



# Cisco Crosswork Overview

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## About this guide

This guide explains the requirements and process to install Cisco Crosswork Infrastructure, along with Cisco Crosswork Data Gateway and the Cisco Crosswork applications. It also explains the process to upgrade your Cisco Crosswork to the latest version. This guide is relevant for customers using the Cisco Crosswork Network Controller solution, the Cisco Routed Optical Networking solution, any of the Crosswork applications.

There are other components that integrate with Cisco Crosswork (see [Integrated Components, on page 4](#)), such as Cisco NSO or Cisco WAE, but they are NOT covered in this document. For integration steps, please refer to the [Cisco Crosswork Infrastructure 4.4 and Applications Administration Guide](#). For more details about these components, please refer to their respective installation documentation.



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**Note** While this guide includes instructions for installing Cisco Crosswork on Amazon EC2 platform, the EC2 deployment is only available as a limited-release deployment. Please contact the Cisco Product Management team for assistance.

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## Audience

This guide is for experienced network users and operators who want to use Cisco Crosswork Infrastructure and applications in their network. This guide assumes that you are familiar with the following:

- Using a Docker container
- Running scripts in Python

- Deploying OVF templates using VMware vCenter
- Deploying using OVF tool
- Amazon Web Services (AWS), Amazon EC2 concepts, and creation of CloudFormation templates

## 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.

## Introduction

Cisco Crosswork Infrastructure is a microservices-based platform and is the foundation required for running Crosswork on-premise applications. It employs a cluster architecture to be extensible, scalable, and highly available. The Crosswork cluster consists of at least three VMs or nodes operating in a hybrid configuration. Additional VMs or nodes in a Worker configuration can be added, as needed, to match the requirements of the deployed applications. A Hybrid node can run infrastructure and application pods, while a Worker node can run only application pods. The total number of Hybrid and Worker nodes varies based on the size of the network and the applications being run. Please work with the Cisco Customer Experience team to determine the number of nodes required for your needs.



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**Note** Hereafter in this guide, Cisco Crosswork Infrastructure is referred to as "Cisco Crosswork".

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Cisco Crosswork uses **Cisco Crosswork Data Gateway (CDG)**, a software package that is separated into its Virtual Machine (VM), to gather information from the managed devices and forward it to Cisco Crosswork as well as external destinations. The information is then analyzed and processed by the Crosswork applications and used to manage the network or respond to changes in the network. The number of Crosswork Data Gateways deployed in your network depends on the number of devices, the amount of data being collected, the overall topology, and your redundancy requirements. Please consult with the Cisco Customer Experience team for guidance on your deployment to best meet your needs.

The Crosswork Data Gateway is an integral part of the Crosswork solution being deployed. For this reason, this document explains Crosswork Data Gateway as a foundational component that must be installed in tandem with the Crosswork cluster. However, this document does not cover the installation of the other integrated components (such as Cisco NSO, Cisco SR-PCE, etc.) that may already be installed or can be used independently.

# Cisco Crosswork Product Portfolio

Cisco Crosswork provides a flexible platform to deploy different products where each product is downloaded and added to the platform.

Cisco Crosswork supports Cisco Crosswork Network Controller solution and its contents:

**Cisco Crosswork Network Controller** is an integrated Crosswork solution that combines essential components, such as Cisco Network Services Orchestrator, Segment Routing Path Computation Element (SR-PCE), Crosswork Active Topology, and Crosswork Optimization Engine. The solution enables you to proactively manage your end-to-end networks, and it provides intent-based and closed-loop automation solutions to ensure faster innovation, optimal user experience, and operational excellence.

Crosswork Network Controller applications are bundled as **Essentials** and **Advantage** packages.

**Table 1: Cisco Crosswork Network Controller Packages**

Package	Contents	Description
Cisco Crosswork Network Controller Essentials	Cisco Crosswork Optimization Engine	An application that provides closed-loop tracking of the network state and real-time network optimization in response to changes in network state, allowing operators to effectively maximize network capacity utilization, as well as increase service velocity.
	Cisco Crosswork Active Topology	A component of Crosswork Network Controller that enables visualization of topology and services on logical and geographical maps.

Package	Contents	Description
Cisco Crosswork Network Controller Advantage	Cisco Crosswork Optimization Engine	An application that provides closed-loop tracking of the network state and real-time network optimization in response to changes in network state, allowing operators to effectively maximize network capacity utilization, as well as increase service velocity.
	Cisco Crosswork Active Topology	A component of Crosswork Network Controller that enables visualization of topology and services on logical and geographical maps.
	Cisco Crosswork Service Health	An component of Cisco Crosswork Network Controller that overlays a service level view of the environment and makes it easier for operators to monitor if services (for example, L2/L3 VPN) are healthy based on the rules established by the operator.
	Cisco Crosswork Health Insights	An application that performs real-time Key Performance Indicator (KPI) monitoring, alerting, and troubleshooting. Cisco Crosswork Health Insights enables programmable monitoring and analytics, and builds dynamic detection and analytics modules that allow operators to monitor and alert on network events based on user-defined logic.
	Cisco Crosswork Change Automation	An application that automates the process of deploying changes to the network. Orchestration is defined via an embedded Ansible Playbook and then configuration changes are pushed to Cisco Network Services Orchestrator (NSO) to be deployed to the network.
	Cisco Crosswork Zero Touch Provisioning	A component of Cisco Crosswork Network Controller that streamlines onboarding and provisioning of Day 0 configuration resulting in faster deployment IOS-XR and IOS-XE devices at a lower operating cost.
	Element Management Functions	A library of functions that provides deep inventory collection, alarm management and image management using Inventory, Fault, and Software Image Management (SWIM) functions.

For information on the installation and configuration requirements of Cisco Crosswork products, see [Integration Requirements for other Cisco Products](#).

## Integrated Components

**Cisco Network Services Orchestrator** functions as the provider for Crosswork to configure the devices according to their expected functions, including configuring model-driven telemetry (MDT) sensor paths, if any, for data collection. Cisco NSO is vital in supplying device management and configuration-maintenance services.

**Cisco Segment Routing Path Computation Element (SR-PCE)** is an IOS-XR multi-domain stateful PCE supporting both Segment Routing Traffic Engineering (ST-TE) and Resource Reservation Protocol Traffic

Engineering (RSVP-TE). Cisco Crosswork uses the combination of telemetry and data collected from the Cisco SR-PCE to analyze and compute optimal TE tunnels and/or to discover devices in the network.

Cisco Crosswork can also integrate with other providers (such as Cisco WAE, Syslog and Alert), external servers (TACACS+ and LDAP), DHCP server (when using Crosswork ZTP), Vitria, and external Kafka. The details about these specific integrations are addressed in the [Cisco Crosswork Infrastructure 4.4 and Applications Administration Guide](#) or in the application guides.

## Crosswork Installation Workflow

The following table describes the general workflow to install Crosswork components on your preferred datacenter.

**Table 2: Crosswork Installation Workflow**

Step	Action
1. Ensure that your environment meets all the requirements.	Refer to the guidelines in: <ul style="list-style-type: none"> <li>• <a href="#">General Requirements (common for VMware and AWS)</a></li> <li>• <b>VMware:</b> <a href="#">Installation Requirements in VMware vCenter</a></li> <li>• <b>AWS EC2:</b> <a href="#">Installation Requirements in AWS EC2</a></li> </ul>
2. Install or upgrade to the compatible version of NSO with the appropriate Function packs to support the applications you plan to use.	Follow the steps in <a href="#">Integration Requirements for other Cisco Products</a> .
3. Install the Cisco Crosswork cluster on your preferred datacenter platform.	Choose an installation method for your platform, and follow the relevant procedure: <ul style="list-style-type: none"> <li>• <b>VMware:</b> <ul style="list-style-type: none"> <li>• <i>Using cluster installer tool:</i> <a href="#">Install Cisco Crosswork on VMware vCenter using Cluster Installer tool</a></li> <li>• <i>Manual Installation:</i> <a href="#">Manual Installation of Cisco Crosswork using vCenter vSphere UI</a></li> </ul> </li> <li>• <b>AWS EC2:</b> <ul style="list-style-type: none"> <li>• <i>Using CloudFormation template:</i> <a href="#">Install Cisco Crosswork on AWS EC2 using CloudFormation Template</a></li> <li>• <i>Manual Installation:</i> <a href="#">Install Crosswork Cluster on Amazon EC2 Manually</a></li> </ul> </li> </ul>

Step	Action
4. Verify if the installation was successful, and log into the Cisco Crosswork UI	Refer to the guidelines in: <ul style="list-style-type: none"> <li>• <a href="#">Monitor the Installation</a> (for VMware)</li> <li>• <a href="#">Log into the Cisco Crosswork UI</a></li> </ul>
5. Install the Crosswork Data Gateway on your preferred datacenter platform.	Choose the profile for the Cisco Crosswork Data Gateway VM (i.e., Standard, Standard with Extra Resources or Extended). See <a href="#">Mandatory deployment type for Crosswork Data Gateway</a> for more information and install as per your preferred method: <ul style="list-style-type: none"> <li>• <b>VMware:</b> <ul style="list-style-type: none"> <li>• <i>Using vSphere:</i> <a href="#">Install Cisco Crosswork Data Gateway Using vCenter vSphere Client</a></li> <li>• <i>Using OVF tool:</i> <a href="#">Install Cisco Crosswork Data Gateway Via OVF Tool</a></li> </ul> </li> <li>• <b>AWS EC2:</b> <ul style="list-style-type: none"> <li>• <i>Using CloudFormation template:</i> <a href="#">Install Crosswork Data Gateway on Amazon EC2 using CloudFormation Template</a></li> <li>• <i>Manual Installation:</i> <a href="#">Install Crosswork Data Gateway on Amazon EC2 Manually</a></li> </ul> </li> </ul> <p><b>Note</b> When entering the parameters for deployment, ensure that you add the correct parameters. If the parameter values are incorrect, you have to destroy the current Crosswork Data Gateway VM, create a new VM, and re-enroll the new VM with Cisco Crosswork.</p>
6. Complete the Crosswork Data Gateway post-installation tasks.	Follow the steps in <a href="#">Crosswork Data Gateway Post-installation Tasks</a> .
7. Verify that the Crosswork Data Gateway VM has enrolled successfully with Cisco Crosswork.	Follow the steps in <a href="#">Cisco Crosswork Data Gateway Authentication and Enrollment</a> . After verifying that the Crosswork Data Gateway VM has enrolled successfully with Cisco Crosswork, set up the Crosswork Data Gateway for collection by creating a Crosswork Data Gateway pool. See Section: <i>Create a Crosswork Data Gateway Pool</i> in the <a href="#">Cisco Crosswork Infrastructure 4.4 and Applications Administration Guide</a> . <p><b>Note</b> If you plan to install multiple Cisco Crosswork Data Gateway VMs due to load or scale requirements or you wish to leverage Cisco Data Gateway High Availability, we recommend that you install all the Crosswork Data Gateway VMs first and then proceed with adding them to a Data Gateway pool.</p>

Step	Action
8. Install the Crosswork Applications	<p>Follow the steps in <a href="#">Install Crosswork Applications</a>.</p> <p><b>Important</b> If you intend to use the Crosswork Network Controller solution (Essential or Advantage), install Crosswork Cluster and Crosswork Data Gateway, and then install the Crosswork applications in the following sequence:</p> <ol style="list-style-type: none"><li>1. Crosswork Optimization Engine</li><li>2. Crosswork Active Topology</li><li>3. Crosswork Service Health (only available in Advantage bundle)</li><li>4. Cisco Element Management System (EMS) Services (only available in Advantage bundle)</li></ol> <p>Crosswork Change Automation, Crosswork Health Insights, and Crosswork Zero Touch Provisioning can be installed independently in any order and do not require any other application to be installed prior.</p>

