

Arista 7280R series: Q&A

What are the 7280 Series switches?

The 7280R are a series of fixed systems including the 7280R, 7280R2 and 7280R2A. The 7280R are 1RU and 2RU switches designed with deep buffers, virtual output queues, rich features and support for 10/25/40/100G ports and are suitable for large scale layer 2 and layer 3 cloud designs, Service Provider NFV, Internet Exchanges, overlay networks, Content delivery, virtualized or traditional enterprise data center networks.

What are the key advantages of 7280R Series switches?

The 7280R capabilities address the requirements for modern networking and rich multi-media where content delivery require a lossless forwarding solution.

- Standards-based high density 10/25G and 40/100G switches ideal for future proof network designs and high bandwidth needs such as in High Performance Storage or Content Delivery Networks (CDNs)
- Ultra deep buffers in fixed systems makes for an ideal top of rack switch where lossless performance and in-cast problems are expected such as in data analytics and IP storage
- Directly connected 25GbE, 40GbE and 50GbE attached next generation storage systems, requiring high performance and predictable latency
- Streaming network state and high rate sFlow for advanced analytics with CloudVision
- Network-wide virtualization platform for next generation cloud bursting with wire-speed VXLAN routing
- Hardware assisted PTP enables accurate timing solutions across Ethernet based networks without costly investment in separate timing networks
- Unique monitoring and provisioning features – LANZ, DANZ, AEM, IEEE 1588 PTP, ZTP, VM Tracer, VXLAN, and eAPI
- IEEE compliant MACsec on select 7280R platforms for physical layer traffic encryption for secure connectivity
- Comprehensive L2 and L3 feature set for open multi-vendor networks with no proprietary lock-in
- Internet scale L2 and L3 tables allow deployment flexibility in both large L2 and L3 environments with any-workload suitability
- NEBS compliance and DC power supplies designed for service provider environments

What are the focus markets of the 7280R?

The 7280R capabilities address the requirements for modern networking and rich multi-media content delivery requiring a lossless forwarding solution in a compact and energy efficient form factor.

The 7280R can be deployed in a wide range of open networking solutions including large scale layer 2 and layer 3 cloud designs, Service Provider NFV, Internet Peering and Internet Exchanges, Overlay networks, Content delivery, virtualized or traditional enterprise data center networks. Deep packet buffers and large routing tables allow for Internet peering applications. The broad range of interfaces and density choices provide deployment flexibility. 7280R platforms with integrated MACsec encryption enables high performance, cost effective and secure Data Center Interconnect (DCI) solutions with the use of DWDM Optics.

Why are deep buffers required?

Today's cloud data applications, including Hadoop, Big Data, Search or Storage, are distributed applications running on server clusters with many-to-many communication patterns. The key to achieving predictable performance for these distributed applications is to provide consistent network bandwidth and latency to the various traffic flows since in most cases it is the slowest flow or query completing last that determines the overall performance. Without sufficient packet buffer memory in the switches, network bandwidth is allocated

grossly unfairly among different flows, resulting in unpredictable completion times for distributed applications. In heavily loaded networks, query completion times are dramatically shorter with big buffer switches compared to small buffer switches. Below is a link to Arista whitepaper on why big data needs big buffers provides additional details.
<https://www.arista.com/assets/data/pdf/Whitepapers/BigDataBigBuffers-WP.pdf>

What are the key features of the Arista 7280R series?

The Arista 7280R delivers a suite of advanced traffic control and monitoring features to improve the agility of modern high performance environments, with solutions for automation, data monitoring, precise timing and next-generation virtualization.

Feature	Benefit
Ultra Deep Buffers	Up to 32GB of packet memory per switch virtually eliminating packet drops in congestion scenarios
FlexRoute™ Engine	Provides the flexible scalability to support deployment as a routing platform with Internet scale routing up to 2M routes
sFlow acceleration	Enables high rate sampling up to 1:1000, that provides for advanced network monitoring and traffic engineering solutions with granular control
AlgoMatch™	Efficient packet matching algorithm that enables flow matching for access control, policy and visibility
DANZ Tap Aggregation	10/40/100G Tap Aggregation with best-in-class performance and high density up to 48 100G Tap/Tool ports
Latency Analyzer (LANZ)	Microsecond granularity on port utilization using buffering watermarks to provide immediate feedback and precision monitoring
Wirespeed VXLAN Routing	Seamless integration between VXLAN and L2/L3 environments, physical and virtualized networks
IEEE 1588 PTP	Build and scale accurate timing solutions with sub-microsecond accuracy
128-way ECMP and MLAG	Improve network scalability and balance traffic across large-scale leaf-spine designs or server load balancers
Network Wide Virtualization	Multi-vendor API Support with eAPI, VXLAN and NSX, and other encapsulation techniques
MACsec encryption	Line-rate 100G frame encryption and authentication for data security and protection from passive wire tapping, intrusion and playback attacks

Can the 7280R hold full Internet BGP table?

Yes, the 7280R can hold a full copy of the internet in the forwarding tables leveraging Arista FlexRoute. There is sufficient capacity for table size growth of approximately 50% from today's Internet providing several years of investment protection.

How is FlexRoute useful?

The Arista 7280R Series **FlexRoute** engine provides the flexible scalability to support deployment as a routing platform with Internet scale routing to more than 2M IPv4 and IPv6 routes. Arista FlexRoute along with EOS NetDB enables enhanced innovation and scalability.

What is the benefit of 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. All models of the 7280R Series enable sFlow utilizing the high performance CPU. Within modern high performance systems traffic sampling requires the capability to both sample and process packet rates of hundreds of millions of packets per second. With the

7280R Series Accelerated sFlow feature the sampling and processing of flow samples into sFlow datagrams is handled via a dedicated sFlow engine capable supporting 1:1000 sampling rates, in 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 consistent integration with existing standard sFlow collection and analysis tools and no loss of information.

What is AlgoMatch and which 7280R switches support AlgoMatch?

AlgoMatch is a unique Arista innovation combining software and hardware to implement access control lists to achieve higher scale. AlgoMatch utilizes a more efficient packet matching algorithm that in turn enables flow matching for access control, policy and visibility that is more flexible.

The following 7280R products currently support AlgoMatch.

- 7280SRA-48C6 - 48 x 10G and 6 x 100G
- 7280SR2A-48YC6 - 48 x 25G and 6 x 100G
- 7280SRAM-48C6 - 48 x 10G and 6 x 100G with MACSec
- 7280SR2K-48C6 – 24 x 25G, 24 x 10G and 6 x 100G
- 7280TRA-48C6 – 48 x 10G-T/RJ-45 and 6 x 100G
- 7280QRA-C36S – 24 x 40G and 12 x 100G
- 7280CR2A-30 - 30 x 100G
- 7280CR2K-30 - 30 x 100G with 2M routes
- 7280CR2A-60 - 60 x 100G
- 7280CR2K-60 - 60 x 100G with 2M routes

What is Latency Analyzer (LANZ)?

LANZ provides a unique real-time high precision monitoring of buffer utilization, micro-bursts, and network hotspots before congestion leads to drops. LANZ allows for proactive planning of capacity upgrades or topology changes.

LANZ (Latency Analyzer) is an advanced monitoring feature available on Arista 7500R and 7280R Series.

Arista 7280R Series LANZ provides the ability to track utilization of deep VOQ buffers, providing the user with an understanding of which destination interfaces are most congested and how much data is being en-queued and its sources.

What features are part of Latency Analyzer (LANZ)?

LANZ refers to the set of latency analyzer features available with the Arista 7280R series of devices.

- Per Queue per Port Reporting - allows reporting and configuration for every egress port and all VoQs
- Congestion Lifecycle Monitoring – tracks congestion events end-to-end, providing Start-Time, Duration and Maximum Queue Length
- Drop Monitoring - report on lost traffic occurring through severe congestion events
- Per VoQ Buffer Monitoring - reports on VoQ buffer usage in addition to interface queues
- Data Capture - capture and mirror packets that were involved in congestion events
- Local Analysis – provides a local database of congestion records
- Export data - LANZ Streaming allows for real-time streaming of data in an open Google Protocol Buffer (GPB) encoded TCP stream.

What is VXLAN?

VXLAN is a multi-vendor industry-supported network virtualization technology that enables much larger networks to be built at layer 2 without the inherent scale issues that underpin large layer 2 networks. It uses a VLAN-like encapsulation technique to encapsulate layer 2 Ethernet frames within IP packets at layer 3 and as such is categorized as an 'overlay' network.

VXLAN provides solutions to a number of underlying issues with layer 2 network scale, namely:

- Enables large layer 2 networks without increasing the fault domain
- Scale beyond 4K VLANs.
- Enables layer 2 connectivity across multiple physical locations or pods
- Potential ability to localize flooding (unknown destination) and broadcast traffic to a single site
- Enables large layer 2 networks without every device having to see every other MAC address

From a virtual machine perspective, VXLAN enables VMs to be deployed on any server in any location, regardless of the IP subnet or VLAN that the physical server resides in.

VXLAN is an industry-standard method of supporting a layer 2 overlay across layer 3 boundaries. As multiple vendors support VXLAN there are subsequently a variety of ways VXLAN can be deployed: as a software feature on hypervisor-resident virtual switches, on firewall and load-balancing appliances and on VXLAN hardware gateways built into L3 switches.

The 7280R Series platforms are able to natively encapsulate and decapsulate VXLAN packets without recirculation.

What advantages does VXLAN provide over building large L2 networks?

Large Layer 2 broadcast and failure domains can be eliminated and traded for more stable L3 networks supporting greater scale, better multipathing and millisecond convergence. In addition, previous scalability limitations due to MAC address table exhaustion and limited VLAN tags (4K VLANs) are replaced with the VXLAN header allowing for up to 16 million customer segments.

Why is PTP (IEEE 1588) in the switch important?

PTP is a useful solution wherever accurate synchronization of measured events is important to enable correlation. Traditionally, high precision environments have deployed dedicated time distribution networks, which consist of an overlay network of co-axial cabling and dedicated hardware, required in each client machine. These networks are expensive to scale and require significant additional cable infrastructure. The ability of PTP to offer scalable, hierarchical in-band time distribution is very attractive to simplify deployments, lower costs and limit GPS antenna sprawl.

What EOS licenses are available and what features require them?

The Arista EOS feature set is designed to provide flexibility both in the choice of the appropriate feature functionality and in the software consumption model. The EOS licenses are tiered by both feature set and platform.

The Arista official [licensing page](#) provides the latest information on various license options for platforms and features.

What are the high availability features of 7280R?

The Arista 7280R switches were designed for continuous operations with system wide monitoring of both hardware and software components, simple serviceability and provisioning to prevent single points of failure.

Key high availability features include:

- 1+1 hot-swappable power supplies and four hot-swap fans provide dynamic temperature control combined with N+1 redundancy
- Color coded PSU's and fans that deliver platinum level power efficiency
- Live software patching
- Self healing software with Stateful Fault Repair (SFR)
- Smart System Upgrade (SSU) and Accelerated Software Update (ASU)

(Check EOS release notes for supported features)

What is MACsec and which 7280R switches support MACsec?

MACsec is an IEEE defined MAC security encryption standard (referred as MACsec) that provides secure communication between network devices by preventing communication monitoring or intrusion attacks on the wire. 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-XPB block cipher suite

7280R platforms supporting MACsec encryption

Platform	MACsec Capable Ports
7280SRAM-48C6	6 x 100G QSFP Ports
7280SRM-40CX2	2 x 200G Coherent
7280CR2M-30	30 x 100G QSFP Ports

MACsec encryption is a licensed feature and requires a license file to enable the encryption feature. License information can be found in the ordering information section of the product datasheet.

What interface types and port speeds are available on 7280R?

7280R platforms support a wide range of interface types and all platforms are capable of multiple port speeds providing ultimate deployment flexibility. The table below shows the port-types and maximum number of interfaces for each speed.

Platform	Port Type	Max 10G interfaces	Max 25G interfaces	Max 40G interfaces	Max 50G interfaces	Max 100G interfaces
7280CR-48	48 ports of 100G QSFP 8 ports of 40G QSFP+	192	192	56	96	48
7280QR-C72	56 ports of 40G QSFP+ 16 ports of 100G QSFP	160	64	72	32	16
7280QR-C36	24 ports of 40G QSFP+ 12 ports of 100G QSFP	144	48	36	24	12
7280QRA-C36S	24 ports of 40G QSFP+ 12 ports of 100G QSFP	120	48	36	24	12
7280SR-48C6	48 ports of 10G SFP+ 6 ports of 100G QSFP	72	24	6	12	6
7280SRA-48C6	48 ports of 10G SFP+ 6 ports of 100G QSFP	72	24	6	12	6
7280SRAM-48C6	48 ports of 10G SFP+ 6 ports of 100G QSFP	48	-	6	-	6
7280SRM-40CX2	40 ports of 10G SFP+ 2 ports of 200G CFP2	40	-	-	-	2 (200G)
7280SR2-48YC6	48 ports of 25G SFP 6 ports of 100G QSFP	72	72	6	12	6
7280SR2K-48C6	24 ports of 25G SFP 24 Ports of 10G SFP+ 6 ports of 100G QSFP	72	48	6	12	6
7280SR2A-48YC6	48 ports of 25G SFP 6 ports of 100G QSFP	72	72	6	12	6
7280TR-48C6	48 ports of 10BASE-T 6 ports of 100G QSFP	72	24	6	12	6

7280TRA-48C6	48 ports of 10BASE-T 6 ports of 100G QSFP	72	24	6	12	6
7280CR2-60	60 ports of 100G QSFP	240	240	60	120	60
7280CR2A-60	60 ports of 100G QSFP	240	240	60	120	60
7280CR2K-60	60 ports of 100G QSFP	240	240	60	120	60
7280CR2A-30	30 ports of 100G QSFP	120	120	30	60	30
7280CR2K-30	30 ports of 100G QSFP	120	120	30	60	30
7280CR2M-30	30 ports of 100G QSFP	-	-	30	60	30

How scalable is the 7280R?

The 7280R is recommended both inside the datacenter as a Universal leaf and as a router with support for full Internet route scale. Each member of the 7280R Series supports a flexible set of resources as shown below. Expanded choice within the 7280R offers incremental scale capability.

Scale comparison*	7280R	7280RA	7280R2	7280R2A	7280R2K
MAC Addresses	768K	768K	768K	768K	768K
IPv4 Host Routes	768K	768K	768K	768K	768K
IPv6 Unicast Host Routes	768K	768K	768K	768K	768K
IPv4 Unicast LPM Routes	Over 1M	Over 1M	1.3M	1.3M	2M+
IPv6 Unicast LPM Routes	1M	1M	1.3M	1.3M	2M+
Multicast Routes	Up to 768K	Up to 768K	Up to 768K	Up to 768K	Up to 768K
ACL Entries per forwarding Engine	24K	24K	24K	24K	24K

* Max values dependent on shared resources in some cases

Is there native 25G support on 7280R platforms?

Yes, 7280SR2-48YC6 and 7280SR2A-48YC6 are universal leaf platforms with full IEEE specification compliant native 25G SFP ports. A wide range of 25G SFP optics and transceivers can be used with these platforms to connected to 25G Servers as well as to connect to 25G or 100G spine switches.

What airflow options does the 7280R series support?

The 7280R are optimized for both leaf and spine deployments. Many of the 7280R 1RU systems are available as either F-R (port side to fan) and R-F (fan side to port), and offer optimized airflow allowing for hot / cold aisle containment. The 2RU 7280CR-48 and 7280CR2-60 models support front to rear, with air intake at the ports, and exhaust at the fans, and the 7280QR-C72 supports both airflow directions.

What are the options for support?

Arista A-Care Service Options are designed to provide you with world-class support. A-Care service offerings are available 24x7x365 with advance replacement options to minimize any network downtime. All A-Care Service options include full access to bug fixes and software downloads. For more information about A-Care Service options go to [Arista Customer Support](#)

Where do I get more information on the Arista 7280R series?

For more information please go to www.arista.com or contact us at sales@arista.com.