HP OpenView Enterprise Discovery

(formerly Peregrine Enterprise Discovery)

Software Version: 2.1

Reference Guide

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1 Introduction

Welcome to the Enterprise Discovery™ *Reference Guide*.

This guide contains several chapters that you may find useful as you use Enterprise Discovery. Included are many definitions of terms and concepts used in Enterprise Discovery, as well as other reference materials that might help you work with the product.

2 Terms and Concepts

This chapter is divided into two basic categories:

- (to review terms and concepts common to network management)

- (to learn terms and concepts unique to this product)

Network Terms and Concepts

These terms and concepts are common to networks and network management. They are not unique to Enterprise Discovery.

SNMP

Defined by the Internet Engineering Task Force (IETF) in RFC 1157, Simple Network Management Protocol (SNMP) is the protocol that governs network management, and network device monitoring.

MIB

Management Information Base. This database of network management information is used by SNMP. The information contained in this database helps define each device by giving specific information about the device and manufacturer.

Domain names

Example: website.example.com

A domain name such as "website.example.com" is easier to remember than an IP address such as "192.168.96.1". This ease of remembering is the chief reason for the existence of domain names.

The term "domain name" and "host name" are sometimes used interchangeably. A domain name is a name in the Domain Name System (DNS) format as registered with a DNS server. A host name is purely an internal name, used by a device to refer to itself.

Address types

The two main types of numeric address are the IP address and the MAC address.

IP address

An IP address was intended to be a unique number identifying a unique device or port of a device.

When you see the term "IP address" with no qualifiers in Enterprise Discovery, it means that either an IPv4 address or an IPv6 address is acceptable. The 32-bit address space of IPv4 addresses puts severe limits on the number of unique addresses available, and the supply is fast running out. The IPv6 128-bit address space was created to address this problem.

IPv4 address

An IPv4 address contains four sections separated by periods (or "dots"). Each section, called an octet, contains 8 bits expressed in decimal (0–255).

Example: 192.168.96.1

IPv6 address

An IPv6 address contains eight sections separated by colons. Each section contains 16 bits expressed in hexadecimal (0000–FFFF).

Example: 1234:5678:9ABC:DEF0:1234:5678:9ABC:DEF0

To make it easier to remember and type an IPv6 address, you can use a double colon (::) to indicate multiple contiguous sections of zeros. You can also omit leading zeroes. For example, you can simplify address 0123:0000:0000:0000:0004:0056:789A:BCDE to 123::4:56:789A:BCDE.

MAC address

A MAC (Media Access Control) address is a unique number identifying a unique device or port of a device.

When you see the term "MAC address", it means a numeric MAC address.

Numeric MAC address

A MAC address contains six sections. Each section contains 8 bits expressed as a hexadecimal number (00–FF).

Sometimes the first three sections and last three sections are separated by one space; sometimes all sections are presented as one, without spaces; sometimes each section is separated by a colon or a space.

Examples: 010203 FDFEFF, 010203FDFEFF, 01:02:03:FD:FE:FF

MAC address including OUI

This type of MAC address is sometimes (inaccurately) referred to simply as an OUI. In fact, the Organization Unique Identifier (OUI) comprises the first three sections of a MAC address. If Enterprise Discovery recognizes the numeric form of the OUI, it replaces the numbers with a short form of the organization name. This makes it easier to identify a device. If Enterprise Discovery uses an alphabetic short form for a device's OUI, the device is said to have a recognized OUI. Having a recognized OUI is sometimes abbreviated to "having" an OUI.

Example: DELL 59FC91

Netmask notation

Network masks, often referred to as netmasks, can usually be expressed in two formats in IPv4—either the familiar octet notation (also called dotted decimal notation) or CIDR notation.

Example of octet notation: 255.255.255.248

Example of CIDR notation: 29

The shorter CIDR notation is based on the binary equivalent of the octet notation, and refers to the numbers of contiguous 1s. Below are examples of netmask notation:

255.255.255.255	11111111.11111111.11111111.11111111	32 1s
255.255.255.248	11111111.11111111.11111111.11111000	29 1s
255.255.0.0	11111111.11111111.00000000.00000000	16 1s

> A valid Netmask contains a series of contiguous 1s. If there are zeroes, it is not a valid netmask.

In IPv6, netmasks can only be written in CIDR notation.

Community strings/Users

Depending on the version of SNMP supported on a device, a management system can access the SNMP MIB with a community string (SNMPv1/v2) or a user (SNMPv3).

Community strings and users are like device-based password that control access to the SNMP MIB of a device. A device controls its own community strings/users, but you must tell Enterprise Discovery about them.

If Enterprise Discovery is not given the correct community strings/users and access to devices on your network, Enterprise Discovery will be unable to read device MIBs. Enterprise Discovery will then assume that each device it cannot read has no SNMP management available.

Multiple Strings

For each device that it discovers, Enterprise Discovery will try all the community strings/users you have provided for that device and use the first string that receives a positive acknowledgement to read or write to the system MIB. This means that Enterprise Discovery may try several community strings/users before it finds one that will cause the device to respond.

The fact that Enterprise Discovery may try several community strings/users has implications for any devices that issue SNMP traps (also known as security traps and authentication traps).

SNMP Traps

Some devices may issue an SNMP trap when Enterprise Discovery attempts to explore them. Even if Enterprise Discovery has the correct community string/user in its list, Enterprise Discovery may still "trip" the trap if Enterprise Discovery tries multiple community strings/ users before finding the right one.

For example, Enterprise Discovery might try two invalid community strings before reaching the valid community string. Any invalid community string will "trip" a security trap.

Once a trap has been tripped, the trap may be re-issued periodically until the trap is reset. Enterprise Discovery does not reset traps. Therefore, you should either disable all such traps or use only a single correct community string/user for each device that issues a trap.

➤ If another network management system is used in the same network with Enterprise Discovery, this other system may generate alarms due to these traps.

Directed Community Strings

If a device is programmed with a directed community string (sometimes known as a direct access list), it will reject the attempt by Enterprise Discovery to SNMP QUERY it, even if Enterprise Discovery has been given the correct community string. With a directed community string, each device checks not only the "password," but also to see if the Enterprise Discovery server is on the list of "trusted" devices.

You can allow Enterprise Discovery to communicate with a device with a directed community string, but you cannot do so merely by configuring Enterprise Discovery. You must also give the device itself an entry for a directed community string associated with the IP address of the Enterprise Discovery server.

Bridge aging

To obtain the best results with Enterprise Discovery, turn bridge aging on. Also, set the aging interval for 2–6 hours, although some circumstances may call for an aging interval as long as 12 or even 24 hours. (Longer aging intervals are not always possible. A common maximum aging interval is 32767 seconds, or just over 9 hours.)

Bridges, routers, and switches generally have tables in which they store the addresses of devices on the network. The tables are periodically purged and relearned in order to keep the list of devices current. The aging interval defines the frequency with which tables are purged and relearned.

When there is no table entry for the address of an incoming packet, the bridge, router, or switch must learn the location of the address. To learn the location, the device sends the incoming packet to all its own ports. (This is often referred to as "flooding" or "leakage".) When the destination device with the corresponding address responds, the bridge, router, or switch learns the location and makes an entry in the address table.

If the table is full and a new entry must be made, the "oldest" entry is usually replaced by the new entry. Device manufacturers commonly strive to include a table large enough to hold the addresses of all active sessions, but space in a table is always finite.

Enterprise Discovery reads the tables of bridges, routers, and switches to learn the addresses of all the connected devices. Many bridge, router, and switch vendors use a standard aging interval of 300 seconds (5 minutes), which is too short.

If the bridge aging interval is too short:

- Enterprise Discovery may never discover devices that are connected to the network for short periods—for example, laptops.
- Enterprise Discovery may take longer to determine connections between devices that it has discovered.
- Tables will be purged so frequently that flooding will occur regularly, using bandwidth unnecessarily.

If bridge aging is not turned on for a device, or if the bridge aging interval is too long:

- Tables will contain old addresses of devices that may been removed from the network or devices that are broken. As a result, Enterprise Discovery will work from an outdated and possibly confused representation of what is in your network and how it is connected.

OSI model layers

The Open Systems Interconnection (OSI) model has seven layers. Layers 2 and 3 are the most important to Enterprise Discovery:

- Layer 2 is the Data Link layer, at which level MAC addresses are used. Bridges and some switches are layer 2 devices.
- Layer 3 is the Network layer, at which level IP addresses are used. Routers are layer 3 devices.

Some switches are both layer 2 and layer 3.

The seven layers are:

Layer number	Layer
7	Application
6	Presentation
5	Session
4	Transport
3	Network
2	Data Link
1	Physical

Management workstation

Any workstation or personal computer capable of running a supported web browser. There is more detail on requirements for a management workstation in the *Installation and Initial Setup Guide*.

Enterprise Discovery Terms and Concepts

These terms and concepts are either unique to Enterprise Discovery, or have a special meaning in this context.

The object label

For devices, the object label tells you what kind of device it is. For packages, the object label tells you how many devices are in the package.

Object icon ————

Object tag ———— Win XP Pro

Object title ———— win.example.com ————Object label

Real device

- device tag classifies the device
- device title identifies a specific device

Tag type	Example
Rule-specific[a]	Cisco NCD?
Model	Cisco 1601
Family	Cisco 1600
Network Function	Optivity
Operating System	Windows 95
Registered SysObjId Manufacturer	Novell Inc
Registered OUI(MAC) Manufacturer	Cisco

a. Limited information is available, or, a managed device is not listed in the Enterprise Discovery Rulebase; see also the following table.

Ending	Meaning
?	less than 90% probability of identity
NCD?	Enterprise Discovery is relying on the MAC address. The OUI indicates that the device is probably a network connectivity device (NCD), but there is some possibility that it may be an end node.

Virtual device

- no device tag
- device title can identify a subnet or can be arbitrary

Package

- package tag shows number of devices contained by package
- package title can identify parent device (automatic package) or top object of package (multi-object package); can also be arbitrary (any package)
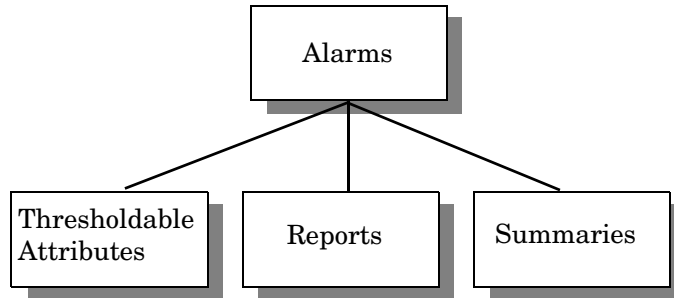
Events and Alarms

An Attribute is the type of data being monitored, such as Utilization or Delay. When the value of that attribute crosses a specific threshold, it will cause an alarm in Enterprise Discovery, and that alarm will be reflected in the Health Panel and the Alarms Viewer. An alarm can have 4 different values: info, minor, major, or critical.

Events can be caused by a change in an attribute's alarm state (for example, an attribute going from OK to Major would be considered an event). Events can also be caused by other scenarios, such as adding a new device, or changing a device property such as its icon or title. All of these events will be reflected in the Events Browser.

To see what alarms are raised by report data or attribute data, see **Help > Classifications > Alarms**. There are 5 event types:

Event Type	What is Generated	Example
Thresholdable Attribute	Will generate an alarm in the Health Panel and Alarms Viewer (critical, major, minor, info)	Utilization
Add	Event in the Events Browser	new device added to network
Delete	Event in the Events Browser	the device is hidden or has been deactivated
Move	Event in the Events Browser	connectivity change, physically moving a device
Property Change	Event in the Events Browser	changing a device icon, priority

The following diagram shows the Enterprise Discovery Alarm hierarchy.

```
                        ┌─────────────┐
                        │   Alarms    │
                        └─────────────┘
              ┌───────────────┼───────────────┐
      ┌───────────────┐ ┌───────────┐ ┌───────────────┐
      │ Thresholdable │ │  Reports  │ │   Summaries   │
      │  Attributes   │ │           │ │               │
      └───────────────┘ └───────────┘ └───────────────┘
```

Thresholdable Attributes can cause alarms (critical, major, minor, info). These are thresholds that the user can change. These events are reflected in the Health Panel the next time a value is collected for that attribute (the database is refreshed once a minute). To see what attributes can be "alarmed" see the "Can be Thresholded" column in the table at **Help** > **Classifications** > **Supported Device/Port Attributes**. To change the thresholds, from the Network Map or Health Panel, click **Edit** > **Alarm Thresholds**.

Reports (ex, MTTR, MTBF) are accumulated data, and summarize data for the past 24 hours. You can change the default "time period" for these alarms in **Administration** > **System Configuration** > **MTTR and MTBF**.

Summaries (ex, Adds, Deletes) are summaries of events. You can change the default "time period" for these alarms in **Administration** > **System Configuration** > **Adds/Deletes/Changes/Moves**.

Here is a list of the alarm indicators visible in the Health Panel and elsewhere in the user interface:

Alarm Type		Indicator
n/a (not an alarm state, this indicates that the attribute is not being monitored)		blank
OK	—	dash
Info	✳	green asterisk
Minor Alarm	▲	gold triangle
Major Alarm	◆	orange diamond
Critical Alarm	■	red square

Panel Elements

Certain elements are common to all Device Manager or Port Manager, Line Manager, or Attribute Manager panels:

- When data in a table has a gray background, the data shown is considered stale, because it was obtained before the beginning of your selected time period. (In some cases, data may be shown in parentheses rather than with a gray background.) To change the time before data is considered stale, see the section on Account Properties in the *Configuration and Customization Guide*.

- A blank space indicates that data is not available for a device or port.

- The final line on each panel is the date and time that the panel was refreshed. (This refers to rendering the panel itself, not when the data shown in the panel was last read.) This date can be useful when you print a panel. To change the format of this date, see the section on Account Properties in the *Configuration and Customization Guide*.

Banner

The banner that appears at the top of all Device Manager or Port Manager , Line Manager, or Attribute Manager panels consists of several elements.

Element	Example	Notes
Attribute Name	Total Breaks	This only appears in the Attribute Manager
Device title and IP address	website.example.com / 192.168.96.1	see Device Title on page 18 if the device title is the IP address, the IP address is shown once if there is no IP address, only the device title is shown
Manager name	Device Manager	—
System name of Enterprise Discovery server	ExampleCorp	see the *Installation and Initial Setup Guide*
Web browser name	Netscape | Internet Explorer	—

Device Title

The title displayed in the banner of Device Manager or Port Manager, Line Manager, or Attribute Manager (and in some panels of those managers) will be the first available of:

- a device title chosen by the Enterprise Discovery Administrator in **Administration > System Configuration > Display preferences**. The Enterprise Discovery Administrator can choose one or several of the following and choose their order too:

  - Asset Tag
  - BIOS Asset Tag
  - NetBIOS Name (scan)

- Last Name
- First name
- Device-specific title
- Domain name
- Host name
- NetBIOS name (network)
- Operating system
- Family
- Model
- Network function
- System description
- System name
- System location
- System contact
- IPv6 address
- IPv4 address
- MAC address including OUI
- MAC address (all-numeric)

➤ Only Administrator or IT Manager accounts can change device titles (**Device Properties** button on the Device Manager). The device titles are global. To determine the default title for a device, see the Diagnosis panel on the Device Manager.

3 Recorded Events

The Health Panel summarizes changes to the network. Each device should contribute only a single alarm. (If there is more than one alarm per device or per port, they will be displayed in the Device Manager or Port Manager.)

To see what alarms are raised by report data or attribute data, see **Help > Classifications > Alarms**.

Port Add/Deletes

Identifies ports recently added to or deleted from a device. (An added port may or may not be recently discovered.)

Does not include ports on virtual devices.

Port Changes

Changing interface rate, interface type, duplex, or line alarm type.

Device Adds/Deletes

Identifies devices recently added to or deleted from the database. (An added device may or may not be recently discovered.)

Device Changes

Changing icon, priority, title, or tag of a device.

Exceptions

Devices with exceptions. See **Help > Classifications > Exceptions**.

Not Recently Seen

There are two types of "not recently seen" events:

- Network Not Recently Seen
- Scan Not Recently Seen

"Network Not Recently Seen" devices are those with which Enterprise Discovery has lost contact and which may soon disappear from the database.

➤ Once Enterprise Discovery has not had contact with a device for a period greater than the threshold (by default, 6 hours), it will appear as "Not Recently Seen." it will be displayed with a green ring. Once the "not seen" period has exceeded 24 hours, the device will also be appear faded.

"Scan Not Recently Seen" devices are devices for which Enterprise Discovery has not received an updated scan file (by default, 4 weeks and 2 days).

➤ You can change these defaults at **Administration > System Configuration > Report time periods**.

➤ Does not include virtual devices

4 Scanners

The Scanner used to scan each computer can capture any or all of the following types of information, depending on the options selected when the Scanner was configured:

- Information about the hardware configuration.

- Information about the system configuration.

- Information about the software on the drives scanned.

- Information about the physical assets and user details that are recorded using the asset questionnaire.

The information collected by a Scanner is stored in a Compressed XML File (XSF) file. This information can be viewed immediately with the Analysis Workbench or Viewer, but it can also be enriched using the XML Enricher, and have its data sent to the Enterprise Discovery server database. From there, the data can be viewed through the Scan Data Viewer, Reports, and so on.

The Scanner Types

Scanners can be generated for the following operating systems:

Table 1   Scanner types

Scanner	Scanner default name	Platform
Windows Scanner	ScanW32.exe	Windows 95 Windows 98 (includes Windows 98 SE) Windows NT 4.0 (includes Windows NT Server) Windows ME Windows 2000 (includes Windows 2000 Server) Windows XP (includes 64-bit version, Media Center and Tablet PC Editions) Windows 2003 Server (includes 64-bit version)
Solaris Scanner	scansp2	Solaris 2.5, 2.6, 7, 8, 9 and 10 on SPARC
HP-UX Scanner	scanhpx	HP-UX 10.2, 11.0 and 11.i on HPPA
AIX Scanner	scanaix	AIX 4.3, 5.0, 5.1, 5.2, 5.3 on IBM R6000
Linux Scanner	scanlnx	Any distribution with a 2.2x, 2.4x or 2.6x kernel on i386
Mac Scanner	scanmac	Mac OS 10.3 Mac OS 10.4
MSI Scanner	msiscanner.exe This Scanner is located in C:\Program Files\HP OpenView\Enterprise Discovery\2.1.0\Common\bin	Windows 98 (includes Windows 98 SE) Windows NT 4.0 (includes Windows NT Server) Windows ME Windows 2000 (includes Windows 2000 Server) Windows XP (includes 64-bit version) Windows 2003 Server (includes 64-bit version) XP Media Centre Windows for Tablet PCs

The procedure for starting a Scanner depends on the native operating system environment for the computer being scanned.

Viewing the Results of the Scan

HP Enterprise Discovery comes with the Viewer program, which allows you to look at the results of your scans. Refer to the *Viewer* Chapter for more information about how to use this application.

For XSF scan files, a tool such as gzip or Winzip can be used to extract the XML data contained in them. The XML file contained inside the XSF file can be viewed with any text editor or XML viewer such as Internet Explorer.

Command Line Parameters and Switches

Although the options for the Scanner are normally set using the Scanner Generator, it may be necessary to change some settings to allow better operation on some machines. The operation of a Scanner can be modified with the use of the various command line parameters.

Reasons for Overriding the Options in a Configured Scanner

- The Scanner may encounter a problem with a particular hardware. Using command line options, the problem hardware can be circumvented.

- Command line parameters can change the configured options such as save path. This allows the scan results to be saved to a local machine without a full network path having to be defined.

How to Use a Command Line parameter

You can specify command line parameters and switches by:

- Typing the command from a command line (for example, the Windows command prompt, or the UNIX/Mac OS X shell). In UNIX/Mac OS X make sure you specify the path to the Scanner.

  For example:

  ```
  /tmp/scanlnx -?
  ```

  launches the Linux Scanner from the /tmp directory.

- Creating a Windows shortcut. Type the command line options (if any) after the quotation marks.

  For example:

  "C:\Program Files\HP OpenView\Enterprise Discovery\2.1.0\Scanner Generator\ScanW32.exe" -?

  launches the Win32 Scanner and displays a list of valid command line options.

- Typing the command in the Windows Run command in the Start menu. Type in or navigate to the location where the Scanner executable is located. Type the command line parameter or switch after the quotation marks.

  For example:

  "C:\Program Files\HP OpenView\Enterprise Discovery\2.1.0\Scanner Generator\ScanW32.exe" -?

Command Line Parameters for Scanners

Valid command line parameters for the Scanners are shown in the following table:

Table 2   Command line parameters for Scanners

Command Line Parameter	Function
-force	Do not check disk space saving offsite Scan File. This may be useful in situations where the operating system reports insufficient space, but this is actually due to access rights.

-p:\<path\>	Override default offsite save path.
	A UNC path can also be entered as the argument to this option. The format for a UNC path is:
	
	`\\servername\sharename\path\`
	
	For example:
	
	`ScanW32 -p:\\HPOpenView\ED\scanfiles\`
	
	The user running the Scanner must have Write permissions to the specified UNC path.

-r:\<path\>	Override the default path to the original scan files.
	A UNC path can also be entered as the argument to this option. The format for a UNC path is:
	
	`\\servername\sharename\path\`
	
	For example:
	
	`ScanW32 -r:\\HPOpenView\ED\scanfiles\`
	
	The user running the Scanner must have read permissions to the specified UNC path.

Table 2   Command line parameters for Scanners

Command Line Parameter	Function

-scandays:<Count>	Scan only if previous scan was more than Count days ago.
	
	Forces the Scanner to perform the scan only if the previous scan was <N> or more days ago. For example:
	
	`-scandays:7`
	
	For example, if the Scanner is launched from a login script every day, it will only perform the scan every week.
	
	When the scandays:<N> parameter is specified, the Scanner attempts to check when the last scan was run. If no previous scan file is found, no messages are displayed and the scan runs.
	
	If a scan file is found, the following message is added to the log file:
	
	`"Checking the age of Scan File "%s"`
	
	Where %s is the full name of the scan file it uses to check it.
	
	If there is a problem determining the age of the scan file (for example, if it is a newer version or it is corrupt), it then outputs:
	
	`The age of the Scan File cannot be determined.`
	If it does manage to obtain the date, it outputs:
	
	`Last scan was %d days ago`
	
	Where %d is substituted for an integer number.

Table 2   Command line parameters for Scanners

Command Line Parameter	Function

-scandayofweek:< Number>	Scan only on specified day of week(0-Sun,1-Mon, etc).
	\<N\> can be one of the following:
	
	`0-Sunday`
	`1-Monday`
	`2-Tuesday`
	`3-Wednesday`
	`4-Thursday`
	`5-Friday`
	`6-Saturday`
	
	For example:
	
	`-scandayofweek:5`
	
	This will cause the scan to be performed on Fridays only.
	The scandays: and scandayofweek: options can be combined. For example:
	
	`ScanW32 -scandays:14 -scandayofweek:3`
	
	This causes the scan to be performed every other Wednesday.

-incl:\<switch\>	Switches for re-enabling individual hardware tests that were disabled in the Scanner Generator. To include tests 10, 20 and 50, you would run: `-incl:10 -incl:20 -incl:50`
-excl:< switch >	Switches for disabling individual hardware tests. To To exclude tests 10, 20 and 50, you would run: `-excl:10 -excl:20 -excl:50`

Table 2   Command line parameters for Scanners

Command Line Parameter	Function
-paths	Using this switch, it is possible to define exactly which directories to scan; the parameter can be repeated as many times as necessary. For example: `scan –paths:/etc –paths:/var –paths:/bin` will scan just /etc, /var and /bin and their subdirectories. **Note:** You must ensure that the Allow Command Line Override option is checked in the Scanner Generator Software Data tab for this to work.
-o:\<filename\>	Takes the offsite scan file name from the command line. For example (non UNIX): `ScanW32 /o:r:\results\SC002154` Where `r:\results\SC002154` is the path to the file `SC002154`. If a file name is not entered, the file is named Default.xsf. If the path is not specified, the file is placed in the directory configured for offsite scan files in the Scanner Generator (see the *Customization Guide*)
-?	The full list of command line options can be obtained by running the Scanners with the -? or /? command line option.

Viewing Command Line Options in Viewer or Analysis Workbench

If a command line option or switch has been used, it can be viewed in Analysis Workbench or Viewer.

This can be very useful when you want to check if the scan results were obtained from a Scanner that had been run with any special command line options.

For example, if the Scanner had been run with the -paths command:

`scan –paths:/etc –paths:/var –paths:/bin`

The -paths command line option will be displayed in Viewer (System Data folder in the Hardware and Configuration tab page).

Using Command Line Switches to Enable and Disable Specific Hardware Tests

Hardware test numbers that can be used for enabling/disabling hardware tests in the scanners as part of the -excl and -incl command line switches are shown in the following table:

Table 3 **Hardware Tests to be used with -excl and -incl switches to Enable and Disable specific hardware tests**

Hardware Test	Hardware Test
10 : BIOS Data	11 : BIOS Extension
12 : SMBIOS Information	13 : Compaq Asset Tag
14 : Plug and Play Version	30 : Video data
31 : Monitors	40 : Port data
50 : Keyboard and Mouse data	60 : Disk data
70 : Memory Data	72 : Swap Files
80 : CPU Data	90 : Operating System Data
91 : Device driver files	92 : Cluster Data
93 : Services	94 : Virtual Machine Data
95 : User profiles	100 : Storage Data
101 : Devices	102 : SCSI/IDE serial numbers
110 : Network data	111 : TCP/IP data
112 : IPX data	113 : Netbios Data
114 : Network Shares	120 : Bus Data
121 : PCI Cards	122 : PCMCIA Cards
123 : MCA Cards	124 : EISA Cards
125 : ISA PnP Card detection	126 : USB Data
130 : Peripherals	150: System Configuration

Starting the Scanners

Information Collected by the Scanners

See the document entitled 'Data collected by the Scanners'.

Starting the Scanner Manually

Enterprise Discovery allows you to automatically launch your Scanners using agents. We recommend that you use the Windows agent and Enterprise Mode to schedule scans regularly. However, if you need to launch them manually do the following:

Windows Scanners

1   Locate the Scanner using Windows Explorer.

2   Double-click on the Scanner icon or executable file.

3   The Windows Scanners can also be started from a command prompt.

As the Scanner does not interact with the user, if an error is encountered during its operation, it will fail with the appropriate error level. The reason for failing can usually be found in the error log file.

UNIX/Mac OS X Scanners |

The methods for starting the various UNIX Scanners (HP-UX, Solaris, Linux and AIX) are identical.

1   Copy the Scanner executable to the machine to be scanned.

2   Make sure that executable bit has been set (for example, for the Solaris Scanner run chmod +x scansp2 to ensure this)

3   Type the name of the Scanner, for example, scansp2, followed by any desired Scanner command line options, to run it.

    You will have to type ./ in front of scansp2 if the current directory (.) is not in the PATH: ./scansp2

The Scanning Sequence for the Scanners

A console is shown while the Scanner is running. This displays the status of the scanning sequence. Any errors encountered are also shown here.

After the scan has been executed, the following events take place:

*   Hardware scan (also contains system configuration scan)

*   Software scan

Hardware Scan

Initially a copyright message is displayed, after which, hardware is detected (this too, is indicated as text mode messages).

Software Scan

The software scan commences after the hardware scan. It shows a list of directories as they are being scanned.

Scanner Error Level Codes

The Scanners produce error level codes which can be used to handle situations if the Scanner terminates without producing a scan file.

These error codes can, for example, be used in a batch file so that specified actions can be carried out in the event that particular error codes are returned.

These can be used to control re-scan activities when a scan has not completed successfully.

Table 4   Scanner Error Level Codes

Error Level	Description
20	Scanner terminated because virtual machine was detected
6	Another Scanner instance is already running.
5	Too Early – It is earlier than the scan days variable.
4	Fatal Error – Scanner encountered a fatal error.
3	Help Screen – Command line help screen has been requested. It is also returned if invalid command line options are specified.
2	User Abort – User aborted the Scanner.
1	Exception – Scanner terminated because of an exception
0	Normal/successful exit

See Using Error Level codes on page 36 for further information.

The MSI Scanner

Overview of the MSI Scanner

The MSI Scanner is a command line utility used to scan an MSI based installer, extract all required file information and write an XML file describing the installer and its contents. This XML file can then be sent to the central office where the person maintaining the application library can load it into the SAI Editor exactly as if it was the original MSI based Installer.

The MSI Scanner (msiscanner.exe) is not generated by the Scanner Generator. It is supplied with the software in the following location by default: C:\Program Files\HP OpenView\Enterprise Discovery\2.1.0\Common\bin

Starting the MSI Scanner

To start the MSI Scanner:

1   From the command prompt, type the following:

```
msiscanner <setup_package> <output_file>
```

Where:

• <setup_package> is the path and file name of the MSI-based installer.

• <output_file> is the path and file name of the output XML file. Note that if the specified file name does not end in .xml, the MSI Scanner will append an .xml extension to it.

Opening the MSI Scanner Output File in the MSI Importer

The output from the MSI Scanner is usable in the MSI Importer so that you can browse the MSI and teach from it based on the XML file only.

To open the MSI Scanner output file:

1   In the SAI Editor, select the Import MSI based Installer option from the Tools menu.

The File Open dialog box is displayed.

2   In the Files of Type drop-down box, select the MSI Scanner output file.

3   Navigate to the file to be opened.

4   Click OK

MSI Scanner Error Level Codes

The MSI Scanner produce error level codes which can be used to handle situations if the Scanner terminates without producing a scan file.

These error codes can, for example, be used in a batch file so that specified actions can be carried out in the event that particular error codes are returned.

Table 5   MSI Scanner Error Level Codes

Error Level	Description
6	Unexpected error
5	Unable to open the output file
4	Insufficient space available in the Temp directory.
3	Unable to open input MSI
2	Unrecognized package
1	Incorrect parameters
0	Success

Troubleshooting

Using Error Level codes

Windows Scanners produce Error Level codes that can be used to handle situations if the Scanners terminate without producing an audit file.

These can be used to control re-scan activities when a scan has not completed for some reason.

Because the Error Level is available as an environment variable when the Scanner finishes this can be incorporated in a log file.

For example, a Windows NT/200x/XP Scanner with ComputerName and UserName available, a simple batch file could include:

```
echo %computername%, %errorlevel%, %username% to a flag file >
%computername%.flg
```

If the Scanner is terminated using the Windows Task Manager, then it is reported as successful.

Scanner Generator Errors

The most usual problems encountered when the Scanner is generated result in an error message:

ERROR {value} Generating Scanner

The causes can usually be identified as follows:

- The path defined for the executable Scanner executable file does not exist.

- The Scanner file already exists and is currently being used by another application.

- The file name chosen for the Scanner executable file is invalid (that is, does not follow the MS DOS file naming conventions and may include illegal characters).

- Some virus protection software may prevent the Scanner Generator from creating and writing to Scanner executable files.

To Resolve the Problem

- Try generating the Scanner using the default settings, path and file name.

- If the previous step fails, try again selecting a file name which you have checked does not exist.

Hardware Scanning Errors

If a hardware scanning error occurs, the screen will appear to stop responding, or 'hang' during hardware scanning.

Note the test which is failing. The error message is displayed in the console/shell window.

The Scanner provides several command line parameter switches for disabling specific hardware detection tests. Use these command line parameter switches to disable the specific test which has failed.

➤ Typing -? following the Scanner file name at the command line displays a list of the available parameter switches, for example, `ScanW32 -?`

To use a parameter switch to disable a specific hardware test, enter it on the command line after the Scanner file name when the Scanner is started.

For example:

```
scanlnx -excl:60
```

Software Scanning Errors

The following errors may occur during the examination of files and collection of software information.

Out of Swap Space – Cannot Store More Files in Scan File

This message is displayed if there is not enough room on the hard disk drive for storing a file that has been marked for collection in the Scanner Generator.

Could Not read File <file name> - File Not Saved

This message is displayed if a file marked for collection in the Scanner Generator cannot be stored. Check to see if the file is being locked (used) by another process.

Scan File Saving Errors

The following messages may be displayed when the Scanner tries to save a scan file:

Error {value} Saving Local Scan File

There may be insufficient space on the local drive that the Scanner is attempting to save the scan file to. Check the available space on the local disk drive.

Another cause of this error message appearing might be that sufficient privileges do not exist to write the file or the drive cannot be accessed.

Error {value} Saving Offsite Scan File

There may be insufficient space on the offsite drive (for example the floppy disk or network drive) when the Scanner is attempting to save the scan file. Check the available space on the offsite disk drive.

Additional Errors

Additional errors the user may encounter running the Scanner include:

- Not Enough Temp Space
- Compression on Netware Servers
- Slow Scanning

- Virus Warning

Not Enough Temp Space

Check that the TEMP environment variable points to a valid directory with enough disk space available. If it is missing or points to an incorrect directory, set it up accordingly (for example: SET TEMP=C:\TEMP).

Compression on Netware Servers

All signatures should be off or override.ini must be set to ignore all files. This ensures that files are not opened and stored files are not collected. Netware compression is not dynamic such as NTFS compression in Windows NT/2000/XP/2003. Running Scanners could have detrimental effects in Netware Servers if compression is being used. This is because to signature a file, the file must be decompressed and then opened by the Scanner. Netware will not recompress the file, thus a capacity problem could result if the compressed volume is greater than the actual disk space available.

Slow Scanning

This may be due to real-time antivirus software being run. Any file that is opened will be checked for virus infection. Although this can be tedious, it is not advisable to disable the antivirus software for the reasons discussed in the next section.

Virus Warning

Because the Scanner opens files on the computer, if there is real-time antivirus software in operation, it may detect a virus being present in a file. Depending on the virus product being used, they will have an action defined to deal with the virus. Some will try to deal with the problem and immediately disinfect the file. Others will try to move the infected file to a quarantine directory and rename its file extension.

In this case, the quarantine directory may be scanned by the Scanner later during its scan.

To prevent this happening, use the override.ini file with *.vir (where .vir is a typical quarantine file extension). Check the specific product to find the extension for this type of file.

Using the Scanners for Manual Inventories

Enterprise Discovery allows you to automatically launch your Scanners using agents. We recommend that you use the Windows agent and Enterprise Mode to schedule scans regularly. However, Enterprise Discovery Scanners can be generated as stand-alone executables that can be run in a number of ways.

Once you have configured and generated the correct type of Scanners for your computer population, the next issue you will face is how to execute them.

Walkround Inventory

When starting your inventory project it may be necessary to initially conduct a walkround inventory. There may be machines that are not connected to the network, or there may be a closet full of older or broken machines which may only be discovered by physically finding them.

All of these machines need to be accounted for as part of a sound asset management program. Additionally, there is user asset information such as user first name, last name and location which must initially be manually entered.

With a walkround inventory, you can execute the Scanner from a floppy disk, USB memory stick or connect to a network share and run it from there.

Using a Distribution Tool Such As SMS

The advantage of a distribution tool, such as Microsoft's SMS is, it allows an administrator to determine at their discretion when an inventory needs to take place. An administrator has the power from their System Management Console to push a command onto a remote machine at their will. This could include the execution of a Scanner. The disadvantage of a product such as SMS is that an agent must be present on each desktop that the administrator would like to control. This requires time and expertise. Enterprise Discovery comes with a the capability to produce MIF files. These basically allow all SMS clients who are scanned to have their scan files converted to a standard MIF format which SMS can store, read and process.

Command Line Execution

Although the options for the Scanner are normally set using the Scanner Generator, it may be necessary to change some settings to allow better operation on some machines being scanned. This may be to accommodate a 'quirky' machine or to simply change the name given to the scan file. The advantage of running a Scanner from the command line is that there are numerous switches available to override options configured in the Scanner Generator. In addition, new features become available such as the option to run a scan on a scheduled basis.

For more information about command line options for the Scanners, see Command Line Parameters and Switches on page 26.

5 Logging User Actions

Some users need a method of checking the Enterprise Discovery logs to see the actions initiated by different accounts.

The best way to find this kind of information is to go through the audit.log and discovery.log files. Both are available (by default) at this location: C:\Documents and Settings\All Users\Application Data\Peregrine\Enterprise Discovery\Logs.

By default, Enterprise Discovery does not log these events. If you would like to log them, you must enable the **Log User Actions** option at **Administration > System Configuration > Server configuration**.

Audit Log

Before using the audit log, make sure that the data you want to see is recorded in the audit log. The log contains information on most changes you make through the web user interface (for example, account changes and System Configuration). The resulting data appears in the following format:

```
2005-09-21 09:37:20,453 [4380] - OV::ED::Audit::log_info
C:\Perl\site\lib\/OV/ED/Audit.pm (46): "admin@127.0.0.1" set
"audit_log" === to y (ConfigOption)


2005-09-21 09:41:45,040 [4380] - OV::ED::Audit::log_info
C:\Perl\site\lib\/OV/ED/Audit.pm (46): "admin@127.0.0.1" set
"max_login_failure_count" === to 4 (ConfigOption)


2005-09-21 09:42:01,062 [4380] - OV::ED::Audit::log_info
C:\Perl\site\lib\/OV/ED/Audit.pm (46): "admin@127.0.0.1" add
"account" "test_account"


2005-09-21 09:42:17,562 [4380] - OV::ED::Audit::log_info
C:\Perl\site\lib\/OV/ED/Audit.pm (46): "admin@127.0.0.1" change
"password" of "test_account" === *****
```

For each entry, you will see the following information:

Example	Explanation
`2005-09-21 09:41:45,040 [4380] -`	Date and time of the change.
`OV::ED::Audit::log_info` `C:\Perl\site\lib\/OV/ED/Audit.pm (46):`	The name of the script.
`admin@127.0.0.1`	The account name and the IP address from which the server was accessed.
`set "audit_log" === to y (ConfigOption)`	The UI option that was changed.

Discovery Log

The Discovery log contains events relating to discovering the network. For example, it records whenever a user updates the model of a device, or adds a new device to the range of IP addresses.

If you would like to search the log for these events, enter the following grep command at the DOS prompt on your Enterprise Discovery server.

If you have installed Enterprise Discovery to its default location, you can use the following command. Enter the command exactly as shown, including all punctuation marks.

```
"C:\Program Files\HP OpenView\Enterprise
Discovery\2.1\support\bin\grep.exe" "Event write:"
"C:\Documents and Settings\All Users\Application Data\HP
OpenView\Enterprise Discovery\Logs\discovery.log" | "C:\Program
Files\HP OpenView\Enterprise
Discovery\2.1\support\bin\grep.exe" "User=" > "C:\events.txt"
```

This grep command filters the data in the Discovery.log file twice. First, it looks for data containing the text "Event write". Second, it filters again by looking for the text "User=".

When installing Enterprise Discovery 2.1, you may have changed the default location of the folders. If that is the case, make sure to change the command accordingly.

Example	Explanation
`"<program files>\support\bin\grep.exe"`	The location in your "program files" folder that contains the grep executable.
`"Event write:"`	The first filter for text to be found in the discovery log.
`"<data directory>\Logs\discovery.log" |`	The location of the discovery log in your "data directory". There are likely several discovery.log files in this directory, as Enterprise Discovery will split the file once it reaches a certain size. So, you may have to search through several log files, all following this naming convention: discovery.log, discovery2.log, discovery3.log.
`"<program files>\support\bin\grep.exe"`	The location in your "program files" folder that contains the grep executable.
`"User=" >`	The second filter for text to be found in the discovery log.
`"C:\events.txt"`	The name of the output file.

The resulting "events.txt" file will contain data in the following format.

```
2005-09-13 17:08:49,267 LogServerClientHandler
ovedDiscEng:Event[6236]: INFO - Event write: change Object:
node=10 Property=Title Owner=User from=<xxxx> to=<yyyy>
User="abcd" FromIP="ipv4:172.1.1.1"


2005-09-13 17:09:10,249 LogServerClientHandler
ovedDiscEng:Event[6236]: INFO - Event write: Model update mdupd
FromIP="4D58DC30" User="abcd" Type="UpdateModel" Value="Query
Network" EventTime=1126645750 Node=10


2005-09-13 17:09:17,827 LogServerClientHandler
ovedDiscEng:Event[6236]: INFO - Event write: Model update mdupd
FromIP="ipv4:172.1.1.1" User="abcd" Type="UpdateModel"
Value="Run Rulebase" EventTime=1126645757 Node=10


2005-09-13 17:09:29,763 LogServerClientHandler
ovedDiscEng:Event[6236]: INFO - Event write: Model update mdupd
FromIP="ipv4:172.1.1.1" User="abcd" Type="UpdateModel"
Value="Enrich XML" EventTime=1126645769 Node=10


2005-09-13 17:09:39,903 LogServerClientHandler
ovedDiscEng:Event[6236]: INFO - Event write: delete auto_trash
node(s) 10 User="abcd" FromIP="ipv4:172.1.1.1"


2005-09-13 17:09:45,308 LogServerClientHandler
ovedDiscEng:Event[6236]: INFO - Event write: add new device
port(s) 501 User="abcd" FromIP="ipv4:172.1.1.1"


2005-09-13 17:09:45,339 LogServerClientHandler
ovedDiscEng:Event[6236]: INFO - Event write: add node(s) 10
User="abcd" FromIP="ipv4:172.1.1.1"


2005-09-13 17:12:53,539 LogServerClientHandler
ovedDiscEng:Portal.1[9840]: INFO - Event write: Network
Configuration changed by User=abcd FromIP=ipv4:172.1.1.1
```

6 UI Shortcuts

You can launch major components of Enterprise Discovery from outside of the Enterprise Discovery interface. These components include the Device Manager, Port Manager, Line Manager, and all features available from the Home Page.

To launch components from outside Enterprise Discovery, you must use the "?go=" commands. The "?go=" commands associated with the Home Page require only a single argument. The "?go=" commands associated with the Managers can have multiple arguments.

➤ To launch a component on a remote Enterprise Discovery server from a server running in Aggregator mode, use the optional argument "remote_id".

Optional arguments are shown in [square brackets]. Variables (which you must replace with a value) are shown in angle brackets and *<this font>*. You should omit the square brackets, angle brackets, and spaces between arguments when you type the actual text.

Major Components

You can launch the following major components with a single argument from a web browser:

Function	Command
Health Panel	http://*<my_server>*/nm/?go=health_panel
Network Map	http://*<my_server>*/nm/?go=network_map
Events Browser	http://*<my_server>*/nm/?go=events
Find	http://*<my_server>*/nm/?go=find
MIB Browser	http://*<my_server>*/nm/?go=mib_browser
Scan Data Viewer	http://*<my_server>*/nm/?go=viewer
Home	http://*<my_server>*/nm/?go=home
Status	http://*<my_server>*/nm/?go=status
Reports	http://*<my_server>*/nm/?go=reports
Administration	http://*<my_server>*/nm/?go=administration
Help	http://*<my_server>*/nm/?go=help

Asset Questionnaire

Syntax:

http://<*my_server*>/nm/?go=waq ;device=<*device_id*> [;device_type=<*device_type*>]

Parameter	Description
device_id	any string
device_type	one of the following options: OID, NMID, PortOID, PortNMID, IP, IPv4, IPv6, MAC, Cloud, DNS, LabelPrefix, Label, NetBIOS

Examples:

- ```
  http://my_server.example.com/nm/?go=waq;device=172.17.1.1
  ```
- ```
  http://my_server.example.com/nm/
  ?go=waq;device=172.17.1.1;device_type=IPv4
  ```

Device Manager

Syntax:

http://<*my_server*>/nm/?go=device ;device=<*device_id*> [;device_type=<*device_type*>] [;panel=<*panel*>]

Parameter	Description
device_id	any string
device_type	one of the following options: OID, NMID, PortOID, PortNMID, IP, IPv4, IPv6, MAC, Cloud, DNS, LabelPrefix, Label, NetBIOS
panel	one of the following options: about, state, reports, diagnosis, stats, ports, manage, update, visibility Note: If this is omitted, Enterprise Discovery will use the account's default setting.

Examples:

- ```
  http://my_server.example.com/nm/?go=device;device=172.17.1.1
  ``` (open device by IP address)
- ```
  http://my_server.example.com/nm/
  ?go=device;device=172.17.1.1;device_type=IPv4
  ``` (open device by IP address; more efficient)

- `http://my_server.example.com/nm/?go=device;device=56;device_type=NMID`(open device by internal ID)

Port Manager

Syntax:

http://*<my_server>*/nm/?go=port [;device=*<device_id>*] [;device_type=*<device_type>*] ;port=*<port_id>* [;port_type=*<port_type>*] [;panel=*<panel>*]

Parameter	Description
device_id	any string
device_type	one of the following options: OID, NMID, PortOID, PortNMID, IP, IPv4, IPv6, MAC, Cloud, DNS, Label, LabelPrefix, NetBIOS
port_id	any string
port_type	one of the following options: OID, NMID, Index, Description
panel	one of the following options: about, state, reports, diagnosis, stats, purge, connect, disconnect Note: If this is omitted, Enterprise Discovery will use the account's default setting.

Examples:

- `http://my_server.example.com/nm/?go=port;device=172.17.1.1;port=eth0` (open port by IP address and description)

- `http://my_server.example.com/nm/?go=port;port=238;port_type=NMID` (open port by internal ID)

Line Manager

Syntax:

http://<*my_server*>/nm/?go=line [;device=<*device_id*>] [;device_type=<*device_type*>]
;port=<*port_id*> [;port_type=<*port_type*>] [;panel=<*panel*>]

Parameter	Description
device_id	any string
device_type	one of the following options: OID, NMID, PortOID, PortNMID, IP, IPv4, IPv6, MAC, Cloud, DNS, Label, LabelPrefix, NetBIOS
port_id	any string
port_type	one of the following options: OID, NMID, Index, Description
panel	about (the only option available)

This works the same as the Port Manager. The only additional restriction is that the Line Manager will only work if the specified port is connected to something. You may specify either end of the line.

Examples:

```
http://my_server.example.com/nm/?go=line;device=172.17.1.1;port=eth0
```
(open line by IP address and description)

```
http://my_server.example.com/nm/?go=line;port=238;port_type=NMID
```
(open line by internal ID)

Attribute Manager

Syntax:

http://<*my_server*>/nm/?go=attribute [;device=<*device_id*>] [;device_type=<*device_type*>] [;port=<*port_id*>] [;port_type=<*port_type*>] ;attribute=<*attribute_id*> [;attribute_type=<*attribute_type*>] [;panel=<*panel*>]

Parameter	Description
device_id	any string
device_type	one of the following options: OID, NMID, PortOID, PortNMID, IP, IPv4, IPv6, MAC, Cloud, DNS, Label, LabelPrefix, NetBIOS
port_id	any string
port_type	one of the following options: OID, NMID, Index, Description
attribute_id	any string
attribute_type	A full list of the internal names of these attributes is available on the web UI at **Help > Classifications > Supported Device/Port Attributes**.
panel	one of the following options: about, stats Note: If this is omitted, Enterprise Discovery will use the account's default setting.

Examples:

- ```
  http://my_server.example.com/nm/
  ?go=attribute;device=172.17.1.1;port=eth0;attribute=in_util;attribute_typ
  e=Name
  ```
  (open attribute by IP address and description and show the utilization in attribute)

- ```
  http://my_server.example.com/nm/
  ?go=attribute;attribute=49234;attribute_type=NMID
  ```
  (open attribute by internal ID)

Service Analyzer

Syntax:

http://<*my_server*>/nm/?go=service_analyzer [;device1=<*device1_id*>]
[;device1_type=<*device1_type*>] [;device2=<*device2_id*>] [;device2_type=<*device2_type*>]

Parameter	Description
device1_id	any string
device1_type	one of the following options: OID, NMID, PortOID, PortNMID, IP, IPv4, IPv6, MAC, Cloud, DNS, LabelPrefix, Label, NetBIOS
device2_id	any string
device2_type	one of the following options: OID, NMID, PortOID, PortNMID, IP, IPv4, IPv6, MAC, Cloud, DNS, LabelPrefix, Label, NetBIOS

Examples:

- ```
  http://my_server.example.com/nm/
  ?go=service_analyzer;device1=172.17.1.1;device2=nmc
  ```

- ```
  http://my_server.example.com/nm/
  ?go=service_analyzer;device1=32;device1_type=NMID;device2=78;device2_type
  =NMID
  ```

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Portions of this software were developed at the National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign.

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[This is the first released version of the library GPL. It is numbered 2 because it goes with version 2 of the ordinary GPL.]

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libicu

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