Overview of the Intelligent Wireless Access Gateway

Service providers use a combination of WiFi and mobility offerings to offload their mobility networks in the area of high-concentration service usage. This led to the evolution of the Intelligent Wireless Access Gateway (iWAG).

The iWAG provides a WiFi offload option to 4G and 3G service providers by enabling a single-box solution that provides the combined functionality of Proxy Mobile IPv6 (PMIPv6) and GPRS Tunneling Protocol (GTP) on the Cisco Intelligent Services Gateway (Cisco ISG) framework. This document provides information about the iWAG and how to configure it, and contains the following sections:

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 at the end of this module.

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 the iWAG

- Enable mobile client service abstraction (MCSA).
- Enable the **ipv6 unicast-routing** command.

Restrictions for the iWAG

- Roaming from a 3G mobility network to a WLAN is not supported for the GTP and Cisco ISG sessions.
- IP subscriber-routed (L3) sessions are not supported.
- IPv6 and quality of service (QoS) are not supported in a 3G mobility network.
- Only newly established calls are offloaded to the WLAN Third-Generation Partnership Project (3GPP) IP access.
- The iWAG solution for WLAN offload is currently available only for the 3G Universal Mobile Telecommunications System (UMTS).

Information About the iWAG

The iWAG deployment includes a combination of simple IP users (traditional ISG and WiFi) and mobile IP users (PMIPv6 or GTP tunneling). The term *mobility service* is used to refer to either the GTP service or the PMIPv6 service applied to user traffic. The iWAG provides mobility services to mobile IP users, and as a result, a mobile client can seamlessly access a 3G or 4G mobility network. However, the iWAG does not provide mobility services to simple IP users. Therefore, simple IP users can access the Public Wireless LAN (PWLAN) network through the Cisco ISG. Clients are devices that access WiFi Internet (public wireless), where possible. However, if WiFi is not available, the same clients can

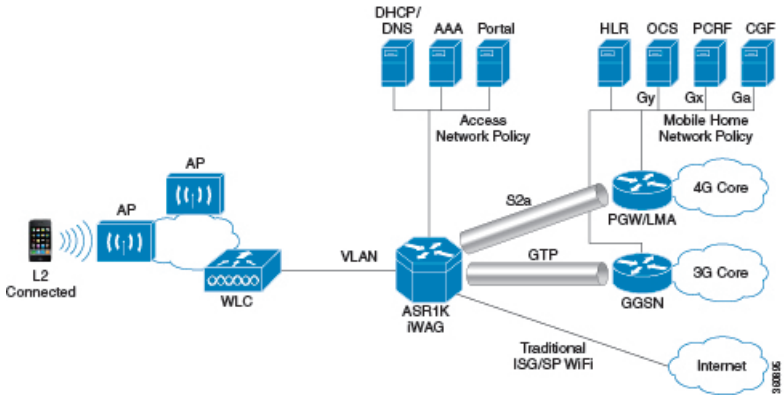
connect to the Internet service using a 3G or 4G mobility network.

The iWAG has a transport or switching element with Cisco ISG subscriber awareness. The iWAG also has RADIUS-based authentication and accounting, and policy-based subscriber routing for the WiFi wholesale model.

For more information about the iWAG, see the Overview of iWAG video.

The following figure shows a deployment model of the iWAG on a Cisco ASR 1000 Series Aggregation Services Router.

Figure 1: iWAG Deployment on a Cisco ASR 1000 Series Aggregation Services Router



Benefits of the iWAG

The iWAG offers the following benefits for mobile operators:

- Reduces network congestion by reducing OpEx and increasing network efficiency by offloading 3G and 4G traffic.
- Provides access to 3G and 4G core inspite of a lack of or weak cell signal, leading to subscriber retention.
- Lowers CapEx on per user basis or bandwidth basis in dense metro environments.

The iWAG offers the following benefits for wireline and WiFi operators:

- Provides WiFi security and subscriber control. Delivers scalable, manageable, and secure wireless connectivity.
- Enables new revenue-sharing business models, such as Mobile Virtual Network Operators (MVNO) and others.
- Delivers a WiFi platform that offers new location-based services.

The iWAG offers the following benefits for subscribers:

- Provides enhanced quality of experience to subscribers on WiFi networks.
- Provides unified billing across access networks.
- Provides mobility across radio access technologies—3G or 4G to WiFi and WiFi to WiFi.
- Provides multiple options within the WiFi platform, thereby enabling location-based services.

AAA Attributes

The following table lists the authentication, authorization, and accounting (AAA) attributes required for the iWAG configuration:

Note The following indicate the availability of the attributes:

C: Conditional

M: Mandatory

O: Optional

N: Not present

Table 1: iWAG AAA Attributes

Attribute /Subattribute	Attribute Name	Value	Description	ARq[1]	AA[2]	ARj[3]	AS[4]	CoA[5]
1	User Name	String	Network Access Identifier	M	M	M	O	C

Attribute /Subattribute	Attribute Name	Value	Description	ARq[1]	AA[2]	ARj[3]	AS[4]	CoA[5]
4	NAS-IP -Address	String	IP address of the MAG	M	N	N	M	O
31	Calling-Station-ID	String	MAC address of the mobile node	M	M	M	M	M
26/10415/1	3GPP-IMSI	String	3GPP IMSI	N	O	N	N	O
26/10415/13	3GPP -Charging -Characteristics	String	Rules for producing charging information	N	O	N	O	O
26/9/1	Cisco-Service -Selection	String	Service Identifier (APN)	N	C	N	N	C
26/9/1	Cisco -Mobile -Node -Identifier	String	Mobile Node Identifier	N	M	N	M	C
26/9/1	Cisco -WLAN -SSID	String	SSID of the Access Point	C	N	N	C	N
26/9/1	Cisco -MSISDN	String	Mobile Subscriber ISDN number	N	C	N	C	C
26/9/1	Cisco-MN -Service	ENUM • none • ipv4 • ipv6 • dual	Mobile Node Service type	N	M	N	M	O

Attribute /Subattribute	Attribute Name	Value	Description	ARq[1]	AA[2]	ARj[3]	AS[4]	CoA[5]
26/9/1	Cisco-MPC -Protocol -Interface	ENUM • none • pmipv6 • gtpv1 • pmipv4	Protocol Interface to be used for interfacing with MPC	N	M	N	O	O
26/9/1	Cisco -Multihoming -Support	Binary	True/False: Multihoming support for mobile node	N	O	N	N	O
26/9/1	Cisco -Uplink -GRE -Key	Integer	32-bit GRE Key to be used on the uplink path (4-octet hex encoding)	N	O	N	N	O
26/9/1	Cisco -Downlink -GRE -Key	Integer	32-bit GRE Key to be used on the downlink path (4-octet hex encoding)	N	O	N	N	O
26/9/1	Cisco -Home -LMA -IPv6 -Address	String	Mobile node's Home LMA IPv6 address	N	C	N	N	O
26/9/1	Cisco -Visited -LMA -IPv6 -Address	String	Mobile node's Visited LMA IPv6 address	N	C	N	N	O

Attribute /Subattribute	Attribute Name	Value	Description	ARq[1]	AA[2]	ARj[3]	AS[4]	CoA[5]
26/9/1	Cisco -Home -LMA -IPv4 -Address	IPv4 Address	Mobile node's Home LMA IPv4 address	N	C	N	N	O
26/9/1	Cisco -Visited -LMA -IPv4 -Address	IPv4 Address	Mobile node's Visited LMA IPv4 address	N	C	N	N	O
26/9/1	Cisco -Home -IPv4 -Home -Address	IPv4 Address	Mobile node's Visited LMA IPv4 address	N	O	N	N	C
26/9/1	Cisco -Visited -IPv4 -Home -Address	IPv4 Address	Mobile node's Visited IPv4 address	N	O	N	N	C
26 /10415 /5	THREEGENPP _GPRS _QOS _PROFILE	String	GRPS QoS Profile	N	O	N	N	N
26 /10415 /7	THREEGENPP _GGSN _ADDRESS	IPv4 Address	GGSN's Address	N	O	N	N	N

Attribute /Subattribute	Attribute Name	Value	Description	ARq[1]	AA[2]	ARj[3]	AS[4]	CoA[5]
26/9/1	Cisco -Access -Vrf -Id	String	Access-side VRF ID	N	O	N	N	N
26/9/1	Cisco -Apn -Vrf -Id	IPv4 Address	GGSN's IPv4 address	N	O	N	N	N

1 Access Request
2 Access Accept
3 Access Reject
4 Accounting Start
5 Change of Authorization

Supported Hardware and Software Compatibility Matrix for the iWAG

Chassis	RP Memory	ESP
Cisco ASR 1001 Router	Integrated RP with 16 GB	Integrated
Cisco ASR 1002-X Router	Integrated RP with 16 GB	Integrated
Cisco ASR 1004 Router	RP2 16 GB	ESP-40G
Cisco ASR 1006 Router and Cisco ASR 1013 Router offering duplex RP or ESP setup	RP2 16 GB	ESP-40G
Cisco ASR 1006 Router and Cisco ASR 1013 Router offering duplex RP or ESP setup	RP2 16 GB	ESP-100G

For information about the field-replaceable units (FRUs) of the Cisco ASR 1000 Series Aggregation Services Routers supported by each ROMmon release, see the "ROMmon Release Requirements" section in the Cisco ASR 1000 Series Aggregation Services Routers Release Notes.

Stateless Inter-Chassis Redundancy Support Matrix for the iWAG

Session Tunneling	Local Breakout (No Tunneling)		GTPv1		GTPv2		PMIPv6 (IWAG=MAG)	
	With HSRP	*Without HSRP*	*With HSRP*	*Without HSRP*	*With HSRP*	*Without HSRP*	*With HSRP*	*Without HSRP*
Layer 2	Yes	No	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Layer 3	Yes	No	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
EoGRE	Yes	No	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported

How to Configure the iWAG

Configuring the iWAG for Simple IP Users

You must configure the Cisco Intelligent Services Gateway (ISG) for the iWAG to enable simple IP users to access Internet services.

The tasks listed below enable IP sessions and indicate how these sessions are identified. For detailed steps, see the "Creating ISG Sessions for IP Subscribers" section in the Intelligent Services Gateway Configuration Guide.

- Creating ISG IP interface sessions
- Creating ISG Static Sessions
- Creating ISG IP Subnet Sessions
- Configuring IP Session Recovery for DHCP-Initiated IP Sessions
- Verifying ISG IP Subscriber Sessions
- Clearing ISG IP Subscriber Sessions
- Troubleshooting ISG IP Subscriber Sessions

You must configure DHCP support in your network before performing the tasks listed below. For detailed steps on assigning IP addresses using DHCP, see the "Assigning ISG Subscriber IP Addresses by Using DHCP" section in the Intelligent Services Gateway Configuration Guide.

- Configuring an ISG Interface for Dynamic DHCP Class Association
- Configuring DHCP Server User Authentication
- Configuring a DHCP Class in a Service Policy Map
- Configuring a DHCP Class in a Service Profile or User Profile on the AAA Server

- Configuring a DHCP Server IP Address

Configuring the iWAG for 3G Mobile IP Users

You must configure GTP for the iWAG to allow access to 3G mobile IP users. The various tasks described in the following sections are mandatory for configuring the iWAG for 3G mobile IP users.

Configuring Authentication, Authorization, and Accounting for the iWAG

This section describes how to configure authentication, authorization, and accounting (AAA) for the iWAG on the Cisco ASR 1000 Series Aggregation Services Routers.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **aaa new-model**
4. **aaa group server radius** *group-name*
5. **server-private** *ip-address* **[auth-port** *port-number* | **acct-port** *port-number] [non-standard] [timeout seconds] [retransmit retries] [* **key** *string]*
6. **aaa authentication login {default |** *list-name}* { **[passwd-expiry]** *method1 [method2...]* }
7. **aaa authorization network** *authorization-name group server-group name*
8. **aaa authorization subscriber-service** *{default {cache* | *group* | *local}* | *list-name}* **method1 [method2...]**
9. **aaa accounting** { **auth-proxy**| *system* | *network* | *exec* | *connection* | *commands level* | *dot1x* } { { **default |** *list-name* } [**vrf** *vrf-name] {start-stop* | *stop-only* | *none}* **[broadcast]** *group group-name*
10. **action-type** *{none* | *start-stop* | *stop-only}*
11. **group** *{tacacs+ server-group}*
12. **aaa accounting** { **auth-proxy** | *system* | *network* | *exec* | *connection* | *commands level* | *dot1x* } { **default** |*list-name* } [**vrf** *vrf-name*] *{start-stop* | *stop-only* | *none}* **[broadcast] group** *group-name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router# enable`	Enables the privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**aaa new-model** **Example:** `Router(config)# aaa new-model`	Enables the AAA access control model.

	Command or Action	Purpose
Step 4	**aaa group server radius** *group-name* **Example:** `Router(config)# aaa group server radius AAA_SERVER_CAR`	Groups different RADIUS server hosts into distinct lists and methods.
Step 5	**server-private** *ip-address* **[auth-port** *port-number* | **acct-port** *port-number] [non-standard] [timeout seconds] [retransmit retries] [* **key** *string]* **Example:** `Router(config-sg-radius)# server-private 5.3.1.76 auth-port 2145 acct-port 2146 key cisco`	Configures the IP address of the private RADIUS server for the group server.
Step 6	**aaa authentication login {default |** *list-name}* { **[passwd-expiry]** *method1 [method2...]* } **Example:** `Router(config-sg-radius)# aaa authentication login default none`	Sets AAA authentication at login.
Step 7	**aaa authorization network** *authorization-name group server-group name* **Example:** `Router(config)# aaa authorization network ISG_PROXY_LIST group AAA_SERVER_CAR`	Runs authorization for all network-related service requests.
Step 8	**aaa authorization subscriber-service** *{default {cache | group | local} | list-name}* **method1 [method2...]** **Example:** `Router(config)# aaa authorization subscriber-service default local group AAA_SERVER_CAR`	Specifies one or more AAA authorization methods for the Cisco ISG to provide subscriber service.
Step 9	**aaa accounting** { **auth-proxy**| *system* | *network* | *exec* | *connection* | *commands level* | *dot1x* } { { **default |** *list-name* } [**vrf** *vrf-name] {start-stop | stop-only | none}* **[broadcast]** *group group-name* **Example:** `Router(config)# aaa accounting network PROXY_TO_CAR`	Enables AAA accounting of requested services for billing and security purposes when either the RADIUS server or the TACACS+ server is used.
Step 10	**action-type** *{none | start-stop | stop-only}* **Example:** `Router(cfg-acct-mlist)# action-type start-stop`	Enables the type of actions to be performed on accounting records.
Step 11	**group** *{tacacs+ server-group}* **Example:** `Router(cfg-preauth)# group AAA_SERVER_CAR`	Specifies the AAA TACACS+ server group to use for preauthentication.

	Command or Action	Purpose
Step 12	**aaa accounting** { **auth-proxy** | *system* | *network* | *exec* | *connection* | *commands level* | *dot1x* } { **default** | *list-name* } [**vrf** *vrf-name*] *{start-stop | stop-only | none}* **[broadcast] group** *group-name* **Example:** `Router(config)# aaa accounting network ISG_PROXY_LIST start-stop group AAA_SERVER_CAR`	Enables AAA accounting of requested services for billing and security purposes when you use either the RADIUS server or the TACACS+ server.

Configuring DHCP when the iWAG Acts as a DHCP Proxy

This section describes how to configure the Dynamic Host Configuration Protocol (DHCP) for the iWAG solution when the iWAG acts as a DHCP proxy.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip dhcp excluded-address** *[vrf vrf-name] ip-address*
4. **ip dhcp pool** *pool-name*
5. **network network-number** *[mask [secondary] | /prefix-length [secondary]*
6. **default-router ip-address** *[last-ip-address]*
7. **domain-name** *domain*
8. **lease** *{days [hours [minutes]] | infinite}*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables the privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**ip dhcp excluded-address** *[vrf vrf-name] ip-address* **Example:** `Router(config)# ip dhcp excluded-address 192.168.10.1`	Specifies the IP address that a DHCP server should not assign to DHCP clients.
Step 4	**ip dhcp pool** *pool-name* **Example:** `Router(config)# ip dhcp pool test`	Configures a DHCP address pool on a DHCP server and enters the DHCP pool configuration mode.

	Command or Action	Purpose
Step 5	**network network-number** *[mask [secondary] | /prefix-length [secondary]* **Example:** `Router(dhcp-config)# network 192.168.0.0 255.255.0.0`	Configures the network number and mask for a DHCP address pool primary subnet or DHCP address pool secondary subnet on a Cisco IOS DHCP server.
Step 6	**default-router ip-address** *[last-ip-address]* **Example:** `Router(dhcp-config)# default-router 192.168.10.1`	Specifies the default router list for a DHCP client.
Step 7	**domain-name** *domain* **Example:** `Router(dhcp-config)# domain-name example.com`	Specifies the domain name for a DHCP client.
Step 8	**lease** *{days [hours [minutes]] | infinite}* **Example:** `Router(dhcp-config)# lease 1 2 2`	Configures the duration of the lease for an IP address that is assigned from a Cisco IOS DHCP server to a DHCP client. **Note** The DHCP pool lease time is applicable only to *simple* sessions. For mobile GTP sessions, lease time from the GTP configuration will be used. Under the GTP configuration, lease duration should be configured the same way as the address hold timer in the GGSN or PGW.

Configuring the Cisco ISG Class Map and Policy Map for the iWAG

This section describes how to configure the Cisco ISG class map and policy map for the iWAG.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **class-map type traffic match-any** *class-map-name*
4. **match access-group output** *{access-group | name access-group-name}*
5. **match access-group input** *{access-group | name access-group-name}*
6. **policy-map type service** *policy-map-name*
7. **[priority] class type traffic** *{class-map-name | default {in-out | input | output } }*
8. **accounting aaa list** *aaa-method-list*
9. **[priority] class type traffic** *{ class-map-name | default {in-out | input | output}}*
10. **drop**
11. **policy-map type control** *policy-map-name*
12. **class type control** *control-class-name* | *always* } [**event** { *access-reject* | **account-logoff** | *account-logon* | **acct-notification** | *credit-exhausted* | **dummy-event** | *quota-depleted* | **radius-timeout** | *service-failed*

| **service-start** | *service-stop* | **session-default-service** | *session-restart* | **session-service-found** | *session-start* | **timed-policy-expiry** }]

13. **action-***number* **service-policy type service** *[unapply] [aaa list list-name]* { **name service-name** | *identifier* { **authenticated-domain** | *authenticated-username* | **dnis** | *nas-port* | **tunnel-name** | **unauthenticated-domain** | *unauthenticated-username* } }
14. **action-number authorize** [**aaa** { **list-name | list** *{ list-name* | *default* } } [**password** *password*]] [**upon network-service-found** *{continue* | *stop* }] [**use method authorization-type**] *identifier* **identifier-type** [*plus identifier-type*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables the privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**class-map type traffic match-any** *class-map-name* **Example:** `Router(config)# class-map type traffic match-any TC_OPENGARDEN`	Creates or modifies a traffic class map that is used for matching packets to a specified Cisco ISG traffic class.
Step 4	**match access-group output** *{access-group* | *name access-group-name}* **Example:** `Router(config-traffic-classmap)# match access-group output name ACL_OUT_OPENGARDEN`	Configures the match criteria for a Cisco ISG traffic class map on the basis of the specified access control list (ACL).
Step 5	**match access-group input** *{access-group* | *name access-group-name}* **Example:** `Router(config-traffic-classmap)# match access-group input name ACL_IN_OPENGARDEN`	Configures the match criteria for a Cisco ISG traffic class map on the basis of the specified ACL.
Step 6	**policy-map type service** *policy-map-name* **Example:** `Router(config)# policy-map type service OPENGARDEN_SERVICE`	Creates or modifies a service policy map that is used to define a Cisco ISG subscriber service.

	Command or Action	Purpose
Step 7	**[priority] class type traffic** *{class-map-name | default {in-out | input | output } }* **Example:** `Router(config-service-policymap)# 20 class type traffic TC_OPENGARDEN`	Creates or modifies a traffic class map that is used for matching packets to a specified Cisco ISG traffic class.
Step 8	**accounting aaa list** *aaa-method-list* **Example:** `Router(config-service-policymap)# accounting aaa list PROXY_TO_CAR`	Enables Cisco ISG accounting and specifies an AAA method list to which accounting updates are forwarded.
Step 9	**[priority] class type traffic** *{ class-map-name | default {in-out | input | output}}* **Example:** `Router(config-service-policymap)# class type traffic default in-out`	Creates or modifies a traffic class map that is used for matching packets to a specified Cisco ISG traffic class.
Step 10	**drop** **Example:** `Router(config-service-policymap)# drop`	Configures a Cisco ISG to discard packets belonging to the default traffic class.
Step 11	**policy-map type control** *policy-map-name* **Example:** `Router(config)# policy-map type control BB_PROFILE`	Creates or modifies a control policy map that defines a Cisco ISG control policy.
Step 12	**class type control** *control-class-name* | *always* } [**event** { *access-reject* | **account-logoff** | *account-logon* | **acct-notification** | *credit-exhausted* | **dummy-event** | *quota-depleted* | **radius-timeout** | *service-failed* | **service-start** | *service-stop* | **session-default-service** | *session-restart* | **session-service-found** | *session-start* | **timed-policy-expiry** }] **Example:** `Router (config-control-policymap)# class type control always event session-start`	Specifies a control class for which actions can be configured in a Cisco ISG control policy.
Step 13	**action-***number* **service-policy type service** *[unapply] [aaa list list-name]* { **name service-name |** *identifier* { **authenticated-domain |** *authenticated-username* **| dnis |** *nas-port* **| tunnel-name | unauthenticated-domain |** *unauthenticated-username* } } **Example:**	Activates a Cisco ISG service.

	Command or Action	Purpose
	`Router(config-control-policymap-class-control)# 10 service-policy type service name OPENGARDEN_SERVICE`	
Step 14	**action-number authorize** [**aaa** {**list-name** | **list** *{ list-name* | *default* }} [**password** *password*]] [**upon network-service-found** *{continue* | *stop* }] [**use method authorization-type**] *identifier* **identifier-type** [*plus identifier-type*] **Example:** `Router(config-control-policymap-class-control)# 20 authorize aaa list ISG_PROXY_LIST password cisco identifier mac-address`	Initiates a request for authorization based on a specified identifier in a Cisco ISG control policy.

Configuring a Session Initiator for the iWAG

This section describes how to configure a session initiator for the iWAG solution. A session can be created using different triggers, such as an unknown MAC address, an unclassified MAC address, a RADIUS message with the Cisco ASR 1000 Series Aggregation Services Router acting as RADIUS proxy or a DHCP DISCOVER message with the Cisco ASR 1000 Series Aggregation Services Router acting as DHCP proxy.

Note To enable roaming, one initiator is required for DHCP sessions and another for the unclassified MAC.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface GigabitEthernet** *slot/subslot/port*
4. **description** *string*
5. **ip address** *ip-address mask [secondary [vrf vrf-name]]*
6. **negotiation auto**
7. **service-policy type control** *policy-map-name*
8. **ip subscriber {l2-connected}**
9. **initiator {dhcp | radius-proxy | static ip subscriber list** *listname* **| unclassified ip | unclassified mac-address}**
10. **initiator {dhcp | radius-proxy | static ip subscriber list** *listname* **| unclassified ip | unclassified mac-address}**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:**	Enables the privileged EXEC mode. Enter your password, if prompted.

	Command or Action	Purpose
	`Router> enable`	
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**interface GigabitEthernet** *slot/subslot/port* **Example:** `Router(config)# interface GigabitEthernet 1/3/3`	Enters the interface configuration mode for Gigabit Ethernet.
Step 4	**description** *string* **Example:** `Router(config-if)# description access interface connected to subscriber`	Adds a description to an interface configuration.
Step 5	**ip address** *ip-address mask [secondary [vrf vrf-name]]* **Example:** `Router(config-if)# ip address 192.171.10.1 255.255.0.0`	Sets a primary IP address or secondary IP address for an interface.
Step 6	**negotiation auto** **Example:** `Router(config-if)# negotiation auto`	Enables auto negotiation on a Gigabit Ethernet interface.
Step 7	**service-policy type control** *policy-map-name* **Example:** `Router(config-if)# service-policy type control BB_Profile`	Applies a control policy to a context.
Step 8	**ip subscriber {l2-connected}** **Example:** `Router(config-if)# ip subscriber l2-connected`	Enables Cisco ISG IP subscriber support on an interface and specifies the access method that IP subscribers use for connecting to the Cisco ISG on an interface. **Note** The iWAG does not support the routed access method.
Step 9	**initiator {dhcp | radius-proxy | static ip subscriber list** *listname* **| unclassified ip | unclassified mac-address}** **Example:** `Router(config-subscriber)# initiator unclassified mac-address`	Enables the Cisco ISG to create an IP subscriber session upon receipt of a specified type of packet.

	Command or Action	Purpose
Step 10	**initiator {dhcp | radius-proxy | static ip subscriber list** *listname* **| unclassified ip | unclassified mac-address}** **Example:** `Router(config-subscriber)# initiator dhcp`	Enables the Cisco ISG to create an IP subscriber session upon receipt of a specified type of packet.

Configuring a GGSN-Facing Interface for the iWAG

This section describes how to configure a GGSN-facing interface between the iWAG solution and the GGSN.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface GigabitEthernet** *slot/subslot/port*
4. **description** *string*
5. **ip address** *ip-address mask [secondary [vrf vrf-name]]*
6. **negotiation auto**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables the privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**interface GigabitEthernet** *slot/subslot/port* **Example:** `Router(config)# interface GigabitEthernet 1/3/5`	Enters the interface configuration mode for Gigabit Ethernet interface.
Step 4	**description** *string* **Example:** `Router(config-if)#description interface connected to GGSN`	Adds a description to an interface configuration.
Step 5	**ip address** *ip-address mask [secondary [vrf vrf-name]]* **Example:** `Router(config-if)# ip address 192.170.10.1 255.255.0.0`	Sets a primary IP address or secondary IP address for an interface.

	Command or Action	Purpose
Step 6	**negotiation auto** **Example:** `Router(config-if)# negotiation auto`	Enables auto negotiation on a Gigabit Ethernet interface.

Enabling Mobile Client Service Abstraction

This section describes how to enable Mobile Client Service Abstraction (MCSA) for PMIPv6.

Note Enabling MCSA is mandatory before you enable the Mobility feature in the Cisco ASR 1000 Series Aggregation Services Routers.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **mcsa**
4. **enable sessionmgr**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables the privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**mcsa** **Example:** `Router(config)# mcsa`	Enables MCSA on the Cisco ASR 1000 Series Aggregation Services Router.
Step 4	**enable sessionmgr** **Example:** `Router(config-mcsa)# enable sessionmgr`	Enables MCSA to receive notifications from the Cisco ISG.

Configuring the GTP of the iWAG

This section describes how to configure GTPv1 for the iWAG solution.

Before you begin

Enable MCSA.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **gtp**
4. **n3-***request number of requests*
5. **interval t3-response** *number of seconds*
6. **interval echo-request** *request-number*
7. **interface local GigabitEthernet** *slot/subslot/port*
8. **apn-name** *apn-name*
9. **ip address ggsn** *ip-address*
10. **default-gw** *address* **prefix-len** *value*
11. **dns-server** *ip-address*
12. **dhcp-server** *ip-address*
13. **dhcp-lease** *seconds*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables the privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**gtp** **Example:** `Router(config)# gtp`	Configures the GTP for the iWAG solution on the Cisco ASR 1000 Series Aggregation Services Router.
Step 4	**n3-***request number of requests* **Example:** `Router(config-gtp)# n3-request 3`	Specifies the number of times a control message must be retried before a failure message is sent. The default value is 5.
Step 5	**interval t3-response** *number of seconds* **Example:** `Router(config-gtp)# interval t3-response 10`	Specifies the time interval, in seconds, for which the SGSN of the iWAG waits for a response for the control message sent. The default value is 1.

	Command or Action	Purpose
Step 6	**interval echo-request** *request-number* **Example:** `Router(config-gtp)# interval echo-request 60`	Specifies the time interval, in seconds, for which the SGSN of the iWAG waits for before sending an echo request message. The range is from 60 to 65535. The default value is 60. The value of 0 disables the Echo Request feature.
Step 7	**interface local GigabitEthernet** *slot/subslot/port* **Example:** `Router(config-gtp)# interface local GigabitEthernet 0/0/3`	Configures the transport interface to communicate with the GGSN.
Step 8	**apn-name** *apn-name* **Example:** `Router(config-gtp)# apn-name example.com`	Configures an APN name string for GPRS load balancing.
Step 9	**ip address ggsn** *ip-address* **Example:** `Router(config-gtp-apn)# ip address ggsn 192.170.10.2`	Sets the IP address for the GGSN.
Step 10	**default-gw** *address* **prefix-len** *value* **Example:** `Router(config-gtp-apn)# default-gw 192.171.10.1 prefix-len 16`	Specifies the default gateway address of the subscriber. **Note** This is the default gateway address of the IP provided by the GGSN using GTP, and not the default gateway address on the physical local interface that the subscriber is connected to. They can be the same, but we recommend that they be two different subnets.
Step 11	**dns-server** *ip-address* **Example:** `Router(config-gtp-apn)# dns-server 192.165.1.1`	Specifies the Domain Name System (DNS) IP server that is available for a DHCP client.
Step 12	**dhcp-server** *ip-address* **Example:** `Router(config-gtp-apn)# dhcp-server 192.168.10.1`	Specifies the primary and backup DHCP server that is used to allocate IP addresses, the IP address can be a local iWAG interface address, to mobile station users entering a particular public data network (PDN) access point.
Step 13	**dhcp-lease** *seconds* **Example:** `Router(config-gtp-apn)# dhcp-lease 3000`	Configures the duration (in seconds) of the lease for an IP address that is assigned from a Cisco IOS DHCP Server to a DHCP client.

Configuring the iWAG for 4G Mobile IP Users

Configuring PMIPv6 for the iWAG

You must configure PMIPv6 for the iWAG to allow access to mobile IP users.

The tasks listed below describe the procedures involved in configuring the Mobile Access Gateway. For detailed steps, see the "How to Configure Proxy Mobile IPv6 Support for MAG Functionality" section in the *IP Mobility: PMIPv6 Configuration Guide, Cisco IOS XE Release 3S* .

- Configuring a Proxy Mobile IPv6 Domain by Using the Configuration from the AAA Server
- Configuring the Minimum Configuration for a MAG to Function
- Configuring a Detailed Configuration for a MAG when an AAA Server is not Available
- Configuring a Minimum Configuration for a MAG
- Configuring a Detailed Configuration for a MAG

The tasks listed below describe the procedures involved in configuring Local Mobility Anchor. For detailed steps, see the "How to Configure Proxy Mobile IPv6 Support for LMA Functionality" section in the *IP Mobility: PMIPv6 Configuration Guide, Cisco IOS XE Release 3S* .

- Configuring a Proxy Mobile IPv6 Domain by Using the Configuration from the AAA Server
- Configuring a Minimum Configuration for a Domain When an AAA Server Is Not Available
- Configuring a Detailed Configuration for a Domain When the AAA Server Is Not Available
- Configuring a Minimum Configuration for an LMA
- Configuring a Detailed Configuration for an LMA

Enabling Mobile Client Service Abstraction

This section describes how to enable Mobile Client Service Abstraction (MCSA) for PMIPv6.

Note Enabling MCSA is mandatory before you enable the Mobility feature in the Cisco ASR 1000 Series Aggregation Services Routers.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **mcsa**
4. **enable sessionmgr**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable**	Enables the privileged EXEC mode.

	Command or Action	Purpose
	Example: `Router> enable`	Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**mcsa** **Example:** `Router(config)# mcsa`	Enables MCSA on the Cisco ASR 1000 Series Aggregation Services Router.
Step 4	**enable sessionmgr** **Example:** `Router(config-mcsa)# enable sessionmgr`	Enables MCSA to receive notifications from the Cisco ISG.

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Command List, All Releases
ISG concepts, configuration tasks, and examples	*ISG Configuration Guide*
ISG commands	Cisco IOS Intelligent Services Gateway Command Reference
iWAG commands	Cisco IOS Intelligent Wireless Access Gateway Command Reference
Mobile IP configuration concepts, tasks, and examples	*IP Mobility: PMIPv6 Configuration Guide*
IP Mobility commands	Cisco IOS IP Mobility Command Reference
GGSN configuration concepts, tasks, and examples	*Mobile Wireless GGSN Configuration Guide*

Standards and RFCs

Standard/RFC	Title
RFC 3775	Mobility Support in IPv6
RFC 5213	Proxy Mobile IPv6

Standard/RFC	Title
RFC 5844	IPv4 Support for Proxy Mobile IPv6
RFC 5845	Generic Routing Encapsulation (GRE) Key Option for Proxy Mobile IPv6

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature.	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

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 the Intelligent Wireless Access Gateway

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.

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.

Table 2: Feature Information for the Intelligent Wireless Access Gateway

Feature Name	Releases	Feature Information
Intelligent Wireless Access Gateway	Cisco IOS XE Release 3.8S	The iWAG solution offers the following tunneling technologies to integrate WiFi access with the Evolved Packet Core (EPC): • GPRS Tunnel Protocol version 1 (GTPv1) allows integration of a 3G environment, where iWAG behaves in a way that is similar to a Serving GPRS Support Node (SGSN) connecting to a Gateway GPRS Support Node (GGSN). • Proxy Mobile IPv6 (PMIPv6) allows the integration of a 4G environment where iWAG behaves as a PMIPv6 Mobile Access Gateway (MAG) connecting to an Local Mobility Anchor (LMA) that is co-located with a Packet Gateway (PGW), which acts as PMIPv6 LMA. In Cisco IOS XE Release 3.8S, this feature was implemented on the Cisco ASR 1000 Series Aggregation Services Routers.