DATA SHEET

CISCO IOS IP SERVICE LEVEL AGREEMENTS

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Network services have changed dramatically in recent years, most notably due to the addition of voice, video, and other mission-critical delay-and-performance-sensitive applications. The network has been embraced as a productivity tool. Customers demand guaranteed, reliable network services for business-critical applications. Cisco IOS® IP Service Level Agreements (SLAs) is a capability embedded within almost all devices that run Cisco IOS Software, which allows Cisco customers to understand IP service levels for IP services, increase productivity, lower operational costs, and reduce the frequency of network outages. Service Providers will measure and provide SLAs, Enterprises will verify service levels and outsourced SLAs, and understand network performance with Cisco IOS IP SLAs. It can perform network assessments, verify Quality of Service (QoS), ease deployment of new services, and assist administrators with network troubleshooting. Cisco IOS IP SLAs use unique service level assurance metrics and methodologies to provide highly accurate, precise service level assurance measurements.

Cisco IOS IP SLAs use active traffic monitoring, the generation of traffic in a continuous, reliable, and predictable manner, for measuring performance. It can simulate network data and IP services and collect network performance information in real time. This includes data regarding response time, one-way latency, jitter, packet loss, voice quality scoring, and server response time. Cisco IOS IP SLAs can also monitor performance for different classes of traffic over the same connection.

THE CHALLENGE

IP services enhance the efficiency of the network, and help businesses achieve key objectives and gain a competitive advantage. Service levels are crucial because they affect the performance of IP services and business-critical applications. SLAs between Service Providers and customers or between corporate Enterprise IT departments and end-users are intended to provide service guarantees and validate network performance on an ongoing basis. SLAs should be simple to understand and should improve Mean Time to Repair (MTTR).

It may be difficult to deliver differentiated services and monitor service levels. The chosen metrics are often not strict enough to allow for service differentiation. Many network administrators have not implemented best practices for measuring IP services and service levels. When network performance is poorly understood, there is a higher chance of network downtime and greater potential for decreased network reliability. If network administrators can measure how well the network is performing for each service, they can use that information to improve network performance, network operations, and user satisfaction. Effectively measuring and monitoring IP services in real time contributes to increased profits, effective troubleshooting, and faster deployment of network applications in order to further business or organizational goals.

THE SOLUTION: CISCO IOS IP SLAS

Cisco IOS IP SLAs is embedded within Cisco IOS Software and there is no additional device to deploy, learn, or manage. A dependable tool used to verify IP service levels, Cisco IOS IP SLAs provide a scalable, cost-effective solution for network performance measurement.

Cisco IOS IP SLAs collect network performance information in real time: response time, one-way latency, jitter, packet loss, voice quality measurement, and other network statistics. The user can continuously, reliably, and predictably measure network performance and proactively monitor network health. With Cisco IOS IP SLAs, service level monitoring is automated, IP service levels can be assured, network operation can be verified proactively, and network performance can be accurately measured. Active monitoring continuously measures the network performance between multiple paths in the network, providing ongoing performance baseline information.

Network administrators can also use Cisco IOS IP SLAs as a troubleshooting tool. They can obtain hop-by-hop performance statistics between two Cisco routers or between a router and a server. If the network performance level drops during the operation (ie: due to congestion), the network administrator can promptly identify the location of the bottleneck and resolve the problem. Cisco IOS IP SLAs can also perform a network assessment for a new IP service and verify Quality of Service (QoS) levels. For example, Cisco IOS IP SLAs can determine whether the network is ready for Voice over IP (VoIP) by simulating VoIP codecs and measuring network performance and VoIP quality across the IP network.

KEY CISCO IOS IP SLAS BENEFITS

- Embedded in Cisco IOS Software
- Automated, real-time, accurate network performance and network health monitoring
- Capable of verifying and measuring IP service levels and parameters needed for service level agreements
- Per-class QoS traffic monitoring
- Flexible scheduling
- Proactive notifications with Simple Network Management Protocol (SNMP) trap
- Hop-by-hop and end-to-end performance measurement
- Controlled through SNMP or Cisco IOS Software Command-Line Interface (CLI)
- VoIP codec simulation and VoIP quality measurement; Mean Opinion Score (MOS) and Calculated Planning Impairment Factor (ICPIF)
- Multiprotocol Label Switching (MPLS) network monitoring
- Integrated into several third-party partner performance management products

HOW IT WORKS

Cisco IOS IP SLAs measure performance by sending one or more packets to a destination IP device or a Cisco router. Cisco IOS IP SLAs use the timestamp information to calculate performance metrics such as jitter, latency, network and server response times, packet loss, and MOS voice quality scores.

A destination router that is running Cisco IOS Software can be configured as a Cisco IOS IP SLA responder, which processes measurement packets and provides detailed timestamp information. The responder can send information about the destination router’s processing delay back to the source Cisco router. This delay is removed during calculation to further improve accuracy. One-direction measurements are also possible with Cisco IOS IP SLAs. Users can schedule a Cisco IOS IP SLA operation at any point in time or continuously over any time interval.

Cisco IOS IP SLAs can be configured to monitor per-class traffic over the same link by setting the Diff-Serv Code Point (DSCP) bits.

It can also be used for troubleshooting MPLS network operations; the performance measurements are essential for MPLS VPN service level agreement monitoring.

Cisco IOS IP SLAs provide a proactive notification feature with a SNMP trap. Each measurement operation can monitor against a pre-set performance threshold. Cisco IOS IP SLAs generate a SNMP trap to alert management applications when this threshold is crossed. An alert occurs if jitter exceeds a specified value between any two points in the network, and a trap sent to a Network Management System (NMS) can alert the network administrator. Administrators can also configure Cisco IOS IP SLAs to run a new operation automatically when the threshold is crossed. This feature, combined with hop-by-hop measurement capability, enables immediate real-time problem analysis.

Network performance measurement results are available with both SNMP and the Cisco IOS Software CLI.

Figure 1. The Cisco IOS IP SLAs Deployment Life Cycle

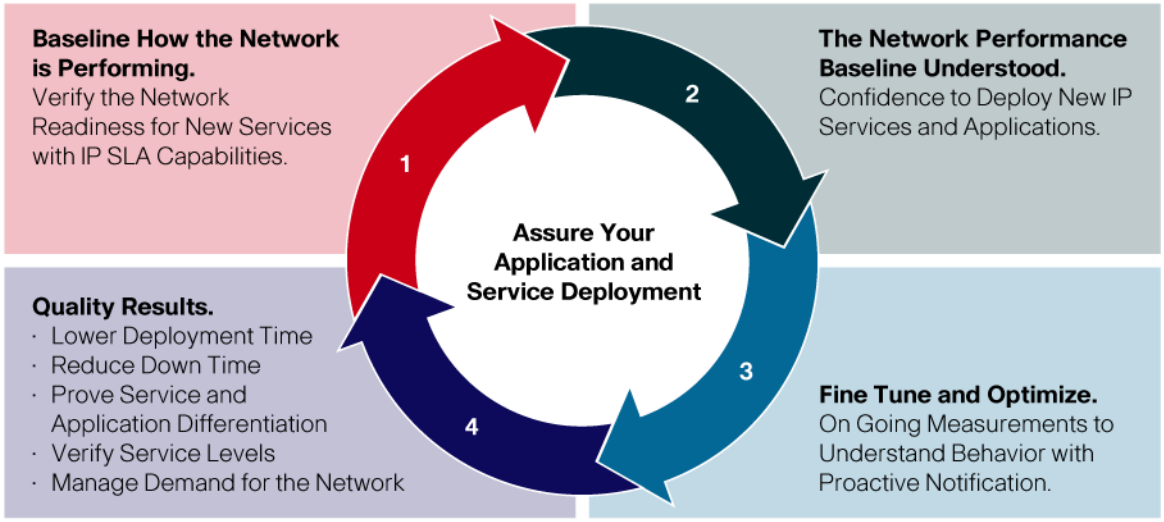

Table 1. Cisco IOS IP SLAs Operations and Applications

	Measurement Capability	Key Applications
UDP Jitter	• Round-trip delay, one-way delay, one-way jitter, one-way packet loss • One-way delay requires time synchronization between the Cisco IOS IP SLAs source and target routers	Most common operations for networks that carry voice or video traffic, such as IP backbones
UDP Echo	Round-trip delay	Accurate measurement of response time of UDP traffic
UDP Jitter for VoIP	• Round-trip delay, one-way delay, one-way jitter, one-way packet loss • VoIP codec simulation G.711 ulaw, G.711 alaw, and G.729a • MOS and ICPIF voice quality scoring capability • One-way delay requires time synchronization between the Cisco IOS IP SLAs source and target routers	Useful for VoIP network monitoring
TCP Connect	Connection time	Server and application performance monitoring
Domain Name System (DNS)	DNS lookup time	DNS performance monitoring, troubleshooting
Dynamic Host Configuration Protocol (DHCP)	Round-trip time to get an IP address	Response time to a DHCP server
FTP	Round-trip time to transfer a file	FTP get performance monitoring
HTTP	Round-trip time to get a Web page	Web site performance monitoring
Internet Control Message Protocol (ICMP) Echo	Round-trip delay	Troubleshooting and availability measurement using ICMP ping
ICMP Path Echo	Round-trip delay for the full path	Troubleshooting
ICMP Path Jitter	Round-trip delay, jitter, and packet loss for the full path	Troubleshooting
Data Link Switching Plus (DLSw+)	Peer tunnel performance	DLSw peer tunnel performance monitoring

PARTNER APPLICATIONS

Cisco IOS IP SLAs integrate with many industry-leading performance management applications, which provide graphical front ends for configuring operations, analyzing performance metrics, and detailed reports.

Multiple applications rely on Cisco IOS IP SLAs to collect performance measurements:

- Cisco Systems
  - Cisco Works Internetwork Performance Monitor (IPM)
  - IP Solution Center
  - CiscoWorks IP Telephony Environment Monitor
- Agilent
  - Agilent OSS QoS Manager
- Concord
  - eHealth
- Crannog Software
  - Response Watch
- InfoVista
  - VistaView
  - InfoVista News
- HP Openview
  - Performance Insight
- Micromuse/Quallaby
  - ISM
- Wired City
  - IT Monitor
- Open source or Freeware products
  - MRTG

ADDITIONAL INFORMATION

For more information on Cisco IOS IP SLAs, please visit http://www.cisco.com/go/ipsla/.

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