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# Hardware and Technology Updates in the Cisco UCS Server Products

# Hardware and Technology Updates in the Cisco UCS Server Products

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## Overview of the Cisco UCS Infrastructure

In 2014, Cisco Unified Computing Solution (UCS) became the number one server in the US in the x86 blade server market with over 42 percent market share up from 2.4 percent in 2009. Cisco has recently pushed even harder with several additional added technologies to enhance UCS.

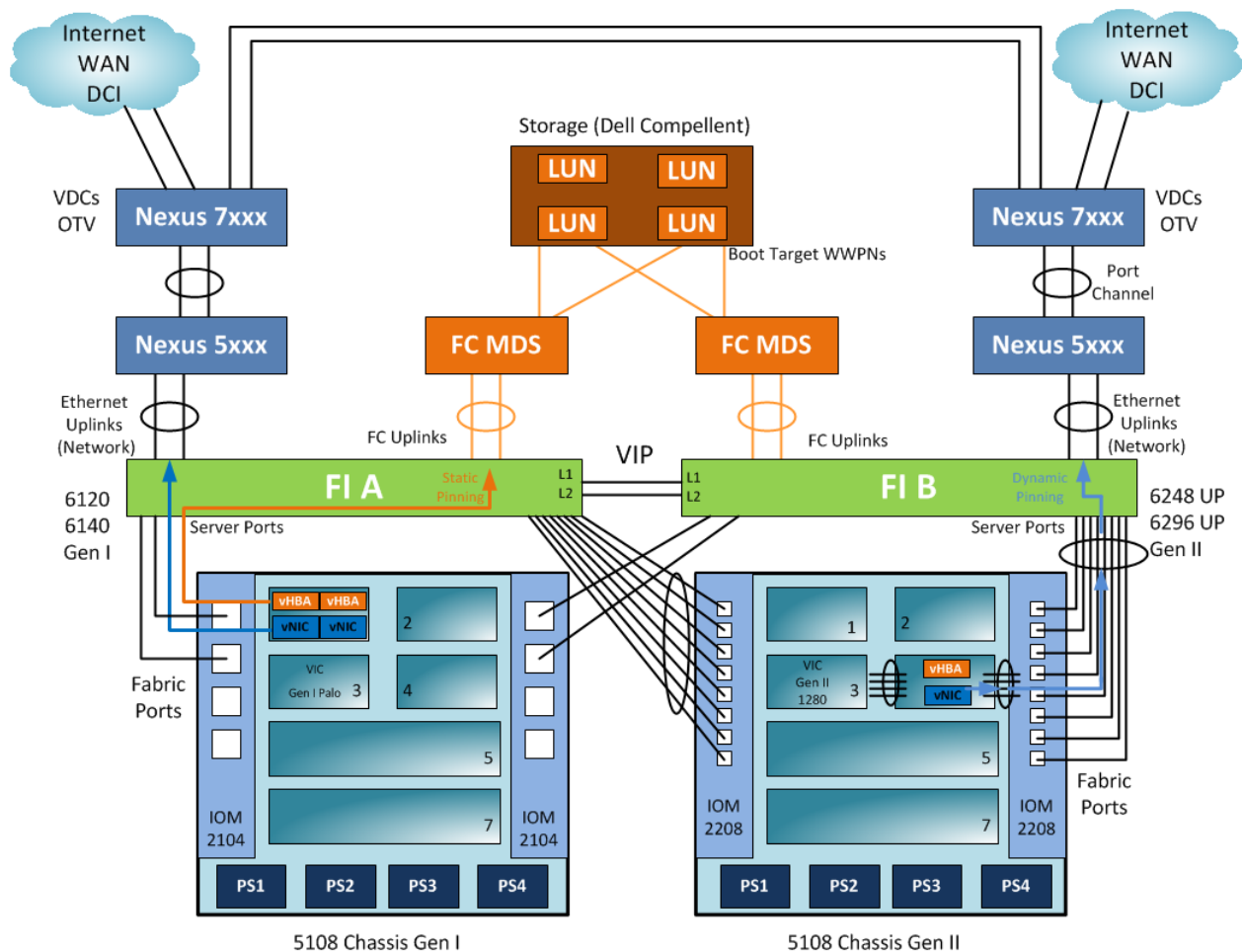
The focus of this white paper is to provide an update on the new UCS related technologies.

## Cisco UCS B Series Generation II Hardware Updates

One of the best Cisco UCS B server hardware performance and failover improvements from Gen I to Gen II is port channeling in the chassis and from the connection of the Input Output Module (IOM) to the Fabric Interconnect (FI). This requires the new Gen II hardware for all three components:

- IOM: 2204 or 2208, which support port channeling for the four or eight 10 Gbps ports.
- FI: 6248 or 6296 for 48 or 96 ports total, respectively
- VIC: 1240, 1280 or other new released Gen II VICs.

In the 1990s, the Spanning Tree Protocol did its job well blocking Layer 2 loops in an Ethernet network. However, in today's refined Cisco UCS datacenter design approach, losing bandwidth due to a blocked spanning tree port on even one 10 Gbps link is very inefficient, not to mention totally unacceptable. While there are several technologies in the data center to improve upon spanning tree, the default Cisco UCS method to eliminate spanning tree blocked ports on a UCS Ethernet uplink port is called pinning. Pinning is a logical path of connectivity that starts from the vNIC to the Ethernet Uplink Port and from the vHBA to the Fibre Channel Uplink port. Study the following drawing. For illustration purposes only, generation I hardware is shown on the left and generation II on the right. Pinning is illustrated with the blue arrows for Ethernet and orange for Fibre Channel (FC).



Pinning can be either static or dynamic. Static pinning was the only option in generation I hardware and always uses a single physical connection. Dynamic pinning is available only in generation II hardware and later and is far more desirable as it pins to port channels, which optimizes bandwidth and failover. For example, on the left chassis in the above drawing, if one of the physical cables between the IOM and the FI failed or were unplugged, the static pin would also fail, unless the failover option in the service profile were selected. However, on the right Gen II chassis, if a cable, or even up to seven cables from the IOM to the FI failed, the pin would remain fully functional since dynamic pinning is to the port channel, not any one cable. Of course in this example, losing seven 10 Gbps links would reduce the overall bandwidth capacity.

Pinning is the default in UCS and is also called End Host mode. In UCS Manager navigate to **Equipment > Fabric Interconnects** and highlight one of your FIs. Under the **General** tab, note the four settings.



In this example, **Set Ethernet End-Host Mode** is greyed out as that is the current setting. Being foolish and turning on **Set Ethernet Switching Mode** turns pinning off and turns Spanning Tree on the uplink ports.

## UCS Central

Note in the previous topology diagram that the UCS Management domain is defined by one or two FIs in a single data center. For UCS installations spanning more than two data centers the complexity in managing UCS increases. The solution is UCS Central, which allows a new single point of administration of UCS Managers in different geographic locations. Each data center still needs the two FIs as UCS Central does not eliminate any UCS hardware. UCS Central is itself a virtual machine that can be downloaded from Cisco. There are no licensing costs up to five different UCS management domains.

Similar to UCS, UCS Central is based on the industry standard XML language. UCS is based on Cisco SingleConnect technology, which unifies the LAN, SAN, and system management into one simplified link. SingleConnect incorporates the UCS hardware such as the VICs, Fis, and FEX into a single network layer.

## UCS Mini

On the other end of the spectrum, for smaller data centers that only need one UCS Chassis, Cisco has released the UCS Mini. This is the first UCS B series offering that doesn't need external FIs. Inside the chassis, the IOMs are not needed and are replaced with the 6324 FI, which provides the same networking capabilities as the 6200 FIs. The UCS mini can also be a branch or remote office solution. The 5108 chassis supports the same traditional eight slots for blades and management is done the same way with UCS Manager. UCS Central can also be used to manage multiple UCS Minis.

## Conclusion

UCS is a very popular and powerful solution driven by the flexibility and agility of the hardware failover options and the flexibility of Service Profiles combined with the power of path selection with the uplink ports. Cisco continues to provide updated UCS management options for the full range of data center installations.

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## About the Author

Chris Olsen has been an IT trainer since 1993 and an independent consultant and technical writer since 1996. He has taught over 60 different IT, datacenter, and telephony classes to over 15,000 students. He is a technical editor for Global Knowledge's lab manuals and he has published two books with Cisco Press, CIPT2 and CCNA Voice Flash Cards. He is an author and technical editor on both Microsoft OCS 2007 and 2007 R2 certification exams, as well as a technical author for Cisco certified courses.