

A Client-driven Mobility Frame System -

Mobility Management From a New Point of View

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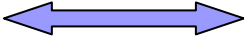
Contents

- Motivation, introduction
- CMFS - Client-driven Mobility Frame System
 - The idea
 - Basic notations
 - Network discovery
- Examples for Mobility Management Strategies implemented on CMFS
- Some numerical results



Motivation / Introduction

- IP the most spread protocol
 - >different solution proposals for IP mobility

Complexity  Optimality

An alternative point of view

- Transform the problem from network level to individual level

User based mobility management strategy :
CMFS – Client-base Mobility Frame System



CMFS - Client-driven Mobility Frame System

- No need network logic
 - > low impact on nodes, simple command handling
- Management system in mobile
 - control with command sending to nodes
 - own algorithm for each entity (can be)
 - Own parameter setting
 - no need to choose an exact mobility approach
 - very efficient and easy to implement!

CMFS

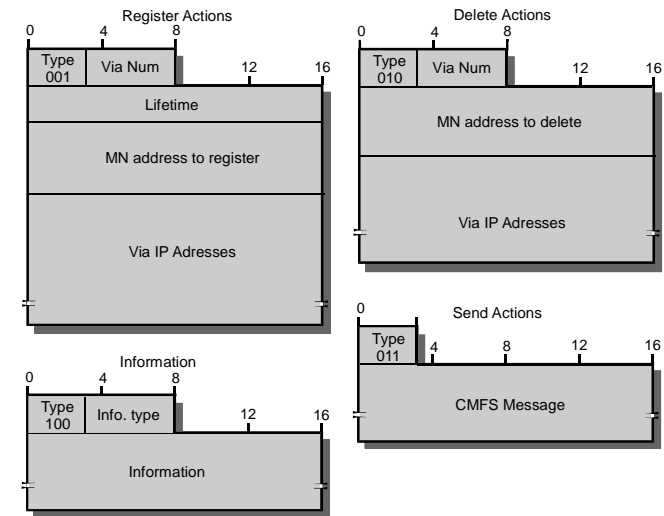
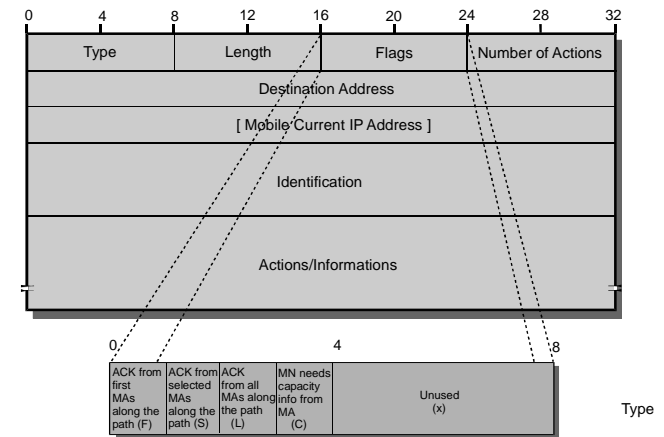
■ Basic notations

- Mobile Node (MN)
- Mobility Access Point (MAP)
- Mobility Agents (MA)
- Hierarchical Point (HP)
- Home Agent (HA)

■ Message Structure

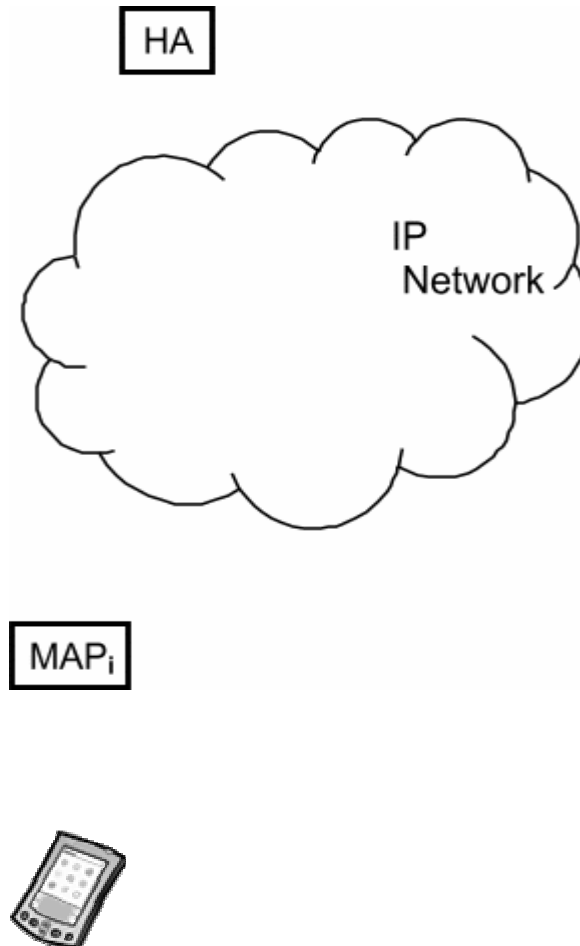
- Example: HAWAII like protocol

```
[Dst: MAPi, Src: MN, Actions:
  Register MN to MAPi via MN]
[Dst: MAPi;1 //The former node//,
Src: MN, Actions:
  Register MN to MAPi;1 via MAPi]
```



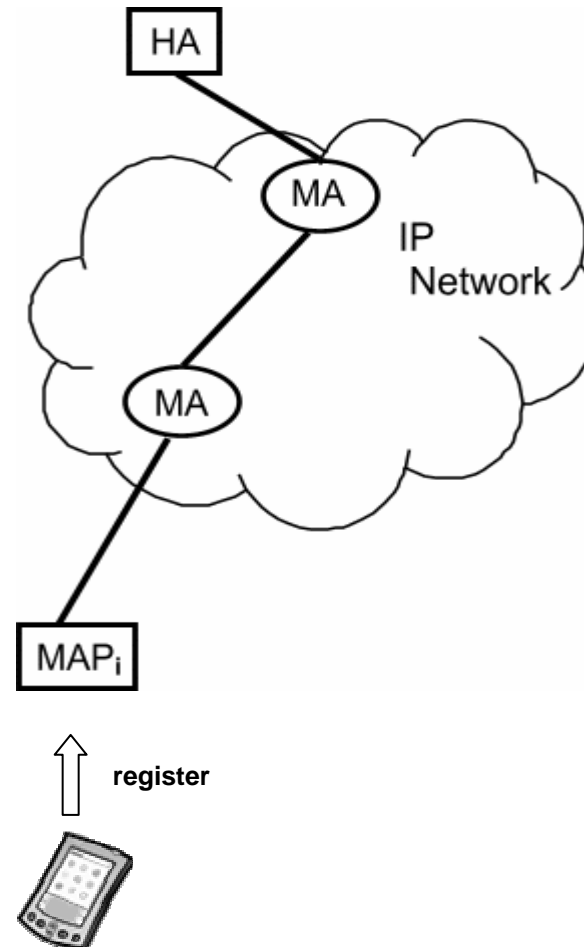
Network discovery

- Maintain database
nodes,
distances (weights),
time intervals



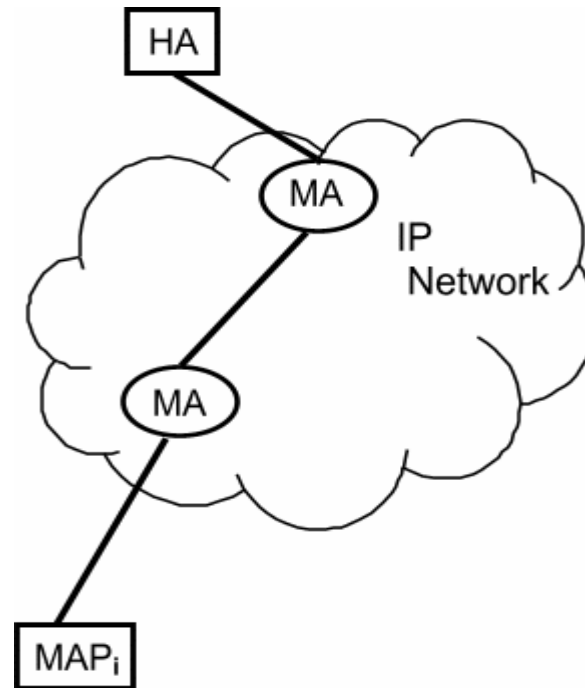
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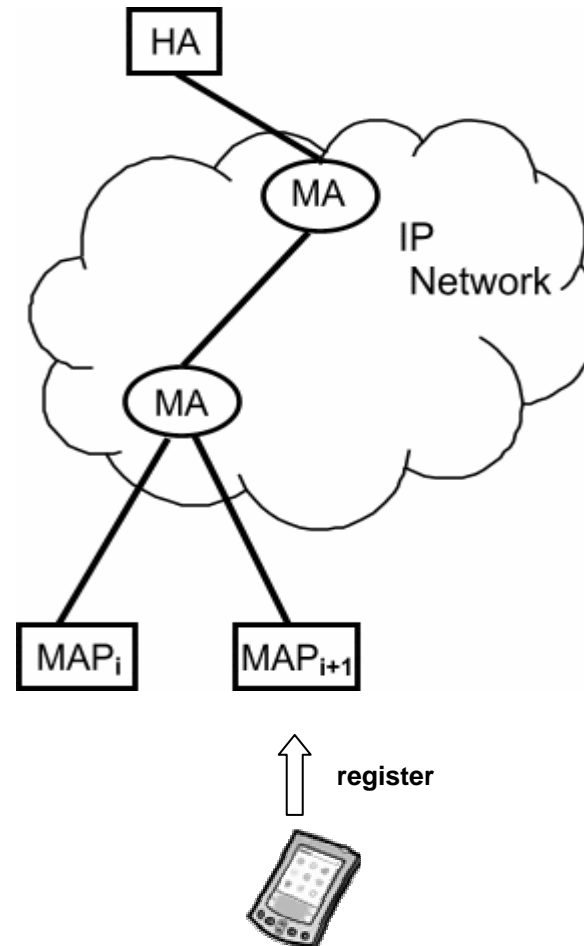
Network discovery

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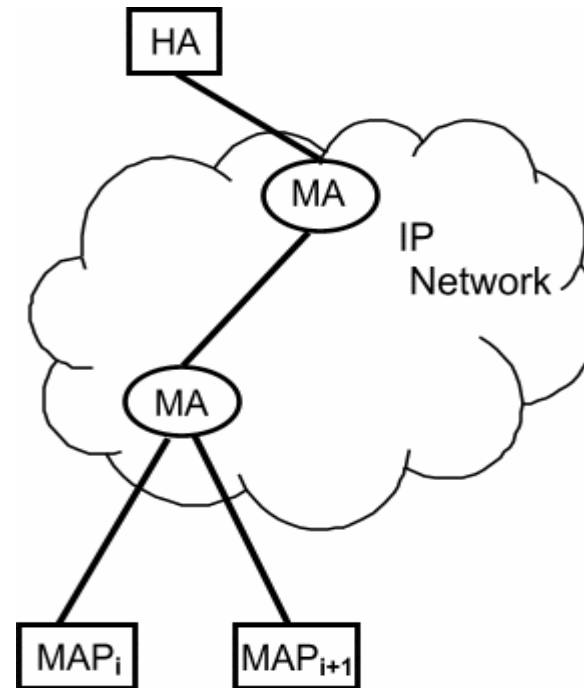
Network discovery

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Network discovery

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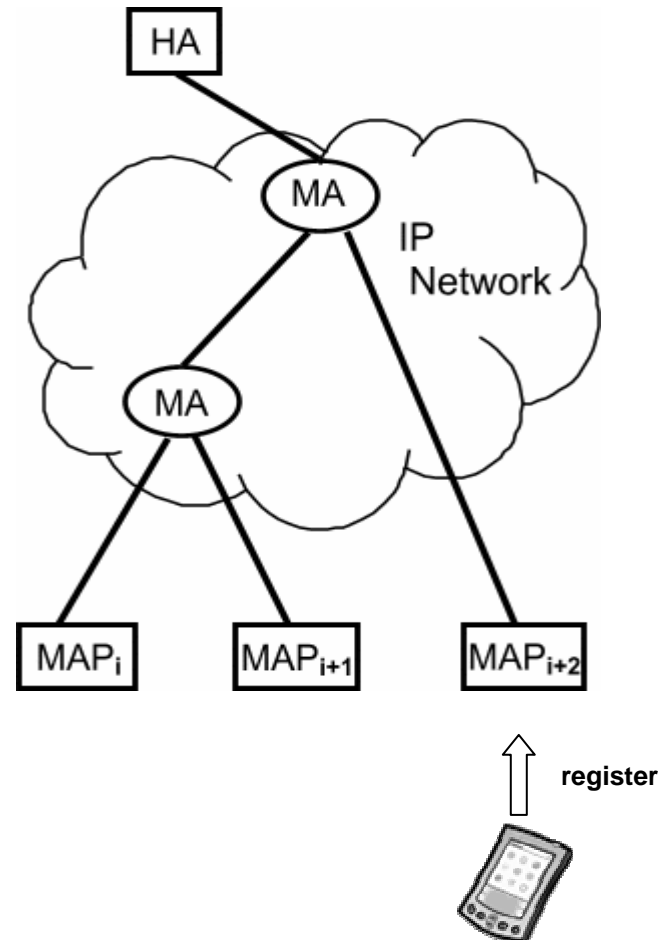
Network discovery

- Mobil Node database

- nodes,
- distances (weights),
- time intervals
- *Generally: it can be different for any network*

- Keeps the original MIP concept:

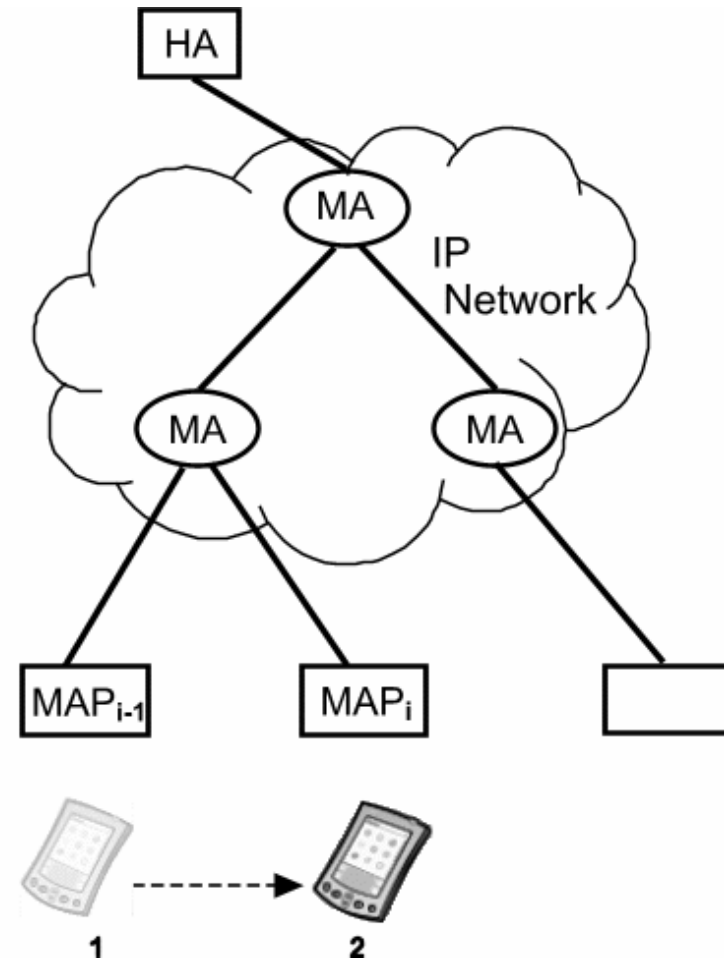
- no pre-built network architecture is needed on mobility level



Personal Mobile IP - PMIP

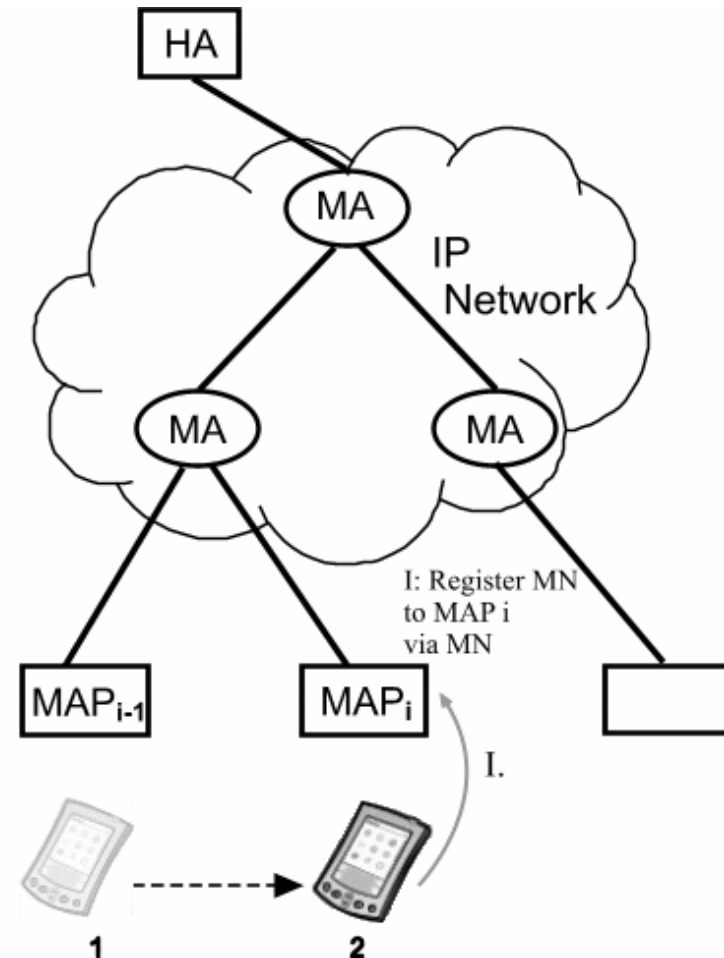
MA database is maintained by the MN
-simple routing-like commands
-customized to each mobile
-multiple algorithm on the same network

```
[Dst: MAPi, Src: MN, Actions:  
-Register MN to MAPi via MN;  
-[Dst: HA, Src: MAPi,  
Actions: Register MN to HA  
via MAPi];  
-[Dst: MAPi-1, Src: MAPi,  
Actions: Delete MN in  
MAPi-1 via MN]  
].
```



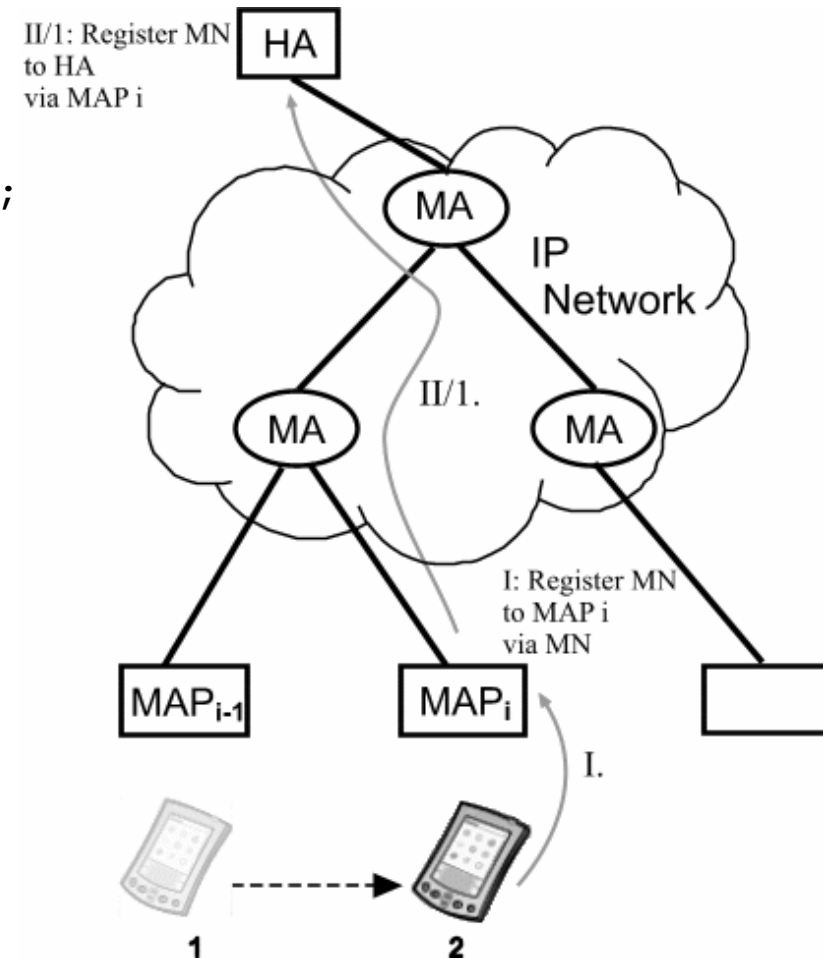
Personal Mobile IP - PMIP

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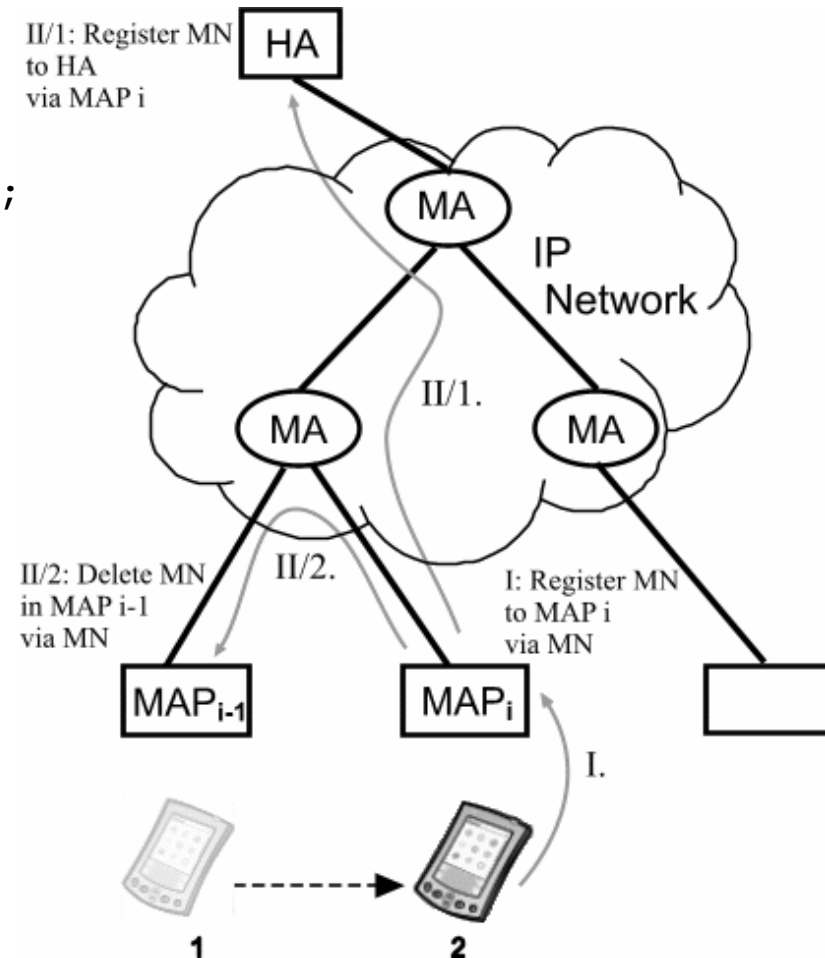
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Personal Mobile IP - PMIP

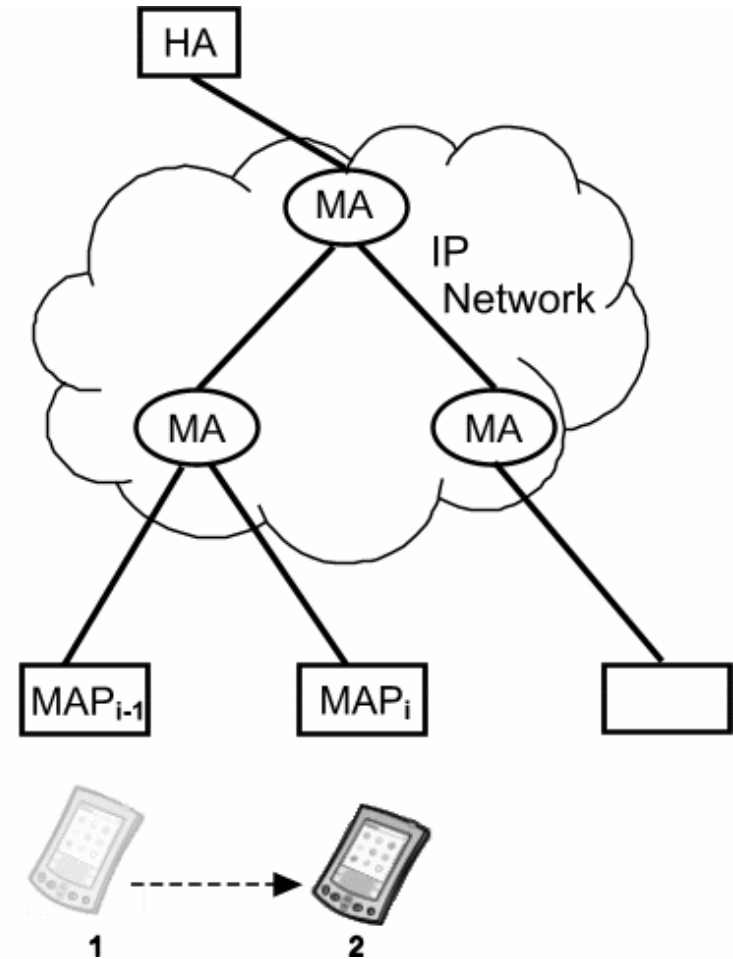
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Actions: Delete MN in  
MAPi-1 via MN]  
].
```



Extended Personal Mobile IP – E-PMIP

- [Dst: MAPI, Src: MN, Actions:
 - Register MN to MAPI via MN;
- [Dst: MAPI-1, Src: MAPI, Actions:
 - Register MN in MAPI-1 via MAPI;
 - Delete MN in MAPI-1 via MN;
- [Dst: HA, Src: MAPI-1, Actions:
 - Register MN to HA via MAPI;
 - Delete MN in HA via MAPI-1;
- [Dst: MAPI-1, Src: HA, Actions:
 - Delete MN in MAPI-1 via MAPI

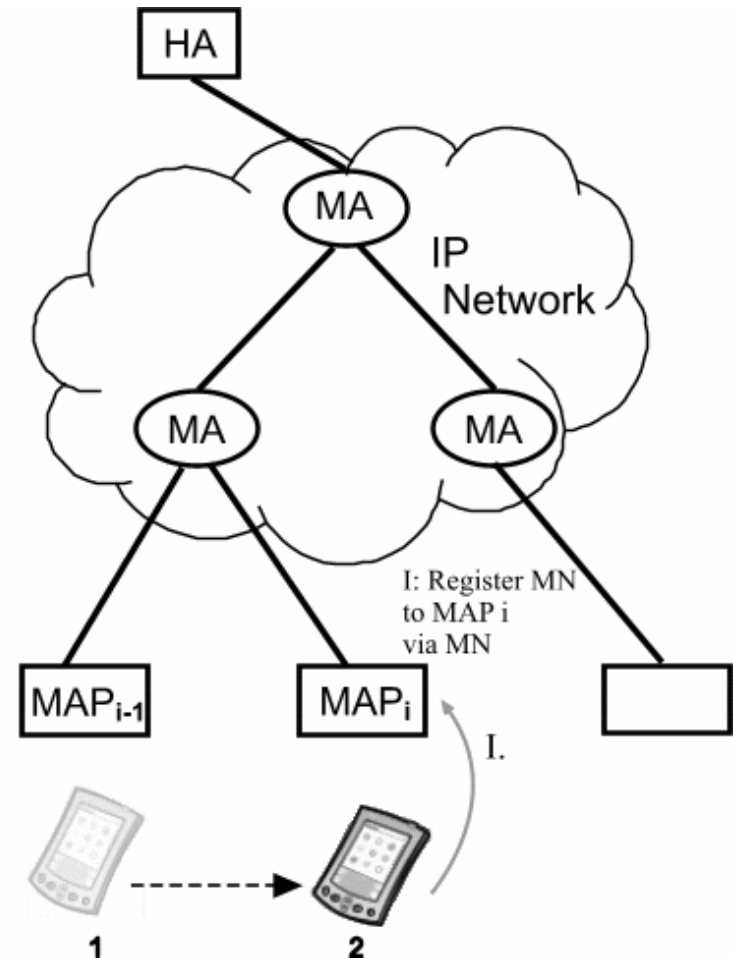
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Extended Personal Mobile IP – E-PMIP

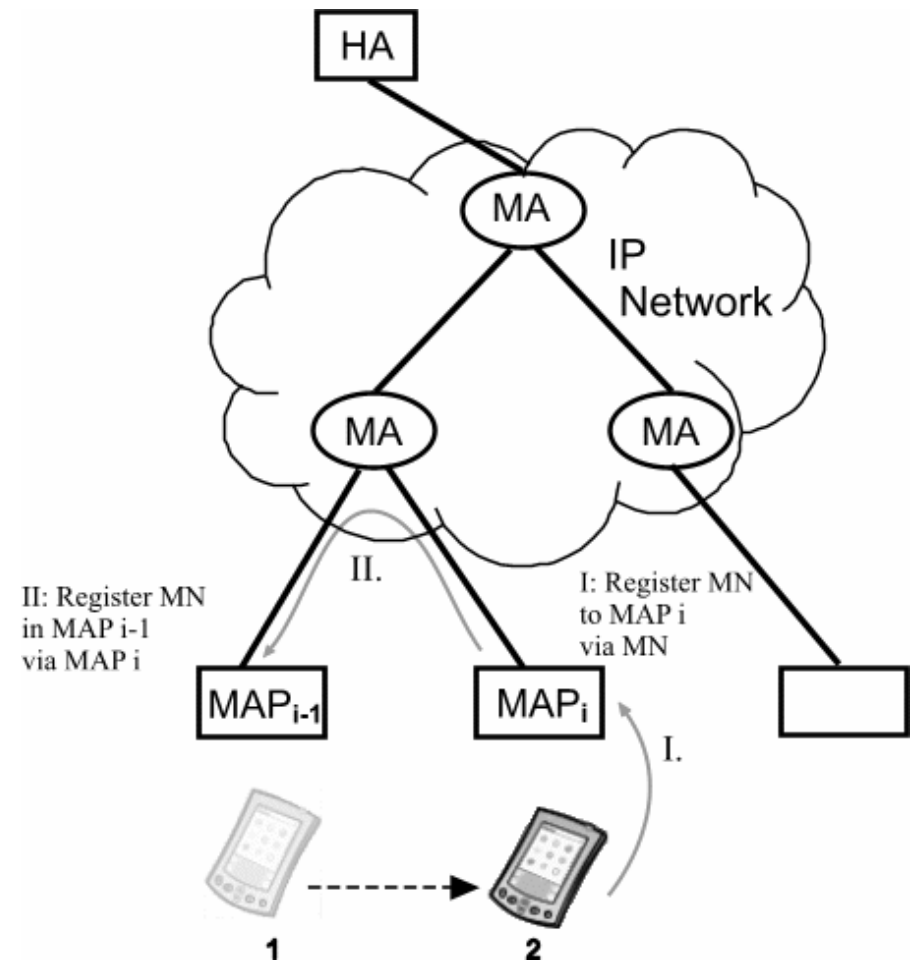
- [Dst: MAP_i, Src: MN, Actions:
 - Register MN to MAP_i via MN;
- [Dst: MAP_{i-1}, Src: MAP_i, Actions:
 - Register MN in MAP_{i-1} via MAP_i;
 - Delete MN in MAP_{i-1} via MN;
- [Dst: HA, Src: MAP_{i-1}, Actions:
 - Register MN to HA via MAP_i;
 - Delete MN in HA via MAP_{i-1};
- [Dst: MAP_{i-1}, Src: HA, Actions:
 - Delete MN in MAP_{i-1} via MAP_i

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Extended Personal Mobile IP – E-PMIP

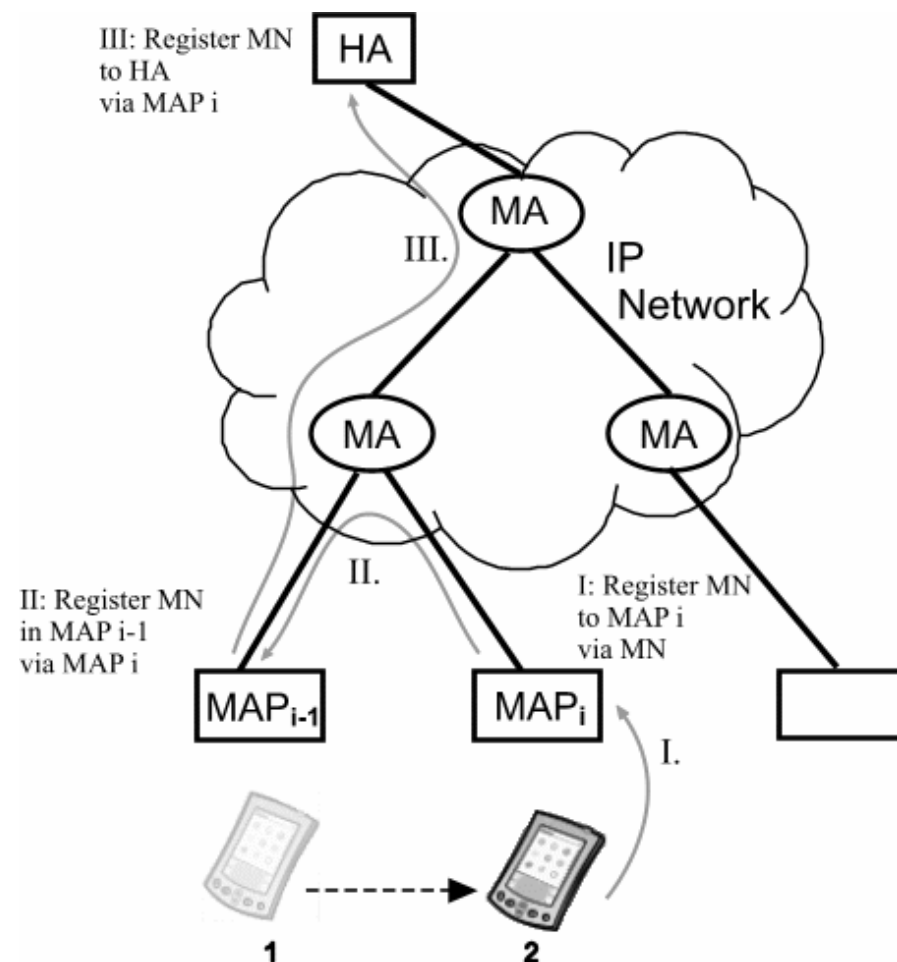
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 - Register MN in MAP_{i-1} via MAP_i;
 - Delete MN in MAP_{i-1} via MN;
 - [Dst: HA, Src: MAP_{i-1}, Actions:
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 - Delete MN in MAP_{i-1} via MAP_i

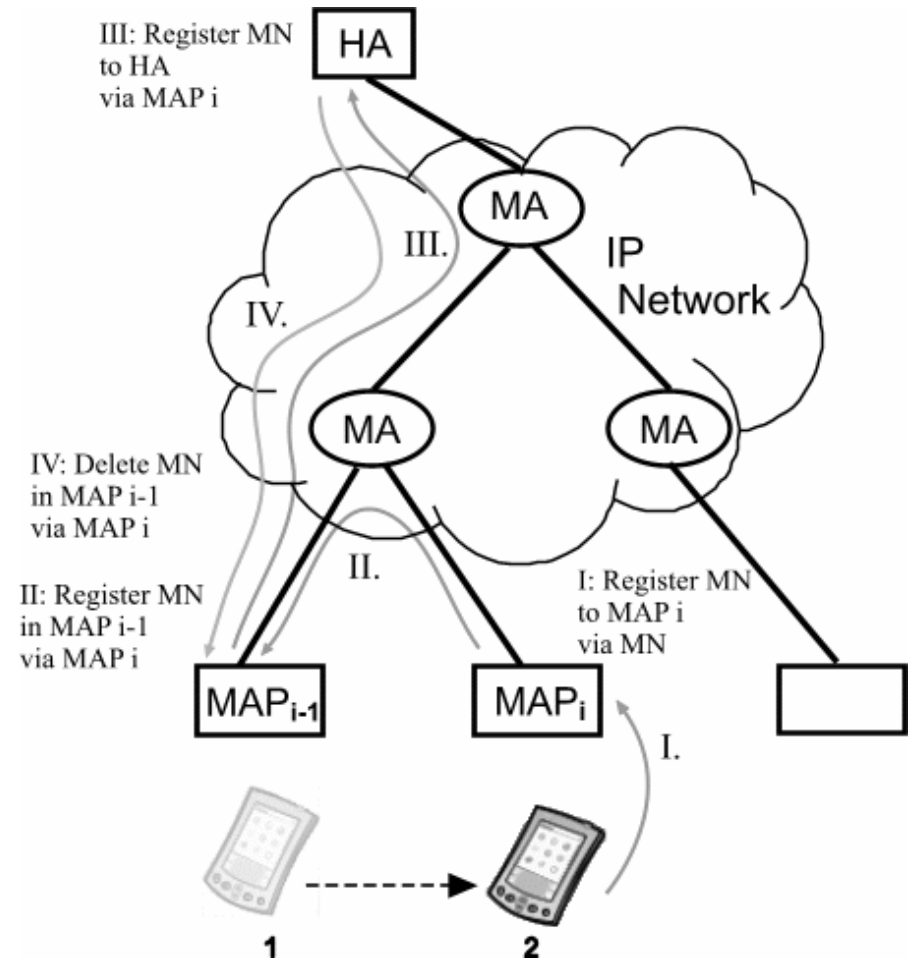
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Extended Personal Mobile IP – E-PMIP

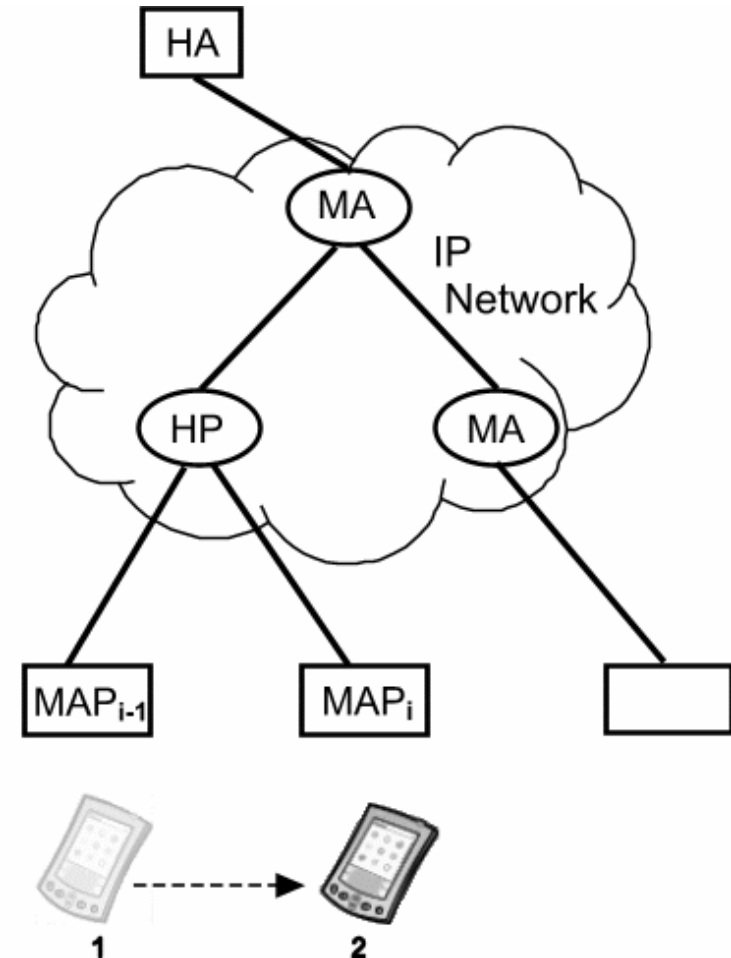
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 - Delete MN in MAP_{i-1} via MN;
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Personal Hierarchical Mobile IP – PHMIP

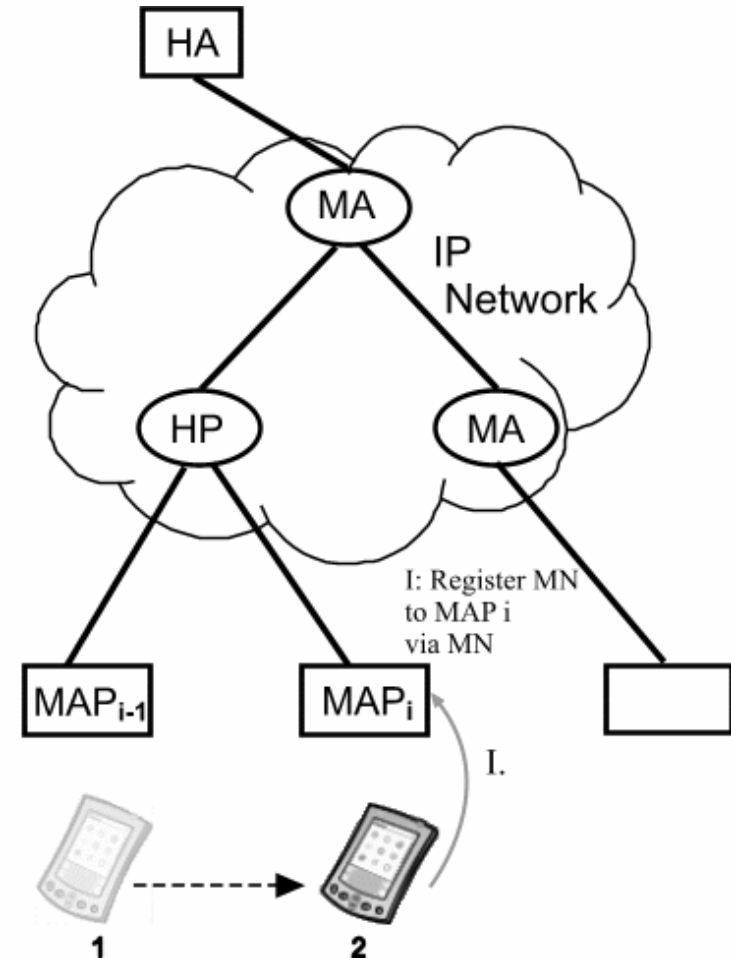
```
-[Dst: MAPi, Src: MN, Actions:  
  -Register MN to MAPi via MN;  
-[Dst: MAPi-1, Src: MAPi, Actions:  
  -Register MN in  
  MAPi-1 via MAPi;  
  -Delete MN in MAPi-1  
  via MN;  
-[Dst: HP, Src: MAPi-1, Actions:  
  -Register MN to HP via  
  MAPi;  
  -Delete MN in HP via  
  MAPi-1;  
-[Dst: MAPi-1, Src: HP, Actions:  
  -Delete MN in MAPi-1 via  
  MAPi  
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```



Personal Hierarchical Mobile IP – PHMIP

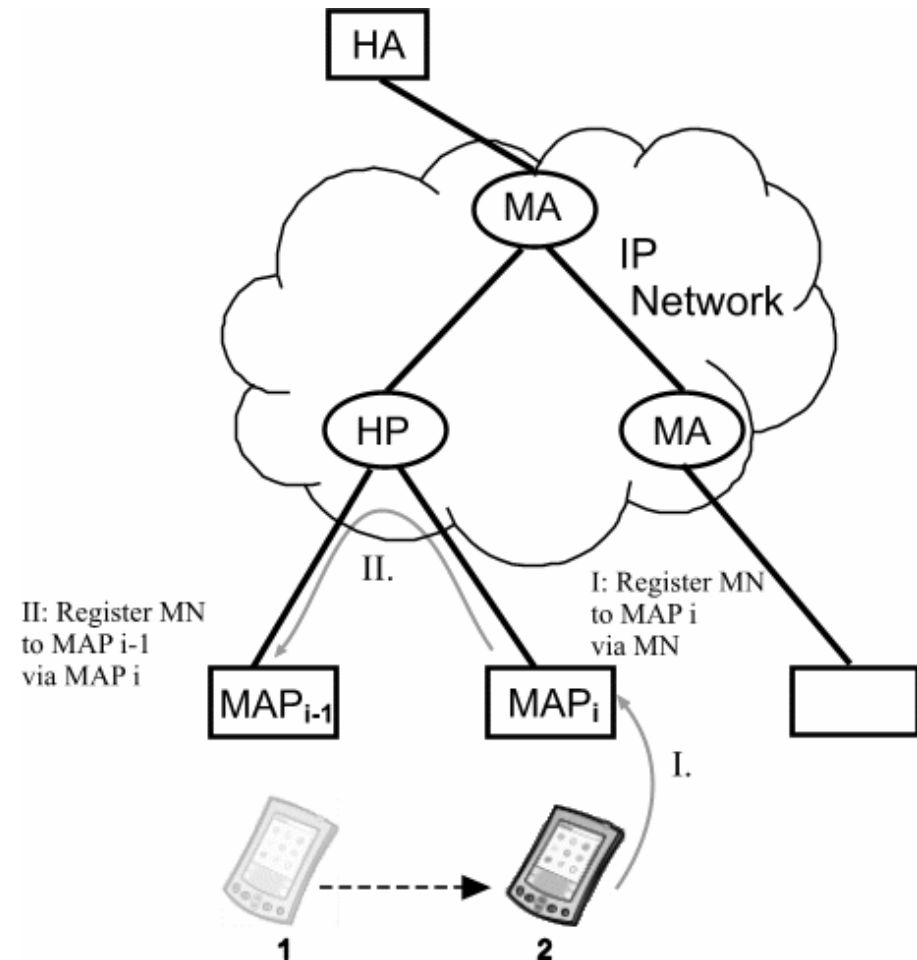
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 - Delete MN in MAP_{i-1} via MN;
- [Dst: HP, Src: MAP_{i-1}, Actions:
 - Register MN to HP via MAP_i;
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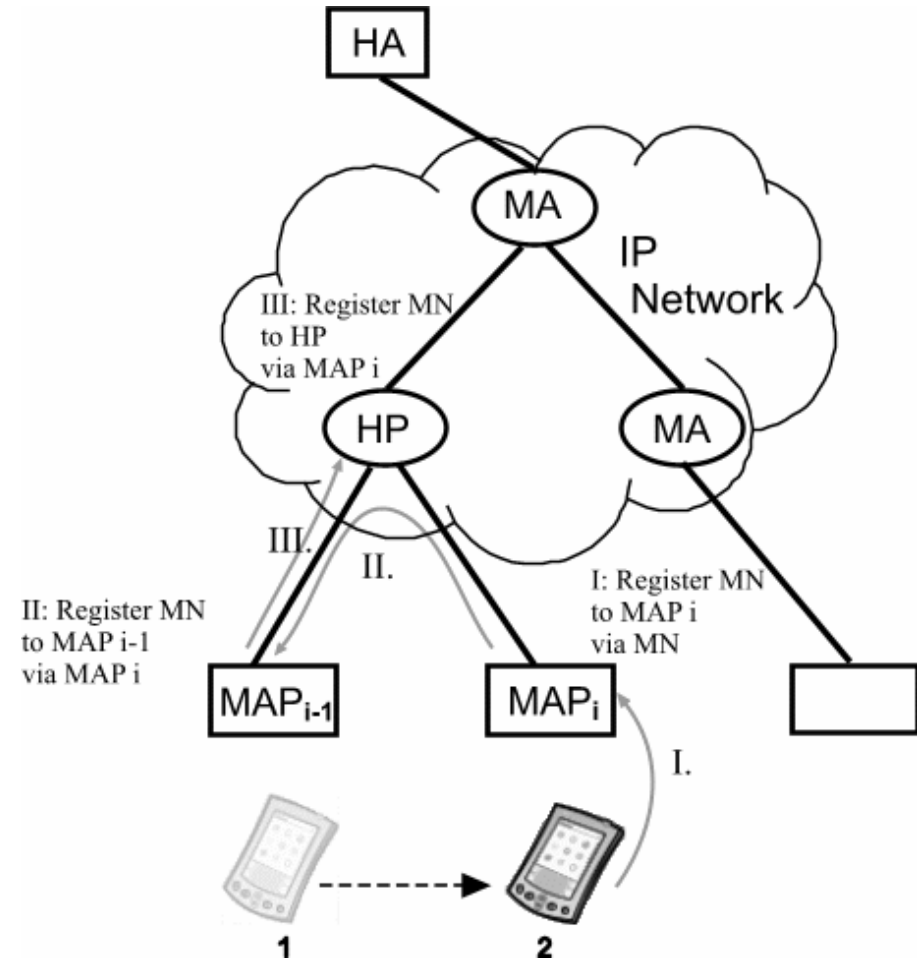
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 - Delete MN in MAP_{i-1} via MN;
 - [Dst: HP, Src: MAP_{i-1}, Actions:
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Personal Hierarchical Mobile IP – PHMIP

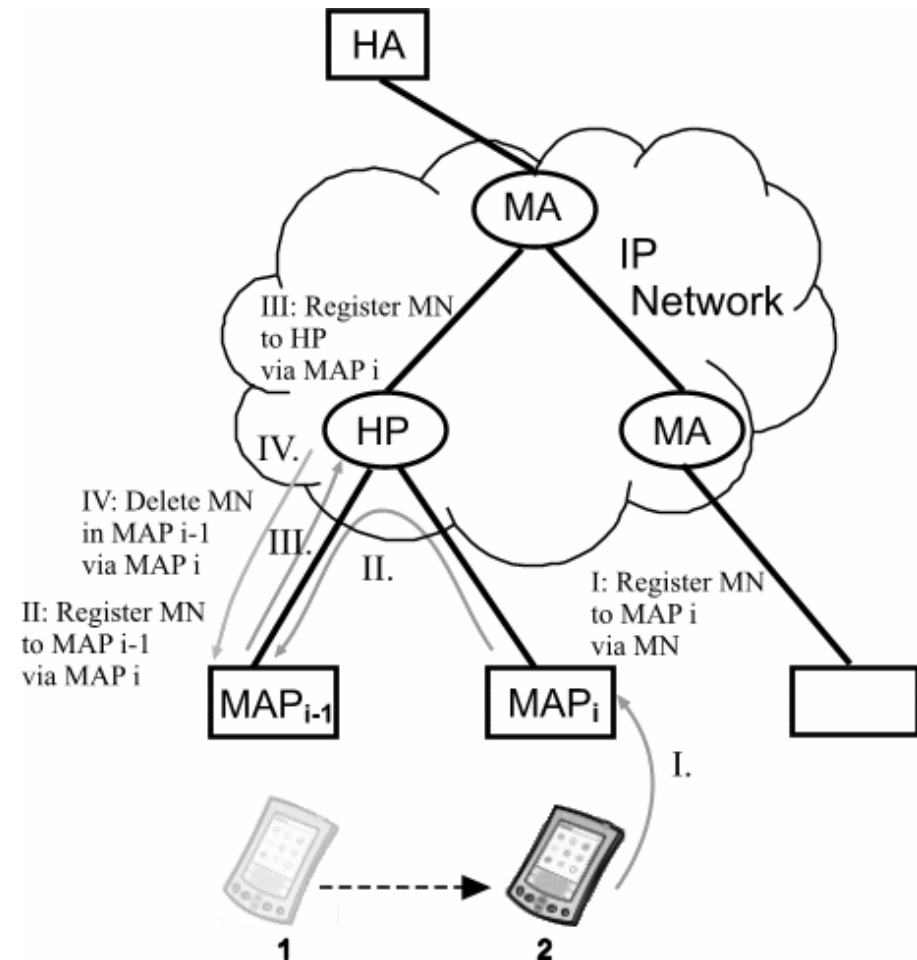
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 - Delete MN in MAP_{i-1} via MN;
 - [Dst: HP, Src: MAP_{i-1}, Actions:
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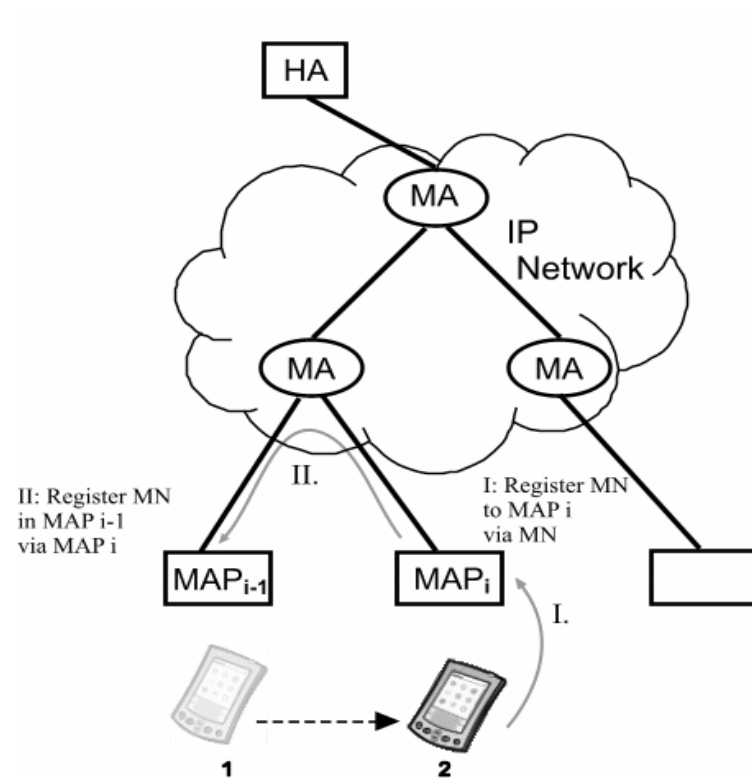
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 - Delete MN in HP via MAP_{i-1};
- [Dst: MAP_{i-1}, Src: HP, Actions:
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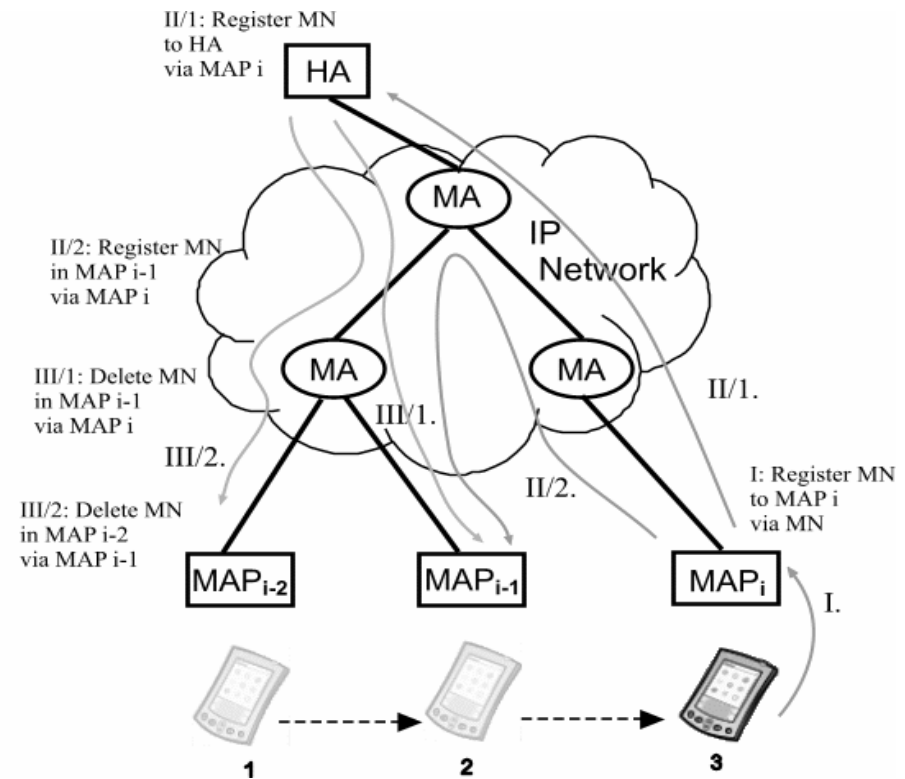
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Personal Tracking Mobile IP – PTMIP



Tracking handover



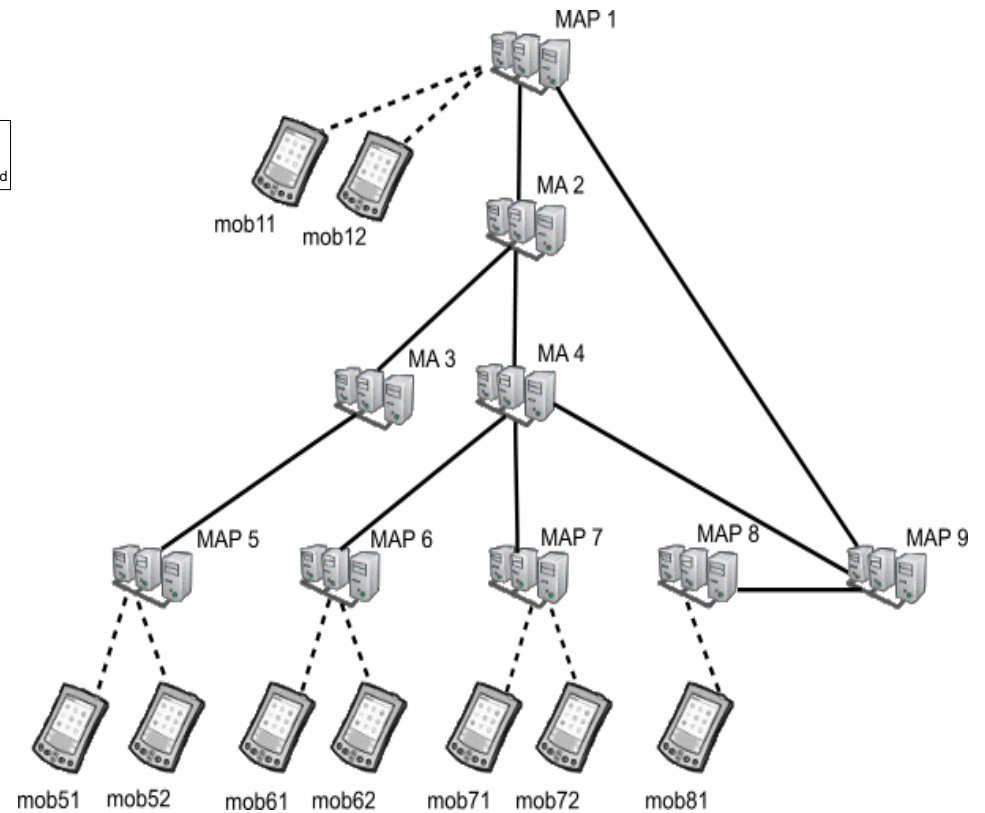
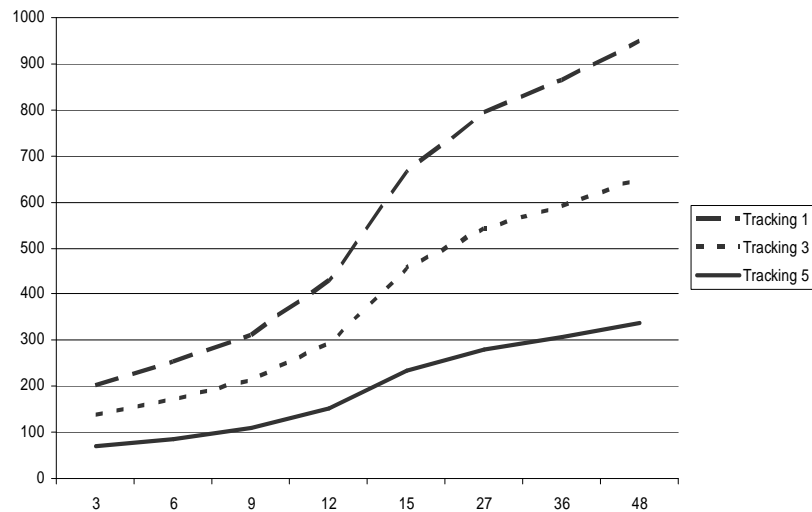
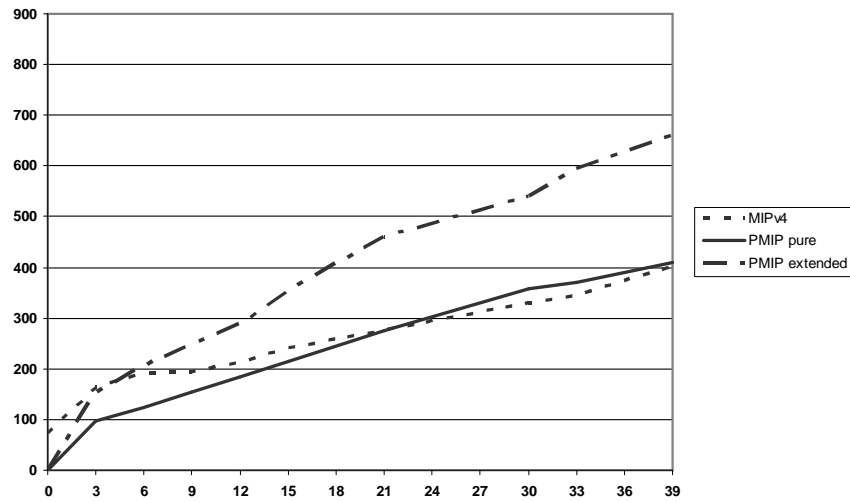
Normal handover

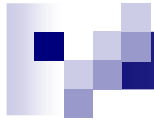


Benefits and drawbacks - Properties

- There can be any Mobility Agents and any new agent can be installed. The configuration of the MAs is done by the MNs and no external management is needed
- Anybody can connect to the network with its own MN
- The MN should run complex methods to optimize resource utilization
- This method can be different for each MN!
- Anyone can implement its own Mobility Protocol (even it can switch between different protocols)
- The network nodes does not have to run complex optimization and no network level optimization is needed
- Automatically handles vertical handover

Simulations, Numerical results





THANK YOU!

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