



# Catalyst 스위칭 제품 업데이트

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Consulting System Engineer

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## Catalyst Switch 발전 : 주요 내용

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- **장비 안정성 및 보안등의 IP 서비스의 강화**  
Catalyst 6500 Supervisor Engine 32  
High Availability: Fault Prevention
- **10GE 스위칭의 확장**  
Catalyst 6500 Supervisor Engine 32 (2x10GbE)  
Catalyst 4500 Supervisor Engine V-10GE
- **10/100/1000 & POE의 지원 확장**  
Gigabit Ethernet IP Phone: 10/100/1000 & F  
Catalyst 3560 10/100/1000 and PoE models  
Catalyst 3750 10/100/1000 and PoE models  
Enhanced Catalyst 6500 interface modules







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# Cisco Catalyst Switches

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<b>Performance</b> <b>Services</b> <b>Functions</b> <b>Density</b>	 <p><b>Catalyst 6500</b></p>	<b>Industry Leading Modular Chassis</b> <ul style="list-style-type: none"> <li>Multiple deployment and performance options</li> <li>Highest availability and 10/100/1000 + GbE densities</li> <li>Integrated WAN and advanced IP services modules</li> <li>Wire-speed 10 GbE aggregation</li> </ul>	<b>Deployment Focus</b> <ul style="list-style-type: none"> <li>Core</li> <li>Distribution</li> <li>Data center access/core + services</li> <li>High performance wiring closets</li> <li>Medium wiring closets</li> <li>Small/medium distribution/core</li> <li>Medium data center access/core</li> <li>Large/medium branch offices</li> <li>Small wiring closets</li> <li>Medium branch office</li> <li>Small data center access</li> <li>Small network aggregation</li> <li>Small wiring closets</li> <li>Small branch offices</li> <li>Industrial environments</li> <li>Classroom deployments</li> </ul>
	 <p><b>Catalyst 4500</b></p>	<b>Mid-Range Modular Chassis</b> <ul style="list-style-type: none"> <li>Resilient Layer 3 switching with intelligent Layer 3 and 4 services</li> <li>High density 10/100/1000</li> <li>Power over Ethernet modules</li> <li>Media configuration flexibility with WAN connectivity options</li> </ul>	
	 <p><b>Catalyst 3550/3560/3750</b></p>	<b>Advanced Fixed Configuration</b> <ul style="list-style-type: none"> <li>Layer 3 switching with intelligent Layer 3 and 4 services</li> <li>Resilient stacking options</li> <li>Medium density 10/100/1000</li> <li>Power over Ethernet versions</li> </ul>	
	 <p><b>Catalyst 2950/2970</b></p>	<b>Entry-Level Fixed Configuration</b> <ul style="list-style-type: none"> <li>Layer 2 switching with intelligent Layer 3 and 4 services</li> <li>Advanced cluster management</li> <li>Fixed-configuration 10/100/1000</li> <li>Redundant power option</li> </ul>	

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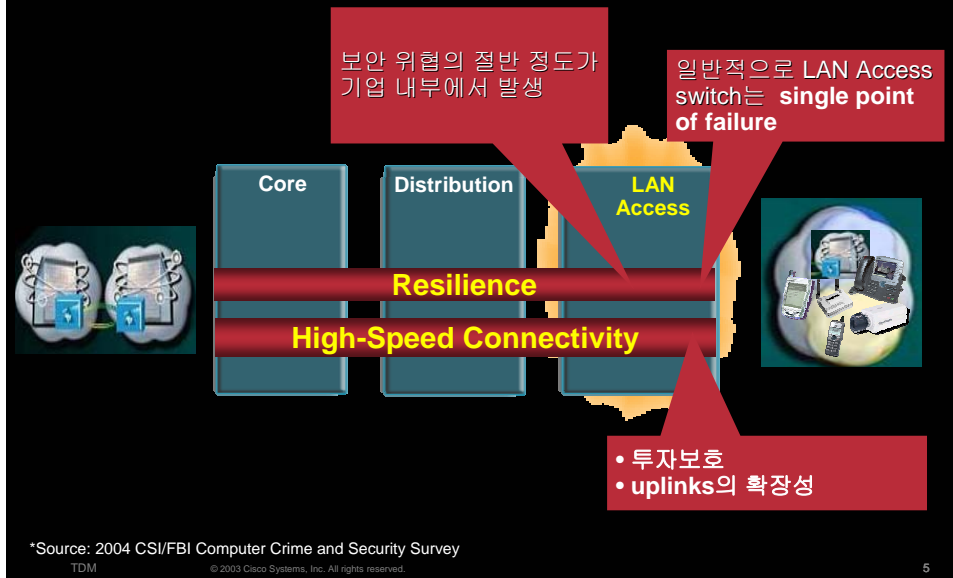


장비 안정성 및 보안등의  
IP 서비스의 강화

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## LAN Access Layer 이슈 및 동향

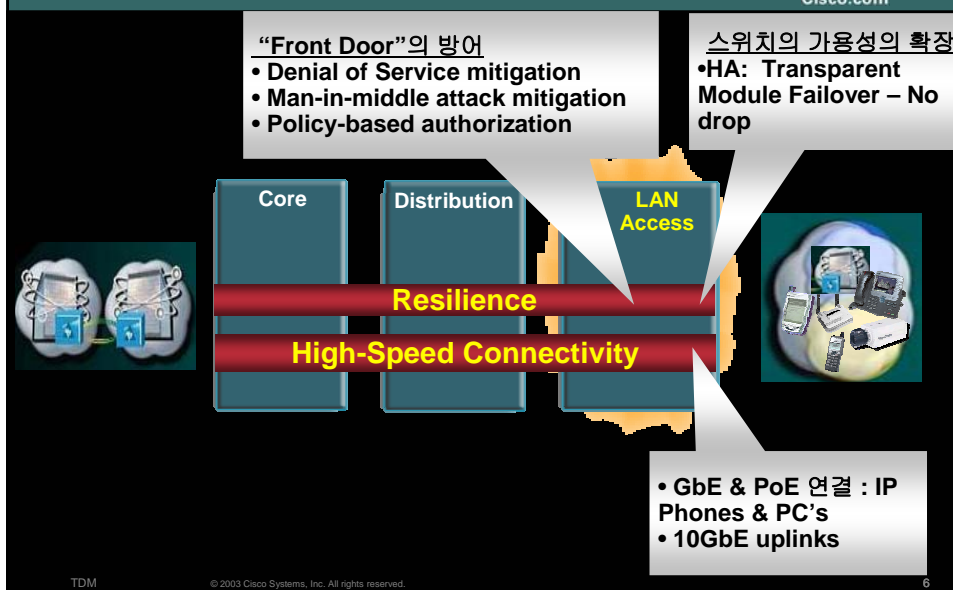
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## LAN Access Layer의 역할 변화 Key Element in an Integrated System

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# Catalyst 6500 Supervisor Engine 32

Extending Catalyst 6500 Innovations to Access Layer at Right-sized Price/Performance



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## Industry-leading Integrated Security

- Denial of Service mitigation: Multiple CPU rate limiters
- Man-in-middle attack (identity theft) mitigation
- Identity-Based Networking (802.1x) extensions

## Advanced IP Services

- Hardware GRE, IPv6, NAT/PAT, MPLS
  - Field-upgradeable daughter cards
- Meet future requirements without forklift upgrades



## List Price

Starting at \$10,000  
(when purchased  
with chassis + fans)

## Highest Level of Availability

Support for sub-second Stateful  
SwitchOver (SSO) - IP Phone  
calls and WLAN connections  
don't drop

## Cost Savings: Integrated Uplink Ports

2x10GbE or 8xGbE SFP

Industry-standard LX4 optics enable  
10GbE over existing campus MMF cabling



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# Catalyst 주요 모듈 이중화

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## Downtime factors with single connections to Layer 2 access switches:

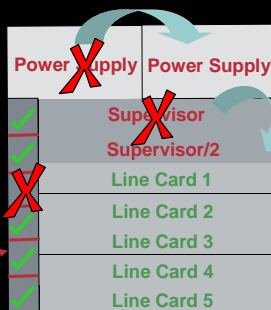
- Supervisor Engine
- Power Supply
- Fan Tray

Hardware Redundancy  
for the most complex  
components

## Supervisors (1+1)



## N + 1 Redundant Fans



## Enclosed Passive Backplane

## Power Supplies (1+1)



## Hot Swap Line Card

Much higher MTBR than  
Supervisors, Fans & Power



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## Catalyst 6500 Sup. 이중화 – NSF/SSO

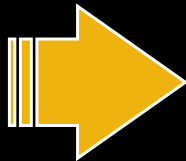
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The Catalyst 6500 supports a range of HA options from RPR and RPR+ to Layer 2 SSO and Layer 3 SSO/NSF...

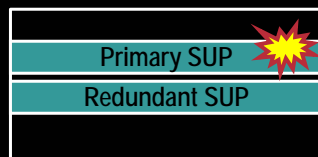
Route Processor  
Redundancy  
(60+ Seconds)

Route Processor  
Redundancy +  
(30+ Seconds)

Layer 2 Stateful  
Switchover  
(1+ Second)



Non Stop Forwarding (NSF)  
Stateful Switchover (SSO)



NSF/SSO provides for sub-second Layer 3 **stateful** switchover – allowing the **6500** to minimize knowledge of any failure from end users...

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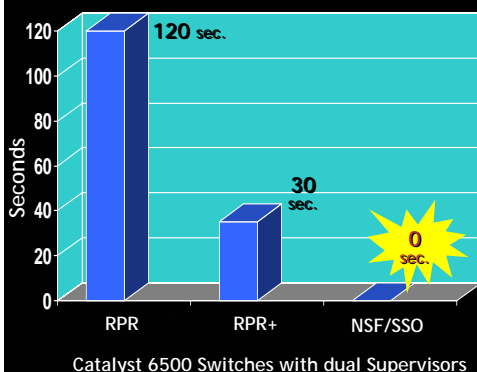
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## Catalyst 6500 NSF/SSO - 공식 기관의 테스트

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Networks built with Catalyst 6500 Series Switches deliver **zero packet loss** on Supervisor failovers



OPUS

Validated by  
OPUS One

Cisco NSF/SSO

- NO Link Flaps
- NO Route Flaps
- **Zero** impact to Data/Voice/Video
- Supported on ALL 6500 Chassis

Certified QoS & Security with HA

Only LAN switching platform to deliver **BOTH L2 AND L3** Resiliency

**Catalyst 6500 L2/L3 Resiliency: Enabling Non-Stop Application Delivery**

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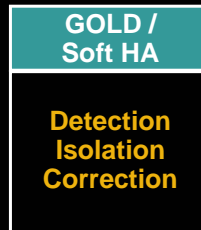
## GOLD / Soft HA

### Fault Detection & Auto-Correction의 개선

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#### Improving Resiliency in Redundant & Non-Redundant Deployments

- Misconfigured System
- Memory Corruption
- Software Inconsistency
- System Faults



- 시스템 안정성의 개선
- 네트워크 안정성의 개선

- 빠르고 유용한 fault detection을 위한 Software의 개선
  - Online diagnostics for proactive fault isolation at boot-up, run-time, on-demand
- Soft failures의 detect and correct 에 대한 기능
- Detect failures that the runtime software may not be able to detect

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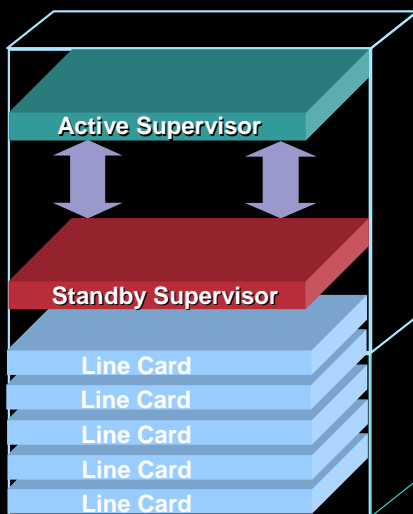
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## Catalts 4500 Sup. 이중화 : Stateful Switchover

### Non-Stop Application Delivery and Layer 2 Forwarding

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- Active/standby supervisors are synchronized at all times
- Seamless Supervisor Engine sub-second switchover with NO interruption to packet forwarding and Layer 2 sessions
- Protect application delivery from Supervisor Engine hardware or software failure

#### SSO Synchronizes:

Port Security	802.1x
IGMP Snooping	ARP/DHCP
VLANs/Trunks/Ports	STP/VTP/DTP
PAgP/LACP	802.1Q
ACL/QoS	Voice VLAN with PoE

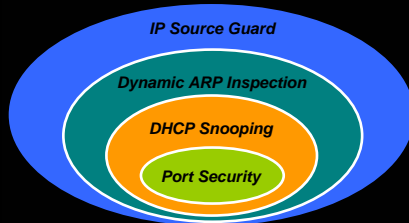
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## SSO의 공식 기관의 Test Demonstrated on the Catalyst 4500

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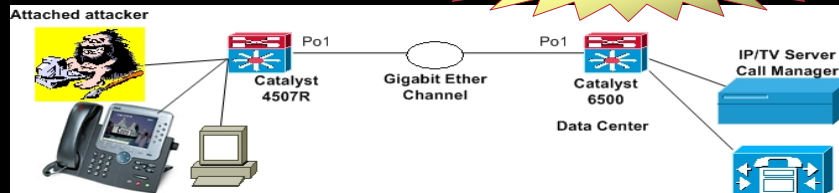
**OPUS**

**Certified Security with HA**

### Opus Testing Results

- 1) Attacks such as Man-in-the-middle and IP spoofing failed **before, during and after the sub-second switchover**; in other words, the network was never vulnerable to these attacks
- 2) Failover times of **0.024 seconds** observed for unicast and multicast traffic with system under attack.

**Failover 중에도 보안 기능의 유지**



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Results to be published in October 2004

## CPU Rate Limiters

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- Hardware-based DoS Protection 기능
- Provides mechanism to protect the RP CPU 보호 기능 제공
- 100% CPU utilization 현상 방지
- CPU 유입 트래픽의 양 조절
- 내부 및 외부 공격이 네트워크 잘못된 망 구성 또는 운영자의 실수가 발생할 경우에도 장비 다운 방지



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## 10GE 스위칭 장비의 확장

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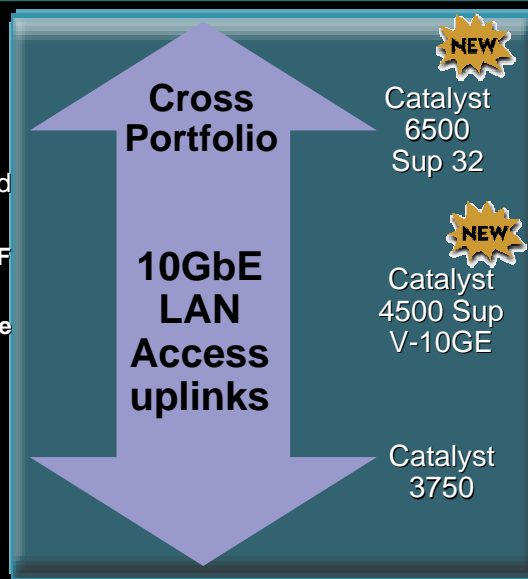
### LAN Access 동향 10GbE 확장 – 투자 보호

Cisco.com

#### 10GbE 확장

- 10/100/1000 driving higher uplink scaling requirements
- Continued 10GbE operational and cost efficiencies
  - Utilize existing 62.5 micron MMF cabling w/ LX4 optics
  - Less fiber utilization vs. multiple GbE fiber links
  - Attractive price/performance

다양한 범위의 10GbE  
LAN Access uplink  
options



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## 기 제공된 10GE Solution

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### Catalyst 6500 : 4 port 10GE module

- CEF720 Linecard
- Two x 20Gb Connections into the Switch Fabric
- Supports optional DFC
- Up to 48Mpps when DFC is used



### Catalyst 3750G-16TD Stackable Switch

- 16-port 10/100/1000 with one 10GbE uplink
- Integrated StackWise technology for 32Gbps stacking
- Cross-stack Etherchannel of up to two 10GbE uplinks for redundancy and increased throughput



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## Catalyst 6500 Supervisor Engine 32

**Catalyst 6500 Innovations to Access Layer at Right-sized Price/Performance**



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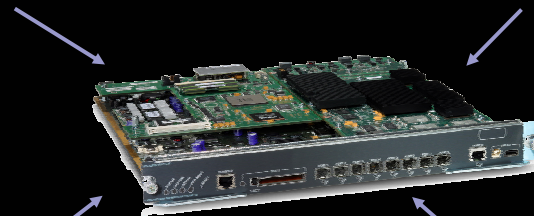
### Industry-leading Integrated Security

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- Identity-Based Networking (802.1x) extensions

### Advanced IP Services

- Hardware GRE, IPv6, NAT/PAT, MPLS
- Field-upgradeable daughter cards

Meet future requirements without forklift upgrades



### Highest Level of Availability

Support for sub-second Stateful SwitchOver (SSO) - IP Phone calls and WLAN connections don't drop

### Cost Savings: Integrated Uplink Ports 2x10GbE or 8xGbE SFP

Industry-standard LX4 optics enable 10GbE over existing campus MMF cabling

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## Supervisor 32 호환성

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- 모든 chassis type 지원 (including the E-Series)
- **High Speed Fan Tray** 와 최소 **2500W AC** power supply 또는 **1300W DC** power supply 필요
- Sup720 (1&2 in 3 slot, 5&6 in 6/9 slot chassis, 7&8 in 13 slot)과 동일 슬롯 사용
- Supervisor 32 사용 가능 모듈:
  - All Classic Modules
  - All CEF256 Modules (without a DFC)
- Supervisor 32 미사용 모듈:
  - Any CEF720 Series Module (67xx Series)
  - Any dCEF720 Series Module (6802-10GE)
  - Any dCEF256 Series Module (6816-GBIC)
  - Any DFC or DFC3 (WS-F6K-DFC, WS-F6K-DFC3x, etc)
  - Any Switch Fabric Module

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## Catalyst 6500 Supervisors

Optimized for End-to-End Secure & Scalable Deployments

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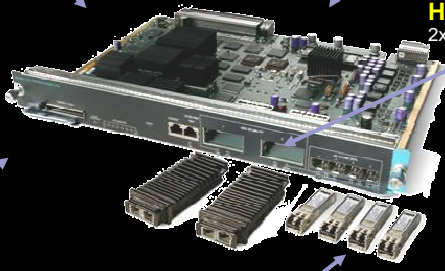
## Catalyst 4500 Supervisor V-10GE

**10GbE & GbE LAN Access Uplinks for Investment Protection**

Cisco.com

**Innovative Security**  
Patent Pending, Self Defending Network Security Features

**Availability**  
Support for sub-second stateful switch over (SSO) in redundant mode (Cat4507R & 4510R) - IP Phone calls don't drop



**Manageability**  
Integrated NetFlow for deeper network visibility

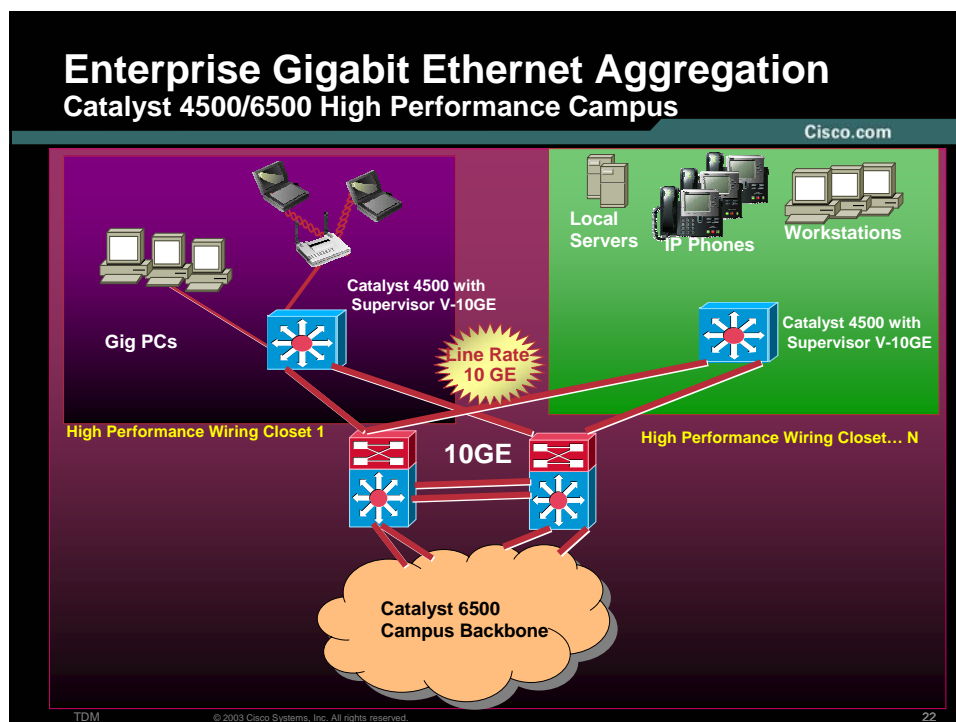
**High-Speed Uplinks**  
2x10GbE wire-speed uplinks

**Leverage existing 62.5 micron MMF**  
Industry-standard LX4 optics

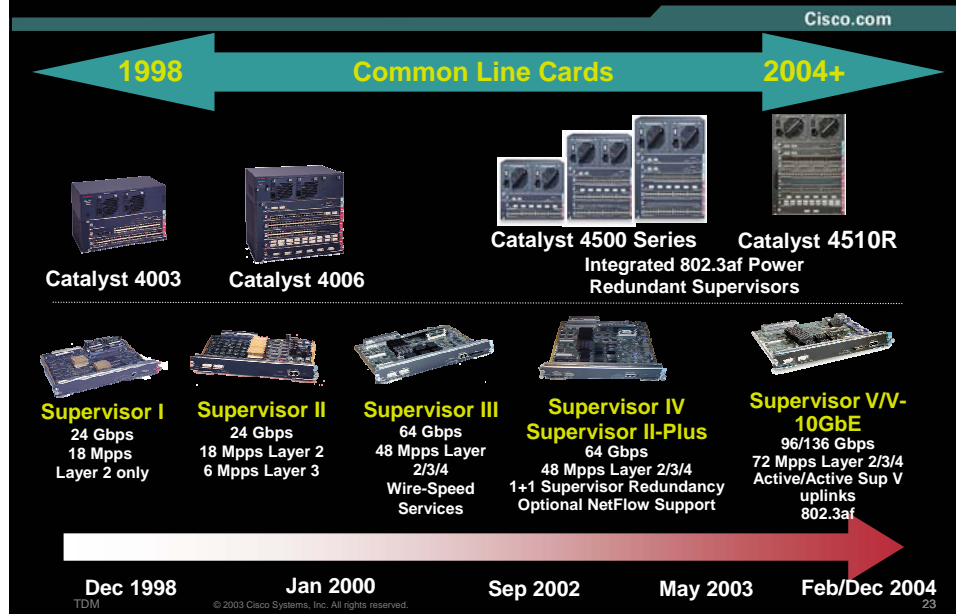
**Scalability**  
Increased Density: 384 ports

**Investment Protection**  
Future Proof network and ease transition to 10GbE by enabling 4x1GbE SFP Uplinks today

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# Cisco Catalyst 4500 Series Evolution



## 10/100/1000 & POE의 지원 확장

## LAN Access 동향

Desktop 연결: 10/100/1000 & PoE

Cisco.com

### 10/100/1000 & PoE의 적극적인 도입

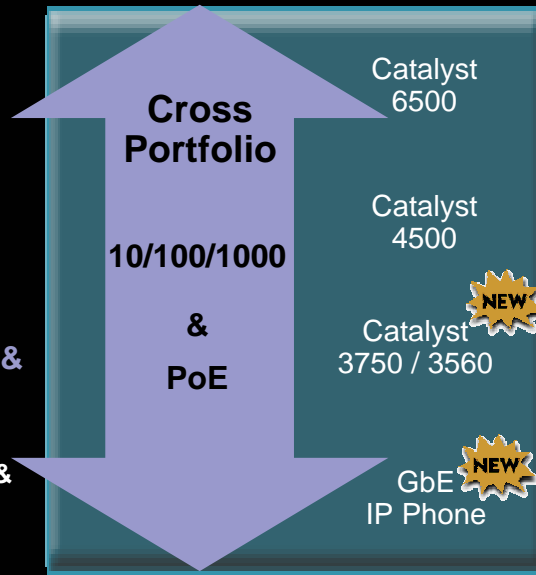
- 10/100/1000 has already crossed over 10/100 on Catalyst 6500
- Cisco has shipped over 28 million PoE ports to date

### 다양한 범위의 10/100/1000 & PoE options

- Enables broader deployments of 10/100/1000 & PoE in campus and branch networks

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## Catalyst 6500 LAN Access Interface Modules

Increased Intelligence & Investment Protection

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### 48-port 10/100/1000 (PoE) and 48-port 10/100 modules (PoE)



- Power over Ethernet option
- Rapid cable fault detection – integrated Time Domain Reflectometry (TDR) support
- Higher end-end performance – jumbo frames
- Enhanced QoS capabilities – deeper and more per-port queues

### 48-port 100BASE-X SFP



- Flexibility & investment protection
  - 100 Mbps fiber to desktops (esp. Federal market)
  - Flexible, modular SFP options

### 96-port 10/100 (RJ-21), PoE Option



- Highest-density PoE module
- Simplified, structured cable mgt. - RJ-21 interfaces

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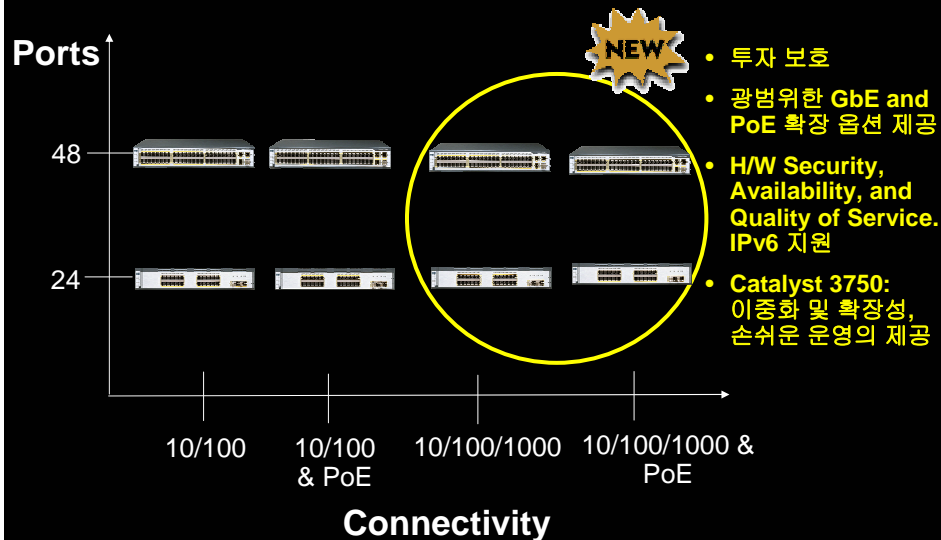
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## Cisco Catalyst 3750 and 3560 Product Lines의 확장

Gigabit Ethernet and PoE for Application Readiness

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## Cisco Catalyst 3750 GE Series

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### Catalyst 3750G-24TS-S/E1U Catalyst 3750G-48TS



24 10/100/1000 ports  
4 SFP ports  
1 RU (older version is 1.5RU)



48 10/100/1000 ports  
4 SFP ports  
1 RU

### Catalyst 3750G-24PS Catalyst 3750G-48PS



24 10/100/1000 ports  
4 SFP ports  
1 RU



48 10/100/1000 ports  
4 SFP ports  
1 RU

**IEEE 802.3af and Cisco prestandard Power over Ethernet Support**

### Two Software Versions

#### Standard Multilayer Software Image (SMI)

- Enterprise-class intelligent services: advanced QoS, enhanced security, RIP, and static IP routing

#### Enhanced Multilayer Software Image (EMI)

- SMI feature set plus: dynamic IP unicast routing, smart multicast routing, PBR, WCCP

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# Cisco Catalyst 3560 10/100/1000 Switches

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## Catalyst 3560G-24TS



- 24 10/100/1000 ports
- 4 SFP ports

## Catalyst 3560G-48TS



- 48 10/100/1000 ports
- 4 SFP ports

## Two Software Versions

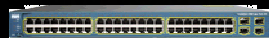
- Standard Multilayer Software Image (SMI)
- Enhanced Multilayer Software Image (EMI)

## Catalyst 3560G-24PS



- 24 10/100/1000 ports
- 4 SFP ports
- 370W IEEE 802.3af / Cisco prestandard PoE

## Catalyst 3560G-48PS



- 48 10/100/1000 ports
- 4 SFP ports
- 370W IEEE 802.3af / Cisco prestandard PoE

## Power over Ethernet

- IEEE classification supported
- 370W PoE for 24-port & 48-port configurations
  - 24 Class 3 devices (15.4W)
  - 48 Class 2 devices (7W)
- Cisco Intelligent Power Management Capabilities

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# Cisco Gigabit Ethernet IP Phone

Utilizing 10/100/1000 & PoE Connectivity



Cisco.com

Complete Cisco End-to-End Solution - 10/100/1000 IP phone interfaces extend Gigabit connectivity from switch to PC's



## • Cisco IP Phone 7971G-GE

- Feature identical to Cisco IP Phone 7970G
- Backlit, high-resolution color touch-screen display, 8 line keys, 5 soft keys
- Unconstrained 10/100/1000 bandwidth to desktop applications

## • Supports IEEE 802.3af PoE

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## Q&A

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