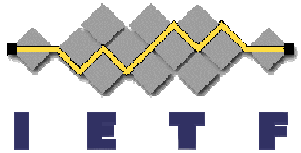
Aplusp BoF
IETF 76

A+P for Dual-Stack Mobile IPv6/ Proxy Mobile IPv6



draft-sarikaya-aplusp-pmip-00.txt

draft-sarikaya-aplusp-dsmip-00.txt

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Context and Motivations

- Mobile devices, iPhone, Android Phone, Mobile Windows Phone, etc. are **increasingly connected** to the Internet

- Smart phones **need always-on connectivity** and should have access to **advanced services**

- Need for NAT binding refreshments when CGN is deployed
  - **Power consumption** to maintain NAT bindings may be a hurdle for mobile devices

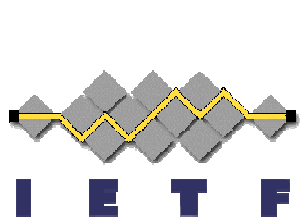
Context and Motivations

- Performance degradation happens frequently in mobile networks due to (cascaded levels of) NAT boxes

- Problems stem from the use of private addresses in IPv4

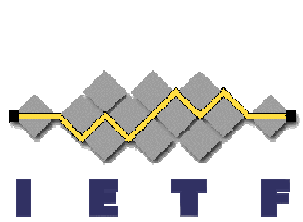
  - Overlapping addresses may be used with some additional complexity

Context and Motivations



- In developing countries, mobile technologies are used to deliver broadband-like services
  - The same issues for IP addressing as fixed network would be valid
- Mobile architectures are essentially centralized
  - Scalability and performance degradation are important concerns
  - …let's not forget also CAPEX and OPEX issues

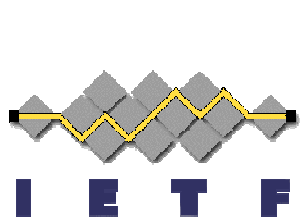
Context and Motivations



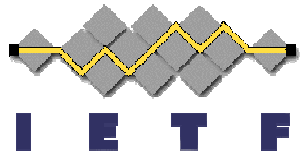
- Migration to IPv6 of a local realm doesn't solve the global problem because we will need NAT64 also

- A strategy for graceful migration to IPv6 is needed and **A+P contributes to this effort**
  - Stateless IPv4 address sharing
  - Stateless IPv4-IPv6 interconnection

Conclusions



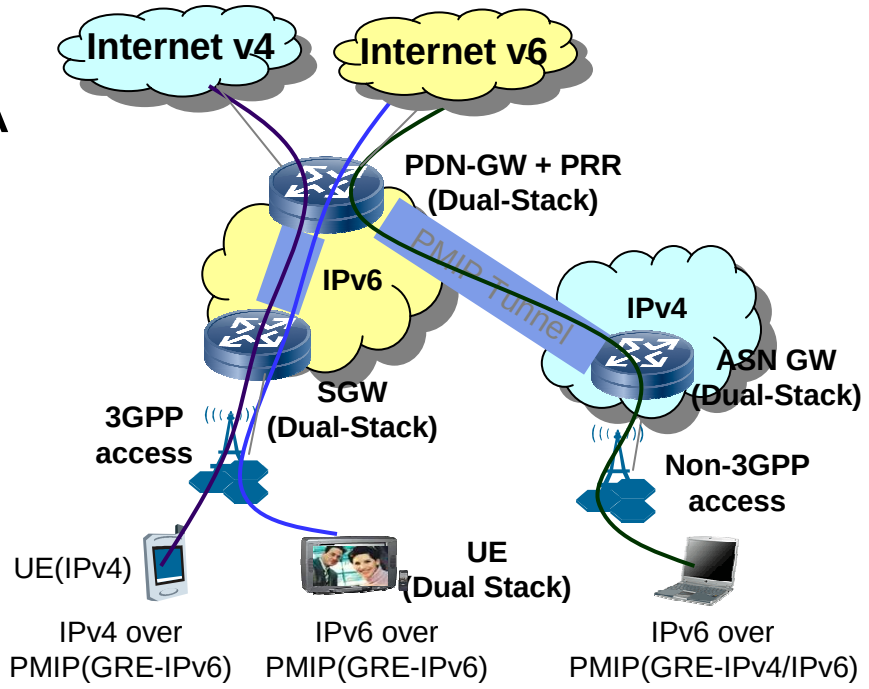
- A+P solves both IPv4 address exhaustion and NAT issues related to the deployment of CGN as experienced by mobile operators
- A+P is a step forward to prepare smooth migration to IPv6 within mobile networks
- For convergence purposes, “similar” solutions should be encouraged for both fixed and mobile networks



Appendix

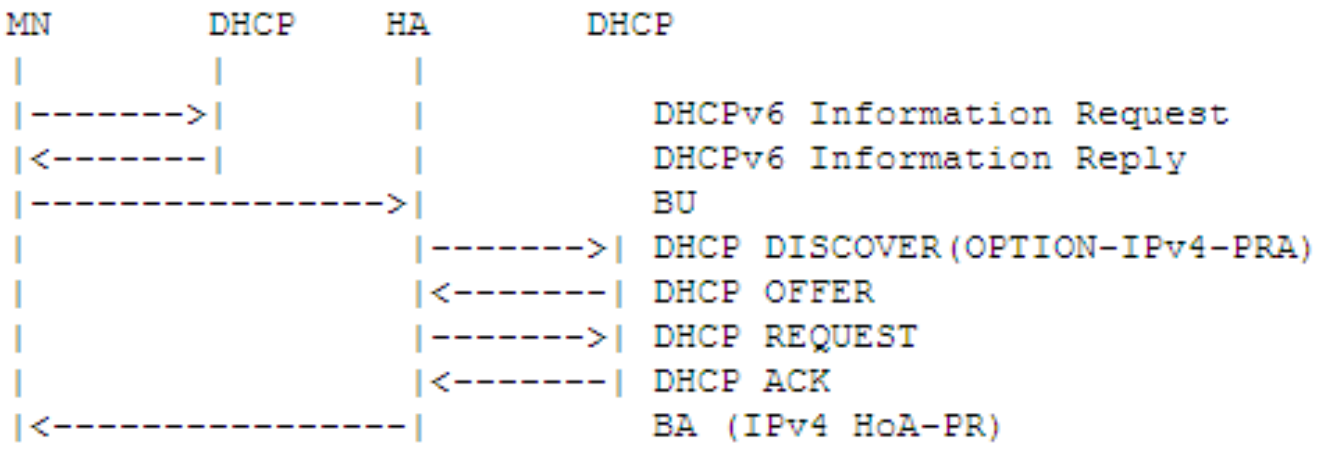
DSMIP/PMIP A+P Architecture

- PMIPv6 (RFC 5213)
- DSMIPv6 (RFC 5555)
- Port Range Router at HA or LMA, binding table+ binding cache
- DHCP modifications for port range IPv4 addresses to MN
- Binding Update/Proxy Binding Update extensions
- DS-Lite network is an option



Message Flows - DSMIP

- MN gets Port Range Home Address



HA Binding cache includes port range

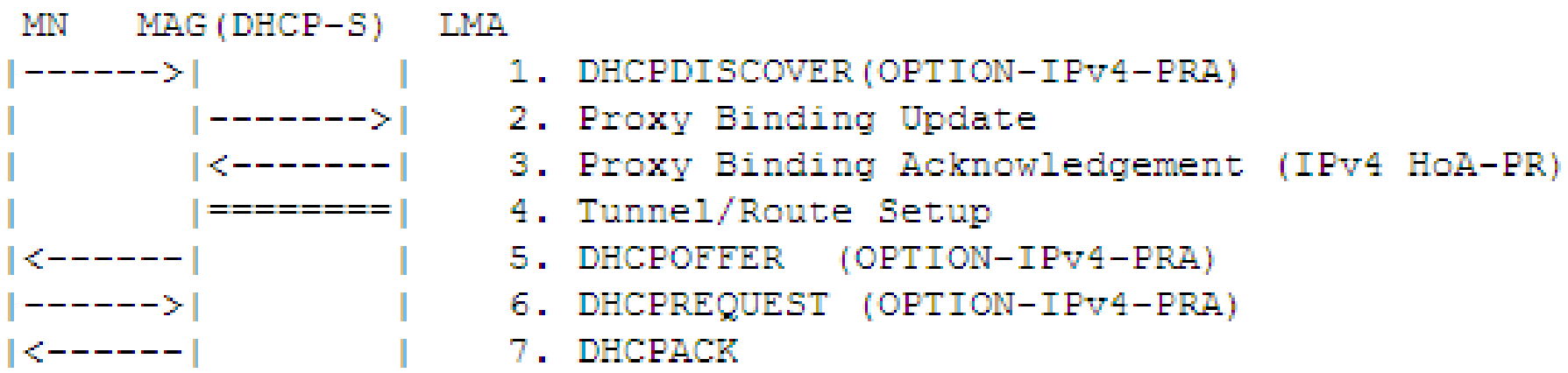
HA + PRR + Binding Table (binding identifier=IPv6 CoA)

Message Flows - DSMIP

- IPv4 Data Flow with Binding Table
- Incoming IPv4 datagrams are tunneled in IPv4-in-IPv6 tunnel to MN after binding table search
- Stateless mode: no binding table, PRR generates an IPv6 address and encapsulates IPv4 datagram without binding table search
- DS-Lite network mode: HA uses DHCPv6 to get port range IPv4 HoA

Message Flows - PMIP

- MN gets Port Range Home Address

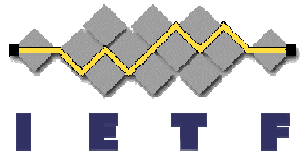


LMA Binding cache includes port range

LMA + PRR + Binding Table (binding identifier=Proxy-CoA)

Message Flows - PMIP

- IPv4 Data Flow with Binding Table
- Outgoing IPv4 datagrams: MN sends it in IPv4 to MAG, MAG encapsulates in IPv6 and sends to LMA
- Incoming IPv4 datagrams are tunneled in IPv4-in-IPv6 tunnel to MAG at Proxy-CoA after binding table search
- Stateless mode: no binding table, no PRR IPv6 address generation, LMA finds Proxy-CoA in binding cache and encapsulates IPv4 datagram without binding table search
- DS-Lite network mode: MAG uses DHCPv6 to get port range IPv4 HoA or encapsulates DHCPv4 messages in IPv6



Thank you