Achieveing Opex reduction and revenue growth with NGN

Paolo Campoli
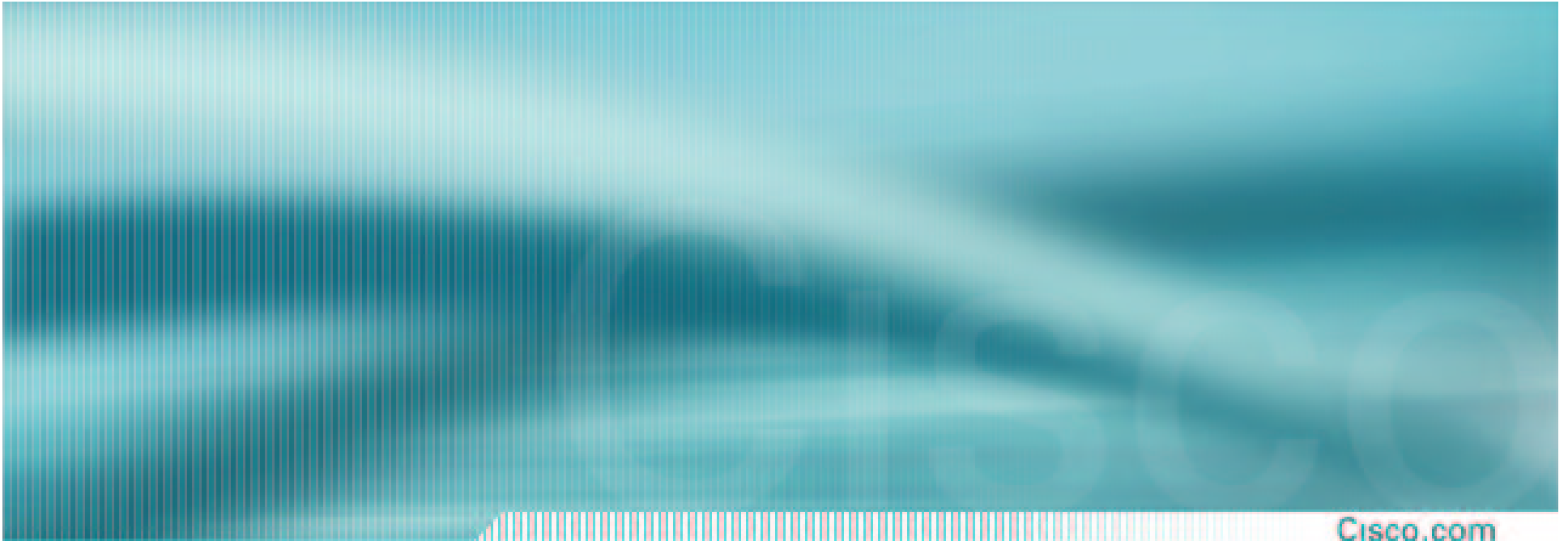
Senior Manager, Technology Solution Marketing
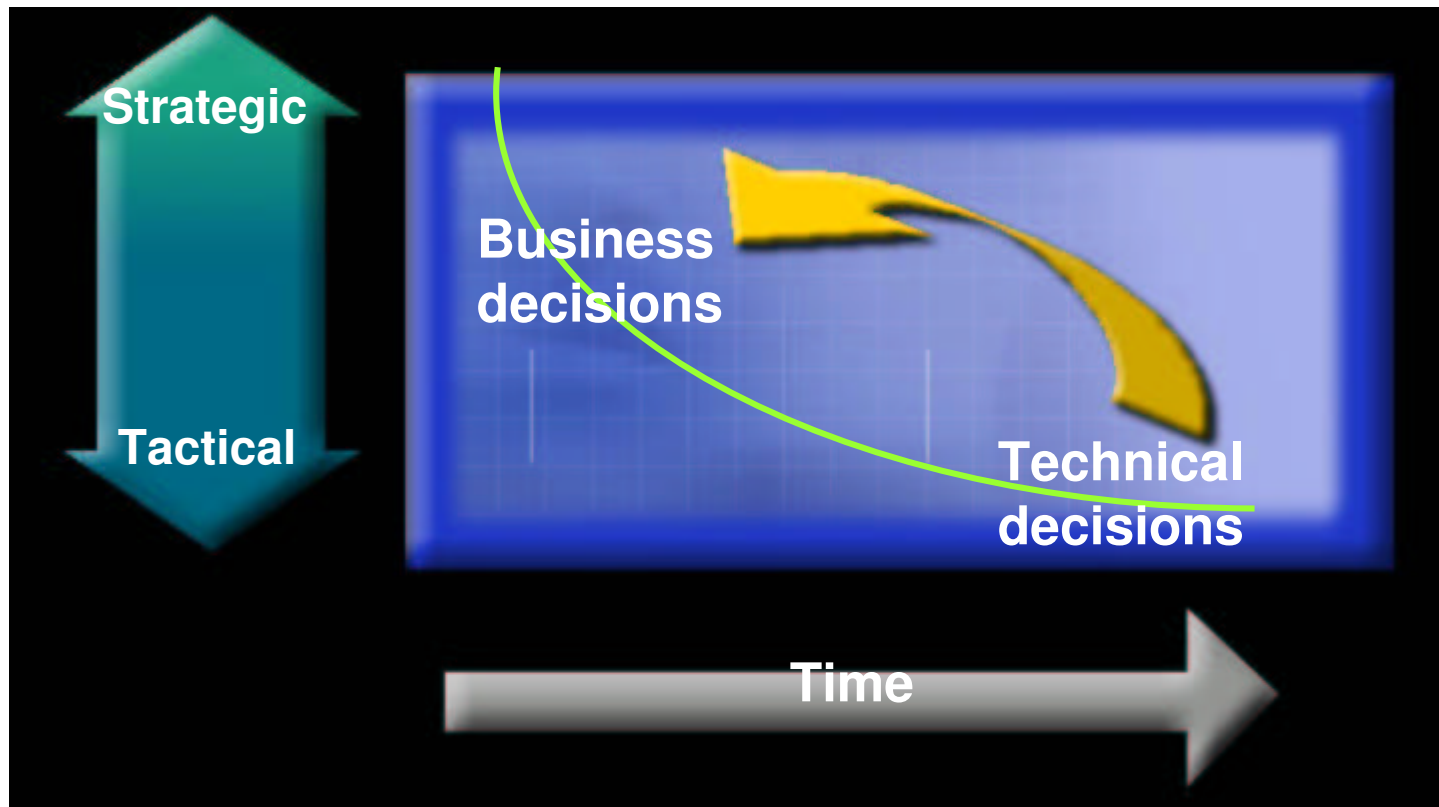
CISCO SYSTEMS EMEA – Jan 2002

Agenda

- **The Telco voice migration market**

- **Business customer rationale**

- **Economics of VoBB**

- **Economics of C4 replacement**

- **Achieving ARPU growth and Opex reduction**

Cisco.com

The Telco voice migration market
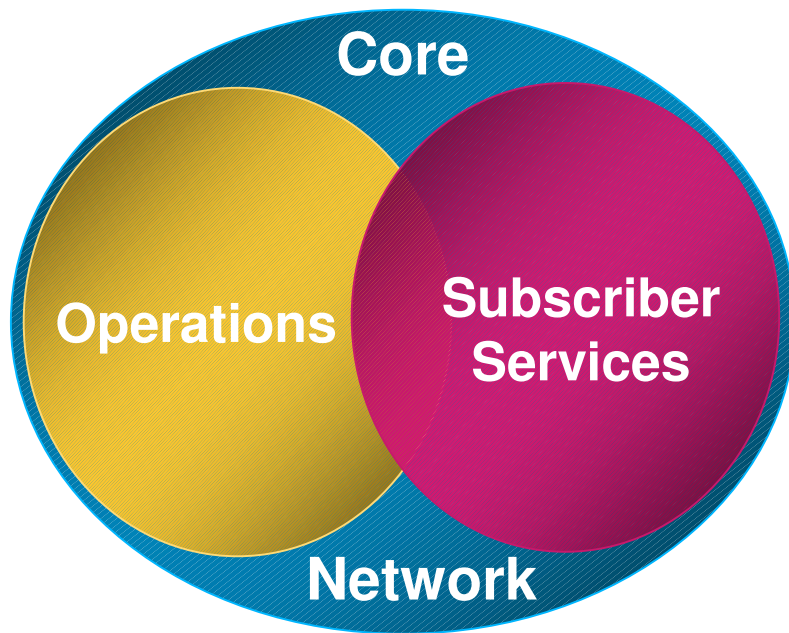
3

Move Up in the Decision-Making Process

- **Any decision on IT and networking investment is a business decision**
- **Motivations: business strategy & direction, NOT product speeds and feeds**
- **The network is relevant to ensure competitiveness and productivity**

4

Service Provider Business Objectives

Core

Operations

Subscriber Services
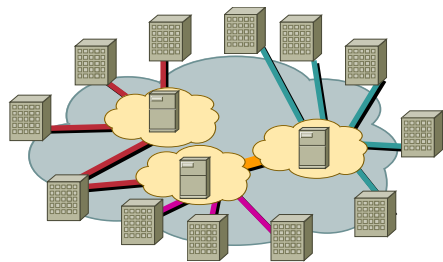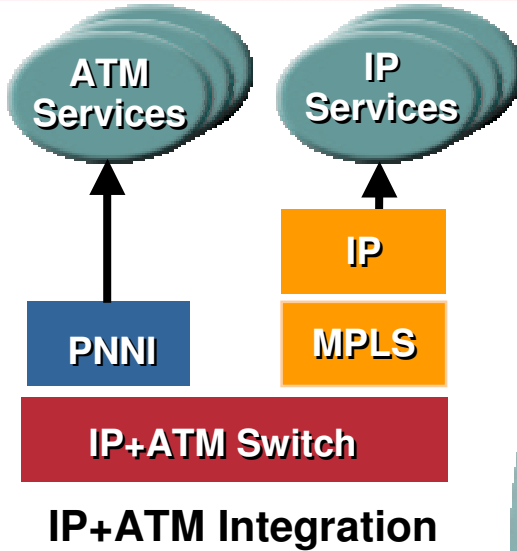
Network

- **Operations**: drive down operational costs

- **Subscriber Services**: sustain TDM to packet migration introducing new revenue generating services

- **Core Network**: strategic technology asset that supports SP business

5

Waves of Voice Infrastructure Investment (Conceptual Model)
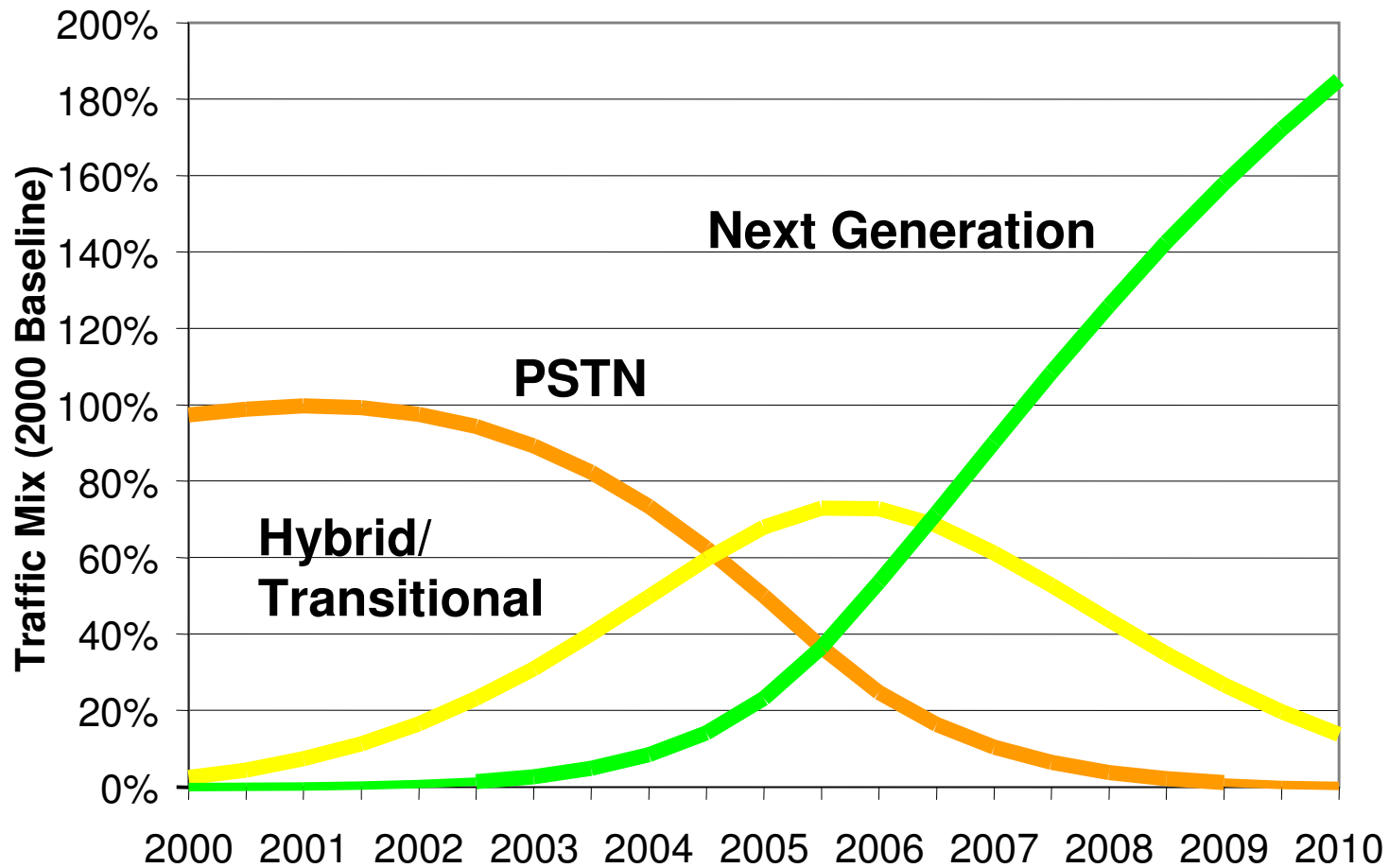
CORE: Enabling convergence and support of Next Generation voice with MPLS

ATM Services

IP Services

IP
MPLS

PNNI

IP+ATM Switch

IP+ATM Integration

Highly Reliable Transport independent

Protection Solution Reduction in CAPEX & OPEX

Optical Services

IP Services

IP
MPLS

O-UNI

IP+Optical Switch

IP+Optical Integration

Frame Relay

PSTN

PSTN

ATM

Multiservice VPNs: Build Once / Sell Many Network Based VPNs
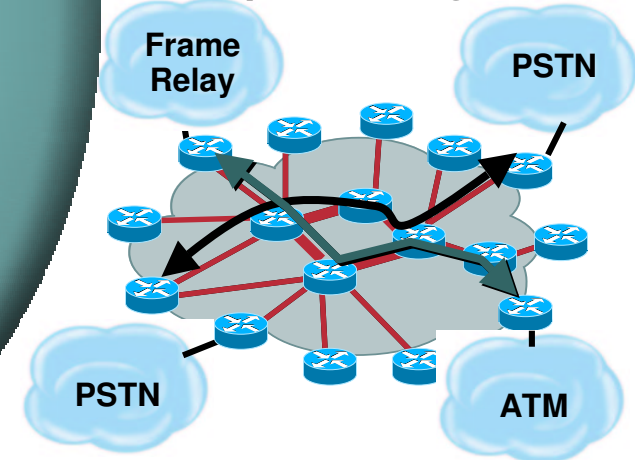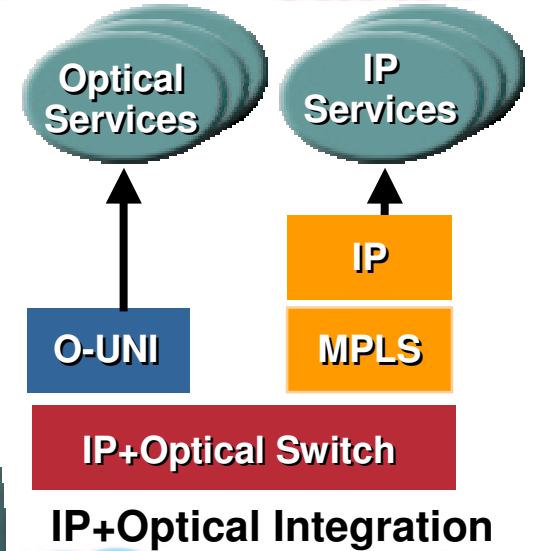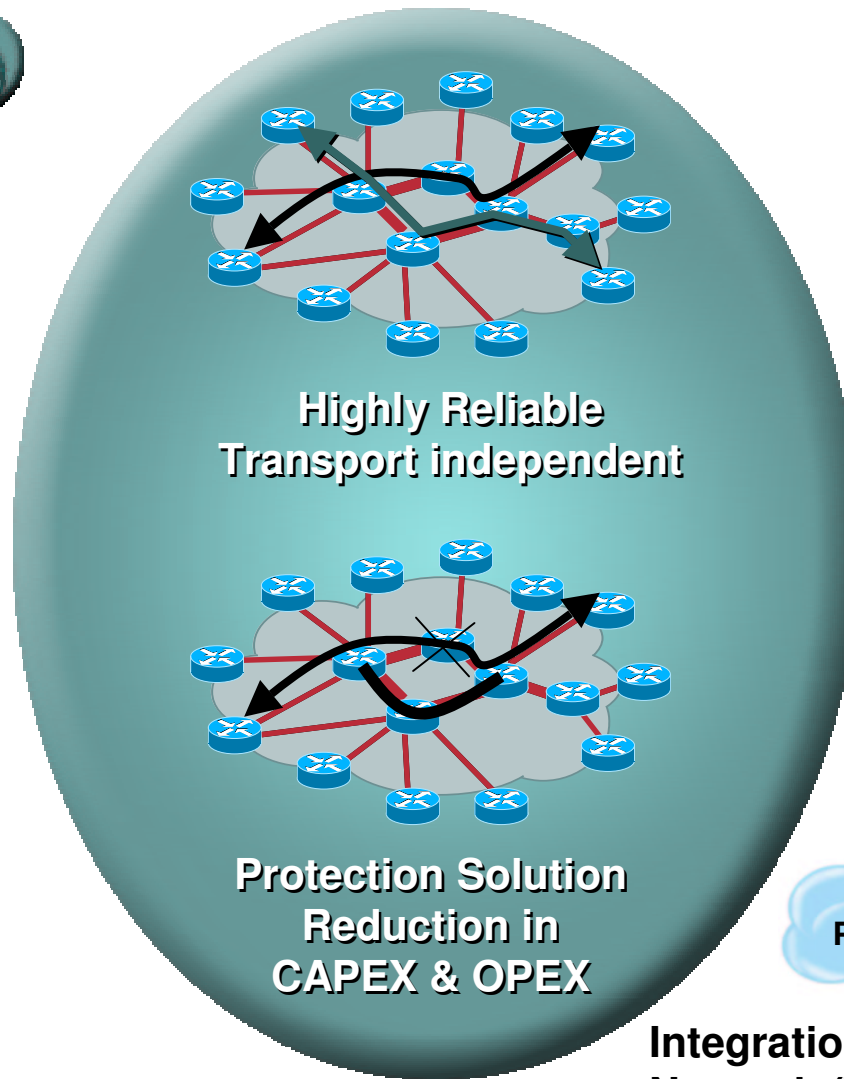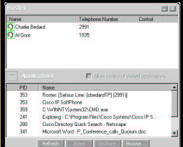
Integration for a Single Converged Network (Transit / L2 services)

EDGE: Broadband Access and TDM to IP-PBX migration

Innovation is edge driven

Collaboration

IP Phone Productivity Services

Cisco Unity VM & UM

Personal Assistant

ICM Intelligent Contact Manager

IP IVR & IP ICD

VPNs Revenue in WE

M$

6,000
5,000
4,000
3,000
2,000
1,000
0

2001 2002 2003 2004 2005

■ Data/Voice/Video
■ Data only

Pure IP   **IP Enabled/Converged**

IP enabled PBX

15.000
10.000
5.000
0

2000 2001 2002 2003 2004 2005 2006
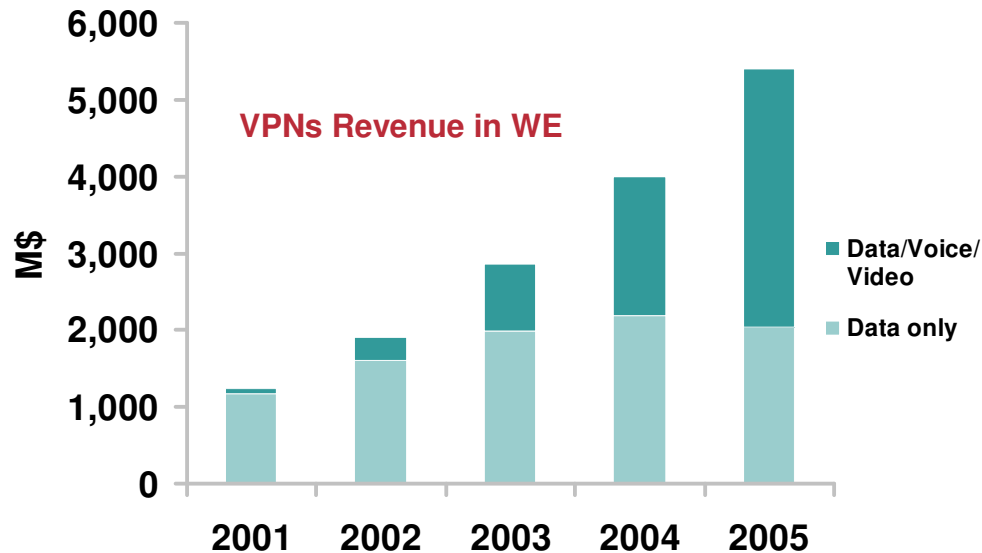
Source: IDC, Ovum 2001
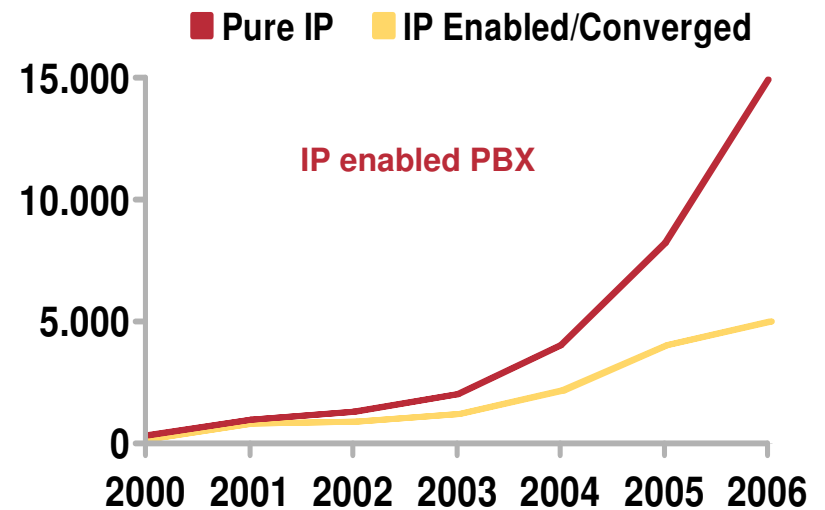
Synergy Research Sept 02

Carrier Class voice evolution

TDM

POTS

PRI

**VoIP
End points
'controlled'
by the SPs**

'VoIP PRI'

**TDM
Delivered
by VoIP**

Access

End User

**VoIP in
ESMB +
Managed Networks**

9
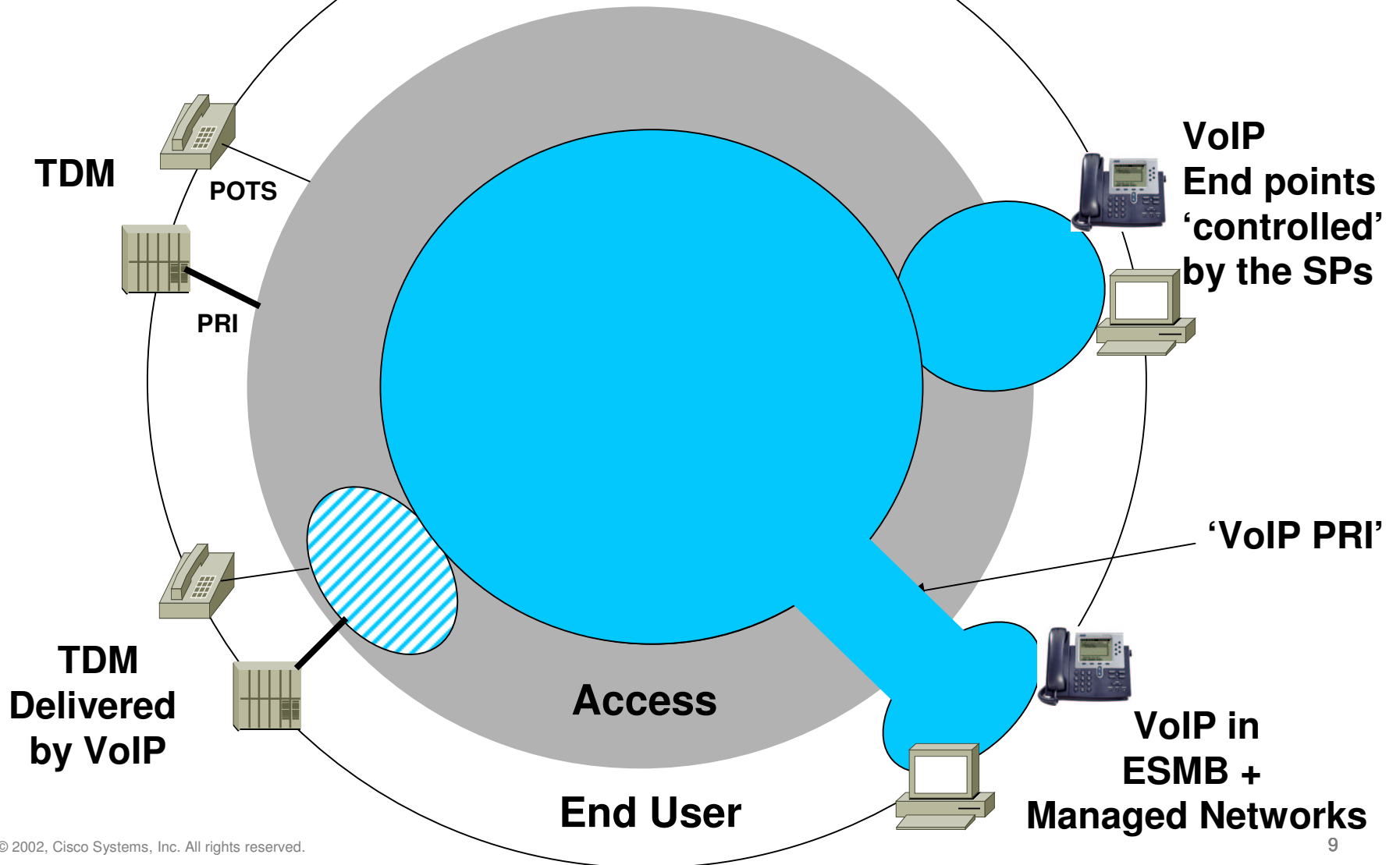
Complementary Approaches

Inside-Out Approach

- Start with network core and build out to edge
- PSTN element *replacement* is the operative paradigm
- Capture the network, then the subscriber
- Endpoints are dumb
- Centralized call control
- PSTN-centric architecture
- Development focus on legacy integration
- Opex reduction-driven

Outside-In Approach

- Start with network edge and build in to core
- PSTN service *substitution* is the operative paradigm
- Capture the subscriber, then the network
- Endpoints are intelligent
- Distributed call control
- IP-centric architecture
- Development focus on new services
- Profitable revenue-driven

VoIP services taxonomy

```
                              Voice Services

         Edge Services                          Transport Services

  Local Services    Managed Services        Wireline          Wireless
```

Local Services:
- VoIP over CABLE
- Voice over DSL
- VoIP over Metro ETHERNET
- VoIP over Leased lines
- VoIP local loop + V5.2
- Class 5 Replacement

Managed Services:
- Business Voice Access (virtual PRI)
- Multiservice over VPN
- Managed IP-PBX
- IP Centrex

Wireline:
- Global Long Distance
- Class 4 Tandem Replacement

Wireless:
- Wireless Trunking
- Wireless Cell Site Aggregation
- Wireless Transit

VoIP Reference Network Architecture
Distributed switching

ASP

Internet

Infrastructure

IN LNP LI LCR Billing

Mobile Termination

PGW SLT

GSM UMTS

MG

H.323
SIP

PGW

Enterprise
IP Tel

IP

Carrier
Infrastructure

GK

SIP

GK

SIP

GK

Multiservice
VPN

GK

PSTN Termination

PGW SLT

PSTN

MG

Residential
VoIP over BB

GK
MGC
Proxy

IP

Circuit to Packet

Advanced Services

IN Applications

SCP

PSTN GW Call Control

Adv Routing   Voice Portal   Directory

Transit Exchange 'Class 4'

SS7

Centralised Call Control

'Hosted IPT'

Residential Line Side

'Virtual PRI'

SIP

GK

Local Exchange 'Class 5'

Access

Narrowband Access

Trunk GATEWAY

Broadband Access

ETTx/Cable/DSL   IP VPN

V5.2

RCU

CPE End Users

POTS

Centrex

Private or Managed PBX

POTS

Bus. VoIP Access

Private or Managed IP Telephony

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Cisco.com

The business rationale

Why Enterprise and SMB migrate to IP Telephony and convergence

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ENTERPRISE: Managed Multiservice VPN
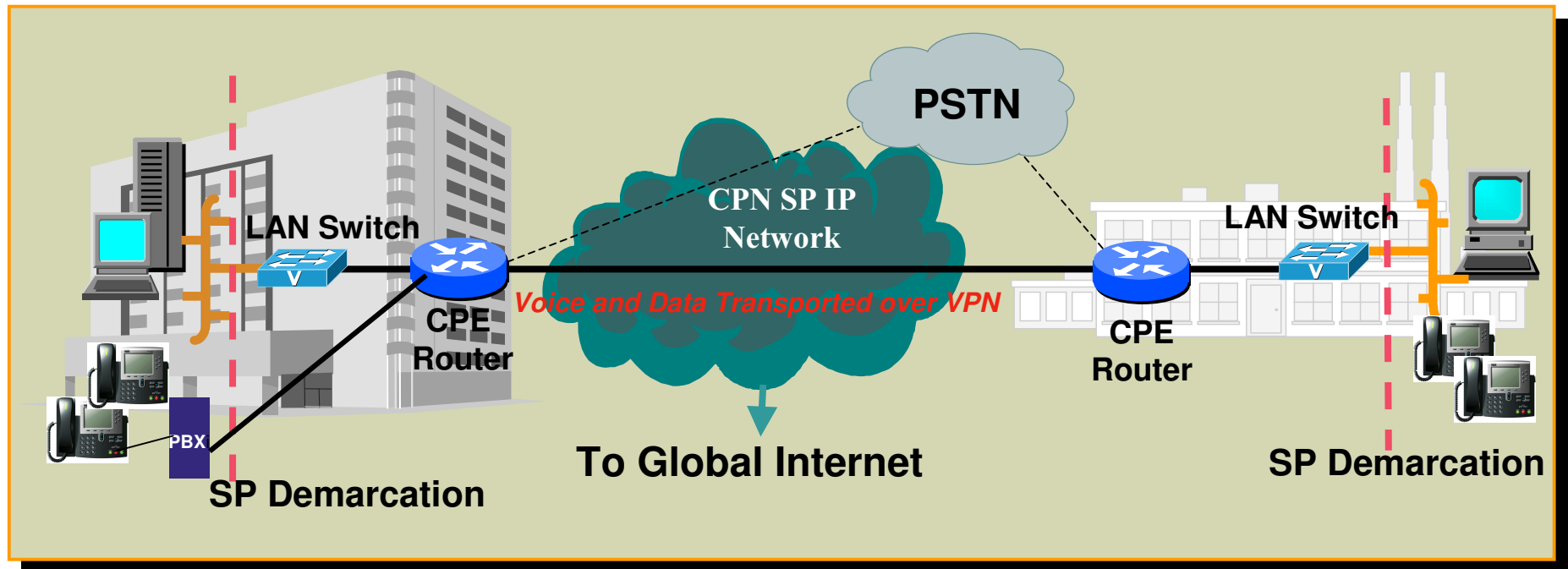
- Voice and data **converge** over a single IP VPN network

- Voice IP PBX functions embedded in the access router (ITS)

- Access router provides Security and VPN access functions configures VOIP interface and features in managed Cisco Router

Why Enterprise and SMB migrate to IP Telephony and converged networks

- A **converged** voice, video and data network reduces infrastructure costs

  - Reduced infrastructure expense for new sites

  - Substantial savings in remote site networking equipment costs with centralized call processing deployment model

  - Reduced equipment upgrade/replacement costs versus maintaining multiple networks

 - Phone and PC share single Ethernet cable drop resulting in 50% reduction in # of wiring drops (**$150/drop**)

- A **converged** voice, data and video network reduces network carrier costs

  - Reduction in international and domestic inter-office **calling charges**

  - Reduction in the number of external communication lines

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Why Enterprise and SMB migrate to IP Telephony and converged networks

- **A converged voice, data and video network reduces ongoing network administration and support costs**
  - Improved productivity of network support staff
    - **10-40% productivity improvement post data/voice convergence**
    - Shifts IT staffs focus from administrative to value-added
  - Improved productivity of consolidated voice and data help desk
  - No-Cost Moves, Adds, Changes (MAC's)
    - Performed by user, saves **$75–$125 per MAC**
  - Reduced cost of outsourced contracts for on-site support and maintenance
  - Reduced branch office administrative expenses via **centralized call processing deployment model**
  - Reduced ongoing network design, project management and implementation costs

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Why Enterprise and SMB migrate to IP Telephony and converged networks

- **A converged voice, data and video network lowers support costs and enhances the productivity of mobile workers**

  Extension mobility feature of Cisco CallManager enables shared workspace office environments

  Increases the number of employees per office thereby reducing real estate and facilities costs

  A **typical 2:1 worker to workspace ratio can reduce real estate and facilities costs by 30-50%**

  Virtual at home office extension provides complete network functionality at home or in the office

  Increases telecommuting productivity

  Reduces telecommuting support costs

  $1500 on average PBX versus $100 on converged network

  Ubiquitous network access and converged applications provides the increasingly mobile worker easy access anywhere, anytime

Economics of Voice over Broadband

Voice over broadband: an example

Business Access

Residential Access

Set-Top Box

Access Switch

GE

Distribution Switch

Main POP

Mini POP

GE

STB

VoIP Home Access GWY

Subscriber Management System				
DHCP Server	Policy Server	Network Provisioning	Self-Care	Other Functions

Core Switch

GE

GE

Core

Distribution

Trunk Gateway

Basement Access Device

SS7 Interconnect

Internet

Access

Video Servers

PSTN

Customer Premise

20
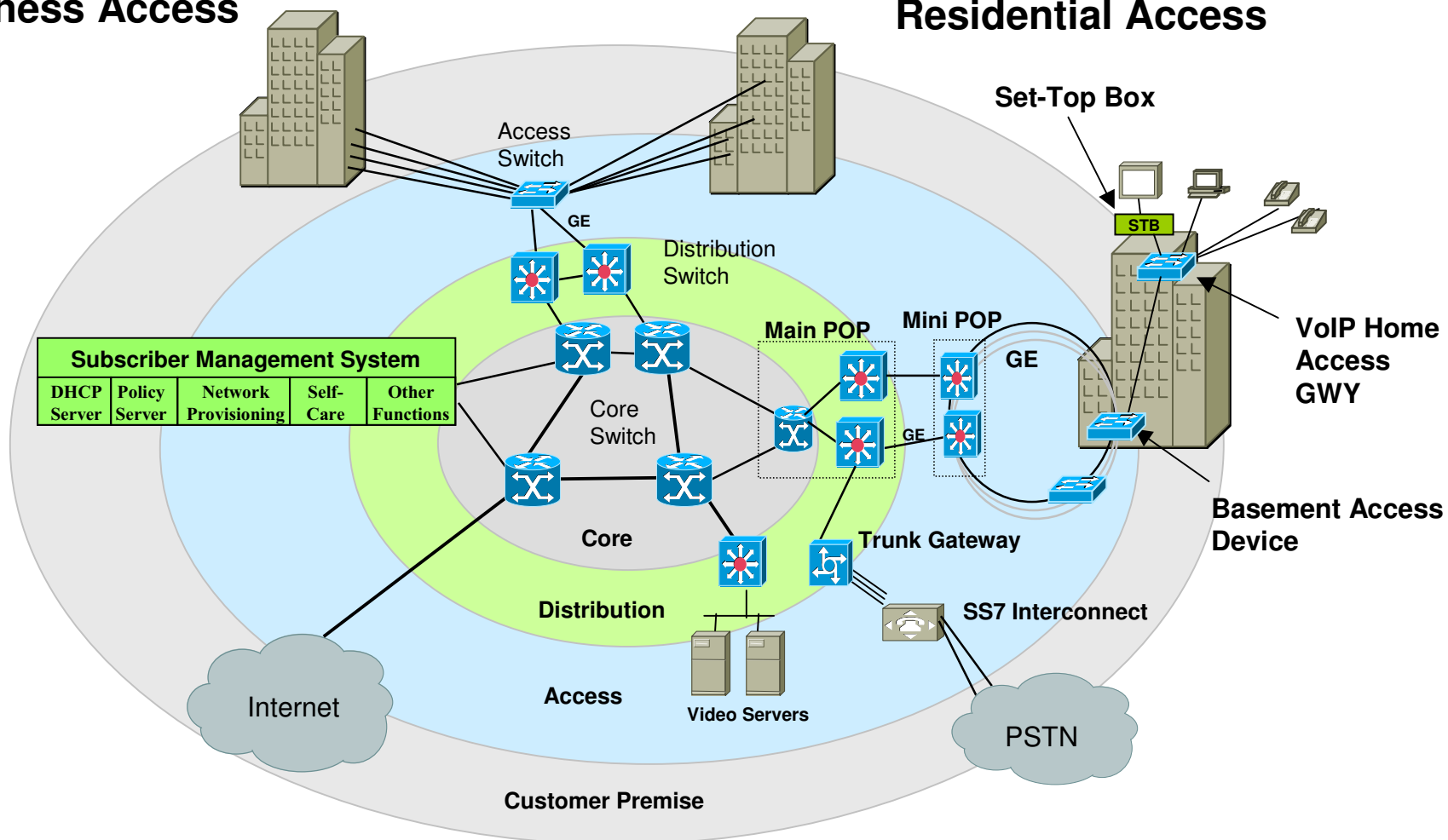
Why VoIP Class 5 services: the case of Metro Ethernet fiber access

USD Millions; Percent

Cisco.com

Assuming Start Up In year 2002

Coverage of city (surface)

	Residential	Business	Both
100%	NPV* = -45 IRR = 9% CF positive = 2007 Financing = 220	NPV* = 94 IRR = 23% CF positive = 2007 Financing = 76	NPV* = 184 IRR = 22% CF positive = 2007 Financing = 188
Top 50%	NPV* = -49 IRR = 7% CF positive = 2006 Financing = 172	NPV* = 92 IRR = 24% CF positive = 2006 Financing = 64	NPV* = 158 IRR = 22% CF positive = 2006 Financing = 158
Top 25%	NPV* = -51 IRR = 5% CF positive = 2007 Financing = 117	NPV* = 79 IRR = 26% CF positive = 2005 Financing = 40	NPV* = 124 IRR = 23% CF positive = 2005 Financing = 102

Customers addressed

Best Target If access to cash is available

Best Target If access to cash is Limited..

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Very effective to bundle voice and data while full triple play becomes less important at small coverage

USD Millions; Percent

Coverage of city (surface)

	Only data	Data/voice	Data/voice/video
100%	NPV* = 103 IRR = 18% CF positive = 2007 Financing = 193	NPV* = 165 IRR = 22% CF positive = 2007 Financing = 164	NPV* = 184 IRR = 22% CF positive = 2007 Financing = 188
Top 50%	NPV* = 93 IRR = 19% CF positive = 2006 Financing = 156	NPV* = 148 IRR = 23% CF positive = 2006 Financing = 134	NPV* = 158 IRR = 22% CF positive = 2006 Financing = 158
Top 25%	NPV* = 77 IRR = 19% CF positive = 2006 Financing = 101	NPV* = 121 IRR = 24% CF positive = 2005 Financing = 85	NPV* = 124 IRR = 23% CF positive = 2005 Financing = 102

EXISTING ATTACKER

RESIDENTIAL & BUSINESS

Services offered

17
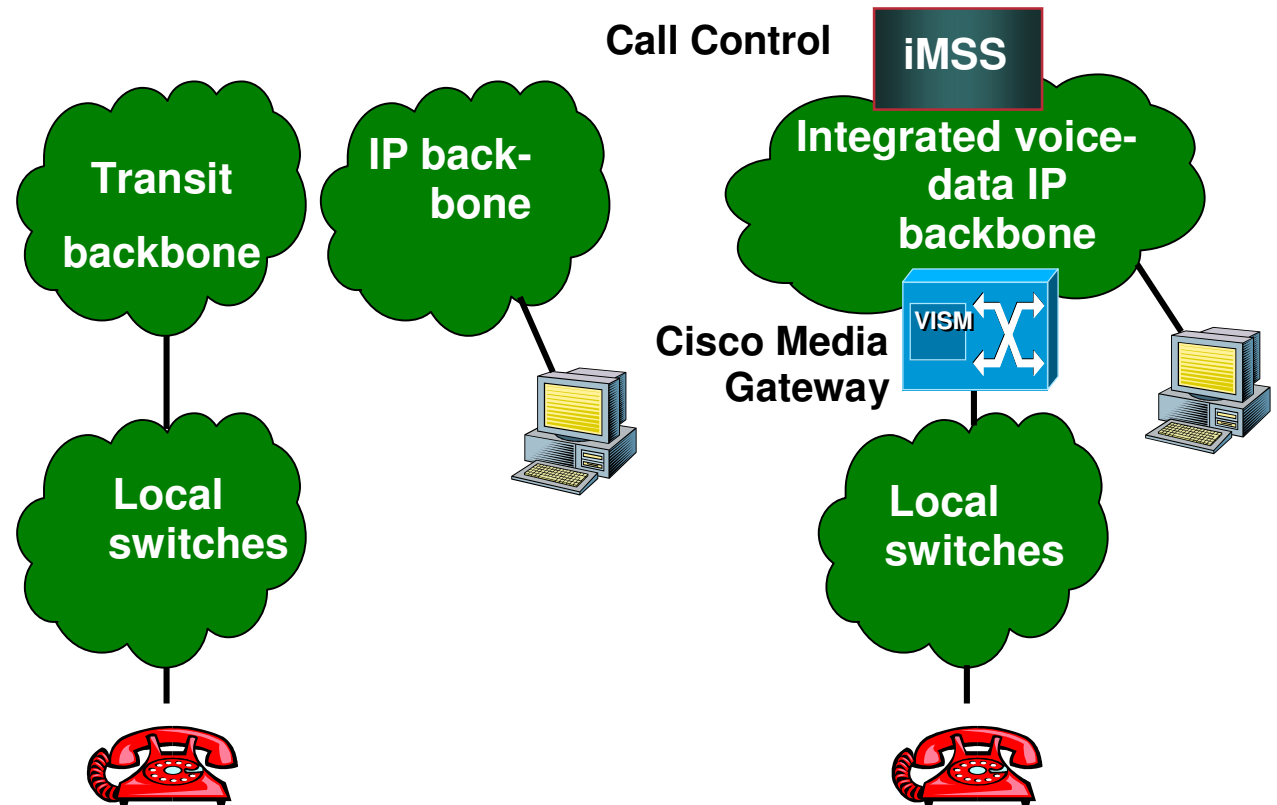
Economics of Voice packet transit

Class 4 (Voice/Data Integrated Backbone)

- **From …**
- **…To**

- **Key idea**

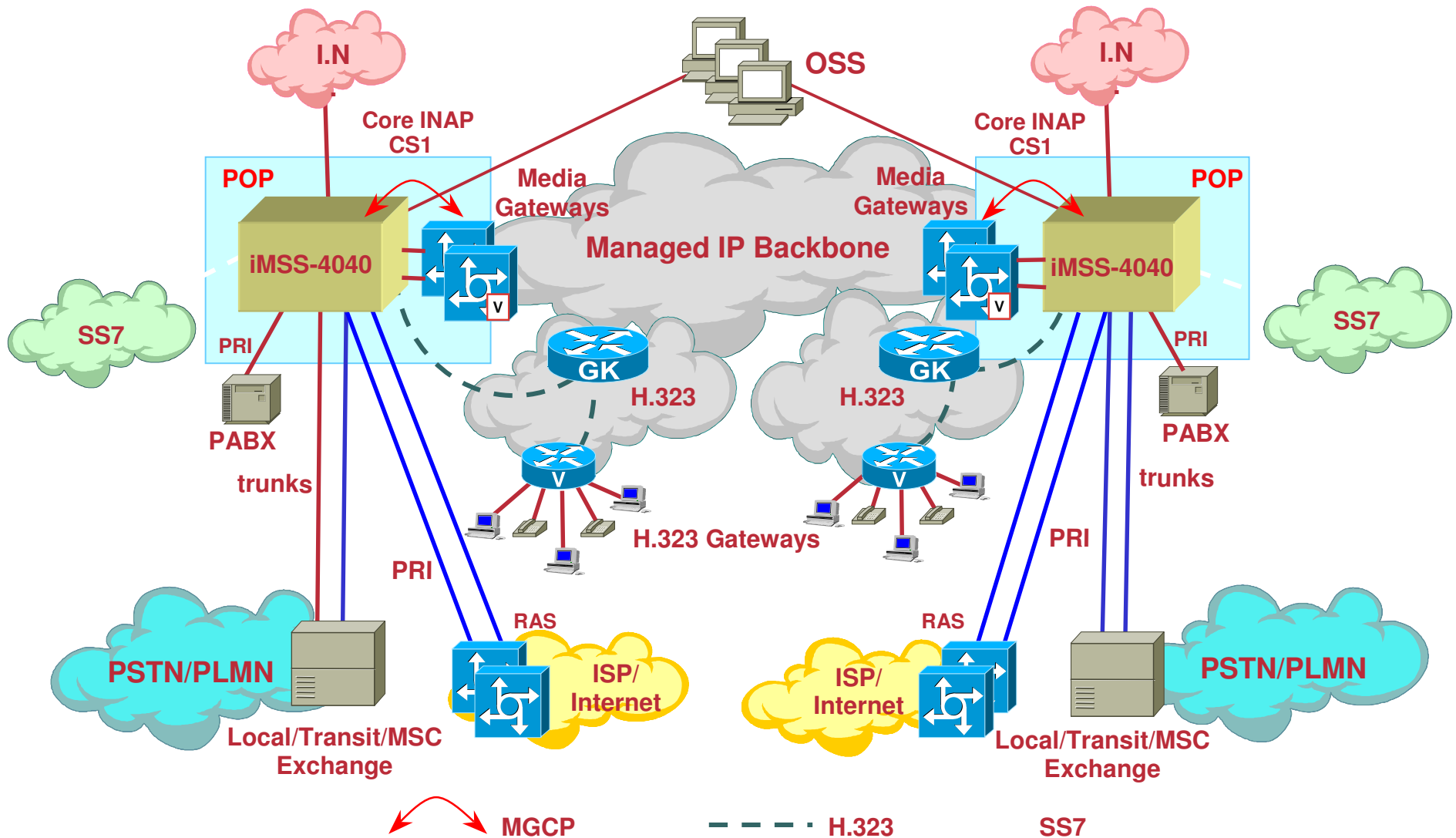- **Replacement of current Transit TDM switches by iMSS Class 4 solution* allows integration of voice and data at the backbone level**

Call Control

iMSS

Transit backbone

IP back-bone

Integrated voice-data IP backbone

VISM

Cisco Media Gateway

Local switches

Local switches

Composed of Italtel softswitch and Cisco Gateways
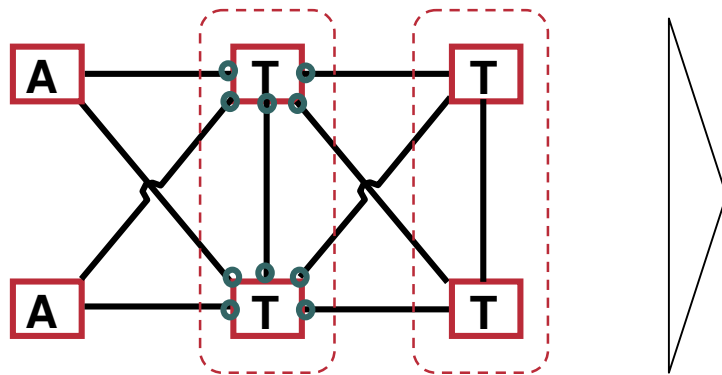
Voice/Data Integrated Backbone - details

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Multiservice Voice Transit Economics

Before

After

Main components of <u>CAPEX</u> savings:

- **Transmission savings**
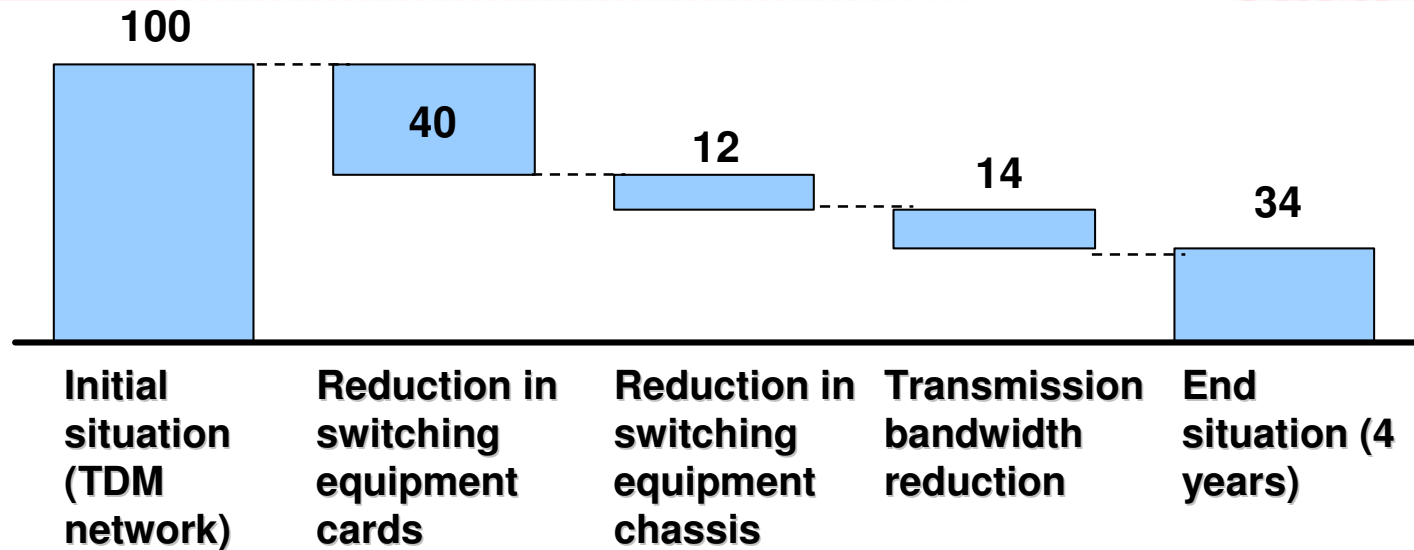- **Switching savings**

Main components of <u>OPEX</u> savings:

- **Operation and Maintenance**
- **Personnel**
- **Power consumption**
- **Use of Space**

<u>In production w/billions of call minutes per annum !</u>

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C4 replacement ECONOMICS: Opex and Capex savings

OPEX SAVINGS

100
40
12
14
34

| Initial situation (TDM network) | Reduction in switching equipment cards | Reduction in switching equipment chassis | Transmission bandwidth reduction | End situation (4 years) |

CAPEX SAVINGS

100
7
12
81

| Initial situation (TDM network) | Transmission savings | Switching savings | End situation (4 years) |
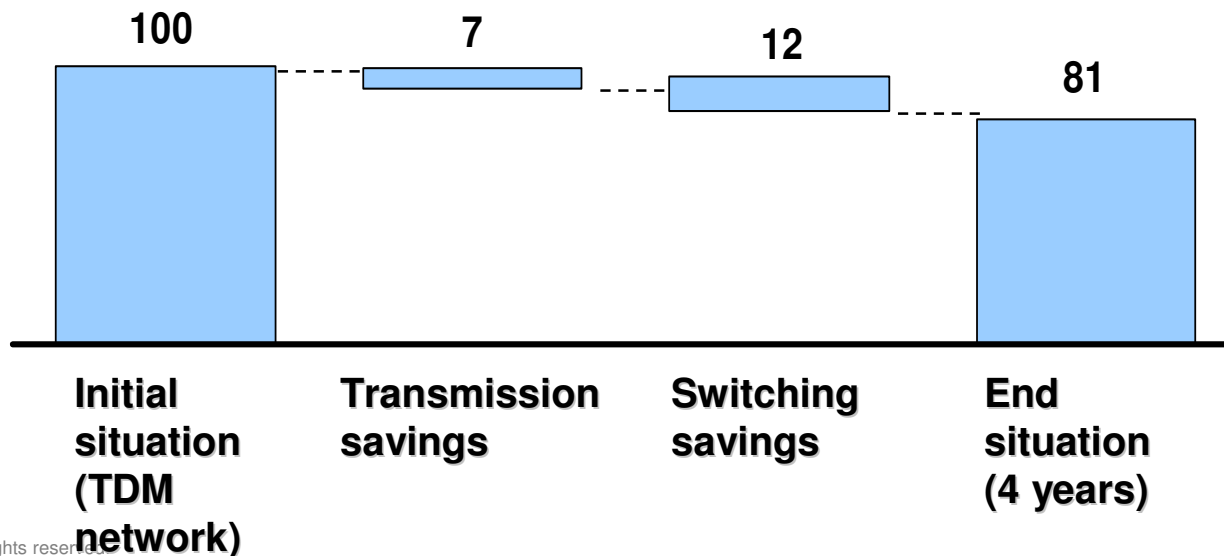
OPEX savings are driving Class 4 Replacement deployments

"We chose VoIP because we could **save two thirds of our transit operating expenses** and give our customers and shareholders a better service.

By the end of 2003, we estimate that **80% of Telecom Italia's transit voice traffic will travel over the Cisco Systems** and Italtel Multi-service solution.

We chose Cisco Systems and Italtel because they had the most reliable solution. **Cisco Systems has more experience in IP technology and VoIP than any other infrastructure company** and the partnership with Italtel provides additional expertise in the switching carrier environment.

Cisco Systems and Italtel also used our existing infrastructure, which meant we didn't have to reinvent the wheel and could save money on implementation"

Stefano Pileri, Head of Telecom Italia's domestic network

ROME, Italy, 9 October 2002

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Benefits of SS7oIP
In both Mobile and Fixed Networks
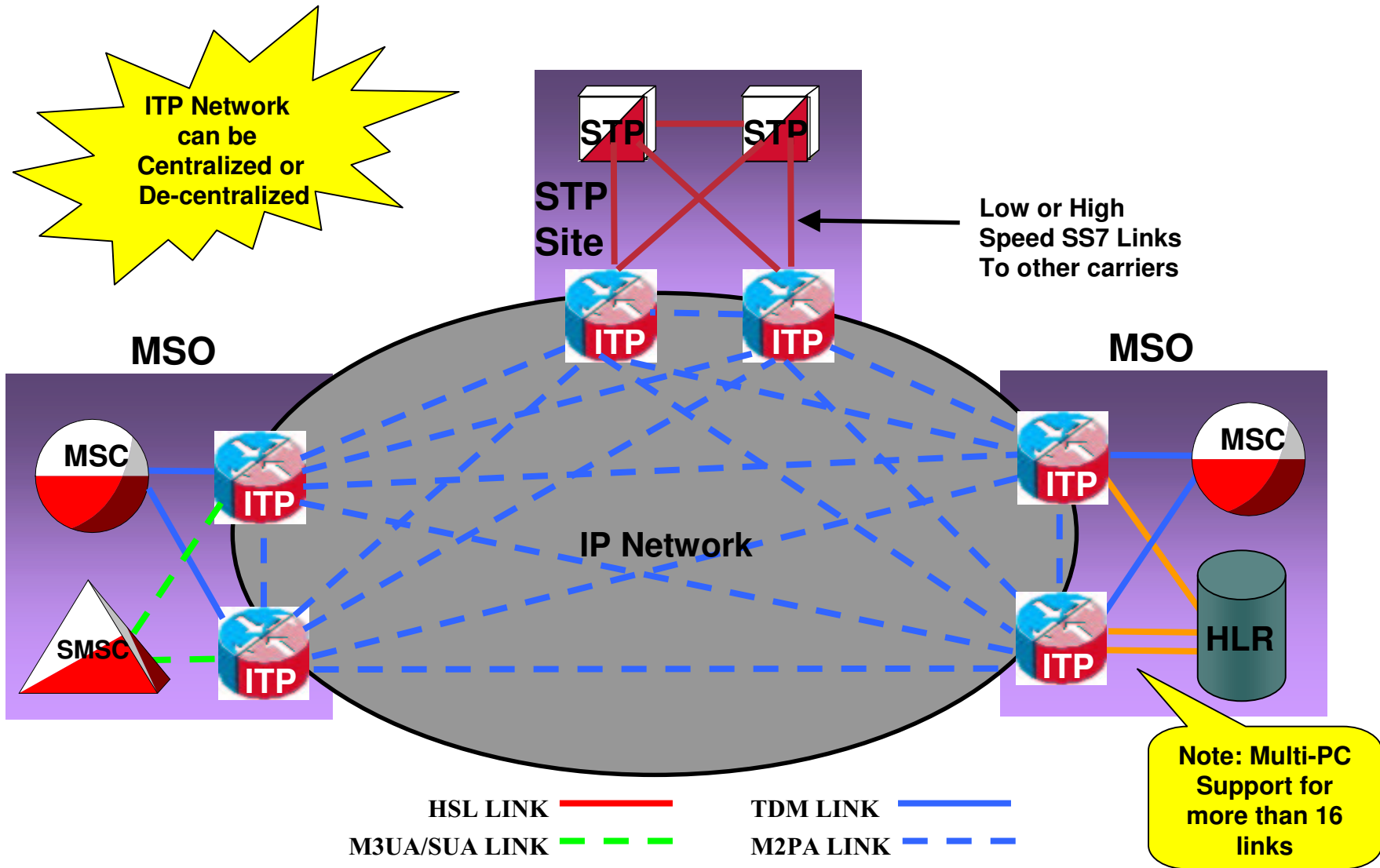
Financial

Replace TDM links with cost efficient IP

Reduce STP Port Utilization (scalability)

Reduced POP Footprint

Provides IP investment protection

Strategic

Position IN infrastructure for emerging IP-based services and applications

Sigtran = Open Standards

Provides smooth evolution path to 3G and Fixed NGN

SS7 Network Transport
SS7 Signaling Offload

ITP Network can be Centralized or De-centralized

STP

STP

STP Site

Low or High Speed SS7 Links To other carriers

MSO

MSO

ITP

ITP

MSC

MSC

ITP

ITP

IP Network

HLR

SMSC

ITP

ITP

Note: Multi-PC Support for more than 16 links

HSL LINK	———	TDM LINK	———
M3UA/SUA LINK	— — —	M2PA LINK	– – –

SSoIP Return On Investment (EXAMPLE)

	STP	Cisco ITP
One-time Equipment		
Annual License/Maintenance		
Annual Recurring Network (E1's)	$ 576,000.00	$ 288,000.00
First year Total Expense	$ 11,520,000.00	$ 2,456,760.00
Annual Recurring Expense	$ 2,400,000.00	$ 385,560.00

First Year Cost Avoidance/Savings	$ 9,063,240.00
Annual Recurring Savings	$ 2,014,440.00

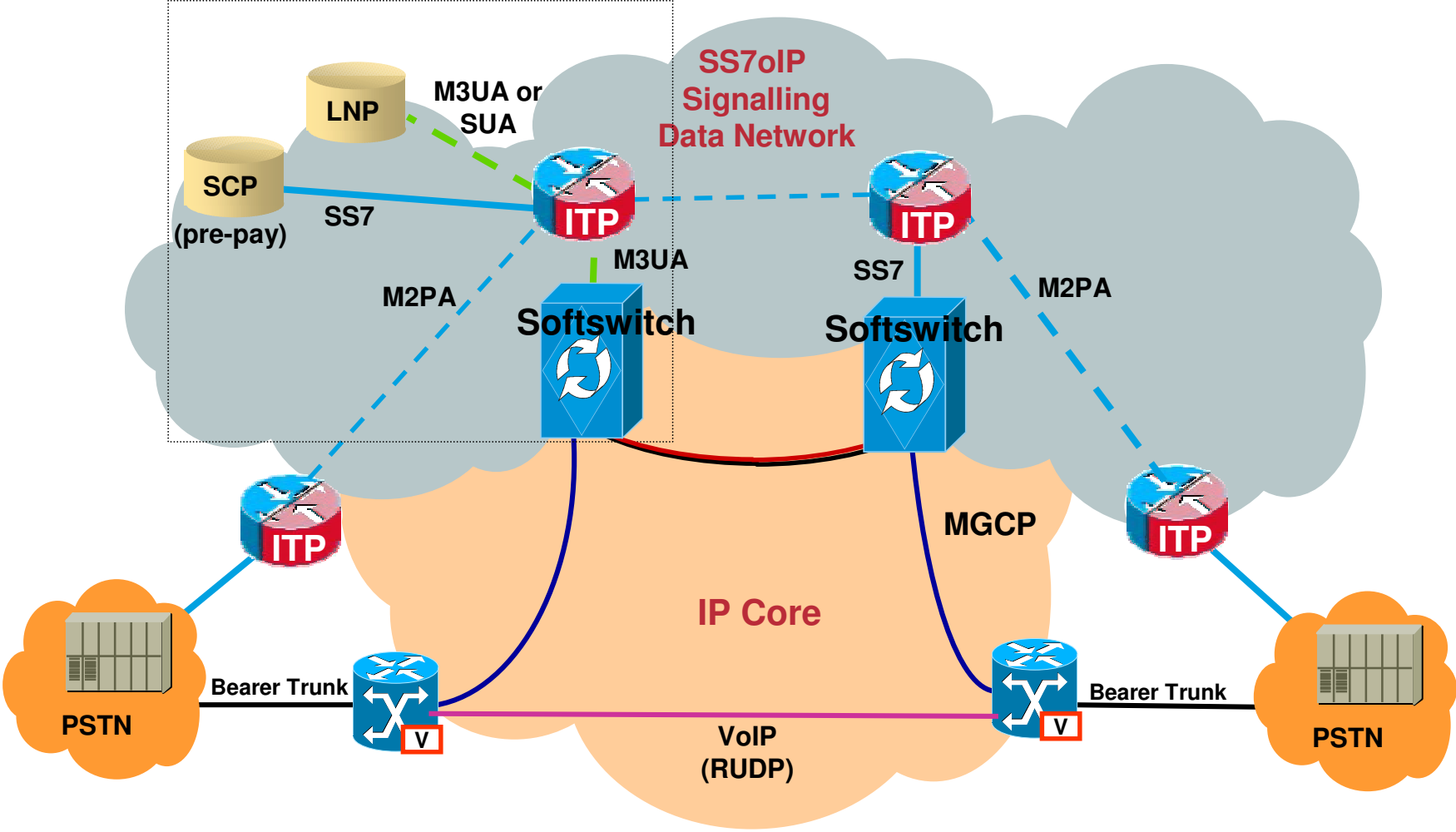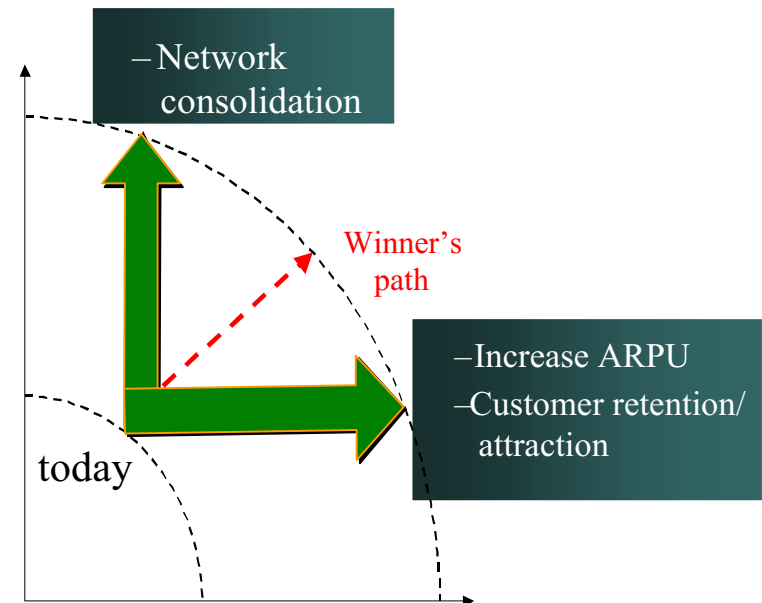|			
ROI based on First Year Cost Avoidance/Savings	0.21 years (2.5 months)	ROI based solely on reduced annual recurring expenses	1.18 years (14.2 months)

PSTN Voice Transit Offload
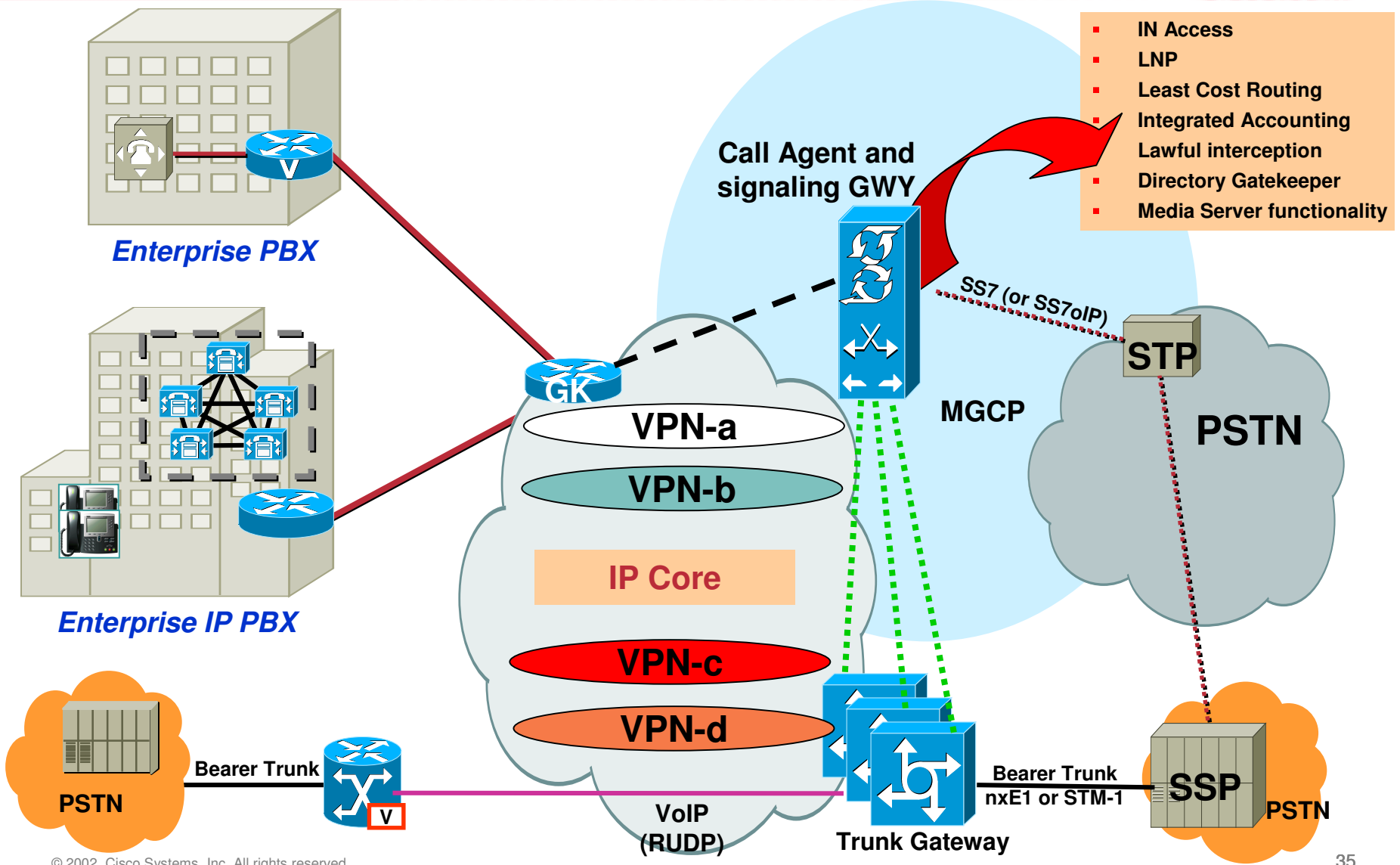## Integrated Voice and Signalling over IP

Achieving ARPU growth and Opex savings over the same network

Multiservice backbone to support Opex and ARPU drivers

1. **Business Voice and PSTN transit traffic over the same IP backbone ➔ OPEX + ARPU needs**

2. **Integrated Call Control for**

   - **Packet transit PSTN traffic +**

   - **call routing for business Voice VPN**

   - **signalling gateway**

3. **Sell long distance H.323 VoIP minutes over multiservice backbone**

4. **Address Class 5 replacement by gathering V5.2 access into same call control (multi-vendor access network)**

5. **Create Virtual Transit Network "VPN" for Mobile Operators**

–Network consolidation

Winner's path

–Increase ARPU
–Customer retention/ attraction

today

Business Voice and PSTN transit over the same IP QoS backbone

Cisco.com

- IN Access
- LNP
- Least Cost Routing
- Integrated Accounting
- Lawful interception
- Directory Gatekeeper
- Media Server functionality

Enterprise PBX

Enterprise IP PBX

Call Agent and signaling GWY

SS7 (or SS7oIP)

STP

GK

VPN-a

VPN-b

IP Core

VPN-c

VPN-d

MGCP

PSTN

PSTN

Bearer Trunk

VoIP
(RUDP)

Bearer Trunk
nxE1 or STM-1

SSP

PSTN

Trunk Gateway

Conclusions

- **Converged IP transport is ready to support billed Voice traffic: Business Voice, VoBB and PSTN transit traffic**

- **Economics for NGN migration proven on transit side, primarily OPEX savings**

- **Economics for Business VoIP migration clear to Enterprise, business VoIP services rolled out by Service providers as REVENUE growth areas**

- **Compelling reasons for NGN investments are not evident to many Telco's, while some innovator already proven clear Opex savings with NGN**

- **More robuts business case comes with convergence of PSTN transit and Business VoIP over the same multiservice backbone**

- **VPN's allow to re-sell voice transport services and maximise ROI**