CISCO SYSTEMS

Migrating to IP Telephony from Traditional Voice Technologies

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Agenda

- Introduction
- Dial Plan and PBX Migration
- Voicemail Migration
- Unified Messaging Integration
- Moving the Users
- Migration Examples

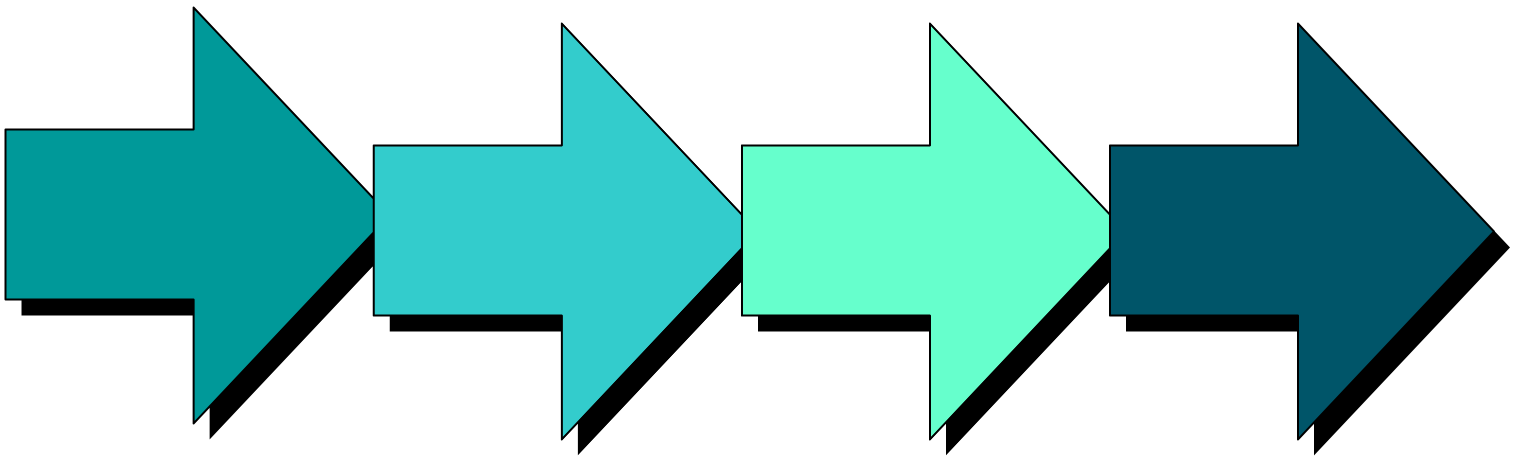
Introduction

- Why can’t we move 12,000 users in a day
- No flash cut,
- Plan/Test … but before you do it, talk to you users, perform station reviews early in the process
- Don’t be afraid, IPT doesn’t bite
- Raffiky says “Change is good”
- Remember you are not just moving to another Phone System
- Do not perpetuate Chaos
- There are Tools Available to ease Migration

Typical Deployment Cycle

Complete Business Case
Complete Network Design
Finalize Migration Strategy
Identify Productivity Tools

Migrate Users
Hybrid Centrex/
IP Telephony Users



Pilot to Validate Design and Business Case

Migration Completed
Full Benefits Realized

Dial Plan

- It's called Dial ***PLAN*** not Dial Improvise…

  So ….. **PLAN IT**
- Considerations

  Users want to keep phone numbers

  Local Number Portability

  Centrex Tie/CallFWD

  Integrated Dial Plan
- Other Tools that can help during migration

  IP Softphone, Directories, Personal Fast Dials

  Active Assistant, VMO/VMI

Local Number Portability

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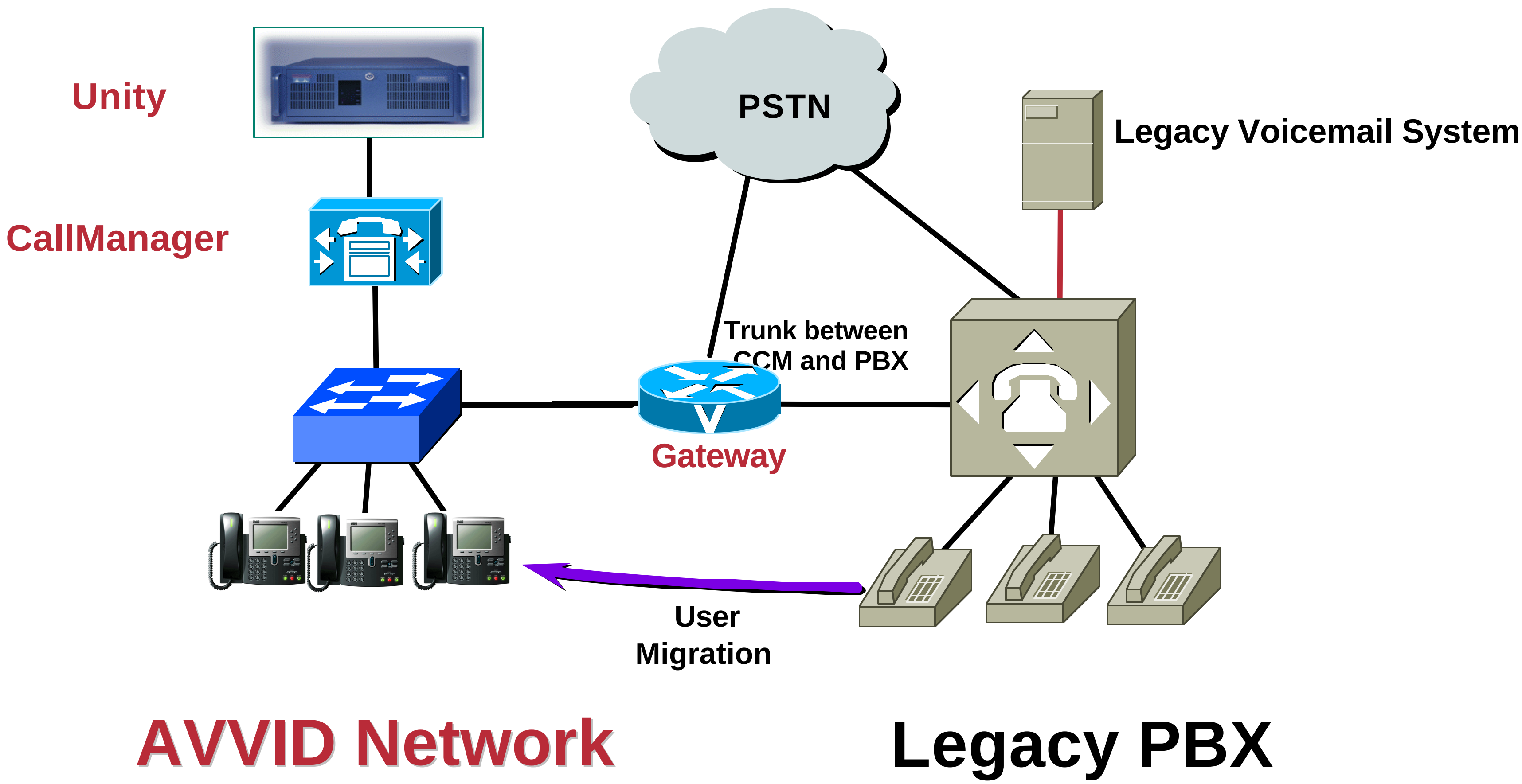
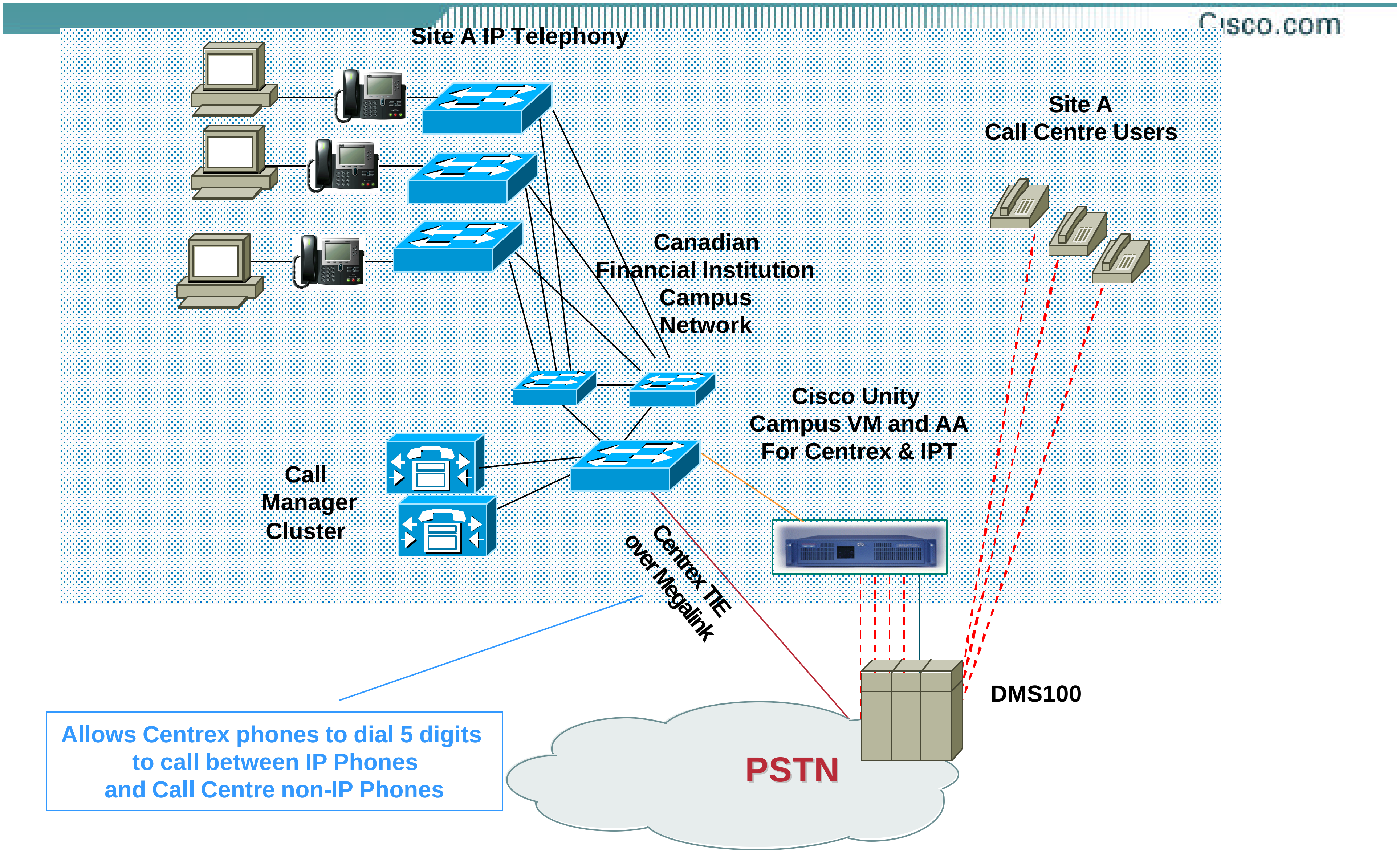
- 1. Local number portability key to migrating from Centrex to ISDN (with same Telco or a CLEC) http://www.crtc.gc.ca/cisc/eng/Portable.HTM

- 2. Alternate for Centrex users is to use a call forward feature for inbound on key published phone numbers where LNP not available.

CallManager and PBX Migration (The Basic Concept)



5 Digit Dialing Between all Users in a Site
(IP Phones & Call Centre non-IP Phones)



External Route Elements in CallManager

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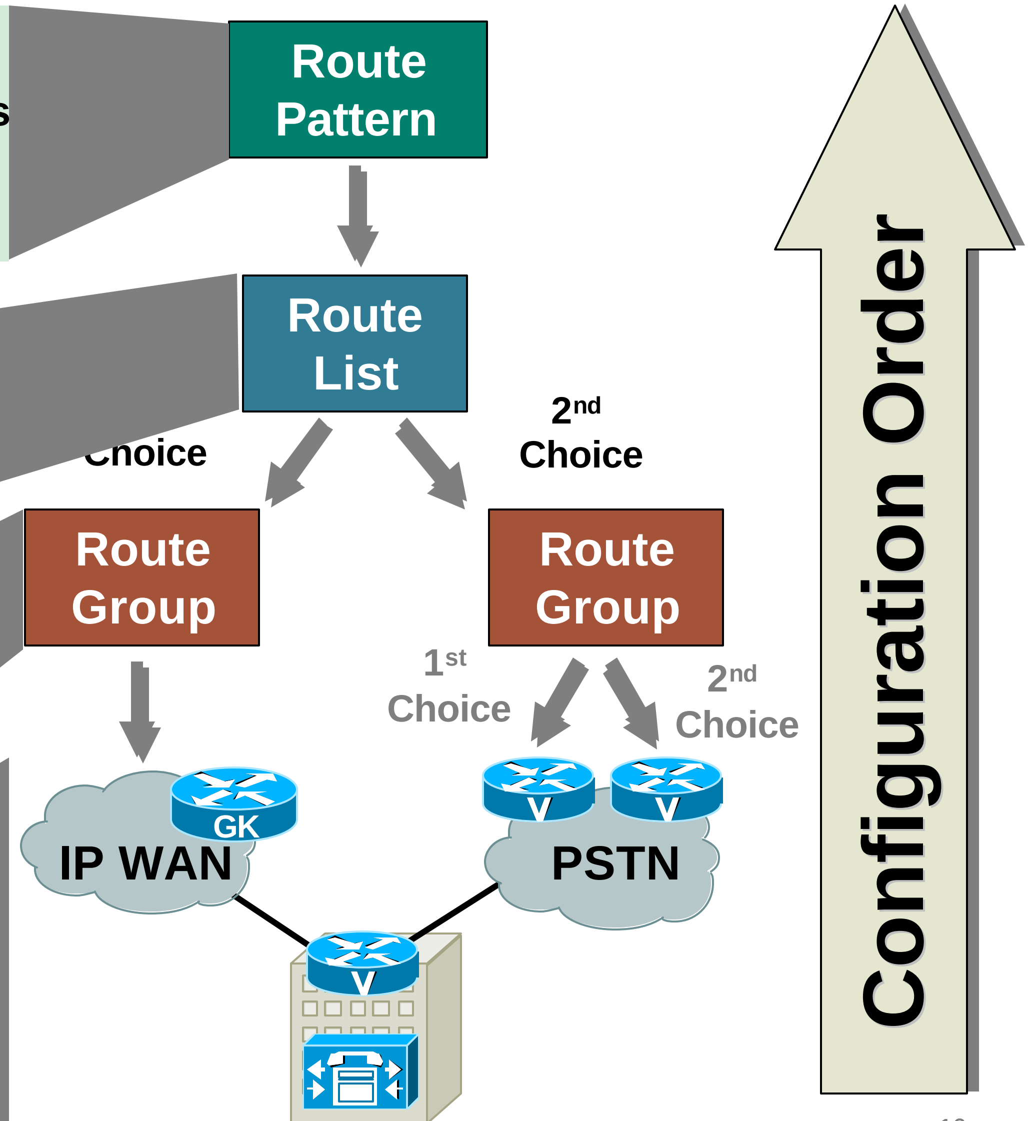
Route Pattern
- Matches dialed number for external calls
- Performs digit manipulation (optional)
- Points to a Route List for routing

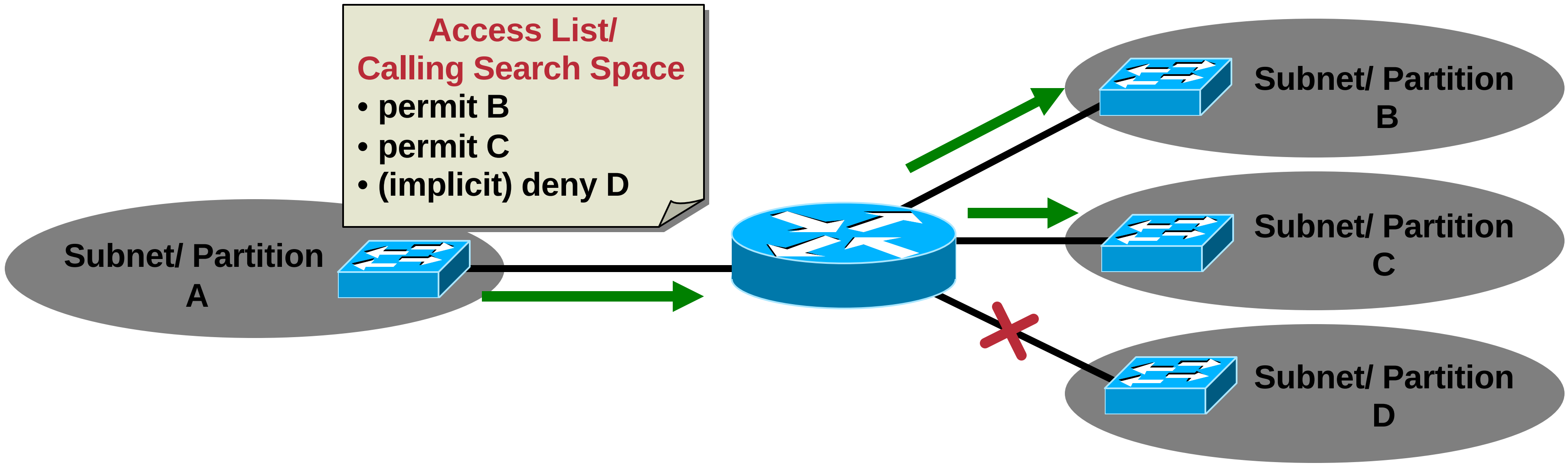
Route List
- Chooses path for call routing
- Points to prioritized Route Groups

Route Group
- Performs digit manipulation
- Points to the actual devices

Devices
- Gateways (H.323, MGCP)
- Gatekeeper
- Inter-cluster Trunk (remote CM)



Partitions/ Calling Search Spaces:
Analogy with Subnets/ Access Lists



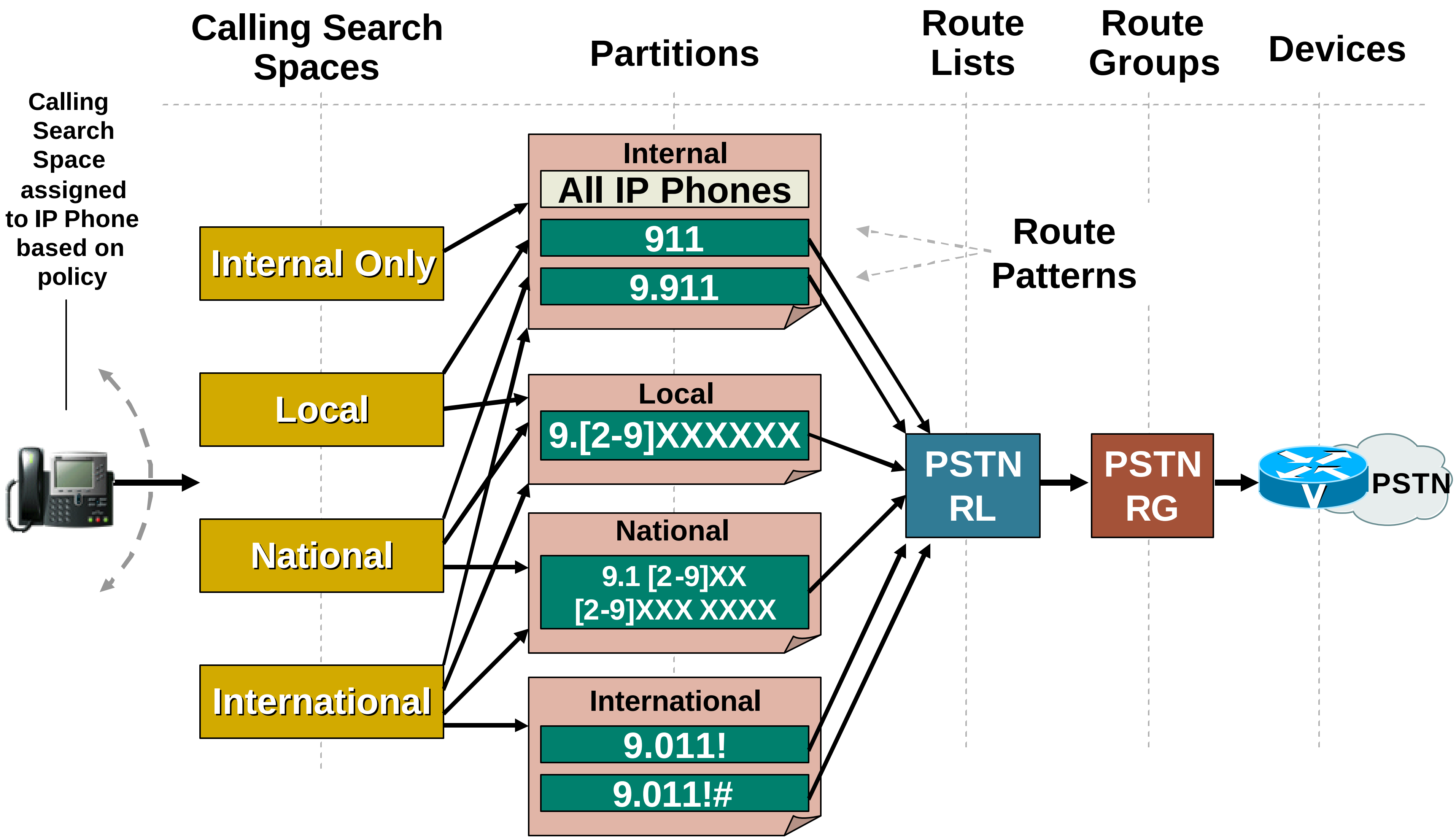
Partition –
"Where you are"

- Collects devices with similar "reachability" characteristics
- Items placed in partitions: Directory Numbers (DN), Route Patterns, Voice Mail Ports...

Calling Search Space –
"Where you may call"

- Set of rules to set call restrictions/ permissions
- Defines which partitions a device may search to reach a dialed number
- Is assigned to IP phones, GWs

Example of Composite Dial Plan View
Single Site PSTN Access



Voicemail Migration

- SMDI Splitting with VG248
- DPA
- Overview of Networking
  - IVC, SMTP AMIS and Bridge Users
- AMIS
  - AMIS Definition, Sample Conversation, Bridgehead concept
- Analog Octelnet
  - Unity Bridge
- UM Considerations
- VPIM

SMDI for Voicemail—VG248

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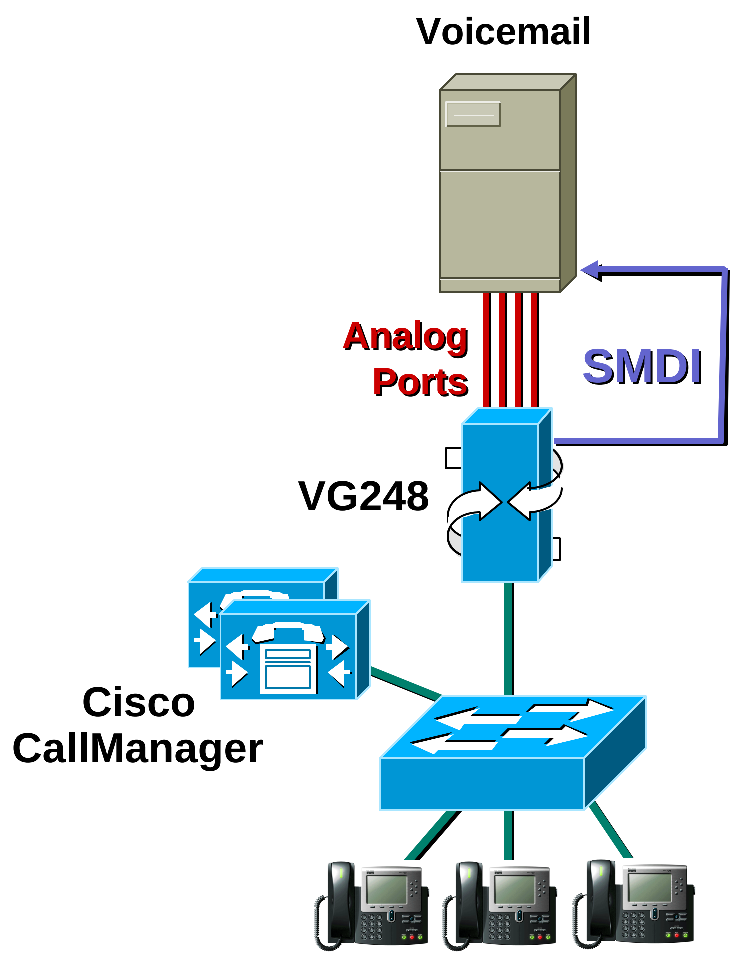
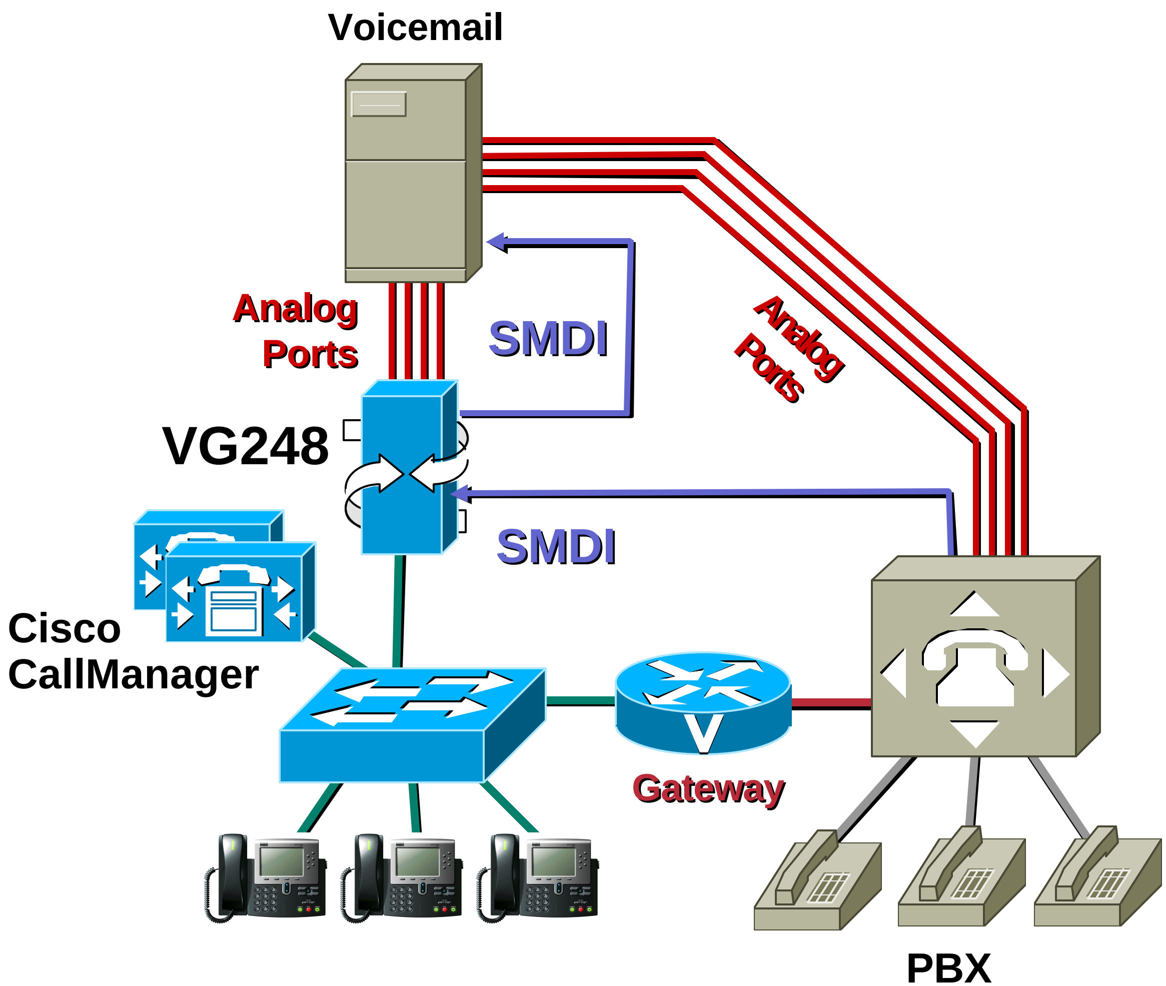
- **Multiple SMDI links per Cisco CallManager**
- **SMDI fail-over capability**
- **Voicemail location independence**

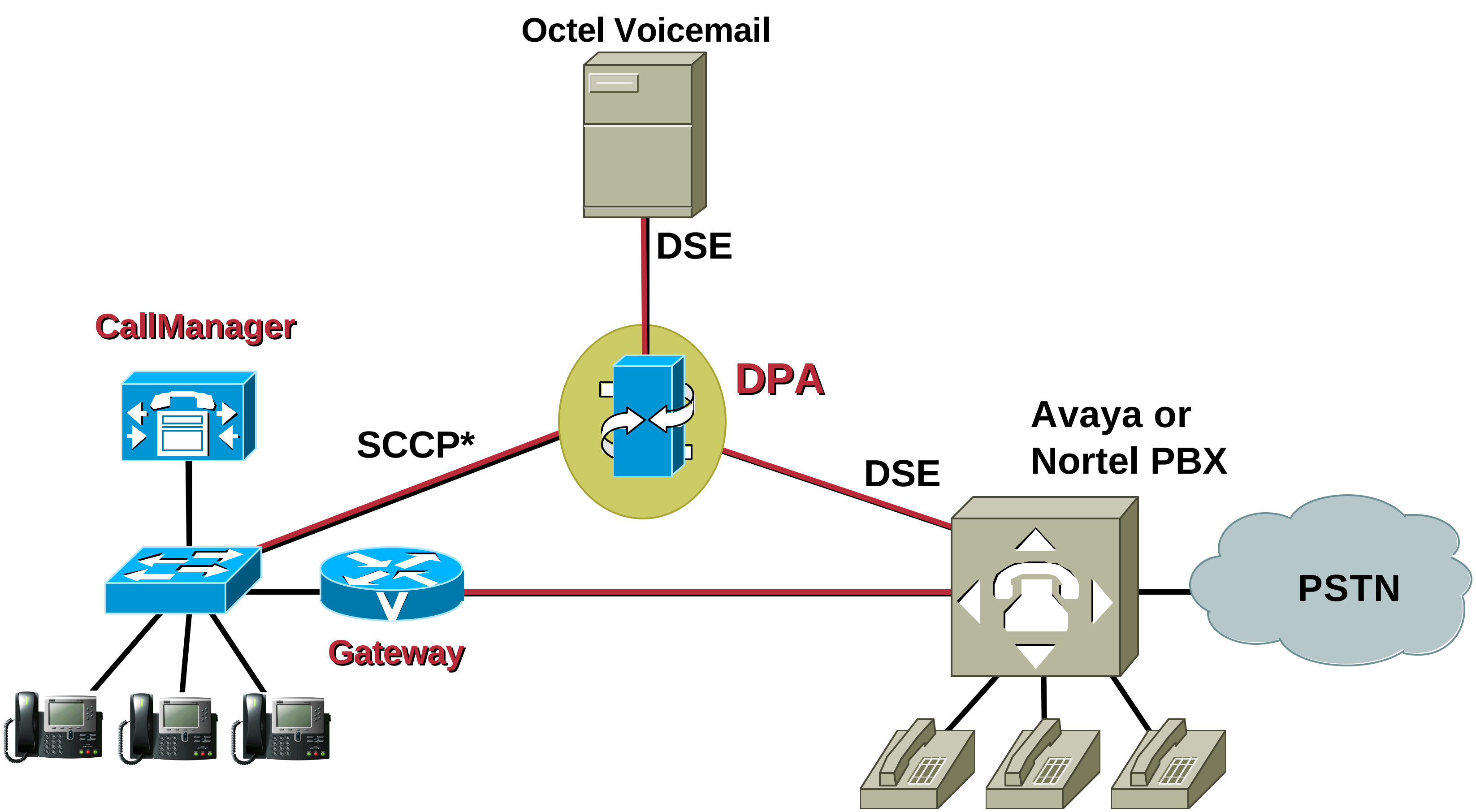


SMDI with PBX—VG248

- **Multiple SMDI sources**
- **Smooth migration**
- **Single SMDI link to voicemail**



DPA for Octel with Avaya or Nortel PBX



*Skinny Client Control Protocol, See Session VVT-220 for More Information

DPA for Octel with CallManager

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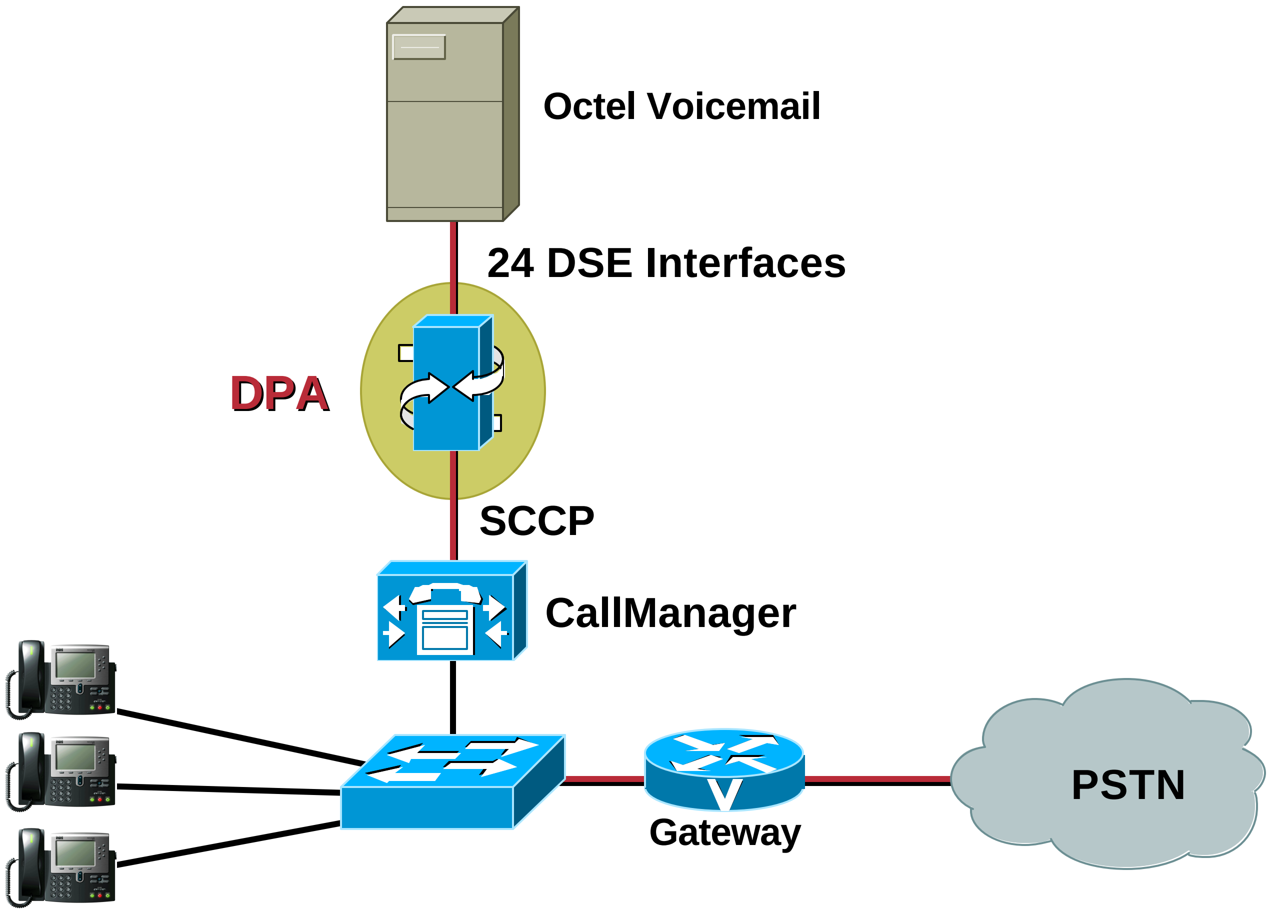

Allows Digital Set-Emulation Integration to CallManager

Unity Networking Overview

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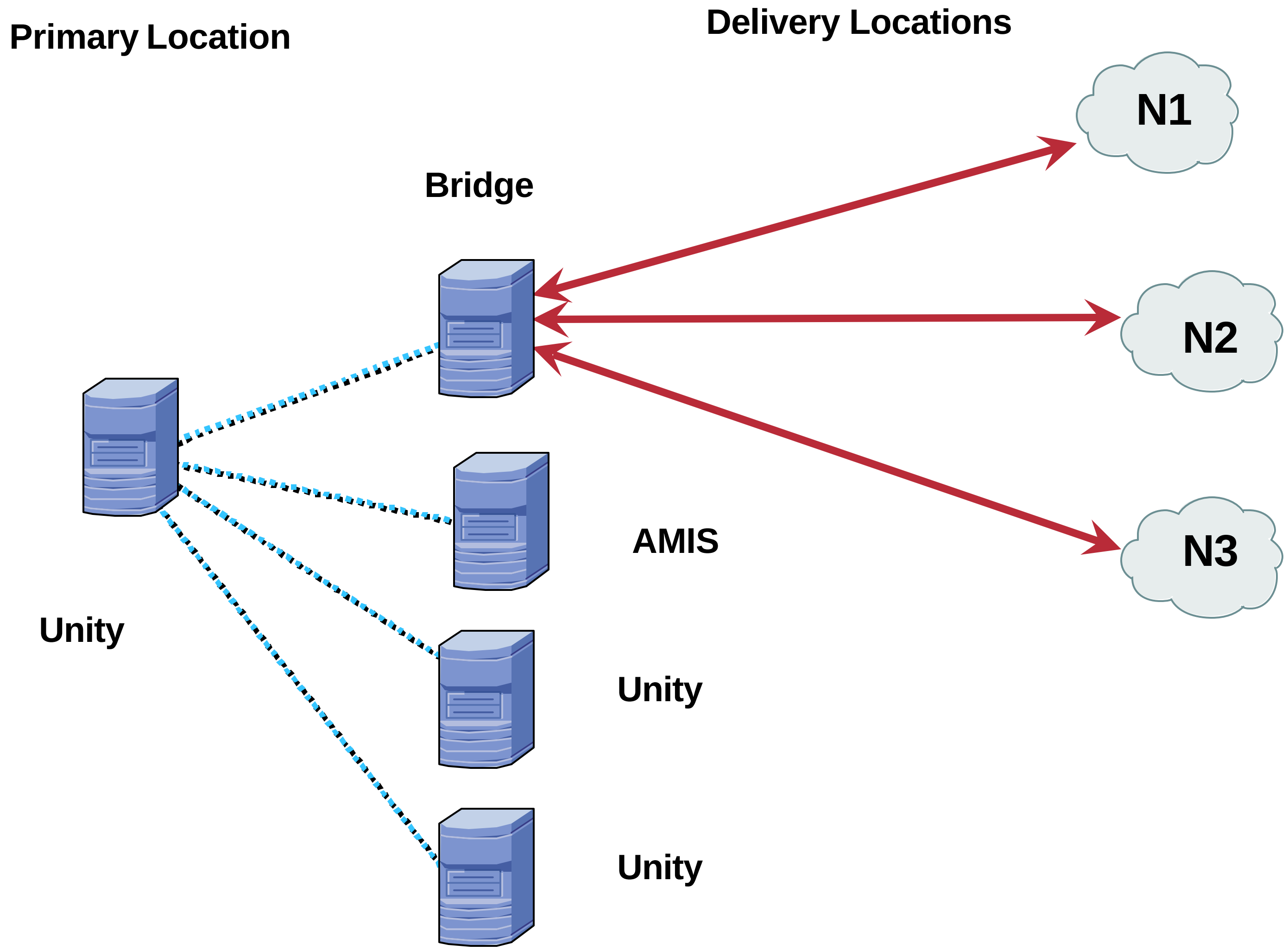
- Locations are Cisco Unity-specific objects that are used in networking.
- There are two types of locations: primary locations and delivery locations
- Each Cisco Unity server is associated with one location—referred to as the default or primary
- Each primary location contains the network information that identifies the Cisco Unity server to other Cisco Unity servers and other voice messaging systems.

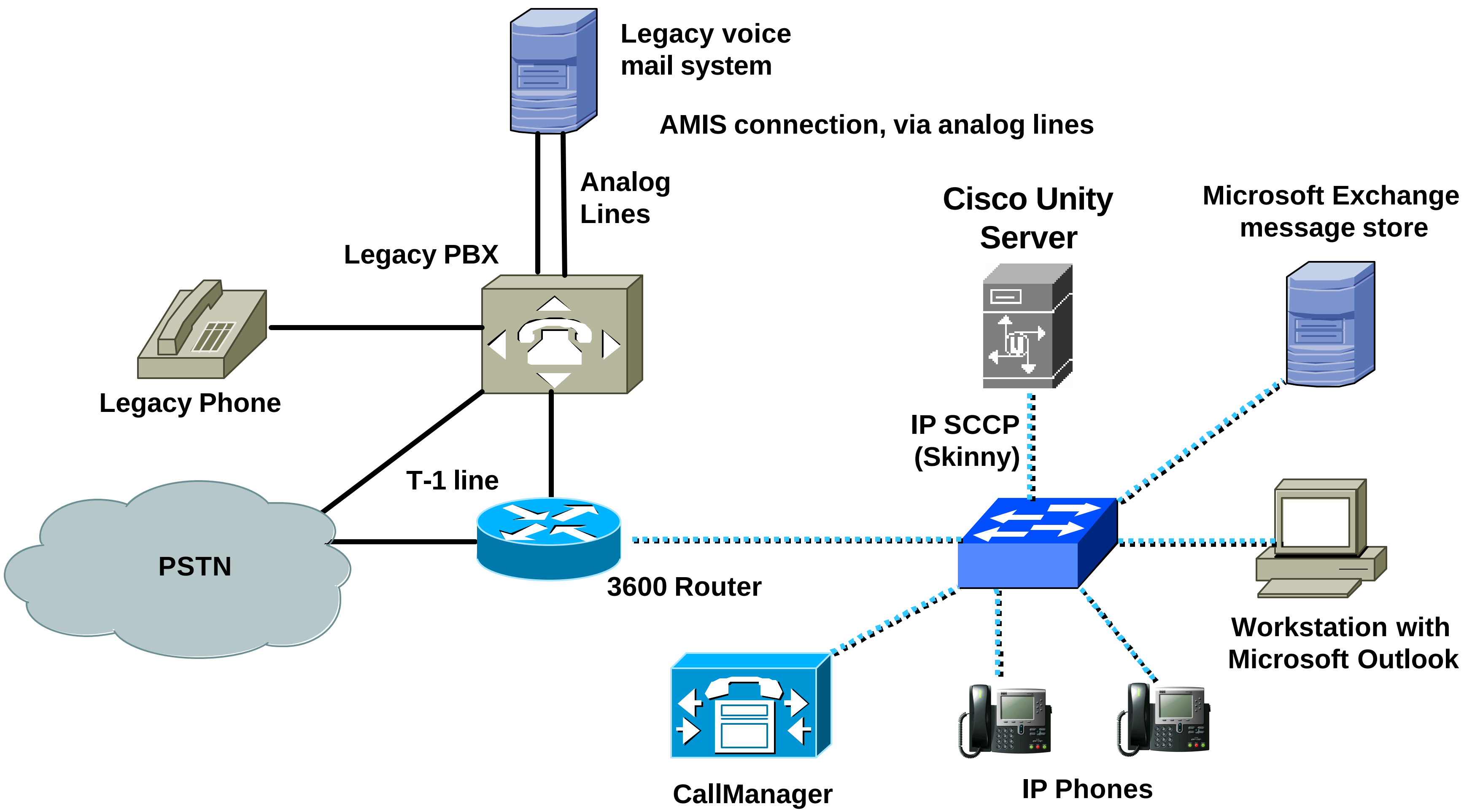
Locations


Primary Location
Delivery Locations
N1
Bridge
N2
AMIS
N3
Unity
Unity
Unity

AMIS

- **AMIS**
  - Blind Addressing
  - AMIS Subscribers
- **AMIS Bridgehead Model**
  - Digital Network multiple Cisco Unity systems
  - Dedicated Cisco Unity for AMIS Traffic
  - Home Internet subscriber and AMIS users on that Cisco Unity

Cisco Unity: AMIS-A



AMIS Conversation

- (Ringing)
- CCD*041116*05*1721#408#2327200#05*49*1630015555#9995#07*05

(Voice message plays here)*03417*05*049033

AMIS Conversation

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Digits Sent	Sent By	Description
N/A N/A Ringing.		
CC	Originating system	DTMF “C” tone for call setup. In this case, the “C” tone is repeated because no response is received within the Timeout period.
D	Destination system	DTMF “D” tone response.
*041116	Originating system	*: Start Digit. 04: Frame Length (4 digits, not including * and 04). 1: Function Code (1 = Start Session). 1: Data (always a 1 if a Start Session frame). 16: Checksum (sum of 10 + 4 + 1 + 1 = 16).
*05	Destination system	*: Start Digit. 0: Response Code (0 = accept and continue with Data frame). 5: Check Digit (always a 5 with a Response Code of 0).

AMIS Conversation

*1721#408#2327200#05	Originating system	*: Start Digit. 17: Frame Length (17 digits, not including * and 17). 2: Function Code (2 = System Number). 1#408#2327200#: Data (originating system phone number), plus # (the terminating character, needed because the Data is variable length). 05: Checksum (sum of all digits in the frame. 1 + 7 + 2 + 1 + 12+ 4 + 10 + 8 + 12 + 2 + 3 + 2 +7 + 2 + 10 + 10 + 12 =105, yielding a Checksum of 05).
*49	Destination system	*: Start Digit. 4: Response Code (4 =accepting messages but node response not allowed). 9: Check Digit (always a 9 with a Response Code of 4).

AMIS Conversation

*1630015555#9995#07	Originating system	*: Start Digit. 16: Frame Length (16 digits, not including * and 16). 3: Function Code (3 = Message Information). 0: Data, Message Type (0 = new message). 0: Data, NDR Reason (0 = new message or node response message). 1: Data, Message Length (1 minute, rounded up). 5555#: Data (originating mailbox), plus # (the terminating character). 9995#: Data (destination mailbox), plus # (the terminating character). 07: Checksum (sum of all digits in frame. 1 + 6 + 3 + 10 + 10 +1 + 5 + 5 + 5 + 5 + 12 + 9 + 9 + 9 + 5 + 12 = 107, yielding a Checksum of 07).
*05	Destination system	*: Start Digit. 0: Response Code (0 = accept and continue with Data frame). 5: Check Digit (always a 5 with a Response Code of 0). N/A N/A Voice message plays. Recorded directly into mailbox 9995 on the destination system.

AMIS Conversation

Conversation	PLAY MESSAGE	Example
*03417	Originating system	*: Start Digit. 03: Frame Length (3 digits, not including * and 03). 4: Function Code (4 = End Message). 17: Checksum (sum of all digits in frame. 10 + 3 + 4 = 17).
*05	Destination system	*: Start Digit. 0: Response Code (0 = accept and continue with Data frame). 5: Check Digit (always a 5 with a Response Code of 0).
*049033	Originating system	*: Start Digit. 04: Frame Length (4 digits, not including * and 04). 9: Function Code (9 = End Session). 0: Data (0 = no more messages; normal termination disconnect). 33: Checksum (sum of all digits in frame. 10 + 4 + 9 + 10 = 33). N/A Destination system No Response frame sent; call is disconnected as a successful call.

Unity Bridge

- **Networking GW between Unity and Octel**
- **The Bridge looks like another node in the network**
- **Communication between the Bridge and Octel is done using Analog Octelnet (based on DTMF tones)**
- **Communication between Unity and the Bridge is digital.**

Cisco Unity With Unity Bridge —Multi Node Octel

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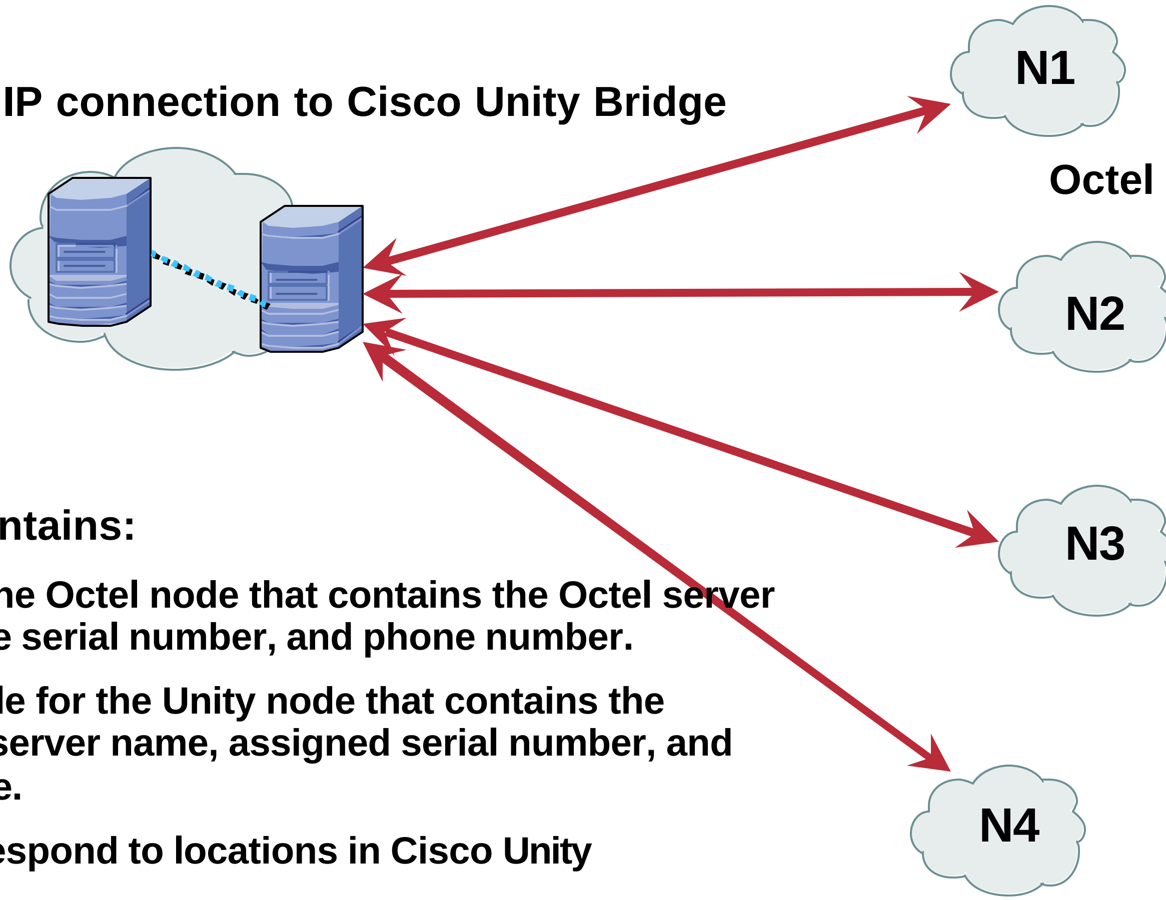

- The Bridge maintains:
    - A table for the Octel node that contains the Octel server name, unique serial number, and phone number.
    - Another table for the Unity node that contains the Cisco Unity server name, assigned serial number, and domain name.
- Octel nodes correspond to locations in Cisco Unity

Addressing options:

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- **Blind addressing:**
  - No information about the individuals associated with the other Octel nodes (such as their extensions and recorded voice names).
  - To address a message, subscribers enter the delivery location Dial ID and the remote mailbox number of the recipient.
  - Cisco Unity sends the message without confirming that the recipient exists.
- **Bridge subscribers**
  - Cisco Unity has information about the remote users, such as their names, extensions, and recorded voice names.
  - Unity Subscribers address messages to Bridge subscribers the same way they do to to regular Cisco Unity subscribers—by extension or by spelling the name of the recipient.

VPIM

- **Allows the interchange of voice, fax and text messages between disparate voice messaging systems over a TCP/IP data network.**
- **Wraps encoded voice messages in MIME message parts, and uses SMTP to transport them over TCP/IP networks.**
- **The VPIM profile requires that these multi-part messages be formatted and used according to a specific set of conventions and rules as defined in these protocols**

VPIM

- VPIM messages are made up of one or more parts, at least one of which must be a voice message, and all of which are MIME encoded.
- The profile also allows adding optional, parts for spoken name, forwarded messages and fax messages.
- Subscriber on one system sends VPIM mail to subscriber on the other system by addressing a SMTP message to TelePhoneNumber@Domain.com

VPIM

- **Example # 1- To send voice mail to user Andres Martinez with telephone number 206-256-1234 at Cisco.com, VPIM compatible system will send VPIM message to 2062561234@cisco.com using SMTP protocol.**

- **Example # 2- To send voice mail to user Andres Martinez with extension 1234 at telephone number 206-256-3000 at Cisco.com, VPIM compatible system will send VPIM message to 2062563000+1234@cisco.com using SMTP protocol**

Protocol Comparison

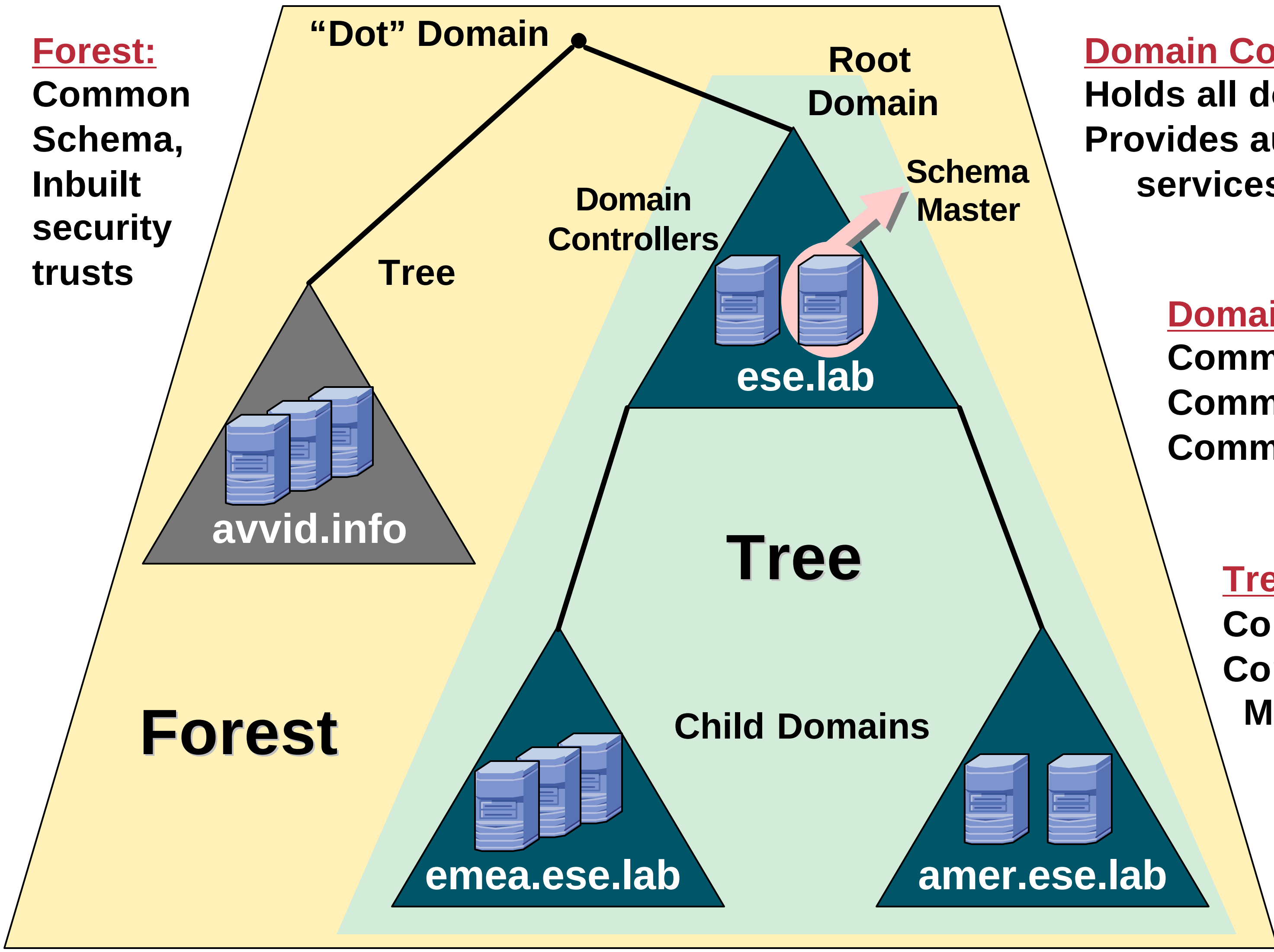
AMIS	Analog Octel (BRIDGE)	VPIM
Analog Protocol	Analog Protocol	Digital Protocol
Most legacy systems support it.	Supported only by Octel Systems	Supported by newer voice mail systems including Avaya Interchange.
Does not support name confirmation	Supports name confirmation	May support name confirmation
Does not support fax	Support fax	Supports fax
Cost of ownership is Highest	Cost of ownership is Medium.	Cost of ownership is lowest.
5 minutes message to 10 recipients will take around 50 minutes of phone call.	5 minutes message to 10 recipients will take around 5 minutes of phone call.	5 minutes message to 10 recipients will take 0 minutes of phone call as messages are sent using SMTP.

UM Considerations

- AD integration
- Schema Updates
- Message Store
- The MCSE is your Friend
- VMO/VMI

Active Directory Integration Details
AD Terminology

Forest:
Common Schema, Inbuilt security trusts



Domain Controller:
Holds all domain information, Provides authentication services

Domain:
Common Schema, Common Namespace, Common Security Policy

Tree:
Common Schema, Common Namespace, Multiple domains

Large Cisco Unity Deployment UM or VM

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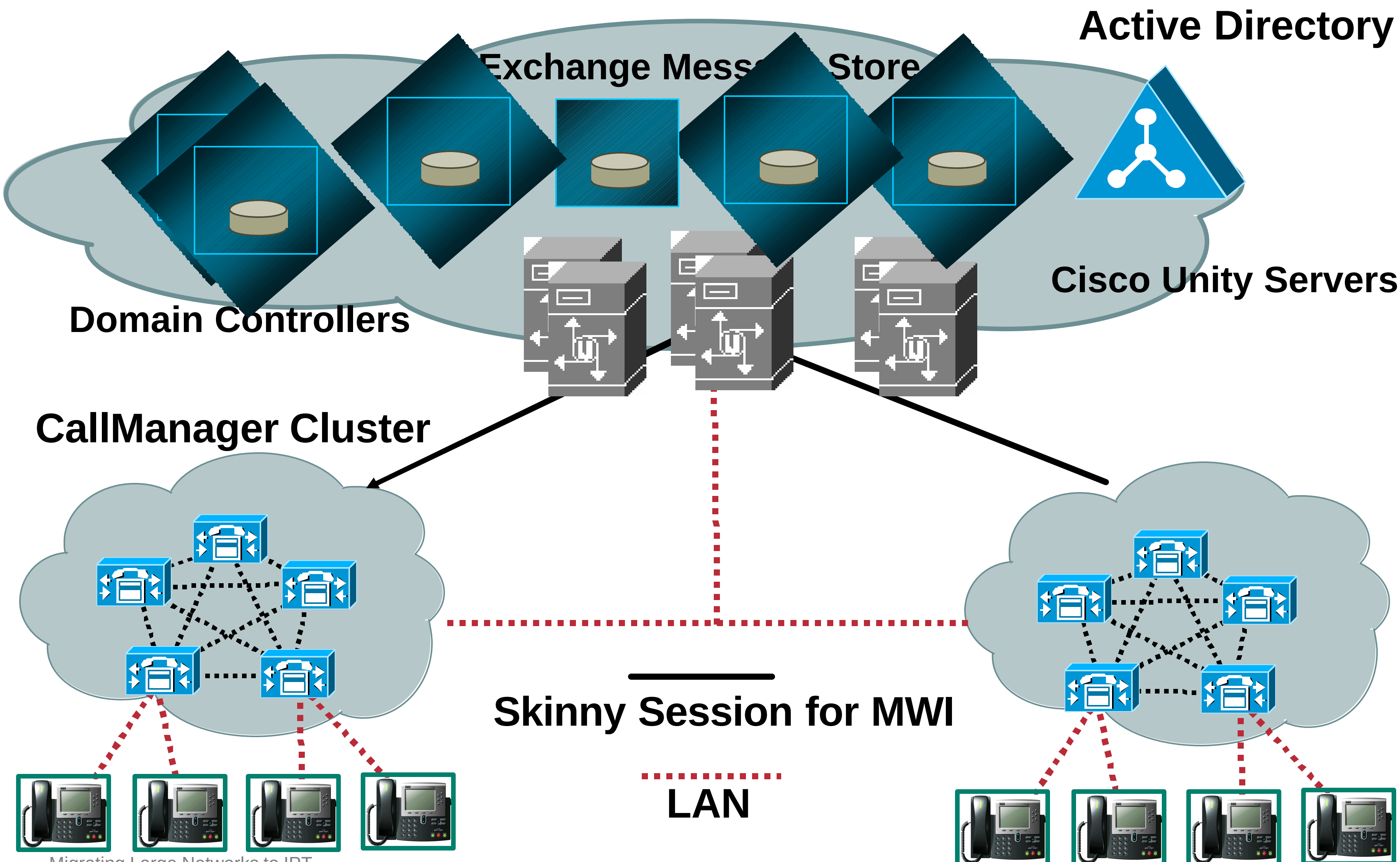

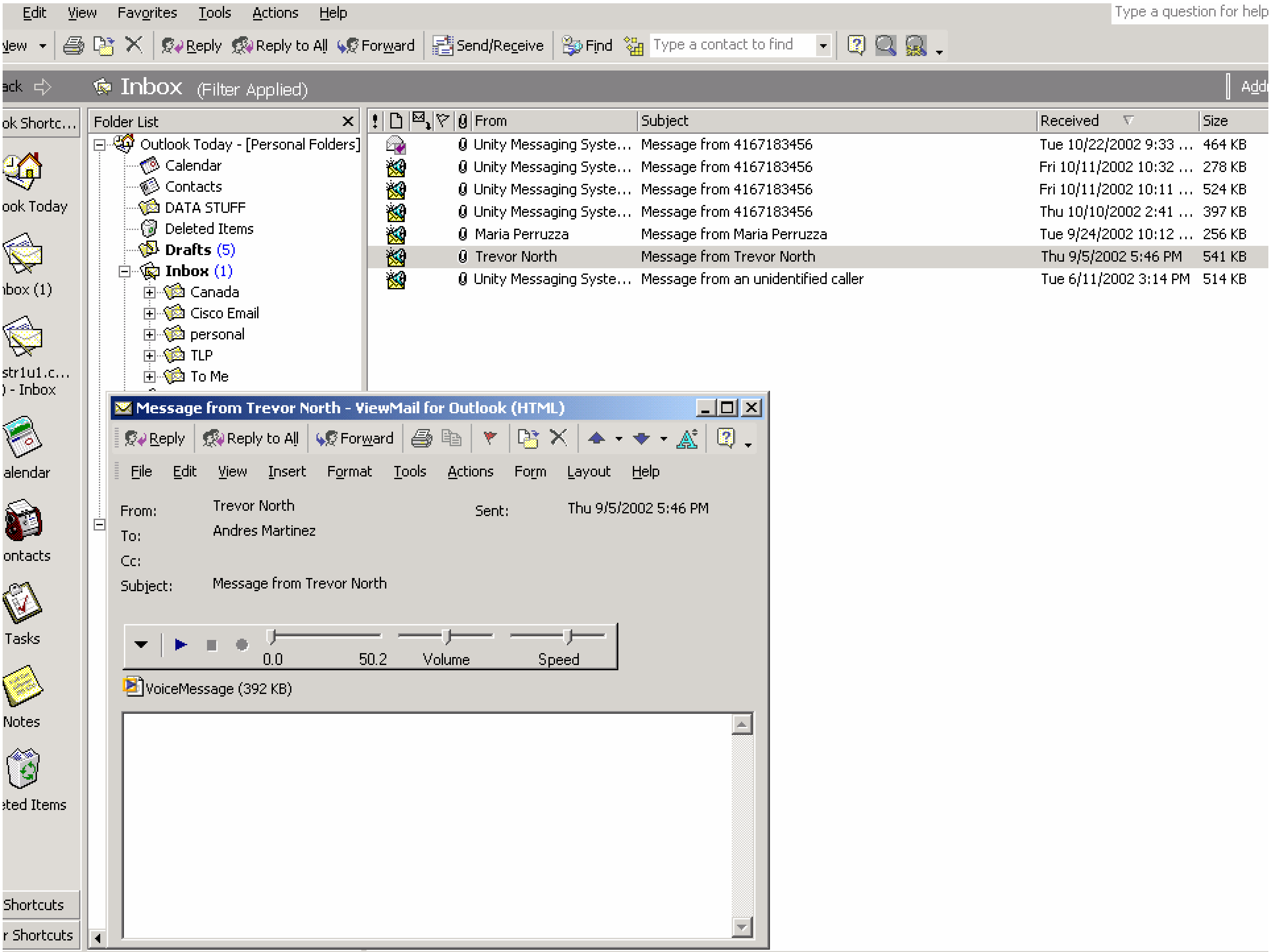
Edit View Favorites Tools Actions Help
Type a question for help
Reply Reply to All Forward Send/Receive Find Type a contact to find
Inbox (Filter Applied)
Folder List
Outlook Today - [Personal Folders]
Calendar
Contacts
DATA STUFF
Deleted Items
Drafts (5)
Inbox (1)
Canada
Cisco Email
personal
TLP
To Me
From Subject Received Size
Unity Messaging Syste... Message from 4167183456 Tue 10/22/2002 9:33 ... 464 KB
Unity Messaging Syste... Message from 4167183456 Fri 10/11/2002 10:32 ... 278 KB
Unity Messaging Syste... Message from 4167183456 Fri 10/11/2002 10:11 ... 524 KB
Unity Messaging Syste... Message from 4167183456 Thu 10/10/2002 2:41 ... 397 KB
Maria Perruzza Message from Maria Perruzza Tue 9/24/2002 10:12 ... 256 KB
Trevor North Message from Trevor North Thu 9/5/2002 5:46 PM 541 KB
Unity Messaging Syste... Message from an unidentified caller Tue 6/11/2002 3:14 PM 514 KB
Message from Trevor North - ViewMail for Outlook (HTML)
Reply Reply to All Forward
File Edit View Insert Format Tools Actions Form Layout Help
From: Trevor North
Sent: Thu 9/5/2002 5:46 PM
To: Andres Martinez
Cc:
Subject: Message from Trevor North
0.0 50.2 Volume Speed
VoiceMessage (392 KB)
Tasks
Notes
Shortcuts

Agenda End User Migration

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Pre-build Infrastructure

- Call Mgr cluster
- Dial plan
- gateways/PSTN
- voicemail integration
- voicemail templates
- CDR reporting
- network QoS
- implement Security policies

User Configuration

- Identify Users for move

-Station Review (eg. Phone type, special features,…)

-Populate spreadsheet with users

-Bulk Load spreadsheet into Call Mgr DB and LDAP directory

Approx. 2-3 days prior to each move

Deploy Phones

- Installer unpacks and installs phone at desk

- phone auto-registers with temp number (eg. X1001) – no external calling allowed

-installer then picks up phone and TAPs service collects proper phone number

- TAPS service reconfigures phone with proper bulk loaded profile **(5 phones every 20 minutes per installer)**

Train & Support Users

- User can bring their own phone to training (plug n' play)

- user is trained on their own phone & voicemail box

- opportunity during training to correct any problems (eg. Name display)

- On-line tutorial for follow up training option

Bulk Administration Tool (BAT)

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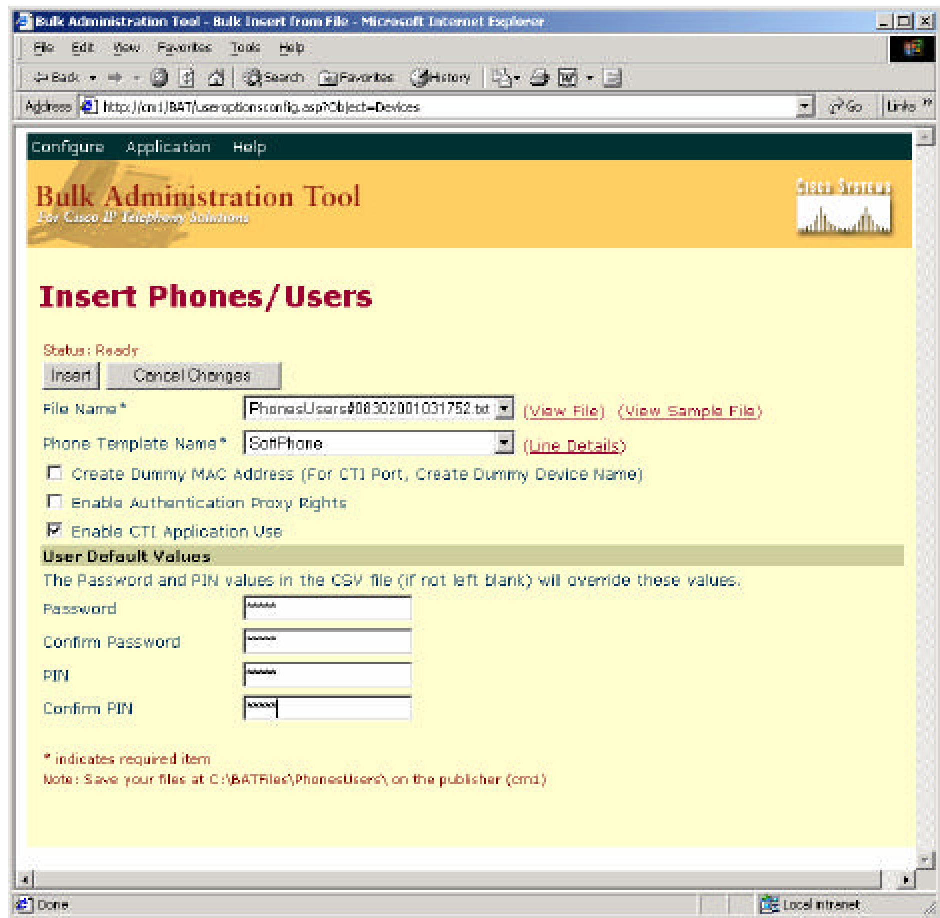
Allows bulk adds, deletes and updates of devices, lines and users

- **Add or delete users by the thousands**
- **Operates on a comma-separated-value file**
- **Created from existing databases and directories**
- **Comes with spreadsheet macro**
- **Tool for Auto-registered Phone Support (TAPS) – updates auto-registered phones with predefined configurations**



Bulk Admin: Spreadsheet Macro

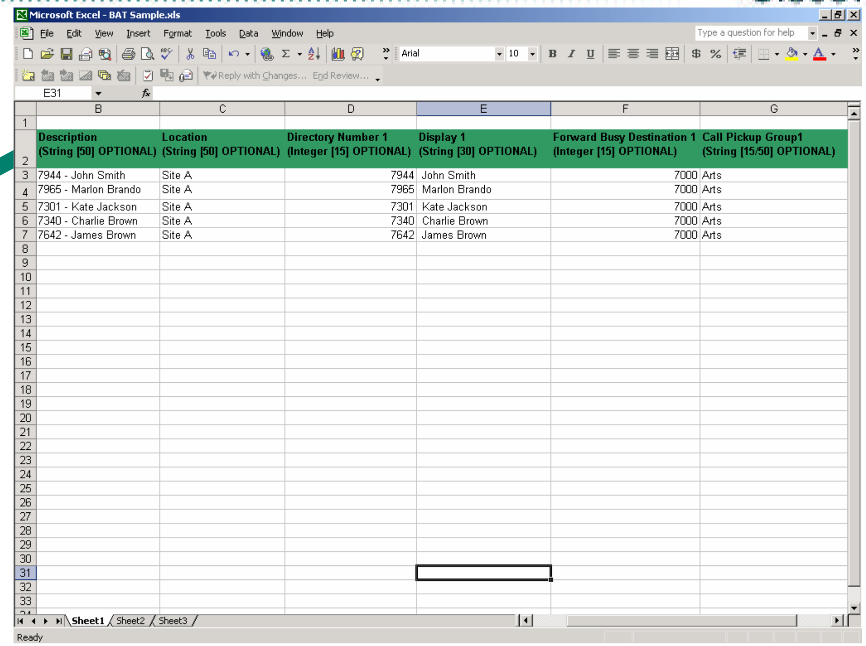
Microsoft Excel - bat-ffr.3-0-31

File Edit View Insert Format Tools Data Window Help

G6 =

	B	C	D	E	F	G
1	Description (String[50] OPTIONAL)	Location (String[50] OPTIONAL)	Directory Number 1 (Integer[15] OPTIONAL)	Display 1 (String[30] OPTIONAL)	Forward Busy Destination 1 (Integer[15] OPTIONAL)	Call Pickup Group1 (String[15/50] OPTIONAL)
2	7944 - John Smith	Creekside	7944	John Smith	7000	Finance
3	7655 - Kate White	Creekside	7655	Kate White	7000	Finance
4	7301 - Mike Jones	Creekside	7301	Mike Jones	7000	
5	7340 - Sally Barnes	Creekside	7340	Sally Barnes	7000	Finance
6	7642 - Cathy Ember	Creekside	7642	Cathy Ember	7000	

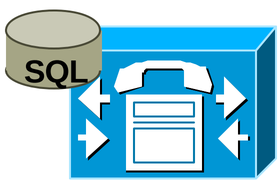
TAPs Process: Step 1 Bulk Load



Microsoft Excel - BAT Sample.xls

Description (String [50] OPTIONAL)	Location (String [50] OPTIONAL)	Directory Number 1 (Integer [15] OPTIONAL)	Display 1 (String [30] OPTIONAL)	Forward Busy Destination 1 (Integer [15] OPTIONAL)	Call Pickup Group1 (String [15/50] OPTIONAL)
7944 - John Smith	Site A	7944	John Smith	7000	Arts
7965 - Marlon Brando	Site A	7965	Marlon Brando	7000	Arts
7301 - Kate Jackson	Site A	7301	Kate Jackson	7000	Arts
7340 - Charlie Brown	Site A	7340	Charlie Brown	7000	Arts
7642 - James Brown	Site A	7642	James Brown	7000	Arts

- **Spreadsheet with users imported into Call Manager database**

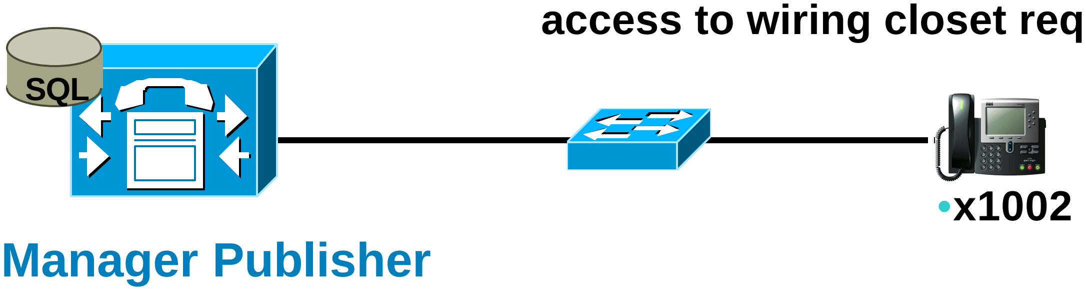


Call Manager Publisher

Type	User	Phone/MAC
Bulk Load - BAT	John Smith	7944
Bulk Load - BAT	Kate Jackson	7655
……	……	…..

TAPs Process: Step 2 Auto-Registers

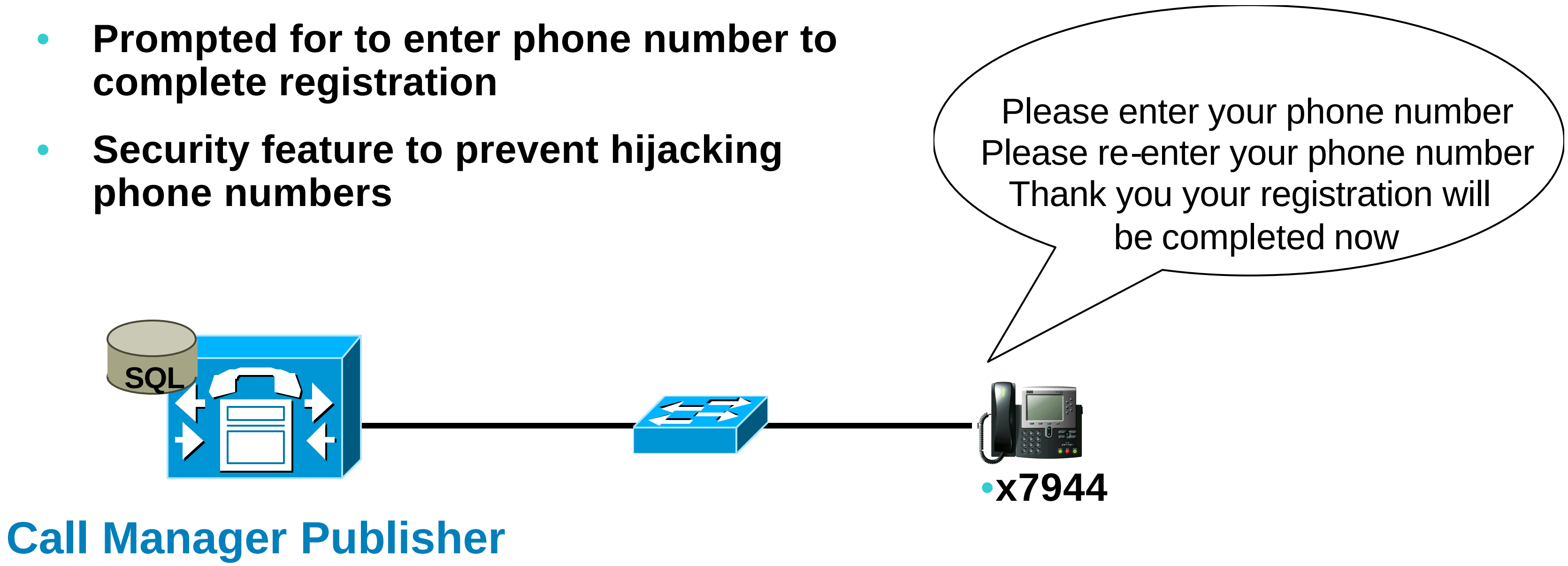
- Phone is plugged in and
- auto-registers with x1002
- Phone Software automatically updates
- Calls restricted internally
- Installer only needs to be at desk (no access to wiring closet required)



Type	User	MAC	Phone
Bulk Load - BAT	John Smith	dummy	7944
Bulk Load - BAT	Kate Jackson	dummy	7655
Auto-Registered	Unknown	00c012341234	1001
……	……	………	…..

TAPs Process: Step 3 Complete Registration

- Calls TAPS service on Call Mgr
- Prompted for to enter phone number to complete registration
- Security feature to prevent hijacking phone numbers



Type	User	MAC	Phone
Final Configured	John Smith	00c012341234	7944
Bulk Load - BAT	Kate Jackson	dummy	7655
Auto-Registered	*Unknown*	*00c012341234*	*1001*
……	……	……….	…..

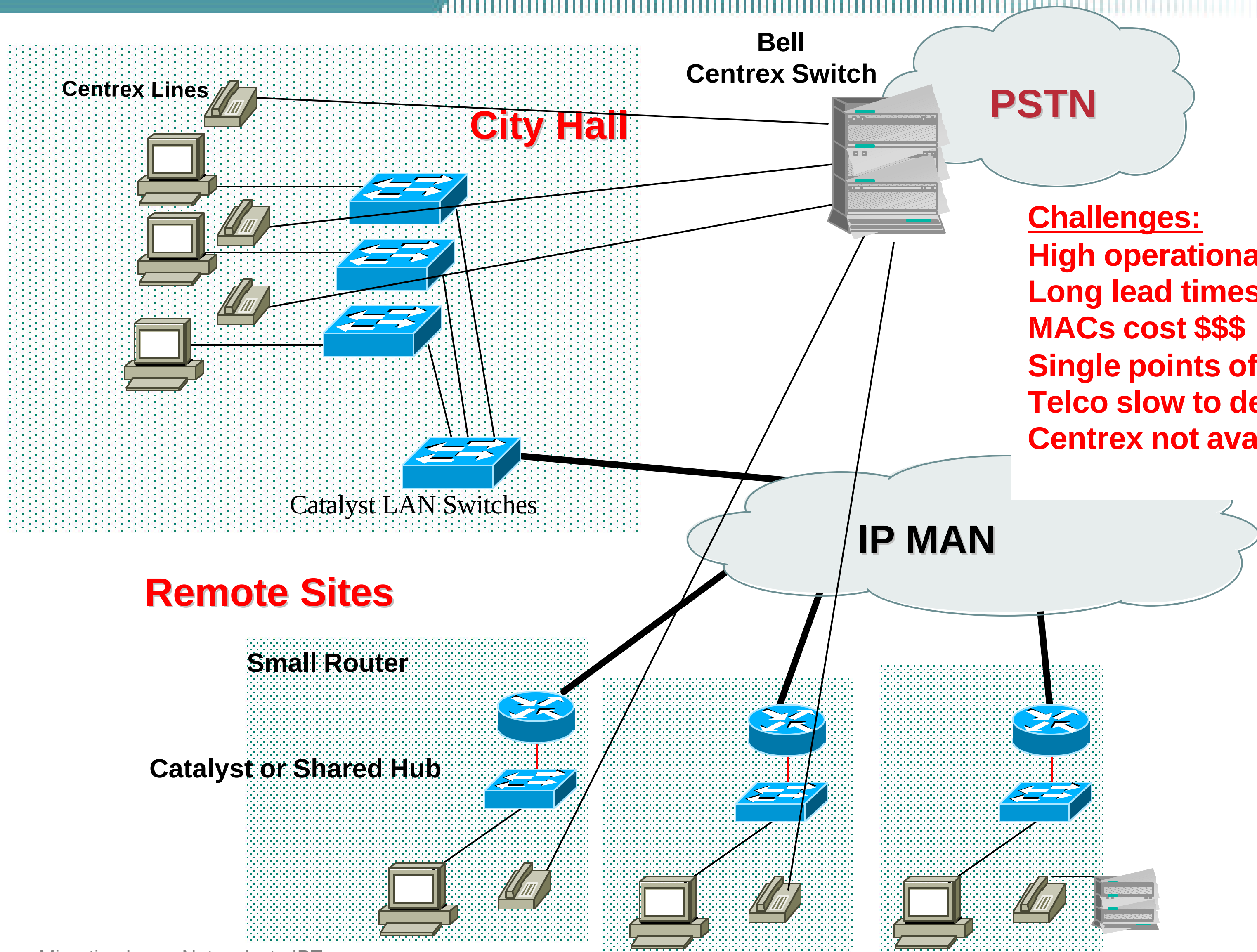
- Update bulk entry with New mac address
- Delete this record

End User Training

- **User can bring phone to Class**
  - User trains on their own phone, voicemail
  - any corrections to config can be done at class
  - Option to give user phone at class and have them install at desk themselves
  - Better retention of information if on their own phone
- **Follow-up On-Line Phone Tutorial**
  - Full animated & audio interactive tutorial
  - http://www.cisco.com/warp/public/779/largeent/avvid/products/7960/router_page.htm

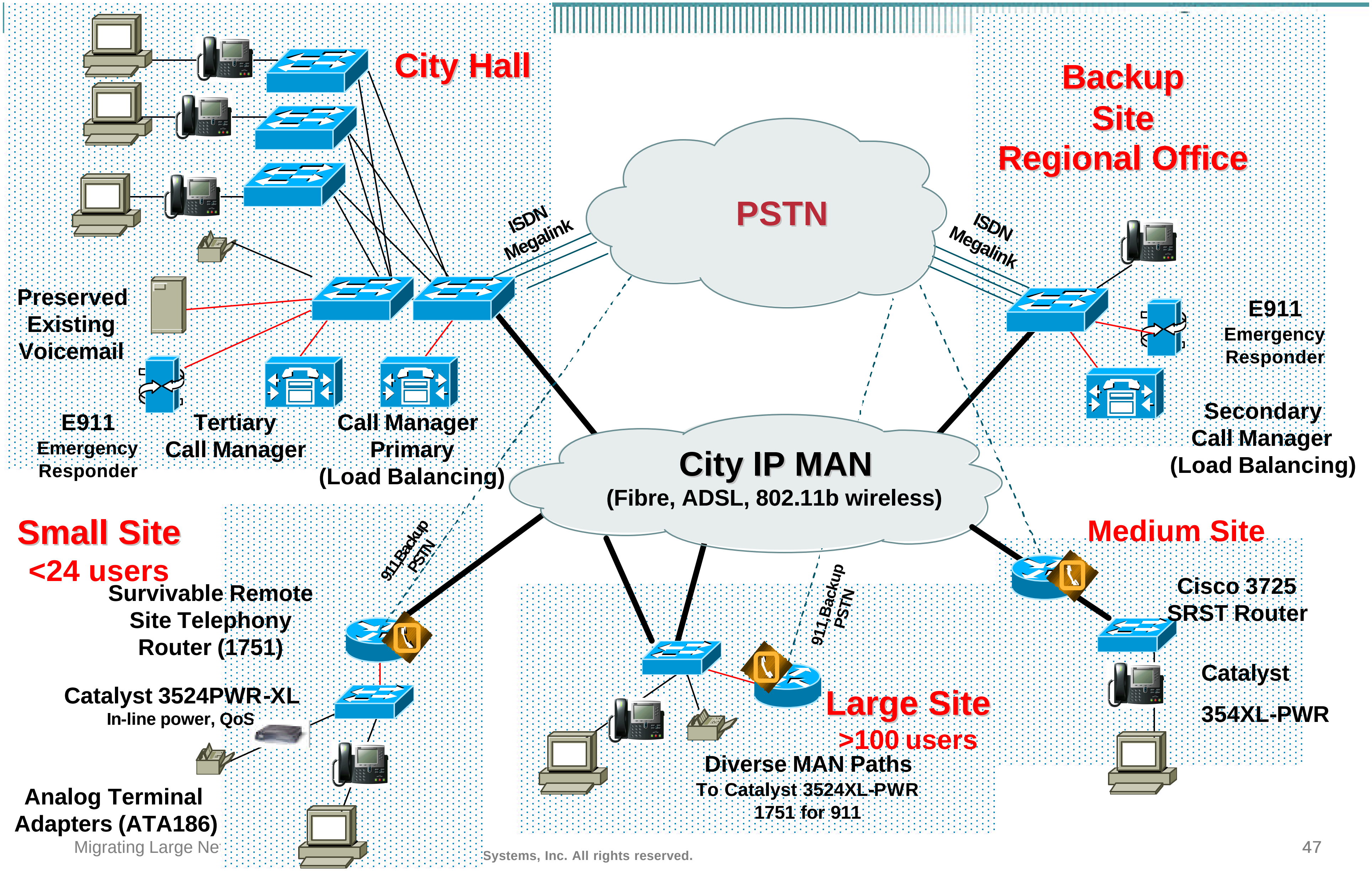
Migration Examples

Canadian City … Previous Design: Separate Data, Centrex Voice

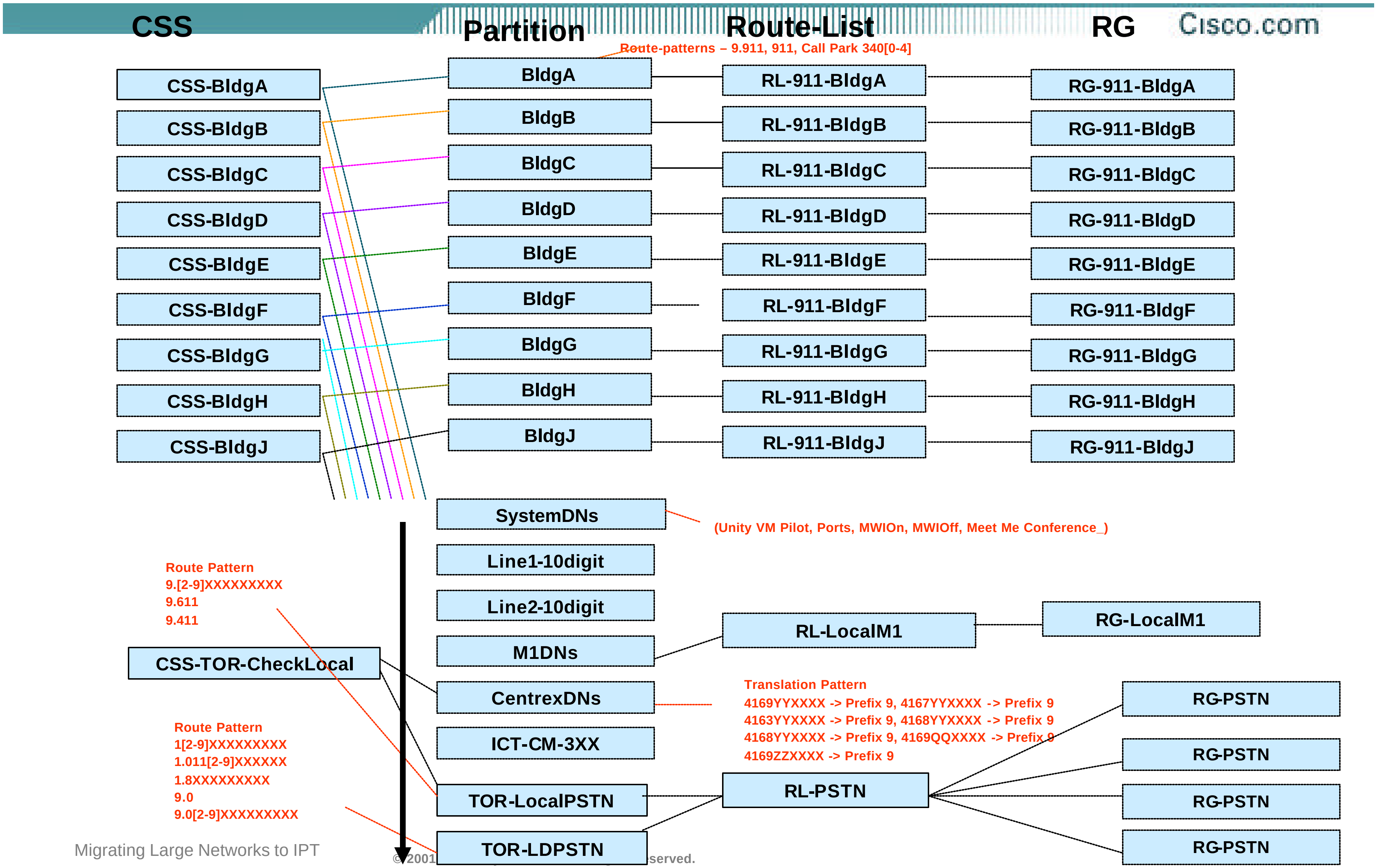


Challenges:
- High operational costs
- Long lead times for changes
- MACs cost $$$
- Single points of failure
- Telco slow to deploy new features
- Centrex not available everywhere

New City Design: Converged Voice/Data



Campus Dial Plan Example



Campus Deployment Downtown Toronto

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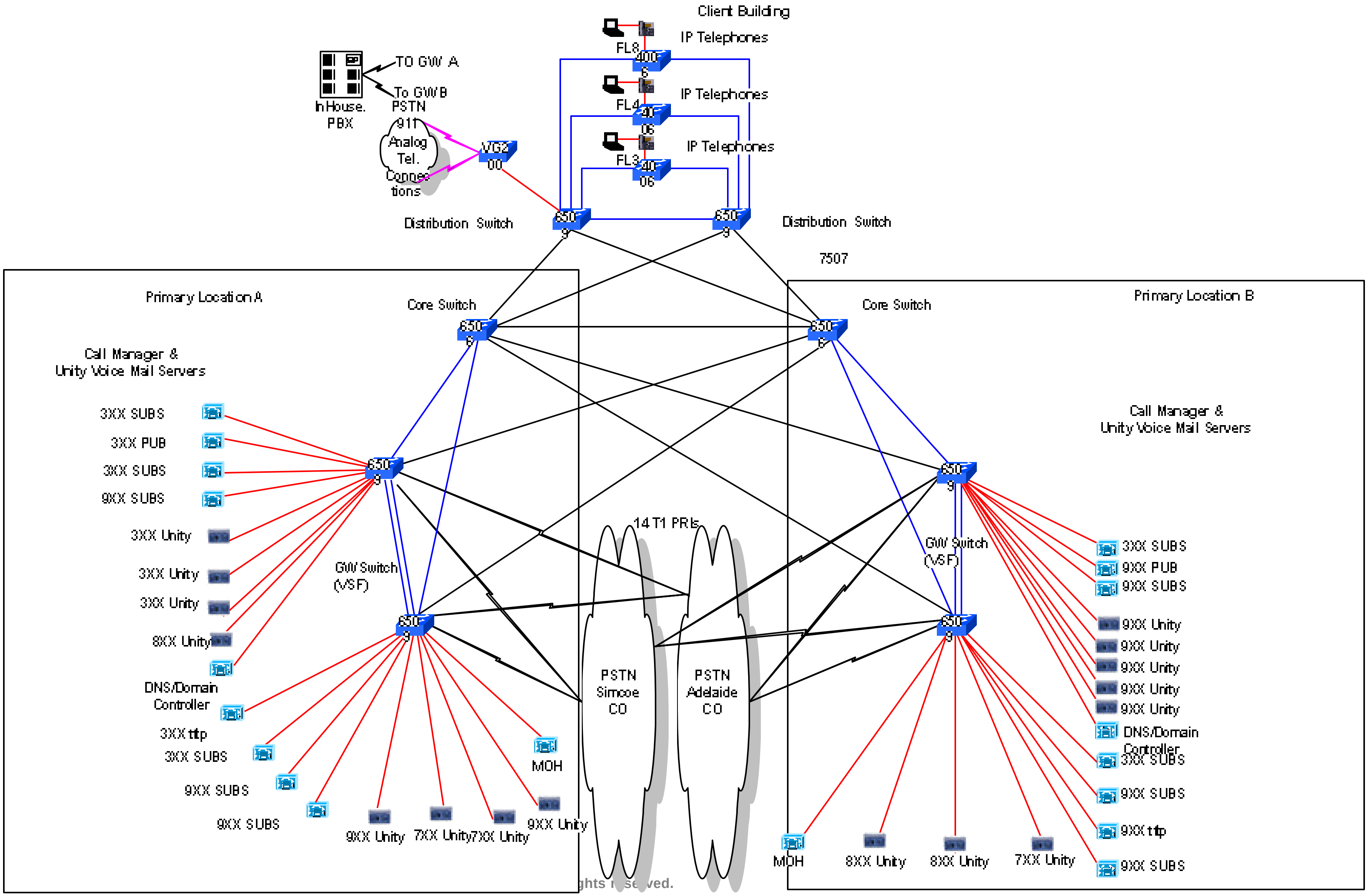

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EMPOWERING THE INTERNET GENERATION

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