CISCO SYSTEMS

Introducing Cisco's Integrated Services Routers

Secure, Wire-speed Delivery of Concurrent Services and Applications
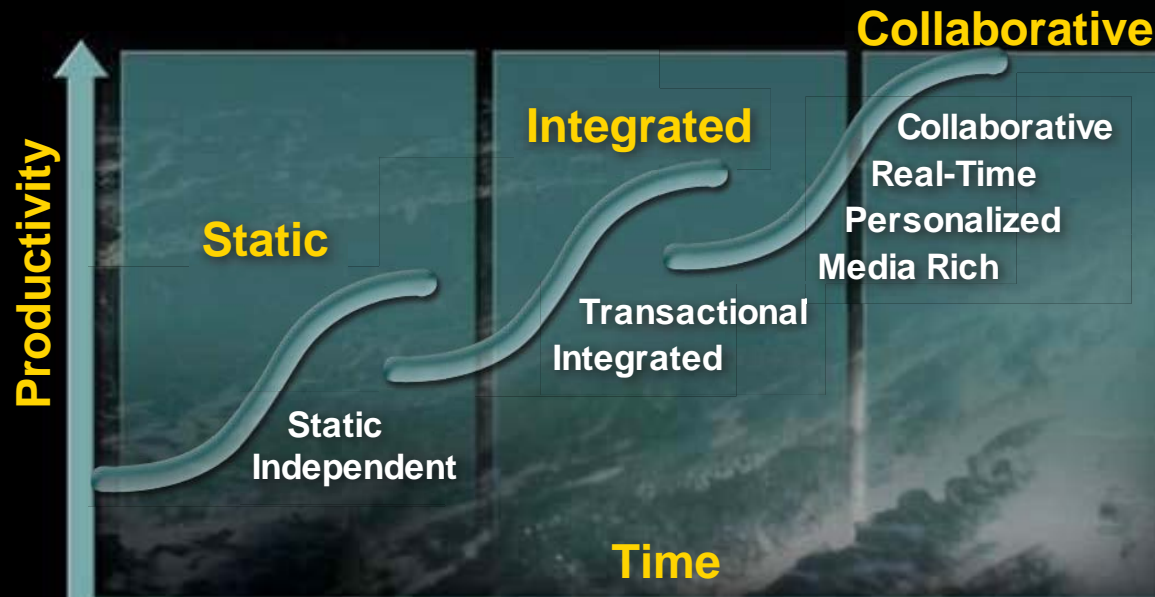
Agenda

- **Technology Trends**

- **Investing in the Future**

- **New Cisco Integrated Services Routers**

- **Security, Voice and Advanced Services**

- **Summary**

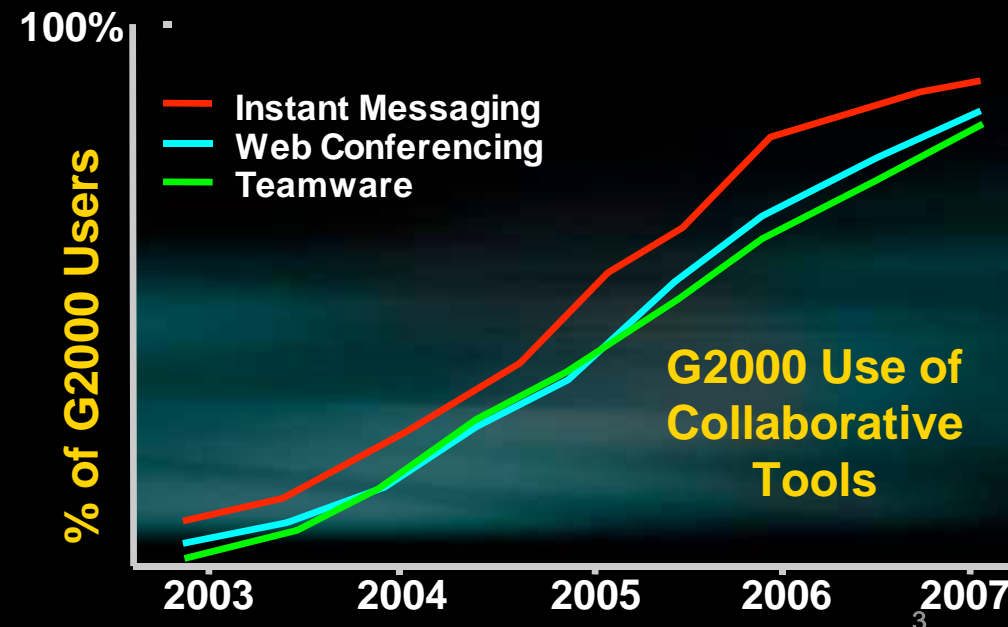# Rapid Adoption and Deployment of Web Applications, New Network Demands

Collaborative

Integrated

Static

Productivity

Collaborative Real-Time Personalized Media Rich

Transactional Integrated

Static Independent

Time

From cost-cutting mode to investment in productivity applications

Source: Meta Group

Web applications accelerate productivity and growth, but place NEW demands on network

100%

% of G2000 Users

— Instant Messaging
— Web Conferencing
— Teamware

G2000 Use of Collaborative Tools

2003   2004   2005   2006   2007

3

Integrated Services Routers
Deliver on Top Network Requirements

Customer Requirements:

- **Intelligent and Secure**
  - Support Intelligent Security Services

- **Directly Support the Business**
  - Support IP Communications
  - Reduce Operating Expenses
  - Reduce Capital Expenses

- **Future-Proof**
  - Upgrade Easily
  - Scale Easily

Top Network Requirements
from May 2004 Yankee Group Survey

	#1	#2	#3

Support Intelligent Security Services

Support IP Communications

Reduce Operating Expenses

Upgrade Easily

Scale Easily

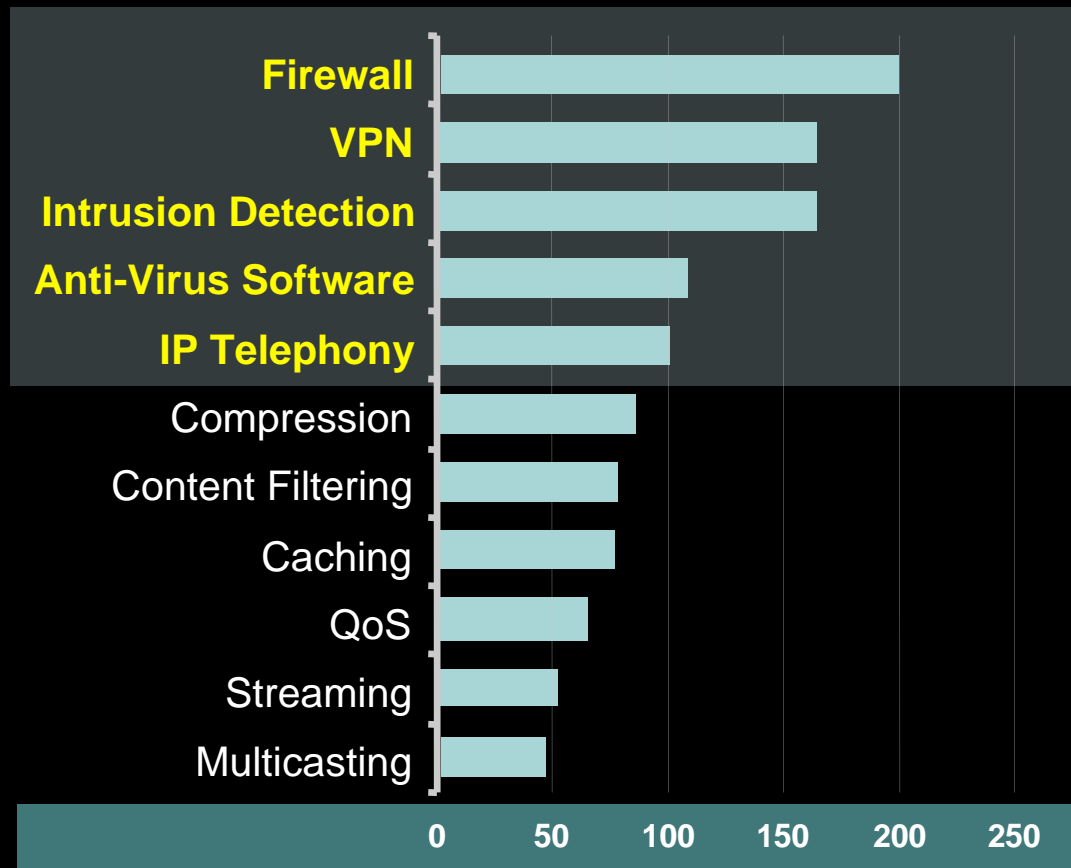Reduce Capital Expenses

0	10%	20%	30%
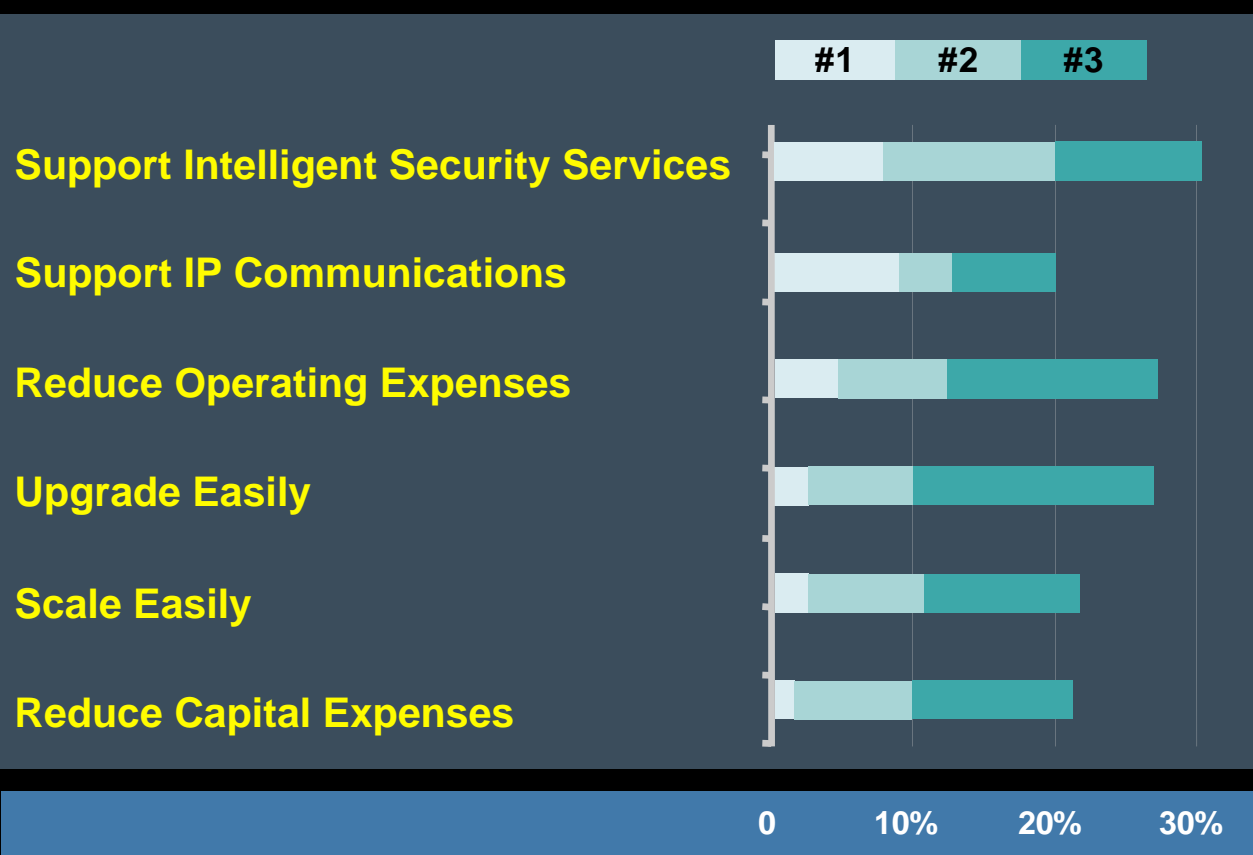
Source: Cisco/Yankee Group
May 2004 Survey - 300 US, UK, & German companies

Customers of All Sizes Prefer a Systems Approach

- **Small office, branch preferences**

- **Converged data, security, and voice**

- **Systems approach optimizes costs and productivity**

Functions that SHOULD be router-integrated n=331

Function	Value
Firewall	~200
VPN	~165
Intrusion Detection	~165
Anti-Virus Software	~110
IP Telephony	~100
Compression	~85
Content Filtering	~80
Caching	~78
QoS	~65
Streaming	~52
Multicasting	~48

0   50   100   150   200   250

Cisco Survey: June 03

Traditional Branch Solution: Separate Applications

Security

Firewall, IDS and VPN Appliances

Content Delivery

Content Engine

Voice Services

Hybrid / Key System

Data

Branch Access Router

Local Connectivity

LAN Switch

New Option:
Integrated Solution for Advanced Services

Integrated Services Router

Embedded Security

Voice Ready
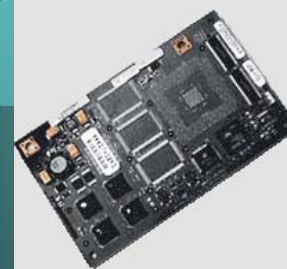
Video Integration

Low Density L2 Switching

Network Analysis

Integrated Systems Approach Redefining Branch Routing

Multiservice Access Router

In Line IPS, NAC

DSP's

Call Processing

Management

Voice & Security Acceleration New Intelligent Services

Integrated Services Routers

- **Deliver secure, wire-speed, concurrent data, voice, and video**

- **Speed application deployment and reduce costs and complexity**

- **Unparalleled services, performance, and investment protection**

Benefits of IOS for Integrated Services

CISCO IOS BENEFITS

- **Manageable, scalable, secure, available, flexible networks**

- **Integration between Features**

- **Integration between IP services**

- **Integration between Services Modules and Routers**

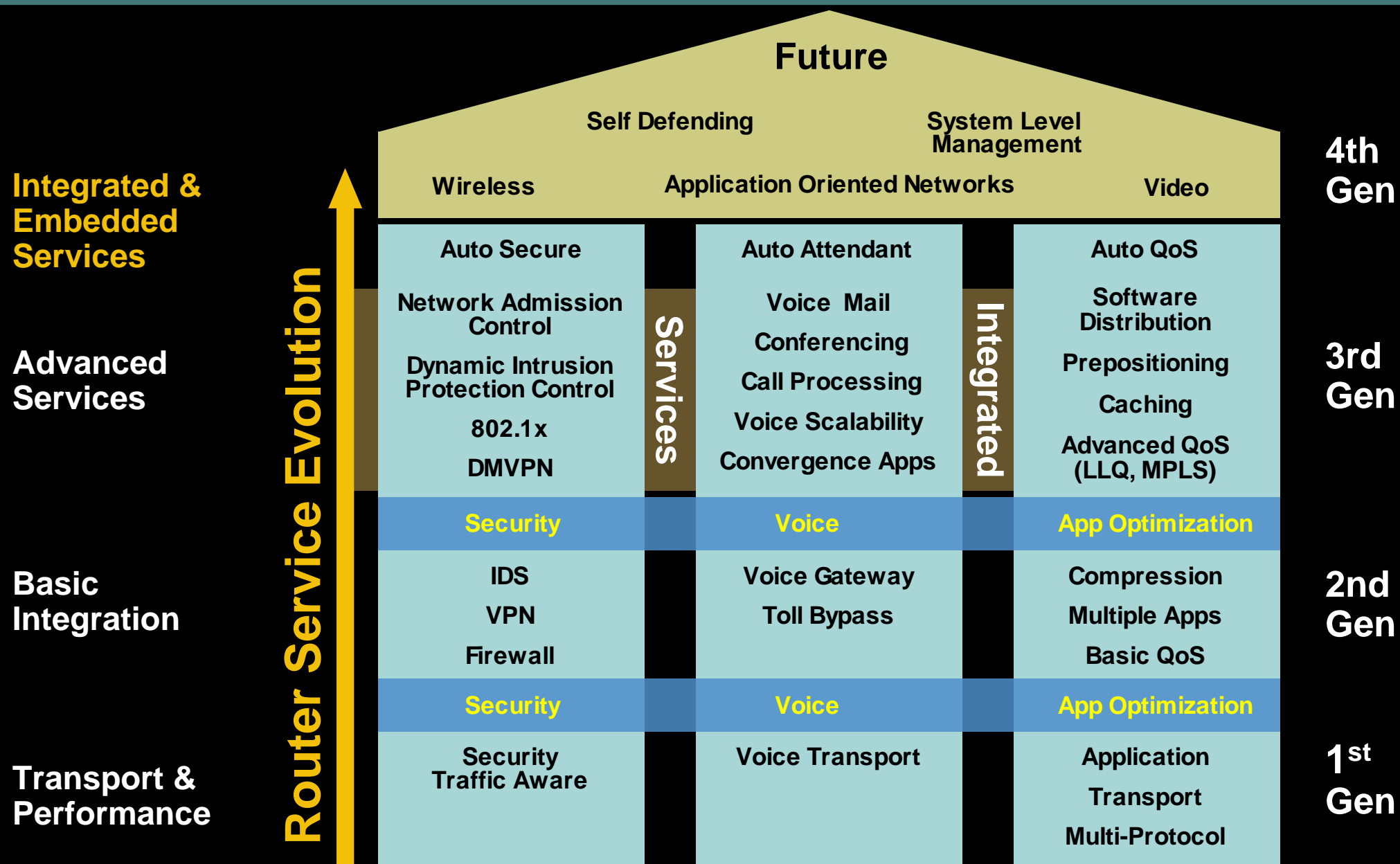## SOFTWARE

Software Services

HARDWARE

Services Modules

System Benefits

- **Simplicity**

- **Intelligence**

- **Greater Productivity**

- **Faster Profitability**

- **Maximum Investment Protection**

Cisco Evolution: Transport & Performance to Integrated & Embedded Concurrent Services

Future

	Self Defending	System Level Management	
Wireless	**Application Oriented Networks**		**Video**

Integrated & Embedded Services				4th Gen
	Auto Secure	**Auto Attendant**	**Auto QoS**	
Advanced Services	Network Admission Control	Voice Mail	Software Distribution	3rd Gen
	Dynamic Intrusion Protection Control	Conferencing	Prepositioning	
		Call Processing	Caching	
	802.1x	Voice Scalability	Advanced QoS (LLQ, MPLS)	
	DMVPN	Convergence Apps		
	Security	**Voice**	**App Optimization**	
Basic Integration	IDS	Voice Gateway	Compression	2nd Gen
	VPN	Toll Bypass	Multiple Apps	
	Firewall		Basic QoS	
	Security	**Voice**	**App Optimization**	
Transport & Performance	Security Traffic Aware	Voice Transport	Application	1st Gen
			Transport	
			Multi-Protocol	

Router Service Evolution

Services **Integrated**

10

Cisco's New Integrated Services Routers

Secure, Concurrent Services At Wire-speed!

Up to… 5X service density, 7X performance, 4X memory!

Embedded security, tightly integrated with voice

Integrated Services Routers

Backward compatibility with existing router modules for solid investment protection

Industry-leading network availability and resilience

Plus headroom to grow!

CISCO SYSTEMS

Cisco Integrated Services Router Portfolio

Scalable from Small Business to Large Enterprises

Performance and Services Density

3800 Series

FCS 4QCY04

2800 Series

FCS 3QCY04

1800 Series

FCS 3QCY04

Increased Value Extended to New Markets

- Greater service densities across the portfolio
- Substantial increase in price/performance

Highest Density and Performance for Concurrent Services

Embedded, Advanced Voice, Video, Data, and Security Services

Integrated Security & Data

Enterprise Branch Office

Small Branch

SMB

Investment Protection and Migration Path

FCS 4QCY04

Cisco 3800 Series

FCS 3QCY04

Cisco 2800 Series

FCS 3QCY04

Cisco 1800 Series

Performance and Services Density

Cisco 3700 Series

Cisco 2600 Series

Cisco 1751/1760

Cisco 1721

Cross compatibility with existing router modules for investment protection

Increased default memory across 1700, 2600, 3700 line

New feature development and additions until IOS 12(5) mainline

No end of sale for at least 18 months

Continued software support for 5 years after last sale

New Cisco 3825 and 3845 Routers
Flagship Integrated Services Router

	3825	3845
NME Slots	2	4
DSP Slots	4	4
RPS	External	Internal
Form Factor	2RU	3RU
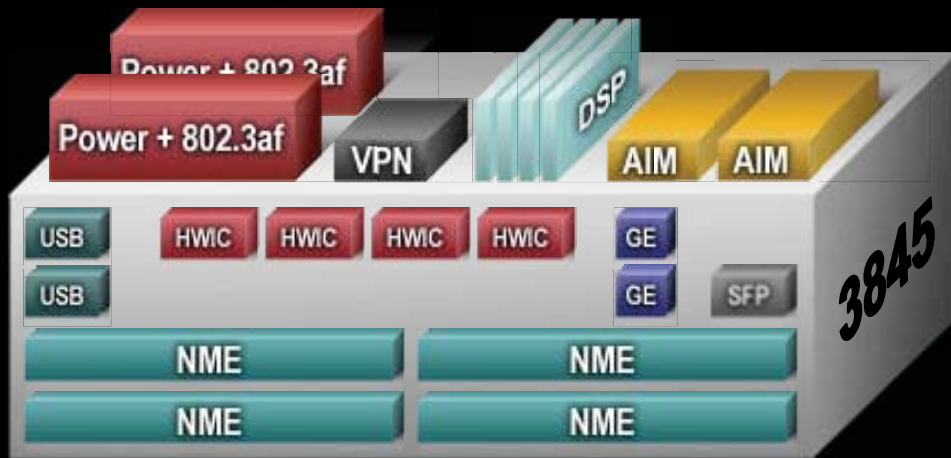
- **Integrated Services at Wirespeed**

  Up to T3/E3 rates with *all services* turned on

  Security: On-board encryption, FW, IPS, NAC, and more

  Voice: On-board DSP Slots, up to 240 IP Phones

- **Services Density for Convergence**

  Maximum density for both connectivity and service modules

  Slots support new modules + existing interfaces

  Optional integrated 802.3af powered switching

- **Enhanced Availability**

  Hot-swap modules and power supplies

  Highly serviceable design (field replaceable)

  Internal redundant power

New Cisco 2801, 2811, 2821, 2851 Routers
Integrated Services Routers for the Converged Branch
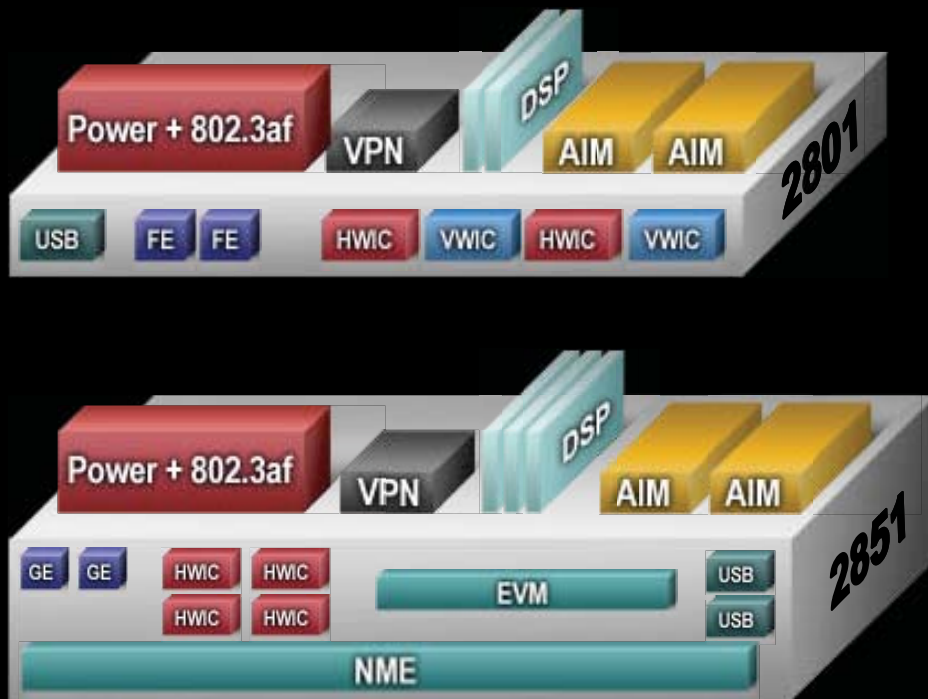
- **Integrated Services at Wirespeed**

  Up to NxT1/E1 rates with *all services* turned on

  Security: On-board encryption, FW, IPS, NAC, and more

  Voice: On Board DSP Slots, up to 96 IP Phones

- **Services Density for Convergence**

  x2 slots for connectivity w/service expansion

  Slots support new modules and existing interfaces

  Optional integrated 802.3af powered switching

- **"Right-sized" IP Communication solutions**

  Performance and density matched for 24-96 user data + voice solution

  New expansion voice module slot for high density analog/BRI

	2801	2811	2821	2851
NME / EVM	0/0	1/0	1/1	1/1
DSP Slots	2	2	3	3
LAN	2 FE	2 FE	2 GE	2 GE
Form Factor	1RU	1RU	2RU	2RU

Routers Right-Sized for Customer Needs

	New 2851	2691
VPN Bundles - List Price	$7,395	$8,095
WAN to LAN Throughput	10/100/1000	10/100
Bundled and Maximum Memory	8X → 32X	X → 8X
Integrated Services *More …* concurrent services, density, and performance deliver higher value	**ALL AT WIRE SPEED:** Call Mgt, Vmail & Auto-Attendant **AND …** Analog FAX & Voice **PLUS** Web Caching/Video **OR** Network analysis **OR** L2 switching	Call Mgt, Vmail & Auto-Attendant **OR …** Analog FAX & Voice **OR** Web Caching/Video **OR** Network analysis **OR** L2 switching

New Cisco 1841 Router
Integrated Services Router for the Secure Branch/SMB
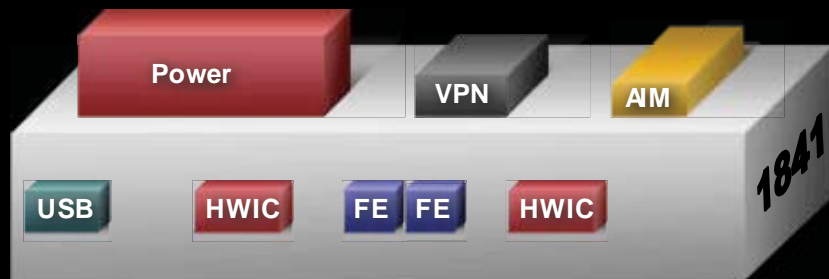
	1841
HWIC Slots	2
AIM Slots	1
Form Factor	Desktop

- **Integrated Services at Wirespeed**

  T1/E1/xDSL rates with *services* **turned on**

  Security: On-board encryption, FW, IPS, NAC, and more

- **Modular flexibility**

  Comprehensive data connectivity options

  Slots support new modules and existing interfaces

  On-board Dual FE

  Optional integrated 10/100 switching

Verified full T3-rate performance for concurrently running services

"Our tests prove the Cisco 3845 simultaneously sustains full T3 WAN rates for multiple applications. Its embedded crypto processor handles both 128 bit AES and IPsec VPNs with ease, concurrently delivering firewall, intrusion prevention, QoS, and data routing at maximum WAN-link speeds. Additionally, an impressive 72 streams of voice traffic, including transcoding, voice mail, auto-attendant, fax, and survivable remote site telephony was handled with no performance degradation in the Cisco 3845."

Ed Mier
President, Mier Communications Inc.

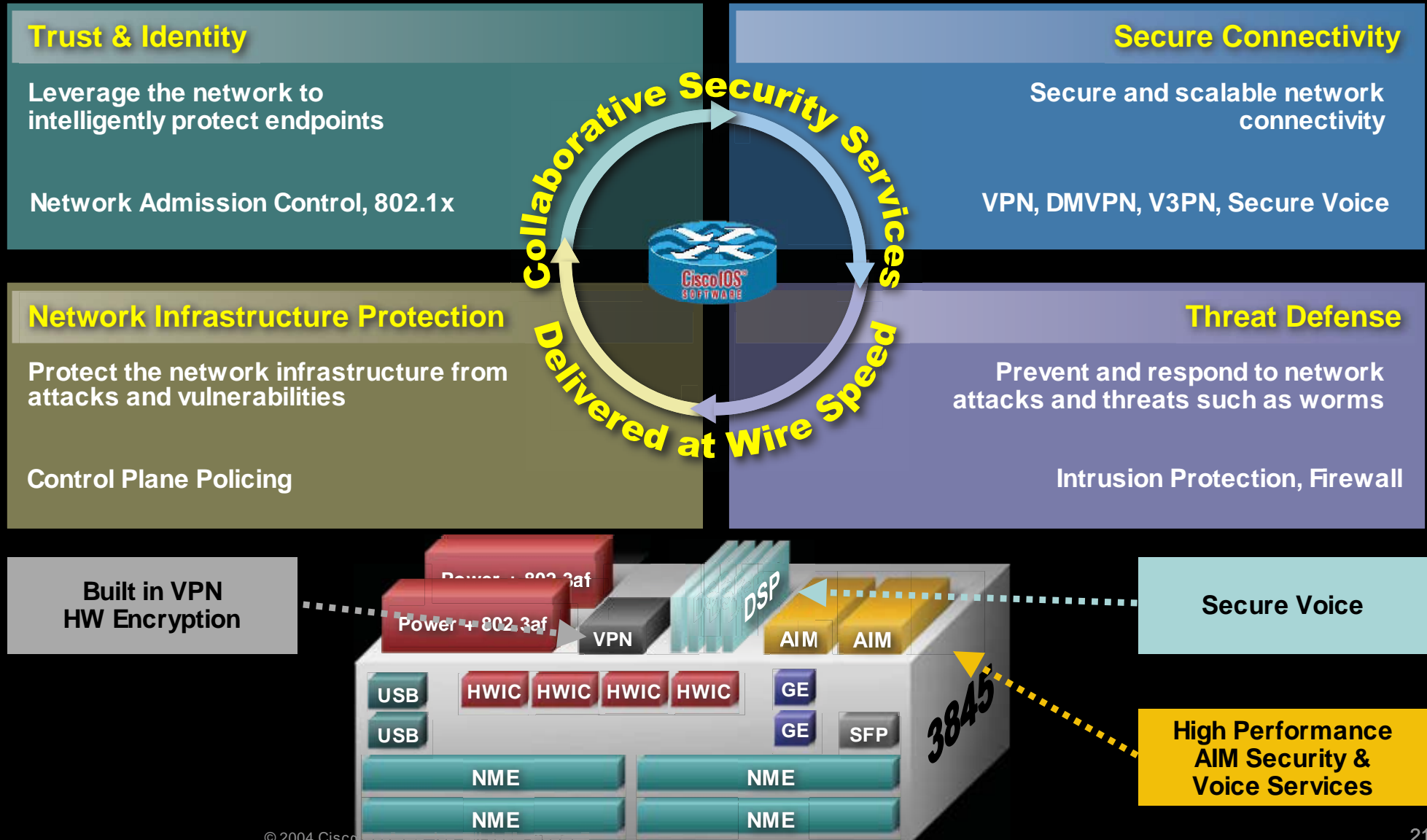**See www.miercom.com for complete testing of four different**

19

Cisco Router-Integrated Services

Hardware Innovation Raises Security Leadership
Cisco Self-defending Networks Delivered At Wire-speed!

Complete, Preventative, Scalable Security Solutions

Trust & Identity

Leverage the network to intelligently protect endpoints

Network Admission Control, 802.1x

Secure Connectivity

Secure and scalable network connectivity

VPN, DMVPN, V3PN, Secure Voice

Network Infrastructure Protection

Protect the network infrastructure from attacks and vulnerabilities

Control Plane Policing

Threat Defense

Prevent and respond to network attacks and threats such as worms

Intrusion Protection, Firewall

Collaborative Security Services

Delivered at Wire Speed

CiscoIOS® SOFTWARE

Built in VPN HW Encryption

Power + 802.3af

Power + 802.3af

DSP

VPN

AIM   AIM

USB   HWIC   HWIC   HWIC   HWIC   GE

USB   GE   SFP

3845

NME   NME

NME   NME

Secure Voice

High Performance AIM Security & Voice Services

Router Security Considerations

1) Do you plan to incorporate NAC as part of your strategy against worms and viruses?

2) Are you considering migrating to VPN in the future or using VPN as a backup?

3) Will you be required to encrypt traffic over Leased Line or Frame Relay links?

4) Are you implementing a "Defense in Depth" policy in your branch offices to prevent worm attacks, DDoS attacks, and unauthorized traffic?

5) Do you require Web filtering at your branch?

6) Do you wish to incorporate IP Communications in your overall strategy (eg Secure Voice)

Embedded Services Management
Cisco Router and Security Device Manager (SDM) 2.0

Integrated Management of Router Services—Routing, Switching, Security, QoS
Web-Based, easy-to-use Management tool ships on all 1800, 2800 and 3800 Series

- **New Security Features**
  - **Inline IPS with Dynamic Signature update and signature customization**
  - **Easy VPN Server and AAA**
  - **Role-Based Router Access, SSHv2**
  - **Digital Certificates for IPSec VPNs**

- **New Wizards for non-experts**
  - **QoS Policy and NBAR**

- **New Troubleshooting tools**
  - **VPN, WAN connection**

- **Major UI Improvements - Router Services Dashboard, Task-based Navigation**

- **Real-Time and Graphical router and application traffic monitoring**

**Use the Cisco TAC knowledgebase to troubleshoot VPN and WAN**

http://www.cisco.com/go/sdm

One Touch Router Lock-down, Auto Secure

Router-Integrated Services
Network Admission Control (NAC)

Companies need to minimize downtime due to viruses and worms, protect network availability and integrity, manage network access, and enforce security policy

Solution: **Cisco Network Admission Control (NAC)**

- **Reduces IT costs by preventing external and internal threats**

- **Prevents "contagious" endpoints from infecting network; reduces downtime**

- **Day-zero protection, increases network availability, resilience, and productivity**

- **Leverages existing Cisco, antivirus, and endpoint investments**

- **Integrated Services Router is one of first network devices to enable NAC**
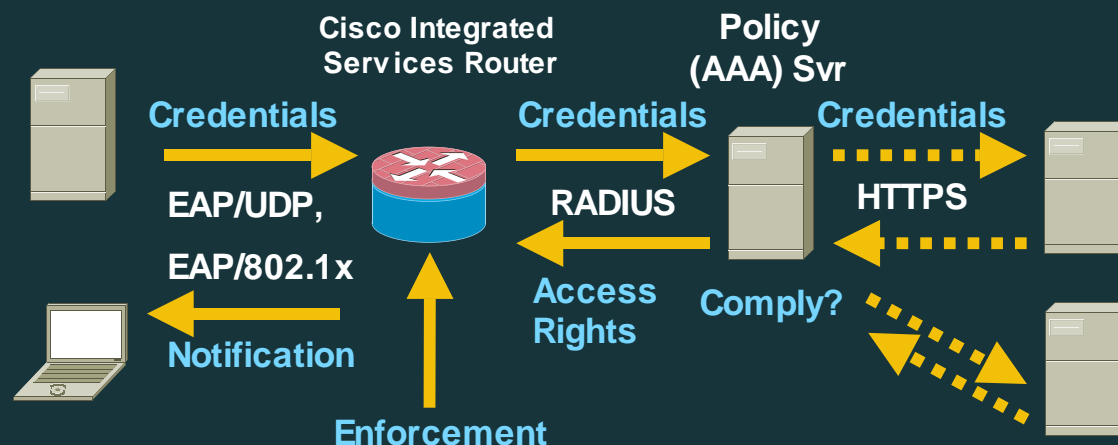
Router-Integrated Services
Intrusion Prevention Systems (NM-CIDS, IOS IPS)

Threat Defense: prevent and respond to network attacks such as worms and virus

Solution: Intrusion Prevention System (IPS)

- IPS in hardware with NM-CIDS, or software with IOS IPS

- IOS IPS: Inline Intrusion Prevention—send alarm, drop packet, reset connection

- Dynamically load customizable signatures

- IDS Network Module stores signature data base locally and captures/logs all events

- External NM FE allows for complete IDS segmented Net/Op and Sec/Op management

Data Center

Hacker

Internet

Monitoring

IDS DATABASE

Cisco Integrated Services Router (IOS IPS option)

NM-CIDS

Remote Users

NM-CIDS

➜ Dedicated CPU

➜ Monitors, and Report alarms

➜ Built in GU for Graphical reports
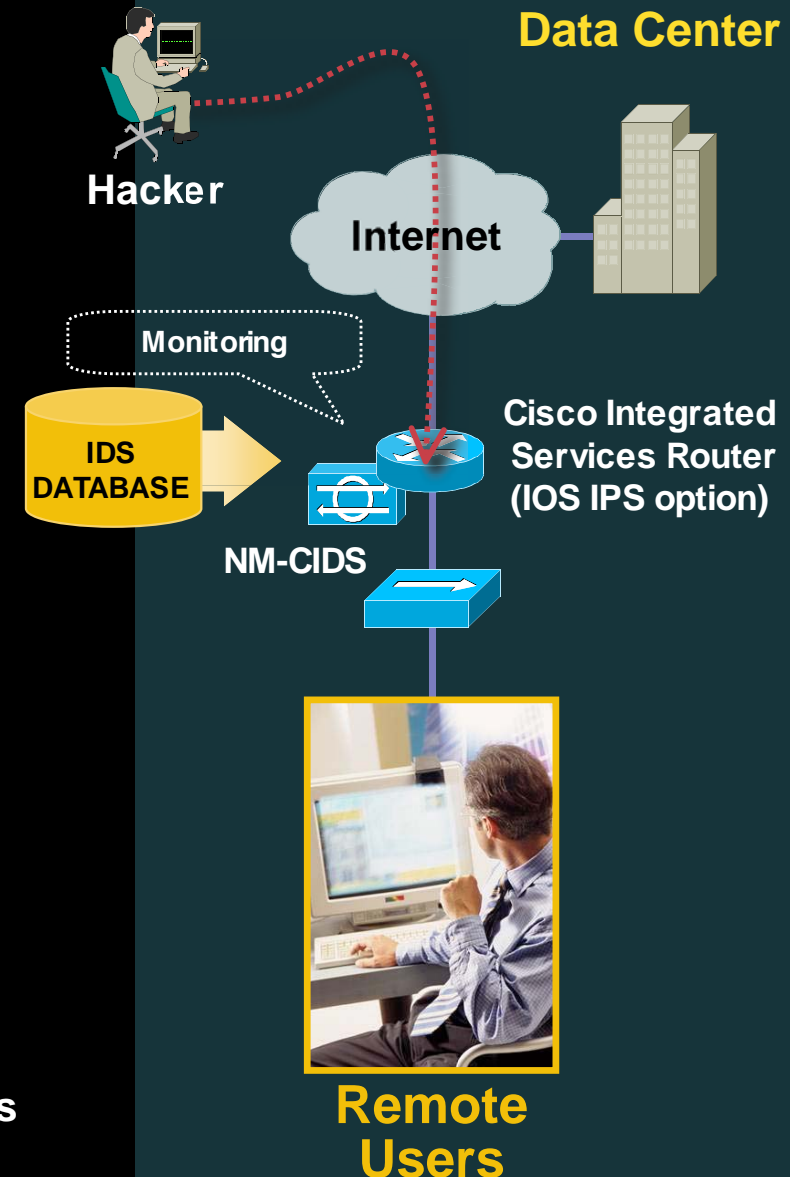
Router-Integrated Services
LAN Switching with Transparent Firewall

Providing LAN segmentation with security in multiple branch sites can be costly and time consuming to deploy

Solution: **EtherSwitch (NM-ESW or HWIC-ESW) and IOS Transparent Firewall**

- **VLAN and transparent IOS FW enables segmented networks with secure access control**
- **Simplify subnets, no changing IP addresses on a device by device basis**
- **Configure the router and integrated switch without visiting the remote site**
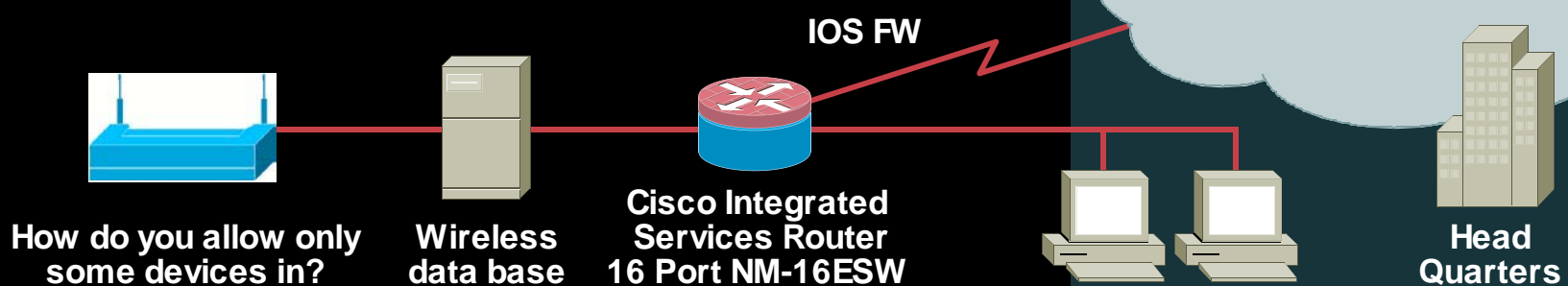
NM-ESW
16 and 36 ports of 10/100 Ethernet

NEW

HWIC-ESW
4 and 9 port
Hi-Speed WAN Interface Card

Branch Office

WAN

IOS FW

How do you allow only some devices in?

Wireless data base

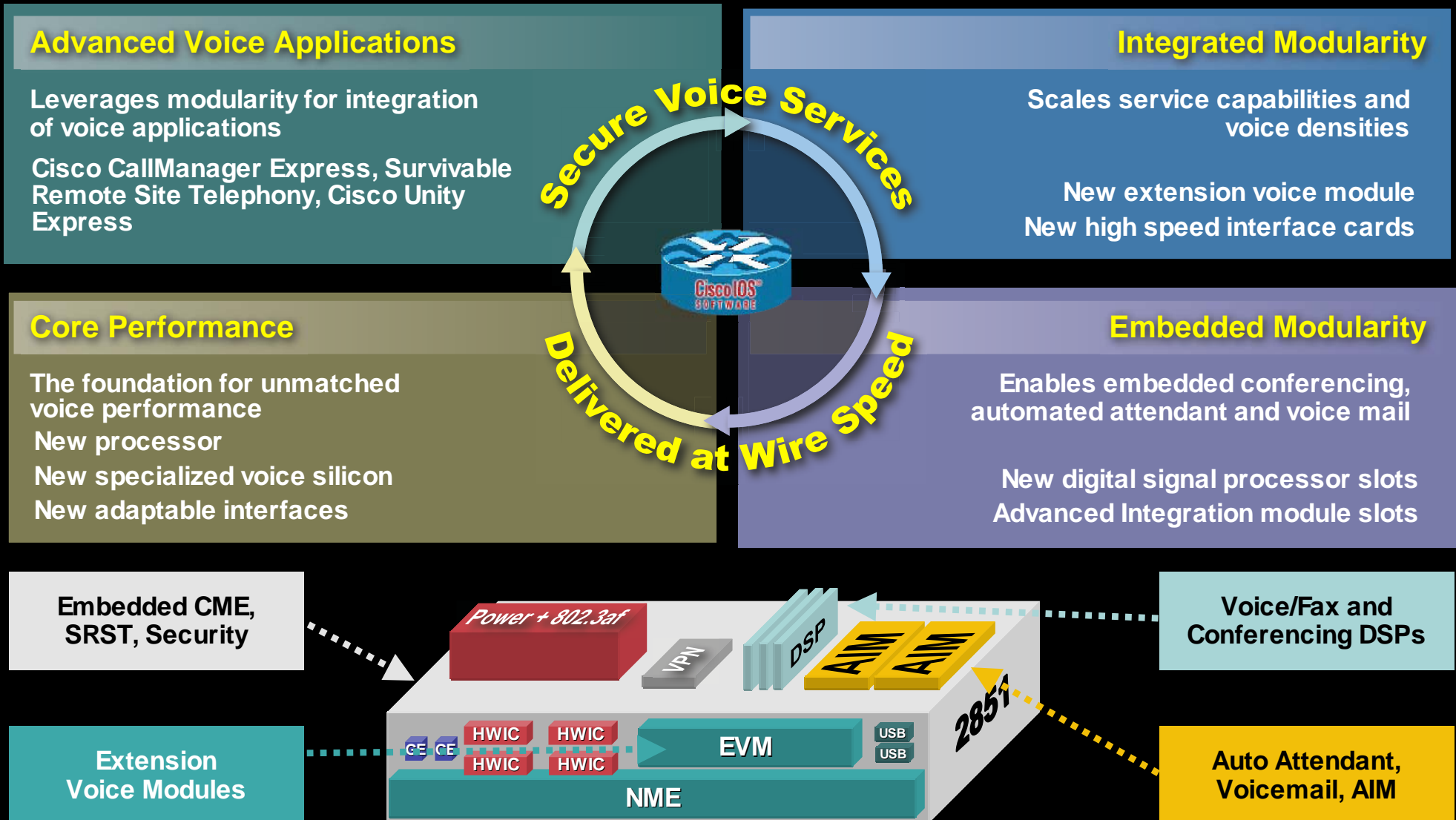**Cisco Integrated Services Router 16 Port NM-16ESW**

Head Quarters

Hardware Innovation Raises Voice Leadership
Cisco Services and Applications At Wire-speed!

Affordable, Secure, Scalable Voice Solutions

Advanced Voice Applications

Leverages modularity for integration of voice applications

Cisco CallManager Express, Survivable Remote Site Telephony, Cisco Unity Express

Integrated Modularity

Scales service capabilities and voice densities

New extension voice module
New high speed interface cards

Core Performance

The foundation for unmatched voice performance
New processor
New specialized voice silicon
New adaptable interfaces

Embedded Modularity

Enables embedded conferencing, automated attendant and voice mail

New digital signal processor slots
Advanced Integration module slots

Secure Voice Services
Delivered at Wire Speed

Cisco IOS SOFTWARE

Embedded CME, SRST, Security

Voice/Fax and Conferencing DSPs

Extension Voice Modules

Auto Attendant, Voicemail, AIM

Power + 802.3af
VPN
DSP
AIM
AIM
2851
GE GE HWIC HWIC
HWIC HWIC
EVM
USB
USB
NME

IP Communications for the Enterprise Branch Office

Affordable and robust IP Communications for enterprise branches and small to medium sized businesses

Solution: Cisco CallManager Express (CCME) with Cisco Unity Express (CUE) and SRST with CallManager
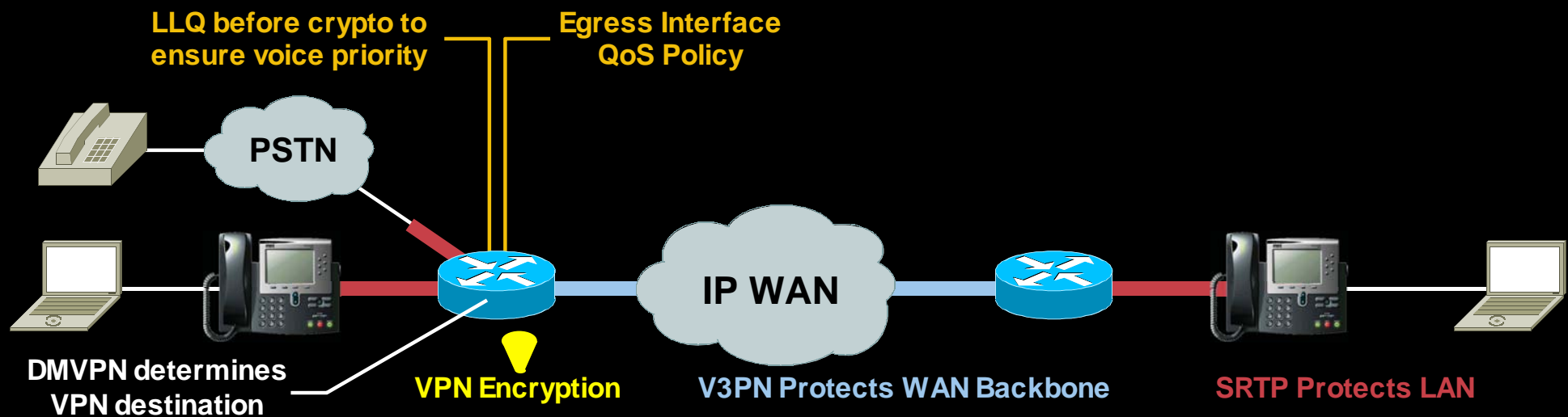
- Localized call processing with Cisco CallManager Express (CCME) for up to 240 phones!

- "Failover" localized call processing with Cisco Survivable Remote Site Telephony (SRST) for up to 720 phones!

- Distributed Voicemail via Cisco Unity Express (NM-CUE, or AIM-CUE)—new 14 hour AIM Flash!

- Etherswitch® Module for Line Powering IP Phones

- Centralized DSP resources for voice connectivity

- Higher digital and analog voice densities

Data Center

CCM

IP WAN

Cisco Integrated Services Router

CCME/SRST and NM-CUE or AIM-CUE

Remote Users
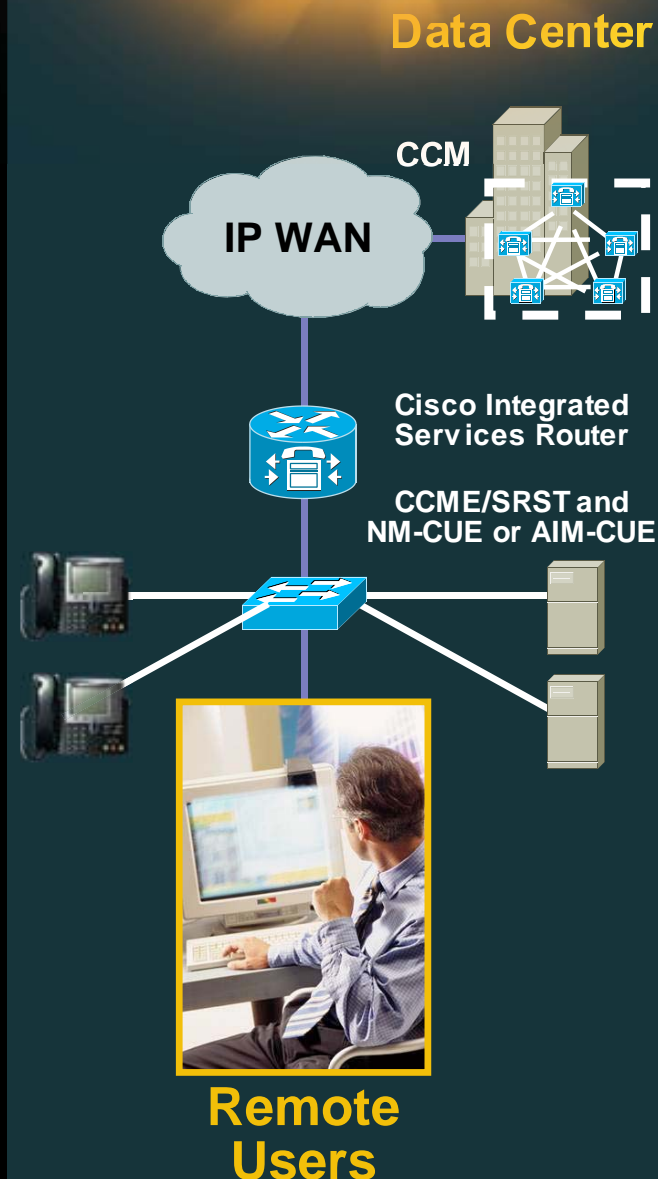
Secure, Toll Quality IP Telephony Using DMVPN & V3PN

Communications problem solved though network intelligence and a systems approach managed though policies

LLQ before crypto to ensure voice priority

Egress Interface QoS Policy

PSTN

IP WAN

VPN Encryption

DMVPN determines VPN destination

V3PN Protects WAN Backbone

SRTP Protects LAN

Requirements

- Mesh configuration, hub & spoke simplicity
- Wire-speed encryption
- Voice / video prioritization
- Bandwidth conservation
- Concurrent services VPN
- Secure RTP

Benefits

- Ease of management, configuration
- Traffic throughput with encryption
- Toll quality, jitter-free voice and video
- DMVPN sets up tunnel when needed
- WAN hacker security, lower costs
- LAN hacker security

Router-Integrated Services
## Application & Content Networking (NM-CE)

Data Center

Web applications, intranet portals, and business video consume expensive wide-area-network (WAN) bandwidth

As companies extend Web applications and Internet access to employees, they need to manage what the Internet is used for and potential threats from "un-trusted" sites/content

Solution: Cisco ACNS

- **Web application acceleration:**

  Siebel, SAP, intranet portals, file/software distribution

- **Business video:**

  Pre-load rich media; deliver RN, WMT, QT, MPEG, ASF, PDF, etc.

- **Web content security:**

  Internet and application access control and use policy enforcement

  URL filtering with Internet traffic logging and reporting

Internet

Cisco Integrated Services Router (IOS IPS option)

NM-CE

Branch Users
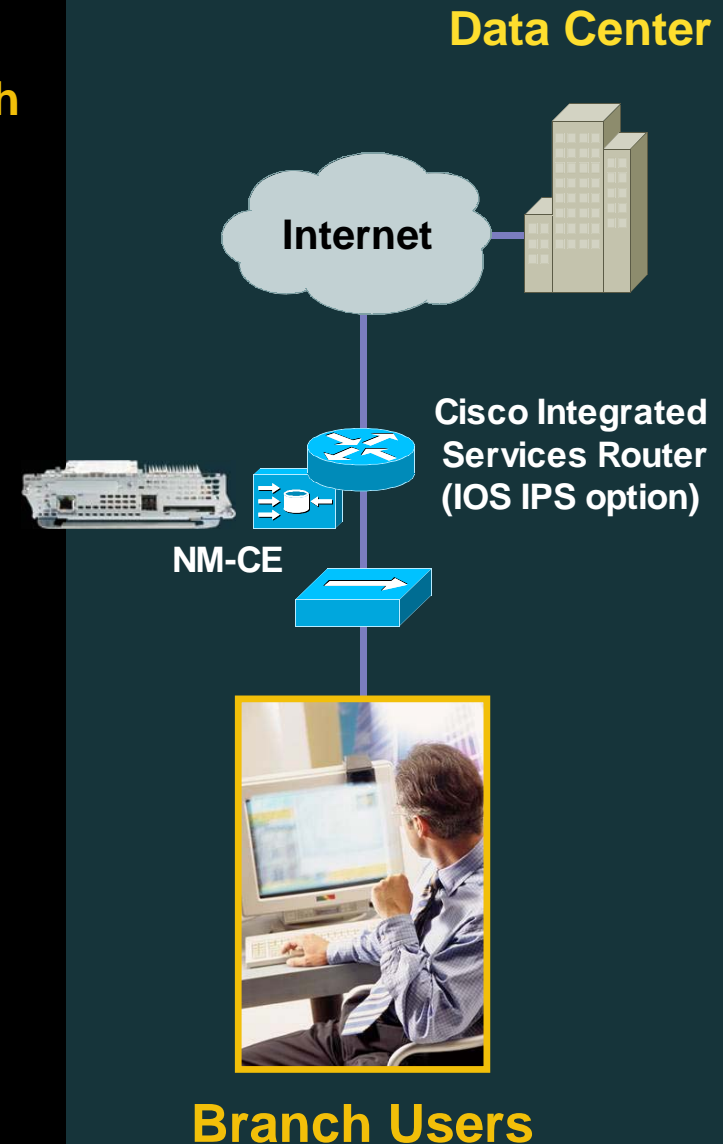
Traffic Monitoring
Network Analysis (NM-NAM, NAM Application Software 3.2)

NM-NAM network module for Integrated Services Routers

- **Quick to deploy and easy to use with embedded web based Traffic Analyzer GUI**

- **Analyzes traffic flows for applications, hosts, conversations, and IP-based services such as QoS and VoIP**

- **Collects NetFlow Data Export to provide broad application-level visibility**

- **Tracks response times using the ART MIB to isolate application performance problems related to the network or to the server**

NM-NAM

Industry-leading network availability for the Branch and Router-Integrated Services

End-to-end systems approach to

minimize downtime and optimize application delivery

Hardware Resiliency
Resilient Platforms designed for High Availability

- Redundant System Power*
- Redundant Inline Power*
- Online Insertion & Removal of Like NME*
- Online Insertion & Removal of SFP**
- Power Over Ethernet (POE) – 802.3af Remote Power Reset
- Error-Correcting Code (ECC) Memory

* 3845 only
**3825 and 3845 only

System Resiliency
Cisco IOS Software functionality that mitigates the impact of HW and SW failures

- Warm Reload
- Warm Upgrade
- Control Plane Policing
- Gateway Load Balancing Protocol (GLBP)
- Stateful NAT
- Stateful IPSec***

*** Q1, CY05

Network Resiliency
Cisco IOS Software functionality for faster network convergence, protection and restoration

- Survivable Remote Site Telephony (SRST)
- Nonstop Forwarding (NSF) Awareness
- Routing Convergence Enhancements
- Multicast Sub-Second Convergence

Embedded Management
Embedded intelligence for proactive maintenance and local recovery

- Embedded Event Manager
- Embedded Syslog Manager
- Configuration Rollback
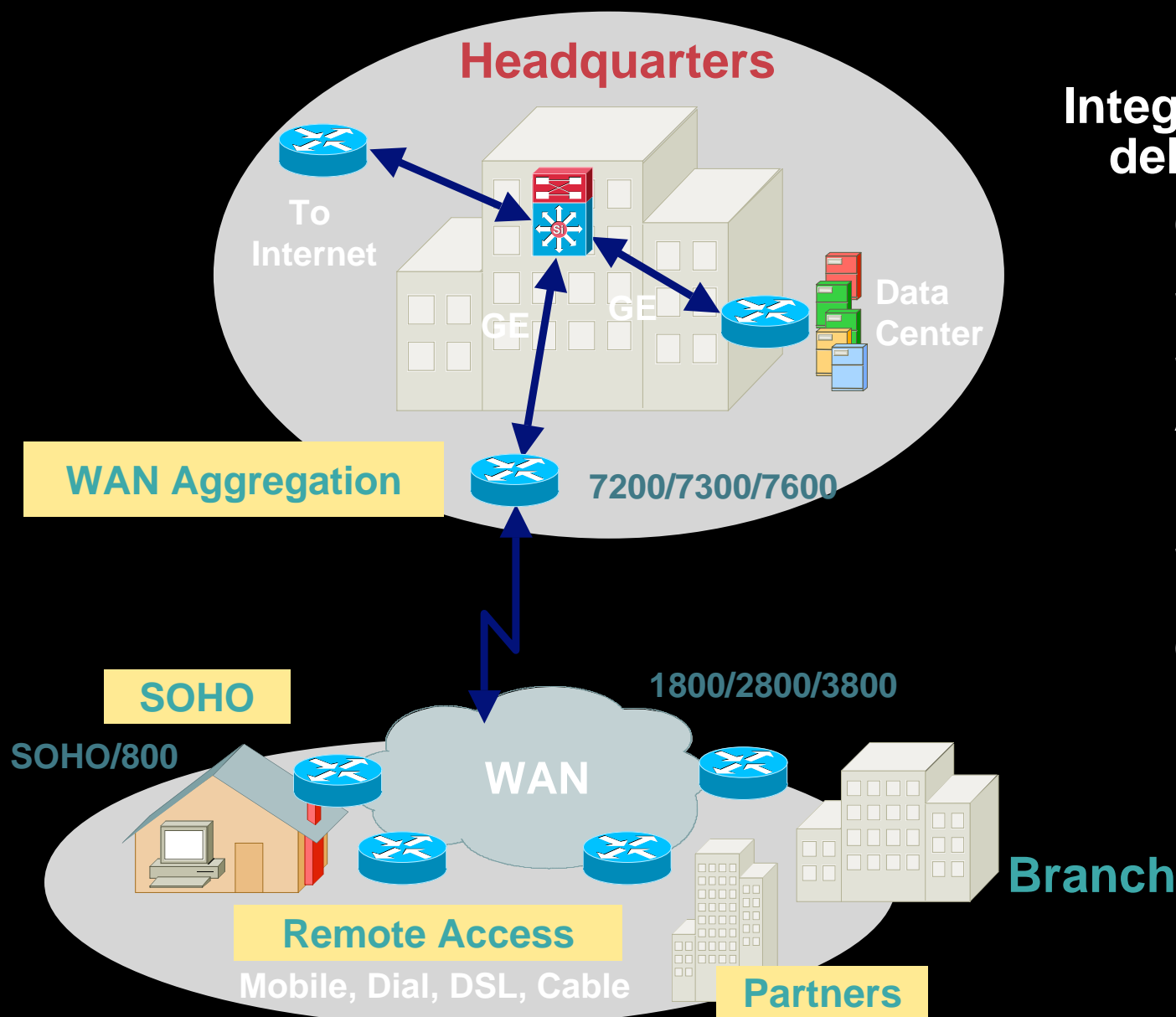- Resource Management Infrastructure (RMI)

Cisco Sets The Technology Standard

- **Next generation, best-in-class routing**

- **Concurrent services at wire-speed**

- **Leading security solutions**

- **Leading voice solutions**

# Enterprise-wide Integrated Services from Headquarter to the Branch

Headquarters

To Internet

GE   GE

Data Center

WAN Aggregation   7200/7300/7600

SOHO

SOHO/800

1800/2800/3800

WAN

Remote Access

Mobile, Dial, DSL, Cable

Partners

Branch

Integrated services delivery across the WAN

Converged Voice/Video/Data

Site to site VPN

Security

Advanced QoS

High Availability

Services Flexibility

Integrated GE LAN/Data Center Connectivity

IP/MPLS Routing
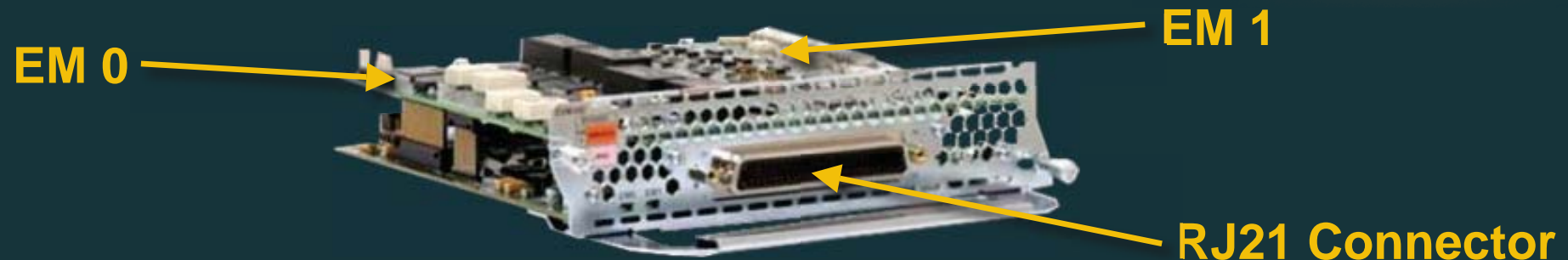
Multi-protocol WAN Traffic
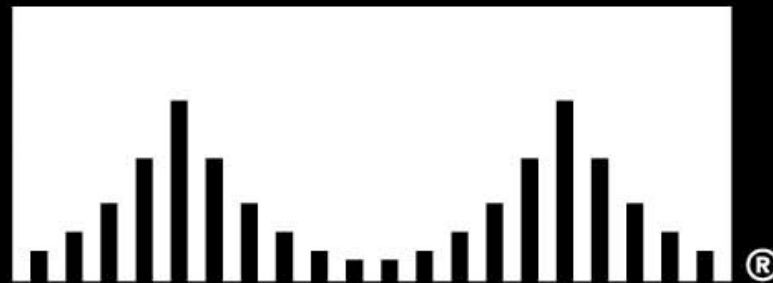
Extended Voice Module (EVM-HD)

EM 0

EM 1

RJ21 Connector

- **The EVM card (with expansion modules) supports high-density FXS, FXO, Analog-DID and BRI ports**

- **Architecturally similar to the NM-HDA and shares one EM**

- **Baseboard:**
  - **EVM-HD-8FXS/DID: High density voice/fax extension module – 8FXS/DID**

- **Expansion Modules:**
  - **EM-HDA-8FXS: 8-port voice/fax expansion module—8FXS**
  - **EM-4BRI-NT/TE: 4-port voice/fax expansion module—BRI (NT& TE)**
  - **EM-HDA-3FXS/4FXO: 7-port voice/fax expansion module—3FXS/4FXO**
  - **EM-HDA-6FXO: 6-port voice/fax expansion module—6FXO**

High-Speed WAN Interfaces

4 & 9 port Etherswitch HWIC

- **Low density L2 switching**

- **Cisco and 802.3af standards-based PoE support on 3800 and 2800 series ISR**

  Delivers 48V DC Power over a standard copper Ethernet cable

Gigabit Ethernet HWIC

- **Offers Optical and Copper connectivity without NM occupancy**

- **Support in 2811, 2821, 2851 & 3800 only**

Hi-Speed WAN Interface Card (HWIC)

Small Form Factor Pluggable (SFP) GE Transceiver

DS0 Connectivity Summary

	1751	1760	2801	VG224	2600XM	2691	2811	2821	2851	3725	3745	3825	3845
FXS	12	16	16	24	12	12	28	52	52	24	48	52	88
FXO	12	16	16	0	8	8	24	36	36	16	32	36	56
E&M	6	8	8	0	4	4	12	12	12	8	16	16	24
Analog-DID	4	8	8	0	4	4	12	20	20	8	16	20	32
CAMA	12	16	16	0	4	4	24	36	36	8	16	36	56
BRI Ports	6	8	8	0	4	4	12	20	20	8	16	20	32
BRI Channels	12	16	16	0	8	8	24	40	40	16	32	40	64
Total T1/E1 Ports	4	4	8	0	5	6	12	12	12	10	18	16	24
Onboard T1/E1 Ports	4	4	8	0			8	8	8			8	8
NM/AIM-based T1/E1 Ports	0	0	0	0	5	6	4	4	4	10	18	8	16
T1 Channels: DS0 Connectivity	96	96	192	0	120	144	288	288	288	240	432	384	576
Onboard T1 DS0 Connectivity	96	96	192	0	0	0	192	192	192	0	0	192	192
NM/AIM-based T1 DS0 Con'tivity	0	0	0	0	120	144	96	96	96	240	432	192	384
E1 Channels: DS0 Connectivity	120	120	240	0	150	180	360	360	360	300	540	480	720
Onboard E1 DS0 Connectivity	120	120	240	0	0	0	240	240	240	0	0	240	240
NM/AIM-based E1 DS0 Con'tivity	0	0	0	0	150	180	120	120	120	300	540	240	480

Central Device & Network Management for Ease of Operations

Integrated, Central Management for Devices, Networks, and Services

Foundation Management	**CiscoWorks:** VPN, Security, WAN, Small Networks		
Service Management	Access Control	Quality Performance	Voice
Device Management	GUI & CLI	Secure Routers	Configuration
Instrumentation	NetFlow Syslog	SNMP RMON	Service Assurance — Network Analysis

Automation of device configuration	**Reduce deployment costs by as much as 60%**
Real-time inventory and change information	**Simplifying tasks "inventory, config change" reducing time by 80%!**
Embedded security control with Router & Security Device Manager (SDM)	**Standard in every Integrated Services Router!**

Making Security Services Sales Faster, Easier: Cisco 3800, 2800 and 1800 Security Bundles

New	Enhanced Security Bundles	Entry Security Bundles
3800 Series	Cisco 3825-HSEC/K9 Cisco 3845-HSEC/K9	Cisco 3825-SEC/K9 Cisco 3845-SEC/K9
2800 Series	Cisco 2801-HSEC/K9 Cisco 2811-HSEC/K9 Cisco 2821-HSEC/K9 Cisco 2851-HSEC/K9	Cisco 2801-SEC/K9 Cisco 2811-SEC/K9 Cisco 2821-SEC/K9 Cisco 2851-SEC/K9
1800 Series	Cisco 1841-HSEC/K9	Cisco 1841-SEC/K9
	Include: AIM-VPNII PLUS, Router, Cisco IOS Advanced IP Services	Include: Router, Cisco IOS Advanced Security

Making Voice Services Sales Faster, Easier: Cisco 3800, 2800 IPC Bundles

New

V3PN Bundles	SRST Voice Bundles	CME Voice Bundles	Entry Level Voice Bundles
3845-3VPN/K9	3845-SRST/K9	3845-CCME/K9	3845-V/K9
3825-3VPN/K9	3825-SRST/K9	3825-CCME/K9	3825-V/K9
2851-3VPN/K9	2851-SRST/K9	2851-CCME/K9	2851-V
2821-3VPN/K9	2821-SRST/K9	2821-CCME/K9	2821-V
2811-3VPN/K9	2811-SRST/K9	2811-CCME/K9	2811-V
2801-3VPN/K9	2801-SRST/K9	2801-CCME/K9	2801-V
Includes: Router, Cisco IOS Advanced Services, DSPs, AIM-VPN Accelerator	Includes: Router, Survivable Remote Site Telephony, Cisco IOS SP Services, DSPs, Memory	Includes: Router, Cisco CallManager Express, Cisco IOS SP Services, DSPs, Memory	Includes: Router, Cisco IOS SP Services, DSPs, Memory