PMIP Mobility - 3G Mobility Anchor

The 3G Mobility Anchor(3GMA) feature acts as an anchor point for 3G User Equipment (UE). 3GMA functions as the DHCP server for Gateway general packet radio service (GPRS) Support Node (GGSN)/Packet Data Serving Node (PDSN), and as a Local Mobility Anchor (LMA) towards Wi-Fi Mobile Access Gateway (MAG).

This module describes the 3G Mobility Anchor feature.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Prerequisites for 3G Mobility Anchor

You must configure the IPv4 and IPv6 address pools for the Local Mobility Anchor (LMA) to assign IPv4 or IPv6 addresses.

Information about PMIP Mobility - 3G Mobility Anchor

3G Mobility Anchor Overview

Third-generation Mobility Anchor (3GMA) is the default gateway for Packet Data Serving Node (PDSN)/General Packet Radio Service (GPRS) Support Node (GGSN). A 3GMA node is placed on Gi interface of the PDSN/GGSN to serve as an anchor point for 3G User Equipments (UEs). Gi interface is the reference point between a GPRS network and an external packet data network. 3GMA node works as a DHCP server towards GGSN/PDSN, and as an LMA towards a WiFi MAG. 3GMA node assigns an IP address and responds to DHCP messages from GGSN/PDSN. UEs are configured with a specific Access Point Names (APNs); when a UE connects to this APN, PDSN/ GGSN is configured to operate in Proxy DHCP mode, instead of using local address pool. In 3GMA mode, the IP address assigned to the mobile is obtained from an external DHCP server (3GMA node). Local Mobility Anchor (LMA) functionality described in RFC 5213 can also be configured in 3GMA mode.

Local Mobility Anchor

Local Mobility Anchor (LMA) is the home agent for a mobile node (MN) in a Proxy Mobile IPv6 (PMIPv6) domain. It is the topological anchor point for MN home network prefixes and manages the binding state of an MN. An LMA has the functional capabilities of a home agent as defined in the Mobile IPv6 base specification (RFC 3775) along with the capabilities required for supporting the PMIPv6 protocol.

Note Use the **dynamic mag learning** command to enable LMA to accept Proxy Mobile IPv6 (PMIPv6) signaling messages from any Mobile Access Gateway (MAG) that is not configured locally.

Mobile Node

Mobile node (MN) is an IP host and the mobility of the MN is managed by a network. MN can be an IPv4-only node, an IPv6-only node, or a dual-stack node, which is a node with IPv4 and IPv6 protocol stacks. MN is not required to participate in any IP mobility-related signaling for achieving mobility for an IP address or a prefix that is obtained in the Proxy Mobile IPv6 (PMIPv6) domain.

Radio Access Technology Type

A radio access type (RAT) refers to the method of allocating radio resources in a wireless network for communication in the uplink (user to network) and downlink (network to user). RAT indicates the type of radio technology used to access a Core Network (CN), which is the central part of a telecommunication network that provides various services to customers who are connected by the access network. RAT is implemented by the radio access network (RAN) that resides between a device such as a mobile phone, a computer, or any remotely controlled machine, and provides connection with its CN. Mobile phones and other wireless connected devices are known as user equipment (UE). Examples of RAT types include Worldwide Interoperability for Microwave Access (WiMAX), Wireless Local Area Network (WLAN), and 3GPP

How to Configure PMIP Mobility - 3G Mobility Anchor

Configuring LMA in 3GMA Mode

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip local pool** *pool-name low-ip-address high-ip-address*
4. **ipv6 local pool** *pool-name prefix/prefix-length assigned-length*
5. **ipv6 unicast-routing**
6. **ipv6 mobile pmipv6-lma** *lma-id* **domain** *domain-name*
7. **address ipv6** *ipv6-address*
8. **network** *network1*
9. **pool ipv4** *pool-name* **pfxlen** *number*
10. **pool ipv6** *pool-name* **pfxlen** *number*
11. **exit**
12. **default profile** *profile-name*
13. **role 3gma**
14. **interface** *interface-type*
15. **rat** *rat-type* **priority** *priority-number*
16. **end**
17. **show ipv6 mobile pmipv6 lma binding**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ip local pool** *pool-name low-ip-address high-ip-address* **Example:** `Device(config)# ip local pool v4pool 209.165.201.1 209.165.201.10`	Creates a local pool of IPv4 addresses.

	Command or Action	Purpose

Step 4	**ipv6 local pool** *pool-name* *prefix/prefix-length* *assigned-length*
	
	Example:
	
	`Device(config)# ipv6 local pool v6pool`
	`2001:0DB8::/32 64`
		Creates a local pool of IPv6 addresses.

Step 5	**ipv6 unicast-routing** **Example:** `Device(config)# ipv6 unicast-routing`	Enables IPv6 routing.

Step 6	**ipv6 mobile pmipv6-lma** *lma-id* **domain** *domain-name*
	
	Example:
	
	`Device(config)# ipv6 mobile pmipv6-lma lma1 domain`
	` dn1`
		Enables the Local Mobility Anchor (LMA) service on the device, configures the Proxy Mobile IPv6 (PMIPv6) domain for the LMA, and enters LMA configuration mode.

Step 7	**address ipv6** *ipv6-address*
	
	Example:
	
	`Device(config-ipv6-pmipv6-lma)# address ipv6`
	`2001:DB8::1`
		Configures an IPv6 address for the LMA.

Step 8	**network** *network1* **Example:** `Device(config-ipv6-pmipv6-lma)# network network1`	Associates a network, on which an IPv4 or IPv6 pool is configured, with the LMA, and enters LMA-network configuration mode.

Step 9	**pool ipv4** *pool-name* **pfxlen** *number*
	
	Example:
	
	`Device(config-ipv6-pmipv6lma-network)# pool ipv4`
	` v4pool pfxlen 24`
		Specifies the name of the IPv4 address pool from which a home address is allocated to an mobile node (MN) subscriber.

Step 10	**pool ipv6** *pool-name* **pfxlen** *number*
	
	Example:
	
	`Device(config-ipv6-pmipv6lma-network)# pool ipv6`
	` v6pool pfxlen 24`
		Specifies the name of the IPv6 address pool from which a home address is allocated to the MN subscriber.

Step 11	**exit** **Example:** `Device(config-ipv6-pmipv6lma-network)# exit`	Exits the LMA-network configuration mode and enters LMA configuration mode.

	Command or Action	Purpose
Step 12	**default profile** *profile-name* **Example:** `Device(config-ipv6-pmipv6-lma)# default profile profile1`	Enables the default profile for the MN.
Step 13	**role 3gma** **Example:** `Device(config-ipv6-pmipv6-lma)# role 3gma`	Enables 3GMA and enters 3GMA mode. **Note** Specifying at least one interface is mandatory. The **role 3gma** command does not work if no interface is specified.
Step 14	**interface** *interface-type* **Example:** `Device(config-ipv6-pmipv6lma-role)# interface Ethernet 1`	Configures 3GMA interface on LMA.
Step 15	**rat** *rat-type* **priority** *priority-number* **Example:** `Device (config-ipv6-pmipv6lma-role)# rat wlan priority 2`	Sets the priority for Radio Access Type (RAT).
Step 16	**end** **Example:** `Device (config-ipv6-pmipv6lma-role)# end`	Exits 3GMA role configuration mode and enters privileged EXEC mode.
Step 17	**show ipv6 mobile pmipv6 lma binding** **Example:** `Device# show ipv6 mobile pmipv6 lma binding`	Displays the list of the LMA bindings established over the Proxy Mobile IPv6 (PMIPv6) signaling plane.

Configuration Examples for PMIP Mobility - 3G Mobility Anchor

Example: Configuring LMA in 3GMA Mode

The following example shows how to configure LMA in 3GMA mode:

```
Device> enable
Device# configure terminal
Device(config)# ip local pool v4pool 209.165.201.1 209.165.201.10
Device(config)# ipv6 local pool v6pool 2001:0DB8::/32 64
Device(config)# ipv6 unicast-routing
Device(config)# ipv6 mobile pmipv6-lma lma1 domain dn1
Device(config-ipv6-pmipv6-lma)# address ipv6 2001:DB8::1
```

```
Device(config-ipv6-pmipv6-lma)# network network1
Device(config-ipv6-pmipv6lma-network)# pool ipv4 v4pool pfxlen 24
Device(config-ipv6-pmipv6lma-network)# pool ipv6 v6pool pfxlen 24
Device(config-ipv6-pmipv6lma-network)# exit
Device(config-ipv6-pmipv6-lma)# default profile profile1
Device(config-ipv6-pmipv6-lma)# role 3gma
Device(config-ipv6-pmipv6lma-role)# interface Ethernet 1
Device (config-ipv6-pmipv6lma-role)# rat wlan priority 2
Device (config-ipv6-pmipv6lma-role)# end
Device# show ipv6 mobile pmipv6 lma binding
```

Additional References for PMIP Mobility - 3G Mobility Anchor

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Command List, All Releases
IP mobility commands	Cisco IOS IP Mobility Command Reference

Standards and RFCs

Standard/RFC	Title
RFC 3775	*Mobility Support in IPv6*
RFC 5213	*Proxy Mobile IPv6*
RFC 5844	*IPv4 Support for Proxy Mobile IPv6*
RFC 5845	*Generic Routing Encapsulation (GRE) Key Option for Proxy Mobile IPv6*
RFC 5846	*Binding Revocation for IPv6 Mobility*

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for PMIP Mobility - 3G Mobility Anchor

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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Table 1: Feature Information for PMIP Mobility - 3G Mobility Anchor

Feature Name	Releases	Feature Information
PMIP Mobility - 3G Mobility Anchor	Cisco IOS XE Release 3.9S	The 3G Mobility Anchor(3GMA) feature acts as an anchor point for 3G User Equipment (UE). 3GMA functions as the DHCP server for Gateway general packet radio service (GPRS) Support Node (GGSN)/Packet Data Serving Node (PDSN), and as a Local Mobility Anchor (LMA) towards Wi-Fi Mobile Access Gateway (MAG). The following commands were introduced or modified: **rat**, **role 3gma**, **interface (proxy mobile IPv6)**, and **show ipv6 mobile pmipv6 lma binding**

Feature Information for PMIP Mobility - 3G Mobility Anchor