AVAYA

AVAYA Communication® Manager Application Notes: Configuring a Multinational server

Abstract

Avaya Communication Manager 2.1 provides the capability to use a single Enterprise Communication Server (ECS) with stations, port networks, remote offices, or gateways in multiple countries. This paper covers configuring the following features to work in multiple countries:

- Internet Protocol (IP) Network Region
- Multiple Locations
- Tenant Partitioning
- Country
- Time Zone and Daylight Savings Rules
- Dialing
- Local Attendants
- Announcements
- Call Detail Recording
- Transmission
- Tones
- Displays
- Time of Day Coverage
- Integrated Services Digital Network (ISDN)
- R2-Multifrequency (R2-MFC) Signaling
- Extensions Administered per System
- Music On Hold
- Automatic Wakeup
- Loudspeaker Paging Zones
- Call Center Features

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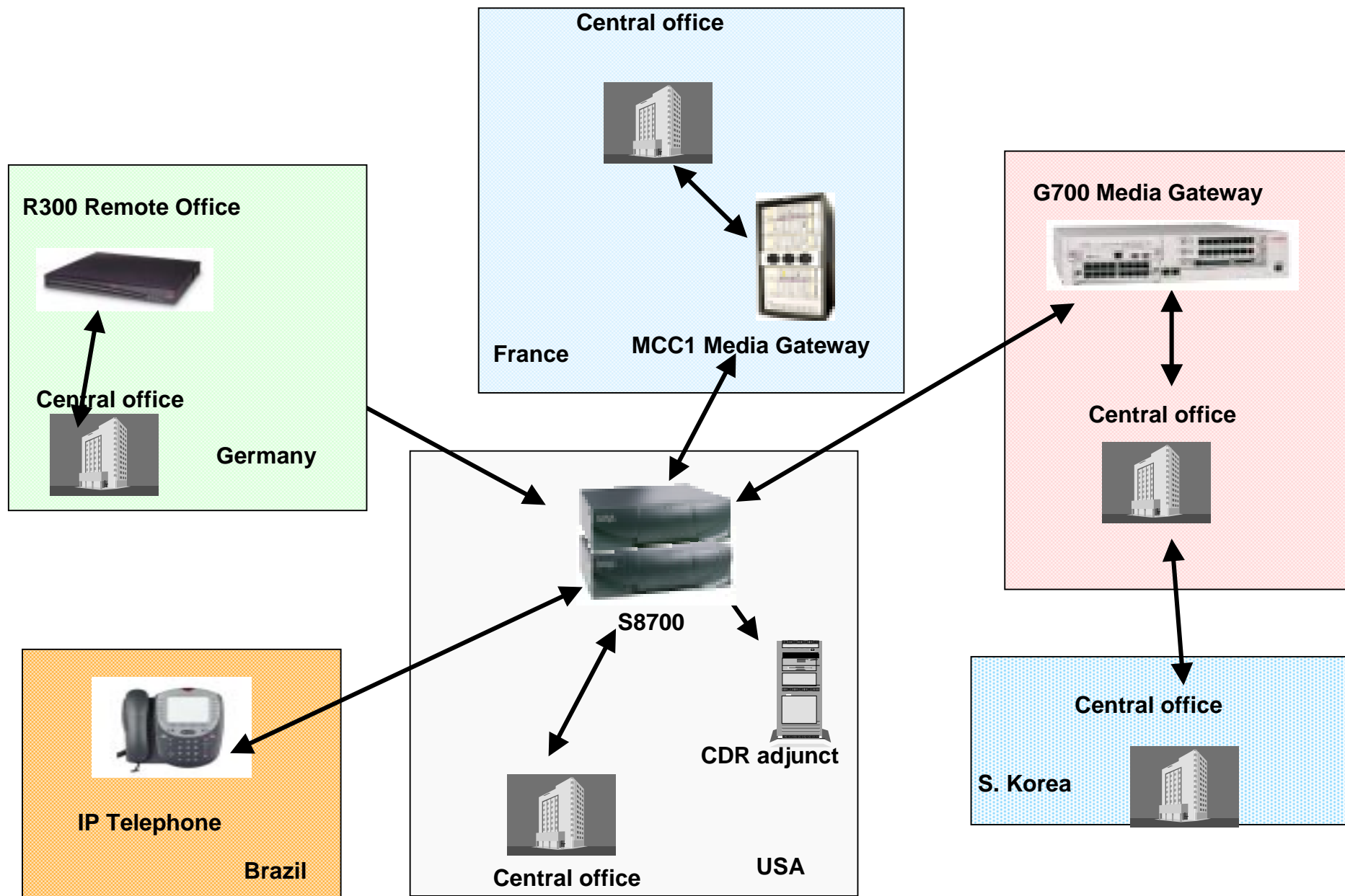Reviewed: GRB
Date (08/19/04)

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1. Introduction

This paper covers configuring Avaya Communication Manager 2.1 software on a single media server to work in multiple countries.

For those who prefer to think in terms of pictures rather than words, the next page has a drawing of a single ECS, labeled with various piece parts in different countries. This is not intended to show all possible configurations, nor even all possible components of this configuration. For example, the drawing only shows one end user phone, but a real system would have end user phones at every site.

Central office

R300 Remote Office

Central office

Germany

France

MCC1 Media Gateway

G700 Media Gateway

Central office

IP Telephone

Brazil

S8700

CDR adjunct

Central office

USA

Central office

S. Korea

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1.1. Limitations.

This paper does not cover configuration of the following.
1) Features that work the same way with the same configuration for media servers deployed in a single-country as for media servers deployed across multiple countries.
2) Features currently being considered for Communication Manager releases past the Communication Manager 2.1 release.
3) Hardware. This paper assumes that you have already decided on the basic hardware for the Communication Manager system. This means that you have already determined:
   - which media server to use,
   - how many media gateways that media server will need to support,
   - what countries each media gateway will be physically located in, and
   - the countries that will have standalone IP telephones within them,
   You now want to start administering the software.
4) Adjuncts compatible with Communication Manager 2.1 driven media servers, whether sold by Avaya Inc. or by other vendors. Section 2 on page 9 gives a brief overview of voice messaging configurations.
5) Communication Manager based special applications. Those are sometimes called "green features" or "red features".
6) The level of detail of specifying for each of the more than 200 countries in the world the administration values that should be entered into Communication Manager software's more than 100 administration forms.
7) Non-Linux servers. Several major multinational features are only available on the Linux servers.
8) Multiple server networks. The Network Connectivity manual covers that topic. See section 1.2 Related Documents, below.

This paper does not attempt to describe or even to list everything that you can configure a multinational switch to do or not do. You may have in mind deploying a particular multiple country configuration. You may want to know whether or how a particular feature will work in your particular multi-country configuration. If this paper does not answer your question, please contact your Avaya representative for assistance.

1.2. Notation, Terminology And Acronyms

There are several sample administration forms in this document. The fields shown in bold in the sample administration forms are the ones of interest to a multinational server. Some forms have been simplified by omitting several fields not used for multinational call handling.

The following table gives meanings for most of the terms and acronyms used in this document.

Term	Meaning
AAR	Automatic Alternate Routing
ACA	Automatic Circuit Assurance
ACD	Automatic Call Distribution
ACW	After Call Work
ARS	Automatic Route Selection, a feature for choosing which trunk will carry a call.
ASAI	Adjunct Switch Application Interface
Attd	Attendant
AWOH	Administration without Hardware. In this paper, it refers to an extension number that lacks a corresponding port or telephone.
BCMS	Basic Call Management System
BRI	Basic Rate Interface.
BSR	Best Service Routing
CLAN	Control-LAN, a Communication Manager IP interface circuit pack mostly used for terminating signaling connections.
COR	Class of Restriction, administration that restricts extensions' calling permissions.
codec	Coder and Decoder. Equipment or a protocol used for converting analog media to digital media, or vice versa.
compand	Compression and Expanding. The process of converting analog media to digital media, or vice versa.
Country Code	A number associated with a country. Most administration fields that take country codes use the Communication Manager numbering scheme: 1 United States and Canada, 2 Australia and New Zealand, 3 Japan, 4 Italy, etc, as described in the Administrator's guide.
DCP	Digital Communication Protocol
DHCP	Dynamic Host Configuration Protocol
DS0, DS1	Digital Signaling 0, Digital Signaling 1
EIA	Electronic Industries Alliance
EAS	Expert Agent Selection
ECS	Enterprise Communication Server
EWT	Expected Wait Time
FAC	Feature Access Code
Gateway, Media Gateway	An object administered on the media-gateway form. Examples include G600, G700, CMC1, MCC1. These are typically used to connect stations and trunks to the rest of the system.
G700	A particular media gateway model number.
ICC	Internal Call Controler
ID	Identification
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union

Term	Meaning
LAN	Local Area Network
Location	A collection of devices and IP network regions that share the same time zone, ARS routing, and other characteristics typically assigned geographically.
LSP	Local Spare Processor
MCT	Malicious Call Trace
MFC	Multifrequency Coded or Multifrequency Compelled signaling
OCM	Outgoing Call Management
PSTN	Public Switched Telephone Network
PWT	Predicted Wait Time
QSIG	Signaling via the Q.931 standard issued by the International Telecommunication Union.
Region, IP Network Region	A collection of IP endpoints and IP interfaces. Typically you would assign region numbers so that that IP interconnection of endpoints and interfaces is less expensive or provides better performance than interconnections between members of different regions.
Server	The part of the system that provides call control under normal operating conditions.
Short extension number	A number that maps to any one of several extension numbers. Which one it maps to depends the location of the party dialing the short extension number. Section 4.2.2 on page 21 explains this in more detail.
System	A term used in this document for: an Avaya Media Server running Avaya Communication Manager software, the Avaya Media Gateways and telephones that it controls, the intermediate Avaya Converged Multi Layer switches and Avaya Security Gateways that carry the media and control signaling, the Avaya System and Network Management Suites that manage it, and the associated Avaya Message Servers and Avaya Connector for Communication Manager systems that provide associated services. The term is also used to refer to similar products sold by other vendors.
TAAS	Trunk Answer from Any Station
TAC	Trunk Access Code
TN	Tenant Number
UCID	Universal Call ID
UDP	Uniform Dial Plan
USNI	United States Network Interface
UUI	User-to-User Information
VDN	Vector Directory Number
VLAN	Virtual Local Area Network
VOA	VDN of Origin Announcement Extension
VPN	Virtual Private Network
VuStats	View Statistics

Term	Meaning
WAN	Wide Area Network

2. Voice Messaging Summary

While this paper does not cover configuring voice mail adjuncts to Avaya Communication Manager 2.1 driven servers, an overview of that topic may be useful to you.

2.1. Typical Voice Mail configurations

If you already have an Avaya DEFINITY® Enterprise Communication Server or a Communication Manager system that you plan to upgrade to Communication Manager 2.1 software, you probably already have one or more voice mail systems running that use the correct country-specific characteristics for the voice mail systems' countries. If you plan to add both a Communication Manager 2.1 voice server and a voice mail network across multiple countries, you will want to consider the following points when choosing and configuring voice mail systems.

- Time zone.
  Avaya voice mail products administer time per voice mail system. If end users care about having an accurate local timestamp on their voice mail messages, you will need one voice mail system per time zone[1].

- Language.
  Avaya INTUITY™ and Avaya Modular Messaging voice messaging products support nine languages for voice prompts per voice mail system. End users who prefer visual prompts to voice prompts can be given INTUITY Message Manager; those who prefer a speech interface can be given Avaya Unified Communication Center Web Messaging. Those products are available with user interfaces in several languages, the exact list depending on the product. You will probably want one of the above voice mail systems for each nine countries your Communication Manager system covers. Of course, you can use fewer systems if some countries share a common language and time zone.

Given the above considerations, a Communication Manager voice server spread across multiple countries could use one voice mail server, provided the Communication Manager system covered no more than 1 time zone and 9 countries. A Communication Manager voice server spread across more than 1 time zone or 9 countries would need to have multiple voice mail systems networked together. That implies that you could not use the INTUITY AUDIX® 770

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[1] This requirement may apply to call centers. In support of some applications it is common for call center agents to have voice mail.

messaging system. While the INTUITY AUDIX 770 messaging system does support multiple languages, it cannot support centralized voice messaging.

2.2. Voice Mail Tone detection

It is possible for INTUITY AUDIX messaging systems and INTUITY AUDIX 770 messaging systems to launch calls into the Communication Manager voice server. If they do so, the tones they receive from the server could vary per the country of the called station. This should not be a problem. INTUITY systems use dial tone detection for outbound calling, and busy or intercept detection for disconnect supervision. The systems can detect 8 different versions of tones. Dial tone will always have the characteristics of the country the INTUITY system is located in. While busy and intercept may vary from country to country, that variance is small; those tones' characteristics are almost the same worldwide. INTUITY systems do not currently use ringback tone detection for anything except for facsimile (fax) fax calling. A fax call would probably succeed even if ringback tone detection failed. An answered call will correctly detect fax carrier tone while an unanswered call will eventually time out. There is no human involved to be annoyed at the extra time that will take.

2.3. Locations for Virtual Voice Mail Extensions

On the Avaya S8300 media server, the AUDIX hunt group members for the INTUITY AUDIX 770 co-resident AUDIX application are administered as type 2500 analog stations with ports 1, 2, 3 and so on, on a virtual media module in media gateway 1 with slot location 001V8. There are only four "real" slots in a G700 media gateway - v1 to v4. These voice mail ports all use the location administered for media gateway 1.

2.4. National Regulations

National regulations may require Communication Manager servers and gateways to be configured differently in some countries than in others. A single system should not be installed across multiple countries unless the Communication Manager servers and gateways can be administered to be legal in all of those countries. For example, suppose that users A and B are talking. Suppose that A's country's law requires the voice server to play intrusion tone. Suppose B's country's law does not, and B's location has intrusion tone administered as silence. If user C activates intrusion towards extension B, the Communication Manager software would probably play silence[2]. This is even though C, by intruding into the B ←→ A call, can eavesdrop on A. That may violate country A's law.

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[2] It is "probably" rather than "definitely" because, for example, B may be on a conference call with stations in countries that do use intrusion tone.

At the time this paragraph was written, use of voice over IP across a country's borders was illegal in Cambodia[i] and Panama[ii], and regulated in PR China[iii], Thailand[iii], India[iii], Canada[iv], and Hungary[iv]. Use of encryption on customer owned equipment was illegal in PR China, and was regulated in France. The author of this document does not have information about whether other Communication Manager capabilities are illegal or regulated in other countries. Neither can he know when any of the laws cited in this paragraph will change.

3. Geographic Concepts in Communication Manager Software

Communication Manager software has three separate geographic concepts that determine how software parameters are assigned:

- Region,
- Location, and
- Country code.

Communication Manager software also provides a non-geographic concept, Tenant Partitioning[3], which you can use geographically. You might wonder how the concepts of region, location, country, and tenant fit together. A short and accurate description, but not a particularly detailed one, is: "any way you want them to." This is because in Avaya Communication Manager software, region, location, tenant, and country are all administrable parameters. From the software's point of view, they are just numbers, much like a Class of Restriction (COR) is just a number.

3.1. IP Network Region

Network region numbers control things that depend only on IP network topology, for example quality of service parameters, whether IP connections are allowed, etc. While there are no technical requirements for any correlation between IP network topology and concepts like "time zone" or "national government", Avaya believes that creating such correlations will be useful anyway to facilitate ongoing administration. Normally when one's network consists of several Local Area Networks (LANs) separated by a Wide Area Network (WAN), one would assign one IP Network Region number per LAN.

The Avaya Communication Manager platforms S8300, S8500, and S8700 support 250 network regions.

Network region numbers are administered directly to IP circuit packs on the ip-interfaces form.

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[3] Tenant service is popular in call centers. Through its use, media servers using Communication Manager software can present unique Music-on-Hold to diverse groups of callers placed on hold by answering call takers, i.e. agents.

```
display ip-interface 01a04

                              IP INTERFACES


                Type: C-LAN                        ETHERNET OPTIONS
                Slot: 01A04                          Auto? n
         Code/Suffix: TN799  D                       Speed: 100Mbps
           Node Name: clan04                         Duplex: Full
          IP Address: 172.17 .17 .235
         Subnet Mask: 255.255.0  .0
      Gateway Address: 172.17 .17 .254
  Enable Ethernet Port? y
       Network Region: 4
                VLAN: n

Number of CLAN Sockets Before Warning: 400
```

IP Phones get an IP Network Region number according to the following priority order:

1. The region number administered on the ip-network-map form that corresponds to the IP Phone's IP address.

```
display ip-network-map                                     Page   1 of  32
                       IP ADDRESS MAPPING

                                                          Emergency
                                      Subnet               Location
 From IP Address  (To IP Address   or Mask)  Region   VLAN  Extension
 172.17 .  1 .000  172. 17 .1 .255          1        n
 172.17 .  2 .000  172. 17 .2 .255          2        n
```

2. If the IP address of the phone does not fall into any of the IP address ranges administered on the form, then Communication Manager software uses the region number of the Control-LAN circuit pack (CLAN) that the phone is registering through. As noted above, the CLAN gets its ip-network region number from the ip-interfaces form.

If you have all your softphone users dialing into the same Virtual Private Network (VPN), they'll all appear to the server to have the same IP address range, making the ip-network-map useless for them. If in addition you have that one VPN connect to only one CLAN's Ethernet port, your switch would have no way to assign softphones to different network regions. This is not recommended.

Another reason to make sure to have ip address ranges administered into the ip-network-map is in case part of your LAN fails. IP telephones may not always be able to reach a CLAN close to them. If you don't have entries in the ip-network-map covering some IP phones' addresses, and they end up registering to a distant CLAN, or to a Local Spare Processor (LSP), the network region applied to the phones would change when the re-registered. This would be true even if the LSP that they register to happens to be physically close to the phone. LSPs always have the same administration translations as the main server does. When an LSP is providing processor

service during a LAN outage, it acts as a main server. In particular, it applies the main server's network region to any phones that register to it whose IP addresses are not in an ip-network-map address range.

Most Communication Manager features that depend on IP network regions are administered per region directly on the ip-network-region form. One feature, IP Codec, is administered per region on a series of forms. The ip-network-region form contains a pointer, "Codec Set" to the ip-codec-set form. Codec related parameters are administered on that ip-codec-set form.

3.1.1. Network Address Translation (NAT)

If an IP phone gets its IP Network Region number from the ip-network-map, and if the phone is behind a Network Address Translation (NAT) device, the IP network region is based on the phone's NAT translated IP address, not the phone's native IP address.

3.1.2. Virtual Private Network (VPN)

If you connect IP Telephones or IP Softphones to the ECS via VPN remote client, put in separate VPN tunnels and therefore separate IP address ranges for users that you want in separate IP network regions.   Then you can assign to those IP address ranges different entries in the ip-network-map.

3.2. Multiple Locations

Location numbers control several things that usually vary by political entity, for example time zone, digit analysis, A-law and Mu-law companding, call progress tone generation, loss plan, and analog line board parameters. Should you then conclude that a Communication Manager location must always be within one political country? No, but that would be a reasonable way to administer Communication Manager software. Normally when your network covers several area codes or major metropolitan area, you would assign one Location number per area code or major metropolitan area.

The Avaya Media Server S8300 platform supports 50 locations. The Avaya Media Server S8500, and S8700 platforms support 250 locations.

Location numbers are administered directly to cabinets, remote offices, and media gateways. Non-IP phones connected to these things inherit the location number of the cabinet or gateway they connect to.

```
Change cabinet                                            page 1 of   1

CABINET DESCRIPTION
                    Cabinet: 5
             Cabinet Layout: single-carrier-stack
               Cabinet Type: expansion-port-network
      Number of Port networks: 2
        Survivable Remote EPN? n      Survivable Remote Processor ID: _____
                   Location: 5
                        Room: _____  Floor: _____  Building: _____
```

```
change remote-office 4                                   Page   1 of   1

                              REMOTE OFFICE  4

          Node Name: far-end
      Network Region: 4
           Location: 4
           Site Data:
```

```
display media-gateway 2
                              MEDIA GATEWAY
          Number: 2                          IP Address: 172.25 .74 .1
            Type: g700              FW Version/HW Vintage: unavailable
            Name: New York                  MAC Address: 01:17:2d:43:59:01
        Serial No: 02DR00000001            Encrypt Link? n
   Network Region: 2                            Location: 2
```

Location numbers are administered indirectly to IP phones, via network regions. Once a location number is administered on each network region form, that number applies to all IP phones in the region. This applies whether the phone gets an IP Network Region number from the ip-network-map or from the CLAN or media gateway it registered through.

```
change ip-network-region 2                               Page   1 of   2
                              IP NETWORK REGION

         Region: 2                    Name: North America
       Location: 2
```

Should you then conclude that a network region must always be within one location? No. You could choose to leave the location number field blank on the ip-network-region form; then IP phones in that region would derive their location indirectly, from the location number of the:
- cabinet containing the CLAN the endpoint registered through, or
- media gateway the endpoint registered through.

Even if all the IP phones in a network region have the same location number, the same thing is not necessarily true of the IP circuit packs in the region. However, you will probably prefer consistency, and therefore administer Communication Manager software so IP circuit packs and

IP phones in the same region are also in the same location. Communication Manager software will not provide consistent tone usage unless you do that.

An incoming trunk to the Communication Manager server also has a location. Location numbers for incoming trunks are determined as follows. The following table mentions Extension to Cellular.   That feature allows Communication Manger phones and public cellular phones to work together. Section 4.2.7 on page 26 contains more details about that feature.

Type	Location for the incoming trunk.
Non-IP trunks	The location of the cabinet containing the trunk circuit pack.
H.323 trunks	The location of the cabinet containing the CLAN circuit pack carrying the signaling for the trunk.
SIP trunks not using Extension to Cellular.	The location of the cabinet containing the CLAN circuit pack carrying the signaling for the trunk.
SIP trunks using Extension to Cellular.	If the calling party's IP address falls within an IP address range administered into the ip-network-map form, and a network region is administered for that address range, that value is used as the network region to determine location. If the calling party's IP address does not fall within an IP address range administered into the ip-network-map form, but the signaling group's field "Far-end Network Region" contains a value, that value is used as the network region to determine location. If both the calling party's IP address is not administered into the ip-network-map form, and "Far-end Network Region" is blank, then the CLAN that trunk's signaling is going through determines the incoming trunk's location.
Trunks used by the Separation of Signaling and Bearer feature	The location of the trunk bearing the audio, as opposed to the trunk carrying the signaling.

Communication Manager features that depend on location numbers are administered per location on a series of forms.
- Some features are administered directly on the locations form.

```
change locations                                           Page   1 of   1
                              LOCATIONS

                 ARS Prefix 1 Required For 10-Digit NANP Calls? y

 Loc. Name             Timezone  Rule     NPA    ARS Attd  Loc.   Pre- Proxy Sel.
 No                    Offset                    FAC FAC   Parms. fix  Rte. Pat.
   1  Main             + 00:00   0
```

- The locations form also contains a pointer, "Loc. Parms." to the location-parameters form. More parameters are administered on that form.

```
change location-parameters 1                               Page   1 of   4

                      LOCATION PARAMETERS 1


                   Tone Generation Plan: 1
                 Analog Ringing Cadence: 1
              Analog Line Transmission: 1
           DCP Terminal-parameters Plan: 1
                   Country code for CDR: 1
                        Companding Mode: Mu-law

RECALL TIMING
                     Flashhook Interval? _          Upper Bound (msec): 1000
              Disconnect Timing (msec): 150         Lower Bound (msec): 200


            Forward Disconnect Timer (msec): 600
                   MF Interdigit Timer (sec): 10
Outgoing Shuttle Exchange Cycle Timer (sec): 4
```

- The location-parameters form in turn contains pointers to the tone-generation form and to the terminal-parameters form.

3.3. Tenant Partitioning

Tenant partitioning was not originally designed as a geographic concept. Tenant partitions were intended for a single firm managing the voice system for an entire office building and wishing to provide individualized phone service for each of the firms who are building tenants. Tenant numbers allow each tenant in a building to have its own attendant, and to have its own music sources while callers are on hold. However, if you administer tenant numbers uniquely per country, this feature can be used to:

- give each country its own attendant and music sources, and
- alert stations with crisis alert buttons only if the stations are in the same country as the emergency caller.

The S8300 platform supports 20 tenant partitions; the S8500 and S8700 support 100 tenant partitions.

Communication Manager features that depend on tenant numbers are administered per tenant partition directly on the tenant form.

```
change tenant 2
                    Tenant 2
          Tenant Description: New York
              Attendant Group: 2
        Ext Alert Port (TAAS): x        Ext Alert (TAAS) Extension: 2001
            Night Destination: 2000
                 Music Source: 2
      Attendant Vectoring VDN:
             Emergency Number:
```

3.4. Country

Country codes are assigned to all kinds of objects on the server: Digital Signaling 1 (DS1) circuit packs, signaling groups, terminal-parameter sets, and tone-generation sets, among others. They control things that typically vary by national entity. Could one then conclude that everything with the same Communication Manager country code must always be within one political country? No, but that would be considered by many a reasonable way to administer Communication Manager software.

Internal to Communication Manager software, several fields that can take country code values are mapped from one country code to another. The internal mappings are not for customized values, but for default values. For example, country code 3 maps to 1 for default Digital Communications Protocol (DCP) terminal parameters. However, if you customize terminal parameter set 3's DCP terminal parameters, you won't suddenly find terminal parameter set 1 DCP terminal parameters are customized too. Internal mappings may differ from country code to country code. For example, 3 is not mapped to anything for loss plan values. Loss plan 1 and loss plan 3 are different.

Communication Manager features that depend on country codes are administered per country directly on the individual features' forms, via fields that take country codes.

Communication Manager software currently uses these country codes.

1. United States, Canada
2. Australia, New Zealand
3. Japan
4. Italy
5. Netherlands
6. Singapore
7. Mexico
8. Belgium, Luxembourg
9. Saudi Arabia
10. United Kingdom
11. Spain
12. France
13. Germany
14. Czech Republic, Slovakia
15. Russia (Commonwealth of Independent States)
16. Argentina
17. Greece
18. China
19. Hong Kong
20. Thailand
21. Macedonia
22. Poland
23. Brazil
24. Nordic
25. South Africa

Alarm handling that depends on a specific country code applies per circuit pack. For example, the ISDN-PRI Signaling Group Error Type 3902 applies only for circuit packs using Country code 12 (France). Communication Manager software determines the country to use for alarm handling as follows.

- You administer a "Country/Peer Protocol" field on the bri-trunk-board form for Basic Rate Interface (BRI) trunks. ISDN trunk ports use that as the country number for port level alarm handling.
- You administer a "Country Protocol" field on the DS1 form. ISDN PRI trunk circuit packs use that as the country number for board level alarm handling. DS1 boards used for bit-oriented protocols use the base tone generation set number as described in the following bullet item.
- For alarm handling of non-ISDN circuit packs, Communication Manager maintenance determines the location of other circuit packs from the cabinet or gateway containing the pack. From the location-parameters form for that location, it obtains the Tone Generation Plan number. From the corresponding tone-generation form, it obtains the Base Tone Generator Set number. Non-ISDN circuit packs use that number as the country number for maintenance alarm handling.

3.5. Summary

To summarize the above four sections, normally one would administer:
- one IP network region number for each LAN. Each IP network region contains 1 or more gateways and possibly many standalone IP phones.
- one location number for each area code or major metropolitan area. Each location contains 1 or more IP network regions.
- one tenant number and one country code per political country. Each country contains 1 or more locations.

Starting from that background, here's how to use those concepts to customize a single Communication Manager server's behavior for simultaneous use in several countries.

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4. Configuring individual features

4.1. Time Zone and Daylight Savings rules

The example location form in section 3.2 starting on page 13 showed the timezone offset from system time, and the daylight savings rules administered per location. These items apply to station set displays' date and time. The Timezone Offset field specifies how much time each location differs from the system time. The "Rule" column on the location form specifies the daylight savings time change rules for each location. The corresponding rules are administered on the daylight-savings-rules form, shown below.

```
display daylight-savings-rules                            Page   1 of   2
                       DAYLIGHT SAVINGS RULES

 Rule          Change Day                  Month   Date   Time    Increment

  0: No Daylight Savings

  1: Start: first Sunday      on or after April    1   at 02:00   01:00
     Stop: first Sunday       on or after October  25  at 02:00
  2: Start: first             on or after              at   :       :
     Stop: first              on or after              at   :
```

4.2. Dialing

4.2.1. ARS, Locations, And Routing To a Local Trunk Group

Communication Manager software uses Automatic Route Selection (ARS) to direct outgoing public network calls. ARS routing begins when a user dials the ARS Feature Access Code (FAC) followed by the number the user wants to call. Communication Manager software analyzes the digits dialed, selects the route for the call, and routes the call over the trunks you specify in your routing tables.

You can define ARS call routing covering all locations as well as call routing specific to each individual location. Use your routing tables to define local routing local calls for each location. Leave any numbers that apply across all locations on the routing tables with the Location field set to "**all**". For example, you might have the following table for the USA.

```
display ars analysis 1                                         Page   1 of   2
                          ARS DIGIT ANALYSIS TABLE
                            Location:  2          Percent Full:    8

        Dialed          Total      Route    Call   Node  ANI
        String         Min  Max   Pattern   Type   Num   Reqd
    10xxx0              6    6       1        op           n
    10xxx0              16   16      2        op           n
    10xxx01             14   22      3        iop          n
    10xxx011            15   23      4        intl         n
    10xxx1              16   16      5        fnpa         n
```
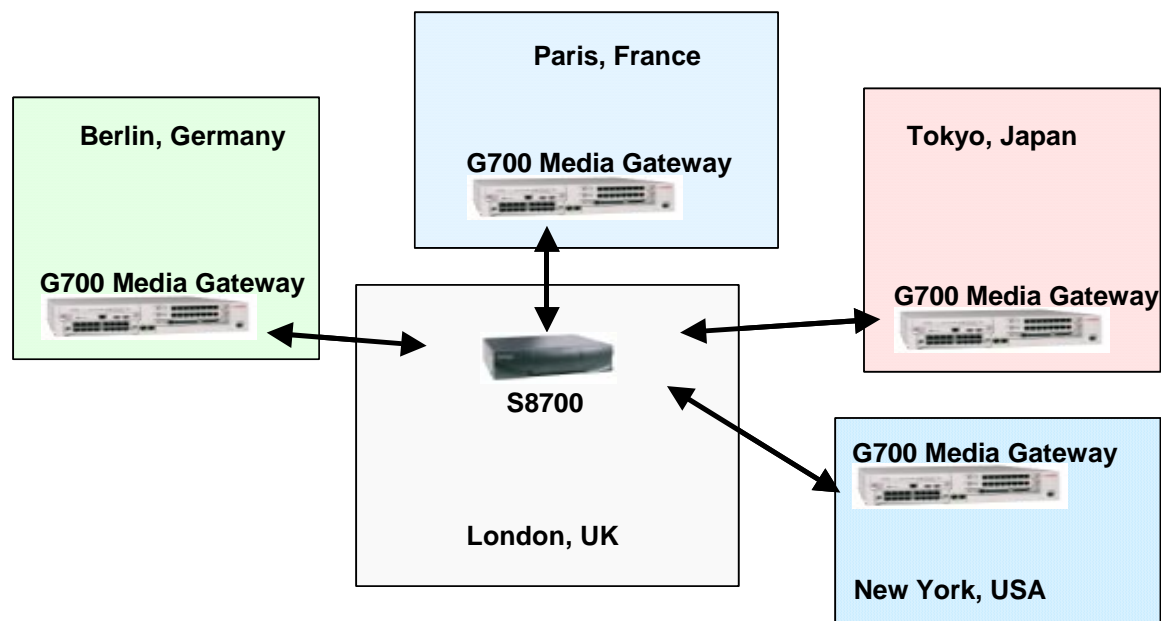
4.2.1.1 An Example Configuration

The following diagram illustrates a plausible Communication Manager configuration with G700 Media Gateways connected via a WAN to a central controlling S8700 server. Among other gateways, it has one G700 located in New York, USA. The controlling S8700 server is located in London, UK. The ARS routing examples that follow refer to this diagram.

Consider this sequence of events[4]

---

[4] In this example sequence of events, all the media gateways, locations, trunk groups and route patterns are numbered 2. That's just to keep the example simple to follow. Communication Manager software does not require you to use the same numbers for these things.

1. An individual in New York dials a local 7-digit call 555-5555 from a non-IP station connected to MG 2 in New York.
2. The dialed digit string is transmitted from MG 2 to the S8700 server located in London.
3. The S8700 determines the call has originated from MG 2, which is administered with Location 2.
4. ARS digit analysis of the 7-digit string for Location 2 indicates the call should be routed to route pattern 2.
5. Trunk Group 2 is the first, and only, preference in the list of trunk groups supported by Route Pattern 2. This trunk group is assigned to MG 2.
6. Communication Manager software sets up the call to be transmitted on a trunk interface connected to the New York MG and terminate to a local destination in New York.

Here is an example ARS analysis form for location 2, showing only the fields relevant to this example.

```
change ars analysis 5                                           Page   1 of   2
                          ARS DIGIT ANALYSIS TABLE
                              Location:    2           Percent Full:    6

         Dialed          Total    Route    Call   Node  ANI
         String        Min  Max  Pattern   Type   Num   Reqd
    555                  7    7      2      fnpa         n
```

The same thing happens with a call placed from a non-IP station behind an R300 Remote Office or an ATM or DS1 remoted cabinet.

Now, suppose an IP Telephone in New York obtained IP address 172.17 .2 .053 from a Dynamic Host Configuration Protocol (DHCP) server in New York. According to the IP address range administered on the example ip-network-map form in section 3.1 on page 11, this IP Telephone would have an IP Network Region number of 2. According to the example "ip-network-region 2" form in section 3.2 on page 13, this region would have a location of 2. If the phone dialed a 7-digit number, the call would route out a trunk on the Media Gateway in New York, and reach a local New York destination.

The methods described in this section for forcing Communication Manager software to route calls out a trunk group in the same country are not essential to reach the right country. If a single trunk group does span multiple locations, Communication Manager software will attempt to route calls out trunk members on the local media gateway or port network within a given trunk group if that is possible. However, you may want to use the methods described in this section anyway, so you can control when calls route out trunks distant from the caller, and over which trunks.

4.2.2. Short UDP extension numbers

Communication Manager software allows users in several countries to dial the same digit string and reach a destination in their own country. Although it is not technically an extension number, a digit string that is mapped to different extensions depending on the location of the caller is commonly called a "short extension number". For example, suppose you want each user to dial 3 digits to reach extensions in their own country, and to dial 4 digits to reach an extension in another country. Suppose that you always want the three digit string "555" to reach a security office in the same country as the person who dialed the call.

The Uniform Dial Plan (UDP) form has a column, "Insert Digits". You can put into that column the key words L1, L2, L3, L4, or L5. The corresponding number of Location specific digits will be taken from the Pre-fix field on the Locations form and prepended to the front of the dialed string.

Continuing the example, suppose you administer forms as follows:

```
display uniform-dialplan 1                                    Page   1 of   2
                        UNIFORM DIAL PLAN TABLE
                                                         Percent Full: 0


  Matching          Insert          Node   Matching           Insert          Node
  Pattern   Len Del Digits Net Conv Num    Pattern   Len Del Digits Net Conv Num
  5          3   0   L1    ext  y
  8          3   0   L1    ext  y
```

```
display locations                                             Page   1 of  16
                                LOCATIONS

              ARS Prefix 1 Required For 10-Digit NANP Calls? y

 Loc.   Name             Timezone Rule  NPA  ARS   Attd Loc.   Pre-    Proxy Sel.
 No.                     Offset             FAC   FAC  Parms.  fix     Rte. Pat.
 1:    London           + 00:00   0          0    9            1
 2:    New York         - 05:00   0          9    0            2
 3:    Tokyo            + 07:00   0               0            3
 4:    Paris            + 01:00   0          0                 4
 5:    Berlin           + 01:00   0          0                 5
```

and numbers for the country's security offices are extension 1555 in London, extension 2555 in New York, and extension 3555 in Tokyo. Suppose a user in London dials the three digits "555". Those dialed digits match the first pattern on the uniform-dialplan form. The corresponding Insert Digits field is set to L1. Communication Manager software looks up 1 digit to insert from the Pre-fix column of the locations form. Since the caller is in location 1, the associated Pre-fix is 1. Inserting 1 digit from that prefix into the beginning of the dialed number converts the dialed number into 1555. The security office in London will answer the call.

In this example, the digit string "555" is the 'short extension', and the corresponding location based long extensions, i.e. real extension numbers, are "1555", "2555", "3555" and so on.

In addition to end users dialing extension numbers, several fields in Communication Manager administration accept extension numbers. You might think that if you put a short extension number into one of those fields, then the equivalent long extension number corresponding to the country of the end user invoking the administered feature would be used. Whether that is true or not may vary from feature to feature, and some features may require some extra administration.

- Some administration fields internally store extension numbers as digits. Those fields can take short extension numbers. For example, call forwarding and abbreviated dialing can take short extensions. If someone dials a short extension that has been forwarded, Communication Manager software uses the country of the party that set up the forwarding, not the country of the caller, to interpret the short extension.
- Some administration fields internally store extension numbers as software pointers to a specific station. Those fields will not accept short extensions. However, there is a way around that.
  - o If the field can take a Vector Directory Number (VDN), that VDN's vector in turn can consist only of a "route to" step. Vector route-to fields can take a short extension.
  - o If the field can not take a VDN, then enter into the field a real extension. Call forward all calls from that real extension to a VDN. After setting up call forwarding, save translations. Call forwarding instructions survive system resets if translations have been saved. Then use the method described in the previous bullet to route the VDN to a short extension.

4.2.3. ARS Access Code and Attendant Access Code

People in North America typically expect to dial 9 to reach a trunk, and to dial 0 to reach an attendant or operator. People in Europe typically expect to dial 0 to reach a trunk, and to dial 9 to reach an attendant or operator. Communication Manager software can satisfy both groups, by administering ARS and Attendant codes on the location form. The example location form in the previous section 4.2.2 on page 21 shows this.

The ARS FAC or the Attendant (Attd) FAC fields or both can be left blank for some locations. If you do that, those locations fall back to using these:
- system-wide ARS access codes administered on the Feature Access Code form
- system-wide attendant call type administered on the Dial Plan Analysis form, or the system-wide attendant access code administered on the feature-access-codes form.

In the example location form in the previous section 4.2.2 on page 21, users in:
- London will dial 9 to reach the attendant and 0 to reach ARS.
- Tokyo will dial 0 to reach the attendant. They will dial whatever is administered into the "Auto Route Selection (ARS) Access Code1: _____ Access Code 2: _____" fields on the feature-access-codes form to reach ARS.

- Paris will dial 0 to reach ARS. They will dial whatever attendant code is administered into the Dial Plan Analysis form or whatever attendant code is administered into the feature-access-codes form to reach the attendant.

Communication Manager software will not allow a station to use both the system-wide ARS codes and the location-based ARS code at the same time, and similarly for Attendant codes. Well, that is unless the location-based FAC and the system-wide FAC happen to be the same number. In that case the FACs would work as administered. But if the two are different:

- if a location has a location-based ARS FAC is administered on the locations form, and a user in that location dials a system-wide ARS FAC, that user gets intercept treatment.
- if a location has a location-based attendant FAC administered on the locations form, and a user in that location dials the system-wide attendant FAC, that user gets intercept treatment.

4.2.4. FACs and Extensions

If you want a single digit string to be an extension in some countries, and in other countries to be a Facility Access Code (FAC), then you should administer the digit string on the uniform-dialplan form as a short extension. For those countries that want to use it as an extension, apply the technique described previously in section 4.2.2 on page 21. For those countries that want to use it as a FAC, call forward the equivalent location-specific long extension number to a FAC. After setting up call forwarding, save translations. Call forwarding instructions survive system resets if translations have been saved.

4.2.5. Abbreviated Dialing

Abbreviated Dialing consists of the system list and enhanced system list, group lists, personal lists, and lists independent of Communication Manager software, for example those provided by IP Softphone.

If you want the entries in the system list or the enhanced list to reach the same destinations for everyone in the world, then administer full international numbers as the abbreviated dialing entries. If you want entries in these lists to reach different destinations depending on where the station using the system or enhanced abbreviated dialing list is, there are two ways to accomplish that:

- Put only short extension numbers into a system or enhanced list, as described in section 4.2.2 on page 21. If you need entries to reach destinations other than extensions, use call forwarding off-net to forward calls from the corresponding long location-specific extension numbers to the outside destinations that you want.
- Do not use the system and enhanced lists at all, and instead use one group list per country as if that group list were a local system list. The group lists do not provide labels for 2420/4620 stations as does the system list, though.

4.2.6. Local Spare Processor (LSP)

It is possible for part of a data network to go down temporarily. When that happens, some of your phones and gateways may register with their Local Spare Processor (LSP), while other phones and gateways may register with the main server. When the data network recovers, the phones and gateways that happened to register with the LSP stay registered to the LSP until you reset the LSP. To maintain as much connectivity as possible between end users being served by these two different processors, set up your switch as follows.

A. Put at least one Public Switched Telephone Network (PSTN) trunk on every gateway. Make the location-based ARS digit analysis tables for users in the same location as that gateway point to a routing pattern that contains that PSTN trunk as one of its entries. It is ok to make that the last entry in the routing pattern, if needed for cost reasons.

B. Optionally, put at least one tie trunk between gateways and some other part of the switch, preferably the main server. This configuration rule is not essential, but it is useful if your private trunks, for example H.323 trunks, are lower cost than PSTN trunks. Preferably, these tie trunks should be capable of signaling the calling extension's number, for example via Q-signaling (QSIG).

Set up your station's coverage paths with entries in the following order:

1. Your usual coverage path entries, for example the voice mail hunt group extension.
2. The Automatic Alternate Routing (AAR) access code followed by the voice mail hunt group extension. This entry would only be used if the processor (main or LSP) handling the call can't reach voice mail directly as an extension, but has access to a tie trunk going to the gateway serving the voice mail hunt group extension. This step is what item B above was done for.
3. Optionally, the ARS access code followed by the full international number of the station's extension. This configuration rule would allow station-to-station calls to almost always reach the called station if the call can't reach voice mail. But, this configuration rule would also use up large numbers of coverage paths; it's not for every station on a very large switch.

If a call is answered by voice mail, eventually the user the call was for may dial into the voice mail extension to retrieve the message. If the processor (main or LSP) handling that call to the voice mail server can't reach voice mail directly as an extension, the user would want an alternative. Set up your voice mail hunt group's coverage path with entries in the following order:

1. The AAR access code followed by the voice mail hunt group extension. This is another reason why you'd want to do step (B) above for as many gateways as is practical.
2. The ARS access code followed by the full international number of the voice mail hunt group.

4.2.7. Extension to Cellular

The Extension to Cellular feature allows Communication Manger phones and public cellular phones to work together. When the Extension to Cellular feature handles a station-to-station call, it both
- rings the called station, and
- launches an outgoing from the called station to the PSTN cell phone number associated with the called station.

However, only if the called station has a location do these features handle the outgoing call as if from the called station's location. If the called station lacks a location, for example if the called station exists only as an Administration without Hardware (AWOH) extension, these features handle the outgoing call if it were dialing from location 1. In particular, ARS is likely to pick a routing pattern whose digit treatment and sending format would make sense for location 1, but would not make sense for the location of the trunk that will make the call to the user's cell phone number. For example, in France the PSTN expects to receive the cell phone number as "06 + mobile #" with type of number = national. In Hungary the PSTN expects to receive the cell phone number as either of "mobile number" with type of number = national or as "06 + mobile #" with type of number = unknown. A call having a different format than the PSTN expects would result in the call being rejected by the PSTN. There are two possible ways to prevent this.

- Don't use ARS to route the outgoing call to the cell phone. Instead, use AAR. AAR is not location specific. Administer cell phone numbers in the off-pbx-telephone station-mapping form as full international numbers, including country codes.

```
display off-pbx-telephone station-mapping              Page   1 of   2
                STATIONS WITH OFF-PBX TELEPHONE INTEGRATION


 Station       Application   Dial    Phone Number     Trunk        Configuration
 Extension                   Prefix                   Selection    Set
 65005         OPS            1 -    3035555555         aar         1
                                -
```

Set the "Trunk Selection" field on the off-pxb-telephone station-mapping form to AAR. The outgoing digit string should then be correctly formatted for the PSTN trunk that handles the outgoing call.

- Don't use AWOH extensions for Extension to Cellular. Administer cell phone numbers in the off-pbx-telephone station-mapping form as ordinary national numbers.

```
display off-pbx-telephone station-mapping              Page   1 of   2
                STATIONS WITH OFF-PBX TELEPHONE INTEGRATION


 Station       Application   Dial    Phone Number     Trunk        Configuration
 Extension                   Prefix                   Selection    Set
 65005         OPS             -     3035555555         ars         1
                                -
```

ARS should then the outgoing call as if from the location of the called station. ARS will correctly format the outgoing string and route the call out a local trunk. However, this method does require CM hardware, e.g. circuit pack ports or IP stations, for every Extension to Cellular user.

4.2.8. Softphone in Telecommuter Mode

If you use softphone in telecommuter mode, the Communication Manager server dials an outgoing call to a phone number that you designate for handling audio. This telephone number is administered on the softphone, in a field called "Telephone At:". The digits that you enter into that field are analyzed by Communication Manager 2.1 software using the softphone's location.

When using softphone in telecommuter mode, end the number in the "telephone at" field with a #. This symbol stops a 5 second interdigit timer within Communication Manager software, and also stops interdigit timeouts used by some Central Offices (COs). That may not seem like much time, but it may be important if network call setup times are really long, as may be true for some international calls. Communication Manager software stops the telecommuter voice channel call setup attempt if the call to the "Telephone At:" number is not answered in around 30 seconds.

4.3. Local Attendants

The previous examples in section 4.2.3 on page 23 have implicitly assumed only one attendant group per system. You may want to have multiple attendant groups, one group per country. You may or may not want to restrict calls from a location to reach only an attendant at that location. If you do want this restriction, there are a couple of ways this or something roughly equivalent to it can be accomplished.
- Using the tenant feature. Section 4.3.1 on page 27 describes how to use the tenant feature to accomplish this.
- Using hunt groups. Section 4.3.2 on page 28 describes how to use hunt groups to accomplish this.

4.3.1. Tenants and Attendant Groups

One way to have multiple attendant groups, one group per country, is by using tenant partitioning. For example, consider the previous example in section 4.2.3 on page 23, and assume that someone dialing 0 from New York wants to reach an English speaking attendant, but someone dialing 0 from Tokyo wants to reach a Japanese speaking attendant. Assign all the stations and trunks in New York to one tenant partition, and assign all the stations and trunks in Tokyo to a different tenant partition. Create two different attendant groups, one for each country. If tenant partitioning is active, attendants only receive calls from callers within their partition. The following forms show example administration for this.

```
change station 2001                                                Page   1 of   4
                                  STATION

Extension: 2001                         Lock Messages? n          BCC: 0
     Type: 8410D                        Security Code:             TN: 2
     Port: 01A0301                      Coverage Path 1:          COR: 1
     Name: New York Station             Coverage Path 2:          COS: 1
                                        Hunt-to Station:
```

```
add trunk-group next                                               Page   1 of  20
                                TRUNK GROUP

Group Number: 3                  Group Type: co           CDR Reports: y
  Group Name: Tokyo Trunk                 COR: 1      TN: 3      TAC:
   Direction: two-way        Outgoing Display? N
```

```
display attendant 2                                                Page   1 of   4
                             ATTENDANT CONSOLE 2

         Type: console            Name: New York
    Extension: 3775020            Group: 2                Auto Answer: none
 Console Type: day-only             TN: 2                 Data Module? n
```

```
change tenant 2
                      Tenant 2
             Tenant Description: New York
                 Attendant Group: 2
           Ext Alert Port (TAAS): x       Ext Alert (TAAS) Extension: 1800
               Night Destination: 1801
                    Music Source: 2
         Attendant Vectoring VDN:
                Emergency Number:
```

If you happen to both have locations in multiple countries, and also rent office space to other
companies, you may want to use the tenant feature to limit attendant access to per country, and
also use the tenant feature for its intended purpose of limiting building tenants' access to switch
resources. If each building tenant resides in exactly one country, this is easy. If some tenants
have some stations and trunks in several countries, then per-country attendant restrictions and
any other per-country restrictions described elsewhere in this document that rely on using tenant
partitioning could only be used as long as the sum over all countries of the tenants per country is
less than 100.

4.3.2. Hunt Groups acting like attendant groups

Another way to have multiple groups acting like attendant groups, one group per country, is to
use hunt groups as if they were attendant groups. Consider the previous example in section 4.2.3
on page 23, and assume that someone dialing 8 from Paris wants to reach an attendant in France,
but someone dialing 8 from Berlin wants to reach an attendant in Germany. Assume there is a
hunt group in Paris with extension number 4888, and a hunt group in Berlin with extension 5888.

Then you would administer a VDN with extension 8, containing a single vector step: 'route-to 888 unconditionally'. The Uniform Dialing Plan entry "888   3   0   L1   ext y" will cause the call to route to 4888 if the caller is in Paris, or route to 5888 if the caller is in Berlin.

You could take this idea even further, and use the Expert Agent Selection (EAS) feature. EAS is part of Avaya Call Center Software – Elite and is Avaya's term for "skills based routing". Use EAS to log these pseudo-attendants into and out of the hunt groups. You can then use the EAS skills features to decide which pseudo-attendant to route an attendant-seeking call to. For example, a call from a French location could terminate to any attendant who can speak French, even if that attendant is not physically located in France.

This hunt group method for creating local pseudo-attendant groups depends on being able to administer as a VDN extension the digit that users want to be able to dial to reach an attendant. If that digit were already in use as the attendant access code, then that would be impossible. If you want to use both Per-location Attendant Access Codes and Per-location attendants on the same switch, then you'll have to use Tenant Partitioning, as previously described in section 4.3.1 on page 27.

4.3.3. Night Service

Night destinations are administrable both per tenant and per hunt group, so either tenant or hunt group method works equally well for night service. If you have chosen to use Trunk Answer from Any Station (TAAS) for night service, then be sure to use tenant partitioning to allocate attendants. Otherwise, an ordinary end user, who most likely does not speak multiple languages, could end up answering a call from another country. The TAAS parameters are administered per tenant, as shown in the example form in section 4.3.1 on page 27.

4.3.4. Features and the Tenant and Hunt Group Methods

The following administration fields can be set to attendant. If you want calls controlled by these fields routed to attendants or hunt groups in the same country as the caller, you should administer Communication Manager software as follows.

Form	Field	Tenant based attendants	Hunt group based attendants
Trunk Group	Night Service	attd	hunt group extension
Hunt Group	Night Service Destination	attd	hunt group extension
Hospitality	Routing Extension on Unavailable Voice Synthesis	attd	hunt group's short extension
Coverage Path	Point 1-6	attd	hunt group extension

Form	Field	Tenant based attendants	Hunt group based attendants
Feature Related System Parameters	DID/Tie /ISDN Intercept Treatment	attd	hunt group's short extension
	Stations with System Wide Retrieval Permission	attendant personal numbers	hunt group extension
	Controlled Outward Restriction Intercept Treatment	attd	hunt group's short extension
	Controlled Termination Restriction	attd	hunt group's short extension
	Controlled Station to Station Restriction	attd	hunt group's short extension
	DID Busy Treatment	attd	The feature does not work for hunt groups acting like attendant groups.
Security Related System Parameters	Referral Destination. (This field occurs multiple times on the form.)	See sections 4.12.3 Security Referral Destination on page 40 and 4.4.1 Security announcements on page 32.	
public-unknown-numbering	Ext Code	See section 4.10.2 Public-unknown-numbering on page 38.	

4.3.5. Emergency Access To Attendant calls

You may want an Emergency Access To Attendant call to route to an attendant in the same country as the calling party.
- If you are using tenant-based attendants, this can be done by assigning separate attendant groups to tenant partitions as described in section 4.3.1 on page 27.
- If you are using hunt groups as attendant groups, see the following section 4.3.5.2 on page 31.

4.3.5.1 Emergency Access Redirect Extension

If there were not an available attendant in the caller's country, then someone placing an emergency access to attendant call would probably prefer any attendant in any country to no attendant. The "Emergency Access Redirection Extension" field provides for this situation. That

field takes the assigned extension number where the emergency attendant queue overflow will redirect.

```
display system-parameters features                      Page   3 of  13
                    FEATURE-RELATED SYSTEM PARAMETERS
                Reserved Slots for Attendant Priority Queue: 1
                              Time before Off-hook Alert: 3000
                    Emergency Access Redirection Extension:
            Number of Emergency Calls Allowed in Attendant Queue: 1
```

The field could be administered with a specific country's security office, or it too could be made to reach a destination in the caller's country, or it could reach any available attendant in any country. These can be accomplished in the following ways.

- To reach a destination in the caller's country, use a VDN as described in section 4.2.2 on page 21. This field can not take short extensions.
- To reach any available attendant in any country, administer into the redirect field a hunt group extension. Put into the hunt group all the attendant personal numbers for all attendants in all countries. That would cause the redirected call to reach the first attendant available anywhere.

4.3.5.2 Hunt Groups and the Redirect Extension

The Emergency Access Redirection Extension field is also be useful if you are using the hunt group based attendant method described in section 4.3.2 on page 28. Reserve one real attendant group, and make sure it has no attendants. Administer all the tenants using hunt groups as pseudo-attendant groups to have that one real attendant group as their attendant group administered on the tenant form.

```
change tenant 2
                    Tenant 2
            Tenant Description: New York
               Attendant Group: 1
        Ext Alert Port (TAAS): x        Ext Alert (TAAS) Extension: 1800
            Night Destination: 1801
                  Music Source: 2
        Attendant Vectoring VDN:
              Emergency Number:
```

Emergency access to attendant calls from tenants administered to use that attendant group will then automatically overflow to the Emergency Access Redirection Extension. The same techniques described above in section 4.3.5.1 on page 30 would then apply.

- To reach a destination in the caller's country, use a VDN as described in section 4.2.2 on page 21.
- To reach any available pseudo-attendant in any country, administer into the redirect field a hunt group extension. Put into that hunt group all the extension numbers for all the pseudo-attendant stations in all countries.

4.4. Announcements

Consider the previous example in section 4.2.3 on page 23, and assume that someone dialing an invalid number from Paris wants to reach a French announcement, but someone dialing an invalid number from Berlin wants to reach a German announcement. The same kind of administration described in that section applies, but it is even simpler because you do not have to use VDNs. The VDN step was needed to expand a single digit, 8, into multiple digits, 888. Fortunately, people do not expect announcement extensions to be single digit.

For example, assume you have an announcement in French with extension number 4880, and an announcement in German with extension 5880. If you administer the digit string "880" into the field "DID/Tie/ISDN Intercept Treatment" on the Feature Related System Parameters form, then a station in Paris will receive the French intercept announcement, and a station in Berlin will receive the German intercept announcement.

If you administer a short extension into a field that requires an announcement, but for some locations you accidentally forget to administer the corresponding long location-based extension number as an announcement extension, Communication Manager software will recover in one of three ways:
- Play Silence. It does this for these features:
  - Analog Busy Auto Callback Announcement (Feature Related System Parameters),
  - Direct Agent Announcement Extension (Feature Related System Parameters),
  - First Announcement Extension (Hunt Group form),
  - Second Announcement Extension (Hunt Group form), and
  - Hospitality Announcement(Hospitality form),
- Play Intercept tone. It does this for these features:
  - DID/Tie/Intercept Announcement,
  - Controlled Outward Restriction Intercept Treatment,
  - Controlled Termination Restriction (Do Not Disturb),
  - Controlled Station to Station Restriction,
  - Controlled Toll Restriction Intercept Treatment and
  - Invalid Number Dialed Intercept Treatment.
- For call vectors, the previous feedback continues and the vector (call control table) goes on to the next step.

4.4.1. Security announcements

The system-parameters security form contains the security referral call announcement extension field. If this field contains a value and a security violation occurs, the switch calls the referral destination, then plays this announcement upon answer. Unlike other announcements, you would want the language for this announcement to depend upon the country of the called party, not upon the country of the calling party. This field must contain an announcement, not a VDN. You probably should put into the field the extension number of an announcement in the same

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Date (08/19/04)

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national\paper\paper12.doc
CID: 101178

language as the referral destination extension. Probably that would be at your corporate headquarters.

However, you might want the security referral call to go to a location that is in normal business hours for its time zone. If so, you could do either of the following.

- Use time of day coverage to make calls to the referral destination cover to a location that is in business hours at the time the security violation occurs. Section 4.9 on page 38 describes time of day coverage.
- Put a hunt group extension into the referral destination field, and then put one member of that hunt group in each location.

If you did either of those things, then the single system-wide security referral announcement may not be in a language the person answering the referral call can understand. To prevent that, record multiple languages into a single announcement, one right after the other. Since only four business days could cover the whole globe, this still would give a reasonably short announcement.

4.4.2. VDN of Origin Announcement Extension

The VDN of Origin Announcement Extension (VOA) is administered per VDN. If you are using a Communication Manager system as a multinational inbound call center, you can assign to each country its own national VDN. Or, you can use the technique described in section 4.2.2 on page 21 to route calls directed towards the VDN of Origin Announcement Extension to an announcement in the same language as the caller.

4.5. Call Detail Recording (CDR)

Communication Manager software can record in Call Detail Records the country, location, and time zone of both the calling and called parties. You can administer fields for each of "location-to", "timezone-to", "country-to", "location-from", "timezone-from", and "country-from" into the custom CDR format form.

The country number used by "country-to" and "country-from" is administered per location on the location-parameters form. See the example form in section 3.2 on page 13. For CDR records, you might prefer to use the Communication Manager country code scheme: 1 United States and Canada, 2 Australia and New Zealand, 3 Japan, 4 Italy, etc., or you might prefer the International Telecommunication Union's country numbering scheme: 1 USA and Canada and Caribbean, 7 Russian and Kazakhstan, 20 Egypt, 27 South Africa, 30 Greece, etc.

The location, timezone, and country used in CDR are for the interface at which the call enters or leaves the PBX, not the party that answers the call. The interface could be a speakerphone or handset connected to a human ear, or be a trunk to or from another PBX. For example, suppose that a user in the USA dials "9 011 82 2 511 2184", and the call routes over the corporate WAN

to a G700 in Japan, and then goes out a CO trunk media module to a Central Office (CO) in Japan. The Japanese public network then carries the call to South Korea. The country-to and country-from fields in the CDR records would show that the call was from the USA to Japan, not to South Korea.

There is a chance a calling or called party may not be contained within a single location, time zone, or country. If that happens, Communication Manager CDR records asterisks (***) for the associated parameters. For example, suppose you have a server in London, U.K., with Media Gateways in Paris, Berlin, and elsewhere. Now, suppose you have a paging group with members in both Paris and Berlin, but this particular paging group has no members elsewhere. Now, suppose someone calls to that paging group. Even though the paging group is spread across 2 locations, it is inside only one country, and only inside one time zone. The CDR record would show:

* country-to: ***, because the call terminates to two different countries.
* location-to: ***, because the call terminates to two different locations.
* timezone-to: 01:00, because Paris and Berlin are in the same time zone even though they are in different countries and locations.

4.6. Transmission and Related Topics

4.6.1. A and Mu law Companding

A and Mu law companding is administered per location via the Companding Mode field on the location-parameters form. See the example form in section 3.2 on page 13.

4.6.2. Analog Line Board Parameters

The analog line board parameters "Analog Ringing Cadence" and "Analog Line Transmission" are assigned a Communication Manager country code per location on the location-parameters form. The Analog line board recall timing parameters "Flash hook Interval" and "Disconnect Timing" are directly administered per location on the location-parameters form. See the example form in section 3.2 on page 13.

Analog line ringing current is set via a slide switch on each carrier. Power supplies in each carrier have a ring generator mode switch on the bottom of the power supply, with settings of 20 Hz, 25 Hz, or 50 Hz. France is an exception; it has a different power supply for balanced ringing, but still that is installed per carrier. Therefore, a single carrier should not support analog phones in multiple countries unless they use the same analog line ringing current.

4.6.3. DCP Terminal Parameters

You administer a DCP Terminal-parameters Plan per location on the location-parameters form. See the example form in section 3.2 on page 13. You administer the characteristics of each DCP Terminal-parameters Plan on the terminal-parameters forms. Those characteristics consist of:
- A Base Parameter Set. This field takes a Communication Manager country code.
- Customize Parameters fields.

4.6.4. Loss and Tone Loss

You administer loss per location on the location-parameters form.

```
change location-parameters 1                               Page   2 of  4

LOSS PLANS

          Inter-location Loss Group: 18

                2 Party Loss Plan: 1                    Customize? n

                  Tone Loss Plan: 1                    Customize? n

End-to-End total loss (dB) in a n-party conference:
3: 15   4: 21   5: 26   6: 29                             Customize? n

```

In addition to the loss characteristics that need to be assigned for a single country system, a system that spans multiple countries needs one additional item: the Inter-location Loss Group. When inserting loss for a call, Communication Manager software treats parties on the call who are in separate locations as if the location with the most parties were connected by an equal number of IP tie trunks as there are parties in the call in other locations. These virtual IP tie trunks are treated as if they were using the "Inter-location Loss Group" loss plan.

4.7. Tones

4.7.1. Tone Generation

You administer a Tone Generation Plan per location on the location-parameters form. See the example form in section 3.2 on page 13. You administer the characteristics of each Tone Generation Plan on the tone-generation forms. Those characteristics consist of:
- a Base Tone Generator Set. This field takes a Communication Manager country code.
- Tone customization fields.

```
change tone-generation 2                                          Page   1 of  21
                          TONE GENERATION 2


        Base Tone Generator Set: 2
             440Hz PBX-dial Tone? n                 440Hz Secondary-dial Tone? n
```

```
change tone-generation 2                                          Page   2 of  21
                      TONE GENERATION CUSTOMIZED TONES 2

        Tone Name          Cadence        Tone
                            Step     (Frequency/Level)
```

The tone generator circuit packs and tone generation function on the G700 receive their tone
characteristics at initialization. That means that a single generator circuit pack or G700 can not
play tones for more than one country.

A media gateway or port network uses its own tone generation resources to supply tones to DCP
or analog stations directly attached to the Media Gateway or port network. However, IP sets are
not directly attached to anything but the LAN. IP sets get their tones from the Media Gateway or
port network that is supplying the media processor that is carrying the audio for any particular
call. If you want IP sets in each country to have country-specific tones or country-specific levels
on tone volume, you should assign IP network regions so IP sets have to use media processors in
the same country. That in turn implies that an IP network region should be within a single
country. Either that, or if a region does span multiple countries, all of the locations in those
countries should use the same location-parameter number.

During a partial network outage, it may happen that an IP set needs to listen to a tone, but no
media processors are available in the same location or a location with the same location-
parameter number as the IP station's location. In this case the IP set will receive tones from any
media processor that the CM server can connect the phone to. This may result in the user
hearing tones intended for another country. The tones may sound unfamiliar.

You should be careful when administering characteristics for the tones 1-call-wait, 2-call-wait, or
3-call-wait on the tone-generation form. The fields "Repetitive Call Waiting Tone?" and
"Repetitive Call Waiting Interval (sec): _" are administered per system on the system-parameters
features form. If you were to administer one of the call-wait tones with a longer duration than
the Repetitive Call Waiting Interval, your users would hear the tones running into themselves.

Some countries want the following tones turned on, and some do not. You can turn on all these
tones per system on the system-parameters features form. Then for countries that don't use one
or more of them, on the tone customization pages of the tone-generation forms administer silence
as that tone's frequency.   For the countries that do use the tones, administer real frequencies.

Tone name on system-parameters feature forms	Tone name on tone-generation forms

Tone name on system-parameters feature forms	Tone name on tone-generation forms
Conference tone	conference
Bridging Tone	conference
Intrusion Tone	intrusion
AUDIX One-Step Recording Tone	zip This tone is also used by other features.

4.7.2. Tone Detection

Communication Manager software will raise an alarm if there are fewer tone receiver ports available in the system than the thresholds administered on the system-parameters maintenance form. You can use the command "list measurements tone-receiver" to see how many tone receiver ports the system is using and has available. Similar alarms or reports apply for media processor, multimedia interface, and voice conditioner resources. These alarms and reports apply to all port networks system wide, not per country. Resources on media gateways are not included in these reports or alarm thresholds.

Section 4.16.2.1 on page 44 describes using call classification in multiple countries.

4.8. Displays

Communication Manager servers will use each set's location to show the correct date and time on displays. However, the date and time format is administered per system on the system-parameters-features form via the "Date Format on 607/2420/4600/6400" field. You can still have per-country date and time formats, though, if you give IP Softphones to everyone who needs a different date and time format than the system-wide setting.   IP Softphones in call bar view determine their date and time format from the PC's settings, not from Communication Manager settings.

4.8.1. ICON sets

AT&T used to sell ICON DCP sets to customers outside of the USA and Canada. Those sets show only "export version" on their displays until they receive an enabling message from the server. That message is only set if the field "Location" in the license file, displayed via System Parameters Customer-Options is set to "2". If you have such sets, be sure that your license file has that field set to "2". Although that field is called "Location", it has nothing to do with the location numbers mentioned throughout this document. It is purely coincidence that the two concepts have the same name.

4.9. Time of Day Coverage

The Time of Day Coverage feature assigns a number T1 through T999 to a collection of {time range, coverage path) pairs, per system. On the station form, you can administer T1 through T999 instead of a usual coverage path number.   You should enter into the "coverage time-of-day" form entries using your system-wide time, instead of the local time zone time at each user's location.

4.10. ISDN

4.10.1.   USNI Calling Name for Outgoing Calls

This feature sends a calling name with outgoing Primary Rate Interface (PRI) calls. Some Central Offices (COs) can accept such a United States Network Interface (USNI) Calling Name, but some drop calls if the Communication Manager server tries to send such a name to them. If COs are dropping ISDN calls in some countries, try leaving the value in this field at n.

4.10.2.   Public-unknown-numbering

Use the "Trunk Group" column on the "public-unknown-numbering" form to adjust calling party number formats according to the country the trunk group serves. This implies that you should not have a single ISDN trunk group spanning multiple countries unless they use the same common calling party number formats.

4.10.3.   ISDN Maintenance extension

If limitations on other switches' numbering plans require that ISDN trunk test calls be directed to specific extensions in each country, you can administer a single extension as the ISDN Maintenance extension on the system-parameters maintenance form. Then use call forwarding from the country-specific extensions to the single system-wide ISDN Maintenance extension. Call forwarding does survive a system reset if translations have been saved.

4.11. R2-Multifrequency (R2-MFC) signaling

You administer a R2 MFC Signaling plan per trunk group. This implies that you should not have a single MFC trunk group spanning multiple countries unless they use the same MFC signaling characteristics. You administer most of the characteristics of each R2 MFC Signaling plan on multifrequency-signaling forms. There are a few exceptions, though.

- The Multifrequency timers (Forward Disconnect, MF Interdigit, and Outgoing Shuttle Exchange) are administered per location on the location-parameters form.
- The MF Test Call Extension is administered per switch on the system-parameters maintenance form. If COs in various locations need to use different DID numbers to reach the MF test call extension, this can be accomplished. Administer one of those DID numbers as the MF test call extension. Administer the other DID numbers as x-port stations. Set up call forwarding from those x-port stations to the one MF test call extension. Then save translations. Call forwarding does survive a system reset if translations have been saved.

The multifrequency-signaling forms do have a column of fields that are new for Communication Manager 2.1 software. Those are the "Outgoing II by COR" fields. They work as follows. Before the Communication Manager 2.1 release, if either of the fields:
- Use COR for Calling Party Category?
- Use COR for All Group II Responses?
were set to Y for "yes", then the group II signals sent to the CO were determined by the calling party's COR. This is set via the "Group II Category For MFC" field on the COR form. Starting in Communication Manager 2.1 software, the entry on the COR form is not used directly. Instead, it is adjusted via the "Outgoing II by COR" fields.

For example, suppose that a user has a COR with its "Group II Category For MFC" field set to 1. The user dials an outgoing call, and Automatic Route Selection (ARS) happens to route that call over a MFC trunk group with "R2 MFC Signaling" field set to 2. Suppose the multifrequency-signaling 2 form is set up as follows.

```
change multifrequency-signaling 2                        Page   2 of   4
              MULTIFREQUENCY-SIGNALING-RELATED PARAMETERS   2

    Request Call Category at Start of Call? n          Outgoing II by COR
          Restart ANI from Caller Category? y            1:  6
             Number of Incoming ANI Digits: 0            2:  1
             Number of Outgoing ANI Digits: 0            3:  1
             Truncate Station Number in ANI: no          4:  1
Address Digits Include End-of-digits Signal? n           5:  1
          Call Category for Vector ii-digits? n          6:  1
                Request CPN at Start of Call? n          7:  1
          Do Not Send Group B Signals to CO? n           8:  1
  ANI Source for Forwarded and Covered Calls: caller      9:  1
                                                        10:  1
```

The group II signal that would be sent to the CO would be 6.

4.12. Extensions administered per system

The extensions listed in this section are administered one per system, yet you may want each country to have its own extension for these features. This section says how to achieve that.

4.12.1.   Remote Access extension

Communication Manager software only has one remote access Direct Inward Dial (DID) extension per switch; it is administered on the remote-access form. If users of a multinational switch had to dial that one access number, some of them would be making international toll calls to get to remote access. That is not necessary. There are two ways to avoid this.

- The remote access extension can be made a short extension, as described in section 4.2.2 on page 21. The UDP form would prepend digits according to the location of the incoming DID trunk. This method works as long as the last few digits of the local DID number for the remote access extension are the same for every country.
- If local DID numbering plans do not allow the same last few digits in each country, you can set up local DID numbers for each location, then call forward those inside the switch to a single remote access extension.

4.12.2.   Telecommuting Access extension

The Telecommuting Access extension is administered per system on the telecommuting-access form. If users of a multinational switch had to dial that one access number, some of them would be making international toll calls to get to the telecommuting access extension. You can use the same method to make it apply per country as you did for the remote access extension described in the previous section 4.12.1.

4.12.3.   Security Referral Destination

The Security Referral Destination receives calls if the system detects a security violation. There is only one Security Referral Destination per switch, administered on the system-parameters security form. This can be a VDN. You can use Call Vectoring Time-of-Day routing to route the security referral call to different destinations based on the time of day. That would route the referral call to a destination that is in its normal business hours when the referral call happens.

4.12.4.   ACA Referral Destination

The Automatic Circuit Assurance (ACA) Referral Destination receives calls if the system detects a circuit problem. There is only one ACA Referral Destination per switch, administered on the system-parameters features form. The same method described in section 4.12.3 on page 40 for security referrals would work for it as well.

4.12.5.   Terminating Trunk Transmission Test Extension

The Terminating Trunk Transmission Test Extension receives tie trunk test calls from other voice switches. If limitations on other voice switches require that tie trunk test calls be directed to different specific extensions, a single Terminating Trunk Transmission Test Extension can be administered on system-parameters maintenance, and then multiple local extensions can be call forwarded to the single system-wide extension.

4.12.6. DS1 Maintenance extension

The DS1 Maintenance extension receives DS1 trunk test calls from other voice switches or media servers. If limitations on other switches require that Digital Service 0 (DS0) loop-around trunk test calls be directed to different specific extensions, a single DS1 Maintenance extension can be administered on system-parameters maintenance, and then multiple local extensions can be call forwarded to the single system-wide extension.

4.13. Music on Hold

You would probably want your media server to provide appropriate music on hold per country. Communication Manager voice server currently provides one music source per tenant. If you want separate music sources per country, administer tenant numbers uniquely per country.   Use the music-sources command to assign music source numbers to ports, then use the Music Source fields on the tenant form, as shown in section 3.3 on page 16, to assign those music sources to tenants partitions.

4.14. Automatic Wakeup

The automatic wakeup feature displays the time and date in the user's local time.   The user is able to specify wakeup times in local time, and receive wakeup verification with the correct local time.

4.14.1. Speech Synthesis for Automatic Wakeup

The automatic wakeup feature can use speech synthesis to prompt a user for the wakeup time. There is only one speech synthesis language per system, but you do not have to use it. Instead of using speech synthesis, you can instead use the Room Activated Wakeup with Tones feature and provide your users with instructions written in local languages on how to enter wakeup times via tone prompts.

The automatic wakeup feature can use speech synthesis to announce the time of day during the wakeup call. When the time is announced during the wakeup call to the station, the time is always system time. The time announcement is built for each time interval, not each station. If

your system covers many countries, instead of using the speech synthesis option for the wakeup treatment, use either the music-on-hold or announcement or silence options for the wakeup treatment. Different Music on Hold sources can be assigned per tenant, as described in section 4.13 on page 41. Different announcements can be assigned per country, as described in the following sections.

4.14.2.   Default Announcement Extension

The automatic wakeup feature can play an announcement when a hotel guest answers the wakeup call. When an attendant enters a wakeup request for the guest, and the system is administered with Announcement Type mult-integ, the attendant is prompted to enter an announcement extension number. Those announcements can be in any language. The Default Announcement Extension is the default value presented to the attendant while entering the wakeup request. This field can take a short extension. You can use the technique described in section 4.2.2 on page 21 to make this apply per country. Or, you could just let the attendant enter a non-default announcement extension equivalent to the guest's language.

4.14.3.   Integrated Announcement Extension

The Integrated Announcement Extension plays when a hotel guest receives a wakeup call and the system is administered with Announcement Type integrated.   Unlike other announcements, the language for this one should depend on the location of the called party, not the calling party. If your system covers relatively few countries, you can record multiple languages into a single announcement, one right after the other. If your system covers many countries, instead of using the Announcement Type integrated for the wakeup treatment, use either the Announcement Type mult-integ as described in the previous section, or use music-on-hold or silence options for the wakeup treatment. Different Music on Hold sources can be assigned per tenant, as described in section 4.13 on page 41.

4.15. Loudspeaker Paging Zones

Loudspeaker Paging allows users to make voice pages over an external loudspeaker system connected via an AUX trunk. The loudspeaker form correlates one loudspeaker paging zone with each port on an AUX trunk. You probably would want loudspeaker pages to be in the local language, which means you would need to configure the voice server to have an AUX trunk in each country. The form allows at most 9 paging zones, which implies that you can use it in at most 9 countries.

If you want to support more than 9 countries, instead of an AUX trunk system, use a loudspeaker system connected via an ordinary trunk or station port.

4.16. Call Centers

Most call center characteristics are administered on a mix of per agent or per hunt group or per Vector Directory Number (VDN). Those can be different per country, as long as a single hunt group does not span more than one country and a single VDN does not serve more than one country. However, some call center characteristics are system-wide call center characteristics. Some of those call center characteristics can be made to apply differently per country even though they are administered per system, and some can not, at least not yet.

- Section 4.16.1 on page 43 describes system-wide call center characteristics that can be made to vary per country.
- Section 4.16.2 on page 44 lists system-wide call center characteristics that must be set to the same values for all countries, but for which the system characteristics are multiple entries. If individual entries assigned carefully, a single switch could cover a few countries.
- Section 4.16.3 on page 45 lists system-wide call center characteristics that must be set to the same values for all countries.

4.16.1.   Can be applied per country.

The system-wide call center characteristics listed in this section can be made to vary per country.

4.16.1.1   Direct Agent Announcement Extension

The Direct Agent Announcement Extension is the extension number of the announcement that is played while a caller is waiting in queue on a direct agent call. This field is administered on the system-parameters features form. The field can take a short extension. Use the technique described in section 3.2.2 on page 13 to make this field apply per country.

4.16.1.2   Minimum Agent-Login ID Password Length

The Minimum Agent-LoginID Password Length is administered per system on the system-parameters features form, but you can still vary password length per country. Set this field to the lowest value used in any country that your system supports, and then manually keep track of lengths of passwords that you administer for agents in other countries.

4.16.1.3   Service Observing

Whether Conference and Warning Tones are played during Service Observing is administered per system on the system-parameters features form. Instead of enabling or disabling this on that form, administer the tones' characteristics per location to be silent or non-silent per country, as described in section 4.7.1 on page 35.

Whether Service Observing by FAC is allowed is administered per system on the system-parameters features form. Instead of enabling or disabling this per system, administer "Can Be Service Observer" or "Can Be Service Observed" permissions per Class of Restriction (COR).

4.16.2.   Limited system capacity items

This section describes system-wide call center characteristics that must be set to the same values for all countries, but for which the system characteristics are multiple entries. If individual entries assigned carefully, a single switch could cover a few countries.

4.16.2.1   Outbound Call Management (OCM) Call Classification

Communication Manager software's SYSTEM PARAMETERS OCM CALL CLASSIFICATION form allows you to administer tone detection characteristics for up to 8 tones. We hope that is enough for the countries that you want to a single Communication Manager server to cover, great. However, if it is not, here are some suggestions for conserving tone characteristics entries.

- Only enter tones for countries that need them. For example, suppose your server is for an outbound call center where all agents are in the Philippines and all trunks that will be used to carry predictive dialing calls are in the USA. In this case, only administer detection characteristics for USA tones.
- Administer as wide a range between the Duration Minimum and the Duration Maximum as you can on the OCM call classification form. while still accurately detecting tones.
- Use ISDN or MFC trunks. Those types of trunks do not need tone detection to determine the state of the called party. On the system-parameters features form, administer "Call Classification After Answer Supervision" to be "no" to avoid using tone detection resources on these trunks.
- Instead of precise dial tone detection for trunk calls, use the Level of Tone Detection option: medium. This is administered on the system-parameters features form. With this option, Communication Manager software interprets any tone that has a continuous "on" period of longer than 1 second as if it were dial tone.
- Instead of dial tone detection for trunk calls, use delay timers on the route-pattern forms to estimate when the CO provides dial tone. For different countries, this could require configuring different route patterns to use different delays.
- Instead of dial tone detection for trunk calls, use cut-through of network dial tone. This is administered on the Cut-Through field on the trunk group form.

- Instead of tone detection for CDR, use answer detection timers to estimate when, or if, a call was answered. You set a timer for each trunk group, using the Answer Supervision Timeout field on the Trunk Group form. Or you set a circuit pack timer for the ports on that circuit pack, using the Outgoing End of Dial(sec) field on the Trunk Group form. If the caller is off-hook when the timer expires, the system assumes that the outgoing call has been answered.
- If you use Call Coverage Redirect Off Net, make the off-net telephone numbers the last entries in all coverage paths.
- If you use Busy Tone Disconnect, turn it on only for those trunk groups that need it. Once turned on per system, this feature is administered per trunk group via the "Busy Tone Disconnect" field. You should not have a single trunk group spanning multiple countries if some of those countries require busy tone disconnect and others don't.

Also, when determining how many tone detection ports you will need, keep in mind that the tone detectors on media gateways are not usable for call classification.

4.16.2.2 Holiday Tables

Holiday tables control the days and times for which Holiday Vectoring will apply. Vector steps refer to them. You can administer 10 holiday tables, i.e., enough to cover up to 10 countries.

4.16.2.3 Reason Code Names

The Reason Code Names form allows you to assign a different name to each Reason Code for Aux Work and for Logout. The form allows you to assign 9 different names for AUX Work Reason Codes and 9 different names for Logout Reason Codes. You could vary them a little between a few countries, if you used few aux work and logout codes.

4.16.3. Single-country Call Center features

The following call center features can not be applied differently per country. They would need to be set to the same values across all countries.

Feature-Related System Parameters	
• ACD Login Identification Length	• Create Universal Call ID (UCID)
• ACW Agents Considered Idle	• Direct Agent Announcement Delay
• Adjunct CMS Release	• EIA Device Bit Rate
• Auto Reserve Agents	• Expert Agent Selection (EAS) Enabled
• Aux Work Reason Code Type	
• Available Agent Adjustments for BSR	• Hear Zip Tone Following VOA
	• Interflow-qpos EWT Threshold

Feature-Related System Parameters	
• BCMS/VuStats Abandon Call Timer • BCMS/VuStats LoginIDs • BCMS/VuStats Measurement Interval • Call Classification After Answer Supervision • Call Selection Measurement • Call Selection Override • Clear VuStats Shift Data • Converse Data Return Code • Converse Delay Data1/Data2 • Converse Signaling Tone/Pause • Copy ASAI UUI During Conference/Transfer • Coverage — Don't Answer Interval for Subsequent Redirection	• Lines Per Page • Logout Reason Code Type • Message Waiting Lamp Indicates Status • MIA Across Splits or Skills • Predicted Wait Time (PWT) • Prompting Timeout (secs) • Remove Inactive BCMS/VuStats Agents • Reverse Star/Pound Digit for Collect Step • Send UCID to ASAI • Service Level Supervisor • System Printer Endpoint • UCID Network Node ID • Validate BCMS/VuStats Login IDs

Feature Access Code	
• Add Agent Skill Access Code • After Call Work Access Code • Assist Access Code • Auto-In Access Code • Aux Work Access Code • Converse Data Return Code • Login Access Code • Logout Access Code	• Manual-In Access Code • Remove Agent Skill Access Code • Remote Logout of Agent Access Code • Service Observing Listen Only Access Code • Service Observing Listen/Talk Access Code

CDR System Parameters
• Record Called Agent Login ID Instead of Group or Member

5. Conclusion

Communication Manager 2.1 provides the capability to use a single ECS with stations, port networks, remote offices, or gateways in multiple countries. While such a configuration has always been possible, before CM 2.1, many features on the Communication Manager ECS would not work transparently across national borders . While there are still some features that won't work in such a configuration, if properly administered CM 2.1 has many features that can work transparently across national borders.

6. Additional References

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