



Turn It On

Power Up

Turn on all these features to leverage the full value of Cisco routers and switches.

- Protective QoS Features
 - Control Plane Policing (CoPP)
 - Network-Based Application Recognition (NBAR)
- VRF-Lite/Multi-VRF CE
- Advanced VPN Services:
 - Dynamic Multipoint VPN (DMVPN)
 - Group Encrypted Transport (GET VPN)
- Catalyst Integrated Security Features (CISF)
- Spanning-Tree Protocol (STP) Toolkit
- Encapsulated Remote Switched Port Analyzer (ERSPAN)
- **Dynamic Intelligent Routing Solutions**
 - **IP Service-Level Agreement (IPSLA)**
 - **Optimized Edge Routing (OER)**
 - **Embedded Event Manager (EEM)**

Contact your Cisco Systems Engineer for more information and assistance in turning on the full functionality of your Cisco routers and switches.

To learn about enabling additional Cisco features, visit www.cisco.com/go/turniton.

To help you get the most functionality, value and ROI from your Cisco routers and switches, we want to ensure you're aware of the many powerful features residing within. Our **Turn it On** program is designed to empower Federal agencies like yours to take full advantage of Cisco's powerful core networking solutions to maximize your productivity, efficiency and technology investment.

Dynamic Intelligent Routing Solutions: IPSLA, OER, EEM

IP services improve uptime and performance of business-critical applications and contribute to accomplishing key business objectives. However, historically, it's proven difficult to deliver differentiated services, monitor service levels and intelligently route around network failures that impact the performance of low-latency applications - resulting in a higher chance of network downtime and greater potential for decreased network reliability of devices, network paths and applications.

Three of the most effective tools in empowering your network to remain at maximum capacity are Cisco IP Service Level Agreements (SLAs), Optimized Edge Routing (OER) and Embedded Event Manager (EEM). Together, these advanced solutions enable powerful real-time measurement, management and network failure-detection capabilities.

This valuable functionality is deployed for effective monitoring of applications and dynamic intelligent routing that provides optimal path selection based on advanced criteria beyond shortest-path metrics (found in today's BGP and IGP) through the network or carrier network. The result is greatly elevated performance-aware routing through advanced monitoring tools, that simplifies network operations. And most of these dynamic tools already reside in Cisco IOS. All you have to do is turn them on.

Cisco IOS IP SLAs

Cisco IOS IP SLAs provide a scalable, cost-effective solution for network performance measurement. Active, automated monitoring continuously measures network performance between multiple paths in the network, providing ongoing performance baseline information. Now you can continuously, reliably and proactively assure IP service levels, verify network operation and monitor network health.

Providing hop-by-hop performance statistics between two Cisco routers or between a router and a server. Cisco IP SLAs are also valuable troubleshooting tools. If network performance level drops during operations, you can promptly identify the bottleneck and resolve the problem. Additionally, this powerful solution can perform network assessment for new IP services and verify Quality of Service (QoS) levels.

Impressive functionality

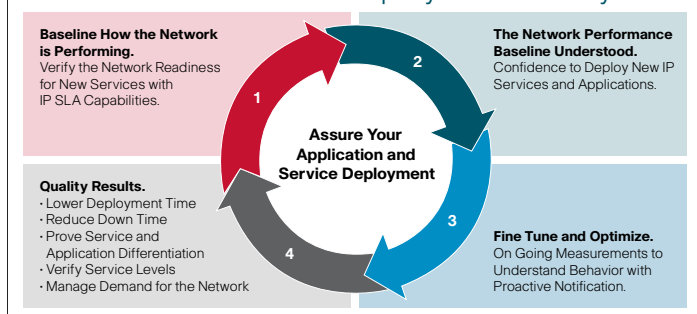
Providing a suite of automated monitoring solutions, Cisco IP SLAs empower you to maximize end-to-end network performance.

- Measures performance by sending one or more packets to a destination IP device or a Cisco router and uses the timestamp information to calculate performance metrics such as jitter, latency, network and server response times, packet loss, and MOS voice-quality scores.
- One-direction measurements are also possible
- Schedule an operation at any point in time or continuously over any interval.
- Can be configured to monitor per-class traffic over the same link by setting the Diff-Serv Code Point (DSCP) bits.
- Provides a proactive notification feature with a SNMP trap, automatically alerting network administrators when jitter exceeds a pre-set performance threshold between any two points in the network and can be configured to automatically run a new operation when the threshold is crossed.

Valuable benefits

- 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

The Cisco IOS IP SLAs Deployment Life Cycle



Cisco Optimized Edge Routing

Cisco OER helps enable intelligent path selection at the WAN edge based upon performance-sensitive routing metrics such as response time, packet loss, path availability, traffic load distribution and cost minimization. Enabling real-time routing adjustments based on criteria other than static routing metrics on an IP prefix-by-prefix basis, Cisco OER provides an important foundation for building highly available paths across the Internet and WAN, optimizing performance, uptime and cost-efficiency.

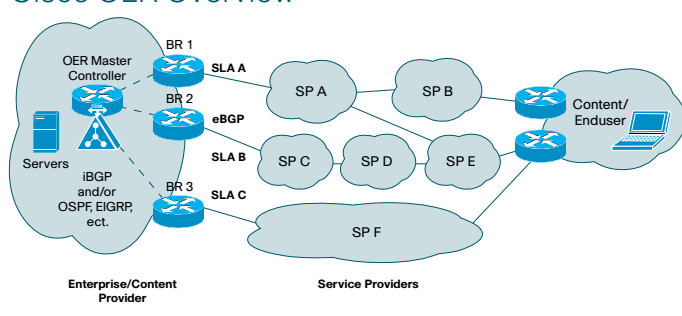
How it works

The Cisco OER solution consists of a master controller functioning as an intelligent decision-maker, and one or more border routers serving as the exit points to Internet or WAN links. Master controller functionality can reside on a Cisco IOS router or a Cisco OER Master Controller Engine. On the router, Cisco OER can be deployed with familiar simplicity using standard command-line interface (CLI) configuration. It provides enhanced scalability, extended history and a Web-based GUI for configuration and reporting, and optimizes routes based on latency, packet loss, reachability and throughput.

Measurable benefits

- Improve response time - automated route optimization detects and routes around poorly performing paths.
- Optimize performance – automated monitoring minimizes network degradation.
- Minimize bandwidth costs - minimize traffic sent over expensive links or consolidate multiple flat-rate connections to fewer and lower-cost tiered services.
- Reduce engineering operating expenses - automatic performance optimization eliminates need for costly manual network performance analysis and tuning of Border Gateway Protocol (BGP).
- Better manage ISP SLAs - reports for traffic distribution and usage before and after route optimization provide more specific and detailed SLA reporting than the ISPs.

Cisco OER Overview



Embedded Event Manager

A powerful ally for device and system management, EEM transforms routers or switches running Cisco IOS to become active participants rather than passive slaves to external network management systems. Now you can harness the network intelligence intrinsic to Cisco IOS and customize its behavior based on real network events as they happen.

Based on your defined policies, EEM takes specific actions when the Cisco IOS software recognizes user-defined events. The result is an extremely powerful and flexible set of tools to automate many network management tasks and direct the operation of Cisco IOS to increase availability, collect information and notify external systems or personnel about critical events.

Go Beyond with EEM

Cisco Beyond is a new scripting community that provides an easy-to-use, Web-based file-sharing system where you can download and share EEM scripts.

Cisco Beyond, A Scripting Community for EEM

- **Cisco IOS® Embedded Event Manager**
Extremely flexible and powerful onboard, event driven, scripting facility
- **Cisco Beyond**
A place to share scripts, upload, download, get examples
- **Now Available**
Pre-populated with over a dozen scripts

More details:

<http://cisco.com/go/eem>
http://www.cisco.com/en/US/products/ps6441/products_configuration_guide_book09186a008054ddd.html
<http://forums.cisco.com/eforum/servlet/EEM?page=main>



Integrated advantages

Alone, each of these features delivers powerful advantages that enhance application and network monitoring as well as optimize routing-process path selections. When integrated, these three solutions functioning as unified platform provide robust, dynamic functionality that is easily implemented into customer architectures to greatly increase uptime and limit operational issues inherent in optimizing static route paths.

Together, IP SLA and OER provide a dynamic “best path” selection capability beyond next-hop routing. By enabling these features, monitoring of delay, packet-loss or jitter can be done on a specific application for the entire end-to-end path, and IP SLA features provide feedback that can dictate at what level or threshold the route should revise its path to the network, and OER routes traffic to the best carrier. In tandem, this is an ideal solution for dual-carrier models and when there is more than one path to a host, network or application.

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