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Access Network Information Option for Proxy Mobile IPv6
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Abstract

This specification defines a mechanism and a related mobility option for carrying the access network identifier and the access operator identification information from the mobile access gateway to the local mobility anchor over Proxy Mobile IPv6. Based on the received information, the local mobility anchor is able to provide access network and access operator specific handling or policing for the mobile node traffic.

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1. Introduction

In many deployments there is a need for the local mobility anchor to provide differentiated services and policing to the mobile nodes based on the access network to which they are attached. Policy systems in mobility architectures such as PCC [TS23203] and ANDSF [TS23402] in 3GPP system allow configuration of policy rules with conditions based on the access network information. For example, the service treatment for the mobile node's traffic may be different when they are attached to a access network owned by the home operator than when owned by a roaming partner. The service treatment can also be different based on the configured SSID in case of IEEE 802.11 based access networks.

The Proxy Mobile IPv6 specification [RFC5213] allows carrying of the Access Technology Type (ATT) information from the mobile access gateway to the local mobility anchor. However, the Access Technology Type alone is not sufficient for correct policy to be applied at the LMA and there is a need to ensure additional information related to the access network is available. Learning the access network operator identity may not be possible for an LMA without a support of an additional policy framework that is able to provide required information out of band to the LMA. Such a policy framework may not be required for all Proxy Mobile IPv6 deployments and hence an alternative approach for carrying such information is required to ensure that additional information related to the access network is available.

This document defines a new mobility option, Access Network Identifier (ANI) option for Proxy Mobile IPv6 (PMIPv6), that can be used by mobile access gateway (MAG) for carrying the access network information to the local mobility anchor. The specific details on how the local mobility anchor uses this information is out-of-scope for this document.

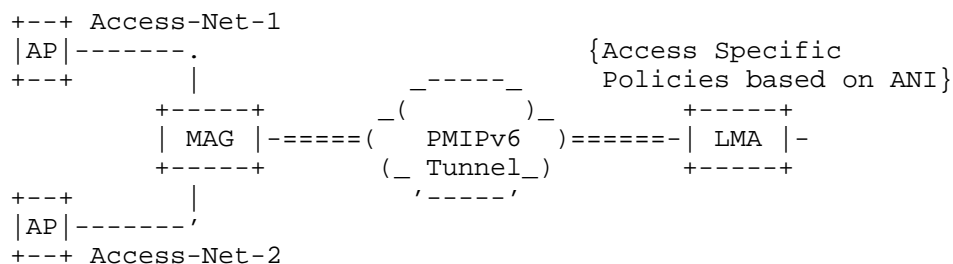


Figure 1: Access Networks attached to MAG

Figure 1, illustrates the scenario where the IEEE 802.11 Access Points are configured to the mobile access gateway.

2. Conventions and Terminology

2.1. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

2.2. Terminology

All the mobility related terms used in this document are to be interpreted as defined in the Proxy Mobile IPv6 specifications [RFC5213] and [RFC5844]. Additionally, this document uses the following abbreviations:

ANDSF

Access Network Discovery and Selection Framework

PCC

Policy and Charging Control Framework

Service Set Identifier

Service Set Identifier (SSID) identifies the name of the IEEE 802.11 network. SSID differentiates from one network to the other.

Vendor ID

The Vendor ID is the SMI Network Management Private Enterprise Code of the IANA-maintained Private Enterprise Numbers registry [SMI].

3. Protocol Considerations

The following considerations apply to the local mobility anchor and the mobile access gateway.

- o The conceptual Binding Cache entry data structure maintained by the local mobility anchor, described in Section 5.1 of [RFC5213], MUST be extended to store the access network information

associated with the current session. Specifically, the following parameters must be defined.

Network Identifier

Operator Identifier

- o The conceptual Binding Update List entry data structure maintained by the mobile access gateway, described in Section 6.1 of [RFC5213], MUST be extended to store the access network information associated with the current session. Specifically, the following parameters must be defined.

Network Identifier

Operator Identifier

- o The mobile access gateway may be statically configured with the access network information related to the access links its attached to. In access systems where the mobile access gateway is attached to a micro-mobility domain such as IEEE 802.11 WLAN domain, the DHCP relay agent function in that micro-mobility domain may be configured to add the access network information in DHCP option (82), which is the DHCP Relay Agent Information option [RFC3046]. The mobile access gateway may learn the access network information from this option.
- o On receiving a Proxy Binding Update message [RFC5213] from a mobile access gateway with the Access Network Information option, the local mobility anchor must process the option and update the corresponding fields in the Binding Cache entry.
- o The local mobility anchor MAY choose to use the access network information options for applying any access operator specific handling or policing of the mobile node traffic.

4. Access Network Identifier Option

A new option, Access Network Information option, is defined for using it in Proxy Binding Update (PBU) and Proxy Binding Acknowledgement (PBA) messages exchanged between a local mobility anchor and a mobile access gateway. This option is used for carrying the information related to the access network to which the mobile node is attached.

The alignment requirement for this option is 4n.

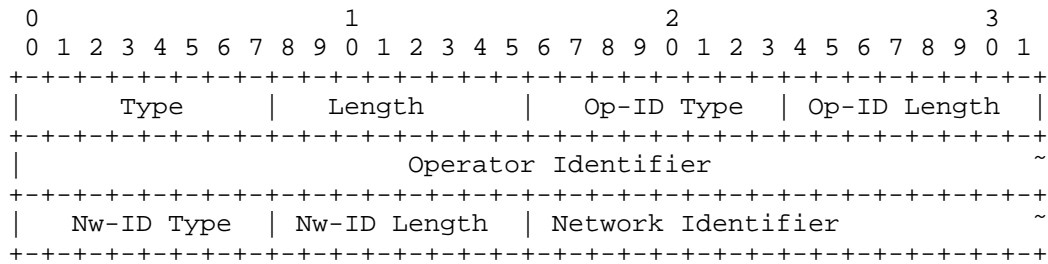


Figure 2: Access Network Identifier Option

Type

TBD by IANA

Length

8-bit unsigned integer indicating the length in octets of the option, excluding the type and length fields.

Op-ID Type

8-bit unsigned integer indicating the type of the Operator Identifier. Currently the following types are defined:

1. reserved.
2. Vendor ID as a Private Enterprise Number [SMI].
3. Realm of the operator. Realm names are required to be unique, and are piggybacked on the administration of the DNS namespace.

Op-ID Length

8-bit unsigned integer indicating the number of octets-1 needed to encode the Operator Identifier.

Operator Identifier

Up to 256 octets of the operator identifier. The encoding of the identifier depends on the used OP-ID Type.

Nw-ID Type

8-bit unsigned integer indicating the type of the Network Identifier. Currently the following types are defined:

1. reserved.
2. SSID of the IEEE 802.11 network.
3. Geolocation of the Access Point

Nw-ID Length

8-bit unsigned integer indicating the number of octets-1 needed to encode the Network Identifier.

Network Identifier

Up to 256 octets of the network identifier. The encoding of the identifier depends on the used Nw-ID Type.

5. IANA Considerations

This specification defines a new Mobility Header option, the Access Network Information. This option is described in Section 4. The Type value for this option needs to be assigned from the same numbering space as allocated for the other mobility options, as defined in [RFC3775].

Furthermore, this specification creates a two new name spaces: Op-ID Type ND Nw-ID Type. Both are described with their initial allocations in Section 4. These two name spaces are placed under the Mobile IPv6 parameters registry for [RFC3775].

6. Security Considerations

The Access Network Information option defined in this specification is for use in Proxy Binding Update and Proxy Binding Acknowledgement messages. This option is carried like any other mobility header option as specified in [RFC3775] and does not require any special security considerations.

The Access Technology Type option [RFC5213] is always present in the Proxy Binding Update and Proxy Binding Acknowledgement messages. Carrying additional details related to the access network to which the mobile node is attached does not introduce any new security

vulnerabilities.

7. Acknowledgements

The authors would also like to acknowledge all the discussions related to carrying Access Network Information option in Proxy Mobile IPv6 protocol signaling. Additionally, the authors would like to thank Stefano Faccin, Gerardo Gieratta, Rajesh Pazhyannur, and Eric Voit for all the discussions around this topic.

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