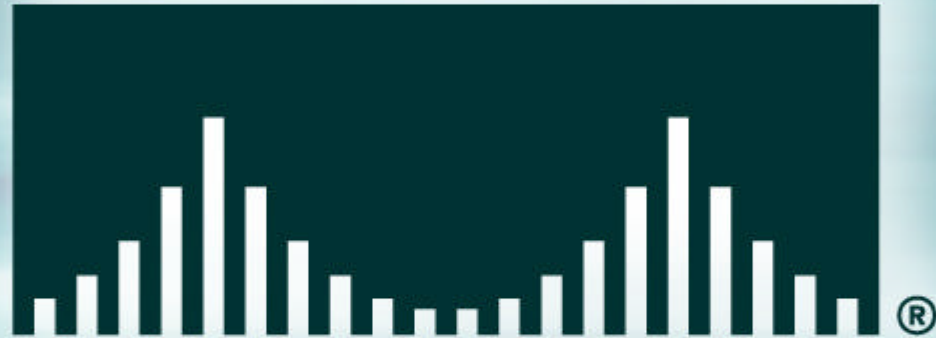


# CISCO SYSTEMS



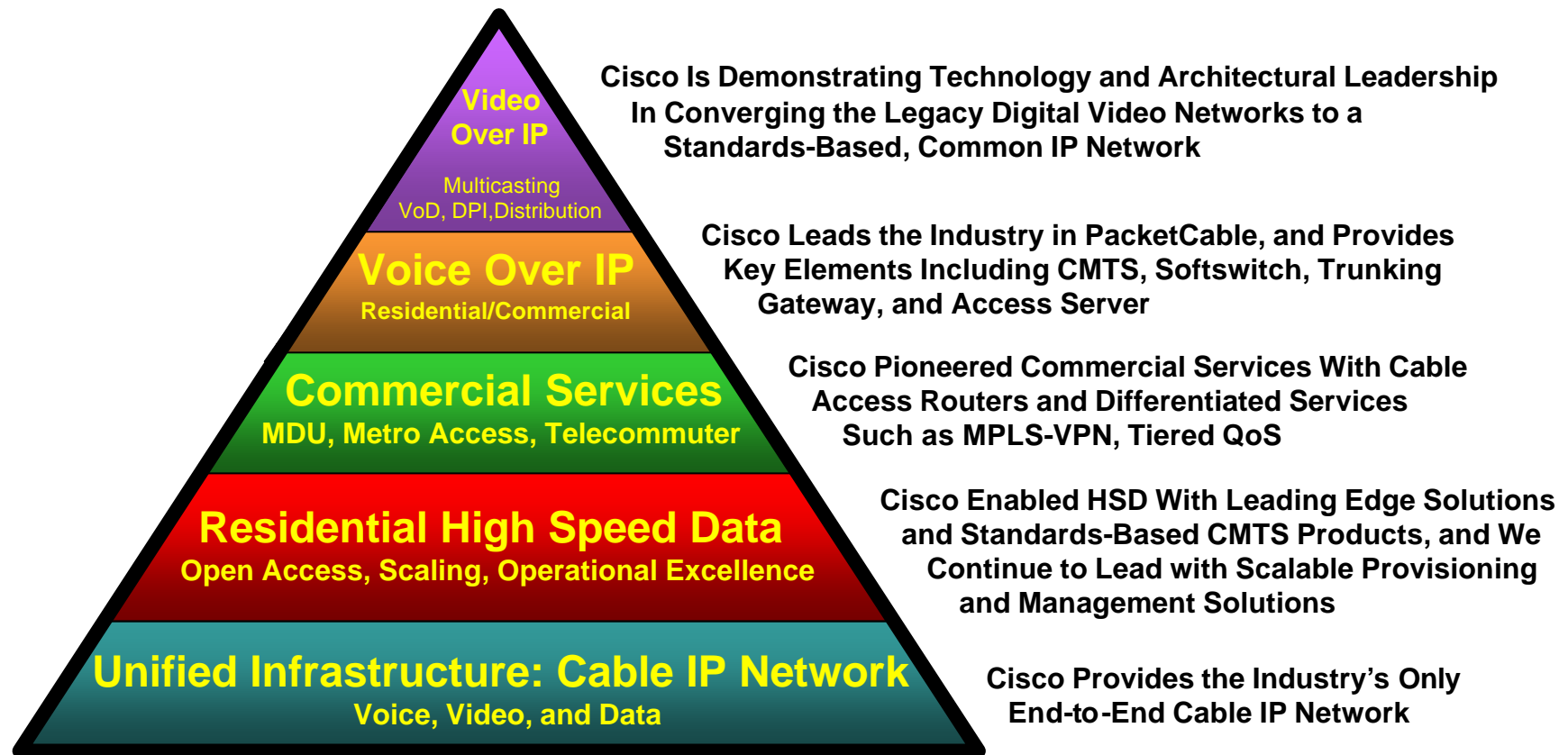
# Deploying Commercial Services

Cisco.com

**Cisco Systems, Inc.  
May 2002**

# Convergence of Multiple Networks to Cable IP Network Enables New Services to Scale

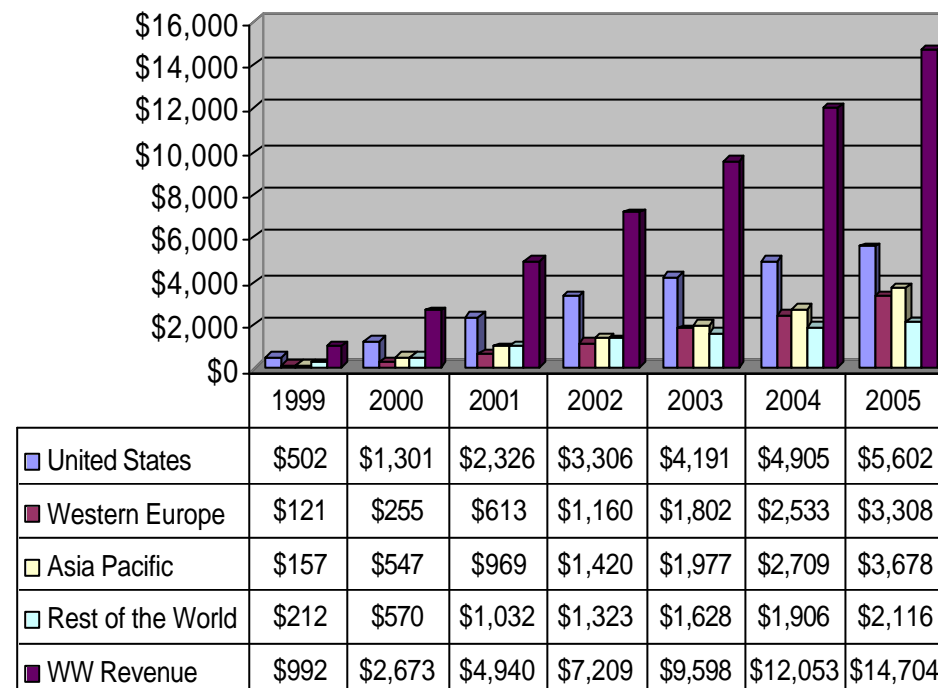
Cisco.com



# Cable Modem Service Revenue

Cisco.com

**Worldwide Cable Modem Service Revenue (\$M)**

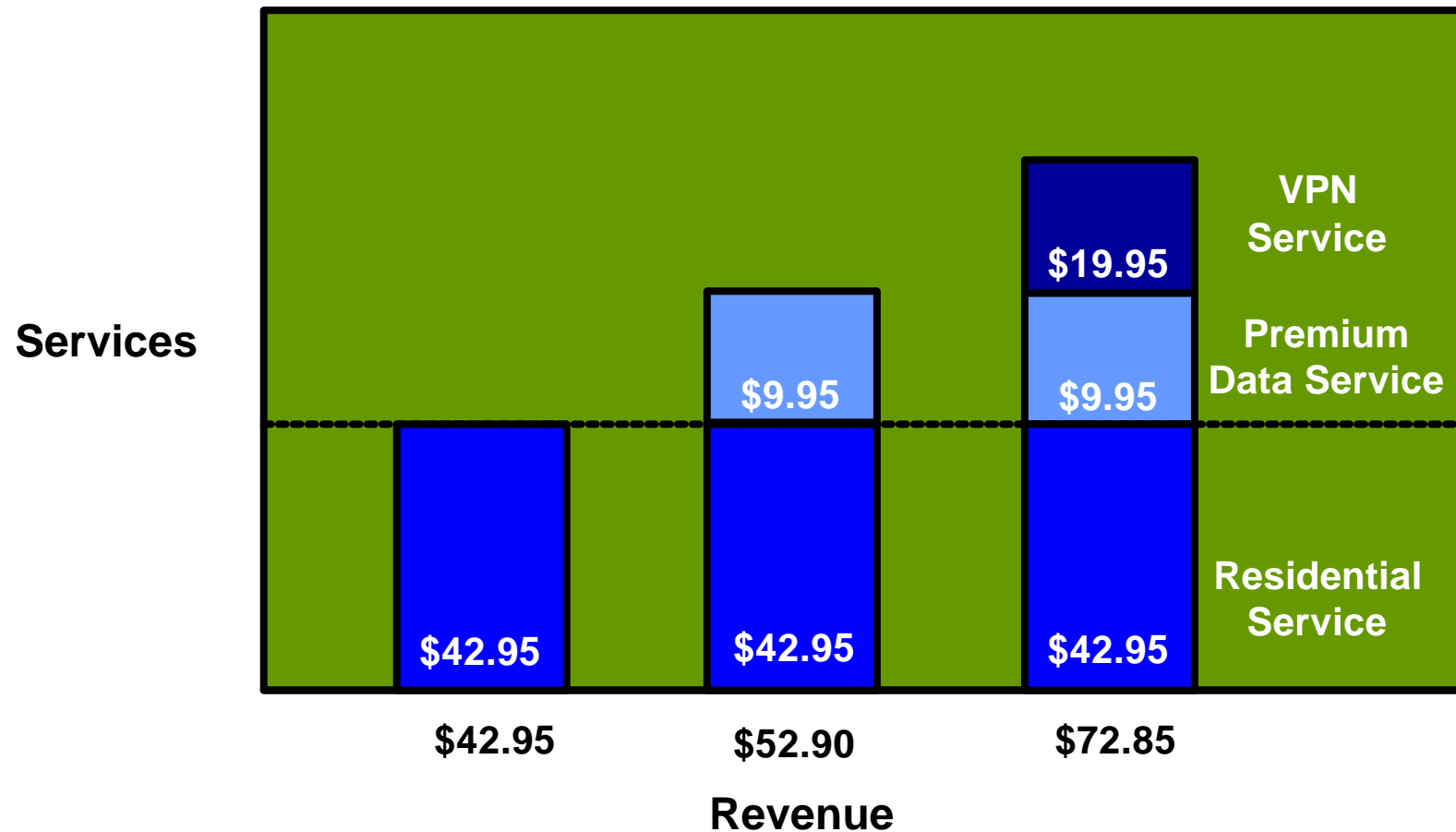


■ United States 
 ■ Western Europe 
 ■ Asia Pacific 
 ■ Rest of the World 
 ■ WW Revenue

**Source: IDC April 2001**

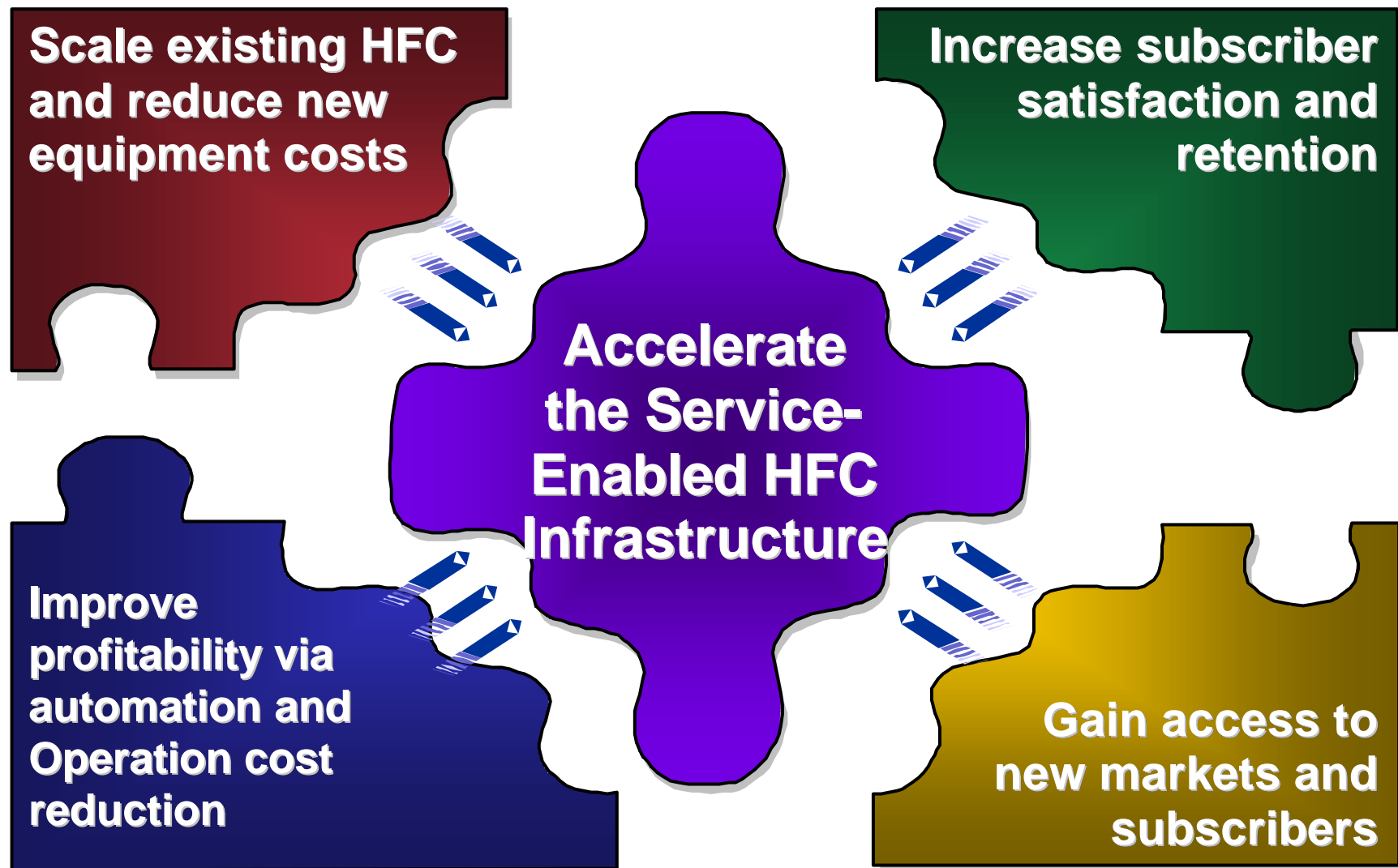
# Commercial Services Grow Revenue

Cisco.com



# Deployment Strategies

Cisco.com



# Agenda – Deploying Commercial Services

Cisco.com

- **Telecommuter services**
- **Corporate VPNs and Multi-ISP services**
- **Multi-dwelling or Multi-tenant Units (MxU)**
- **Metro Access**

# Deploying Commercial Services

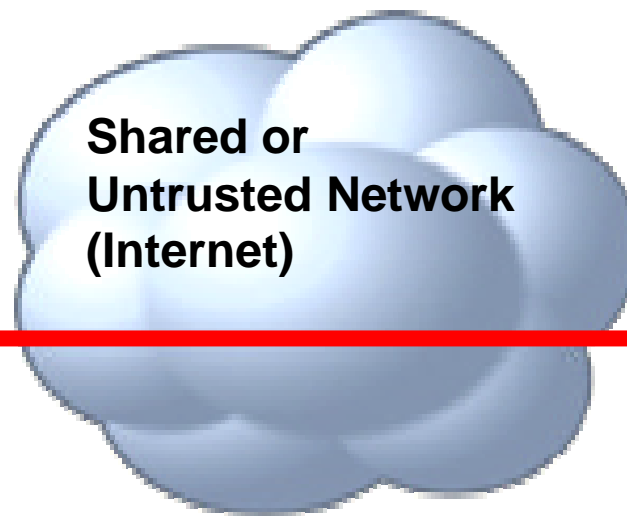
Cisco.com

## *Telecommuter Services*

# Telecommuter Services

Cisco.com

**Allowing remote employees to connect transparently to their companies – gaining seamless access to corporate network resources.**



# Telecommuter Service Requirements

Cisco.com

- **High-speed access**
- **Superior Quality of Service (QoS)**
- **Data and device security**
- **Multiple PC access**
- **Mobility**
- **Transparent connections to corporate resources**
- **Provisioning/Management**

**PC-based or location-based connectivity**

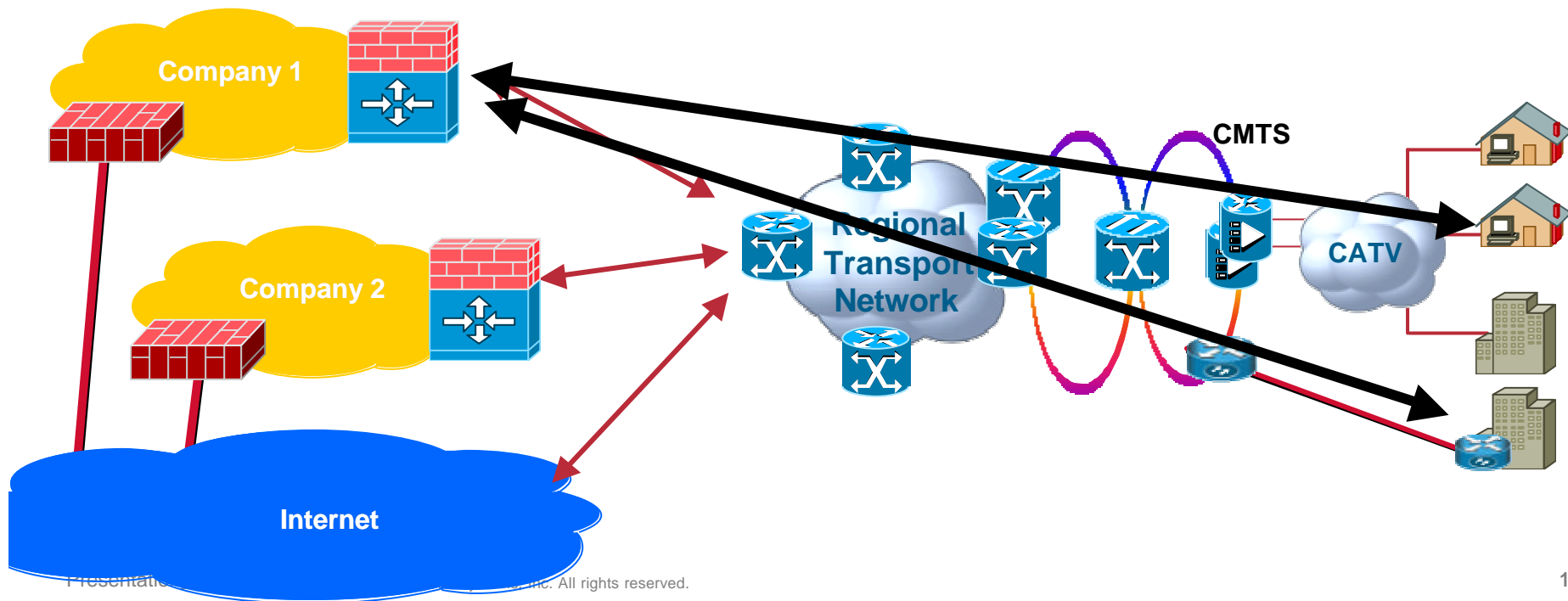
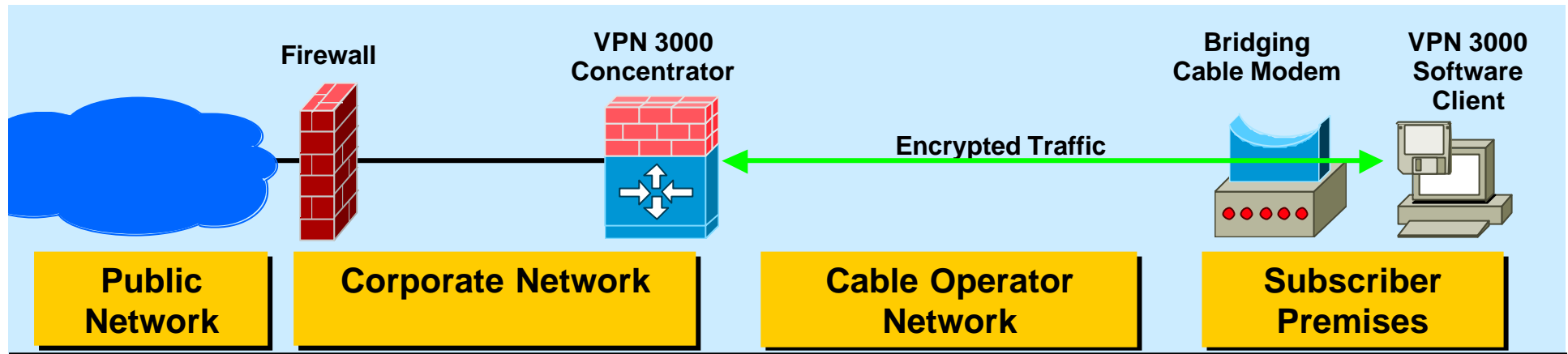
# Technologies for Telecommuter Service

Cisco.com

Requirement	Enabling Technology
High Speed Access	DOCSIS 1.0 & DOCSIS 1.1
Superior QoS	DOCSIS 1.1 + IP QoS
Data and Device Security	IP-Sec, BPI+, Firewalls
Multiple PC Access	NAT on Advanced CM
Mobility	PC-based Client
Transparent Connections to Corporate Network	VPN Clients and Concentrators

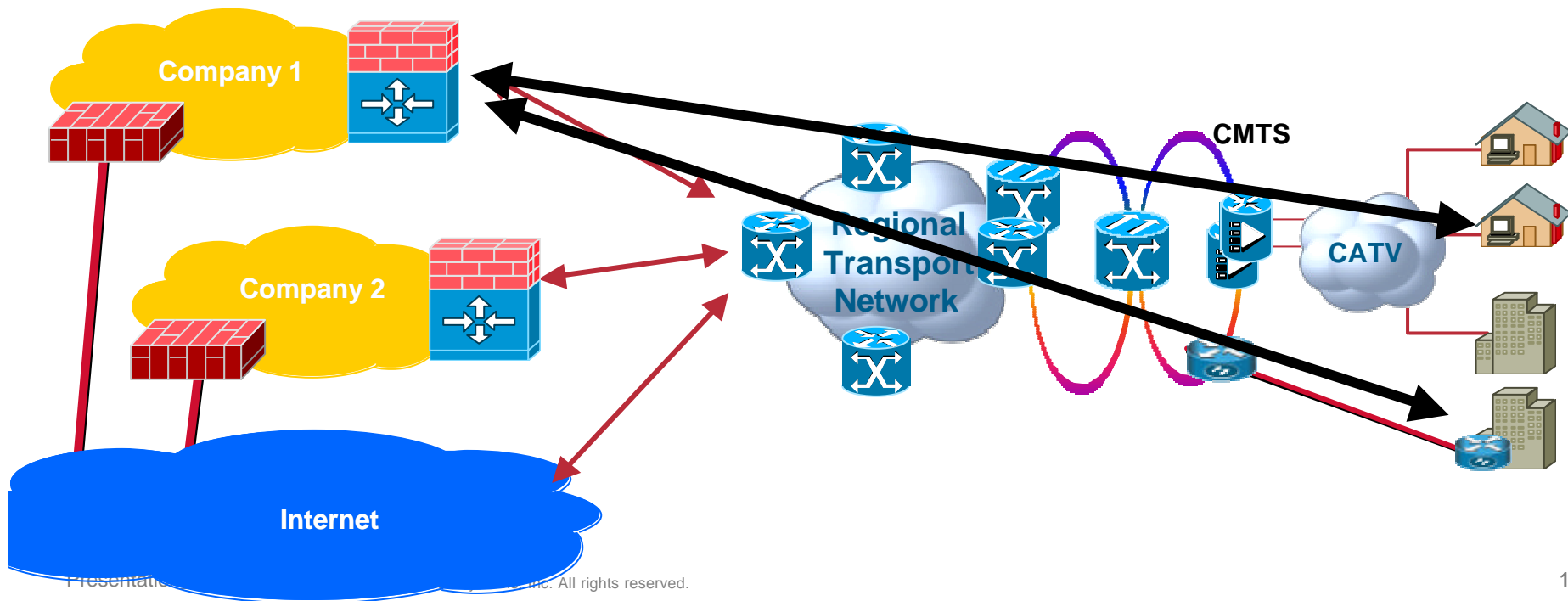
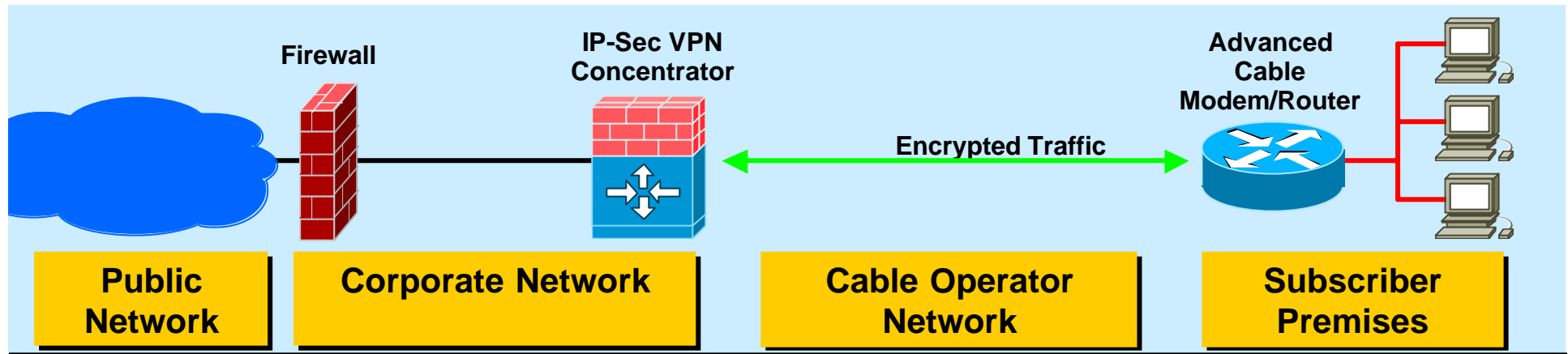
# Telecommuter Service Architecture: PC-based Software Client

Cisco.com



# Telecommuter Service Architecture: Cable Modem-based Client

Cisco.com



# Deploying Telecommuter VPNs

Cisco.com

- Devices and technologies exist today
- Equipment stable and deployable
- Solution fully tested, defined, and deployed
- Billing and business models available

**Already used by hundreds of  
thousands of people  
EVERY DAY**



# Deploying Commercial Services

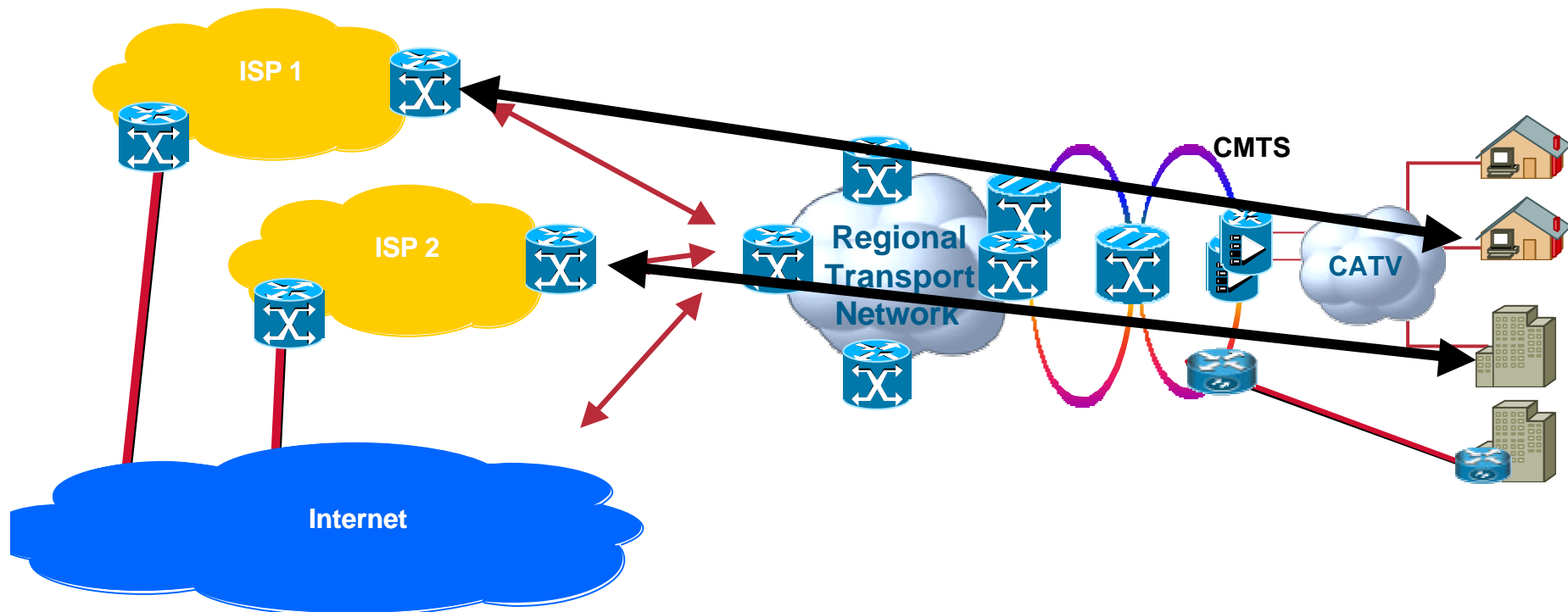
Cisco.com

## *Multi-ISP Services (Managed or Open Access)*

# Multiple ISP – Managed Access

Cisco.com

***Seamless access to multiple ISPs through a single MSO network.***



# Why Managed Access?

Cisco.com

- **FCC/FTC support for Open Access initiatives**
- **Reduction in MSO operational support resources.**
- **Provides foundation to enable revenue-generating services.**
- **Leverage existing ISP expertise in data services.**
- **Allows for streamlined billing models.**
- **Drive new service offerings such as caching, content hosting, and others.**

# Technical Requirements

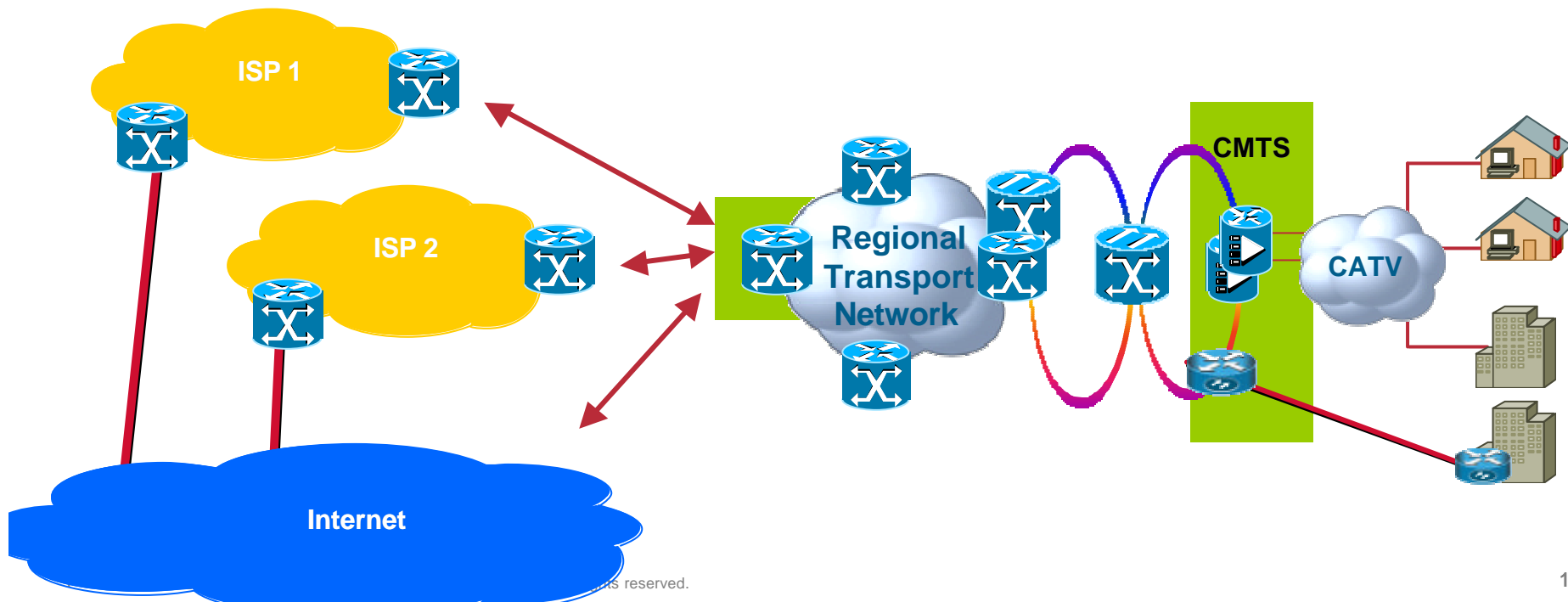
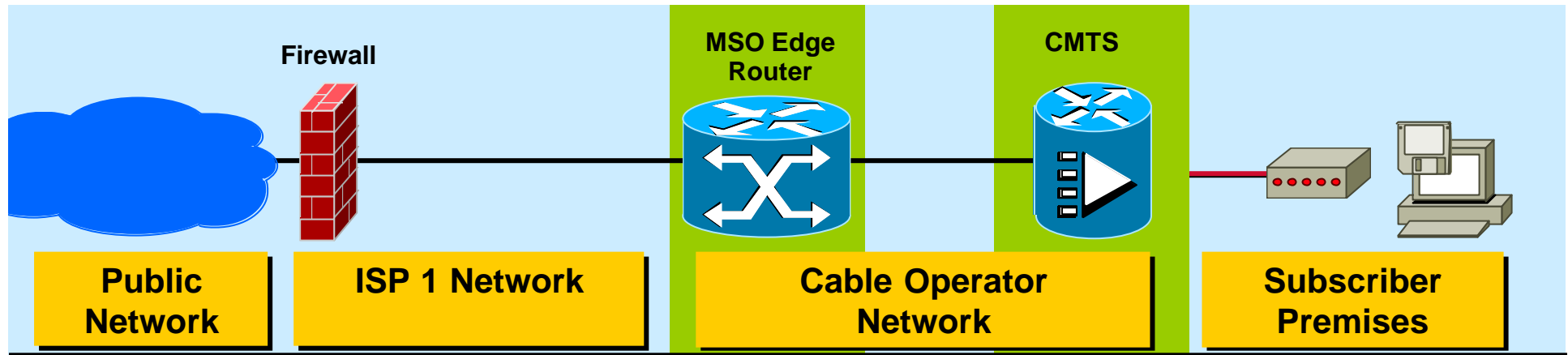
Cisco.com

- **Traffic identification/differentiation**
- **Throughput control (high-speed access)**
- **Quality of Service (QoS)**
- **Security**
- **Multiple device access & routing considerations**
- **Caching**
- **Transparency of connection**
- **Provisioning & management**

## Cable Modem or flow-based differentiation

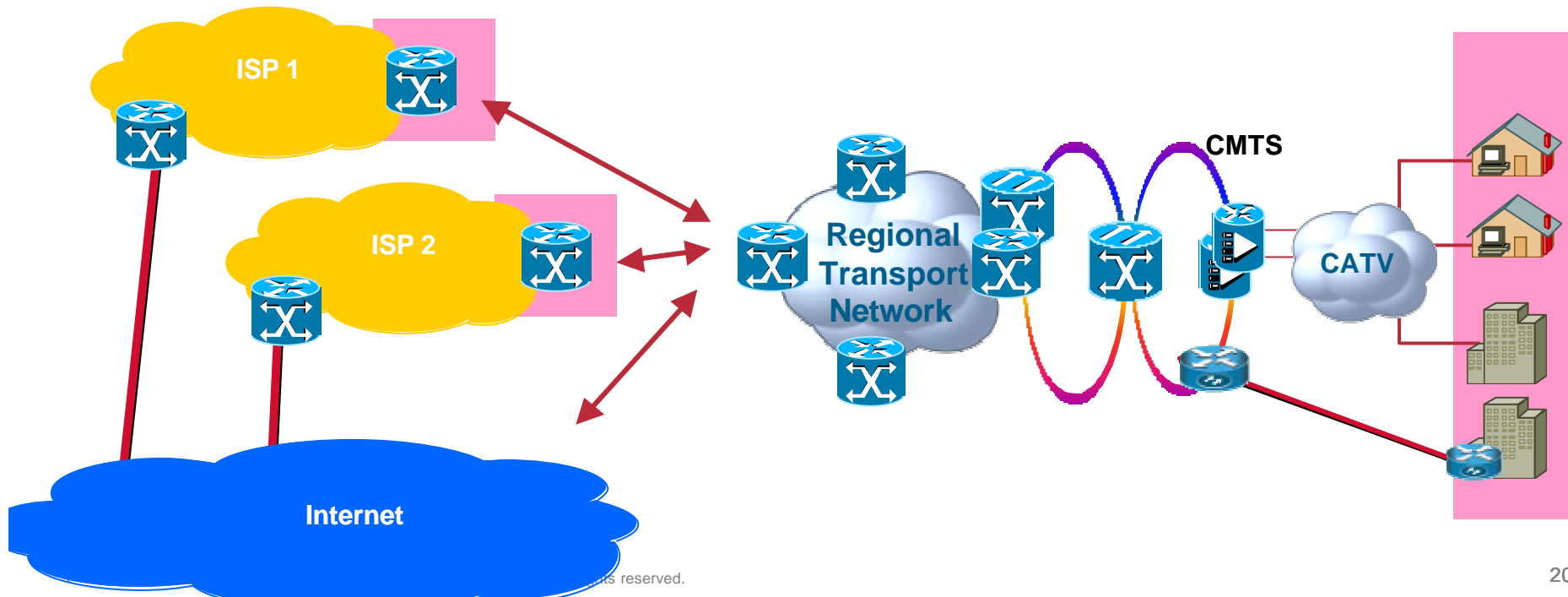
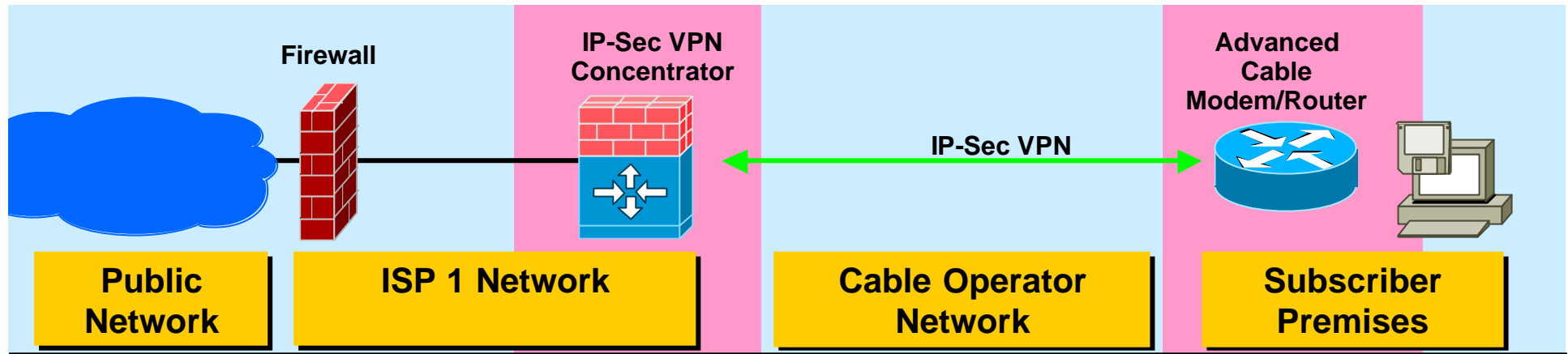
# Policy Based Routing (PBR) for Multi-ISP

Cisco.com



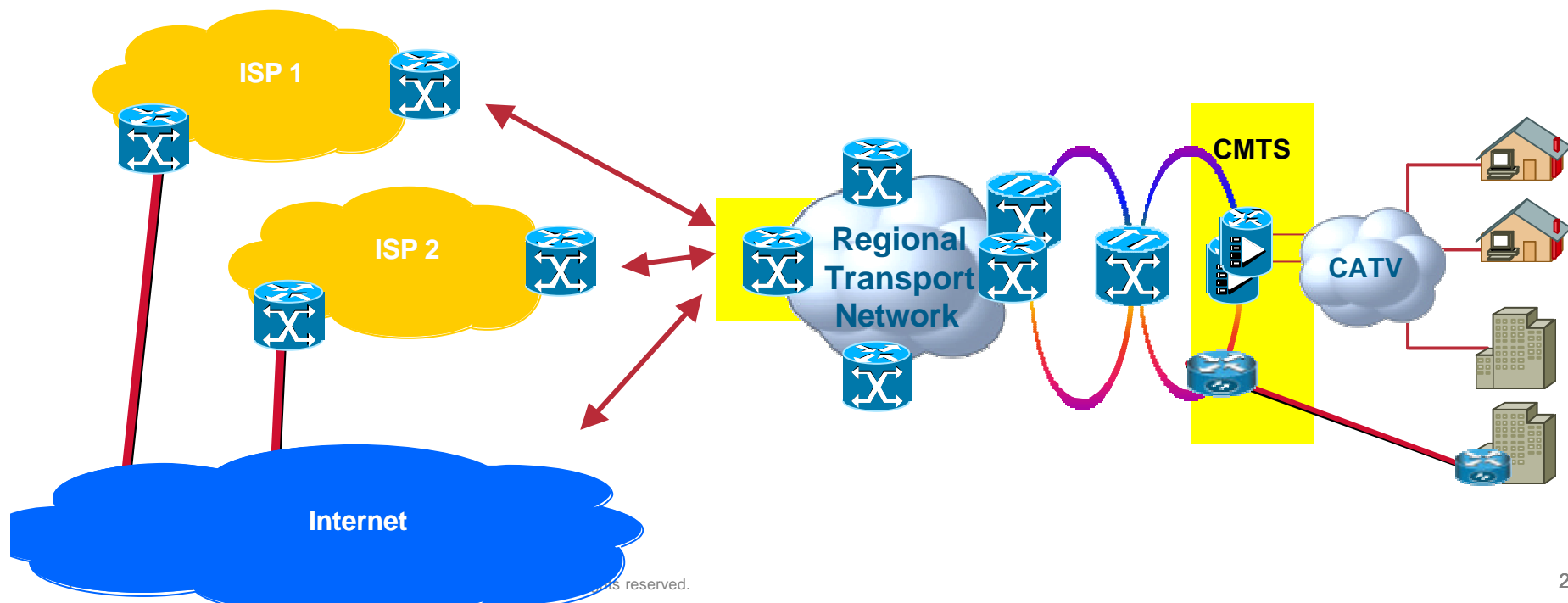
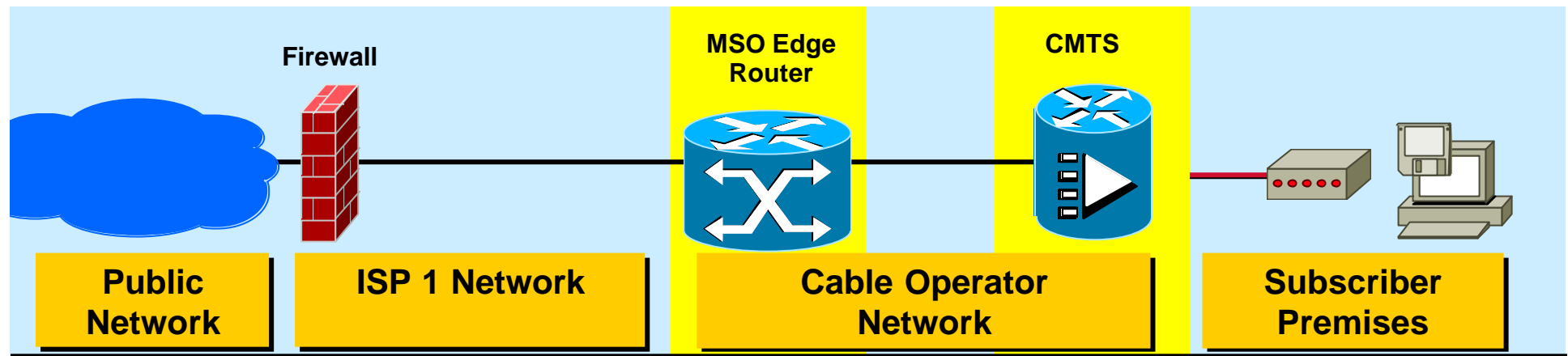
# IP-Sec VPNs for Multi-ISP

Cisco.com



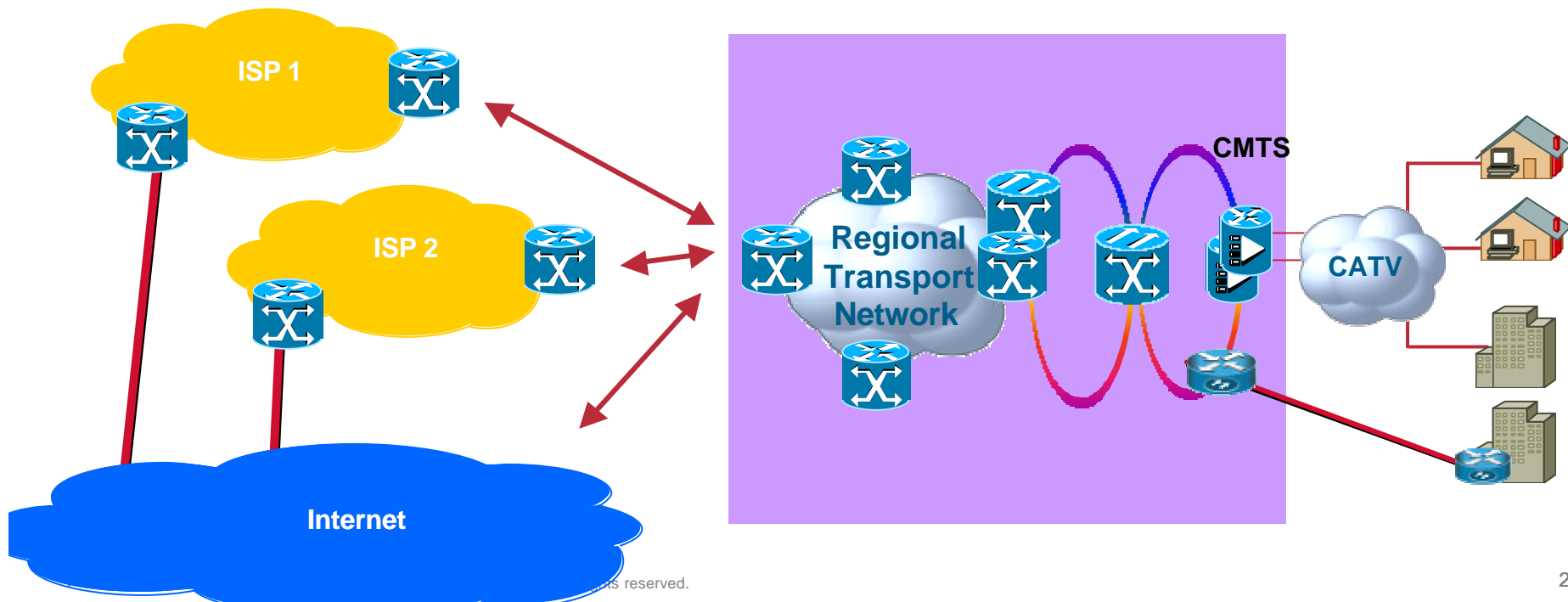
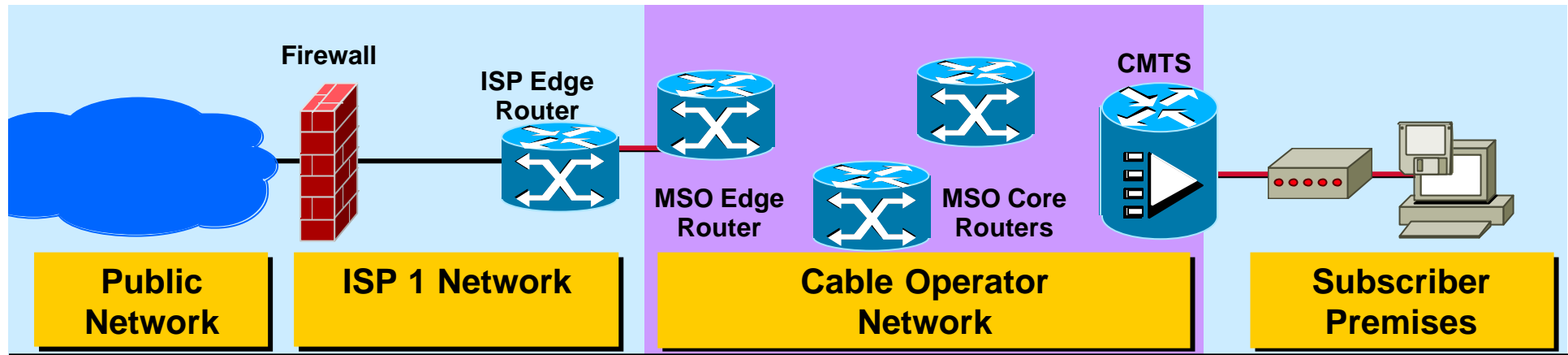
# Layer-Two Tunneling Protocol (L2TP) for Multi-ISP

Cisco.com



# MPLS-VPNs for Multi-ISP

Cisco.com



# Managed Access Deployments Today

Cisco.com

- **Successful trial deployments exist today**
  - **Deployments now exceed 100,000 subscribers**
- **Service architectures defined and available**
  - **Technologies well understood**
- **Residential subscriber demand low – corporate demand high!**
  - **Use of Managed Access technology for Small/Home Office may be more immediately lucrative than Multi-ISP**
- **Provisioning tools developed and available**
  - **Cisco's VPN-SC tool decreases operating expenses by simplifying management tasks**

# Deploying Commercial Services

Cisco.com

## ***Commercial Services for Multi-Dwelling and Multi-Tenant Units (MxU)***

# MxU Data Services:

Cisco.com

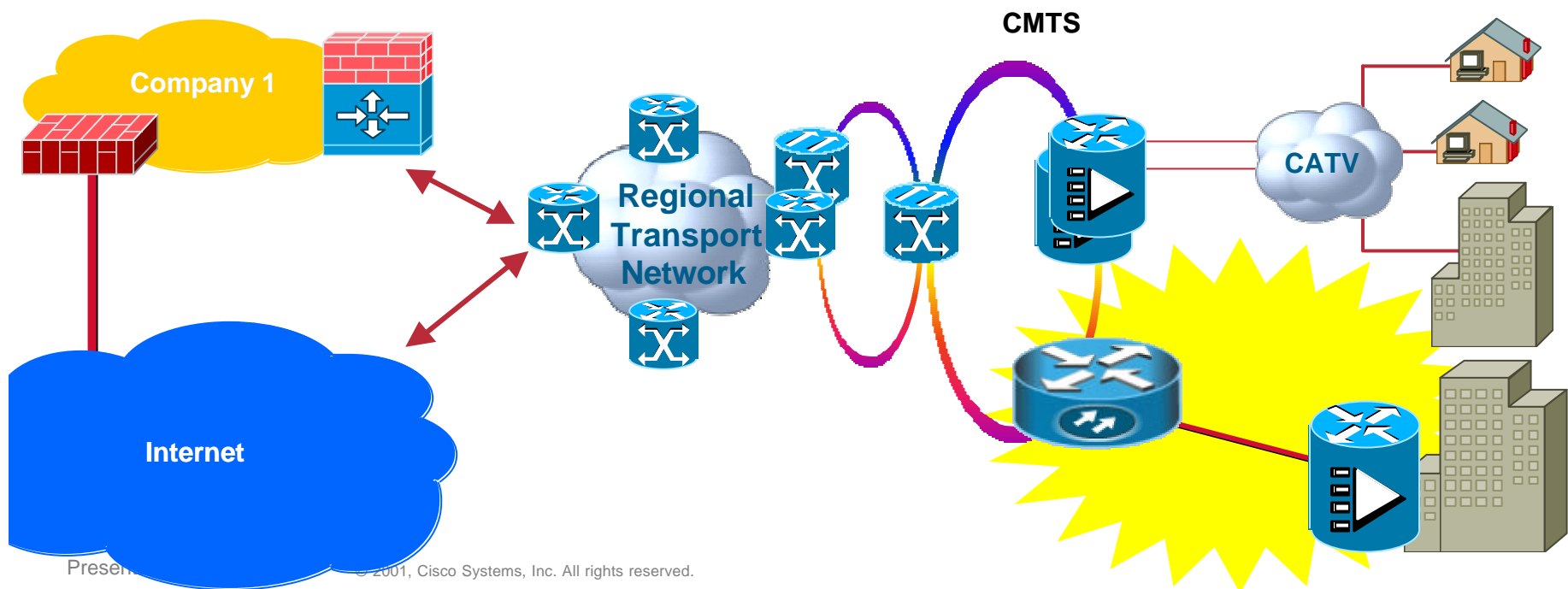
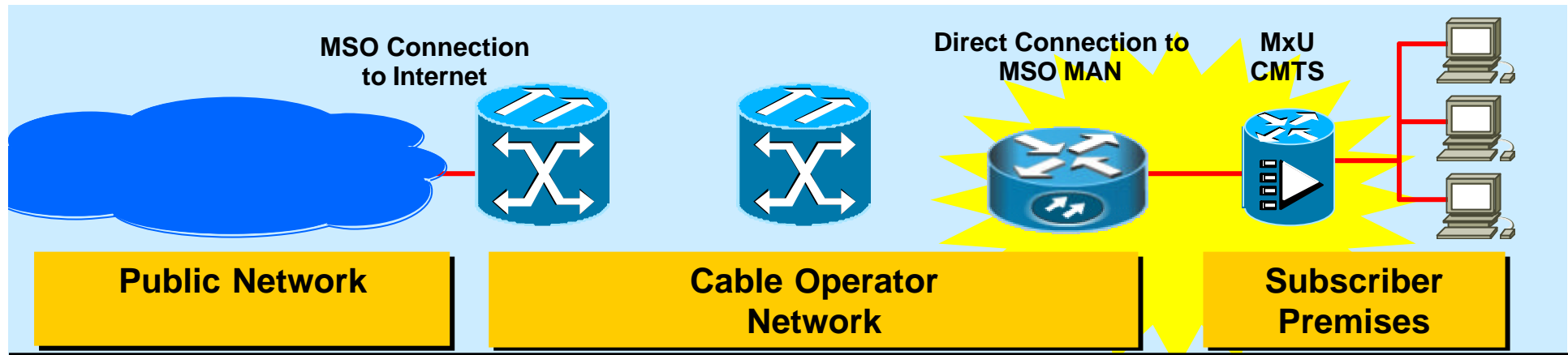
## Cable Modem Access for

- **Hotels and Hospitality**
- **Multi-Dwelling Units (apartment buildings)**
- **Universities, Colleges, and Schools**
- **Multi-Tenant Units (commercial buildings)**



# MxU Services Architecture: Connecting

Cisco.com



# Hospitality

Cisco.com

- **U.S. market size**
  - 51,000 hotels in the US**
  - 39 million rooms**
- **59% of business travelers want computers with Internet access in their guestrooms**



**Source: Cahner's In-Stat Group, Forrester, Yankee**

# Multi-Dwelling Unit—MDU

Cisco.com

- **20% of all US households live in MDUs (20 million MDUs today)**
- **Less than 5% of US residential market has high-speed Internet access**



**Source: Cahner's In-Stat Group, Forrester, Yankee**

# Education

Cisco.com

- **U.S. market size**
  - 4,000 colleges**
  - 14.4 million students**
- **Dormitories, faculty housing**



# Multi-Tenant Unit—MTU

Cisco.com

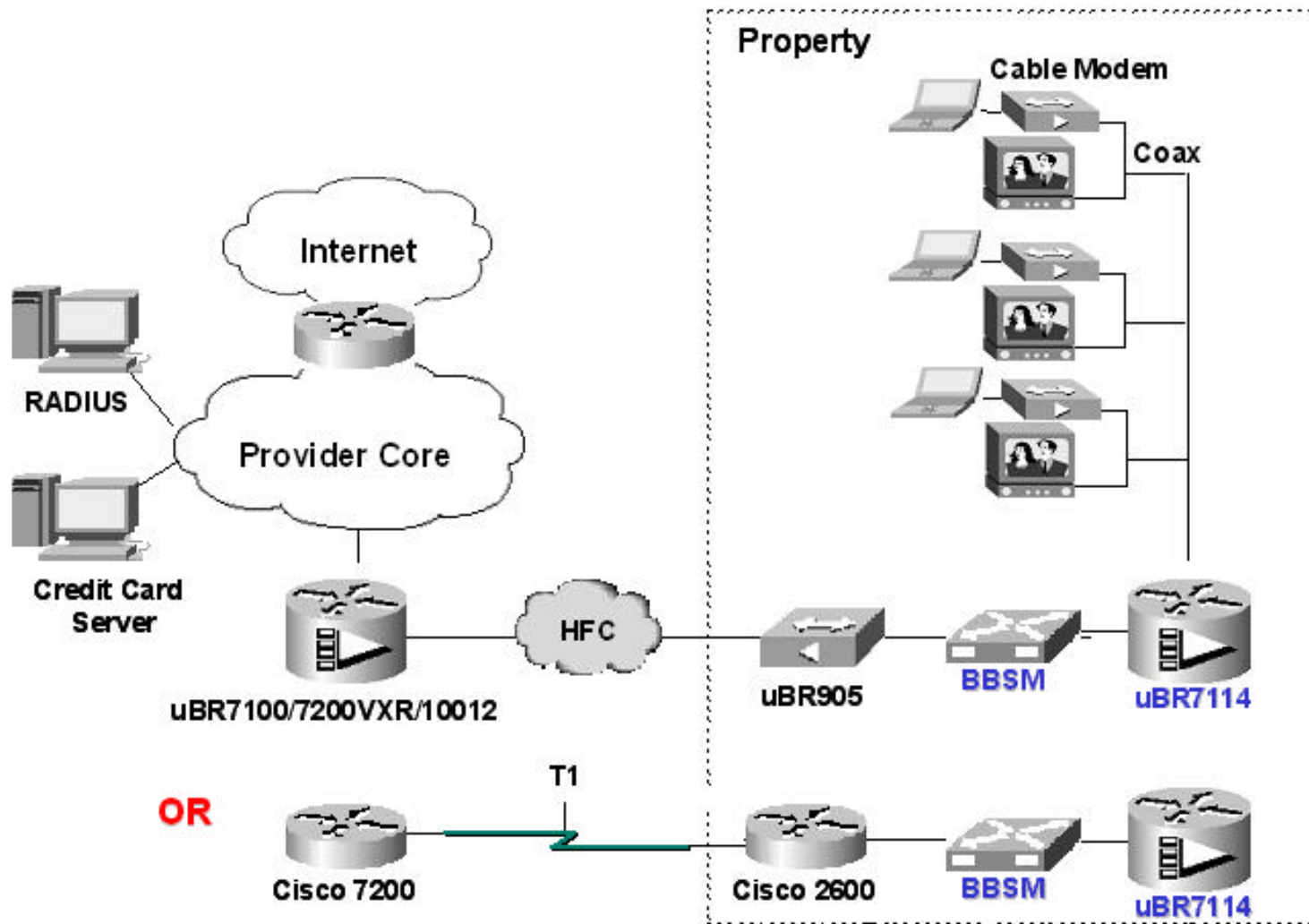
- **U.S. market size**  
705,000 properties 10.5 billion square feet
- **Potential of nearly \$10 billion in revenue exists**



**Source: Cahner's In-Stat Group, Forrester, Yankee**

# Unique MxU Architecture

Cisco.com



Created by Wilson Aboumrak

# Hospitality Services

Cisco.com

- 45 million Mobile Business Professionals
- 75% travel with laptops
- 62% access the Internet from hotels – primarily using dial-up
- 75 minutes online per day
  - Email
  - Intranet
  - Communications
  - Secure connections



# User Prospective

Cisco.com

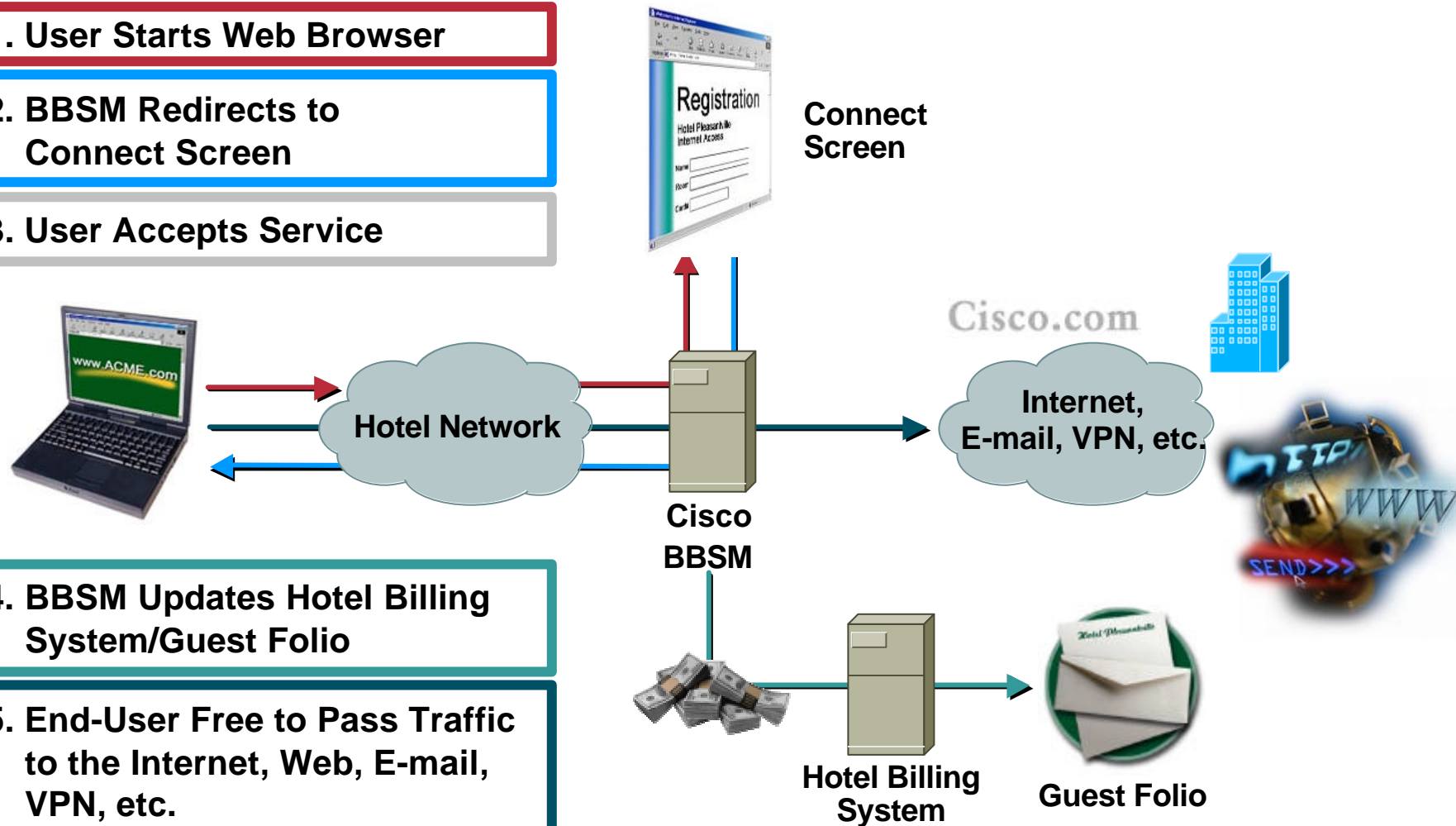
1. User Starts Web Browser

2. BBSM Redirects to  
Connect Screen

3. User Accepts Service

4. BBSM Updates Hotel Billing  
System/Guest Folio

5. End-User Free to Pass Traffic  
to the Internet, Web, E-mail,  
VPN, etc.



# MxU Service Architecture:

Cisco.com

- **High-speed access**
- **Multiple billing/payment options**
  - Credit card, access code, RADIUS, hotel PMS integration**
- **Plug-and-play for users**
- **Security**
- **Custom portal**
- **User self provisioning**
- **Walled-garden free access area**
  - Free access to room service, advertisers, e-commerce**
  - Branding and service marketing opportunity**
- **Tiered service levels**

# MxU Service a Reality

Cisco.com

- **New growing market—from \$370 million in 2000 to \$4.8 billion in 2004**
- **BBSM/Cisco solution currently deployed and popular**
- **Enables popular telecommuter solution with PC-based software client**



# Deploying Commercial Services

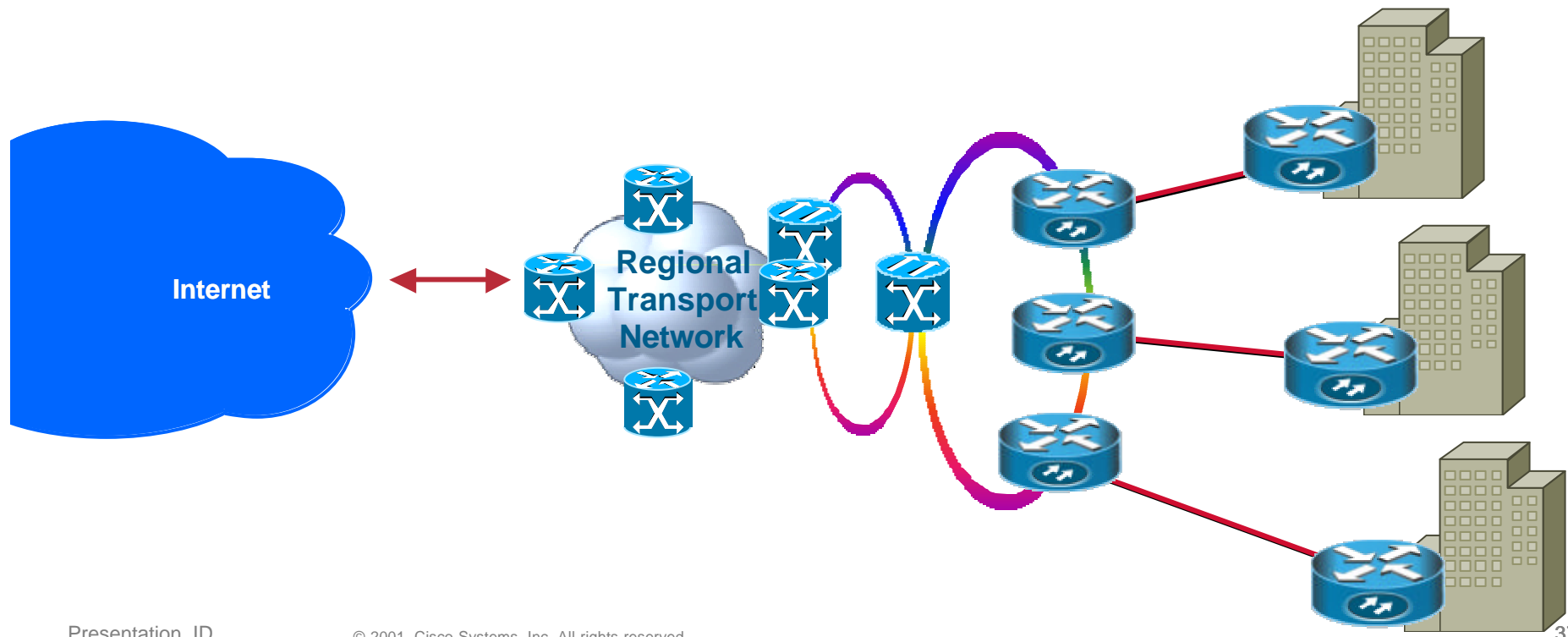
Cisco.com

## *Metro Access Services*

# Metro Access Services:

Cisco.com

**High speed connections  
to deployed MAN optical infrastructure**

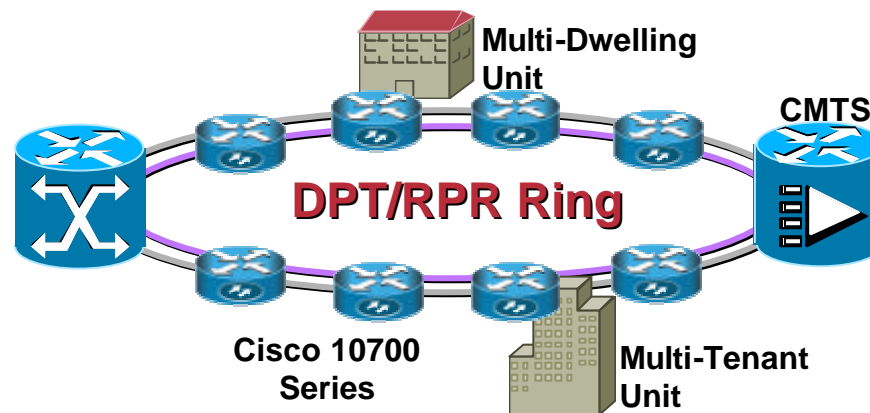


# Metro Ethernet/IP Access Systems

Cisco.com



Cisco 12000 Series



Cisco 10720  
Internet Router

- Uses Metro Area Network to supply IP access services
- Direct Ethernet customer connectivity
- High performance Ethernet/IP services portfolio
- Simple operations and service delivery

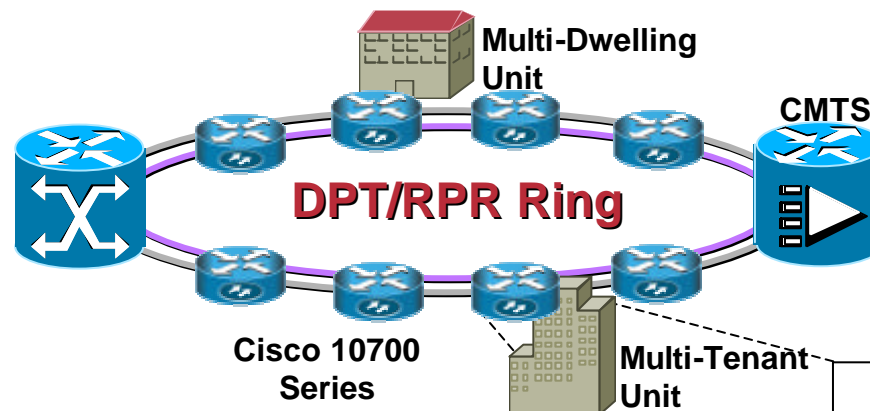
# Metro Ethernet/IP Access Systems

## *Direct Ethernet Customer Connectivity*

Cisco.com

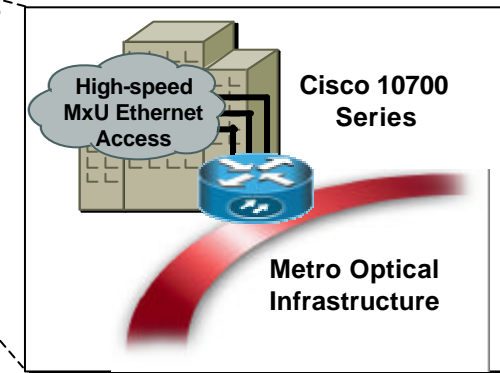


Cisco 12000 Series



Cisco 10720  
Internet Router

- 10/100/1Gbps Customer Connectivity  
**Copper, MM Fiber, SM Fiber**
- Time Domain Reflectometer (TDR)  
functionality for troubleshooting in-  
building copper wiring



# Metro Ethernet/IP Access Systems

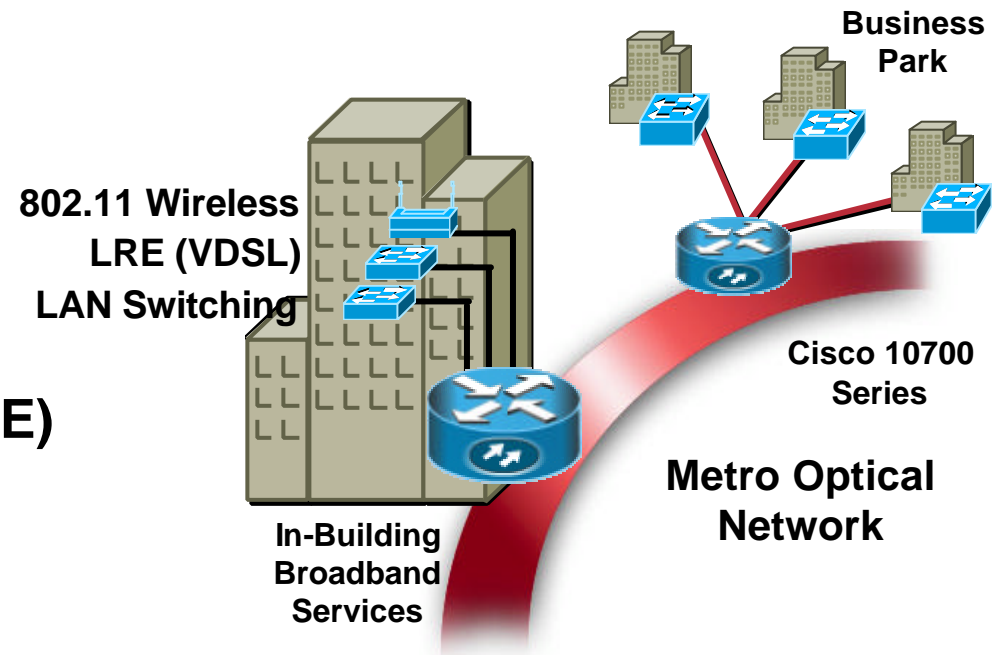
*Ethernet Switching, LRE, 802.11b Aggregation*

Cisco.com

- **Support Copper, Multi-mode Fiber, Single-mode Fiber Ethernet interfaces**
- **Supports fanouts for high-density applications:**
  - LAN Switching
  - Long Reach Ethernet (LRE)
  - 802.11b Wireless



Cisco 10720  
Internet Router



# Metro Ethernet/IP Access Systems

*Ethernet technologies to reduce CAPEX and OPEX*

Cisco.com

## Before

- Heavy Provisioning Needs
- High Equipment Cost/Port Count Requirements
- Costly Truck Rolls

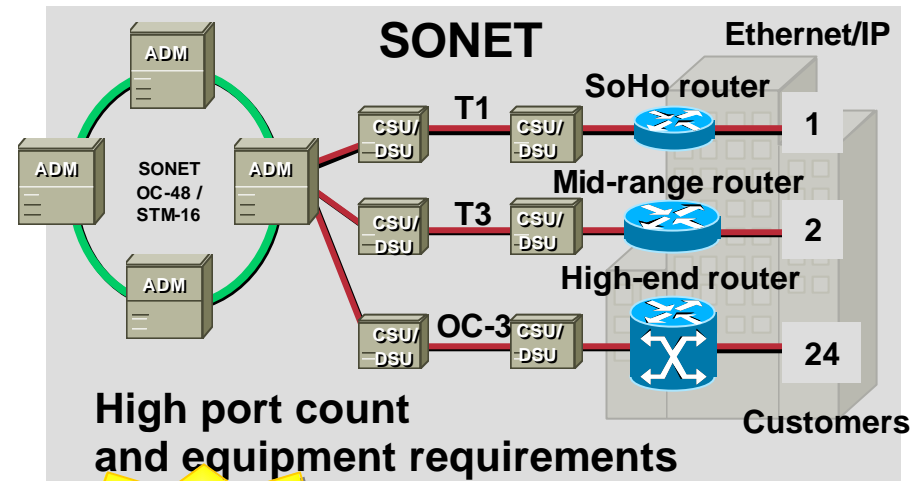
## After

- Simplified Network Topology
- Streamlined Network Operations
- Efficient Fiber Utilization
- Carrier-Class Reliability

## Bottom line operational savings

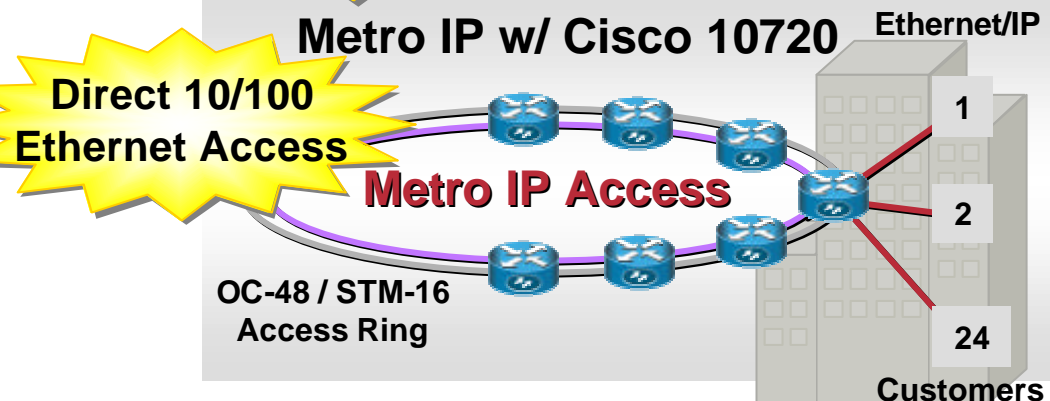
- Network Complexity/Provisioning Reduced
- **No TDM Provisioning = Higher Service Velocity**

## BEFORE



Sub 50ms  
Service Restoral

## AFTER



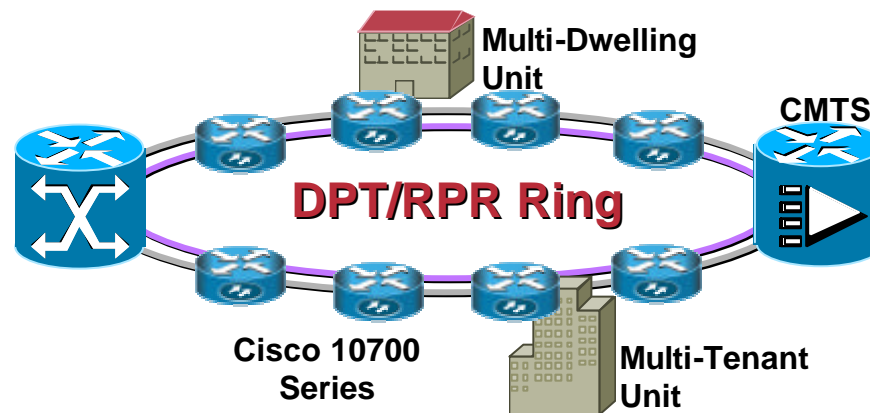
# Metro Ethernet/IP Access Systems

## *Internet-Class IP Performance*

Cisco.com



Cisco 12000 Series



Cisco 10720  
Internet Router

- Full IP unicast and multicast routing support; Full Internet routing table support
- Internet-class packet buffering
- Architecture optimized for low-latency packet delivery with minimal packet loss

# Metro Ethernet/IP Access Systems

## IP Services: Metrics for Success—Latency, Packet Loss

Cisco.com

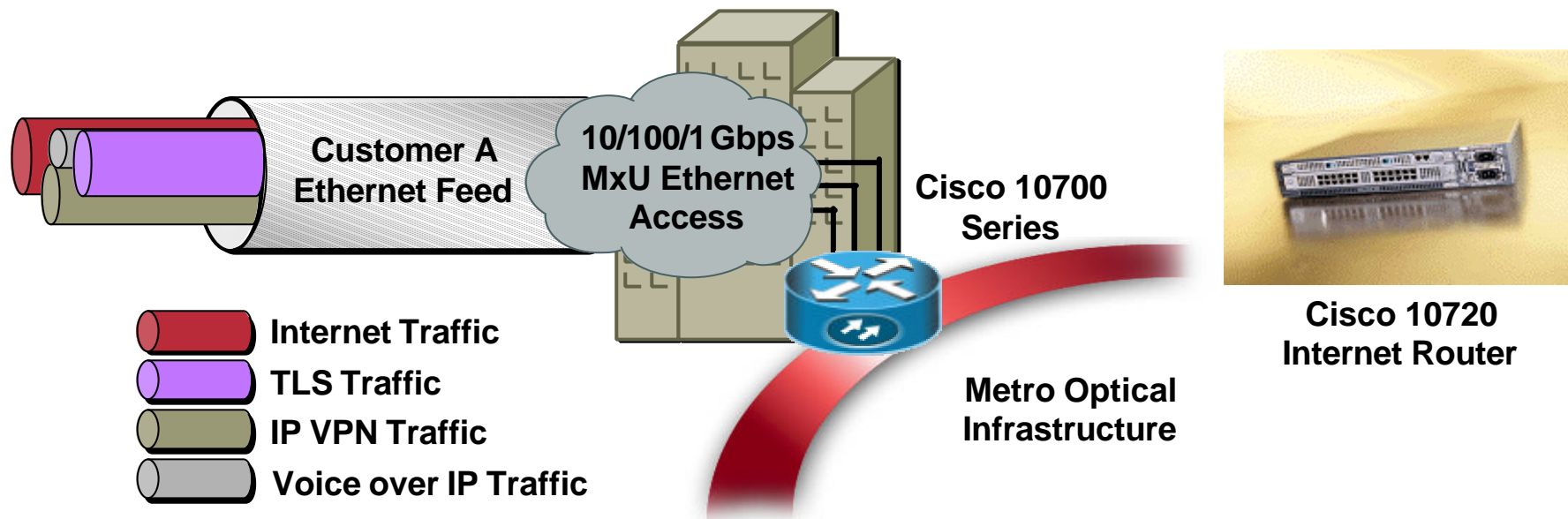
The image displays four overlapping screenshots of web pages from different telecommunications providers, each with red circles highlighting specific performance metrics and service level guarantee sections.

- AT&T Data & IP Services:** The screenshot shows the AT&T Business homepage. A red circle highlights the "Network Weather" section, which displays metrics: Delay (30ms), Loss (0.00%), and Connect Success (98%). Another red circle highlights the "Read more about the AT&T IP Backbone" link.
- Sprint Solutions:** The screenshot shows the Sprint Solutions page. A red circle highlights the "Performance Metrics" link in the navigation menu.
- WorldCom:** The screenshot shows the WorldCom "Internet Service Level Guarantee" page. A red circle highlights the "Service Level Guarantee" section, which lists various service level agreements (SLAs) such as Latency Statistics, Packet Delivery Statistics, Internet SLA, Colocation Services Technical Support, Internet Colocation Services SLA, Shared Hosting SLA, and Managed Hosting SLA.
- Qwest IP Network Statistics:** The screenshot shows the Qwest IP Network Statistics page. A red circle highlights the "Performance Reports" section, which includes a "Latency & Packet Loss" report. The report states: "View the latency and packet loss statistics for the Qwest IP Network North America and Qwest & TOUCHAMERICA IP Services. In addition, access the last three months of statistical data by clicking the appropriate month."

# Metro Ethernet/IP Access Systems

## *High Performance Ethernet/IP Edge Services*

Cisco.com



- **Rate Limited IP Services from 1Mbps-1Gbps based on UTI/L2TPv3 and EoMPLS/MPLS**

**Internet Access**

**Ethernet Private Line/Transparent LAN**

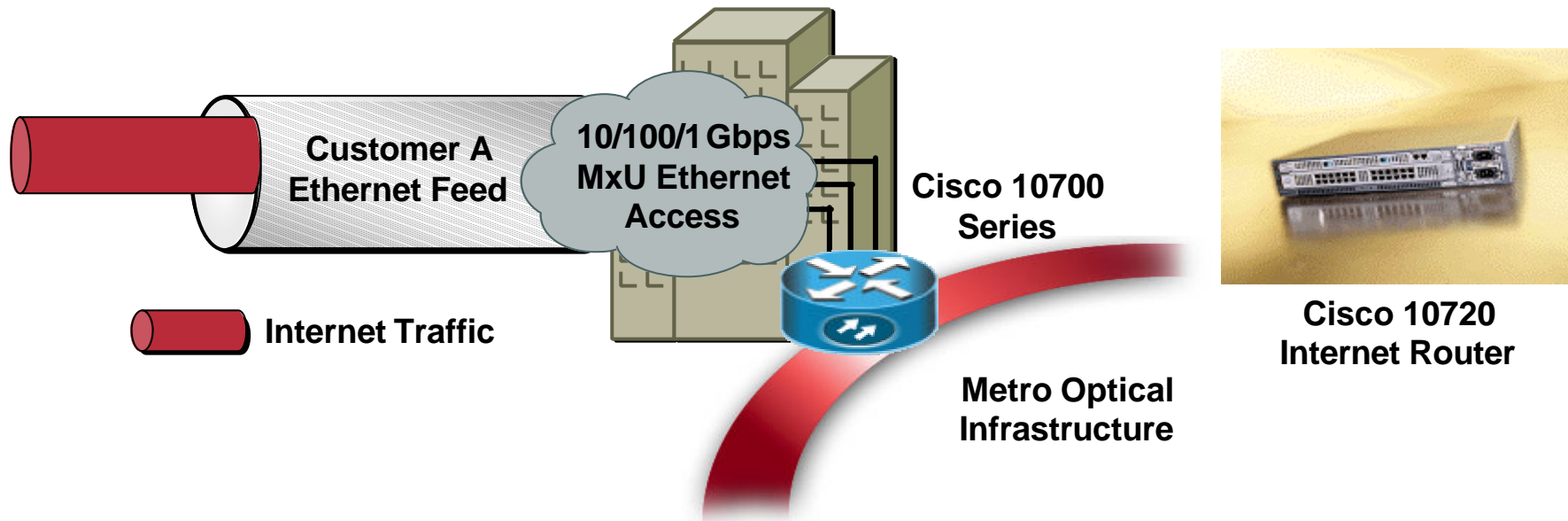
**IP VPNs**

**Voice over IP**

# Metro Ethernet/IP Access Systems

## *High Speed Internet Access*

Cisco.com

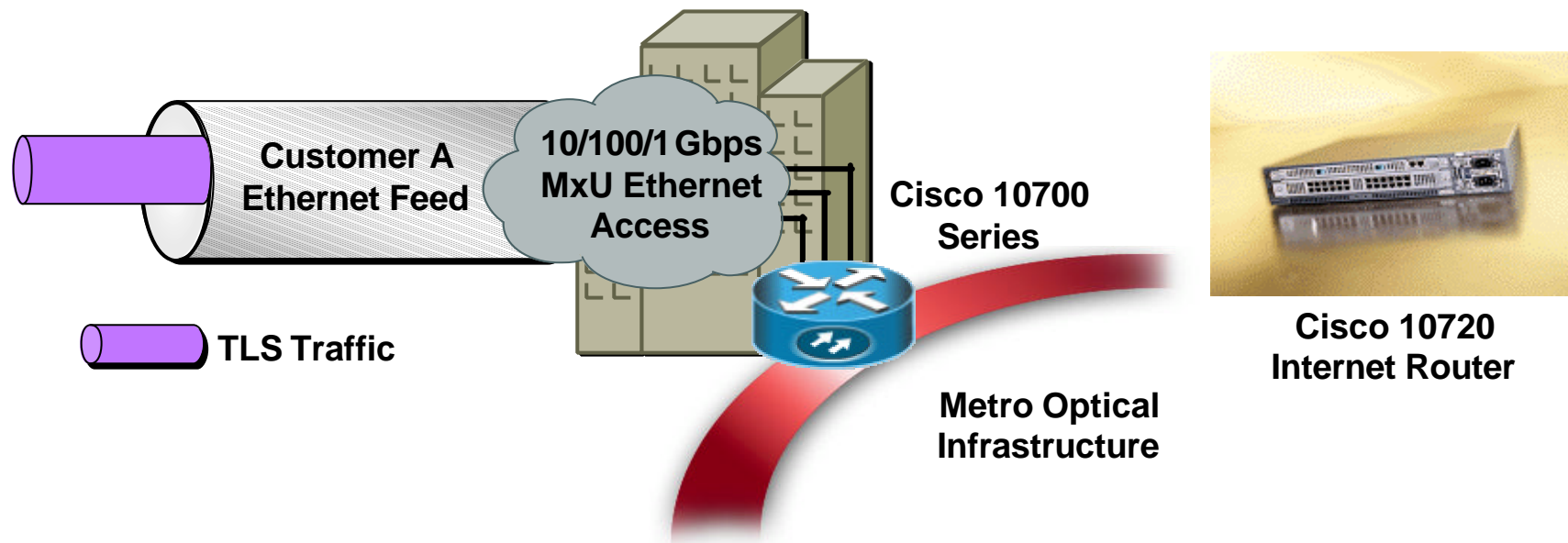


- **Rate Limited Internet Access from 1Mbps-1Gbps**
- **Full featured routing capabilities (BGP, QoS Policy Propagation)**

# Metro Ethernet/IP Access Systems

## *Ethernet Private Line/Transparent LAN Services*

Cisco.com

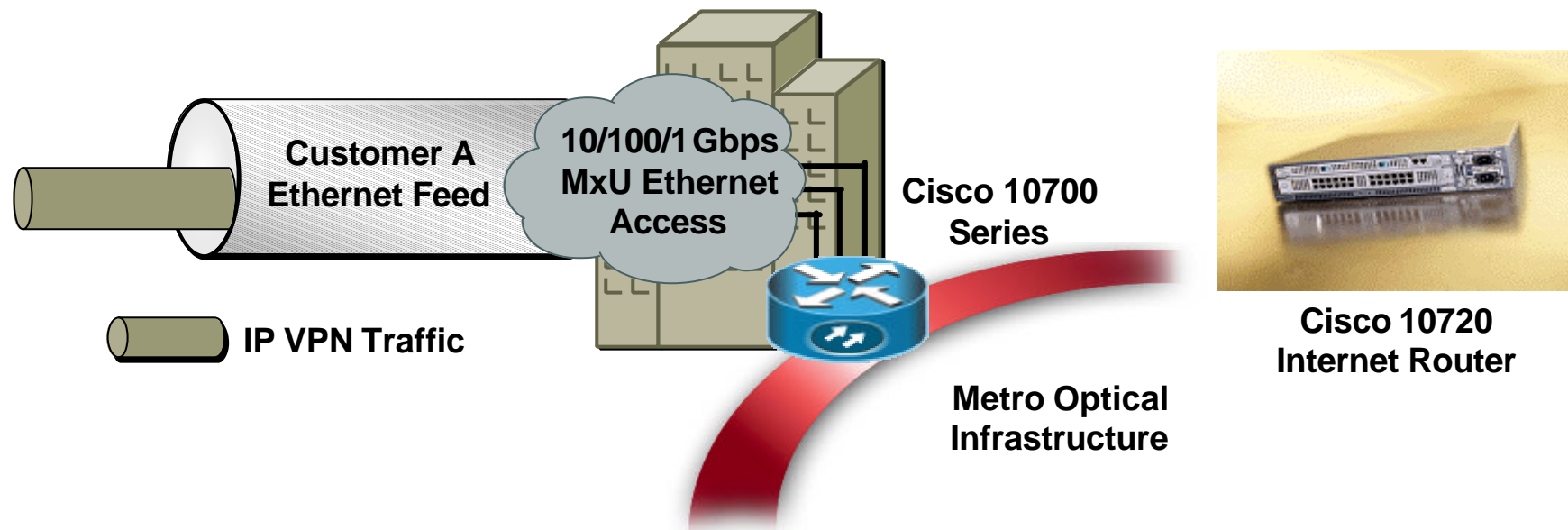


- **Rate Limited Ethernet Private Line/Transparent LAN Services from 1Mbps-1Gbps**
- **High-performance tunneling functionality for local, regional or global TLS**
- **802.1q tunneling via UTI/L2TPv3 or EoMPLS**

# Metro Ethernet/IP Access Systems

## *IP VPN Services*

Cisco.com

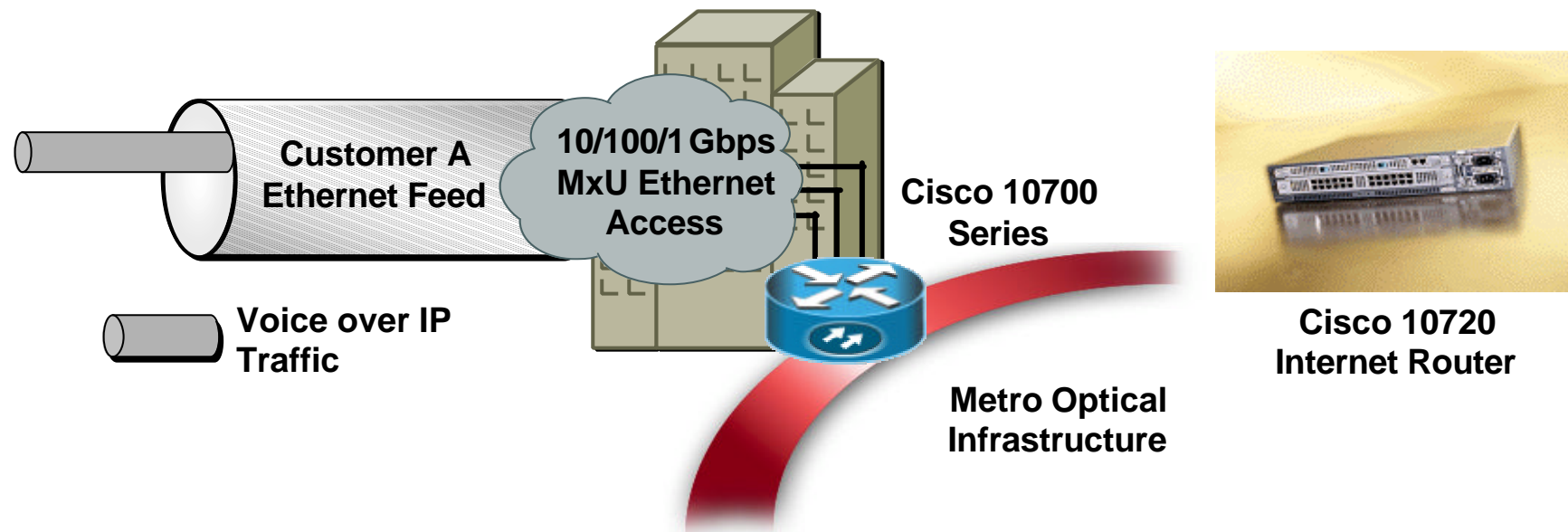


- **Rate Limited IP VPN services from 1Mbps-1Gbps**
- **High-performance tunneling functionality for local, regional or global IP VPNs**
- **UTI/L2TPv3 & MPLS support; VPN SC support**
- **Point-to-Point, Multipoint**

# Metro Ethernet/IP Access Systems

## *Voice over IP Transport Services*

Cisco.com



- **Support for latency-sensitive traffic**
- **High performance optical transport priority mechanism for guaranteed QoS for Voice transmission**

# Metro Ethernet/IP Access Systems

## Network Management Solutions

Cisco.com



Cisco 12000 Series



Cisco 10720  
Internet Router



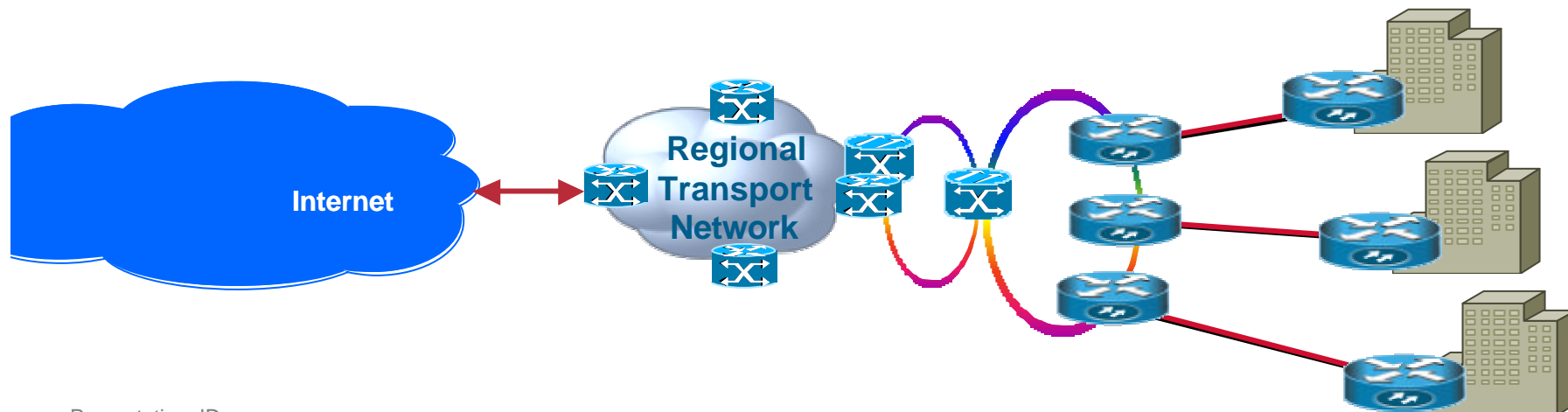
Cisco ONS 15194

- **Physical assets:**
  - Optical power monitoring
  - Time domain reflectometer
- **Element Management:**
  - Cisco IOS CLI, Telnet
  - SNMP (SONET MIB, DPT MIB)
  - CiscoWorks 2000 (12000 series, 10720)
  - CEMF (12000 Series Manager, 10720 CEMF under development)
  - IP over DCC for in-band management
  - 10720 Auto-Install support under development
- **Network/Service Management**
  - IOS-XML framework
  - VPN Solution Center for UTI/L2TPv3 & MPLS services

# Metro Access Services:

Cisco.com

- Available for deployment today
- Management and provisioning tools in place
- Business models and ROI information available
- Products fully developed and strenuously tested
- Services currently deployed and generating revenue world-wide



# Deploying Commercial Services

Cisco.com

## *Final Thoughts*

# Many Services – One Network

Cisco.com

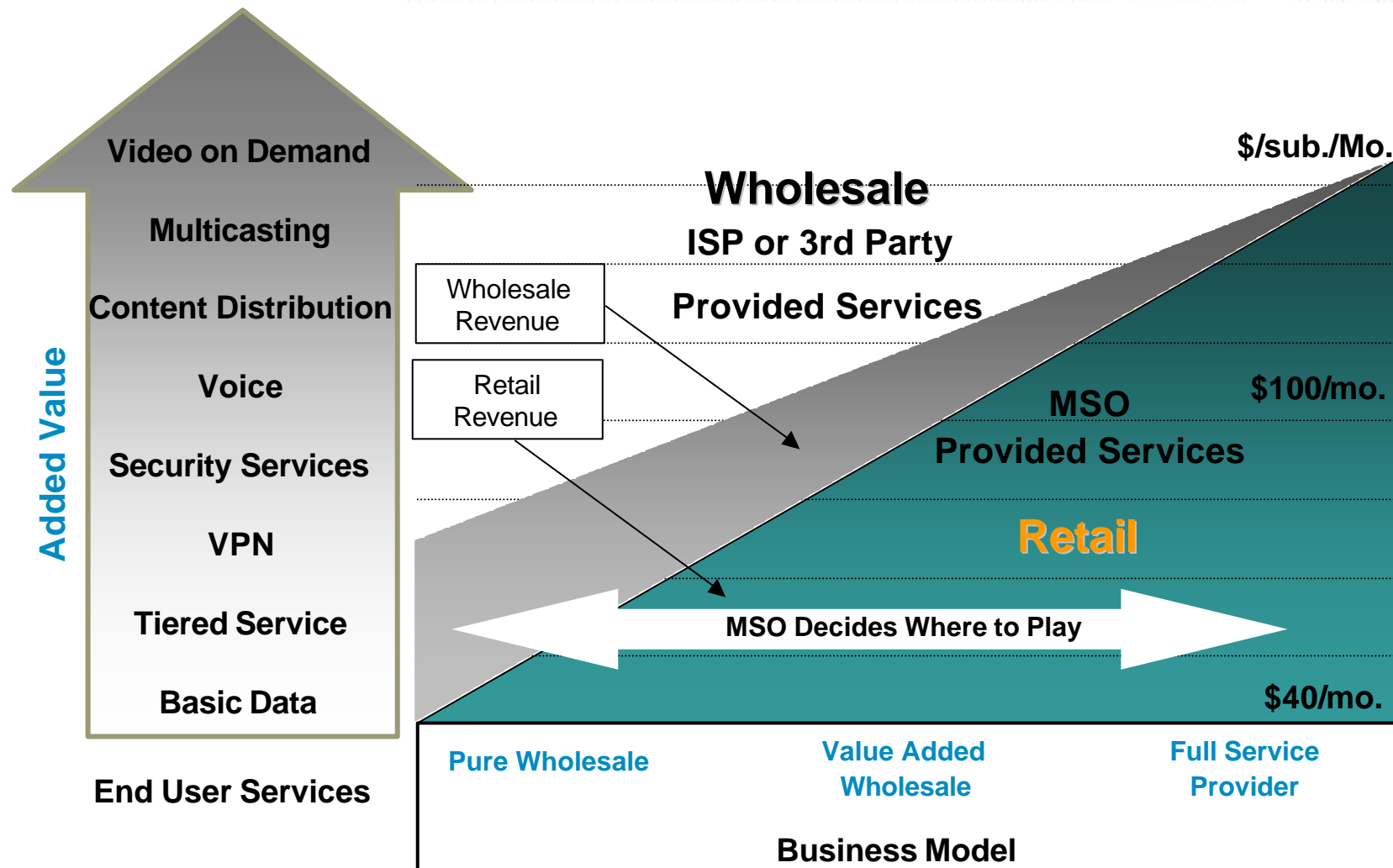
## Commercial services share common requirements

- **Unified architecture**
- **Quality of Service and High Availability**
- **Provisioning & management tools**
- **Advanced IP features**
- **Real-world deployment-ready products**

**Cisco offers products to support commercial services end-to-end**

# MSO Challenge -- Business Flexibility

Cisco.com



# CISCO SYSTEMS



EMPOWERING THE  
INTERNET GENERATION