

# Auto Discovery

The Cisco EMF Auto Discovery application allows you to examine the network for IP and SNMP devices and create a managed object for each new device discovered. Auto Discovery can be opened from the Cisco EMF Launchpad window or from a pop up menu available on a selected object.

Figure 5-1 Discover Network Devices Window



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**Note** Cisco EMF supports both SNMPv1 and SNMP v2c.

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## Mechanisms for Discovering Devices

The Auto Discovery application can use three different mechanisms for discovering devices:

- IP—ICMP pings are used to find devices in a given IP address range. This allows Cisco EMF to find which IP devices exist, but does not enable it to discover what kind of devices they are.
- SNMP—SNMP get requests are used to find devices in a given IP address range. Several SNMP community strings can be used so equipment with different community strings can be discovered in the same discovery session. The SNMP information returned by devices is used to determine the types of devices that have been found.
- IP and SNMP—ICMP pings are used to find devices and then SNMP requests are used to interrogate the devices to find out what kind of devices they are. This is the default mechanism.

The Auto Discovery application can discover devices on more than one subnet by using multi-hop discovery. This option is available when using SNMP or IP and SNMP discovery. When Cisco EMF discovers a device that is connected to more than one network, it can run Auto Discovery on the next network. It does this if the hop count is greater than zero. The next network is then discovered with hop count minus one.

When Auto Discovery is launched as a service from a selected IP manageable object, the discovery range, by default, is related to the IP address of the launch object.

An option is available to specify the physical location where discovered objects will be created. This is particularly useful when using Auto Discovery with Element Managers.

## Auto Discovery Configuration

You can configure Auto Discovery to be scheduled as described in the “Scheduling Auto Discovery” section on page 5-8.

## User Inputs

The following information is necessary to carry out Auto Discovery:

- IP address range for discovery
- Discovery method (IP only, IP and SNMP, SNMP only)
- Number of hops allowed
- ICMP/SNMP retries
- SNMP community strings
- Location of newly found devices in the managed network hierarchy
- SNMP timeout (this is configured from the GUI)

## Auto Discovery Process

Auto Discovery proceeds with IP pings (ICMP echo requests) first (if IP is selected), followed by SNMP GETs of **sysDescr** and **sysObjectId** (if the ping was successful and SNMP is selected or SNMP only is selected).

Only devices within the selected range should be pinged, unless however, one of the devices discovered is a router. For example, if a router has three ports with IP addresses 172.23.145.10, 130.159.72.40, and 142.123.45.200, the system automatically pulls the network address entry table and creates network objects for the networks on the other interfaces. As Cisco EMF is discovering on network 172.23.145.0, it finds the first interface. It also finds that the device is a router (it has IP forwarding configured), so it finds the other interfaces and creates networks for 130.159.72.0 and 142.123.45.0, as well.

The hop count field specifies how many times auto discovery should begin on a new subnet. If Cisco EMF discovers a device with multiple IP interfaces, it automatically starts auto discovery on the other interfaces if the hop count is greater than zero; the address range is the entire subnet for that interface and the hop count is decremented each time this occurs.

If no response to the ping is received within the timeout period, the operation is tried again, up to the number of times specified in ping retries.


For SNMP gets, all provided community strings are tried until one succeeds or the list is exhausted.

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**Note** A Cisco EMF object is created for every device which responds, even for those which only respond to pings and not SNMP get requests. If you only want objects which responded to the SNMP get requests to be created, then use the SNMP only discovery method.

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## Launching the Auto Discovery Application

The Auto Discovery application is launched using the  icon in the Cisco EMF Launchpad window or from other Cisco EMF applications. Select the **Auto Discovery** option from the pop up menu available when you right click on a selected object. A window similar to Figure 5-1 is displayed.

## Discovering IP Devices

To discover IP devices, proceed as follows:

- Step 1** Select the object within the Map Viewer window that Auto Discovery will be launched from.
- Step 2** Open the Discover Network Devices window (refer to Figure 5-1).  
The object name and address are displayed in the **Discovery Configuration** panel of the window.
- Step 3** Select the drop down list next to **Discovery Method** and select **IP** from the displayed list.  
**IP** is displayed next to **Discovery Method**.
- Step 4** In the **Ping Retries** data entry box, type the number of times the system should try to identify whether an active machine is connected at a specified address.

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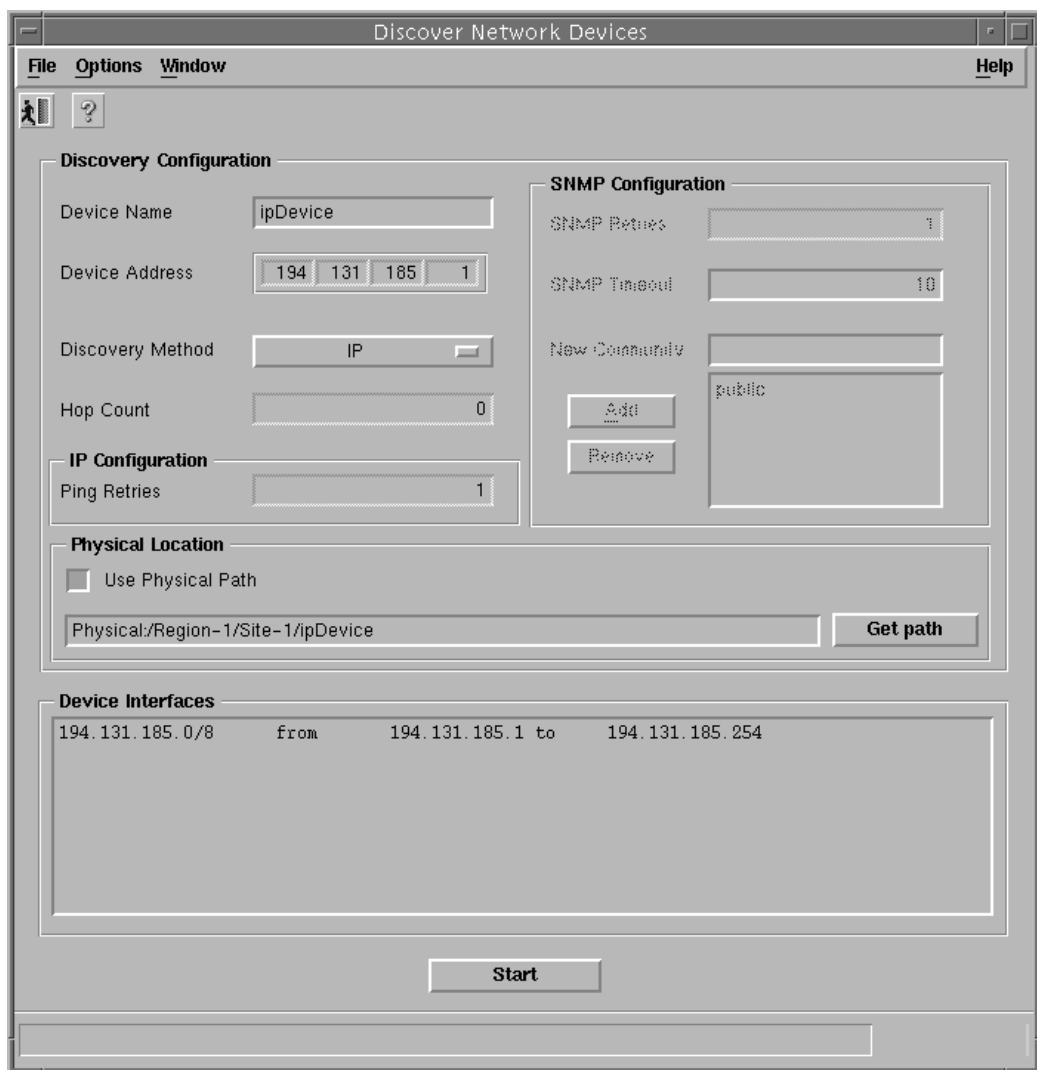
**Note** If **IP Retries** is left at zero, only the initial attempt to ping a device is made. If the device does not respond or responds with an error, the device is ignored.

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**Step 5** In the **Physical Location** panel, click the **Use Physical Path** button. Make sure the correct path is shown. Select **Get Path** and select the correct Physical View if required.

**Note** If the object used to launch Auto Discovery already has a physical location, it is shown by default. This path should be selected.

**Figure 5-2 Discover Network Devices Screen - Devices Interface List**



**Step 6** To start the discovery process, select the device from the **Device Interfaces** list, then click the **Start** button.

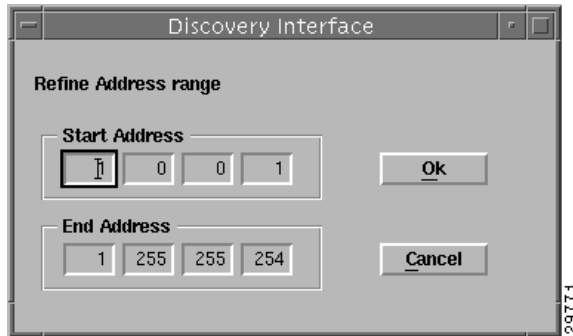
The Discovery Progress window is displayed. The **Action Log** displays the auto discovery progress in a tabular format. A window similar to Figure 5-4 is displayed.

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**Note** You can restrict the IP address range the system interrogates by double-clicking the left mouse button on the displayed Device Interface entry. The Discovery Interface window is displayed. This allows you to specify a range of IP addresses by entering a start address and a stop address. Only IP addresses within the specified address range are discovered.

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**Figure 5-3** Discovery Interface Screen




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**Note** You can stop the discovery and creation of objects by clicking the **Stop** button.

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**Note** When auto discovery is started, the system checks for existing devices in a selected address range. Any existing devices are ignored by the discovery process.

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When all the relevant IP devices on the network have been discovered, an object class is created and stored under the **Network** view for each device. These devices can then be accessed by the Map Viewer.

## Discovering SNMP Devices or IP and SNMP Devices

To discover SNMP devices or IP and SNMP devices, proceed as follows:

- Step 1** Select the object within Map Viewer that Auto Discovery will be launched from. From the pop up menu, select **Auto Discovery**, or launch the Auto Discovery application from the Cisco EMF Launchpad.
- Step 2** Open the Discover Network Devices window.  
The object name and address are displayed in the **Discovery Configuration** section of the window.
- Step 3** Select the drop down list next to **Discovery Method**, then select **SNMP** or **IP & SNMP** from the displayed list.  
**SNMP** or **IP & SNMP** is displayed next to **Discovery Method**.
- Step 4** Set the hop count to the number of subsequent devices you want to discover away from the starting network. The maximum number is 16.

**Step 5** For IP devices, in the **Ping Retries** data entry box, specify the number of times the system should try to identify whether an active machine is connected at a specified IP address. The maximum number is 10.

**Step 6** Enter a community name in the **New Community** data entry box, then click the **Add** button. The new community name is displayed along with all of the other community names already entered.

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**Note** You can remove any of the displayed community names by selecting the community name and then clicking the **Remove** button. There must be at least one community name.

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**Step 7** In the data entry box next to **SNMP Retries**, enter the number of times the system should try to communicate with a device without receiving an expected reply, before it is discarded as not being an SNMP device. The maximum number is 10.

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**Note** If **SNMP Retries** is left at zero, only the initial attempt to communicate with a device is made. If the device does not respond or responds with an error, the device is ignored.

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**Step 8** In the **Physical Location** panel, click the **Use Physical Path** button. Make sure the correct path is shown. Select **Get Path**, then select the correct Physical View if required. Objects available for selection have an associated green color box. A red color box next to a node indicates the object is not available.

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**Note** If the object used to launch Auto Discovery already has a physical location, it is shown by default. This path should be selected.

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**Step 9** In the data entry box next to **SNMP Timeout**, enter the required time. The default is set to 10 seconds.

**Step 10** To start the discovery process, click the **Start** button.

The Discovery Progress window is displayed.

The **Action Log** displays the auto discovery progress and displays the results in tabular form. A window similar to Figure 5-4 is displayed.

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**Note** You can stop the discovery and creation of objects by clicking the **Stop** button.

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When all of the relevant devices on the network have been discovered, an object class is created and stored under the **Network** view for each device.

## Discovering Devices on Subnets Different from the Default Network

The IP address field of the discovery configuration window is editable. To add a new address range to the interfaces list, edit the **ipAddress** fields. Enter the address of any device within the network range you wish to discover by selecting the first field of the **ipAddress** and entering the IP Address, then press either **Tab** or **Enter** to move onto the next part of the **ipAddress**.

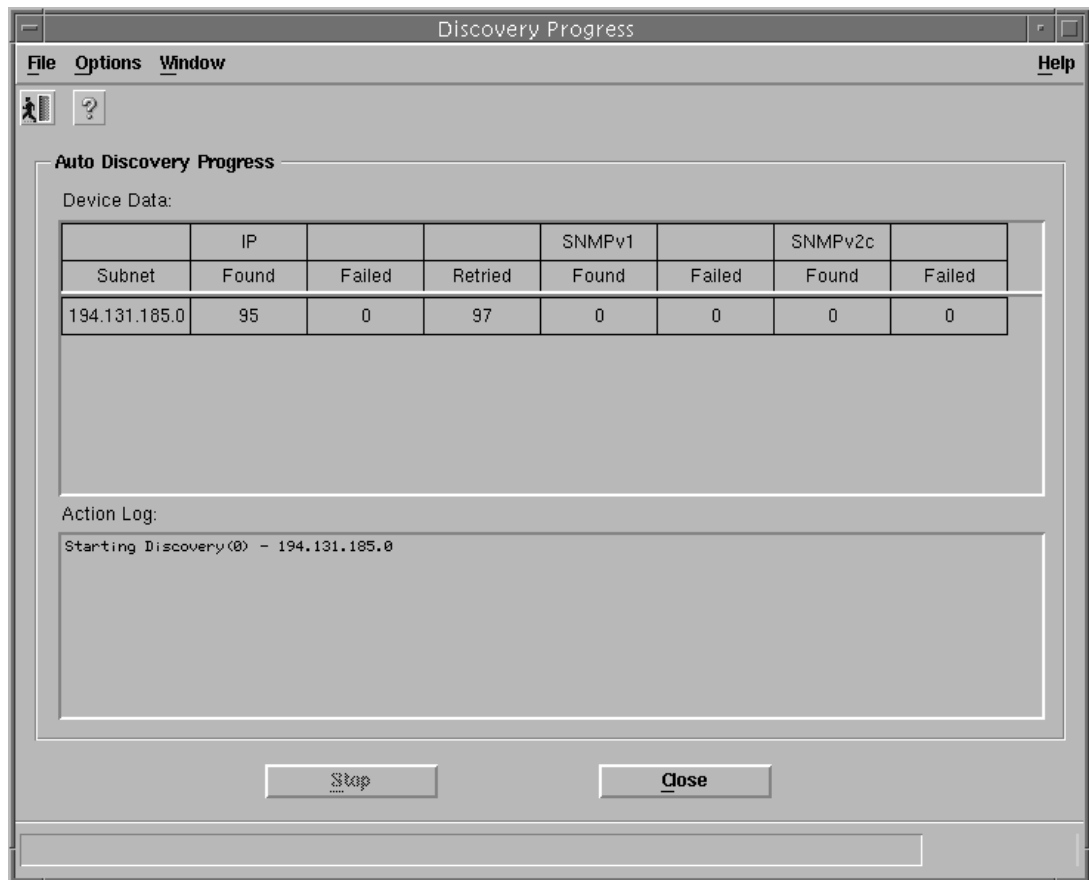
When you exit from the last part of the **ipAddress** field (by pressing **Tab** or **Enter**), a new address range is added to the interface list. The address range is automatically calculated using the class of the IP address entered (class A, class B, or class C).

To remove an address range from the interfaces list, select the interface, then press the **Backspace** key.

## Action Log

The **Action Log** displays the auto discovery progress and its results. A window similar to Figure 5-4 is displayed.

Figure 5-4 Discovery Progress Window



The Discovery Progress window displays the progress of the auto discovery process in two ways. The **Device Data** panel displays information on the number of devices found and information on the success of IP and SNMP queries performed on the devices. The data is presented in a spreadsheet

format with each row representing a subnet being discovered. This provides an indication of the current state of the auto discovery process. Each cell has an accumulating total indicating the current number of:

- IP found, failed, and retried (values relate to the number of successful or unsuccessful pings)
- SNMP v1 found and failed (values relate to the number of successful and unsuccessful SNMP requests)
- SNMP v2 found and failed (values relate to the number of successful and unsuccessful SNMP requests).

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**Note** To discover SNMP devices, Cisco EMF first sends out SNMP v2c requests. If these fail, then Cisco EMF sends an SNMP v1 request.

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The Action log provides information on which networks are being discovered, when they are finished, when devices are created, and when the entire auto discovery process is complete.

## Scheduling Auto Discovery

Auto Discovery can be automatically scheduled by editing the **discoverySchedules** file in the `<CEMF_ROOT>/config/discoverySchedules` directory, where `<CEMF_ROOT>` is the CEMF installation directory. This allows you to specify the IP address range, communities to query within that network, the number of hops, the number of ping and SNMP retries, the discovery method, and time and period values.

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**Note** You do not have to set up a schedule. Auto Discovery can be opened from Network Maps or the Object Group Manager as described earlier.

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**Step 1** Using a text editor, open the **discoverySchedules** file.

A file similar to the following example appears:

```
#
# DiscoveryMethod 0 = IP only, 1 = SNMP only, 2 = IP and SNMP
#

schedules = sched1, sched2

sched1StartAddress = 194.131.185.1
sched1EndAddress = 194.131.185.254
sched1Communities = public, private
sched1Hops = 0
sched1PingRetries = 0
sched1SnmpRetries = 0
sched1DiscoveryMethod = 2
sched1SnmpTimeout = 10
sched1StartTime = 14:09:00
sched1Period = 5 minutes
sched1ParentPath = physContainment:/testObject1/

sched2StartAddress = 194.131.3.1
sched2EndAddress = 194.131.3.254
sched2Communities = public, private
sched2Hops = 0
sched2PingRetries = 0
sched2SnmpRetries = 0
sched2DiscoveryMethod = 2
sched2SnmpTimeout = 10
sched2StartTime = 11:30:00
sched2Period = 7 days
sched2ParentPath = physContainment:/SITE-1/
```

This example shows schedules for two networks. You can edit existing schedules or create new schedules as required. For example, to create a schedule for a third network you would create entries in the file with `sched3` preceding each line.

**Step 2** The **StartAddress** and **EndAddress** specify the network you want to auto discover. Enter the appropriate IP addresses.

**Step 3** In **Communities**, enter the relevant SNMP community names, in a comma separated list.

**Step 4** Enter the number of hops. This is a value between 0 and 16. The hop count should be left at zero when Auto Discovery using IP only is selected.

**Step 5** Enter the number of ping retries. This is a value between 0 and 10.

**Step 6** Enter the number of SNMP retries. This is a value between 0 and 10.

The Discovery Method options are as follows:

- (a) IP only
- (b) SNMP only
- (c) IP & SNMP

**Step 7** Enter the start time, using the 24 hour clock notation.

The period can be defined by a number and a keyword (minutes or hours or days.)

**Step 8** When all changes have been made, save the files and close the text editor. Run the files using the `<CEMF_ROOT>/bin/reinit_discovery_scheduler` program.

The **discoveryScheduler.log** file in `<CEMF_ROOT>/logs` informs you of the present scheduled settings, the progress, and reasons for the scheduling not starting, if applicable.