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Research Note

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Why Cisco's Catalyst 6500 Series Will Be Around in 2025

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Cisco's Catalyst 6500 series is by far the most popular switching platform in the history of computer networking. Consider that the Catalyst 6500 has generated more than $45B in cumulative revenue for Cisco, thanks to its large footprint of close to 800,000 systems, 110 million ports shipped thus far to some 45,000 customers. Some deployments are as big as 4,000 Catalyst 6500 switches large! Factor in an installed base 20 times bigger than its nearest competitor with the resources to deliver long-term service and support, and the best analogy to describe the Catalyst 6500 is that of Boeing's airplanes. Airlines upgrade from 737 to 747 to 757 and 777 as they grow and improve their service, maintaining operational consistency, quality and investment protection of training plus supply chain. In short, Boeing builds platforms that last, creating trust between airlines and Boeing. So, too, is Cisco's Catalyst 6500 because Cisco is investing hundreds of million of dollars on a roadmap innovation with investment protection. We predict that the Catalyst 6500 will be in operation well into 2025. In this Lippis Report Research Note, we explain why.

Catalyst 6500: Built to Last

Cisco engineering builds Catalyst 6500 functionalities with an eye five to eight years into the future, while keeping in perspective that thousands of corporations have invested in the platform and will keep it in production for a decade and more to come. Cisco's Catalyst 6500 DNA is made up for four key organizing principles, including: 1) innovation with investment protection to provide forward and backward compatibility, 2) a rich set of services, 3) operational consistency across generations of Catalyst 6500 and 4) lowering total cost of ownership with every new initiative or major upgrade. From a product development point of view, it's this DNA that keeps the Catalyst 6500 in production well into 2025.

Innovation with Investment Protection: The Catalyst 6500 has been an innovation engine for Cisco switching. IPv6, MPLS, Integrated Service Modules and Virtual Switching first appeared on the Catalyst 6500. Consider the Catalyst 6500 E-series chassis introduced in 2004. The current Catalyst 6500 E-series supports 80 Gbps of bandwidth per slot equipped with the Supervisor Engine 2T (Sup2T); this is twice the slot bandwidth of the 2004 Catalyst 6500 E-series of 40 Gbps per slot equipped with the Supervisor Engine 720 (Sup720); that is the same chassis, same backplane wiring, same power supply, same footprint, etc., that now scales to 80 Gbps per slot. This same chassis can scale up to 180 Gbps per slot with the same supervisor engine, the Sup 2T; that is, the E-series chassis has demonstrated forward and backward compatibility over the span of eight years and counting.

Rich Set of Services: Network services built into the Catalyst 6500's operating system IOS or Internetworking Operating System are fundamental in assisting IT executives to take advantage of technology and market transitions. For example, Catalyst 6500 services have enabled corporations to transition from mainframe to client-server computing, thanks to its support of SNA and client-server networking via integration of 7200 and 7500 routers and services like DLSw/DLSw+. When it became possible to integrate data and voice, the Catalyst 6500 supported a range of services to enable this technology transition, too, via PoE, IP to TDM Gateway and hardware-based transcoding. And as video becomes a dominant traffic type while Ethernet switching transitions to Unified Access, the Catalyst 6500's services will enable this transition too. In addition to enabling technology and market transitions, the Catalyst 6500 has specialized in providing IT operations greater control and visibility to manage users and applications plus automating IT problem resolution process.

Operational Consistency across Generations of Catalyst 6500: In addition to user experience consistency, the 45,000 Catalyst customers are accustomed to consistent management. IT and network operations have been able to maintain operational consistency in the IT trouble ticketing process, for example. In addition, there is minimal retraining of network operations when new Catalyst 6500 upgrades are deployed, thanks to consistent IOS functionality and feature retention.

Lowering Total Cost of Ownership: The Catalyst 6500 engineering team has developed a stream of software features innovation aimed at operations automation to reduce opex. For example, the Catalyst 6500's Embedded Event Manager (EEM) provides real-time network event detection and onboard automation. Its Smart Call Home feature performs proactive internal diagnostics to provide real-time alerts and remediation advice when an issue is detected. Smart Install provides plug-and-play configuration and software image-management for zero-touch deployment of new switches. The Catalyst 6500 team has pioneered high availability through Stateful Switchover or SSO redundancy of supervisor engines, plus its Virtual Switch System or VSS was the first implementation of active-active trunking with consolidated management of two switches being managed as one virtual switch.

Innovation precipitates a transition from old to new. When Cisco customers see an end of life or end of sale announcement on a Catalyst 6500, they should know it doesn't mean the Catalyst 6500 is being retired. It just means that Cisco is retiring a product with older technology and introducing a new module, Supervisor or a chassis. Even after end of sale, the product typically has a five-year runway for customers to receive Cisco support.

The best way for Catalyst 6500 customers to process an end of sale announcement is to know that something new was introduced that aims to solve a new IT problem or an existing problem using better, faster or more cost effective technology. In essence, this is how Cisco assists customers to move forward. The five years of product support and service, post end of sale, provides substantial time to plan and deploy a gradual migration to new technology. For example, the Sup 720-3B was launched in 2003 and will go end of sale in January, 2013. The next generation Sup 2T was released last year with three times the performance, four times the scale and 20 to 25% lower cost in most configurations. If a Catalyst owner is not ready to swap Sup 720-3Bs for Sup 2Ts, then they should find comfort in the fact that Sup720-3B will continue to be supported for another 5 years.

To demonstrate Catalyst's staying power, consider HP and Juniper. During the 10 years when the Supervisor Engine 720 was in production, HP was touting its A9500 switch series and Juniper its EX8200 line of modular Ethernet switches as migration platforms for Catalyst 6500. But now, both firms are divesting out of these two platforms while the Catalyst 6500 receives continued investment and customer traction.

Current Trends and Cisco Unified Access

While the Catalyst 6500 has proven its longevity plus customer trust, and Cisco has institutionalized its Catalyst 6500 engineering around the four above organizing principles, for the Catalyst 6500 to be relevant into 2025, it needs to keep up with market needs. Campus network requirements fundamentally changed in 2007 when Apple introduced the iPhone and drove the Bring Your Own Device or BYOD phenomenon. In addition, enterprises are investing in collaboration applications as video traffic soars, and security concerns mount.

Unified Access is Cisco's vision for campus networking, addressing market and technology trends such as the increase in mobility, BYOD, cloud, etc. With a motto of "One Policy, One Management, One Network," Cisco Unified Access is an architecture that delivers IT a platform to make use of today's cloud and BYOD transformations to enable business innovation. In Cisco Unified Access, all products run on one common operating system—that is, IOS 15.0 from access, core to WAN edge.

The Catalyst 6500 with Sup 2T plus VSS provides a pivotal role as the Unified Access architecture backbone. For example, BYOD pressures a campus backbone in ways not seen traditionally as a network of 1,000 users becomes a network of 3,000 devices. Cisco engineering has built the Catalyst 6500 Sup 2T with capacity, services and tight integration with Cisco campus networking products to securely support BYOD, real-time collaboration and cloud.

The Catalyst 6500 Sup 2T enables the above trends in the following ways:

- The Sup 2T's third-generation VSS hardens the network core to accommodate proliferation of devices that pressures the network backbone. A VSS configuration delivers 4Tbps of throughput.
- The wireless controller module or WISM-2 supports up to 15K wireless clients, 1,000 access points and provides a gateway for Apple Bonjour, Apple's implementation of Zero configuration networking.
- Easy Virtual Network and Secure Group Tags, both supported by Sup 2T, simplify network segmentation configuration, enabling IT to securely manage access policy for BYOD.
- Flexible NetFlow and the Network Analysis Model or NAM-3 provides deep visibility into application and user traffic. Both increase troubleshooting coverage to support the plethora of devices on the network as well as network traffic. Flexible NetFlow and NAM-3 provide application visibility and control.
- The Sup 2T supports strict priority queuing, industry leading multicast plus the Cisco Medianet suite of tools for granular analytics and troubleshooting to deliver the best video experience a user's device is capable of receiving.

Core switching innovations like BGP Prefix Independent Forwarding and OSPF Non-Stop-Routing (NSR) have added core resiliency and fast convergence features that push the envelope of reliability for Unified Access (UA) core services.

Looking Forward

So what can Catalyst owners expect in the near future? Based upon its past, we can extrapolate its future—that is increased performance and network services to support a more device- and mobile-dense enterprise campus network. From a performance or capacity improvement point of view, the Catalyst Sup 2T has proven to operate up to 180G/slot or more than twice its current capacity. Cisco plans to scale the platform up and down with an eye toward higher performance and increased 10GbE density.

Cisco also announced plans to incorporate 100 Gigabit Ethernet in the Catalyst 6500.

To increase reliability, Cisco invested in its third generation of VSS that was designed for a VSS pair to be resilient to three supervisor failures. Typically, two Catalyst 6500s are combined into one virtual switch with VSS. If there are four Sup2Ts between the two switches, three can fail, and the fourth Supervisor in the virtual switch will continue to operate. This provides deterministic and automated recovery from failures.

To further streamline operations and reduce overall TCO, Cisco engineers incorporated Smart Install and soon Campus FEX (Fabric Extender Technology) that was developed in the Nexus product line. Smart Install is a plug-and-play configuration and image-management feature that provides zero-touch deployment for new switches. Many network architects ship a switch to a location, connect it into the network and power it on with no configuration required. Smart Install leads to zero-touch deployment of access switches where Catalyst 6500 acts as the master. Cisco plans to bring FEX to campus networking to simplify management by reducing the logical number of switches in the campus that a network administrator has to manage. Interesting to note that Catalyst 6500 engineers seem to consistently deliver services across generations of platforms that strive to lower risk and migration costs.

Cisco also plans to make the Catalyst 6500 programmable for customers who seek to customize campus networking for topology independent forwarding. This initiative is to be compatible with Cisco onePK. To address mobile users and workload use cases, Cisco will also incorporate LISP or Locator/ID Separation Protocol in the Catalyst 6500. LISP is a huge innovation from Cisco as it separates user identity from its location. To understand LISP, think of how mobile phones work; that is, one keeps the same phone number independent of location. By separating user identify from location, LISP enables seamless mobility for end-users to plug their endpoints into their networks, independent of location and receive

all their rights and privileges. This concept has been applied successfully to solve VM workload mobility challenges in the data center and moving forward user mobility in the enterprise.

The Catalyst 6500 will become more integrated with enhancements to its Integrated Service Module or ISM. Cisco also plans to develop IPsec and AnyConnect support on the Catalyst 6500 through its ASA service module, bringing enhanced security to borderless enterprise. While it's easy to evaluate acquisition cost of switching products on a cost per port basis, it's much harder, but more intellectually honest, to calculate estimated cost over the entire product lifecycle. The above set of features being planned needs to be incorporated during acquisition planning.

Will Catalyst Be Around in 2025?

There have been two major Ethernet network epochs thus far. The first epoch was centered on connectivity. During the 90s, networking was focused around providing a connectivity service; that is, what drove corporate networks were email and the advent of client-server computing. Everyone needed to be connected to each other and the internet. The Catalyst 6500 played a key role here and was rewarded with fast adoption rate.

The second epoch was the webification of applications that were layered on top of this network connectivity that also included unified communications, video, increased security and the expanded internet. This second epoch was centered on web-based applications and productivity improvement. Here, too, the Catalyst 6500 delivered value and enjoyed increasing market share and customer deployments.

The third epoch is centered on the impact from mobile and cloud computing. In this new epoch, what's important from a campus network perspective are increased application visibility, control, automation and operational efficiency. Based upon the above, the Catalyst 6500 is prepared for the third epoch.

So will the Catalyst 6500 be around in 2025? Are the stars aligned with engineering predicting which future features are needed to satisfy rapid technology and market transitions? Well, consider that Supervisor Engines enjoy a ten-year-or-so life span. The E-Series chassis has been in operation for nearly 10 years and will more than likely be in operation well beyond 2020. The Sup2T is one year old, and if the Sup720 is a guide, it will be in operation into 2021. Any new chassis introduced in the next several years will also have a ten-plus-year life span too. A new Catalyst chassis will factor trend lines and projections for campus networking capacity requirements. Therefore, if a new chassis is introduced in the middle of this decade, it will be in operation, more than likely, well into 2025.

On the software side, Cisco has made a fundamental change to IOS with componentization. Not only can features be distributed to a wide range of campus switches, but also new features can be engineered independently and integrated in multiple platforms, speeding up time to market. And that's important, as it's IOS that links Catalyst to today's trends such as BYOD, cloud and collaboration.

The Boeing 737 aircraft platform is 45 years old and still the workhorse of the airline industry. The Catalyst is only 15 years old. As platforms go, the Catalyst should be around for a very long time as Cisco continues its major investments in product development and support strategies.

About Nick Lippis

Nicholas J. Lippis III is a world-renowned authority on advanced IP networks, communications and their benefits to business objectives. He is the publisher of the Lippis Report, a resource for network and IT business decision makers to which over 35,000 executive IT business leaders subscribe. Its Lippis Report podcasts have been downloaded over 160,000 times; i-Tunes reports that listeners also download the Wall Street Journal's Money Matters, Business Week's Climbing the Ladder, The Economist and The Harvard Business Review's IdeaCast. Mr. Lippis is currently working with clients to design their private and public virtualized data center cloud computing network architectures to reap maximum business value and outcome.

He has advised numerous Global 2000 firms on network architecture, design, implementation, vendor selection and budgeting, with clients including Barclays Bank, Eastman Kodak Company, Federal Deposit Insurance Corporation (FDIC), Hughes Aerospace, Liberty Mutual, Schering-Plough, Camp Dresser McKee, the state of Alaska, Microsoft, Kaiser Permanente, Sprint, Worldcom, Cigitel, Cisco Systems, Hewlett Packet, IBM, Avaya and many others. He works exclusively with CIOs and their direct reports. Mr. Lippis possesses a unique perspective of market forces and trends occurring within the computer networking industry derived from his experience with both supply and demand side clients.

Mr. Lippis received the prestigious Boston University College of Engineering Alumni award for advancing the profession. He has been named one of the top 40 most powerful and influential people in the networking industry by Network World. TechTarget an industry on-line publication has named him a network design guru while Network Computing Magazine has called him a star IT guru.

Mr. Lippis founded Strategic Networks Consulting, Inc., a well-respected and influential computer networking industry-consulting concern, which was purchased by Softbank/Ziff-Davis in 1996. He is a frequent keynote speaker at industry events and is widely quoted in the business and industry press. He serves on the Dean of Boston University's College of Engineering Board of Advisors as well as many start-up venture firm's advisory boards. He delivered the commencement speech to Boston University College of Engineering graduates in 2007. Mr. Lippis received his Bachelor of Science in Electrical Engineering and his Master of Science in Systems Engineering from Boston University. His Masters' thesis work included selected technical courses and advisors from Massachusetts Institute of Technology on optical communications and computing.