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Cisco's Mobile IPv4 Host Configuration Extensions

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This RFC does not offer any security mechanisms to provide data origin authentication and integrity, yet these security services are vitally important in this context.

Abstract

An IP device requires basic host configuration to be able to communicate. For example, it will typically require an IP address and the address of a DNS server. This information is configured statically or obtained dynamically using Dynamic Host Configuration Protocol (DHCP) or Point-to-Point Protocol/IP Control Protocol (PPP/IPCP). However, both DHCP and PPP/IPCP provide host configuration based on the access network. In Mobile IPv4, the registration process boots up a Mobile Node at an access network, also known as a foreign network. The information to configure the

host needs to be based on the home network. This document describes the Cisco vendor-specific extensions to Mobile IPv4 to provide the base host configuration in Registration Request and Reply messages.

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1. Introduction

An IPv4 device requires some basic configuration to communicate with other nodes. Typically, it has an IP address for an interface and DNS server's IP address to resolve the peer's hostname to an IP address. DHCP [RFC2131] and PPP/IPCP [RFC1332] provide host configuration information on the access network interface, but this is inadequate in a Mobile IPv4 environment. In Mobile IPv4 [RFC3344], a Mobile Node has a virtual network interface on the home network, anchored by the Home Agent. The IP address, home subnet prefix, default gateway, and home network's DNS servers are essential in the boot up of a network interface. In some cases, these are the only pieces of information needed by the Mobile Node.

The Mobile IPv4 registration process provides the mechanism for a Mobile Node to boot up on a foreign network. Upon the successful registration, the Mobile Node can communicate with the Correspondent Node. The need to provide an efficient method to obtain the host configuration exists. If the Mobile Node is a DHCP client, it can obtain configuration parameters from the DHCP server in the home network after the initial registration.

This document introduces the Cisco vendor-specific extensions (VSEs) [RFC3115] to provide the means for a Mobile Node to download some fundamental configuration associated with the home network via the

Home Agent. These extensions provide information for home subnet prefix, DNS server, DHCP server, DHCP client identifier, default gateway, DNS suffix, and configuration URL.

2. Host Configuration Extensions Summary

The following Cisco vendor-specific extensions provide the host configuration for a Mobile Node. The "Host Configuration Request" extension is allowed only in the Registration Request. The rest of the extensions are appended in the Registration Reply.

- Host Configuration Request
  - Request for host configuration information from the Mobile Node to the Home Agent.
- Home Network Prefix Length
  - The length of the subnet prefix on the home network.
- Default Gateway
  - The default gateway's IP address on the home network.
- DNS Server
  - The DNS server's IP address in the home network.
- DNS Suffix
  - The DNS suffix for hostname resolution in the home network.
- DHCP Client ID
  - The DHCP Client ID used to obtain the IP address. When the Mobile Node returns home and is responsible for managing its own address, this information maps to the client identifier option as defined in section 9.14 of [RFC2132] and referenced in [RFC2131].
- DHCP Server
  - The DHCP server's IP address in the home network.
- Configuration URL
  - The URL for the Mobile Node to download configuration parameters from a server.

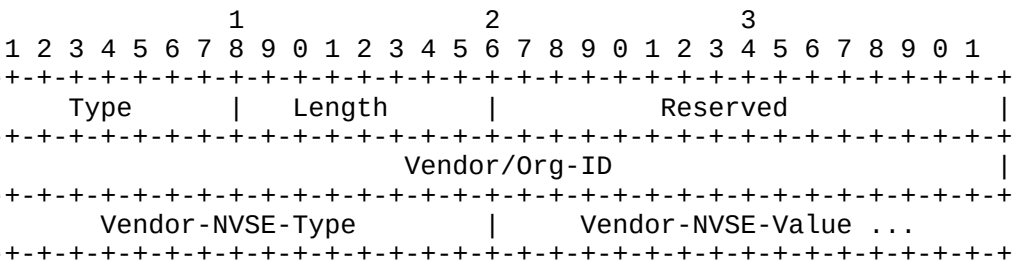
When the Mobile Node needs to obtain its host configuration, the Host Configuration Request VSE is appended to the Registration Request. This VSE indicates to the Home Agent that either all or selected host configuration VSEs need to be appended to the Registration Reply. If the Home Agent retrieved the information from a DHCP server (in Proxy DHCP mode), then the DHCP Client ID and DHCP Server extensions are appended in the Registration Reply. These DHCP-related extensions are populated with values that had been used in the DHCP messages exchanged between the Home Agent and the DHCP server.

The VSEs are authenticated as part of the registration message using any of the authentication mechanism defined for Mobile IP ([RFC3344], [RFC3012]).

This message MAY contain extensions defined in Mobile IP, including vendor-specific extensions [RFC3115].

3. Host Configuration Extensions

Cisco's host configuration extensions to Mobile IPv4 are based on the vendor-specific extensions defined in [RFC3115]. The format of the VSE TLV (Type-Length-Value) is as follows:



Type: 134

Length:

Indicates the length (in bytes) of the data field within this extension, excluding the Type and Length fields.

Reserved:

Reserved for future use. To be set to 0 while sending, ignored on reception.

Vendor/Org-ID:

9 (Cisco Systems)

Vendor-NVSE-Type:

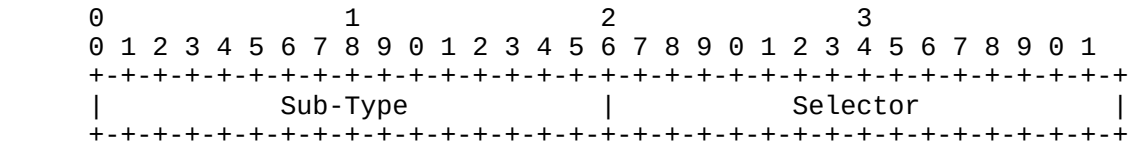
14 (Host Configuration)

Vendor-NVSE-Value:

Format is shown below for each subtype. The Sub-Type field is an integer from 0 to 255.

3.1. Host Configuration Request Extension

This format of the Host Configuration Request extension is shown below.



Sub-Type:

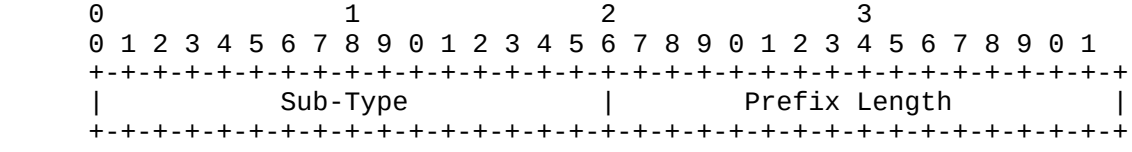
0

Selector:

0 indicates all host configuration available to the Home Agent (HA) is requested by the Mobile Node.

3.2. Home Network Length Prefix Extension

This format of the Home Network Prefix Length extension is shown below.



Sub-Type:

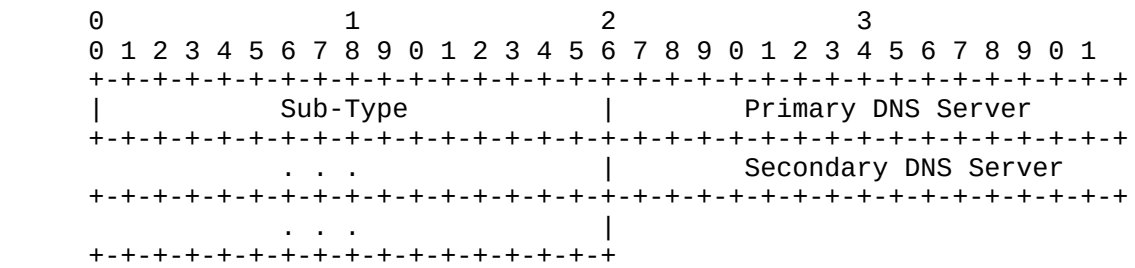
1

Prefix Length:

The number of bits in the home subnet prefix.

3.3. DNS Server Extension

This format of the DNS Server extension is shown below.



Sub-Type:

2

Primary DNS Server:

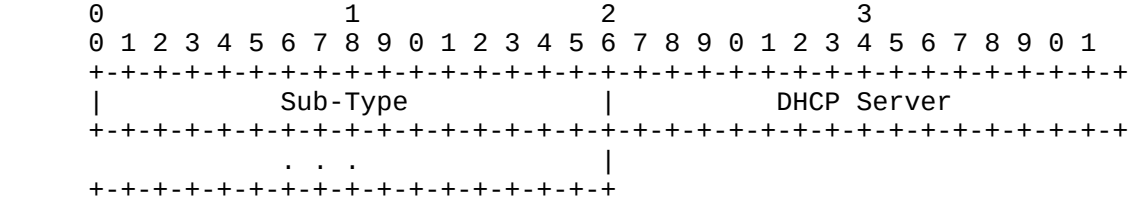
The IP address of the primary DNS server.

Secondary DNS Server:

The IP address of the secondary DNS server.

3.4. DHCP Server Extension

This format of the DHCP Server extension is shown below.



Sub-Type:

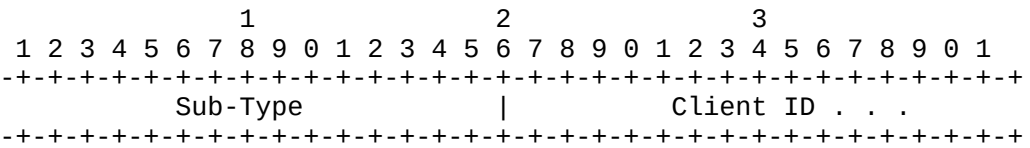
3

DHCP Server:

The IP address of the DHCP server.

3.5. DHCP Client ID Extension

This format of the DHCP Client ID extension is shown below.



Sub-Type:

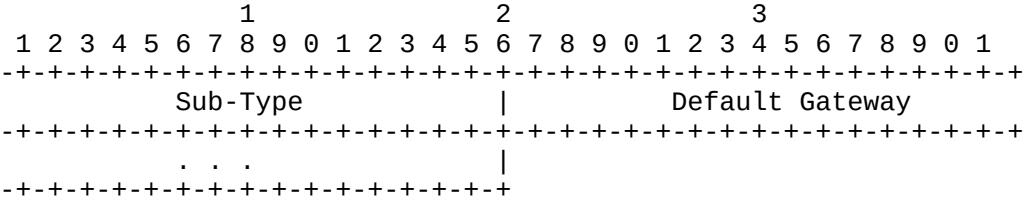
4

Client ID:

DHCP servers use this value to index their database of address bindings. This value is expected to be unique for all clients in an administrative domain. The size of field is between 2 and 255 octets.

3.6. Default Gateway Extension

This format of the Default Gateway extension is shown below.



Sub-Type:

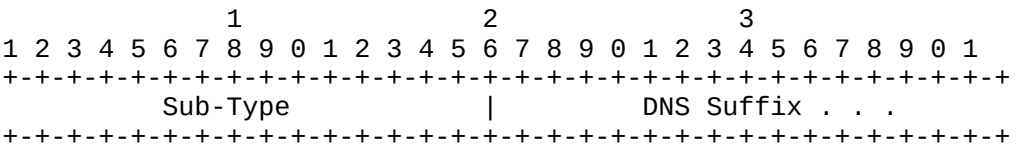
5

Default Gateway:

The IP address of the default gateway for the Mobile Node on the home network.

3.7. DNS Suffix Extension

This format of the DNS Suffix extension is shown below.



Sub-Type:

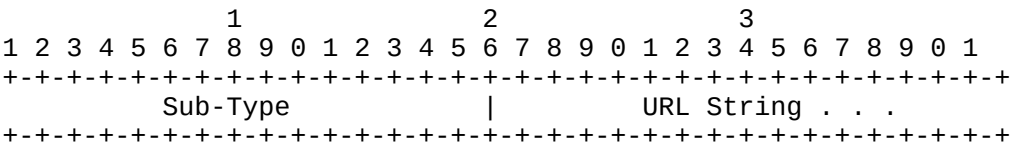
6

DNS Suffix:

The DNS suffix to be appended to the name of Mobile Node when completing its fully qualified domain name (FQDN). The size of field is between 1 and 246 octets.

3.8. Configuration URL Extension

This format of the Configuration URL extension is shown below.



Sub-Type:

7

URL String:

The Mobile Node can retrieve configuration parameters via the URL. The URL is at most 246 bytes in length.

4. Security Considerations

The host configuration extensions follow the same rules for Mobile IP extensions in registration messages. See the Security Considerations section in RFC 3344.

The Configuration URL extension may trigger the Mobile Node to download the configuration parameters from a server. The protection of the data transfer is outside the scope of this document. Possible options include encryption of data before transfer or using HTTPS.

5. Acknowledgements

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6. Informative References

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