Product Highlights

Density and Performance

- 48x100GbE high performance line card
- Scales to up to 384 wire speed ports of 100GbE MACsec in a 7800R3 system
- Full IEEE 100GbE support
- Wire speed L2 and L3 forwarding
- Broad connectivity with 100G QSFP pluggable optics

Wire-speed Encryption

- IEEE 802.1AE MACsec encryption
- 100G wire speed encryption on every port
- Cost and performance optimized for Data Center Interconnect (DCI) and Leaf-Spine to transport massive volumes of traffic securely

Highly Scalable

- Compatible with all 7800R Series systems
- Mix and Match with 100G and 400G
- Up to 384 100GbE line rate ports per switch
- Deep packet buffer 8GB per line card
- Virtual Output Queues per port to eliminate head of line blocking
- Pluggable optics for pay as you grow

Virtualization and Provisioning

- CloudVision
- VXLAN for next generation DC
- LANZ for microburst detection
- VMTracer
- Zero Touch Provisioning(ZTP)
- Advanced Event Monitoring
- sFlow (RFC3176)
- IEEE 1588 PTP

Cloud Networking Ready

- 768K MAC addresses
- Over 1M+ IPv4 Routes

Arista Extensible Operating System

- Single binary image
- Fine-grained truly modular network OS
- Stateful Fault Containment (SFC)
- Stateful Fault Repair (SFR)
- Full access to Linux shell and tools
- Extensible platform - bash, python, C++

Overview

The phenomenal growth in demand for bandwidth, driven by mobile, video streaming and cloud applications, is driving the need for connecting several geographically separate data centers to maintain seamless content delivery and provide application agility. One of the major challenges for data center operators is to protect the data from passive wire tapping, intrusion and other attacks. To keep up with the global growth of inter-site bandwidth, interconnecting these data centers has to be operationally simple and economically efficient while also ensuring security.

Traditional transport infrastructure cannot meet the density challenge and most existing encryption solutions require additional systems that are expensive to deploy and manage so deploying bulk data center encryption is challenging. The Arista 7800R3 Series 100G MACsec line card provides IEEE 802.1AE defined MACsec encryption at wire speed on all ports for the secure transport of data, without compromising on either density or performance.

The Arista high density MACsec solution is integrated to a 7800R3 Series 100GbE line card delivering un-compromised performance at an efficient cost point and is fully compatible with all other 7800R3 Series line cards. It utilizes proven encryption technology to protect traffic for simple, reliable and scalable data center interconnect and for securing links between tiers in leaf and spine data center designs. Flexible 100GbE QSFP pluggable optics ensures a broad choice of cost effective connections.

Arista 48 port 100GbE line card with MACsec for 7800R

Arista EOS

All Arista products including the 7800R Series runs the same Arista EOS software, binary image simplifying network administration with a single standard across all switches. Arista EOS is a modular switch operating system with a unique state sharing architecture that cleanly separates switch state from protocol processing and application logic. Built on top of a standard Linux kernel, all EOS processes run in their own protected memory space and exchange state through an in-memory database. This multi-process state sharing architecture provides the foundation for in-service-software updates and self-healing resiliency together with stateful switchover without the loss of data plane forwarding.

Arista EOS enables advanced monitoring and automation capabilities such as Zero Touch Provisioning, LANZ, VM Tracer and Linux based tools to be run natively on the switch.

Highly Scalable and Future Proof Architecture

The Arista 100G MACsec line card is supported in the Arista 7800R3 Series and compatible with all the available 100G and 400G line card offerings. The following 7800R chassis options are available:

- **7808R** an 8-slot 16 RU chassis that supports up to 8 line cards with both AC or DC power options
- **7804R** a 4-slot 10 RU chassis that supports up to 4 line cards with both AC or DC power options

The Arista 7800R Series uses a deep buffer virtual output queue (VOQ) architecture that eliminates head-of-line (HOL) blocking and virtually eliminates packet drops even in the most congested network scenarios.

An advanced traffic scheduler fairly allocates bandwidth between all virtual output queues while accurately following queue disciplines including weighted fair queueing, fixed priority, or hybrid schemes. As a result, the Arista 7800R can handle the most demanding data center requirements with ease, including mixed traffic loads of real-time, multicast, and storage traffic while still delivering low latency.

100G Wire-speed Encryption

The Arista 100G MACsec line card has built-in 100G wire-speed encryption on every port. Industry standard IEEE 802.1AE (MAC Security standard, referred to as MACsec) capabilities provide line-rate frame encryption and authentication for all traffic. This removes the need for additional encryption devices which ensures confidentiality as well as provides anti-replay protection and therefore confidence in the integrity of encrypted traffic. MACsec is a link layer encryption technology and operates at the speed of the Ethernet ports, providing high performance without the processing overheads associated with encryption options such as IPSec.

MACsec uses a long-term key to derive session keys used for encryption utilizing the MACsec Key Agreement Protocol per IEEE 802.1X-2010. Long term keys can either be statically defined or derived via RADIUS server(s)*. Data is encrypted using the 128 bit or 256-bit* GCM-AES-XPN block cipher suite.

MACsec encryption is a EOS licensed feature and requires a license file to enable the encryption feature. License information is included in the ordering information section of this document.

Line Card Specifications

The 7800R3 Series of line cards build on the capability of the 7280R and 7500R Series with support for FlexRoute, Accelerated sFlow and large scale ACLs. FlexRoute provides scalability to support deployment as a routing platform with Internet scale routing. Algorithmic ACLs provide flexible pattern matching for access control, policy based forwarding and network telemetry. Accelerated sFlow at high density 100G provides visibility and programmatic control of traffic steering with no impact on packet forwarding. All variations of the 7800R3 Series line cards interoperate.

The Arista 100G MACsec line card delivers up to 9.6 Tbps of bandwidth with 48 ports of 100G QSFP interfaces. Full 100GbE standards support ensures interoperability and future proofing for next generation network architectures. Support for industry standard pluggable optics for both single and multi-mode fiber provide a wide choice of connection options.

All QSFP ports are capable of operating independently in providing a flexible combination of speeds and operating distances using Arista pluggable optics and cables. Each port is individually configurable for MACsec allowing a flexible combination of encrypted links and standard links.

Each 7800R3 MACsec line card contains 8GB of high bandwidth packet memory for approximately 40 msec of traffic buffer per ingress port and virtually eliminating packet drops in congestion scenarios. Line cards connects to all fabric modules in a non-blocking full mesh.

FlexRoute™

The Arista FlexRoute Engine provides support for the full internet routing table, in hardware, with IP forwarding at Layer 3 and with sufficient headroom for future growth in both IPv4 and IPv6 route scale to more than 1.3 million routes. The innovative FlexRoute Engine with its patented algorithmic approach to building layer 3 forwarding tables on Arista R-Series Universal Spine and Leaf platforms is unique to Arista and a key enabler in calling these platforms routers.

*Not currently supported in EOS

7800R3 Accelerated sFlow

SFlow is a powerful tool used commonly by network operators for advanced network telemetry, capacity planning, security analysis and quality of experience monitoring. Traditional sFlow utilizes a system CPU for processing samples of hundreds of thousands of flows. In modern high performance systems, guaranteed high rate sampling requires the capability to both sample and process packet rates of billions of packets per second. With the 7800R3 Series Accelerated sFlow feature the sampling and processing of flow samples into sFlow datagrams is handled via integrated sFlow engines capable of supporting 1:500 sampling rates on of full wire speed systems or even higher rates with selective sampling based on triggers and filters. All sFlow v5 information is included in the sFlow records ensuring integration with standard sFlow collection and analysis tools and no loss of key information.

Algorithmic ACLs

Algorithmic ACLs combine both software and hardware to enable more flexible and scalable solutions for access control, policy based forwarding and network telemetry. Combining general purpose memory with advanced software algorithms delivers higher scale, performance and efficiency with lower power and is more cost effective than traditional solutions. Algorithmic ACLs leverage efficient packet matching algorithms that in turn enables flow matching for access control, policy and visibility. The net benefits are a high performance policy engine with both increased functionality and scale in a cost and power efficient solution. Algorithmic ACLs are available on the 7800R3 and 7800R3K Series of linecards.

- Enables IPv4 and IPv6 access control at the same scale
- L4 rule ranges are programmed efficiently without expansion or reduced capacity
- Multiple actions can be performed on a single packet or flow
- User defined filters allow flexible packet classification based on offsets for custom actions
- Supports rich policy with consistent semantics that would exhaust classical resources

7800R3 MACsec Technical Specifications

Line card Module	7800R3-48CQM
Interface	QSFP100
Max 100GbE Ports	48
Max 40GbE Ports	48
Packet Buffer	8GB
Throughput	4.8Tbps (9.6Tbps Full Duplex)
Packets per Second	2Bpps
Weight	20 lbs (9.1 kg)
Typical (Max) Power	783W (900W)
FlexRoute	Yes
Accelerated sFlow	Yes
Size (WxHxD)	18.9" x 2.1" x 17.8" (48.1 x 5.4 45.2cm)
Chassis Support	DCS-7808 and DCS-7804
Minimum EOS Version	tbd

Typical power consumption measured at 25C ambient with 50% load on all ports

Linecard Resources [1]

Profile	7800R3 Series Balanced	7800R3 Series L3
MAC Addresses	448K	128K
IPv4 Host Routes	896K	256K
IPv6 Unicast Host Routes	224K	64K
IPv4 Unicast LPM Routes	704K	1.3M
IPv6 Unicast LPM Routes	235K	440K
Multicast Routes	448K	128K
ACL Entries	24K	24K

1. Maximum values dependent on shared resources in some cases

Environmental Characteristics

Operating Temperature	0 to 40˚C (32 to 104˚F) Note 1
Storage Temperature	-40 to 70˚C (-40 to 158˚F)
Relative Humidity	5 to 95%
Operating Altitude	0 to 10,000 ft, (0-3,000m)

Note 1. Higher power or reduced temperature range optics may reduce system operating temperature to 35˚C (95˚F)

Supported Optics and Cables

Interface Type	40G QSFP ports
40GBASE-AOC	3m to 100m
40GBASE-UNIV	150m (OM3) / 150m (OM4), 500m (SM)
40GBASE-SRBD	100m (OM3) /150m (OM4)
40GBASE-SR4	100m (OM3) / 150m (OM4)
40GBASE-XSR4	300m (OM3) / 400m (OM4)
40GBASE-PLRL4	1km (1km 4x10G LR/LRL)
40GBASE-PLR4	10km (10km 4x10G LR/LRL)
40GBASE-LRL4	1km
40GBASE-LR4	10km
40GBASE-ER4	40km

100GbE	100G QSFP ports
100GBASE-SR4	70m OM3 / 100m OM4 Parallel MMF
100GBASE-SWDM4	70m OM3 / 100m OM4 Parallel MMF
100GBASE-SRBD	70m OM3 / 100m OM4 Duplex MMF
100GBASE-DWDM	80km SM Duplex (DWDM)
100GBASE-LR4	10km SM Duplex
100GBASE-LRL4	2km SM Duplex
100GBASE-CWDM4	2km SM Duplex
100GBASE-PSM4	500m SM Parallel
100GBASE-AOC	1m to 30m
100GBASE-ERL4	40km SM Duplex

Product Number	Product Description
DCS-7800R3-48CQM-LC	7800R3 Series 48 port 100GbE QSFP100 with MACsec, wirespeed line card (Spare)
DCS-7800R3-48CQM-LC#	7800R3 Series 48 port 100GbE QSFP100 with MACsec, wirespeed line card (Ships in chassis)
LIC-MOD-1-MACSEC	MACSEC Encryption License for Arista Modular switches - Encryption with MACSEC capable Linecard

Warranty

The Arista 100G MACsec Line card for 7800R3 Series switches and Arista Optical transceivers come with a one-year limited hardware warranty, which covers parts, repair, or replacement with a 10 business day turn-around after the unit is received.

Service and Support

Support services including next business day and 4-hour advance hardware replacement are available. For service depot locations, please see: http://www.arista.com/en/service

Headquarters

5453 Great America Parkway
Santa Clara, California 95054
408-547-5500

Support

support@arista.com
408-547-5502
866-476-0000

Sales

sales@arista.com
408-547-5501
866-497-0000

www.arista.com

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