CiscoWorks Internetwork Performance Monitor Version 2.4

Q. What is IPM?
A. Internetwork Performance Monitor (IPM) is a network performance-troubleshooting tool. This tool empowers network engineers to proactively troubleshoot network performance problems. IPM measures network performance based on the following metrics, latency, jitter, availability, packet loss, and errors. IPM can report on these metrics utilizing either real-time or historical reports, or it can define performance thresholds that will automatically provide notification if they are violated.

Q. Can IPM be used to troubleshoot QoS performance in a network?
A. Yes. IPM collectors can be configured to include an IP Precedence value. The synthetic traffic generated by the SA Agent in the source router based on such a configuration will provide a performance measurement for the specified value of IP Precedence. As a result, between any two points in a network, IPM can measure performance for various traffic classes as defined by the IP Precedence value assigned to each traffic class.

Q. Can IPM be used to troubleshoot Voice over IP (VoIP) in a data network?
A. Yes. With the new enhanced UDP jitter operations supported by IPM, it is possible to perform monitoring and troubleshooting of the network's ability to carry IP-based telephony.

Q. Do I need to have CiscoWorks software to use IPM?
A. Yes. IPM is sold only as a component application within the CiscoWorks Routed WAN Management Solution. As such, IPM integrates with the CiscoWorks2000 desktop, and can utilize device inventory information available in Resource Manager Essentials, which is also a component of the CiscoWorks Routed WAN Management Solution.

Q. In using IPM, what is meant by the following terms: source, target, operation, and collector?
A. Definitions are as follows:

- *"Source"* is the source router that supports the Cisco Service Assurance (SA) Agent technology and plays a critical role in network performance measurement. The source device actually generates synthetic network traffic to a destination, and measures the response-time latency from that destination. This response-time latency measurement is then stored by the source device as performance data to be passed to the IPM application.

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- *"Target"* is the destination device receiving synthetic network traffic from the source device. The target provides a response to the synthetic traffic sent to it by the source device.
- *"Operation"* is a set of parameters that define the type of synthetic traffic generated by the source router. These parameters include network protocol type, IP Precedence value, packet size, and measurement interval.
- *"Collector"* is the combination of source, target, and operation that is configured by the user to enable IPM to provide network performance measurements.

Q. What network protocols do the IPM collectors simulate?
A. IPM provides support for the following types of operations:

- DNS Echo
- DLSw Echo
- DHCP Echo
- Enhanced UDP with Jitter Monitoring
- ICMP Echo
- ICMP Path Echo
- SNA Echo
- TCP Connect
- UDP Echo
- HTTP (static URL's)
- Support for Loose Source Routing and QoS (IP Precedence)

Q. Does IPM require a network management system such as HP OpenView, or SunNet Manager?
A. IPM has no dependencies on these network management platforms. However, if you use IPM to configure SNMP performance thresholds in the source router, then you should have a network management system (NMS) set up to receive and view the simple network management protocol (SNMP) traps transmitted by the source router when a performance threshold has been exceeded. Either HP OpenView or Sun Net Manager can play a valuable role as a fault monitor in conjunction with IPM. IPM itself does not receive these SNMP traps.

Q. Does IPM require a dedicated hardware probe to monitor response time and availability?
A. No. IPM utilizes the SA Agent software feature embedded in the Cisco IOS® software of a router or Catalyst® Route Switch Module (RSM) to measure response time and availability.

Q. Does the IPM application measure response time from the point of view of the management workstation?
A. No. IPM configures the SA Agent feature of a router or Route Switch Module running Cisco IOS software to take network performance measurements. As such, these measurements are taken from the perspective of devices within the network rather than from the perspective of the IPM management workstation, and thereby provide a more valuable perspective of network performance.

Q. What workstation and network devices do I need to run IPM?
A. IPM comprises several distinct pieces of functionality:

- The IPM server application runs on Solaris or Windows NT.
- The IPM client application, including the user interface, runs on Solaris, Windows NT, Windows 98, Windows 2000 server or Windows 2000 Professional. The IPM client on Solaris may run on the same workstation as the IPM server.
- The IPM application requires a software agent imbedded in Cisco IOS software, called SA Agent. At least one router running a release of Cisco IOS software that supports SA Agent is required.
- If you are using IPM to monitor Systems Network Architecture (SNA) response time, a mainframe application must be installed on your Multiple Virtual Storage (MVS) system.
- IPM also provides access to historical reporting information via a Web browser. To view this information, you need to have a Web browser, such as Netscape Navigator or Microsoft Internet Explorer, installed on your workstation.

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Q. Can I run IPM on my PC?

A. You can run the IPM client user interface on Windows 98, Windows 2000 Server, Windows 2000 Professional, or Windows NT on your PC. The IPM server must run on a Solaris or Windows NT host.

Q. How do I install the IPM client?

A. The IPM client may be installed either from the CD-ROM distributed with IPM, or by using a Web browser to download the IPM client from an IPM server.

Q. Do I have to install any software on the router to use SA Agent and IPM?

A. The SA Agent is imbedded in many but not all feature sets of Cisco IOS software. A release of Cisco IOS software that supports SA Agent must be installed on the source device used by IPM to measure response time. Table 1 summarizes which Cisco IOS releases support SA Agent.

Table 1 Cisco IOS Releases Support

Cisco IOS Release	Cisco IOS Feature Set	IPM/SA Agent Support	Maximum Duration for Collectors
Less than 11.2(8)	All	No	-
11.2(8)–11.2(15)	• IP Plus • Desktop Plus • IBM • Enterprise	Yes	23 days
	• IP only • IP/IPX • Desktop	No	-
11.2(16)–11.2(x) **(x greater than 16)**	• IP Plus • Desktop Plus • IBM • Enterprise	Yes	Forever
	• IP only • IP/IPX • Desktop	No	–
11.3(0)–11.3(5)	All	No	–
11.3(6)–11.3(y) **(y greater than 6)**	• IP Plus • Desktop Plus • IBM • Enterprise	Yes	Forever
	• IP only • IP/IPX • Desktop	No	–
12.2 and up	All	Yes	Forever
12.0(5)T	all	Yes	Forever
12.1(1)	All	Yes	Forever
12.1(2)T	All	Yes	Forever
12.1(1) or later	All	Yes	Forever
12.2(1)T or Later	All	Yes	Forever

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Q. How many collectors (monitored network links) can be configured on each router platform?

A. The SA Agent restricts the number of configured collectors to a maximum of 200 per router for Cisco IOS Releases 11.2 and 11.3, 500 collectors per router for Cisco IOS Releases 12.0(5) - 12.1(1), and 500 collectors per router for Cisco IOS Releases 12.0(5)T-12.1(2)T. The 12.(1) and 12.2(1)T or higher Cisco IOS releases do not have fixed collector limitations. The actual number of supported collectors, however, is dependent on the specific router platform and amount of RAM installed in the router. Test results for some typical platform configurations are shown in Table 2.

Table 2 Collector Support by Platform

Platform Series	Cisco IOS Release	DRAM (MB)	Maximum Number of Collectors
Cisco 7500	11.2	64	200
	11.3	128	200
	12.0	64	500
Cisco 7200	11.2	120	200
	11.3	120	200
	12.0	56	500
Cisco AS5300	11.2	64	200
	11.3	64	200
	12.0	64	500
Cisco 4700	11.2	32	100
	11.3	64	200
	12.0	64	500
MC3810	12.0	27	500
Cisco 3600	11.2	24	80
	11.3	24	80
	12.0	28	500
Cisco 2600	11.3	48	200
	12.0	48	500
Cisco 2500	11.2	16	100
	11.3	16	100
	12.0	16	500
Cisco 1600	11.2	24	40
	12.0	24	500
Catalyst 5500 RSM	11.2	64	80
	11.3	32	200

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Q. Which Cisco hardware platforms support the SA Agent feature of Cisco IOS software?
A. As of the publication of this document, all platforms that support Cisco IOS software will also support the SA Agent, with the exception of the following platforms:

- Cisco 1000 series router
- Cisco 800 series router
- Cisco 700 series router
- Cisco 90 series router

Q. How does IPM interact with the SA Agent feature of Cisco IOS software?
A. IPM uses SNMP to configure SA Agent in the Cisco IOS software of a router or route switch module (RSM) to collect response time and availability statistics. The SA Agent samples response time and availability to targets (network devices, servers, PCs, and so on) in the network. IPM then uses SNMP to collect performance statistics from the SA Agent, and stores that information for presentation and analysis.

Q. What is the name of the Management Information Base (MIB) used by IPM?
A. IPM both configures and queries the RTTMon MIB, which is supported by the SA Agent feature in Cisco IOS software. This MIB may be downloaded from the Cisco Web site.

Q. Does a target device need to be a router that supports SA Agent?
A. No. IPM supports targets as long as they are reachable through IP. These targets may be Web servers, PCs, printers, routers, switches, other network devices, or any other device that has an IP address. IPM also supports simple network architecture (SNA) targets running the NSPECHO application that is provided with IPM.

However, if you are measuring enhanced user datagram protocol (UDP) or jitter statistics for applications such as Voice over IP (VoIP) or virtual private network (VPN) monitoring, then the target must be a Cisco router running a version of the Cisco IOS software that supports the SA Agent responder feature (Cisco IOS release 12.0[5]T or later).

Q. Do I have to be running a Cisco IOS Release 11.2 or later with the SA Agent feature on all my routers to get hop-by-hop performance statistics?
A. No. You are required to be running the SA Agent feature only on the source router in the path being measured.

Q. Should I install the router component of IPM on a backbone router so that it intercepts all paths?
A. The answer ultimately depends on the number of SA Agent collectors you will be monitoring at any one time. The router component of IPM uses memory and CPU cycles, so Cisco recommends that you run the router component on multiple fringe routers instead. This setup distributes the load across multiple routers.

Q. How does IPM measure response time between routers in the SNA environment?
A. In the SNA environment, IPM uses an “SNA ping.” IPM ships with a component that runs on the mainframe. The router component of IPM sends a block of data (the request) to the mainframe component, which responds with a block of data (the response). Both the request and response sizes can be customized by the user so that traffic flow for various applications can be modeled. IPM supports the SNA ping over Logical Unit (LU) 0 and LU 2 sessions.

Q. Why is IPM no longer part of the CiscoWorks Blue family of products?
A. The CiscoWorks Blue line of products is targeted specifically at customers who have a mixed SNA/IP environment. CiscoWorks IPM also works in pure IP environments.

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Q. The Concord Network Health application will generate reports based on the same SA Agent feature utilized by IPM. Should I purchase IPM or Concord Network Health?

A. IPM and Concord Network Health have different features and benefits. IPM is a network performance and troubleshooting tool. The reporting features within IPM are designed to troubleshoot network performance problems. Concord Network Health is designed to report on multiple performance statistics on devices from multiple vendors. IPM also supports viewing real-time statistics and analyzing multiple paths and multiple hops. The Concord application does not provide these features.

Q. I currently own IPM Version 1.0 for AIX or HP/UX. Can I upgrade to IPM Version 2.2?

A. No. IPM 2.4 currently supports server functionality on Solaris and Windows only, and client functionality on Solaris, Windows 98, and Windows NT, Windows 2000 Server and Windows 2000 Professional. The AIX and HP-UX versions of IPM have been discontinued and there are no plans at this time to support future versions of IPM on AIX or HP-UX.

Q. How much of the router's memory do collectors in SA Agent consume?

A. The router memory consumed by Echo collectors depends on the version of Cisco IOS software running on the router:

- For routers running Cisco IOS software Release 11.2 to 11.3 or 12.0, each Echo collector consumes 40 KB of router memory.
- For routers running Cisco IOS software Release 12.0(3)T or later, each Echo Collector consumes 14 KB of router memory.
- The router memory consumed by a Path Echo collector is dependent on the number of paths and the number of hops in the path for each collector.

Q. How frequently can network performance measurements be taken?

A. SA Agent generates several measurements per hour, then IPM polls the router once per hour and collects summarized statistics for that one-hour period. You can set the sampling interval for SA Agent as often as every 10 seconds, but for optimal performance, we recommend that you set the sample interval to at least 60 seconds (one minute). This is the default value.

You can view up-to-date real-time statistics in the Real Time Statistics window as SA Agent collects the data from the collector. However, IPM does not store the real-time data in the IPM database. IPM only stores the hourly summarized data in the IPM database.

Q. When IPM collects the data from the SA Agent using SNMP, is this data averaged or summarized in any way?

A. The data is summarized and averaged in a variety of ways. IPM displays the data in the Historical Statistics window in hourly, daily, weekly, and monthly increments. IPM also displays average, minimum, and maximum calculations of the data over the monitoring period. IPM also provides an automatic aging facility for summarizing and aging older data.

Q. Are there plans to support IPM on Solaris for Intel platforms?

A. No. The demand seems to be relatively low for IPM running on this platform, while the demand for supporting other platforms and adding additional features to the existing platforms is fairly high. Therefore, the likelihood of IPM on Solaris for Intel being supported is relatively slim.

Q. Is IPM integrated with CiscoWorks?

A. Yes. IPM is packaged with CiscoWorks in the Routed WAN Management Solution. IPM can use inventory information stored in Resource Manager Essentials (RME), which is another CiscoWorks application included in the Routed WAN Management Solution. RME can export inventory information, router IP addresses, and SNMP community strings in a format understood by IPM. IPM can then import this device inventory information so that configuration of router community strings must only be performed once.

Q. How many data collectors can IPM support?

A. There is no functional limit on the number of collectors that IPM can support. However, it is recommended that you limit the maximum number of collectors per IPM server to 1000. To support more than 1000 collectors, you can deploy multiple IPM servers. Many users deploy an IPM server in each geographic area of their network.

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Q. When IPM configures the routers, it seems that the configuration is a running configuration and not saved. What happens when the router is rebooted?

A. IPM handles configuring the source router using running configurations entirely. IPM automatically reconfigures the router after a reboot. You do not have to do anything special from the router command line after a reboot. Also, IPM does not interact with or destroy any manually generated collectors.

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