



Cisco ONS 15454 Multiservice Transport Platform 7.0

Executive Overview Presentation

Agenda

- **Optical Networks Market Trends**
- **Cisco Optical Strategy**
- **Cisco IP+Optical Strategy**
- **ONS 15454 MSTP Benefits**
- **Summary**



Market Conditions

Time of Rapid Change

- **Relaxed regulation accelerates broadband revolution**
- **Broadband (ETH + xDSL) is changing telecoms market power balance**
- **E-government plans drive bandwidth demand from public sectors**
- **Results in upsurge of packet data transport requirements (ETH, IP, MPLS)**
- **Enterprise data communications needs becoming sophisticated and rapidly growing (bandwidth, port volumes)**
 - SAN—IP storage demand soaring e.g. RFID**
 - Hosted applications (ASP model)**
 - Business continuity**
 - Lambda services**

Changing Market Conditions

Service Provider Priorities

- **Reduce expenses**
 - Use Capex efficiently, reduce Opex for existing and new services
- **Introduce new services, increase revenue**
 - Be profitable, counter competitive threats, generate growth
- **Reduce system complexity**
 - Less is more, simplify planning and provisioning, network management
- **Build flexible architectures**
 - Anticipate “forecast error” and change, avoid silos, be scalable, be adaptable
- **Convergence**
 - Legacy to next generation networks, circuit to packet

The Balance of Cost Optimization and New Service Introduction Is Paramount Today

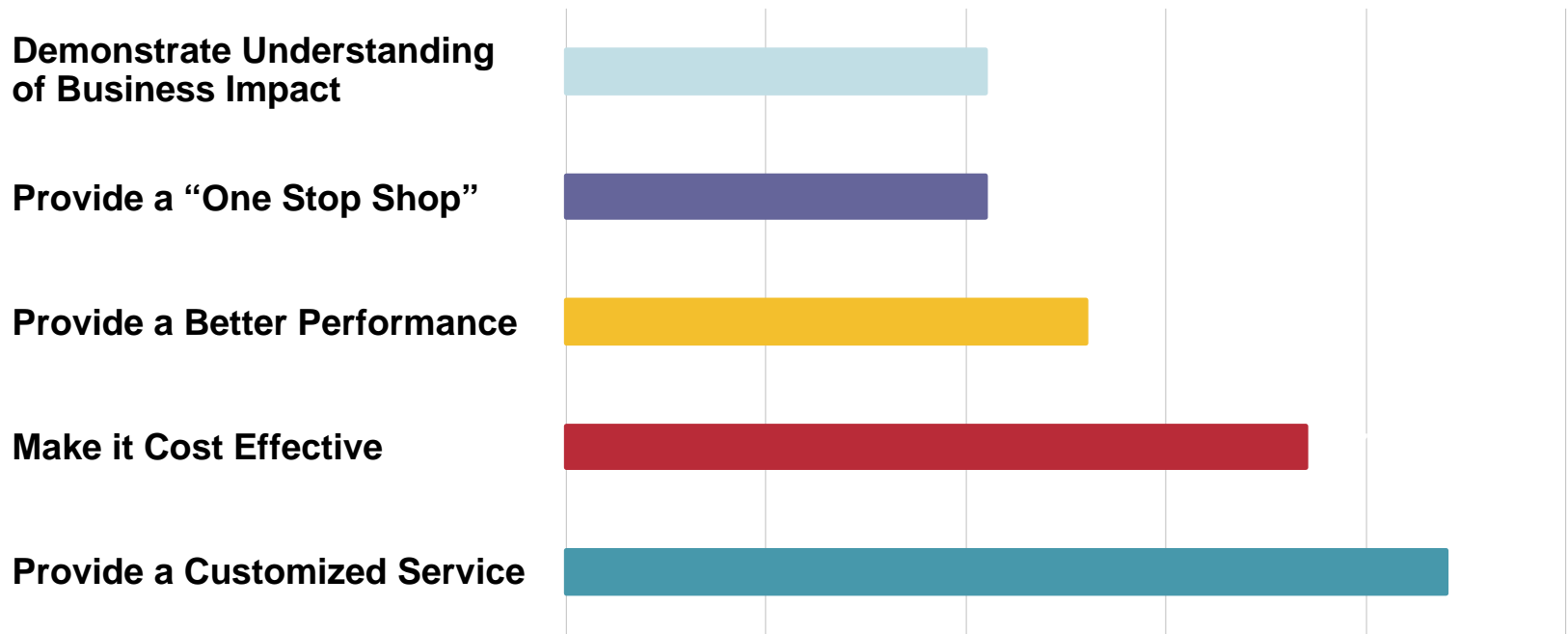
Service Provider Requirements

- **Flexible options for service deployment**, including point-to-point, multipoint and hybrid
- **(New) profitable services**
- Support a flexible/elastic mix of (new) services
- Simple and **scalable** design for service delivery—low impact on existing infrastructure
- **Separation of services from architecture**
- **Differentiate** from competitors

Enterprise Requirements

Customized Services

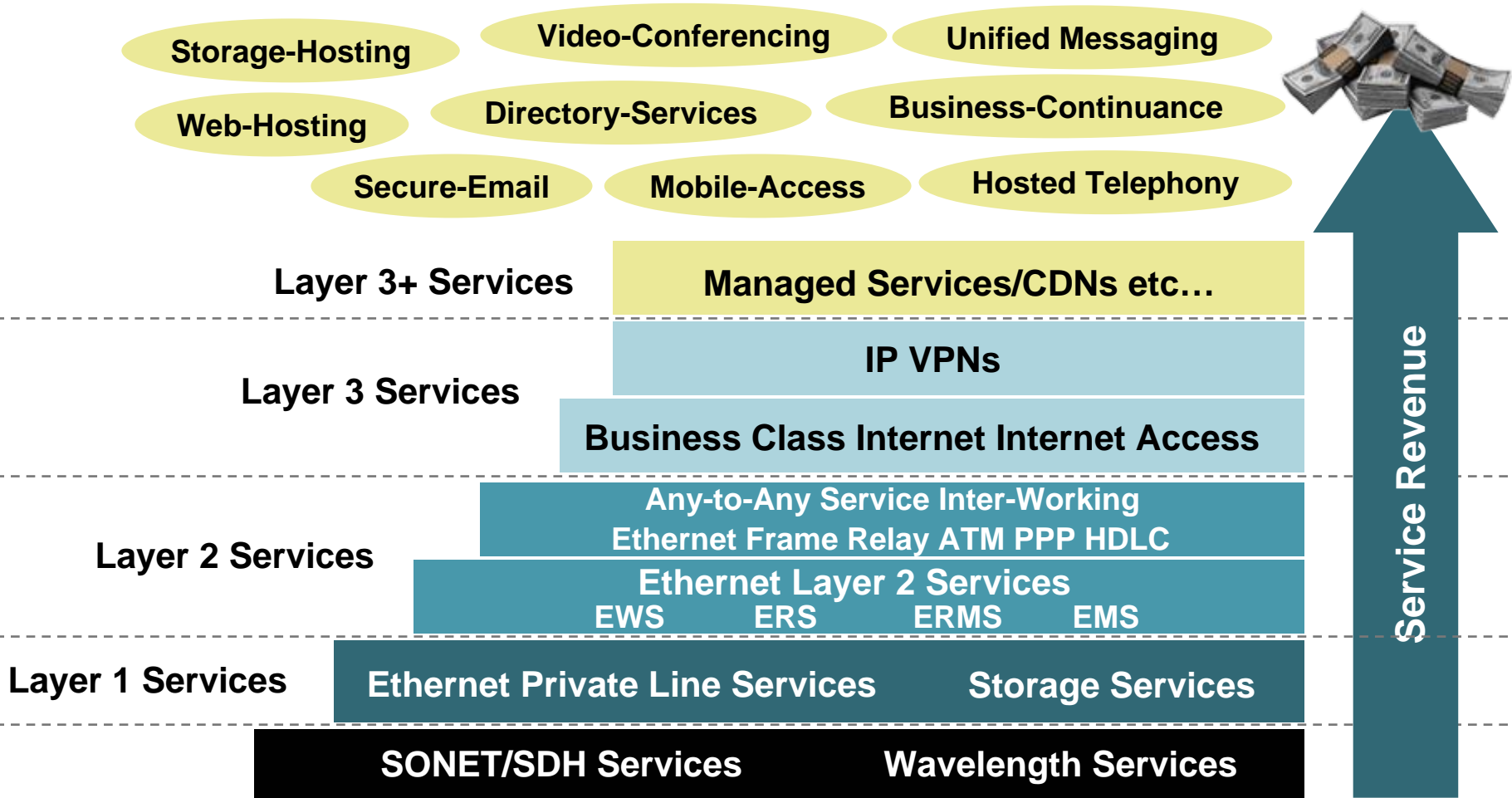
Which of the Following Would a Telecommunications Service Provider Need to Do to Make You Outsource More Network Services? (Rank by Importance)



Source: IDC

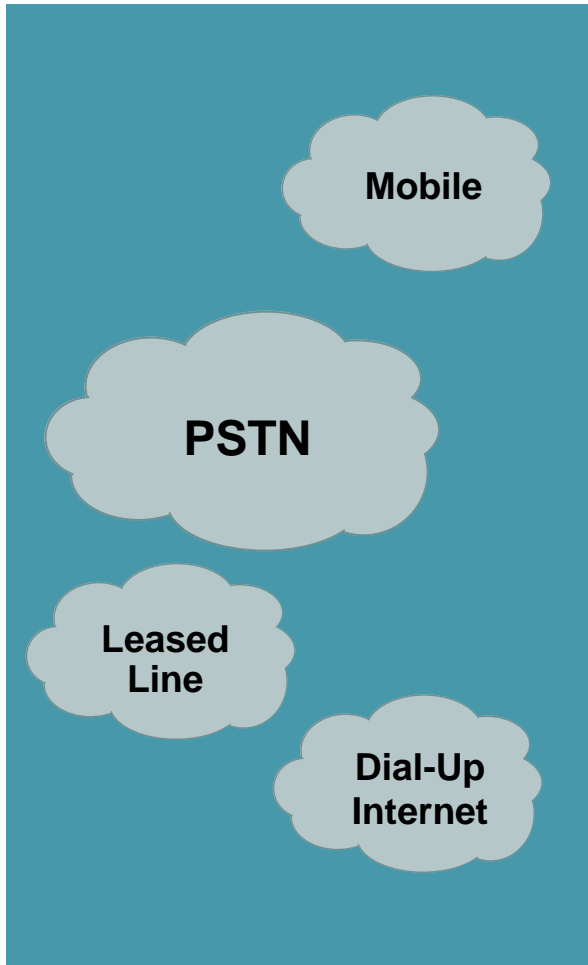
Multi-Layer Service Portfolio

One Architecture, Many Services

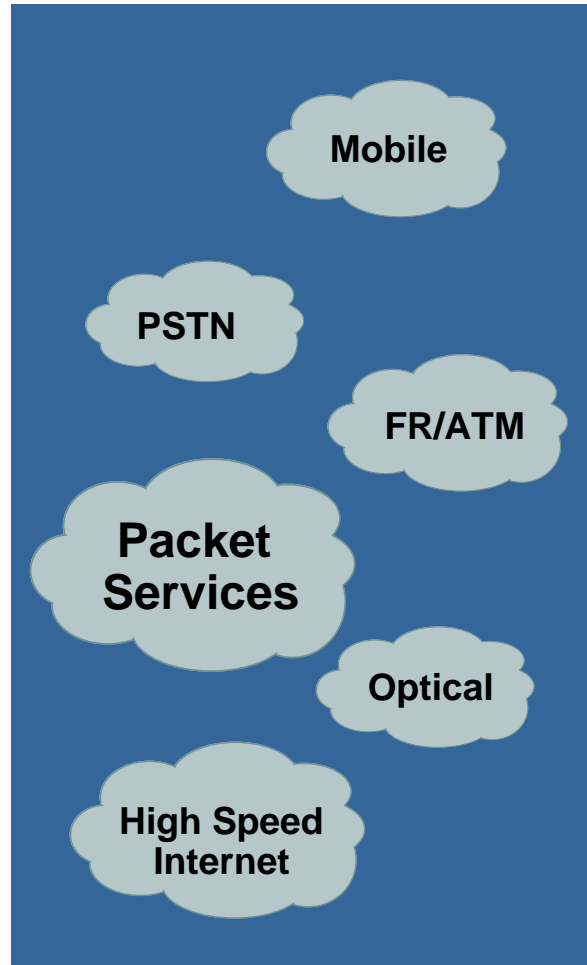


Network Migration

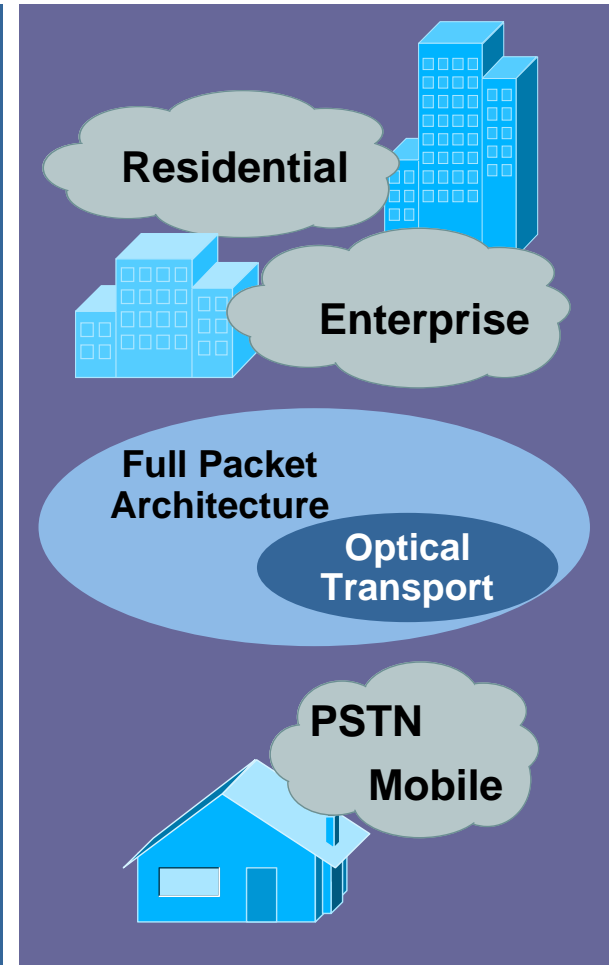
Past: All Circuit



Present: Hybrid



Future: All Packet



Cisco Service Provider Vision

Connecting Customers with Services, Services with Networks, and Networks with Each Other

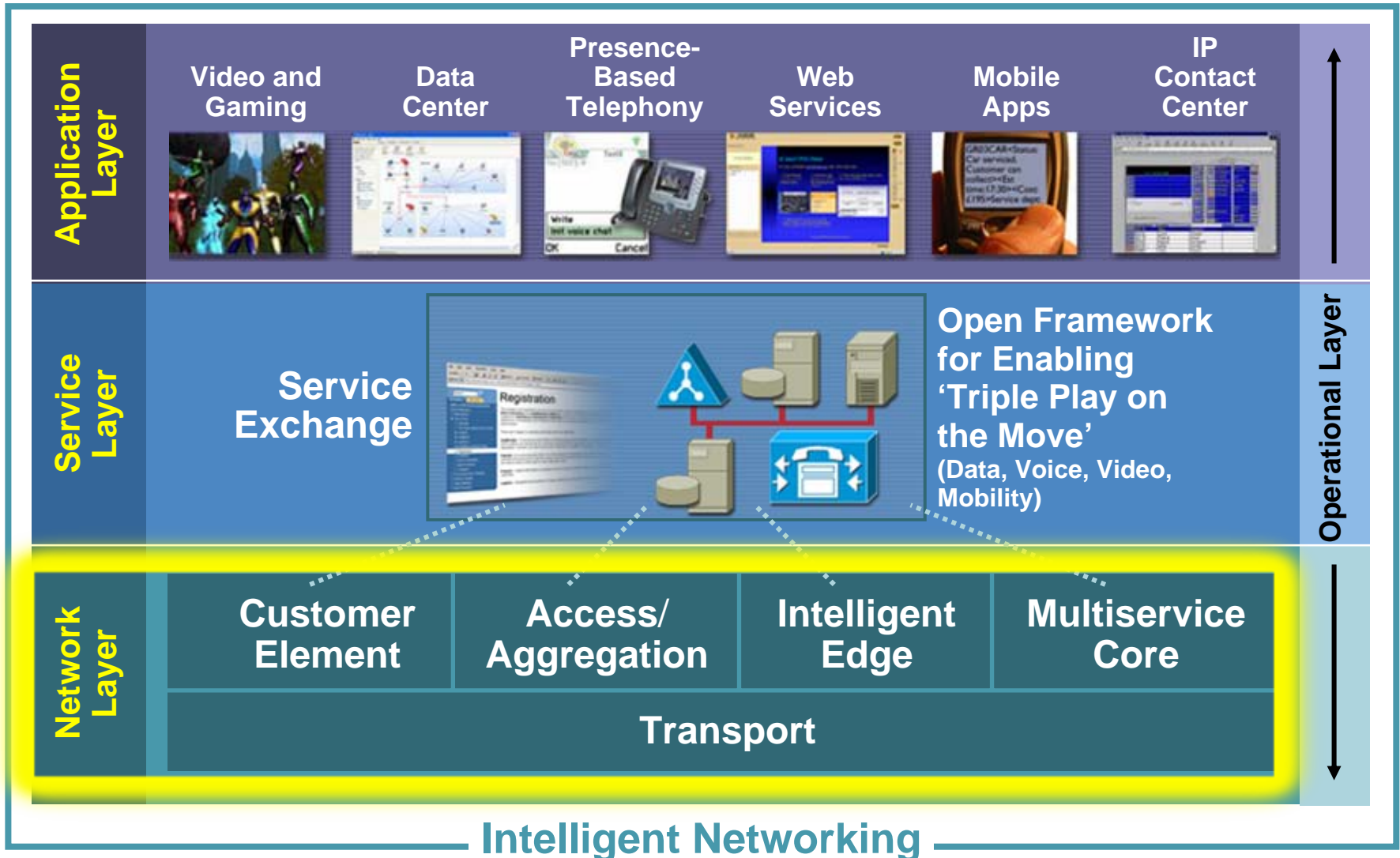


IP Next Generation Network



Cisco IP NGN Architecture

Achieving a Whole Greater Than the Sum of the Parts



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Cisco's Optical Strategy

- **Next generation optical**

Match and exceed comparable next generation optical products: Operations, functionality and value

- **New services**

Be the best solution for converged networks

Provide a migration path to new services: Ethernet, IP, MPLS, IS, SAN

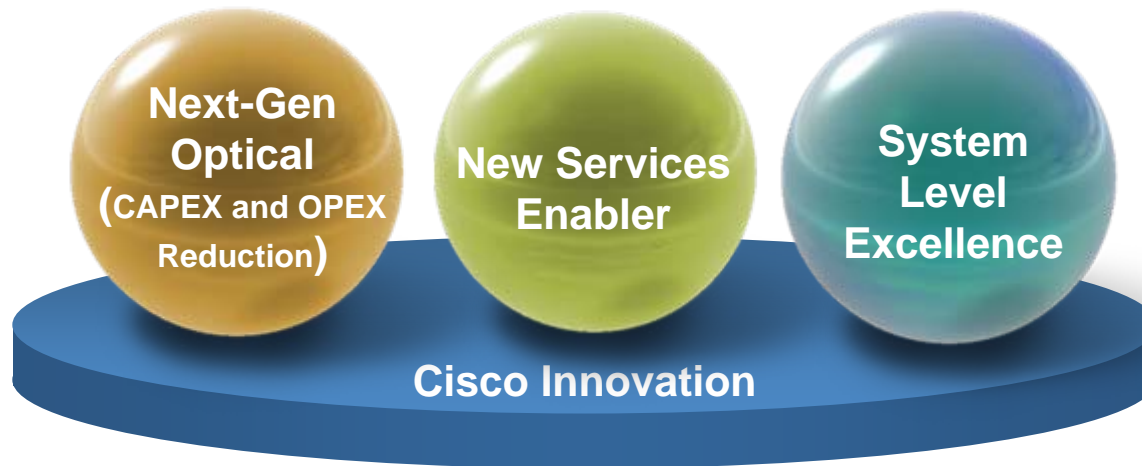
- **System level excellence**

Provide operational efficiency and end-to-end cost reduction

Migrate from legacy to next gen and from circuit to packet

Cisco's Optical Strategy

Building Blocks and Technologies



- **Next-Gen Optical**

Vertical integration:

Collapsing SDH and DWDM layers, collapsing TM/ADM/DXC SDH functions

➔ end-to-end with less boxes

Transversal integration:

Common pluggable, common craft and EMS/NMS management

End-to-end CPE to core operational ease

- **New Services Enabler**

End-to-end Ethernet architecture

End-to-end storage architecture

End-to-end IP + optical architecture

End-to-end Wavelength Services arch.

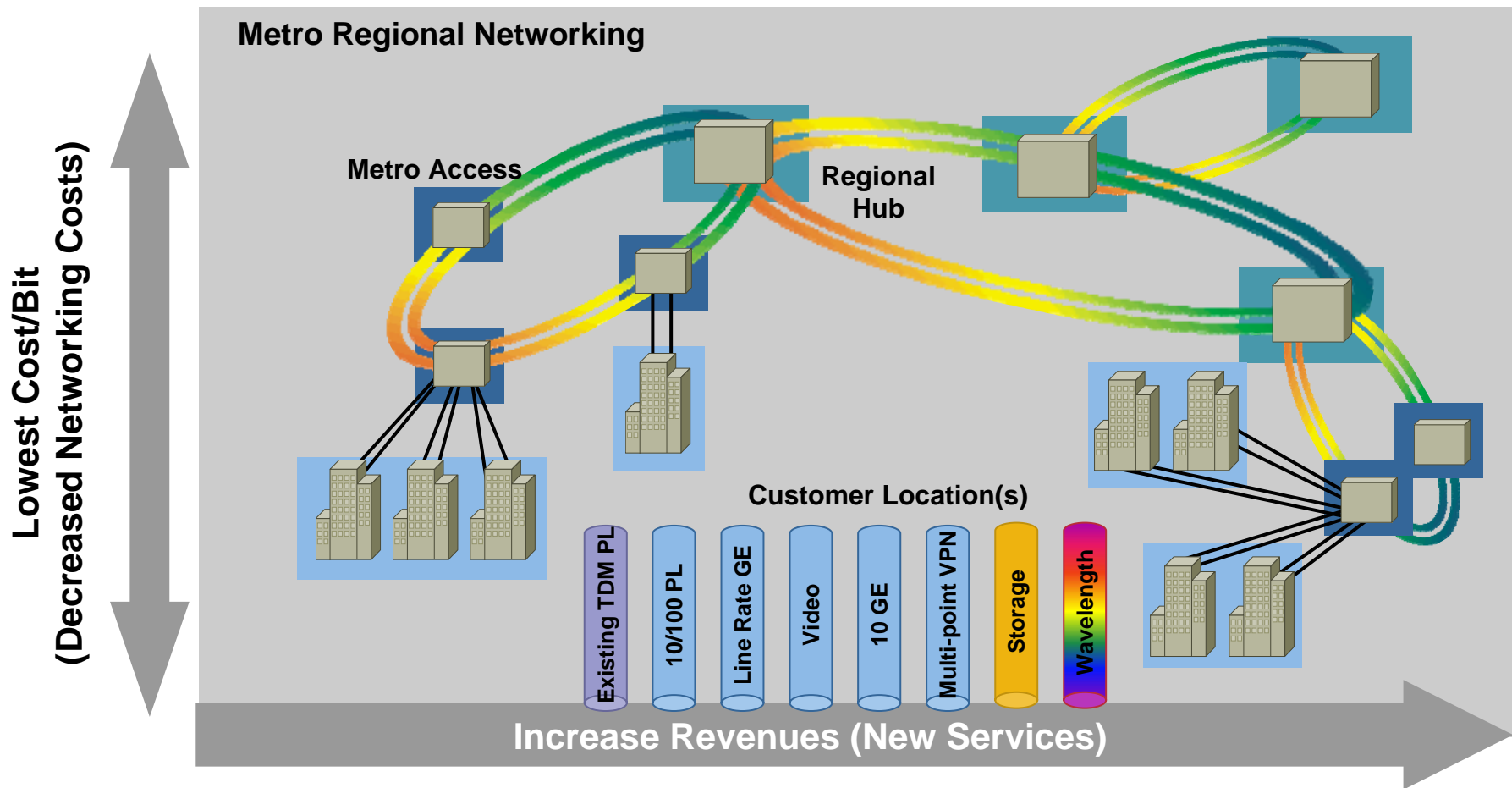
- **System Level Excellence**

Carrier-class

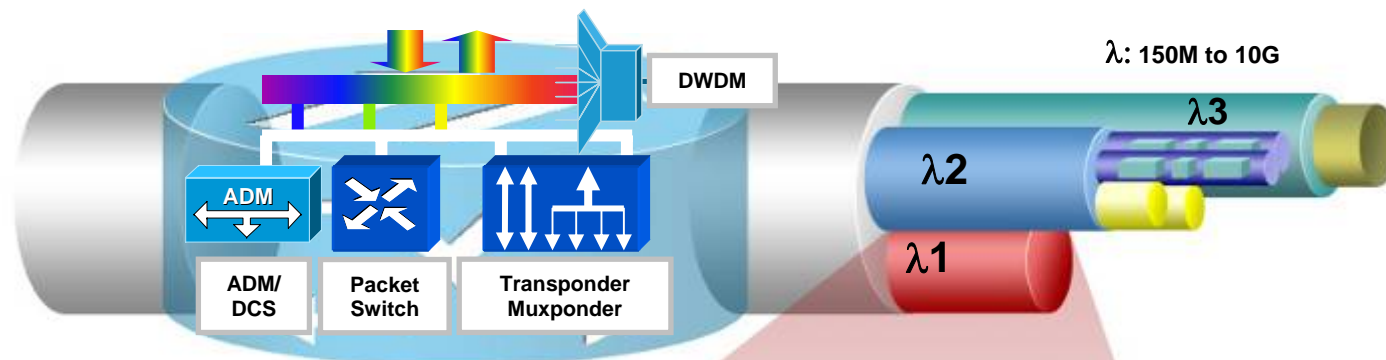
Design to scale

Cisco's Optical Approach

Convergence: Fewer Boxes, Lower Costs, Increased ROI



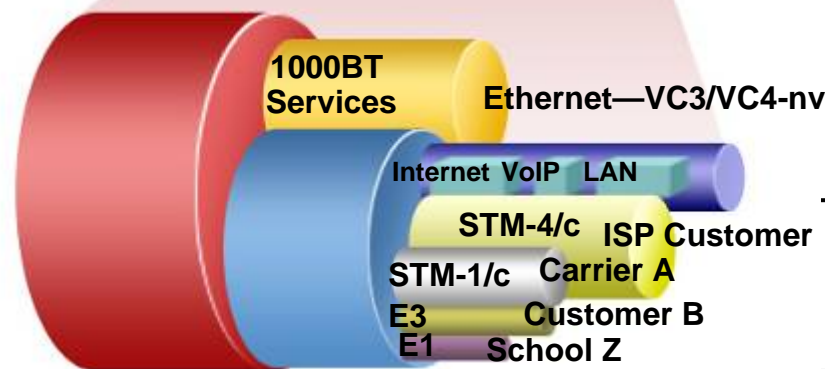
Cisco Transport Solution: ONS 15454 MSTP



Multiple Services on the Same Wavelength

Three Core Functions

- **SONET/SDH transport** with TDM aggregation
- **Native Ethernet, IP switching** and aggregation
- **Intelligent DWDM** multiplexing and wavelength transport

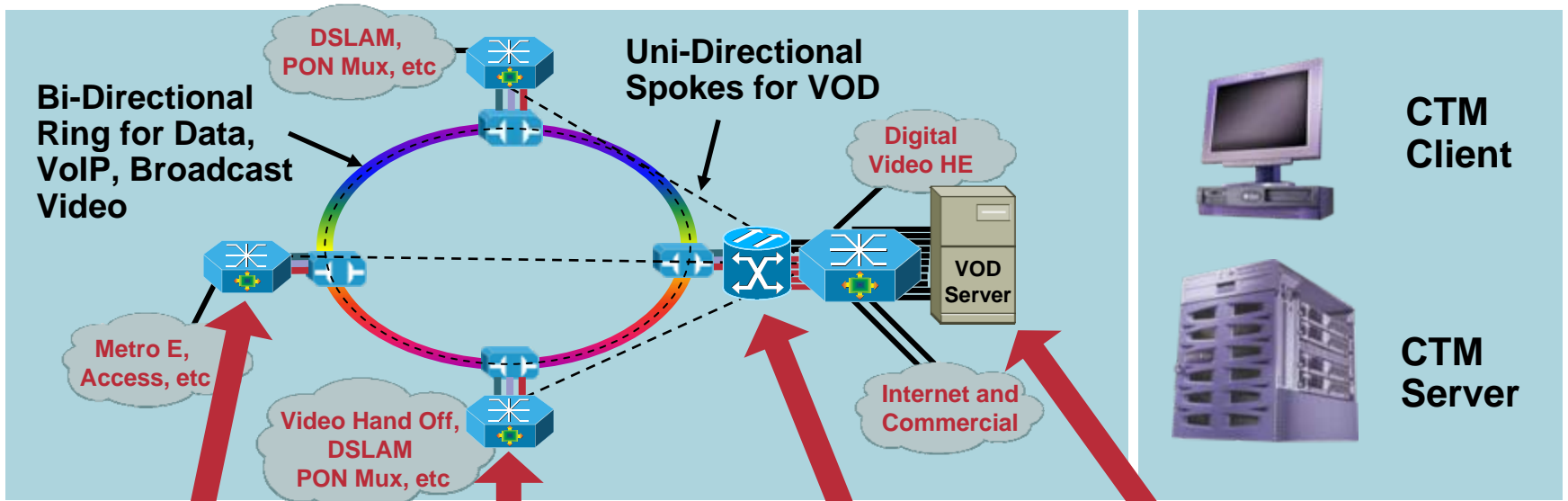


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Optical Technology Integration with Core IP



CTM Client



CTM Server



Catalyst 7600



Cisco ONS 15454 MSTP/MSPP (ANSI/ETSI)



CRS-1/XR 12000



Extending the Advantage: IP+Optical

Today

Separate Optical, Router Interfaces



Future

Colored, Tunable Interfaces Directly on Router

Separate Management Approaches



Unified, Common Management

Separate Control Plane



Integrated Control Plane

Separate Optical Domains



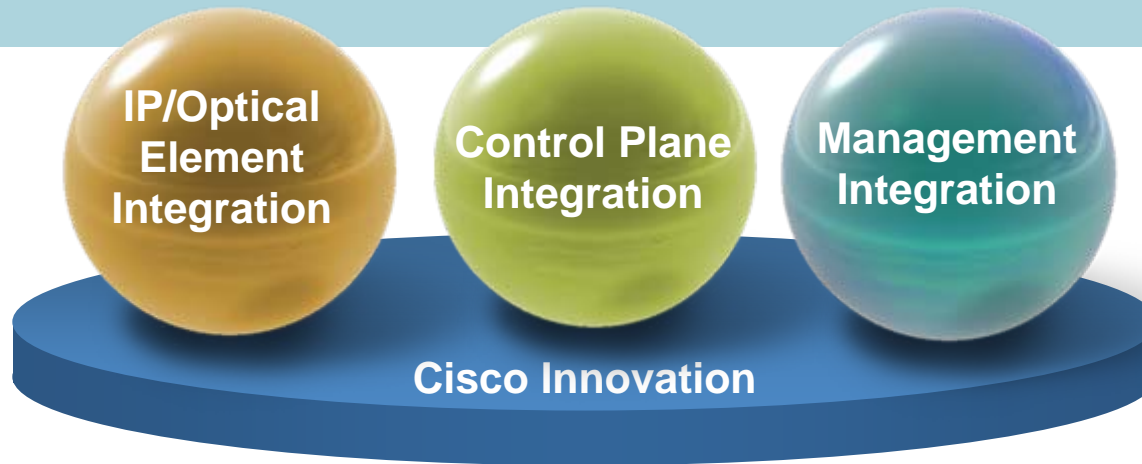
Optical Convergence Layer-Seamless

Clear Direction to the Future!

Cisco's Optical Strategy

Building Blocks and Technologies

Ready for Packet Optimized Next Gen Transport Networks



- **10G DWDM interface on routers as an entry point into the optical domain**
- **40G DWDM interface over 10Gbps transport**
- **2.5G WDM SFP for lower end applications**
- **Advanced LH DWDM layer w. extensive optical control loops and monitoring**
- **Ring optical switching using ROADMs**
- **Mesh optical switching using I Routers**
- **Control plan technologies:**
 - Link Mgmt. Protocol (LMP)
 - Peer model (GMPLS)
 - Overlay model (O-UNI)
- **Network management integration**

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ONS 15454 MSTP

Solving the Complexities of DWDM Transport!

Fully Reconfigurable, Intelligent DWDM

- **Carrier Class DWDM transport**
 - TDM/Ethernet/SAN integrated DWDM platform
 - Integrated planning, Install and turn-up
 - Automatically compensate for fiber issues
- **Reconfigurable networking**
 - 32Chs Reconfigurable Optical Add Drop Mux (ROADM)
 - Full band tunable 10G lasers
- **Cisco's core DWDM transmission platform**
 - DWDM capabilities for Cisco's TDM **and** IP platforms
 - End-to-end mgmt of Cisco IP DWDM networking
 - Directly connect IP wavelengths
- **Industry leading advancements**
 - 96Chs Capable Solution
 - Qualified for 40G transport



Carrier Class DWDM Reconfigurable Networking



ROADM Amplifiers OSC Modules



2.5G MR TXP/ MXP 10G MR TXP/ MXP

Common Equipment

Service Cards

- Reconfigurable Optical Add Drop Multiplexer (ROADM) in C- and L-band
- Automatic power control and automatic node setup for simple and fast turn-up
- Enhanced Forward Error Correction (EFEC) and G.709 for embedded management
- Network Level Alarm Correlation and Multi-Shelf Management for simple operation

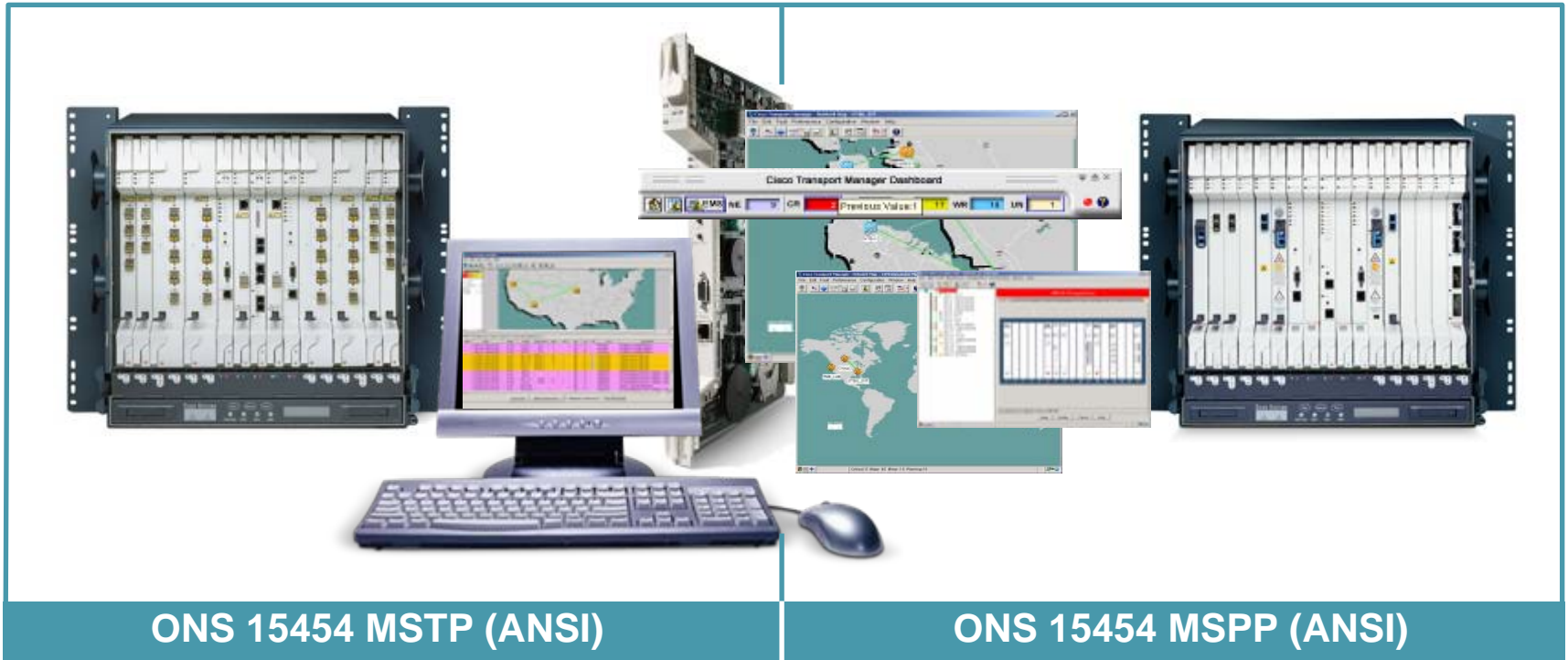
ROADM Highlights

#1 in ROADM Deployment (More than 1000 Shipped)

- Deployed by ILEC, IXC, PTT, MSO, IOC, government, education, enterprise
- Lowest first and total cost ROADM
six channel OADM cost = 32 channel ROADM cost
- **Integrated PLC (iPLC) ROADM** based on Silicon Array Waveguide Grating (AWG)
- **iPLC ROADM** integrates Dynamic Gain Equalization (DGE) and Optical Performance Monitoring (OPM)
- Allows direct interconnection of “alien” DWDM Interfaces (e.g. ITU services from IP line cards)
- In-service upgrade to >degree-2 ROADM
- Four cards for degree-2 ROADM



DWDM and SONET/SDH Universal Shelf

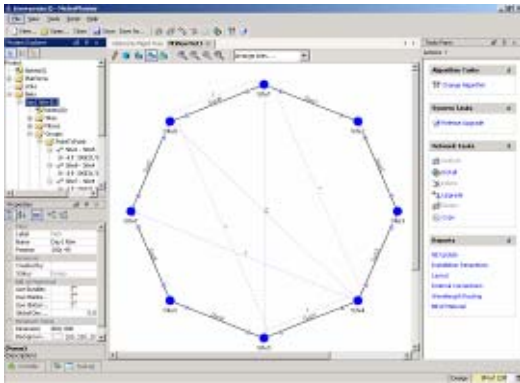


- Same shelf
- Same TCC (node controller)

- Same software
- Same EMS/Local Craft (CTC)/Network Design tool (MP)

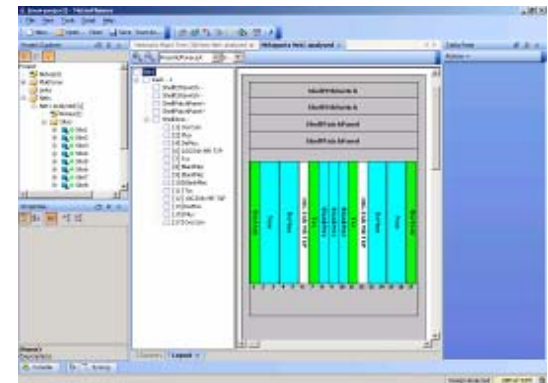
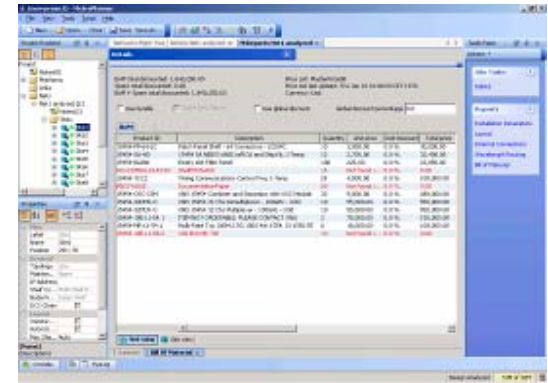
Streamline Deployment of DWDM Networks

Planning DWDM Network with Cisco MetroPlanner



Integrated Element Management

Create Accurate BOM



Instructions to Configure the Network



Management Lifecycle

Benefits of IP+Optical

Before



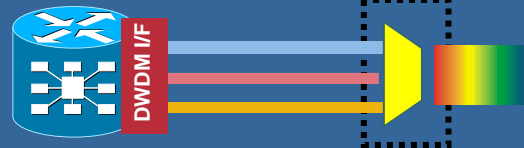
CRS-1 Transponder ROADM



Transponder
Integrated into CRS-1



CRS-1 ROADM



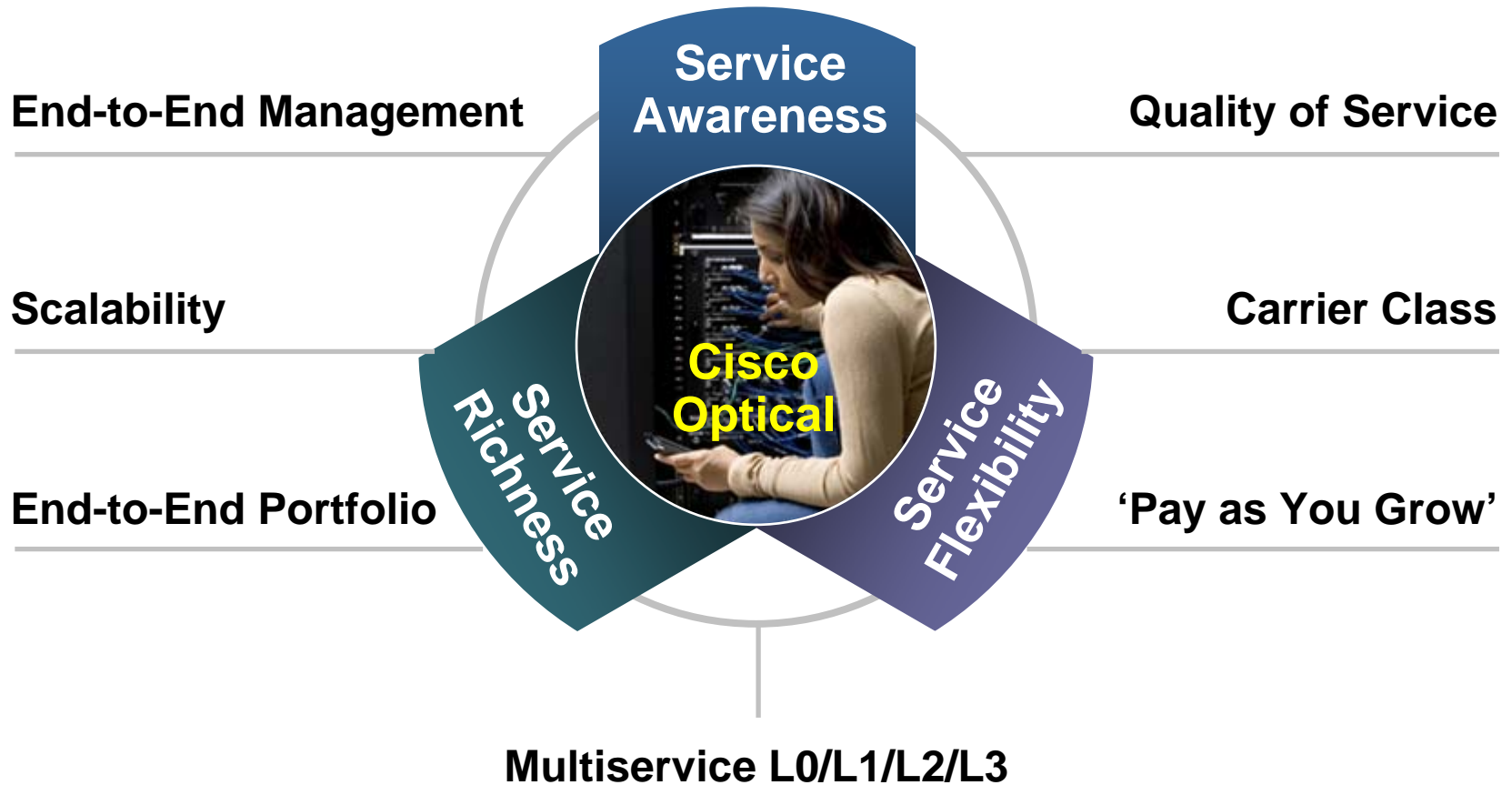
- **Increased performance**
 - 4x increase in throughput for existing 10G DWDM systems
- **Lower CapEx**
 - 50% optics reduction
 - 10GE price points
- **Lower OpEx**
 - Fewer shelves (space, cooling, power, management)
- **Enhanced resiliency**
 - Fewer devices, fewer active components

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Cisco Optical Value Proposition



The Cisco Optical Benefit



**Multiservice
Capabilities**



**Enhanced
Administrative Features**



**Optimized
Architectures**

➤ **Cisco Optical Solutions Enable New Revenue Streams, Lower Operational Costs, and Reduced Capital Expenditures to Dramatically **Increase Service Provider Profitability****



Cisco Intelligent Optical Transmission Summary

Traditional Vendors

Legacy Solutions

- Pure metro or long-haul derivatives

Inflexible

- Preplanning
- Rigid configurations
- Limited application support
- No linkage with service delivery/enables

Difficult to Manage

Cisco Optical

Next-Generation Metro Regional Solution Designed from Ground Up

Flexible

- Minimizes need for preplanning
- Configurable to meet cost-growth tradeoff
- Wide variety of applications
- Integrated optics with L2 and L3

Intelligent Software Enables Automated Network Set-Up and Management Along Network Life



CISCO SYSTEMS

