

## VLOD with Partitioned Addressing Use this Model if...

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- A global on-net numbering plan using site codes is not desired (*or possible*)
- Policy restrictions must be applied to on-net inter-site calls (*that is, some or all users are not allowed to dial other sites on-net*)
- Inter-site calls are always routed over the PSTN
- CTI applications are not used across sites

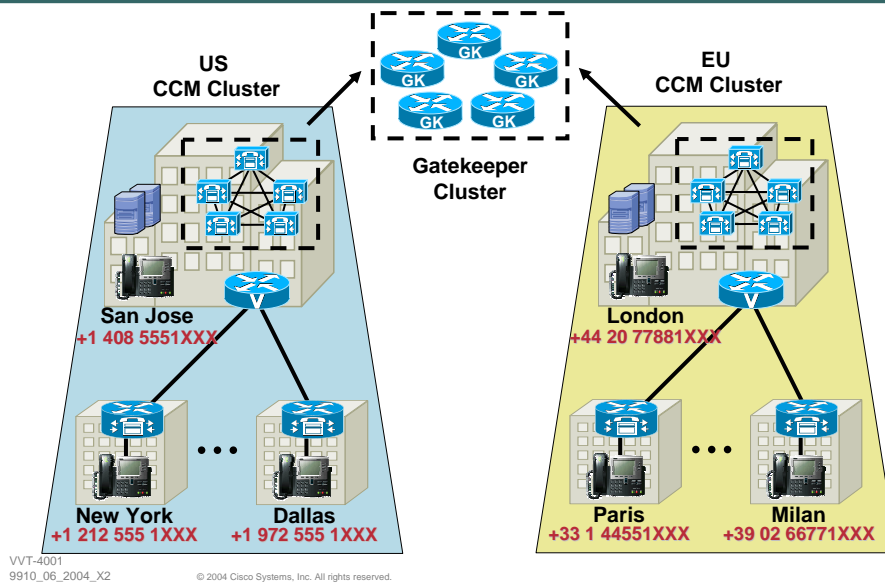
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## VLOD with Partitioned Addressing Hypothetical Customer Example

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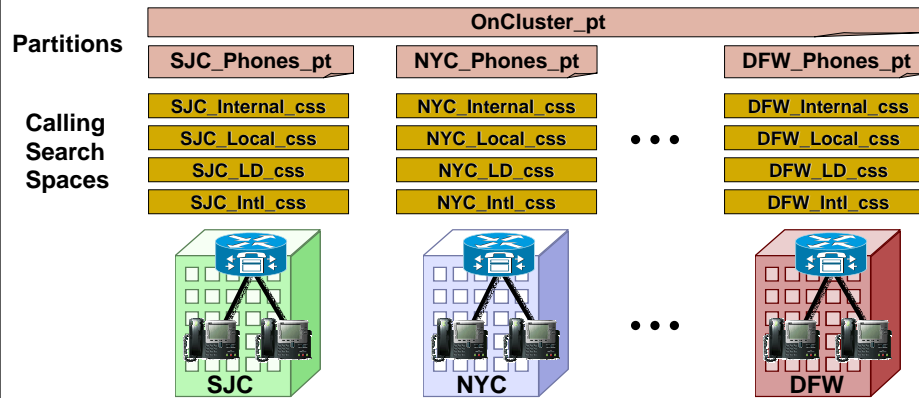
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# VLOD with Partitioned Addressing Partitions and Calling Search Spaces

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**\* Note: If using the Line/Device CSS approach, the number of CSS's can be reduced**

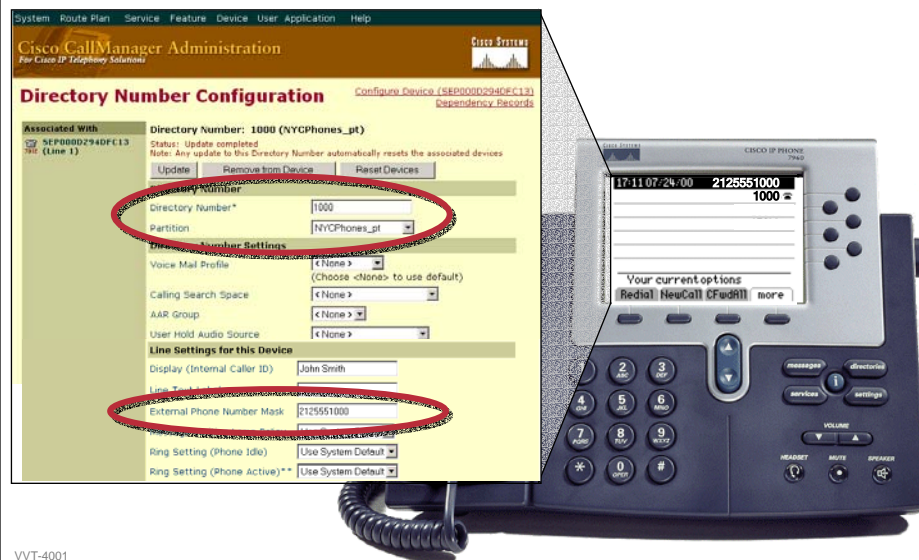
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# VLOD with Partitioned Addressing Line Configuration

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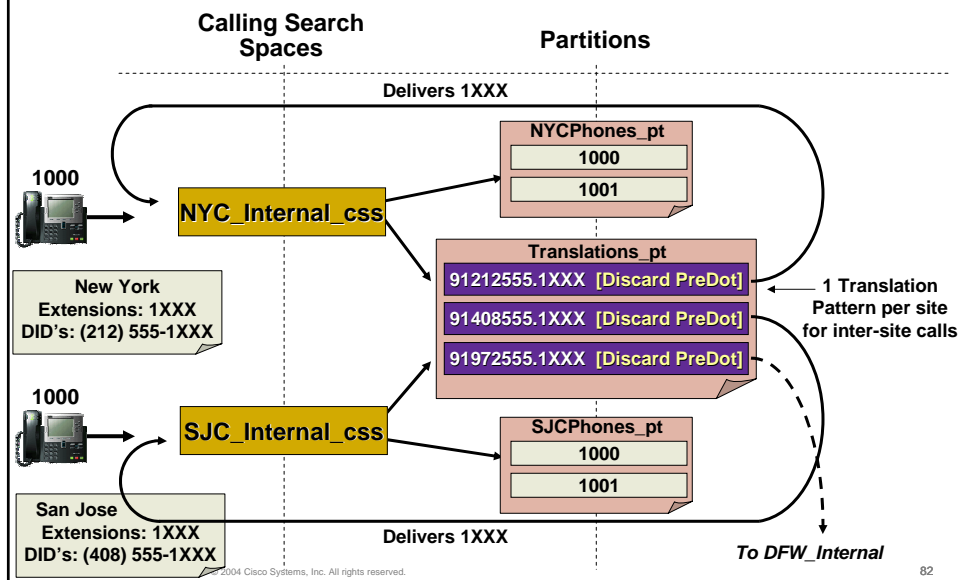
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## VLOD with Partitioned Addressing Inter-site Calls within a Cluster

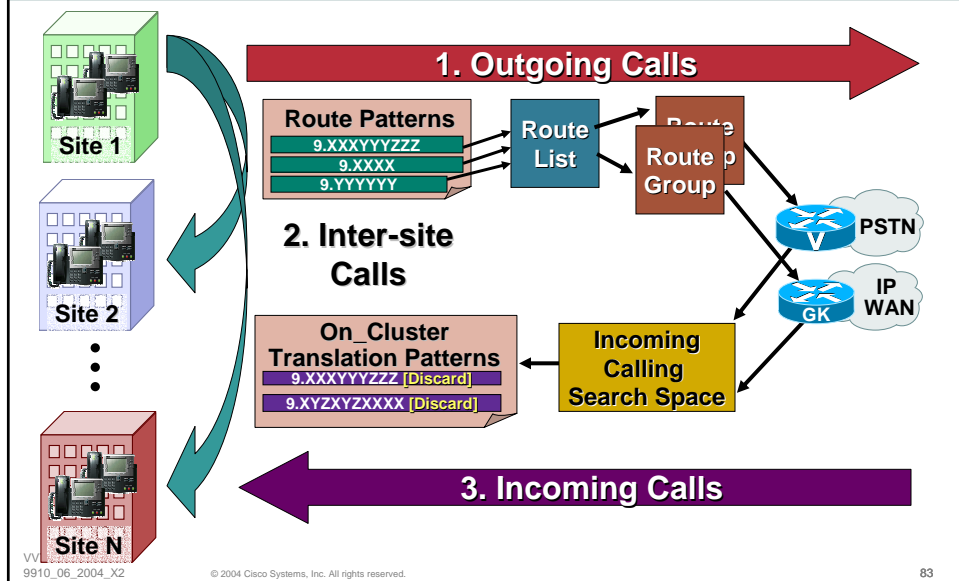
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## VLOD with Partitioned Addressing Dial Plan Architecture (see Appendix for details)

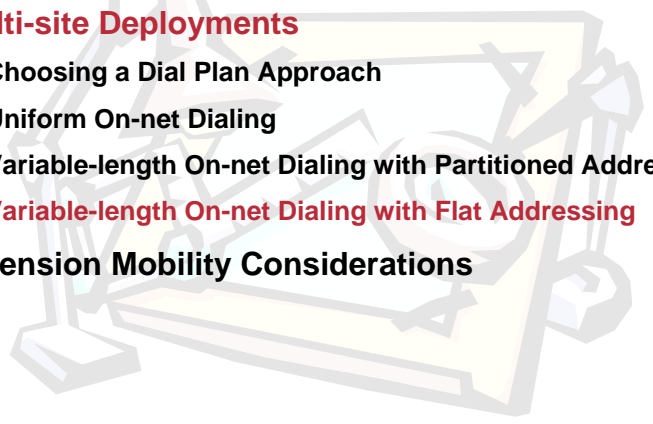
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## Design Best Practices Agenda

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- Building Classes of Service
  - **Multi-site Deployments**
    - Choosing a Dial Plan Approach
    - Uniform On-net Dialing
    - Variable-length On-net Dialing with Partitioned Addressing
    - Variable-length On-net Dialing with Flat Addressing**
  - Extension Mobility Considerations
- 

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## VLOD with Flat Addressing Use this Model if...

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- Branches interact often
- Users dial a 'site code' for inter-site calls
- Inter-site calls go over IP WAN
- CTI applications are used across sites
- International deployment
- A global on-net dial plan is needed

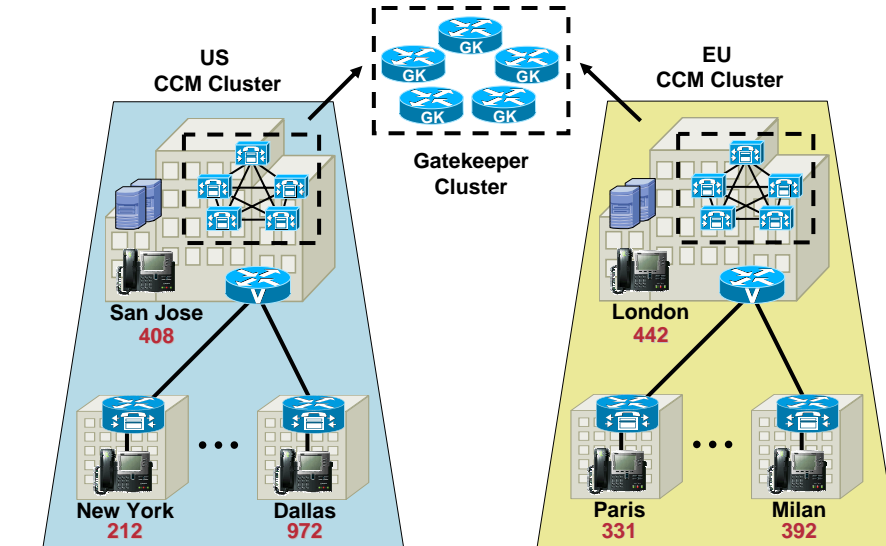
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## VLOD with Flat Addressing Site Code Assignment

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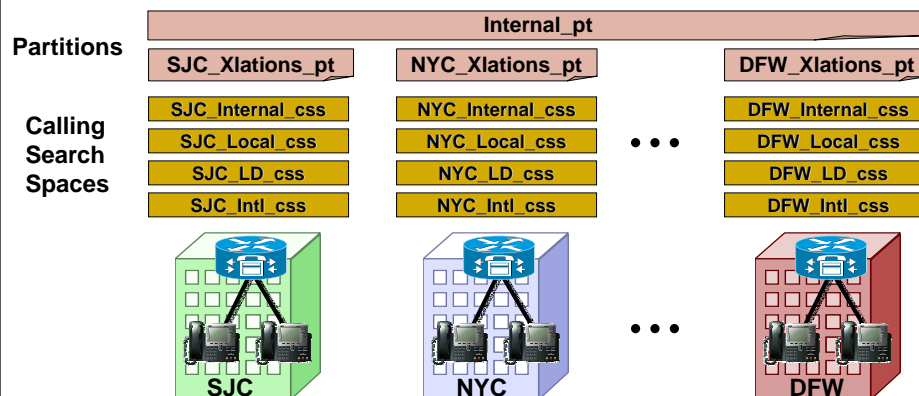
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## VLOD with Flat Addressing Partitions and Calling Search Spaces

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# VLOD with Flat Addressing Line Configuration

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**Directory Number Configuration**

Associated With: ADP000785287409 (Line 2), SEP000785287409 (Line 2)

Directory Number: 82121000 (Internal)

Status: Ready

Note: Any update to this Directory Number automatically resets the associated devices.

Update Remove from Device Reset Devices

Directory Number: 82121000

Partition: Internal

Line Number Settings

Voice Mail Profile: (Choose <None> to use default)

Calling Search Space: <None>

AAR Group: <None>

User Hold Audio Source: <None>

Line Settings for this Device

Line Text Label: 1000 \*

External Phone Number Mask: 2125551000

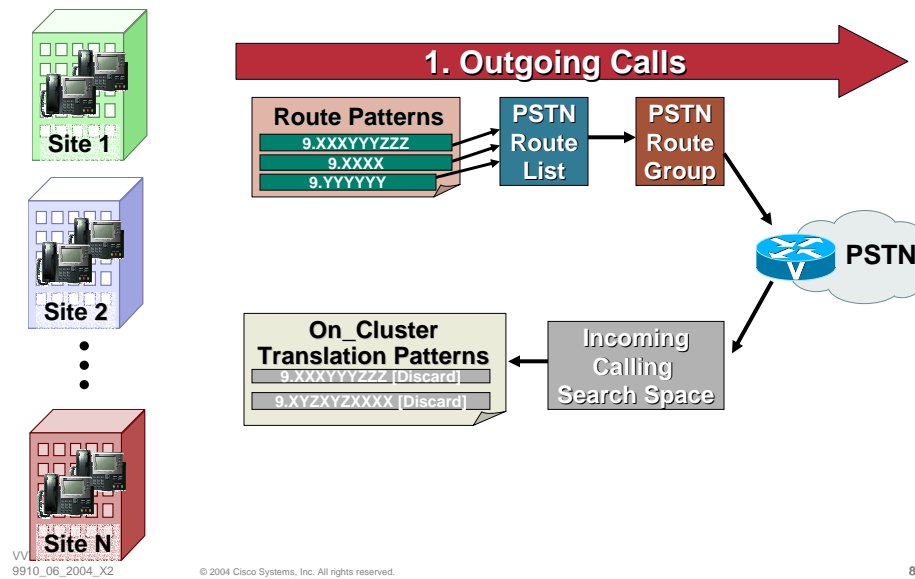
Ring Setting (Phone Idle): Use System Default

Ring Setting (Phone Active): Use System Default

**\* Note: Line Text Label is not preserved in SRST mode**

# VLOD with Flat Addressing Outgoing PSTN/ IP WAN Calls

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## VLOD with Flat Addressing Outgoing PSTN/ IP WAN Calls

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- **Option 1: 8-digit only**
  - Simple, easy to maintain
  - No automatic PSTN failover (manual redial)
- **Option 2: 8-digit + E.164 with centralized PSTN failover**
  - A little more configuration and maintenance
  - Automatic PSTN failover using central gateway
  - Possibility to place calls on-net even when dialed as PSTN
- **Option 3: 8-digit + E.164 with distributed PSTN failover**
  - A lot more configuration and maintenance
  - Automatic PSTN failover using local gateway

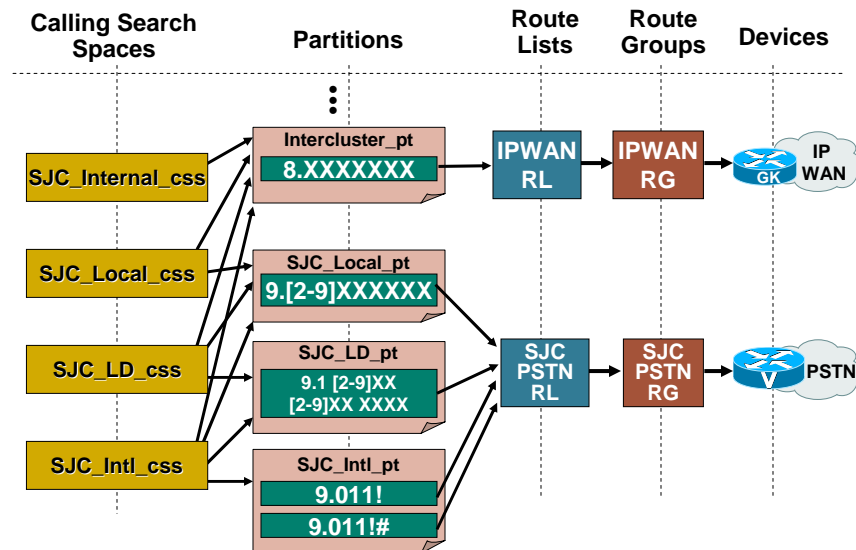
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## VLOD with Flat Addressing Outgoing PSTN/ IP WAN Calls – Option 1

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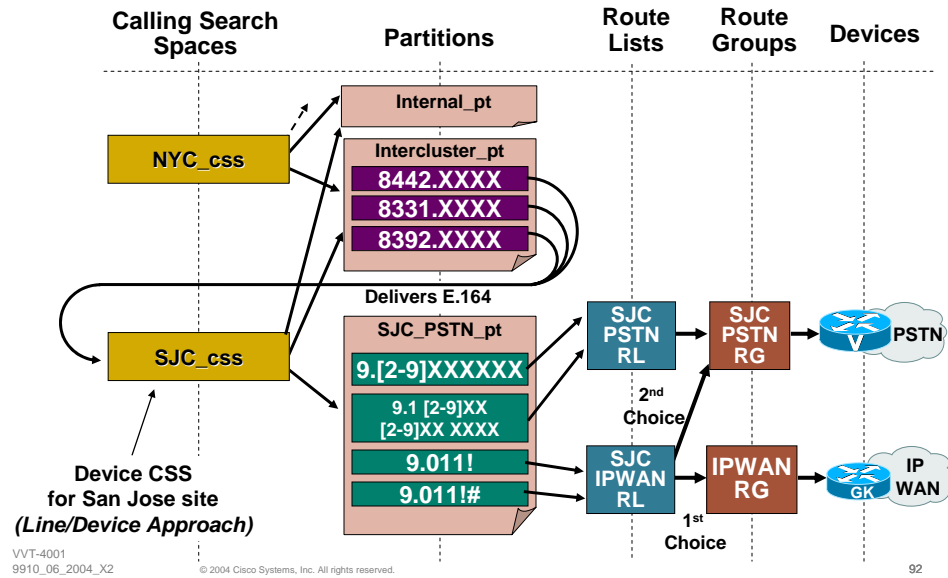
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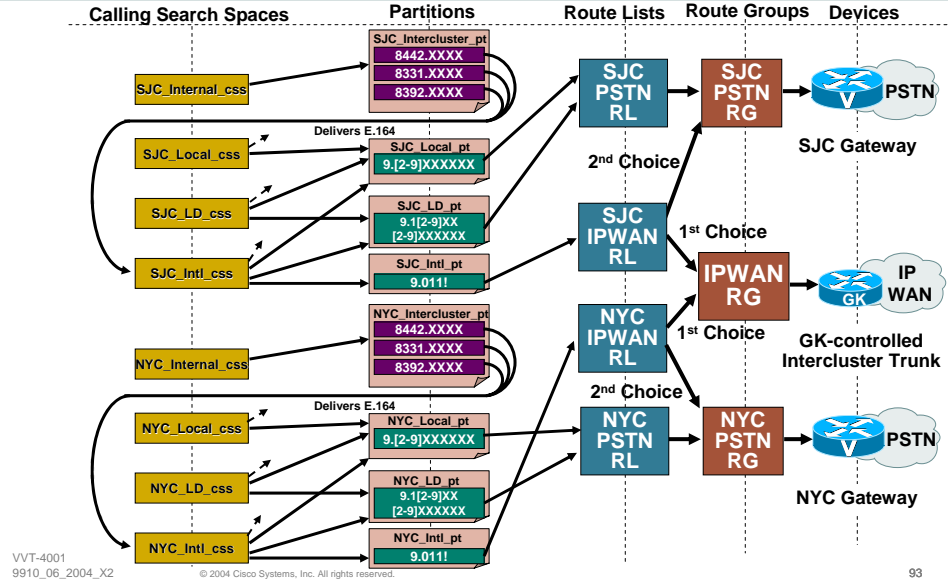
## VLOD with Flat Addressing Outgoing PSTN/ IP WAN Calls – Option 2

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## VLOD with Flat Addressing Outgoing PSTN/ IP WAN Calls – Option 3

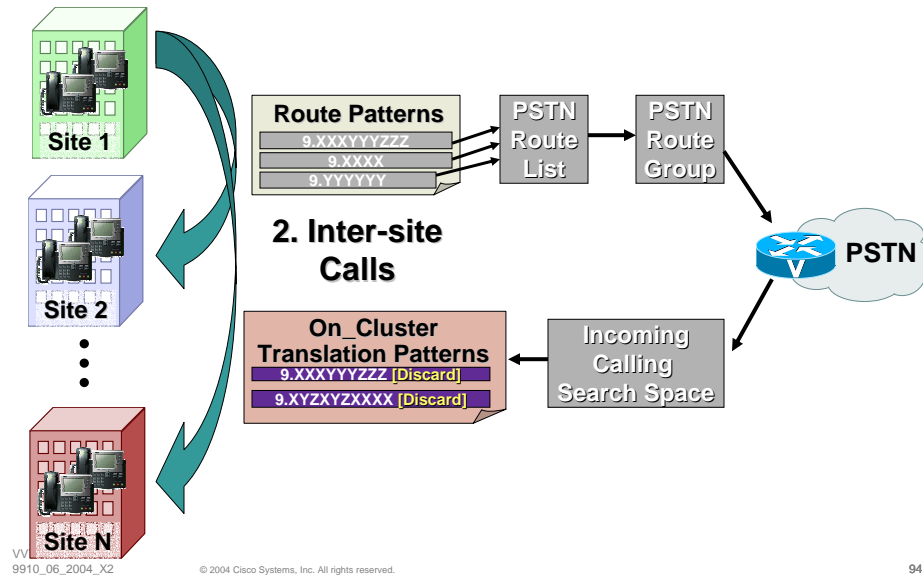
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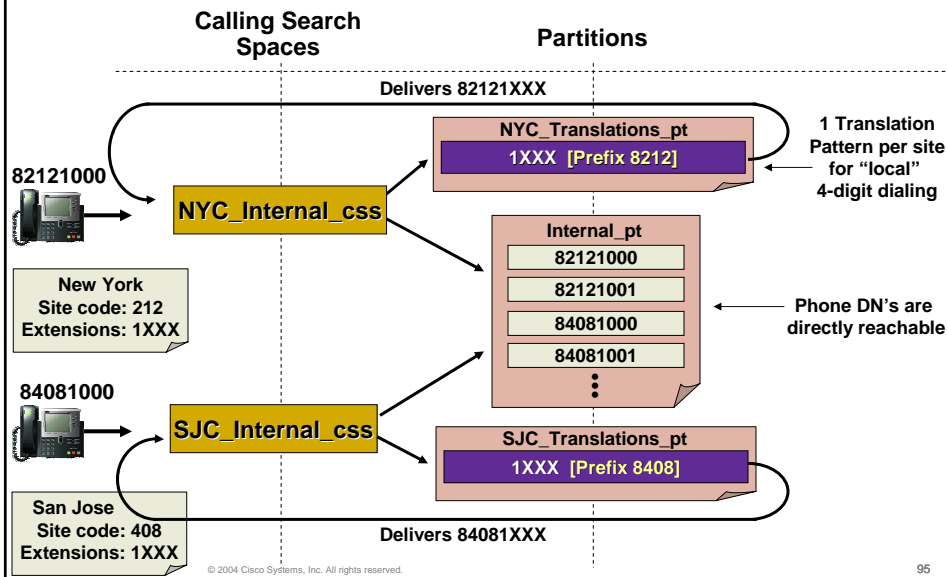
## VLOD with Flat Addressing Inter-site Calls within a Cluster

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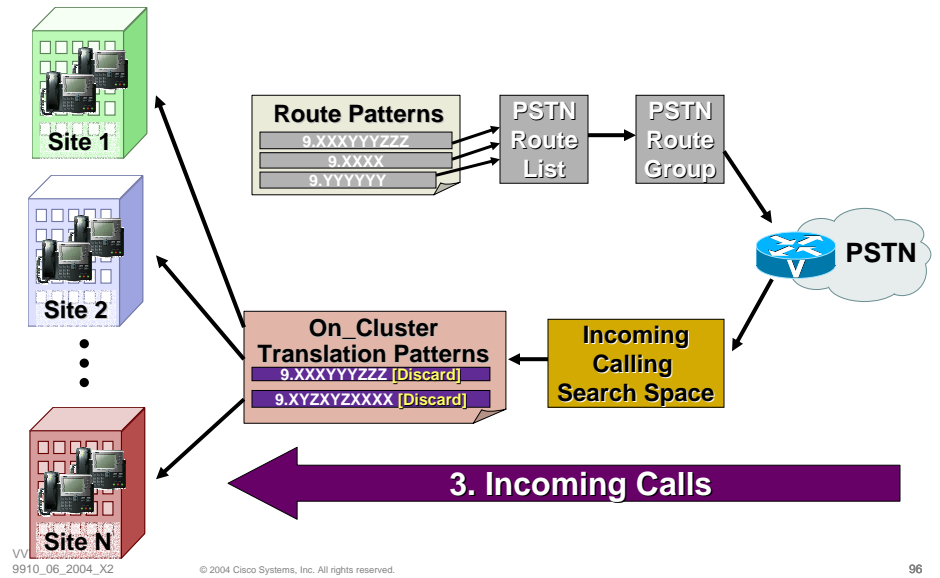
## VLOD with Flat Addressing Inter-site Calls within a Cluster

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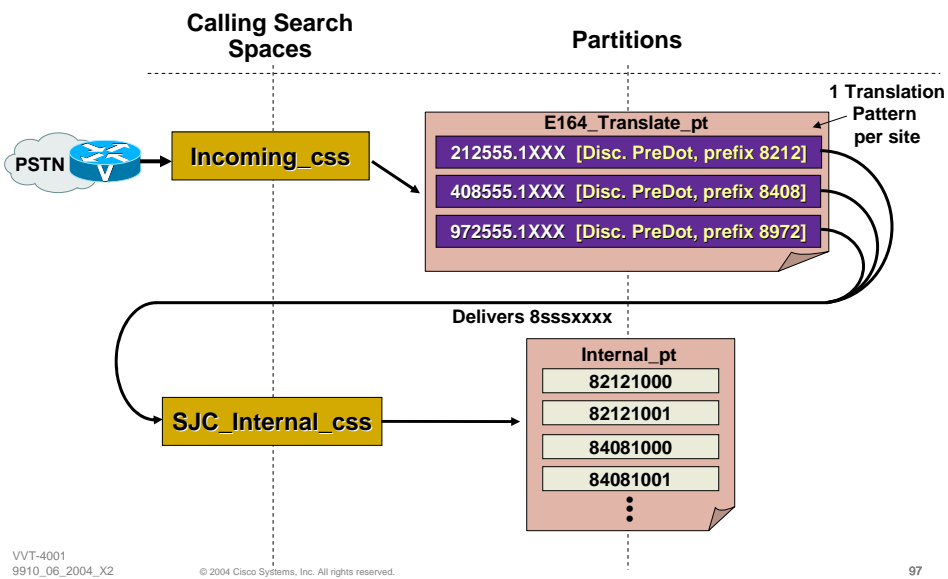
## VLOD with Flat Addressing Incoming PSTN/ IP WAN Calls

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## VLOD with Flat Addressing Incoming PSTN/ IP WAN Calls

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## VLOD with Flat Addressing Incoming PSTN/ IP WAN Calls (*Alternative*)

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System Route Plan Service Feature Device User Application Help

**Cisco CallManager Administration**  
For Cisco IP Telephony Solutions

[Back to Find/List Gateways](#)  
[Dependency Records](#)

**Gateway Configuration**

Assigned to Route Group: PSTN R.G. 

Product : Cisco Catalyst 6000 T1 VoIP Gateway

Gateway : S0/DS1-0@SDA0001C96ACDDE

Device Protocol: Digital Access PRI

Registration: Registered with Cisco CallManager SJCCEM2

IP Address: 10.0.1.13

Status: Ready

**Call Routing Information**

**Inbound Calls**

Significant Digits\*

Calling Search Space

AAR Calling Search Space

Prefix DN

**Configure GW to strip and prefix relevant digits**

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## VLOD with Flat Addressing Gatekeeper Configuration

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```
gatekeeper
zone local US cisco.com 10.9.11.1
zone local EU cisco.com 10.20.1.1
no zone subnet US default enable
no zone subnet EU default enable
zone subnet US 10.9.11.2/32 enable
zone subnet US 10.9.11.3/32 enable
zone subnet EU 10.20.1.2/32 enable
zone subnet EU 10.20.1.3/32 enable
zone prefix US 14085551...
zone prefix US 12125551...
zone prefix US 19725551...
zone prefix EU 442077881...
zone prefix EU 33144551...
zone prefix EU 390266771...
gw-type-prefix 1#* default-technology
bandwidth interzone zone US 256
bandwidth interzone zone EU 256
arq reject-unknown-prefix
no shutdown
```

**! Replace E.164's with 8-digit numbers for Option 1**

! zone prefix US 84081...

zone prefix US 82121...

zone prefix US 89721...

zone prefix EU 84421...

zone prefix EU 83311...

zone prefix EU 83921...

!

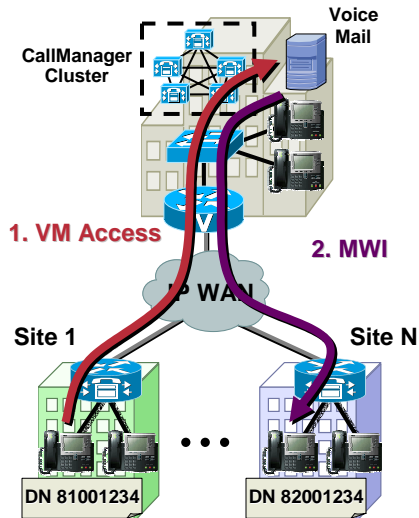
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## VLOD with Flat Addressing Voice Mail Integration

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- Each 8-digit extension is unique → it can be used to identify a Voicemail box
- No need to use masks in Voicemail Profile
- No translations necessary for MWI

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## Design Best Practices Agenda

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- Building Classes of Service
- Multi-site Deployments
- **Extension Mobility Considerations**

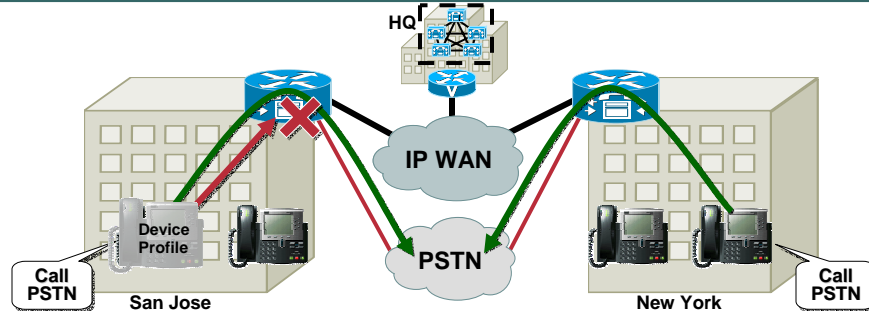
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## Extension Mobility Considerations Requirements

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- Allow users to log in at different sites with a single Device Profile
- Restrict PSTN calls when logged out
- Always route emergency calls via local gateway
- *Optional: Route all PSTN calls via local gateway*

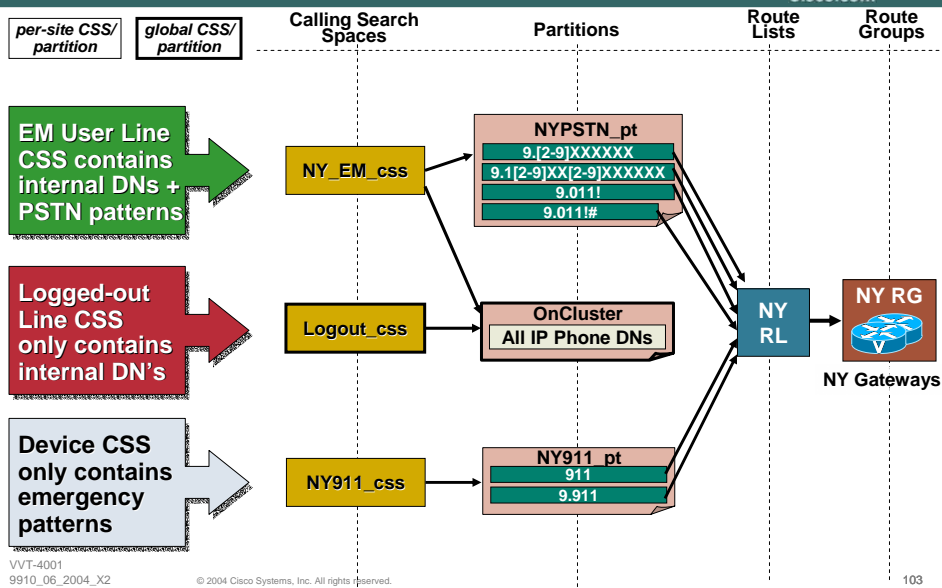
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## Extension Mobility Considerations Traditional Dial Plan Approach

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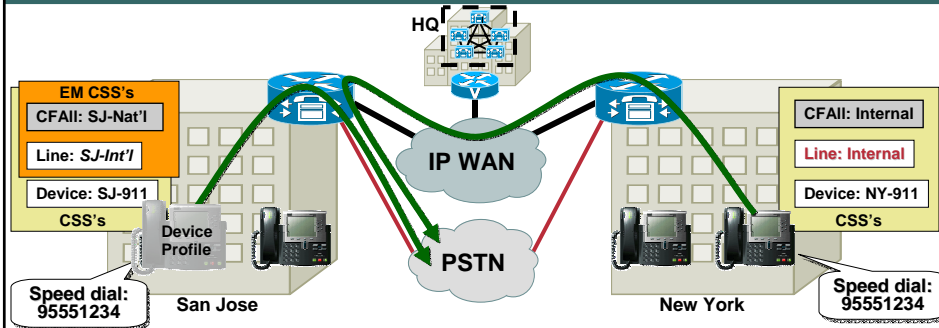
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## Extension Mobility Considerations Traditional Dial Plan Approach: Behavior

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- Emergency calls routed via local gateway
- Other PSTN calls routed via “home” gateway
- User dialing habits and speed dials are automatically preserved

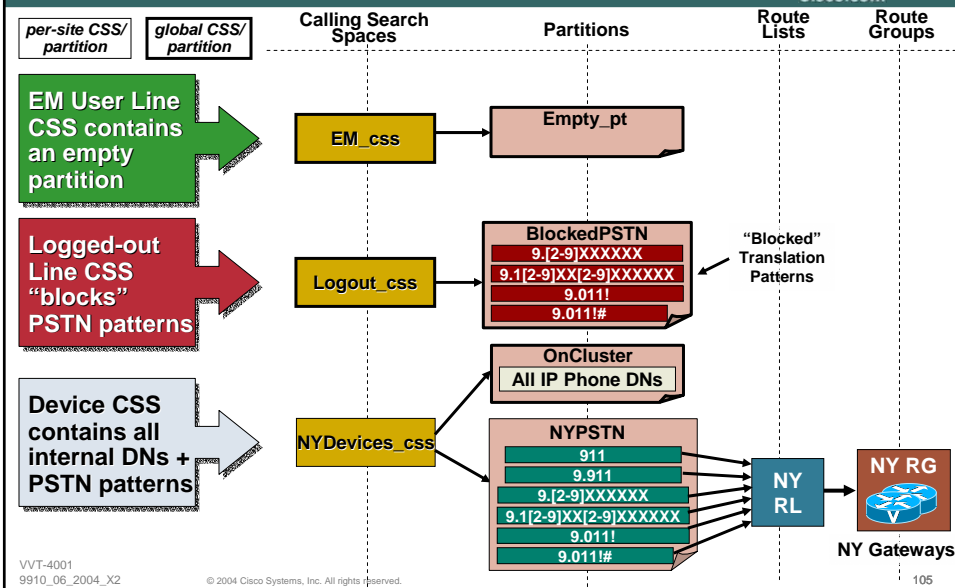
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## Extension Mobility Considerations Line/Device Dial Plan Approach

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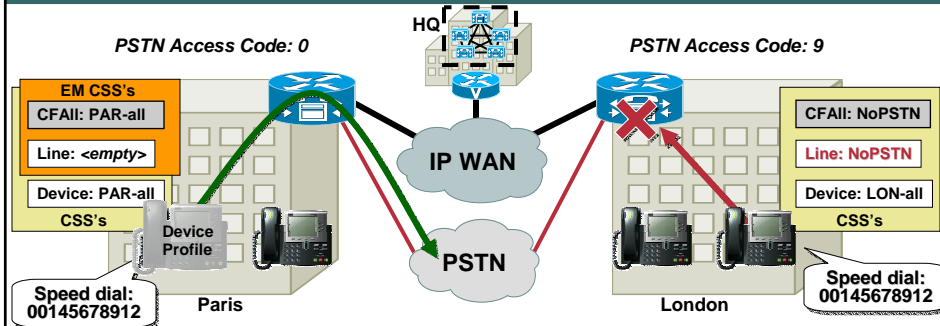
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## Extension Mobility Considerations Line/Device Dial Plan Approach: Behavior

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- All PSTN calls are routed via local gateway
- User dialing habits and speed dials are **not** preserved across different dialing "domains"
- *Forwarded calls are routed via "home" gateway*

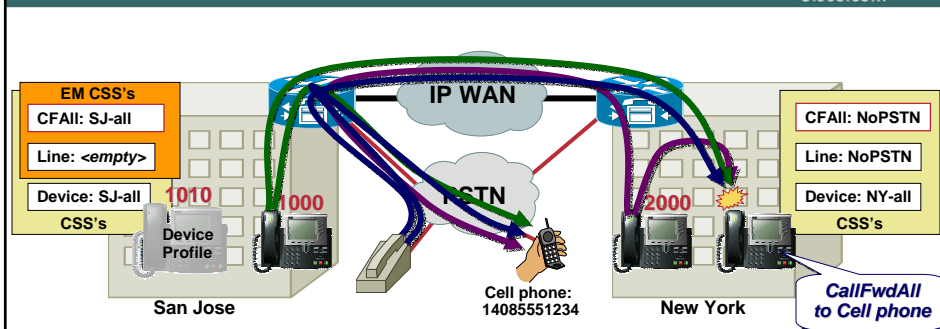
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## Extension Mobility Considerations Line/Device Dial Plan Approach: Forwarded Calls

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- When a SJ user logs in at NY site and forwards his phone to a PSTN number:  
 Calls from SJ IP phones use SJ PSTN GW  
 Calls from PSTN users get hairpinned at the SJ PSTN GW  
**Calls from NY IP phones cross the WAN and use SJ PSTN GW**

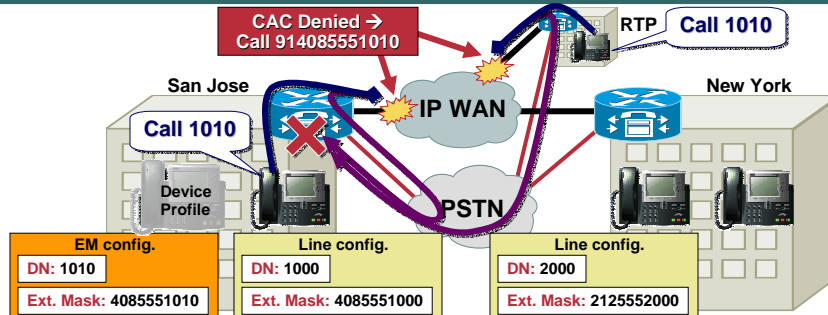
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## Extension Mobility Considerations AAR Caveats

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- AAR is inherently incompatible with EM users moving across branch sites (regardless of approach)
- When EM users log in at a different site, they cannot be reached via AAR from other sites (*DIDs don't move!*)
- Ensure that GW CSS's contain internal numbers only to prevent routing loops

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## CONCLUSIONS



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## Conclusions

### General Recommendations

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- **KEEP IT SIMPLE!**
- Plan for future growth
- Use Gatekeeper-controlled Intercluster Trunks when more than 2 CallManager clusters are present
- Normalize DNs to the full E.164 when using Gatekeeper for dial plan resolution

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## Conclusions

### Summary—What Did We Cover?

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- Planning an Enterprise IP Telephony dial plan—uniform vs. variable-length dialing
- Enterprise IP Telephony dial plan elements—the tools and how to use them
- Design recommendations in different areas of dial plan:
  - Classes of Service
  - Dialing Architectures
  - Addressing Methods

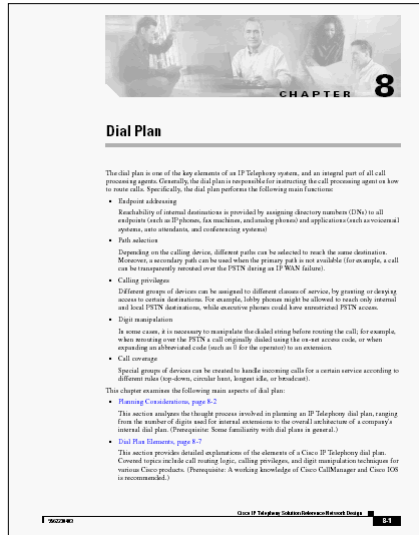
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## For More Information

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- More details in: Chapter 8 of the IP Telephony SRND for CallManager 4.0, available at: <http://www.cisco.com/go/srnd/>

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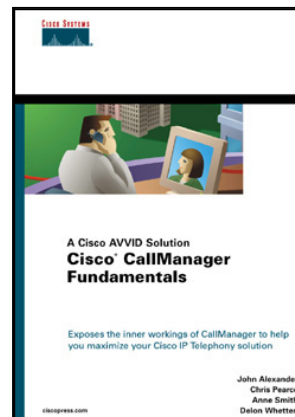
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## Recommended Reading

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**Cisco CallManager Fundamentals:  
A Cisco AVVID Solution**  
ISBN: 1-58705-008-0



**Available On-Site at the Cisco Company Store**

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## Complete Your Online Session Evaluation!

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- WHAT:** Complete an online session evaluation and your name will be entered into a daily drawing
- WHY:** Win fabulous prizes! Give us your feedback!
- WHERE:** Go to the Internet stations located throughout the Convention Center
- HOW:** Winners will be posted on the onsite Networkers Website; four winners per day

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## APPENDIX

