Cisco IOS Optimized Edge Routing Feature Roadmap

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This feature roadmap lists the Cisco IOS features documented in the Cisco IOS Optimized Edge Routing configuration guide and maps them to the documents in which they appear. The roadmap is organized so that you can select your release train and see the features in that release. Find the feature name you are searching for and click on the URL in the "Where Documented" column to access the document containing that feature.

Many legacy features have been incorporated into the configuration files, and these features may not have entries in this roadmap. In addition, information in this roadmap supports other software releases or platforms. For the latest feature information and caveats, see the release notes for your platform and software release.

Feature and Release Support

Table 1 lists Cisco IOS Optimized Edge Routing (OER) feature support for the following Cisco IOS software release trains:

- Cisco IOS Release 12.2SR
- Cisco IOS Release 12.2SX
- Cisco IOS Releases 12.3T, 12.4, and 12.4T
- Cisco IOS Release 15.0

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS, Catalyst OS, and Cisco IOS XE software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

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Table 1 lists the most recent release of each software train first and the features in alphabetical order within the release.

Table 1 Supported Cisco IOS Optimized Edge Routing Features

Release	Feature Name	Feature Description	Where Documented
Cisco IOS Release 12.2SR			
12.2(33)SRE	PfR EIGRP mGRE DMVPN Hub-and-Spoke Support	The PfR EIGRP mGRE DMVPN Hub-and-Spoke Support feature introduced PfR route control capabilities based on EIGRP by performing a route parent check on the EIGRP database. Support was also added for multicast Generic Routing Encapsulation (mGRE) Dynamic Multipoint Virtual Private Network (DMVPN) deployments that follow a hub- and-spoke network design.	"Using Performance Routing to Control EIGRP Routes with mGRE DMVPN Hub-and-Spoke Support"
12.2(33)SRE	PfR - Protocol Independent Route Optimization (PIRO)	PIRO introduced the ability of OER to search for a parent route—an exact matching route, or a less specific route—in any IP Routing Information Base (RIB), allowing OER to be deployed in any IP-routed environment including Interior Gateway Protocols (IGPs) such as OSPF and IS-IS.	"Using OER to Control Traffic Classes and Verify the Route Control Changes"
12.2(33)SRB	OER BGP Inbound Optimization	This feature introduced support for best entrance selection for traffic that originates from prefixes outside an autonomous system destined for prefixes inside the autonomous system. External BGP (eBGP) advertisements from an autonomous system to another autonomous system (for example, an Internet service provider) can influence the entrance path for traffic entering the network. OER uses eBGP advertisements to manipulate the best entrance selection.	• "Cisco IOS Optimized Edge Routing Overview" • "Using OER to Profile the Traffic Classes" • "Measuring the Traffic Class Performance and Link Utilization Using OER" • "Configuring and Applying OER Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"

Table 1 Supported Cisco IOS Optimized Edge Routing Features (continued)

Release	Feature Name	Feature Description	Where Documented
12.2(33)SRB	OER DSCP Monitoring	This feature introduced automatic learning of traffic classes based on protocol, port numbers, and DSCP value. Traffic classes can be defined by a combination of keys comprising of protocol, port numbers, and DSCP values, with the ability to filter out traffic that is not required, and the ability to aggregate the traffic in which you are interested. Information such as protocol, port number, and DSCP information is now sent to the master controller database in addition to the prefix information. The new functionality allows OER to both actively and passively monitor application traffic.	• "Using OER to Profile the Traffic Classes" • "Measuring the Traffic Class Performance and Link Utilization Using OER" • "Configuring and Applying OER Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"
12.2(33)SRB	OER Voice Traffic Optimization	This feature introduced support for outbound optimization of voice traffic based on the voice metrics, jitter and Mean Opinion Score (MOS). Jitter and MOS are important quantitative quality metrics for voice traffic and these voice metrics are measured using OER active probes.	• "OER Voice Traffic Optimization Using Active Probes" • "Measuring the Traffic Class Performance and Link Utilization Using OER" • "Configuring and Applying OER Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"
12.2(33)SRB	OER Active Probe Source Address	This feature introduced the capability to configure a specific exit interface on the border router as the source for active probes.	"Measuring the Traffic Class Performance and Link Utilization Using OER"

Table 1 Supported Cisco IOS Optimized Edge Routing Features (continued)

Release	Feature Name	Feature Description	Where Documented
12.2(33)SRB	OER Application-Aware Routing: PBR	This feature introduced the capability to optimize IP traffic based on the type of application that is carried by the monitored prefix. Independent policy configuration is applied to the subset (application) of traffic.	• "Setting Up OER Network Components" • "Using OER to Profile the Traffic Classes" • "Configuring and Applying OER Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"
12.2(33)SRB	OER Support for Cost-Based Optimization and Traceroute Reporting	This feature introduced the capability to configure exit link policies based on the ISP billing cost. This feature also introduces the capability to configure traceroute probes to determine prefix characteristics on a hop-by-hop basis.	• "Configuring and Applying OER Policies" • "Configuring Performance Routing cost Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"
	OER Support for Policy-Rules Configuration	This feature introduces the capability to select an OER map and apply the configuration under OER master controller configuration mode, providing an improved method to switch between predefined OER maps.	"Configuring and Applying OER Policies"
	Port and Protocol Based Prefix Learning	This feature introduced the capability to configure a master controller to learn prefixes based on the protocol type and the TCP or UDP port number.	"Using OER to Profile the Traffic Classes"
	VPN IPsec/GRE Tunnel Optimization	This module documents an OER solution that describes how to configure IP security (IPsec)/Generic Routing Encapsulation (GRE) tunnel interfaces as OER-managed exit links. Only network-based IPsec VPNs are supported.	"Configuring VPN IPsec/GRE Tunnel Interfaces As OER-Managed Exit Links"

Table 1 Supported Cisco IOS Optimized Edge Routing Features (continued)

Release	Feature Name	Feature Description	Where Documented
12.2(33)SRB	Optimized Edge Routing (OER)	OER provides automatic route optimization and load distribution for multiple connections between networks. OER is an integrated Cisco IOS solution that allows you to monitor IP traffic flows and then define policies and rules based on prefix performance, link load distribution, link bandwidth monetary cost, and traffic type. OER provides active and passive monitoring systems, dynamic failure detection, and automatic path correction. Deploying OER enables intelligent load distribution and optimal route selection in an enterprise network. The OER master controller software has been modified to handle the limited functionality supported by the Cisco 7600 series border routers. Using the Route Processor (RP), the Cisco 7600 series border routers can capture throughput statistics only for a traffic class compared to the delay, loss, unreachability, and throughput statistics collected by non-Cisco 7600 series border routers. A master controller automatically detects the limited capabilities of the Cisco 7600 series border routers and downgrades other border routers to capture only the throughput statistics for traffic classes. By ignoring other types of statistics, the master controller is presented with a uniform view of the border router functionality.	• "Cisco IOS Optimized Edge Routing Overview" • "Setting Up OER Network Components" • "Using OER to Profile the Traffic Classes" • "Measuring the Traffic Class Performance and Link Utilization Using OER" • "Configuring and Applying OER Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"

Table 1 Supported Cisco IOS Optimized Edge Routing Features (continued)

Release	Feature Name	Feature Description	Where Documented
Cisco IOS Release 12.2SX			
12.2(33)SXH	OER Border Router Only Functionality	In Cisco IOS Release 12.2(33)SXH support for using a Cisco Catalyst 6500 series switch as an OER border router was introduced. Only border router functionality is included in the Cisco IOS Release 12.2(33)SXH images; no master controller configuration is available. The master controller that communicates with the Cisco Catalyst 6500 series switch being used as a border router must be a router running Cisco IOS Release 12.4(6)T or a later release. The OER master controller software has been modified to handle the limited functionality supported by the Cisco Catalyst 6500 border routers. Using the Route Processor (RP), the Catalyst 6500 border routers can capture throughput statistics only for a traffic class compared to the delay, loss, unreachability, and throughput statistics collected by non-Catalyst 6500 border routers. A master controller automatically detects the limited capabilities of the Catalyst 6500 border routers and downgrades other border routers to capture only the throughput statistics for traffic classes. By ignoring other types of statistics, the master controller is presented with a uniform view of the border router functionality.	• "Setting Up OER Network Components" • "Using OER to Profile the Traffic Classes" • "Measuring the Traffic Class Performance and Link Utilization Using OER"
Cisco IOS Releases 12.3T, 12.4, and 12.4T			
12.4(24)T	PfR - Protocol Independent Route Optimization (PIRO)	PIRO introduced the ability of OER to search for a parent route—an exact matching route, or a less specific route—in any IP Routing Information Base (RIB), allowing OER to be deployed in any IP-routed environment including Interior Gateway Protocols (IGPs) such as OSPF and IS-IS.	"Using OER to Control Traffic Classes and Verify the Route Control Changes"

Table 1 Supported Cisco IOS Optimized Edge Routing Features (continued)

Release	Feature Name	Feature Description	Where Documented
12.4(20)T	Performance Routing with NBAR/CCE Application Recognition	The Performance Routing with NBAR/CCE Application Recognition feature introduces the ability to profile an application-based traffic class using NBAR. Network-Based Application Recognition (NBAR) is a classification engine that recognizes and classifies a wide variety of protocols and applications, including web-based and other difficult-to-classify applications and protocols that use dynamic TCP/UDP port assignments. PfR uses NBAR to recognize and classify a protocol or application, and the resulting traffic classes are added to the PfR application database to be passively and actively monitored.	"Using Performance Routing to Profile the Traffic Classes"
12.4(15)T	OER - Application Aware Routing with Static Application Mapping	This feature introduces the ability to configure standard applications using just one keyword. In Cisco IOS Release 12.4(9)T, and prior releases, the definition of application traffic involves some awkward configuration. This feature also introduces a learn list configuration mode that allows Optimized Edge Routing (OER) policies to be applied to traffic classes profiled in a learn list. Different policies can be applied to each learn list. New **traffic-class** and **match traffic-class** commands are introduced to simplify the configuration of traffic classes that OER can automatically learn, or that can be manually configured.	"Using OER to Profile the Traffic Classes"
	Performance Routing - Application Interface	This feature introduces support for an OER application interface. The application interface defines the mode of communication and messaging between applications and the network for the purpose of optimizing the traffic associated with the applications. A provider must be registered with an OER master controller before the application can interface with OER. Host devices in the provider network running an application that communicates with OER using the application interface must also be configured at an OER master controller with an IP address and key chain password.	"Setting Up OER Network Components"
	Performance Routing - Link Groups	This feature introduces the ability to define a group of exit links as a preferred set of links, or a fallback set of links for OER to use when optimizing traffic classes specified in an OER policy.	"Configuring and Applying OER Policies"

Table 1 Supported Cisco IOS Optimized Edge Routing Features (continued)

Release	Feature Name	Feature Description	Where Documented
12.4(9)T	OER BGP Inbound Optimization	This feature introduced support for best entrance selection for traffic that originates from prefixes outside an autonomous system destined for prefixes inside the autonomous system. External BGP (eBGP) advertisements from an autonomous system to another autonomous system (for example, an Internet service provider) can influence the entrance path for traffic entering the network. OER uses eBGP advertisements to manipulate the best entrance selection.	• "Cisco IOS Optimized Edge Routing Overview" • "Using OER to Profile the Traffic Classes" • "Measuring the Traffic Class Performance and Link Utilization Using OER" • "Configuring and Applying OER Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"
	OER DSCP Monitoring	This feature introduced automatic learning of traffic classes based on protocol, port numbers, and DSCP value. Traffic classes can be defined by a combination of keys comprising of protocol, port numbers, and DSCP values, with the ability to filter out traffic that is not required, and the ability to aggregate the traffic in which you are interested. Information such as protocol, port number, and DSCP information is now sent to the master controller database in addition to the prefix information. The new functionality allows OER to both actively and passively monitor application traffic.	• "Using OER to Profile the Traffic Classes" • "Measuring the Traffic Class Performance and Link Utilization Using OER" • "Configuring and Applying OER Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"

Table 1 Supported Cisco IOS Optimized Edge Routing Features (continued)

Release	Feature Name	Feature Description	Where Documented
12.4(6)T	OER Voice Traffic Optimization	This feature introduced support for outbound optimization of voice traffic based on the voice metrics, jitter and Mean Opinion Score (MOS). Jitter and MOS are important quantitative quality metrics for voice traffic and these voice metrics are measured using OER active probes.	• "OER Voice Traffic Optimization Using Active Probes" • "Measuring the Traffic Class Performance and Link Utilization Using OER" • "Configuring and Applying OER Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"
12.4(2)T	OER Active Probe Source Address	This feature introduced the capability to configure a specific exit interface on the border router as the source for active probes.	"Measuring the Traffic Class Performance and Link Utilization Using OER"
	OER Application-Aware Routing: PBR	This feature introduced the capability to optimize IP traffic based on the type of application that is carried by the monitored prefix. Independent policy configuration is applied to the subset (application) of traffic.	• "Setting Up OER Network Components" • "Using OER to Profile the Traffic Classes" • "Configuring and Applying OER Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"

Table 1 Supported Cisco IOS Optimized Edge Routing Features (continued)

Release	Feature Name	Feature Description	Where Documented
12.3(14)T	OER Support for Cost-Based Optimization and Traceroute Reporting	This feature introduced the capability to configure exit link policies based on the ISP billing cost. This feature also introduces the capability to configure traceroute probes to determine prefix characteristics on a hop-by-hop basis.	• "Configuring and Applying OER Policies" • "Configuring Performance Routing cost Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"
12.3(11)T	OER Support for Policy-Rules Configuration	This feature introduces the capability to select an OER map and apply the configuration under OER master controller configuration mode, providing an improved method to switch between predefined OER maps.	"Configuring and Applying OER Policies"
	Port and Protocol Based Prefix Learning	This feature introduced the capability to configure a master controller to learn prefixes based on the protocol type and the TCP or UDP port number.	"Using OER to Profile the Traffic Classes"
	VPN IPsec/GRE Tunnel Optimization	This module documents an OER solution that describes how to configure IP security (IPsec)/Generic Routing Encapsulation (GRE) tunnel interfaces as OER-managed exit links. Only network-based IPsec VPNs are supported.	"Configuring VPN IPsec/GRE Tunnel Interfaces As OER-Managed Exit Links"

Table 1 Supported Cisco IOS Optimized Edge Routing Features (continued)

Release	Feature Name	Feature Description	Where Documented
12.3(8)T	Optimized Edge Routing (OER)	OER provides automatic route optimization and load distribution for multiple connections between networks. OER is an integrated Cisco IOS solution that allows you to monitor IP traffic flows and then define policies and rules based on prefix performance, link load distribution, link bandwidth monetary cost, and traffic type. OER provides active and passive monitoring systems, dynamic failure detection, and automatic path correction. Deploying OER enables intelligent load distribution and optimal route selection in an enterprise network.	• "Cisco IOS Optimized Edge Routing Overview" • "Setting Up OER Network Components" • "Using OER to Profile the Traffic Classes" • "Measuring the Traffic Class Performance and Link Utilization Using OER" • "Configuring and Applying OER Policies" • "Using OER to Control Traffic Classes and Verify the Route Control Changes"
Cisco IOS Release 15.0			
15.0(1)M	PfR EIGRP mGRE DMVPN Hub-and-Spoke Support	The PfR EIGRP mGRE DMVPN Hub-and-Spoke Support feature introduced the ability to inject routes into the EIGRP routing table allowing PfR to control prefixes and applications over EIGRP routes. This feature also adds support for multicast Generic Routing Encapsulation (mGRE) Dynamic Multipoint Virtual Private Network (DMVPN) deployments that follow a Hub- and-Spoke network design.	"Using Performance Routing to Control EIGRP Routes with mGRE DMVPN Hub-and-Spoke Support"