



OptiSwitch - MR Series

Leader in 10 GE Networking



Agenda

- ▶ **Market Trends**
- ▶ **OptiSwitch-MR Series - Product Profiles**
- ▶ **Deployment Scenarios**
- ▶ **Leader in the 10 GE Networking**
- ▶ **Summary**

Business Productivity Driving Toward Infrastructure Investments

- ▶ Productivity improvements
- ▶ Network and data security
- ▶ Operational simplicity
- ▶ Cost of ownership
- ▶ Ease of use/end-user satisfaction
- ▶ Business resiliency
- ▶ Business solutions



Enterprise Switch Market Trends

▶ Intelligent services

- ▶ Enhanced **Security**, quality of service (**QoS**), and **High Availability** for mission-critical applications

▶ Gigabit Ethernet to the Desktop



Security



Virtual Finance

High Availability



ERP

QoS



Video on Demand



Security & QoS



Video Conferencing
Application sharing

MRV OptiSwitch-MR Series Comprehensive Portfolio

Density, Services, Security, Performance

		Deployment scenario
	<p>Advanced Fixed Configuration</p> <ul style="list-style-type: none"> ▶ Layer 3 switching with Intelligent layer 2/3/4 QoS ▶ High Density of 10/100/1000 in 1RU ▶ Resiliency stacking options ▶ Advanced security 	<ul style="list-style-type: none"> ▶ Medium/Small wiring closets ▶ Enterprise Distributed Core ▶ Branch offices ▶ Datacenter
	<p>Optimized Fixed Configuration</p> <ul style="list-style-type: none"> ▶ Layer 2 switching with Intelligent layer 2/3/4 QoS ▶ Resiliency stacking options ▶ Advanced security 	<ul style="list-style-type: none"> ▶ Departmental workgroup ▶ Desktop connectivity ▶ Small/Medium Branch offices ▶ Wiring Closets ▶ Servers connectivity

MRV MR Series

▶ Next Generation Enterprise-class services

- ▶ **Enhanced Security:** ACL, port security, Private VLAN, RADIUS/TACACS+, 802.1x, SSH, SNMPv3*
- ▶ **Advanced QoS:** Layer 2–4 QoS with CoS, Weighted Round Robin (WRR), Strict priority queuing scheduling, Rate limitation
- ▶ **High Availability:** IP Routing, VRRP (also HSRP), MSTP*, IGMP snooping, Dual copies of Firmware images, Multiple Configuration files, Stacking, Redundant Power Supply (optional)

▶ High performance

- ▶ Gigabit Ethernet and Fast Ethernet configurations provide *wire-speed* switching and routing with QoS and security
- ▶ **10 GE solutions**

▶ Ease of management

OptiSwitch-MR Series

Layer2 with L2-4 Services Model Overview

▶ **MR2228-S2C**

- ▶ 24 10/100 ports
- ▶ 2 combo Giga RJ45/SFP ports
- ▶ 2 RJ45 Giga stacking ports (data/stacking)
- ▶ Stackable



▶ **MR2252-S2C***

- ▶ 48 10/100 ports
- ▶ 2 combo Giga RJ45/SFP ports
- ▶ 2 RJ45 Giga stacking ports (data/stacking)
- ▶ Stackable



▶ **MR2324-4C**

- ▶ 20 10/100/1000 ports
- ▶ 4 combo Giga (RJ45/SFP) ports



* To be release in Q1 2005

OptiSwitch-MR Series Power Over LAN Model

▶ MR2226-POE

- ▶▶ Power over Ethernet Stackable switch with enhanced security and QoS
- ▶▶ 24 10/100 ports POE
- ▶▶ 2 combo Giga RJ45/SFP ports for data/stacking
- ▶▶ Stackable



* To be release in Q1 2005

OptiSwitch-MR Series Layer3 Model Overview

▶ **MR3312-4C** *Fiber Router*

- ▶ 8 SFP ports
- ▶ 4 combo Giga (RJ45/SFP) ports



▶ **MR3325-S4C** *part of 10 GE solutions*

- ▶ 20 10/100/1000 ports
- ▶ 4 combo Giga (RJ45/SFP) ports
- ▶ Module 10GE*
- ▶ Stackable



▶ **MR3349-S4C** *part of 10 GE Solutions*

- ▶ 44 10/100/1000 ports
- ▶ 4 combo Giga (RJ45/SFP) ports
- ▶ Module 10GE*
- ▶ Stackable



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OptiSwitch-MR Series Layer3 Model Overview

▶ **MR3312-4C** *Fiber Router*

- ▶ 8 SFP ports
- ▶ 4 combo Giga (RJ45/SFP) ports



▶ **MR3325-S4C** *part of 10 GE solutions*

- ▶ 20 10/100/1000 ports
- ▶ 4 combo Giga (RJ45/SFP) ports
- ▶ Module 10GE*
- ▶ Stackable



▶ **MR3349-S4C** *part of 10 GE Solutions*

- ▶ 44 10/100/1000 ports
- ▶ 4 combo Giga (RJ45/SFP) ports
- ▶ Module 10GE*
- ▶ Stackable



* To be release in Q1 2005

Connectivity Unlimited™



OptiSwitch-MR Series Layer3 Model Overview

▶ MR3312-4C

- ▶ 8 SFP ports
- ▶ 4 combo Giga (RJ45/SFP) ports



▶ MR3325-S4C

- ▶ 20 10/100/1000 ports
- ▶ 4 combo Giga (RJ45/SFP) ports
- ▶ Module 10GE*
- ▶ *Stackable*



▶ MR3349-S4C

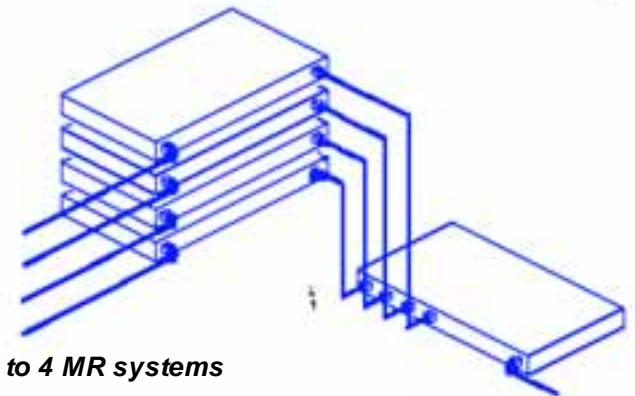
- ▶ 40 10/100/1000 ports
- ▶ 4 combo Giga (RJ45/SFP) ports
- ▶ Module 10GE*
- ▶ Stackable



OptiSwitch-MR Series *Redundant Power Supply*

▶ MR4600RPS - 600 Watt Redundant Power Supply

- ▶ Supports any combination of up to **four external** 150 Watt devices.
 - **Directly connects to up to 4 MR systems.**
- ▶ Provides up to **600 Watts** of 12 Volts power.
- ▶ 1 U rack mountable package.
- ▶ **Over-Heating protection.**
- ▶ **Over-Load protection.**
- ▶ **Over-Voltage protection.**
- ▶ Front panel mounted LEDs allow for easy management.



Redundant Power Supply

* To be release in Q1 2005

Connectivity Unlimited™



Leading in Fiber Connectivity

SFP (Mini GBIC) Pluggable

- ▶ Industry standard connector
- ▶ Hot pluggable
- ▶ Smaller fiber connector: LC
- ▶ MRV SFPs interfaces:
 - ▶ Multimode – SX
 - ▶ Gigabit Multi Mode up to 2 km - MMX
 - ▶ Single mode - LX, ELX, XD, ZX (upto 120 km)
 - ▶ Single Fiber - BX
 - ▶ CWDM/DWDM (including Passive Optical Solution eWDM)



OptiSwitch-MR Intelligent Technology

Software Features for Intelligent Services

OptiSwitch-MR

Gigabit Intelligent Switching For Business Success

Advanced Features

- ✓ Jumbo frame up to 9KB
- ✓ Flow Control including: HOL blocking prevention, & Broadcast storm protection
- ✓ IGMP snooping and queries
- ✓ Link Aggregation and EtherChannel
- ✓ Load Balance for Unicast & Multicast traffic
- ✓ STP, RSTP, MSTP*
- ✓ 802.1 S*/W
- ✓ Advanced VLANs function including Private VLAN & GVRP
- ✓ Stackable solutions

IP & Routing

- ✓ IP Unicast Routing: Static, RIPv1/v2, OSPF
- ✓ IP Multicast Routing IGMP, DVMRP, PIM
- ✓ IP Redundancy VRRP, HSRP
- ✓ DHCP Server/Client/Relay
- ✓ DNS (proxy) server

Security

- L2/L3/L4 access control list
- RADIUS, TACACS+
- SSH (v1.5/2.0) port based security
- HTTPS/SSL
- IEEE 802.1x
- Static port security (MAC-based)
- SNMPv3
- Private VLANs



QoS

- ✓ 802.1p based CoS
- ✓ 4/8 priority queues per port
- ✓ WRR & Strict Scheduling priority queue
- ✓ Classification based on:
 - ✓ IP TOS/Precedence
 - ✓ DSCP
 - ✓ TCP/UDP ports
- ✓ Rate limitation: both Ingress and Egress.
- ✓ RED

Management

- ✓ Standard based CLI
- ✓ Embedded Secure Web-based Management (HTTPS)
- ✓ Support Port Mirroring
- ✓ BOOTP/DHCP client for IP address Assignment
- ✓ Dual copies of Firmware image
- ✓ Multiple copies of configuration
- ✓ System/Crash/Error log
- ✓ SNTP (RFC 2030)
- ✓ Supports SNMPv1/v2c/v3*
- ✓ Supports RMON group (1,2,3 & 9)

Note: The above features are general – please read the datasheet for product specific features

Features

Benefits

10 GE, Gigabit and Fast Ethernet Ports with Non-blocking Wire-speed Performance	Ensures Maximum Data Throughput on Even Highly Loaded Networks
Tri-speed (10/100/1000 Mbit/s) Operation via RGMII Interfaces	Standards interface for all Speeds
Jumbo Frame Support	Connects Effortlessly to Networks, Hosts, and Controllers that Utilize up to 9K Jumbo Frame size
Classifier and QoS (Layer 2-4), Including 802.1p, TOS, TCP/UDP ...	Optimizes Network Performance to Support any Digital Stream, from Internet Browsing to VoIP and Video
4/8 priority queues per port with WRR & Strict priority scheduling	Enables networks to support Voice, Video and Data application to be transmitted on the same time.
Multicast and Broadcast Storm Control	Eliminates Unwanted Flooding of Ports and Thereby Increases Overall Network Performance
Flexible Link Aggregation Compliant to IEEE 802.3ad and Cisco EtherChannel	Provides High Bandwidth Uplinking Abilities
Access control list, RADIUS/ TACACS+, SSH, HTTPS(SSL), IEEE 802.1x	Ensure secure network operation and traffic management and access control. Leverages access control. And well-known transport and encryption technologies (SSL) for secure communications
Multiple protocol Support IEEE 802.1d, IEEE 802.1w, IEEE 802.1s and Routing	Supports Complex Network Topologies with Fast Failure Recovery.

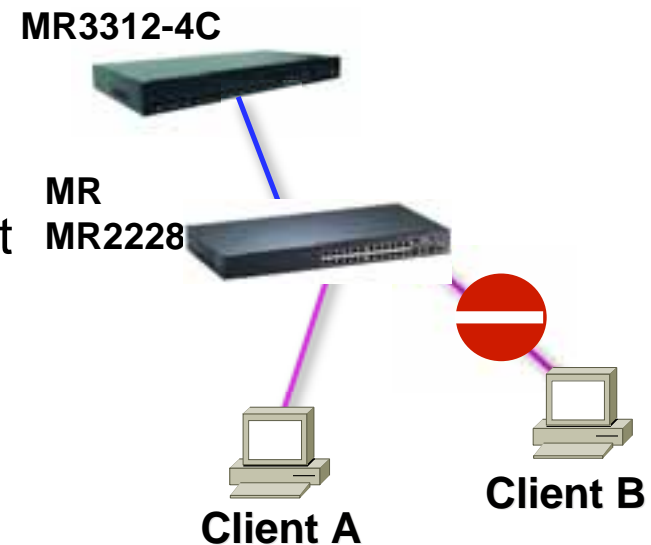
Features and Benefits

▶ 802.1x

- ▶ Port Authentication - Authentication and accountability. Port is not enabled before user is authentication . Supports EAP-MD5 authentication with Radius server and EAP (Extensive Authentication Protocol)

▶ HTTPS

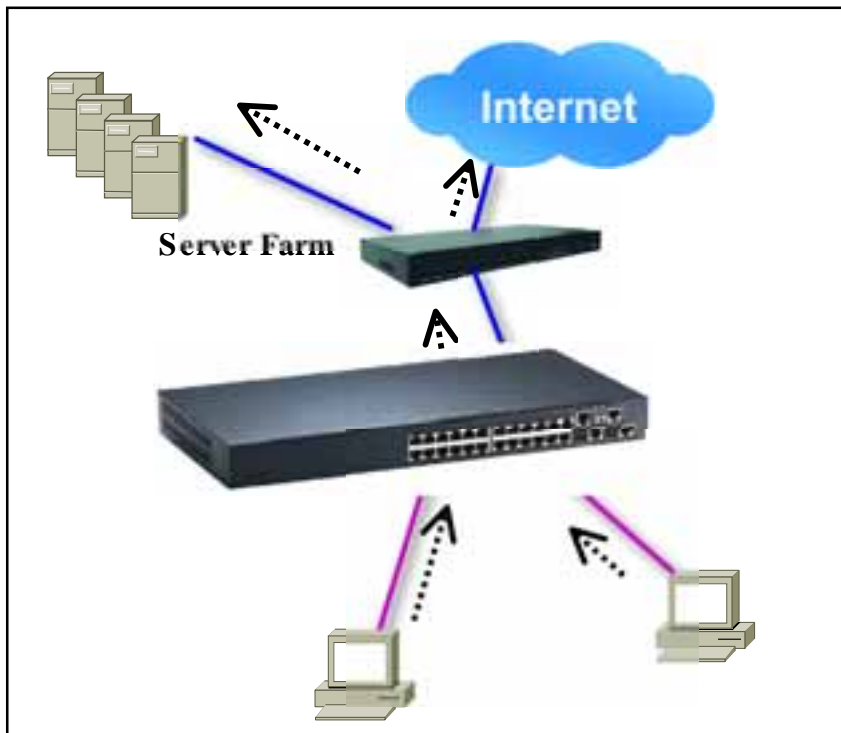
- ▶ Supports encryption of management data, avoiding management configuration data via web interface from eavesdropping.



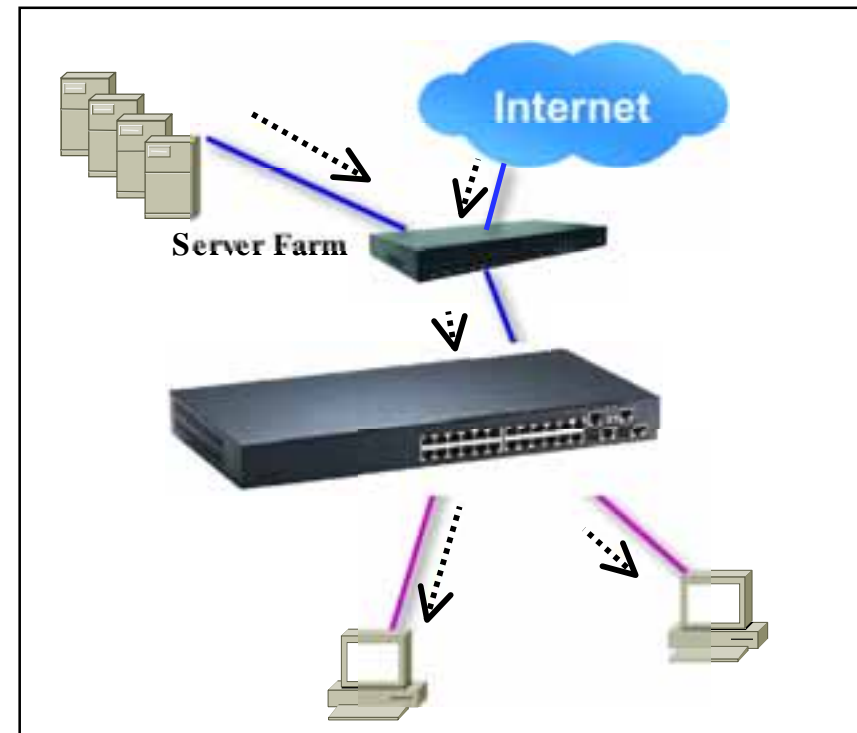
Features and Benefits

► Rate Limitation

- Limits the traffic by different bandwidth for different customer applications



Ingress rate limitation control the bandwidth provided to user for uploading

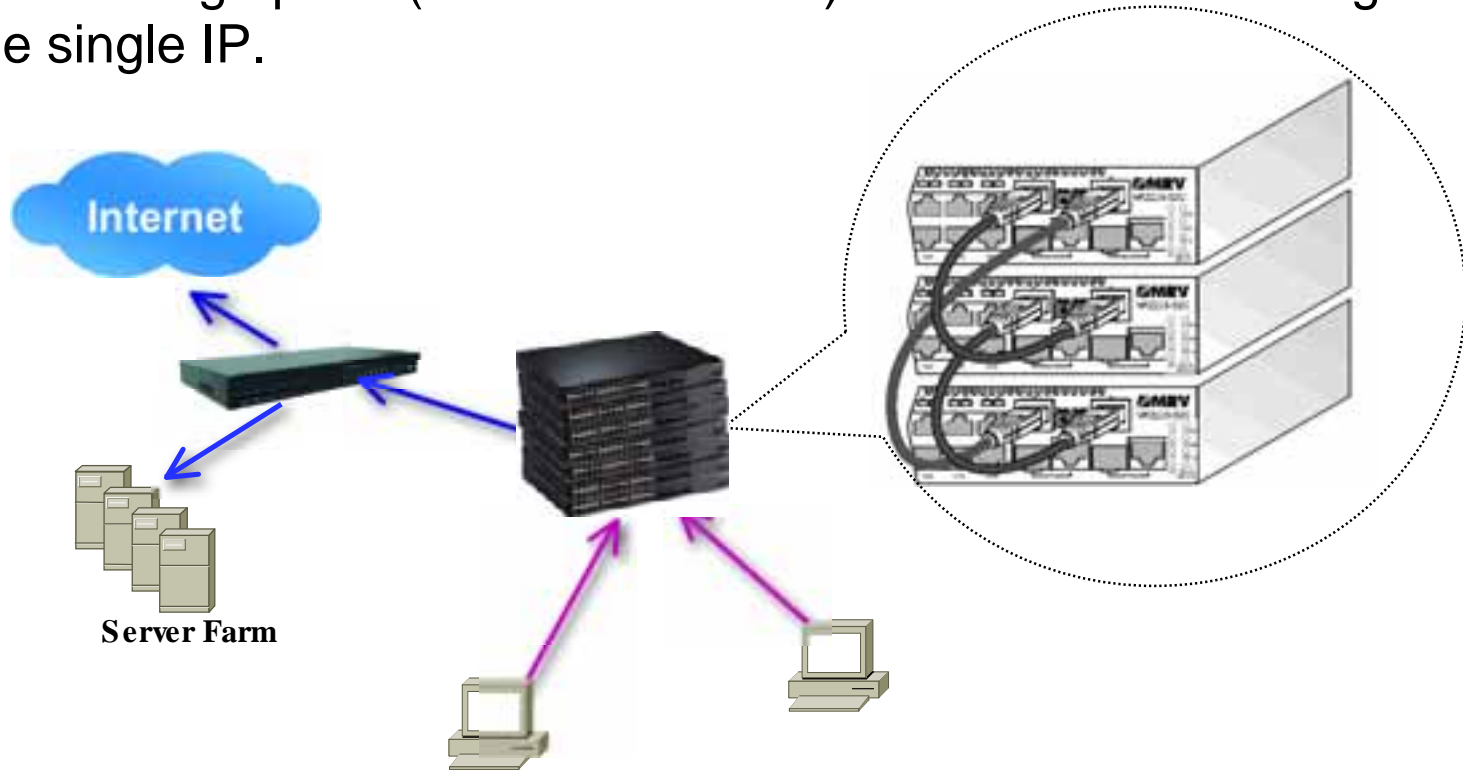


Egress rate limitation control the bandwidth provided to user for downloading high volume of data

Features and Benefits - Stacking

▶ High Performance Stack Connection

- ▶ Can stack up to 8 units and thus increases port density to 192 10/100 ports and 16 Giga ports (with the MR2228). 8 units can be managed with one single IP.



Stacking on the MR3325 and MR3349: Up to 8 units , 40 GE based stacking

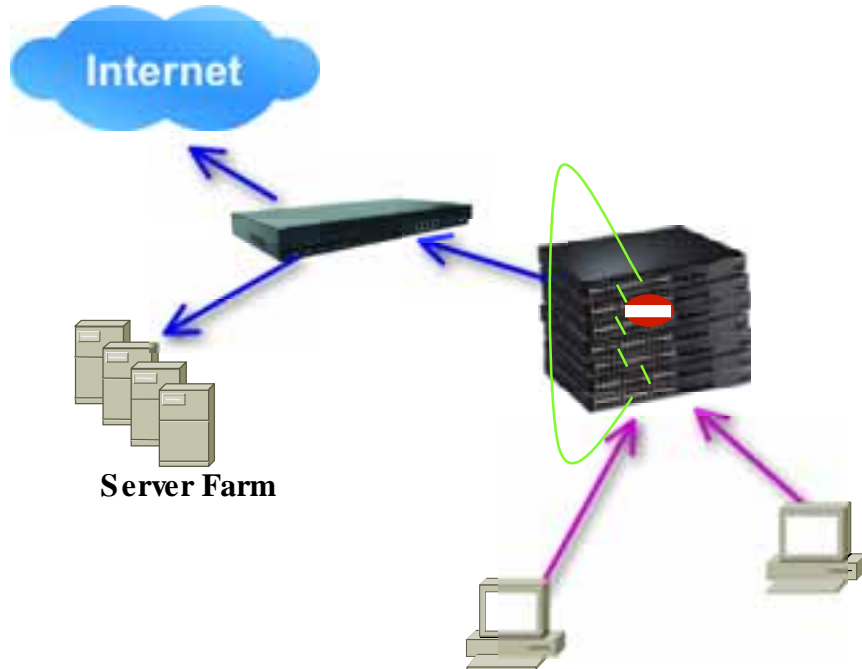
Connectivity Unlimited™



Features and Benefits - Stacking

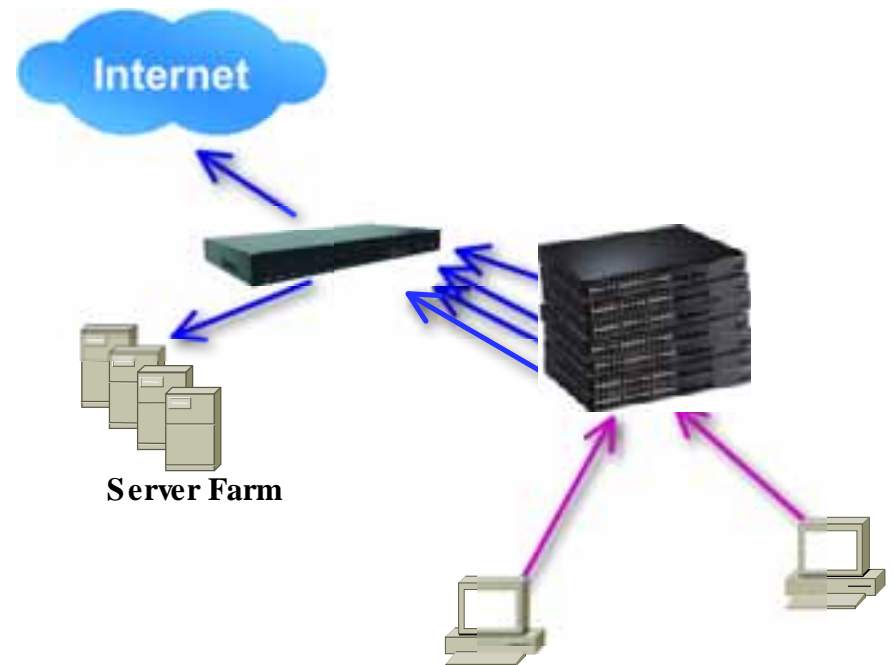
▶ Close Loop Stacking

Provides resiliency link to prevent network down when stacking cable failure or unit failure



▶ Stack Wide Trunking

Provides up to 4 Gbps uplink bandwidth to protect against link or unit failure

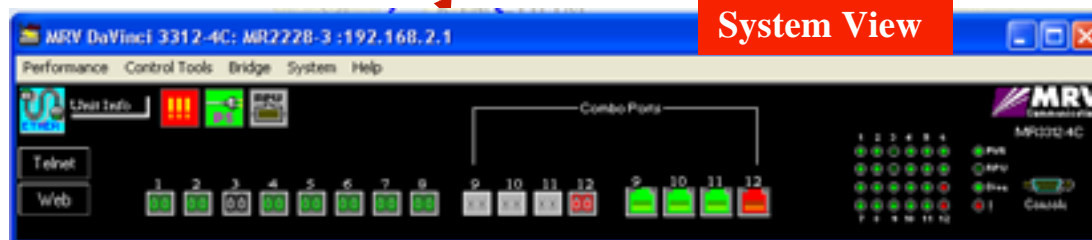


MegaVision Web® - NMS

- ▶ SQL database & Multi-IOS platform
- ▶ Northbound interfaces :
SNMP MIB, TL1, SQL



- ▶ Monitoring
- ▶ Inventory
- ▶ Configuration/Activation
- ▶ Network Maps view
- ▶ Alarm/Traps



Management – Stacking

The image displays a network management interface. The main window, titled 'MapView - map-DaVinci1', shows a map of Europe with a network topology overlay. The topology consists of several MRV switches (represented by green icons) connected in a hierarchical structure. A red box highlights a specific switch on the map, with a red arrow pointing to a detailed view of that switch's configuration.

The detailed view window, titled 'MRV DaVinci1 2226 SJC- stack -192.168.2.1', shows the configuration for a stack of four MRV switches. The stack is organized into four planes, each with its own configuration page. The top plane is labeled '1 Plane' and the bottom plane is labeled '4 Plane'. Each plane shows a grid of ports with status indicators (green for OK, red for error) and a 'Web' button for configuration. The MRV logo is visible in the top right corner of each plane's configuration area.

Management – Web

Direct from any Web Browser

The screenshot displays the MRV web management interface. On the left, the 'Network View' shows a hierarchical network diagram with a central switch and several peripheral switches. A red box highlights one of the peripheral switches. On the right, the 'System View' shows the '24PE Stackable Intelligent Switch Manager' configuration page. A red arrow points from the browser's address bar to the URL 'http://192.168.3.45/'. Below the System View, the 'Feature View' shows a 'Port Configuration' table with the following data:

Port	Name	Admin	Speed	Duplex	Flow Control	Autonegotiation				Trunk
1		<input checked="" type="checkbox"/> Enabled	1000a	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> 10h	<input type="checkbox"/> 100h	<input type="checkbox"/> 1000h	<input type="checkbox"/> Sys	
2		<input checked="" type="checkbox"/> Enabled	1000a	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> 10h	<input type="checkbox"/> 100h	<input type="checkbox"/> 1000h	<input type="checkbox"/> Sys	
3		<input checked="" type="checkbox"/> Enabled	1000a	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> 10h	<input type="checkbox"/> 100h	<input type="checkbox"/> 1000h	<input type="checkbox"/> Sys	
4		<input checked="" type="checkbox"/> Enabled	1000a	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> 10h	<input type="checkbox"/> 100h	<input type="checkbox"/> 1000h	<input type="checkbox"/> Sys	

OptiSwitch-MR Intelligent Technology

Deployment Examples

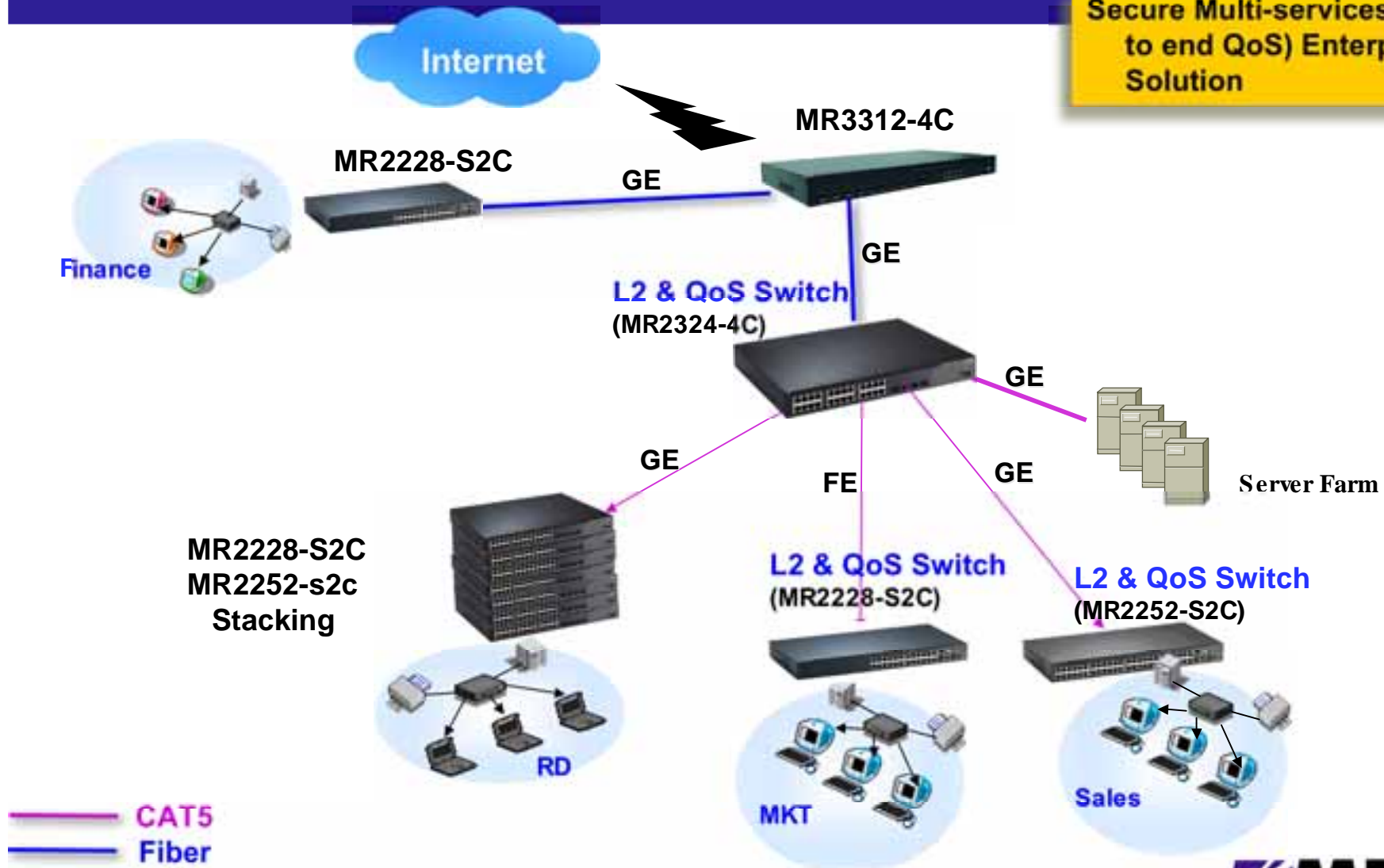
Branch Office

Space Constrained
Data Center

Wiring Closet

Enterprise Network Application OptiSwitch-MR Solution

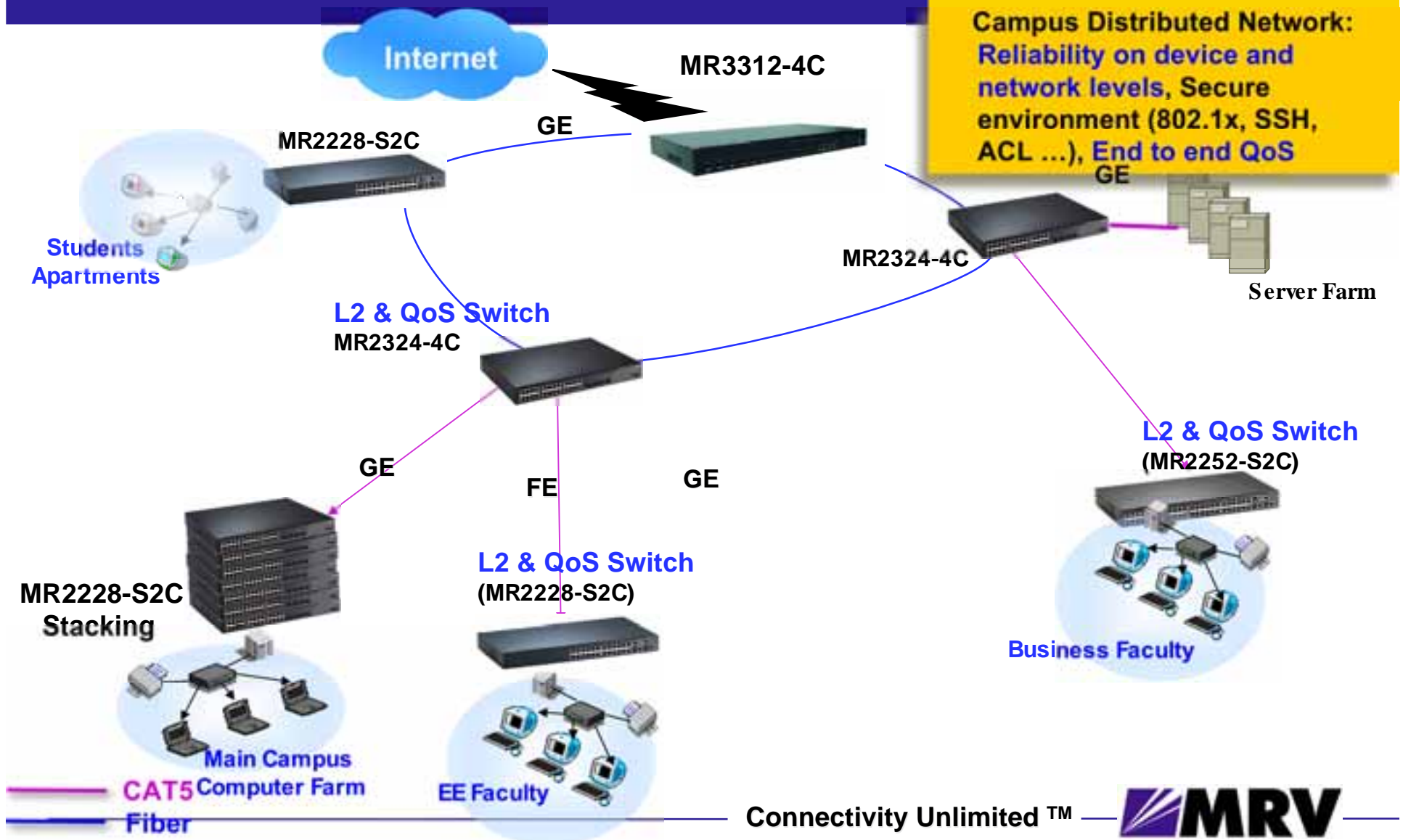
Secure Multi-services (end to end QoS) Enterprise Solution



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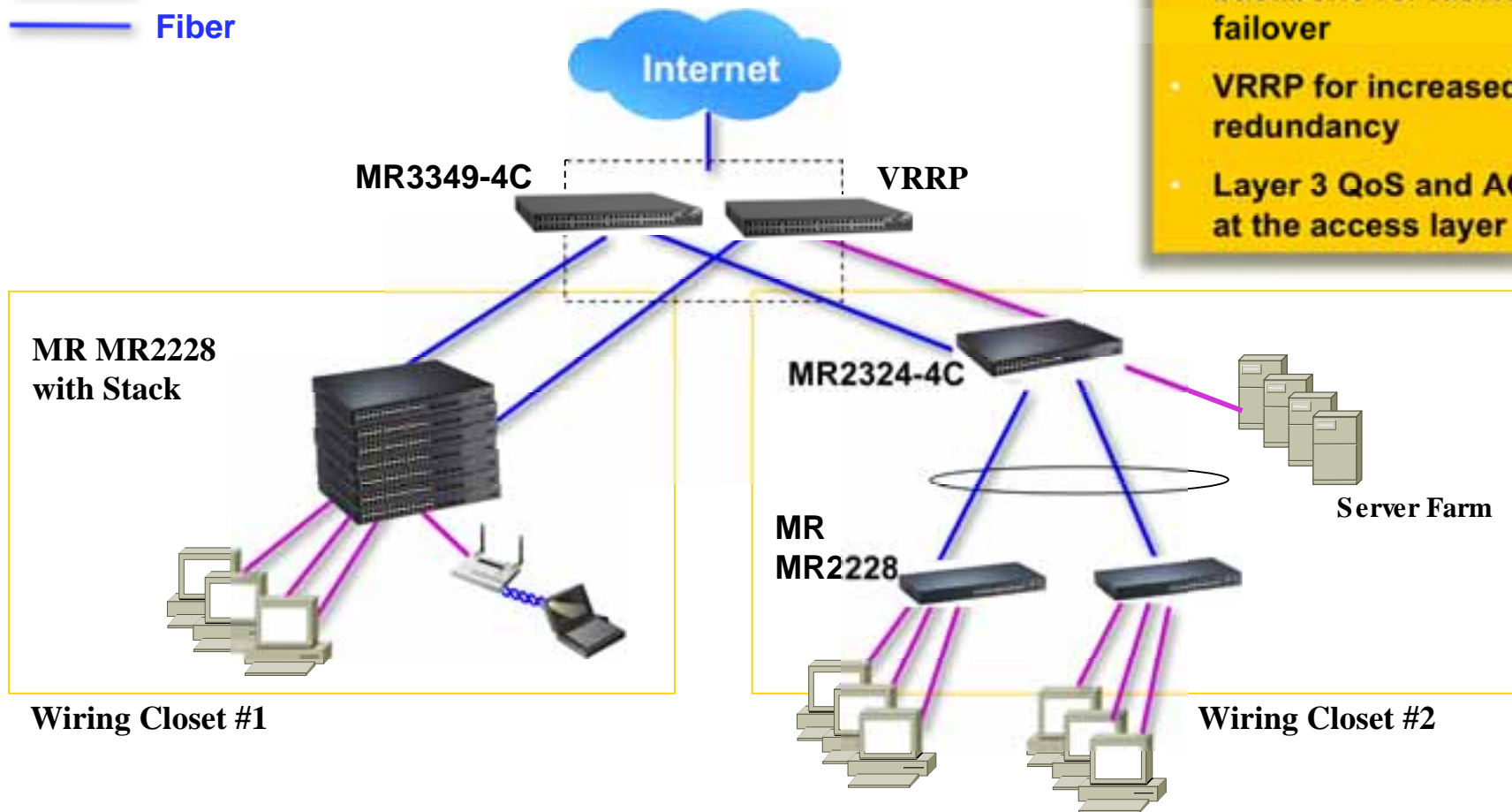


Campus Network Application OptiSwitch-MR Solution



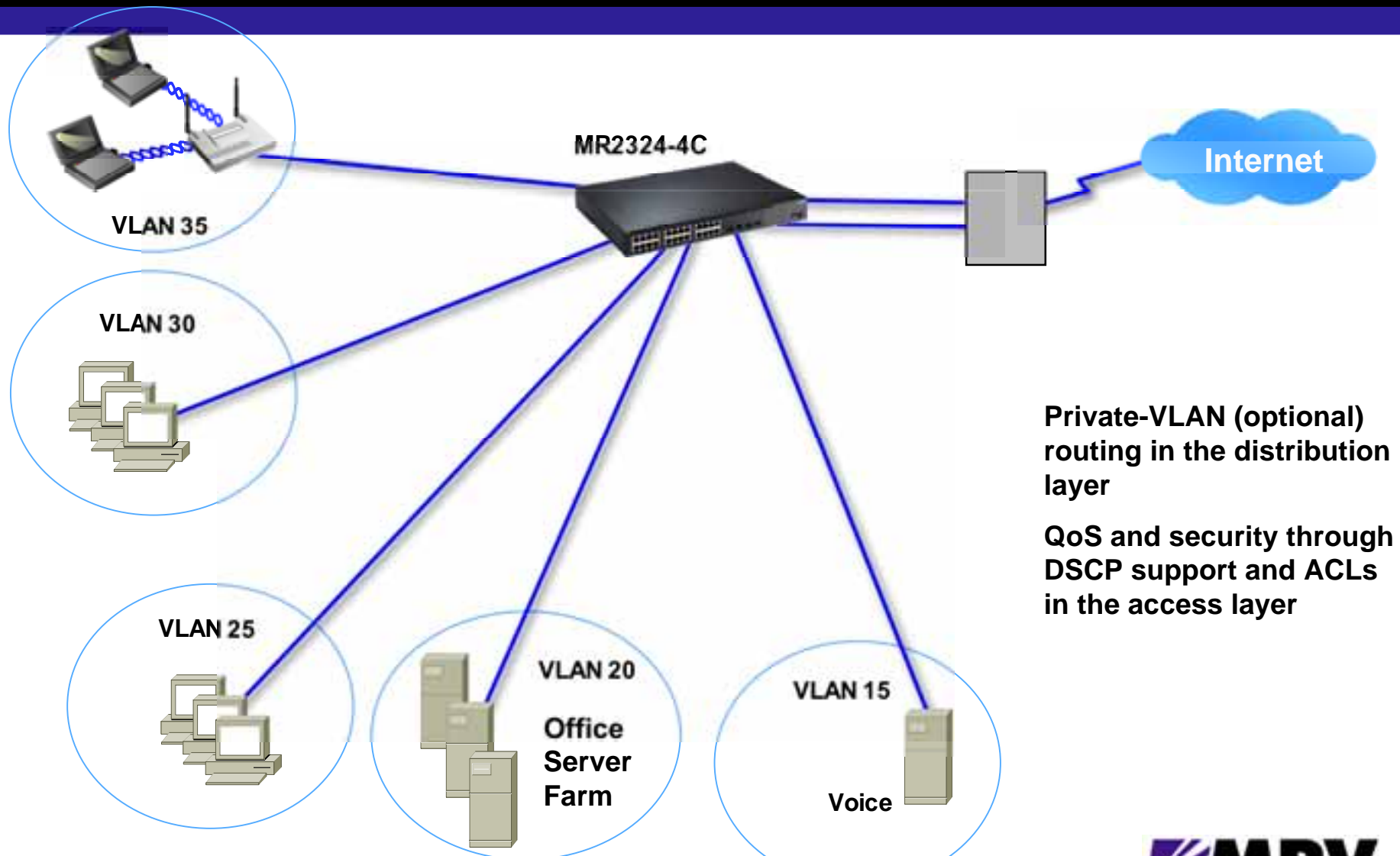
Enterprise Wiring Closet OptiSwitch-MR Solution

— CAT5
— Fiber



- Fiber / CAT5 integration
- Routed uplinks to the backbone for faster failover
- VRRP for increased redundancy
- Layer 3 QoS and ACLs at the access layer

Enterprise **Branch Office** OptiSwitch-MR



**Private-VLAN (optional)
routing in the distribution
layer**

**QoS and security through
DSCP support and ACLs
in the access layer**

Leader in the 10GE Networking

- ▶ The highest **10 GE** density
- ▶ Industry most flexible **10 GE** solution
- ▶ Lowest **10 GE** price per port

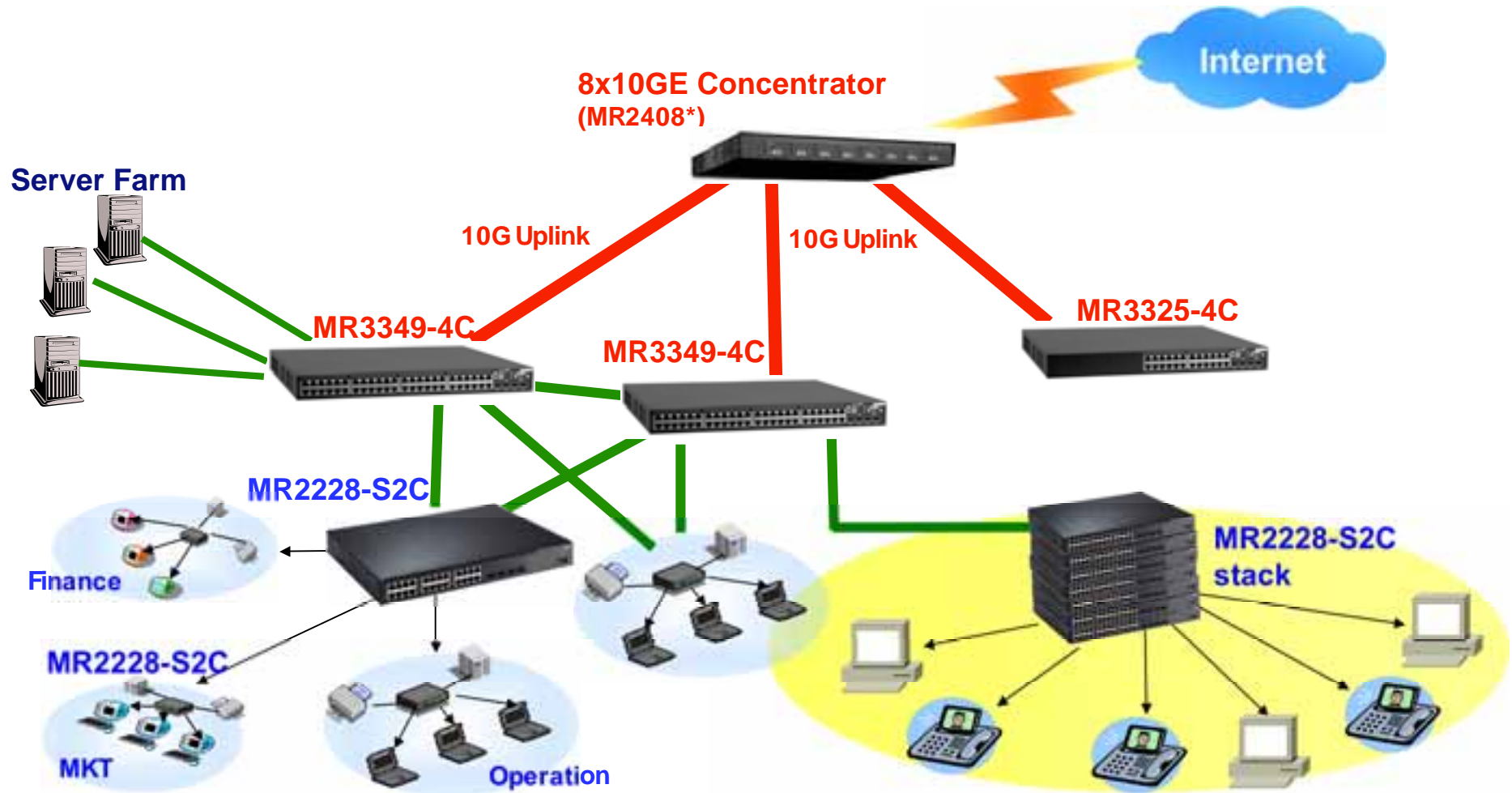


* Will be available in Q1 2005

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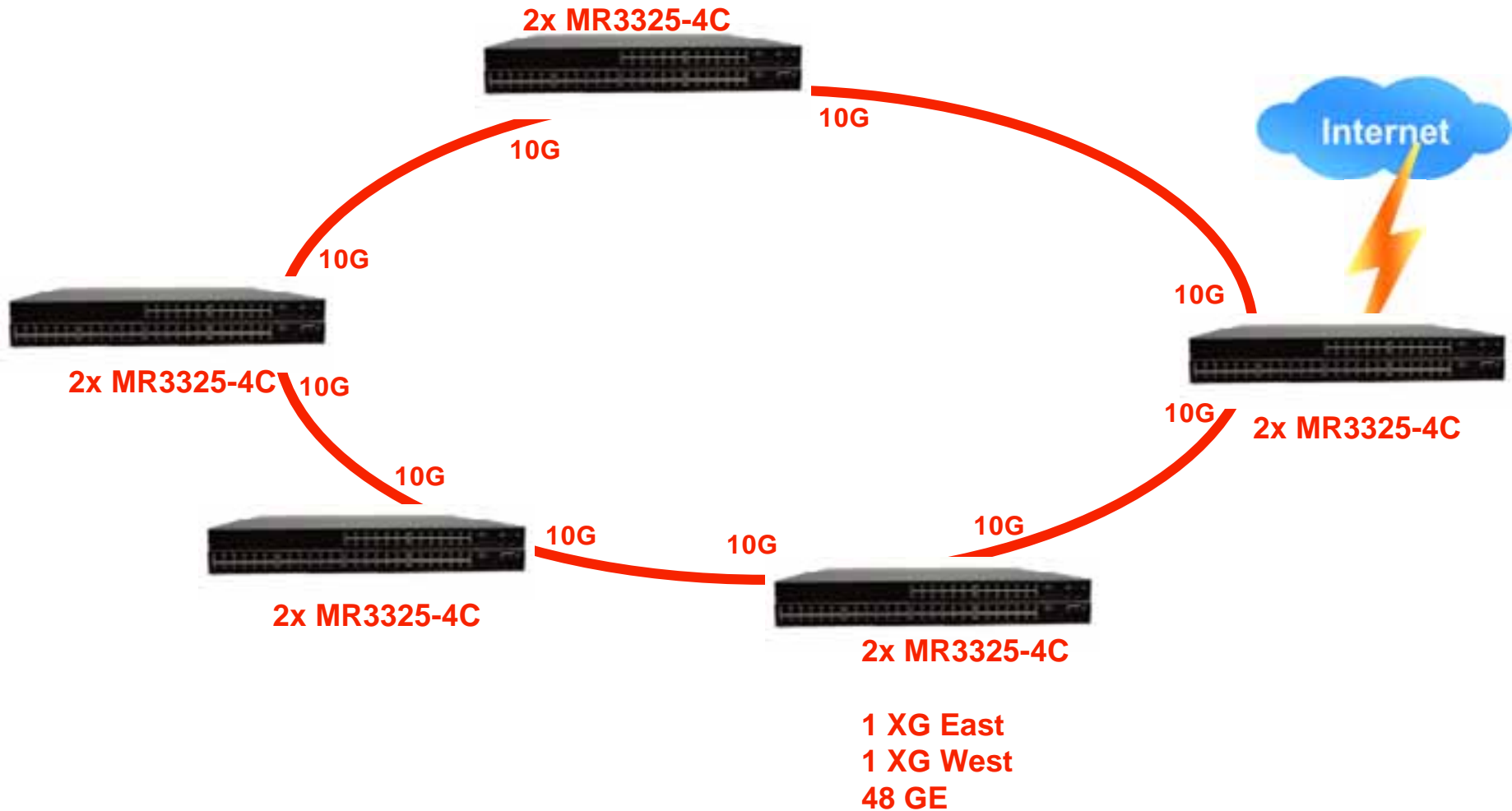


10GE Networking Solution- Star

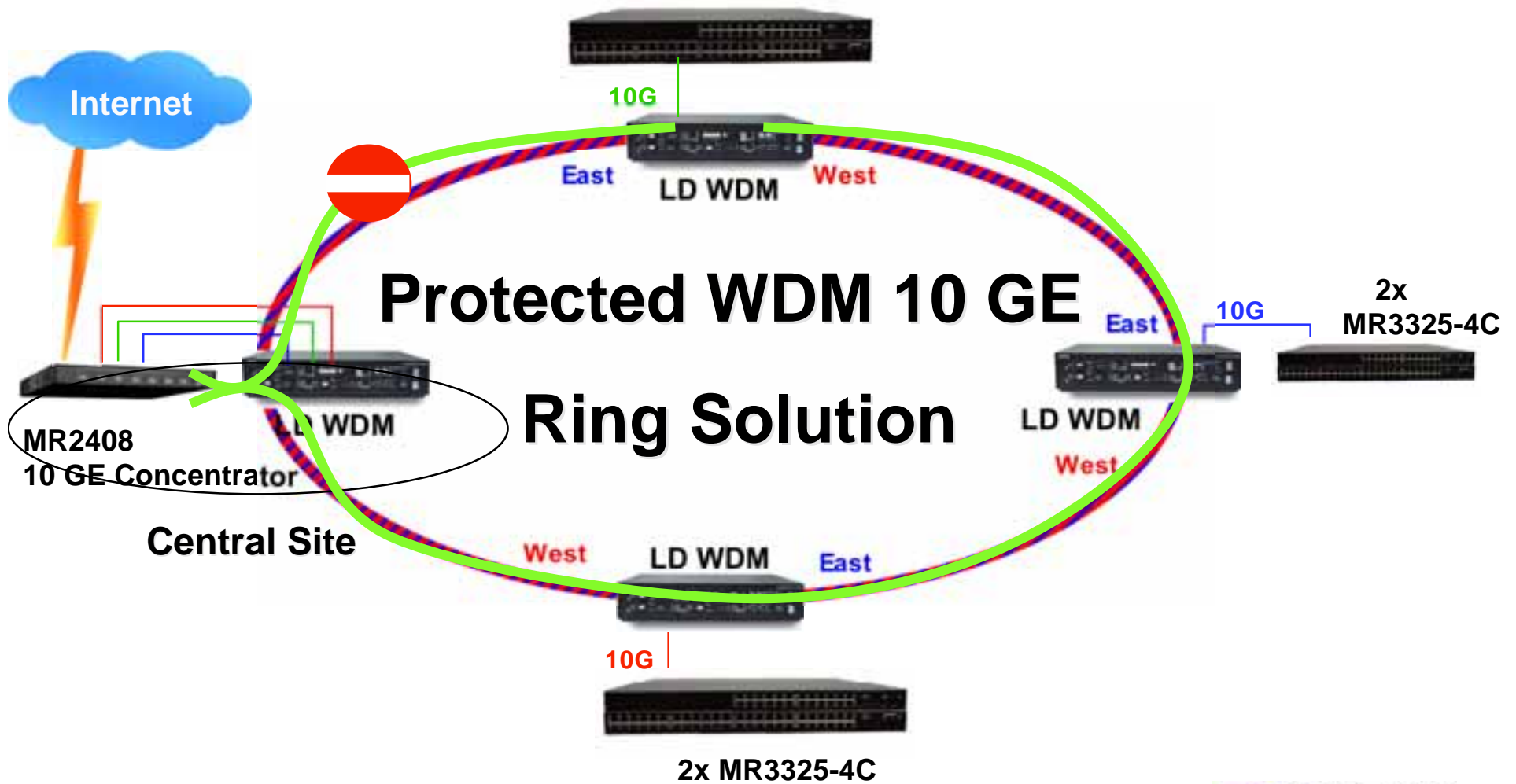


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10GE Solutions - RINGs



10GE Solutions-Star with WDM Ring



Summary

- ▶ Adding innovative MR Series with advanced technology offerings

- **Enhanced Security**
- **Advanced QoS**
- **High Availability**
- **10 GE Networking**
- **Lower TCO**





Thanks

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