



Platform Comparison: 65xx and Nexus (June 2011)

At its simplest, the relative positioning of the 65xx and the equivalent Nexus unit (the NX7000 family) is straightforward:

- ❑ The **Nexus 7K** (and its related NX-OS devices) is a **switching-only** architecture for **very high-density** 10GbE environments and/or for the 'converged fabric' of LANs and SANs
- ❑ The **65xx** family (and its related IOS devices) is a **switching-plus-services** architecture for **'normal' density** environments with need for integrated services (e.g. firewall, SSL).

Both of these families will be developed over the next decade (according to Cisco), but their development paths will not be co-extensive.

Platform Design: At the next level of detail, here are the salient design centers and features:

- ❑ **The Nexus architecture main design goals:**
 - Designed as the main delivery platform for Cisco's "Data Center 3.0" vision (i.e. everything unified via Ethernet switching fabrics, and everything virtualized)
 - Termination point(s) for very high-density 10GbE architectures (2x-4x that of 65xx)
 - Only Cisco way to get converged fabric -- FCoE (Fibre Channel over Ethernet)
 - Architecture to flatten switching architecture (e.g. downstream switches look like line cards)
 - Ability to scale fabric independently of line cards (i.e. fabric capacity is not fixed)
- ❑ **Nexus architecture design limitations:**
 - Service modules excluded by switch-only design (i.e. will require external appliances for 65xx-type service line cards/SSL/firewall/ACE/etc)
 - Not designed as WAN edge device (MPLS support was only added in March of this year)
 - Not designed as Internet edge device
 - No support for PoE (Power over Ethernet) devices such as VoIP phones, security cams
- ❑ **The Catalyst/65xx design goals:**
 - Designed for 'normal' density (i.e. mix of FE/1GbE/10GbE) at high throughput
 - General purpose platform for integrated services (via service modules) in Layers 4-7
 - Continued usefulness in hybrid/Nexus architecture
- ❑ **Catalyst/65xx design limitations:**
 - Smaller number of 10GbE ports available
 - Growth in fabric capacity limited (relative to Nexus)
 - Slower throughput (but lower latency) than Nexus (i.e. it still uses the older ASIC-- the EARL7)

- Some newer data center technologies not available (i.e. Nexus-only, such as OTV, 801.1ae)

Architectural Futures: Although it is generally conceded by the industry (but not confirmed by Cisco!), it is expected that the Nexus family will expand into Catalyst territory over the next couple of decades. But this depends (mostly) on data center design changes--and from all indications of actual product launches, news releases, and Cisco comments, the 65xx platform still has 'a few surprises left' in it. [eg, *Current Analysis* document on the Cisco Catalyst 6500, dated April of 2011.] Here are some observations about possible futures.

- ❑ **Nexus:** It is expected (but not announced or discussed by Cisco) that Nexus (NX-OS) devices will appear which will be able to accept service modules, but this is very uncertain. The virtualization pitch of Cisco (in UCS for example) might create these appliances as virtual machines--which could work if the underlying hardware is powerful enough. Many developments in the Nexus family, however, will be driven by competitive forces (e.g. market share losses to lowest-latency Arista fuelled the intro of the new low-latency 3K switch).
- ❑ **Catalyst/65xx:** Apart from explicit statements by Cisco as to the long-life of existing Catalyst designs, we might note that:
 - Cisco needs 65xx profit margins. Chambers has stated that he has to sell 2-3 Nexus boxes (even at their high prices!) to generate the same amount of profit dollars as a single 6500.
 - A Next-generation Supervisor still shows up on long-term roadmaps (i.e. the Sup2T with the EARL8 ASIC, currently used in the Nexus 7K)
 - Many future-oriented technologies have found their way into Catalyst--matching some of the advances in Nexus (e.g. VSS which allows a pair of 6500s to hit the 2Tbps mark, Data Center Interconnect, Distributed Forwarding Engines which help stretch throughput)
 - 10GbE has been added to the 3750s, so 10GbE entry port limitations are being softened somewhat
 - New products for the 6500 are still being introduced, some of which are possibly very relevant to your environment there:
 - ❖ The ACE30 application control engine for load-balancing (good for ERP)
 - ❖ The ES+ 40 (4 x 10GbE ports) for prioritizing voice, video, and data traffic (good for VoIP)
 - ❖ A new ASA module for embedded firewall and security.

Hybrid Scenarios. Apart from greenfield data centers, most Nexus boxes go into hybrid environments with 65xx units (according to Cisco). Here are three hybrid scenarios which are worth considering (and which are being done successfully in the field)

- ❑ One. Replacing core 65xx boxes with NX7000's and using the 65xx boxes for PoE, services, access layer, etc. This obviously leverages existing investments and yet still increases the ability to accommodate increasing 10GbE port requirements.
- ❑ Two. Using smaller Nexus boxes (the 5000) as an access layer for 10GbE ports which are NOT fully utilized, and uplinking these to 6500s. Many servers now come with 10GbE on the motherboards, even though the full pipe is only partially used (e.g. 20% would be

"2GbE"). This would require a dedicated 10GbE port at the access layer, but not require a full/dedicated one at the core/distribution layer. The Nexus 5K could take in, for example, 10 such underutilized ports but the upstream 6500 would only need two ports to accommodate the actual load.

- ❑ Three. Strictly speaking, hybrid scenarios using non-Cisco equipment are entirely feasible now [see *Gartner Group* document, "Debunking the Myth of the Single-Vendor Network", dated Nov 2010]. IT shops could introduce higher-performing, lower-cost competitive switches into an existing Catalyst architecture--to upgrade the switch-only part of the architecture.

Specific, short-term practical issues. There are four near-term issues to work through, in considering the NX7K option:

- ❑ MPLS was added only in late March of this year, and the official documents say that details on per-Chassis licensing will 'be released shortly'. I cannot find any data to indicate how 'real' this offering is at the present (some docs say 'only in NX-OS version 5.2'--with 5.1 being the current release). Unless you know more about this under NDA--given your MPLS usage--be sure to get more detail on how 'real' this option is before taking the NX7K seriously. [This has been a major impediment for adoption by enterprises, since the launch of Nexus in 2008.]
- ❑ There are some limitations on copper 10GbE connections for the Nexus. Currently, only twinax connections are available in copper, with a 10m distance limitation. In contrast, the 6500s have copper/SFP options for 10GbE available. [BTW, 10GbE fiber is different from 1GbE fiber--this needs to be planned for carefully.]
- ❑ The Nexus family uses a different OS than Catalyst (NX-OS versus IOS). NX-OS was developed from the SANos used in the MDS products, but it is still different from IOS. Some NetMgrs have expressed anxiety/frustration over its (a) instability and/or (b) unfamiliarity. [Cisco competitors point out that if you have to learn a NEW OS to leverage Nexus, you might as well learn their OS --e.g. JUNOS--and save a ton of money.]
- ❑ In an ERP scenario, I am not sure I can find a huge value in the Nexus box yet. It adds no value to WAN connections/speeds (that's not what it is for, as a core switch-only design), and the computational parts of ERP (e.g. forecasting) are not network intensive (unless the servers and data are distant from one another). In a collaboration environment, on the other hand, the bandwidth requirements for media (esp. video) might require the Nexus.

The main decision points, then, would include:

- ❑ If you need convergence of LAN and SAN (e.g. FCoE, iSCSI), Nexus is your only Cisco option.
- ❑ If you are going into a very high 10GbE port count, with high port utilization, Nexus [or a competitive vendor product] needs to be included into your 6500 architecture.
- ❑ If you still need an integrated services 'core', only the 6500s will allow you to do this.
- ❑ If you need PoE for VoIP devices, Nexus cannot be used to deliver that at the time of this writing. [But the 6500E's can be redeployed for that wiring-closet use.]

That's the main points--we can talk through these next week on the concall, as needed.

Thanks--Glenn Miller, Strategic Advisory Services, Macquarie Equipment Finance.