



IP + Optical Big Bang Seminar
2001



Service Provider Storage Networking Solutions

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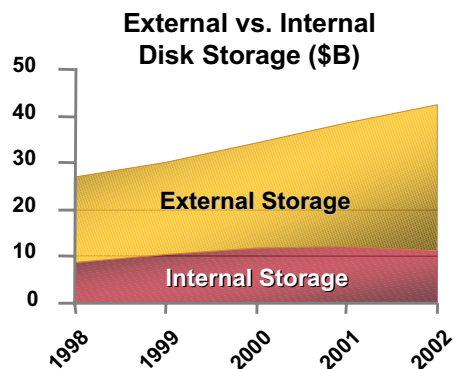
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3

Key Drivers

Most Storage Will Be Networked by 2005

- Storage Costs Rising to 80% of Storage & Server Spending
- Storage is Distributed to Departments & Desktops
- Trend to Multihost, Networked External Storage



Source: International Data Corporation

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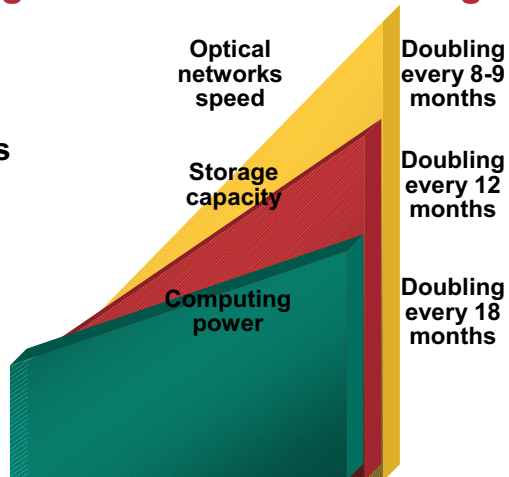
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Key Drivers

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Acceleration of Higher Bandwidth Technologies

- Optical Bandwidth Is Increasing Rapidly
- Bottlenecks Have Shifted Again



Source: Storage Networking Industry Association

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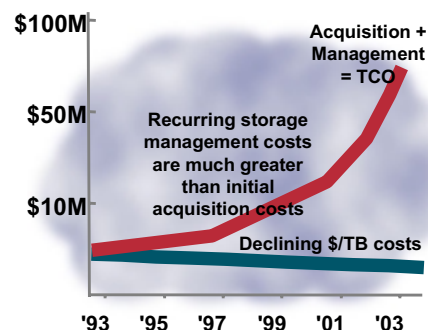
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Key Drivers

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Total Cost of Ownership is Skyrocketing!

- Price Per Gigabyte Declining 40% / Yr.
- For \$1 Invested Today, Management is \$3- \$5
- Acute Shortage of IT Professionals



Source: IDC, Meta Group, Gartner Research, ITAA

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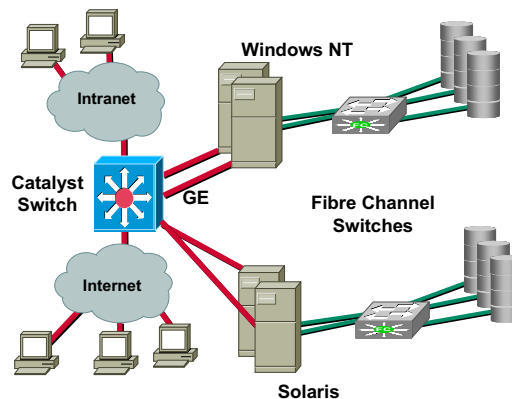
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Customer Perspective

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Customers Plan For Storage By Operating System Today

- Multiple Points of Management
- No Sharing
- Large Pools of Unused Storage



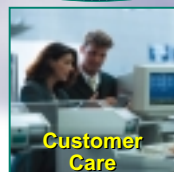
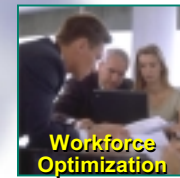
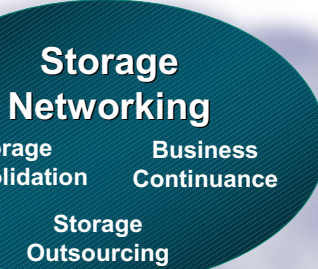
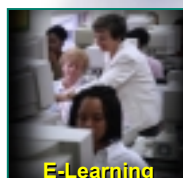
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7

Storage Networking Solutions

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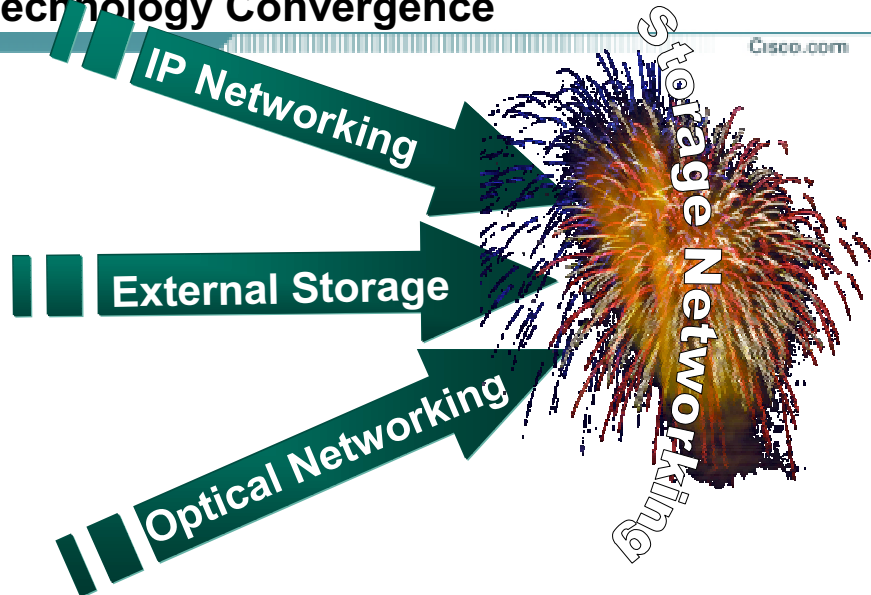
IP + Gigabit Ethernet + FC + Optical Networking + Storage + Partners



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8

Technology Convergence



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9

Cisco SN 5420 Storage Router



- IP Block Level Access To Storage Based On iSCSI Protocol
- Standard Ethernet & Fibre Channel Interfaces
- Scale Storage Networks With IP Hardware
- Leverage Existing Security, Management & QOS Tools
- Optimize Customer's SAN Investment

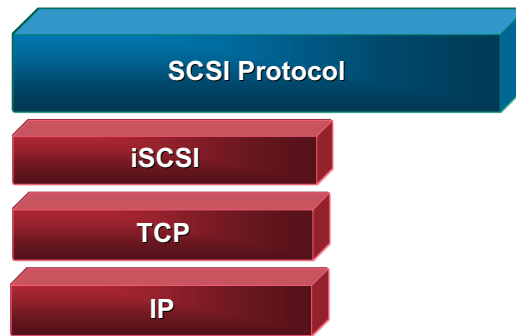
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10

What Is iSCSI?

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- Protocol originally developed by IBM, Cisco and SANGate
- Submitted to IETF "Internet Draft"
- Objective: to provide *common standard* transport for storage protocols over TCP/IP



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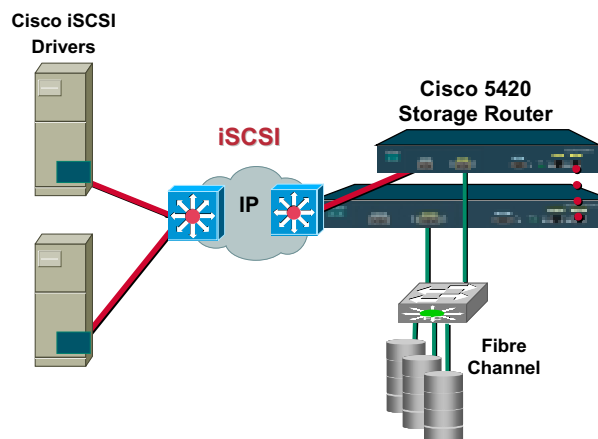
11

Introducing...SN5420 Storage Router

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Universal Access to Storage over IP networks

- SN5420 Storage Router
- iSCSI Drivers (Solaris, Linux, NT)
- Ethernet NIC



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12

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- The diagram illustrates a storage architecture. A central blue Catalyst Switch is connected to an Intranet (cloud) and the Internet (cloud). The Intranet contains desktop computers and servers. The Internet contains desktop computers. The Catalyst Switch is connected to two blue circular devices labeled GE and SN5420. These are connected to two Fibre Channel Switches (green squares with 'X' marks). The Fibre Channel Switches are connected to storage devices, including three stacked cylinders labeled 'Tape' and a large green cylinder labeled 'Tape'.
- Windows NT,
Solaris, Linux...
- Intranet
- iSCSI
- Fibre Channel Switches
- Catalyst Switch
- GE
- FC
- SN5420
- Internet
- Tape

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13

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The diagram illustrates a converged network architecture. On the left, a central blue square icon with a white star and arrows represents a **Router/Switch**. This router is connected to an **Intranet** (cloud) and the **Internet** (cloud). The Intranet contains two desktop computers and a server labeled **Windows NT**. The Internet contains three desktop computers. To the right of the router, two blue circular icons represent **SN5420** switches. These switches are connected to the router via red lines labeled **GE** (Gigabit Ethernet). The top SN5420 switch is also connected to a server labeled **Sun Solaris** via a red line labeled **iSCSI**. Both SN5420 switches are connected to two green square icons representing **BROCADE FC Switches** via green lines labeled **FC** (Fiber Channel). These Brocade switches are then connected to a stack of four server racks. The racks are labeled with various brands: **Sun**, **HITACHI DATA SYSTEMS**, **Lightning 9900**, **EMC**, **Symmetrix**, and **IBM ESS**. A single server rack labeled **Sun Solaris** is also connected to the bottom Brocade switch via a green line labeled **FC HBA** (Fiber Channel Host Bus Adapter).

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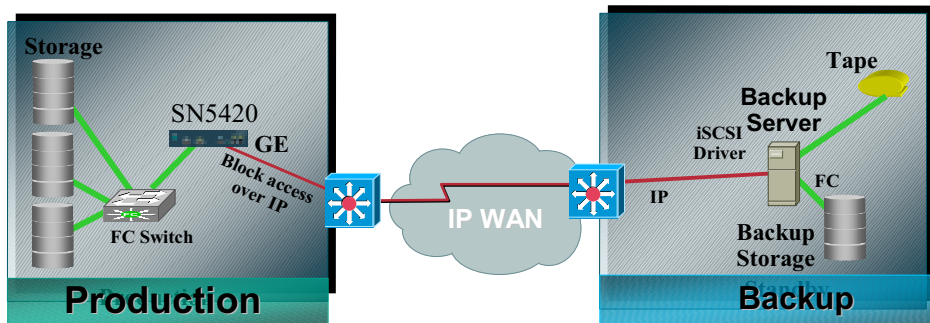
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IP Block Access Applications:

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Backup over IP WAN

- Backup or archiving to disk or tape
- SCSI, FC, or IP attached backup storage



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15

SSP Solutions

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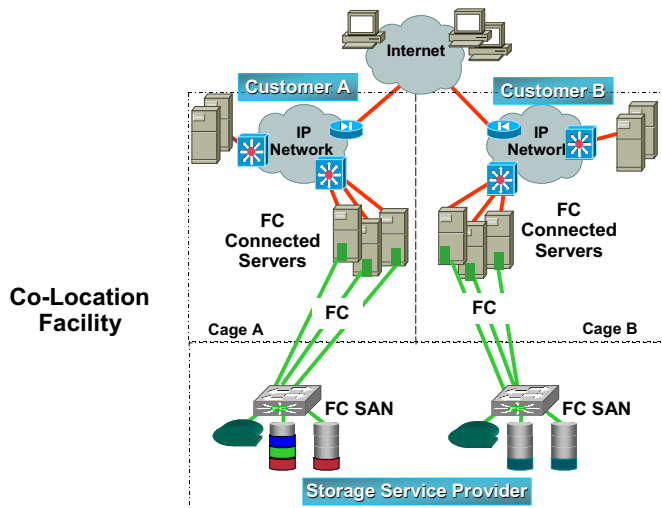
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16

SSP Co-location Solution - Fibre Channel

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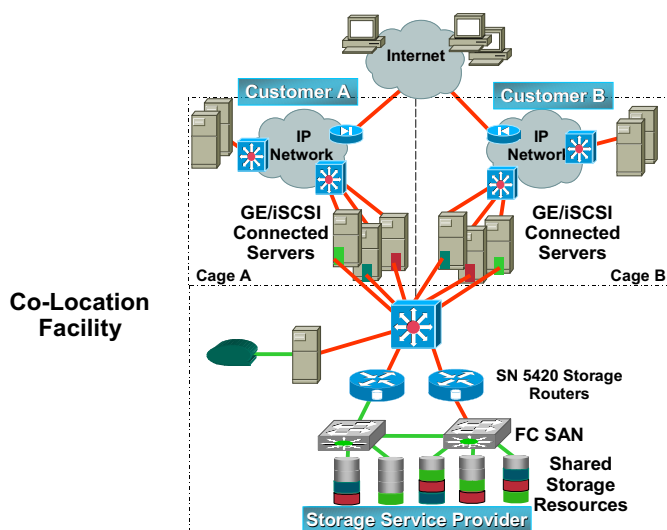


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17

SSP Co-location Solution - iSCSI Storage Router

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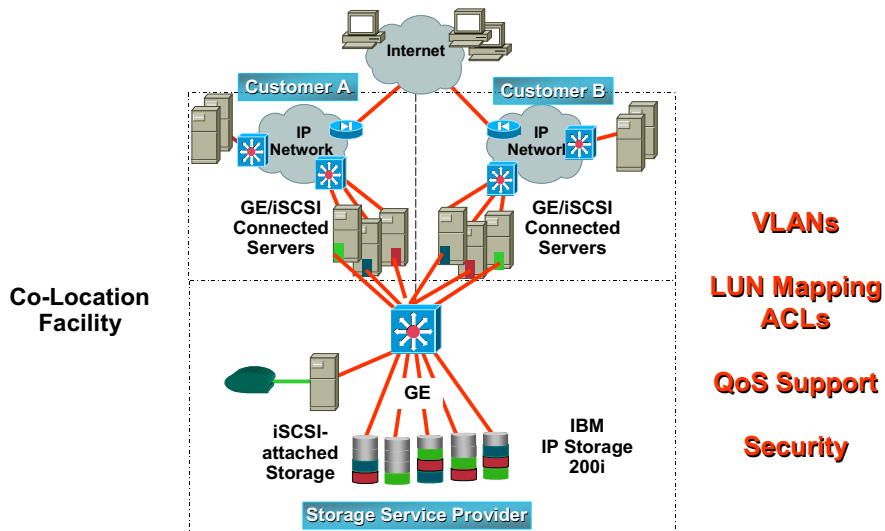
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18

VLANs
LUN Mapping
ACLs
QoS Support
Security

SSP Co-location Solution iSCSI Storage

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Hosting Center Solutions

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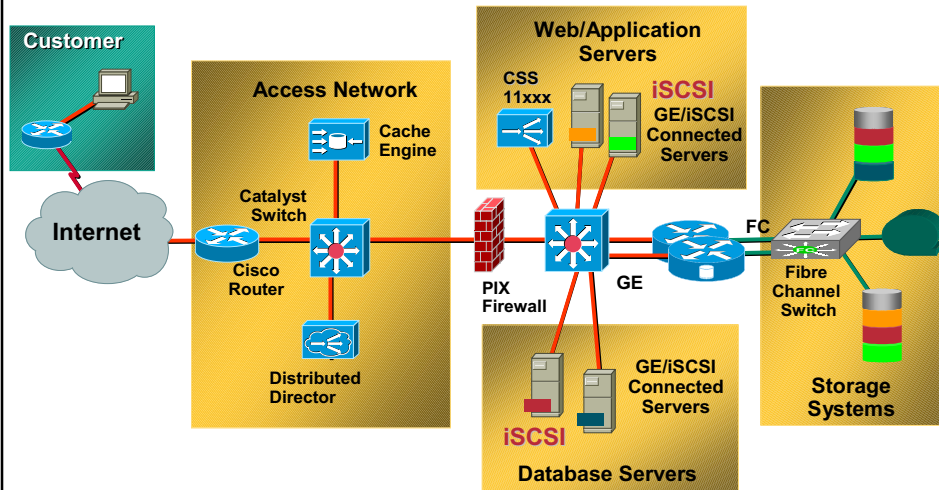
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20

Managed Hosting Provider: iSCSI Router Solution

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Storage Consolidation

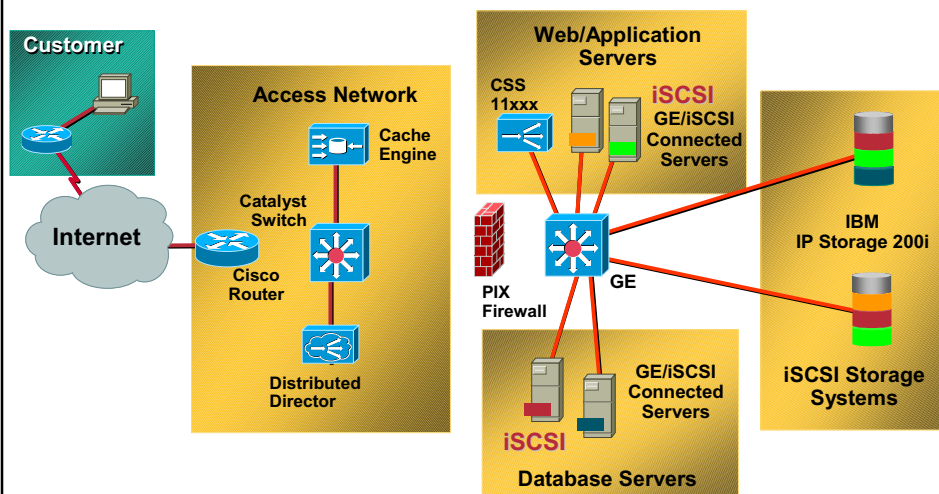


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21

Managed Hosting Provider: Total IP Solution

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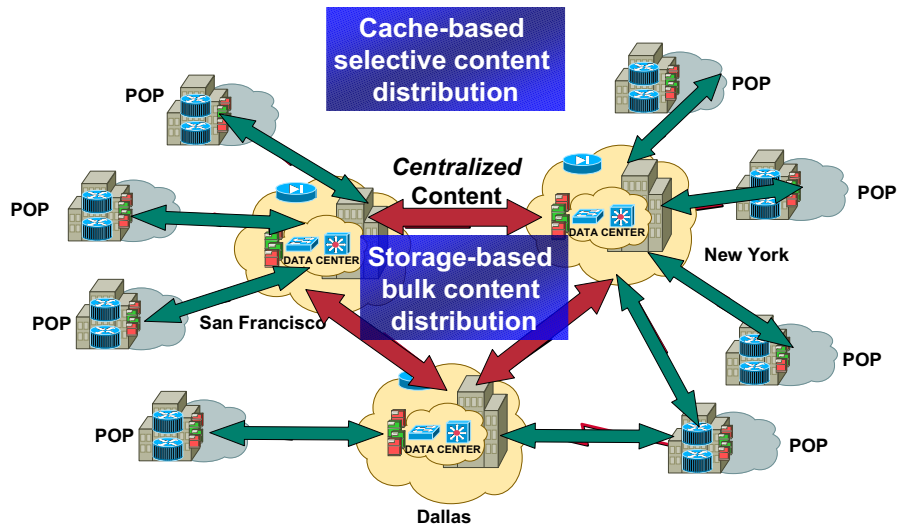


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22

CDN + Storage Networking Enabling the Internet Data Center

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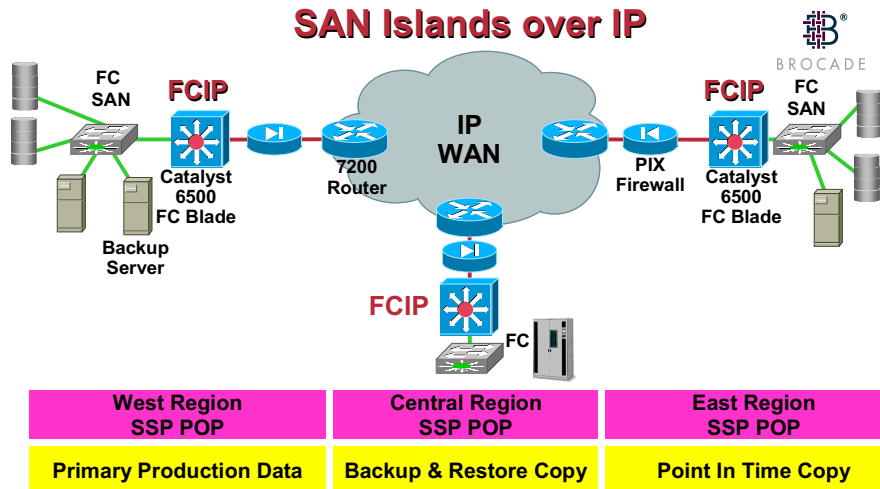
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WAN Solutions: Cisco Cat 6500-FC over IP

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**FCIP enables interconnection of Fibre Channel
SAN Islands over IP**



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24

Storage Service Providers

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- Online Data Storage Services
- Backup and Recovery Data Protection Services

- Backup & Restore – back-up as much or as little information as needed
- Managed Disk – access to virtually unlimited online disk space 24/7 with guaranteed service level agreements



- OutStore™ managed storage begins with as little as 100 GB of storage space.
- OutBackUp™ scales according to the data requirements.

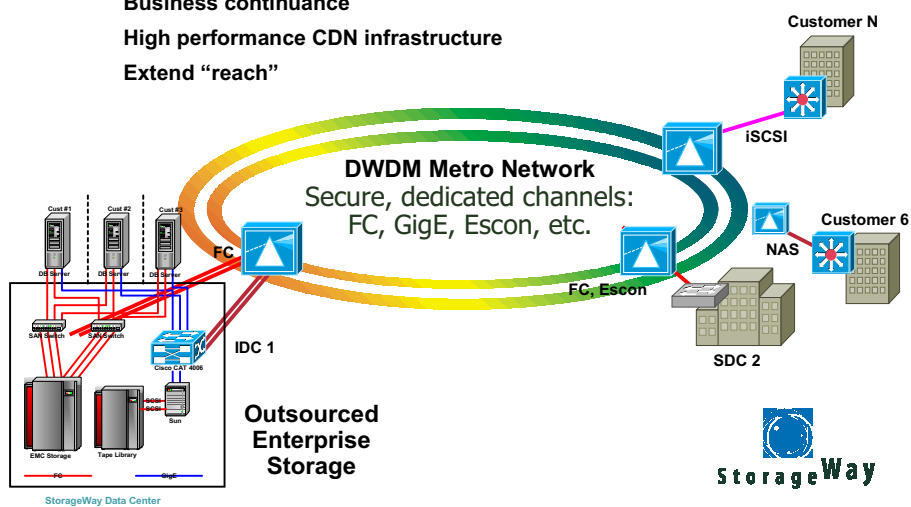
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25

StorageWay

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- Layered products and services
 - Business continuance
 - High performance CDN infrastructure
 - Extend “reach”



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26

Metro Solutions

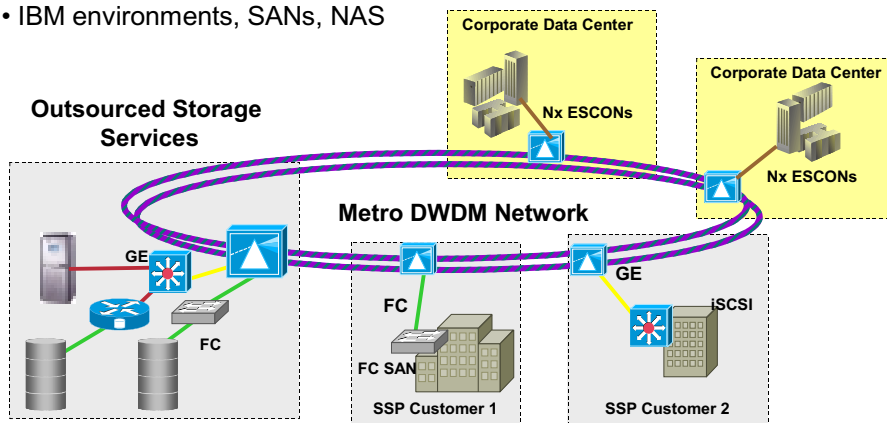
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27

Metro Optical Solution

- Managed Wavelength + NOC (+ Fiber) for Enterprise or SSP
- Native Storage Networking connectivity services
- Enables Storage over Optical, IP access to Storage, FC over IP
- IBM environments, SANs, NAS



28

NSP& SSP Partnership Model

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**Storage Service
Provider - SSP**
(e.g. StorageWay)

**Storage Management
Services**

**Example Services:
Disk Mirroring
Backup**

Partnership

**Services
Mapping**

**Small & Med size
Enterprise Outsource
Opportunity**

**Network Service
Provider - NSP**
(e.g. Cogent)

**Connectivity
Services**

**Example Services:
100/GE Ethernet
Fibre Channel**

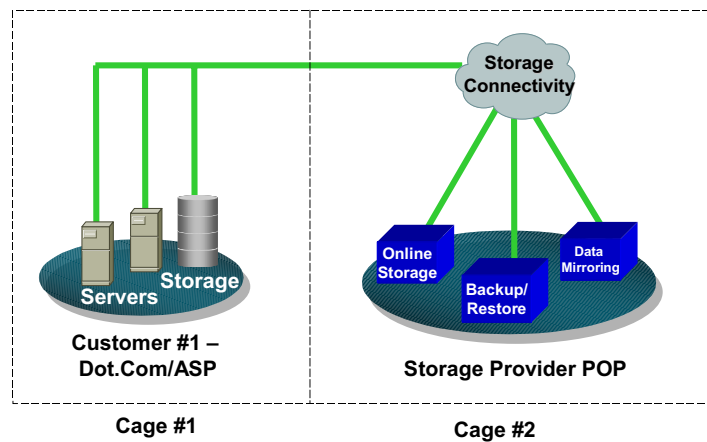
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29

Storage Service Provider IDC Connectivity

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Internet Data Center (IDC) Facility

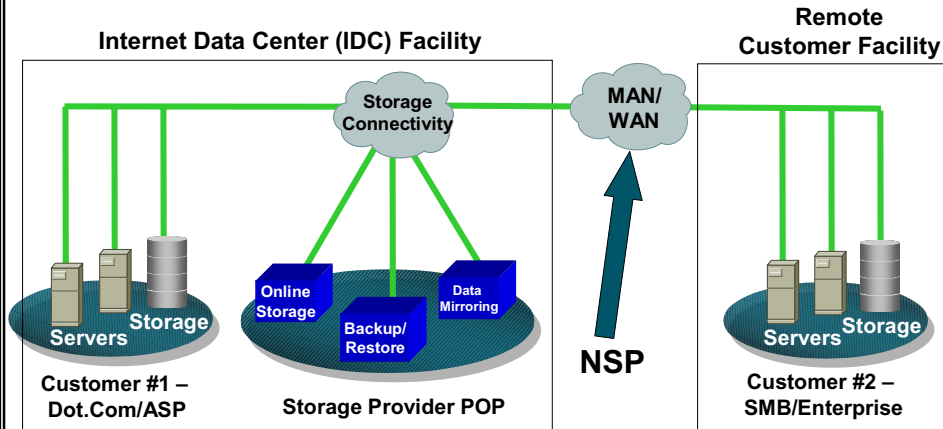


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30

Storage Service Provider Remote Connectivity

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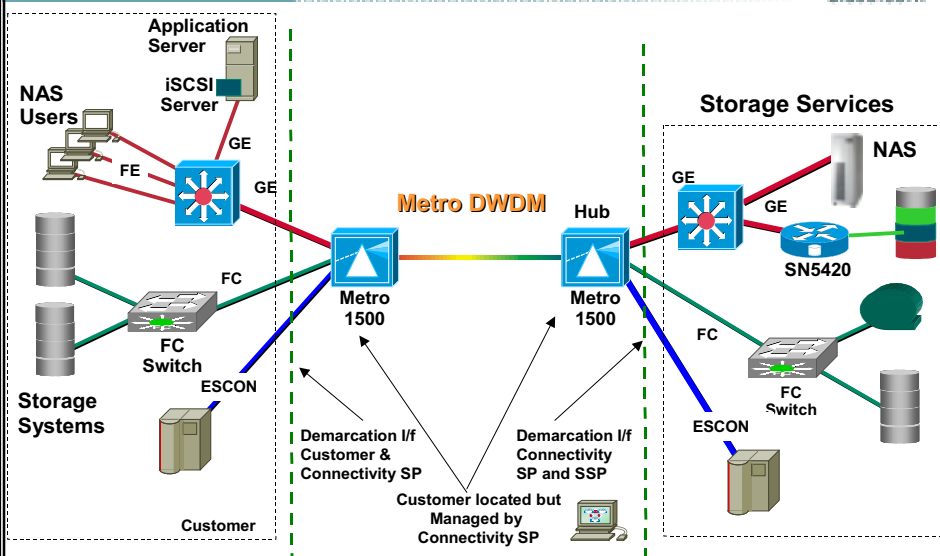


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31

Metro 1500 Architecture (Managed Wavelength Provider)

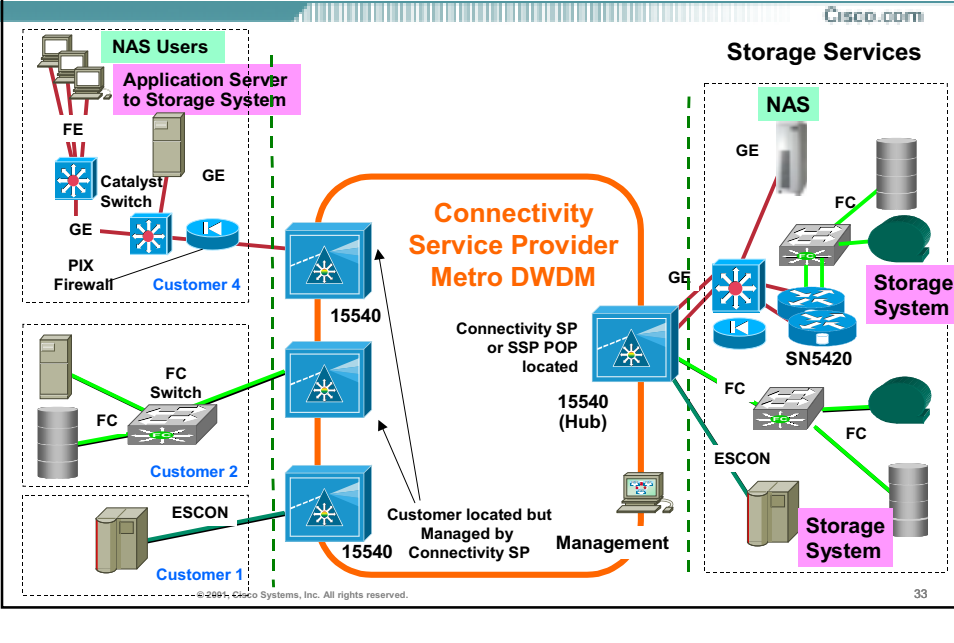
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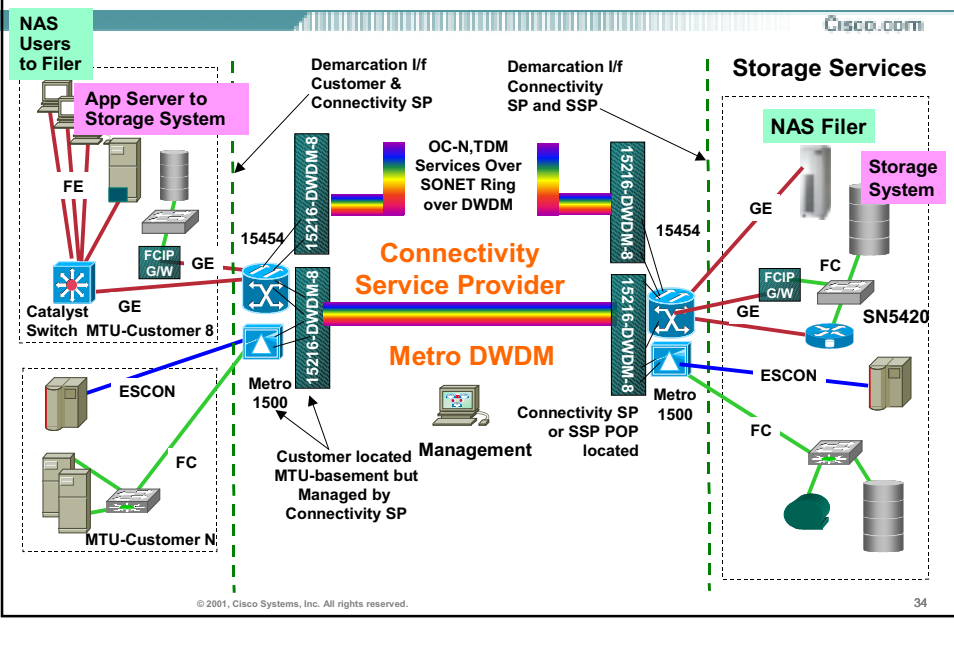
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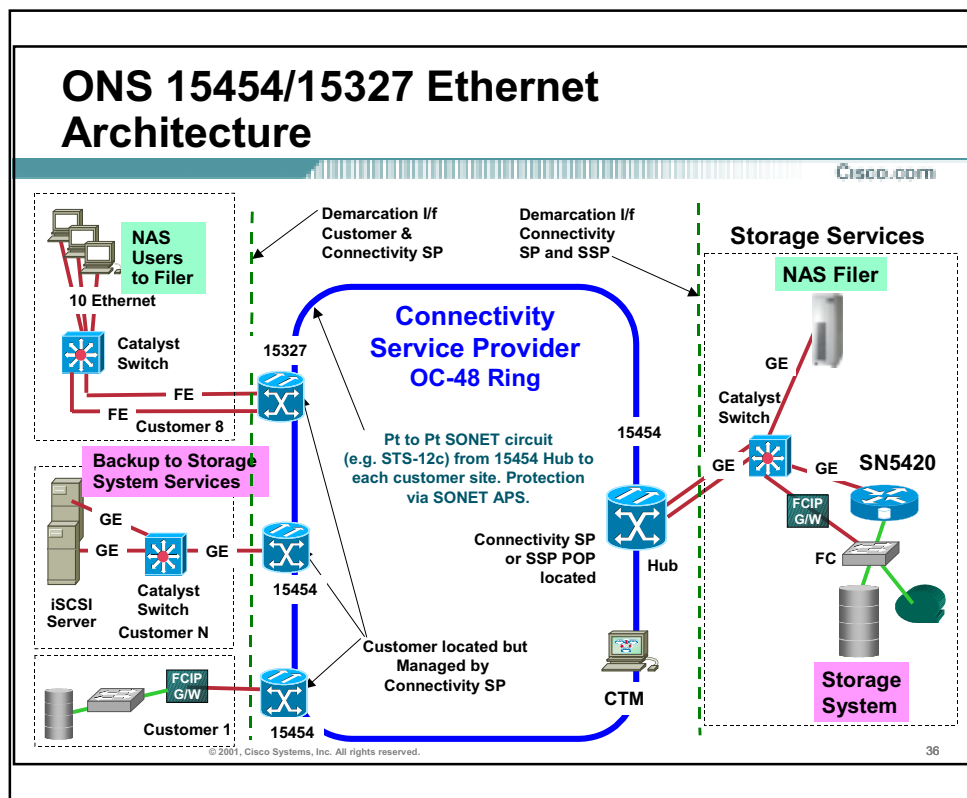
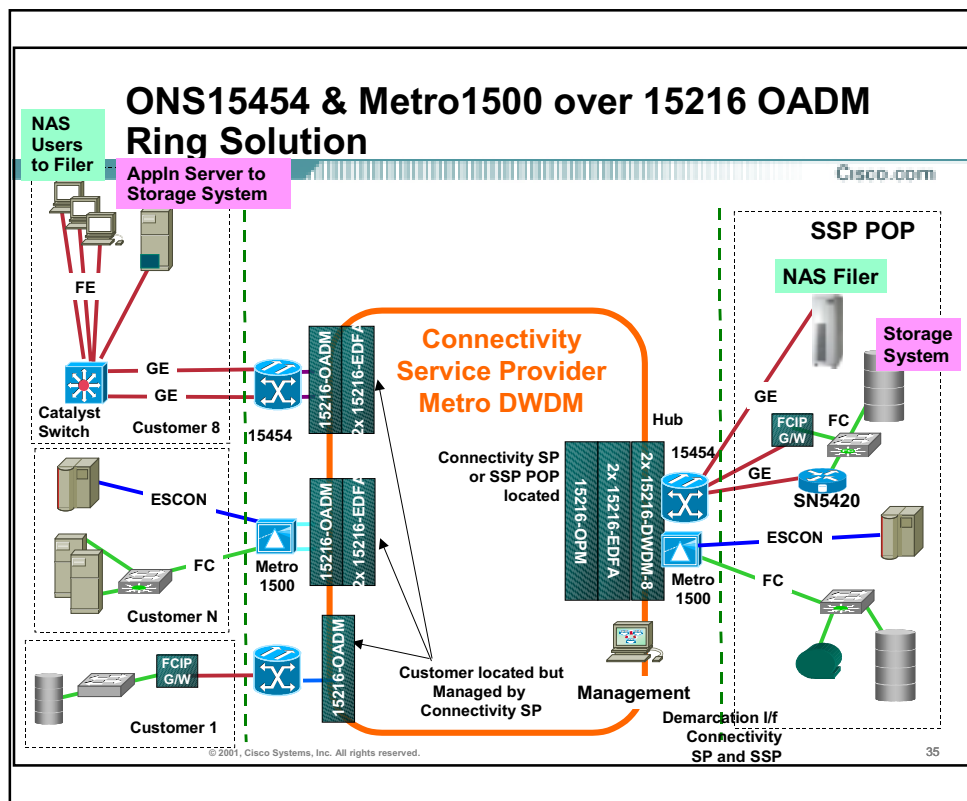
32

ONS 15540 Ring Architecture



ONS15454 & Metro1500 over 15216 P2P Architecture







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37