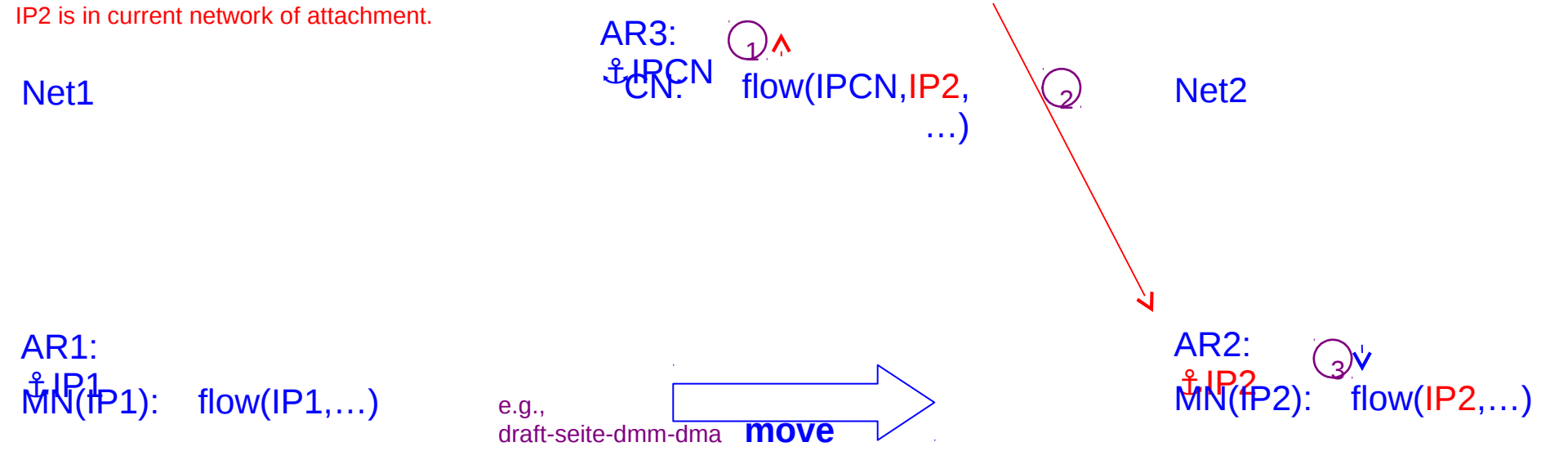
After MN moves to Net2
MN in Net2 is allocated IP2 from AR2
MN and CN restarts a new flow(IP2,IPCN, …) .

IP2 is in current network of attachment.

Net3

Data Plane Packet in flow(IPCN,IP2,…) from CN to MN:

1. Packet from CN → AR3
2. Forward from AR3 → AR2
3. Forwarded from AR2 → MN



What I have is only borrowed from God so that I may serve others. H Anthony Chan

Moving the IP address anchor
address anchored (to AR2) in current network of attachment

Before moving:
MN in Net1 is allocated IP1 from AR1
MN and CN has flow using IP1 and IPCN, … .

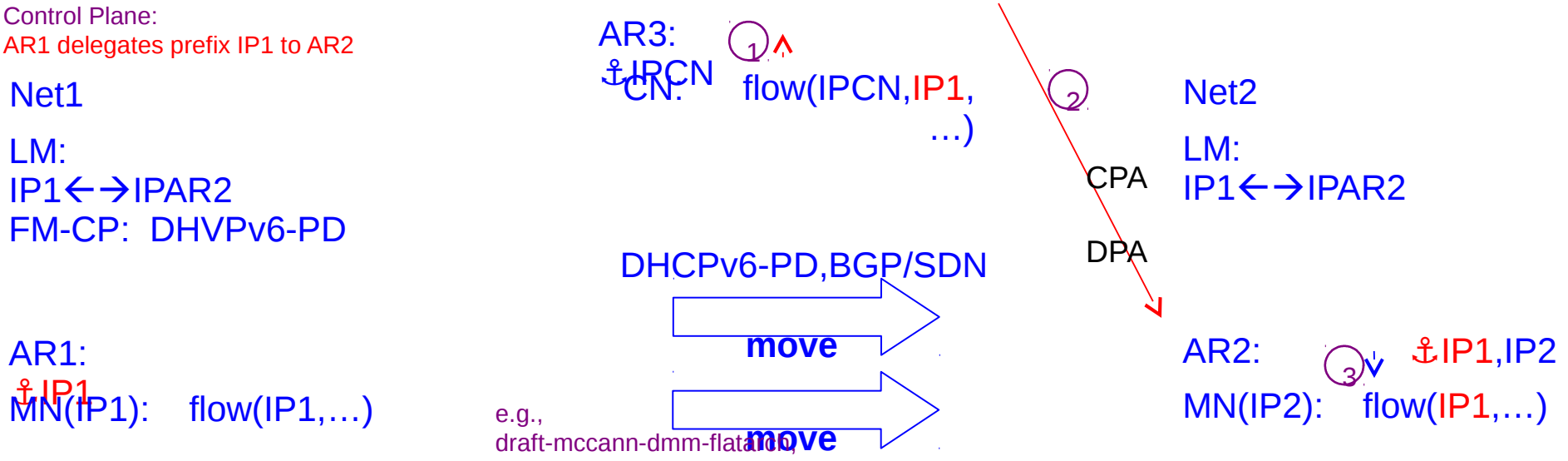
After MN moves to Net2
MN in Net2 is allocated IP2 from AR2
MN and CN needs to continue the flow

Control Plane:
AR1 delegates prefix IP1 to AR2

Net3

Data Plane Packet in flow(IPCN,IP1,…) from CN to MN:

1. Packet from CN → AR3
2. Forward from AR3 → AR2
3. Forwarded from AR2 → MN



e.g.,
draft-mccann-dmm-flatarch,
draft-liu-dmm-deployment-scenario,
draft-matsushima-stateless-uplane-vepec

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Address anchored to AR1 not in current network of attachment

Before moving:
MN in Net1 is allocated IP1 from AR1

After MN moves to Net2:
MN in Net2 is allocated IP2 from AR2
flow(IP1, …) is using IP1 not in current net of attachment

(to be continued in next slide)

Keeping the IP address
address anchored to AR1 not in current network of attachment

Before moving:
MN in Net1 is allocated IP1 from AR1
MN and CN has flow using IP1 and IPCN, … .

After MN moves to Net2:
MN in Net2 is allocated IP2 from AR2
MN and CN need to continue the flow(IP1,IPCN, …)

(to be continued in next slide)

Net3

AR3:
⚓IPCN
CN: flow(IPCN,IP1, …)

Net1

Net2

DPA

AR1:
⚓IP1
MN(IP1): flow(IP1,…)

move

AR2:
⚓IP2
MN(IP2): flow(IP1,…)

Indirection of a flow
(keeping the IP address)

Control Plane:

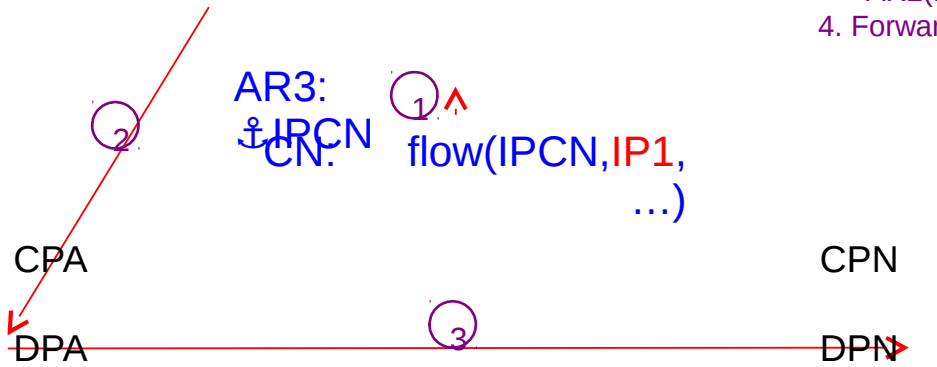
LM at AR1(CPA) and AR2(CPN) has binding information: IP1 ← → IPAR2

FM-CP at AR1(CPA) and AR2(CPN) sets up indirection path between AR1(DPA) and AR2(DPN)

Net3

Data Plane Packet in flow(IPCN,IP1,…) from CN to MN:

1. from CN → AR3
2. Forwarded from AR3 → AR1 in Net1
3. FM-DP: Indirection AR1(DPA) → AR2(DPN)
4. Forwarded from AR2 → MN



Net1

LM:
IP1←→IPAR2
FM-CP: sets up indirection

FM-DP: AR1<==>AR2

AR1:
IP1
MN(IP1): flow(IP1,…)

Net2

LM:
IP1←→IPAR2
FM-CP: sets up indirection

FM-DP: AR1<==>AR2

AR2:
IP2
MN(IP2): flow(IP1,…)

e.g.,
draft-bernardos-dmm-cmip,
draft-bernardos-dmm-pmip, draft-sarikaya-dmm-for-wifi,
draft-yhkim-dmm-enhanced-anchoring

move

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Changing indirection path (keeping the IP address)

Control Plane:

LM at AR1(CPA) and AR2(CPN) has the binding information: IP1 ← → IPAR2 ;
LM information copied to AR3

FM-CP at AR3(CPA') and AR2(CPN) sets up indirection path between AR3(DPA') and AR2(DPN)

Net1

LM:
IP1←→IPAR2
FM-CP: sets up indirection

FM-DP: AR1<==>AR2

AR1:
IP1
MN(IP1): flow(IP1,…)

CPA

DPA

copy

Net3

LM:
IP1←→IPAR2
FM-CP: sets up indirection

FM-DP: AR3<==>AR2

AR3:
IPCN
CN: flow(IPCN,IP1,…)

1

e.g., paper-distributed.mobility.move

move

Data Plane Packet in flow(IPCN,IP1,…) from CN to MN:

CPA'

DPA'

1. from CN → AR3
2. FM-DP: Indirection from AR3(DPA') → AR2(DPN)
3. Forwarded from AR2 → MN

2

CPN

DPN

Net2

LM:
IP1←→IPAR2
FM-CP: sets up indirection

FM-DP: AR3<==>AR2

AR2:
IP2
MN(IP2): flow(IP1,…)

3

Straw poll?

- Informational draft to explain enhanced/distributed anchoring and the different dmm approaches:
- draft-chan-dmm-distributed-mobility-anchoring-04 as informational draft

- Separate drafts on new features to standardize