

Qlogic Stackable FC Switches Go Mainstream

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The HP/QLogic OEM Agreement

QLogic has announced that its 5800V and 5802V Series 8Gb stackable FC switches are now available from HP as the HP StorageWorks SN6000 Stackable 8Gb FC Switches. HP also announced the new H-series portfolio which includes the HP StorageWorks SN6000 and 8/20q Fibre Channel switch. Initially, HP will market the SN6000 with HP's BladeSystem cClass blade server solutions that also include HP Virtual Connect, the HP StorageWorks Enterprise Virtual Array (EVA) and the P2000 series formerly known as the Modular Smart Array (MSA).

QLogic has marketed a stackable FC switch line for a number of years. Now, HP will sell the QLogic stackable switches along with new and upgraded deliveries of its widely installed bladed server product line giving QLogic a significant opportunity to improve its standing in the FC SAN switch marketplace. Though primarily known for its HBAs, the SN6000 is in fact the eighth FC switching product for which HP has partnered with QLogic.

While there are many examples of stackable Ethernet switches, currently only two switch vendors market a stackable Fibre Channel switch: Cisco and QLogic. The Cisco switch (MDS 9134) supports 4Gbps FC and can only be stacked in pairs for a maximum of 64 FC ports, whereas the QLogic stackable supports 8Gbps FC and can scale to 120 FC ports in a six-unit stack and over 500 ports in multi-stack configurations. The QLogic switch also supports active failover in the event of a failure of one of the switches in the stack.

In this report we highlight the feature set of the QLogic stackable switch and its recently announced HP SN6000 counterpart, supplied by QLogic as an OEM vendor to HP. In addition, we review how the SN6000 functions and is managed within the HP blade server environment.

The Stackable FC Switch

The stackable FC switch is essentially in a different FC switch product category from the edge switch on one hand and the director switch on the other. It has the form factor of an edge switch but can scale in capacity like a director switch. Edge switch fabrics are normally extended by adding switch units and using device ports as the points of interconnection between switches. With stackable switch technology, dedicated Ethernet ISL ports provide the interconnection between switches, allowing the IT administrator to scale the number of switch ports without subtracting FC device ports from the fabric or reconfiguring the existing FC fabric. Competing designs that do not have dedicated high-speed ISL uplinks are forced to utilize several ports in order to obtain the bandwidth needed. This forces FC SAN network engineers to trade off scalability in order to achieve performance.

Device ports can also be defined as FC ISL ports if required as interconnections with other stacks or other FC fabrics. As a result FC SAN networks built utilizing stackable switches typically provide the most cost effective and best performance designs for SANs ranging in size from 32 ports up to 120 ports. For larger networks, stackable designs can be used in conjunction with FC directors to provide even greater scalability.

BladeSystem Implementations

While the stackable switch is highly versatile with regard to the types of applications it can address, it is ideally suited to blade server implementations. It can then be scaled upward in the number of switch ports as quickly as one can add more blade servers to the rack. And while the stackable switch scales in capacity by adding modular switch units, a multi-unit stack can still be managed as a single switch from the standpoint of the administrator managing the entire blade server rack configuration. In the c-Class BladeSystem implementation, the SN6000 connects HP's Virtual Connect module to HP's EVA or MSA storage.

In Virtualized Server Environments

The stackable switch is also an excellent fit for small to medium-scale virtualized server environments. In these environments, the SAN can be the nexus between all VMs and all shared storage. Any disruption to the fabric can impact all virtual machines and, by extension, all application users. Therefore there is a real need to minimize fabric disruption. The stackable switch supports the addition of port capacity as servers are added with minimal disruption i.e. no SAN zoning modifications to existing connections. Additionally, the same management application used for one switch "sees" and manages all switches in the stack from a single "pane of glass." This virtual server fabric management portal can be integrated with other management applications as well that encompass servers, storage, and other networking infrastructure. Finally, FC fabric performance is a prime concern as VMs and VM servers are added. Dedicated ISLs between switches can dramatically improve performance vs. using FC device ports as interconnection points.

In HP Racks as Self-contained Virtual Server Environments

The self-contained FC fabric supports N_Port ID Virtualization (NPIV). NPIV support is included with the HBAs, Virtual Connect modules that aggregate multiple blade server FC ports, and stackable switches. Under NPIV, a single physical FC port can appear as 256 virtual ports. This allows each VM in a virtualized server environment to be assigned a unique address (virtual world-wide port name-WWPN) on the SAN. Furthermore, each vWWPN can "travel" with the VM. So, if VMs are moved under the control of VMware VMotion for example, the WWPNs used by the SAN infrastructure to communicate with each VM "travel" along with each VM.

Cost, TCO, and ROI considerations

Because stackable switches use dedicated ISL connections for inter-switch communications, fabrics built around these switches can make maximum use of the device ports while scaling the fabric to support more server/storage connections. Without high-speed ISL links, typical edge switches can require up to 50% of their ports to be used for ISL traffic. In contrast, stackable designs are able to allocate 100% of ports for host and storage access. Stackable switches provide SAN engineers with a method to start with a relatively small SAN environment, and grow it to support up to several hundred SAN switches with minimal complexity and overhead.

Scaling FC fabric port count using conventional edge switches can require the rededication of an increasing number of device ports as the fabric grows to the point that buying more switches will contribute increasingly fewer ports that can be used to connect servers and storage devices to the fabric. As a result, the cost per FC port that can be used for devices increases as the fabric grows.

The need to reconfigure the edge switch fabric as ports are added is also an important consideration. Reconfiguration can cause operational disruption. Mistakes are commonplace leading to unplanned outages, trouble shooting, and more corrective actions on the part of IT staff. The cost of IT staff time devoted to edge switch management can be significantly reduced by using stackable switches.

“Stacking-up” the QLogic and HP Models

As mentioned, the QLogic stackable switch is available from QLogic as the 5800 series, and from HP as the SN6000. While the two come from the same source, there are a few technical differences. Here we compare the two:

Feature	5800V - Series	SN6000
FC Port count	(20) device ports, 8/4/2 Gbps per switch	(20) device ports, 8/4/2 Gbps per switch
Dedicated ISL port count	(4) 10/20 Gbps Ethernet stacking ports	(4) 10/20 Gbps Ethernet stacking ports
Max. single fabric FC port count	500+ (5x6 switch stacks)	500+ (5x6 switch stacks)
NPIV support	Yes	Yes – Transparent Router (see below for more detail)
Adaptive Trunking support (see below for more detail)	Yes	Yes
Device management application	QLogic QuickTools	HP Simple SAN Configuration Manager (SSCM)

Table 1: QLogic vs. HP Stackable Switch Comparison



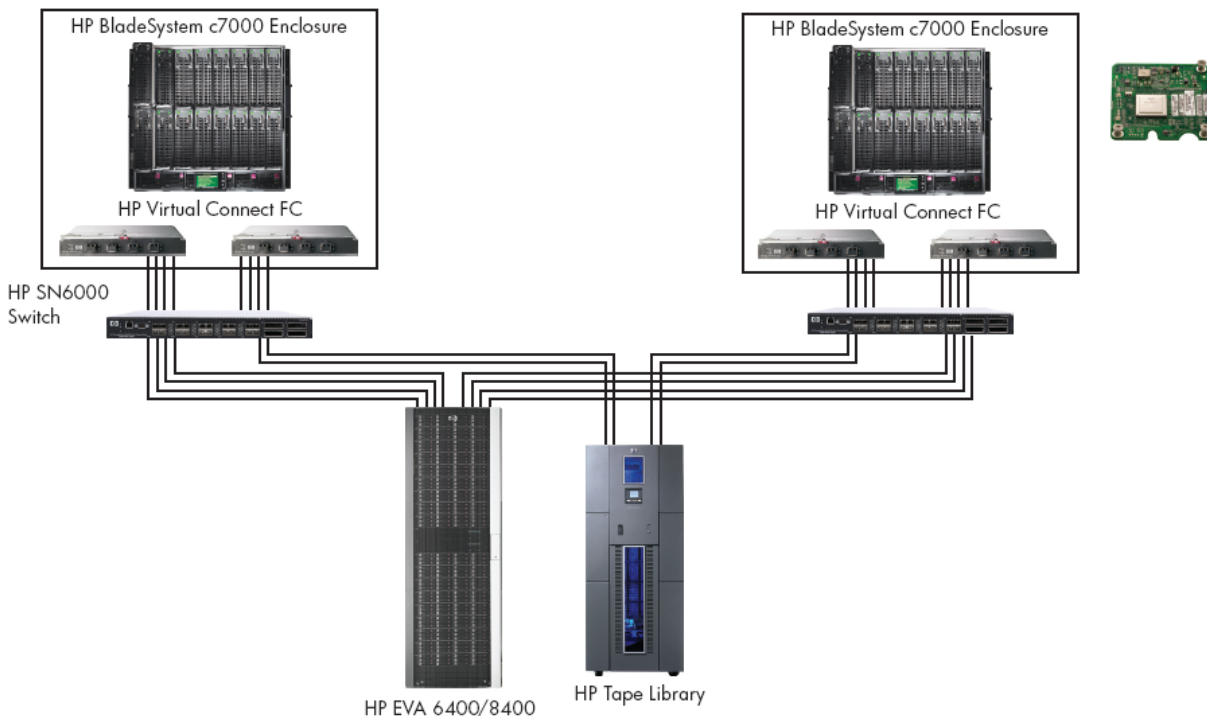
The HP SN6000 Stackable FC Switch

The SN6000 and the HP BladeSystem/StorageWorks solution

As mentioned earlier, the HP SN6000 will be marketed with HP BladeServer configurations using FC block storage. The configuration will feature end-to-end 8Gbps FC interconnection between mezzanine card HBAs attached to each server blade and HP FC-based storage arrays.

Configuration components include:

- HP BladeSystem c-Class servers and enclosure
- 8Gb HBAs (QMH2562 mezzanine cards)
- HP Virtual Connect 8Gb, 20-port FC Module for aggregation of FC connections between the server blades and the switch
- HP StorageWorks SN6000 Stackable 8Gb FC Switch(es)
- HP StorageWorks EVA or P2000 FC array storage
- HP StorageWorks Simple SAN Connection Manager (SSCM)
- HP StorageWorks E-series Tape Library



SN6000-related features worth noting include:

Adaptive Trunking

Adaptive Trunking is common to both the QLogic and HP versions of the stackable switch. This no-charge feature automatically load balances inter-switch traffic when multiple ISL paths are configured. Both dedicated Ethernet ISL and FC ports configured as ISLs are supported. FC ISL paths between other stacks and other fabrics are also supported. The device ports that are defined to ISL links do not have to be located on adjacent ports. There is no limit to the number of device ports that can be redefined to ISL links, and they are automatically included in a trunk. These features will assist in better bandwidth utilization without requiring manual reconfiguration.

HP Transparent Router

Transparent Router leverages NPIV to mask interoperability issues between the SN6000 and switches from other vendors (Brocade or Cisco, also known as HP B-series and C-series). Transparent Router specifically allows the SN6000 to be “transparently” connected to other FC fabrics that use HP B-series (Brocade) or C-series (Cisco) switches. This allows sharing of fabric and storage resources without introducing additional management complexity and E_port configuration. It also allows a non-disruptive connection to an existing SAN structure. We note however that HP has severed its relationship with Cisco to supply FC SAN switches so only HP C-series units already in the field will be supported under HP Transparent Router.

Simple SAN Connection Manager (SSCM)

SSCM is a SAN management application that does the work of three device managers (i.e. HP arrays, HP HBAs and H-series configuration). It enables an automated FC SAN set-up and configuration for the HP BladeSystem stack, although it is not specific to the stack. In this context, it greatly facilitates the setup, configuration, and management of the blade system storage environment. Discoverable and manageable elements include server blades, HBAs, Virtual Connect ports, stackable switches, and StorageWorks EVA and P2000 disk arrays. SSCM also includes a Logical Disk Wizard and a Logical Partitioning Wizard for configuring HP EVA and P2000 disk arrays and can be integrated with HP CommandView, the management application for the HP EVA. Functionally, these wizards address daily administrative work such as LUN provisioning, firmware upgrades, and monitoring across the three devices.

Conclusion

There are really two things going on in this announcement of an OEM relationship between HP and QLogic. First is the selection of a stackable FC switch for storage fabrics embedded within a blade server rack vs. the available alternatives. HP sees that the ease of management and cost containment attributes of the stackable switch can be translated directly to users of its blade servers.

Most small to moderately large FC SAN networks require more than two switches, yet often do not require the size, cost or complexity that a FC director combined with FC edge switch design entails. Stacked systems are managed as a single element, which also simplifies complexity and costs. For these reasons, Evaluator Group believes that stackable switches offer one of the best solutions for a wide range of SAN environments and that QLogic stands to gain material market share in this space in the coming quarters. We also expect QLogic to continue to further expand upon this strategy as it evolves into more of a data center-class switching company over the next 12-24 months.