



Cisco and the
Service Provider IP
Next-Generation Networks
(IP NGN) Journey—
Enabling the Transition from
Basic Highway to Value-Add,
Personalized Tollway



30th of April 2007

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SP SEM

Agenda

Service Provider Drivers

IP NGN Overview

Application Convergence

Service Convergence

Network Convergence

Cisco IP NGN Leadership

State of the Industry

Economic Drivers Prevailing—For Some, Survival at Stake



Hyper-Competition Increasing

Overlap of players increasing, not number of customers



Income Statements “Unbalanced”

Traditional revenue streams flat or down due to technology substitution, but not operating expenses



Broadband Promise Under-Realized

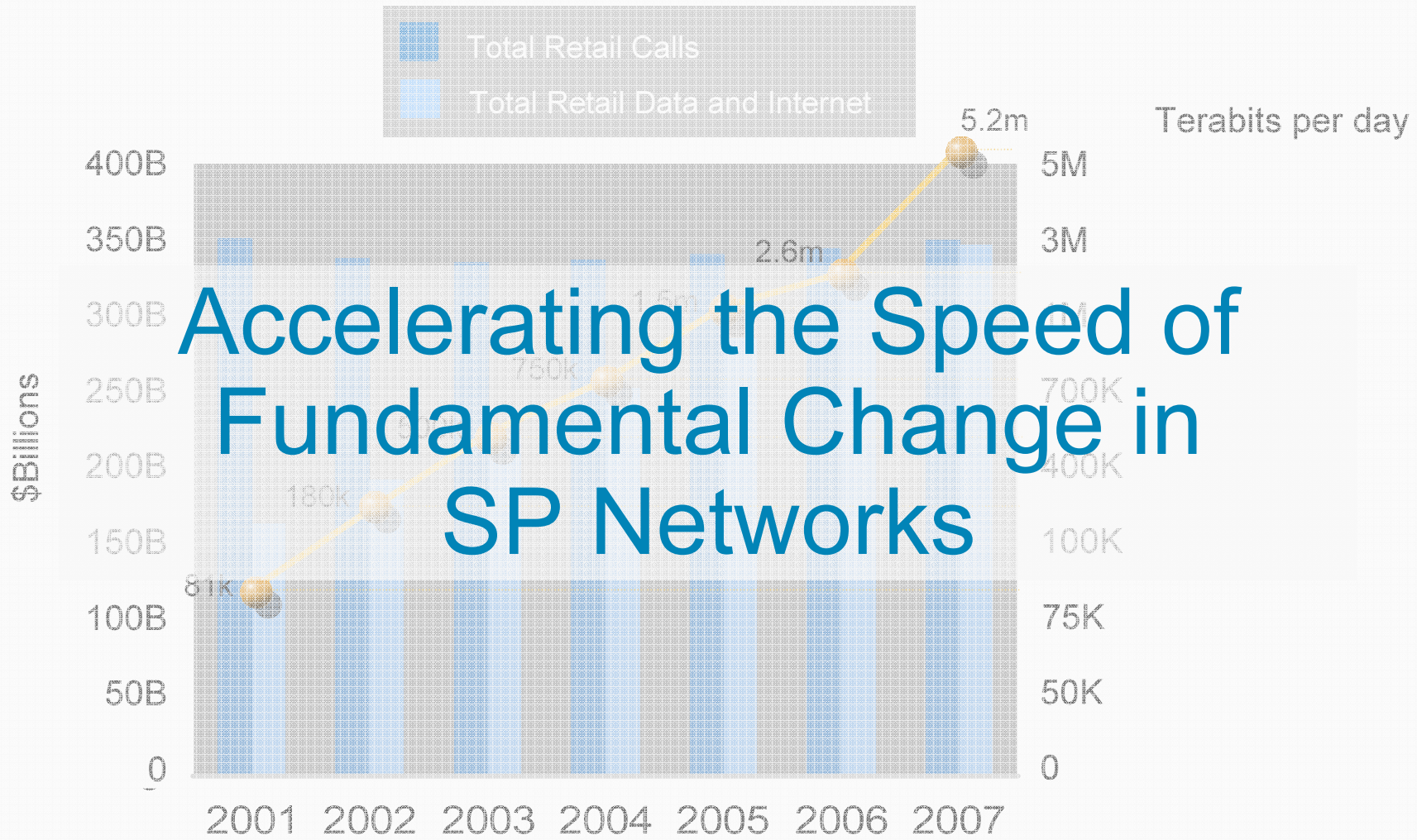
Growth in demand for bandwidth, not yielding growth in revenue



Customer Expectations Soaring

Want to pay less, not get less

Service Provider Business Model Dilemma



Represents a compound annual growth rate (CAGR) of 95.6% from 2002-2007

To Address These and Other Challenges Service Providers are Driving Towards...

Services

Differentiation
Loyalty
Revenue

Efficiencies

OPEX
CAPEX
Profits

Control

Service
Network
Business

IP

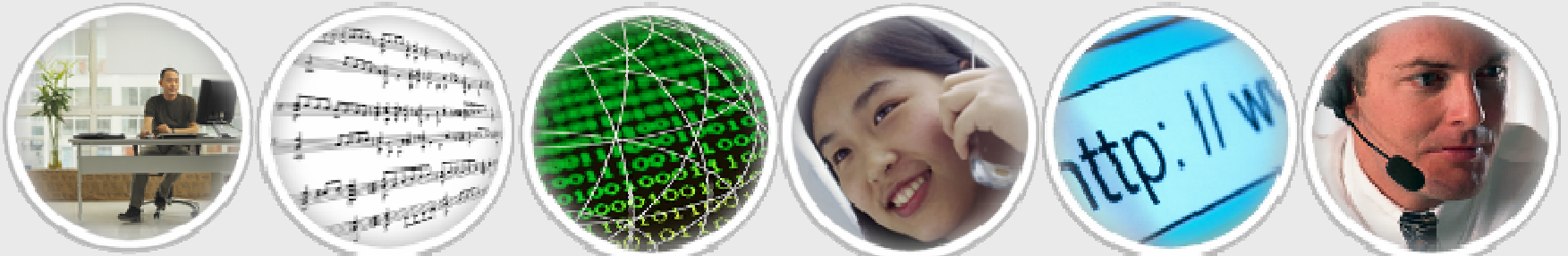
Intelligence
Flexibility
Adaptability

Cisco Service Provider Vision Providing Intellegint solution for Service providers

Connecting Customers with Services,
Services with Networks,
and Networks with Each Other



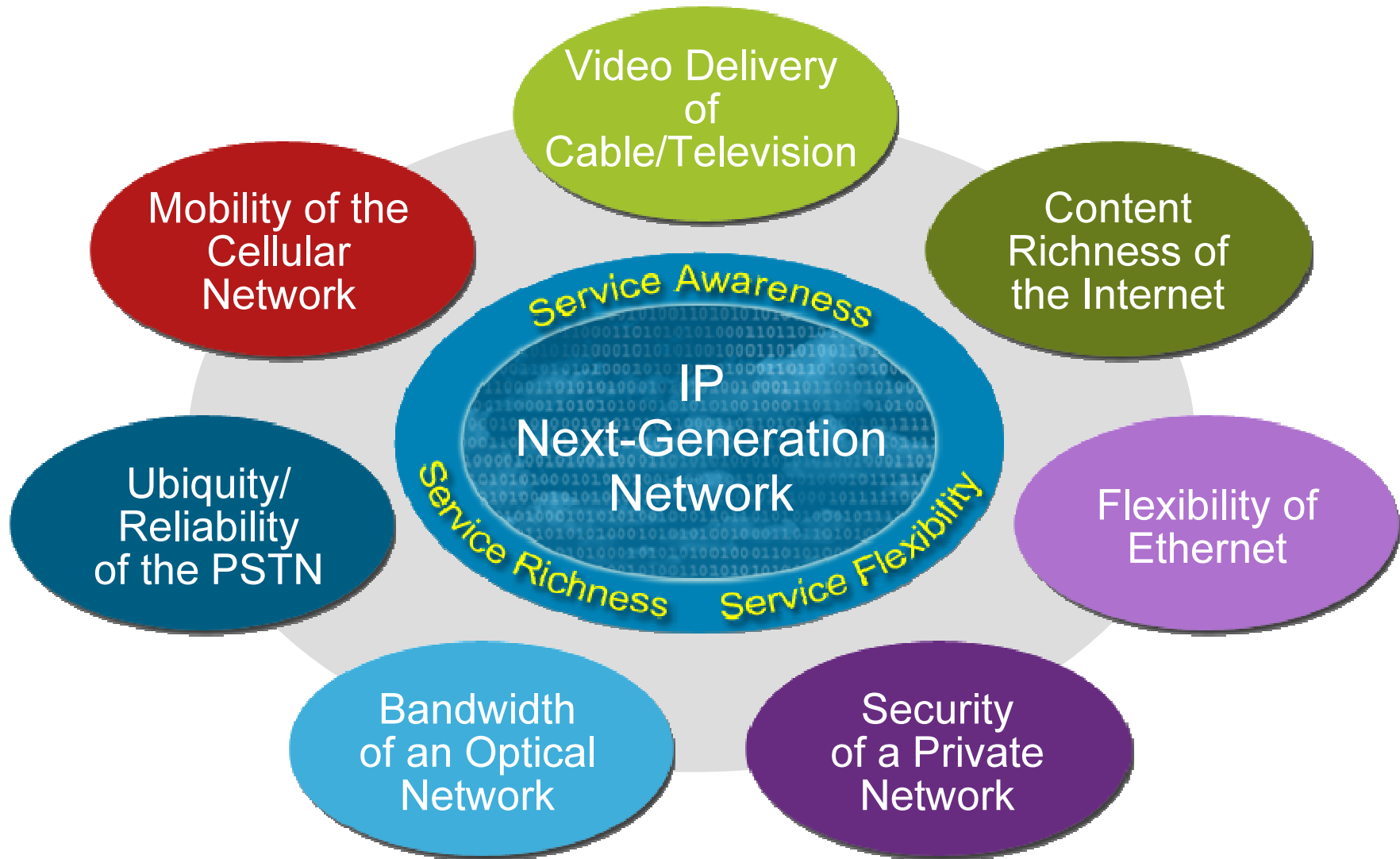
IP Next-Generation Network



VPNs Content Transport Mobility Internet Voice and Video

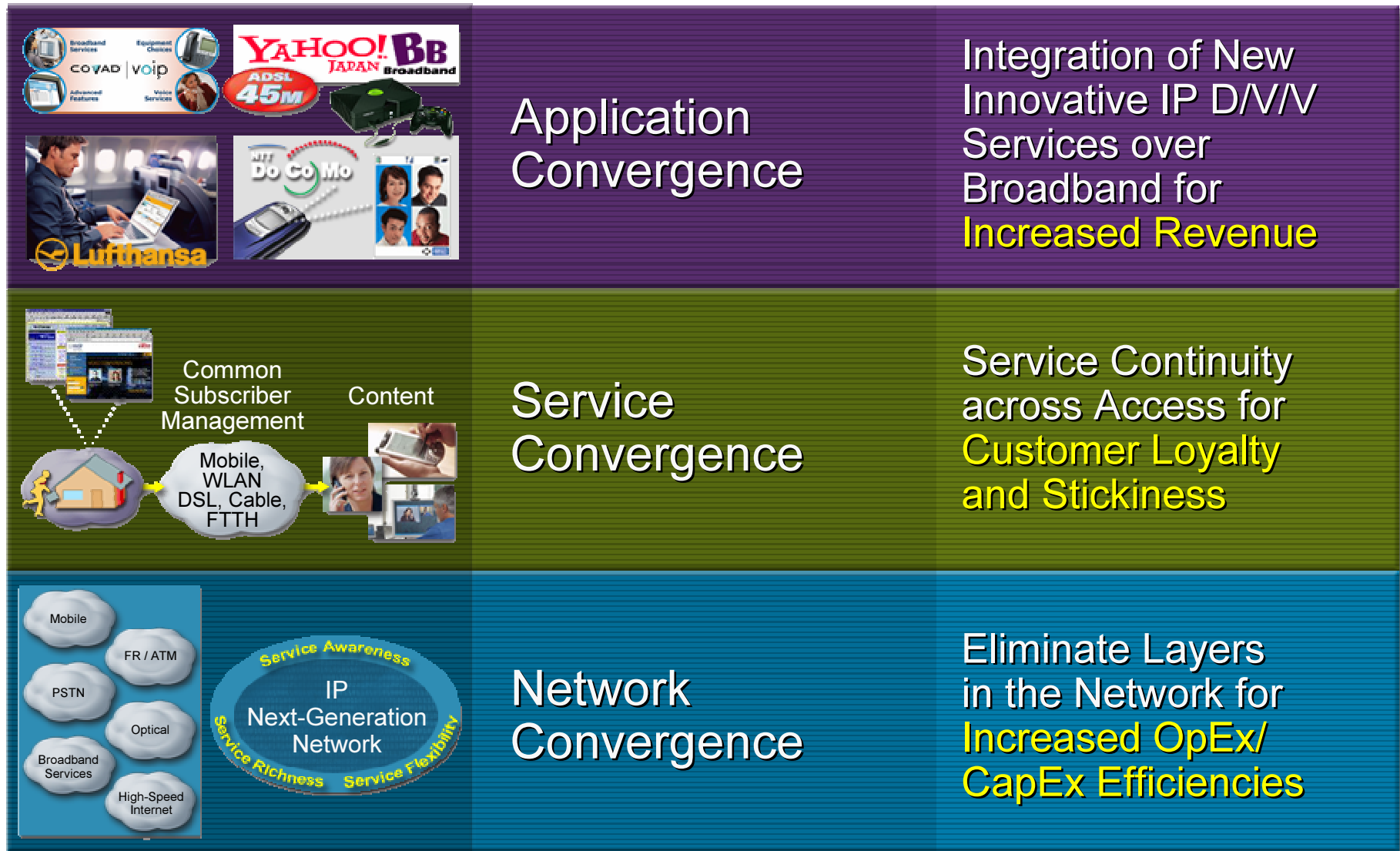
Characteristics of an Ideal Network

Fusing the Best of Today's Networks and More



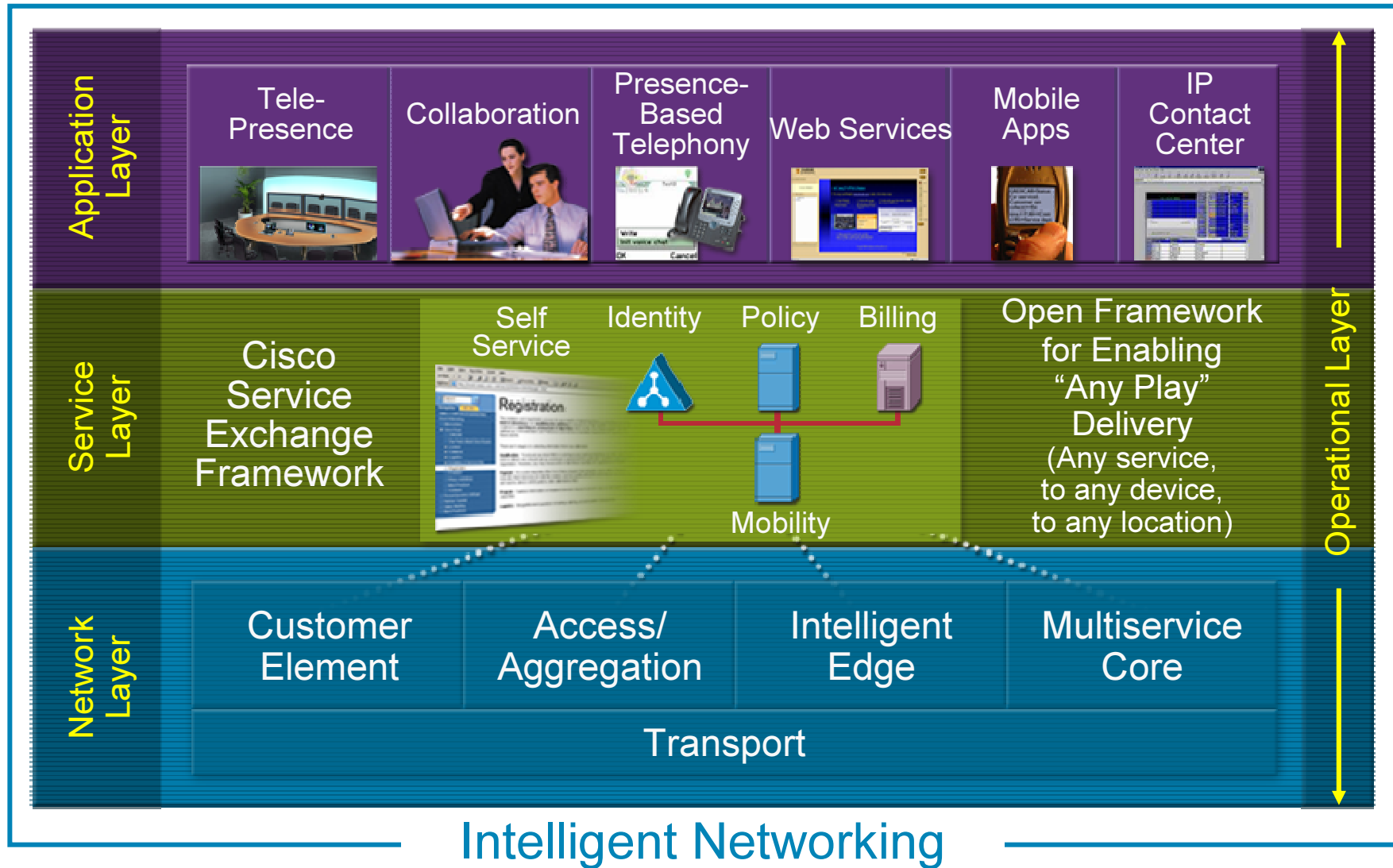
IP NGN Journey

Requires Multiple Layers of Convergence



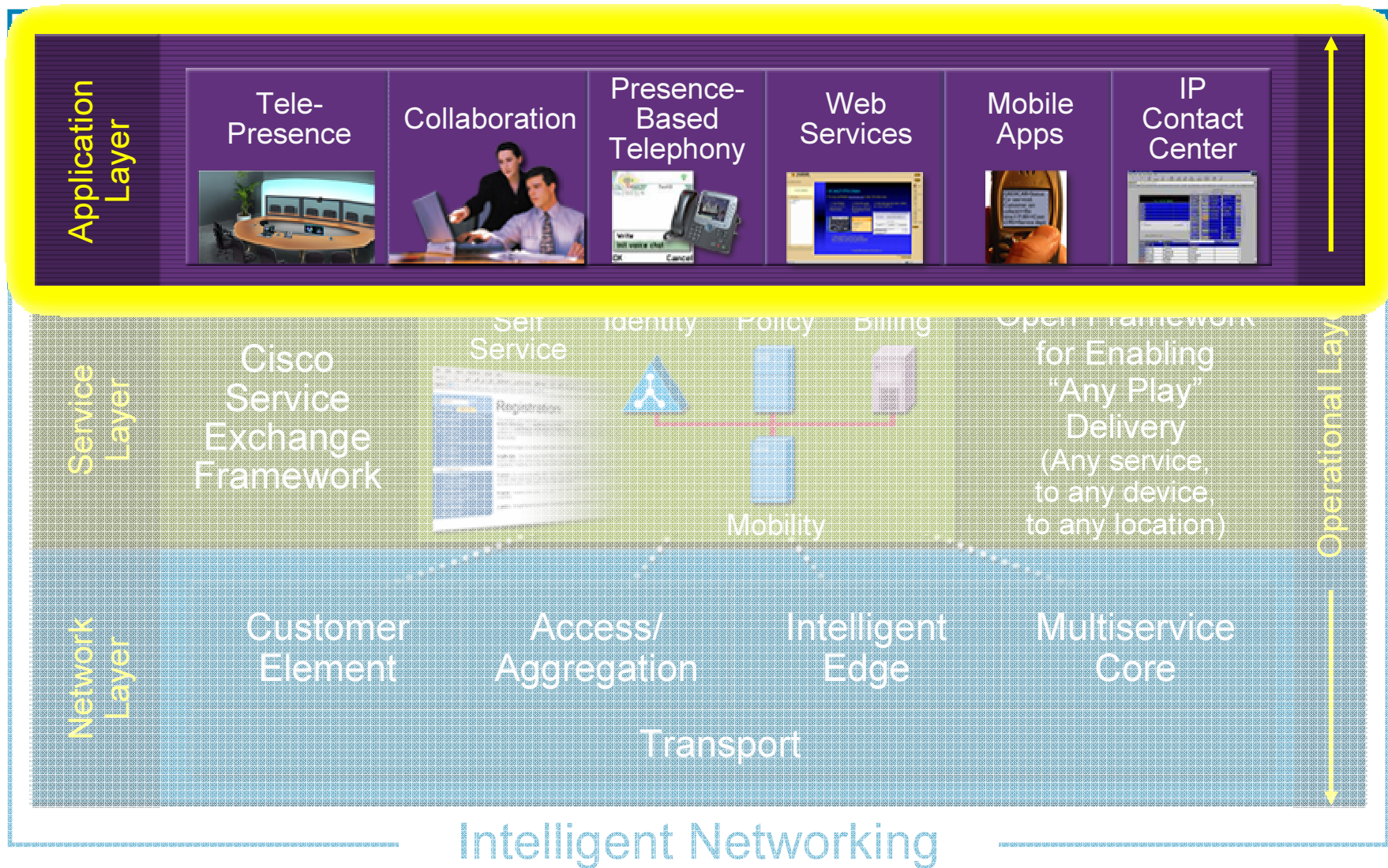
Cisco IP NGN Architecture

Achieving a Whole Greater Than the Sum of the Parts



Intelligent Networking

Application Convergence



New Service Provider Offer:

“Many Services to Many Screens, any time any where”

VoIP	Custom Ring Tones / MP3 Player	High-Speed Internet /VPN	Text / Instant Messaging
Push-to-Talk / Intercom	Video Conferencing	Digital TV / VOD	PDA / Email



Data

Voice

Video



At Work, At Home, On The Move

Creating New Services

Residential Broadband Portfolio

Integrated Networks, Content, and Entertainment Services



**Residential
Broadband Access**
~\$30/Mo



Gaming
~\$7/Mo



Wireless Security
~\$30/Mo



**Local and
Long Distance Voice**
~\$40/Mo



Home Net
~\$10/Mo



**Teleworker/
Home Business**
~\$70/Mo



Digital Music
~\$10/Mo



Video and xVoD
~\$50/Mo



NetPVR
~\$10/Mo

Enabled by a Cisco IP NGN

Creating New IP-Based Services Business Portfolio

Moving Up the Value Chain



Managed Firewall
~\$100/Mo/Site



Metro Ethernet
~\$75/Mo/Site



Content Distribution
~\$50/Mo/Site



Managed IP Telephony
~\$40/Mo/Site



Remote Access
~\$75/Mo/Site



Managed Router Service
~\$250/Mo/Site



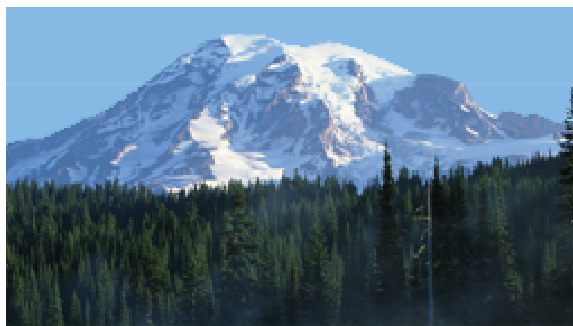
Managed LAN Service
~\$13/Mo/Site



IP/MPLS/VPN
~\$150/Mo/Site

Enabled by a Cisco IP NGN

Stringent Requirements on Infrastructure



Resilient

- Multilayer Security
- High Availability
- Scalable



Integrated

- Virtualized Services
- Application Aware
- Modular Approach
- Service Control

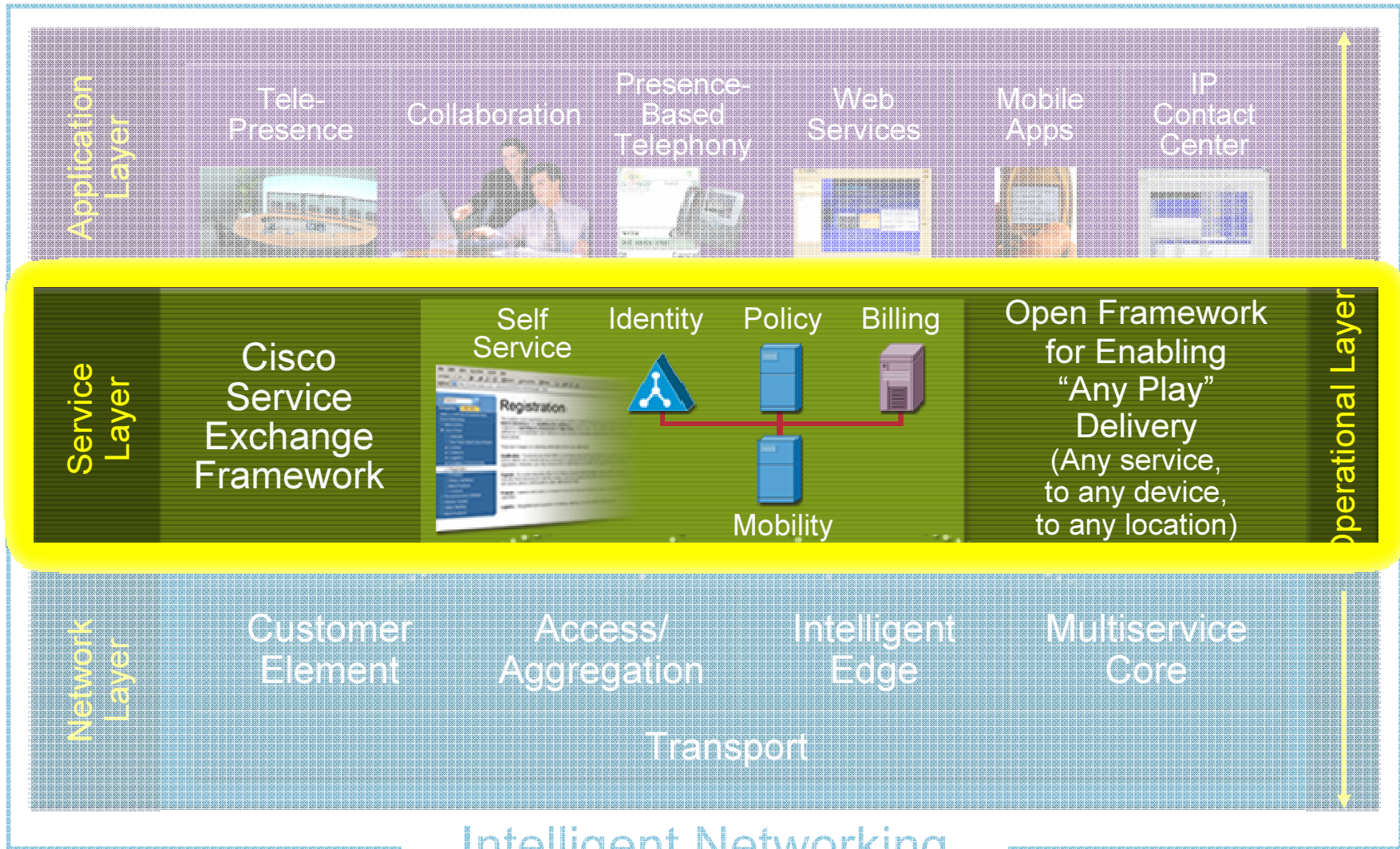


Adaptive

- Self-Provisioning
- Self-Optimizing
- Self-Defending

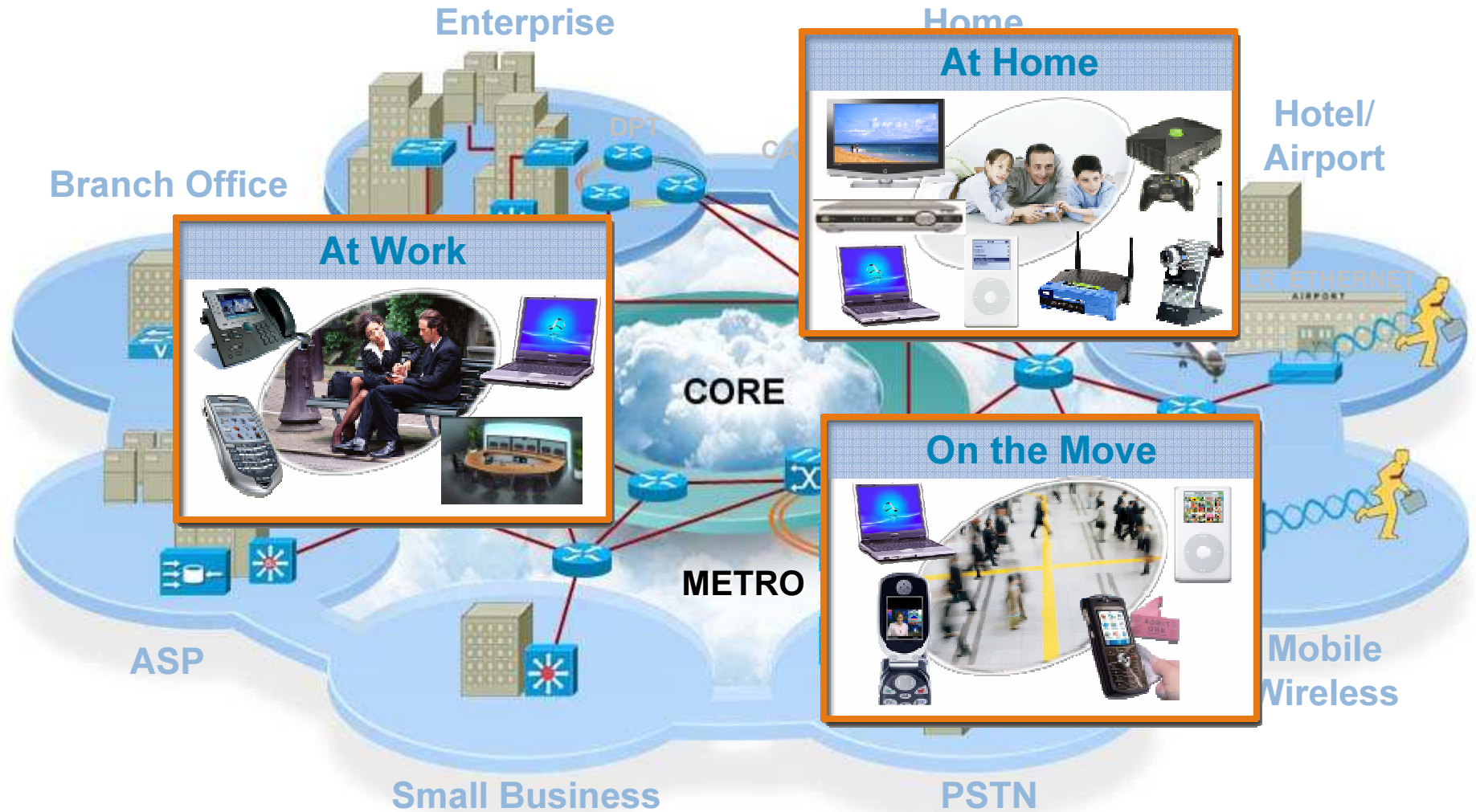
Intelligent Networking Enables Business Success

Service Convergence



Personalized “Any Play” Experiences

Providing Means for Service Continuity, Customer Stickiness
Follow me Mobility



Service Exchange Framework

Making “Any Play” Real

Who?

Who is the user?

- Device
- Profile
- Location
- Presence

Where?

Where can the user roam?

- Track/recognize the devices across carriers
- Maintain the session across multiple networks
- Offer all services in all locations

What?

What can the user do?

- Within what timeframe
- To what extent
- Under what rules

How?

How can resources be dynamically controlled?

- Interwork and provide rich media control
- Monitor and charge on a per-service, per-user basis
- Enable application awareness

**Cisco
Service
Exchange
Framework**

Service Exchange Framework

Making “Any Play” Real

Identity and Mobility Management

- User / Device ID
- Subscriber Awareness
- Location / Presence
- Service Registration
- Audit / Logging
- Assured Authentication
- Device Roaming
- Service Mobility
- User Mobility
- Who user their devices & Service they are trying to use

Cisco Service Exchange Framework

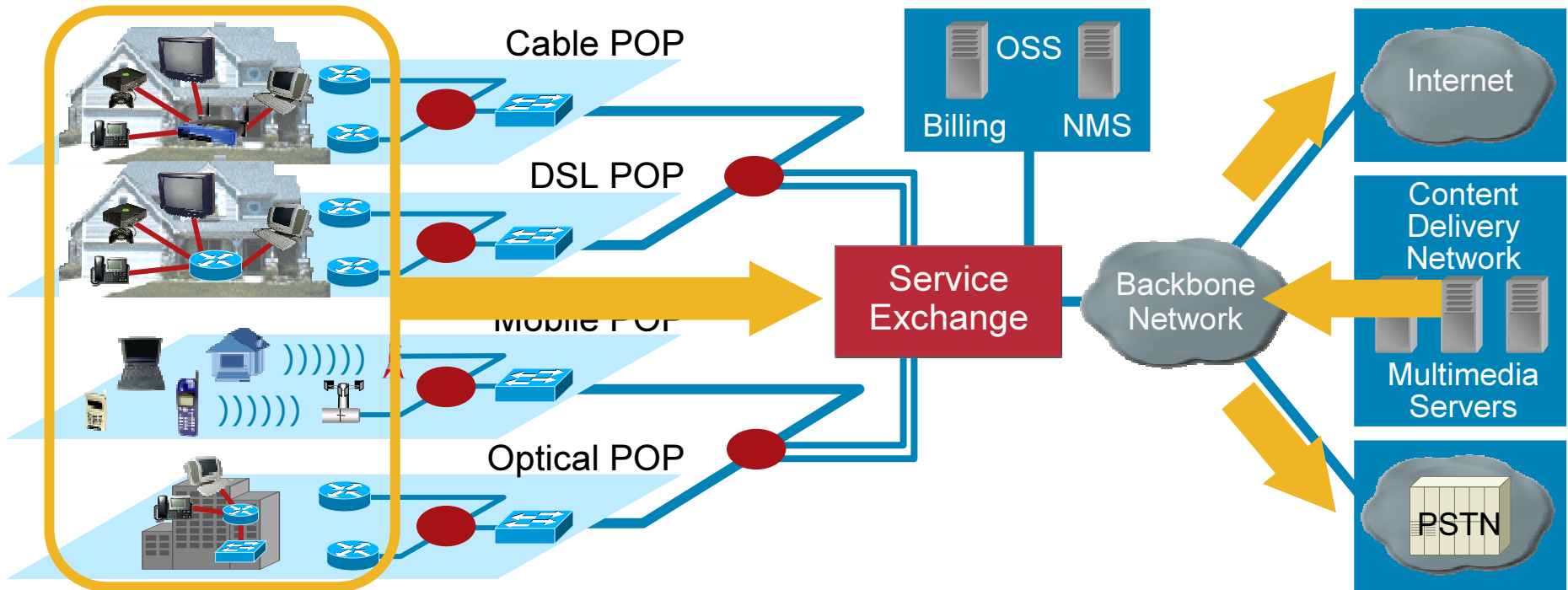
Service Policy and Resource Management

- Subscriber Policy
- Application / Chaining
- Per-Subscriber Service
- Service Invocation
- What are they allowed,
- What timeframe can they do

Session and Media Management

- Call Control
- Session Border Control
- Rich-Media Control
- Diff Bandwidth & QoS per Session
- Accounting / Billing
- How can traffic be monitor & charge

Control: Turning an Uncontrolled Network Into a Controlled Network

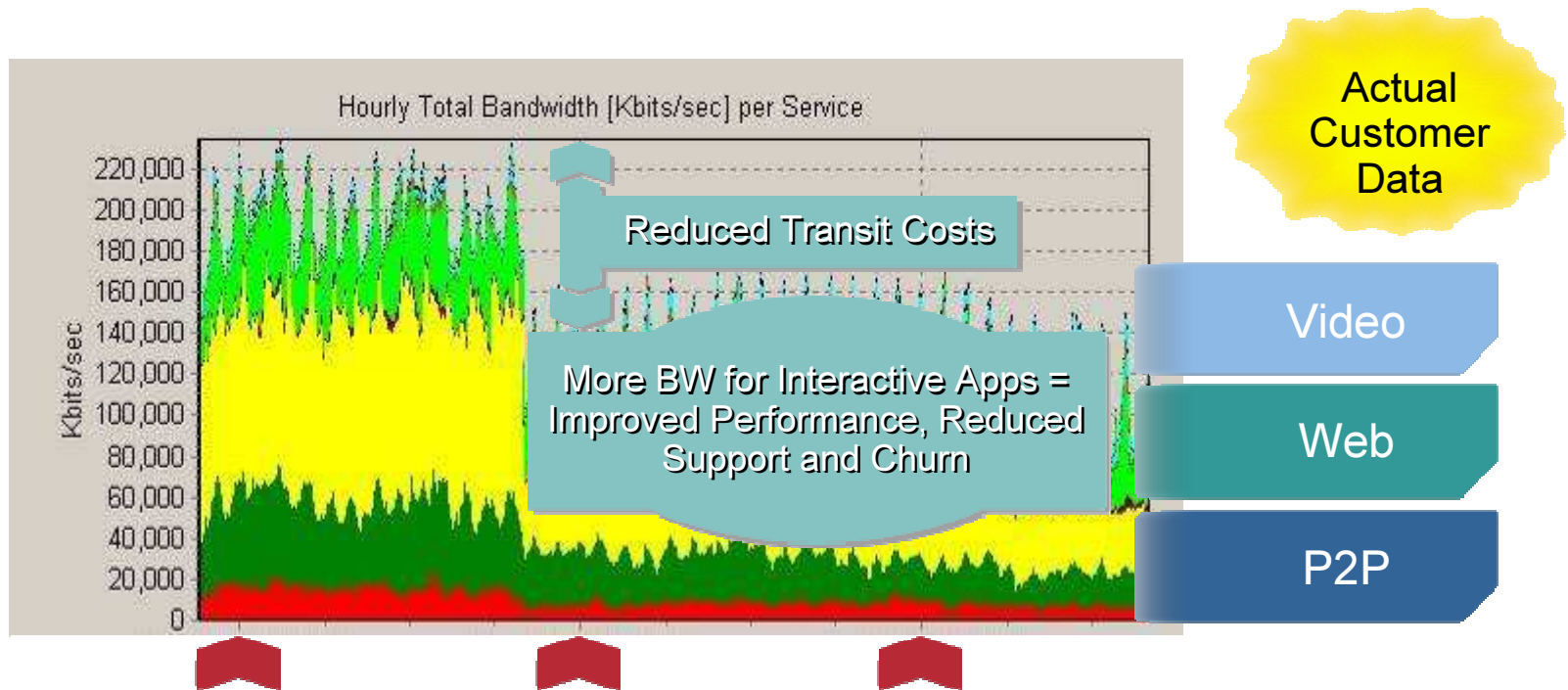


Barriers to Harnessing More Profit and Subscriber Loyalty:

- Insufficient information yields an uncertain revenue model
- Network congestion and contention for scarce bandwidth degrades subscriber experience, leading to increased churn

Efficiencies: Reduced OpEx and CapEx

Example: Application Traffic Optimization



Reduction of peer-to-peer traffic delivers:

- Improved performance and more bandwidth for interactive, billable apps
- Reduction of number of support calls with level of service complaints

Service Exchange Framework

Open Framework for 'Any Play' Delivery

Broadband Aggregation

BRAS / ISG
Cisco 10000 / 7x00 / uBR

Session / Call Control

BTS / PGW / SBC
MGX 8880 Media Gateway

Integrated Policy Control

Cisco Service Control
Cisco BB Policy Manager

Security Services

DDoS Protection
CNS Access Registrar

Mobile IP

Cisco Mobile Exchange

Video

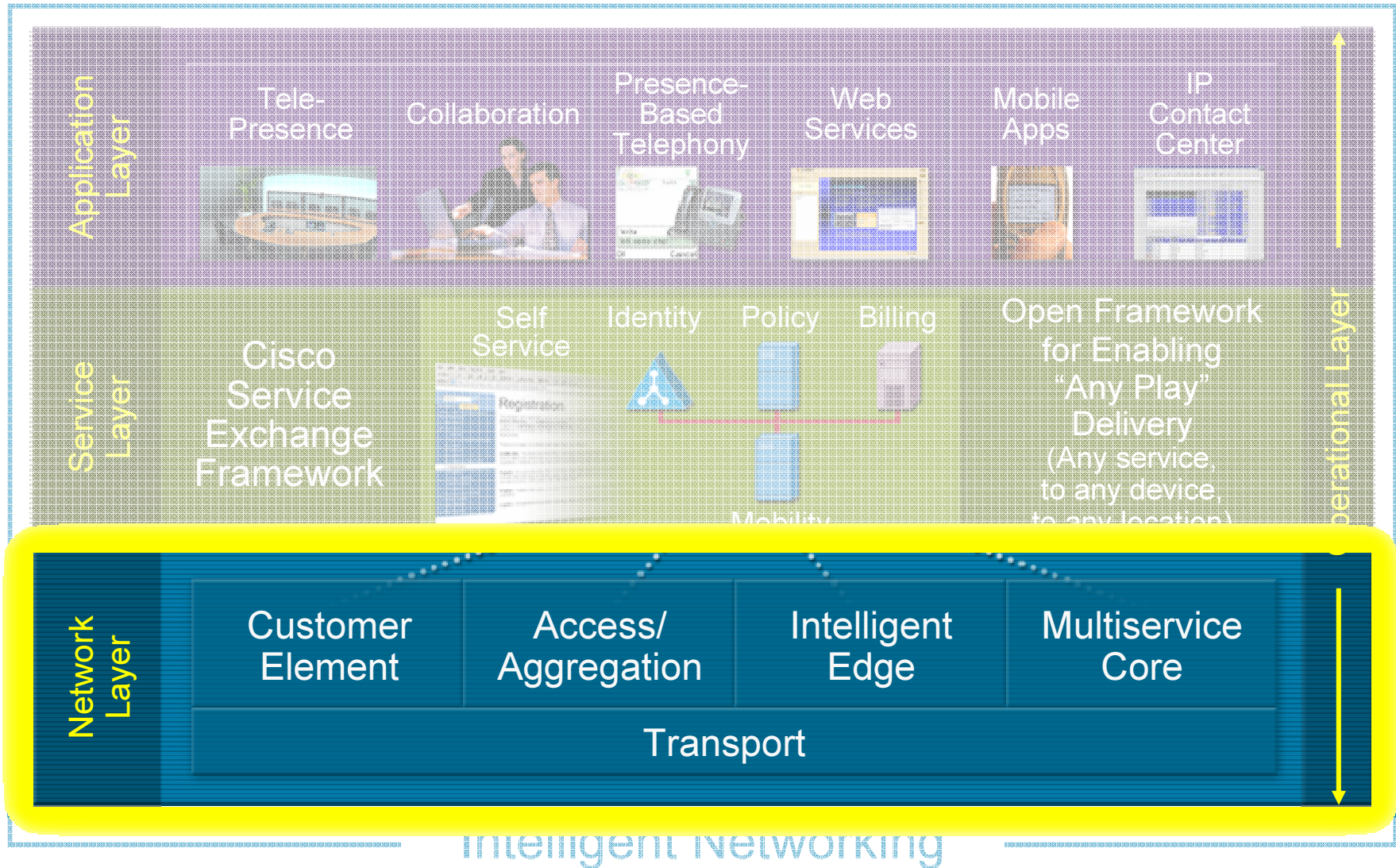
Video & Multicast CAC
Content Delivery System

Cisco Partners
For policy
control &
billing

- Supports both IMS and non-IMS apps
- Enables fixed-mobile convergence
- Better app, service, subscriber awareness
- Protects branded services
- Expedites speed to service
- Open / standard interfaces

Cisco
Service
Exchange
Framework

Network Convergence



Technology Strategy

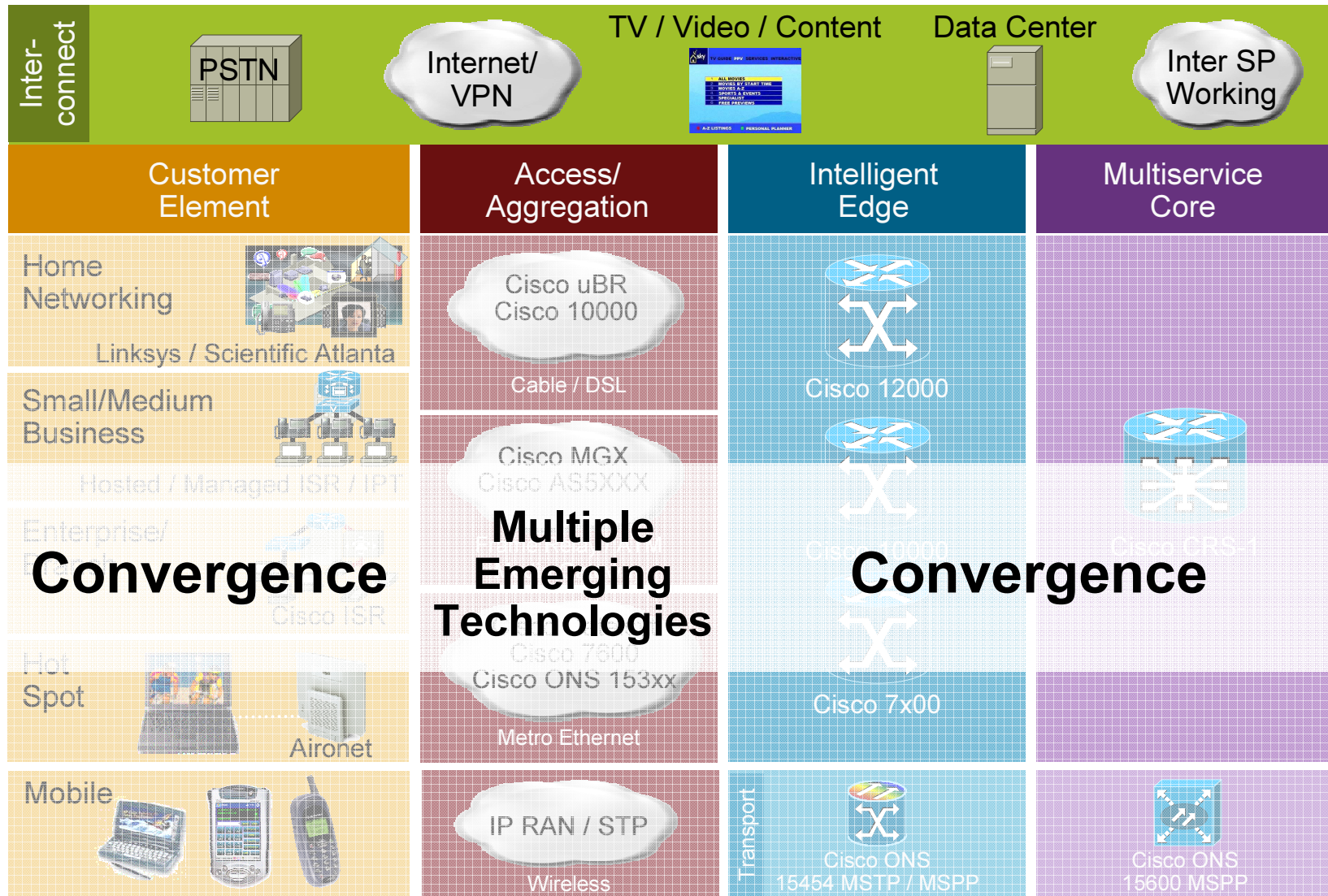


Cisco IP NGN Technology

Spanning Secure Network Layer



Access-Agnostic Convergence



Customer Element / Business CPE

Evolution of Cisco Integrated Services Router (ISR)

ISR Introduced



1M Sold

2M Sold

Integrated Security

- DMVPN
- NAC

- Incident Control System
 - Cisco Security Manager
 - Secure Device Manager

- SSL VPN

- AIM VPN-SSL
- Group Encrypted VPN

Unified Communications

- Multi-language voicemail

- SIP Phone Support
 - Integrated Messaging
 - QCT 3.0
- Secure Voice
 - Voice XML
 - Integrated Video
 - SIP Trunk Support

Application Aware Networking

- WAFS
- Network Analysis Module

- AON on ISR

- WAAS
- NAM

Integrated Communications

- Unified WLAN switching, 802.11a/b/g
- Integrated switching with PoE, StackWise stacking
 - DOCSIS Cable

- Linux Services Engine
 - G.SHDSL
 - Satellite Module

2004

2005

2006

2007

Cisco's New Integrated Services Routers

Embedded Security and Voice in Branch and Small Office Routers

Concurrent Wire-Speed Services



5X Service Density,
10X Performance,
4X Memory

Performance
with Services

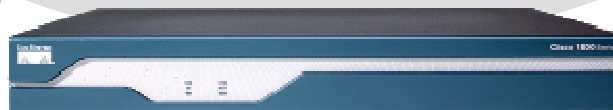


Embedded Security,
Integrated with Voice

Integrated
Services
Routers

Compatibility with Existing
Router Modules

Network Availability
and Resilience



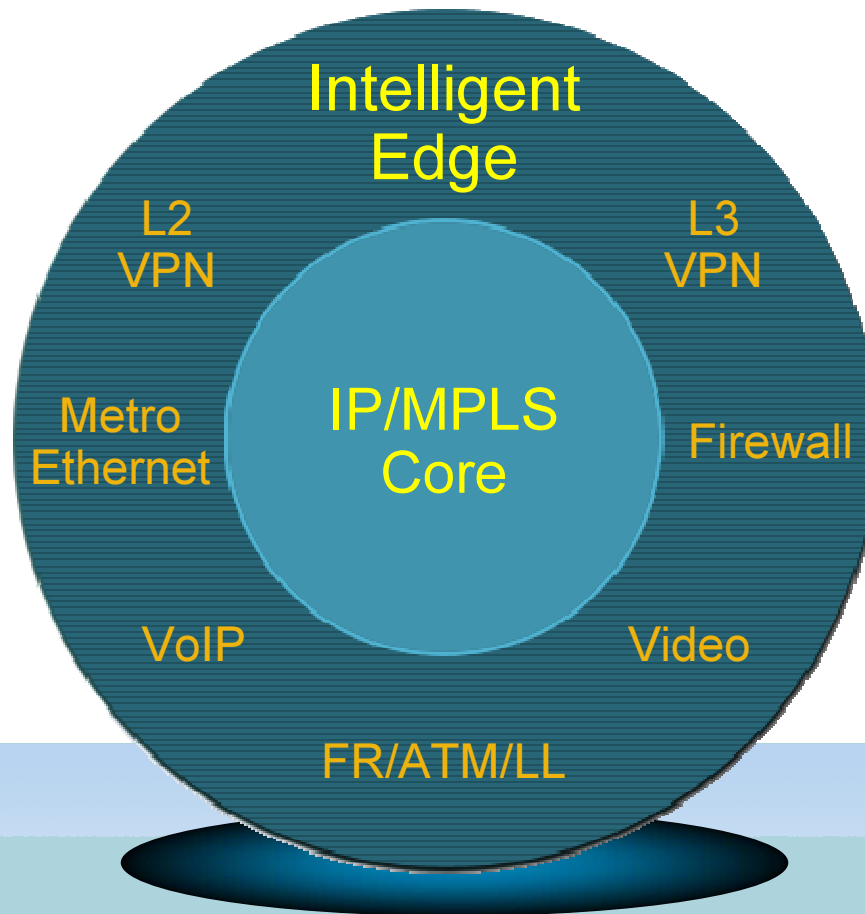
Customer Element

Evolution of the Home Network: Separate to Converged



Core/Edge

Evolution Blurring Boundaries



- Virtualization
- Service flexibility
- Scalability
- Continuous operation
- Management
- Investment protection
- Security

One Network, Many Services

Cisco IP/MPLS Portfolio

Cisco 7600



Triple Play
Service Edge

Cisco 10000



Integrated
Broadband and
Leased Line
Edge

Cisco XR 12000



Multiservice
Edge

Cisco CRS-1



Redefining
IP
Communications

Extending the Cisco CRS-1 Family

Introducing Cisco CRS-1 8-Slot Single-Shelf System

- **Continuous system operation**
 - True Telco grade OS
 - Separate control, data and management planes
 - Hitless in-service hardware and software upgrades
 - Simple, large-scale management
- **Unprecedented service flexibility**
 - Network convergence using logical routers
 - Speed-to-service elements
 - Single system PoP design
- **Unparalleled system longevity**
 - Multi-chassis fabric scales to 92Tbps
 - Programmable 40G silicon packet processor for IPv4, IPv6 and MPLS

CRS-1 Adoption



Cisco XR 12000 Series

- **Secure virtualization**
 - Secure isolation of services (Public/private)
 - Infrastructure security
- **Continuous system operation**
 - “Always on” Cisco IOS XR
 - Self healing and self defending
 - Granular in service software upgrade (ISSU)
- **Multiservice scale**
 - Scales customer attach points
 - Scales service attach points
 - Programmatic management

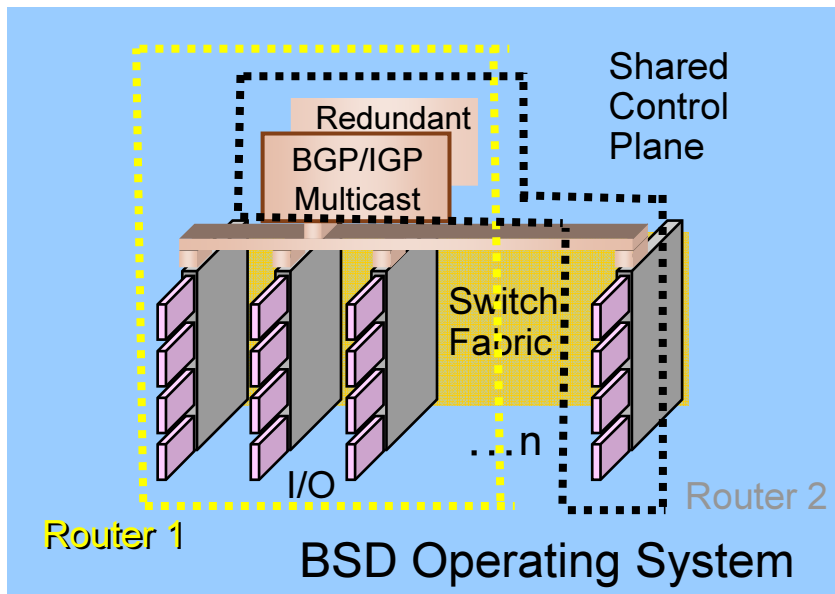


Combines the Innovation of the IOS XR with Investment Protection for the Cisco 12000 Series

	
 Deutsches Forschungsnetz	

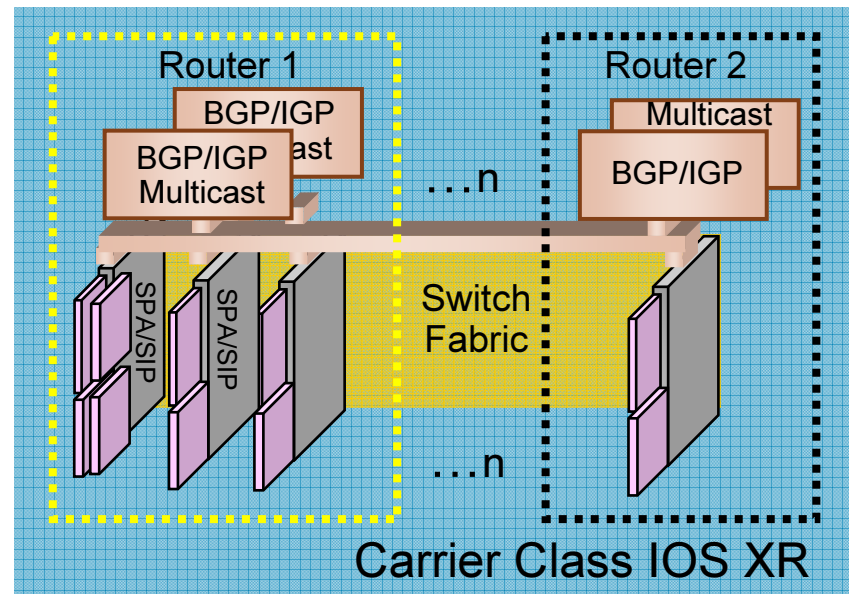
Secure Virtualization with Service Separation Architecture

X_Vendor



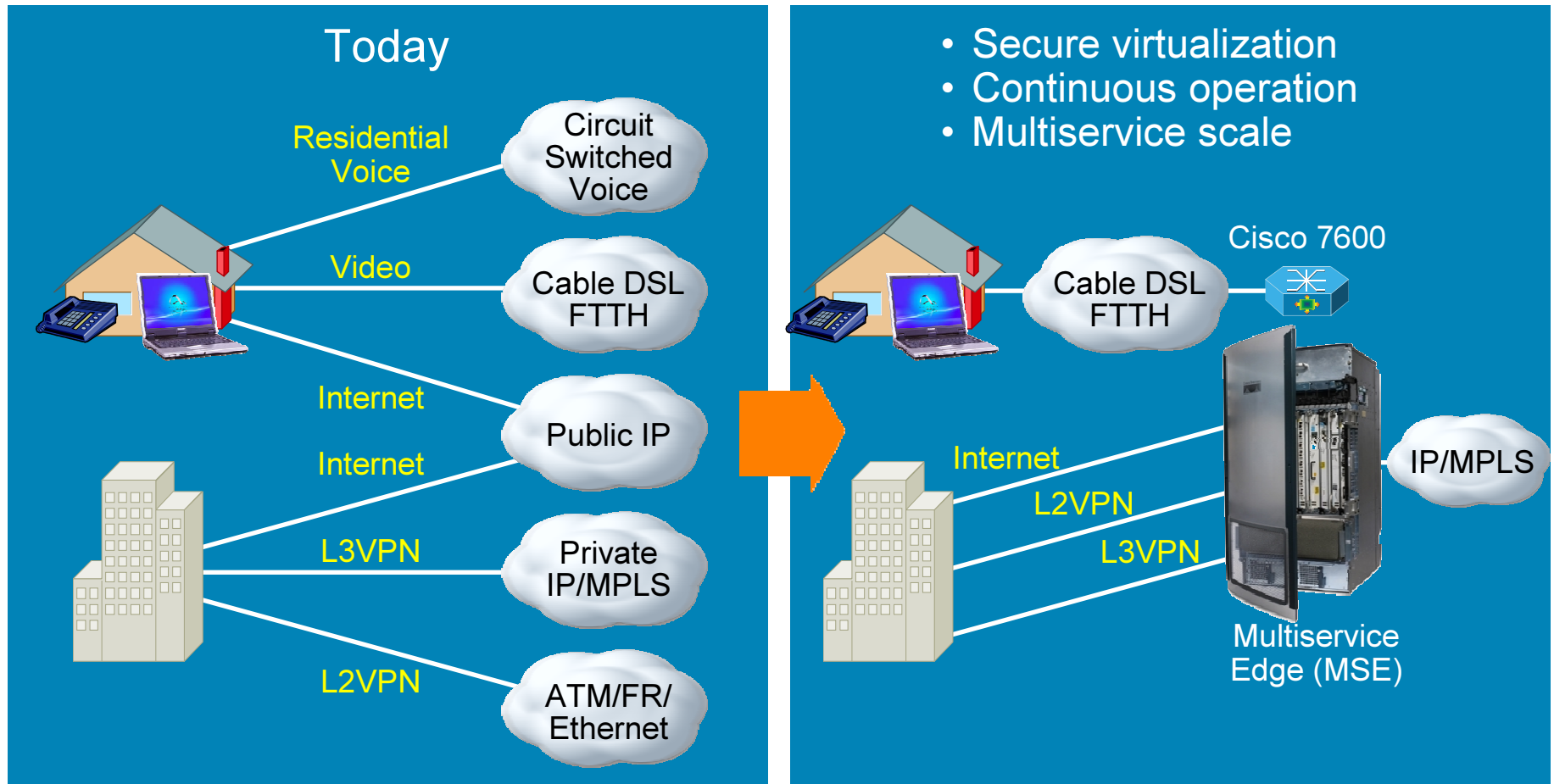
Virtual/Logical Router Sharing Resources

Cisco XR 12000



Moving Beyond Virtual/Logical Routers to Complete Physical and Logical (Memory Protected) Separation

Cisco XR 12000 ServiceFlex Design for Network Convergence



Consumer, Business and Wholesale Services

Network Convergence for Consumer, Business and Wholesale Services

Cisco 7600 Series

Introducing Cisco 7604

- **High performance, scalable routing**
 - Line rate performance for IPv4, IPv6, and MPLS VPN with QoS and security
 - Up to 720 Gbps bandwidth per chassis
- **Single platform multiservice convergence**
 - Business: L2/L3 VPN, VPLS, managed security
 - Residential: GE DSLAM and VoD server aggregation
- **Peerless IP services performance**
 - IPv4 and IPv6 Multicast at 10+ Gbps
 - SLA Assurance through integrated HA, security
- **Unmatched interface breadth**
 - Standard Ethernet to 10G Ethernet
 - DS0 to OC-48 / STM-16



Cisco 7600

Accelerating Network Convergence

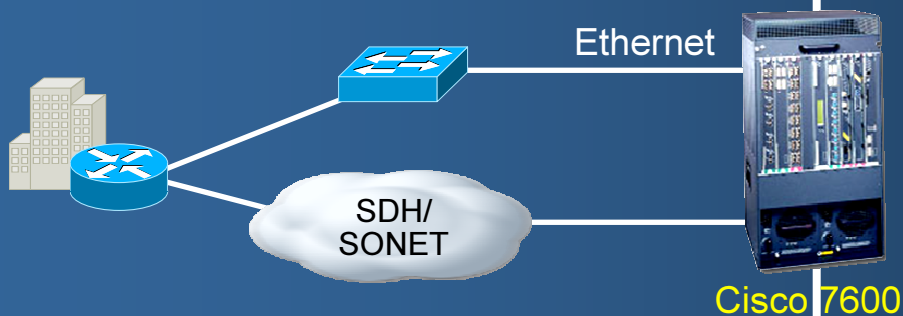
Triple Play



Triple Play

- Converged Business + Consumer Services in the Access PE
- User-Based Service Application
- Cisco Mobile Exchange for Mobile IP services
- Best-in-Class Queuing

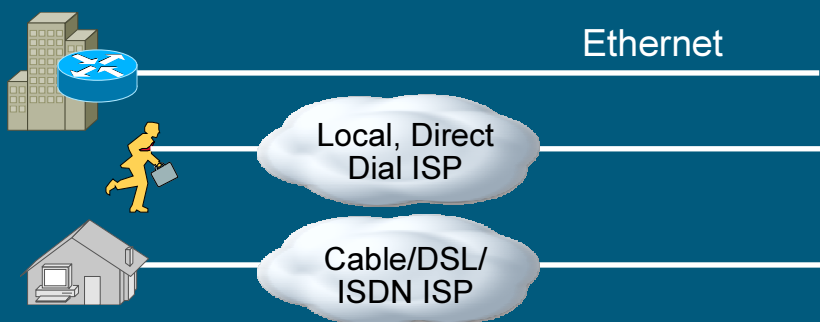
Secure PE



Secure PE

- Full Suite of L2/L3 MPLS Features
- Interface Breadth
- High Availability
- Service Acceleration Modules

Enterprise



Carrier-Class Enterprise WAN

- Managed Security Services
- Cisco 7500 Feature Parity
- Converged LAN/WAN Functionality

Cisco 7600

Proven “Triple Play” Expertise

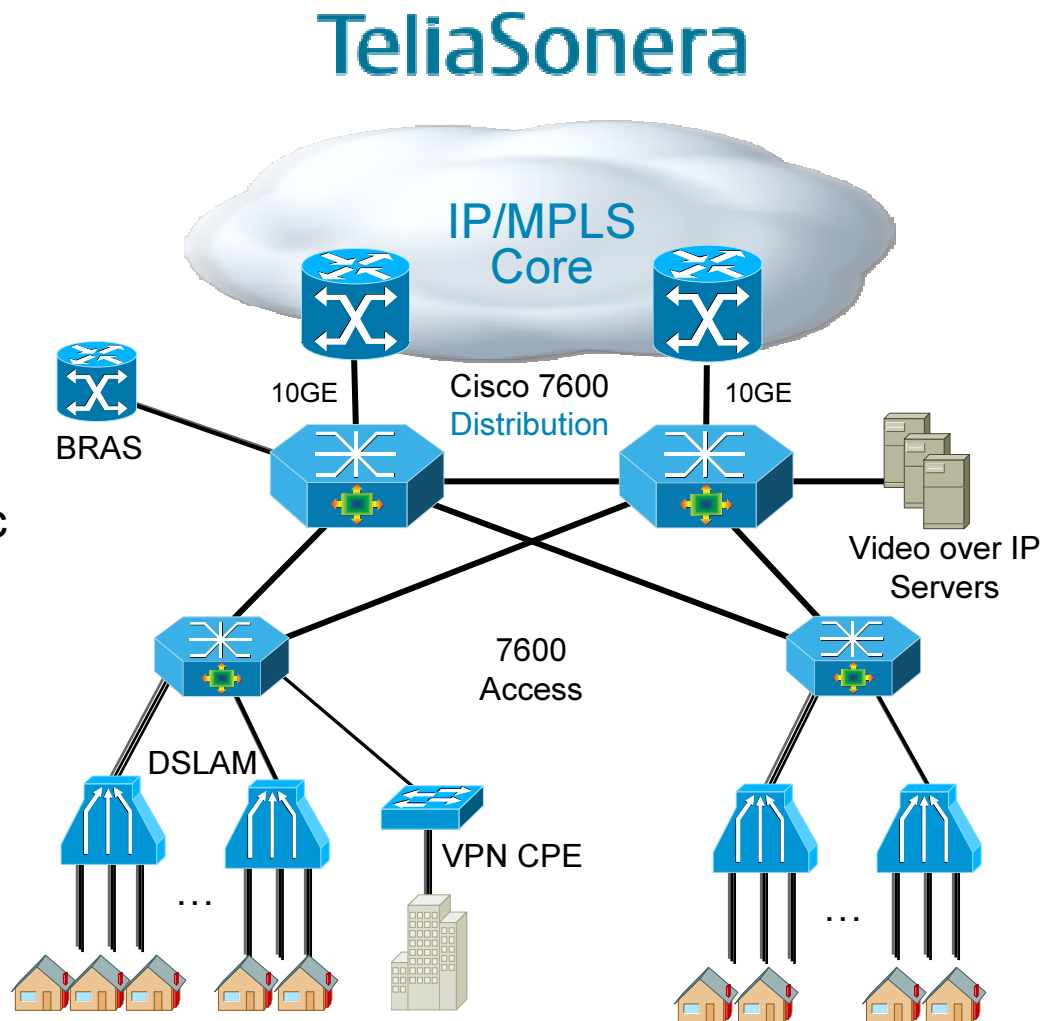
- Proven worldwide leadership in triple-play deployments

Over 13,500 Cisco 7600 systems in production worldwide

Expertise is triple-play deployments over agnostic media types

- Growing demand for service-enabled Ethernet

Economical, high-density 10GE and NxGE deployment solutions



Investment Protection for IP NGN Migration

Introducing Cisco Interface Flexibility (I-Flex) Design for Carrier Routing Portfolio

Shared Port Adapters (SPA)

SPA Interface Processor (SIP)
Carrier Card



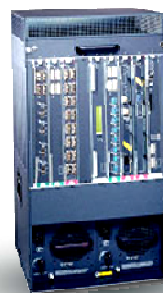
Cisco 7304

Cisco 10000
Series

Cisco 7600
Series

Cisco XR
12000 Series

Cisco CRS-1



Cisco Innovation—Reducing Total Cost of Ownership, Accelerating Speed to Service

- **Leadership investment protection reducing OpEx/CapEx**

 - Support across industry's most widely deployed carrier routing portfolio

 - Leadership slot economics

 - Pay as you grow—Granular scalability for cross-platform sharing/sparing

- **“Triple Play” service flexibility accelerating speed-to-service**

 - Broad SPA options (Copper, Channelized, POS, ATM and Ethernet)

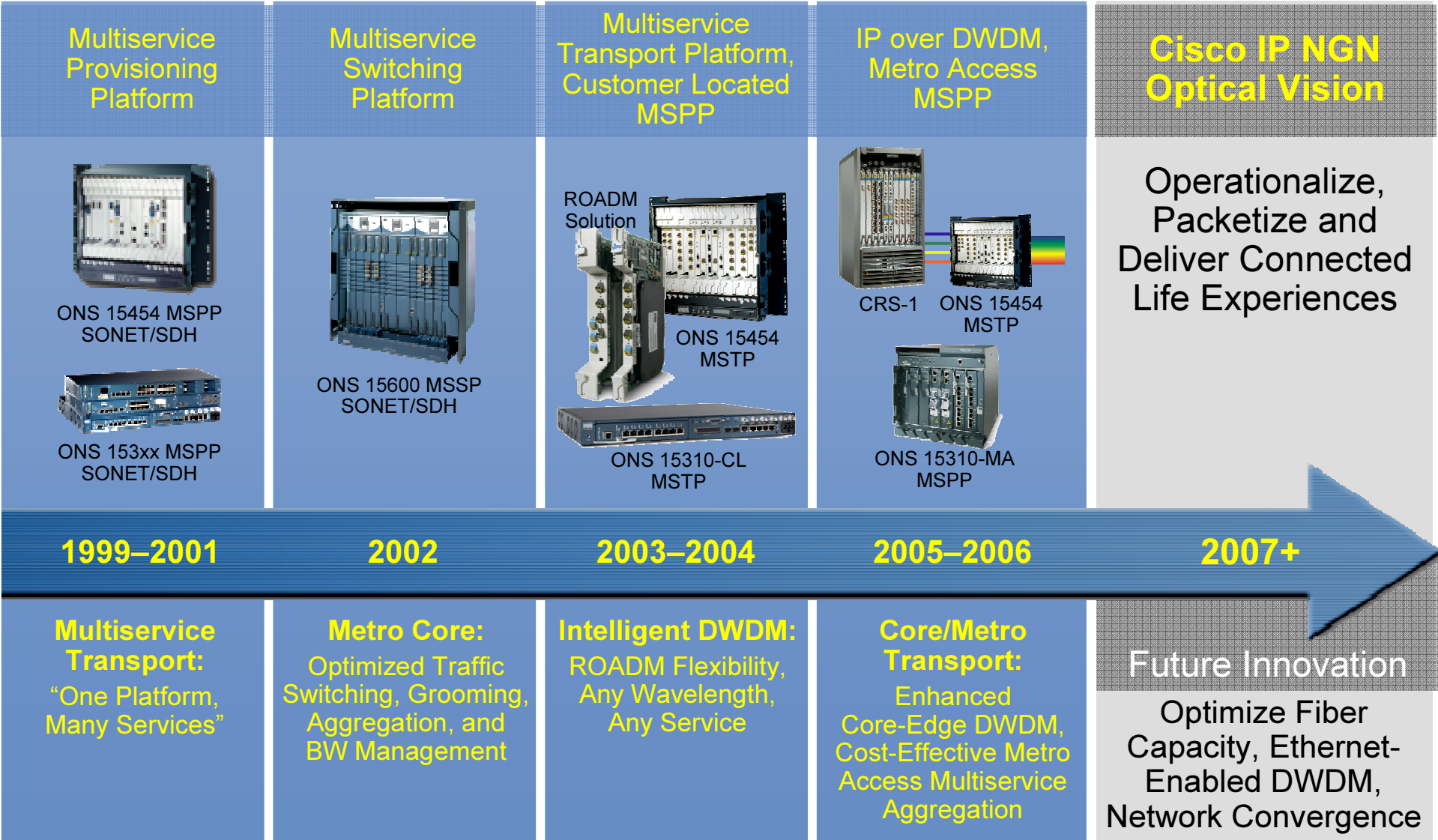
 - SIP Service intelligence—No add-on SPA needed for enhanced queuing, tunneling or link services

 - Accelerates network convergence with FR/ATM, Ethernet and IPsec SPAs



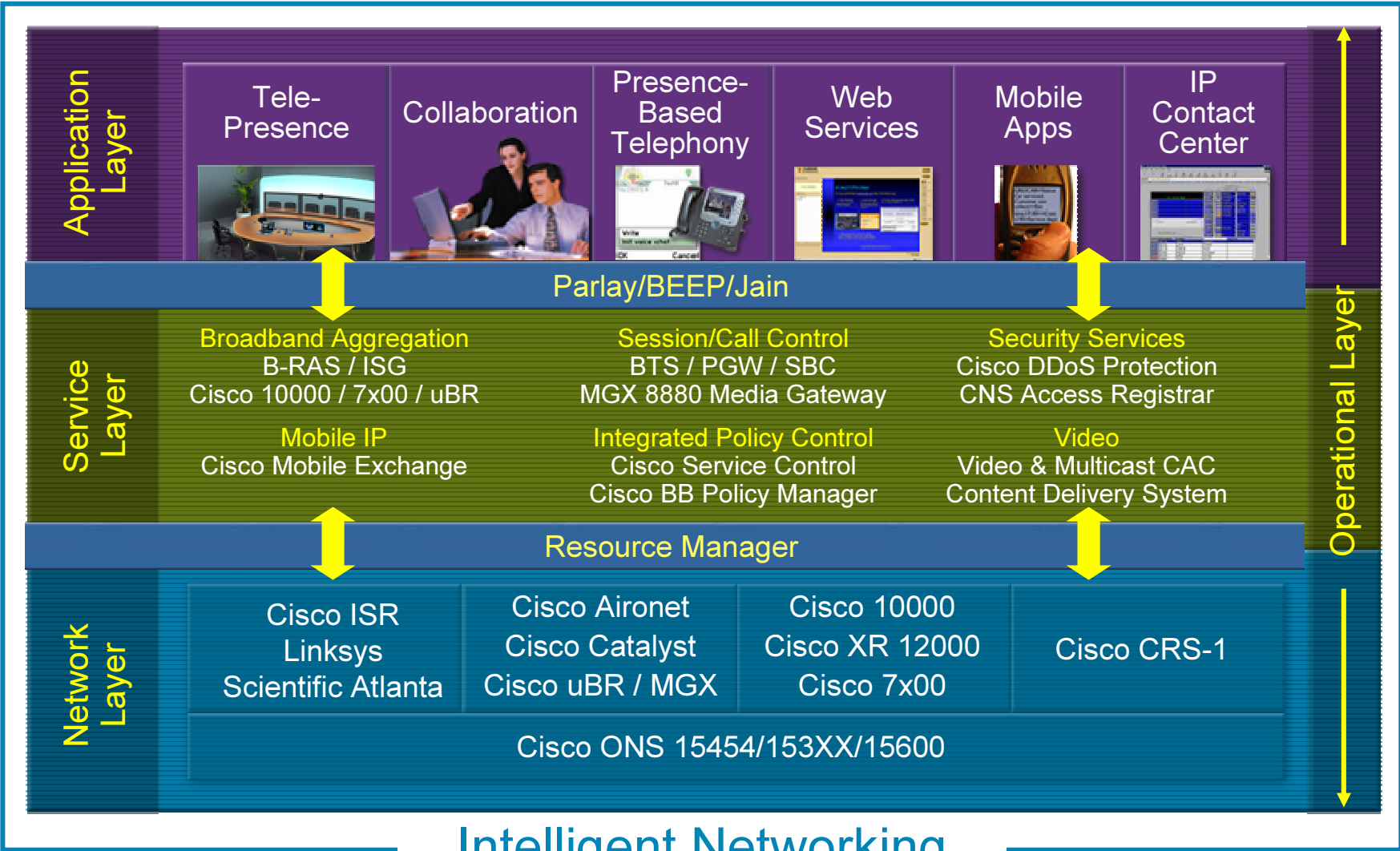
Cisco IP NGN Transport Innovation

Cisco Optical Solutions Evolution



Cisco IP NGN Architecture

Achieving a Whole Greater Than the Sum of the Parts



Intelligent Networking

Cisco IP NGN Leadership



Cisco Service Provider Strategy

The Most Complete Partner for SP Success

Deploy Services

Layer existing and new services for revenue and profit growth, faster time to market



Build Networks

Intelligent, extensible, and efficient packet infrastructures for lower TCO



Accelerate Demand

Accelerate demand by connecting consumers, SMBs and enterprises to SP services

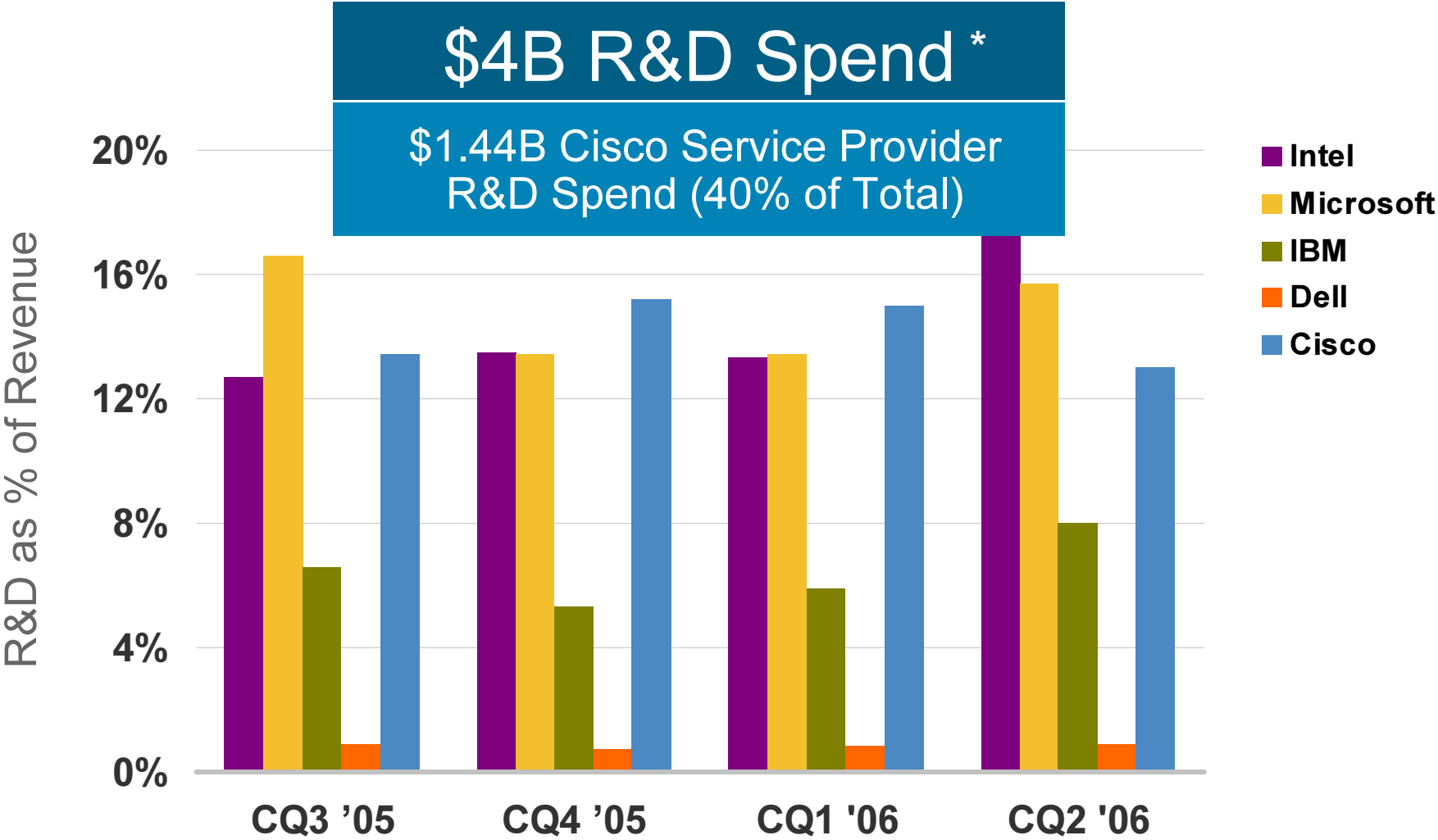


Optimize Business

Provide domain expertise to support business and network transitions and improve operational efficiencies



Cisco R&D Commitment

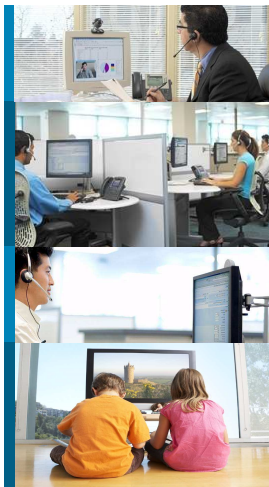


*Total four quarters ending 7/29/06

Source: Yahoo Finance, Company Financial Statements

Cisco IP NGN Momentum

Across Segments, Across Continents



Over 250 MPLS VPN networks in production

Over four million IP phones installed—Replacing 6000 TDM phones every day

Over 14 million VoIP gateway ports

Over ten million cable VoD subscribers supported in the U.S. alone



Core for IP NGN



The all digital NGN for Cable



Core for IP NGN



PSTN Migration to IP NGN



Broadband for triple play



Largest MPLS/ MetroE deployment



Biggest broadband MetroE for triple play



MS edge + core for IP NGN



IP NGN Vision Becoming Reality

Resources

Comprehensive IP NGN Portfolio

IP DNA

Unmatched IP Expertise and Experience

Commitment

Over \$1.4B for SPs

Build

CRS-1, XR 12000, 7600, ISR, More...

Partner

Ericsson, Italtel, Fujitsu, More...

Acquire

Scientific-Atlanta, Linksys, Others...

Cisco Service Provider Vision

Connecting Customers with Services,
Services with Networks,
and Networks with Each Other



IP Next-Generation Network



IP NGN Leadership

- **Founded on IP**

Expertise gained from over 20 years of experience

- **IP Market leadership**

Over 250 MPLS VPN networks in production

Over 4 Million IP Phones installed:
Replacing 6000 TDM phones every day

Over 14 Million VoIP gateway ports

Over 10 Million Cable VoD Subscribers supported in U.S. alone

- **Leading IP standards contributor**

ITU and many others

High-End Routing

Mid-Range Routing

CPE Routing

IP Telephony

VoIP Gateway Ports

MetroE Ports

Switching

Security

Home Networking

Cable

WiFi

BRAS

To Address Service Provider Needs



