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NetCloud Exchange

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NetCloud Exchange (NCX) is a unified WAN networking and security architecture that brings cellular, SD-WAN, and security into a tightly integrated solution, uniquely designed for lean IT.

NetCloud Exchange enables customers to:

— **Connect from anywhere** using LTE/5G

— **Provide inherent Wireless WAN security** by creating a locked-down, zero-trust network

— **Deliver application assurance** across highly distributed cellular and hybrid WANs through cellular-optimized SD-WAN

— **Streamline operations** through cloud-based orchestration and intuitive policy management

NetCloud Exchange architecture components:

NetCloud Exchange Service Gateway is a scalable and reliable services delivery platform (or headend) that can reside standalone or in an active/standby configuration in a customer's data center or hosted cloud. The NCX Service Gateway aggregates traffic from IoT, vehicle, site, and remote work environments, enforces policy, and provides visibility into every flow.

Cradlepoint WAN edge routers for providing persistent, reliable cellular or hybrid connectivity for IoT devices, vehicles, sites, or remote work. The NCX Service Gateway is compatible across Cradlepoint's primary WAN solutions (excluding standalone adapters), augmenting them with advanced security and SD-WAN services.

NetCloud Manager to simplify the deployment, management, and ongoing troubleshooting of the NetCloud Exchange architecture. It enables scalable end-to-end WAN orchestration, the bulk provisioning of policies across multiple device types, and provides intuitive health dashboards, AI-driven insights into faults, and comprehensive reporting and alerts.

Optional components:

NetCloud Exchange Virtual Edge is a software-based solution that can be easily deployed in an AWS Virtual Private Cloud (VPC) to extend the NCX Secure Connect zero-trust network to resources in the AWS.

NetCloud Client for enabling secure remote access to an NCX Secure Connect network. The NetCloud Client supports Windows and macOS laptops, iOS and Android mobile devices, and Linux devices. The NetCloud Client is available with a Zero-Trust Network Access license.

NetCloud Exchange Network Diagram

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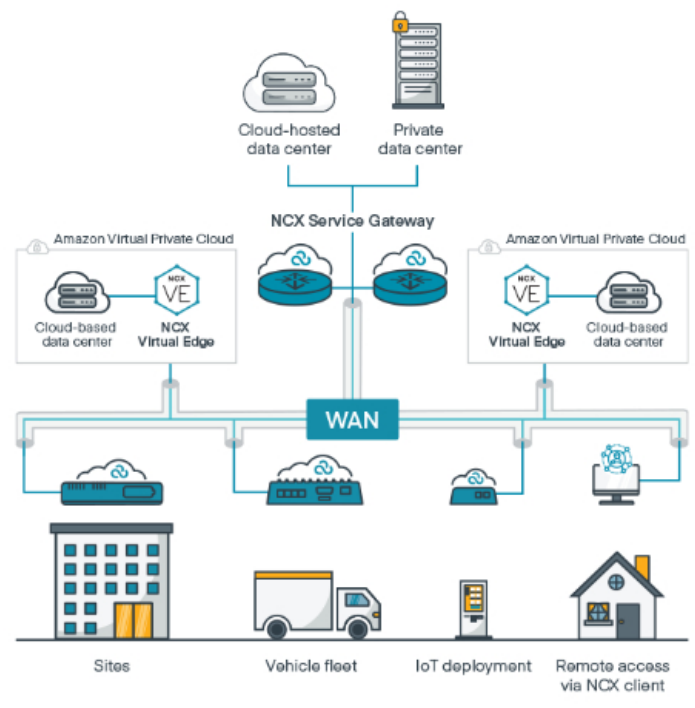
Common Use Cases

IoT Deployments

NCX Secure Connect for zero-trust connectivity between IoT devices and their hosts, replacing complex VPN architectures.

NCX SD-WAN for improving the quality of experience of real-time applications over low-speed links (for example implementing FEC over for a video transfer over a lossy link.

NCX Zero-Trust Network Access for granting internal and third parties secure remote access to IoT devices on the WAN for maintenance and monitoring.

Vehicle Deployments

NCX Secure Connect for zero-trust connectivity between vehicle-based technology and their hosts, replacing complex VPN architectures.

NCX SD-WAN for traffic steering and providing resiliency between multiple modems/service providers, satellite links, or Wi-Fi as WAN connections.

NCX ZTNA for secure remote access to corporate applications in the cloud or data center, or IoT devices on the WAN.

Branch Deployments

NCX Secure Connect for zero-trust connectivity between branches and corporate data centers and clouds, replacing complex VPN architectures.

NCX SD-WAN for traffic steering and providing resiliency between wired and cellular connections.

ZTNA for secure remote access to corporate applications in the cloud or data center, or IoT devices on the WAN.

NCX Service Gateway Specifications

NetCloud Exchange Service Gateway is the foundation of the NetCloud Exchange architecture enabling organizations to take advantage of fully integrated zero-trust security and SD-WAN as part of their Cradlepoint wireless or hybrid WAN. The NetCloud Exchange Service Gateway aggregates traffic, enforces policy, and provides deep visibility into traffic flows.
NCX Service Gateway benefits:

— Compatible with Cradlepoint IoT, vehicle, site and remote work routers.

— Designed from the ground up to meet zero-trust principles.

— Flexible deployment in a customer-hosted data center or cloud or downloaded on a physical server.

— Optional redundancy with active / standby configuration

PERFORMANCE

Licensed Capacities:	
	— 250 Mbps
	— 500 Mbps
	— 1 Gbps
	— 2 Gbps
	— 4 Gbps†

SYSTEM REQUIREMENTS (ALL CAPACITIES)

Deployment:	AWS	Azure
Software Version:	Ubuntu 18.04	Ubuntu 18.04
Instance:	c5.2xlarge	Standard_D8S_v3
vCPUs:	8	8
Memory:	16 GB	32 GB
Minimum Disk Space:	16 GB	16 GB
vNICs:	3	3
Minimum NCX Service Gateway Release:	7.22.70	7.22.70
Concurrent Tunnels:	Up to 4,000	Up to 4,000

Performance testing was conducted based on requirements as defined in RFC2544 using fixed-frame 1518-byte packets. Throughput results reflect unidirectional. UDP traffic with less than 1% packet loss as tested with wired connections. At the time of release, the number of supported sites and tunnels is a 1:1 ratio. NCX-enabled routers support multiple WAN interfaces simultaneously in NCX SD-WAN mode.

PERFORMANCE

Licensed Capacities:	
	— 250 Mbps
	— 500 Mbps
	— 1 Gbps
	— 2 Gbps
	— 4 Gbps†

SYSTEM REQUIREMENTS (ALL CAPACITIES)

Deployment:	KVM	VMware
Software Version:	Ubuntu 18.04	ESXi 6.7 or newer
Instance:	N/A	N/A
vCPUs:	8	8
Memory:	16 GB	16 GB
Minimum Disk Space:	16 GB	16 GB
vNICs:	3	3
Minimum NCX Service Gateway Release:	7.22.70	7.22.70
Concurrent Tunnels:	Up to 4,000	Up to 4,000

Performance testing was conducted based on requirements as defined in RFC2544 using fixed-frame 1518 byte packets. Throughput results reflect unidirectional. UDP traffic with less than 1% packet loss as tested with wired connections. At the time of release, the number of supported sites and tunnels is a 1:1 ratio. Each NetCloud Edge router will only support one tunnel on one active WAN interface at a time.

NCX Secure Connect Site Specifications

NCX Secure Connect offers a simple-to-manage alternative to complex VPN infrastructures for securely connecting IoT devices, sites, vehicles, and remote workers. As the foundation for all other NCX services, NCX Secure Connect delivers a policy-governed, zero-trust network that can be easily orchestrated to enable highly secure communications from the WAN edge to the cloud.
NCX Secure Connect benefits:

— Dynamic orchestration of zero-trust tunnels at scale.

— Simplified WAN deployments with support for overlapping IP addresses through name-based routing.

— Reduces the network attack surface by hiding network resources, encrypting traffic, and obscuring all public IP addresses.

— Delivers enhanced security by being deny-all by default, with access only enabled through policy.

— Provides containment of breaches and malware by restricting all east/west traffic by default.

PERFORMANCE			
Site Routers	Typical Client Count	Throughput	Concurrent Tunnels
IBR650B, IBR600C/IBR650C, IBR900, S700/S750	5	10 Mbps	10
R920	5	100 Mbps	10

NOTE: NCX Secure Connect site performance may vary based on latency conditions.

PERFORMANCE			
Site Routers	Typical Client Count	Throughput	Concurrent Tunnels
E100, E102	5	40 Mbps	20
IBR1700	30	40 Mbps	20

NOTE: NCX Secure Connect site performance may vary based on latency conditions.

PERFORMANCE			
Site Routers	Typical Client Count	Throughput	Concurrent Tunnels
AER2200	100	40 Mbps	20
E300	50	400 Mbps	20

NOTE: NCX Secure Connect site performance may vary based on latency conditions.

PERFORMANCE			
Site Routers	Typical Client Count	Throughput	Concurrent Tunnels
E3000, R1900, R2105/R2155	100	400 Mbps	20

NOTE: NCX Secure Connect site performance may vary based on latency conditions.

NCX SD-WAN Site Specifications

NCX SD-WAN is a cellular-optimized network service based on a zero-trust foundation that enhances WAN resilience and quality of experience (QoE) by optimizing traffic over multiple physical or logical connections including, wired, 5G/LTE, satellite, Wi-Fi as WAN, private APNs, and 5G standalone network slices.

NCX SD-WAN benefits:

— Designed on a simple, modern zero-trust foundation that obscures IP addresses, is deny all by default, and where resources must be defined before they are accessible.

— Supports traffic optimization over physical and logical connections, including being the first SD-WAN solution to support 5G network slicing.

— Implementation of application-based policies network-wide in a few simple steps.

— Efficient and cost-effective operation over cellular by considering cellular-specific attributes when steering traffic (for example, signal strength) in addition to latency, loss, and jitter.

— Preserves bandwidth by using inline traffic rather than artificial traffic to measure WAN performance.

— Offers enhanced QoE over lossy links through Forward Error Correction (FEC).[†]

— Ability to intelligently bond multiple WAN interfaces together to increase resiliency and provide more granular control over traffic.[†]

— Deep visibility into latency, loss, and available bandwidth from the edge to the cloud.

† Available on select SD-WAN appliances. See the technical specifications for further details.

PERFORMANCE		
Site Routers	Typical Client Count	Throughput
R920	5	100 Mbps

The R920 routers do not yet support the Forward Error Correction (FEC) or Intelligent Bonding features. Other NCX SD-WAN functionality is supported.

PERFORMANCE		
Site Routers	Typical Client Count	Throughput
E100, E102	5	40 Mbps
IBR1700	30	40 Mbps

The E100, E102, and IBR1700 routers do not yet support the Forward Error Correction (FEC) or Intelligent Bonding features. Other NCX SD-WAN functionality is supported.

PERFORMANCE		
Site Routers	Typical Client Count	Throughput
AER2200	100	40 Mbps
E300	50	400 Mbps

The AER200 router does not yet support the Forward Error Correction (FEC) or Intelligent Bonding features. Other NCX SD-WAN functionality is supported. All features are supported when using E300 routers.

PERFORMANCE		
Site Routers	Typical Client Count	Throughput
E3000, R1900, R2105/R2155	100	400 Mbps

NCX Zero Trust Network Access Specifications

Zero Trust Network Access (ZTNA) is a security service that integrates with an organization's existing identity provider to provide isolated user-to-resource access for authenticated users. It enables secure remote access for internal employees and third parties to resources (IoT devices and/or applications) on the Cradlepoint WAN through granular user-based access policies.
NCX ZTNA benefits:

— Simple and safe remote access to required resources on the WAN for internal employees and third parties.

— Flexible authentication to the network through a client (Windows or macOS) or through a Cradlepoint router.

— Enhanced security with granular user-based access policies leveraging SAML-based attributes and context.

— Integration with any SAML 2.0 compliant identity provider.

— Continuous monitoring for changes in context that could revoke or reduce access privileges.

— Device posture visibility for users that are leveraging the NetCloud client for remote connectivity.

SYSTEM REQUIREMENTS	
Operating System:	Windows
Version:	Windows 10 and 11
Processor:	Intel x86
Memory:	16 GB
Maximum NetCloud Client Count:	Unlimited (limited by NCX Service Gateway licensed throughput capacity per network)

SYSTEM REQUIREMENTS	
Operating System:	macOS
Version:	Monterey 12.x or later
Processor:	Intel or Apple M1/M2 CPU
Memory:	16 GB
Maximum NetCloud Client Count:	Unlimited (limited by NCX Service Gateway licensed throughput capacity per network)

SYSTEM REQUIREMENTS	
Operating System:	iOS
Version:	iOS 16 or later
Processor:	ARM64 or Apple Silicon
Memory:	64 GB
Maximum NetCloud Client Count:	Unlimited (limited by NCX Service Gateway licensed throughput capacity per network)

SYSTEM REQUIREMENTS	
Operating System:	Linux Ubuntu
Version:	22.04
Processor:	— Intel x86 — Minimum four core CPU
Memory:	16 GB

Maximum NetCloud Client Count:	Unlimited (limited by NCX Service Gateway licensed throughput capacity per network)

Hybrid Mesh Firewall

Hybrid Mesh Firewall (HMF) is a security service that can be added to a Secure Connect, SD-WAN or ZTNA network. With application and web filtering plus integrated IDS/IPS, HMF brings in modern firewall features, without the complexity.

NCX HMF benefits:

— Uses policies and deep packet inspection to determine whether to block or allow traffic, including communications to or from an application.

— Provides continuous monitoring of all north/south and east/west traffic flows to detect and prevent malicious activity.

— Blocks access to inappropriate web content including high-risk domains that may contain malware.

PERFORMANCE			
Site Routers	Typical Client Count	Throughput	Concurrent Tunnels
IBR600C/IBR650C, R920, S700/S750	5	10 Mbps	10

NOTE: NCX Hybrid Mesh Firewall site performance may vary based on latency conditions.

PERFORMANCE			
Site Routers	Typical Client Count	Throughput	Concurrent Tunnels
E100, E102	5	40 Mbps	20
IBR1700	30	40 Mbps	20

NOTE: NCX Hybrid Mesh Firewall site performance may vary based on latency conditions.

PERFORMANCE			
Site Routers	Typical Client Count	Throughput	Concurrent Tunnels
AER2200	100	40 Mbps	20
E300	50	400 Mbps	20

NOTE: NCX Hybrid Mesh Firewall site performance may vary based on latency conditions.

PERFORMANCE			
Site Routers	Typical Client Count	Throughput	Concurrent Tunnels
E3000, R1900, R2105/R2155	100	400 Mbps	20

NOTE: NCX Hybrid Mesh Firewall site performance may vary based on latency conditions.

NCX Virtual Edge Specifications

NetCloud Virtual Edge enables a simple extension of the NCX Secure Connect zero-trust network to applications that reside in an Amazon Virtual Private Cloud (Amazon VPC).
NetCloud Virtual Edge benefits:

— Push button deployment to an Amazon VPC from NetCloud Manager.

— Cost-effective and simple solution for organizations that need to connect to one or more Amazon VPCs.

— Extension of NCX Secure Connect zero-trust network to the cloud to control access to and from cloud-based applications.

PERFORMANCE	
Tunnel Throughput to/from NetCloud Exchange:	300 Mbps
DEPLOYMENT TARGETS — AWS	
Instance:	m4.large
vCPUs:	2
Memory:	8 GB
vNICs:	2

NetCloud Exchange Management and Operations

NetCloud Exchange is fully deployed and managed through Cradlepoint's powerful cloud management and orchestration platform, NetCloud Manager. With features that include zero-touch deployment, bulk provisioning, multilayered dashboards, centralized flow-level visibility, and intuitive troubleshooting tools, NetCloud Manager is a valuable assist to lean IT organizations.

NetCloud Manager also offers valuable AI-driven insights:

— Simplified fault management, isolation, and root cause analysis through AIOps-driven dashboard.

— Improved productivity with virtual expert capabilities to assist with everyday queries through Natural Language Processing.

Ordering Guide

The NetCloud Exchange Service Gateway is a required component to implementing NetCloud Exchange services (Secure Connect, SD-WAN and ZTNA). These services can be purchased as an add-on to any compatible router with a NetCloud Branch, Mobile or IoT service plan, while the NCX Service Gateway is purchased based on required network capacity.
For ordering details, see the following:

— **Step 1 (required):** Select **NetCloud Service plan(s)**

— **Step 2 (required):** Select NCX Service Gateway **capacity** for entire solution (separate part number for high availability)

— **Step 3 (required):** Select NCX Secure Connect **site license(s)** for supported routers

— **Step 4 (optional):** Select NCX SD-WAN **site license(s)** for supported routers (selection must match Step 3)

— **Step 5 (optional):** Select NCX ZTNA **Client** per user license(s)

— **Step 6 (optional):** Select Hybrid Mesh Firewall **site license(s)** for supported routers

— **Step 7 (optional):** Select NetCloud Virtual Edge per each Amazon VPC

NETCLOUD SERVICE PLAN	SITE LICENSE	CAPACITY

NetCloud Service for Branch	Micro Site	250 Mbps — up to 4,000 tunnels	
NetCloud Service for Mobile	Small Site	500 Mbps — up to 4,000 tunnels	
NetCloud Service for IoT	Medium Site	1 Gbps — up to 4,000 tunnels	
NetCloud Service for SOHO	Large Site	2 Gbps — up to 4,000 tunnels	
		4 Gbps — up to 4,000 tunnels	

NetCloud Add-Ons

REGION	NCX PACKAGE	DESCRIPTION	PART NUMBER
All Regions:	Service Gateway	250 Mbps 500 Mbps 1 Gbps 2 Gbps 4 Gbps	NCX-000x-SG250MBPS NCX-000x-SG500MBPS NCX-000x-SG1GBPS NCX-000x-SG2GBPS NCX-000x-SG4GBPS
	Service Gateway High Availability	Active + Standby 250 Mbps Active + Standby 500 Mbps Active + Standby 1 Gbps Active + Standby 2 Gbps Active + Standby 4 Gbps	NCX-002x-SGAS250MBPS NCX-002x-SGAS500MBPS NCX-002x-SGAS1GBPS NCX-002x-SGAS2GBPS NCX-002x-SGAS4GBPS
	Secure Connect	Micro Site Small Site Medium Site Large Site	NCX-000x-SCMICRO NCX-000x-SCS NCX-000x-SCM NCX-000x-SCL
	SD-WAN	Micro Site Small Site Medium Site Large Site	NCX-000x-SDWANMICRO NCX-000x-SDWANS NCX-000x-SDWANM NCX-000x-SDWANL
	ZTNA	Per User	NCX-00Ax-ZTNA

	Hybrid Mesh Firewall	Micro Site Small Site Medium Site Large Site	NCX-000x-HMFMICRO NCX-000x-HMFS NCX-000x-HMFM NCX-000x-HMFL
	Virtual Edge	NetCloud Essentials for Virtual Edge with Secure Connect	NCX-000x-VESC
	IPS and Web Filter	NetCloud Security IPS and Web Filter, requires corresponding NetCloud Essentials and supports E3XX, E3XXX, R19XX, R210X, and IBR17XX series routers	SEC-000x-NCIWF
All Regions — Renewal:	Service Gateway	Renewal — 250 Mbps Renewal — 500 Mbps Renewal Active + Standby — 250 Mbps Renewal Active + Standby — 500 Mbps	NCX-000x-SG250MBPS-R NCX-000x-SG500MBPS-R NCX-002x-SGAS250MBPS-R NCX-002x-SGAS500MBPS-R
	Secure Connect	Renewal — Micro Site Renewal — Small Site Renewal — Medium Site Renewal — Large Site	NCX-000x-SCMICRO-R NCX-000x-SCS-R NCX-000x-SCM-R NCX-000x-SCL-R
	SD-WAN	Renewal — Micro Site Renewal — Small Site Renewal — Medium Site Renewal — Large Site	NCX-000x-SDWANMICRO-R NCX-000x-SDWANS-R NCX-000x-SDWANM-R NCX-000x-SDWANL-R
	ZTNA	Renewal NCX ZTNA — Per User	NCX-00Ax-ZTNA-R
	Hybrid Mesh Firewall	Renewal — Micro Site Renewal — Small Site Renewal — Medium Site Renewal — Large Site	NCX-000x-HMFMICRO-R NCX-000x-HMFS-R NCX-000x-HMFM-R NCX-000x-HMFL-R
	Virtual Edge	Renewal NetCloud Essentials for Virtual Edge — Per Self-Hosted Virtual Appliance	NCX-000x-VESC-R
	IPS and Web Filter	Renewal NetCloud Security IPS and Web Filter, requires corresponding NetCloud Essentials and supports E3XX, E3XXX, R19XX, R210X, and IBR17XX series routers	SEC-000x-NCIWF-R

x= 1, 3, or 5 years