CHAPTER 7

Managing Inventories and Reports

Cisco E-DI maintains an inventory of the devices that are in its management domain. This information is used for configuring the network through the XML Programmable Interface and the CLI.

Cisco E-DI also collects Layer 2 data reports which can be used when diagnosing Layer 2 connectivity issues in the network.

This chapter includes the following information:

Inventory Information

For each device, Cisco E-DI initially collects the following physical inventory information from the NE interface through the SNMP protocol:

- Device type
- OS version
- List of interfaces/status through IF-MIB
- List of modules/slots/ports through ENTITY MIB if supported by the device/OS version

Inventory information can be collected manually in network mode.

Cisco E-DI collects inventory automatically on a periodic basis, however a manual inventory can be triggered at any time using the **inventory** command.

A typical inventory can collect the following performance statistics:

- Interface performance—This inventory collects interface performance statistics including errors, packet discards and actual throughput. The report reflects changes between the last poll cycle and the current one.
- Device performance and resources —This inventory collects all device performance and resources parameters, for example CPU utilization, and memory utilization.

Cisco E-DI collects the following inventory data. Inventory collection for each category can be done independently:

- Basic inventory:
  - Device basic data
  - Device interface data

  - Device status polling
- Extended inventory
  - Device file system information
  - Device asset information
  - Device configuration information
- Performance and miscellaneous inventory
  - Device CPU utilization
  - Device interface status
- Application inventory
  - Device ARP, CAM, STP, VTP data

Each category of inventory data is collected through one or more configurable services. Each inventory service polls the device at regular intervals to collect or synchronize data. The following services can be configured independently depending on the user's requirements, and to improve performance:

- Basic inventory and status-polling—This is a mandatory service and cannot be turned off
- File system—Disabled by default
- Configuration file manager—Enabled by default
- Asset—Disabled by default
- Performance—Disabled by default
- ARP table—Disabled by default
- VTP—Disabled by default
- STP—Disabled by default

The results of each inventory collection service can be displayed.

Cisco E-DI also includes a service that the administrator can use to manage the assets in the network. The service provides details of the hardware and the associated information for each of the device in the network. For example chassis, cards, ports, fans, and power supply.

Using the asset inventory management service, an administrator can view:

- All the hardware assets contained in the device including the name, type and identifier of each of the asset. This enables tracking of individual assets on the devices.
- Chassis information of each device, for example, the serial number, hardware revision, and a brief description of the chassis. This provides details of the hardware information of the chassis without requiring a physical inspection of the device.
- Information on the cards and modules available in the device including the name and identifier of the card, and the container that holds the card. This tracks the cards, and their position in the device.
- Slot information in the device, for example the number of chassis slots, cards contained in the slot, slots that are empty, and daughter card slots.
- Port information in the device which gives the list of ports on the device and the location of each port.
- Power supply information in the device. There can be one or more power supply modules in a device. The report gives information about the number of these modules, and also the wattage of each power supply module.
- Fans in each device.

Cisco E-DI collects an inventory of the assets at regular intervals. However, you can do a manual inventory to synchronize the updated asset information with Cisco E-DI, see Table 7-2.

Manual Inventory

To perform an inventory on a device in the current context, enter the following command:

```
[NET:/network]# inventory
```

Note The behavior of this command changes when session based device authentication is enabled. See Using Session Based Device Authentication, page 2-7 for a full explanantion of the command behavior.

Configuring the Inventory Service

You can configure services in Cisco E-DI according to the category of inventory data required, see Table 7-2 for commands.

Table 7-1 Commands to Collect Inventory Data

Description	Command
To enable the status poller service. You can view the current frequency of any task, enter **show job details** *<task-name>*.	[SRV:/server](config)# **service statuspoller**
To set the polling fequency of the status poller service. You can view the current frequency, enter **show job details** *<task-name>*.	[SRV:/server](conf-statuspoller)# **poll-interval** <poll-frequency>
To enable the inventory service. You cannot disable the inventory service.	[SRV:/server](config)# **service inventory**
To set the polling fequency of the inventory service. You can view the current frequency, enter **show job details** *<task-name>*.	[SRV:/server](conf-inventory)# **poll-interval** <poll-frequency>
To enable the performance service.	[SRV:/server](config)# [**no**] **service performance**
To set the polling frequency of the performance service. You can view the current frequency, enter **show job details** *<task-name>*.	[SRV:/server](conf-performance)# **poll-interval** <poll-frequency>
To enable the configuration service. You cannot set the frequency for the configuration service. The configuration collection is driven by Syslog messages received by Cisco E-DI and the inventory service. Every inventory collection triggers a configuration collection. That means that the frequency of the configuration collection service is the same as the frequency set for the inventory service.	[SRV:/server](config)# [**no**] **service config**

Table 7-1 Commands to Collect Inventory Data (continued)

Description	Command
To enable the file system service. You cannot set the frequency for the file system service. The file system collection is driven by Syslog messages received by Cisco E-DI and the inventory service. Every inventory collection triggers a file system collection. That means that the frequency of the file system collection service is the same as the frequency set for the inventory service. **Note** If the filesystem service is disabled, the **dir** command under the device context shows the following warning message, Warning: filesystem service is disabled. Enter **sync filesystem fg** to manually synchronize the data.	`[SRV:/server](config)# [no] service filesystem`
To display the configuration of the services to collect inventory data.	`[SRV:/server]# show running-config`

Viewing the Inventory

You can view the inventory report, see Table 7-2 for commands.

Table 7-2 Commands to View the Inventory

Description	Command

To show the data collection status for a device. Data may be collected by a system triggered task (by the poller) or by a user initiated task (**inventory**, **sync asset**, **sync config** and **sync file system**).
Example output:
`Device Inventory StartTime EndTime Status Message Type`
`172.16.0.0 Perf 09/05/2005 11:19 09/05/2005 11:19 Finished Success`
`172.16.0.0 Asset 09/05/2005 11:19 09/05/2005 11:19 Finished Success`
`172.16.0.0 Config 09/05/2005 11:19 In-Progress`
`172.16.0.0 Perf 09/05/2005 11:18 09/05/2005 11:18 Failed for Spec If-Performance-Inventory Failed`
`172.16.0.0 Asset 09/05/2005 11:18 09/05/2005 11:18 Finished Success`
`172.16.0.0 Config 09/05/2005 11:18 In-Progress`
Inventory type:
• Perf—Performance data
• Asset—Asset data
• Config—Configuration data
• FileSystem—Devices file system information
The Message column shows whether a task has completed successfully or failed.
If the task is running at the time of report, the Status column shows In-Progress.
	`[SRV:/server]# show status inventory`

To view all the assets of all the devices in the network. A warning message is displayed if this dervice is disabled. Enter **sync asset fg** to manually synchronize the data.	`[NET:/network]# show asset all`
To view the chassis information including serial number, hardware revision. A warning message is displayed if this dervice is disabled. Enter **sync asset fg** to manually synchronize the data.	`[NET:/network]# show asset chassis`
To view the cards available on each device including the those that are on the chassis slots and also on the other cards. A warning message is displayed if this dervice is disabled. Enter **sync asset fg** to manually synchronize the data.	`[NET:/network]# show asset cards`

Table 7-2 Commands to View the Inventory (continued)

Description	Command
To view the slots that are available in the chassis of the device and also on the daughter card modules. A warning message is displayed if this dervice is disabled. Enter **sync asset fg** to manually synchronize the data.	[NET:/network]# **show asset slots**
To view the ports that are available on a device. A warning message is displayed if this dervice is disabled. Enter **sync asset fg** to manually synchronize the data.	[NET:/network]# **show asset ports**
To view the power supply available on the device. A warning message is displayed if this dervice is disabled. Enter **sync asset fg** to manually synchronize the data.	[NET:/network]# **show asset power-supply**
To view the fans present on a device. A warning message is displayed if this dervice is disabled. Enter **sync asset fg** to manually synchronize the data.	[NET:/network]# **show asset fans**
To synchronize the updated asset information with Cisco E-DI. Synchronization can be done in the foreground or the background.	[NET:/network]# **sync asset** {**bg** | **fg**}
To show cdp information for managed devices.	[NET:/network]# **show cdp neighbors**
To list all interfaces in the current network view.	[NET:/network]# **show interfaces**
To show IP information.	[NET:/network]# **show ip interface brief**
To show a report on the alarm state of the device over a period of time.	[NET:/network]# **show report availability**
To show detailed cpu-utilization information on the device over a period of 5 minutes. A warning message is displayed if this performance service is disabled. The data may not be up-to-date.	[NET:/network]# **show report cpu-utilization**
To display a list of all devices in the current context.	[NET:/network]# **show report device-list**
To show a report on the alarm state of the device over a period of time. A warning message is displayed if this performance service is disabled. The data may not be up-to-date.	[NET:/network]# **show report if-performance-summary**
To show the interface utilization. A warning message is displayed if this performance service is disabled. The data may not be up-to-date.	[NET:/network]# **show report if-utilization-summary**
To show the current software version on all the devices.	[NET:/network]# **show report software**
To display the network running configuration. See Table A-1 for details of the options available with this command.	[NET:/network]# **show running-config**
To display the network startup configuration. See Table A-1 for details of the options available with this command.	[NET:/network]# **show start-up-config**
To show the software version.	[NET:/network]# **show version**

The asset inventory service can be enabled or disabled in Cisco E-DI. See Table 7-3.

Table 7-3 Commands to Enable or Disable the Asset Inventory Service

Action	Command

To navigate to the server configure mode.	`[SRV:/server]# configure terminal`
	or
	`[SRV:/server]# config t`

To enable the asset management service.	`[SRV:/server](config)# service asset`
To disable the asset management service.	`[SRV:/server](config)# no service asset`

Layer 2 Information

Cisco E-DI collects the following Layer 2 information through the SNMP protocol and Telnet for each device for which the information is available, and provides reports which can be used when debugging Layer 2 connectivity issues in the network:

- ARP data—Address Resolution Protocol. The Internet protocol used to map an IP address to a MAC address. Supported on all Cisco IOS, CATOS and PIX devices.
- MAC(CAM) table data—Media Access Control. Standardized data link layer address that is required for every port or device that connects to a LAN. Other devices in the network use these addresses to locate specific ports in the network and to create and update routing tables and data structures.
- VLAN/VTP data
  - Virtual LAN—Group of devices on one or more LANs that are configured (using management software) so that they can communicate as if they were attached to the same wire, when in fact they are located on a number of different LAN segments.
  - VTP data—Virtual Terminal Protocol. ISO application for establishing a virtual terminal connection across a network.
- STP data—Spanning-Tree Protocol. Bridge protocol that uses the spanning-tree algorithm, enabling a learning bridge to dynamically work around loops in a network topology by creating a spanning tree.

The L2 data collection is disabled by default when the Cisco E-DI server starts. The service must be enabled to start collecting the data. The System Administrator can enable or disable data collection using the service commands in the Cisco E-DI configuration mode.

Layer 2 data collection is supported on CATOS and Cisco IOS devices that support the Bridge.Mib and Cisco-VTP-mib.

The Layer 2 data reports collected from the devices are archived into the database. When the database reaches one million events, the oldest 10% of events are discarded.

There are two methods to synchronize the data reports on Cisco E-DI with the devices:

- Specify the polling option in the configuration mode
- Manually synchronize Cisco E-DI with the devices

Note If frequent polling is specified, this can have an adverse effect on performance.

Collecting ARP Data

ARP information from all the devices can be collected periodically and maintained in the database. The report includes protocol, age of entry, MAC address of the device, and the interface the entry was learnt on. See Table 7-4 for the commands.

Table 7-4 Commands to Collect ARP Data

Description	Command
To change to configuration mode.	`[SVR:/server]# config t` `[SVR:/server] (config)#`
To disable the ARP service.	[SRV:/server](config)# **no service arp**
To enable the ARP service. To enter the config-arp sub mode.	[SRV:/server](config)# **service arp**
To configure the frequency of polling in minutes.	[SRV:/server](config-arp)# **poll-interval** *<5-1000>*
To manually synchronize the local ARP information with that of the device in the current context.	`[NET:/network]#` **sync arp**

Table 7-5 Commands to View ARP Data Records

Description	Command
To view all the ARP entries on the devices in the network	`[NET:/network]#` **show arp**
To view all ARP entries for the specified ip address	`[NET:/network]#` **show arp ipaddress <A.B.C.D>**
To view all ARP entries for the specified mac address	`[NET:/network]#` **show arp macaddress <H.H.H>**

Sample ARP data report:

```
Age   -   Age (Minutes)

 Device         Protocol Address        Age Hardware Addr   Type Interface
 --------------- -------- --------------- --- -------------- ----
 172.25.86.109   Internet 172.25.86.5      0 00c0.9f61.7b61 ARPA Vlan205
 172.25.86.109   Internet 172.25.86.1      1 0009.e831.d8ff ARPA Vlan205
 172.25.86.109   Internet 172.25.86.42   113 00e0.812d.0a9f ARPA Vlan205
 172.25.86.109   Internet 172.25.86.76     3 0012.3f24.e706 ARPA Vlan205
 172.25.86.109   Internet 172.25.86.77     0 0004.235f.4235 ARPA Vlan205
 172.25.86.109   Internet 172.25.86.78     5 0004.23a7.85d1 ARPA Vlan205
 172.25.86.109   Internet 172.25.86.72     0 0004.23a6.3759 ARPA Vlan205
 172.25.86.109   Internet 172.25.86.73     0 0004.23a6.7247 ARPA Vlan205
 172.25.86.109   Internet 172.25.86.74     2 00c0.9f3f.2e2f ARPA Vlan205
 172.25.86.109   Internet 172.25.86.71     0 0002.55b7.6fa3 ARPA Vlan205
 172.25.86.109   Internet 172.25.86.109    - 0008.e3c3.6b00 ARPA Vlan205
 172.25.86.109   Internet 172.25.86.140   21 0040.9655.c861 ARPA Vlan205
```

```
172.25.86.109   Internet 172.25.86.141    7 0012.da3e.5348 ARPA Vlan205
```

Collecting MAC Address Table Information

MAC address table information from all the devices that report such information can be collected periodically and maintained in the database.

The report includes the VLAN, the port the entry was learned on, MAC address, and VLAN type. Filters can be set up to filter by MAC address or VLAN or VLAN type. See Table 7-6 for the commands.

Table 7-6 Commands to Collect MAC Address Table Entries

Description	Command
To change to configuration mode.	`[SVR:/server]# config t` `[SVR:/server] (config)#`
To disable the MAC address table service.	`[SRV:/server](config)# no service mac-address-table`
To enable the MAC address table service. To enter the config-mac-address-table sub mode.	`[SRV:/server](config)# service mac-address-table`
To configure the polling frequency in minutes.	[SRV:/server](config-mac-address-table)# **poll-interval** *<5-1000>*
To synchronize the local MAC address table information with that of the device in the current context.	[NET:/network]# **sync mac-address-table**

Table 7-7 Commands to View MAC Address Table Entries Records

Description	Command
To view all the CAM entries on the switches in the network.	`[NET:/network]# show mac-address-table`
To view all the CAM entries on the switches in the network which match with the specified mac address.	`[NET:/network]# show mac-address-table address <H.H.H>`
To view all the dynamic CAM entries on the switches in the network.	`[NET:/network]# show mac-address-table dynamic`
To view all the static CAM entries on the switches in the network.	`[NET:/network]# show mac-address-table static`
To view all the CAM entries for specified vlan on the switches in the network.	`[NET:/network]# show mac-address-table vlan <vlan_id>`

Sample MAC address table report:

```
admin@edi-jms-1[172.25.86.109 #show mac-address-table
 Switch Address  Address          Type             VLAN Port
------------------------------------------------------------
 172.25.86.109   00c0.9f61.7b61  DYNAMIC  205 FastEthernet0/1
 172.25.86.109   0014.f21f.9370  DYNAMIC  205 FastEthernet0/1
 172.25.86.109   0014.6969.57a8  DYNAMIC  205 FastEthernet0/1
 172.25.86.109   0013.8028.1c04  DYNAMIC  205 FastEthernet0/1
 172.25.86.109   0012.da3e.6fff  DYNAMIC  205 FastEthernet0/1
 172.25.86.109   0012.d923.a306  DYNAMIC  205 FastEthernet0/1
 172.25.86.109   0011.20db.88d2  DYNAMIC  205 FastEthernet0/1
 172.25.86.109   000b.4556.73ff  DYNAMIC  205 FastEthernet0/1
```

```
172.25.86.109   0009.e831.d8ff  DYNAMIC  205 FastEthernet0/1
172.25.86.109   0009.7b9e.317c  DYNAMIC  205 FastEthernet0/1
172.25.86.109   0008.e3db.df3e  DYNAMIC  205 FastEthernet0/1
172.25.86.109   0007.8508.554a  DYNAMIC  205 FastEthernet0/1
172.25.86.109   0007.0ea7.71aa  DYNAMIC  205 FastEthernet0/1
172.25.86.109   0004.23a6.7247  DYNAMIC  205 FastEthernet0/1
172.25.86.109   0004.23a6.3759  DYNAMIC  205 FastEthernet0/1
172.25.86.109   0004.235f.4235  DYNAMIC  205 FastEthernet0/1
172.25.86.109   0003.ba0f.cbc7  DYNAMIC  205 FastEthernet0/1
172.25.86.109   0003.ba0f.a63f  DYNAMIC  205 FastEthernet0/1
172.25.86.109   0002.55b7.6fa3  DYNAMIC  205 FastEthernet0/1
172.25.86.109    0001.42b1.c100  DYNAMIC  205 FastEthernet0/1
```

Collecting VLAN and VTP Data

VLAN and VTP status and statistics information from all the devices that support VTP can be collected periodically and maintained in the database. The report includes the mode, version and revision of the VTP configuration database for all the devices in each domain.

VTP statistics reports also provide information on the number of VTP advertisements sent and received, and configuration revision/digest errors. See Table 7-8 for the commands.

The reports can include the following information:

- Status of VLAN in the entire network on a per-domain basis
- Status of the access and trunk ports
- VLAN mapping of ports
- Additional trunk port status including encapsulation

Table 7-8 Commands to Collect VTP Data

Description	Command
To change to configuration mode.	`[SVR:/server]# config t` `[SVR:/server] (config)#`
To disable VTP service.	`[SRV:/server](config)# no service vtp`
To enable VTP service. To enter the config-vtp sub mode.	[SRV:/server](config)# **service vtp**
To configure the polling frequency in minutes.	[SRV:/server](config-vtp)# **poll-interval** *<5-1000>*
To synchronize the local VTP information with that of the device in the current context.	[NET:/network]# **sync vtp**

Table 7-9 Commands to View VLAN and VTP Data Reports

Description	Command
To view the VLAN status information including the domain, VLAN Id, VLAN name and the status of the VLAN.	`[NET:/network]# show vlan`
To view the status of both trunk and access ports of all the switches in the current context. To view all the ports configured to function as access ports.	`[NET:/network]# show vlan ports`

Table 7-9 Commands to View VLAN and VTP Data Reports (continued)

Description	Command
To view the status of the trunk-ports with additional information like encapsulation. To view all the ports configured to function as trunk ports.	`[NET:/network]# show vlan trunk-ports`
To view all the VTP trunking statistics..	`[NET:/network]# show vtp counters`
To view the VTP status information of all devices in the current context.	`[NET:/network]# show vtp status`

Sample VTP status report:

```
Device Domain Mode Ver Rev Last Updater Pruning State
------------ ---------- --------- ---- --- ------------ ----------------- ---------------

172.25.86.108 Server 2 0 0.0.0.0 Disabled
172.25.86.106 Server 2 0 0.0.0.0 Disabled
172.25.86.104issc-2Transparent2 0 172.25.86.104 Disabled
172.25.86.103isscTransparent 2 0 172.25.86.103 Disabled
172.25.86.116 lab Server 2 20 172.25.86.116 Disabled
172.25.86.109issc-1 Transparent 2 0 0.0.0.0 Enabled
```

Collecting STP Data

STP information on a per-VLAN basis can be collected periodically and maintained in the database. The report includes the STP status of the bridge including priority, number of ports, root port, cost and the state (blocked/forwarding/…) of the ports. See Table 7-11 for the commands.

Table 7-10 Commands to Collect STP Data

Description	Command
To change to configuration mode.	`[SVR:/server]# config t` `[SVR:/server] (config)#`
To disable STP service	[SRV:/server](config)# **no service span-tree**
To enable STP service. Also enter into config sub mode config-span-tree	[SRV:/server](config)# **service span-tree**
To Configure the frequency of polling in minutes.	[SRV:/server](config-span-tree)# **poll-interval** <*5-1000*>
To synchronize the local STP information with that of the device in the current context.	`[NET:/network]# sync span-tree`
To clear the local STP information.	`[NET:/network]# clear span-tree`

Table 7-11 Commands to View STP Data Reports

Description	Command
To view spanning tree information on a per-vlan basis for all the devices.	`[NET:/network]# show stp`

Table 7-11 Commands to View STP Data Reports (continued)

Description	Command
To view the spanning tree of the given vlanId.	[NET:/network]# **show stp vlan <vlanId>**
To show detailed bridge information for each port on the device such as port state (forwarding, disabled, etc), cost, priority and vlan.	[NET:/network]# **show stp vlan <vlanId> port-state**

Sample STP report:

```
* - STP designated Root

Device VLAN PriorityBridge ID Num RootRoot PortRoot BridgeCost
               of Ports   Priority
172.25.86.1031327690012.dae1.0080 11327680009.e830.6500   31
172.25.86.1032327700012.dae1.0080 10327700012.dae1.0080    0
172.25.86.103 205329730012.dae1.0080 21327680001.42b1.c101   42
172.25.86.116 132768000b.45f0.b800 6765327680009.e830.6500   42
172.25.86.116 632768000b.45f0.b800 2032768000b.45f0.b805    0
172.25.86.116 205000b.45f0.b8cc2650001.42b1.c101   69
172.25.86.116 805000b.45f0.b8cc20000b.45f0.bb24    0
```