Configuring IP Services

This chapter describes how to configure the Domain Name Server (DNS) client and enable the Dynamic Host Configuration Protocol version 4 (DHCPv4) client on the Cisco 1000 Series Connected Grid Routers (*hereafter* referred to as the Cisco CG-OS router). The system software for the Cisco CG-OS router is identified as the Cisco CG-OS software.

This chapter includes the following sections:

Information About IP Services

This section includes the following topics:

DNS Client

When your network devices require connectivity with devices in networks for which you do not control the name assignment, you can assign device names that uniquely identify your devices within the entire internetwork using the domain name server (DNS). DNS uses a hierarchical scheme for establishing host names for network nodes, which allows local control of the segments of the network through a client-server scheme. The DNS system can locate a network device by translating the hostname of the device into its associated IP address.

On the Internet, a domain is a portion of the naming hierarchy tree that refers to general groupings of networks based on the organization type or geography. Domain names are pieced together with periods (.) as the delimiting characters. For example, Cisco is a commercial organization that the Internet identifies by a *com* domain, so its domain name is *cisco.com*. A specific hostname in this domain, the File Transfer Protocol (FTP) system, for example, is identified as *ftp.cisco.com*.

Name Servers

Name servers keep track of domain names and know the parts of the domain tree for which they have complete information. A name server might also store information about other parts of the domain tree. To map domain names to IP addresses on the Cisco CG-OS router, you must identify the hostnames, specify a name server, and enable the DNS service.

The Cisco CG-OS software allows you to statically map IP addresses to domain names. You can also configure the Cisco CG-OS software to use one or more domain name servers to find an IP address for a host name.

DNS Operation

A name server handles client-issued queries to the DNS server for locally defined hosts within a particular zone as follows:

- An authoritative name server responds to DNS user queries for a domain name that is under its zone of authority by using the permanent and cached entries in its own host table. When the query is for a domain name that is under its zone of authority but for which it does not have any configuration information, the authoritative name server replies that no such information exists.

- A name server that is not configured as the authoritative name server responds to DNS user queries by using information that it has cached from previously received query responses. When no Cisco CG-OS router is configured as the authoritative name server for a zone, queries to the DNS server for locally defined hosts receive nonauthoritative responses.

Name servers answer DNS queries (forward incoming DNS queries or resolve internally generated DNS queries) according to the forwarding and lookup parameters configured for the specific domain.

Stateless Restart

The Cisco CG-OS router supports stateless restarts for the DNS client. After a system reboot, the Cisco CG-OS software applies the running configuration.

DHCP Client Version 4

DHCP client version 4 (DHCPv4) support is enabled on a per interface basis on the Cisco CG-OS router for automatic IPv4 address assignment.

The DHCPv4 server, which supplies the IP addresses to the Cisco CG-OS router interfaces, does not need to be on the same subnet as the Cisco CG-OS router. However, when the DHCPv4 server and the Cisco CG-OS router are on different subnets, DHCPv4 relay must be active in the network. Generally, DHCPv4 relay is configured on a router in the path between the Cisco CG-OS router and the DHCPv4 server.

Prerequisites

DNS

You must have a DNS name server accessible to the Cisco CG-OS router.

DHCPv4

You must have a DHCPv4 server accessible to the Cisco CG-OS router.

When the Cisco CG-OS router and the DHCPv4 server are on different subnets, DHCPv4 relay must be enabled on a router in the path between the Cisco CG-OS router and the DHCPv4 server.

Guidelines and Limitations

DHCPv4

DHCPv4 server must be active in the network before you install the Cisco CG-OS router when you employ DHCPv4 client for interface IP address assignment.

DNS

DNS Security Extension (DNSSEC) is not supported on the Cisco CG-OS router.

Default Settings

Table 4-1 lists the default settings for IP Services parameters.

Table 4-1   Default IP Services Parameters

Parameters	Default
DNS client	Enabled
DHCPv4 server	Disabled

Configuring IP Services

This section includes the following topics:

- Configuring DNS Clients, page 4-3
- Enabling DHCPv4 on Interfaces, page 4-4

Configuring DNS Clients

You can configure the DNS client to use a DNS server on your network.

BEFORE YOU BEGIN

Ensure that you have a domain name server on your network.

DETAILED STEPS

	Command	Purpose
Step 1	**configure terminal**	Enters configuration mode.
Step 2	**ip host** *name address1* [*address2... address6*]	Defines up to six static hostname-to-address mappings in the hostname cache. The address can be either an IPv4 address or an IPv6 address.
Step 3	**ip domain-name** *name*	(Optional) Defines the default domain name that the Cisco CG-OS router uses to complete unqualified host names. The Cisco CG-OS router appends the default domain name to any hostname that does not contain a complete domain name before starting a domain-name lookup.
Step 4	**ip domain-list** *name*	(Optional) Defines additional domain names that the Cisco CG-OS router uses to complete unqualified hostnames. The Cisco CG-OS router uses each entry in the domain list to append that domain name to any hostname that does not contain a complete domain name before starting a domain-name lookup. The process continues for each entry in the domain list until it finds a match.
Step 5	**ip name-server** *address1* [*address2... address6*]	(Optional) Defines up to six name servers. The address can be either an IPv4 address or an IPv6 address.
Step 6	**ip domain-lookup**	(Optional) Enables DNS-based address translation.
Step 7	**show hosts**	(Optional) Displays information about DNS.
Step 8	**copy running-config startup-config**	(Optional) Saves this configuration change by copying it from the running-config file to the startup-config file.

EXAMPLE

This example shows how to configure a default domain name and enable DNS lookup.

```
router# configure terminal
router(config)# ip host cisco-rtp 192.0.2.1
router(config)# ip domain-name myserver.com
router(config)# ip domain-list mycompany.com
router(config)# copy running-config startup-config
```

Enabling DHCPv4 on Interfaces

BEFORE YOU BEGIN

Verify that the Cisco CG-OS router has access to the DHCPv4 server.

DETAILED STEPS

	Command	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**interface {ethernet	wimax}** *slot/port*	Specifies an interface and enters the interface configuration mode.
Step 3	**ip address dhcp**	Enables DHCPv4 client on the interface to allow automatic assignment of IP addresses to the specified interface. To disable DHCPv4 on the interface, enter **no ip address dhcp** for the interface.
Step 4	**show ip interface brief**	(Optional) Displays abbreviated configuration details for interfaces configured with IPv4 addresses.
Step 5	**show ip interface** *slot/port*	(Optional) Displays configuration details for a specific interface.
Step 6	**copy running-config startup-config**	(Optional) Saves this configuration change by copying it from the running-config file to the startup-config file.

EXAMPLE

This example shows how to enable DHCPv4 client on a specific interface.

```
router# configure terminal
router(config)# interface wimax 3/1
router(config-if)# ip address dhcp
router(config-if)# copy running-config startup-config
```

Verifying the Configuration

To display the DNS client configuration, enter the following command:

Command	Purpose
show hosts	Displays information about DNS.
show interface	Displays configuration information about the interface.
show ip interface *slot/port*	Displays configuration details for a specific IPv4 interface.
show ip interface brief	Displays abbreviated configuration details for interfaces configured with IPv4 addresses.
show running-config interface *slot/port*	Displays the running configuration for the specified interface.

Configuration Examples

DNS Client

This example shows how to establish a domain list with several alternate domain names.

```
ip domain-list csi.com
ip domain-list telecomprog.edu
ip domain-list merit.edu
```

This example shows how to locate local name servers, configure the hostname-to-address mapping, configure the addresses of the two name servers, and the default domain name.

```
ip domain lookup
ip name-server 192.168.1.111 192.168.1.2
ip domain-name cisco.com
```

DHCPv4 Client

This example shows how to enable DHCPv4 client on a specific interface.

```
router# configure terminal
router(config)# interface ethernet 3/1
router(config-if)# ip address dhcp
router(config-if)# copy running-config startup-config
```