

# Cisco Software-Defined WAN (SD-WAN)



## What is the Cisco SD-WAN solution?



Traditional Wide Area Networks (WAN) have been designed using MPLS for connectivity, where the majority of branch office traffic flows within an enterprise's intranet boundary. However, new cloud applications (SaaS) like Microsoft Office 365 and Salesforce.com, and public cloud services (IaaS) like Amazon Web Services (AWS) and Azure are changing traffic patterns. Today, the majority of enterprise traffic flows to public clouds and the Internet. This change creates new requirements for security, application performance, cloud connectivity, WAN management, and operations

Cisco® SD-WAN offers an entirely new way to manage and operate your WAN infrastructure. It is a cloud-based solution that delivers a secure, flexible, and rich services architecture. SD-WAN delivers the following key benefits:

- **Better user experience**—Deploy applications in minutes, on any platform, with a consistent user experience.
- **Greater agility**—Simplify the deployment and operation of your WAN, and get faster performance using less bandwidth. Deploy your WAN over any type of connection, such as MPLS, Internet, or 4G LTE.
- **Threat-centric security**—Securely connect your users to applications in minutes and protect your data from the WAN edge to the cloud.



## What problems does the Cisco SD-WAN solution help solve?



The Cisco SD-WAN solution solves many critical enterprise IT problems, including:

- Establishing a transport-independent WAN for lower cost and higher diversity
- Meeting Service-Level Agreements (SLAs) for business-critical and real-time applications
- Providing end-to-end segmentation for protecting critical enterprise compute resources
- Extending seamlessly into the public cloud
- Providing optimal user experience for SaaS and IaaS applications



## Who has deployed Cisco SD-WAN solution?



Cisco has one of the most widely deployed enterprise-grade SD-WAN solutions in the industry, with large deployments in retail, healthcare, financial services, energy, and many more sectors in both enterprise and managed-service provider infrastructures. The solution is deployed across Fortune 2000 enterprises with thousands of production sites in every major industry, including healthcare, manufacturing, retail, energy, oil and gas, insurance, finance, government, logistics, and distribution as some examples.

## Q How do you manage and operate Cisco SD-WAN?

A Cisco SD-WAN is a centrally managed, orchestrated, and operated solution with a cloud-hosted Cisco vManage GUI management and provisioning platform, vSmart controller, and vBond orchestration layer at the heart of the solution.

**vSmart Controllers** are the centralized brain of the solution that implements policies and connectivity between SD-WAN branches. The centralized policy engine in Cisco vSmart Controllers provides policy constructs to manipulate routing information, access control, segmentation, extranets, and service chaining.

The **vBond Orchestrator** facilitates the initial bring-up by performing authentication and authorization of all elements into the network. Cisco vBond Orchestrator also provides the information on how each of the components connects to other components. Cisco vBond Orchestrator plays an important role in facilitating Cisco SD-WAN devices that sit behind the Network Address Translation (NAT) to communicate with the network.

The entire solution is managed with **Cisco vManage**, Cisco's GUI-based centralized management and provisioning platform for day 0, day 1, and day n+ for the entire Cisco SD-WAN infrastructure. You can login to the Cisco vManage dashboard to centrally manage the WAN. Cisco vManage provides the ability to manage all aspects of the WAN—from provisioning, monitoring, and upgrading routers to application visibility and troubleshooting the WAN.

## Q How is Cisco SD-WAN deployed at branch offices and data center network or regional hubs?

A Branch office and regional data center hub sites can be deployed and connected using either virtual or physical secure routers. Enterprise customers and service providers can gain rich services like WAN optimization and firewall or basic WAN connectivity for physical or virtual platforms across the branch, WAN, or cloud as follows:

### Physical

- Branch-Cisco vEdge series routers
- Branch-Cisco 1000 Series Integrated Services Routers (ISR)
- Branch-Cisco 4000 Series ISR
- Branch/regional hub/data center -Cisco ASR 1000 Series Aggregation Services Routers (ASR)

### Virtual

- SD-Branch-Cisco 5000 Series Enterprise Network Compute System (ENCS) and Integrated Services Virtual Router (ISRV)
- Networkhub/colocation/data center -Cisco Cloud Services Platform 5000 and Cloud Services Router 1000V (CSR 1000V)

### Public Cloud (IaaS)

- Amazon Web Services
- Microsoft Azure
- Google Cloud Platform

For a list of SD-WAN-capable Cisco IOS-XE platforms and details, see the [SD-WAN Release Notes](#).

## Q Is the Cisco SD-WAN solution secure?

A Cisco is bridging networking and security together like no other vendor. With Cisco SD-WAN we provide highly effective and scalable security that is easy to manage, deploy, and maintain, empowering businesses to adopt the latest cloud services with confidence.

Cisco SD-WAN is built based on the zero-trust model and multilayer security encrypts all data for protection from the WAN edge to the cloud. All of the Cisco SD-WAN components mutually authenticate each other and all of the edge devices are authorized before they are allowed into the network. Every packet across data plane, control plane, and management plane that flows through the network is encrypted using Secure Socket Layer (SSL) and IPsec Security (IPsec) technologies. The Cisco SD-WAN solution has differentiated integrated capabilities to build a large-scale IPsec network across tens of thousands of branches.

**Q Does the Cisco SD-WAN solution support network segmentation and what are the benefits?**

**A** Yes, the Cisco SD-WAN solution supports network segmentation. Segmentation provides secure logical isolation on the SD-WAN network, where each segment is defined as a separate VPN and controlled centrally by access-control policies. Some of the benefits of segmentation:

- Increased security—Isolate your network from outside attackers and create secure separation within multiple application segments.
- Acquisitions can be integrated on the parent network and yet kept separate. Policies control what applications the acquired company can access.

- Guest Wi-Fi can be maintained on a separate, low-priority segment and offloaded onto the Internet at the closest exit points.
- Business partners can each be defined on a separate segment, or on a collective business-partner network segment. Policies control the access of business partners to data-center applications.

For more information, see the [Segmentation \(VPN\) Overview](#).

**Q What are the SD-WAN security capabilities and which platforms support SD-WAN security?**

**A** Cisco SD-WAN Security capabilities include an application-aware enterprise firewall, intrusion prevention, DNS layer enforcement (Cisco Umbrella™), and URL filtering. Cisco SD-WAN reduces complexity by having a single management interface (vManage) for both the network and security.

Platform support for SD-WAN security is as follows:

Platform	Enterprise firewall	Enterprise firewall application-awareness	Intrusion prevention system	URL filtering	DNS web layer security (Umbrella)
Cisco vEdge 100, 1000, 2000, and 5000 series	Yes	DPI using Qosmos	X	X	Yes
Cisco CSR	Yes	Yes	Yes	Yes	Yes
Cisco ISRV/ ENCS 5000 series	Yes	Yes	Yes	Yes	Yes
Cisco 4451, 4351, 4331, 4321, and 4221ISRs	Yes	Yes	Yes	Yes	Yes
Cisco 1111X-8PISR	Yes	Yes	Yes	Yes	Yes
Cisco 1111-4P, 1111-8P, 1116-4P, and 1117-4PISRs	Yes	Yes	X	X	Yes
Cisco ASR 1001-HX, 1002-HX, 1001-x, and 1002-X=	Yes	Yes	X	X	Yes

**Q Can the Cisco SD-WAN solution provide insight into threats in encrypted traffic, without the need for decryption?**

**A** Encrypted Traffic Analytics (ETA) for the Cisco SD-WAN solution is not currently supported but is planned to be introduced in the future. For more information on ETA, see: <https://www.cisco.com/c/en/us/solutions/enterprise-networks/enterprise-network-security/eta.html>.

**Q Can the Cisco SD-WAN solution provide optimization for IaaS and SaaS platforms like AWS, Microsoft Azure and Office 365, Google, Salesforce.com, Cisco Webex®, etc?**

**A** The Cisco SD-WAN fabric connects users at the branch to applications in the cloud in a seamless, secure, and reliable fashion. Cisco delivers this comprehensive capability for Infrastructure-as-a-Service and Software-as-a-Service (IaaS/SaaS) applications with Cisco Cloud OnRamp, and is currently available with vEdge series platform SD-WAN solutions.

With Cloud OnRamp, the SD-WAN fabric continuously measures the performance of a designated application through all permissible paths from a branch (i.e. MPLS, Internet, and 4G LTE). The Cisco SD-WAN fabric automatically makes real-time decisions to choose the best-performing path between the end users at a remote branch and the cloud application. Enterprises and service providers have the flexibility to deploy this capability in multiple ways and according to business needs and security requirements.

For more information see: [https://www.cisco.com/c/m/en\\_us/solutions/enterprise-networks/sd-wan/infographics/cloud-onramp-for-saas.html](https://www.cisco.com/c/m/en_us/solutions/enterprise-networks/sd-wan/infographics/cloud-onramp-for-saas.html).

**Q What is the difference between Cisco SD-WAN and Cisco Meraki® SD-WAN?**

**A** Cisco SD-WAN can help your business no matter its size with a variety of deployment options, providing for Lean IT operations (Meraki) and for full-featured enterprise deployments with Cisco vEdge, 1000 and 4000 ISRs, ASR 1000, ENCS5000, and Cloud Service Platform 5000 platforms.

- Lean IT-Deploy Cisco SD-WAN powered by the Meraki MX UTM hardware and enjoy a unified, secure SD-WAN for businesses with lean IT teams.
- Branches and campuses-With both physical and virtual options, you can deploy Cisco SD-WAN on Cisco vEdge, CSR, 1000 and 4000 ISRs, or with Network Functions Virtualization (NFV) using Cisco SD-Branch with the ISRv on the ENCS 5000 and Cisco UCS®-E platforms.
- Headquarters, datacenter, colocation-With physical or virtual options, deploy Cisco SD-WAN on Cisco ASR 1000 routers or with Network Functions Virtualization (NFV) and networkhub solutions on the Cloud Services Platform 5000 platforms.

**Q How is the Cisco SD-WAN solution ordered?**

**A** Cisco SD-WAN software is included with each vEdge series routing device and platform and can be enabled on some 1000 and 4000 ISRs, ASR 1000Series Routers, the Cisco ISRv on the ENCS 5000, and with the Cisco CSR 1000V on the Cloud Services Platform 5000 Series with the latest Cisco IOS-XE software. For a list of SD-WAN-capable Cisco IOS-XE platforms, see the [SD-WAN Release Notes](#).

Each device requires a subscription license (three or five years) for Cisco SD-WAN software. The license fees are charged per branch device. The license fee is dependent on service bandwidth and feature content, with a single set of software licenses that includes security and access to ongoing innovation and the latest threat intelligence. License bundles include:

- **DNA Essentials**-includes basic connectivity, security, and application visibility
- **DNA Advantage**-includes everything in DNA Essentials plus flexible connectivity, advanced security, and enhanced application visibility
- **DNA Premier** (replaces Cisco ONE DNA Advantage)-includes everything in DNA Essentials and DNA Advantage plus advanced application policy and experience using analytics and assurance and WAN optimization

The subscription price of SD-WAN software includes cloud-hosted vManage, vSmart and vBond devices, 24-hour daily Cisco SD-WAN support, next-day hardware replacement for Cisco SD-WAN platforms, software upgrades on all components, and the cost of hosting Cisco SD-WAN controllers in the Cisco SD-WAN cloud.

For more information, see: <https://www.cisco.com/c/en/us/products/software/one-wan-subscription/index.html>.

**Q Are the Cisco DNA subscription licenses portable and able to be moved to another hardware platform?**

**A** Yes, the DNA software licenses are portable and can be moved across routing platforms, including 1000 and 4000 Series ISRs, ASR 1000, ENCS 5000, and CiscoEdge series routers. With software portability you have investment protection for your licenses regardless of which Cisco routing platform you choose now or want to upgrade to in the future.

For more information, see: [https://www.cisco.com/c/dam/en\\_us/about/doing\\_business/legal/policy/Software\\_License\\_Portability\\_Policy\\_FINAL.pdf](https://www.cisco.com/c/dam/en_us/about/doing_business/legal/policy/Software_License_Portability_Policy_FINAL.pdf).

**Q Does the Cisco SD-WAN solution support multi-tenancy?**

**A** Yes, a service provider can manage multiple customers, called tenants, from vManage that is running in multitenant mode. All tenants share a single vBond orchestrator. All tenants share the service provider's domain name, with each tenant having a subdomain name to identify the tenant. For example, the service provider, fruit.com, might manage the tenants, mango (mango.fruit.com) and plum (plum.fruit.com). For each tenant, you configure one or more vSmart controllers and vEdge routers the same way that you configure these devices on a single-tenant vManage Network Management System (NMS).

For more information see: [https://sdwan-docs.cisco.com/Product\\_Documentation/Getting\\_Started/Viptela\\_Overlay\\_Network\\_Bringup/03Deploy\\_the\\_vManage\\_NMS/07Create\\_a\\_Multitenant\\_vManage\\_NMS](https://sdwan-docs.cisco.com/Product_Documentation/Getting_Started/Viptela_Overlay_Network_Bringup/03Deploy_the_vManage_NMS/07Create_a_Multitenant_vManage_NMS).



**Is Cisco's SD-WAN solution programmable and does it support APIs?**



Yes, the Cisco SD-WAN solution is open and programmable and with open APIs, Cisco SD-WAN provides service providers and partners the opportunity to create new and unique services, including operational and business support systems. With Cisco SD-WAN you can access the available Representational State Transfer (REST) APIs, create API calls, obtain device and interface information using code, pass parameters and write applications, and work on innovative solutions.

As part of the SD-WAN developer resources availability and learning content, there are two additional resources that are a great value-added service for developers:

- **DevNet Ecosystem Exchange** makes it easy to find and share an application or solution built for Cisco platforms. Business leaders and developers alike can use this online portal to discover partner solutions that span all Cisco platforms and products. Currently, this central repository for developers contains over 1300 solutions.
- **DevNet Code Exchange** gives developers a place to access and share software to quickly build next-generation applications and workflow integrations. It offers a curated list of sample code, adaptors, tools, and SDKs available on GitHub and written by Cisco and the DevNet community. Code Exchange spans Cisco's entire portfolio and is organized according to Cisco platform and product areas.

For more information, see the SD-WAN Developer Center at: <https://developer.cisco.com/sdwan>.

**Q** **Are there any services available to support my SD-WAN solution?**

**A** Regardless of where you are in your journey, Cisco Services offers a full lifecycle of services to support you transition. Our portfolio allows you to create a roadmap for success, speed deployment and maximize network performance, security, uptime and efficiency. Cisco experts will help you build your in-house IT expertise and effectively migrate and manage your SD-WAN solution to achieve high service levels at lower costs. [Learn more.](#)

**Q** **Where can I find more information on Cisco SD-WAN?**

**A** For more information about Cisco SD-WAN, visit: <https://www.cisco.com/go/sd-wan>