



Cisco Crosswork Optimization Engine 4.1.x Release Notes

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Cisco Crosswork Optimization Engine 4.1.x Release Notes

This document provides information about Cisco Crosswork Optimization Engine, including product overview, new features and functionality, compatibility information, and known issues and limitations.

Change History

The following table lists available patches and describes information that has been added or changed since the initial Cisco Crosswork Optimization Optimization 4.1 release of this document.

Table 1: Change History

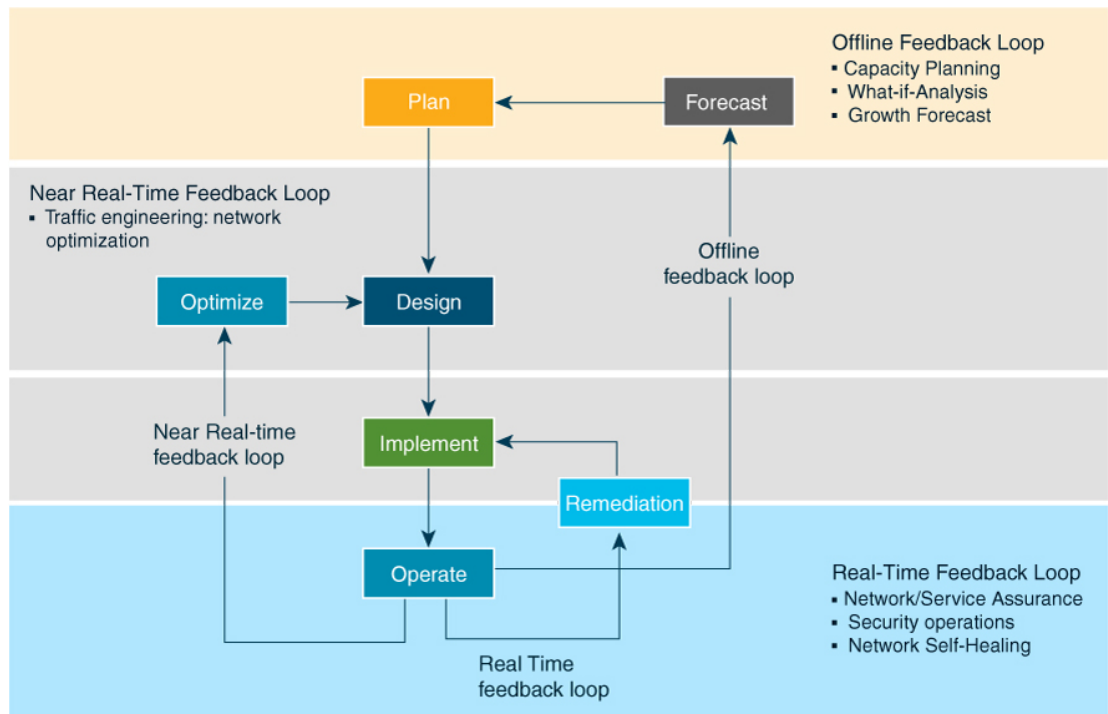
Date	Change
2023-01-30	<p>The following bugs have been resolved in these patches:</p> <ul style="list-style-type: none">• Cisco Crosswork Optimization Engine 4.1.1<ul style="list-style-type: none">• CSCwd68294• CSCwd72005 and CSCwd72025• CSCwd94329• CSCwe12284• CSCwe20341• Cisco Crosswork Platform Infrastructure 4.4.1<ul style="list-style-type: none">• CSCwd82628 <p>Note Both the Crosswork Optimization Engine 4.1.1 (cw-na-coe-patch-4.1.1-10-release-230128.tar.gz) and Crosswork Platform Infrastructure 4.4.1 (cw-na-infra-patch-4.4.1-2-release-221219.tar.gz) patches must be installed. For patch installation steps, see Patch Installation Workflow, on page 17.</p>

Overview of Cisco Crosswork Optimization Engine

Network operators are facing challenges to support the exponential growth of network traffic while addressing the pressure to efficiently run network operations. They need a toolset to help automate bandwidth optimization and efficiently steer traffic with little operator intervention. Cisco Crosswork Optimization Engine fulfills this need by providing real-time network optimization capabilities that allow operators to effectively maximize network utility as well as increase service velocity.

Looking at the following figure, Cisco Crosswork Optimization Engine is built to fulfill the need for a closed-loop optimization loop as described under “Near Real-Time Feedback Loop”. Through Cisco Crosswork Optimization Engine, the operator is able to define the optimization intent, implement the intent, and continuously monitor, track, and react to maintain the original intent.

Figure 1: Network Resolution Lifecycle



Real-time Visibility

To run their network effectively, end-to-end visibility is important to any network operator. Cisco Crosswork Optimization Engine not only provides this visibility, but also the ability to visualize the network across different layers (optical to IP) and the relationship between each layer. Cisco Crosswork Optimization Engine leverages IETF-standard BGP-LS protocol to discover IP network automatically, including the following features:

- Real-time visibility: Provides the network operator with a true representation of the actual topology
- Hierarchical topology view: Enables operators to define the different levels of granularity in the topology visualization

Simplified SR-TE Policy and RSVP-TE Tunnel Lifecycle Management

Cisco Crosswork Optimization Engine also provides an easy to use UI and API to manage and monitor the TE tunnel lifecycle. The UI and API enables the network operator to perform the following tasks:

- Visualize SR-TE (SR-MPLS and SRv6) policies and RSVP-TE tunnels.
- Create, modify, and remove SR-MPLS policies and RSVP-TE tunnels using an intuitive workflow
- Continuously track SR-MPLS policies and RSVP-TE tunnels and use dynamic path computations to maintain SLA objectives
- Preview an SR-MPLS policy or RSVP-TE tunnel before deploying it to the network

Extensibility through Feature Packs

Crosswork Optimization Engine feature packs provide congestion mitigation and closed loop bandwidth optimization. A user defines the bandwidth optimization intent and the tools implement the intent, and continuously monitor, track, and react to maintain the original intent. A user can also define network congestion thresholds and configure whether to have the tool automatically remediate congestion or provide mitigation suggestions the operator can choose to act upon.

Due to licensing or the configuration of the role associated with your user account, you may not be able to access all of the features and functions. For licensing and ordering information, work with your Cisco Partner or Cisco Sales representative to review options described in the "Cisco Crosswork Optimization Engine Ordering Guide".

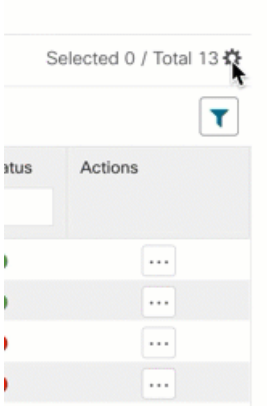
What's New in Release 4.1.0

This section lists new features and changes delivered in Cisco Crosswork Optimization Engine 4.1. For system requirements information, see the [Cisco Crosswork Infrastructure and Application Installation Guide](#).

Table 2: New Features and Functionality in Cisco Crosswork Optimization Engine 4.1

Feature	What's New?
Segment Routing Tree Segment Identifier (Tree-SID) Visualization	<p>You can now visualize Tree-SID policies implemented in a network that uses the Segment Routing Path Computation Element (SR-PCE) using path computation element protocol (PCEP). You can view the Tree-SID details of the root, transit, leaf, and bud nodes. Visualization provides an easier way to confirm that Tree-SID is implemented correctly in your network.</p> <p>Note Visualization of Tree-SID policies are supported on PCEs running IOS XR 7.7.1. If there are devices running other versions in the network, Tree-SID visualization will not work.</p>

Feature	What's New?
Traffic Engineering Dashboard	<p>Crosswork Optimization Engine now supports TE Dashboard that provides a summary of SR-MPLS, RSVP-TE tunnel, SRv6, and Tree-SID policy information.</p> <p>To view the historical data, from the main menu, choose Traffic Engineering > Traffic Engineering.</p> <p>For every policy/tunnel, there is a new Historical Data tab that displays the traffic history and the path and state change event for the same. TE Dashboard also shows underutilized policies and top 'n' policies by events.</p> <p>The configuration for TE affinity, and unused utilization threshold can be found in Administration > Settings > Traffic Engineering.</p>
Policy and Tunnel Provisioning	<ul style="list-style-type: none"> • Policy and tunnel provisioning preview details have been updated with more details and topology map enhancements. • Only PCC nodes that have a PCEP session with the PCE are available for headend selection.
SRv6 Support	<ul style="list-style-type: none"> • IPv6 router ID and IPv6 SID information (when available) are now displayed in SRv6, SR-MPLS, RSVP, Tree SID policy details. • Different IGP/TE metrics may be used for each interface for IPv4 and IPv6. • For TE optimized IPv6 routing, IPv6 link metrics are used if it exists, otherwise IPv4 link metrics are used. The following metrics are used in order of preference: <ol style="list-style-type: none"> 1. IPv6 TE 2. IPv6 IGP 3. IPv4 TE 4. IPv4 IGP

Feature	What's New?
<p>Flexible Algorithm Support</p>	<ul style="list-style-type: none"> You can now provision dynamic SR-MPLS policies to use a SID Algorithm constraint. For more information, see Create Dynamic SR-MPLS Policies Based on Optimization Intent. The Flexible Algorithm SID attribute associated with each candidate path is displayed in the SR Policy table and in the policy details. To view the SID in the SR Policy table, you must enable the SID Algorithm column to show in the table. 
<p>Global PCE Maximum Latency Support</p>	<p>Crosswork now supports the global maximum latency value that is set manually on the PCE (via the CLI or NETCONF). For example:</p> <p>Device-IOS-XR-771(config-pce)#constraints bounds cumulative type latency <max-latency-value></p> <p>If this value is configured on the device, then the SR-PCE will only allow LSPs within the threshold. This feature applies to <i>dynamic</i> policies with the metric type set to Latency. This is useful for advanced network users who are interested in paths with a lower latency.</p> <p>Note For BWoD:</p> <ul style="list-style-type: none"> Only PCC-initiated policies are supported. SR-PCE and PCC nodes must be running Cisco IOS XR 7.7.1.

Feature	What's New?
<p>Local Mitigation Congestion (LCM)</p>	<ul style="list-style-type: none"> • A new Stay in Area option restricts bypass LSP paths to stay within the mitigated area for OSPF or levels for ISIS. • The minimum value for the Congestion Check Interval has been changed to 60 seconds. • Instead of having to manually find LCM deployed policies, you can now click on a deployed policy from the LCM Operational Dashboard, and it will only display the deployed SR policies topology. • The Link Management page has been updated and renamed to Interface Thresholds. In addition to importing a CSV file containing interface thresholds, you can now add individual interface thresholds on the Interface Thresholds page. • A new advanced Maximum Segment Hops option allows you to specify a custom Maximum SID Depth (MSD) constraint to use for up to 5 device tag groups. When calculating bypass TTE policies, LCM uses the effective MSD available value (as entered in the LCM Configuration page) for the assigned device tag groups. <p>Crosswork Optimization Engine learns from SR-PCE the MSD for each platform advertising the hardware limit in the IGP and BGP-LS. It represents the hardware limit that can be imposed exclusive of any service/transport/special labels. Therefore, you may want to use this new option to assign less than the advertised MSD value that LCM can use for bypass TTE policy calculation.</p> <p>Note To view the MSD value for a device, navigate to the Traffic Engineering topology map and click on the device. From the Device Details page, and click SR-MPLS > Prefixes tab > Expand All.</p> <ul style="list-style-type: none"> • A new advanced Uneven ECMP Traffic Threshold option allows you to enter the percentage of sensitivity to detect uneven amounts of traffic across solution bypass tunnels. • When LCM detects no measured traffic (typically due to the “Profile ID” not being properly configured), then the LCM solution is marked as “degraded”. <p>For more information, see Configure LCM.</p>
<p>Device PCEP Session Details</p>	<p>Device PCEP session information is now displayed in the Device Details page (Traffic Engineering topology map > <i>device-icon</i> > Details tab).</p>
<p>Bandwidth on Demand (BWoD)</p>	<p>Extended existing support for MSDs to PCC-initiated BWoD policies. BWoD now computes a path to comply with the manually configured MSD constraint (<code>sid-limit</code>) on the headend router.</p>

Feature	What's New?
Device Grouping	Device group visualization enhancements have been made. For more information, see View Device Group to Filter you Topology View .
Multivendor Support	You now have the ability to customize Device Package templates to support certain vendor specific traffic statistics. Contact your Cisco Crosswork Customer Experience representative for details.
APIs	The following API features have been updated: <ul style="list-style-type: none"> • Feature Packs—Extended LCM and Flexible Algorithm support. • SRv6: <ul style="list-style-type: none"> • Further support of IPv6 Router IDs • Support for discovery and reporting of IPv6 Link-Local style links • Support for an "SID Algorithm" constraint in the SR-MPLS provisioning API, and GET API of the SR-MPLS policy detail. • Dashboard API • Added node-pcep-sessions in topology mode For more information, see the Cisco Crosswork Network Automation API Documentation on Cisco DevNet .

Compatibility Information

The following table details Crosswork Optimization support for IOS Versions, SR-PCE, and Cisco devices. A later table indicates compatibility with Cisco Crosswork applications, NSO Function Packs, and browsers.

Cisco IOS Support

SR-PCE Cisco IOS-XR version 7.7.1 has been validated to work with Crosswork Optimization Engine 4.1 features. Other listed PCC versions are supported, but may not support all Crosswork Optimization Engine features because of PCC version limitations.



Note Software Maintenance Updates (SMUs) are required for both PCC/Headend and SR-PCE versions indicated in the table. To download the Cisco IOS XR versions and updates, see the [IOS XR Software Maintenance Updates \(SMUs\)](#) document. The correct SMUs to download will have "Optima" or the bug ID appended to the filename. For example: `asr9k-x64-6.6.3.Optima.tar` or `xrv9k-7.3.1.CSCvy63506.tar`.

Table 3: Crosswork Optimization Engine 4.1 Support for SR-PCE 7.7.1 (by Cisco IOS Version and Headend Router Type)

Cisco IOS XR or XE Version	Cisco ASR 9000 (32-bit)	Cisco ASR 9001 (64-bit)	Cisco XRv 9000 ¹	Cisco 8201 series	Cisco NCS 5500 series	Cisco NCS 540 series ²	Cisco NCS 560 series	Cisco ASR 920	Cisco ASR 903 RSP 3
6.5.3	✓+ SMU	✓+ SMU	✓+ SMU	✗	✓+ SMU (500Qm)	✗	✗	NA	NA
6.6.3	✓+ SMU	✓+ SMU	✓+ SMU	✗	✓+ SMU (500Qm)	✓+ SMU (500Qm)	✓+ SMU (500Qm)	NA	NA
6.7.2	✓	✗	✗	✗	✗	✗	✗	NA	NA
7.0.2	✗	✓	✓	✗	✓	✓	✓	NA	NA
7.1.2	✗	✓	✓	✗	✓	✓	✓	NA	NA
7.2.1	✗	✓	✓	✗	✓	✓	✓	NA	NA
7.3.1	✗	✓	✓	✗	✓	✓	✓	NA	NA
7.3.2	✗	✓	✓	✗	✓	✓	✓	NA	NA
7.4.1	✗	✓	✓	✗	✓	✓	✓	NA	NA
7.4.2	✗	✓	✓	✓	✓	✓	✓	NA	NA
7.5.2	✗	✓	✓	✓	✓	✓	✓	NA	NA
7.6.1	✗	✓	✓	NA	✓	✓	✓	NA	NA
7.7.1	✗	✓	✓	✓	✓	✓	✓	NA	NA
17.4.1 ³	NA	NA	NA	NA	NA	NA	NA	✓	✗
17.5.1	NA	NA	NA	NA	NA	NA	NA	✓	✓
17.6.3	NA	NA	NA	NA	NA	NA	NA	✓	✓
17.7.1	NA	NA	NA	NA	NA	NA	NA	✓	✓
17.8.1	NA	NA	NA	NA	NA	NA	NA	✓	✓

¹ The SR-PCE may be deployed on XRv9000 (VM or appliance).

- ² The SMU is available via the Cisco NCS 540-ACC-SYS Router or Cisco NCS 540x-ACC-SYS Router Software Download Center.
- ³ Supports only PCE initiated SR-TE policy deployment.

**Note**

- Segment Routing Traffic Matrix (SRTM) is only available in Cisco ASR 9000 devices.
- SRv6 and Visualizing Native Path (Path Query) features are supported from PCC IOS XR 7.3.2 or later.
- Local Congestion Mitigation is supported from:
 - PCC IOS XR 7.1.2 (ISIS) and above for ASR 9000
 - PCC IOS XR 7.3.2 and above for NCS 5500, NCS 560, and NCS 540
 - PCC IOS XR 7.5.2 and 7.7.1 for Cisco 8000
 - PCC IOS XE 17.5.1 or 17.6.3 (only with OSPF) for ASR 903/907 RSP 3
 - PCC IOS XE 17.7.1 (ISIS and OSPF) for ASR 903 RSP 3

Cisco Crosswork Application, NSO Function Pack, and Browser Support

The following table lists software versions that have been tested and are known to be compatible with Cisco Crosswork Optimization Engine. For *complete* installation requirements, see the [Cisco Crosswork Infrastructure 4.4 and Applications Installation Guide](#).

Hardware/Software	Supported Version
Cisco Crosswork Infrastructure	Version 4.4
Cisco Crosswork Data Gateway	Version 4.1
Function Packs	<ul style="list-style-type: none"> • Cisco Crosswork NSO Telemetry Traffic Collector Function Pack 4.4.0 • Cisco Network Services Orchestrator DLM Service Pack 4.4.0
Browsers	<ul style="list-style-type: none"> • Google Chrome—100 or later • Mozilla Firefox—100 or later

Scale Support

The following number of devices, and SR-TE policies (SR-MPLS and SRv6) and RSVP-TE tunnels are supported. Scale support numbers only apply to Cisco Crosswork solution applications.

**Note**

These scale numbers have been qualified on a 5 node cluster system setup with 10 CDG VMs (each with 2.5 K devices attached) and 8 SR-PCE pairs (16 SR-PCEs total).

Table 4: Scale Support

Feature	Scale Support
Devices	25,000
Total Interfaces ⁴	350,000 ⁵
SR-TE policies and RSVP-TE tunnels	100,000
IGP links	200,000

⁴ This is the total number of interfaces that Cisco Crosswork can receive and process.

⁵ This number has been validated with a total collection load of 650,000 interface entries across 25,000 devices (with 300,000 entries filtered out in the CDGs based on interface type). The number of CDG VMs can be increased to support higher collection loads.

Networking Technology Support

Table 5: Supported Feature

Category	Details	Notes
SR	PCE-initiated policies	Policies that are provisioned or discovered by Crosswork.
SR	PCC-initiated policies	Policies that are discovered by Crosswork.
SR	Explicit Path SRTE policies	PCC-init, PCE reported, PCE-init
SR	Dynamic Path SRTE policies	PCC computed/PCE reported, PCE delegated
SR	Single consistent Segment Routing Global Block (SRGB) configured on routers throughout domain covered by Crosswork	If index SIDs are used and there are different SRGB bases along a path of a policy, the label can change along the path.
SR	Prefix SID	—
SR	Adjacency SID	—
SR	EPE adjacency SID	EPE Adj SIDs must be configured on both sides of eBGP link
SR	Protected and Unprotected adjacency SIDs	—

Category	Details	Notes
SR	Regular and Strict prefix SIDs	Multiple prefix SIDs per node not supported for PCC-init policies with label only explicit SID lists
SR	SR-MPLS policy optimization objective min-metric (IGP, TE, and Latency)	PCE-init provisioning, PCC-init discovery
SR	SR-MPLS policy path constraints (affinity and disjointness, protected segments)	Only 2 SR-MPLS policies per disjoint group or sub-id are supported
SR	Binding SID for explicit or dynamic policies	Discovered for PCC-init/PCE-init, configurable for PCE-init
SR	Profile ID (Discovered and configurable for PCE-init)	Used for applying features on PCC to PCE-init policies
SR	Flex-Algo (SR-MPLS/SRv6)	<ul style="list-style-type: none"> • Discover / Visualize node Flex Algo participation • Discover / Visualize Flex Algo Definitions • SR policy IGP path respecting Flex Algo associated with prefix SIDs • Display pruned topology participating in FlexAlgo • Preview/Provision PCE-init SRTE policy with SID-Algo constraint
SR	Discovery/Visualization of multiple candidate paths	—
SR	Binding SIDs as Segment List Hops for SR policies	Discovery/visualization of PCC-init

Category	Details	Notes
SR	TreeSID	Visualization
SR	Routers that are not SR-capable	SR policy IGP paths should not include these non-SR capable nodes
SR	SR policies with Loopback IPs (Prefixes) other than TE router ID for headend/endpoint and prefix SIDs in segment list	Prefix (node) SIDs associated with specific IGP domain / area
SR	Maximum SID Depth (MSD)	<ul style="list-style-type: none"> • Per-node Base MPLS imposition MSD discovered via IGP/BGP-LS • Per-node MSD discovered via PCEP session info • Per-policy MSD
SR	Global Max Latency	Configured on PCE and applied to all PCE delegated SRTE policies with latency metric
SR	Inter-domain SRTE policies (inter-IGP domain, inter-AS)	PCE delegated, BWoD
SR	Node SID reuse across different IGP domains	Recommended to not reuse node SIDs in adjacent IP domains. Interdomain explicit path policies with a label-only hop that is a node SID used in adjacent domains may be unresolvable if hop after ABR hop.
RSVP	PCE-initiated tunnels (Provisioned by COE, discovered by COE), PCC-initiated tunnels (discovered by COE)	—
RSVP	ERO strict hops, ERO loose hops (PCC-init only)	—

Category	Details	Notes
RSVP	FRR protection on COE provisioned tunnels	—
RSVP	Path optimization objective min-metric (IGP TE Latency)	—
RSVP	Path constraints (affinity, disjointness)	Only 2 RSVP tunnels per disjoint group/sub-id
RSVP	Binding Label (explicit dynamic)	—
RSVP	Signaled Bandwidth	—
RSVP	Setup/Hold Priority	—
RSVP	Path Protection (partial support)	Paths discovered as independent tunnels if multiple paths are up. Cisco XR only reports active path. Other vendors may report all active paths.
PCEP	PCEP Session discovery	Each PCEP session a PCC has with a PCE along with its details is displayed as part of node details
SR-IGP	Visualizing native SR-IGP path	Path Query OAM feature to use traceroute on device to report actual SR-IGP multi-paths to destination node (SR-MPLS only)
IPv4/IPv6	Dual Stack IPv4/IPv6	Nodes can be IPv4, IPv6 or IPv4/IPv6 capable
IPv6	IPv6 Link Local Interfaces	Discovery of IPv6 link local interfaces as part of topology and as a hop in an SRv6 TE policy
IPv6	IPv6 Router ID	Nodes with IPv6 and IPv6 Router ID only with support for SRv6 only

Table 6: Unsupported Features and Limitations

Category	Description	Notes
SR	Provisioning multiple candidate paths via Crosswork	—
SR	Per-Flow Policies	PFP (ODN or manually configured) not supported in PCEP. This PFP is the mapping of forward class to PDP with matching color and EP. Underlying PDP is reported as normal.
SR	Multiple segment lists per candidate path	This configuration is not supported in Crosswork. These segment lists will not be discovered if configured on a PCC. <ul style="list-style-type: none"> • Discover multiple segment lists (with weights) per policy (TopoSvc, PCE, PCC) • Provision multiple segment lists (with weights) per policy (UI, PCED, PCE, PCC) • Visualize including showing IGP paths (UI, OE) • Compute paths of policies with multiple segment lists for LCM (OE, LCM)
SR	Anycast SIDs	—
SR	Hop count metric type for policies	Cisco Crosswork does not support provisioning with this metric type and does not discover this metric type if configured on the PCC.
SR	SR policy provisioned (PCE-init) with IPv6 endpoints or hops	—
SR	SRv6 TE traffic Stats	Requires telemetry (gNMI) for policy counters (no SNMP support)
SR	SR-MPLS policy optimization objective min-metric with margin	Not supported for policies provisioned by Cisco Crosswork. Margin is not discovered for PCC-initiated policies.

Category	Description	Notes
SR	SR-MPLS policy constraints (resource exclusion or metric bound)	Not supported for policies provisioned by Cisco Crosswork. Constraints are not discovered for PCC-initiated policies.
SR	Heterogeneous SRGBs	Different SRGBs configured on nodes are not supported. SRGB must be configured to ensure proper discovery and visualization of SR policy paths.
SR	EPE (PeerNode, PeerSet BGP Peering SID types)	No discovery
SR	TreeSID Provisioning	Configured directly on PCE.
IGP	ISIS Overload bit	Affects IGP paths for all policies and PCE path computation (BWoD, LCM). PCE reports but does not process.
IGP	OSPF MADJ Interfaces	No support for discovering OSPF Multi-area adjacencies
IGP	Multiple IGP instances on same interface	Single interface that participates in multiple IGP instances are not supported.
RSVP	Configuring loose hop ERO in COE	Only strict hops can be configured. If strict hops are not configured for every hop along the path and those hops are not remote interface IPs or loopbacks, unexpected behavior may occur
RSVP	Named tunnels configured on PCCs	Required for Juniper RSVP HEs
RSVP	Tunnels with Loopback IPs other than TE router ID for headend/endpoint and path hops	—
RSVP	Display of active FRR protected path in UI	Cisco Crosswork will discover an FRR tunnels which are displayed in UI but will not associate an actively protected tunnel with the FRR tunnel. Path in UI will not include FRR protected path when protection is active.
RSVP	P2MP tunnels	—
RSVP	Path protected RSVP LSPs	No association between paths discovered.

Category	Description	Notes
LDP	LCM in Mixed SR/LDP networks	LCM will not work in a mixed SR/LDP network with PEs that are LDP only. LDP traffic destined to the LDP-only egress PE attempted to be steered into Autoroute LCM tactical policies will be blackholed
IPv4	IPv4 Unnumbered Interfaces	Interfaces not discovered. As hops in SR policies not discovered.
IPv4/IPv6	Secondary IP addresses for interfaces	Not supported. Unpredictable behavior if discovered.
IPv4/IPv6	Overlapping IP addresses in different IGP domains	IP addresses for IGP interfaces and nodes (router-ids) are assumed to be unique across all domains
IPv6	IPv6 Router ID	SR & RSVP not supported (SRv6 only)
SRv6	PCE-Init SRv6 Provisioning	Not supported in XR (7.1.1)

Upgrade Crosswork Optimization Engine Feature Packs

If you have enabled feature packs (LCM, Bandwidth Optimization, or BWoD) in Crosswork Optimization Engine 4.0 and want to upgrade to Crosswork Optimization Engine 4.1, you must perform the following tasks prior to upgrading:

LCM and Bandwidth Optimization (BWOpt)

- From the LCM or Bandwidth Optimization **Configuration** page:
 1. Set the **Delete Tactical SR Policies when Disabled** option to **False**. This task must be done prior to disabling LCM or BWOpt so that tactical policies deployed by LCM or BWOpt remain in the network after the upgrade.
 2. Set the **Enable** option to **False**. If LCM or BWOpt remains enabled, there is a chance that tactical policies may be deleted after the upgrade.
 3. Note all options (Basic and Advanced) in the LCM or BWOpt **Configuration** page so that you can confirm the same configuration has been migrated after the upgrade.
- Export the current list of interfaces managed by LCM or BWOpt (**Traffic Engineering > Local Congestion Mitigation** or **Bandwidth Optimization > Interface Threshold > Export** icon). Confirm the interfaces are valid by reimporting the CSV file without errors. For more information, see "Add Individual Interface Thresholds" in the [Cisco Crosswork Optimization Engine 4.1 User Guide](#).
- After the upgrade, wait until the **Traffic Engineering** page shows all the nodes and links before enabling LCM or BWOpt.

Note:

After the system is stable and before enabling domains for LCM, confirm that the migration of previously monitored interfaces has completed and that each domain has the expected configuration options.

1. Navigate to **Administration > Alarms > All > Events** and enter **LCM** to filter the **Source** column.
2. Look for the following event: "Migration complete. All migrated LCM interfaces and policies are mapped to their IGP domains". If this message does not appear wait for the **Congestion Check Interval** period (set in the **LCM Configuration** page), then restart LCM (**Administration > Crosswork Manager > Optimization Engine > optima-lcm > ... > Restart**).
3. Wait until the optima-lcm service changes from Degraded to Healthy state.
4. For each domain, navigate to the **Configuration** page and verify the options have been migrated successfully. If the domain configurations are incorrect, restart LCM (**Administration > Crosswork Manager > Optimization Engine > optima-lcm > ... > Restart**).
5. Check the **Events** page for the event mentioned above and the **Configuration** page to verify the options.



Note

- If the confirmation message does not appear or domain configuration options are incorrect, then contact Cisco Technical support and provide them with showtech information and the exported Link Management CSV file.
 - You can also manually add missing interfaces that were previously monitored or update domain configuration options *after* the system is stable.
-

BWoD

- Set the **Enable** option to **False**. If BWoD remains enabled, there is a chance that tactical policies may be deleted after the upgrade.
- Note all options (Basic and Advanced) in the **BWoD Configuration** page so that you can confirm the same configuration has been migrated after the upgrade.
- After the upgrade, wait until the **Traffic Engineering** page shows all the nodes and links before enabling BWoD.

Patch Installation Workflow

This section explains how to install patch files from the Cisco Crosswork UI.

Before you begin, ensure that you have the following:


- Patch image file (.tar.gz) downloaded from [Cisco Software Download](#) to your local machine.
- Cisco Crosswork Administrator user credentials.
- Management IP address used for your Crosswork VM deployment.



Note

If you encounter any error while installing the patch, please contact the Cisco Customer Experience team.

Procedure

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- Step 1** Click on **Administration > Crosswork Management**, and select the **Application Management** tab. The Crosswork Platform Infrastructure and any applications that are added are displayed here as tiles.
- Step 2** Click on the **Add File (.tar.gz)** option to add the patch file that you had downloaded.
- Step 3** In the Add File dialog box, enter the relevant information and click **Add**.
- Step 4** Once the file is added, click  on the application tile, and select **Upgrade** from the drop down list.
-

Product Documentation

The following table lists the guides that Cisco provides for Cisco Crosswork Optimization Engine. You can access all Cisco Crosswork Optimization Engine end user documentation at <https://www.cisco.com/c/en/us/support/cloud-systems-management/crosswork-optimization-engine/model.html>.



Note We sometimes update the documentation after original publication. Therefore, you should always review the documentation on Cisco.com for any updates.

Table 7:

Documentation Title	What is Included
Cisco Crosswork Optimization Engine 4.1 Release Notes	This document
Cisco Crosswork Infrastructure 4.4 and Applications Installation Guide	Shared installation guide for all the Cisco Crosswork applications and their common infrastructure. Covers: <ul style="list-style-type: none"> • System requirements • Installation prerequisites • Installation instructions • Upgrade instructions

Documentation Title	What is Included
Cisco Crosswork Infrastructure 4.4 and Applications Administration Guide	<p>Shared administration guide for all the Cisco Crosswork applications and their common infrastructure. Covers:</p> <ul style="list-style-type: none"> • Managing clusters and data gateway • Data collection • High availability • Backup and restore • Onboard and manage devices • Zero touch provisioning • Set up maps • Managing users, access and security • Maintain system health
Cisco Crosswork Optimization Engine 4.1 User Guide	<ul style="list-style-type: none"> • Getting started • Setting up and monitoring the network • Monitoring SR-TE (SRv6 and SR-MPLS) policies and RSVP-TE tunnels • Provisioning SR-MPLS policies and RSVP-TE tunnels • Mitigating network congestion • Defining and maintaining intent-based bandwidth requirements
Open Source Software Used in Cisco Crosswork Optimization Engine	Lists of licenses and notices for open source software used in Cisco Crosswork Optimization Engine.
API Documentation	Advanced users can extend the Cisco Crosswork functionality using the APIs. API documentation is available on Cisco Devnet .

Related Product Documentation

You can access documentation for all Cisco Crosswork products at <https://www.cisco.com/c/en/us/support/cloud-systems-management/crosswork-network-automation/tsd-products-support-series-home.html>

Known Issues and Limitations

The following section details the known issues and limitations for Cisco Crosswork Optimization.

Tree-SID

- Only visualization of Tree-SID policies is supported. You cannot create, edit or delete Tree-SID policies from the UI.
- Tree-SID policies are only supported on devices running Cisco IOS XR software.
- Tree-SID policies are not deleted from the UI when the SR-PCE in HA mode is down.
- PCE HA is not supported.
- Tree-SID policies are not supported in Label Switch Multicast (LSM) routing. In cases where LSM is enabled, IGP updates and traffic utilization data are not supported.
- LCM will not operate in portions of the network carrying Tree-SID LSPs.
- On Cisco 8000 Series Routers, only static Tree-SID policies with leaf role are supported.
- The RestConf API is not supported.
- Tree-SID policy details do not show IPv6 router ID or Srv6 core information.

TE Dashboard

- Traffic Utilization is not supported on Tree-SID and SRv6 policies.
- You cannot view the IGP path on the historical data when an event is selected.
- The metric type for BWoD policies are not visible on the TE Dashboard.
- Hop count metric and BWoD type are not shown in the TE Dashboard under metric/policy type.
- State and Path change events are not visible in the Historic tab of a policy until you zoom in by 5 to 6 clicks.

SRv6

- Provisioning of SRv6 policies is not supported.
- Traffic collection on SRv6 policies is not currently supported.
- Visualization of PCC-initiated explicit path SRv6 policies is not supported
- SRv6 is not supported on Bandwidth Optimization, Bandwidth on Demand, or Local Congestion Mitigation feature packs.

SR-MPLS

- In the SR-MPLS provisioning screen and while previewing an SR-MPLS policy with an IPv6 address, a parsing error is displayed instead of correct error message: "Request Failed. Endpoint address is IPv6, IPv6 provisioning is not supported yet."
- Updating the SID constraint on an existing policy is not allowed by the SR-PCE. The modification screen gives a successful update message, instead of a warning message that it is not allowed.

APIs

- The Topology API cannot discover and report IPv6 Link-Local style links.
- The Dashboard Export API cannot export CSV files to an external location. It can only export to /mnt/cw_glusterfs/bricks/rscoean/export.

BWoD

- BWoD gets disabled when SR Policy Traffic field has 'Measured' selected and Policy Violation field has 'Strict Network' selected.

Cisco Bug Search Tool

If you encounter problems while working with Cisco Crosswork, please check this [list of open bugs](#). Each bug ID in the list links to a more detailed description and workaround. You can use the Cisco Bug Search Tool to search for bugs.

1. Go to the [Cisco Bug Search Tool](#).
2. Enter your registered Cisco.com username and password, and click **Log In**.

The Bug Search page opens.



Note If you do not have a Cisco.com username and password, you can [register here](#).

3. To search for all Cisco Crosswork bugs, from the Product list select **Cloud and Systems Management > Routing and Switching Management > Cisco Crosswork Network Automation** and enter additional criteria (such as bug ID, problem description, a feature, or a product name) in the Search For field. Examples: "Optimization Engine" or "CSCwc62479".
4. When the search results are displayed, use the filter tools to narrow the results. You can filter the bugs by status, severity, and so on.



Tip To export the results to a spreadsheet, click **Export Results to Excel**.

Security

Cisco takes great strides to ensure that all our products conform to the latest industry recommendations. We firmly believe that security is an end-to-end commitment and are here to help secure your entire environment. Please work with your Cisco account team to review the security profile of your network.

For details on how we validate our products, see [Cisco Secure Products and Solutions](#) and [Cisco Security Advisories](#).

If you have questions or concerns regarding the security of any Cisco products, please open a case with the Cisco Customer Experience team and include details about the tool being used and any vulnerabilities it reports.

Accessibility Features

For a list of accessibility features in Cisco Crosswork Optimization Engine, visit <https://www.cisco.com/c/en/us/about/accessibility/voluntary-product-accessibility-templates.html> (VPAT) website, or contact accessibility@cisco.com.



Note The Cisco Crosswork Optimization Engine VPAT document listed for 4.0 applies to this release.

All product documents except for some images, graphics, and charts are accessible. If you would like to receive the product documentation in audio format, braille, or large print, contact accessibility@cisco.com.

Obtain Additional Information and Submit a Service Request

Information about Cisco products, services, technologies, and networking solutions is available from various online sources.

- Sign up for Cisco email newsletters and other communications at:
<https://www.cisco.com/offer/subscribe>
- Visit the Cisco Customer Experience website for the latest technical, advanced, and remote services to increase the operational reliability of your network. Go to:
https://www.cisco.com/c/m/en_us/customer-experience
- Obtain general networking, training, and certification titles from Cisco Press publishers at:
<http://www.ciscopress.com>
- To submit a service request, visit [Cisco Support](#).

Support and Downloads

The Cisco Support and Downloads website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies.

Access to most tools on the Cisco Support and Downloads website requires a Cisco.com user ID and password.

For more information:

<https://www.cisco.com/c/en/us/support/index.html>

