CHAPTER 2

Installing the Software and Configuring the Cisco CNS 2100 Series Intelligence Engine

This chapter describes how to install the Cisco CNS Configuration Engine 1.3 software and configure the Cisco CNS 2100 Series Intelligence Engine.

Installing the Software

The Cisco CNS Configuration Engine 1.3 software is contained on a CD-ROM that is in the accessory kit.

To be able to monitor the installation activity, you should have a local keyboard-mouse and a VGA screen to your system C2T (out) port using a K/M/V (keyboard, mouse, VGA cable (IBM P/N 00N6954).

To install the software, follow these steps:

Step 1 Verify that the CNS 2100 Series system is powered down.

Step 2 Power on the system and quickly insert the Cisco CNS Configuration Engine 1.3 CD-ROM in the CD drive.

Step 3 Push the **Reset** button to restart the system from the CD-ROM.

The software installs automatically. When the install sequence completes, the system automatically ejects the CD-ROM and restarts into Linux from the hard drive.

Step 4 Go to Running the Setup Program to run the **Setup** program.

Running the Setup Program

You must run the **Setup** program when you start the system for the first time.

You must connect to the system using the serial port to use the **Setup** program. The parameters for using the serial port are 9600-N-8-1. Alternatively, you can connect a VGA monitor to the CNS 2100 Series.

If this is the first time running **Setup**, or you have just run **reinitialize** or **relocate**, you cannot connect to the system using Telnet. Telnet is only possible if the network interfaces are configured.

To run **Setup**, follow these steps:

Step 1 Start the system.

When the system finishes the startup routine, a login prompt appears.

Step 2 Log in with username **setup**.

The **Setup** program starts.

Step 3 Enter responses to the prompts that appear.

For information about valid values for each parameter, see Table 2-1 on page 2-5 through Table 2-9 on page 2-14.

Use the following conventions when running the **Setup** program:

- Press **Enter** to enter a response and proceed to the next prompt.

  After you enter a response, you cannot edit it again. To change an entered response you must exit the **Setup** program and enter your responses again. You can exit the **Setup** program in two ways:

  – Press **Ctrl-c**.

    The login prompt appears. Use the login **setup** to run the **Setup** program.

  – Enter **n** at the final prompt, Committed changes: [y/n].

    The **Setup** program exits without saving the configuration, then restarts.

- Press **Backspace** or **Delete** to delete characters.

Step 4 Provide values where prompted.

For an example of the Internal Directory mode prompts, see “Internal Directory Mode Setup Prompts”on this page.

For an example of the External Directory mode prompts, see “External Directory Mode Setup Prompts” section on page 2-10.

Step 5 Review your **Setup** configuration.

Step 6 To commit (save) your changes, type **y**.

After you save the configuration, the shell prompt appears.

How to Re-execute Setup

You cannot run **Setup** a second time by logging in as **setup** because that account is disabled for security reasons after it is used once successfully. To re-execute **Setup**, login as root, then enter the **setup** command in the shell prompt.

Internal Directory Mode Setup Prompts

The following sample shows the standard set of prompts for Internal Directory mode:

```
Entering Network Appliance Setup
Type ctrl-c to exit

        For detail information about the parameters in this setup, refer to "Cisco
        Intelligence Engine 2100 Series Configuration Engine Administrator’s Guide”.

Interactive or non-interactive setup? 0=interactive, 1=non-interactive. 0

        Note: Modular router support is available only in internal directory mode.

Choose operational mode of system. 0=internal directory mode, 1=external directory mode. 0

        Please enter the password you would like to use as the root password for the
        IE2100. Warning: If you lose this password, the root account will be locked out
        of maintaining the IE2100.

Enter root password: ******
Re-enter root password: ******
Enter hostname: rain
Enter domain name: cisco.com

        User-level shell account for IE2100 has read-only monitoring and troubleshooting.
        However, no configuration changes are possible with this account.

Enter username for user-level shell account: admin
Enter password for user-level shell account: *****
Re-enter password for user-level shell account: *****

        You must configure eth0 or eth1. Press <Enter> to skip!

Enter eth0 IP address: 10.1.19.12
Enter eth0 network mask: 255.255.255.0
Enter eth0 default gateway IP address: 10.1.19.6
Enter eth1 IP address:
Enter primary DNS server IP address: 171.68.226.120
Enter secondary DNS server IP address (optional):
Enter country code: us
Enter company code: cisco

        Configuration Engine user ID is used to log in to the web-based GUI and manage
        network device objects and templates. This account does NOT have shell access.

Enter Configuration Engine login name: admin
Enter Configuration Engine login password: *****
Re-enter Configuration Engine login password: *****
Enter internal LDAP server password: *****
Re-enter internal LDAP server password: *****

Encryption settings:
------------------------

Enable cryptography (crypto) between Event Gateway(s)/Config Server and device(s) (y/n)?
[y]
Certificates already exist. Overwrite (y/n)? [y]
Enter certificate FTP server (hostname.domainname or IP address): [ringer]
Enter username used for FTP server: [anrichar]
Enter FTP password: [********]
Re-enter FTP password: [********]
Enter absolute pathname of remote key file: [/users/anrichar/cert/server.key]
Enter absolute pathname of remote certificate file: [/users/anrichar/cert/server.crt]

        Enabling plaintext operation will increase security risk.

Enable plaintext between Config Server and devices/GUI administration (y/n)? [n] y
Enable plaintext operation between Event Gateway and devices (y/n)? [n] y

Authentication settings:
-----------------------------
```

```
        IOS Devices are normally authenticated before being allowed to connect to the
        Event Gateway/Config Server. Disabling authentication will increase security risk.

Enable authentication (y/n)? [n] y

Event services settings:
-----------------------------

Enter NSM directive (none, default, http): [default]
Enable Event Gateway debug log (y/n)? [n]

        Each Event Gateway process serves 500 devices. Maximum number of Event Gateways
        allowed is 11.

Enter number of Event Gateways that will be started with crypto operation: 10
Enter number of Event Gateways that will be started with plaintext operation: [0]1

Enter CNS event bus network parameter: [rain]
Enter CNS event bus service parameter: [7500]

Current settings for IMGW:
---------------------------------

Gateway ID: rain
Run as daemon (y/n)? y
Timeout in seconds for entire Telnet operation to complete: 180
Timeout in seconds between prompts during Telnet session: 60
Concurrent Telnet session limit: 100
Remove temporary logs of Telnet sessions into devices (y/n)? y
Location of temporary logs of Telnet sessions into devices: /tmp
Hoptest success retry interval (sec): 7200
Hoptest failure retry interval (sec): 3600
Logging level (verbose, error, silent): error
Log file prefix: IMGW-LOG
Log file size (bytes): 50331648
Log file rotation timer (minutes): 60
Logging mode (append, overwrite): append

Re-configure IMGW (y/n)? [n]
```

Parameter Descriptions

Interactive or non-interactive setup: In interactive setup, you set up the appliance by entering all configuration inputs manually. In non-interactive setup, you download a configuration file that can be run and set up the box automatically.

Internal/external directory mode: Internal Directory mode uses the embedded directory service. External Directory mode uses an external directory service.

Root password: This is the password for logging into the root-user account of Linux. **Setup** prompts you to redefine the root password whenever it detects that the root password is set to the factory default **blender**. Later, you can change root password using the Linux password command **passwd**.

Hostname: The name of the CNS 2100 Series system.

Domain name: The name of the domain in which the CNS 2100 Series system exists.

Username/password for user-level shell account: This is the username-password pair to be created in Linux for administrative purpose. This account does not have root privileges.

Eth0/Eth1 IP address/network mask: IP address and network mask of the system. You can configure one or both Ethernet card(s) for network connectivity.

Default gateway IP address: This is the gateway IP address that makes up the default route in the routing table.

Primary/secondary DNS server IP address: This is the server that provides domain-name to IP address translation service. Only the first one is required. The second one is optional.

Country/company code: These are the information used to define the internal storage structure of DCL.

Configuration Engine login name/password: Defines the administrator account and password for accessing the configuration server user interface.

Enter internal LDAP server password: Defines internal-directory-account password for the two internal administrative users: **dcdadmin** and **cdauser1**.

Table 2-1 Valid Values for General Parameters

Parameter	Type	Length
Interactive or non-interactive setup?	0=interactive, 1=non-interactive	
Choose operational mode of system.	0=internal directory mode, 1=external directory mode	
Root password	Password	6—12
Hostname	Alphanumeric, dash	1—32
Domain name	Alphanumeric, dash, dot	1—unlimited
User-level shell account	Alphanumeric, dash	1—32
User-level shell account password	Password	6—12
[eth0/eth1] IP address	IP address	
[eth0/eth1] Network mask	Network mask	
[eth0/eth1] Default gateway ip address	Gateway IP	
[Primary/Secondary] DNS server IP address	IP address	
Country code	Country Code	
Company code	Alphanumeric, dash	1—80
Configuration Engine login name	Alphanumeric, dash	1—30
Configuration Engine login password	Password	1—12
Internal LDAP server password	Password	1—20

- Alphanumeric type refers to alphabetic and numeric characters plus the underscore “_” symbol**.**
- Password type refers to ASCII characters that are between the octal values 040 (space) and 176 (“~”) inclusive.
- IP address must be entered in the format **a.b.c.d**, where a, b, c, and d are decimal values from 0 to 255. IP address must pass four more checks:
  - It cannot be a class D (multi-class 0xE0 00 00 00) address.
  - It cannot be in class A network zero (0x00 00 00 00).
  - It cannot be in class A network 127 (0x7F 00 00 00).
  - It must be either a class A, B, or C address.
- Network mask refers to a valid IP address that obeys the following rules:

  - Network mask must be composed of contiguous 1s.
  - It cannot be 0x00000000 or 0xFFFFFFFF.
  - When applying to the host IP address, the host address cannot be a subnet broadcast address; for example, all ones or zeros in the IP host portion.
- A Gateway IP address is a valid IP address and must be in the same subnet as the host.
- Country code refers to ISO two-letter codes for country identification (ISO 3166). There are 241 of them. See Appendix B, "Country Codes" for a list of the valid country codes.

Encryption Settings

Enable cryptography (crypto) between Event Gateway(s)/Config Server and device(s) (y/n): This option enables crypto (SSL) operation. The web server listens on TCP port 443, and responds to https requests (https://machine/config/login.html). The event gateway listens to ports 11012, 11014, and so on (depending on the number started).

All data between the IE2110 and the far end are encrypted. The SSL protocol (combined with valid certificates) ensures that the IE2110 is authenticated by the far end. In order to complete SSL configuration, valid certificates need to be placed on the IE2110 (see "Configuring SSL Certificates" section on page 2-17).

If disabling crypto operation, the remaining prompts in this section are omitted.

Certificates already exist, Overwrite (y/n): If a certificate already exists, choose whether to download and overwrite the existing one. If there is no certificate initially on the system, this prompt is disabled.

Certificate FTP server: Specifies the location of the FTP server for downloading the certificate. Input can either be an IP address or in the form of *hostname.domain*. For the latter case, the DNS entered earlier is used for the *hostname.domain*-to-IP address resolution.

Username/password for FTP server: Specifies the login name and password for accessing the FTP server.

Absolute pathname of remote key file and certificate file: Specifies the locations of the key and certificate files on the FTP server.

Enable plaintext between Config Server and devices/GUI administration (y/n): This option enables plaintext configuration server operation. In addition to listening on TCP port 443 for crypto connection (https://machine/config/login.html), the web server also listens on TCP port 80 for plaintext connection, responding to **http** requests (http://machine/config/login.html).

Note If crypto is disabled, plaintext between the configuration server and devices and operators is enabled.

Enable plaintext operation between Event Gateway and devices (y/n): This prompt enables/disables the prompt: number of Event Gateways that will be started with plaintext operation, which appears under Event service settings.

Table 2-2 Valid Values for Encryption Parameters

Parameter	Type	Length
Enable cryptography (crypto) between Event Gateway(s)/Config Server and device(s)	y, n	
Certificate ftp server	IP address or hostname.domainname	1—63

Table 2-2 Valid Values for Encryption Parameters (continued)

Parameter	Type	Length
Username used for ftp server	Alphanumeric,dash	1—32
FTP password	Password	1—20
Absolute pathname of remote key file	Alphanumeric, dash, slash	1—255
Absolute pathname of remote certificate file	Alphanumeric, dash, slash	1—255
Enable plaintext between Config Server and devices/operators	y, n	
Enable plaintext operation between Event Gateway and devices	y, n	

Authentication settings

Enable Authentication (y/n): Enables Cisco IOS device authentication mechanism within the IE2110.

Note If bypassing device authentication, connection to devices with a Cisco IOS release earlier than 12.2(11)T is implicitly allowed. There is a security risk associated with disabling authentication.

Table 2-3 Valid Values for Authentication Parameters

Parameter	Type	Length
Enable authentication	y, n	

Event Service Settings

NSM directive: Defines NameSpace Mapper mapping modes. Valid modes are **http**, **none**, and **default** (see "NSM Modes" section on page 1-4). If input to NSM directive is **http**, you must answer the **Event Gateway application parameters** prompt (see "Setting NSM Directive to http" section on page 2-8).

Event Gateway debug log: Turns on Event Gateway debug logging.

Number of Event Gateways that will be started with crypto operation: Specifies the number of Event Gateway processes that should be started in crypto mode (the number of Event Gateways that communicate with devices using SSL). If crypto operation is disabled, this prompt is also disabled.

Number of Event Gateways that will be started with plaintext operation: Specifies the number of Event Gateway processes that should be started in plaintext mode (the number of Event Gateway that communicate with devices without using SSL). The total number of Event Gateways, whether it is started for crypto operation or not, should not exceed 11.

CNS Event Bus Network Parameter: Specifies the outbound network interface of CNS 2100 Series for publishing events. It can be an IP address, the name of the local network interface, a hostname, or multicast address.

CNS Event Bus Service Parameter: Specifies the ports used for publishing and listening to events.

Timesaver Dedicating a port for the communication between an CNS 2100 Series and its managing devices can reduce traffic caused by listening to other unrelated events

Re-configure IMGW: This **y/n** prompt determines whether setup should display the section of prompts for re-configuring IMGW related parameters. Regular users should always answer **n**.

Table 2-4 Valid Values for Event Service Parameters

Parameter	Type	Length
NSM directive	none, default, http	
Event Gateway debug log	y, n	
Number of Event Gateways that will be started with crypto operation	Range from 1 to 11	
Number of Event Gateways that will be started with plaintext operation	Range from 0 to 11 (number of event gateways started with crypto) if crypto is enabled. Range from 1 to 11 if crypto is disabled.	
CNS event bus network parameter	Network parameter	
CNS event service parameter	Range from 0 to 65535	
Re-configure IMGW	y, n	

- Valid inputs for the network parameter consists of up to three parts, separated by semicolons—network, multicast groups, and send address—as in these examples:

```
eth0                                    network only
eth0;224.1.1.1                          one multicast group
eth0;224.1.1.1,224.1.1.5;224.1.1.6      two multicast groups, send address
```

  – **Part One—Network:** Identifies the network, which you can specify in several ways: Host name, Host IP address, Network name (where supported), Network IP number, or Interface name (where supported; for example, **eth0**).

  – **Part Two—Multicast Groups:** A list of zero or more multicast groups specified as IP addresses, separated by commas. Each address in part two must denote a valid multicast address.

  – **Part Three—Send Address:** A single send address. If present, this item must be an IP address, not a hostname or network name.

Setting NSM Directive to http

The previous prompt example has NSM directive set to **default**. When the NSM directive is set to **http**, you are prompted for an additional namespace parameter, Enter Event Gateway application parameter(s) for NSM:

```
Enter NSM directive (none, default, http): [default] http
Enter Event Gateway application parameter(s) for NSM: [config]
```

The new prompt definition and input format is as follows:

Event Gateway application parameter(s) for NSM: Specifies the application namespace to be used in NameSpace Mapper for resolving mapping. The default namespace used is **config**.

Table 2-5 Valid Values for NSM Directive Parameter

Parameter	Type	Length
Event Gateway application parameters	Alphanumeric, dash, space	1—unlimited

Re-configure IMGW Parameters

This section shows the set of prompts required for re-configuring the IMGW settings.

```
Re-configure IMGW (y/n)? [n] y
Enter Gateway ID: [rain]
Run as daemon (y/n)? [y]
Enter timeout in seconds for a CLI command to complete: [180]
Enter timeout in seconds to get the next prompt in Telnet session: [60]
Enter concurrent Telnet session limit: [100]
Remove temporary logs of Telnet sessions into devices (y/n)? [y]
Enter location of temporary logs of Telnet sessions into devices: [/tmp]
Enter hoptest success retry interval (sec): [7200]
Enter hoptest failure retry interval (sec): [3600]
Enter logging level (verbose, error, silent): [error]
Enter log file prefix: [IMGW-LOG]
Enter log file size (bytes): [50331648]
Enter log file rotation timer (minutes): [60]
Enter logging mode (append, overwrite): [append]
```

Parameter Descriptions

Gateway ID: Unique identifier assigned to the IMGW process. It is always set to hostname by default.

Run as daemon: Set to **y** for normal use. **n** is only used for debugging purpose.

Timeout in seconds for a CLI command to complete: The maximum waiting time in seconds for a CLI to complete.

Timeout in seconds to get the next prompt in Telnet session: The maximum waiting time in seconds to get the next prompt in Telnet session.

Concurrent Telnet session limit: The maximum simultaneous Telnet connections that IMGW supports.

Remove temporary logs of Telnet sessions into devices: The y/n value that determines if IMGW should remove the temporary files it creates for download/exec.

Location of temporary logs of Telnet sessions into devices: File system location where IMGW should create the temporary files.

Hoptest success retry interval: Time interval in minutes for IMGW to check device in the Success list (devices for which connectivity-check succeeded).

Hoptest failure retry interval: Time interval in minutes for IMGW to check device in the Failure list (devices for which connectivity-check failed).

Logging level: Verbose mode logs both error and debugging messages. Error mode logs only error messages. Silent mode does not log any message.

Log file prefix: A prefix used to construct the name of the log file. The resulting filename is made up of the prefix and the IMGW gateway ID.

Log file size: Log file size that triggers log rotation.

Log file rotation timer: Time in seconds after which to check log-file size for log rotation.

Logging mode: Select whether to append new log to the end of the log file or overwrite the previous log.

Table 2-6 Valid Values for IMGW Parameters

Parameter	Type	Length
Gateway ID	Alphanumeric, dash	1—32
Run as daemon	y, n	
Timeout in seconds for a CLI command to complete	Range from 30 to 7200	
Timeout in seconds to get the next prompt in Telnet session	Range from 30 to 7200	
Concurrent Telnet Session Limit	Six digits numeric 0 to 999999	
Remove temporary logs of Telnet sessions into devices	y, n	
Location of temporary logs of Telnet sessions into devices	Alphanumeric, dash, slash	1—255
Hoptest success retry interval (sec)	Range from 0 to 2147483647	
Hoptest failure retry interval (sec)	Range from 0 to 2147483647	
Logging level	verbose, error, silent	
Log file prefix	Alphanumeric, dash	1—32
Log file size (bytes)	Range from 5242880 to 4294967295	
Log file rotation timer (minutes)	Range from 0 to 2147483647	
Logging mode	append, overwrite	

External Directory Mode Setup Prompts

Most of the prompts in External Directory mode are identical to those for the Internal Directory mode except for the introduction of the External Directory mode settings and sample schema.

In the External Directory mode, the system is configured to contact the external directory storage for device information. Certain information that makes up the schema of the external directory such as attribute names (in the device class) and container locations must be entered during **Setup**.

To simplify the inputs, you can choose to use the predefined sample schema and construct your external directory accordingly.

The sample shows the prompts for External Directory mode where the sample schema is enabled.

```
Entering Network Appliance Setup
Type ctrl-c to exit

       For detail information about the parameters in this setup, refer to “Cisco
       Intelligence Engine 2100 Series Configuration Registrar Administrator’s Guide”.

Interactive or non-interactive setup? 0=interactive, 1=non-interactive. 0

       Note: Modular router support is available only in internal directory mode.

Choose operational mode of system. 0=internal directory mode, 1=external directory mode. 1

       Please enter the password you would like to use as the root password for the
       IE2100. Warning: If you lose this password, the root account will be locked out
```

```
        of maintaining the IE2100.

Enter root password: ******
Re-enter root password: ******
Enter the hostname: rain
Enter the domain name: cisco.com

        User-level shell account for IE2100 has read-only monitoring and troubleshooting.
        However, no configuration changes are possible with this account.

Enter username for user-level shell account: admin
Enter password for user-level shell account: *****
Re-enter password for user-level shell account: *****

        You must configure eth0 or eth1. Press <Enter> to skip!

Enter eth0 IP address: 10.1.19.12
Enter eth0 network mask: 255.255.255.0
Enter eth0 default gateway IP address: 10.1.19.6
Enter eth1 IP address:
Enter primary DNS server IP address: 171.68.226.120
Enter secondary DNS server IP address (optional):
Enter country code: us
Enter company code: cisco

Encryption settings:
------------------------

Enable cryptography (crypto) between Event Gateway(s)/Config Server and device(s) (y/n)?
[y]
Certificates already exist. Overwrite (y/n)? [y]
Enter certificate FTP server (hostname.domainname or IP address): [ringer]
Enter username used for FTP server: [anrichar]
Enter FTP password: [********]
Re-enter FTP password: [********]
Enter absolute pathname of remote key file: [/users/anrichar/cert/server.key]
Enter absolute pathname of remote certificate file: [/users/anrichar/cert/server.crt]

        Enabling plaintext operation will increase security risk.

Enable plaintext operation between Config Server and devices/GUI administration (y/n)? [n]
y
Enable plaintext operation between Event Gateway and devices (y/n)? [n] y

Authentication settings:
------------------------------

        IOS Devices are normally authenticated before being allowed to connect to the
        Event Gateway/Config Server. Disabling authentication will increase security risk.

Enable authentication (y/n)? [n] y

Event services settings:
-----------------------------

Enter NSM directives (none, default, http): [default]
Enable Event Gateway debug log (y/n): [n]

Each Event Gateway process serves 500 devices. Maximum number of Event Gateways allowed is
11.

Enter number of Event Gateways that will be started with crypto operation: 10
Enter number of Event Gateways that will be started with plaintext operation: [0]1
Enter CNS event bus network parameter: [rain]
Enter CNS event bus service parameter: [7500]

External directory settings:
---------------------------------

Enter IP address of remote directory server: 10.10.18.7
Enter port number of remote directory server: 389
Enter external directory server login name: admin
Enter external directory server password: *****
Re-enter external directory password: *****
Enter User DN: cn=admin,o=butterfly
Enter CNS context: ou=cns,o=butterfly
Use sample schema (y/n): [y]

Current settings of IMGW:
---------------------------------
Gateway ID: rain
Run as daemon (y/n)? y
Timeout in seconds for a CLI command to complete: 180
Timeout in seconds to get the next prompt in Telnet session: 60
Concurrent Telnet session limit: 100
Remove temporary logs of Telnet sessions into devices (y/n)? y
Location of temporary logs of Telnet sessions into devices: /tmp
Hoptest success retry interval (sec): 7200
Hoptest failure retry interval (sec): 3600
Logging level (verbose, error, silent): error
Log file prefix: IMGW-LOG
Log file size (bytes): 50331648
Log file rotation timer (minutes): 60
Logging mode (append, overwrite): append

Re-configure IMGW (y/n)? [n]
```

Parameter Descriptions

These parameter descriptions are for those parameters unique to the External Directory mode. The general parameter descriptions for the sample above (common to both modes) are listed beginning with "Parameter Descriptions" section on page 2-4.

IP address of remote directory server: The location of the external directory expressed as IP address.

Port number of remote directory server: The service port number of the external directory.

Remote directory server login name: Directory user that has the administrative privileges for all objects under CNS context; for example, **admin**.

Remote directory server password: Directory user password. This same password is also used to define the passwords of two internal administrative accounts (**dcdadmin** and **cdauser1**) of the internal directory storage.

User DN: The complete distinguished name for the remote directory administrative user.

CNS context: Directory context (DN) under which all CNS objects are created. This includes device objects, group objects, application objects, and event objects. These objects can be created inside containers under CNS context.

Use sample schema: Select **y** for enabling the predefined sample schema and **n** for otherwise. See "Sample Schema" for the definition and default values of sample schema.

Table 2-7 Valid Values for General External Directory Mode Parameters

Parameter	Type	Length
IP address of the remote Directory Server	IP address	
Port number of the remote Directory Server	Range between 0 to 65535	
Remote directory server login name	Alphanumeric,dash	1—32
Remote directory server password	Alphanumeric,dash	1—20
User DN	Name-value pair with space	3—unlimited
CNS context	Name-value pair with space	3—unlimited

Sample Schema

Table 2-8 lists the parameters and default values that define the sample schema:

Table 2-8 Sample Schema Parameters

Prompt	Value
objectclass for device object:	deviceclass
container name under which device objects are stored:	ou=CNSDevices
container name under which group objects are stored:	ou=CNSGroups
container name under which application objects are stored:	ou=CNSApplications
template attribute name in device objectclass:	IOSconfigtemplate
config id attribute name in device objectclass:	IOSConfigID
event id attribute name in device objectclass:	IOSEventID
CNS group attribute in device objectclass:	parent
CNS password attribute name in the device object class:	AuthPassword
objectclass for bootstrap password object:	CNSBootstrapPwdClass
bootstrap password attribute name in bootstrap password objectclass:	CNSBootPassword

This sample shows the schema prompts that need to be answered when sample schema is disabled:

```
Use sample schema (y/n): n
Enter container name under which device objects are stored: [ou=CNSDevices]
Enter container name under which group objects are stored: [ou=CNSGroups]
Enter container name under which application objects are stored: [ou=CNSApplications]
Enter objectclass for device object: [deviceclass]
Enter template attribute name in device objectclass: [IOSconfigtemplate]
Enter config id attribute name in device objectclass: [IOSConfigID]
Enter event id attribute name in device objectclass: [IOSEventID]
Enter CNS group attribute name in device: [parent]
Enter CNS password attribute name in device object class: [AuthPassword]
Enter objectclass for bootstrap password object: [CNSBootstrapPwdClass]
Enter bootstrap password attribute name in bootstrap password objectclass:
[CNSBootPassword]
```

Parameter Descriptions

Device objects container name: The container in the directory under which device objects are created.

Groups objects container name: The container in the directory under which group objects are created.

Application objects container name: The container in the directory under which application objects are created.

Object class: The name of the user defined object class for device object.

Template attribute name: Attribute of the device class (as specified in the Object-class prompt) that specifies the template file for the device object. This is not the template file itself, just the name of the attribute that has the value of the template filename.

Config ID attribute name: Attribute of the device class that uniquely identifies the device in the config-server domain.

Event ID attribute name: Attribute of the device class that uniquely identifies a device within the Event Gateway server.

CNS group attribute: The attribute of the device class that specifies the group(s) to which the device object belongs. Note that this is only an attribute name, but not the groups themselves. In addition, it is required only when NSM directive is set to http mode.

CNS password attribute name in device object class: The attribute of the device class that stores the value that the CNS 2100 Series expects as the CNS password from the Cisco IOS device. If disabling authentication, this prompt is disabled.

objectclass for bootstrap password object: The name of the user defined object class for the bootstrap password object. If disabling authentication, this prompt is disabled.

Bootstrap password attribute name in bootstrap password object class: The attribute of the bootstrap password class that stores the value that the CNS 2100 Series system uses as the bootstrap password. If disabling authentication, this prompt is disabled.

Table 2-9 Valid Values for Sample Schema Parameters

Parameter	Type	Length
Device container name	Name-value pair with space	3—unlimited
Group container name	Name-value pair with space	3—unlimited
Application container name	Name-value pair with space	3—unlimited
Object class	Alphanumeric,dash	1—80
Template attribute name	Alphanumeric,dash	1—80
Device IP address attribute name	Alphanumeric,dash	1—80
Config ID attribute name	Alphanumeric,dash	1—80
Device ID attribute name	Alphanumeric,dash	1—80
Event ID attribute name	Alphanumeric,dash	1—80
CNS group attribute	Alphanumeric,dash	1—80
CNS password attribute name	Alphanumeric,dash	1—80
Container name under which bootstrap password object is stored	Alphanumeric,dash	1—80
Bootstrap password attribute name	Alphanumeric,dash	1—80

Non-Interactive Setup

For non-interactive **Setup**, a Perl script for setting up CNS 2100 Series must be created and stored on a remote FTP server.

Sample Scripts

Two sample scripts are provided for non-interactive mode. They are *internaldir.pl* used for internal-directory mode and *externaldir.pl* for external-directory mode. They are installed in the directory */opt/CSCOcnsie/bin* of CNS 2100 Series. They can be used as a template for crafting a specific setup.

The sample scripts are basically setup scripts without prompts; in other words, a non-interactive setup script. All required inputs are hard-coded in the variable initialization section. For ease of identification, associated prompts are listed as comments before each variable assignment.

Upon receiving the non-interactive setup script, it is executed and performs the followings:

1. Read in previously stored inputs from */opt/CSCOcnsie/bin/varsetup.dat*, if already exists, as default values.
2. Go through the variable initialization section and override default values.
3. Execute the remaining setup procedures that are carried out after prompting in interactive setup.

General Guidelines

Here are some general guidelines for the non-interactive **Setup**:

- Variable inputs are not validated.
- Variable **$rainmaker_mode_flag** must be set to **0** for internal directory mode and **1** for external directory mode.
- All password variables can be assigned a plaintext password or an encrypted password. If encrypted password is required, it should be generated using the shell command **encrypt** and passed as a function argument to the decrypt function **do_decrypt**. For example, root password variable **$rootpassword** can be set to **blender** as follows:

  ```
  $rootpassword="blender";
  ```

  or

  ```
  $rootpassword=do_decrypt("52616e646f6d49565b909053af1db595ca8823f2ddf29317");
  ```

  where the encrypted password is generated as follows:

  ```
  [root@rain106 /root]# encrypt blender
  52616e646f6d49565b909053af1db595ca8823f2ddf29317
  [root@rain106 /root]#
  ```

  encrypt is a Perl script that takes a plaintext string input from **stdin** and generates the associated, encrypted string at **stdout**.

Note The encryption key used by **encrypt** is erased after each **reinitialize** and a new one is generated when **encrypt** or **setup** is run. Accordingly, all encrypted passwords in the non-interactive setup scripts must be re-generated after each **reinitialize**.

- The value of **$rootpassword** is used to re-define the root password only if the password is formerly set to **blender** (the factory default); otherwise, the value would be ignored.
- Variables **$hostname**, **$domain_name**, **$dcl_country_code**, and **$dcl_company_code** cannot be changed in subsequent **Setup**. These parameters can only be changed after running **reinitialize**.
- Ethernet IP address, either Ethernet eth0 (**$eth0_ip**, **$eth0_network_mask**, **$eth0_gateway_ip**) or eth1 (**$eth1_ip**, **$eth1_network_mask**, **$eth1_gateway_ip**) must be defined. If both are initialized, input of **$eth1_gateway_ip** is ignored.

Encryption Settings

If variable **$enable_ssl** is **n** (disable crypto), **$plaintext_httpd** must be set to **y** so that httpd (the web server) listens on port 80 (the plaintext port). If **$enable_ssl** is **y** (enable crypto), **$cert_overwrite** (a y/n prompt) must be defined to indicate whether to download new certificate and key. If defined **y**, all related FTP server information (such as **$cert_ftp_server**, **$cert_ftp_username**, **$cert_ftp_user_password**, **$cert_ftp_keyfilename**, **$cert_ftp_crtfilename**) must be provided or else, they can be omitted.

Event Services Settings

- Variable **$EventGatewayAppParam** needs to be defined only when **$NSMDirective** is set to **http** mode.
- Variable **$EventGatewayNumberCrypto** (number of crypto event gateway) must be set to 0 if **$enable_ssl** (crypto) is **n**.
- The total of **$EventGatewayNumber** and **$EventGatewayNumberCrypto** must be less than 11.

External Directory Settings

The current schema definition provided in *externaldir.pl* defines sample schema (see Section "Sample Schema" section on page 2-13).

Other Information

- Perl experts are invited to tailor the **Setup** script as required.
- The main function of **Setup** is located in */opt/CSCOcnsie/bin/setupint.pl*.
- All supporting functions can be found in */opt/CSCOcnsie/bin/setuputils.pm*.
- Prompts-related supporting functions can be found in */opt/CSCOcnsie/bin/PromptSupp.pm*.

Configuring SSL Certificates

To configure SSL, you must generate a valid certificate:

Step 1 On any UNIX host that has OpenSSL installed, enter the following commands:

```
% openssl genrsa -out server.key 1024
% chown root:root server.key
% chmod 400 server.key
% openssl req -new -key server.key -out server.csr
```

Step 2 Ensure that the Common Name is the fully qualified name of the IE2110, for example: www.company.com

Step 3 Send the file *server.csr* to the Certificate Authority for signing.

Assuming that the signed file is *server.crt*, then the files *server.key* and *cerver.crt* are transferred (FTP) into the CNS 2100 Series as part of its setup process.

Note The *server.key* file contains the certificate key. You must ensure that access to this file is restricted because the information in this file can be used to create a machine that can masquerade as a CNS 2100 Series. This would compromise system security.

How to Verify the Configuration on the CNS 2100 Series System

After you run the **Setup** program, verify that the CNS 2100 Series system is configured correctly:

Step 1 Log in with the username and password you created during **Setup**.

If you cannot log in, refer to the "Cannot Log In to the System" section on page A-1 for troubleshooting information.

Step 2 Enter the following command to verify that the system can obtain DNS services from the network:

```
# nslookup <dns_name>
```

where <*dns_name*> is the DNS name of a host that is registered in DNS. If the system cannot obtain the IP address of the host from DNS, run the **Setup** program again and verify the correct IP address for the DNS Server(s).

Step 3 Enter the following command to verify that the system can communicate with the network:

```
# ping <ip_address>
```

where <*ip_address*> is the IP address of a host that is accessible on the network. A DNS server is an excellent host to ping because it should always be running and accessible.

If the system cannot communicate with the network, refer to the "System Cannot Connect to the Network" section on page A-2 for troubleshooting information.

Step 4 Enter the command **ifconfig -a** to verify that the configuration is as you expected.

Step 5 Connect to the system using a web browser to verify HTTP connectivity:

Enter the system IP address in a web browser.

For example, if the system IP address is 10.1.58.5, in a web browser enter the URL **http://10.1.58.5/config/login.html**. If plain text has NOT been enabled for the configuration server, enter **https://10.1.58.5/config/login.html**.

If you cannot connect to the system using a web browser, refer to the "Cannot Connect to the System Using a Web Browser" section on page A-3 for troubleshooting information.

Step 6 Enter the **exit** command to log out of the system.

How to Verify the Installation of the Cisco CNS Configuration Engine

Once the system has been installed, you can verify the installation of the Cisco CNS Configuration Engine by following these steps:

Step 1 Go to a different computer and bring up a web browser.

The Cisco CNS Configuration Engine supports Microsoft Internet Explorer 5.0 or Netscape 4.7 or later.

Step 2 On the net-site window enter the URL for the Cisco CNS Configuration Engine.

For example: **http://<*ip_address*>**

where: <*ip_address*> is the IP address you entered during CNS 2100 Series system **Setup**. You can use the hostname if the name has been defined and registered within your DNS domain.

Note If you have enabled encryption in the **Setup** program, you must use **https://<*ip_address*>.**

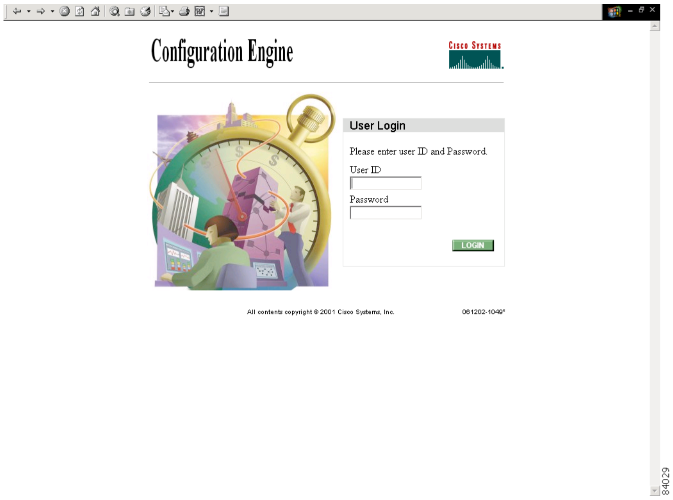
The Cisco CNS Configuration Engine login page appears (see Figure 2-1 on page 2-19).

Step 3 Enter the ConfigService AdminID and Password that you entered during CNS 2100 Series system **Setup**.

The Home page appears (see Figure 2-2 on page 2-19).

If you have reached the Cisco CNS Configuration Engine Home page, you have verified the successful installation on the Cisco CNS Configuration Engine.

Figure 2-1 Login Page



Configuration Engine

User Login

Please enter user ID and Password.

User ID

Password

LOGIN

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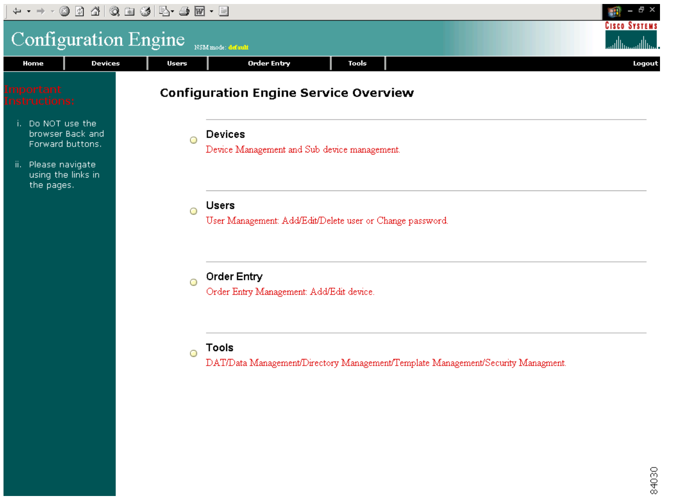
Figure 2-2 Internal Directory Mode Home Page



Configuration Engine NSM mode: default

Home | Devices | Users | Order Entry | Tools | Logout

Important Instructions:

i. Do NOT use the browser Back and Forward buttons.

ii. Please navigate using the links in the pages.

Configuration Engine Service Overview

○ Devices
Device Management and Sub device management.

○ Users
User Management: Add/Edit/Delete user or Change password.

○ Order Entry
Order Entry Management: Add/Edit device.

○ Tools
DAT/Data Management/Directory Management/Template Management/Security Managment.

Migrating DCL Data and Templates from Release 1.2 to 1.3

The migration utility provides a mechanism for upgrading your CNS 2100 Series environment from Release 1.2 to Release 1.3. The utility contains some Perl and Unix shell scripts that help carry out a data migration process. It is a three step process:

1. Export data to a remote FTP site
2. Install Release 1.3 software
3. Retrieve data from the FTP site and setup the box.

Here are the details of each steps:

Export Data Onto a Remote FTP Site

Before exporting the data, it is assumed that the CNS 2100 Series system has already been setup and is up running.

To export your system data onto a remote FTP site, follow these steps:

Step 1 Insert the Release 1.3 CD-ROM into the CD drive of the CNS 2100 Series system to be upgraded.

Step 2 To mount the CD-ROM, login as root and type:

mount /mnt/cdrom

Step 3 Change directory into:

/mnt/cdrom/DataExport

Step 4 Issue the data export command:

./dataexport.

Step 5 Follow the sequence of prompts to enter information of the FTP site and storage location (absolute pathname including filename).

Install Release 1.3 Software

To re-image the system, while the Release 1.3 CD-ROM is still in the CD drive, at the command line,

Step 1 Enter the **sync** command two times:

```
[root@abhishek-storm bin]#sync
[root@abhishek-storm bin]#sync
```

Step 2 Restart the system by hitting the **Reset** button.

Migrate Data and Setup the CNS 2100 Series System

After the system restarted from the new installation, the following prompts appear:

```
This Appliance is not configured.
Please login as setup to configure the appliance.
localhost.localdomain login:
```

To migrate data and setup the CNS 2100 Series system, follow these steps:

Step 1 Login as **root** with password **blender**.

Step 2 Start data migration with the command:

datamigrate

The script proceeds in three stages:

1. Acquires information about the FTP server that stores the migration data and retrieves the data.

2. Starts Release 1.3 **Setup** prompts and configures the system.
3. Populates internal directory storage with retrieved data.

Your interface with the first stage is shown below. It employs the same interface as the non-interactive setup, except it also allows the use of **eth1** (see "Non-Interactive Setup" section on page 2-15).

```
You must configure eth0 or eth1. Press <Enter> to skip!

Enter eth0 IP address: 10.1.19.102
Enter eth0 network mask: 255.255.255.0
Enter eth0 default gateway IP address: 10.1.19.6
Enter FTP server (hostname.domainname or IP address): sername.cisco.com
Enter DNS server IP address: 171.69.226.120
Enter username used for FTP server: smith
Enter FTP password: *****
Re-enter FTP password: *****
Enter absolute pathname of data file on FTP server: /users/smith/migration.tar
```

XML Transform Tool for Users Migrating from Release 1.2 to 1.3

An XML transformation script is added to DAT for automating the XML file conversion process that takes care of the following two problems:

- DAT uses XML file format for bulk uploading data. In release 1.2, the XML file for Bulk Upload feature conforms to a particular DTD that is published for release 1.2. In release1.3, a new DTD is introduced. XML files in release 1.2 DTD format need to be converted to release 1.3 DTD format.
- In addition, there is a release 1.2-to-release 1.3 change of the device object class attribute name for Internal Directory mode from **IOSDeviceID** to **IOSConfigID**. To comply with this change, the data present in the IOSDeviceID attribute for release 1.2 should be copied into the IOSConfigID attribute for release 1.3.

Usage

For XML file conversion, run the following shell script on the CNS 2100 Series console:

```
/opt/CSCOdat/XMLTransform/datxmltransformer.sh <Path to old xml> <true | false>
```

The system generates an XML file conforming to 1.3 DTD with the same data. The shell script takes two input arguments. The first one specifies the absolute pathname to the old (1.2) XML file. The second one, if set to **true**, starts the conversion of IOSDeviceID to IOSConfigID; default is false if omitted.

For example, given an XML file say "Bulkdata.xml" in release 1.2 DTD format, here is the list of steps for the conversion:

Step 1 Login to the console of CNS 2100 Series system.

Step 2 Change directories to:

/opt/CSCOdat/XMLTransform

Step 3 Issue command:

./datxmltransformer.sh ./Bulkdata.xml

The XML that is to be converted (Bulkdata.xml) must be present on the CNS 2100 Series system. The script creates a new file with the name “Bulkdata-new.xml” in the same directory as the old file. This file conforms to release 1.3 DTD. You can use it to upload the Bulkdata in Cisco CNS Configuration Engine 1.3.

Importing Groups and Devices from Release 1.2 to 1.3

In Configuration Registrar 1.2 all devices are stored in the DCL directory in the Internal Directory (Standalone) mode. In this configuration, the only NSM mode supported is **default** mode.

In Cisco CNS Configuration Engine 1.3, Internal Directory mode, all NSM modes (**none**, **default**, and **http** algo/non-algo) are supported.

When you import groups from a Release 1.2 system to a Release 1.3 system, and the Release 1.3 system is setup in NSM **default** mode, devices in the default group and imported groups can receive configurations sent to them. However, when the Release 1.3 system is setup in the NSM **http** mode, sending events to the imported groups (non-default groups) fail.

For imported groups to work in Release 1.3 (NSM **http** mode), you must create a reference for the imported group to an application namespace. The reason is, that NSM **http** mode was not available in Release 1.2 Internal Directory (Standalone) mode.

The value for the application namespace is set during **Setup** with the prompt:

```
Enter the Event Gateway Application Parameter:
```

By default value for this parameter is **config**. You can override this value during Setup with one of your own.

To create the reference to an application namespace (**config** by default) for an imported group, follow these steps:

Step 1 Log in to your Release 1.3 system user interface.

See “How to Log In” section on page 3-2.

Step 2 Click on **Tools**.

See “Management Tools” section on page 3-32.

Step 3 Click on **DAT**.

Step 4 Log in to DAT.

See “How to Log In” section on page 5-1.

Step 5 From DAT main menu, click on **Groups**.

See “How to Manage Groups” section on page 5-11.

Step 6 From the Groups Management page, click Update Groups.

See “Modifying Groups” section on page 5-14.

Step 7 Select the group to which you want to add the application reference to **config**.

Note If during **Setup**, you set a value other than **config** for the Event Gateway Application Parameter, use this value when setting the application reference.

See “How to Add Applications to a Group” section on page 5-17.

Step 8 Check the check box for **config**.

Step 9 Click **Add**.

How to Revert to Factory Setting

To revert to factory settings, follow these steps:

Step 1 Initiate a system backup.

For information about backup, see "Backup and Restore" section on page 3-54.

Step 2 Log in as root.

Use your root password.

Step 3 Type **reinitialize**.

This program clears your system configuration and returns you to **Setup**.

Step 4 Run **Setup** (see "Running the Setup Program" section on page 2-1).

How to Reconfigure System Network Information

To reconfigure system network information, such as CNS 2100 Series system IP address and hostname, follow these steps:

Step 1 Log in as root.

Use your root password.

Step 2 Type **relocate**.

This program performs the same tasks as reinitialize, except that it backs up all data that you can restore when you run **Setup**. It also saves the configuration templates.

Step 3 Run **Setup** (see "Running the Setup Program" section on page 2-1).

Hostname Updates

If you want to change the hostname, country code, or location code without destroying the DCL data and templates, use the **relocate** command. You can use the **relocate** command in both internal (user-created devices and templates) and external (IMGW data) directory modes.

How to Recover and Redefine Your Root Password

To recover and redefine your root password, follow these steps:

Step 1 Verify that the default account has been redefined:

Login: **root**

Password: **blender**

If it has, continue to Step 2 to erase the root account password.

Step 2 Restart the system by pressing the reset button and watch the output at your serial port (or VGA) console.

Step 3 At the LILO boot prompt (**boot:**), press the **TAB** key.

The the name of the boot image appears.

Step 4 At the boot prompt, type:

linuxserial single (or **linuxvga single**).

This starts you into single-user mode on your serial port (or VGA console) where you should see the prompt:

sh-2.04#

Step 5 Redefine the root password using the **passwd** command as follows:

```
sh-2.04 # passwd
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully
sh-2.04#
```

Step 6 At the prompt **sh-2.04#** type:

exit

This returns you to the remaining startup sequence.

Step 7 At the login prompt, login as root with the new password defined in Step 5.

Registering the System in DNS

Register the system in DNS, using the system hostname as its DNS name.

Caution If you do not register the system in DNS using the system hostname as its DNS name, network connectivity problems will occur.

Events are sent to the router with the hostname as the identifier, not the IP address. Consequently, if the CNS 2100 Series system is not registered in DNS, the routers are not able to find it and cannot download configurations.

Installing a Replacement CNS 2100 Series System

This section describes the tasks you should perform when installing a replacement CNS 2100 Series system (a new unit intended to replace an existing unit). These tasks are in addition to the installation and configuration processes described in the "Running the Setup Program" section on page 2-1.

How to Remove the Old System

Before removing the old system:

Step 1 Initiate a system backup.

For information about backup, see "Backup and Restore" section on page 3-54.

Step 2 Verify the backup data is where you expect it to be.

Step 3 Enter the **shutdown** command.

The system shuts down.

Step 4 Power down and remove the old system.

How to Install a Replacement System

To install a replacement system, complete the following steps:

Step 1 Install and power on the new system.

Refer to the *Cisco CNS 2100 Series Intelligence Engine Installation Guide*.

Step 2 Run the **Setup** program.

See the "Running the Setup Program" section on page 2-1.

Step 3 Use the configuration settings that you recorded from the old system to answer the **Setup** program prompts.

Step 4 Restore system data.

For information about restore, see "Backup and Restore" section on page 3-54.

How to Restart the Cron Daemon

The time base for the CNS 2100 Series system should be set to Coordinated Universal Time (UTC). If time is changed, you must restart the cron daemon.

To restart the cron daemon, follow these steps:

Step 1 Connect to the console if you cannot connect using Telnet.

Step 2 Log into the CNS 2100 Series system as root.

Example:

```
Kernel 2.2.16-11bipsec.uid32 on an i586
login: admin
Password:
Copyright (c) 2000 Cisco Systems, Inc.
Appliance 1.0 Wed Feb 21 22:20:29 UTC 2001
Build Version (152) Wed Nov 15 12:00:13 PST 2000
bash $su
Password:
```

Step 3 Enter the command:

# **/etc/rc.d/init.d/crond restart**

Example:

```
# /etc/rc.d/init.d/crond restart
Stopping cron daemon:                                     [ OK ]
Starting cron daemon:                                     [ OK ]
#
```

How to Reimage Your System

If the image on your hard disk has become corrupted, but the disk is operational (you can restart from the hard disk), simply reimage your system by installing the Cisco CNS Configuration Engine 1.3 CD-ROM.

Critical System Information

Before you reimage your CNS 2100 Series system, record the following information about your CNS 2100 Series system:

- IP address
- Gateway address
- Network mask
- DNS name server address

You will need this information when you run **Setup** after the reimage procedure.

Initializing Tivoli Management Agent

This section describes how to:

- Register and de-register the Tivoli Management Agent (TMA) to the system start and stop service
- Initialize the TMA
- Connect the agent to an Endpoint Gateway
- Enable the TMA to start during system boot

This Linux TMA supports Tivoli Framework environment 3.7 and up.

Procedure Overview

- Register Tivoli agent to system start/stop service.
- Install the agent and attach target Endpoint Gateway

Register and De-register Tivoli Agent to System Start and Stop Service

Step 1 To register the Tivoli agent start/stop script (*/etc/rc.d/init.d/Tivoli_lcf1*) to system start and stop service, use the following command:

chkconfig --add Tivoli_lcf1

Once the script is registered, Tivoli agent automatically stops and starts at system restart.

Step 2 To de-register the agent from system start/stop service, use:

chkconfig --del Tivoli_lcf1

How to Initialize the TMA

To install and initialize the agent on the system and connects it to the Endpoint Gateway passed as an argument from the command line, use the following commands:

cd /opt/Tivoli/lcf/dat/1

./lcfd.sh install –g <*gateway_name*>+<*gw_port*> **-P** <*lcfd_port*> <*plus any other lcfd options*>

The <*lcfd_port*> argument must be unique for the Endpoint Gateway environment where you are installing the agent.

How to Verify the TMA is Running

Step 1 From the command line, enter:

ps –ef | grep lcf

This should return the **pid** and information about the running **lcf** process.

Step 2 From the Tivoli Desktop, validate that the agent appears in the target Gateways Endpoint list.

Step 3 From the command line, enter:

wep <*endpoint_name*> **status**

This should respond with the message:

```
<endpoint_name> is alive.
```