



## 7850 NETWORK SERVICES GATEWAY-X

### Highlights

- SDN-based branch networking for the Cloud IT era
- Scalable performance with Gigabit and 10Gigabit Ethernet support
- Policy-based branch traffic offload
- High performance encryption services for SD-WAN at headquarters, datacenters or high-bandwidth branches
- Redundant power to enhance availability
- Boundaryless SDN-enabled connectivity from the WAN to the datacenter

Nuage Networks™ 7850 Network Services Gateway (7850 NSG-X) is optimized for medium, large branch and head office networking to drive the connectivity required by today's SD-WAN and Cloud IT environments.

Based on the industry's most comprehensive Software Defined Networking (SDN) solution, the 7850 NSG-X seamlessly integrates into the Nuage Networks Virtualized Network Services (VNS) SD-WAN solution. The 7850 NSG-X is used to connect WAN locations and remote sites to enterprise datacenters and cloud providers with optimal network efficiency and configurations managed by the Nuage Networks Virtualized Services Platform (VSP) controller. The solution offers multiple service scenarios, namely Layer 2 VPN, Layer 3 VPN, and internet breakout.

The 7850 NSG-X is one of the supported form factors for the NSG component of the Nuage Networks VNS solution, joining the small office (7850 NSG-E) and virtualized (NSG-V), which supports deployment as a software-only form factor on a customer-provided appliance as a virtual machine.

The 7850 NSG-X has a 1-rack unit footprint, and can be shipped and installed at an enterprise location without requiring any network engineering expertise. Because it is centrally managed, it improves the efficiency and productivity of branch operations while eliminating the need for any on-site IT support. The 7850 NSG-X is on-boarded using a secure bootstrapping process that uses zero, one, or two-factor authentication depending on the branch and installer trust-model and security posture. Once bootstrapped, it enables instant networking capabilities at the branch.

What's more, the 7850 NSG-X easily connects to any provider's IP underlay network (private, public, or hybrid) over any access using its WAN-facing Gigabit (RJ-45 and SFP) and 10-Gigabit Ethernet (SFP+) ports. The policy-based network automation capabilities are seamlessly extended to the branch allowing users to automatically connect to any applications in any cloud (public or private). As a result, the delivery and consumption of network services is greatly simplified.

In addition, multiple network functions can be service chained and, using policy-based routing, traffic can be routed to one or more appliances (such as firewalls or IDS/IPS appliances) or virtualized functions at any location before being forwarded to the final destination.



Front



Back

For locations that have high availability requirements, the 7850 NSG-X can be deployed in a high-availability configuration providing device, link, and subnet-level resiliency models. It also supports network uplink redundancy for protection of WAN services.

The Gigabit and 10-Gigabit Ethernet LAN-facing ports of the 7850 NSG-X can be used for logical and physical isolation and segmentation of users or applications to support creation of security zones aligned to the enterprise's IT practices.

For enterprises that require IPsec encryption for overlay traffic, the 7850 NSG-X has a built-in hardware-based crypto acceleration capability, ensuring optimized forwarding for both unencrypted and encrypted communications. The 7850 NSG-X supports Application Aware Routing (AAR) to ensure that each type of application traffic is forwarded over the most efficient underlay network with selectable failover modes.

## Features

**Large branch/head office optimized density** – The one rack unit footprint and energy-efficient design of the 7850 NSG-X provides flexibility for both cabinet and rack-mounted installations. With the flexibility in the base system for dual 10-Gigabit Ethernet (SFP+) and four Gigabit ports with SFP, and four Gigabit Ethernet electrical (RJ-45), the 7850 NSG-X provides flexibility for logical and physical separation of network services across multiple ports and media types at the branch or datacenter.

**Boundaryless SDN from the WAN to the Datacenter** – The Nuage Networks platform enables end-to-end connectivity from the SD-WAN to the SDN datacenter, allowing seamless overlay connections from the IPsec-secured WAN into the DC overlay network. The benefits of single management and policy plane improve efficiency and operations for enterprises and service providers by giving visibility of traffic flows, security policies, and reducing complexity by eliminating siloed SDN environments. Service providers can use this functionality to connect SD-WAN services to existing MPLS VPN services with significant provisioning efficiencies through the seamless PE integration and overlay service interconnection.

**Consume any network transport service** – the NSG-X enables underlay border routing functionality, allowing multiple discrete IP underlays such as MPLS VPNs and the Internet to offer transport services to the SD-WAN. This functionality connects remote branch offices using MPLS VPN transport to remote branch offices using Internet transport by providing an transport-agnostic overlay stitching point.

**Proven operating system** – The 7850 NSG-X utilizes the widely used network operating system of the Nuage Networks VNS SD-WAN solution. Operators can be confident that the 7850 NSG-X is completely interoperable with global IP network services and that its robust networking environment has been field proven.

**Management efficiencies** – As part of the Nuage Networks VNS, the 7850 NSG-X is centrally managed. Network engineering expertise is not required during installation or for day-to-day operation. Configuration changes are centrally administered and pushed to the location using policy.

**Network function optimization** – The Nuage Networks VNS solution provides SDN-based optimization of network functions. With Nuage Networks VNS, complex functions can be virtualized and chained into the branch office connection. For location-specific requirements, the 7850 NSG-X supports advanced functions such as DHCP server, quality of service and advanced traffic filtering rules. The flexibility of SDN provides the opportunity for deployment of third-party functions on the 7850 NSG-X should market demands arise.

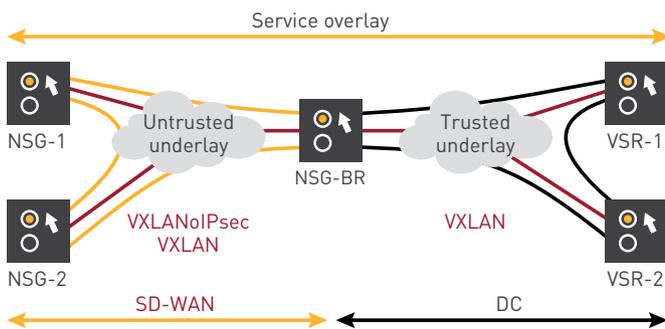
**Traffic security** – The 7850 NSG-X and the Nuage Networks VNS solution support encryption based on IPsec. Through the solution’s central policy engine, the enterprise has complete control of which traffic is encrypted. Compared to other leading IPsec products, Nuage Networks rekeys faster, providing a more secure solution.

**Multiple WAN uplink support** – As an SDN-based solution, the 7850 NSG-X supports a mix of multiple WAN uplinks. These can include a primary link using private and alternative (either active/active or active/standby) connections over diverse access IP technologies, such as IP/MPLS-based VPNs, the Internet or mobile broadband. These WAN uplinks may connect to different networks, and are able to support policy-driven application aware traffic routing.

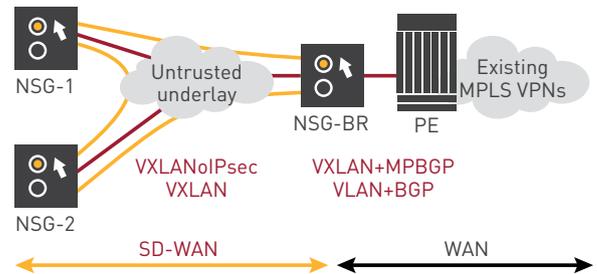
**High availability** – For locations that have high availability requirements, the 7850 NSG-X may be deployed in active/standby pairs, allowing for protection of WAN/LAN services in the event of device or circuit failure. Seamless failover and recovery of all failure scenarios provide WAN administrators with peace of mind.

**Physical LAN isolation** – With multiple LAN ports, the 7850 NSG-X provides the versatility to assign specific ports or VLANs to individual subnets at the location. This can provide isolation for specific hosts, DMZs, or isolated subnets.

**FIGURE 1. Boundaryless SD-WAN to datacenter**



**FIGURE 2. Tenant VXLAN interworking with PE**



The NSG-X can serve as a high-throughput gateway (Border Router, NSG-BR) between datacenter and WAN networks for boundaryless connectivity and management, or between multi-tenant overlay networks and existing MPLS VPN networks, among other deployment use cases. The NSG-X provides the overlay and security protocol translation between these different classes of networks while retaining policy consistency from end-to-end.

## Software technical specifications

Automation	<ul style="list-style-type: none"> <li>■ Secure 7850 NSG-X activation and authentication (X.509)</li> <li>■ 7850 NSG-X software lifecycle management</li> <li>■ Policy server northbound RESTful API and push-based notification-driven event bus</li> </ul>
Management	<ul style="list-style-type: none"> <li>■ Unified management plane for data center (VSP) and Wide Area Network (VNS)</li> <li>■ Centralized, template-based policy management for all managed objects, (including service, security, and QoS)</li> <li>■ Multi-tenanted with role-based administration, optional LDAP integration</li> </ul>
Network services	<ul style="list-style-type: none"> <li>■ Full-mesh and hub-and-spoke topologies</li> <li>■ Layer 2 and Layer 3 Virtual Private Network (VPN) services</li> <li>■ Local internet breakout service</li> <li>■ 802.1Q locally significant VLANs</li> <li>■ Overlay services supporting VXLAN and VXLANoIPsec encapsulation</li> <li>■ DHCPv4 Server, PAT, 1:1 NAT, underlay offload</li> <li>■ Dynamic NAT traversal</li> <li>■ Flow-based WAN uplink load balancing, advanced traffic steering</li> <li>■ IPv6-ready hardware with software support in future releases</li> <li>■ Border Router functionality to seamlessly interconnect cloud overlay environments with encrypted WAN environments</li> <li>■ Underlay Border Router provides connectivity between branch sites on disjoint underlay networks</li> </ul>
Traffic steering	<ul style="list-style-type: none"> <li>■ Application Aware Routing (AAR) with Application Detection (AD) and Network Performance Measurement (NPM) to redirect traffic to best fit uplink based on policy.</li> <li>■ Policy measures overlay performance (Round Trip Delay, Packet Loss, Jitter, Host Continuity) and make an intelligent forwarding decision based on application-based enforcement rules</li> </ul>
Quality of Service	<ul style="list-style-type: none"> <li>■ DSCP-based classification with DSCP rewrite options</li> <li>■ Ingress QoS classification and rate limiting</li> <li>■ Hierarchical QoS color-aware egress shaping based on 4 WRR queues</li> <li>■ Network control queue for control plane traffic</li> </ul>
Security services	<ul style="list-style-type: none"> <li>■ Directional Layer 2 to Layer 4 traffic classification with accept/deny/redirect actions</li> <li>■ Template-based domain-wide ingress and egress reflexive ACL</li> <li>■ Advanced dynamic security policy creation</li> <li>■ Policy auditing through template inheritance</li> </ul>
Encryption	<ul style="list-style-type: none"> <li>■ Secure key generation and distribution</li> <li>■ IPsec authentication: SHA1, SHA2</li> <li>■ IPsec encryption: 3DES, AES-128, AES-192 and AES-256</li> <li>■ Authenticated and encrypted control plane connections</li> </ul>
Analytics and visibility	<ul style="list-style-type: none"> <li>■ Real-time analytics engine integrated within Nuage Networks Virtualized Services Directory (VSD)</li> <li>■ Central usage statistics collection for ports, flows, QoS queues</li> <li>■ Event-based logging</li> <li>■ Secure syslog integration</li> <li>■ Remote port mirroring</li> <li>■ Inbound CLI access for centralized diagnostics</li> </ul>
High availability	<ul style="list-style-type: none"> <li>■ Cluster-based policy and statistics collection infrastructure</li> <li>■ Policy federation supporting geo-redundancy and load-balancing</li> <li>■ Scale-out control-plane architecture leveraging federation based on MP-BGP</li> <li>■ High availability configuration for 7850 NSG-X with per-subnet resiliency</li> <li>■ WAN uplink redundancy options with selective uplink forwarding</li> <li>■ Per-7850 NSG-X Active/Active management and control plane connections</li> </ul>

## Hardware specifications

CPU specifications	Multicore Intel™ Xeon D
Interface quantities	<ul style="list-style-type: none"> <li>■ 4 x 10/100/1000BASE-T Gigabit Ethernet (RJ45)</li> <li>■ 4 x 1000BASE Ethernet (SFP)</li> <li>■ 2 x 10GBASE Ethernet (SFP+)</li> <li>■ 2 x USB 3.0 Standard-A female</li> <li>■ 1 x RS-232 RJ-45 console</li> </ul>
High availability	Redundant, field replaceable AC power supply units
Dimensions	430 mm x 500 mm x 44 mm/17 in. x 19.7 in. x 1.7 in. (width x depth x height)
Weight	10 kg/22 lb
Operating temperature	0 ~ 40°C/ 2° ~ 104°F
Operating relative humidity	5 ~ 85% at 40°C (104°F)
Power	<ul style="list-style-type: none"> <li>■ Draw: 300 W (maximum)</li> <li>■ Input: 100 ~240 V at 50-60 Hz, full range</li> </ul>
Crypto-acceleration	Dedicated Intel® QuickAssist
Compliance agency certifications	<p>Safety:</p> <ul style="list-style-type: none"> <li>■ EN 60950-1 2nd Ed CE-Mark</li> <li>■ IEC 60950-1 2nd Ed CB Scheme</li> <li>■ CSA/UL 60950-1 2nd Ed NRTL</li> </ul> <p>EMC:</p> <ul style="list-style-type: none"> <li>■ ICES-003 Class A</li> <li>■ FCC Part 15 Class A</li> <li>■ EN 55022 Class A</li> <li>■ CISPR 22 Class A</li> <li>■ AS/NZS CISPR 22 Class A</li> <li>■ VCCI Class A</li> <li>■ KCC Korea-Emissions &amp; Immunity (in accordance KN22/24)</li> <li>■ IEC/EN 61000-3-2 Power Line Harmonics</li> <li>■ IEC/EN 61000-3-3 Voltage Fluctuations and Flicker</li> <li>■ EN 55024</li> <li>■ IEC/EN 61000-4-2 ESD</li> <li>■ IEC/EN 61000-4-3 Radiated Immunity</li> <li>■ IEC/EN 61000-4-4 EFT</li> <li>■ IEC/EN 61000-4-5 Surge</li> <li>■ IEC/EN 61000-4-6 Conducted Immunity</li> <li>■ IEC/EN 61000-4-8 Magnetic</li> <li>■ IEC/EN 61000-4-11 Voltage Interruptions</li> <li>■ EN 61000-6-2</li> <li>■ EN 61000-6-4</li> <li>■ EN 55011</li> <li>■ EN 55022</li> </ul>
Security	<ul style="list-style-type: none"> <li>■ Built-in Trusted Platform Module to ensure integrity of system, operating system, and confidentiality of management and data-plane encryption</li> <li>■ Chassis intrusion detection</li> </ul>
Installation	Included rack mount kit