



ExtremeCloud™ SD-WAN

Business Outcomes

- **Improved User Experience**

ExtremeCloud SD-WAN supports your specific performance requirements for critical applications in site-site and site-cloud traffic scenarios using features like automatic application detection, performance conditioning and dynamic WAN selection.

- **Automated and scalable security**

ExtremeCloud SD-WAN helps you protect your sites with multiple choices of security ranging from an in-built zone-based firewall to advanced FWaaS using EdgeSentry, or integration with leading cloud security vendors – Palo Alto Networks, Zscaler, or Symantec.

- **Centralized and Integrated Solution**

ExtremeCloud SD-WAN helps keep everything simple by providing you with a unified solution that helps you manage your wired, wireless and SD-WAN from one platform

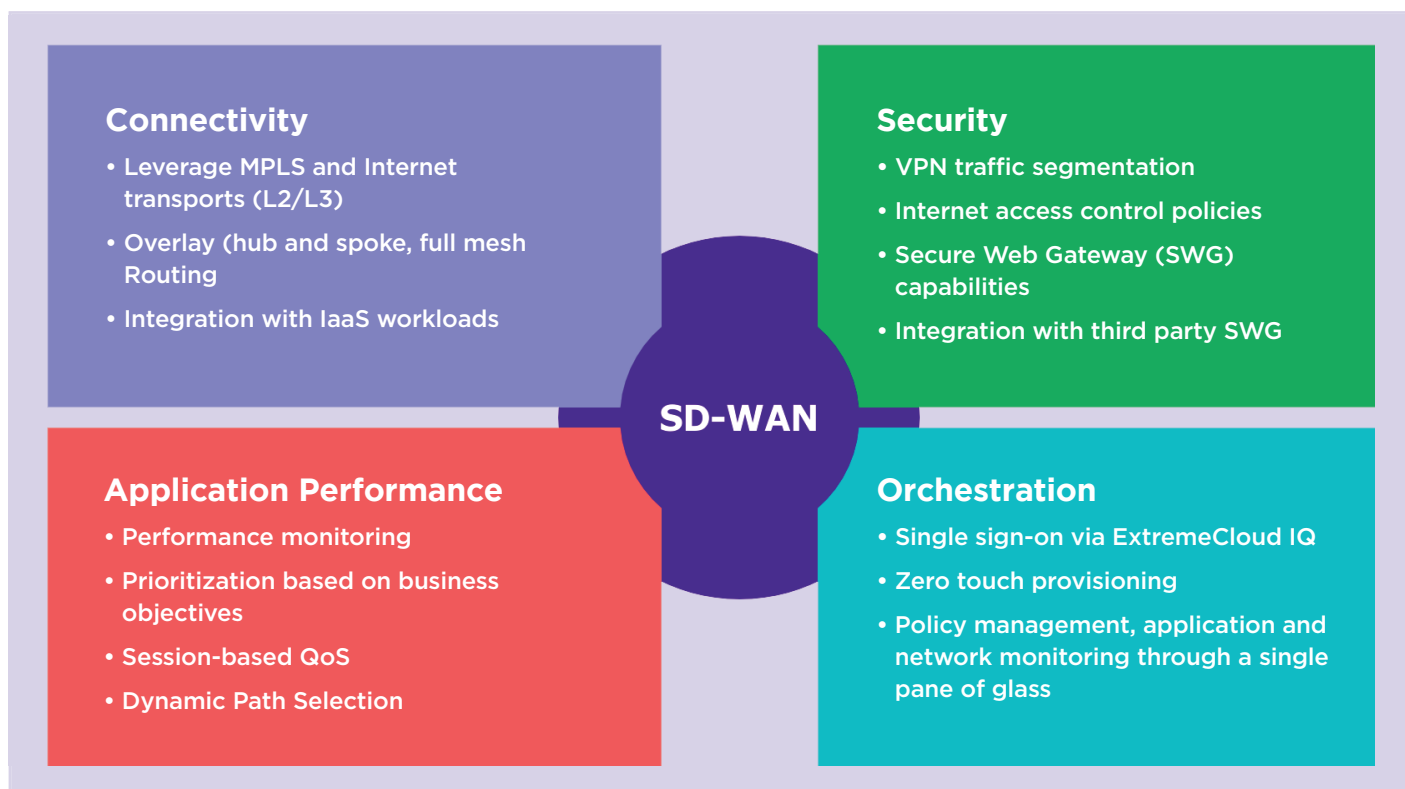
ExtremeCloud SD-WAN helps you become an Infinite Enterprise, enabling your employees, customers, and partners access applications regardless of location while removing complexity from the network.

ExtremeCloud SD-WAN unifies networking and security operations through simple-to-use management seamlessly integrated into ExtremeCloud. With ExtremeCloud SD-WAN, you can securely connect your sites – branch, campus, data center – to each other and the cloud while optimizing application performance.

ExtremeCloud SD-WAN is an all-inclusive subscription-based solution, providing:

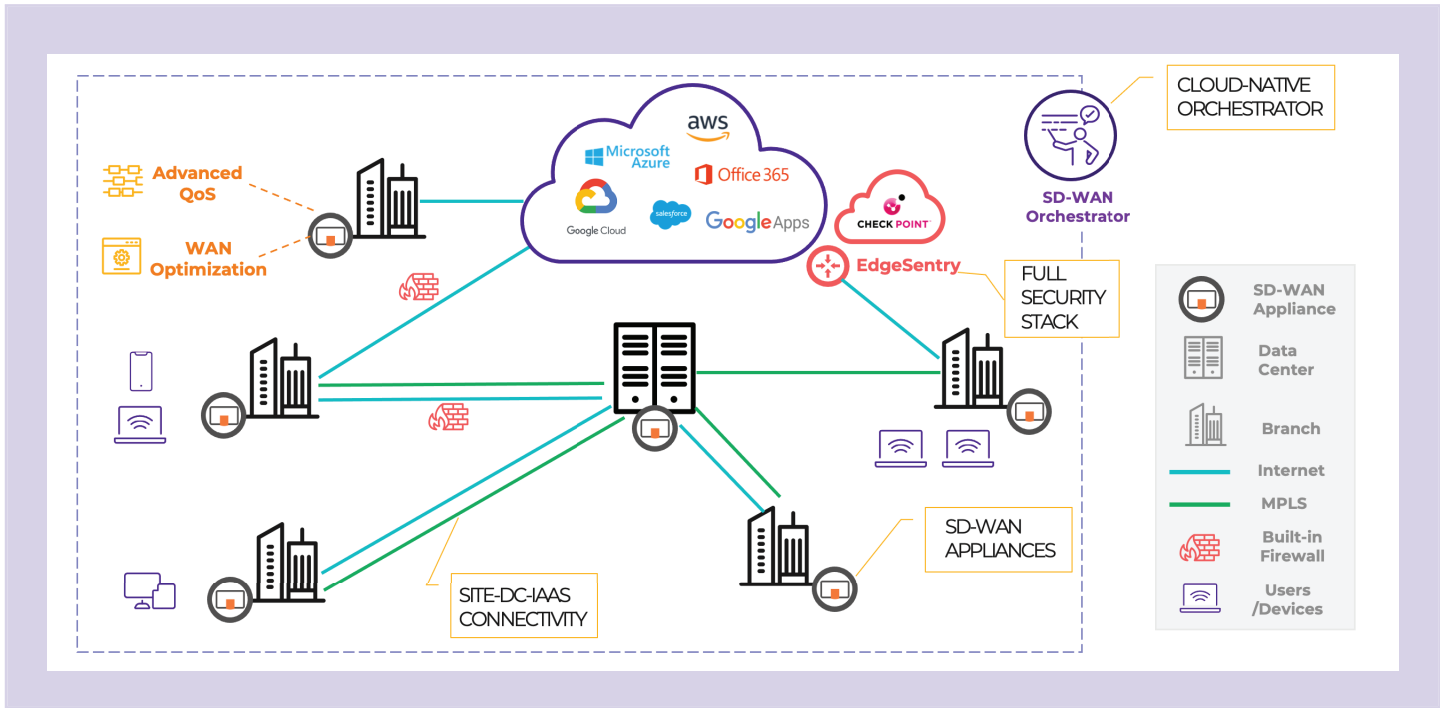
- **Superior economics:** Reduce total cost of ownership (TCO) as you build your SD-WAN from ground up, quickly. Our simplified package includes the appliance, support and maintenance, and customer success in addition to the SD-WAN service.
- **Unified management and secure networking:** ExtremeCloud simplifies and provides unified management for your wired, wireless, and SD-WAN network. A range of built-in and cloud-based security options are available to protect users and applications
- **Exceptional application performance:** Deliver quality user experience for site-to-site and site-to-cloud traffic scenarios, detect applications automatically, and apply performance-based dynamic WAN selection. Improve site resiliency with support for high availability and multiple WAN connections on SD-WAN appliances.
- **Continuous support:** Customer Success teams help you achieve strategic goals and targeted business outcomes.

ExtremeCloud SD-WAN can be configured to meet your network needs. The Enterprise Package is designed to cover basic SD-WAN functionality and is complemented by a range of Add-on Packages, delivering advanced networking features (e.g., Advanced Security, WAN Optimization, Enhanced Reporting to name a few).



ExtremeCloud SD-WAN closely integrates a key set of solution components:

- ExtremeCloud SD-WAN Orchestrator is cloud-hosted and part of ExtremeCloud IQ, providing a single pane of glass for configuration and policy definition across your wired, wireless and WAN. Policy includes configuration of SD-WAN appliances, SD-WAN topology, security profiles and multi-cloud on-ramp rules. In addition, you can configure end-to-end Quality of Experience (QoE) policy and application performance reporting.
- SD-WAN appliance offers a range of deployment modes (routed, route/bridge hybrid, bridge) and site resiliency features designed to deliver a risk-free SD-WAN technology introduction.
- Site-DC-IaaS connectivity established over any WAN transport, creating flexible secure overlay topologies including hub and spoke and full mesh or remote connections to public clouds; the Proprietary Dynamic WAN Selection algorithm is used to distribute traffic across different transport networks, based upon the Experience Quality Score (EQS) driven by application performance.
- Layered security stack featuring a Zone-Based Firewall used for VPN traffic segmentation and Internet traffic steering (direct to internet, backhauling in DC, web gateways) and cloud-based advanced networking platform EdgeSentry (powered by Check Point) designed to bolster site-based security using FWaaS and SWG including Web filtering, HTTPs inspection, data loss prevention, and more.
- Unrivaled application performance monitoring that analyzes all application flows that traverse the SD-WAN overlay, including layer 7. Our application performance algorithm enforces an advanced, end-to-end and per-session QoS across the entire SD-WAN.s; Application Performance specific data is immediately available for Customer analysis in the SD-WAN Orchestrator Reporting Module.



Overview of the ExtremeCloud SD-WAN Components

| | Features | Description |
|------------------|----------------------------------|--|
| Orchestration | Cloud-native | CCloud hosted and managed by Extreme Networks, integrated with ExtremeCloud IQ |
| | Secure communications | https, TLSv2, mutual authentication, secure device enrollment |
| | User Access Control | per user RBAC, suited for flexible delivery models, managed service vs DIY |
| | Azure hosted | Azure firewall, Azure security audit toolset, Azure resiliency implementation |
| | Integration | RESTful Alerting API |
| | Licensing | Subscription (flexible term) |
| SD-WAN Appliance | Zero Touch Provisioning | secure SD-WAN Appliance inventory, per device SN-based enrollment |
| | Branch Office Data Rate | 50Mbps-250Mbps |
| | Datacenter | 500Mbps-2Gbps |
| | High Availability | VRRP, OSPF, BGP, L2 proprietary synchronization |
| | Networking and Routing | DHCP client, DHCP relay, NAT, VLANs, BGP, OSPF, static routes, BFD, DPD, local preferences |
| | Physical Connectivity | GE 10/100/1000 base-T, 10G base SR/LR, optical, copper |
| Connectivity | Multiple Site deployment modes | Full-routed, bridge-routed hybrid, full-bridged |
| | Transparent L2 connectivity | Bridge mode, fail to wire (HW model dependent), Link State Propagation |
| | Automated Hub and Spoke topology | IPsec IKEv2, automatic tunnels setup between spokes and hubs |
| | Automated full-mesh topology | (Coming soon): automatic tunnels setup between Sites |
| | Custom Topologies | IPsec IKEv2, manual hub interconnection, manual site-to-site shortcut, manual site-to-iaaS |

| | Features | Description |
|-------------------------|---|---|
| Security | EdgeSentry (advanced Internet security) | IPsec IKEv2, Threat Prevention, Access control policies, HTTPS Inspection, logs and reporting, IPS, Antivirus, Antibot, powered by Check Point |
| | Direct to Internet | Stateful firewall, NAT, log export, local port forwarding |
| | Zone Based Firewall | L3 VPN segmentation, Internet Traffic policies with application granularity |
| | Compatibility with external WSG | IPsec IKEv2, ZScaler Internet Access, Symantec WSS, Palo Alto Prisma Access |
| Application Performance | Application recognition | 4000+ SaaS applications, DPI dictionary, custom L3-L7 applications definition |
| | Dynamic WAN Selection | Per session, based on network performance versus application-specific requirements and application criticality |
| | Control | Per session prioritization, based on application-specific requirements and application criticality |
| | Flexible reporting | Comprehensive dynamic reports from technical troubleshooting to business level governance, with flexible data retention period (Enhanced Reporting) |
| | WAN Optimization | Compression, SSL optimization |

SD-WAN Orchestrator

The Orchestrator is a cloud-hosted component of the ExtremeCloud SD-WAN, managing and operating the entire SD-WAN solution. It provides a single-pane-of-glass for both configuration and system management while offering visibility and reporting for usage and performance over the customer network. The orchestrator does not participate in traffic forwarding.

SD-WAN Appliance

The service is locally delivered by edge platforms (SD-WAN Appliances) deployed in the customer's premises.

These are proprietary hardware appliances deployed on site, between the SD-WAN devices and the LAN switch. SD-WAN Appliances are provided by Extreme as part of the ExtremeCloud SD-WAN solution.

Deployment modes include a broad range of options from a pure bridge mode (e.g., for Application Performance over MPLS use cases), to full SD-WAN router with comprehensive networking, routing, overlay and security capabilities, as well as a unique hybrid routed/bridge being a mix of both. A wide range of combinations of the above capabilities, applicable to a single site, is fully configurable from the orchestrator.

ExtremeCloud SD-WAN offers a range of SD-WAN appliances, presenting a common set of software capabilities, differentiated by performance metrics and connectivity capabilities. Appliances are specific to Enterprise Packages and divided into two primary usage groups based on the designation towards Branch or Data Center.

SD-WAN Appliance for Branch Offices - Technical Specifications

| Model | ipe-30so | ipe-30ax | ipe-40ax-v2 |
|-------------------------|--|-----------|--------------------------|
| WAN interfaces | 3x GE 10/100/1000Base-TX | | |
| LAN Interfaces | 1x GE 10/100/1000Base-TX | | 2x GE 10/100/1000Base-TX |
| Bypass (Fail-to-wire) | 1 interface pair | | 2 interface pairs |
| Link State Propagation | Yes | | |
| WAN Interface Operation | Bridged, Routed | | |
| Application Performance | Visibility, Control, Dynamic WAN Selection, Cloud Application Database (6000+ Applications) | | |
| WAN Optimization | Compression, Deduplication, incl. https | | |
| Network and Routing | IPv4: Static, BGP, BFD, local preferences, OSPF, DHCP Relay, DHCP Client, NAT | | |
| Security | Full Internet security (with EdgeSentry), Direct to Internet, Stateful Firewall, Zone Based Firewall, Web Security Gateways | | |
| Overlay | IPsec based, Full-mesh, automated Hub and Spoke topology with manual Spoke-to-Spoke and Hub-to-Hub shortcuts, external VPN Gateway support | | |
| High Availability | VRRP for routed mode, proprietary for hybrid and bridge mode | | |
| Recommended Users | up to 100 | up to 100 | up to 300 |

SD-WAN Appliance for DC - Technical Specifications

| Model | ipe-420ax | ipe-2000ax-T | ipe-2000ax-SR-10G ipe-2000ax-LR-10G |
|-------------------------|--|--------------------------|--|
| WAN interfaces | 3x GE 10/100/1000Base-TX | 3x GE 10/100/1000Base-TX | 3x GE 10GBase-SR/LR LC |
| LAN Interfaces | 2x GE 10/100/1000Base-TX | 2x GE 10/100/1000Base-TX | 2x 10GBase-SR/LR LC |
| Bypass (Fail-to-wire) | 2 interface pairs | | |
| Link State Propagation | Yes | | |
| WAN Interface Operation | Bridged, Routed | | |
| Application Performance | Visibility, Control, Dynamic WAN Selection, Cloud Application Database (6000+ Applications) | | |
| WAN Optimization | Compression, Deduplication, incl. https | | |
| Networking and Routing | IPv4: Static, BGP, BFD, local preferences, OSPF, DHCP Relay, DHCP Client, NAT | | |
| Security | Full Internet security (with EdgeSentry), Direct to Internet, Stateful Firewall, Zone Based Firewall, Web Security Gateways | | |
| Overlay | IPsec based, Full-mesh, automated Hub and Spoke topology with manual Spoke-to-Spoke and Hub-to-Hub shortcuts, external VPN Gateway support | | |
| High Availability | VRRP for routed mode, proprietary for hybrid and bridge mode | | |
| Recommended Users | up to 5000 | up to 50,000 | up to 50,000 |

Connectivity

ExtremeCloud SD-WAN provides full connectivity between your sites, Data Center and Infrastructure-as-a-Service (IaaS), with flexible topologies:

- An **automated hub and spoke** topology is available for customer sites in geographical proximity when site-to-site communications are not required and Multi-Cloud integration is not required.
- Customers can also integrate remote sites not equipped with SD-WAN Appliances by connecting **third party gateways** with their overlay network.
- **IaaS workloads integration** can also be achieved using site-to-IaaS connections.

All these overlay connectivity options implement IPsec to provide secure application traffic protection.

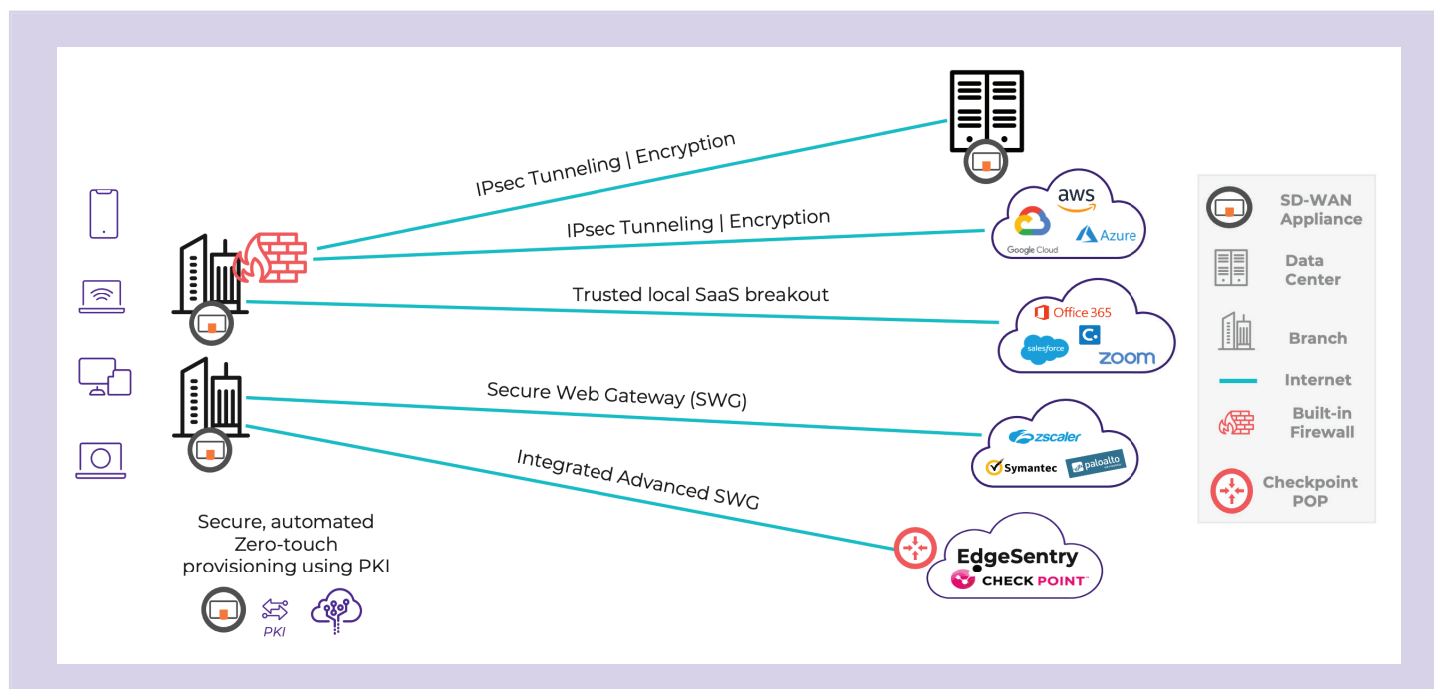
- In addition to the construction of secure overlays, ExtremeCloud SD-WAN can also leverage the existing MPLS connectivity in a fully transparent manner.

Depending on the deployment and configuration, the default gateway may either remain the existing configured router (using bridge capability of the SD-WAN Appliance) or become the SD-WAN Appliance.

ExtremeCloud SD-WAN **Dynamic WAN Selection** feature provides dynamic traffic steering across the different transports to ensure resilience, application performance and cost optimization by leveraging a mix of up to 3 transport networks (MPLS-MPLS, MPLS-Internet or Internet-Internet).

- Selection of the best network access for each application session to maximize application performance, continuity of service, and optimize network utilization.
- End-to-end characteristics of each available network (quality and bandwidth) are considered to determine in real-time the best access for each application session.
- Several selection strategies (fully automated, partially, or totally limited) in order to respect the various policies defined by each company.

Security



This mechanism operates under the control of the Application Performance feature (in charge of dynamic bandwidth allocation for Quality of Service) to better maintain performance of critical applications.

ExtremeCloud SD-WAN provides advanced security enforcement.

- **Zone-Based Firewall**, configured at the domain level, implements segmentation.
- **EdgeSentry** provides advanced Internet security, including web app control (https inspection), URL filtering, data loss prevention (DLP), intrusion protection system (IPS), malware protection/antivirus and sandboxing (threat emulation). This feature, powered by our partner **CheckPoint**, is delivered from the cloud and seamlessly integrates within the ExtremeCloud SD-WAN Orchestrator.
- ExtremeCloud SD-WAN also provides integration with **third party Web Security Gateways**.

Application Performance

Application Performance Monitoring (Visibility)

The ExtremeCloud SD-WAN System analyzes each packet by providing application recognition and measuring end- to-end performance with different network metrics such as packet loss, delay, jitter, and application metrics such as TCP RTT (Round Trip Time), TCP SRT (Server Response Time) and TCP retransmission rate.

Application Performance Guarantee (Control)

The ExtremeCloud SD-WAN system is goal oriented and dynamically allocates bandwidth for critical application sessions to support performance goals during periods network congestion.

The Application Control is a global, dynamic QoS solution at the session level. Each session, depending on its designated criticality and the presence of network congestion, is allocated the bandwidth necessary to achieve targeted performance.

When congestion occurs between sites, the SD-WAN appliances coordinate to protect critical applications.

Application Reporting

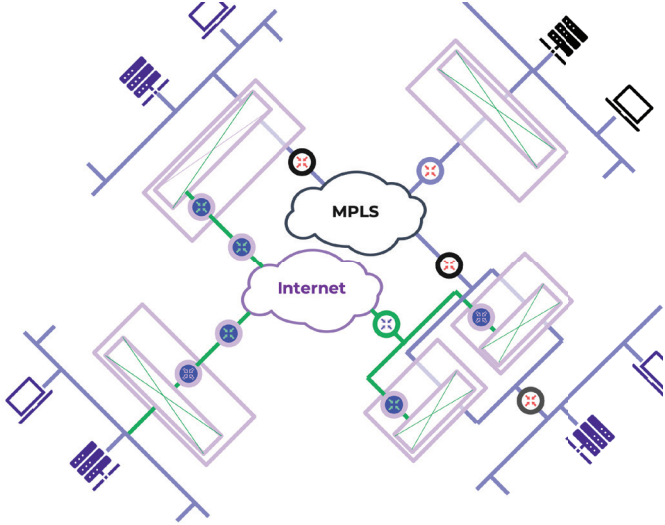
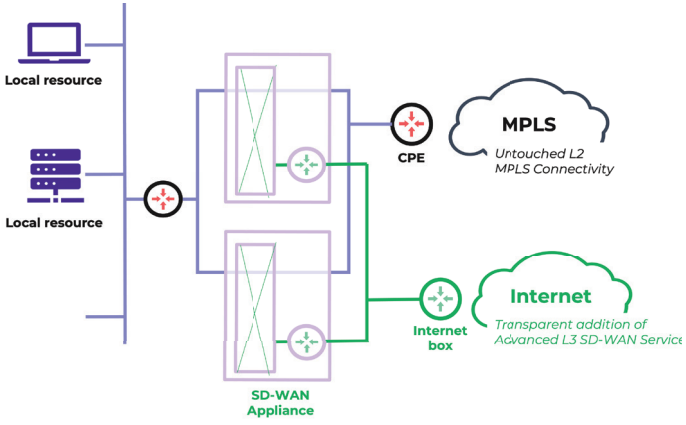
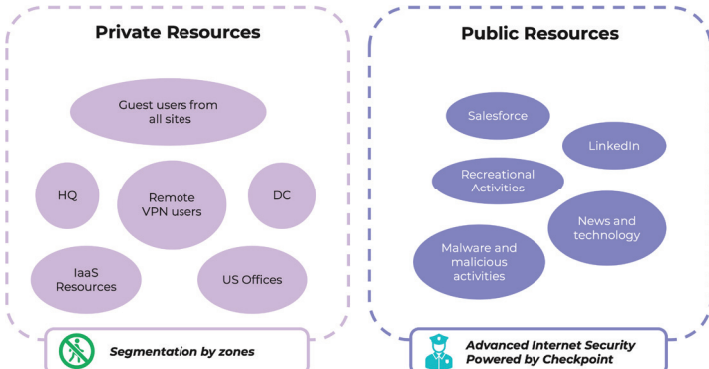
ExtremeCloud SD-WAN Reporting makes it possible to compare performance objectives defined at the orchestrator against actual performance measured on the network. This comparison results in a unique quality indicator, the Experience Quality Score (EQS), to measure performance of a given application, a site, or a link. EQS measures traffic in real time or on a consolidated basis, with a 0 to 10 score.

Application Reporting collects data and aggregates it for up to 13 months with the Enhanced Reporting option.

Use Cases

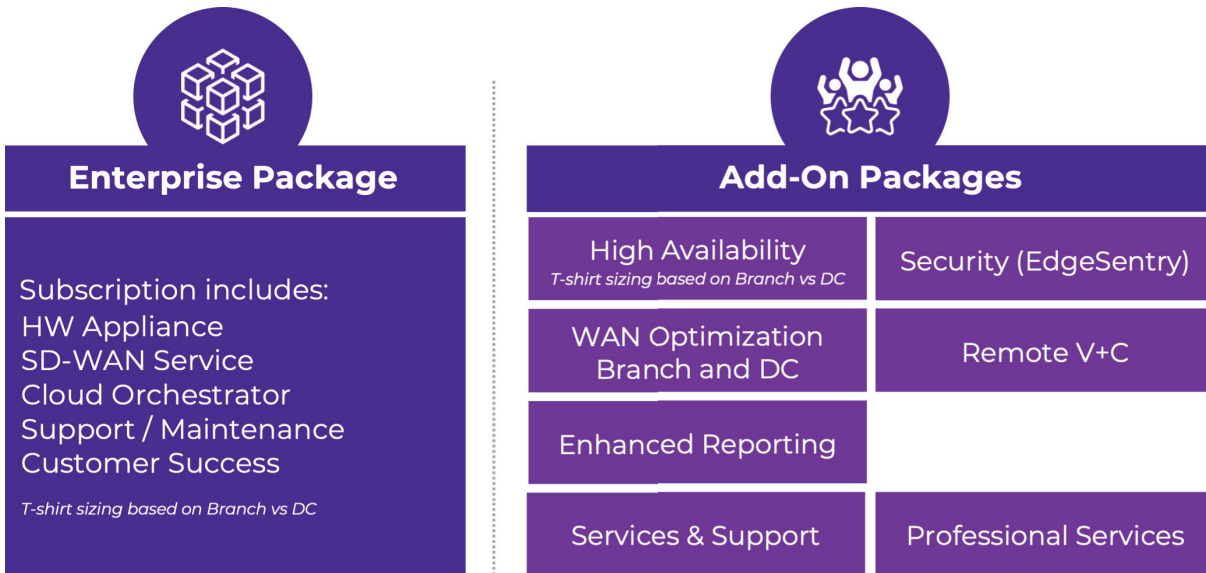
ExtremeCloud SD-WAN is built with Enterprise WAN evolution in mind. It addresses the need to deploy a resilient, cloud-native SD-WAN from ground up, fast and risk-free, while benefiting from low TCO.

Technical Use Cases

| Use Case 1: Connectivity | |
|---|---|
|  | <ul style="list-style-type: none"> • Build your SD-WAN from the ground up, fast, risk free and while maintaining low TCO. • Benefit from flexible deployment modes and zero-touch provisioning with transparent/hybrid deployment topology. • Augment your EXTR stack with SD-WAN, fast from a shared cloud-management. • Underlying technology: ExtremeCloud IQ, zero-touch provisioning and single pane of glass management, transparent/hybrid deployment topology, Hardware included in Subscription. |
| Use Case 2: Resiliency | |
|  | <ul style="list-style-type: none"> • Establish site resiliency through multiple WAN network support and high availability SD-WAN Appliances. • Support application performance for critical workloads in site-site and site-cloud traffic scenarios, detect applications automatically and condition performance-based dynamic WAN Selection. • Underlying technology: Dynamic WAN Selection (performance based) + SD-WAN Appliance HA, Application aware (CAD), application performance monitoring. |
| Use Case 3: Security | |
|  | <ul style="list-style-type: none"> • Secure your SD-WAN Sites, fast and while optimizing TCO. • Leverage advanced networking technologies of FWaaS and SWG delivered as-a-cloud-service (always up to date). • Underlying technology: (EdgeSentry, powered by Check Point) deploy cloud based FWaaS/SWG from unified orchestration, without the need to implement physical NGFW at Site. |

ExtremeCloud SD-WAN Licensing

ExtremeCloud SD-WAN Licensing structure



ExtremeCloud SD-WAN is the market-first “all-inclusive” SD-WAN Service in Subscription only model, structured to offer an immediate benefit of optimized TCO. Commercial offering comprises:

- An affordable Enterprise Package, designed to cover Enterprise SD-WAN functionality.
- Complemented by a range of Add-on Packages, delivering advanced networking features (e.g., Advanced Security, WAN Optimization, Enhance Reporting).

The “all-inclusive” subscription concept is best presented using the example of Enterprise Package, which delivers all components necessary to build an Enterprise SD-WAN network:

- Each Enterprise Package represents an SD-WAN Site and provides the appropriate SD-WAN Appliance as part of subscription.
- Subscription includes the SD-WAN Service Level enabling use of Enterprise SD-WAN functionality.
- SD-WAN Service Level t-shirt size defines what performance/capacity given SD-WAN Site will operate at.
- Enterprise Package, by default, guarantees access to the SD-WAN Orchestrator.

- Support and Maintenance services for any component included in Enterprise Package is also included by default.
- Lastly, ExtremeCloud SD-WAN includes a unique Customer Success service with every Enterprise Package, guaranteeing maximizing value from SD-WAN deployments.

Feature availability in Enterprise Package and Add-on Packages

| Feature | XSD-WAN Enterprise |
|---|--------------------|
| SD-WAN Service Level | • |
| Cloud Orchestration, ZTP | • |
| SD-WAN Appliance (Branch or DC) | • |
| Basic AppPerf | • |
| Remote V+C | • • • |
| Cloud Application Database | • |
| Advanced AppPerf/WANOpt | • • |
| High Availability (Site Resiliency) | • • |
| Hybrid of full-stack deployments (bridge+routed, or fully-routed) | • |
| Basic Security (ZBF) | • |
| Advanced Security (EdgeSentry) | • • • |
| Enhanced Reporting | • • • |

• Included per Site • • Optional per Site • • • Optional multiSite

Enterprise Package Subscription

Foundational element of any SD-WAN deployment is a Site. ExtremeCloud SD-WAN licensing model recognizes an SD-WAN Site through Enterprise Package subscription:

- One Enterprise Package identifies a single SD-WAN Site.
- There are two main Enterprise Package designations: Branch and DC, suggesting appropriate Site assignment in an SD-WAN network.
- Each Enterprise Package is described by a “t-shirt size” (XS, S, M, L, XL), which specifies the SD-WAN Service Level performance.
- The “t-shirt size” coupled with Branch/DC designation identifies the specific SD-WAN Appliance that will be delivered with a particular Enterprise Package.
- SD-WAN Appliance cannot be sold outside of the assigned Enterprise Package

Enterprise Package subscription term:

- New Subscription: 1, 3 or 5 years fixed term.
- Renewal Term: Flexible with one year increments.

Deployment flexibility

- Enterprise Packages with different Service Levels and therefore different SD-WAN Appliances can coexist in a single SD-WAN Domain.
- Enterprise Packages with different terms can coexist in a single SD-WAN Domain.
- Enterprise Package can be upgraded to a higher Service Level by ordering a new Enterprise Package.
- Enterprise Package cannot be downgraded.

Enterprise Package Subscription

| Service Subscription | SD-WAN Service Level/BW | Subscr. Type | New Subscr. Term | Renewal Term | Associated HW (incl.) |
|----------------------|-------------------------|--------------|------------------|-------------------|---|
| ENT-Branch-XS | XS/50Mbps | Site | 1/3/5Y | Flexible (Min 1Y) | ipe-30so |
| ENT-Branch-S | S/100Mbps | Site | | | ipe-30ax |
| ENT-Branch-M | M/250Mbps | Site | | | ipe-40ax-v2 |
| ENT-DC-S | L/500Mbps | Site | | | ipe-420ax |
| ENT-DC-M | XL/1Gbps | Site | | | ipe-2000ax-T |
| ENT-DC-L | XL/2Gbps | Site | | | ipe-2000ax-10G-SR or ipe-2000ax-10G-LR |

High Availability Add-on Subscription

On top of the Enterprise Package Service License a High Availability Add-on license can be ordered, delivering the Site Resiliency functionality and forming a High Availability pair:

- High Availability Service License needs to match the paired Enterprise Package Service License, e.g., ENT-HA-Branch-S can be paired only with ENT-Branch-S.
- High Availability Add-on license term needs to match the paired Enterprise Package.

HA Add-On Subscriptions

| Service Subscription | Subscr. Type | New Subscr. Term | Renewal Term | HW included |
|----------------------|--------------|------------------|-------------------|-------------|
| ENT-HA-Branch-XS | Site | 1/3/5Y | Flexible (Min 1Y) | Yes |
| ENT-HA-Branch-S | Site | | | Yes |
| ENT-HA-Branch-M | Site | | | Yes |
| ENT-HA-DC-S | Site | | | Yes |
| ENT-HA-DC-M | Site | | | Yes |
| ENT-HA-DC-L | Site | | | Yes |

Other Add-On Subscriptions

On top of the Site Service License and HA Add-on, optional licenses, providing added value, are available. Top-level rules governing Add-on licenses:

- New Subscription Term: Flexible (min 1 year).
- Renewal Term: Flexible (min 1 year).
- License Type: per-Site or per-Domain (licensed functionality will be available to all Sites in an SD-WAN Domain).
- Stackable licenses: per-Domain licenses are stackable, which means that to increase capacity of a certain licensed feature, more than one can be assigned to an SD-WAN Domain.

Other Add-On Subscriptions

| Service Subscription | Subscr. Type | Service Level |
|-------------------------|--------------|---|
| ENT-WANOpt-Branch | Site | WAN Optimization add-on for Branch S or M Enterprise Packages, one license per package. |
| ENT-WANOpt-DC | Site | WAN Optimization add-on for DC S, M or L Enterprise Package, one license per package |
| ENT-EnhancedReporting-5 | Domain | Stackable license Enhanced Reporting functionality inside a Domain. Licensed per number of Sites in a Domain. License covers 5 sites and license stack must reflect all sites in domain. |
| ENT-Remote-VandC-5 | Domain | Stackable license enabling 5 RVC destinations within a Domain with Remote V+C functionality. Licensed per number of configurable RVC destinations. |
| ENT-EdgeSentry-10 | Domain | Stackable 10Mbps license to reach desired BW of EdgeSentry functionality in a Domain. Licensed per volume of traffic processed by EdgeSentry inside a Domain. Must be at least 50Mbps per Domain. |

Service Information

ExtremeCloud SD-WAN subscriptions include industry-leading 7x24x365 Global technical support and access to our Technical Support Portal, Next-Business-Day Advance Hardware Replacement (NBD AHR) services, and digital Customer Success.

Customer Success provides content and insights so customers get the most value quickly from their ExtremeCloud SD-WAN subscription. ExtremeCloud SD-WAN Customer Success provides the following value-add access:

- OnDemand Training.
- Prescriptive material to help you onboard quickly.
- Self-Serve Technical Audit to help mitigate future issues.
- Best practice tips on the SD-WAN solution to help you manage your solution.
- Stay focused on your business outcomes with templated Success Plans.
- Periodic reviews with a Customer Success Advocate to ensure you are on the right path to success.



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