

Product Assessment: **Cisco - Catalyst 3750-X**
 Report Date: December 06, 2011
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 Service: Hot Topics , Business Technology and Software
 Market: Data Center , Enterprise Networking
 Class: Fixed Switching
 Current Perspective: ★★★★★

Summary

Buying Criteria



Current Perspective



The Cisco Catalyst 3750-X series of fixed configuration stackable switches is very threatening to competitors because it encompasses not only solid performance, but also strong software features, a long pedigree, and resilient power capabilities, and PoE+ support. The announcement last year of the warranty enhancement to the 3750-X family eliminated one of the competitive weaknesses that had existed in the 3750 series, which leveled the playing field somewhat in the OPEX space. Cisco's StackPower remains a competitive differentiator for the platform as a power stacking technology that allows up to four switches to share their power supplies and pool resources for purposes of supplying PoE and PoE+ power and N+1 power supply resiliency in the stack. With the power capabilities customers can deploy the 3750-X and provide dense PoE+ power and reliability to whatever direction that their business needs dictate. The Catalyst 3750-X also benefits from Cisco's latest designs, consuming less power than any prior incarnation of the Catalyst 3750.

The StackWise Plus on the Catalyst 3750-X is the same as on the earlier Catalyst 3750-E, meaning these products can be stacked together with no loss of performance (although still limited if stacked with first generation 3750 to 32G). This means that customers of the 3750-E can add 3750-X models to existing stacks with no disruption or significant change of plan. This provides considerable investment protection for customers. The front-facing port module allows customers to pick what uplink they desire, be it 10 Gigabit Ethernet, Gigabit Ethernet or a mixture of the two. Most stackable switches that support 10 Gigabit Ethernet support it from the rear of the machine, which can complicate cable routing and maintenance. The Catalyst 3750-X eliminates that problem, easing installation and maintenance. Various models of the Catalyst 3750-X can be mixed and matched to create a highly flexible switching solution for the enterprise closet or small data center. However, Cisco's reputation for high prices may drive off some customers despite list price reductions on the Catalyst 3750-X.

Strengths and Weaknesses

Strengths

- The Catalyst 3750-X supports 10 Gigabit uplinks, making the 3750-X series suitable for supporting next-generation LAN architectures with Gigabit to the desktop. The Catalyst 3750-X is one of the few stackables that supports PoE+, while providing for redundant power supplies within the switch. Competitors are slowly following, but Cisco still has a market advantage with PoE+ and the power capabilities.
- The Catalyst 3750-X series supports a dual-ring, wrap-around stacking architecture, which prevents disruption when adding or removing a switch from the stack, and also enables fault-tolerance should a switch fail during the normal operation of the stack. The 3750-X series uses Cisco's StackWise Plus and can be stacked with the earlier

Weaknesses

- Cisco has lowered the price of the Catalyst 3750-X series, but it still has a reputation for high prices, and Cisco has not done a good job at letting potential customers know that the cost of the Catalyst 3750-X product line is actually less than its 3750/3750-E predecessors.
- Cisco's new warranty only covers fans and power supplies for five years from date of purchase, a fact that will not be lost on competitors, many of whom, including HP, Brocade and Juniper, tout the fact that their limited lifetime warranties cover the entire product for the same term.

3750-E models with no loss of stacking performance. It can also be stacked with the original 3750 Series, but will only run at the slower stacking speed of that product line. The Catalyst 3750-X can be stacked up to nine units high, providing chassis-like functionality in a fixed form factor solution. Most competing stackable solutions on the market can only be stacked up to eight units high.

- The StackPower features of the Catalyst 3750-X series gives customers significant new flexibility when it comes to configuring power. Up to four Catalyst 3750-X series can be connected together via StackPower, which is a wrap-around cable architecture similar to StackWise Plus. Combined with the new dual power supplies 3750-X, customers can provide significant PoE+ power or reliability or a balanced combination. Competitors can only offer this level of flexibility with external power shelves which add space and complexity.
- The Catalyst 3750-X series can be deployed as a full multi-layer IP router or as an intelligent edge switch. Full Layer 3 functionality requires different switch software at a greater cost but allows customers who don't need full Layer 3 functionality to only pay when it's needed. Full performance is delivered whether deployed in Layer 2 or Layer 3 environments. The 3750-X series fully supports IPv6 in hardware and software.
- The Catalyst 3750-X series offers dual removable power supplies and user replaceable fans. It also features network modules on the front of the switch with either 10GbE SFP+ ports, Gigabit Ethernet SFP ports or a combination of both.

- The flagship Catalyst 3750-X features a strong variety of models and configurations, which is good for customers, but this causes problems when customers go to select models. Customers need to take extra time and effort to determine which combination of software and hardware is best for their particular installation.

Point and Counterpoint

Point

- Competitors can claim that the power density achievable with the Catalyst 3750-X series isn't needed and that in general only 802.11N access point and a smattering of pan and scan security cameras use PoE+.

Point

- Competitors can claim that Cisco's multiple software images for different levels of IP routing and features on the Catalyst 3750-X are confusing and unnecessary.

Point

- Competitors can point to Cisco's monolithic IOS architecture with its multiple software trains as inefficient and lacking the sophisticated features of a modular operating system.

Counterpoint

- Cisco can point out that while the market might be currently limited to access points and security cameras, the availability of PoE+ will drive further innovation and the power density achievable on the Catalyst 3750-X provides customers with considerable investment protection.

Counterpoint

- Cisco makes multiple software images available to customers to customize the solution directly to the enterprise's needs and not sell them features that they don't want to pay for, don't need, and may represent complications or security issues if left unconfigured. By offering multiple software images, Cisco is giving customers what they need.

Counterpoint

- Cisco can respond by saying that IOS is one of the most battle-hardened and tested operating systems on the market today. Cisco can also point to the advances it is making in other product lines to move beyond the traditional IOS architecture as a sign that it is moving with the times. This coupled with the popularity and breadth of deployment make IOS the preferred and most copied switch interface in the world.

Buying/Selecting Criteria

Management/Ease of Use



- Cisco's StackWise Plus enables simplified management of a stack of Catalyst 3750-X devices by presenting a single network management interface for managing the stack, and by providing persistent configuration across the stack even in the event of a device failure and/or replacement. This gives a stack of Catalyst 3750-X switches a chassis-like look and feel for management and configuration.
- Additionally, when configured to do so, the ability to simply add a switch to the stack which will assume a subservient state and configuration from the stack master makes adding ports as simple as adding a line card to a modular switch.
- Cisco's integrated Web-based management interface with Cisco Smartports enables policy-like administration of a stack of Catalyst 3750-X switches, enabling the customer to deploy a wide set of rules and configuration parameters to hundreds of ports simultaneously.

- The Cisco Catalyst 3750-X series can also be managed on a broader basis through CiscoWorks, providing enterprises with an end-to-end view of the network.

Performance



- The Catalyst 3750-X Series supports 64 Gbps stacking with StackWise Plus and supports local switching. The original StackWise did not support local switching, but that has been resolved with StackWise Plus.
- The Catalyst 3750-X delivers 101.2 Mpps of forwarding performance, which is among the best in the market for fixed configuration switches.
- The Catalyst 3750-X supports full Layer 2+ or Layer 3 functionality, and delivers equal performance regardless of which role the switch is deployed in.

Port Diversity



- The Catalyst 3750-X supports PoE and PoE+ and also comes in non-PoE models. The 3750-X is one of a select few stackable products on the market today that supports PoE+ and does so with significant PoE power to draw from.
- The StackPower feature of the Catalyst 3750-X gives customers considerable flexibility to install very dense PoE or PoE+ environments and still maintain power supply redundancy.

Scalability



- Up to nine Catalyst 3750-Xs can be stacked and managed as a single unit, which is one higher than most other competitive offerings on the market. With Gigabit and 10 Gigabit uplinks, Cisco currently has good interface flexibility, giving customers a great deal of choice in how they build and expand their wiring closet networks.
- The Catalyst 3750-X can be purchased with or without four SFP or two SFP+ uplinks, providing distributed uplink capabilities or centralized uplinks from another member of the stack. Because the stack is treated as a single unit, EtherChannel can be used across stack members to provide uplink fault tolerance in the event of a device failure.
- Up to 432 10/100/1000 interfaces, 36 SFP interfaces and 18 SFP+ interfaces and can be supported in a single stack. The 3750-X series offers highly competitive 10/100/1000 switching density.

Total Cost of Ownership



- While more expensive, the Catalyst 3750-X does deliver native Layer 3 services and advanced multi-layer classification in its standard image, features for which many competitors still charge extra.
- Cisco's pricing strategy around the Catalyst 3750-X reflects the advanced functionality and high availability features present in the product. Cisco positions the Catalyst 3750-X as an intermediate solution between the cost point of a fixed system and the cost point of a chassis device.
- Cisco charges approximately \$3,000 for an upgrade license for advanced enterprise routing functionality such as BGP, full OSPF, multicast routing, VRF-lite, IPV6 routing and Embedded Event Manager (EEM).
- Cisco has been constantly committed to the Catalyst 3750-X series, with the -X models being the third iteration of the Catalyst 3750 family. This adds an element of investment protection that is appealing to the enterprise buyer.

Metrics

Physical Characteristics

Device Class	Layer 3
Primary Target Market	Wiring Closet

QoS Features

Total Number of Transmit Queues Per Port	4
Total Number of Receive Queues Per Port	4
Rate Limiting Granularity	1% of Interface Speed

Protocol Support

IP Routing	Yes
IP Routing Protocols	RIP, OSPF, (E)IGRP, BGP4, HSRP, DVMRP, PIM-DM, PIM-SM

Interface Support

10/100/1000Base-T	24-port, 48-port
10/100/1000Base-T with 802.3af	24-port, 48-port
1000Base-X (GBIC or SFP)	12-port switch, models support 0, 2, or 4 uplinks
10/100/1000Base-T with 802.3at (PoE+)	24-port, 48-port
10G - XENPAC	12-Port, 2-Port X2 Uplinks Some Models
Other (Specify Type and Port Count)	10G to 2G TwinGig module to provide 2x1G connectivity on 10G port
10G - 10GBASE-T Copper	None
Special Modules (Non-line Cards)	None
PoE Power Budget	48 ports
802.3 at PoE+ Power Budget	48 ports

High Availability

Redundant Power Supplies	Yes
Non-Stop Code Upgrade	No

Performance

Aggregate Switch Throughput	160 Gbps
Forwarding Rate	101.2 mpps max, 48 port model
Non-blocking Wire Speed	Yes
Switch Forwarding Latency	5.6 microseconds

Pricing

Switch Price	WS-C3750X-24T-S @ \$6500 List
Expansion Module Pricing	C3KX-NM-1G= @ \$500 List

Support

Standard Warranty	Enhanced Limited Lifetime Warranty. Original Owner, 90 Days TAC, 5 Years power supply and fan, ends 5 years EOS, Lifetime Software update on based images
Enterprise Maintenance Contract	Cisco SmartNet Offerings

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