The Cisco® SD-WAN solution offers a complete SD-WAN fabric with centralized management and security built in, creating a secure overlay WAN architecture across campus, branch, and data center and multicloud applications. The software solution runs on a range of SD-WAN routers across hardware, virtual, and cloud form factors.

Cisco SD-WAN builds on the architecture called Secure Access Service Edge (SASE). WAN security and features today must be distributed, cloud-based, flexible, and agile. Cisco SD-WAN is the industry's first fully integrated SASE offering that combines best-in-class SD-WAN with the cutting-edge Cisco Umbrella® cloud security portfolio.

Solution overview

Cisco SD-WAN provides a flexible architecture to extend SD-WAN to any environment (Figure 2). The solution automatically discovers, authenticates, and provisions both new and existing Cisco SD-WAN devices.
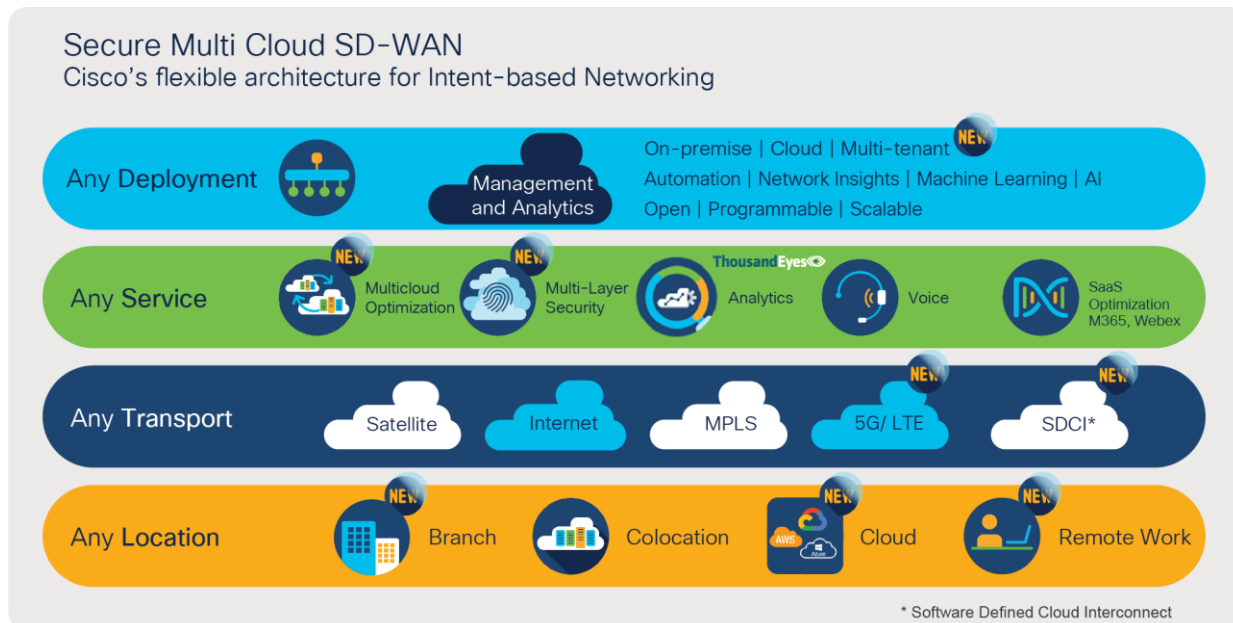
Figure 1.
The Cisco SD-WAN secure, cloud-scale architecture

The Cisco SD-WAN dashboard (Figure 1) connects all company data centers, core and campus locations, WAN branches, colocation facilities, cloud infrastructure, and remote workers. Using the Overlay Management Protocol (OMP), Cisco SD-WAN provides centralized control over the entire network. It simplifies IT operations with automated provisioning, unified policies, and streamlined management to help ensure rapid updates and resolutions, and provides advanced network functionality, reliability, and security.
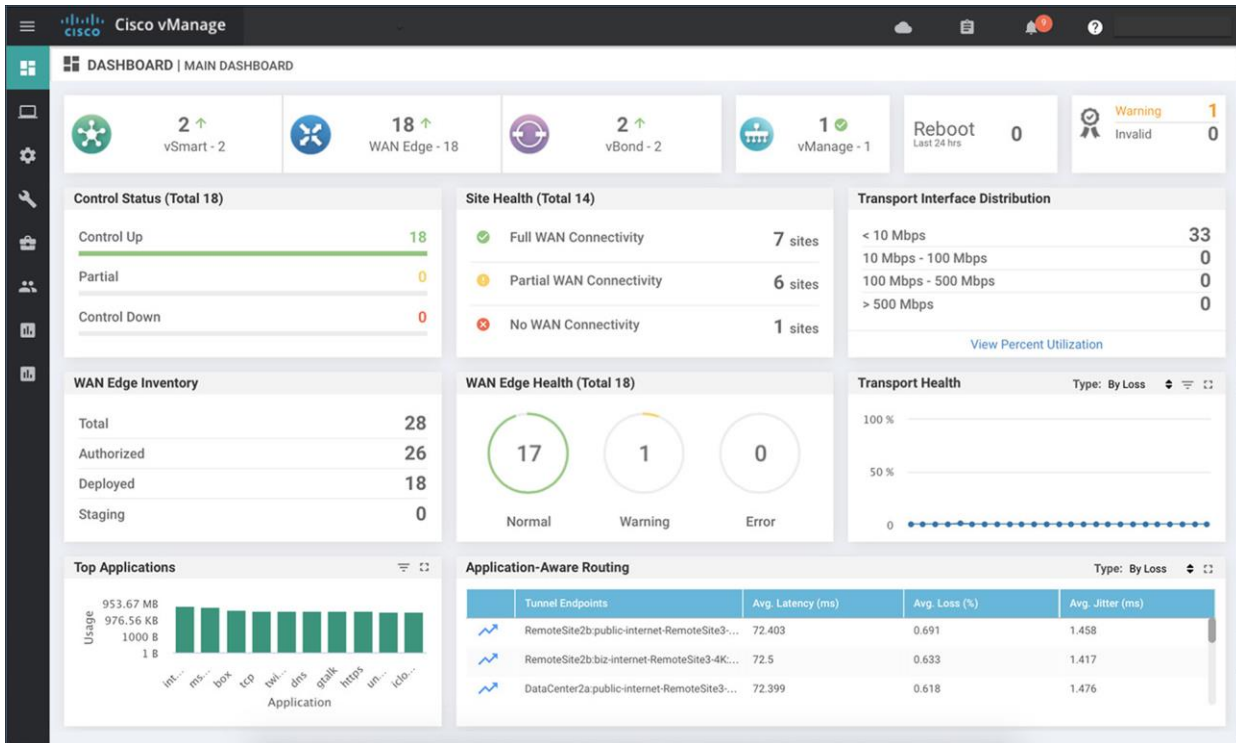
Figure 2.
The Cisco SD-WAN dashboard

After connecting to Cisco SD-WAN, each network device can find the best path to the applications that reside in the data center or multicloud. Cisco SD-WAN can use any transport method (satellite, broadband, Multiprotocol Label Switching [MPLS], 5G/LTE) from any location (core, edge, cloud) for any network service (security, application Quality of Experience [QoE], voice). Through OMP, Cisco SD-WAN supports both common and advanced routing protocols that are necessary for managing networks across the WAN and cloud, such as Border Gateway Protocol (BGP), Enhanced Interior Gateway Routing Protocol (EIGRP), Equal-Cost Multipath (ECMP) routing, Open Shortest Path First (OSPF), Virtual Router Redundancy Protocol (VRRP), and IPv6. Cisco SD-WAN provides this flexibility in both full and partial mesh encrypted deliveries, allowing maximum customization based on business needs.

Features and benefits

Feature	Benefit
Full SD-WAN feature stack with unified communications	Provides sophisticated control of the network with a set of features for routing, unified communications, multicloud, security, and centralized policy control and management.
Multicloud choice and control	Enables a range of optimization for multicloud applications using the Cisco SD-WAN Cloud OnRamp architecture. It optimizes major Software-as-a-Service (SaaS) applications and workflow integrations to major public clouds and colocation providers.
Security that is built in, not bolted on	Enables centralized security policies and provides segmentation across the entire network and a full security stack, either on-premises or in the Cisco Umbrella cloud (Figure 3). Instantly deploy the right security in the right place, all from a single dashboard.
Visibility and analytics	Provides granular visibility into applications and infrastructure, enabling rapid failure correlation and mitigation.
Maximum choice and control	Offers flexibility with a cloud-first architecture to connect any user to any application, across any cloud.

Prominent features

Best-in-class technology innovation

- Fully integrated security everywhere

  ◦ Built-in security or cloud security with Cisco Umbrella Secure Internet Gateway (SIG)

  ◦ Routing intelligence and threat intelligence on a certified trustworthy infrastructure

  ◦ Integrated auto-registration and auto-configuration of cloud-delivered Cisco Umbrella from SD-WAN

  ◦ Talos® security, enabling fast, industry-leading threat detection

  ◦ On-premises security with application-aware enterprise firewall, Snort® IPS, encryption, URL filtering, Malware Defense, and more

- True SD-WAN architecture

  ◦ Separate and dedicated components for the control plane, data plane, and management and orchestration of the WAN

  ◦ Flexibility to implement overlay, underlay, physical, and virtual networks

  ◦ Voice and unified communications support

  ◦ IPv6 support (BGP, OSPF)

- Robust IP multicast support

  ◦ Enables network traffic control, enhances efficiency by eliminating traffic redundancy, and reduces server and CPU loads

  ◦ Efficiently handles one-to-many or many-to-many communications

  ◦ Provides multicast capability across platforms (Protocol Independent Multicast Source-Specific Multicast [PIM-SSM], Internet Group Management Protocol [IGMP] v2, and IGMP v3)

- Enhanced application visibility[*]

  ◦ Integrated with Cisco ThousandEyes to bring end-to-end visibility into application delivery and network performance

  ◦ Extends end-to-end granular insights into network health and application performance with a full hop-by-hop analysis across the internet and cloud

  ◦ Isolates fault domains and provides actionable insights that drastically expedite troubleshooting and resolution, before users are affected

- Investment protection

  ◦ Leverages traditional transport protocols for the best application experience

  ◦ Allows you to simply upgrade existing Cisco routers with SD-WAN functionality if you prefer

[*]Available in Release 17.6 in Q3CY21.

- Flexible multicloud deployment options

  ◦ Cloud OnRamp for Multicloud

  ◦ Cloud OnRamp for SaaS (with Cisco IOS® XE support)

  ◦ Cloud OnRamp for Colocation

  ◦ Cloud OnRamp for Cloud Interconnect

  ◦ Cloud OnRamp for Cloud Hub

Software feature matrix

Category	Description
Authentication, Authorization, and Accounting (AAA)	TACACS+, RADIUS, local, role-based access control
Routing	OSPF, external BGP (eBGP), internal BGP (iBGP), EIGRP, ECMP, static, connected, OMP
Bridging	802.1Q, native VLAN, bridge domains, Integrated Routing and Bridging (IRB), host-mode bridging
Security	Built-in security: Intrusion prevention system, web security, enterprise firewall, Malware Defense, Next-Generation Antivirus (NGAV), URL filtering, and SSL inspection Cloud security (Cisco Umbrella): Web security with SSL proxy, DNS-layer enforcement, URL filtering, Cloud Access Security Broker (CASB), and enterprise firewalls. Read more: https://learn-umbrella.cisco.com/i/1153736-cisco-umbrella-secure-internet-gateway-sig-essentials/0? Device- and network-level security: Zero trust, segmentation, whitelisting, tamper-proof module, Datagram Transport Layer Security (DTLS)/TLS, IPsec, ESP-256-CBC, authentication header, HMAC-SHA1, Distributed Denial-of-Service (DDoS) protection, control plane protection, Network Address Translation (NAT) traversal
Unified communications	SIP, Public Switched Telephone Network (PSTN) voice and fax support, Survivable Remote Site Telephony (SRST), 911 calling, conferencing, Cisco Unified Communications Manager, Webex Calling
Application/WAN optimization	FEC and packet duplication for User Datagram Protocol (UDP), TCP optimization, Cloud OnRamp optimization for SaaS applications
Multicloud and colocation	Public cloud integrations into AWS, Azure, and Google Cloud Cloud OnRamp optimization for SaaS applications Cloud OnRamp for Colocation
Cloud Interconnect and Cloud Hub	Optimized Connectivity with Cloud OnRamp for Cloud Hub and Cloud Interconnect

Category	Description
Application visibility[*]	Cisco ThousandEyes is natively integrated with eligible Cisco Catalyst 8200 and 8300 Series platforms and 4000 Series Integrated Service Routers (ISR) with a minimum 8 GB DRAM and 8 GB bootflash/storage. Additional memory and storage will be necessary for concurrently running the ThousandEyes agent with containerized SD-WAN security services
Forwarding and Quality of Service (QoS)	Classification, prioritization, low latency queuing, remarking, shaping, scheduling, policing, mirroring, NAT/Port Address Translation (PAT)
Multicast	Internet Group Management Protocol (IGMP) v1/v2/v3, Protocol Independent Multicast (PIM), Auto-RP, scale-out traffic replication
Policy	Route policies, app-aware routing, control policy, data policy, Access Control List (ACL) policy, VPN membership policy
Location services	Route policies, app-aware routing, control policy, data policy, ACL policy, VPN membership policy
Cellular	Integrated 4G/LTE modem on some devices
Mobility	Wi-Fi 802.11a/b/g/n/ac, WPA2-Enterprise, WPA2-Personal, MAC filtering, 8 SSIDs per radio, 802.11i security enhancement and 802.11e QoS, wireless intrusion detection and protection
System and network services	IPv4, Simple Network Management Protocol (SNMP), Network Time Protocol (NTP), DNS client, Dynamic Host Configuration Protocol (DHCP) client, DHCP server, DHCP relay, configuration archival, syslog, Secure Shell (SSH), Secure Copy (SCP), NAT/PAT, Cflowd v10 IPFIX export
Configuration and monitoring	NETCONF over SSH, Command-Line Interface (CLI), REST (vManage), Linux shell
Out-of-band management	Management port (vEdge 1000, vEdge 2000, vEdge 5000), serial console port (vEdge 1000, vEdge 2000, vEdge 5000), USB console port
Cisco TrustSec®	Defined segmentation - policy through security groups. Open through IETF, available within OpenDaylight SDN controller and supported on third-party platforms

[*]Available in Release 17.6 in Q3CY21.

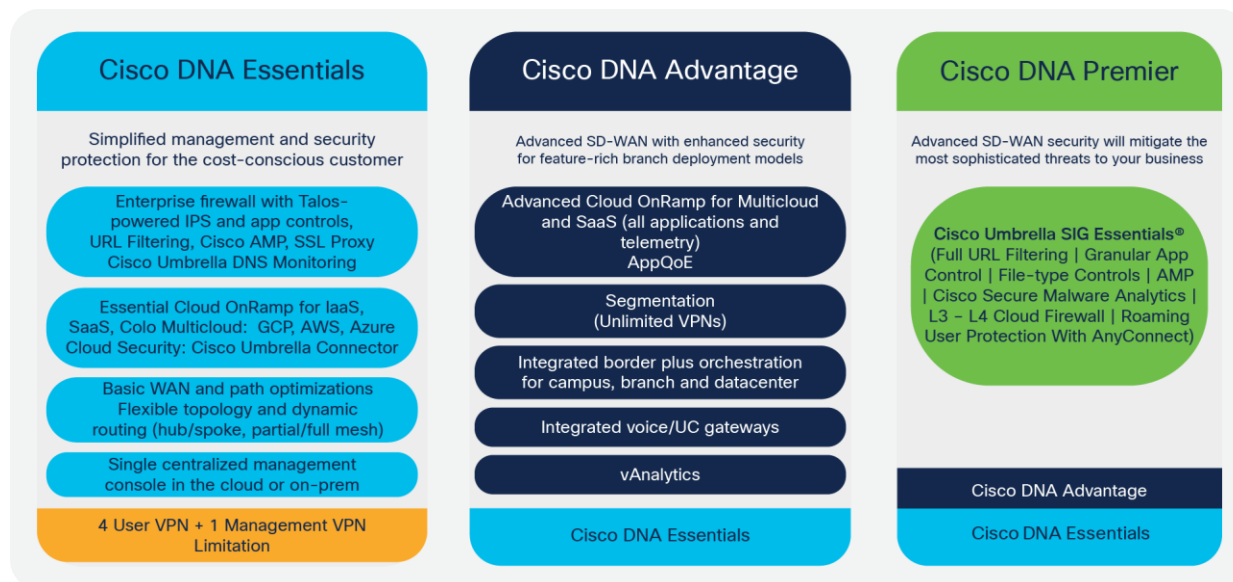## Licensing

Cisco DNA Software for SD-WAN and Routing

Cisco DNA Software subscription licensing offers three feature tiers: Cisco DNA Essentials, Cisco DNA Advantage, and Cisco DNA Premier. These are nested SKUs and represent good, better, and best offers. All are available as a 3-year or 5-year subscription and have bandwidth tier options. Cisco DNA Advantage is also available as a 7-year subscription.

Benefits:

- The latest innovations through simple subscription tiers
- Available across the portfolio
- Flexibility to choose on-premises or cloud management
- Easy license portability across on-premises and cloud
- Easy upgrade across tiers
- Software Support Service (SWSS) included

For more information on Cisco DNA Software subscriptions, go to:
https://www.cisco.com/c/m/en_us/products/software/sd-wan-routing-matrix.html?oid=otren019258

Figure 3.
Cisco DNA Software subscription licensing for SD-WAN and routing

For more information, review the Cisco DNA Software for SD-WAN and Routing Ordering Guide.

Note: Other buying programs are available, including Enterprise Agreements (EA) and Managed Service Licensing Agreement (MSLA). A Cisco Enterprise Agreement provides a simpler way to manage licenses and reduces costs, and a single agreement covers the purchase of software and subscription licenses as well as application software support. The MSLA helps partners align business costs with a subscription-based model for their customers.

Cisco ThousandEyes[*]

A valid ThousandEyes agent license is required to activate the ThousandEyes agent. Existing ThousandEyes subscriptions can be leveraged on Cisco Catalyst 8200 and 8300 platforms and 4000 Series ISRs. For additional ThousandEyes subscription information, go to https://www.thousandeyes.com/signup/?utm_source=Cisco&utm_medium=referral&utm_campaign=Cisco SD-WAN

[*]Available in Release 17.6 in Q3CY21.

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For more information

See how Cisco SD-WAN can help you move faster, lower costs, and reduce risk: https://cisco.com/go/sdwan.