



Cisco Expo
2008

Unified Communications Mobility Design



Visnja Milovanovic, Systems Engineer

vmilovan@cisco.com

Mobile Unified Communications

Your Enterprise Communications on Your Cell Phone

1. Corporate Directory
2. Single Number Reach
3. Route Call via Corporate PBX
4. Unified Mobile and Deskphone Call Logs
5. Corporate Instant Messaging
6. Corporate Presence
7. Corporate Voicemail
8. Conference Services
9. Email
10. Hand-off (WiFi/Cellular, Mobile/Deskphone)

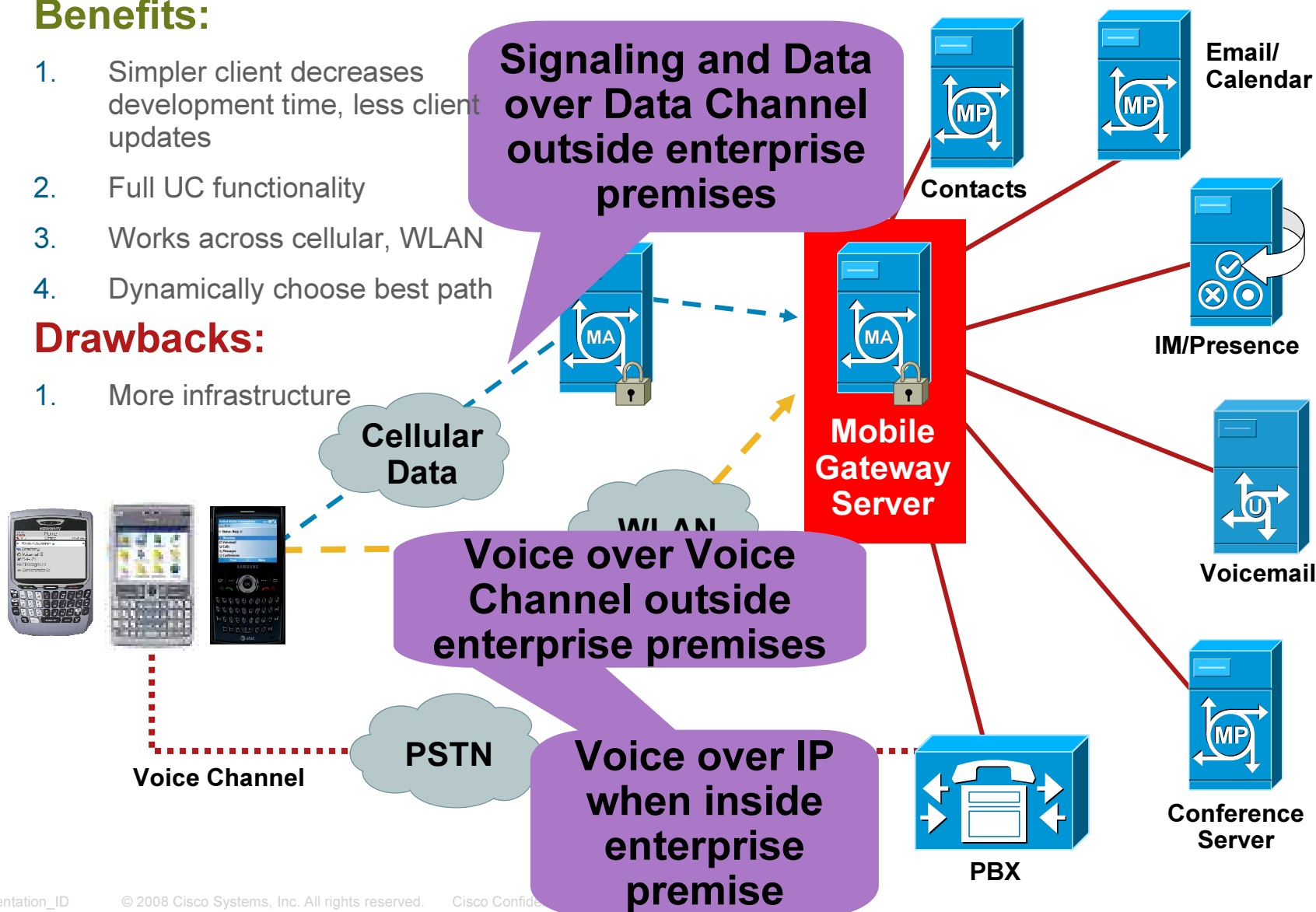
Long-Term Vision: Converged Mobile UC Solution

Benefits:

1. Simpler client decreases development time, less client updates
2. Full UC functionality
3. Works across cellular, WLAN
4. Dynamically choose best path

Drawbacks:

1. More infrastructure



Agenda

- **Unified Mobility**
 - Feature Review
 - Configuration
 - Dial Plan Considerations
 - Design Considerations
- Dual-Mode Phone
- Unified Mobile Communicator

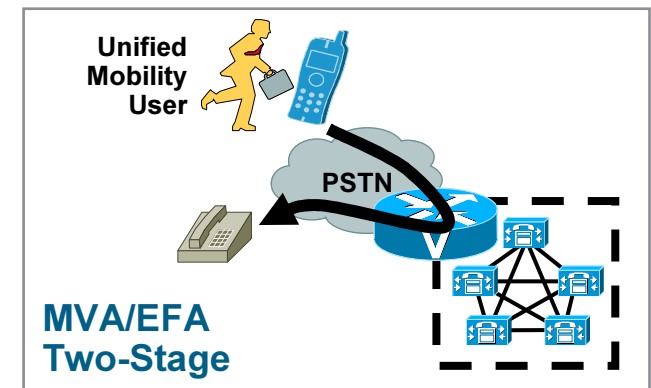
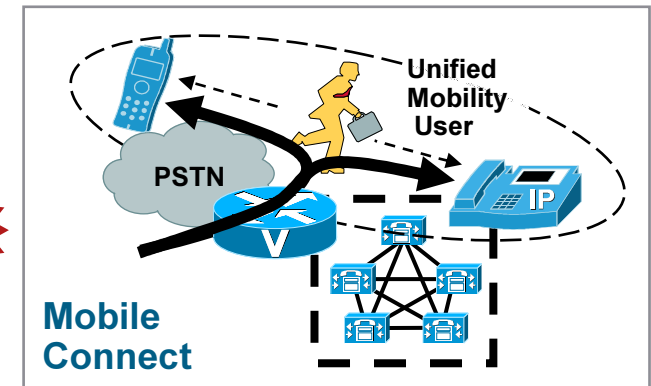


Unified Mobility

Feature Review: Mobile Connect, MVA, and EFA

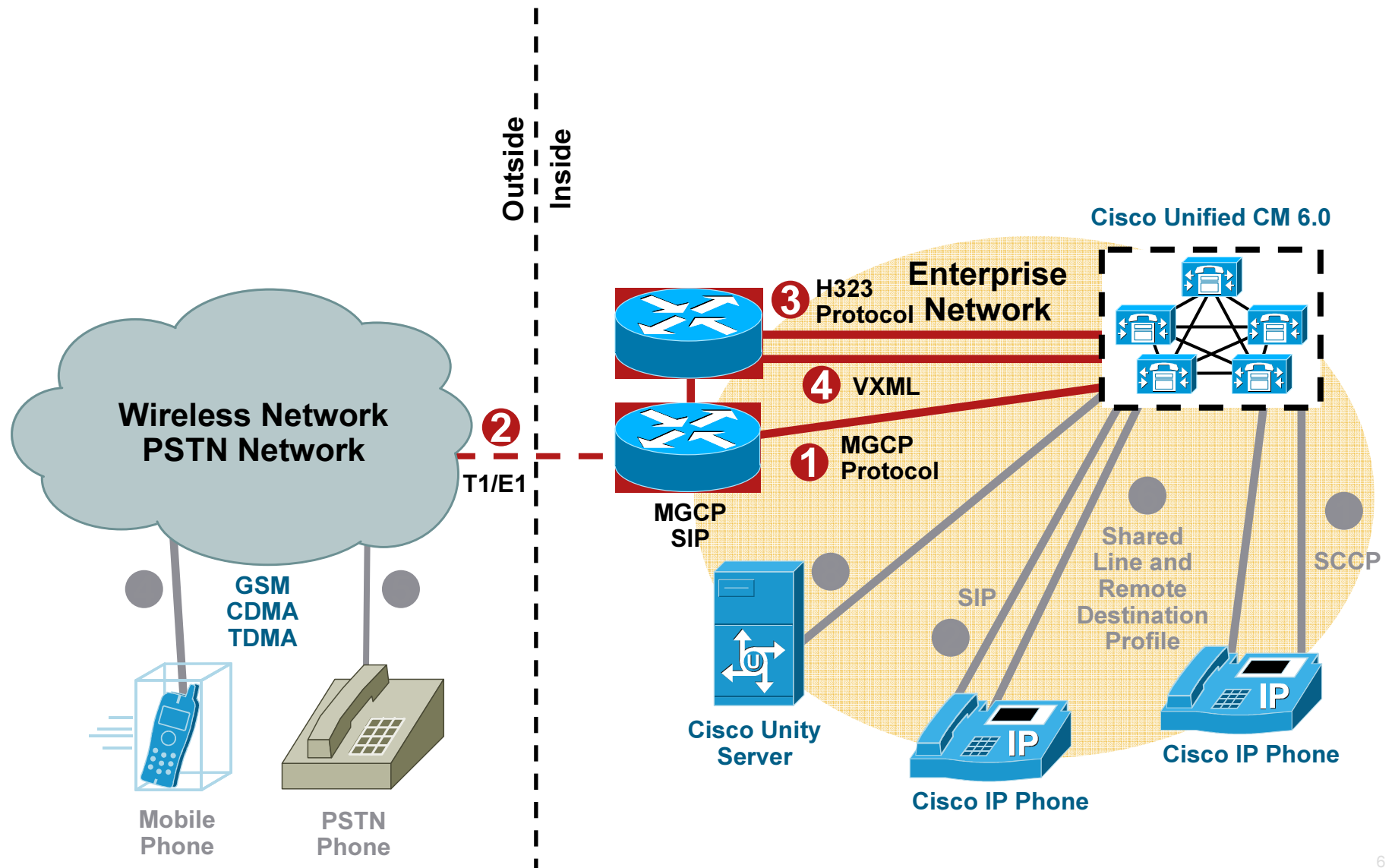
- **Mobile Connect**—Incoming calls to user's enterprise number rings both desk phone and configured Remote Destination (s); Enable/Disable Mobile Connect softkey
- **Mobile Voice Access (MVA)**—Provides the ability to make calls from mobile phone using the enterprise IP telephony infrastructure
 - IVR based application accessed by dialing into the enterprise
 - Requires H.323 VXML gateway
 - User can also enable/disable Mobile Connect
- **Enterprise Feature Access (EFA) Two-Stage Dialing**—Provides identical functionality as MVA without the IVR component **Enter Pin#1# Target #**

7.0
only



Cisco Unified Mobility

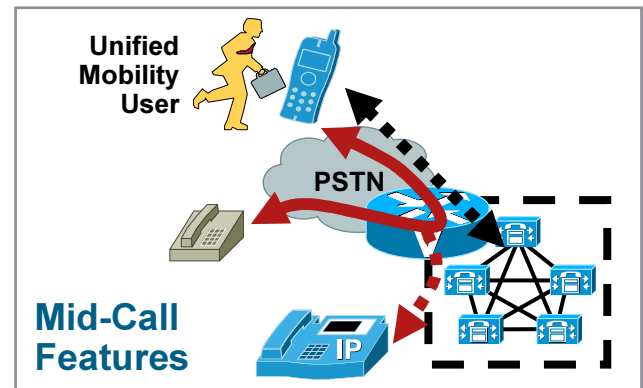
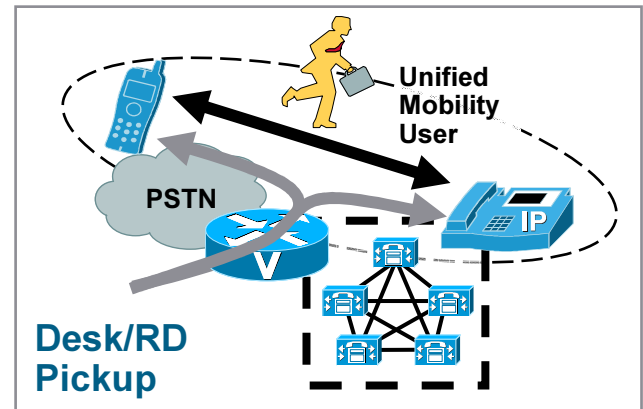
Feature Review: MVA using MGCP



Unified Mobility

Feature Review: Pickup and Mid-Call Features

- **Desk Phone/Remote Destination Pickup**—Once incoming mobility call has been answered, call can be moved between desk phone and RD(s)
- **Mid-Call Features**—Provides the ability to invoke enterprise features Hold, Resume, Transfer and Conference from the RD/mobile phone for active mobility calls
 - *81 Hold/Resume
 - *84 Transfer/Directed Call Park
 - *85 Conference

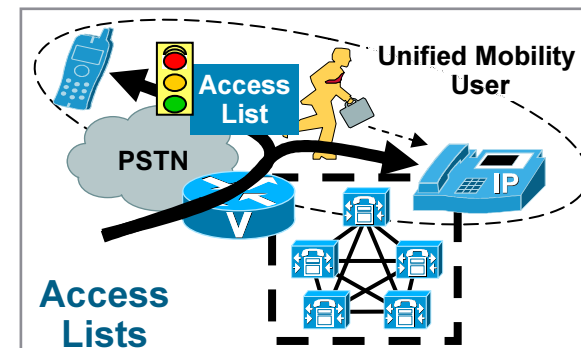
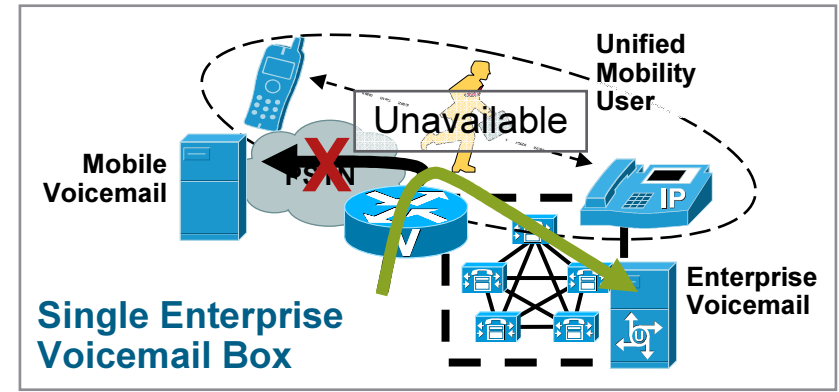


7.0
only

Unified Mobility

Feature Review: Single Enterprise Voicemail Box

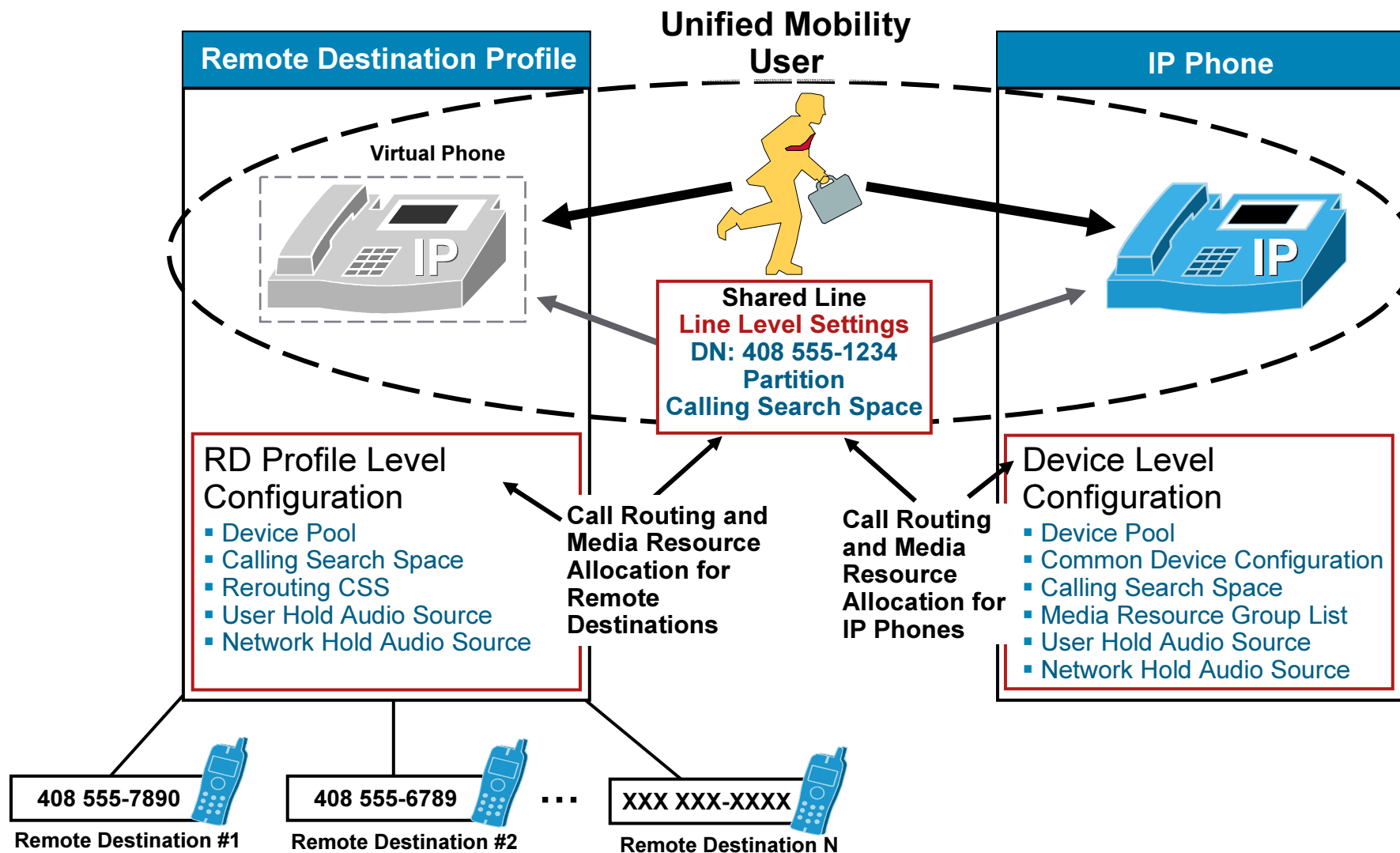
- **Single Enterprise Voicemail Box**—Per RD timers ensure that when mobility user is unavailable, unanswered incoming calls are forwarded to enterprise voicemail box rather than mobile or other voicemail box
- **Access Lists**—Per RD access lists can be defined to filter or screen incoming calls to a mobility user based on caller ID. Filtering allows or blocks calls from being extended to the user's RD. Time of day access lists.



7.0
only

Unified Mobility

Configuration and Call Routing Concept



Unified Mobility

RD # Configuration and Outgoing Calls: PSTN Steering Digits vs. App Dial Rules

There Are Two Options When Configuring RD Numbers:

1. Configure the number as it would be dialed from the enterprise including any PSTN access or steering digits

To Dial PSTN:
9 + 1 + (XXX) XXX - XXXX

2. Configure the number to match incoming caller ID from the PSTN

Caller ID from PSTN:
(XXX) XXX - XXXX

If Option 2 is Chosen, an Application Dial Rule Is Used to Add Appropriate PSTN Access/Steering Digits

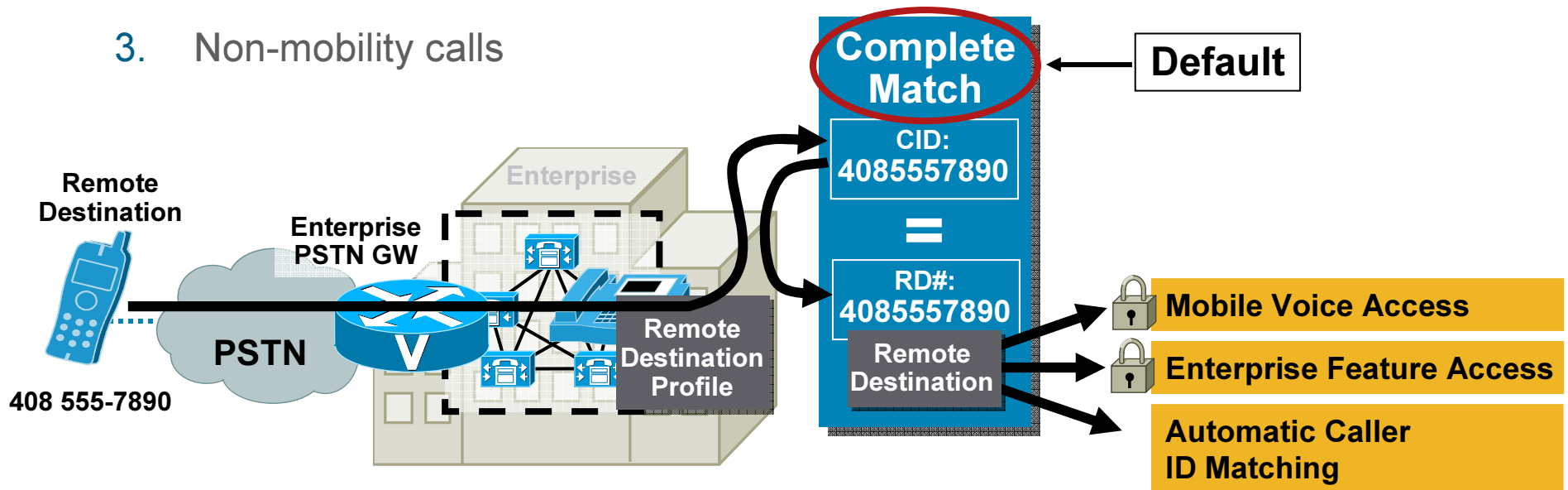
Name	Number Begins With	Number of Digits	Total Digits to be Removed	Prefix With Pattern
PSTN_SJ	408	10	0	91

Unified Mobility

RD # Configuration and Incoming Calls: Complete vs. Partial Matching

If RD numbers are configured to match incoming CallerID (with Application Dial Rules used for outgoing call routing), incoming calls from Remote Destinations are automatically matched for:

1. Mobile Voice Access identification
2. Enterprise Feature Access identification
3. Non-mobility calls

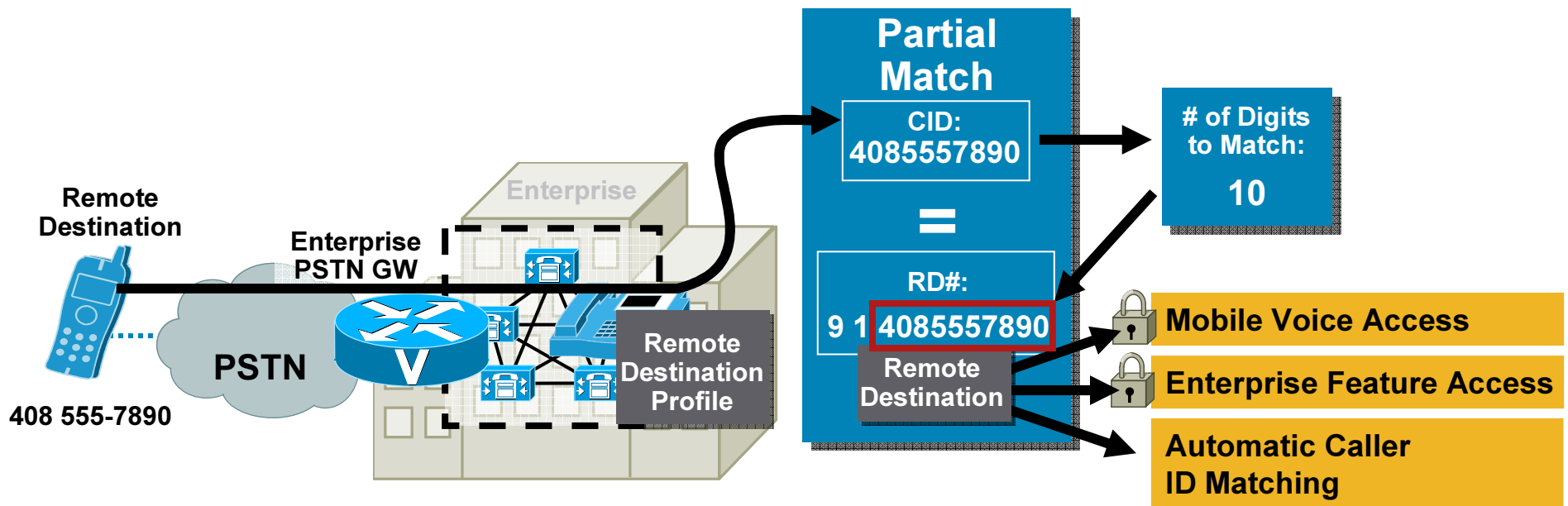


**Complete Match v. Partial Match Is Controlled by the
Matching Caller ID with Remote Destination
Cisco CallManager® Service Parameter**

Unified Mobility

RD # Configuration and Incoming Calls: Complete vs. **Partial** Matching

If RD numbers are **not** configured to match incoming CallerID (i.e. PSTN steering digits are included), **Partial Matching** must be configured in order to match CallerID for incoming calls from Remote Destinations



Number of Digits Matched When Using Partial Match Is Controlled by the **Number of Digits for Caller ID Partial Match** Cisco CallManager® Service Parameter

Unified Mobility

RD # Configuration: Summary

RD # configured with PSTN steering digits:

1. Outbound: Mobile Connect calls routed to RD without need for Application Dial Rule
2. Inbound: Caller ID matching (identification and automatic):
 - Matching Caller ID with Remote Destination → Set to “Partial Match”
 - Number of Digits for Caller ID Partial Match → Set to appropriate number of digits based on inbound caller ID from provider

RD # configured to match inbound Caller ID:

1. Outbound: Mobile Connect calls routed to RD using configured Application Dial Rule(s)
2. Inbound: Caller ID matching (identification and automatic):
 - Matching Caller ID with Remote Destination → Set to default “Complete Match”
3. Note that prefixing of steering digits for outbound routing can also be done using translation or route patterns, or route list/route group constructs

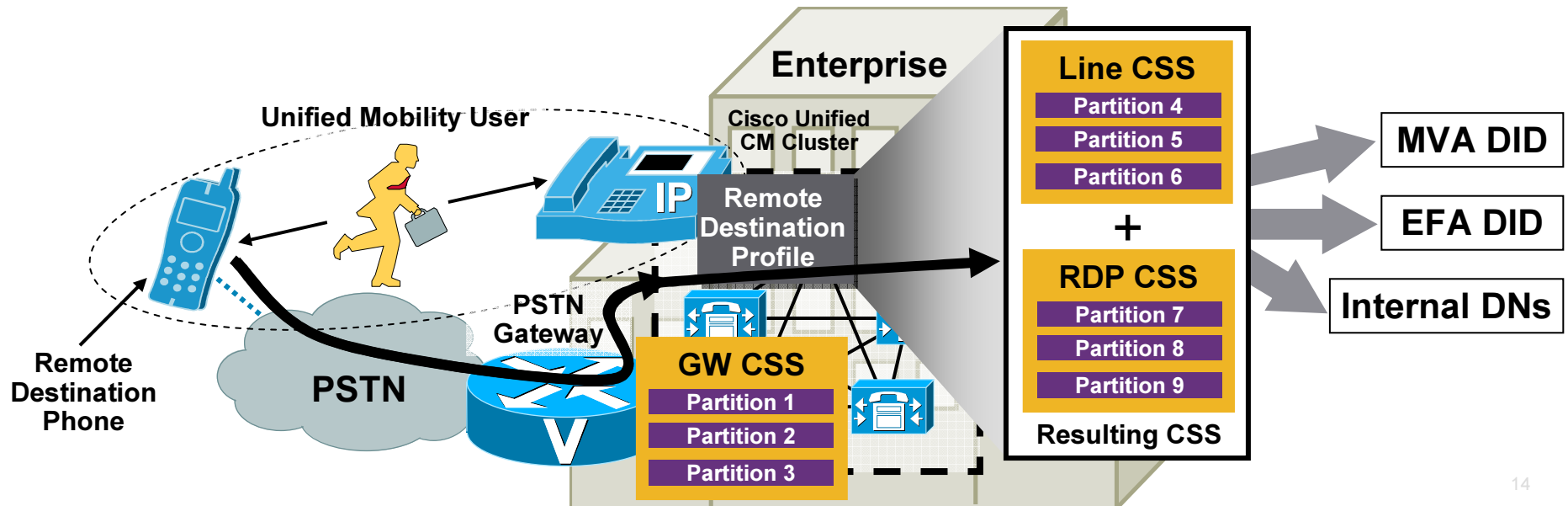
Recommended

Unified Mobility

Dial Plan Considerations: Inbound Call Routing—6.0

1. RD numbers configured within Cisco Unified Communications Manager are automatically compared against caller ID of all incoming calls to the system
2. In version 6.0 if a match is found, incoming call routing is fundamentally different:
 - Incoming calls from configured RDs (MVA calls, EFA Two-Stage calls, or calls to internal extensions) will bypass gateway or trunk's inbound CSS
 - Instead calls are routed via the RDP CSS (in combination with the RDP line-level CSS)
3. In Cisco Unified Communications Manager 6.1 if a match is found, incoming call routing is determined by the following new service parameter:

Inbound Calling Search Space for Remote Destination



Unified Mobility

Dial Plan Considerations: Outbound Call Routing (from RD)

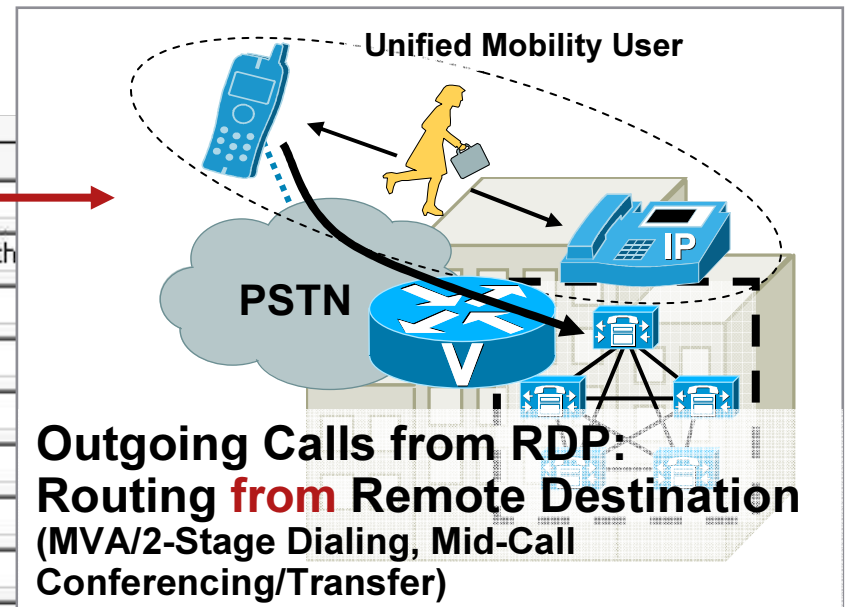
Association Information

1	Line [1] - 10001 in Internal
2	Line [2] - Add a new DN

Remote Destination Profile for Jane Smith

Description	Remote Destination Profile for Jane Smith
User ID*	jsmith
Device Pool*	Default
Calling Search Space	PSTN_CSS
User Hold Audio Source	51-Live
Network Hold MOH Audio Source	51-Live
Privacy*	Off
Rerouting Calling Search Space	PSTN_CSS
Calling Party Transformation CSS	< None >

Ignore Presentation Indicators (internal calls only)



Remote Destination Profile (RDP) contains two CSS settings which control call routing from a RDP perspective:

- **Calling Search Space**

Unified Mobility

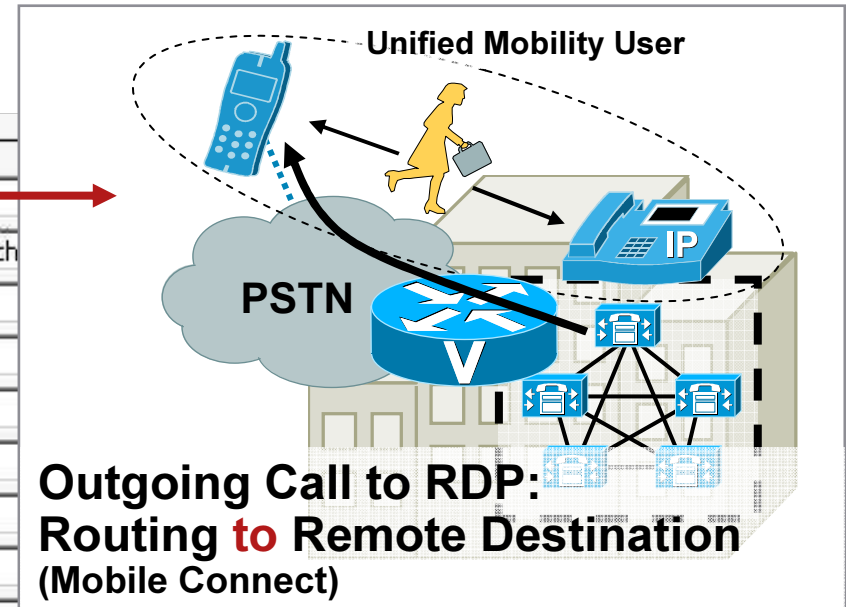
Dial Plan Considerations: Outbound Call Routing (to RD)

Association Information

1	Line [1] - 10001 in Internal
2	Line [2] - Add a new DN

Description: Remote Destination Profile for Jane Smith
User ID*: jsmith
Device Pool*: Default
Calling Search Space: PSTN_CSS
User Hold Audio Source: 51-Live
Network Hold MOH Audio Source: 51-Live
Privacy*: Off
Rerouting Calling Search Space: PSTN_CSS
Calling Party Transformation CSS: < None >

Ignore Presentation Indicators (internal calls only)



Remote Destination Profile (RDP) contains two CSS settings which control call routing from a RDP perspective:

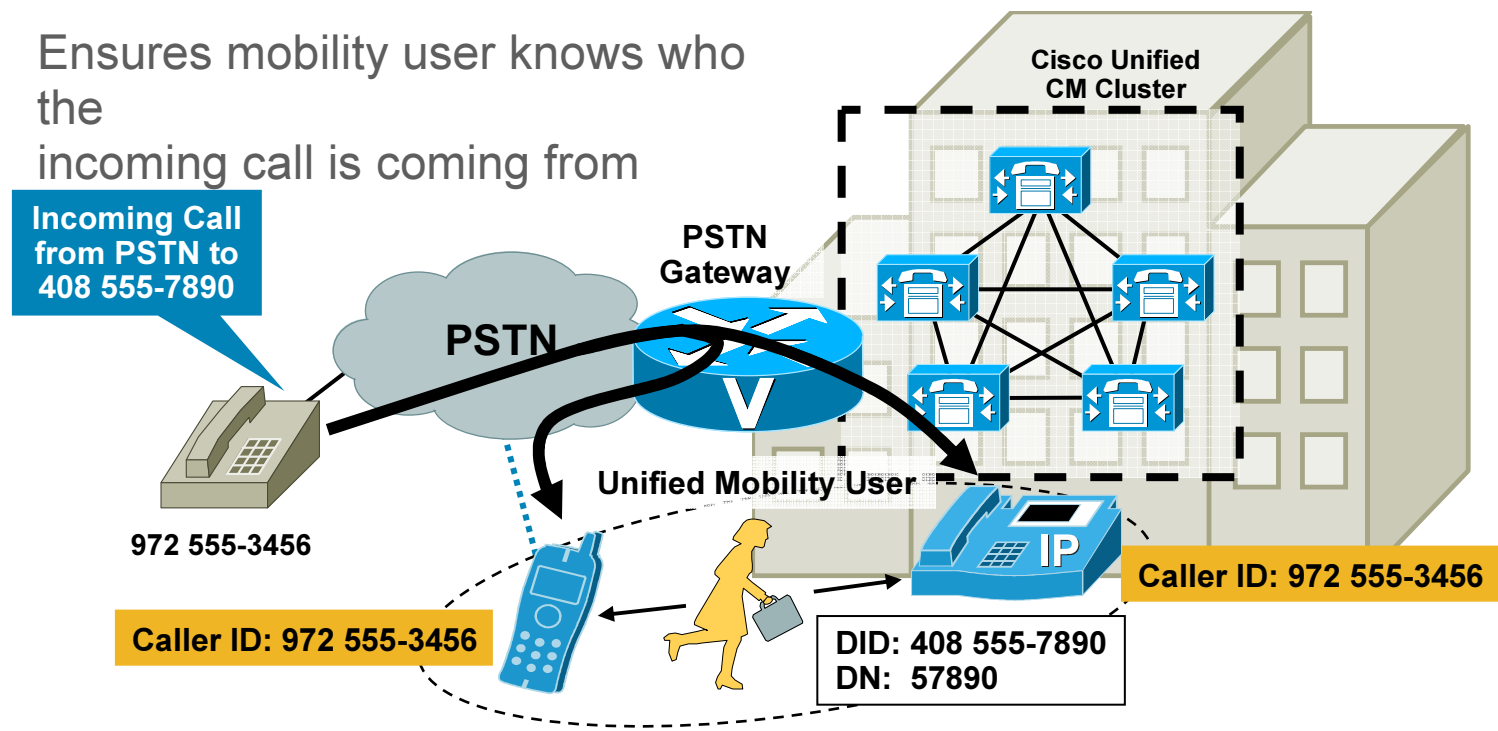
- Calling Search Space
- Rerouting Calling Search Space

Unified Mobility

Dial Plan Considerations: Incoming Caller ID

Caller ID of incoming calls to a mobility-enabled user's enterprise number is preserved when forwarded to the user's remote destination phone(s) by Mobile Connect

1. Ensures mobility user knows who the incoming call is coming from



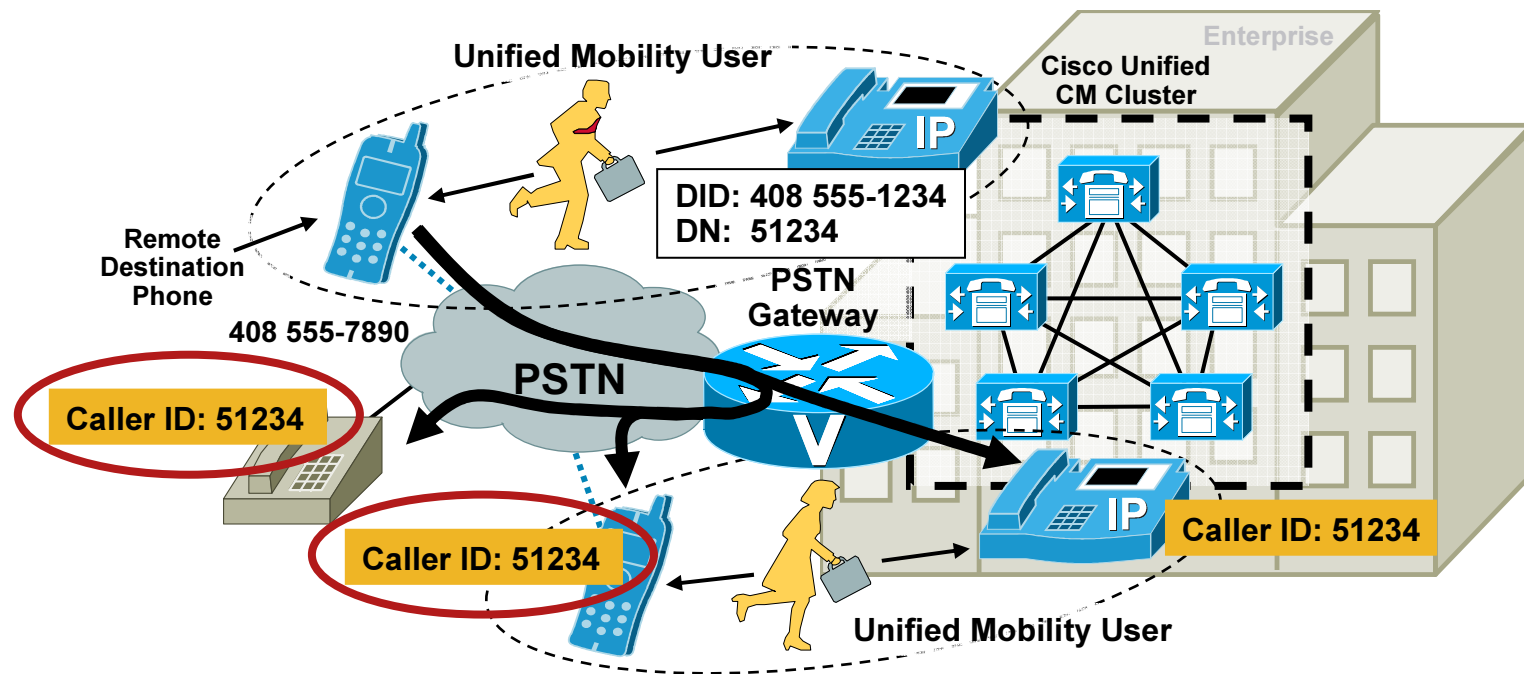
Note: Check with Service Provider to Ensure that Caller ID Is Unrestricted on PSTN Trunks

Unified Mobility

Dial Plan Considerations: Outgoing Caller ID

Caller ID for calls made from remote destination phones are automatically converted to associated enterprise DN

1. Masks RD phone number
2. Ensures return call from call history lists are anchored in enterprise



Unified Mobility

Design: Scalability

1. Cisco Unified Mobility supports the following capacities:

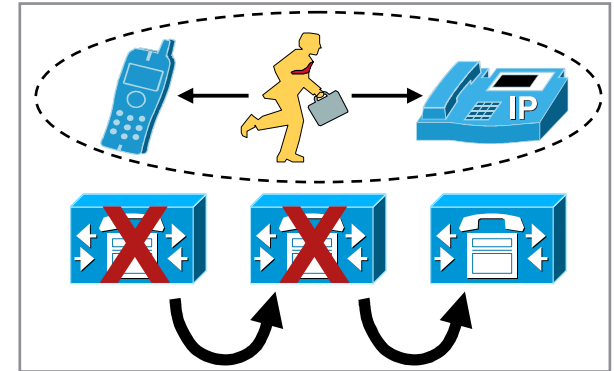
	Mobility-Enabled Users per Cluster	Mobility-Enabled Users per Node
MCS-7845	15,000	3,750
MCS-7835	10,000	2,500
MCS-7825	4,000	1,000

1. Mobility-Enabled User: A user that has an RDP and at least one RD configured
2. Capacity numbers are based on a **single** RD per user
3. As number of RDs per user increases, the number of mobility-enabled users decreases

Unified Mobility

Design: Redundancy

1. Redundancy for RD and RDP configuration provided via device pools/CM groups
2. Mobile Connect (including desk/remote phone pickup), Enterprise Feature Access, and Mid-Call feature functionality are all natively redundant
3. Gateway and PSTN access redundancy as usual
4. No redundancy for Mobile Voice Access
 - If Publisher is down, MVA is not available
 - Enterprise Feature Access Two-Stage Dialing is still possible
5. If Publisher is down, changes to Mobile Connect status (on/off) via Enterprise Feature Access are not saved (and therefore do not take affect)



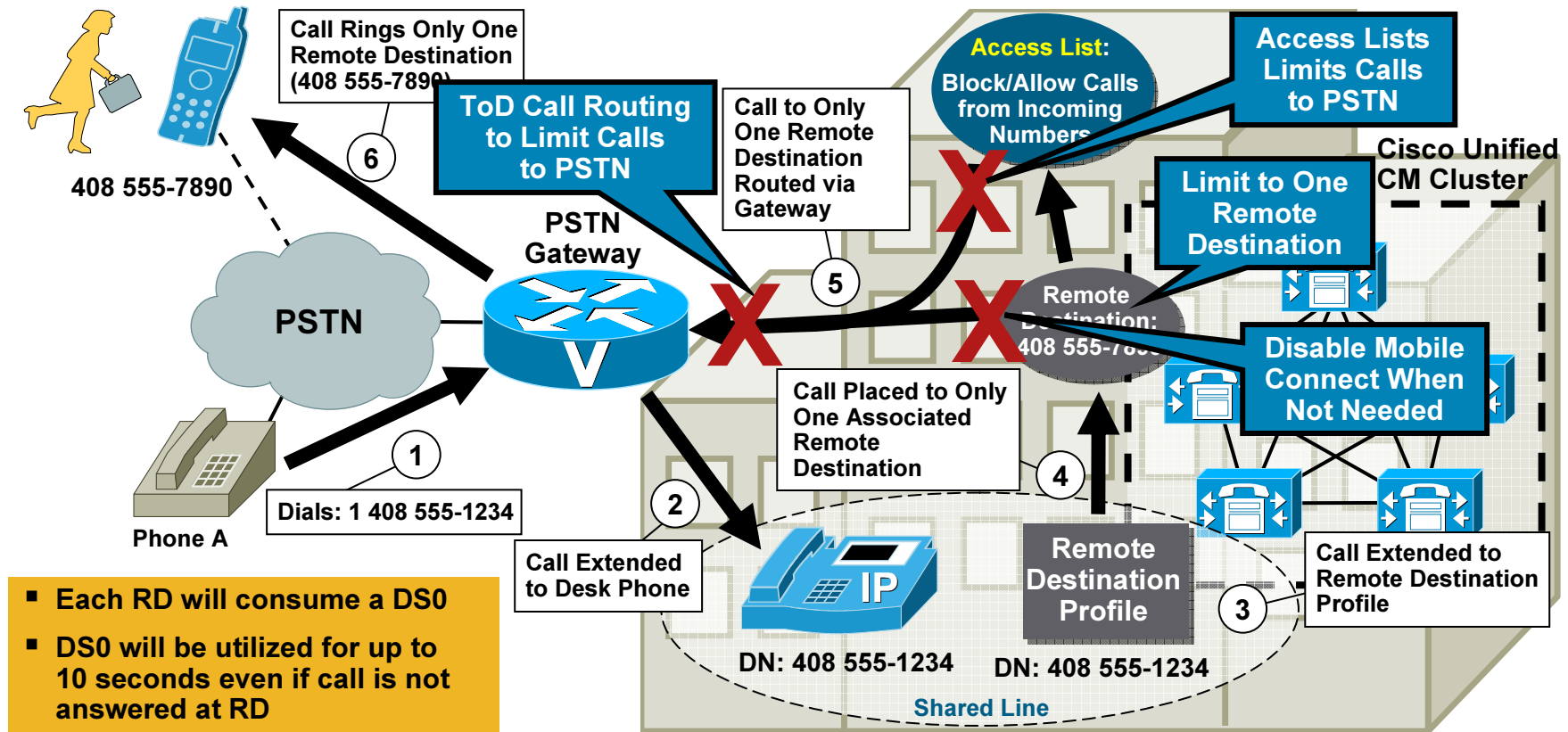
Unified Mobility

Design: General

1. Remote Destinations must be TDM/PSTN devices or IP phones in other clusters (reached via Inter-cluster trunks)
2. Mobile Connect functionality is supported only with PRI for PSTN connections (no T1-CAS, FXO, FXS, or BRI connections)
3. Mid-call features and Enterprise Feature Access Two-Stage Dialing require out-of-band DTMF relay between enterprise PSTN gateway and Cisco Unified CM
4. For Unified Mobility deployments, customer should work with their service provider to ensure the following:
 - If Enterprise Feature Access (mid-call features or two-stage dialing) is required, service provider must send appropriate inbound caller ID to enterprise
 - If original caller ID for Mobile Connect calls is to be sent to mobility user's RD, service provider must not restrict caller ID on trunk to only DIDs assigned to that trunk
5. Planning and allocating PSTN gateway resources is extremely important for Unified Mobility
 - Mobility call flows typically involve multiple PSTN call legs
 - Must increase PSTN gateway resources to handle large numbers of motility users

Unified Mobility

Design: Minimizing PSTN Utilization



PSTN resource utilization reduction for Unified Mobility

1. Limit to one Remote Destination per user
2. Utilize allow/block Access Lists to limit calls forwarded to PSTN
3. Users to disable Mobile Connect when not in use
4. Use time of day (ToD) routing to limit calls forwarded to PSTN

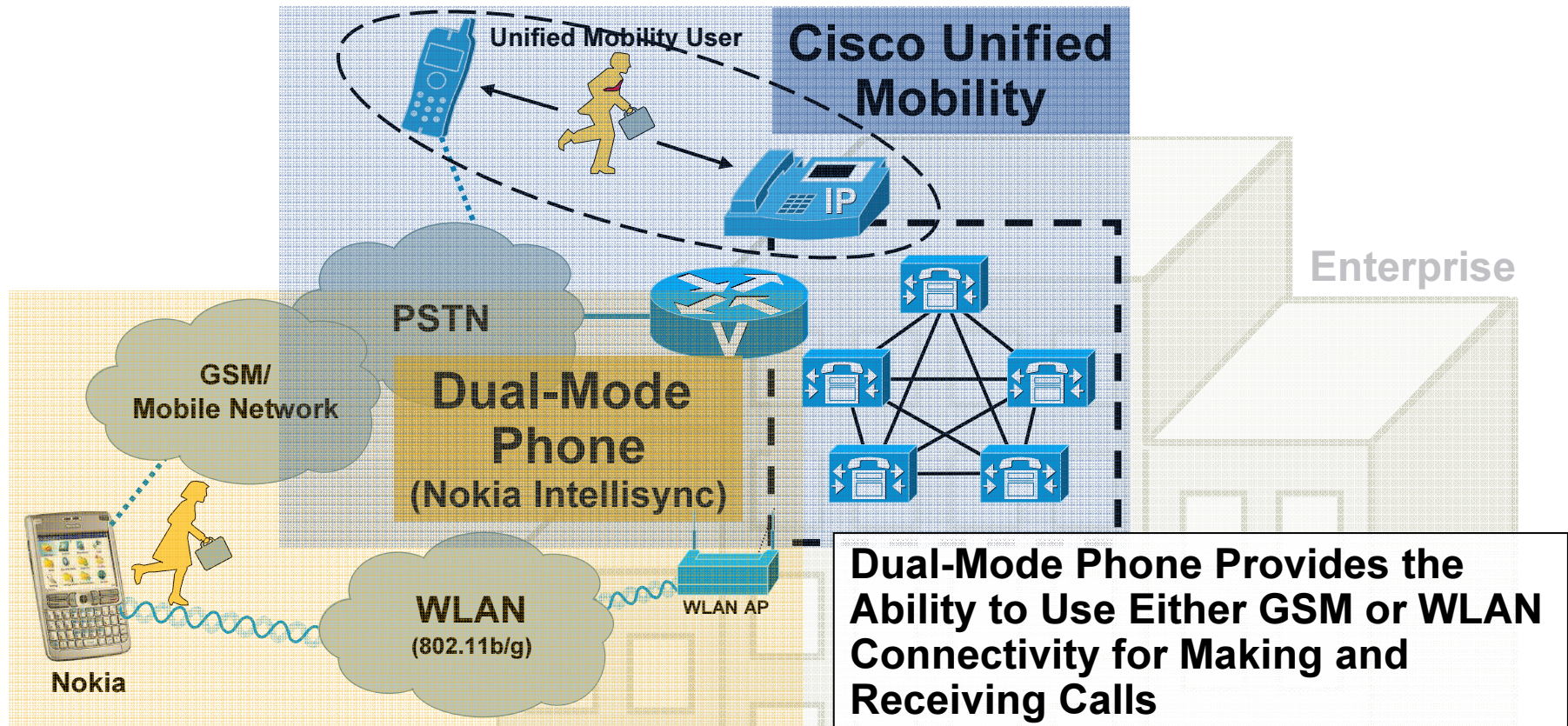
Agenda



- Unified Mobility
- **Dual-Mode Phone**
 - **Architecture & Requirements**
 - **Configuration**
- Unified Mobile Communicator

Mobile Business Solution from Cisco and Nokia

Nokia Intellisync Call Connect for Cisco: Architecture

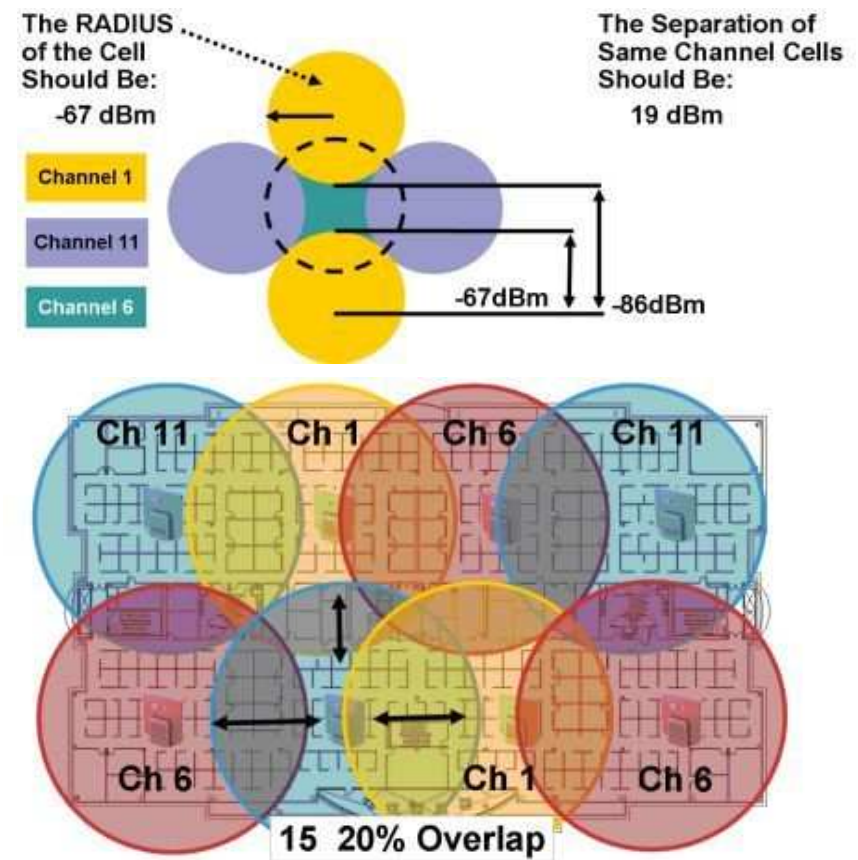


1. When on the Cisco Unified Wireless Network, the mobile phone uses the Nokia Intellisync Call Connect for Cisco (SCCP) client to register with Cisco Unified CM as a phone
2. When WLAN coverage is unavailable, the mobile phone uses GSM for calls

Mobile Business Solution from Cisco and Nokia

Cisco Unified Wireless Network Design Considerations

1. 802.11b/g
2. Cisco Compatible Extensions (CCX) Version 3
3. No seamless handoff between cellular and WLAN networks
4. QoS marking by client
5. Similar VoWLAN network design requirements as Cisco Unified Wireless IP Phone 7921G



For More Information on VoWLAN Design, See the *Voice over Wireless LAN 4.1 Design Guide* at:

<http://www.cisco.com/go/srnd>

Mobile Business Solution from Cisco and Nokia

Software/Hardware Requirements

The Following Hardware and Software Are Supported with the Nokia Intellisync Call Connect for Cisco 1.1 Dual-Mode Client:

1. Phone handsets: Nokia E51, E60, E61, E61i, and E65
2. Communications Manager: 4.1(x), 4.2, 4.3, 5.x, and 6.x
3. Communications Manager Express: 4.1



Nokia E51



Nokia E60



Nokia E61



Nokia E61i



Nokia E65

Check the Latest Supported Handsets and Cisco Unified Communications Manager and Cisco Unified Communications manager Express Versions at:

http://www.businesssoftware.nokia.com/nokia_intellisync_call_connect_for_cisco_downloads.php

Dual-Mode Phone Intermec CN3

1. 802.11b/g
2. IP Blue VTGO SCCP client
3. Cisco Compatible Extensions (CCX) Version 4
4. Highly ruggedized and well-suited for use in warehouse/manufacturing environments
5. No seamless handoff between cellular and WLAN networks
6. Similar VoWLAN network design requirements as Cisco Unified Wireless IP Phone 7921G



Mobile Business Solution from Cisco and Nokia

Nokia Intellisync: Cisco Unified Communications Manager Configuration

1. Cisco Unified Communications Manager Configuration

Dual-mode device configured as a phone within Cisco Unified CM

2. Device type: Nokia S60 (or E60)

Requires Nokia COP file

Add a New Phone

Next

Status

Status: Ready

Select the type of phone you would like to create

Phone Type*

Next

Phone Type

Product Type: Nokia S60

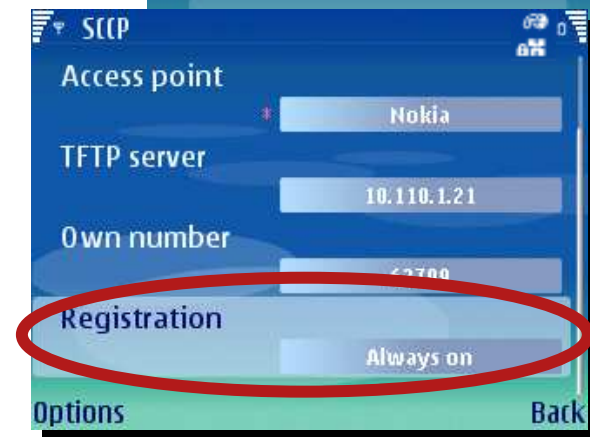
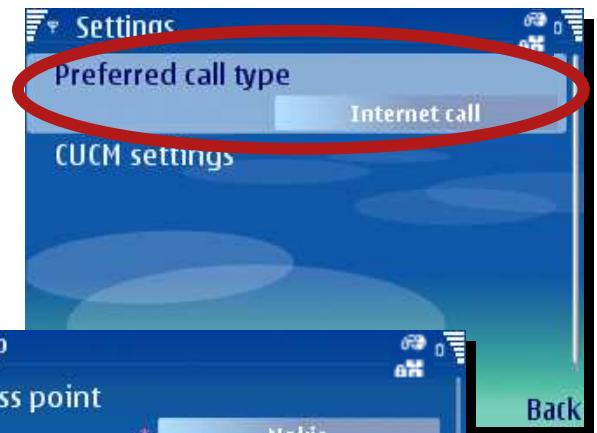
Device Protocol: SCCP

Mobile Business Solution from Cisco and Nokia

Nokia Intellisync Call Connect for Cisco Configuration

Nokia Phone Configuration

1. Intellisync Call Connect application (including SCCP client) must be loaded on the Nokia phone (via infrared port, Blue Tooth, or USB using the Nokia PC Suite)
2. Application configured so that WLAN channel (Internet) is used as the default interface for making calls
 - When associated to the Cisco Unified Wireless Network calls will be made via Cisco Unified CM
 - If WLAN is not available, calls are made using the GSM (voice) interface
3. SCCP client registration should be set to “Always on”—SCCP client registers automatically to Cisco Unified Communications Manager server whenever enterprise WLAN is available



Mobile Business Solution from Cisco and Nokia

Unified Mobility Integration: 6.x Configuration

Unified Mobility User with Dual-Mode Phone



Supported with Cisco Unified Communications Manager 6.x and Nokia Intellisync Call Connect for Cisco 1.1

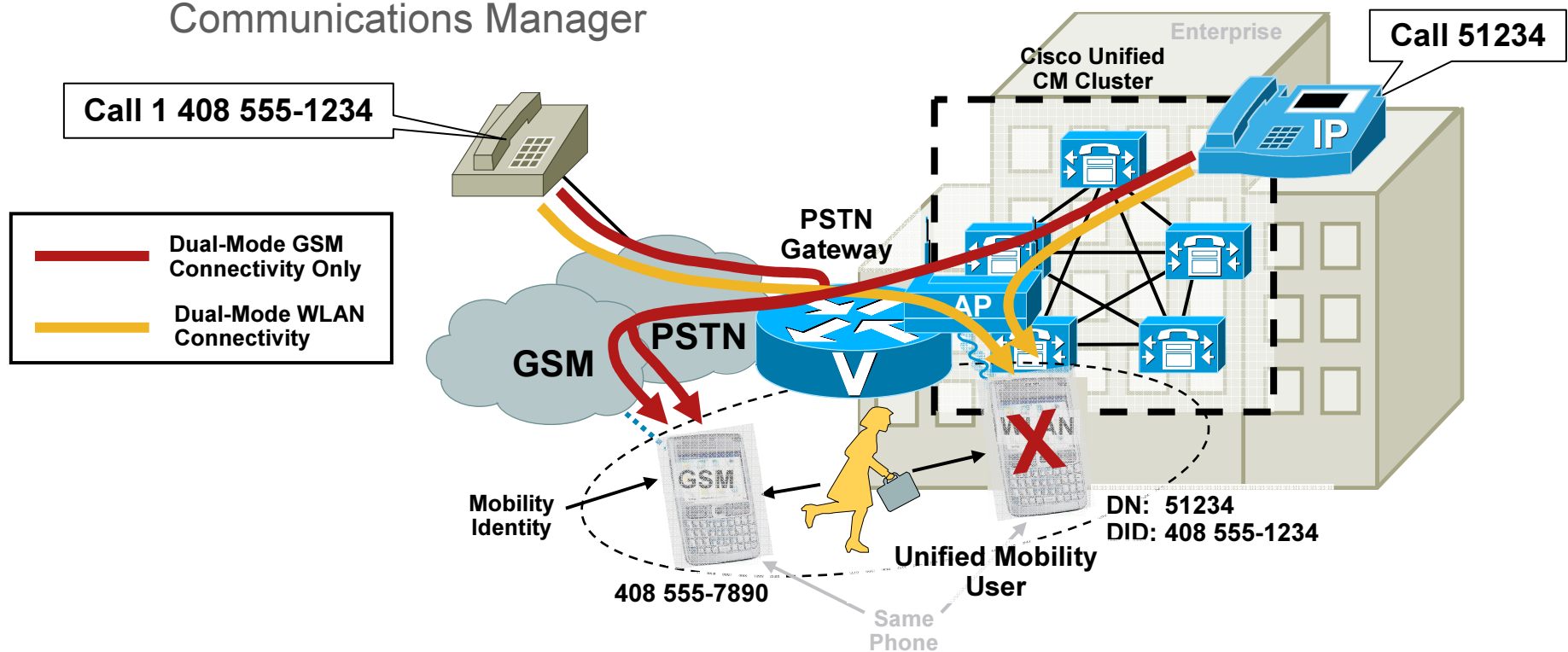
Call Routing and Media Resource Allocation for IP Phone and Mobility Identity



Mobile Business Solution from Cisco and Nokia

Incoming Call Routing

1. Incoming calls are routed to GSM interface via Mobile Connect when phone is not associated/registered to enterprise
2. Incoming calls are routed to SCCP WLAN client when phone is associated to enterprise WLAN and registered to Cisco Unified Communications Manager

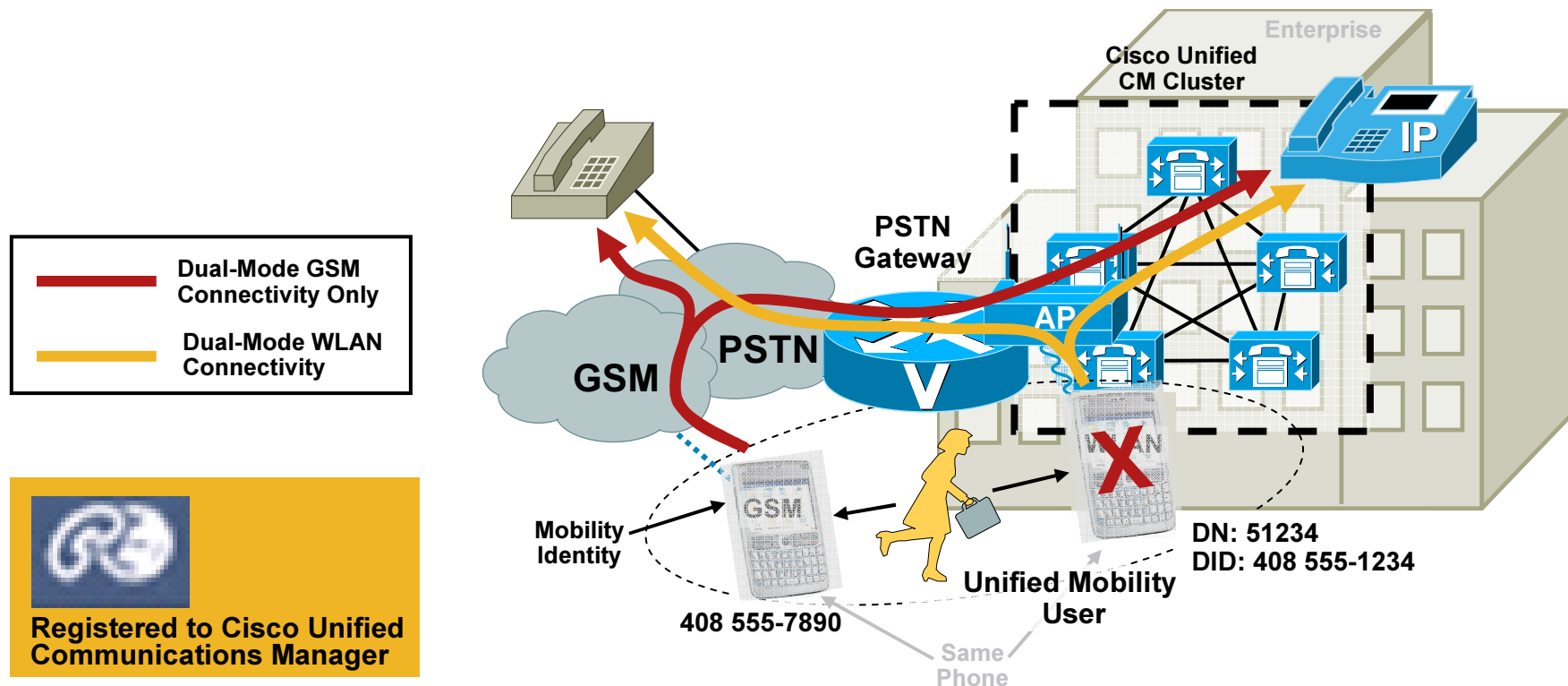


Note: When the Dual-Mode Phone Is in the WLAN, Incoming Calls to the Enterprise DN/DID Will Not Ring the GSM Interface

Mobile Business Solution from Cisco and Nokia

Outgoing Call Routing

1. Outgoing calls from GSM are dialed just like a typical mobile phone call
2. Outgoing calls are routed within WLAN just like any enterprise phone

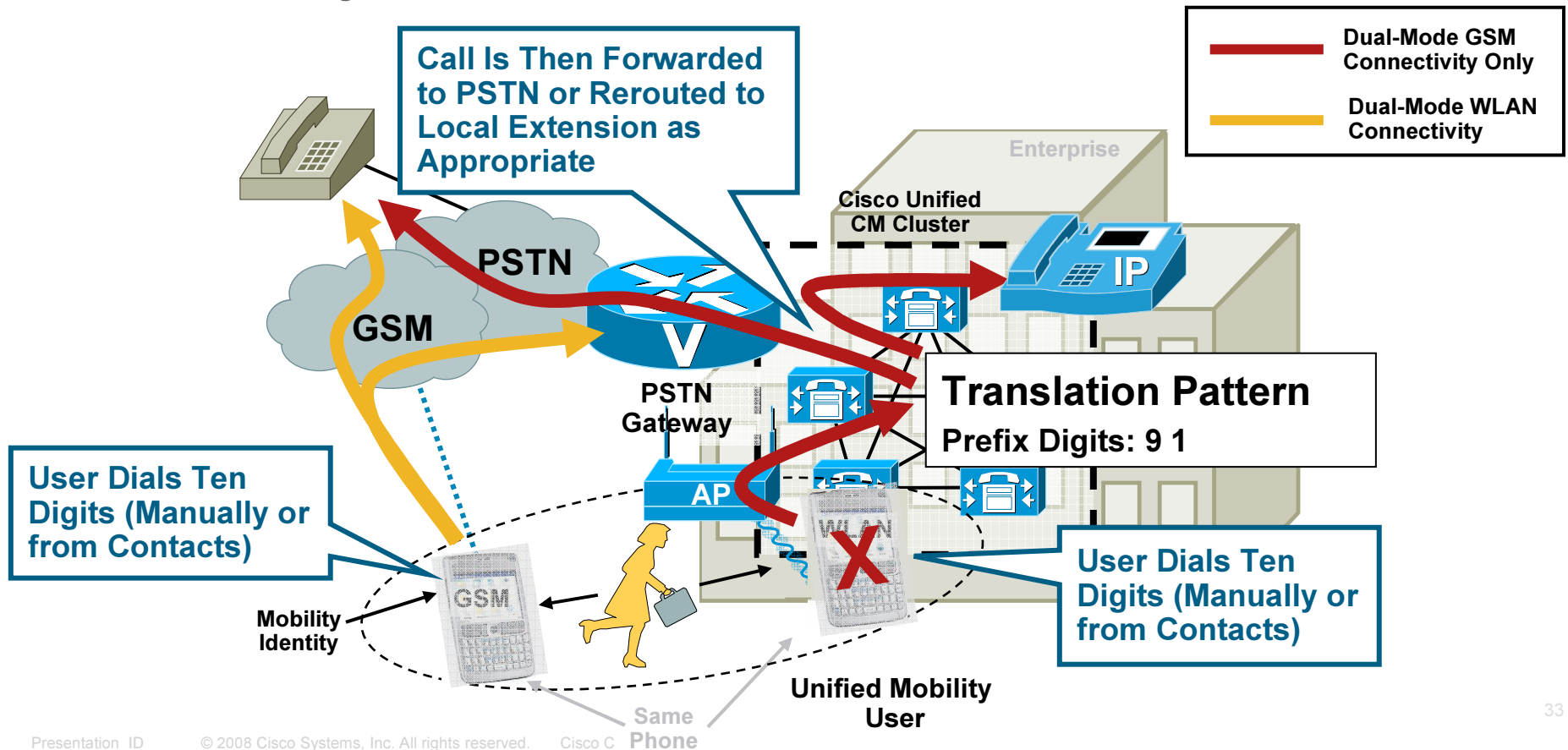


1. Dial plan is challenging in terms of user dialing experience because dialing method within enterprise will be different than from GSM

Mobile Business Solution from Cisco and Nokia

Outgoing Call Routing—Normalization

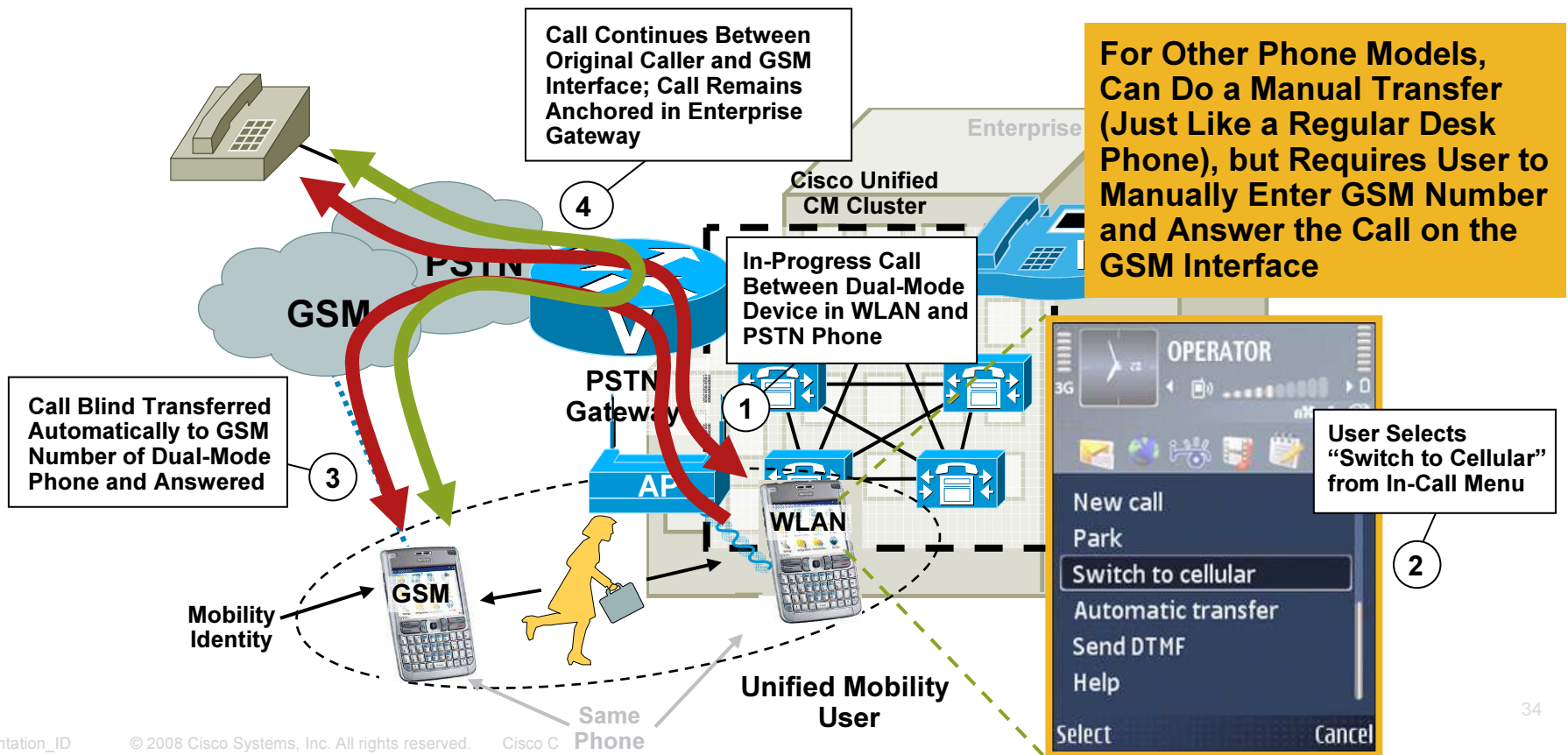
1. Alternatively, can configure dial plan within Cisco Unified Communications Manager to prefix steering digits to calls made by dual-mode devices when in the WLAN
2. Contacts on mobile device will all need to be configured uniformly → 10-digit



Mobile Business Solution from Cisco and Nokia

Nokia Intellisync Call Connect for Cisco 1.1: Switch to Cellular Feature

1. Allows user to manually invoke an automatic blind transfer of active call to pre-defined GSM number (hand-out)
2. Logic built into the client and available only on the Nokia E51 phone
3. Call remains anchored in enterprise gateway



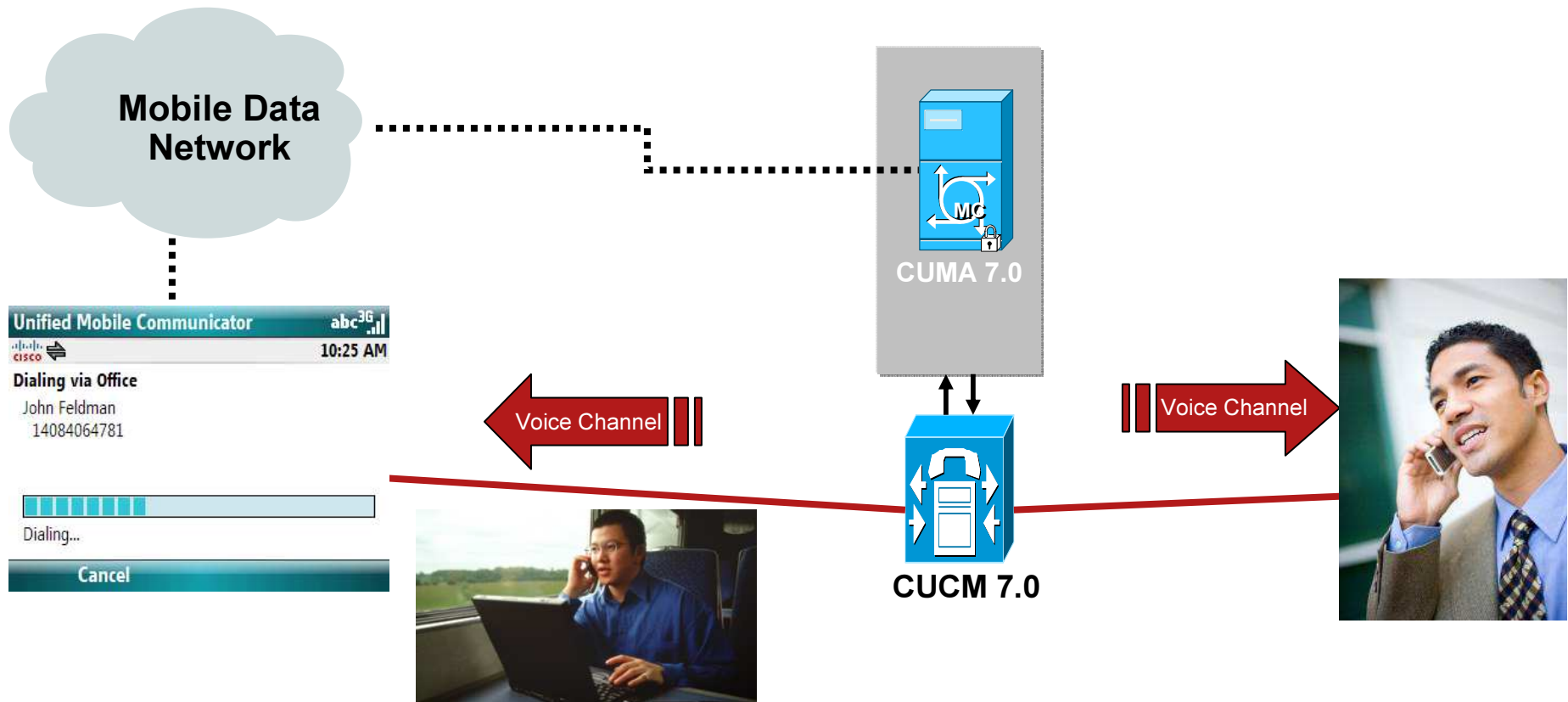
Agenda

- Unified Mobility
- Dual-Mode Phone
- **Unified Mobile Communicator**
 - **Architecture & Requirements**
 - **Features**
 - **Protocols and Application Provisioning**



Dial Via Office

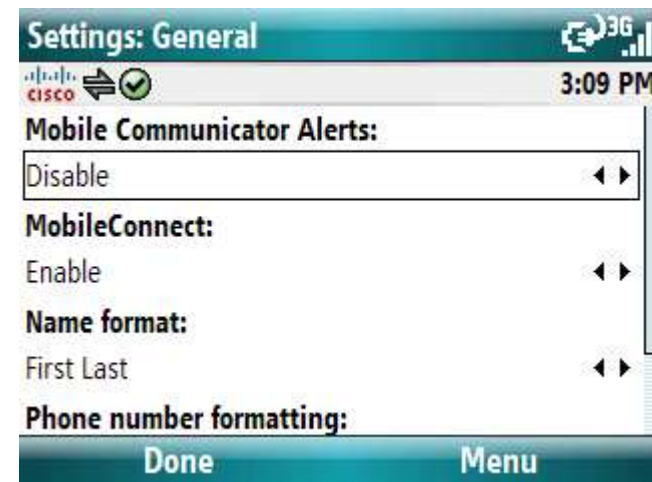
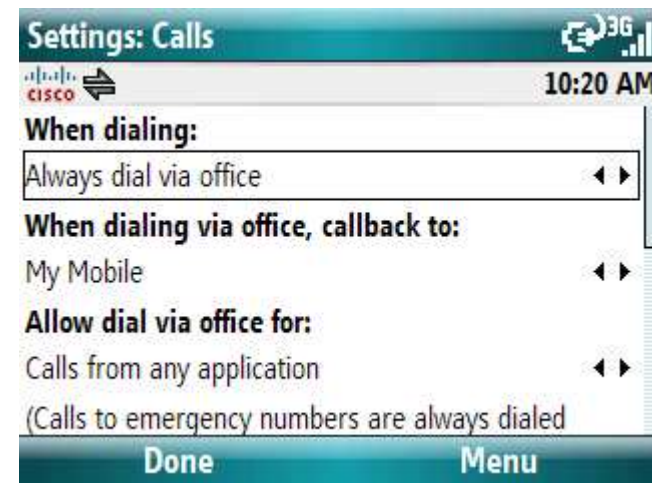
Make calls from mobile phone leveraging enterprise telephony infrastructure



Demo: http://10.89.242.18/%5CUsing_DVO.htm

Dial via Office & Mobile Connect

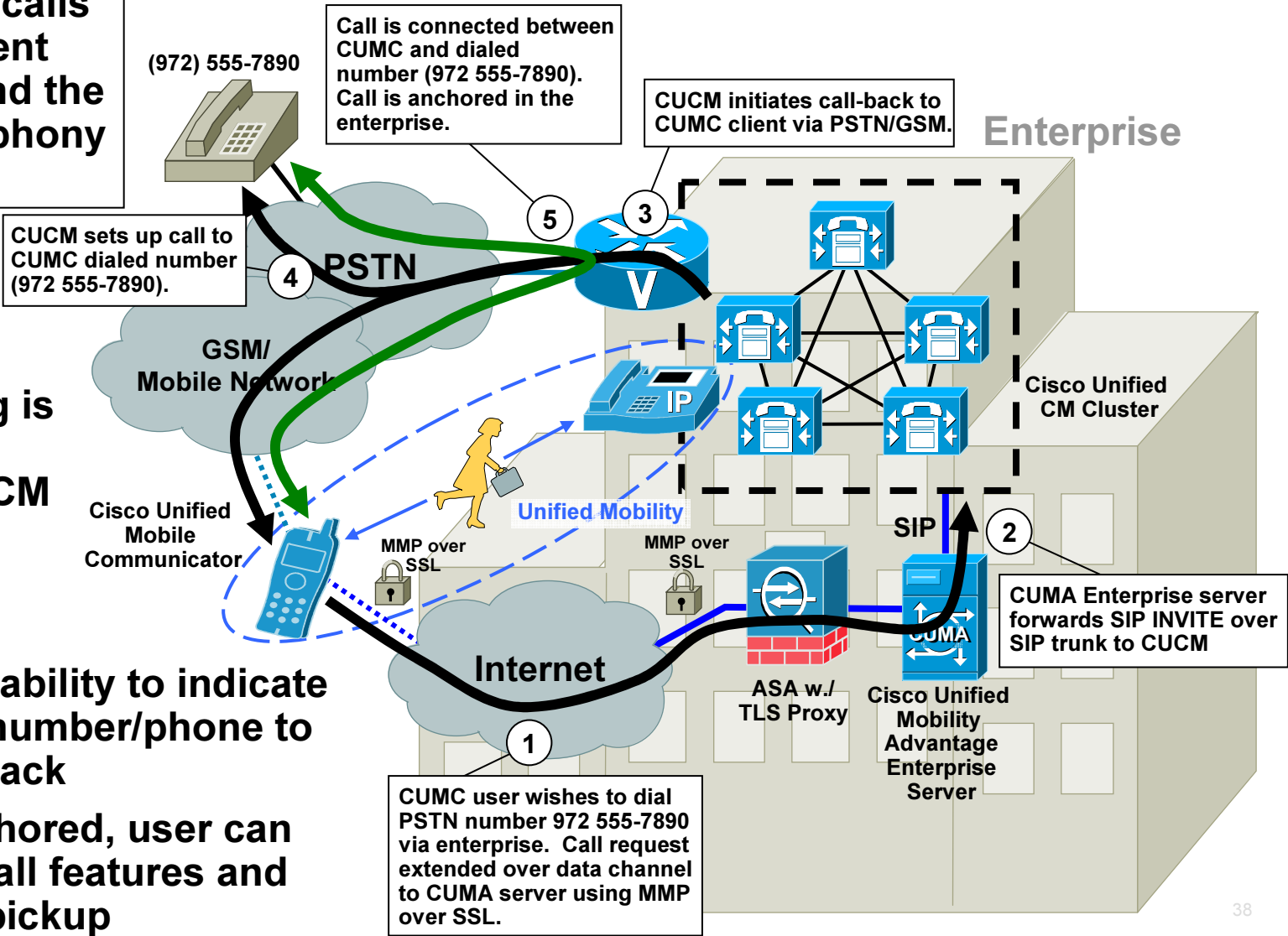
- Admin or user defined Dial via Office Setting
 - Always on
 - Always off
 - Choose on a per call basis
- Call dialed via CUCM (using reverse call back)
- Emergency calls go direct
- Ability to enable or disable Mobile Connect from client



Cisco Unified Mobile Communicator Coming Soon: Dial-via-Office (DVO)



DVO provides the ability to make calls from CUMC client using CUCM and the enterprise telephony infrastructure.



- Call signaling is relayed from CUMC to CUCM via CUMA server using SIP trunk
- User has the ability to indicate an alternate number/phone to receive call back
- With call anchored, user can invoke mid-call features and desk phone pickup

Presence Unified with CUP



1. Presence shared across Cisco Unified Personal Communicator 7.0 and Cisco Unified Mobile Communicator
2. Buddy list synchronized with Cisco Unified Personal Communicator
3. Note: Text messages can be sent from one mobile client to another mobile client



Cisco Unified Mobile Communicator

Coming soon: Presence/CUP Integration

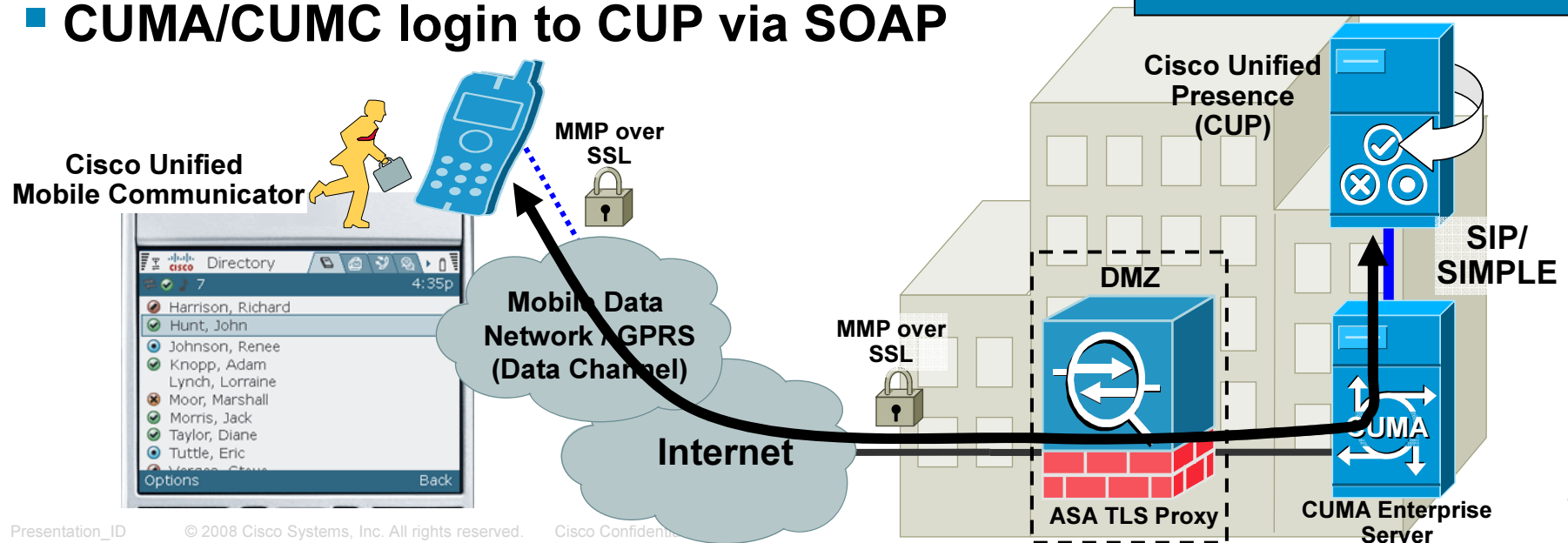


The CUMA Enterprise server can now integrate via SIP/SIMPLE to Cisco Unified Presence server.

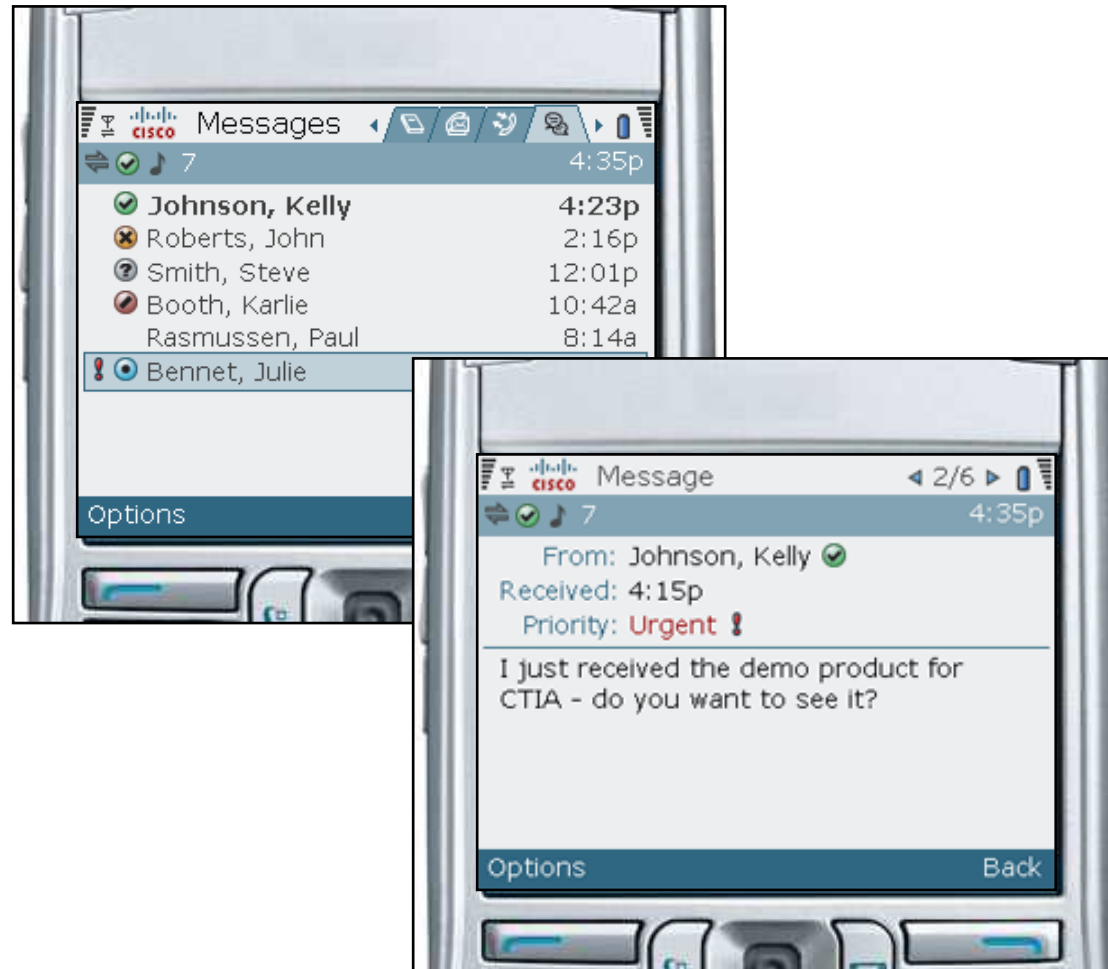
- **Buddy List synchronization:**
 - Buddies added on CUMC will sync to CUPC and vice-versa
 - No group support within CUMC (all in General group)
- **Presence synchronization:**
 - Presence changes on CUMC reflect in CUPC and vice-versa
- **CUMA/CUMC login to CUP via SOAP**

Caveats

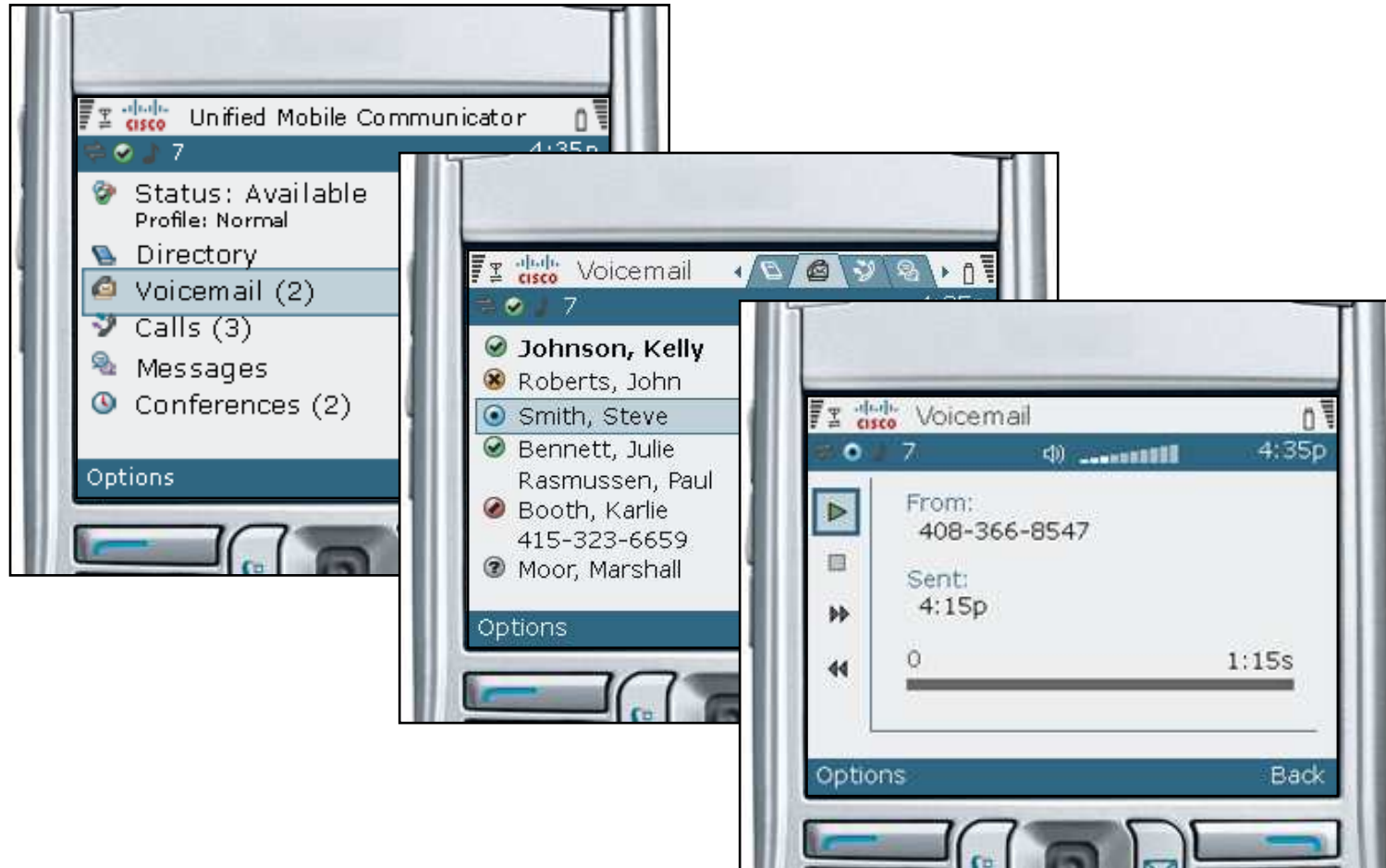
- No Presence without CUP integration
- Users must be provisioned in CUCM and CUP
- No IM federation (IM only between CUMC users)



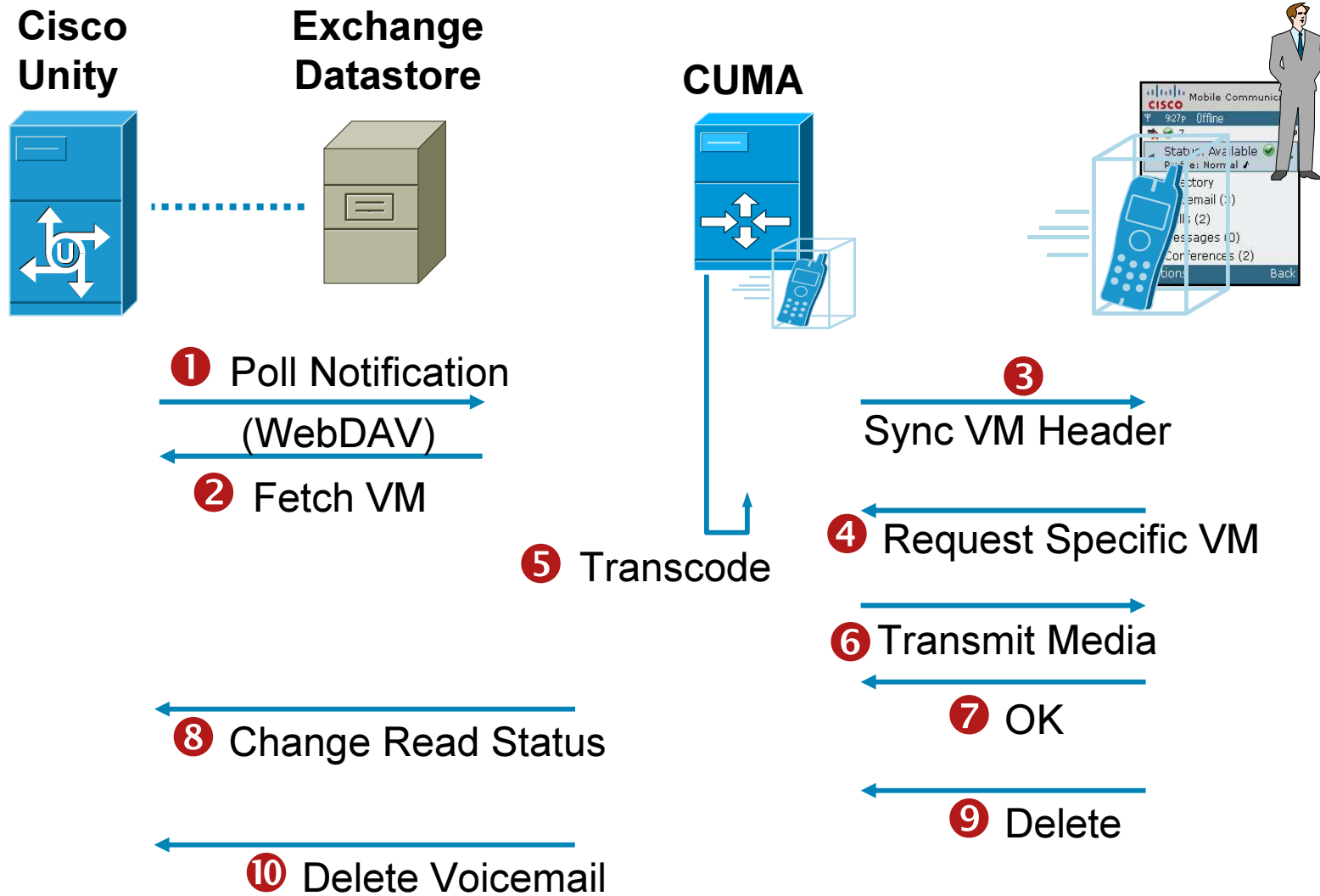
Secure IM with Presence



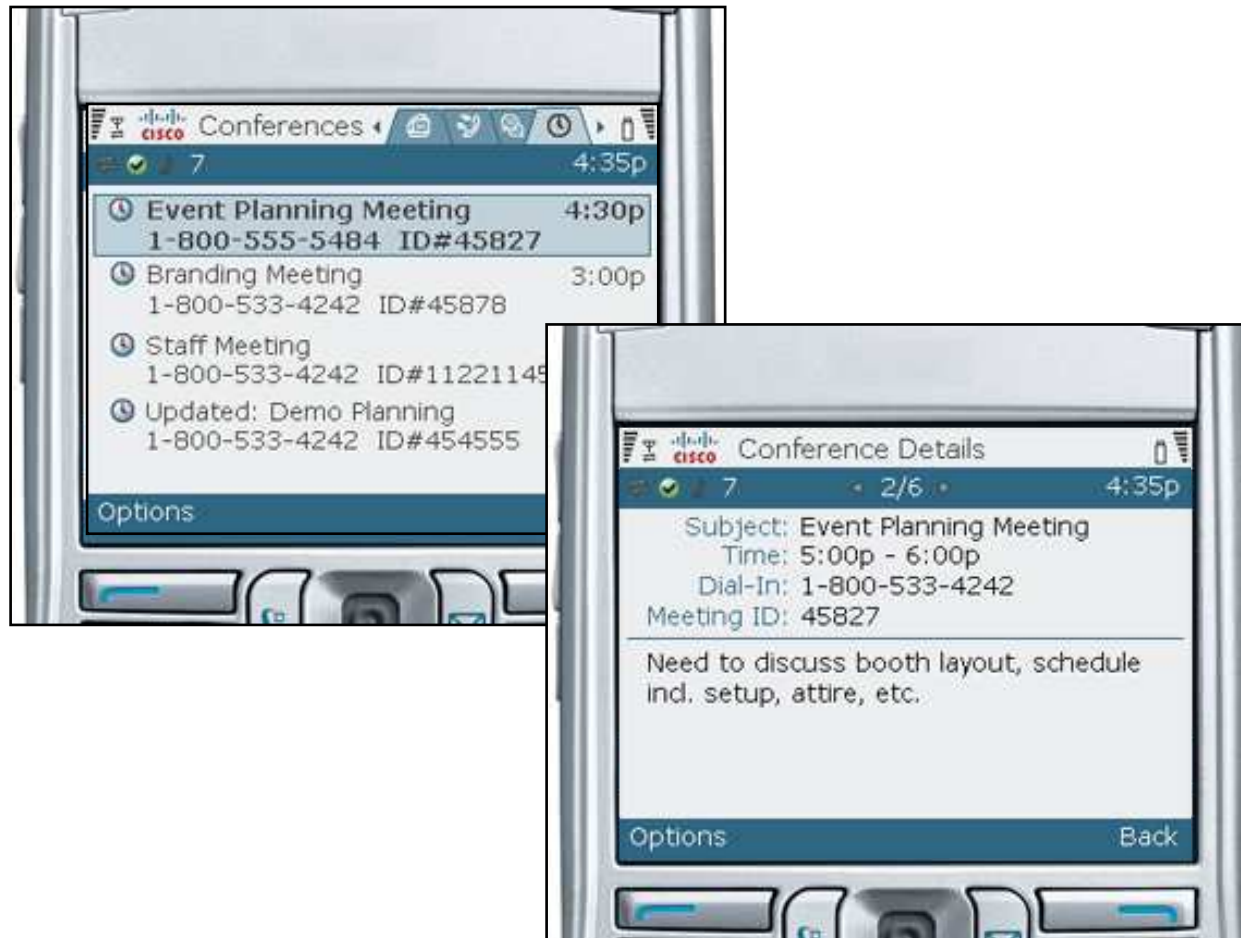
Extend Office Voicemail to Mobile



Visual Corporate Voicemail



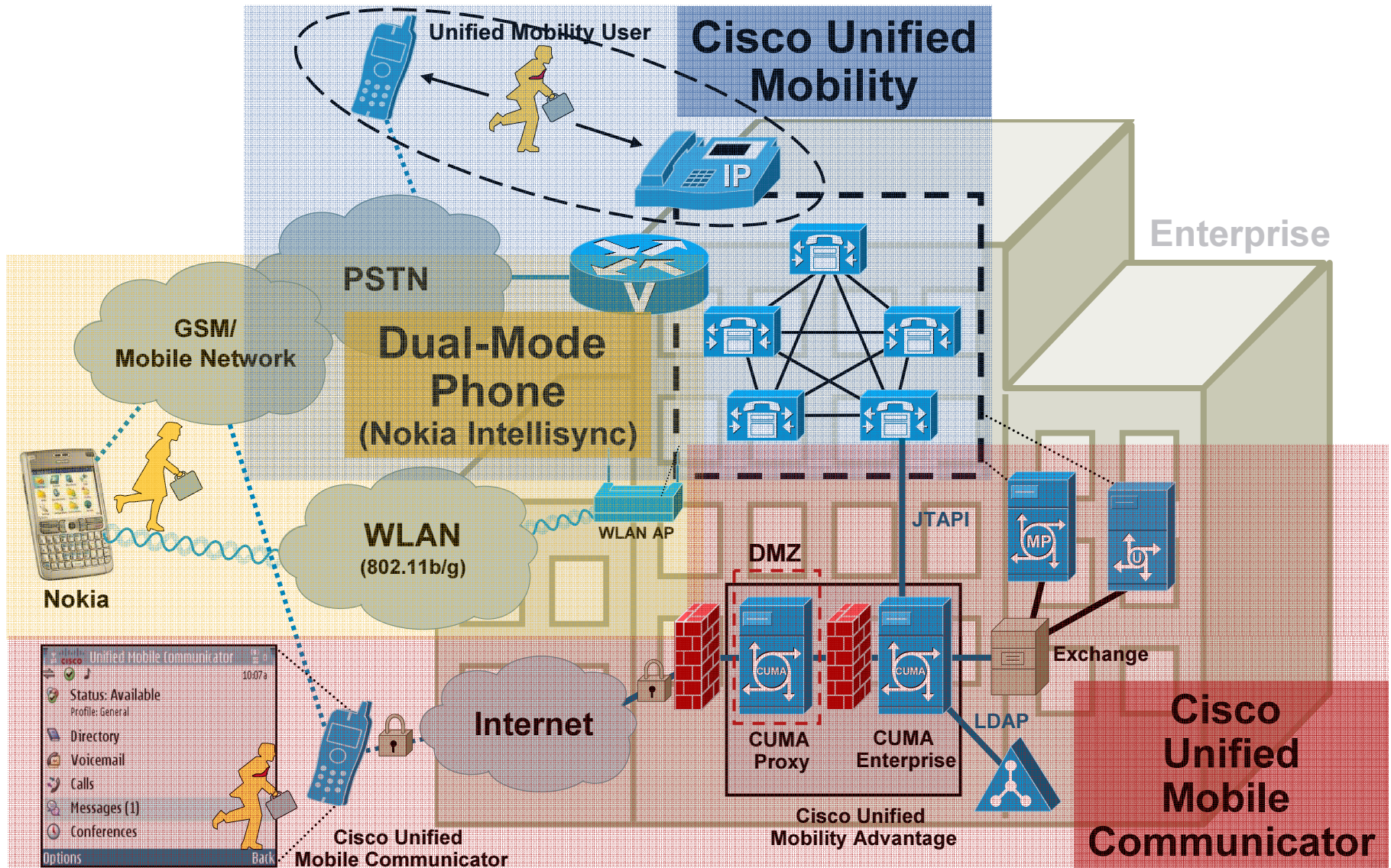
Easy Access to Conference Calls



Call Logs



Cisco Unified Mobile Communicator Architecture



Cisco Unified Mobile Communicator Enterprise Application Integration

Unified CM Integration

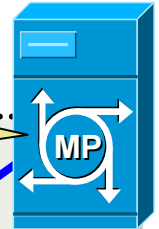
- CUCM 4.x, 5.x, 6.x, 7.x
- DVO with 7.0
- Call log integration (Desk phone call history to mobile client)

PSTN

Conference Integration

- MP 6.0, 7.0 / MPE 1.2, 2.0
- Conference notification
- Click-to-call (no click-to-join)
- Integration via MS Exchange 2000/2003 using WebDAV protocol

MeetingPlace/
ingPlace Express



Integration via JTAPI/CT

Voicemail Integration

- Unity 4.x, 5.x, 7.0 and Unity Connection 7.0
- Support for Unified Mode and Integrated Messaging
- Secure Messaging Unity 7.0 and Unity Connection 7.0
- MWI and Visual VM (visual notification of voicemail box)

Directory Integration

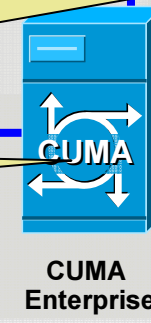
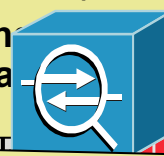
- AD 2000 or 2003
- Required integration: CUMC user authentication
- Directory lookup SIMPLE
- CUMA server and CUMC client do not store password
- Integration via LDAP

Cisco Unified Presence

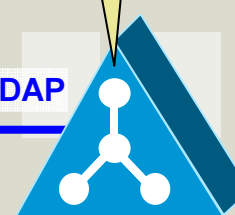
Cisco Unified Mobility Advantage

- CUMA 7.0
- Native support for messaging between CUMC mobile clients (IM/Text).
- Native support for CUMA client Presence and CUP integration with 7.0

Integration via MS Exchange using WebDAV



LDAP



MS Active Directory
2000/2003

SSL

CUMA Proxy

CUMA Enterprise

Cisco Unified
Mobility Advantage

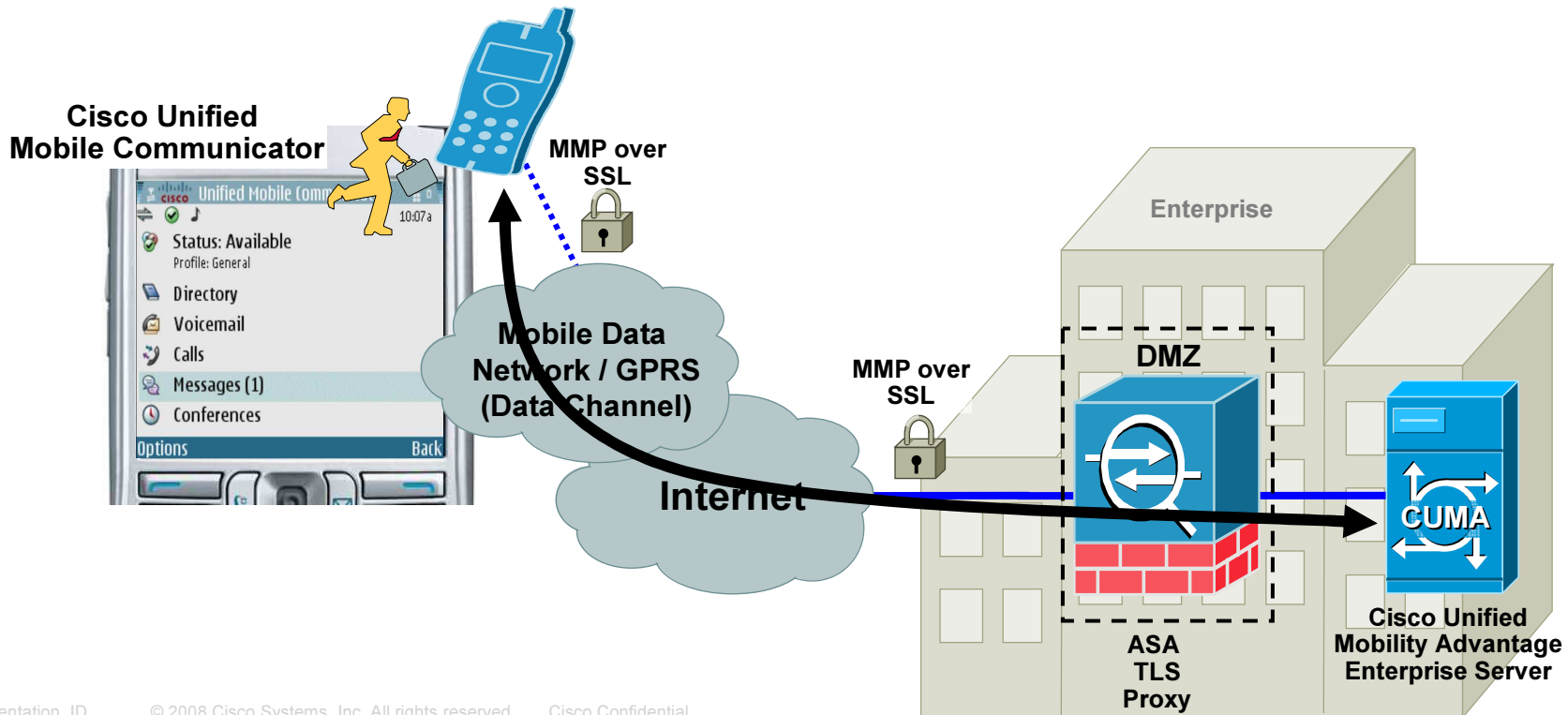
Cisco Unified Mobile Communicator

Coming soon: ASA TLS Proxy



The CUMA Proxy server has been replaced with the Cisco Adaptive Security Appliance (ASA) for enhanced security.

- ASA provides deep packet inspection and hardware encryption/de-encryption for MMP packets
- Improved security for data backhaul connection from CUMC client on Internet to enterprise.



Cisco Unified Mobile Communicator Handset Support

Handsets currently supported with CUMC 3.X



RIM OS

 8100 (Pearl)	 8300 (Curve)	 8700
 8800	 8820	 8830

NOKIA

Symbian OS

 E61	 E61i	 E65
---------	----------	---------

iPhone & Windows Mobile Device Support

- CUMC v7.0 support on Windows Mobile:
 - Windows Mobile Standard Edition v6.0 or v6.1
 - Note: Not compatible with Windows Mobile ® Professional Edition (touch screen devices)
- iPhone?



Architectural Considerations

1. Network Latency, Unreliability

Disconnected client

Sync model

Delivery confirmation

2. Battery Life, Data Usage

Single TCP channel

'Rate controller' limits updates

Sync model

On-demand large data transfer

1. Security

Handset to enterprise

Use SMS only for signaling

Data melt

Proxy inspection

2. Diverse Networks, Handsets

Synchronize data, voice

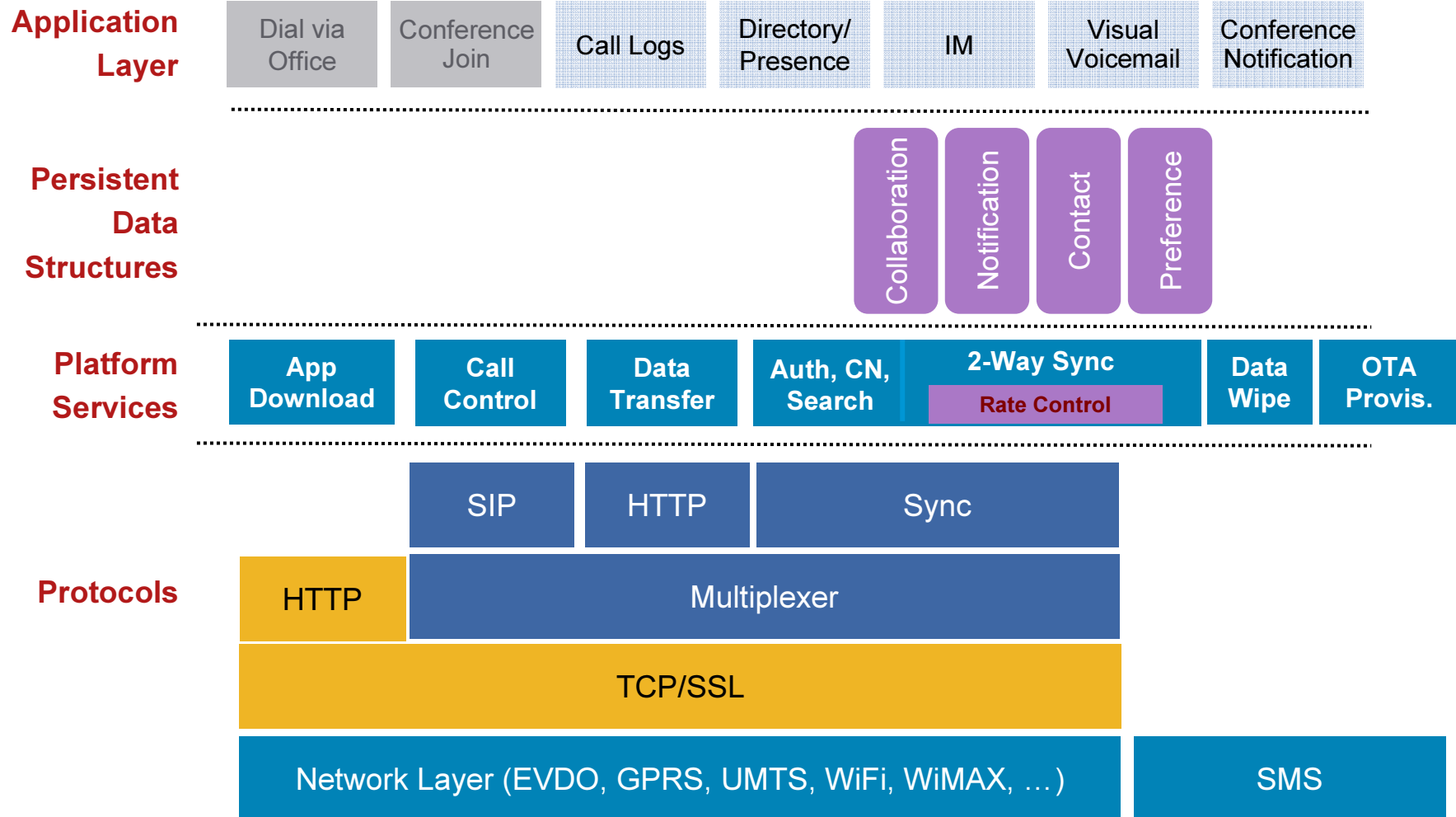
Hide handset differences

3. Auto-Cleanup

SMS inbox

Expire old messages

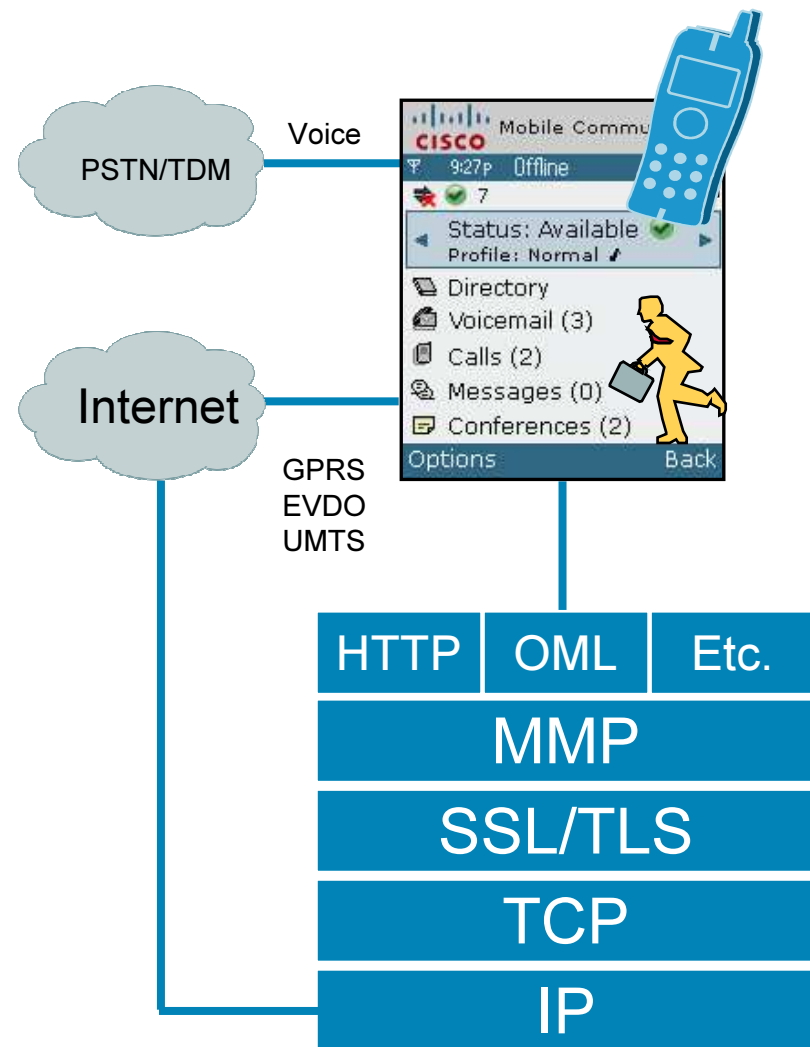
UMC Client-Server Protocol Stack



Cisco Unified Mobile Communicator

Client-Server Communications

- SMS
- SSL/TLS Secure Encryption
- Mobile Multiplex Protocol
- Main Functions
 - Data Framing
 - Session Management
 - Protocol Multiplexing
- Orative Markup Language
 - Presence, Contacts, Appt. Notify, IM, Call Log, Melt, VMail Notify
- HTTP—Transfer of Binary



Global Operator Support

- CUMC 7.0 clients available for all operators
 - Improved “keep alive” algorithm adjusts optimal connection across different mobile networks
 - No need for operator-specific testing
- CUMC v7.0 localized clients
 - Phased delivery in 2009

*English
Language
Client
Until
localizations*



Cisco Networkers Barcelona 26 – 29. Januar 2009. registrujte se!



Cisco Networkers
2009
January 26-29 Barcelona, Spain

<http://www.cisco.com/web/europe/cisco-networkers/2009/index.html>

