Cisco’s IP Telephony Solution
Agenda

• What is IP Telephony?
• Deployment models
• Benefits of IP Telephony
• Case Studies
• IP Telephony Solution components
IP Communication System—Optimizes Business Communications

- Leverage Cisco Architecture for Voice, Video and Integrated Data (AVVID): an enterprise wide, open, standards based architecture
- Deliver cost effective, reliable systems that scale with the organizations needs
- Maximize productivity and enhance customer service
- Leverage the data network investment

Cisco AVVID

Contact Center | Unified Communications | Voice Infrastructure
| IP Video/Audio conferencing | IP Telephony

IP Communications
There Are Three Basic Approaches to Data/Voice Network Convergence

- **“Traditional” PBX Vendors**
  - Not end-to-end IP solution
  - Gateways added to TDM architecture
  - Scalability based on cabinets
  - Proprietary software and IP phones

- **“Next Generation” Vendors**
  - End-to-end IP solution
  - Fully converged LAN/WAN architecture
  - Highly scalable and centralized or distributed
  - Open standards-based

- **Hybrid Boxes**
  - Bundled voice/data in a chassis-based system
  - Not necessarily converged architecture
  - Limited scalability
  - Some proprietary/some open

"True" Convergence
Enterprise Voice Evolution

Legacy PSTN Internetworking

Toll Bypass

End-to-End IP Telephony with Application Enablement
Why not just IP enable?

“Putting VoIP cards in a PBX does not constitute IP Telephony. IPT enables a whole raft of communication that the PBX cannot match. The user is still locked in to the PBX’s feature set … the one that hardly anybody uses on a regular phone. So why do it? Why pay for another device that only does the same thing as the phone you already have?”

Source: Bob Emmerson, Industry Analyst
79% of Businesses Moving to IP Telephony

“This year, we found that nearly one in five (18 percent) of the respondents who have already deployed VOIP are using it to carry 20 percent or more of their voice traffic.”

Source: Jim Metzler, Business Communications Review, July 2002
Why Migrate to Cisco’s IP Telephony Solution?

- Deploy and maintain one network, lowering monthly expense and overall TCO through a common architecture (upgrades, spares, etc)
- Open standards-based allows longterm flexibility and interoperability with 3rd party applications
- Scalability and High Availability
- Location independence-Locate agents and workers anywhere, allowing reduced facilities overhead
- Enhance employee productivity through Applications and access to critical tools
- Enhance customer service through tighter voice/data integration
- Rapid Deployment of new locations or applications, for better business resilience and agility in changing markets
# IP Telephony — Perception vs. Reality

<table>
<thead>
<tr>
<th>Perception:</th>
<th>Reality:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No E911 Support</td>
<td>E911 Support Is Available</td>
</tr>
<tr>
<td>Concern About Voice Quality</td>
<td>Available with QoS and Call Admission Control (CAC)</td>
</tr>
<tr>
<td>Lack of System Availability</td>
<td>Triple Redundancy for High Availability</td>
</tr>
<tr>
<td>Lack of Scalability</td>
<td>Systems Can Scale to 100,000 Users</td>
</tr>
<tr>
<td>Learning Curve Issues</td>
<td>Partner Support for Installation and Service, AT&amp;T, SBC, Williams, Norstan, British Telecom, France Telecom, KPMG, EDS, Etc.</td>
</tr>
<tr>
<td>No IP Voice Applications</td>
<td>Contact Center (IPCC), Interactive Voice Response (IP-IVR), Personal Assistant (IP-PA), Cisco Unity Voicemail and Unified Messaging, Cisco Conference Connection available today</td>
</tr>
</tbody>
</table>
How to Migrate:
1. Change Transport Mechanism

Enterprise Campus

Enterprise Branch Office

PSTN

WAN

Toll Bypass
2. Adopt IP Telephony

Enterprise Campus

Enterprise Branch Office

PSTN

WAN

*SRST < 48 user
3. Deploy Converged IP Applications

Enterprise Campus

Enterprise Branch Office

PSTN

WAN

*SRST < 48 user

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Choices... Flexible Deployment Offerings
Centralized, Distributed, Managed IP PBX

Managed in-house or Outsourced

Centralized Call Processing

Distributed Call Processing

Voicemail/Unified Messaging

CallManager

Router/Gateway

Headerquarters

PSTN

IP WAN

Rest of World

Branch Office A

Branch Office B

Network Operations Center
Centralized Call Processing – Productivity Paradigm Shift

• How much does it cost to visit each site?

• If you can save 2 or 3 “truck rolls” over the next few years, how much will you save?

• How significant is it to be able to deploy technology at a much faster pace than your competitors?

• Imagine deploying new voice productivity applications to users at hundreds of remote sites over the weekend!
How?
Centralized Call Processing

- Cisco CallManager servers and application servers located at central site
- Router, Ethernet switch and IP phones at remote locations
- Branch office router provides call processing backup during WAN failure – SRS Telephony
- IP WAN used for call setup
Benefits of Centralized Call Processing

Improved Productivity

- Give remote users full enterprise level feature sets across telephony applications, instead of reduced capabilities (PBX vs. key system)
- Local PSTN trunking at remote sites (typically)
- IT staff is not required at each remote site
- Deploy telephony to remote sites at a fraction of the time it takes for PBX or Key Systems
- Ability to rapidly deploy new productivity applications to remote users (without requiring a “truck roll” to each site)
- Easy upgrades and maintenance
- Builds upon existing Cisco network infrastructure to deliver Enterprise Voice Solutions
Centralized Call Processing: What is SRS Telephony?

- Survivable Remote Site Telephony integrated with existing data network, to enable Centralized Call Processing
- Unique, industry-first capability in remote office routers for IP Telephony redundancy
- Does not require PBX deployment at remote offices – simplifying management and reducing costs
- Cost-effective enterprise wide deployment of IP telephony enabled by Cisco AVVID (Architecture for Voice, Video and Integrated Data)
- Always available remote IP telephony
- Ideal for enterprise customers utilizing Centralized Cisco CallManager deployment for IP telephony at their remote offices
Survivable Remote Site Telephony – How it works

When Network Failure Doesn’t Affect Productivity

- IP Phones exchange Keep alive messages and Call Processing messages with Centrally located CallManager (CCM)
- WAN Link fails – IP phones lose contact with CCM
- IP Phones register with local router as router of last resort
- Router queries phones for configuration and auto-configures itself
- Router provides call processing for duration of failure via PSTN
- Phone displays “CM Fallback Operating”
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<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
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<tbody>
<tr>
<td>IP call processing</td>
<td>• Lower deployment and maintenance costs</td>
</tr>
<tr>
<td></td>
<td>• Scalability from 3-30,000 users</td>
</tr>
<tr>
<td></td>
<td>• Feature parity across all sites</td>
</tr>
<tr>
<td>CallManager Clustering</td>
<td>• High availability</td>
</tr>
<tr>
<td>Cisco Emergency Responder</td>
<td>• Automatic updates of location information for dynamic and nomadic users</td>
</tr>
<tr>
<td></td>
<td>• Lowers costs and ensures accurate E-911 locations</td>
</tr>
<tr>
<td>Extension and User Mobility</td>
<td>• Removes Moves, Adds, Changes (MAC) costs.</td>
</tr>
<tr>
<td></td>
<td>• Improves productivity</td>
</tr>
<tr>
<td>Integrated Network Services (Application and network integration)</td>
<td>• Enables automatic QoS and VLAN provisioning, and enhanced security and system management</td>
</tr>
<tr>
<td></td>
<td>• Lowers costs and enhances system integrity</td>
</tr>
<tr>
<td>Centralized Call Processing</td>
<td>• Virtual PBX with consistent features and services across the enterprise</td>
</tr>
<tr>
<td></td>
<td>• Lowers costs and improves productivity</td>
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</table>
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Cray Inc. ROI Case Study

**Deployment Details**
- Global market leader in high-end supercomputers
- Multi-site deployment
- Replaced existing PBX with IP Telephony
- 650 phones
- Required data network upgrade to handle time-sensitive voice traffic

**ROI Findings**
- **Payback**—7 months
- **ROI Drivers:**
  - Cost of Cisco IP Telephony and data gear cost the same as PBX
  - Improved productivity of network support staff by 33%
  - Reduced MAC’s costs by $30K/year
  - Reduced inter-office calling charges by $25K/year

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<th>Total Bypass Carrier Network Costs</th>
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<th>0</th>
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<td>Employee Mobility</td>
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<td>Network Administration and Operation</td>
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<td><strong>Total Annual Incremental Costs</strong></td>
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<th>Period (Year)</th>
<th>0</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
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<td>Total Technology Benefits (One time)</td>
<td>181,168</td>
<td>112,854</td>
<td>112,854</td>
<td>112,854</td>
<td>112,854</td>
<td>112,854</td>
<td>563,374</td>
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<td>Total Technology Benefits (Annual)</td>
<td>285,060</td>
<td>545,080</td>
<td>379,060</td>
<td>403,120</td>
<td>430,185</td>
<td>1,833,476</td>
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<th>Cash Flow</th>
<th>Period (Year)</th>
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<th>3</th>
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<tr>
<td>Total Technology Value</td>
<td>180,302</td>
<td>411,208</td>
<td>541,377</td>
<td>689,751</td>
<td>836,909</td>
<td>981,076</td>
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<tr>
<td>Total Technology Cost</td>
<td>0</td>
<td>30,896</td>
<td>52,926</td>
<td>52,926</td>
<td>52,926</td>
<td>52,926</td>
<td>158,724</td>
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<td>Cash Flow (CF)</td>
<td>180,006</td>
<td>379,312</td>
<td>488,451</td>
<td>636,825</td>
<td>783,083</td>
<td>928,150</td>
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<td>Net Present Value (NPV)</td>
<td>180,006</td>
<td>379,312</td>
<td>488,451</td>
<td>636,825</td>
<td>783,083</td>
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<tr>
<td>Period (yrs)</td>
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<tr>
<td>Net Present Value (NPV) ($)</td>
<td>1,700,000</td>
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<td>Internal Rate of Return (IRR) (%)</td>
<td>224</td>
<td></td>
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<tr>
<td>Return on Investment (ROI) (%)</td>
<td>243.56</td>
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<td>Break-Even/Payback Period (Yes)</td>
<td>6.97</td>
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</table>
IP Telephony ROI Case Study—Cray Inc.

Challenge

• Limited support resources required a simpler to manage voice and data communications network
• Moving into new facility required new voice and data network investment

Strategy

• Deployed 650 IP phones and Unified Messaging to three domestic sites in fall of 2000
• Converged network has simplified network management and increased productivity of the network support staff
Cray Inc.—Results

• ROI Findings:
  Payback—6 months
  Total Annual Benefit: $395K per year

% Contribution to Cost Savings

Toll-Bypass
• Annual Savings of $25K 6%

Equipment/Maintenance
• Annual Savings of $35K
  Lower Maintenance Costs
  Wiring Drop Savings 9%

Network Administration
• Annual Savings of $335K
  MAC’s 84%
  Improved Productivity of Support Staff by 33%
Ministry of Social Policy (MoSP)

Who: Largest government agency in New Zealand
8,000 employees across 210 sites

Challenge: Convert legacy PBX communication systems onto one voice/data infrastructure

Solution: 210 remote sites and four (4) core sites
Each core site has a Cisco CallManager cluster
No servers at the remote sites—only IP phones

Results: Large volume calls—130 to 160K/per day
Quick deployment—4 weeks
33% more users at same operational cost
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IP Telephony Solution Building Blocks

The World Is Now Global—All Apps Must Traverse Time and Distance

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What is Cisco CallManager?

- Software application within Cisco AVVID architecture
- Provides call processing, call control, feature control to phones, gateways, devices
- Shared resource manager for VoIP gateways, conference bridges, etc.
- Host for call control APIs (TAPI/JTAPI) and configuration APIs (AXL) to third-party applications and devices
- Enabled by industry standard WinTel platforms (MCS 7800 Series, ICS 7750)
Multi-Protocol IP Telephony

- Features is requirement No. 1
- Multi-protocol for many years
- Interop required with migration to SIP
Cisco Portfolio of IP Phones and Analog Adaptors/Gateways

Cisco IP Phone 7960G
- 145x100 pixel, grayscale display
- 4 soft keys
- 6 programmable line keys
- High quality speaker phone
- Line/local power
- 2-port Ethernet switch
- Supports/enables XML apps.

Cisco IP SoftPhone
- Windows-based IP phone client
- Phone control and standalone modes
- VPN client support
- USB handset support
- Intuitive user interface

Cisco ATA 186/188
- 2 FXS Ports
- 1 RJ-45 10BaseT uplink (Cisco 186 ATA)
- 1 RJ-45 10/100BaseT data port (Cisco ATA 188)

Cisco VG248 Analog Phone Gateway
- 48 FXS Ports
- Single 10/100 port, single PSU
- 2 RJ-21 Telco connectors
- Fax and modem
- Legacy voicemail (SMDI)
- Fully featured

Cisco IP Conference Station 7935
- High quality, state of the art speakers
- Hands-free conference phone
- Standard features

Cisco IP Phone 7940G
- 145x100 pixel, grayscale display
- 4 soft keys
- 2 programmable line keys
- High quality speaker phone
- Line/local power
- 2-port Ethernet switch
- XML applications

Cisco IP Phone 7910G
- 2x24 character display
- 6 feature keys
- Single line
- Line/local power
- 7910G+SW has a 2-port Ethernet switch

Cisco IP Phone 7905G
- 192x64 pixel, monochrome display
- 4 soft keys
- Line/local power
- Single line

Cisco IP Phone 7910G and 7910G+SW
- 2x24 character display
- 6 feature keys
- Single line
- Line/local power
- 7910G+SW has a 2-port Ethernet switch
Productivity Applications
Cisco IP Phones

- Brings the power of WWW to Cisco IP Phones (7960 and 7940)
- Provides a dynamic and interactive environment among users, the enterprise, and the Internet—all through the Cisco IP Phone User Interface
- Utilizes modern web technologies for application services
  - XML-based data tags for phone content processing (text menu, text, input, directory, graphic image, graphic menu)
  - HTTP for transport
  - IP Phone Appl—that processes clear text and static set of XML objects; doesn’t process HTML tags
What is E9-1-1?

- Emergency calls routed to the right emergency center
- Call-taker knows the caller’s location and can return the call
- Multi-Line Telephone Systems:
  Identify at least the bldg and floor of a 911 caller
Cisco ER:
Differentiating Features

Proposed/Legislated E9-1-1 Requirements:

• Automatically provide location of 911 callers to public safety answering point (PSAP):
  
  Identify precise floor of 911 caller when in any building over 7,000 ft² containing 48+ people {NENA* model legislation}
  
  Identify 911 caller to within 40,000 ft² {Illinois legislation}

• Enable callback from PSAP to 911 caller

* NENA= National Emergency Numbers Association

Types of Endpoints

Cisco Support

Trad PBX Support

Nomadic

Stationary
Extension Mobility

- IP Phone and Extension Mobility allows you to be reachable anywhere on the network.

- Simply Log Into the IP Phone and your device profile is sent to that phone (Line Numbers, Speed Dials, Service links etc.)

- Relocate without requiring assistance from telecom administrators.
Virtualizing the Office
Extension Mobility

- User logs into any IP Phone at remote office
- Personal settings available on remote IP phone
- IP Phones can point to any available server anywhere
- Ideal for mobile office worker
Vertical Markets
Exploring the Possibilities

Government (State, Local, Federal)

Hospitality

Retail and Distribution

Colleges and Universities

Transportation

Secondary (K-12) Education
Colleges and Universities: *Real possibilities*

**IP Telephony Applications**

- Empower employees
- Competitive Advantage
- Customer Satisfaction
- Employee Satisfaction
- Revenue Generation
- Cost Controls / Reductions

**Colleges and Universities**

- On-Screen Class Registration
- On-Screen Advertisements
- On-Screen Ticket Sales
- On-Screen Book Sales
- On-Screen “location finder”
- On-Screen scheduling
- On-Screen Email for targeted messages
Horizontal Markets

Enterprise-Wide Examples

- World Clock
- Meeting Room Scheduler
- Weather
- Flight Status
- Yellow Pages Lookup
- Stock Tracker
- Transit Schedules

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Cisco Media Convergence Servers

Customer Benefits
- The MCS 7800 Family of Media Convergence Servers provide highly reliable Windows 2000 server platforms to host voice applications – ranging from 200 up to 7500 users.
- Delivers the high performance and availability demanded by today’s enterprise networks
- Represent a turnkey call processing solution that is easy to deploy and highly cost-effective
Voice Enabled Infrastructure

- Catalyst 6500
- Cisco AS5350
- Catalyst 4000
- Cisco 3600
- Cisco 2600
- Cisco VG200
- Cisco 1750
- IOS Firewall
- PIX Firewall
- HIDS

Switches
Cisco 2900 Series
Cisco 3550 Series

Routers
Cisco 1750
Cisco 2600

Security
Cisco 2900 Series
Cisco 3550 Series
Cisco IP Telephony – a successful solution

- Over One Million Cisco IP phones shipped
- 34,000 Cisco employees using IP Communications worldwide—over 100 PBXs replaced globally
- Longevity of IP telephony customer deployments: New Zealand Ministry of Social Policy, Datek Online, Cray, Merrill Lynch, Key Bank, Hartford Public Schools
- IP Telephony Phone market leader… 52% market share (Cal Q2, 2002 Synergy Res.)