Arista 7050X Series: Q&A

Product Overview

What is the 7050X Family?

The Arista 7050X Series are purpose built 10/40GbE data center switches in compact and energy efficient form factors with wire speed layer 2 and layer 3 features, combined with advanced features for software defined cloud networking.

The Arista 7050X Series combine low latency from 550ns, with a shared packet buffer pool of 12MB per group of ports that is allocated dynamically to ports that are congested. With typical power consumption of less than 5 watts per 40GbE port the 7050X Series provides industry leading power efficiency. An optional built-in SSD supports advanced logging, data captures and other services directly on the switch.

What switch models are available in the 7050X Family?

There are a broad set of models available in the 7050X Series offering a choice of 1RU and 2RU systems with support for 10GBASE-T, 10G SFP+ and 40G QSFP+ interfaces.

- 7050TX has 10GBASE-T interfaces for 100Mb, 1G and 10G with a choice of QSFP+ and MXP uplinks
- 7050SX delivers SFP+ interfaces for 1/10GbE and QSFP+ and MXP for 10/40GbE.
- 7050QX supports QSFP+ interfaces for 40GbE and 4x10GbE and additional SFP+ ports for 1/10GbE

What are the 7050X2 systems?

The 7050X2 Series platforms are part of the ongoing expansion of the 7050X product line. The 7050X2 systems are designed to offer platform improvements that are specific to a set of Arista customers. While these features are critical in those environments, they do not directly replace the existing 7050X models for the Arista customer base.

What are the main differences in the 7050X family over the Arista 7050S/Q/T?

The most important difference is the higher density, effectively 128x10G of I/O bandwidth with support for flexible leaf and spine network design options. In terms of features, the 7050X Series has a number of enhancements while maintaining feature consistency. This makes it an ideal option to expand, or upgrade

existing solutions.

The 7050X supports the following key features:

- VXLAN - wirespeed gateway for both virtualized and non-virtualized data centers
- LANZ - microburst and congestion monitoring
- 1588 PTP - precision time synchronization
- Larger table sizes (L2, L3) - highly virtualized and large scale ECMP designs
- 64-way MLAG and ECMP - expanded scale out at leaf and spine

What are the focus features of the 7050X?

The 7050X Series provide a number of advanced features for software defined cloud networking, high performance compute, big data and traditional Enterprise data center applications.

Feature	Benefits
CloudVision	Network-wide workflow automation and workload orchestration as a turnkey solution for Cloud Networking
Wire speed VXLAN Gateway	Seamless integration between VXLAN and L2/L3 environments, physical and virtualized networks for next generation data center designs
IEEE 1588 PTP	Build and scale accurate timing solutions with sub-microsecond accuracy
Smart System Upgrade *	Optimized SW upgrades to reduce the impact of software upgrades and avoid network convergence
64-way ECMP and LAG	Improve network scalability and balance traffic across large-scale leaf-spine designs to over 200,000 ports, or provide efficient server load balancing
Resilient LAG Hashing / ECMP Hashing	Persistent hashing in the event of network link and topology changes to reduce disruptions and improve reliability
Latency Analyzer	A solution to improve monitoring and visibility at both 10G and 40G for congestion from persistent and short lived microbursts.
Cloud Control	Support for Openflow and OpenStack automation and self-service provisioning with cloud scale economics
Scalable Tables - ALPM and UFT	Flexible allocation of L2 and L3 forwarding table resources for greater design choice

What are the focus markets of the 7050X?

The 7050X Series are ideal for a number of use cases inside the data center. With a choice of systems all capable of 10G and 40G they are ideal for use at both the leaf and spine layers of two-tier networks. The Arista universal network architecture is optimized for all application types ranging from large cloud to enterprise deployments. The following are a selection of use cases:

- Grid / HPC - designs requiring cost effective and power efficient systems to enable non-blocking or minimal over-subscription networks
- Leaf-Spine - open standards based L2 and L3 with monitoring and visibility features - LANZ, sFlow and Network Tracers
- Software Defined Networking - with support for OpenFlow, DirectFlow, eAPI and VXLAN the 7050X Series are ideal for SDN use cases
- Enterprise access layers as middle of row or end of row supporting a wide range of 1G, 10G and 40G connectivity options allowing migration without fork lift upgrades
- Enterprise aggregation with up to 96 x 10G ports or 32 x 40G - full L2 and L3 features
- Dense top of rack for server racks with both RU and blade systems
- 40GbE attached storage - NFS systems requiring dense 40G, high performance and open standards
- ECMP designs up to 64-way - cost-effective 8 way multi-pathing using 7050SX and 7050QX Series as the spine and 64-way using the 7500E or 7300X Series.

What EOS licenses are available and what features require them?

The 7050X Series use the same license structure as the 7150 Series and the 7050 Series. Customers using licensed features must purchase the appropriate EOS licenses.

There are three licenses available for the 7050X series, which align to the different density systems.

Feature	Product SKU	Platform
Virtualization feature license for Arista Fixed switches 40-128 port 10G (VM Tracer and VXLAN)	LIC-FIX-2-V	7050QX-32 7050QX-32S 7050QX2-32S 7050SX-128 7050SX2-128 7050SX-96 7050SX-72 7050SX-72Q 7050SX2-72Q 7050SX-64 7050TX-64 7050TX-72 7050TX-72Q 7050TX-96 7050TX-128 7050TX2-128
Network monitoring and provisioning feature license for Arista Fixed switches 40-128 port 10G (ZTP, LANZ, TapAgg, API, Time-stamping)	LIC-FIX-2-Z	7050QX-32 7050QX-32S 7050QX2-32S 7050SX-128 7050SX2-128 7050SX-96

		7050SX-72 7050SX-72Q 7050SX2-72Q 7050SX-64 7050TX-64 7050TX-72 7050TX-72Q 7050TX-96 7050TX-128 7050TX2-128
Enhanced L3 License for Arista Fixed switches, 40-128 port 10G (BGP, OSPF, ISIS, PIM, NAT)	LIC-FIX-2-E	7050QX-32 7050QX-32S 7050QX2-32S 7050SX-128 7050SX2-128 7050SX-96 7050SX-72 7050SX-72Q 7050SX2-72Q 7050SX-64 7050TX-64 7050TX-72 7050TX-72Q 7050TX-96 7050TX-128 7050TX2-128

For more information on Arista licensing please refer to the official licensing page.

How many ports does each of the switches have?

Within the 7050X Series the TX, SX and QX ranges provide a wide range of interface combinations. The table below summarizes the interface combinations.

Platform	BASE-T	SFP+	QSFP+	MXP	RU
7050QX-32	--	--	32	-	1
7050QX-32S	--	4	32	-	1
7050QX2-32S	--	4	32	-	1
7050SX-64	--	48	4	-	1
7050SX-72	--	48	0	2	1
7050SX-72Q	--	48	6	--	--
7050SX2-72Q	--	48	6	--	--
7050SX-96	--	48	0	4	1
7050SX-128	--	96	8	-	2

7050SX2-128	--	96	8	-	2
7050TX-48	32	0	4	-	1
7050TX-64	48	0	4	-	1
7050TX-72	48	--	0	2	1
7050TX-72Q	48	--	6	--	--
7050TX-96	48	--	0	4	1
7050TX-128	96	--	8	--	2
7050TX2-128	96	--	8	--	2

What speeds do the 7050X Series ports support?

The table below shows the combinations of speeds supported on each switch

Platform	1/10G Only	40G Only	4 x 10G or 1 x 40G
7050QX-32	--	Ports 25-32	Ports 1-24
7050QX-32S	Ports 1 - 4	Ports 29 - 36	Ports 5 - 28
7050QX2-32S	Ports 1 - 4	Ports 29 - 36	Ports 5 - 28
7050SX-64	Ports 1 - 48	--	Ports 49 - 52
7050SX-72	Ports 1 - 48	--	Ports 49-50
7050SX-72Q	Ports 1 - 48	--	Ports 49-54
7050SX2-72Q	Ports 1 - 48	--	Ports 49-54
7050SX-96	Ports 1 - 48	--	Ports 49-52
7050SX-128	Ports 1 - 96	Ports 97 - 104	--
7050SX2-128	Ports 1 - 96	Ports 97 - 104	--
7050TX-48	Ports 1 - 32	--	Ports 33 - 36
7050TX-64	Ports 1 - 48	--	Ports 49 - 52

7050TX-72	Ports 1 - 48	--	Ports 49 - 50
7050TX-72Q	Ports 1 - 48	--	Ports 49-54
7050TX-96	Ports 1 - 48	--	Ports 49 - 52
7050TX-128	Ports 1 - 96	Ports 97 - 104	--
7050TX2-128	Ports 1 - 96	Ports 97 - 104	--

How do I change the multi-purpose QSFP+ ports between 10GbE and 40GbE modes and what is the default?

Multi-purpose QSFP+ ports can be used as either four 10GbE ports or a single 40GbE port.

By default they will operate in 4x10 mode, as shown below:

```
Et3/1    notconnect   1            full    10G 40GBASE-SR4
Et3/2    notconnect   1            full    10G 40GBASE-SR4
Et3/3    notconnect   1            full    10G 40GBASE-SR4
Et3/4    notconnect   1            full    10G 40GBASE-SR4
```

To migrate the links to a single 40GbE interface, use the following command on lane 1 of the physical port.

```
7050QX32(config)#interface ethernet 3/1
7050QX32(config-if-Et3/1)#speed forced 40gfull
```

Note: When in 40GbE mode lanes 2-4 will show as err-disabled, as seen in the following output:

```
Et3/1    connected    in Po101     full    40G 40GBASE-SR4
Et3/2    errdisabled  1            full    10G 40GBASE-SR4
Et3/3    errdisabled  1            full    10G 40GBASE-SR4
Et3/4    errdisabled  1            full    10G 40GBASE-SR4
```

Can the 7050X Series MXP Ports run at 10G?

Yes, all MXP ports can be run at 10G or 40G (on a per lane basis). For example on the models with 4 MXP interfaces:

- 48 x Fixed 10GbE + 48 x 10GbE via MXP
- 48 x Fixed 10GbE + 12 x 40GbE via MXP
- 48 x Fixed 10GbE + 11 x 40GbE via MXP and 4 x 10GbE via MXP

How do I change the multi-purpose MXP ports between 10GbE and 40GbE modes and what is the default?

To configure an MXP port in 40G mode the following command should be executed on the first of 4 adjacent lanes.

```
interface Ethernet<port>/<lane>
  speed forced 40gfull
```

When a port is in 40G mode the 3 logical lanes appear as inactive / unconfigured

```
Et49/1                      connected    1              full    40G 100GBASE-SR1
Et49/2                      inactive     1           unconf unconf 100GBASE-SR1
Et49/3                      inactive     1           unconf unconf 100GBASE-SR1
Et49/4                      inactive     1           unconf unconf 100GBASE-SR1
```

```
show int et49/2
Ethernet49/2 is down, line protocol is down (inactive)
 Hardware is Ethernet, address is 001c.7374.2713 (bia 001c.7374.2713)
```

Can I choose which QSFP+ interface to disable in lieu of the SFP+ ports on the DCS-7050QX-32S?

The leftmost QSFP+ port (Et5/1) must be disabled, as this shares the connections with the 4 SFP+ ports.

How do I enable/disable the SFP+ ports on 7050QX-32S?

The mode of the first SFP+ and QSFP+ ports is selected as follows:

Switch(config)#hardware port-group 1 select Et1-4 [SFP+]

```
Switch(config)#hardware port-group 1 select Et5/1-4  [QSFP+]
```

What sort of latency figures can be expected on the 7050X series?

The 7050X Series support both cut through and store and forward capability. There are differences in forwarding behavior and latency between the single ASIC 7050X Series and multi-ASIC 7250X Series. For a detailed description of the forwarding modes refer to the 7000X Series architecture white paper.

In “Performance Mode” the 7050SX, 7050TX and 7050QX Series support the following modes with all ports enabled in parallel:

Ingress Interface Speed	Egress Interface Speed	Forwarding Mode
10G	10G	Store and Forward
10G	40G	Store and Forward

40G	10G	Store and Forward
40G	40G	Cut Through

Note: If required 40G-40G can be manually configured in store-and-forward mode.

In "10G Low Latency mode" the 7050SX, 7050TX and 7050QX support the following modes. On the QX-32, QX-32S/QX2-32S, SX-128/SX2-128 and TX-128/TX2-128 the rightmost 8 QSFP+ ports are disabled*.

Ingress Interface Speed	Egress Interface Speed	Forwarding Mode
10G	10G	Cut Through
10G	40G	Store and Forward
40G	10G	Store and Forward
40G	40G	Cut Through

*Ports Et25-32 on the QX-32 / QX-32S, Ports Et97-104 on the SX-128 / TX-128.

For cut through operations typical latency for 64 bytes is below 550ns, and for 9K jumbo frames it is less than 650ns. In store and forward modes latency increases with frame size, from 600ns for 256 bytes to 2.4us for a 9K jumbo frame. A typical 512 byte frame has latency of 680ns. As a spine layer device many customers prefer to operate in store and forward, to avoid the implications of errors being propagated. The lower latency while useful is less attractive in a large ECMP design. This allows the 7050, 7050X and 7250X Series to all be deployed as a spine layer switch.

On the 7050TX Series the latency follows the same characteristics, with an offset for 10G-T of up to 2.5usec, but typically just 2usec of additional latency. This additional latency is inherent to the 10G-T Phy, and can vary based on cable distance and overall quality. As a result the latency of the 7050TX in cut-through mode is typically below 3usec, and up to 3.5usec.

What are the advantages of buffer allocation on the 7050X series?

The 7050X series provides a best of both worlds approach to buffering. Combining a shared/dynamic buffer architecture with a small segment size, which together are designed to ensure maximum efficiency by minimizing 'unusable' buffer space. In addition the 7050X Series switches provide a 33% increase in total buffer size compared with the existing 7050 platforms. The 7050X2 Series offer an enhanced buffer with 16MB that is optimized for more demanding environments.

Why is a small segment size so important?

A switching buffer can be likened to taking a large area of land, and dividing it into fixed/equal size plots, with the stipulation that it is not possible for someone to own a partial plot. If someone wanted a plot on which to grow a single tomato plant then a fixed size plot of 20 acres is hardly an efficient use of space. Furthermore the larger the plots become, the more inefficient/expensive it becomes for our landowner and his prized tomato plant.

The logic in the case of buffer segments is similar, especially in 1/2RU devices where the total buffer volume tends to be more conservative and efficient utilization is paramount.

For example, if a 64 byte packet is buffered by a switch with a 1024 byte segment size, 960B of that segment are unused, in other words your buffer utilization is 93.75% inefficient!

This inefficiency is not exclusive to small packets. If the switch in the previous example received a packet which was 1025 bytes in size, the packet would need to be spread over two segments, one that is 100% used, and a second buffer segment that is 0.1% used, or 99.9% inefficient!

What are the maximums for forwarding tables on the 7050X Series?

The 7050X support comprehensive L2 and L3 resources optimized for data center deployments:

Resources	Base Mode	UFT Mode
MAC Addresses	32K	288K
IPv4 Hosts	32K	208K
IPv4 Routes - Unicast	16K	144K*
IPv4 Routes - Multicast	16K	104K*
IPv6 Hosts	16K	104K
IPv6 Routes - Unicast	8K	77K *
IPv6 Routes - Multicast	4K	No Change

Maximum values dependent on shared resources in some cases
* Supported in a future software release

What is the power draw on the 7050X?

The 7050QX-32S has a typical power consumption of just 150W, which is less than 5W per 40GbE port. The maximum power consumption, with fully loaded ports and at its maximum operating temperature is 302W or 9W per 40GbE port.

The 7050SX Series consume a typical power of less than 2W per port, and the 7050TX requires up to 5W per port, depending on the specific platform and combination of 10G-T and 10/40G interfaces.

What efficiency rating do the power supplies have?

The 460W AC PSU is rated at 92% efficiency or gold rated. The new 500W and 750W PSU have an efficiency of 94% - which equates to a platinum rating.

Do the 7050X series support both AC and DC PSUs?

Yes. The existing 460W DC PSU is supported in the 7050QX-32. The other models in the 7050X Series use a higher efficiency 500W or 750W power supply, with DC options available.

How many fans are needed for the 2RU 7050X models?

The 7050X 2RU systems have 4 fan modules. These fan modules are hot swappable, and all fans should be installed for normal operation.

What are the high availability options?

The Arista 7050X switch was designed for high availability from both a software and hardware perspective. Key high availability features include:

- 1+1 hot-swappable power supplies and four N+1 hot-swappable fans
- Color-coded PSUs and fans common to Arista 1RU devices
- EOS Zero Touch Provisioning (ZTP)
- Self-healing software with Stateful Fault Repair (SFR)
- Multi-chassis LAG for active/active L2 multi-pathing
- 64-way MLAG and ECMP routing for all-active L2 and L3

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 http://www.arista.com/en/service.

Where do I get more information on the Arista 7050X Series?

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