



IP + Optical Big Bang Seminar
2001



Customer Metro Networking Options and Positioning

HYUK KIM
(hyukim@cisco.com)

EAS Choices

- Ethernet Switch Solutions
- **MSPP(Multi Service Provisioning Platform)
Solutions**
- DPT(Dynamic Packet Transport) Based
Solutions

MSPP(Multi Service Provisioning Platform) Solutions

Cisco.com

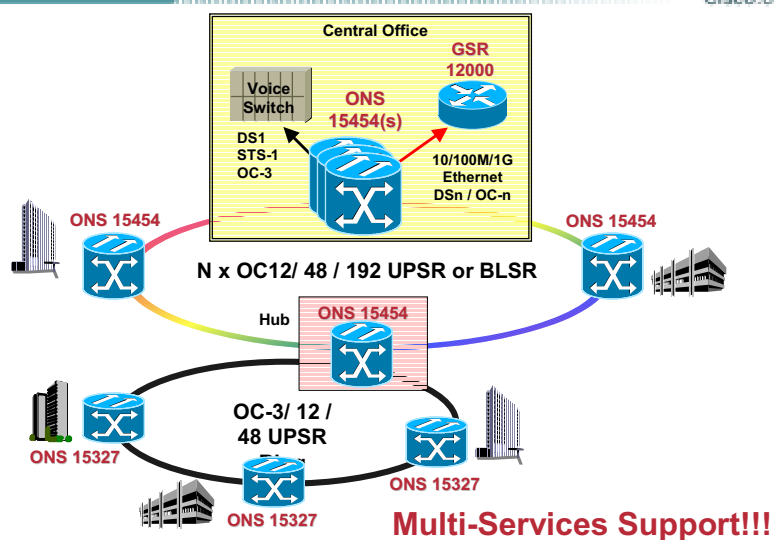
- Multi-Service TDM & Data Support
- SONET/SDH Protection Schemes (BLSR/UPSR,etc.)
- Integrated DWDM for Metro Fiber Relief
- Radical Economics
- Supports Smooth Migration from TDM->Data Centric Environments
- Rapid Service Velocity

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Supercharged MSPP Networks

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Cisco Ethernet Access Solution Over MSPP

Defining MSPP

“

An MSPP is a new network element, designed to replace legacy SONET/SDH ADMs in metropolitan applications, that contains the functionality of a SONET/SDH ADM while adding non-TDM service interfaces, switching fabrics, and transport technology in a single chassis.

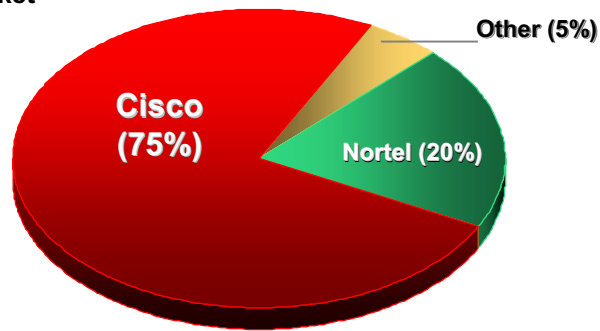
”

**Sterling Perrin,
IDC analyst**

Cisco Worldwide Leader in MSPP Market Share

Cisco.com

2000 Worldwide
MSPP Market



Total = \$1B

Source: IDC

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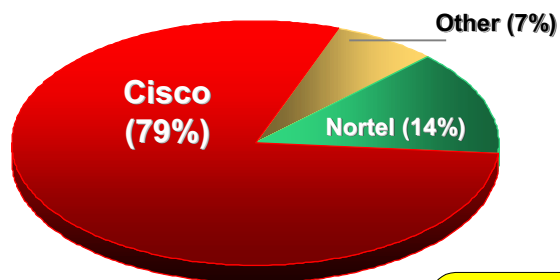
9

Cisco #1 in N.A. MSPP Market Share

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2000 North American
MSPP Market (\$900M)

Source: IDC



Potential
Cisco Revenue in 2005?
\$4.8 Billion!!
(80% of \$6 Billion)

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Cisco ONS 15454

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- **Multi-Service Capabilities**
 - TDM Interfaces & Multiplexing**
 - Ethernet and IP/MPLS Data Interfaces**
 - Integrated Layer 2 & 3 Data Switching**
 - Trans/Muxponder Wavelength Interfaces**
- **Customers: 600+ Across All Segments**
- **36,000+ Systems Shipped / In-Service**
 - ☐ **No. 1 in OC48 shipments in CY2000**
 - ☐ **Leader in Metro Ethernet Transport Market Share**
 - 30,000 Ethernet and Fast Ethernet Ports**
 - 3,000 Gigabit Ethernet Ports**



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Cisco ONS 15327

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- **Supercharged SONET**
 - OC3 through OC48 platform with ADM and DCS functionality**
- **Radical Economics**
 - Low initial costs**
 - Low operating costs**
 - Scalability**
 - Multiservice functionality**
- **600+ Systems Shipped / In-Service**
 - Supercharging the optical Edge**
 - 2,000 Ethernet and Fast Ethernet Ports**

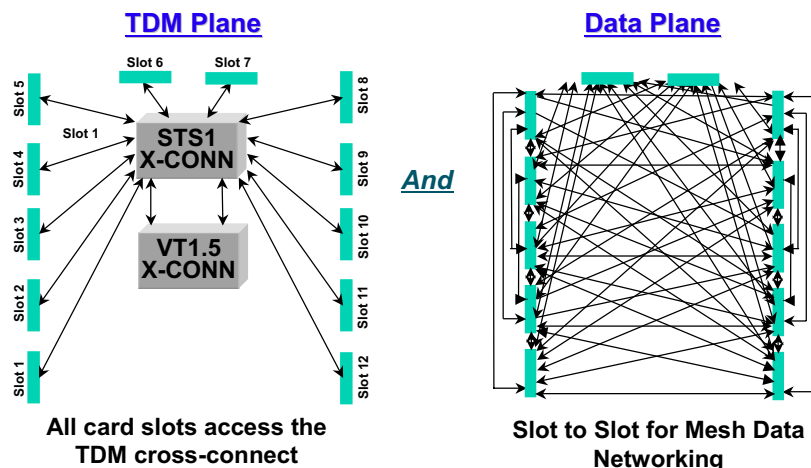


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Integrated TDM and Data Backplanes

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A true hybrid network element!

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Why Ethernet On Next Gen SONET/SDH ?

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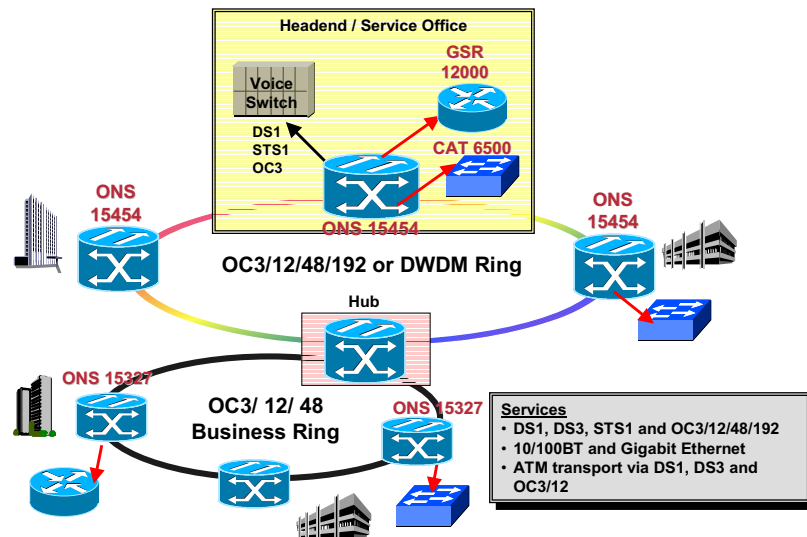
- **Service Provider Familiarity with SONET/SDH as a Network Technology**
- **Customer Migration Capability from TDM to Ethernet**
When customer, carrier & marketplace is ready!
- **Carrier Class Ethernet**
Proven SONET Failure Recovery
vs. for Spanning Tree (30+ seconds)
- **Best for Both Worlds**
Media choice for the customer
Familiarity for the service provider

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Multi-Service Metro Network

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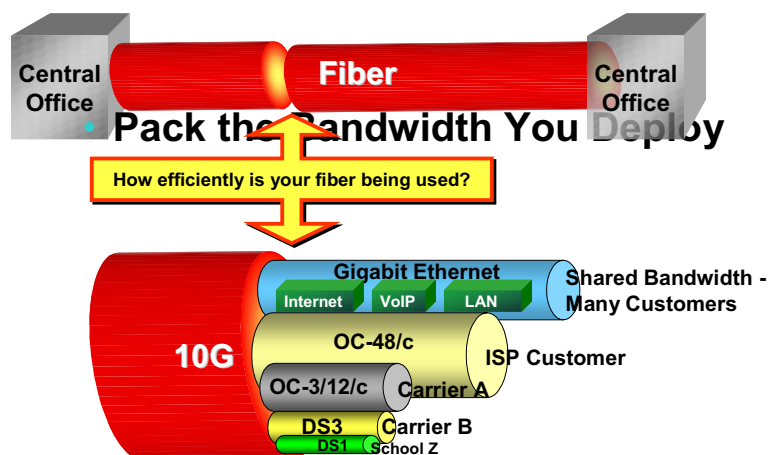


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Customer Needs - Efficient Bandwidth Utilization

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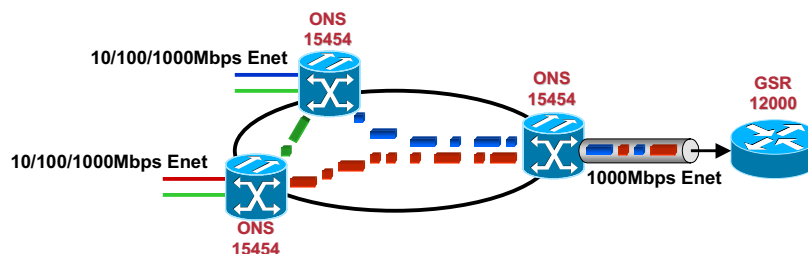


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Ethernet Aggregation and Transport

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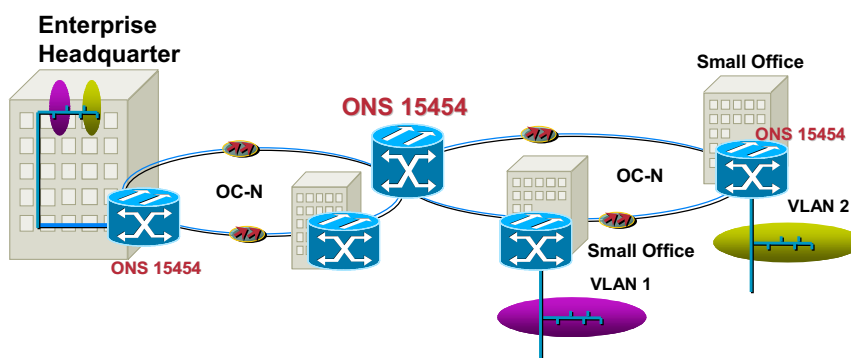
- Transport bandwidth efficiency and port consolidation
- Pt-to-pt, pt-to-multipoint and shared packet ring
- Up to 622Mbps/1.25G per broadcast domain for all VLANs
- Bandwidth dedication and over subscription for variety of SLAs
- Restoration via SONET and Ethernet spanning tree protection

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Metro Ethernet Services

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- Deliver Ethernet TLS and VPN directly over SONET
- Establish low cost, Ethernet-based routers and switches connections
- Broadband LAN extension to small "serverless" offices

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Ethernet Applications

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- Transparent LAN Service
- Internet Backbone



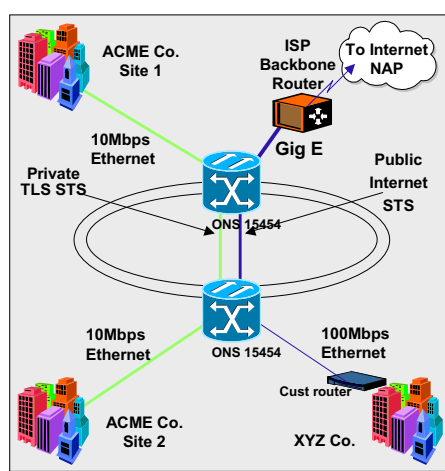
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Transparent LAN Service Backbone

Cisco.com

- TLS Features
 - Supports private networks and Internet Access
 - Uses shared or dedicated STS flows for subscribers
- Benefits
 - Efficient use of bandwidth
 - Provides Ethernet drop-offs, a popular customer solution
 - SLA capability



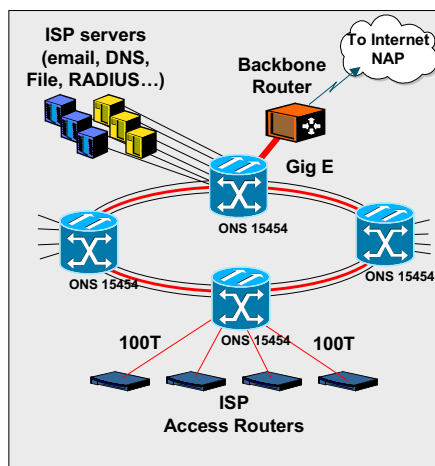
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Internet Backbone

Cisco.com

- **Traffic characteristics**
 - Mostly centralized pattern
 - Some local & hairpinning
 - Local server attachment at CO
- **Benefits**
 - Efficient bandwidth use
 - Reduces need for backbone routers in POPs
 - Eliminates need for separate data center Ethernet switch in CO
 - Reduces the overall port count



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Network Topology

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- **Ethernet over shared STS-Nc flows**
- **Ethernet over dedicated STS-Nc flows**
- **Hybrid Ethernet flows**



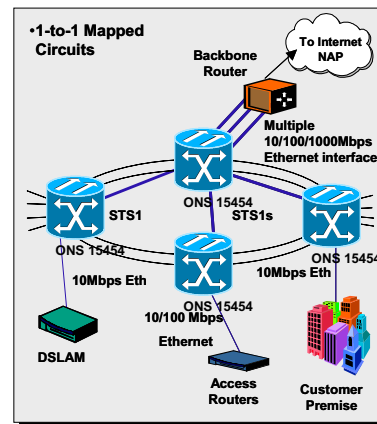
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Point to point Ethernet

CISCO.COM

- Provides STS segregated traffic for VPN/TLS
- Separates user management to STS granularity



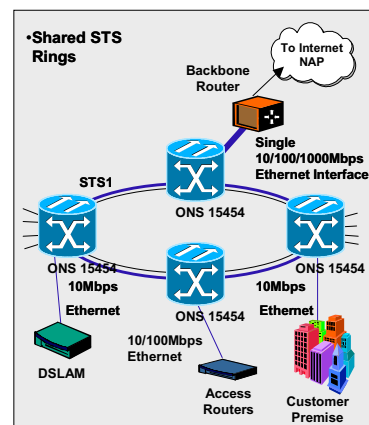
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Shared Ethernet

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- Efficiently utilizes bandwidth by aggregating multiple users into an STS-1 to STS-12c flow, while segregating user traffic
- Decreases the number of backbone router interfaces
- Simplifies the number of provisioned services by using a single transport flow
- Provides 802.1Q segregation for VPN/TLS



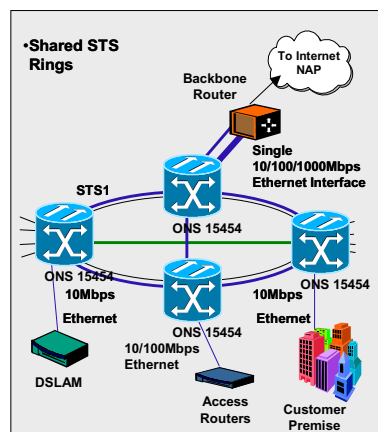
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Hybrid Ethernet

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- Offers the flexibility to use point to point circuits or shared circuits
- Offers the flexibility to use overbooked pipes or dedicated pipes



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NO Overlay Network

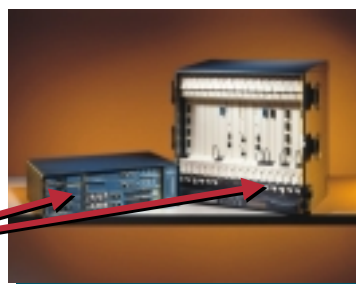
CISCO.COM

- For Currently Deployed ONS15454 & ONS 15327s for Optical Services

Just add Ethernet!

- For New Installations

No need for a crystal ball with ONS 15454/327!



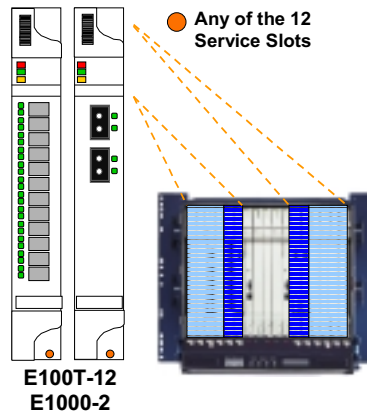
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ONS 15454 : Ethernet Interfaces

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- 12 port Ethernet/Fast Ethernet Card
Auto-sensing 10BaseT or 100BaseT
- 2 port Gigabit Ethernet Card
1000Base-SX/LX GBIC for SM/MM fiber
- Per Ethernet broadcast domain
8000 MAC addresses
519 VLANs
- Ethernet switching with IEEE 802.1D
Spanning Tree Protection
- 2 level priority IEEE 802.1p
- Logical VLANs IEEE 802.1q
- Flow Control with IEEE 802.3X

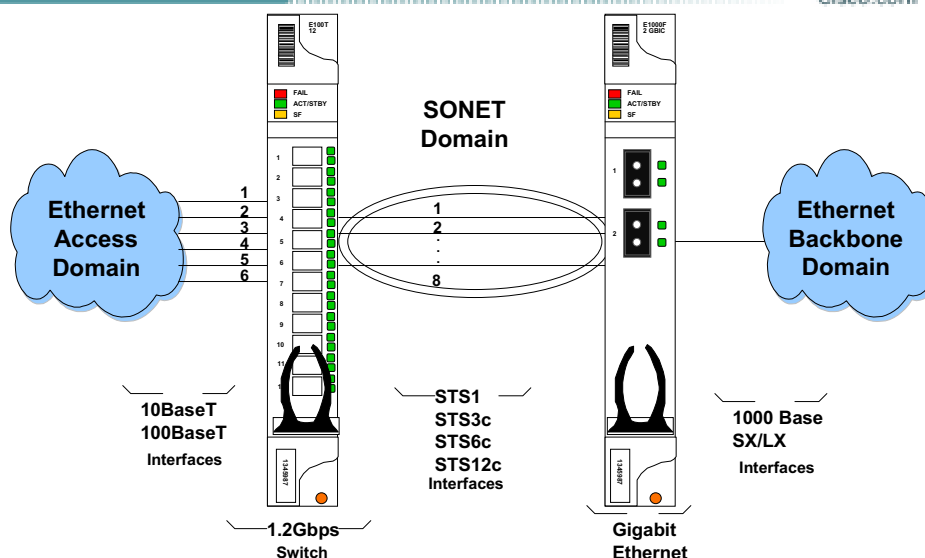


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Cisco ONS 15454 Ethernet Implementation Example

CISCO.COM



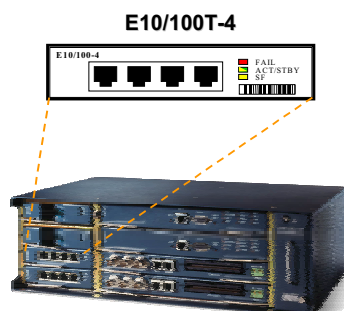
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ONS 15327 : Ethernet Interfaces

CISCO.COM

- Four 10/100BaseT 802.3 compliant interfaces
- Fully compatible with ONS 15454 E-10/100 and E-1000 solutions
- 802.1d support including STP (Spanning Tree)
- VLAN support via 802.1Q and priority support via 802.1p

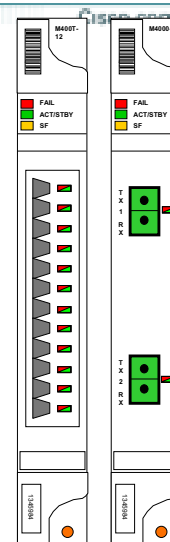


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ONS 15454 L2/L3 Support Plan

- Release 1
 - Common Capabilities
 - Layer 2/3 Solution with migration to L2-MPLS and MPLS-VPN
 - SLAs to 1Mbps
 - M4000-2
 - Two GBIC receptacles for user selection of interface
 - Supports SX/LX/ZX GBICs
 - M400T-12
 - 12 10/100BaseT ports via standard RJ45 Port Gigabit Ethernet 1000Base SX/LX/ZX
 - 12 Port 10/100 BaseT Ethernet

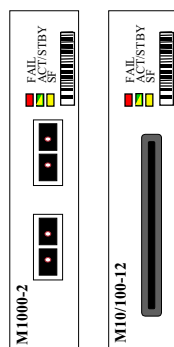


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ONS 15327 L2/L3 Support Plan

Cisco.com



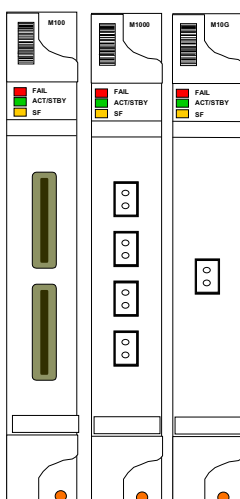
- **Release 1**
 - 12 port 10/100 Ethernet, 1-2 port Gigabit Ethernet (SX, LX, ZX)
 - IOS Based, with CLI (command line interface)
 - 1 Mbps Service Level Agreements (SLA)
 - SRP/DPT/802.17
 - Per interface SLAs
 - 802.1Q VLAN tag, pass through and overwrite
 - Gigabit and Fast Etherchannel

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ONS 15454 L2/L3 Support Plan

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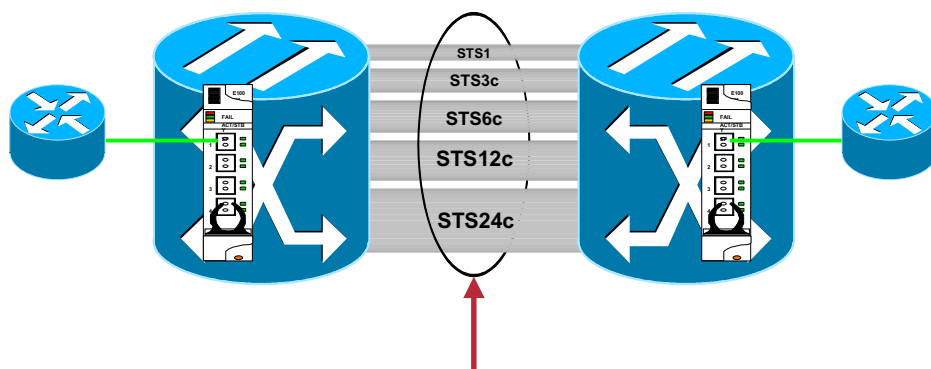
- **Release 2**
 - 1 Port 10 Gigabit Ethernet
 - Hot Standby Routing Protocol (HSRP)
 - MPLS, LSR and Edge LSR Functionality
 - MPLS-VPN
 - IP-VPN
 - BGP-4, OSPF, RIP2

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Bandwidth Scalability

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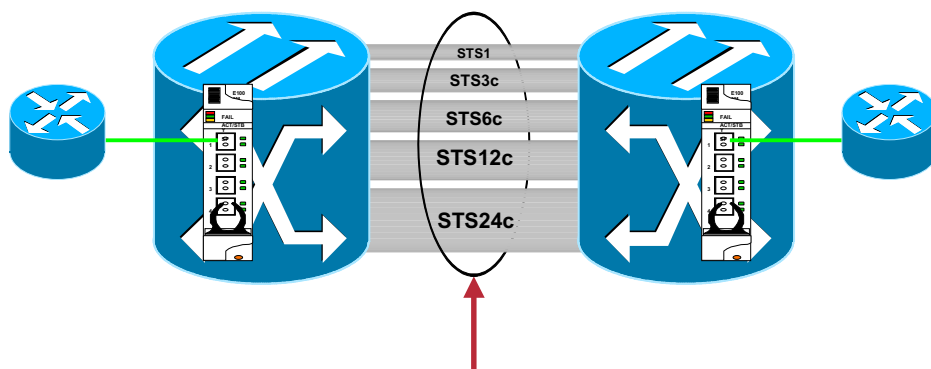
**STS BANDWIDTH SCALABILITY WITH A-Z
PROVISIONING!**

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1Mbps Service Level Agreements

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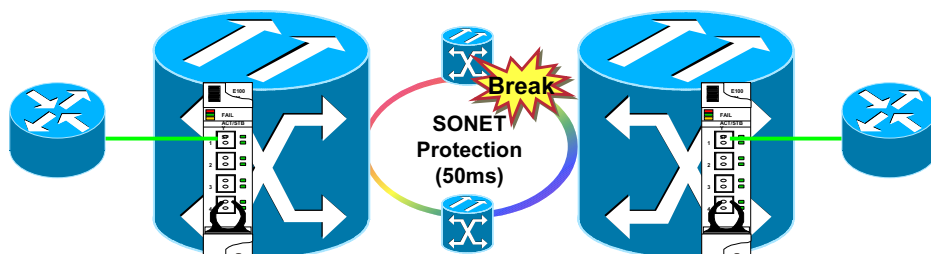
**STS BANDWIDTH SCALABILITY WITH A-Z
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Carrier Class Protection

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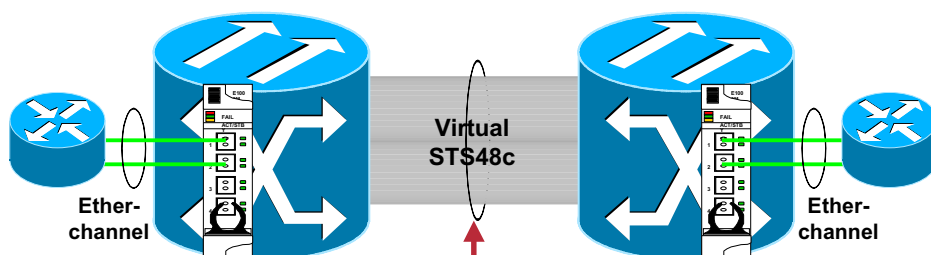
**Means IP/Ethernet Network Stays-up!!!!!!
= Carrier Class Ethernet**

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Gigabit EtherChannel and Link Aggregation Support

Cisco.com



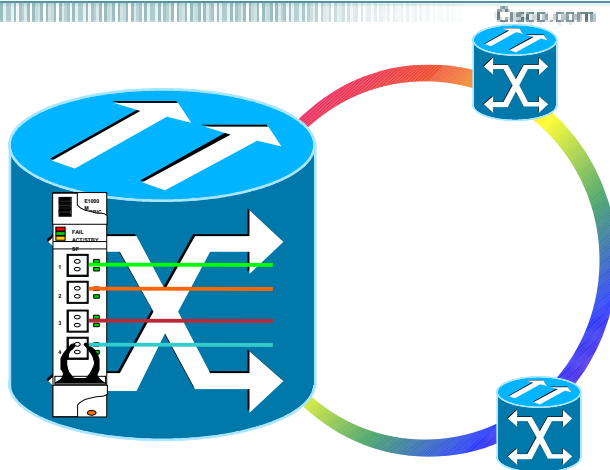
**Support for Channel-Bonding, when Gigabit Is not
Enough!
IDEAL for InterPoP Applications.**

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Efficient Gigabit Packing

- 2 Wire-Speed Gigabit Ethernet per OC48ITU

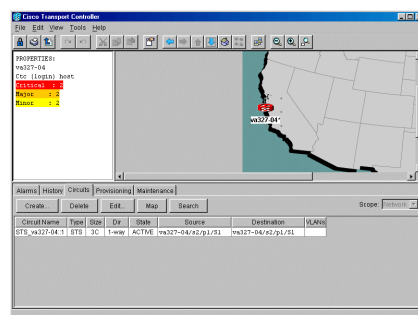


Multiple STS Combinations to Efficiently Pack Lambda's!

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Point-Click Provisioning

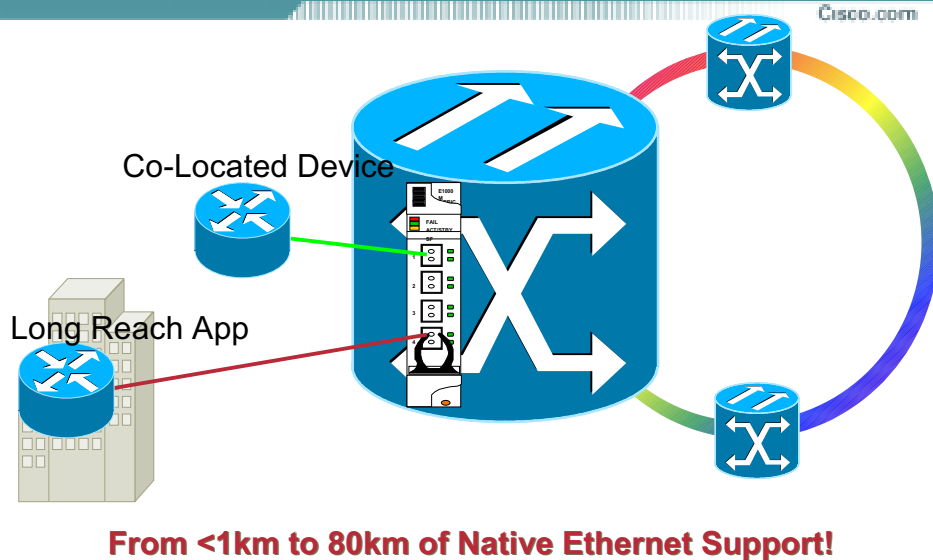


AS Simple as ABC-123 !

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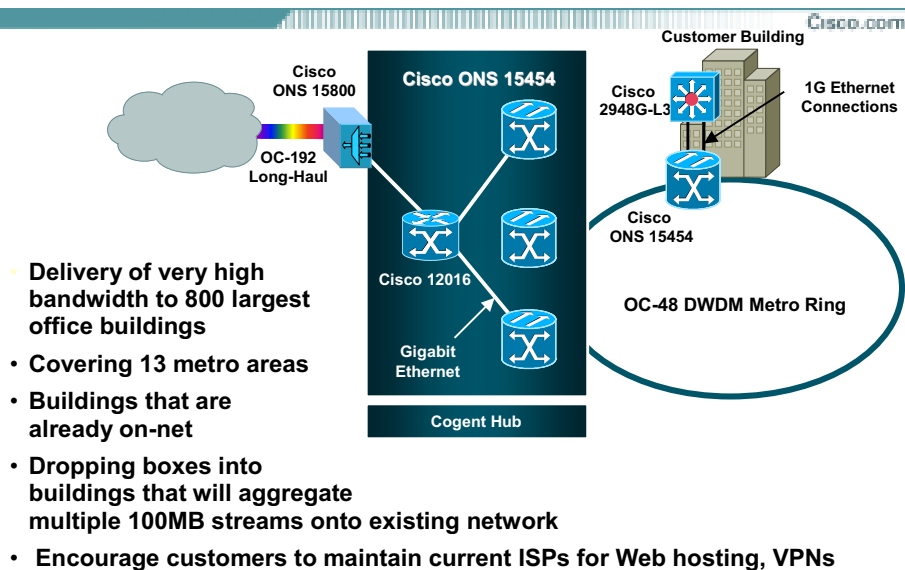
Distance Application Flexibility



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Case Study : Cogent Network



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Summary

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- Provides interface for a mature, widely deployed protocol - Ethernet
- Statistically multiplexes for efficient backbone utilization
- Reduces networking costs (fewer ports, fewer management platforms)
- Provides a robust VPN scheme with IEEE 802.1Q/p
- Provides bandwidth policing
- Enables Full SONET protection of traffic and/or Spanning Tree protection
- Provides A to Z provisioning

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