



MRV Optical Communications Systems®

# Improving the Efficiency in the Test Lab Media Cross Connect

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MRV Optical Communications Systems®

# MRV OCS Fast Facts

- **Founded in 1988**
  - Over 20 years of optical innovation
- **OCS Group employees 300+**
  - Systems and integration business units
- **Product offerings**
  - Infrastructure management
    - Physical Layer Switch
    - Console Server/Power Management
  - Optical communications
  - Network management
  - Network integration professional services



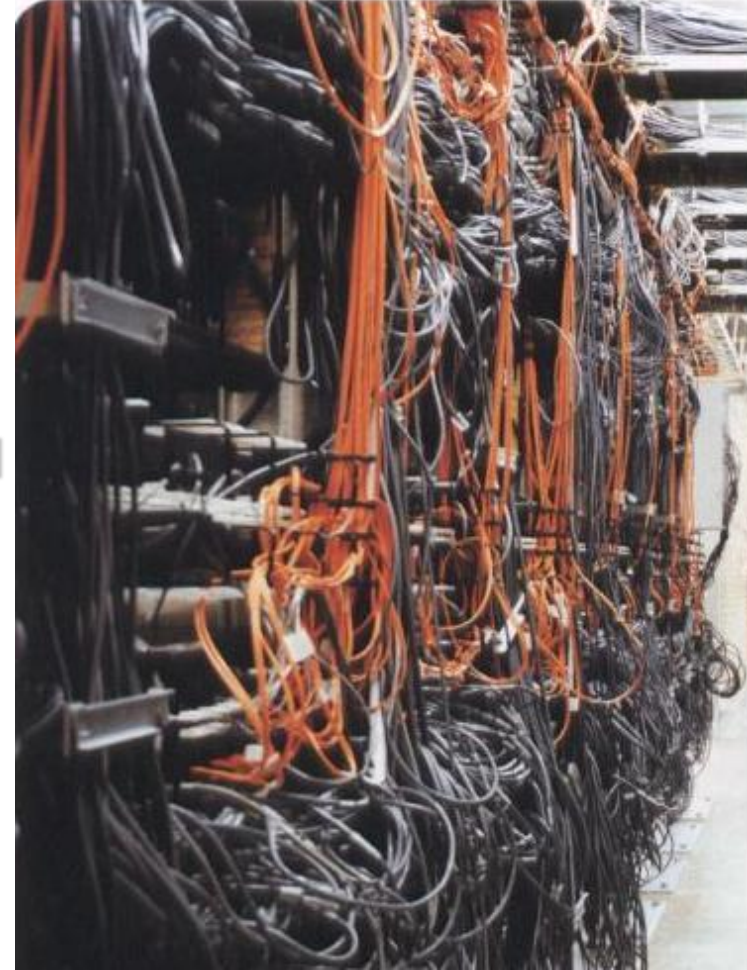
**Worldwide Presence**  
**Sales and service offices worldwide**



# Traditional Test Lab Environment

- Inefficient use of lab equipment
- Labor-intensive, error-prone test set up
- Human error wastes time and causes retests
- Test repeatability and accuracy compromised
- Not positioned for automation

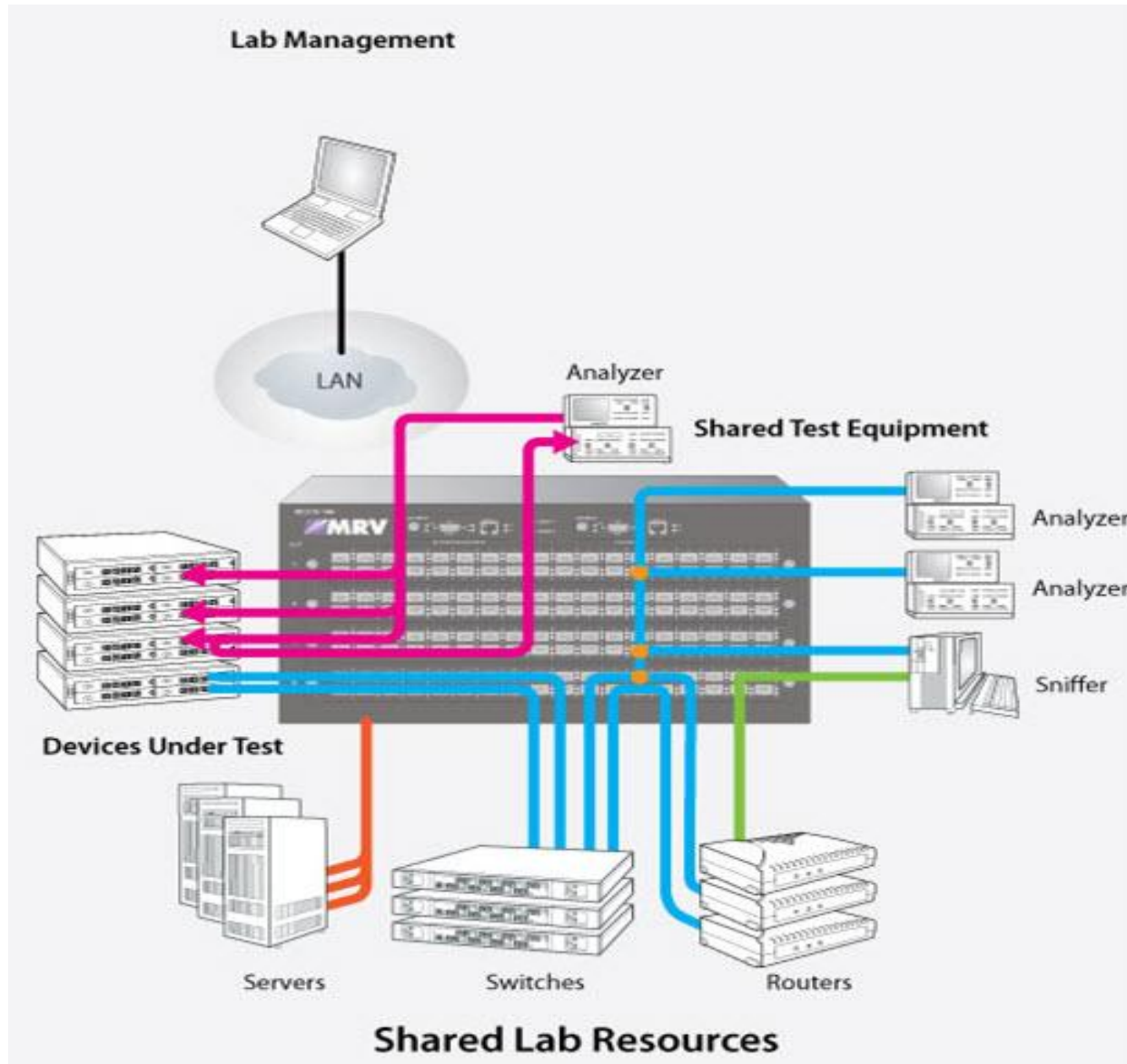
***An estimated 70% testing downtime  
is caused by wiring mistakes***



# Challenges in the Test Lab

- **Budgets getting tighter – fewer resources**
- **Test equipment is more expensive**
- **Limited access to lab infrastructure and resources**
- **Test lab is typically the bottleneck**
  - **Set up**
  - **Retests**
  - **Increased test complexity**

# Media Cross Connect Wire-Once Solution



# Where the MCC is used

- Lab automation
- Equipment sharing
- Interoperability testing
- Network/fault simulation
- System test/validation
- Media conversion
- Proof of concept labs
- Support labs/NOC
- Training centers
- Video matrix distribution/multicast traffic
- Network monitoring

## Test Automation is becoming standard practice as companies have to do more with less

- **Network Equipment Manufacturers (HW & SW testing)**
  - HP, Cisco, Juniper, Microsoft, RIM, Amazon, IBM, Tellabs (Sweden)
- **Telco/Carrier - Validation/System Test Labs**
  - AT&T, TATA, Verizon, ATT Mobility, Qwest, T-Mobile (UK), Orange (FR),
  - Iskratel (Slovenia), O2 (CZ), Vodafone, (Italy) Deutsche Telecom (D), Magyar Telecom (H)
- **Storage Equipment Manufacturers**
  - Brocade, Emulex, Qlogic, HP, LSI,
- **Aerospace and Defense – System Test**
  - Northrop Grumman, Lockheed Martin, Raytheon, Mitre

# What is a Media Cross Connect?

- **Layer 1, Physical Layer Switch**
  - Deals only with the physical layer – patch panel
- **Provides programmable any-port to any-port, wire-speed connectivity using a non-blocking switching back plane**
- **Protocol independent/data rate specific**
- **100% transparent with virtually no latency ( $<\mu\text{s}$ )**
- **Variety of chassis types and interface blades**

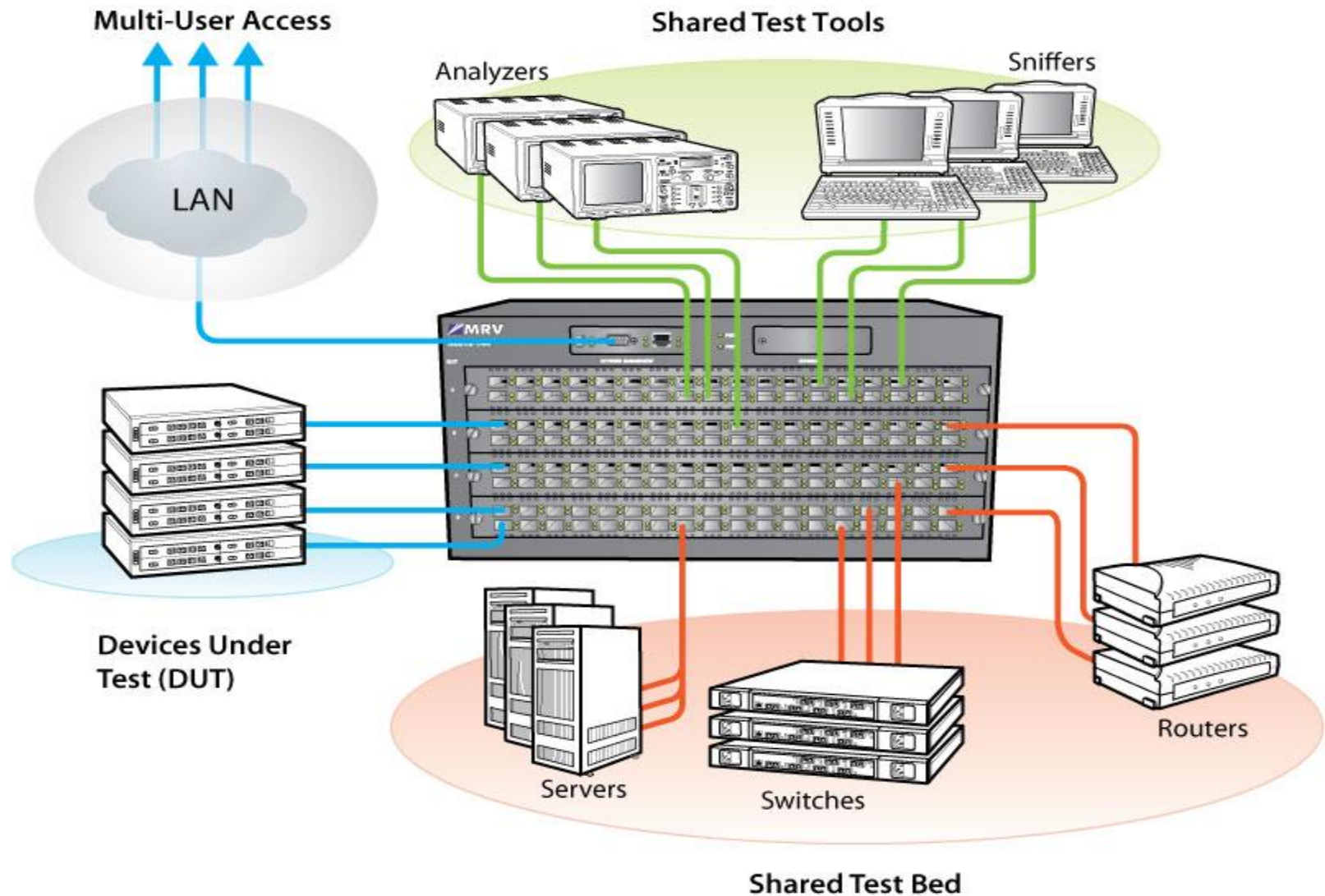


# Media Cross Connect Applications Test Lab

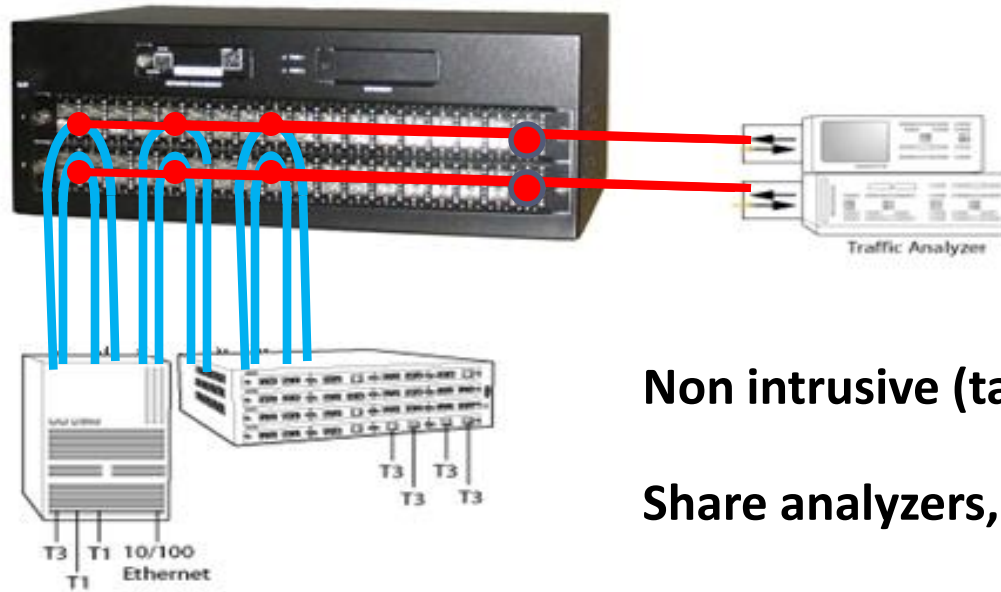
**Abundance of equipment in one lab or multiple labs across organizations causing:**

- **Equipment duplication**
- **Inefficient use of equipment and personnel**
- **Increased capital and operational expense**
- **Limited access to equipment**

# MRV Solution: Equipment Sharing



# MRV Solution: Maximize Equipment Utilization



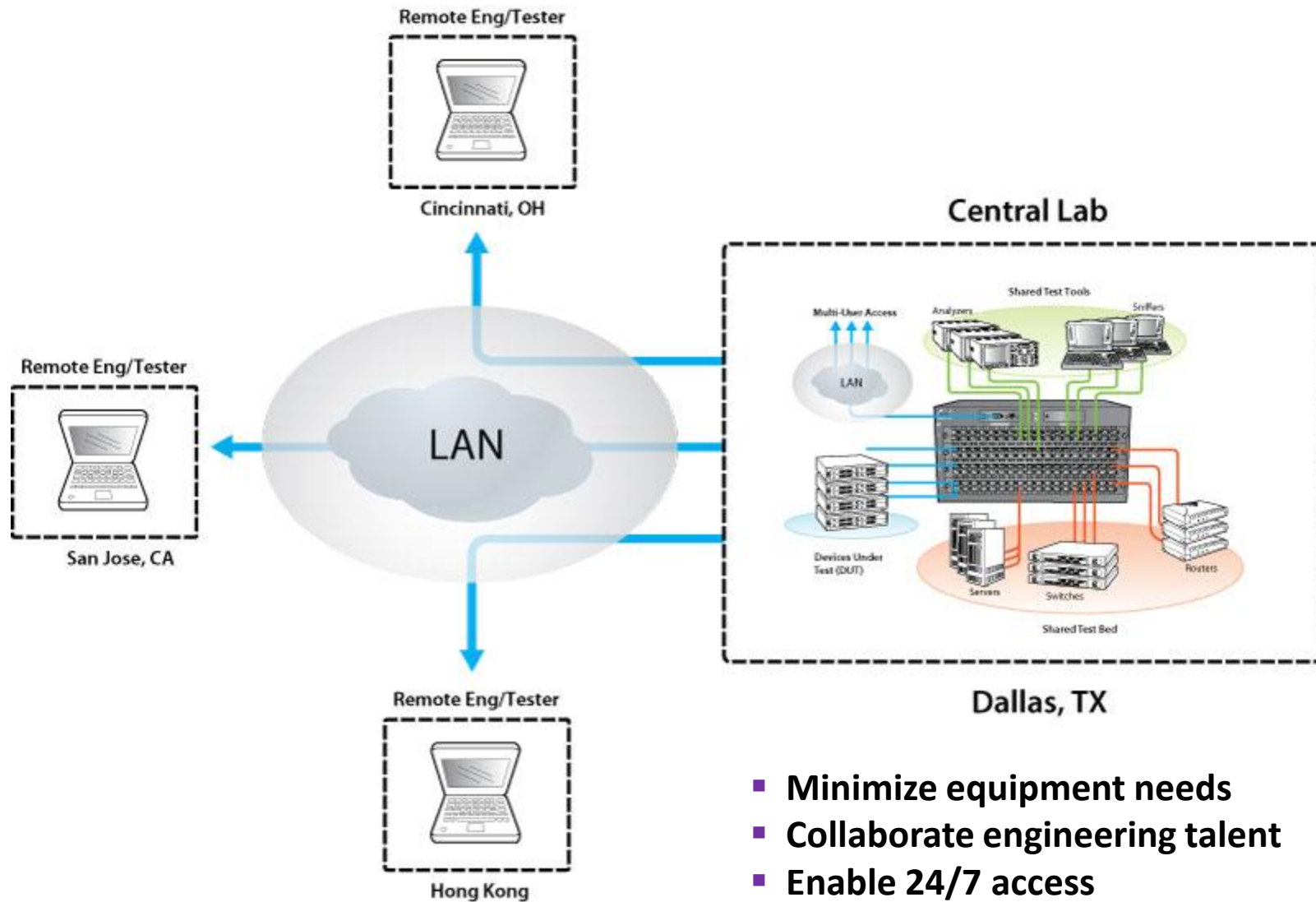
**Non intrusive (tap) or direct connection**

**Share analyzers, probes and sniffers**

**Single or multiple test labs/beds**

**Schedule and**

# MRV Solution: Remote Access



- Minimize equipment needs
- Collaborate engineering talent
- Enable 24/7 access

# Customer Problem

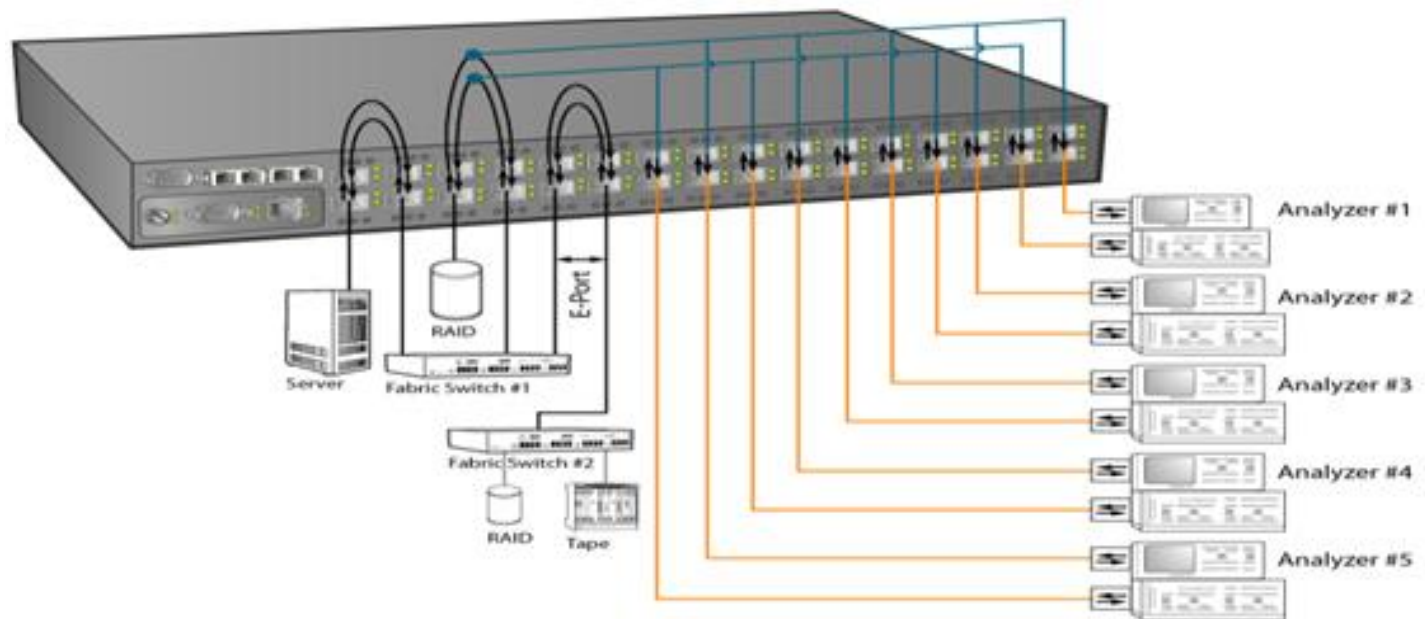
**Excessive time spent setting up and performing tests  
or  
Inefficient/inaccurate manual testing methodologies**

# MRV Solution: Port Mirroring

**Simultaneously analyze data stream at multiple layer**

**Decrease test time**

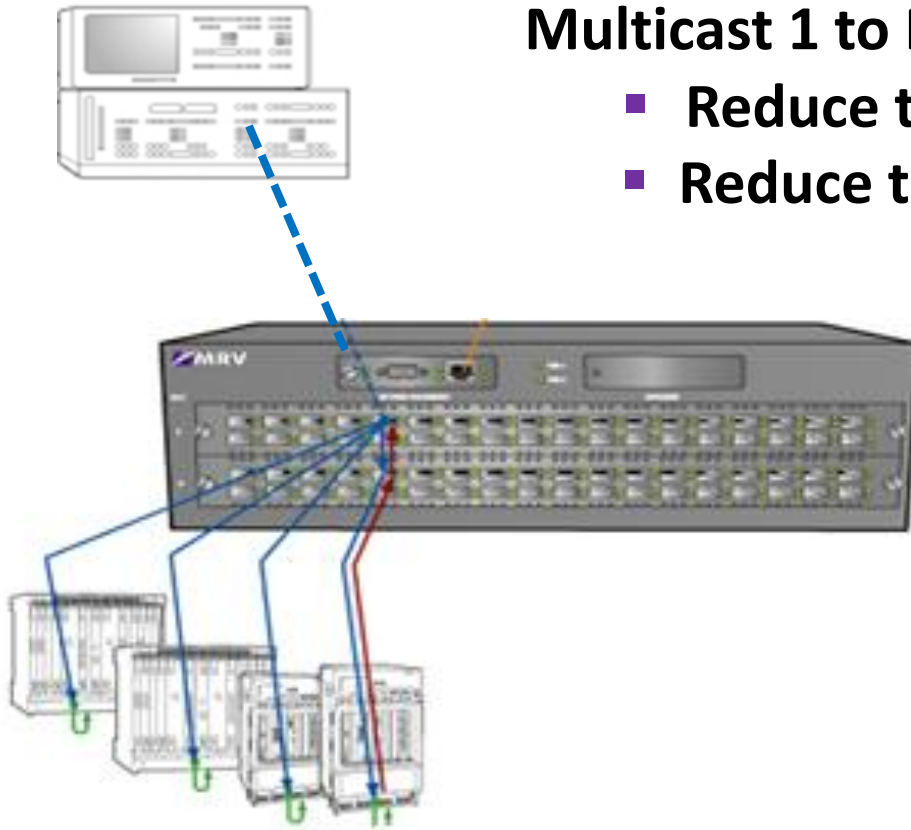
**Increase test accuracy**



# MRV Solution: Multicast

**Multicast 1 to N at wire speed**

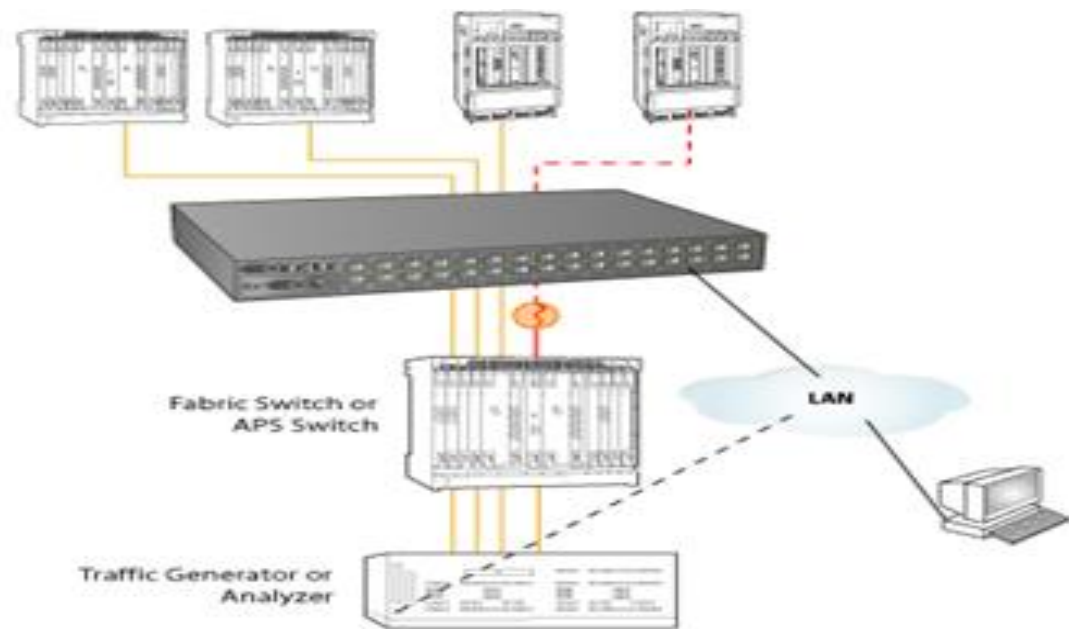
- Reduce test time
- Reduce test set cost



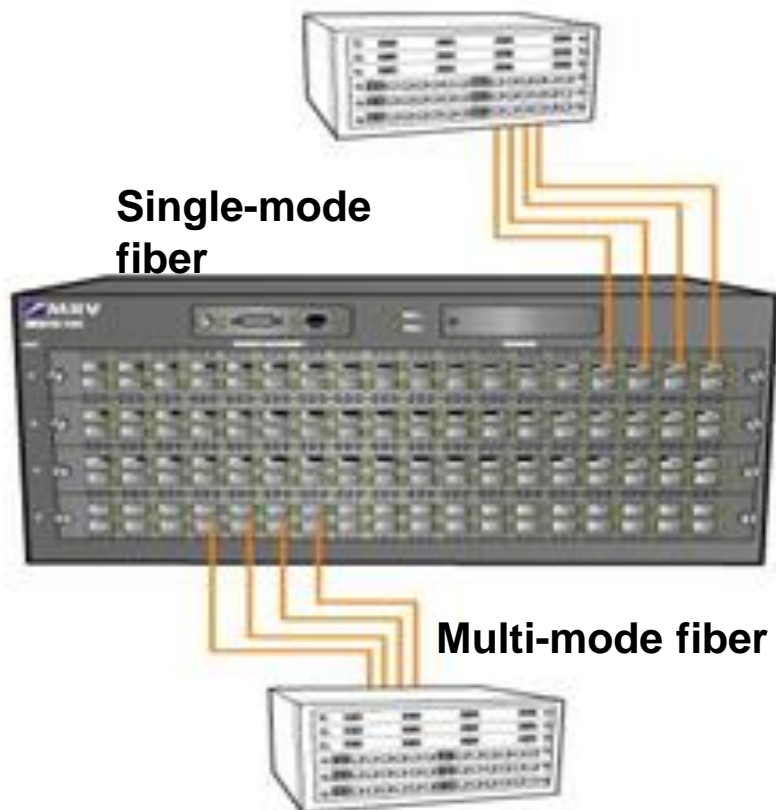


# MRV Solution: Simulation Testing

- Simulate hard node, circuit or line failure
- Script connect/disconnect
- Enhanced feature on SFP+ blade
  - Group ports
  - Programmable up and down time



# MRV Solution: Media Conversion

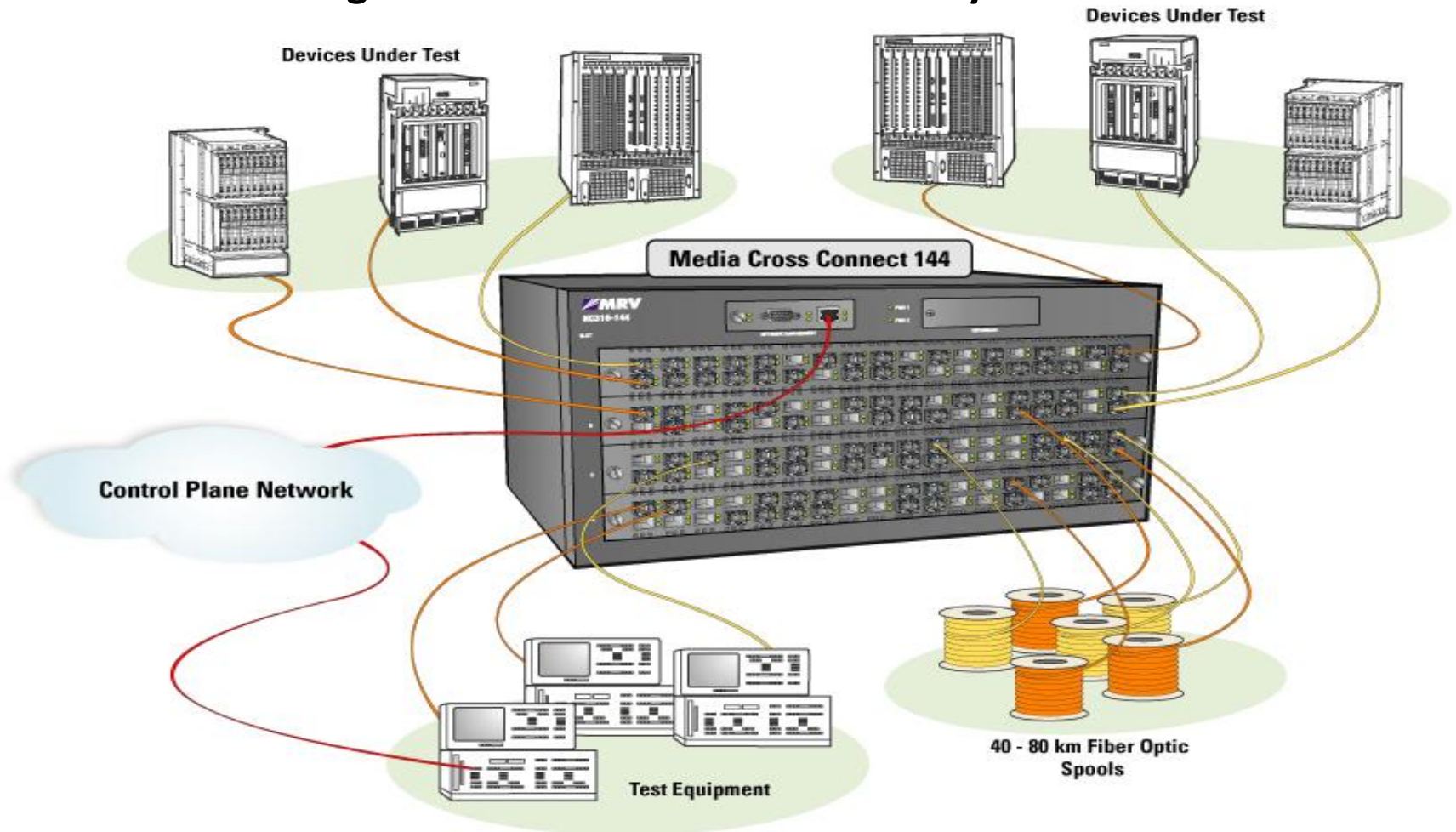


- Single-mode to multi-mode
- Copper to Fiber

# Line Delay Protocol Testing

## Distance/Delay Testing

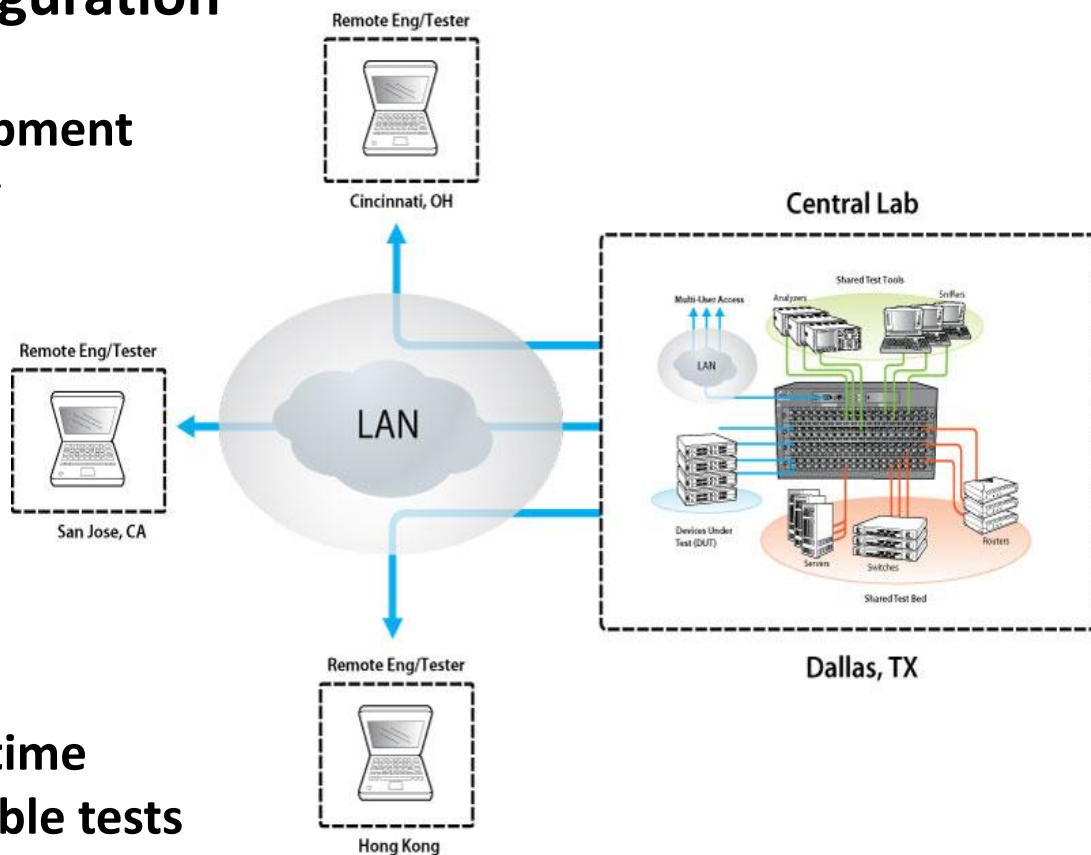
Test over long-haul links for transmission delay effects



# MCC - Cornerstone to Test Automation

## ■ Automated topology configuration

- Save and recall topologies
- Reserve and schedule equipment
- Execute tests automatically



## ■ Automated testing

- More test coverage in less time
- More accurate and repeatable tests
- Eliminates human error and re-test
- Reduces capital and operational expense

# Media Cross Connect Hardware Overview

# What is a Media Cross Connect?

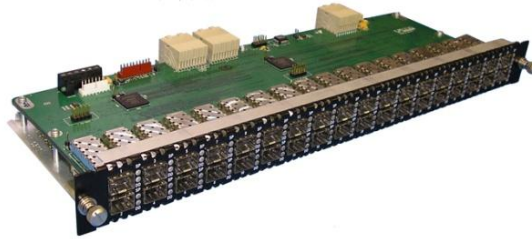
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- **Provides programmable any-port to any-port, wire-speed connectivity using a non-blocking switching back plane**
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- **100% transparent with virtually no latency ( $<\mu\text{s}$ )**
- **Variety of chassis types and interface blades**

# MCC Chassis

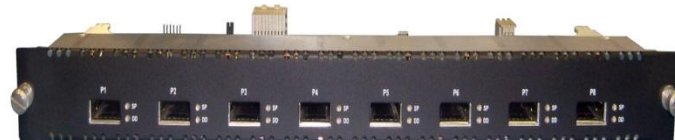
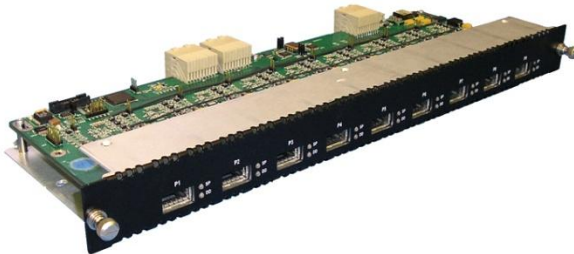
- **4X Chassis (4.25G mapping bandwidth)**
  - 2, 4, 8 slot AC/DC
- **8X Chassis (8.50G mapping bandwidth) Storage Application**
  - 4 slot AC/DC
- **HS Chassis (10.7G mapping bandwidth... 11.09G)**
  - 4 slot AC/DC



# MCC Interface Blades

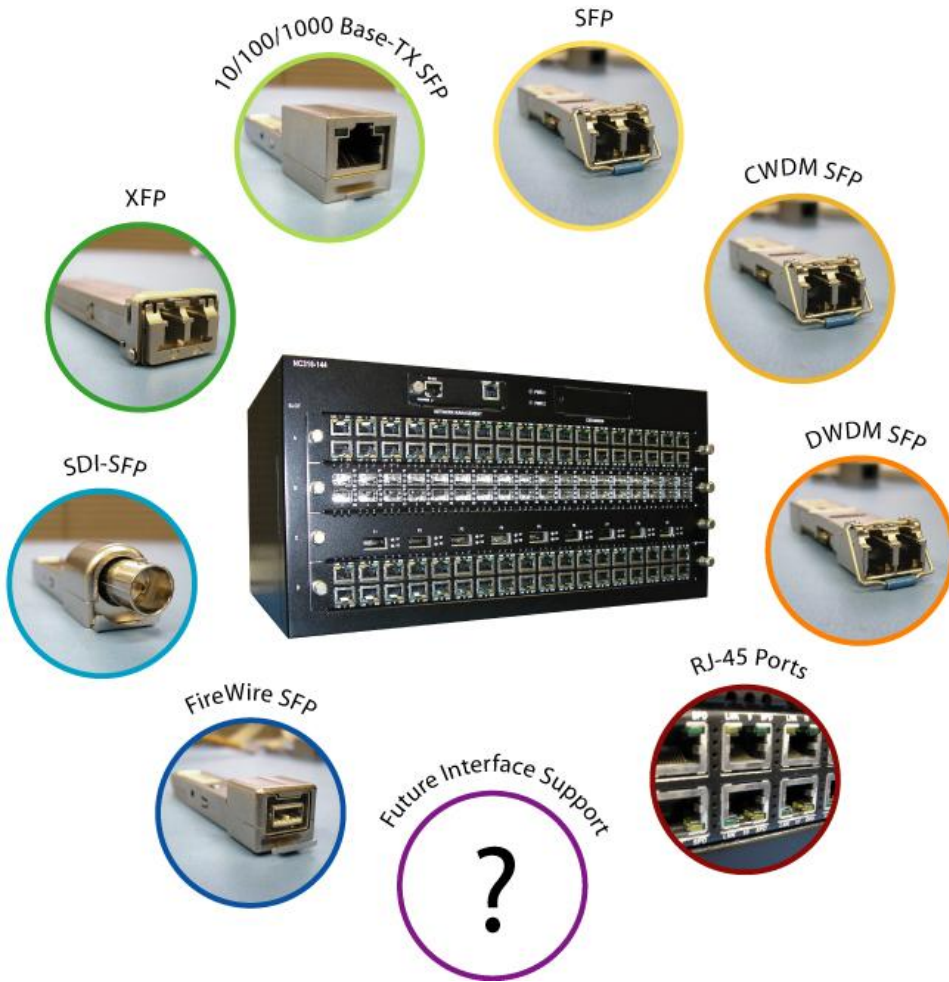


Optical and  
Copper



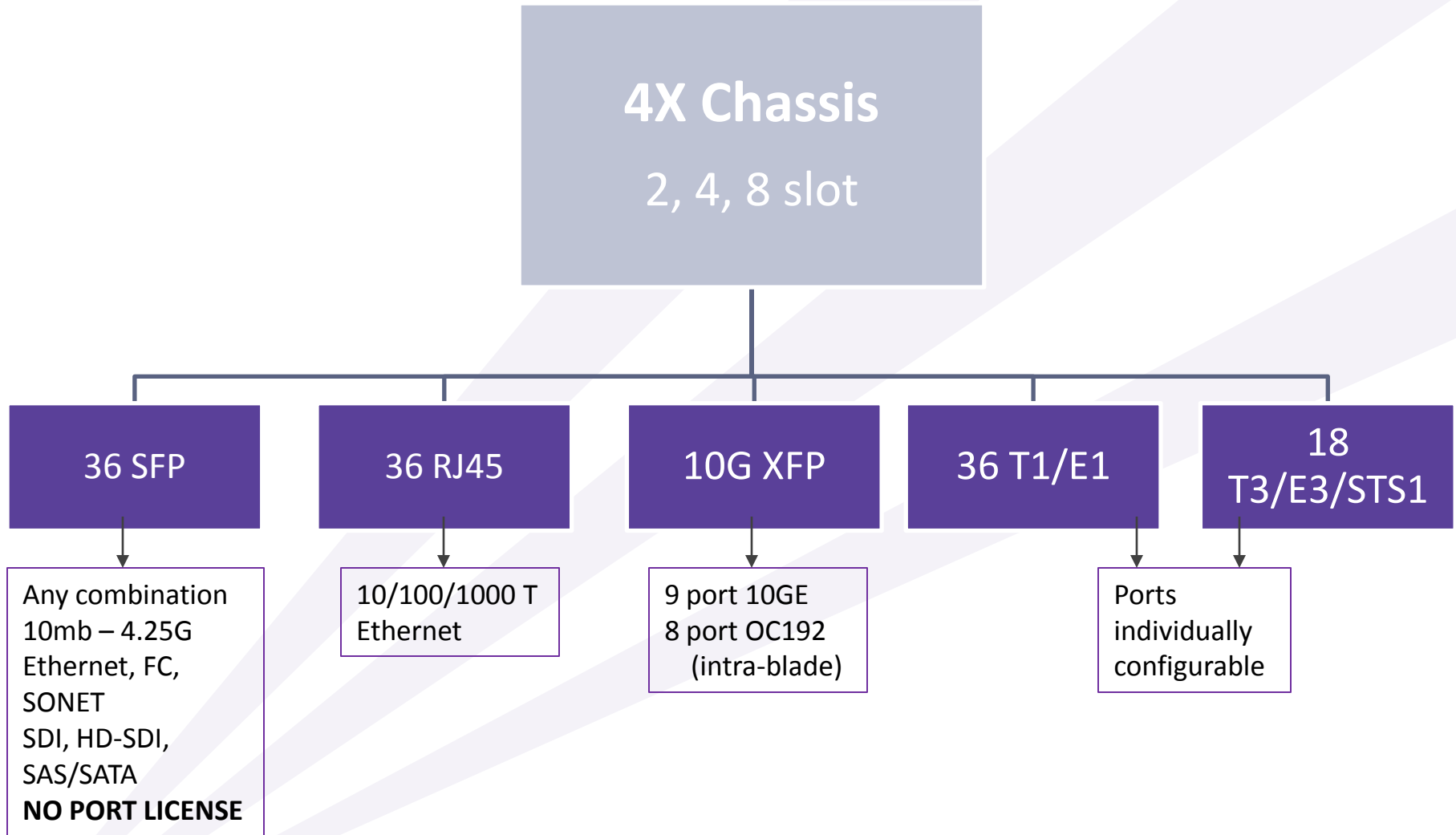


# MCC Protocol Support

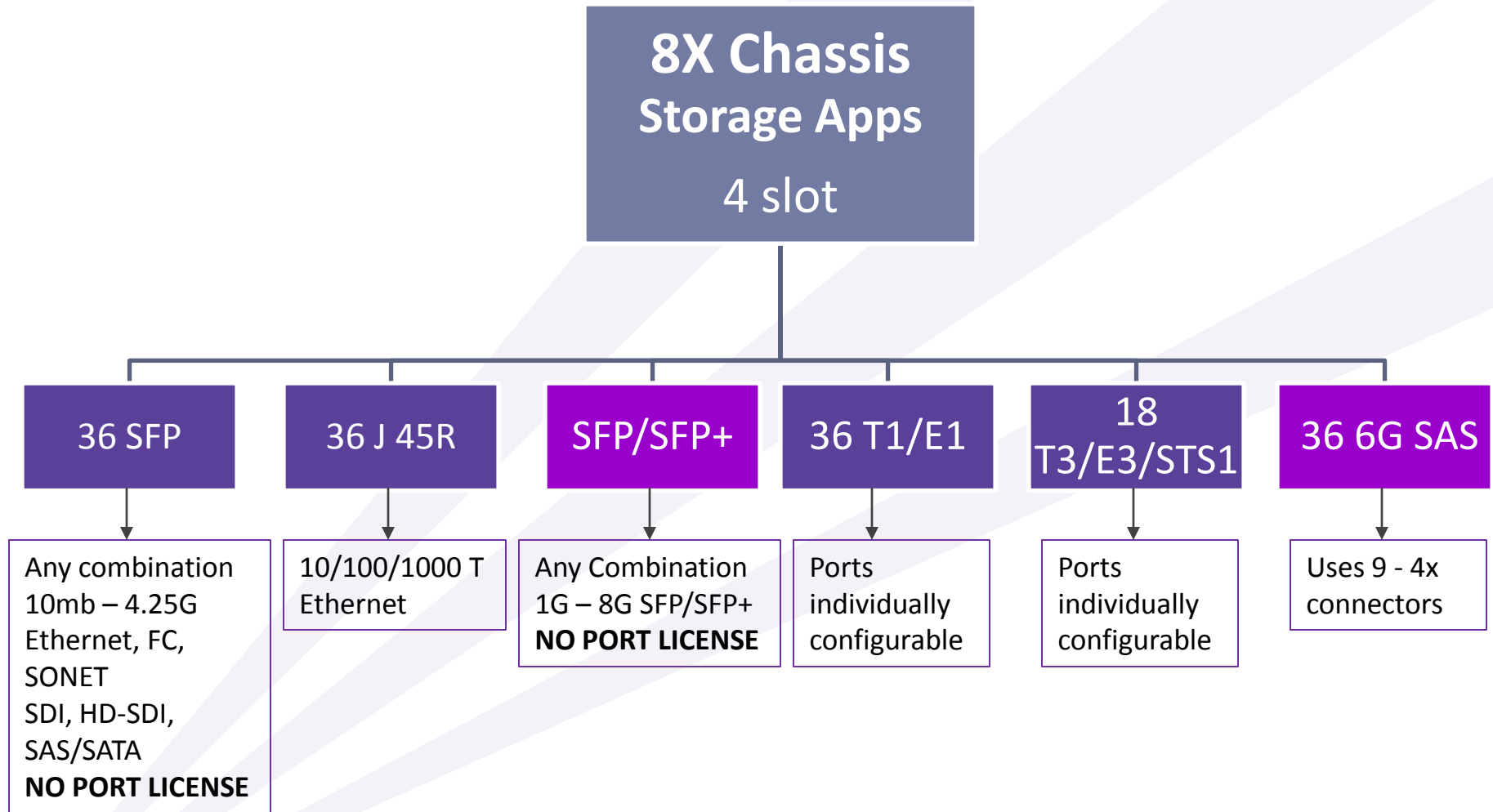


- Ethernet 10/100/1000
- SONET OC3,12,48, 192
- Fibre Channel 1, 2, 4, 8 Gig
- FCoE
- 10 Gig Ethernet & Fiber Channel
- SAS/SATA 1.5, 3, 6 Gig
- T1/E1/J1
- DS3/E3/STS-1
- Digital Video (DVB-SDI)
- PCI express

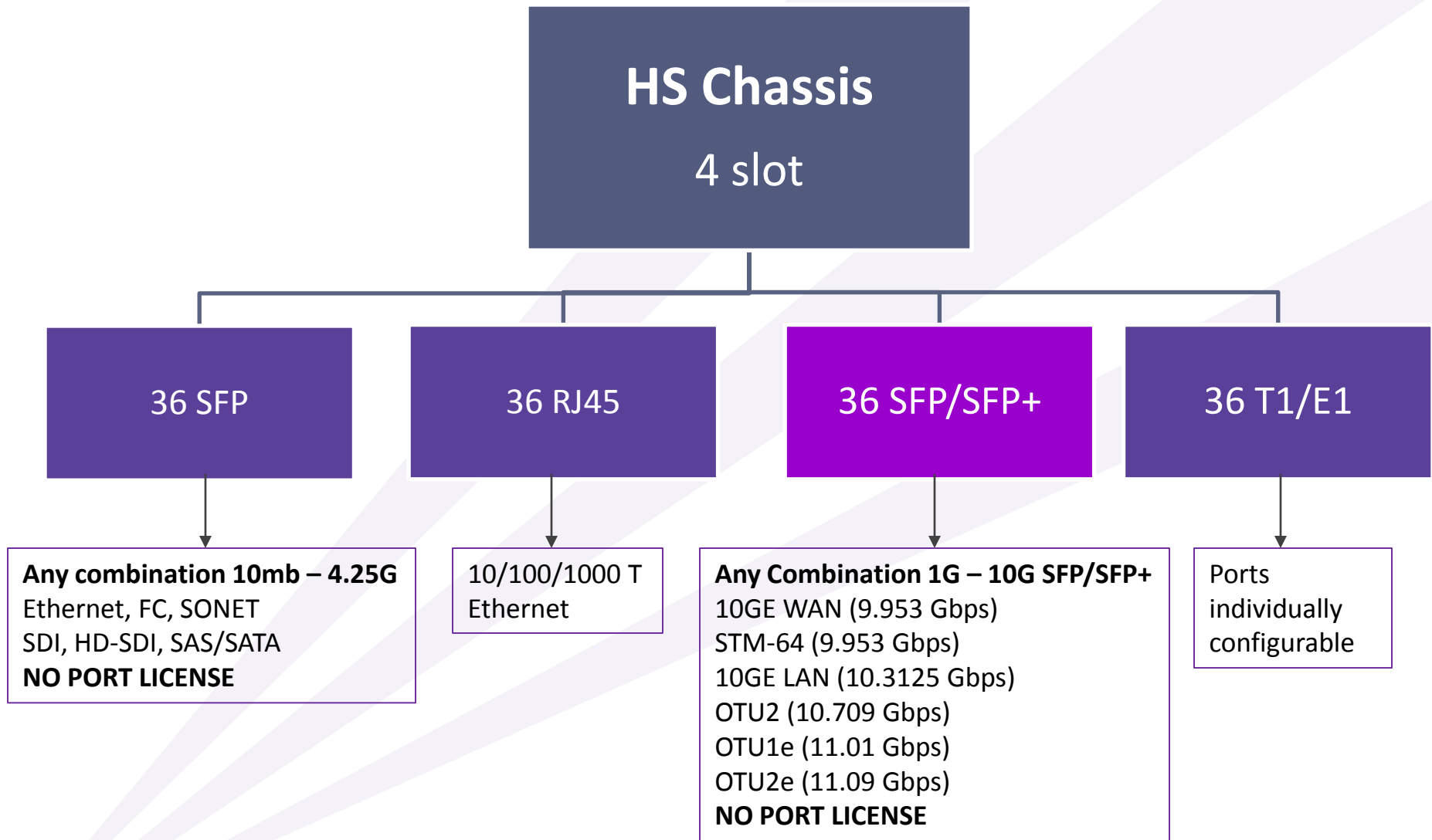
# 4X MCC Capabilities



# 8X MCC Capabilities



# HS MCC Capabilities



# MCC High Speed Chassis Production Status

- 10G chassis/blades fully released and in stock
- Shipped to customers starting October, 2010
- Successfully evaluated by 12+ companies
- Backward compatible with existing blades
  - Protect investment of installed base

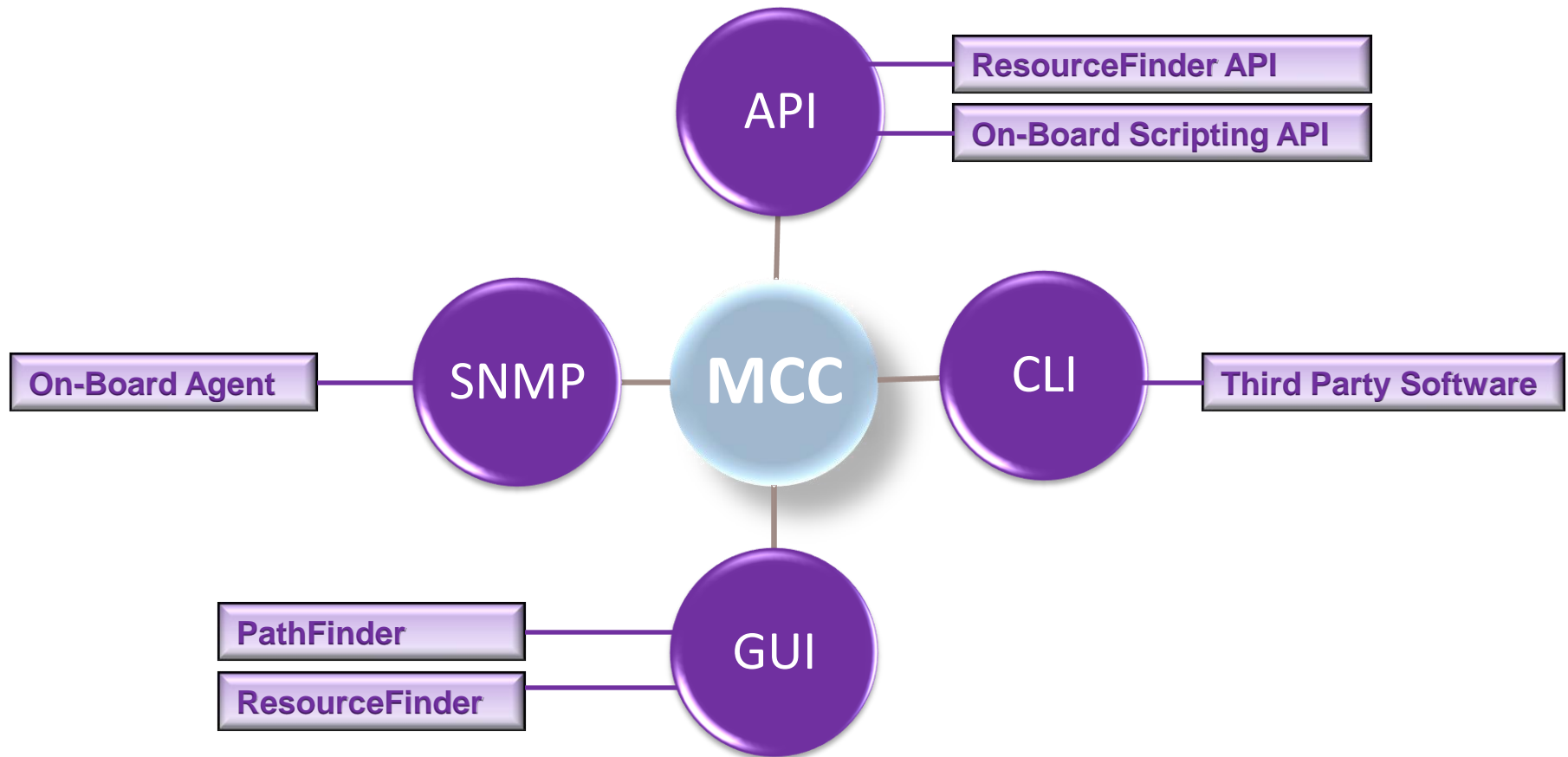
# Optical Cross Connect (OCC)

- All-optical switching matrix (3D-MEMS)
- Single-mode fiber LC connections
- Mappings up to 100Gbps
- Up to 320 ports in 8 port increments
- Optional power input monitoring and redundant processor



# Media Cross Connect Management Options

# MCC Management Flexibility





# MCC Management Options

- **CLI - Command Line Interface**
  - Robust command set
- **SNMP**
  - North-bound OSS interface
- **Tcl-Based API**
  - Simplify scripting
  - Library of pre-determined scripts
- **PathFinder GUI**
  - Single chassis applications
  - Mapping Efficiencies
  - Graphical representation of topology
  - Scaled-down tester interface
- **ResourceFinder GUI**
  - Multi MCC environments
  - Automate testing –Equipment Reservation and Test Scheduling
  - Optimize lab operation
    - Mapping and topology management
    - System management
    - Resource management

# How the MCC helps

- **Remote access to lab infrastructure and resources**
- **Reduce Cap Ex and Op Ex – do more with less**
- **Share expensive/redundant test gear**
  - Analyzers, generators, servers, upper layer devices etc.
- **Increase test accuracy, repeatability and velocity**

# Why Deploy the MCC in the Lab?

- **Reduce test time**
- **Increase test accuracy**
- **Increase equipment utilization**
- **Expedite new product releases**
- **Minimize operational and capital expense**
- **Position for test automation**

**Thank You**

**EMPOWERING  
THE OPTICAL EDGE™**