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Introduction to VPN Technology

Cisco Systems

Agenda

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Virtu… …orks – An introduction

- Business Case
- Technical Overview

Why r…PN?

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VPNs … with a solid ROI, and … and con…

- VPN has a superior cost/bandwidth structure in nearly all cases
- Site-to-Site VPNs allow easily configured extranets and teleworker solutions
- Many Service Providers offer VPN services with SLAs specifying BW, delay, and performance guarantees.
- VPNs allow you to take advantage of toll bypass and many enterprises have deployed full blown IP telephony solutions over VPN

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Migration Business Case

Migration ROI (T1 to T1)

1yr ROI = 73 %

Frame Relay			VPN		
1.5M (512k CIR) port speed			1.5M port speed		
30 sites			30 sites		
10% mesh ~ 2 PVCs per site			Cost for (29) 3745	=	$632,000
			Cost for 7206 (HE)	=	$47,885
			Total NR cost	=	$679,885
Access Charge/Site	=	$6,313	Access Charge/Site	=	$2,059
Management	=	$920	Management	=	$797
Total Branch Access	=	$7,233	Total Branch Access	=	$2,856
Head End Access	=	$15,660	Head End Access	=	$15,660
Total Cost/month (80%)	=	$180,357	Total Cost per month	=	$98,498

$81,860 savings/month in access charges

Equipment paid off after 9 months

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Migration Business Case

Migration ROI (512k to T1)

2x BW

2yr ROI =58 %

Frame Relay			VPN		
512k (128k CIR) port speed			1.5M port speed		
50 sites			50 sites		
10% mesh ~ 3 PVCs per site			Cost for (49) 1760s	=	$282,566
			Cost for 7206 (HE)	=	$47,884
			Total NR cost	=	$330,450
Access Charge/Site	=	$2,621	Access Charge/Site	=	$2,059
Management	=	$1,065	Management	=	$ 797
Total cost per branch	=	$3,686	Total cost per branch	=	$2,856
Total Head End Cost	=	$15,660	Total Head End Cost	=	$15660
Total Cost/month (90%)	=	$176,706	Total Cost per month	=	$155,628

$21,078 savings/month in access charges

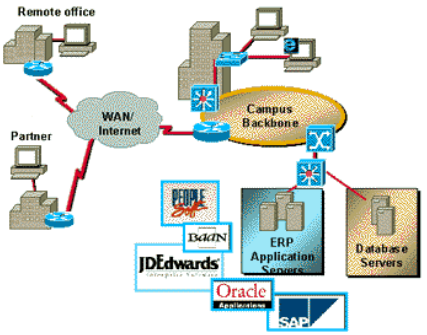
Equipment paid off after 19 months

Migration Business Case

Business Critical Apps

Market indicators for Enterprise Resource Planning (ERP), Supply Chain Mgmt (SCM), Customer Relationship Mgmt (CRM) apps:

- **ERP— ~ $8 billion in 2001, w/ sustained an annual growth rate of 13% through 2005 (Gartner Group, 2001)**
- **SCM— $13.6 billion spent in 2000 and estimated to reach $50 billion by 2005 (Lou Gerstner, CEO, IBM, 2001)**
- **CRM—$20 billion spent in 2000 and estimated to reach $76 billion by 2005 (Gartner Group, 2001)**



These applications require a highly available, scalable, and application-aware WAN solution.

Migration Business Case

Integrated Voice, Video and Data

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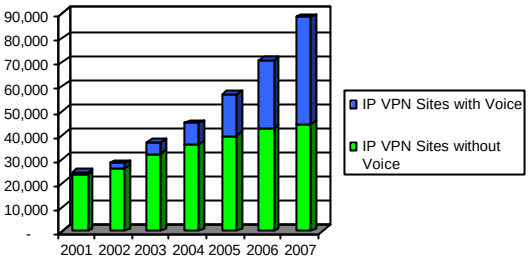
Business Requirements:

- **Cost savings through network convergence (voice + data)**
- **Productivity increase through new application support**



Source: IDC 2002

VOIP/Video applications:

- **Intra-enterprise voice transport, IP telephony**
- **Corporate Communications**
- **Elearning**
- **Videoconferencing**

Application Requirements:

- **Multipoint connectivity/mesh to support intra-enterprise calling**
- **QoS/SLA support required for business quality voice and critical apps**
- **Multicast support for content distribution applications**

Migration Technical Case

VPN scales more cheaply/gracefully than FR

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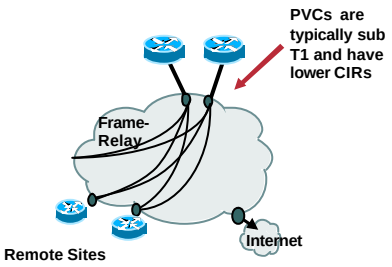
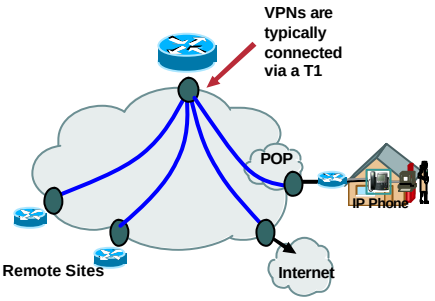
Frame Relay



- **Frame Relay PVCs do not scale cheaply or gracefully**
- **Each new site requires multiple new PVCs**
- **Hub and Spoke topology requires complicated routing schemes to avoid inefficient behaviour**

VPN



- **New sites are as easy as dropping in a new link, or just use the existing Internet link!**
- **All sites enjoy full line speed**
- **Provisioning is the same regardless of number of sites**

Migration Technical Case

VPN is pervasive, and takes less time to provision

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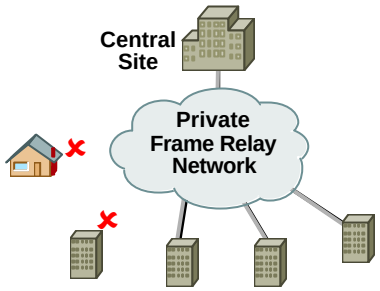
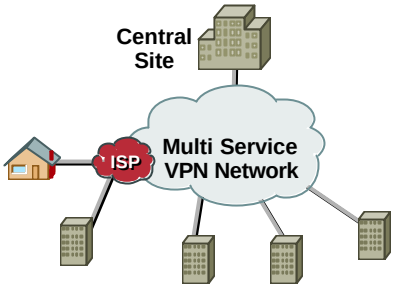
Frame Relay



Branch Offices

- Private FR networks may not reach all branch offices or remote locations
- Frame Relay does not support remote workers
- PVCs can take over a month to provision

VPN



Branch Offices

- Any branch or home that can access the Internet can securely connect to your corporate VPN
- VPN supports teleworkers and Extranets
- New VPN connections take days to provision

Migration Technical Case

VPN Bandwidth

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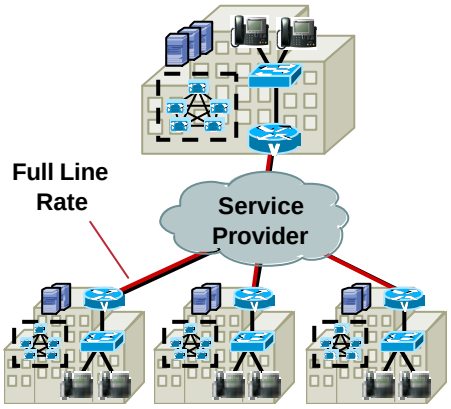

- Frame Relay typically offers CIR that is lower than circuit line speed (access rate equals T1, but CIR is only 512k)
- VPNs allow for full line rate BW speeds on a per remote basis
  - *Higher BW at lower cost*

Migration Technical Case
VPN Security

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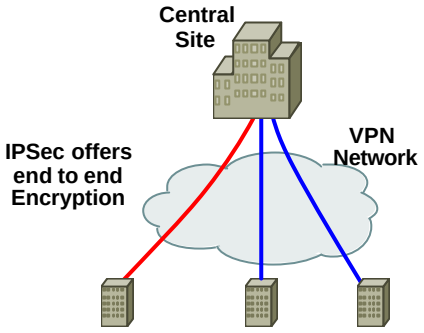

- Frame relay provides logical separation of traffic, not transport security
- VPNs provide a more scalable, easier to manage, and less expensive method for transport security than FR
- Several privacy standards requiring encryption have been enacted by governments worldwide (3DES, AES)
- VPN allows end point authentication

Migration Technical Case
VPNs offers Equivalent QoS

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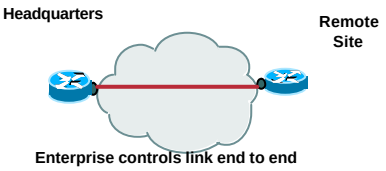
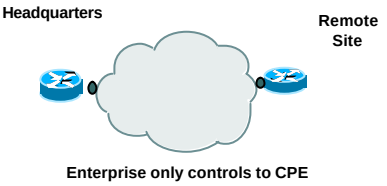
Frame Relay



- With FR the Enterprise owns the Layer 2 link from end to end
- QoS control is very granular

VPN



- With VPN the Enterprise only owns out to the CPE, the SPE owns the rest of the link
- Edge QoS is available
- Most SPs offer an SLA

Migration Technical Case
Teleworker Deployments

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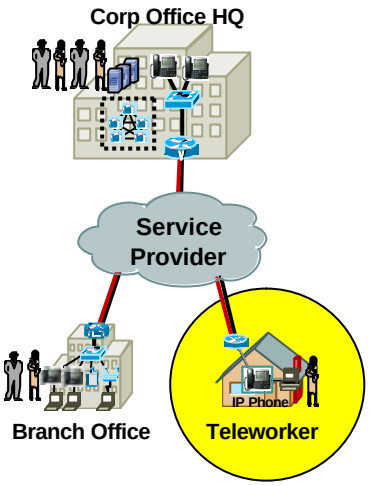

- VPN Deployments lay the groundwork for future VOIP (QoS) enabled Teleworker deployments
- IPSec enabled CPE in Teleworker location utilizes the same head end gear as the branch offices

Service Providers Offering Services
Including SLAs

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- Cisco Powered Network designation created for V³PN service providers—"IP Multiservice VPN"
- V³PN (IP Multiservice VPN) SLA:
  - ✓Delay <= 60ms one way delay
  - ✓Jitter <= 20ms
  - ✓Packet loss <= .5%
  - ✓Edge QoS (highly preferred)
- SP's are responsible for meeting the terms of the SLAs they provide to Enterprises
  - –Similar to private Frame Relay CIR today

Case Study 1 – Why VPN and Voice-over-VPN

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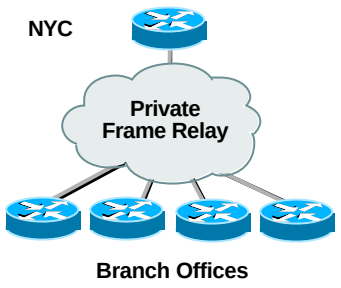
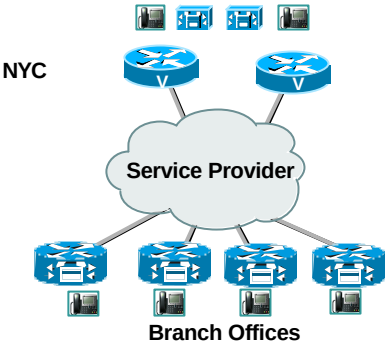
Alternative 1:
Managed Frame Relay



- 20 sites – >$45,000 per month
- 3 year commit, >$1.5M total

Alternative 2:
Voice and Video enabled VPN



- 20 sites – <$20,000 per month
- 1 year commit, <$250K total

Only Cisco Delivers End-to-End, Fully Interoperable VPN Network Solution

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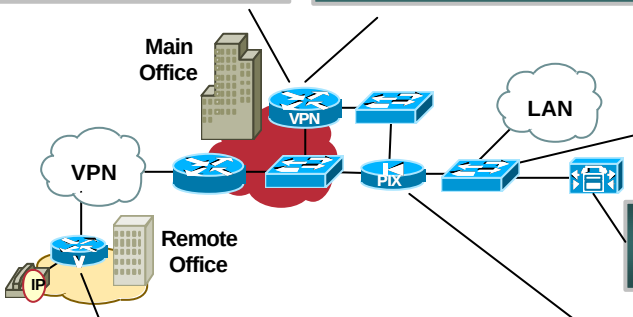
Catalyst Switches
Voice Gateways and VPN head ends (6500)

Cisco IOS VPN Security Routers
Voice, Video integration with IPSec

Cisco IP Phone 7900
Phone handset with integrated QoS



Cisco CallManager
Call setup and signaling; Host IDS protection

PIX Firewall
Statefully inspects Cisco IP Telephony and Video streams

Cisco IOS VPN Security Routers
Integrated WAN, VPN, voice gateway and firewall for remote offices

VPN Advantages

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Cost Savings

- Increased bandwidth at lower cost
- Lower phone bills
- Lower backbone costs delivered by convergence
- Reduces need for travel

Improved Productivity

- More users connected to the network
- Same user experience and access as in corporate office
- Enables new converged applications
- Faster deployment times

The Network Delivers Efficiency

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Why migrate now?

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VPNs– ed feature set over FR with a solid ROI, and po re features, services and conve

- Migrating now gives you access to more services
- Migrating now gives you greater flexibility
- Migrating now provides additional security and a solid ROI
- Migrating now paves the way for future convergence based solutions

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Agenda

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Voice Enabled VPN (V^3PN) – *An evolution of IPSec rs cost-effective integrated voice, video, and eographically dispersed locations.*

- Business Case
- Technical Overview

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V^3PN Deployment Models

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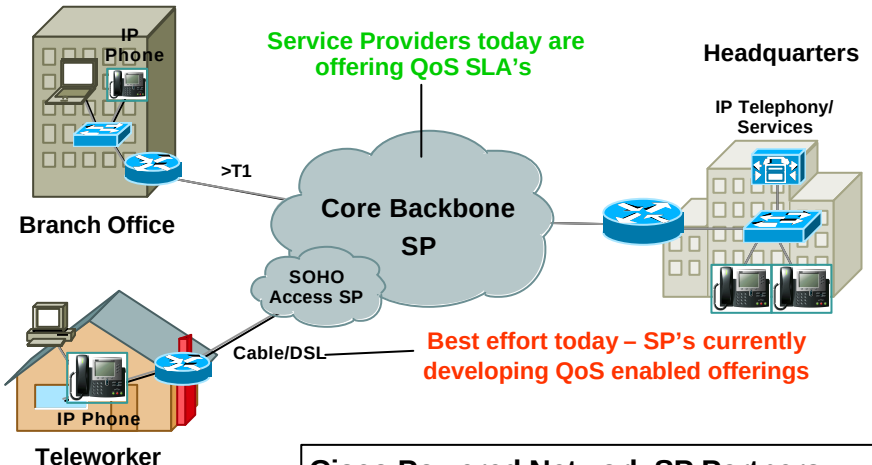

Cisco Powered Network SP Partners

http://www.cisco.com/pcgi-bin/cpn/cpn_pub_bassrch.pl

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V³PN Deployment Model:
Site-to-Site Branch Office

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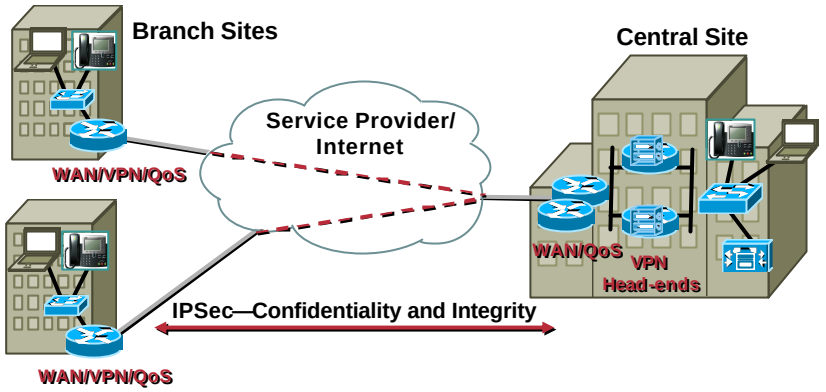

- Hub and Spoke Topology
- Cisco IOS VPN Routers
- QoS capable WAN media (Point to Point, Frame Relay, etc.)
- Service Provider offering QoS-based SLA for drop, delay and jitter, availability

Day in the Life…
of a Cisco employee

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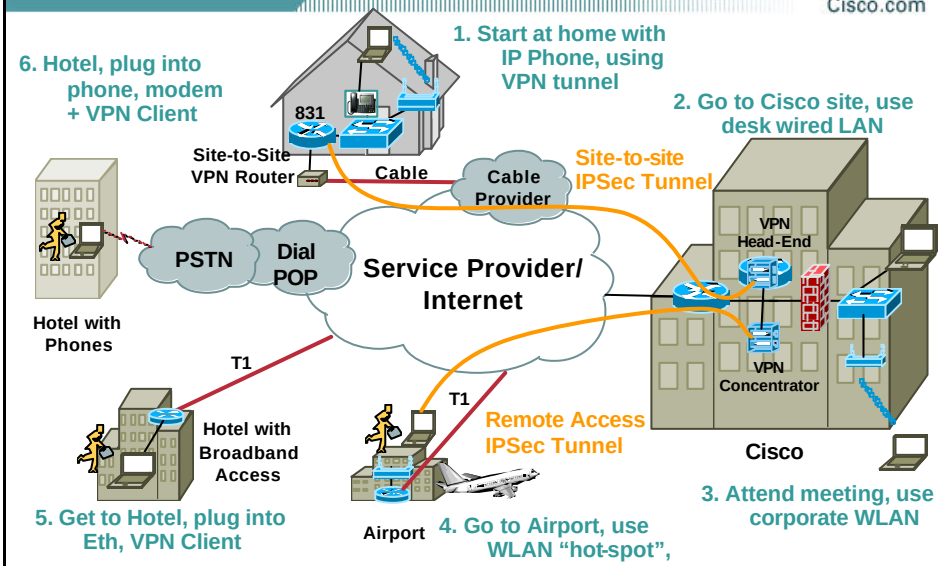
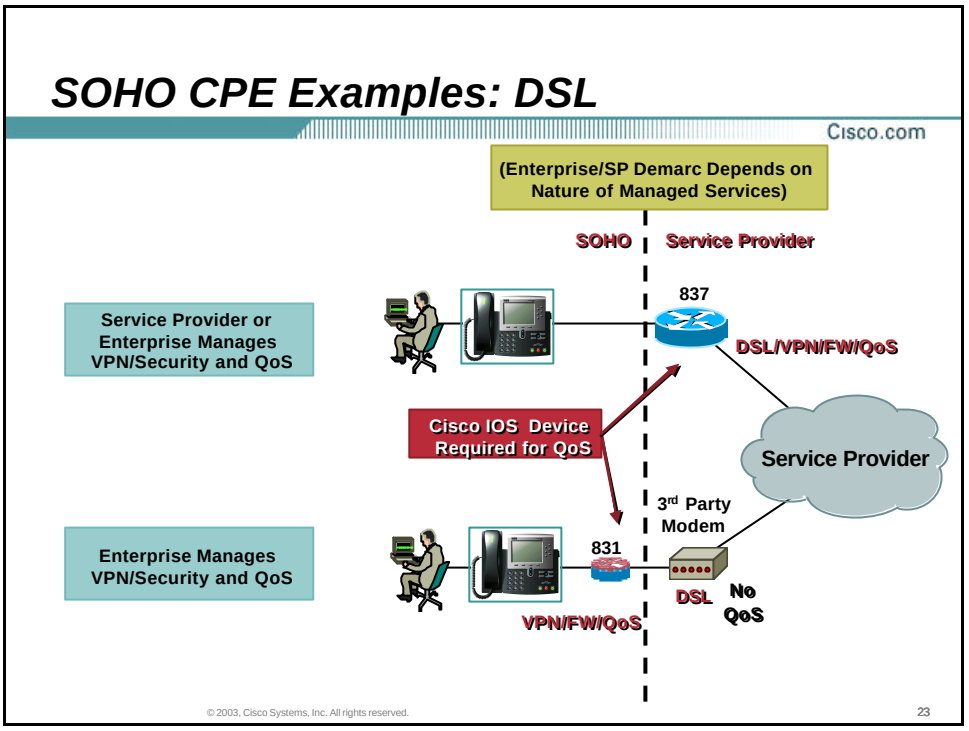
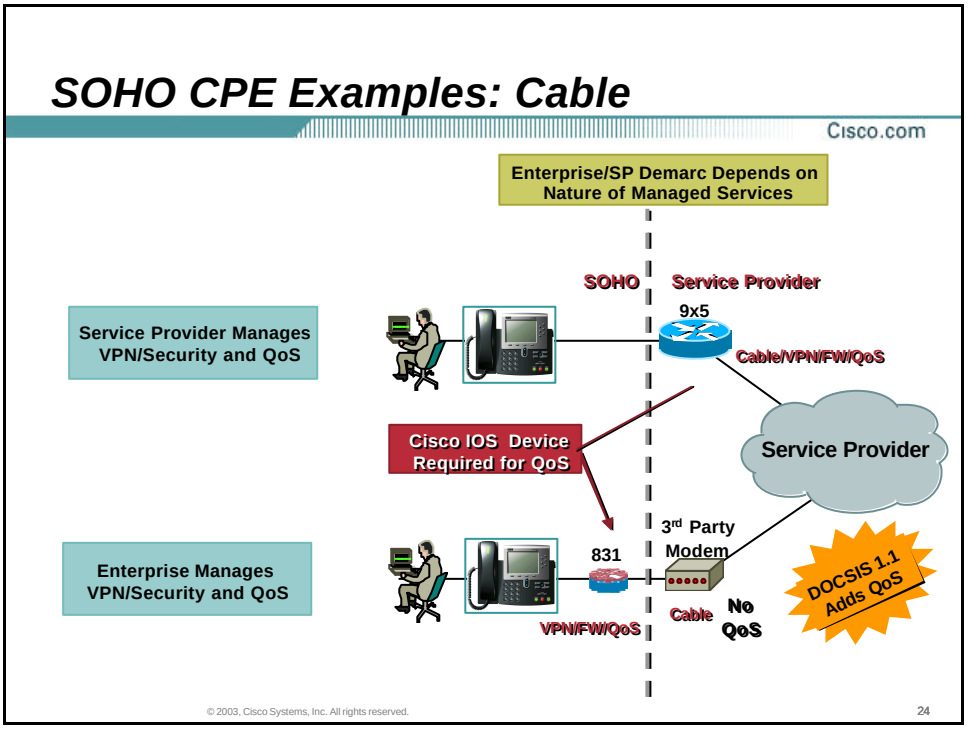


SOHO CPE Examples: DSL

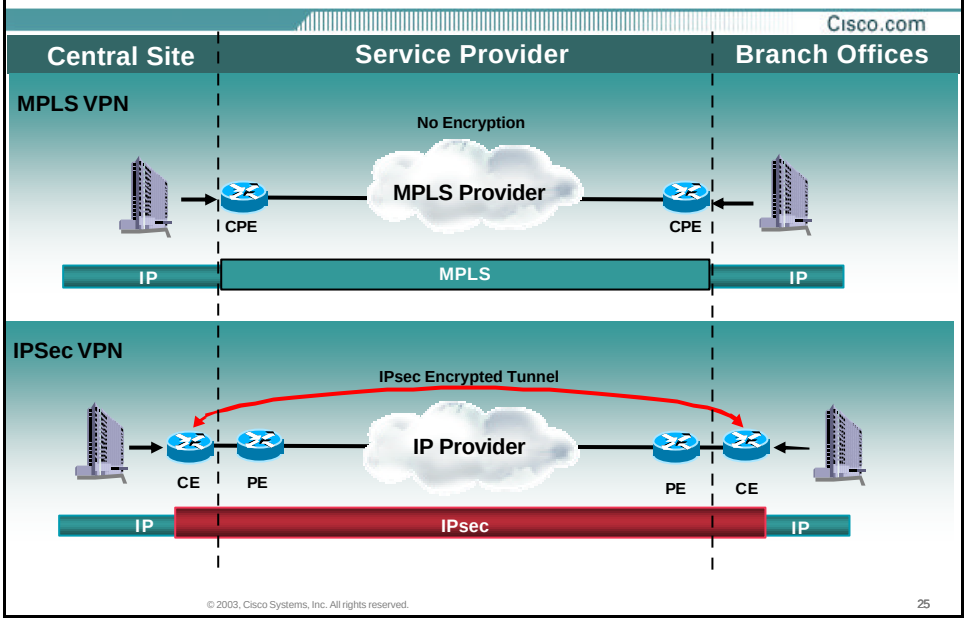


SOHO CPE Examples: Cable



IPsec and MPLS VPNs

Service Provider Options



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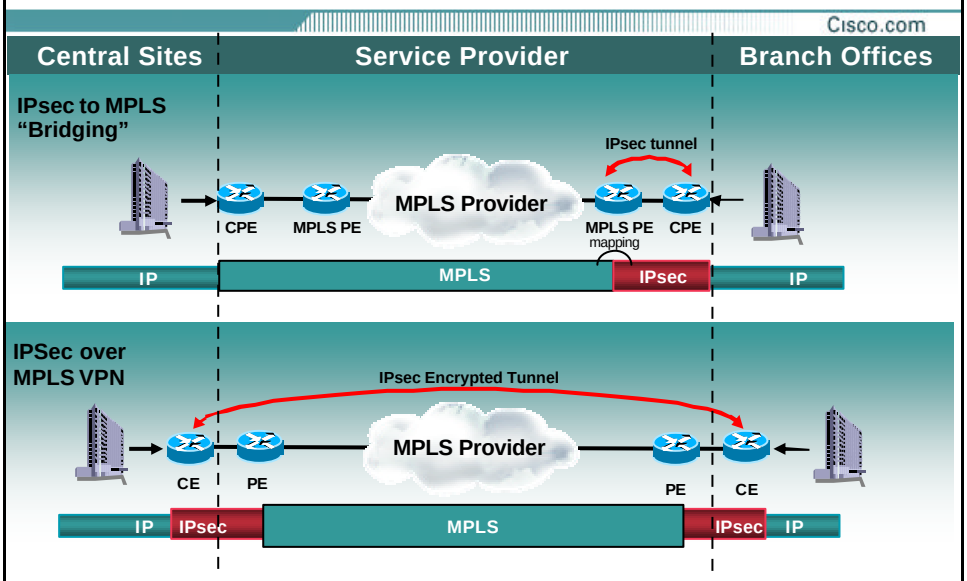
IPsec and MPLS VPNs

Service Provider Options



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V3PN Services

What Does a Customer Choose?

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- **Traffic Separation provides adequate security, full-mesh functionality, Managed Service acceptable**
  - **MPLS VPN**
- **Traffic encryption required and/or Enterprise Customer wants control of security policy**
  - **IPSec VPN**
  - **IPSec VPN over MPLS**
- **"Backbone" services (e.g. MPLS, FR, T1, etc.) not available at location**
  - **IPSec VPN over Broadband Access**
- **"Best Effort" service/bandwidth is acceptable, cost is of utmost importance, resiliency not critical**
  - **IPSec VPN over Broadband Access**

V3PN Service Providers

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Where to go for CPN Designation

http://www.cisco.com/pcgi-bin/cpn/cpn_pub_bassrch.pl

Search for*:*

"IP-VPN Data"

and

"IP-VPN Multiservice"