

# VoIP, AVVID and Unified Communications

Service Provider Seminar

21-23 November 2000

Nairobi, Kenya

Paul Williams

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2004  
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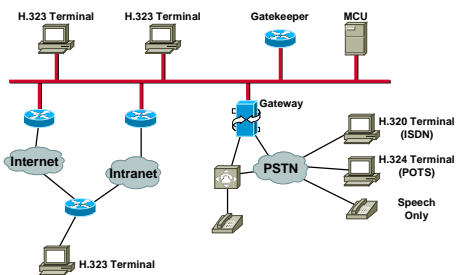
## H.323 Primer



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## H.323 Network Overview

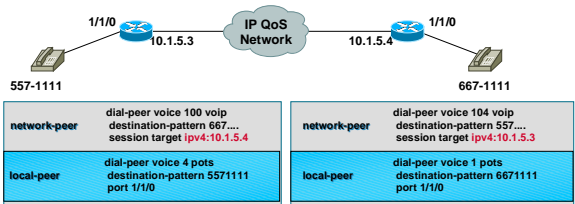


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## H.323 Without RAS - Configuration



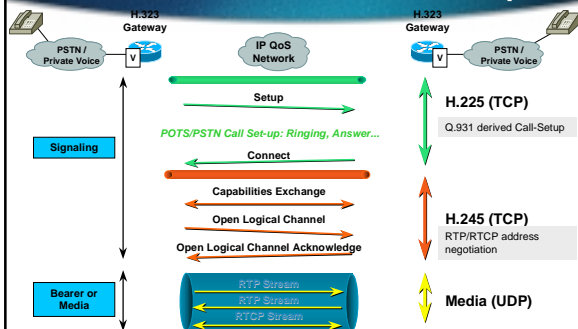
- VoIP Dial Peer points directly to the destination GW's IP address
- Scaling to large networks becomes administratively burdensome

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## H.323 Without RAS - Call Set-up



- Assumes Endpoints know each other's IP addresses
- The FastConnect v2 option must be on messaging (see 12.1.1T section)

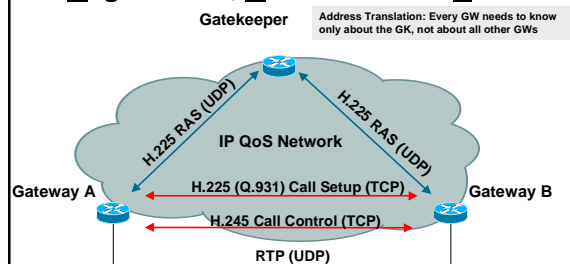
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## H.323 With RAS

### Registration, Admission and Status



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## Gatekeeper Functionality

- Gatekeeper is optional
- Logically separate from the H.323 endpoints
- H.323 ITU Specification
  - Gatekeeper mandatory services are:
    - Address translation
    - Admissions control
    - Zone management
  - Gatekeeper optional services are:
    - Call control signaling
    - Call authorization
    - Bandwidth management and reservation

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## Gatekeeper Functionality

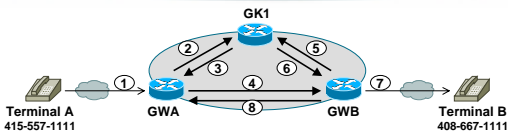
- Cisco Gatekeeper Features
  - Address Translation
    - H.323 ID and E.164 translation to an IP address
  - Admission Control
    - Terminal name registration
    - Gateway registration
    - E.164 Registration
  - Zone Management
    - Zone and subnet configuration
    - Intra- and Inter-zone routing and communication (proxy assignment)
    - Zone access configuration

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## Intra-Zone Call Set-up



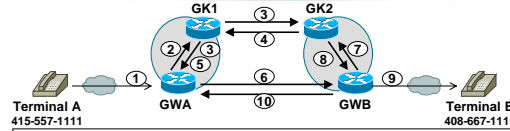
- 1) Terminal A dials the phone number 408-667-1111 for Terminal B
- 2) GWA sends GK1 an ARQ, asking permission to call Terminal B
- 3) GK1 does a look-up and finds Terminal B registered; returns an ACF with the IP address of GWB
- 4) GWA sends a Q.931 Call-Setup to GWB with Terminal B's phone number
- 5) GWB sends GK1 an ARQ, asking permission to answer GWA's call
- 6) GK1 returns an ACF with the IP address of GWA
- 7) GWB sets up a POTS call to Terminal B at 408-667-1111
- 8) When Terminal B answers, GWB sends Q.931 Connect to GWA

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## Inter-Zone Call Set-up



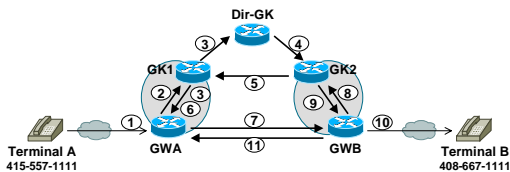
- 1) Terminal A dials the phone number 408-667-1111 for Terminal B
- 2) GWA sends GK1 an ARQ, asking permission to call Terminal B
- 3) GK1 does a look-up and does NOT find Terminal B registered; GK1 does a prefix look-up and finds a match with GK2; GK1 sends an LRQ GK2, and RIP to GWA
- 4) GK2 does a look-up and finds Terminal B registered; returns an LCF with the IP address of GWB
- 5) GK1 returns an ACF with the IP address of GWB
- 6) GWA sends a Q.931 Call-Setup to GWB with Terminal B's phone number
- 7) GWB sends GK2 an ARQ, asking permission to answer GWA's call
- 8) GK2 returns an ACF with the IP address of GWA
- 9) GWB sets up a POTS call to Terminal B at 408-667-1111
- 10) When Terminal B answers, GWB sends Q.931 Connect to GWA

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## Inter-Zone Call Set-up: Directory Gatekeeper



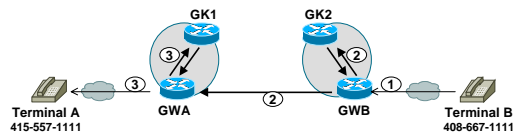
- 1) Terminal A dials the phone number 408-667-1111 for Terminal B
- 2) GWA sends GK1 an ARQ, asking permission to call Terminal B
- 3) GK1 does a look-up and does NOT find Terminal B registered; GK1 does a prefix look-up and finds a wildcard match with Dir-GK; GK1 sends LRQ to Dir-GK, and RIP to GWA
- 4) Dir-GK does a prefix look-up and finds GK2; Forwards the LRQ to GK2
- 5-11) Same as steps 4-10 in previous scenario

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## Call Disconnect



Terminals A and B are in active conversation...

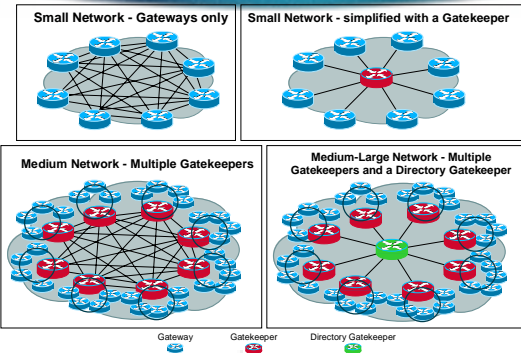
- 1) Terminal B hangs up
- 2) GWB sends DRQ to GK2, disconnecting the call between Terminals A and B. A DCF is received some time later.
- 3) GWB sends a Q.931 Release Complete to GWA
- 4) GWA sends DRQ to GK1, disconnecting the call between Terminals A and B. A DCF is received some time later.
- 5) GWA signals a call disconnect to the voice network (the mechanism differs depending on the trunk used on GWA. If it is a phone set (FXS), then there is no mechanism to signal the disconnect.

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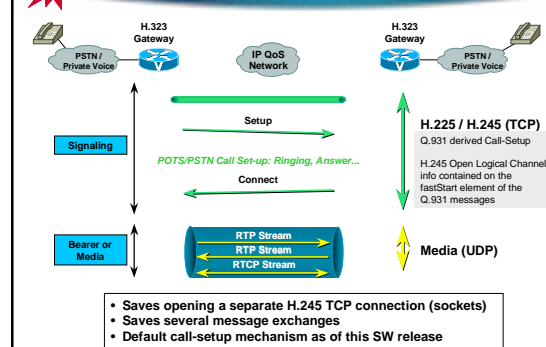
## Directory Gatekeeper - Network Scaling



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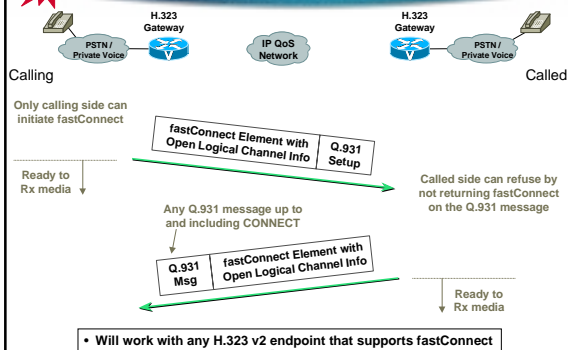
## FastConnect



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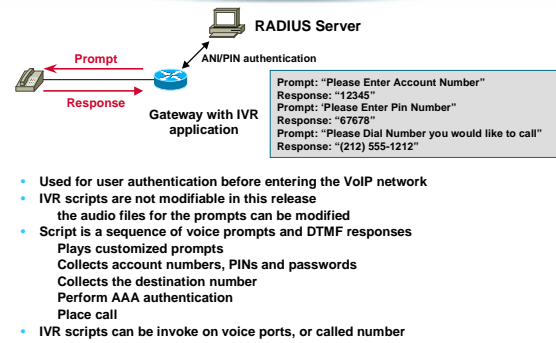
## FastConnect



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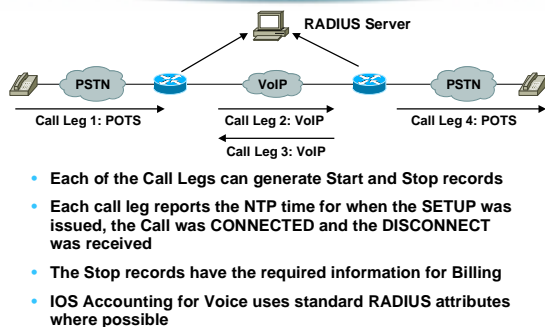
## IVR Example



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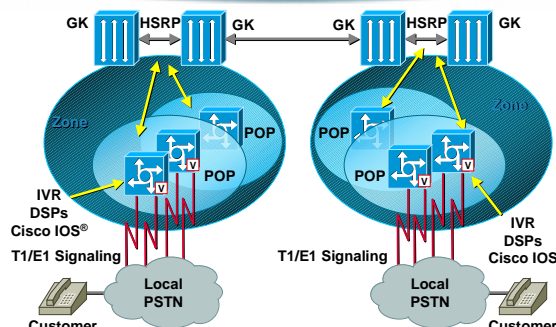
## Billing



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## Anatomy of an H.323 Network



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## POP Sizing - Number Of GWs



### Assumptions:

- POP must service X BHCA
- 3 Minute Hold Times (HT)
- AS5300 GWs can handle up to 2 calls per second
- 120\* ports per AS5300

\* Depends on T1/E1 and signaling type

### Calculating Number Of GWs:

- Calls/DS0 per hour  
 $= (60 \text{ min/hour}) / (\text{HT})$   
 $= 60 / 3$   
 $= 20 \text{ BHCA/DS0}$
- BHCA capacity of AS5300  
 $= (\text{DS0/GW}) * (\text{BHCA/DS0})$   
 $= 120 * 20$   
 $= 2,400 \text{ BHCA/GW (0.67 calls/sec)}$
- # AS5300 GWs Needed  
 $= (\text{POP BHCA}) / (\text{BHCA / GW})$   
 $= X / 2400 \text{ AS5300 Needed}$

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## POP Sizing - WAN Bandwidth



### Assumptions:

- Voice calls
  - 120\* Ports / AS5300
- \* Depends on T1/E1 and signaling type
- Voice Activity Detection 30% efficiency on bandwidth for standard voice calls at T1/E1 levels and up.
  - G.729 CODEC used
  - 60 byte packets + link layer (no header compression)

### WAN Bandwidth/GW:

- Bandwidth per call  
 $66 \text{ bytes} * 8 \text{ bits/byte} * 50 \text{ pps}$   
 $= 26.4 \text{ kbps}$
- Total WAN bandwidth/GW  
 $26.4 \text{ kbps} * 120 (96*) \text{ calls/GW}$   
 $= 3.17 \text{ Mbps (2.53 Mbps*)}$
- Assume 30% VAD Efficiency  
 $2.53 \text{ Mbps} * 70\%$   
 $= 2.22 \text{ Mbps (1.77 Mbps*)}$

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## POP WAN Sizing With CRTP



### WAN Bandwidth:

- Bandwidth per call:  
 $= 12 \text{ kbps}$
- Total WAN bandwidth/GW  
 $12 \text{ kbps} * 120 (96*) \text{ calls}$   
 $= 1.44 \text{ Mbps (1.15 Mbps*)}$
- If Max = 160 (6.6 T1 or 5.3 E1)  
 $12 \text{ kbps} * 160 \text{ calls}$   
 $= 1.92 \text{ Mbps}$
- Assume 30% VAD Efficiency  
 $= 1.34 \text{ Mbps} < 1 \text{ T1/E1}$

### CRTP:

- Performed on WAN backhaul router (e.g. 3660/7200)
- Reduces IP header from 40 bytes to 2-4 bytes much of the time
- Hop-By-Hop
- Fast/CEF switched cRTP  
 $- 12.0(7)\text{T}$  and  $12.0(7)\text{XK}$   
*Limited platforms / interfaces*  
*Limited # of cRTP sessions*

[http://www.cisco.com/servpro/msa/products/docs/crt\\_web/crtp\\_web.html](http://www.cisco.com/servpro/msa/products/docs/crt_web/crtp_web.html)

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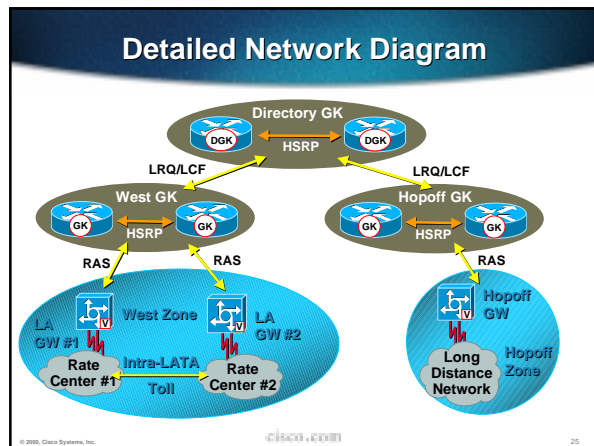
[http://www.cisco.com/servpro/msa/products/docs/crt\\_web/crtp\\_web.html](http://www.cisco.com/servpro/msa/products/docs/crt_web/crtp_web.html)

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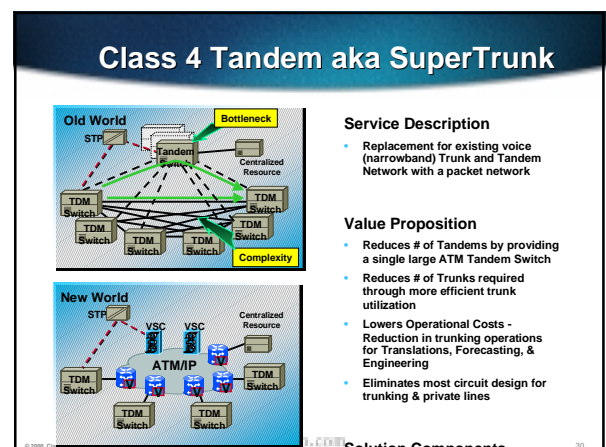
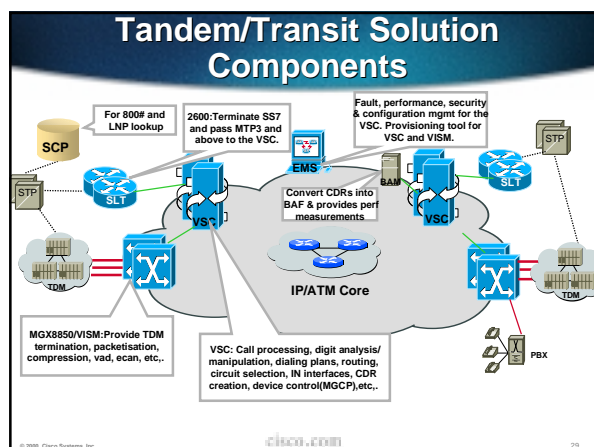
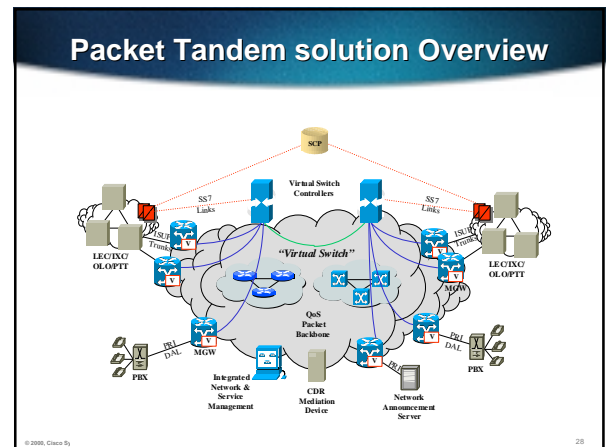
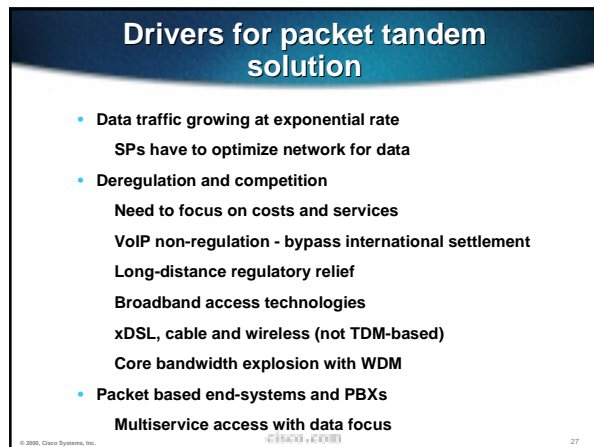
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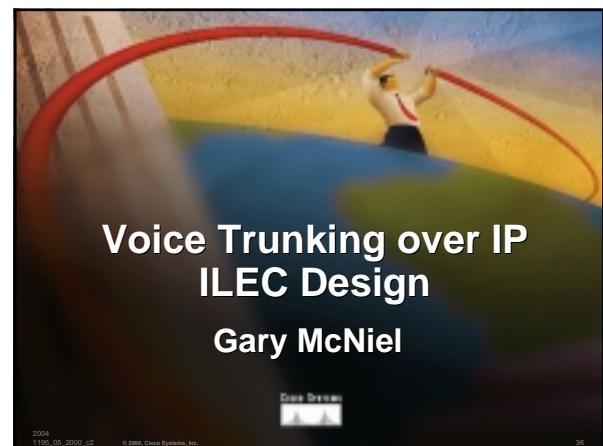
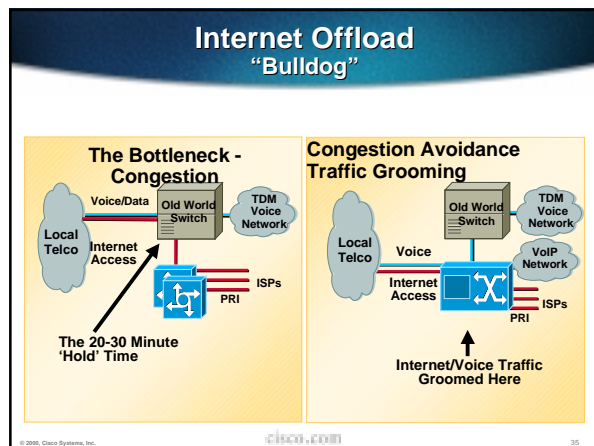
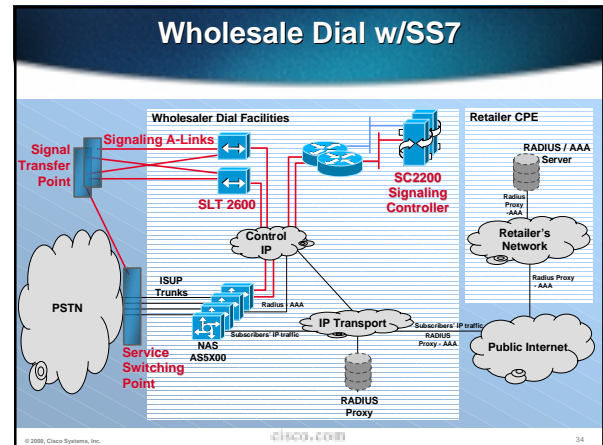
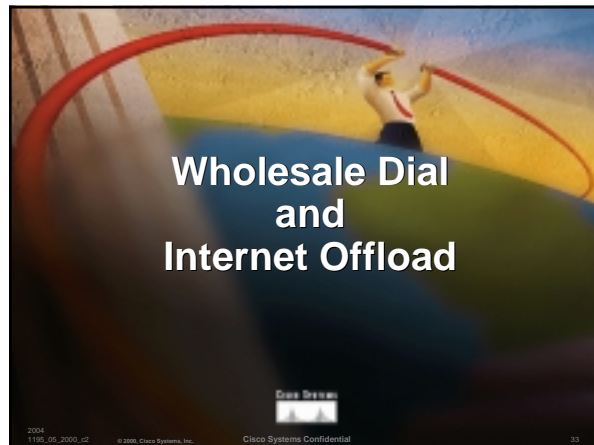
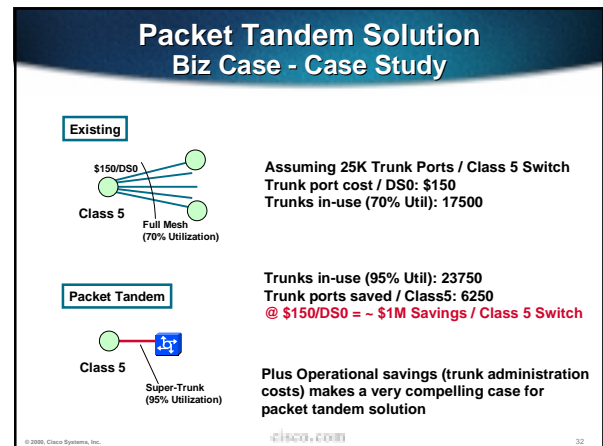
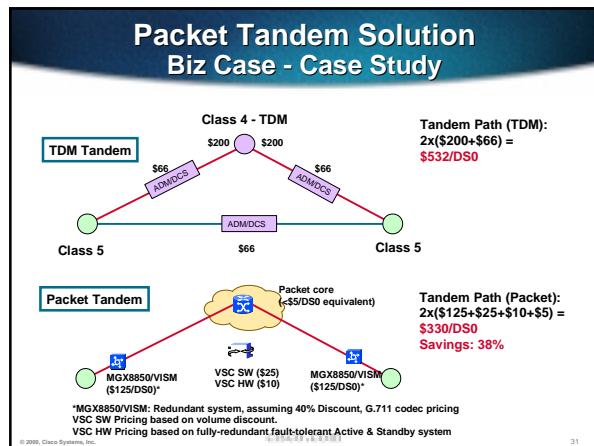
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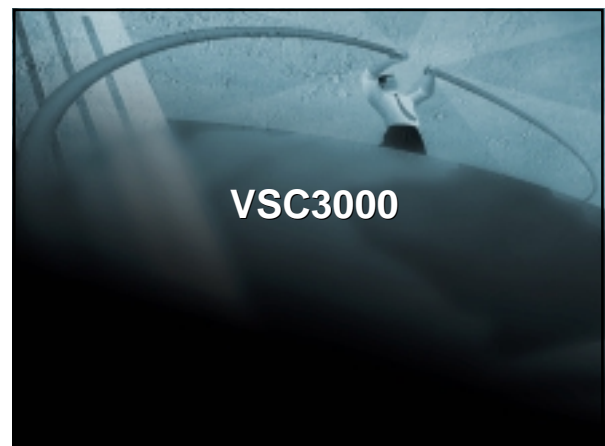
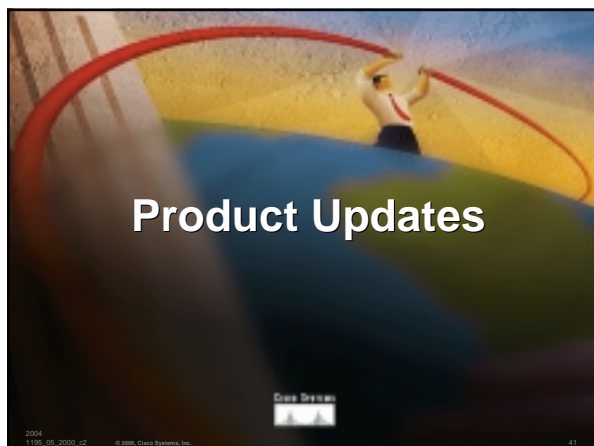
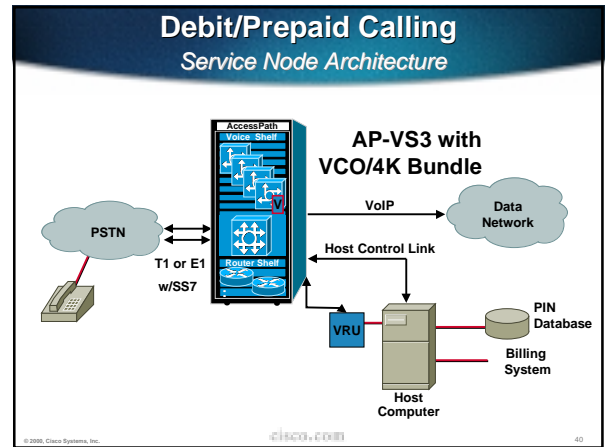
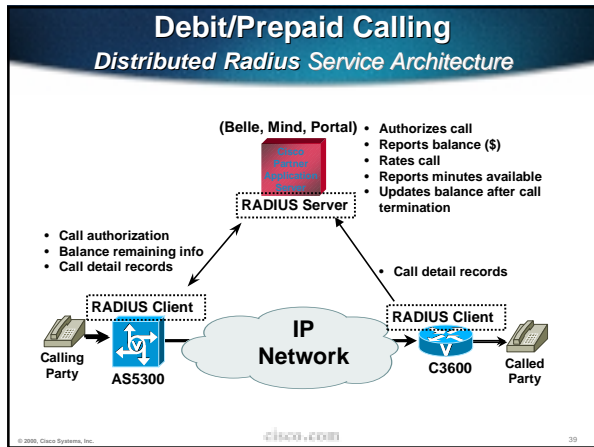
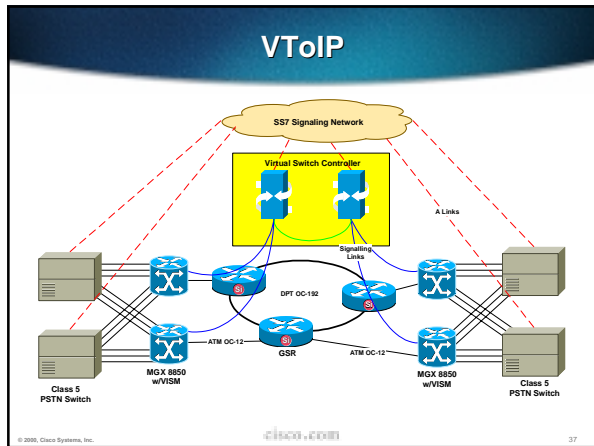


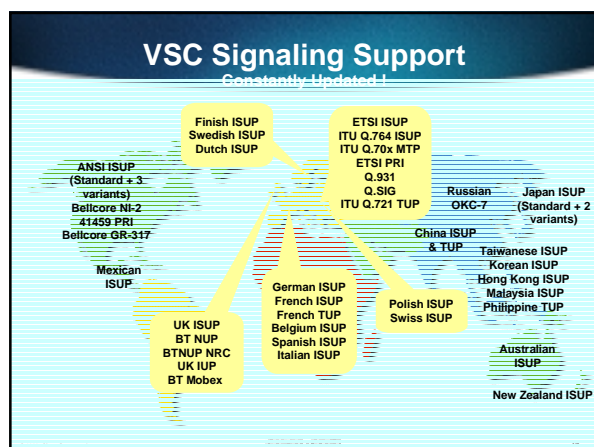
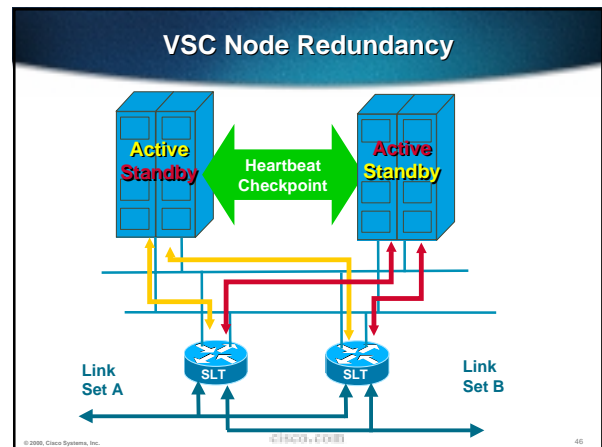
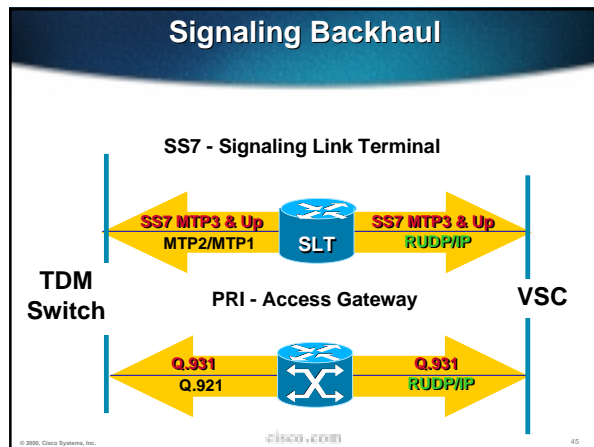
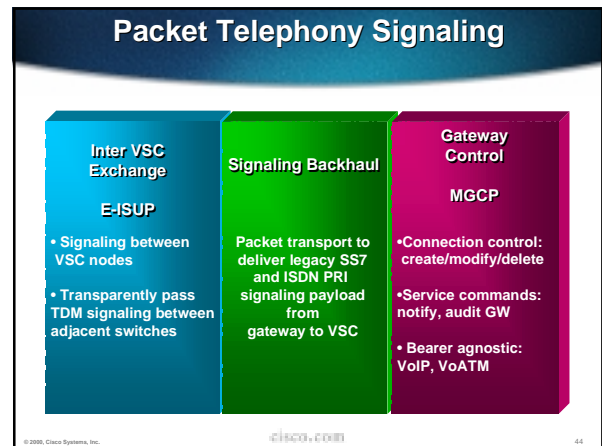
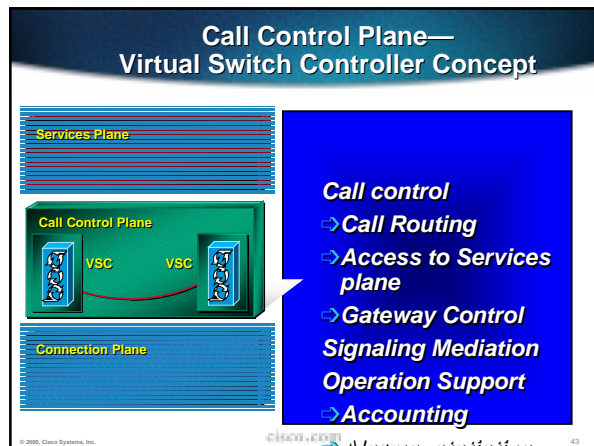


## Packet Tandem Solution Overview











## MGX 8850: First Integrated VoIP and VoATM Edge Switch

- Widest range of data and voice services on a carrier edge switch
- Most cost-effective multiservice solution for both small and large sites
- Widest range of data and voice services on a carrier edge switch
  - DS0 to OC-48c
  - ATM, FR, IP, TDM Services
- Carrier class reliability



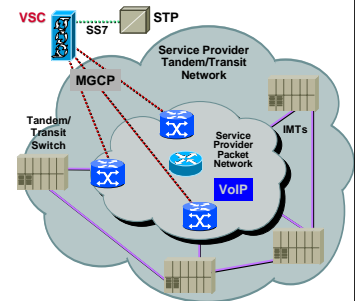
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## Packet Tandem Offload (VoIP)

- New packet revenue stream
- Unique capability to hairpin/groom voice traffic using TDM switching or conversion to VoIP
- Open interfaces: more choices, faster time to market
- SNMP-based EMS
  - Provides fault, performance, security, and configuration management
- CDR interface for billing mediation devices

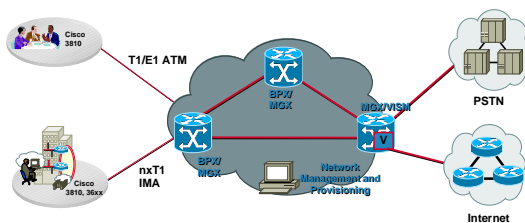


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## MS Access (T1-VoAAL2)



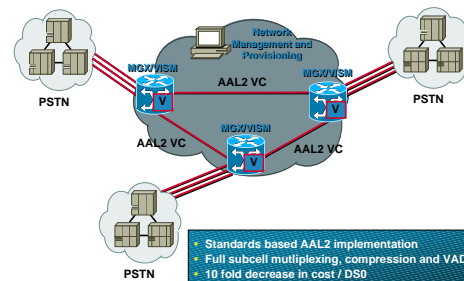
- Integrated IP+ATM voice and data access over a single line
- Compressed Voice over AAL2 using PVC Trunking Model
- Improved access economics

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## Bandwidth Efficient Point-to-Point Trunking



- Standards based AAL2 implementation
- Full subcell multiplexing, compression and VAD
- 10 fold decrease in cost / DS0
- Integrated network for voice and data

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## AAL2 Coding Schemes

G.711	5 Bytes Cell Header	1 Byte Start Field	3 Bytes CPS Hdr	40 Bytes (per 5 msec) G.711 PCM Audio Samples	4 Bytes PAD
G.726	5 Bytes Cell Header	1 Byte Start Field	3 Bytes CPS Hdr	40 Bytes (per 10 msec) G.726 ADPCM Audio Samples	4 Bytes PAD
G.729-10ms	5 Bytes Cell Header	1 Byte Start Field	3 Bytes CPS Hdr	10 Bytes (per 10 msec) 4:729 CS-ACELP Audio Samples	34 Bytes PAD
G.729-20ms	5 Bytes Cell Header	1 Byte Start Field	3 Bytes CPS Hdr	20 Bytes (per 10 msec) Two G.729 CS-ACELP Audio Samples	24 Bytes PAD
G.729-30ms	5 Bytes Cell Header	1 Byte Start Field	3 Bytes CPS Hdr	30 Bytes (per 10 msec) Three G.729 CS-ACELP Audio Samples	14 Bytes PAD

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## Cisco AS5300/VoIP

- Services Supported
  - PSTN & PBX to VoIP
  - Toll bypass
  - Direct and 2-stage dialing
  - Fax Relay
  - Integrated IVR
  - Modem & ISDN Internet access
- Performance
  - 150-MHz R4700 RISC CPU
  - High-performance, low-latency architecture
- Carrier Class
  - Toll quality
  - NEBS
  - Four T1/E1/PR1 (supports 48/60 voice sessions)
  - 10-Mb and 10/100-Mb Ethernet interface




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### Cisco AS5300 Voice/Fax Feature Card

- **Voice/fax feature card**
  - One or two per AS5300
  - 24/30 ports per feature card
  - 100-MHz RISC controller
  - Specifically designed for real-time voice processing
- **DSP modules**
  - Snap-on DSP modules
  - Six DSPs per module
  - G.729 CS-ACELP—8 K
  - G.711 PCM
  - G.165 echo cancellation
  - Group III fax relay
- **VoIP protocol support**
  - H.323 standard
  - RTP, RTCP, CRTP, NTP
  - Cisco IOS™ QoS features
  - IP precedence, WFQ, WRED, RSVP, MLF

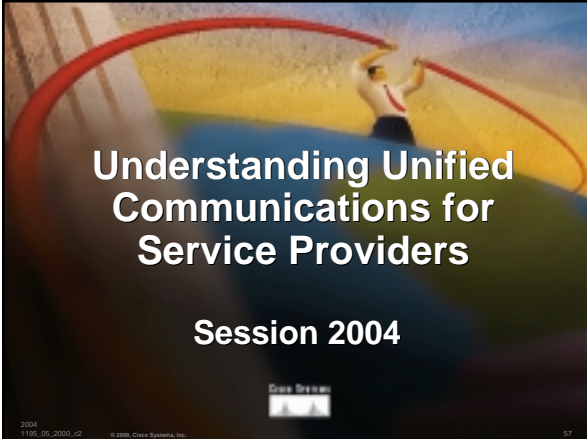


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### Basic Interactive Voice Response (IVR)

- IVR application integrated into the voice Gateway
- Simple voice prompting and digit collection from the caller to:
  - authenticate the user
  - identify destination
- Customer may record their own announcements and prompts (script logic cannot be customized)
- Scripts supported:
  - Announcement
  - ANI authorization
  - Account number/PIN authorization
  - Fax hop on/off (use of redialer boxes)

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## Understanding Unified Communications for Service Providers

### Session 2004

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### Agenda

- Introduction, Features, and Benefits
- Architecture and Components
- Typical Call Flows
- Deployment in a Service Provider Environment
- Redundancy and Load Balancing

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### Unified Communications

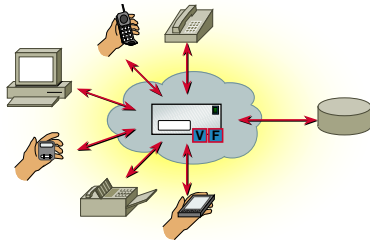
Unified communications is an enhanced voice over IP solution that provides the ability to manage voice mail, e-mail and fax under a common message store, on an existing IP infrastructure.



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## Unified Communications

### Multiple Device Types and Media



**Non Real-Time Message Exchange**

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## Unified Communications Features

### Voicemail

- Multiple personalized greeting
- Handle all messages with a single call
- Designate and prioritize messages
- Leave messages for multiple subscribers
- Forward Voice messages as e-mail attachments
- Locate subscribers using name or phone number
- Message waiting indication by pager, stutter dial tone or indicator light

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## Unified Communications Features

### E-Mail Messaging

- Ability to identify voice, e-mail and fax messages in mailbox
- Play voice messages as streaming audio
- Listen to e-mail messages over the phone using text to speech processing (TTS)
- Respond to an e-mail message over the phone as an audio attachment to the original sender
- Message waiting indication on arrival of new e-mail messages
- Print e-mail to a local fax machine

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## Unified Communications Features

### Fax Messaging

- Ability to redirect fax messages to a local fax machine when ready
- Determine the time of arrival and sender of a fax message using a telephone
- View faxes as a (.tiff) attachment to an e-mail message
- Forward faxes as e-mail attachments to other users
- Message waiting indication on arrival of new fax messages

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## Unified Communications Features

### Single Number Reach

- Caller can dial one number to reach user at work, home or on mobile phone
- Callers can choose to locate subscribers or leave a message
- Subscribers can choose to accept the call based on the caller or transfer to voice mail
- Users can define different reach numbers based on the time of the call
- Users can choose to be notified of incoming calls

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## Service Provider Benefits

- Brand services for greater recognition
- Drive minutes of use on the network, increasing total revenue per subscriber
- Reduce churn by strengthening customer relationships with value added services
- Reduce cost of ownership by utilizing a common platform to introduce new applications and services

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## End User Benefits

- Users can manage and access all of their messages regardless of the media type
- Remote users can access all of their messages with one phone call into their unified messaging system
- Voice mail, e-mail, and fax messaging are non-real-time means of communications, allowing users to access their messages at any time
- Media conversion allows users to access their messages in the media of their choice

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## Agenda

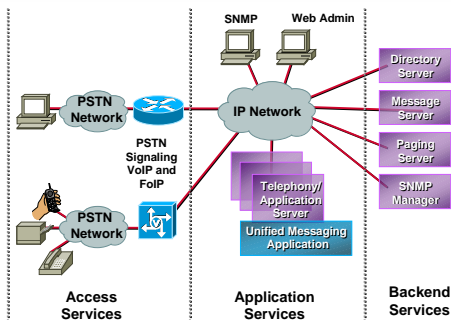
- Introduction, Features, and Benefits
- Architecture and Components
- Typical Call Flows
- Deployment in a Service Provider Environment
- Redundancy and Load Balancing

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## Unified Communications Network Components



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## Network Components Access Services

- Edge devices that provide telephony and data access to the network
  - Cisco AS5300/5800 with Cisco IOS 12.0.5(T2) and vcw-vfc-mz.c542.4.04 as VoIP H.323 gateways which provide access to the network from traditional telephony devices
  - Cisco AS5300 Onramp and Offramp fax gateways that provide access to and from the network for group three fax machines
  - Access servers for dial in data access from PC's

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## Network components Application Services

- Message management logic and H.323 call termination point
- Gateserver
  - Sun Netra T 1125 Dual processor, 440 MHz, 512MB RAM, 9.1G hard drive with Solaris 2.6
  - uOne gateserver software version 4.2S
  - RadVision rel 2.1.2.3 H.323 Stack (Included with uOne)
  - L&H Telecom TTS (Text to Speech) V.100 for Solaris with American English, French and Spanish language sets
  - SNMP master agents (optional)—Solstice enterprise agents runtime V1.03

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## Network Components Backend Services

- Iplanet Directory server 4.0 (LDAP)
- Iplanet Messaging server 4.1
- Hylafax paging server 4.0, patch 1
- Apache Web server 1.3.6
- Network management workstation

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## Backend Services Directory server

- Storage of user profile information in a hierarchical tree like structure based on organizational or geographic boundaries
- Tuned to give quick response to high volume search operations
- LDAP (lightweight directory access protocol) used to manage user information on directory. Uses TCP port 389

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## Backend Services Messaging Server

- Common message store for uOne with open access (IMAP4, HTTP, SMTP)
- Uses directory service for user account information/authentication
- Messages stored using SMTP in MIME format
- Retrieved using IMAP4, POP3 or HTTP (Web-based e-mail client)

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## Backend Services Paging Server

- HylaFax paging server—interfaces with uOne using SNPP (Simple Network Paging Protocol)
- Solaris 2.6 based
- Connects to a modem server using a single ended SCSI 2 cable

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## Gateserver Architecture

- Distributed object-based framework
- Based on new and non-proprietary voice and information standards
- Several major components that can be distributed across multiple systems

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## Gateserver Components

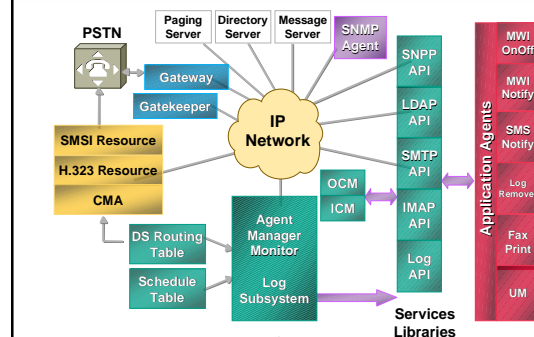
- **Agent Manager and Monitor (AMM)**  
Scheduling, routing, launching, monitoring, and terminating services  
Service libraries to access non proprietary services (IMAP, SMTP)
- **Call Control/Media Agent (CMA)**  
Provides all H.323 services (H.225, RAS, H.245)  
Media services such as playing and recording messages
- **Application agents**  
Launched by AMM to provide specific tasks such as fax, notification  
Provide access to back-end servers by using service library APIs

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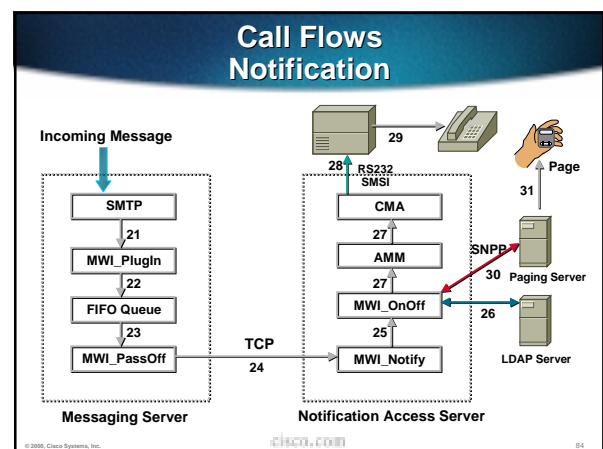
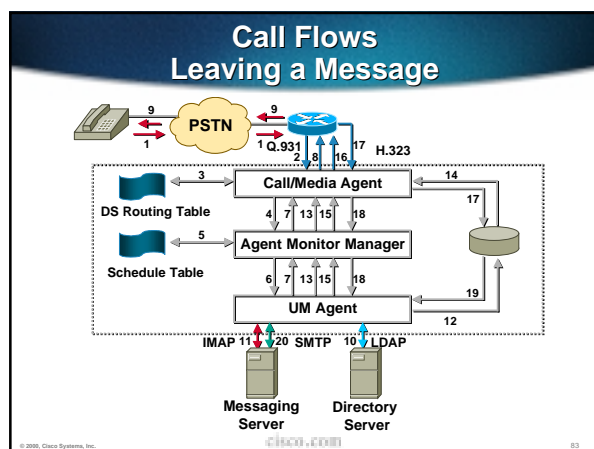
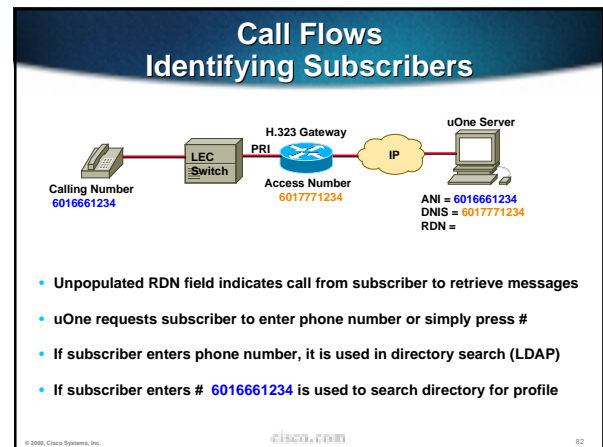
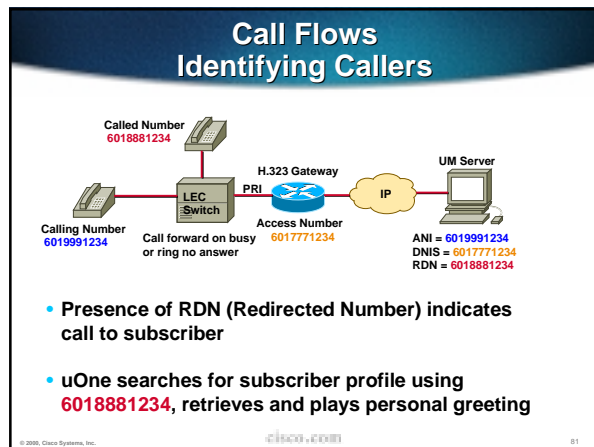
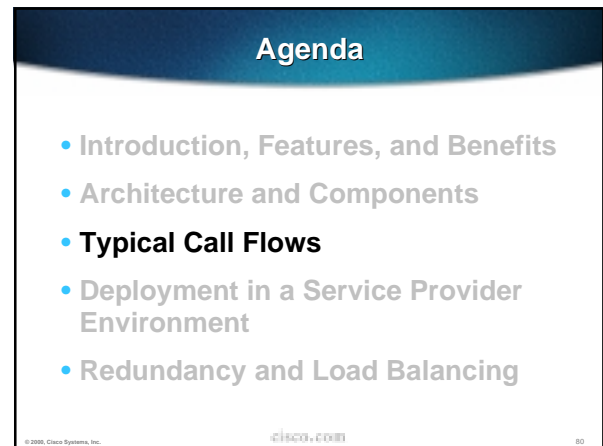
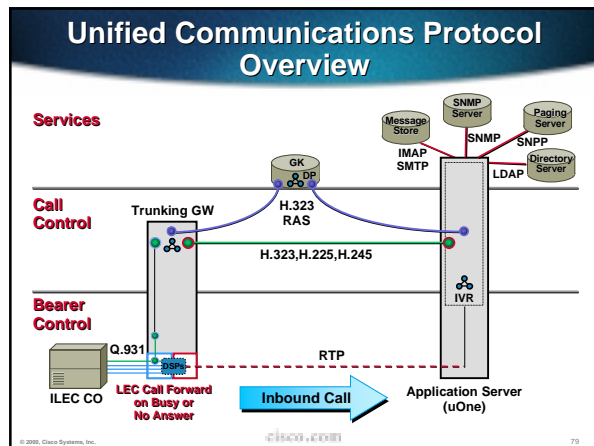
## Gateserver Component Overview



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## Call Flows Inbound Fax

- uOne creates an alias on messaging server mapping assigned fax number to e-mail address
- uOne does not participate in inbound fax to subscriber
- Fax delivered to subscriber mailbox by onramp fax gateway

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## Call Flows Onramp Function



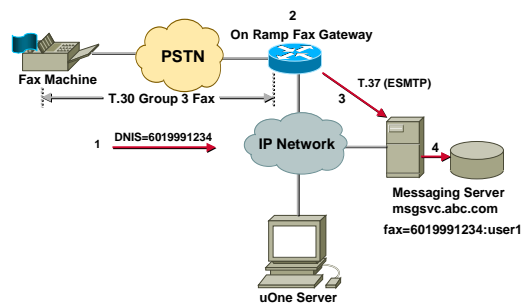
- Demodulate fax call
- ITU-T T.30 fax protocol handling
- Turn fax image into TIFF file
- Create MIME message with TIFF attachment
- Optionally re-write to: address
- Create call history record
- Forward to ESMTP mail server

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## Call Flows Inbound Fax



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## Call Flows Inbound Fax

1. User sends a fax to the subscribers telephone number (6019991234). The fax connects to a fax gateway (AS5300)
2. Incoming call is determined to be a fax call because the DNIS matches dial peer with information type set to fax. The gateway converts T.30 Group 3 fax to a .tif file
3. The gateway creates a mail message, attaches the .tif file and delivers it using ESMTP to the messaging server. Destination e-mail: fax=6019991234@msgsvc.abc.com

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## Call Flows Inbound Fax

4. Messaging server deposits fax message in users mailbox

uOne has created an alias on the messaging server that maps fax=6019991234@msgsvc.abc.com to user1@msgsvc.abc.com at setup time

The receipt to e-mail address is maintained as the alias fax=6019991234@msgsvc.abc.com

The "fax=" alias in the "to:" address defines this message to be a fax message at retrieval time

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## Call Flows Offramp Function



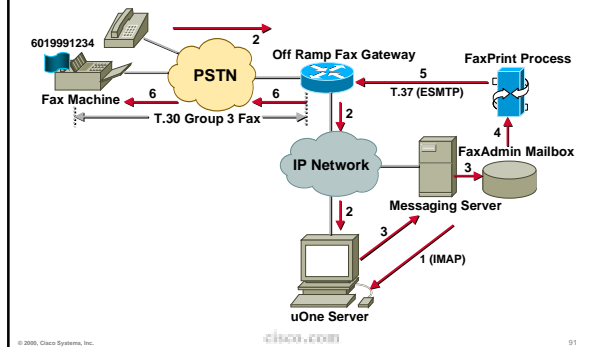
- Authenticate sender against AAA (optional)
- Rasterize text portions of e-mail (text->fax)
- Rasterize TIFF-F into fax pages
- Re-write fax destination number (optional)
- ITU-T T.30 fax protocol handling
- Modulate fax call
- Create call history record
- Delivery status notification

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## Call Flows Outbound Fax



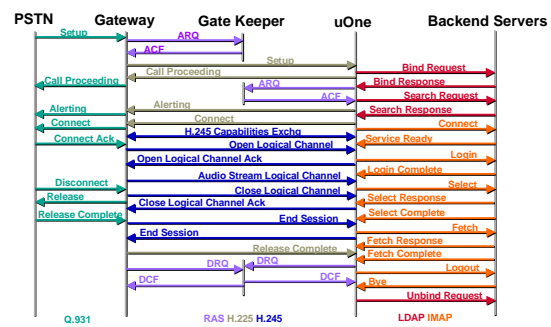
## Call Flows Outbound Fax

1. UM agent retrieves the fax or e-mail message from the messaging server using IMAP
2. Subscriber chooses the option to print the message and keys in the phone number of the fax machine where the message is to be sent, example 6019991234
3. UM agent adds destination fax information to the message and forwards it to subscriber's faxadmin e-mail account using SMTP

## Call Flows Outbound Fax

4. FaxPrint application constantly monitors faxadmin's mailbox for new messages. It retrieves message sent in the previous step using IMAP
5. FaxPrint application sends the message to off Ramp fax gateway (ESMTP) addressed to (fax=6019991234@gw.abc.com)
6. Fax gateway extracts the destination phone number from e-mail address, converts any text to .tif format and sends the fax to the destination as T.30 Group 3 fax

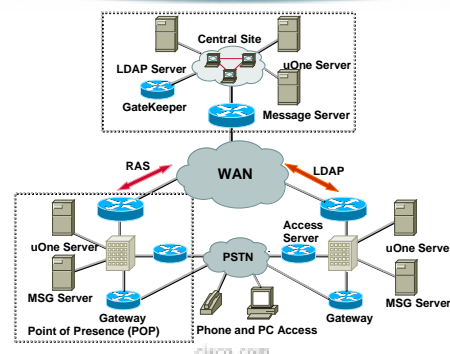
## Call Flows Summary



## Agenda

- Introduction, Features, and Benefits
- Architecture and Components
- Typical Call Flows
- Deployment in a Service Provider Environment
- Redundancy and Load Balancing

## Deployment Overview





## Deployment Overview

- Service quality depends on where uOne components are placed in the network
- Inherent delays across WAN's
- Better quality and service by minimizing traffic across WAN's

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## Deployment Overview Service Quality

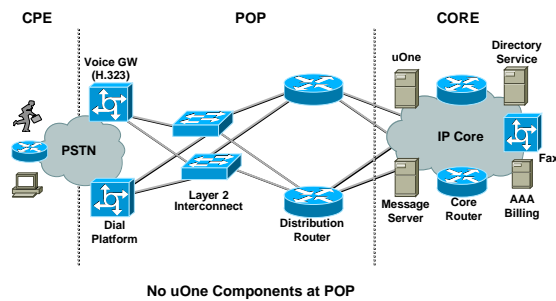
- uOne server  
Call setup times, voice quality
- Directory server  
Authentication, message response (has to be centralized)
- Messaging server  
Message retrieval and response times

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## Dial Internet Access Fully Centralized

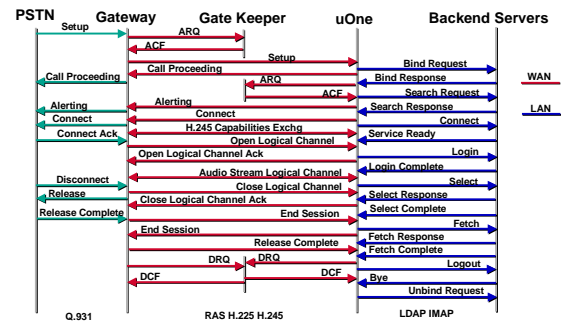


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## Dial Internet Access Fully Centralized

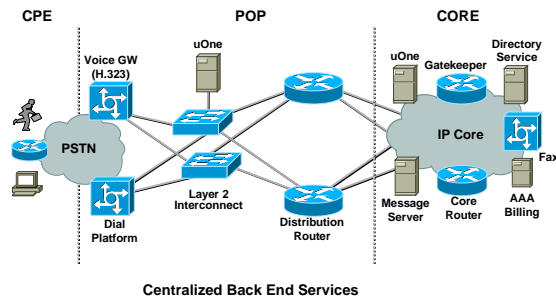


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## Dial Internet Access Partially Centralized

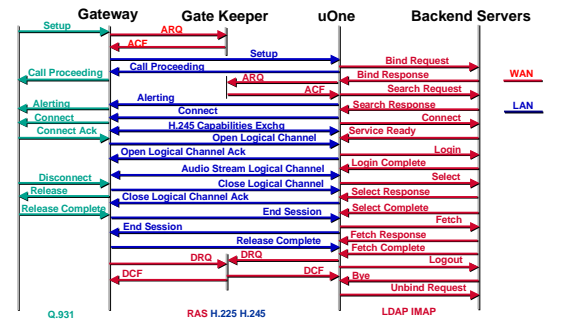


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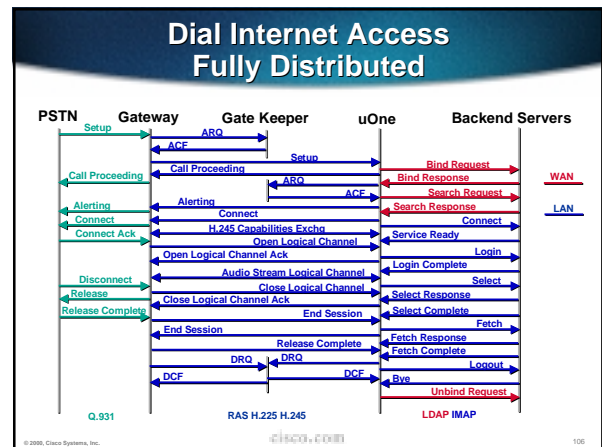
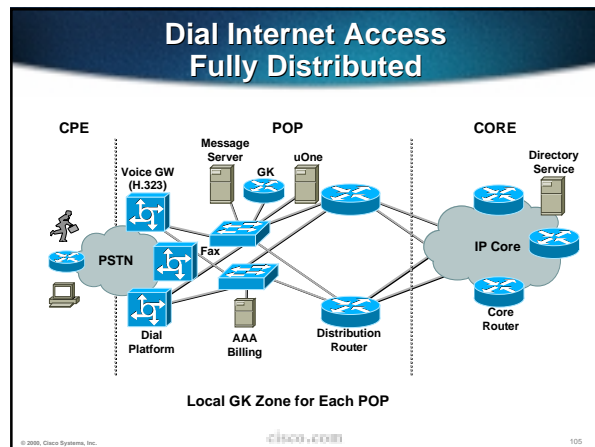
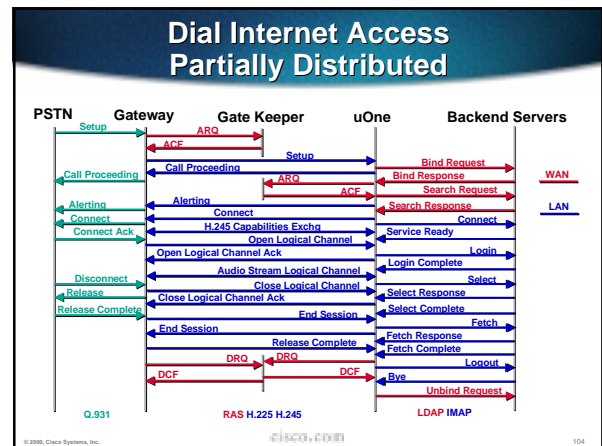
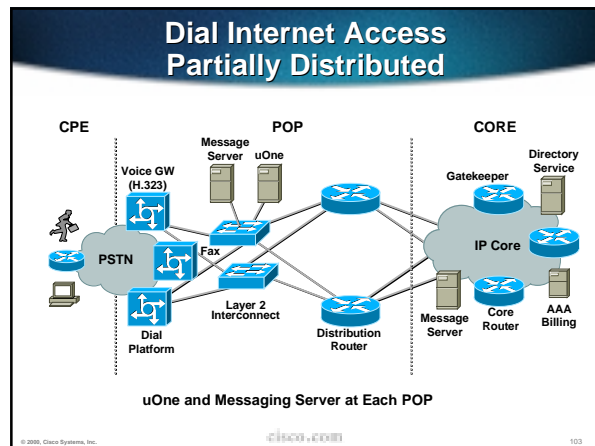
## Dial Internet Access Partially Centralized



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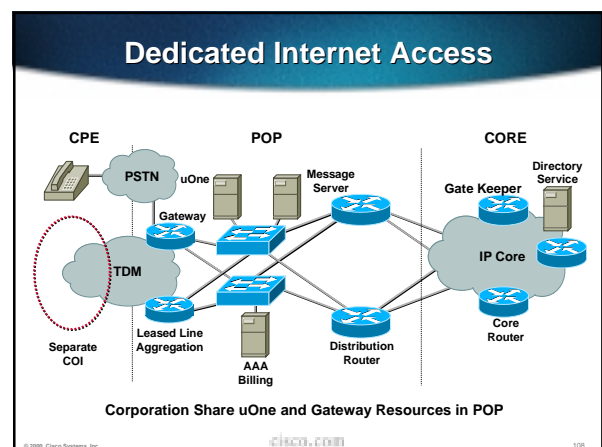


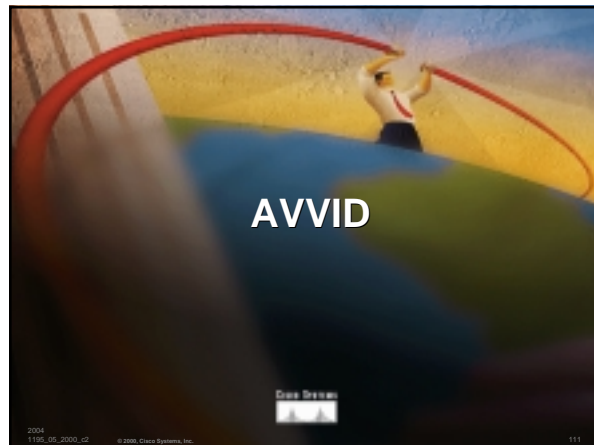
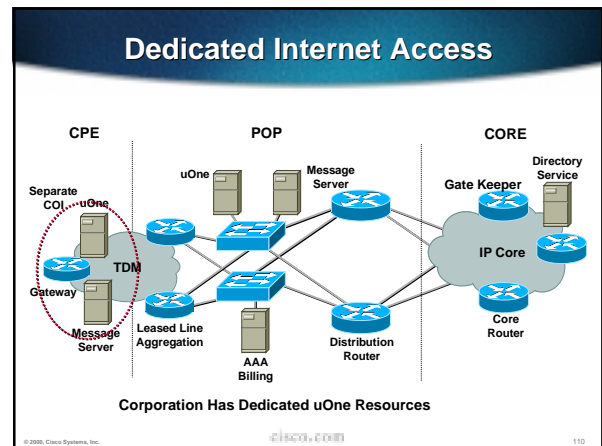
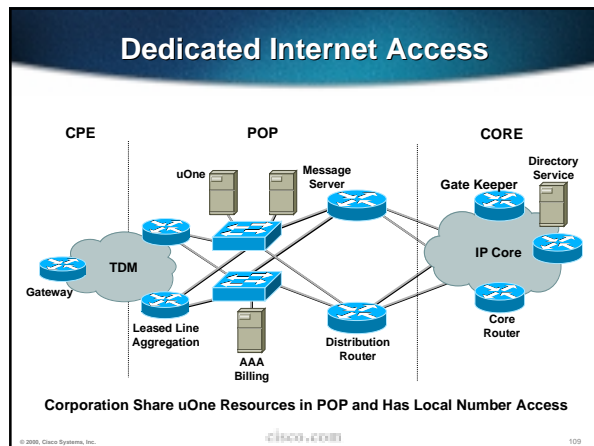
### Dial Internet Access Deployment Summary

Quality Feature	Fully Centralized	Partially Centralized	Fully Distributed	Partially Distributed
Call Setup Time	Delays Possible	Very Good	Best	Very Good
Voice Quality	Degraded Voice Possible	Very Good	Very Good	Very Good
Authentication	Good	Very Good	Very Good	Very Good
Message Response	Good	Good	Very Good	Very Good

Call Setup Time: Time taken to setup call and hear ringing at the far end  
 Voice Quality: Quality of messages being played back from uOne  
 Authentication: Time subscriber has to wait for the system after entering user ID and pin  
 Message Response: Time subscriber has to wait to hear message after that message has been selected.

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### Cisco AVVID Voice Attributes

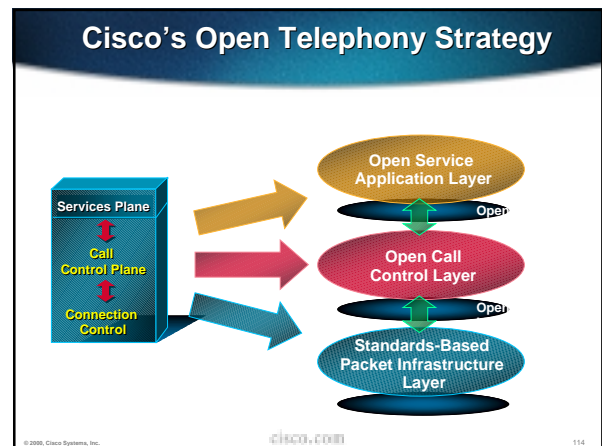
- **Already delivered :**
  - Highly scalable architecture
  - High availability
  - Distributed architecture
  - Lower total cost of ownership
  - Rapid application deployment

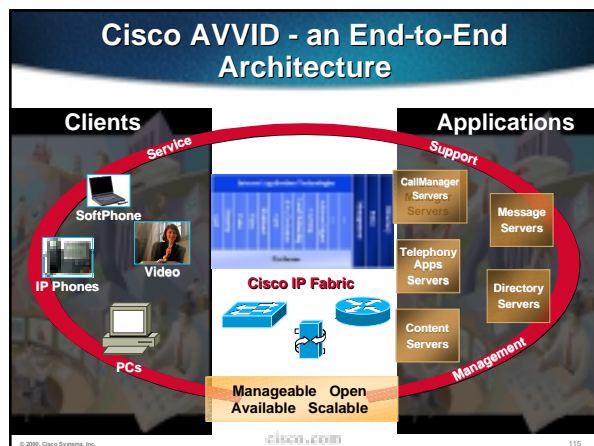
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### New Cisco AVVID Voice Attributes

- **New World Applications**
  - Improved customer care
  - Enhanced workforce efficiency
  - Leverage converged infrastructure
- **Open Systems Partner Program**

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## IP Application Deployment Advantages

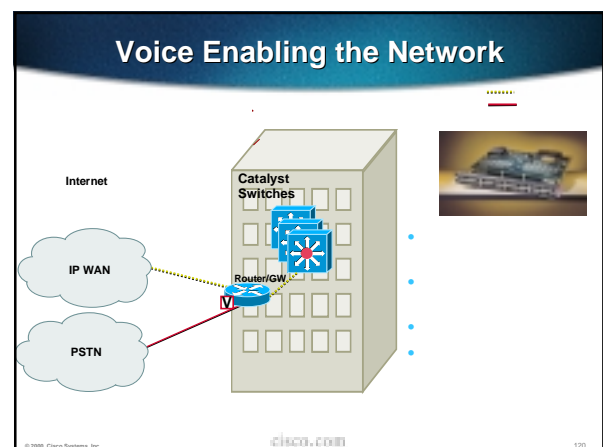
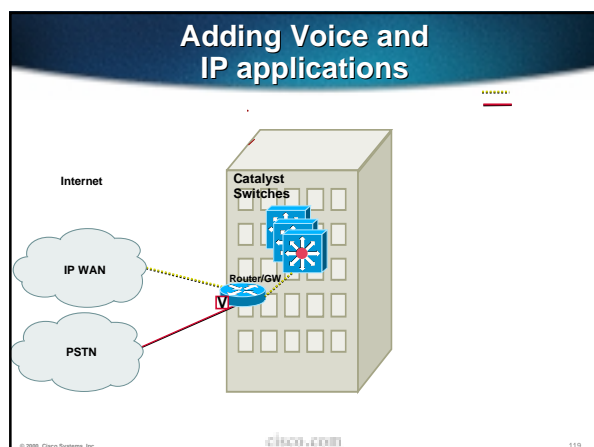
- Scalable applications span time and distance
- Ease of integration
- Rapid deployment
- Leverages existing applications directories, web sites, message stores, calendars

The Cisco logo and website (cisco.com) are at the bottom.

## Announcing AVVID Applications

- IP Phone 7960 Display Services
- IP SoftPhone
- IP Auto-Attendant
- IP Interactive Voice Response
- Cisco Web Attendant
- Cisco uOne Messaging for the enterprise
- IP Contact Center—IPCC

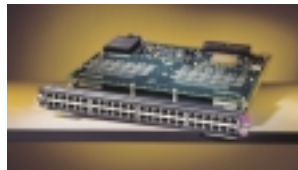
The Cisco logo and website (cisco.com) are at the bottom.





## Cisco Catalyst 4K/6K Ethernet Line Card with Inline Power Option

- 48-port 10/100 Ethernet switch line card, with optional Inline Power daughtercard
- Provides Inline Power to IP phones
- Intelligent auto-detection of IP phones
- Manageable via SNMP



WS-X6348-RJ-45

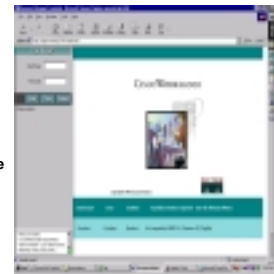
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## Single System Management

- Common management interfaces  
SNMP, XML, Telnet, TFTP
- Common access via IP
- Common end host tracking:  
Track all end host devices within one system (phone, laptop, workstation)
- Reduced operational costs  
No provisioning of adds, moves and changes

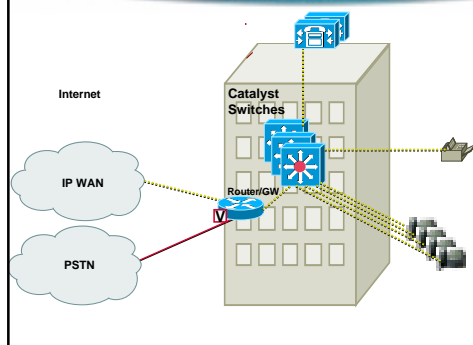


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## IP Telephony



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## Individual Productivity IP 7960 Display Applications



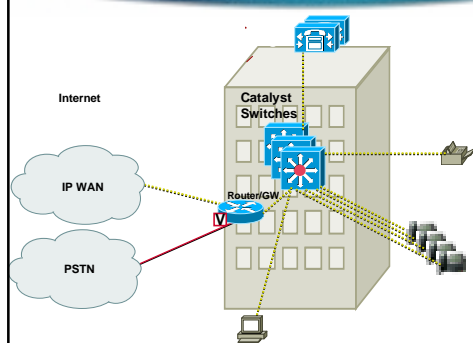
- IP Telephony Appliance
- Corporate directory integration via LDAP
- Web site integration via XML
- Personalised menus via softkeys
- Context-sensitive help
- Open interface for 3rd party app development
- Intelligent, programmable services

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## Add Web Attendant



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## Cisco Web Attendant

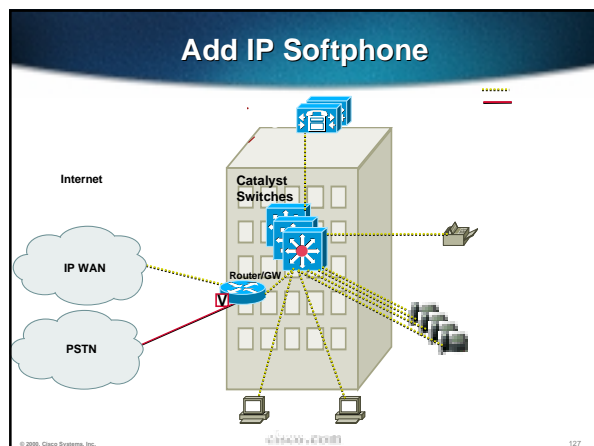
- Allows receptionists to use any phone as attendant console
- Drag and drop users via LDAP
- Benefits:  
Expensive hardware not required  
Can be run from any connected desk



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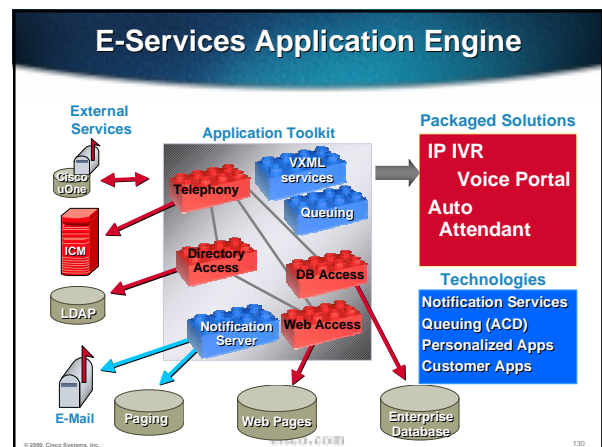
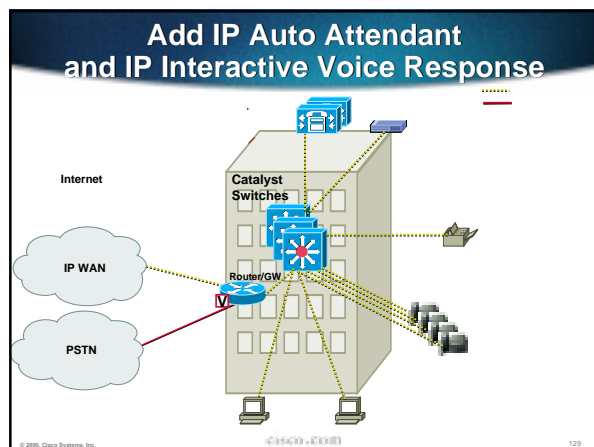
126



### IP SoftPhone—Fingertip Features

- Media termination allows office extension mobility
- Improved productivity
- GUI based interface for phone control (drag and drop)
- Easy feature access
  - One click conference, transfer & collaboration
  - NetMeeting
- Directory integration
  - Personal and Public (LDAP)
  - Dial by name/email address
- Standards based TAPI integration

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### Rapid Update Productivity Voice Portal Solution

Call Manager IP IVR

IP Intranet

Press #1 to Hear Cisco Stock Quote

Cisco Stock Quote

- Extracts XML information from web page into IP IVR
- Benefit
  - Only one place to configure and maintain data
  - Consistency
  - Lower admin costs

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### Notification Services

Notification Services

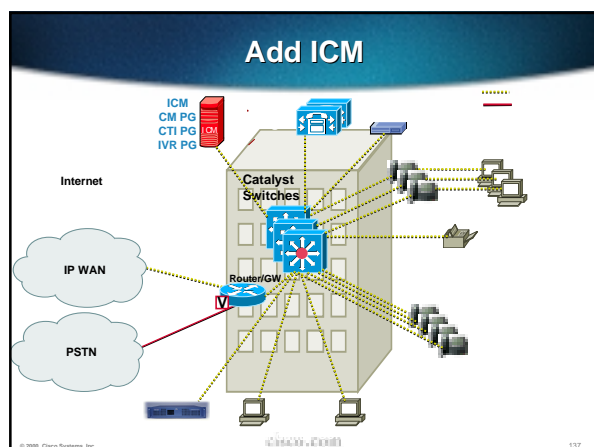
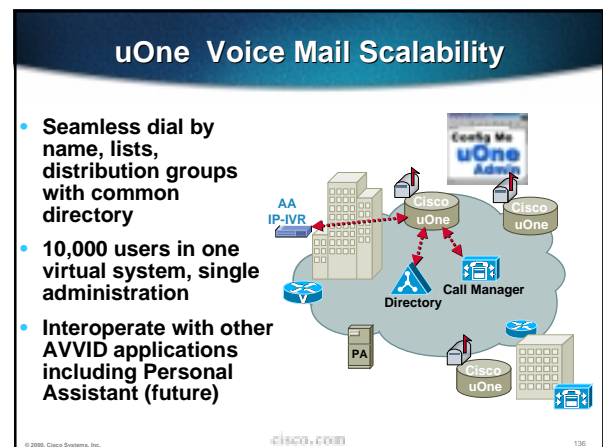
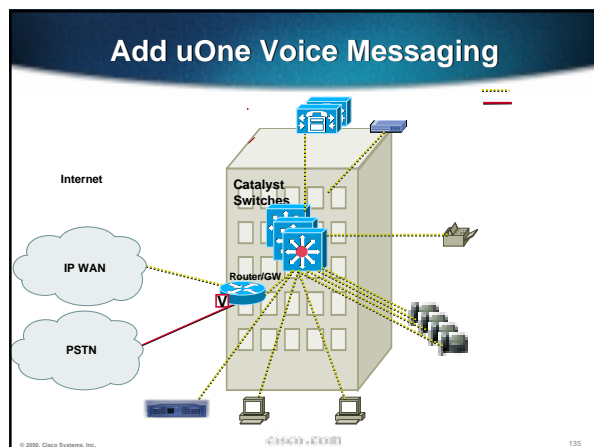
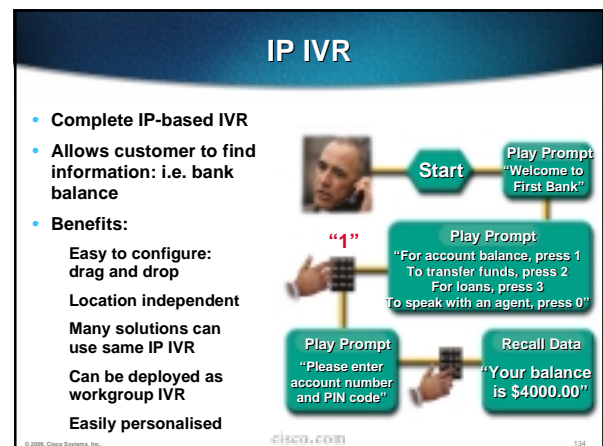
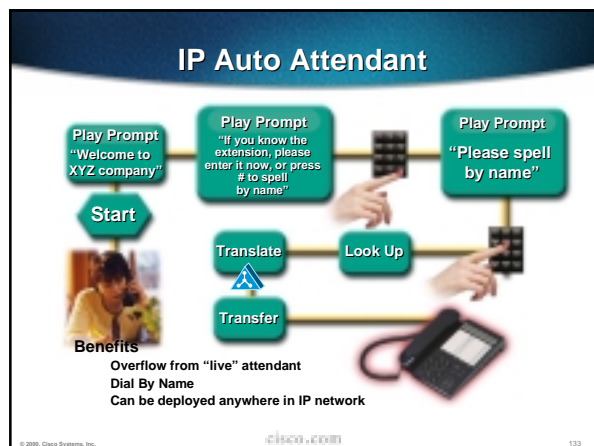
IP Intranet

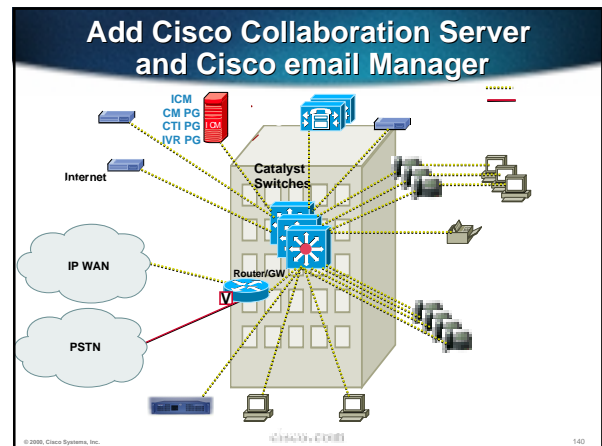
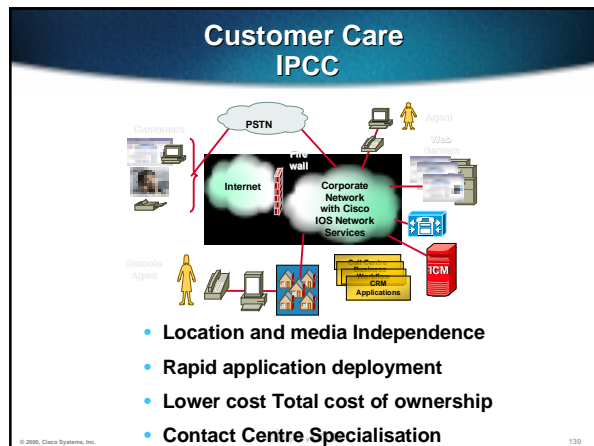
Page Me when Inventory Arrives

CM Apps

- Automatic notification
  - triggers based on back-end system changes
  - thresholds pre-defined
- Notification can be sent to:
  - phone display
  - beeper
  - remote device
- Ease of administration
  - one place to configure and maintain data
  - provides basic e-CARE
  - easily personalized

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## Cisco eMail Manager

- Flexible, extensible and highly scalable email response management (ERM) system
- Allows companies to process email inquiries based on a flexible, customisable system of rules
- Key features:

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## Partner Categories

- Unified Messaging: Active Voice, AVT
- Call Centers: Interactive Intelligence, EasyRun, Wicom
- Call Acctg: ISI, MIND CTI, Telemate, Integratrak
- E-Conferencing: Latitude
- E911 Tracking: SCC
- End point access: Symbol, Circa
- Application Server Mgmt: Integrated Research
- IVR Integrators: Gold Systems, Spanlink, NEC
- Network Analysis: Fluke, Shomiti

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## AVVID the complete solution

The diagram shows the AVVID architecture. It is divided into five layers: 'Partners', 'Applications', 'Call Processing', 'Infrastructure', and 'Clients'. The 'Partners' layer includes 'Applications' and 'Video'. The 'Call Processing' layer includes 'Call Manager'. The 'Infrastructure' layer includes 'PSTN' and 'IP Network'. The 'Clients' layer includes 'PSTN gateways', 'Analog phone support', and 'DSP farms'. The architecture is designed to be a complete solution for AVVID.

The World Is Now Global—  
All Applications Must Span Time and Distance

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## AVVID Installation in Retail

### Sports Soccer

- Leading sports retailer in UK and Belgium
- Manufacturer of Donnay Sports equipment

### Business Issues

- Poor communication between head office, 100 branches and regional managers
- Cost of separate voice, CCTV and data systems
- No branch access to corporate network
- Lack of real time information and control
- Unreliable dial up access to EPOS systems

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## AVVID Summary

- IP telephony has proven acceptance by Enterprise customers
- AVVID delivers high scalability and availability to the enterprise
- New World Applications improve productivity, customer care and deliver competitive advantage
- AVVID's open approach partner ecosystem enables choice



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