Multiservice Access Product Update

Session 2907
Agenda

- Enterprise Branch Office Drivers
- Multiservice Platform Overview
- Platform and Data Features Update
- MultiService Integration Migration
- Packet Voice Features Update
- Multiservice Roadmap

Branch Office Market Drivers

- Rapid Technology Implementation
- Reduced Complexity

- Convergence Funding
- Network Infrastructure Integration
Multiservice Branch Key Applications

- Voice/Data Integration
- ATM Access
- Inter-VLAN Routing
- Serial Device Concentration
- Remote Dial Access
- ISDN Concentration
- Routing and Bandwidth Management
- VPN Access
- Integrated Firewall
- xDSL Access

Cisco Multiservice Access Platforms

- Maximum investment protection, scalability, and flexibility
  Four major platform groups
  Over 80 shared NMs, WAN interface cards, voice interface cards, and A1Ms

- Broadest multiservice capability in the industry
  Data, voice, video, dial, VPN, and ATM edge integration

Over 600K Units and 800K Voice Ports Sold!
Cisco MC3810-V3

New V3 Platform!

ATM, FR, Leased Line Up to T1/E1 + ISDN Backup

Complete Router with Standard Cisco IOS®

Six Analog Voice Ports or T1/E1 Digital Voice Port—VoFR, VoIP, VoATM (AAL5 and AAL2)

Two Serial Data (5 in 1)

One Ethernet LAN (10BaseT)

Cisco 2600 Series Modular Access Routers

- Data, voice, dial and VPN access applications
- VoIP, VoFR and H.323 video
- Ethernet, Token Ring, mixed LAN, and 10/100 Fast Ethernet models
- 2–60 voice ports
Cisco 3620 Modular Access Router

- Two network module slots
- Ethernet, Token Ring, Fast Ethernet, and mixed LAN options
- VoIP, VoFR, VoATM and H.323 video
- 2–60 voice ports

Cisco 3640 Modular Access Router

- Four network module slots
- Ethernet, Token Ring, Fast Ethernet, and mixed LAN options
- VoIP, VoFR, VoATM, and H.323 video
- 2–120 voice ports
Cisco 3660 Modular Access Router

- Higher performance
  100–120Kpps
- Higher density: six NM slots
- Higher level of integration
  One or two Fast Ethernet ports
  Two Advanced Integration Module (AIM) slots
  Console port, aux port, dual PCMCIA card slots, dry contact closure
- 2–360 voice ports (VoIP, VoFR, and VoATM)
- Higher availability
  Dual power (dual AC, dual DC, or AC and DC)
  Hot-swappable network modules
  Hot-swappable power supplies

Multiservice Product Breadth and Depth

Broadband WAN Access Diversity
Packet Voice Technology
Performance
1 and 2 Port T1/E1 Multiflex VWIC

- 1 and 2 port T1/E1 CSU/DSU WIC
- T1/E1 voice interfaces in digital voice modules
- Integrated add/drop multiplexer capability
- G.703 support

New Feature

2 Port T1/E1 Drop and Insert Multiplexer

- Allows circuit switched voice and router data to share a single T1/E1 (or fractional T1/E1) service for reduced WAN costs
- Flexible timeslot assignment from port to port
- Investment protection in migration to packet voice
N x T1 ATM IMA

- Support for 4 or 8 DS1/E1 ATM ports
- Support for ATM forum IMA version 1.0 compliant
- Up to 16 Mbps full-duplex bandwidth with 8 port IMA network module
- Supports UBR, UBR+, VBR-rt, VBR-nrt, and ABR ATM classes of service

Cisco 3600 Series OC-3 ATM Network Modules

- Cost-effective ATM CPE solution for high-speed managed router service
- Ideal for transparent LAN or other applications requiring 20–80 Mbps throughput
- Three versions
  - Multimode OC-3–2km maximum distance
  - Singlemode intermediate reach OC-3–15 km maximum distance
  - Singlemode long reach OC-3–45 km maximum distance
10/100 Ethernet 4/16 Token Ring Combo Network Module

- 1 or 2 10/100 ports (also with no FE)
- Supports all WICs and VWICs
  2 port WICs and VWICs not supported on Ethernet combos
- High bandwidth WIC slots
- Future TDM: VWIC to VWIC and VWIC to backplane

DS3/E3 ATM Network Modules

- Supported on 2600, 3620/40 and 3660
- T3 and E3 coaxial versions
- UBR, UBR+, VBR-rt, VBR-nrt, CBR and ABR Classes of Service support
- Support for voice and data over AAL5

New this Summer
OC-3/STM-1 Circuit Emulation Service

- Supported in IOS Release 12.1(2)T
- Supported on 3620/40 and 3660
- Multimode, singlemode intermediate and singlemode long reach versions
- New CES capability coming in midrange
  - Structured and unstructured modes
  - CBR, VBR-rt, VBR-nrt, UBR, UBR+, and ABR
  - Echo cancellation for a single T1/E1
  - Global, SRTS and adaptive clocking modes
- Utilizes Multiflex VWIC

New this Summer

Hardware Encryption

- Coming Soon!
- Cisco 3620/40 NM
- Cisco 3660 AIM
- Cisco 2600 AIM
Multiservice Packet Voice

Velocity

Toll Bypass

Mass Deployment

Through the Chasm

Enterprise Packet Voice Applications

Multiservice Packet Voice

Migration Spectrum

Scalability

Off-Net Calling

Toll Bypass (on-net)

Video Conferencing

Virtual Contact Centers

Add IP Phones

Unified Communications

Pure IP Telephony

Circuit-Switched

Packet-Based

Packet Edge
Packet Transport
Circuit Edge
Packet Edge
Packet Transport
Circuit Edge
Packet Edge
Packet Transport
Circuit Edge
Packet Edge
Packet Transport
Circuit Edge
Packet Edge
Packet Transport
Circuit Edge
**Migration Step 1: Toll Bypass with any WAN Technology**

- **Existing PBX and Phones**
- PSTN
- Data and Voice
- WAN ATM/FR/IP
- 26/36/7200

**Migration Step 2: Add IP Phones to New Sites**

- **Existing PBX and Phones**
- PSTN
- WAN IP
- IP Phone
- Call Manager
- IP Phone
Migration Step 3: Add New World Applications/Remove PBXs

Multiservice Packet Voice Transport
Top Three Enterprise Reasons

1. Toll charge savings and leased line reduction without circuit-switched equipment forklifts

2. Budget funding and network management advantages of a single common infrastructure

3. Infrastructure preparation for quick incorporation of new data/voice/video applications
### Packet Types

<table>
<thead>
<tr>
<th>Voice Packets</th>
<th>Type</th>
<th>Header Sizes</th>
<th>Packet Efficiency</th>
<th>QoS</th>
<th>Routes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATM</td>
<td>Connection Oriented, Layer 2</td>
<td>Small Headers</td>
<td>56%</td>
<td>Can Be Hard (CBR)</td>
<td>Fixed/Known</td>
</tr>
<tr>
<td>Frame Relay</td>
<td>Connection Oriented, Layer 2</td>
<td>Small Headers</td>
<td>62.5% (FRF.11) 79% (Cisco VoFR)</td>
<td>Deterministic</td>
<td>Fixed/Known</td>
</tr>
<tr>
<td>IP</td>
<td>Connection-less Layer 3</td>
<td>Larger Headers</td>
<td>33% 83% (With CRTP)</td>
<td>Soft—Best Effort</td>
<td>Flexible</td>
</tr>
</tbody>
</table>

---

### CPE/Branch Office Multiservice Platform Choices

<table>
<thead>
<tr>
<th>Egress Choices</th>
<th>Analog Voice Ports</th>
<th>Digital Voice Ports (T1/E1) DS0's</th>
<th>Voice Compression</th>
<th>Voice Packets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco 1750</td>
<td>10/100 Serial</td>
<td>4</td>
<td>G.711 G.729</td>
<td></td>
</tr>
<tr>
<td>Cisco 3810</td>
<td>10BaseT Serial</td>
<td>6</td>
<td>G.711 G.729 G.729a/b G.726</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up to 2 T1/E1 T1 ATM</td>
<td>24/24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cisco 261x 262x</td>
<td>FE TR Serial</td>
<td>4</td>
<td>G.711 G.729 G.729a/b G.723.1 G.726 G.728</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1/E1 ATM Through OC-3</td>
<td>48/60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cisco 3620/40</td>
<td>FE TR Serial</td>
<td>12</td>
<td>G.711 G.729 G.729a/b G.723.1 G.726 G.728</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1/E1 ATM Through OC-3</td>
<td>120/120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cisco 3660</td>
<td>FE TR Serial</td>
<td>24</td>
<td>G.711 G.729 G.729a/b G.723.1 G.726 G.728</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1/E1 ATM Through OC-3</td>
<td>288/360</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

△ New Since July ’99
Cisco Multiservice!
What Have You Done for Me Lately?

- An explosion of features to allow you to migrate your circuit switched PBX traffic to a multiservice network
- Connection support for over 90% of the world’s medium/large legacy PBXs
- Transparent support for proprietary PBX signaling

Cisco MC3810
IOS Release 12.0(7)XK1

- VoIP support
- SGCP support
- Battery polarity reversal on FXO and FXS (supervisory disconnect)
- CVM 2.0 support for VoFR, VoATM and VoIP
- New MC3810-V3 platform

New Features!
Cisco 2600 and 3600 IOS Release 12.0(7)XK1

- Battery polarity reversal on VIC-2FXO-M1/M2 and VIC-2FXS (supervisory disconnect)
- VoFR support added for T1/E1 voice
- VoATM support added for T1/E1 voice and analog voice
- CVM 2.0 support for VoIP, VoFR and VoATM for T1/E1 voice and analog voice
- Including E1 QSIG voice support

VIC-2FXO-M1/M2 Voice Interfaces for C2600/C3600

- VIC-2FXO-M1—North America plus others (same country support as existing VIC-2FXO)
- VIC-2FXO-M2—Europe (same country support as existing VIC-2FXO-EU)
- Support for Battery Polarity Reversal
- Support for Caller ID in IOS Plus 12.1(2)XH
- Includes all of the existing VIC-2FXO features at the same list price!
T1/E1 Voice/Fax Network Module

Flexible Voice Interfaces
- T1 or E1
- Up to 60 (E1) Compressed Voice Channels (48 with T1)

Diverse Signaling
- T1 CAS—Delay, immediate, wink, loop, ground start
- T1 and E1 PRI QSIG
- PRI Q.931, R2, CCS, E1-CAS, T-CCS—New for Summer 2000

DSP Architecture
- G.729, G.728, G.726, G.723.1, G.729a/b, G.711 PCM
- Group III Fax Relay

Protocol Support
- VoIP, VoFR and VoATM
- H.323v2
- SGCP
- MGCP—New for Summer 2000

Voice Processing Is Performed at Modular Processing Elements: Divide and Conquer

VWIC handles
- Line signaling
- Line encoding/decoding
- TDM switching
- Long/short haul functions
- Framing, termination
- DSU/CSU functions
- TDM drop and insert
- Support data WAN connections

New Features Support

T1/E1 Voice Network Module Processing Advantage

NM-HDV-2T1-48 Pictured Above
**NM-HDV handles**

- Voice signaling processing using an onboard CPU
- TDM controller/switch functions
- DSP resource management
- VoCoder management
- PLL clocking

---

**PVDM-12 performs**

- DTMF detection and generation
- PCM encoding and decoding
- Standardized voice compression algorithms
- Voice activity detection
- Echo cancellation
- Initiation of QoS parameters with NM-HDV

The PVDM-12 can be added as voice channels are needed—scaling from 1 to 5 PVDM-12 modules (providing from 3 to 15 DSPs)
Packet Voice T1/E1 PRI Signaling

- PRI Q.931 User Side Signaling to PBX or PSTN
- PRI Q.931 Network Side (NET5) Signaling to PBX or PSTN
- Support for PBXs that speak T1/E1 PRI Q.931 and need PRI features!
- Supported on Cisco 3600 and 2600 in IOS Plus 12.1(2)XH

New this Summer

T1/E1 Network Side or User Side Q.931 PRI

T1/E1 Transparent CCS Signaling

- Connect to PBXs that only speak proprietary PBX signaling protocols (CCIS, Cornet, DPNSS, Nortel, etc.)
- Transparently carry signaling across IP, FR or ATM
- Tie-line replacement and toll-bypass solutions regardless of PBX type!
- Supported on Cisco 3600 and 2600 in IOS Plus 12.1(2)XH

New this Summer
New E1 Packet Voice Signaling

- E1 CAS Signaling to PBX or PSTN
- E1 R2 Line and Register Signaling to PBX or PSTN with over 30 variants
- R2 ITU Q411, Q421, ITU Supplement 7, Compelled Register Signaling, Non-Compelled Register Signaling, Semi-Compelled Register Signaling
- R2 Variants: Argentina, Australia, Bolivia, Brazil, Bulgaria, China, Colombia, Costa Rica, Croatia, East Europe, Ecuador ITU, Ecuador LM, Greece, Guatemala, Hong Kong [China variant], India, Indonesia, Israel, ITU, Korea, LAOS Network (Thailand Variant), Malaysia, Malta, New Zealand, Paraguay, Peru, Philippines, Saudi Arabia, Singapore, South Africa Panaftel, Telmex, Telnor, Thailand, Uruguay, Venezuela, Vietnam
- Supported on Cisco 3600 and 2600 in IOS Plus 12.1(2)XH

Data WAN Connections + Voice Connections on the NM-HDV

- Connect both a data WAN (FR, MLPPP, PPP, HDLC, etc.) and PBXs or the PSTN to one Network Module (Multiple Groups of DS0’s for WAN and Voice)
- Single network module support for packet and TDM voice and WAN connection
- Supported on NM-HDV with T1/E1 VWICs using Cisco 3600 and 2600 in IOS plus 12.1(2)XH
Caller ID

- Transmit Caller ID information via FXS voice interfaces to phone, key system, PBX or fax
- Receive Caller ID information via FXO voice interfaces from PSTN or PBX
- Transmit and Receive Caller ID (ANI) information over E&M voice interfaces
- Transmit and Receive Caller ID information over T1/E1 voice interfaces using ANI or PRI
- Supported on Cisco 3600, 2600 and 3810 in IOS Plus 12.1(2)XH

Additional New Voice Features
Cisco 2600 and 3600

- Feature Group D and B support (DNIS and ANI)
- RAI (Resource Availability Indication) on digital T1/E1 voice interfaces to handle resource availability prior to call establishment
- QoS: Low latency queuing, PQWFQ, VoIP over FR
VoIP, VoFR and VoATM dial plan management

1750, 3600, 2600, MC3810 5300, 7200 and gatekeeper support

Launches from CiscoWorks 2K

Provisioning of QoS

Quality of voice exception report and call volume reporting

Scalability/performance improvements
THE GUARDIAN

- $7 BILLION FINANCIAL SERVICES COMPANY
- LIFE & DISABILITY INSURANCE, 401K, FINANCIAL SECURITY
- OVER 3000 AGENTS
- OVER 150 OFFICES NATIONWIDE
- 4 REGIONAL OFFICES

GUARDIAN’S CORPORATE NETWORKS

- MIX OF IBM LEGACY AND CLIENT SERVER
- CISCO 7200 ROUTED WAN BACKBONE TO REGIONAL OFFICES
- CISCO 2524 FRAME RELAY NETWORK TO 50 GROUP OFFICES
- NEW 3640 MULTISERVICE AGENCY NETWORK
THE GOAL: IMPROVE LIFE SALES AGENT OFFICE OPERATIONS

- BRING NEW CENTRALIZED SALES & MARKETING APPLICATIONS TO AGENTS DESKTOPS
- SUPPORT LEGACY APPLICATIONS
- IMPROVE PERFORMANCE & RELIABILITY OF AGENT SYSTEMS
- BRING MULTIMEDIA CAPABILITIES
- IMPROVE CUSTOMER & AGENT SERVICE

THE CHALLENGE

- GUARDIAN’S ORIGINAL AGENCY LEGACY NETWORK WAS ANTIQUATED
- A MULTIPONT DDS SNA/SDLC NETWORK
- MAINFRAME BASED SYSTEM DIFFICULT TO MAINTAIN
- MULTIPLE PLATFORMS WITH LIMITED BANDWIDTH
- POOR RESPONSE TIME & RELIABILITY
THE SOLUTION
Guardian On Line

- NEW WEB BASED APPLICATIONS
- STANDARDIZED PLATFORMS
- 100 CISCO 3640 ROUTERS AT AGENCIES
- INCREASE SPEED TO 128K - 768K OVER NEW FRAME RELAY NETWORK
- DUAL PVC’S TO GUARDIAN’S FOR HIGHER RELIABILITY AND DISASTER RECOVERY
THE SOLUTION cont’d.

- EACH ROUTER T1 MODULE, ISDN RESTORAL, SERIAL CONN FOR LEGACY & FXO/FXS FOR FAX & VOICE
- PROVIDE FAX CONNECTIVITY FROM AGENCIES TO HQ. OVER NETWORK
- FLEXIBILITY TO CHANGE NETWORK CONNECTIVITY WITHOUT FORKLIFT
- PLATFORM FOR NEW E-LEARNING VIDEO APPLICATIONS

Guardian “On Line” Network

Guardian
Multiservice Network
Voice / Fax / Video Over IP

Agency
Telephone
Fax

Headquarters
7 Hanover Square
NY, NY

Datacenter
Bethlehem, PA

Cisco 7206
Cisco 7513
Guardian Multiservice Network
Voice / Fax / Video Over IP

Catalyst Eth. Switch
VoIP & DLSW+

Token-ring
IBM Mainframe

DS-3
DS-3

Cisco 3640
VoIP & FoIP

Spokane
Appleton
THE RESULTS

- IMPROVED AGENT PRODUCTIVITY AND INCREASED SALES
- BROUGHT NEW SALES APPLICATIONS ON LINE
- OPERATION & SUPPORT COST DECREASED
- IMPROVED AGENT & CUSTOMER SERVICE
- IMPLEMENTING E-LEARNING & VOICE APPLICATIONS

ADDITIONAL MUTISERVICE NETWORKING PLANS

- IMPLEMENTING ATM BACKBONE NETWORK BETWEEN REGIONAL OFFICES
- DATA/VIDEO/VOICE CONNECTIVITY
- EASIER DISASTER RECOVERY
- EXPANSION OF VOIP CONNECTIVITY
- AVVID IP TELEPHONY
Enterprise Branch Market Evolution

Solutions

- WAN Access
- LAN to LAN
- Analog Voice
- ISDN Dial
- Branch VPN
- Digital Voice
- Modem Dial
- Multiservice Voice/VideoTransport
- Integrated Branch IP Telephony
- Enabling New Apps with Intelligent Services

Infrastructure

<table>
<thead>
<tr>
<th>Access BW</th>
<th>Platforms</th>
<th>Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>4T1</td>
<td>25/40xx &gt;&gt; 26/3600</td>
<td>Serial, ISDN, Async., HSSI, Modems</td>
</tr>
<tr>
<td>8T1</td>
<td>Scale Perf. and Density Cisco 3660</td>
<td>ATM OC-3, T1/E1, ATM DS3</td>
</tr>
<tr>
<td>DS3</td>
<td>Scale Extensions</td>
<td>DSL, Wireless</td>
</tr>
<tr>
<td>OC3</td>
<td></td>
<td>Optical</td>
</tr>
</tbody>
</table>

Multiservice Development

- Higher speed **WAN** access
- High bandwidth/**low cost** WAN access
- New LAN connectivity **speeds** and mobility
- Advanced **VPN** solutions
- Integrated **telephony** branches
- Increased multiservice **performance**
- New **applications** (data, voice, and video)
- Hoot and Holler over IP
Cisco Provides the Solutions for Multiservice Networking

Evolve to Multiservice

- Awareness campaign to compel users to start deploying voice today... whether it is 1% or 100%
- Present strategies for migrations
- Web site for sales and partners
- Customer examples and cases
  Over 15 customers filmed and more to come
  Variety of verticals and applications
  Clips available in a multiple formats
- Sales tools, migration guides, and more!
  Internal:
  http://wwwin.cisco.com/go/evolve
  Partner:
  http://www.cisco.com/partner/evolve
Multiservice Access
Product Update

Session 2907

Please Complete Your Evaluation Form

Session 2907