Cisco® Catalyst® 3750 Series with Cisco StackWise™ Technology

Raising the Bar in Stackable Switching
Cisco Catalyst 3750 Series

- Market Trends
- Catalyst 3750 Innovation
- StackWise Technology
- Gigabit Ethernet
- Intelligent Services
- Deployment Scenarios
- Competitive Positioning and Advantages
- Summary
Business Issues Driving Today’s Infrastructure Investments

- Productivity improvements
- Network and data security
- Operational simplicity
- Cost of ownership
- Ease of use/end-user satisfaction
- Business resiliency
- Business solutions
Wiring Closet Switch Market Trends

- Intelligent services at the edge
  Enhanced security, quality of service (QoS), and availability for mission-critical applications
- Converged wiring closet
- Longer product deployments
- Preparing for transition to Gigabit Ethernet
Cisco Catalyst 3750 Technology Strategy

Intelligent Services
IP Communications

Innovation

Performance
Gigabit Ethernet Optimized

Evolutionary Infrastructure
Revolutionary Cisco® StackWise™ Technology
Cisco Catalyst 3750 Series

- Enterprise-class, highly stackable, multilayer switching line optimized for Gigabit Ethernet configurations
- Enables the deployment of network-wide intelligent services
  - High Availability
  - Enhanced Security
  - Advanced Quality of Service
- Familiar Cisco IOS® Software
- Powerful access layer or small network backbone switch deployed in enterprise wiring closets, branch offices, and space constrained data center environments
- Automatic Cisco IOS versioning, automatic stack configuration, and embedded Cluster Management Suite software allows easy configuration of network-wide intelligent services in local or remote locations
Cisco Catalyst 3750 Positioning

**Cisco Catalyst 3750**
- Stackable 10/100/1000 and Gigabit Ethernet configurations
- High performance switching and routing
- Enterprise-class intelligent Layer 3, Layer 4 services
- Clustering capable

**Cisco Catalyst 3550**
- Stackable 10/100 switching
- GBIC-based Gigabit connectivity
- Advanced intelligent Layer 3, Layer 4 services
- Clustering capable

**Cisco Catalyst 4500**
- Modular 10/100/1000
- Highest density switching capacity
- Layer 2/3/4-7
- 32-720 Gbps switching engine
- Highest availability

**Cisco Catalyst 6500**
- Modular 10/100/1000
- High performance Layer 2, 3, 4
- 24-64 Gbps Switching Engine
- Highest availability

**Cisco Catalyst 2950**
- Stackable 10/100 switching
- GBIC-based Gigabit connectivity
- Advanced intelligent Layer 3, Layer 4 services
- Clustering capable

**Function and Flexibility**

**Fast Ethernet**
- Optimized

**Gigabit Ethernet**
- Optimized
Cisco Catalyst 3750 Series

- Improved Operating Efficiency through Resiliency and Ease of Use
  - Fault-tolerant, Bi-directional 32-Gbps Cisco StackWise Technology
  - Automated Configuration & Management
- Next Generation in Desktop Switching
  - Optimized for Gigabit Ethernet
  - IPv6-capable in hardware
- Adapts to Changing Business Needs
  - Configuration Flexibility
  - Support for Dynamic Network Patterns
  - Automation of Layer 2-4 Intelligent Services
## Cisco Catalyst 3750 Series Switches—Model Overview

### Two Software Versions

**Standard Multilayer Software Image (SMI)**
- Enterprise-class intelligent services: advanced QoS, enhanced security, high availability, RIP, and static IP routing

**Enhanced Multilayer Software Image (EMI)**
- SMI feature set plus: dynamic IP unicast routing, smart multicast routing, routed ACLs, HSRP

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### Catalyst 3750G-24T
- **24 10/100/1000 ports**
- **4 SFP ports**

### Catalyst 3750G-24TS
- **24 10/100/1000 ports**
- **4 SFP ports**

### Catalyst 3750-24
- **24 10/100 ports**
- **2 SFP ports**

### Catalyst 3750-48
- **48 10/100 ports**
- **4 SFP ports**

Catalyst 3750-24/48 are orderable with either software image preinstalled

Catalyst 3750-24/48 can be upgraded from SMI to EMI
Cisco Catalyst 3750 Technology Strategy

Innovation

Evolutionary Infrastructure
Revolutionary Cisco StackWise Technology
Cisco Stackable Switch Evolution

Pay As You Grow Meets Intelligent Ethernet

1997
- 10 Mbps
- Layer 2 features
- Standalone

1999
- 10/100 Mbps
- 100 Mbps port interconnection
- Layer 2+

2001
- 10/100/1000 Mbps
- Fast Ethernet Stacking with GigaStack®
- Layer 2–4 switching
- Layer 3 routing
- Inline power
- Single device management
- GBIC uplinks

2002
- High density 10/100/1000 Mbps
- Cisco StackWise technology – 32 Gbps
- Layer 2–4 switching
- IPv6-capable
- Automated stack management
- Small Form-Factor Pluggable (SFP) uplinks
- Cross-Stack intelligent services

2003
Prior Generation Stacking

Individual Switches, Managed Together

- 1-Gbps Stack Interconnect
- User Ports for Stacking
- No Layer 3 Redundancy
- EtherChannel and QoS Per Device Only
Cisco StackWise Technology

- 32-Gbps Stack Interconnect
- Stack up to 9 Units
- Separate Stacking Port
- 1:N Master Redundancy
- Autoconfiguration and Cisco IOS® Version Check/update
- Cross-Stack EtherCchannel and QoS
- Line-Speed Performance with QoS and ACLs for Gigabit Ethernet
- Hot Add and Delete of Gigabit Ethernet and Fast Ethernet Chassis in Same Stack
- Patented Cable Connector

Unified Stacking, Behaving As a Single Unit

After loading Kaon’s plugin, this 3D model can be viewed in presentation mode

Click the following link to get Kaon’s PowerPoint Viewer add-in: http://www.kaon.ws/ppinst.php
Cisco Eases Deployment of Remote Infrastructure with Automation

- Automatic Cisco IOS version check of new units with ability to load images from master Flash
- Automatic configuration of new units with global configuration when connected to the stack
- Stack managed with single IP address
- Hot add and delete of switches – auto reconfiguration

Single IP Address
10.0.1.25
Higher StackWise Availability with the Cisco Redundant Power System 675

- Power supply redundancy
- Supports up to six Cisco networking devices including all Catalyst 3750, 3550, and 2950 switches
- Immediate failover capability
- Cisco RPS 675 senses failure and delivers uninterrupted power to device
- Upon failure, Cisco RPS 675 alerts the network administrator that the other connected devices will not be supported until the failed device is restored or replaced
- Cisco RPS 675 automatically resets into standby mode when the failed unit is replaced with a new unit
Cisco Catalyst 3750 Technology Strategy

Innovation

Performance
Gigabit Ethernet Optimized
Phases of Gigabit Ethernet Adoption

Phase 1: Enterprise Backbone and Data Center

Phase 2: Commercial Backbone and Server Connectivity

Phase 3: Enterprise Wiring Closet

Phase 4: Commercial Wiring Closet and Small Data Center

1999 2000 2001 2002 2003 Future
Factors Driving the Evolution to Gigabit Ethernet—Traffic Increase

- Traffic increased by a factor of 400 between 1990 and 1998
- Next 5-year growth is expected to be by a factor of 1000
- All PCs and servers will ship with 10/100/1000BASE-T network cards by 2003
- Migration from distributed storage to centralized storage
- Ethernet connected devices will grow exponentially (alarms, badge readers, security cameras, monitors, etc.) creating a need for more bandwidth
- Natural migration of core network technologies to the access edge of the network
Gigabit Ethernet with Intelligent Switching Is Crucial for Success

- Higher bandwidth alone does not solve the problem. Layer 2 switches are limited to the processing and forwarding of Layer 2 information only.
- Multilayer switches can look deeper into the frame => intelligent decisions are based on detailed Layer 3 or Layer 4 information.
- Why this is useful:
  - Prevents bottlenecks caused by higher bandwidth by using intelligent routing and allows you to use existing infrastructure to the core.
  - Adds an intelligent layer of security to the network which results in lower hardware operations costs and information loss.
  - Increases the network quality of service which enables the deployment of lower-cost, IP-based services and applications (IP telephony, video on demand, application distribution servers, etc.).
  - Increases network availability by monitoring routes and dynamically routing around network outages or providing least cost routing.
Expanding Gigabit Ethernet Deployments

10/100/1000 Gigabit over Copper

- High-performance desktops
- Dedicated workstations
- Linux clusters
- Space constrained data center
  Server racks

Gigabit SFP Uplinks

- Wiring closet aggregation
- Wiring closet to distribution
- Gigabit fiber server connections
- Extra 1000BASE-T connections
  (with 1000BASE-T SFP transceiver)
Cisco Gigabit Ethernet Switching in the Data Center

- Data center aggregation
- Server aggregation
- Linux clustering
- Storage networking
- Application optimization
- Enhanced data center security

Cisco Catalyst 3750
Cisco Catalyst 4500
Cisco Catalyst 6500
Cisco Catalyst 3750 Technology Strategy

Intelligent Services
IP Communications

Innovation
Cisco Catalyst 3750 Series Switches
Intelligent Features Overview

**Availability**
- Cisco StackWise technology
- Layer 3 load balancing (ECR)
- Sub 1 second Layer 2 failover
- Sub 3 second Layer 3 failover
- RPR+
- IP Unicast Routing
  - Static, RIPv1/v2, OSPF, IGRP, EIGRP
- IP Multicast Routing
  - PIM, DVMRP tunneling
- HSRP
- DTP and PAgP
- Dynamic VLANs
- IGMP snooping
- Spanning-Tree Protocol enhancements
- Layer 2 load balancing (PVST)
- Distributed Layer 2 functions
- Distributed Cisco Express Forwarding
- 802.1s/w

**Security**
- IPv6-ready in hardware
- MAC address notification
- DHCP interface tracker
- CMS security wizard
- Access control lists
- Private VLAN edge
- Port security
- SNMPv3
- 802.1x
- SSH

**Quality of Service**
- Queue servicing:
  - Shaped round robin and strict priority queuing
  - Weighted tail drop
  - Ingress traffic policing
  - Egress traffic shaping
- 802.1p CoS and DSCP
- Congestion avoidance
  - Granular rate limiting
  - Jumbo Frames

**Manageability**
- Autoconfiguration
- Auto Cisco IOS versioning
- Cisco CMS Software
- CiscoWorks
- Voice VLAN
- Dynamic VLAN
- Auto QoS
Identity-Based Network Services

What It Does:

Using the 802.1x protocol with Cisco enhancements, the network grants privileges based on user logon information, regardless of the user’s location or device.

Benefits:

Allows different people to use the same PC and have different capabilities.

Ensures that users get only their designated privileges, no matter how they are logged onto the network.

Reports unauthorized access.
With millions of new devices becoming IP aware, the need for increased addressing and “plug and play” networking is only met with the implementation of IPv6.
Cisco Cluster Management Suite Software

- Manage up to 16 geographically dispersed switches simultaneously with one IP address
- Runs from Cisco IOS Software for free
- Web-based interface simplifies configuration and management of Cisco IOS Software functions
- Manages Cisco StackWise technology stacks
- Use as an alternative to command-line interface (CLI)
- Enables simplified configuration of Layer 3, Layer 4 intelligent services
- Full backward compatibility provides support for Cisco Catalyst 1900, 2900 XL, 3500 XL, 2950, 3550, and 3750
Cisco Cluster Management Suite

- Wizards simplify complex configurations
  - Avoid common pitfalls
  - Advanced quality of service enables traffic prioritization
  - Easy configuration of Layer 3 IP unicast and multicast routing
- Novice users can select “Guide” mode
- IT professionals can select “Expert” mode

- Data, voice, and video wizards
- Security and QoS wizards
- Inter-VLAN routing and multicast routing wizard

**Guide Mode**
- Provides step-by-step prompts
- Used for many of the Layer 3 configuration options

**Expert Mode**
- Compact windows provide configuration options without prompts
Sophisticated Intelligent Services Made Easy

- Extensive, context-sensitive help files make CMS even easier
  No need to access an external Web site for help
- Achieve greater control of access control lists
  CMS allows users to differentiate traffic into various categories and permit or deny certain categories of traffic
- One-click for easy software upgrades
Multidevice, Multiport Management

- Save time by selecting multiple ports across devices for simultaneous configuration
- Dynamic and detailed representation of up to 16 switches in a cluster or StackWise stack
- Simplifies troubleshooting and debugging
Topology View

• Provides comprehensive layout of all clustered devices:
  - Switches
  - IP phones
  - Wireless access points
  - Long-Reach Ethernet customer premises equipment
• Launch the Cisco Aironet® access point management interface
• Displays the StackWise stack
• Filtering options allow important information to be quickly found
• Automatically discovers the network
  - Cisco CMS can see any Cisco Discovery Protocol-enabled device
Enterprise Branch Office—Cisco Catalyst 3750 Wiring Closet and Distribution

- Inter-VLAN routing in the distribution layer
- Layer 3 QoS and security through DSCP support and ACLs in the access layer
- Cisco 2600/3700 for WAN access to branch offices (through VPN)
Enterprise Wiring Closet: Catalyst 3750/4500/6500 Integrated Campus

Catalyst 3750

- Printer
- Workstations

Wiring Closet Building 1
(small building)

- Layer 2 uplinks to the backbone, load sharing through Cross-Stack EtherChannel
- Option for routed uplinks to the backbone for faster failover, load sharing through equal cost routing
- Layer 3 QoS and security through DSCP support and ACLs in the access layer

Catalyst 4500

- IP Phones
- Workstations
- Shared Printers

Wiring Closet Building 2
(large building)

Catalyst 6500

- Campus Backbone

Cisco 7xxx

WAN Aggregation

Data Center

Catalyst 6500

- Cache Engine
- Server Farm
- IP PBX Call Processing

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Space-Constrained (1-3 RU) Server Clustering—Cisco Catalyst 3750G-24TS Switch

- Layer 2-3 required
- Space-constrained racks
- Uplinks to Catalyst 4500 or 6500 for end-to-end security, QoS

EtherChannel across stack
- Redundant uplinks to the core
- Line rate performance with security and QoS activated
Summary
Services and Warranty for the Cisco Catalyst 3750

- **Software upgrades for life**
  Free maintenance and version releases for Cisco IOS Software originally provided with the product

- **Limited lifetime hardware warranty**
  Advance replacement shipping within 10 business days
  Guest access to Cisco.com

- **Total Implementation Solutions (TIS)**
  Project management and training
  Installation, test, and cutover
  Major moves, adds, changes
  Design review and product staging

- **Configuration and verification services ease deployment of network-wide intelligent services – QoS and multicast management**

- **SMARTnet® and SMARTnet Onsite**
  24-hours a day, 7 days a week access to technical support through the Web, e-mail, and phone
  Advance replacement of hardware parts in as little as 2 hours
  Onsite field engineer (SMARTnet Onsite) to assist in hardware replacements
## Operational Technical Support Services

### Onsite Services
- 24 hrs/day, 7 days/wk, 2 hr response
- 24 hrs/day, 7 days/wk, 4 hr response
- 8 hrs/day, 5 days/wk, 4 hr response
- 8 hrs/day, 5 days/wk, next business day
- 24 hrs/day, 7 days/wk, 2 hr response
- 24 hrs/day, 7 days/wk, 4 hr response
- 8 hrs/day, 5 days/wk, 4 hr response
- 8 hrs/day, 5 days/wk, next business day
- 10 business day replacement

### Advance Replacement of Hardware
- 24 hrs/day, 7 days/wk, 2 hr response
- 24 hrs/day, 7 days/wk, 4 hr response
- 8 hrs/day, 5 days/wk, 4 hr response
- 8 hrs/day, 5 days/wk, next business day
- 10 business day replacement
- 24 hrs/day, 7 days/wk TAC access
- Registered Cisco.com access
- Software updates
- Software maintenance

### Diagnostics

### Technology Refresh

### SMARTnet

- Warranty
- SAS
- SASU
- NBD
- 8X5X4
- 24X7X4
- 24X7X2
- NBD
- 8X5X4
- 24X7X4
- 24X7X2

### SMARTnet Onsite
Cisco is Your Partner for Delivering Intelligent Networks

- More than 1600 support engineers, 40 percent with CCIE® certification
- Average 15 years experience
- 80 percent issues resolved online
- Highest level of customer satisfaction *
- Multiple awards for service
- 30,000 Technical Assistance Center cases per month
- 5000+ partners worldwide deliver direct and subcontracted services for Cisco technology
- 1200+ partner-employed CCIEs

* Information Week Study in 4th Qtr 2001
Summary

• Adding innovative Catalyst 3750 Series with revolutionary StackWise technology to stackable switch offerings
  
  Increased performance
  Increased availability
  Unified stacking: Multiple switches behaving as a single unit
  Automated deployment and management

• Taking leadership role in gigabit Ethernet transition

• Delivering advanced intelligent services across the stack at wire speed

• Lowering operating expenses by automating deployment and management
Empowering the Internet Generation