逻辑分区和地理位置的配置和故障排除

目录

简介
先决条件
使用的组件
背景信息
逻辑分区的要素
地理位置
地理位置过滤器
逻辑分区策略
配置
故障排除
需要考虑的要点
参考
已知的 Bug

简介

本文档介绍如何在Cisco Unified Communications Manager(CUCM)中配置逻辑分区和地理定位。

先决条件

Cisco 建议您了解以下主题：

- 思科统一通信管理器

使用的组件

- 思科统一通信管理器8.6或更高版本

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

背景信息

只要通过公共交换电话网(PSTN)网关的呼叫不直接连接到另一地理位置（地理位置）的IP语音(VoIP)电话或VoIP PSTN网关，即使调用中呼叫功能，逻辑分区功能也确保单个系统可用于支持两种呼叫。

在印度等一些国家/地区，必须在企业层面满足电信法规。因此，公司有责任建立语音基础设施。它们的设置使得本地PSTN在连接企业外部的呼叫时专用。根据电信管理局(TRAI)的规定，为了Toll ByPass，印度的PSTN电话网络必须永远不能与VoIP电话网络互连。

这要求语音系统按逻辑划分为两个系统：企业内一个VoIP，另一个用于访问本地PSTN。

在CUCM中，使用呼叫搜索空间(CSS)和分区功能维护此类语音系统非常困难。CSS和分区可以限制基本呼叫，但无法限制重定向和加入等呼叫中功能。

逻辑分区的要素

地理位置

CUCM需要调配标识符，以便分配给电话、网关、中继等设备。地理定位是一种标准，可在逻辑分区中用作同一层。

地理定位用于根据最多17个参数指定物理位置：国家/地区2字母缩写、州(A1)、县(A2)、城市(A3)、区(A4)、邻居(A5)、街道(A6)、方向(PRD)、街道后缀(POD)、住宅号(HNO)和住宅号后缀(HNS)其他。

地理位置过滤器

典型的逻辑分区策略配置仅使用地理定位策略记录中的字段子集。此选择由地理位置过滤器缩小。逻辑分区功能使用在地理位置过滤器中选择的字段。

逻辑分区策略

在CUCM中，逻辑分区定义为呼叫控制功能，可借助逻辑分区策略来限制这些VoIP实体之间的通信。

- IP电话到/从网关
- 网关到网关
- IP电话到/从中继（ICT/SIP中继）
- 中继网关（ICT/SIP中继）

逻辑分区中的设备分为内部和边界。这些设备分类为内部设备：

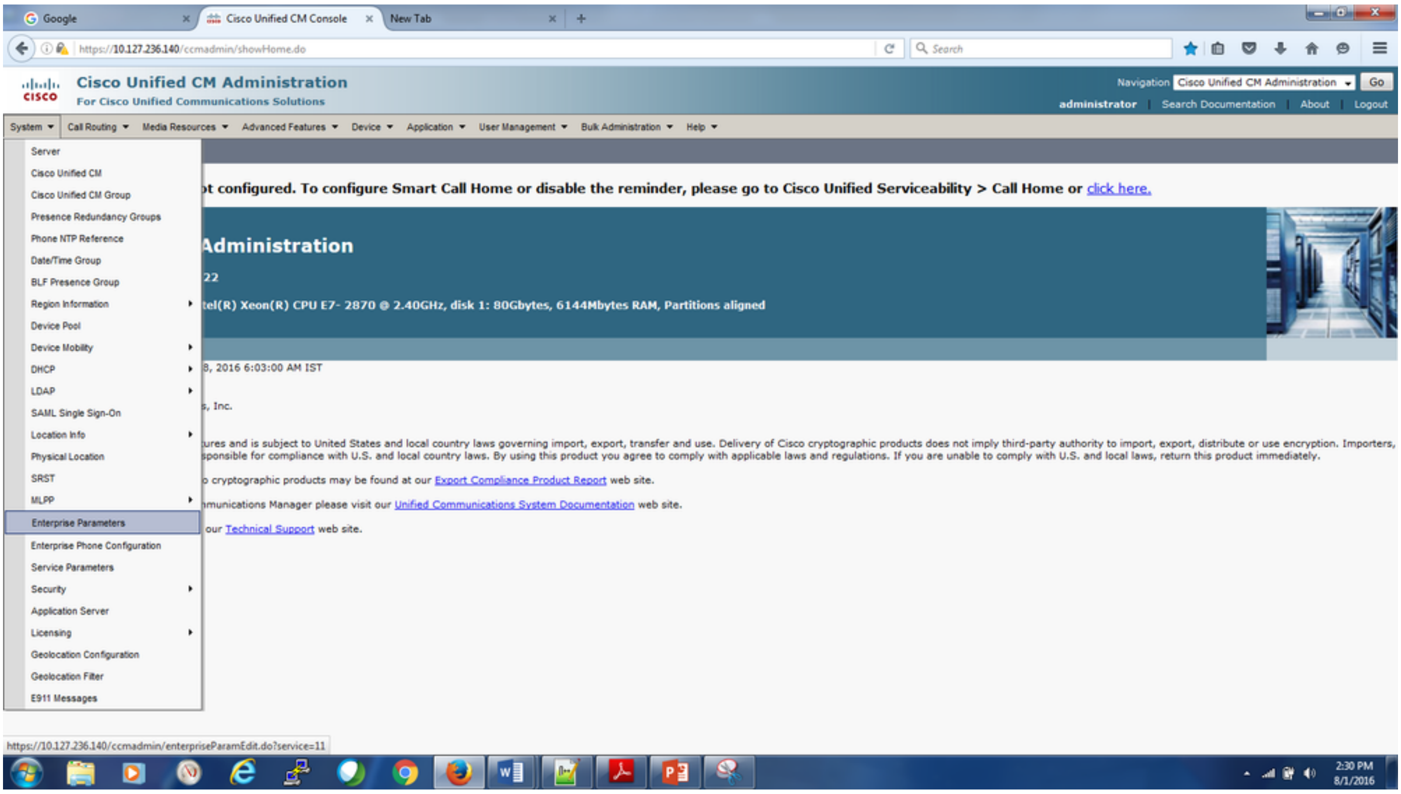
1. 电话（SCCP、SIP、第三方）
2. VG224模拟电话
3. MGCP端口(FXS)
4. 思科Unity语音邮件(SCCP)
5. CTI路由点，CTI端口
6. QSIG网关或ICT

这些设备分为边界：

1. 网关
2. 集群间中继(ICT)
3. H.225中继
4. SIP 中继
5. MGCP端口(E1、T1、PRI、BRI、FXO)

配置

步骤1.默认地理定位适用于未配置地理定位且不参与逻辑分区的设备。要设置默认地理定位策略起着主要作用，如果将其设置为允许，则需要使用拒绝功能适当的逻辑分区策略，反之亦然。


Google
Cisco Unified CM Console
New Tab
https://10.127.236.140/ccmadmin/showHome.do
Search
Cisco Unified CM Administration
For Cisco Unified Communications Solutions
Navigation
Cisco Unified CM Administration
Go
administrator
Search Documentation
About
Logout
System
Call Routing
Media Resources
Advanced Features
Device
Application
User Management
Bulk Administration
Help
Server
Cisco Unified CM
Cisco Unified CM Group
Presence Redundancy Groups
Phone NTP Reference
Date/Time Group
BLF Presence Group
Region Information
Device Pool
Device Mobility
DHCP
LDAP
SAML Single Sign-On
Location Info
Physical Location
SRST
MLPP
Enterprise Parameters
Enterprise Phone Configuration
Service Parameters
Security
Application Server
Licensing
Geolocation Configuration
Geolocation Filter
E911 Messages
https://10.127.236.140/ccmadmin/enterpriseParamEdit.do?service=11
2:30 PM
8/1/2016

ot configured. To configure Smart Call Home or disable the reminder, please go to Cisco Unified Serviceability > Call Home or click here.

Administration

22

tel(R) Xeon(R) CPU E7- 2870 @ 2.40GHz, disk 1: 80Gbytes, 6144Mbytes RAM, Partitions aligned

8, 2016 6:03:00 AM IST

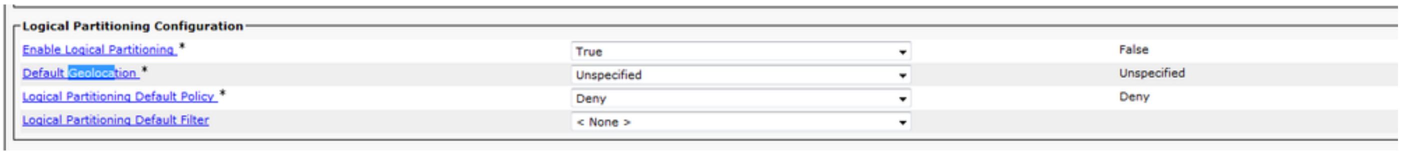
s, Inc.

tures and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, sponsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

o cryptographic products may be found at our Export Compliance Product Report web site.

nmunications Manager please visit our Unified Communications System Documentation web site.

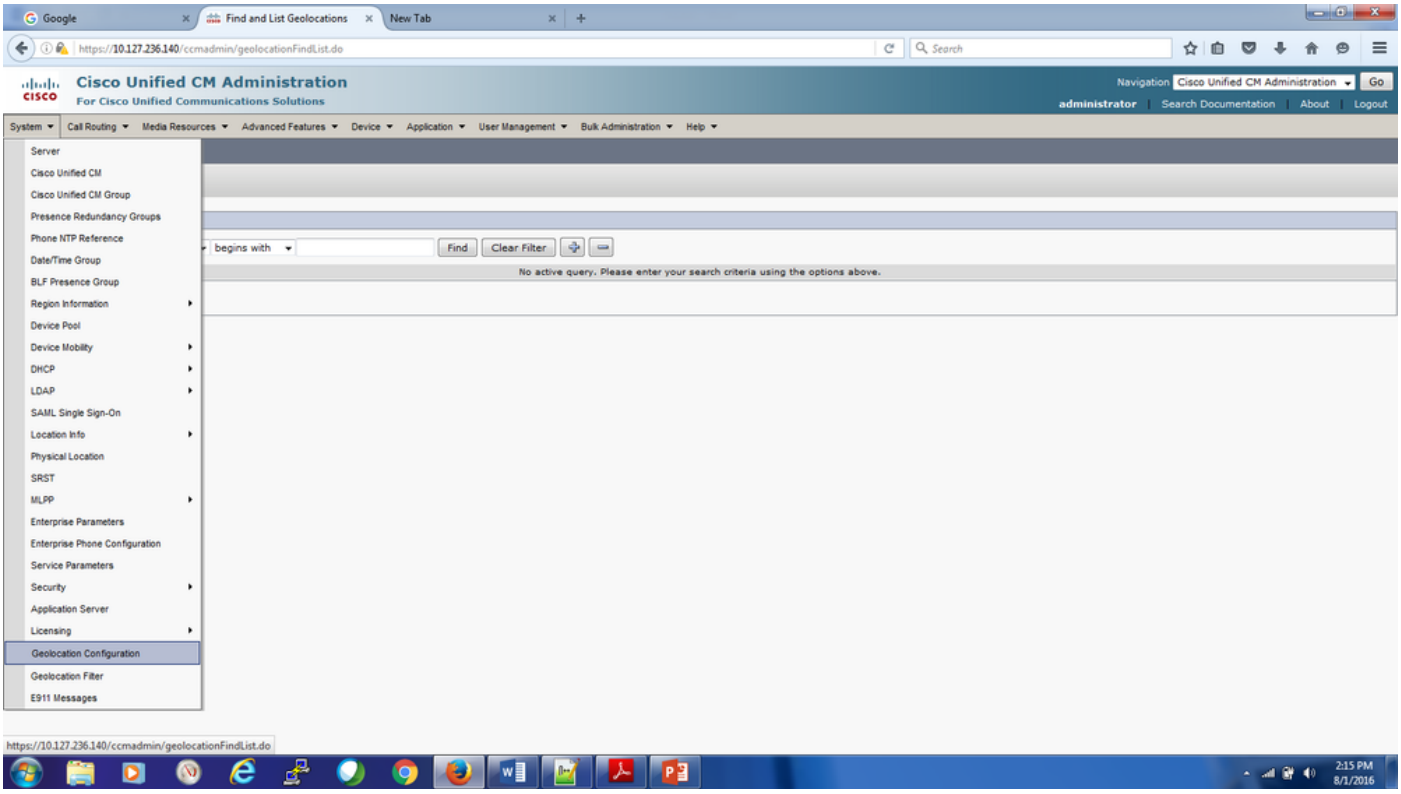
our Technical Support web site.



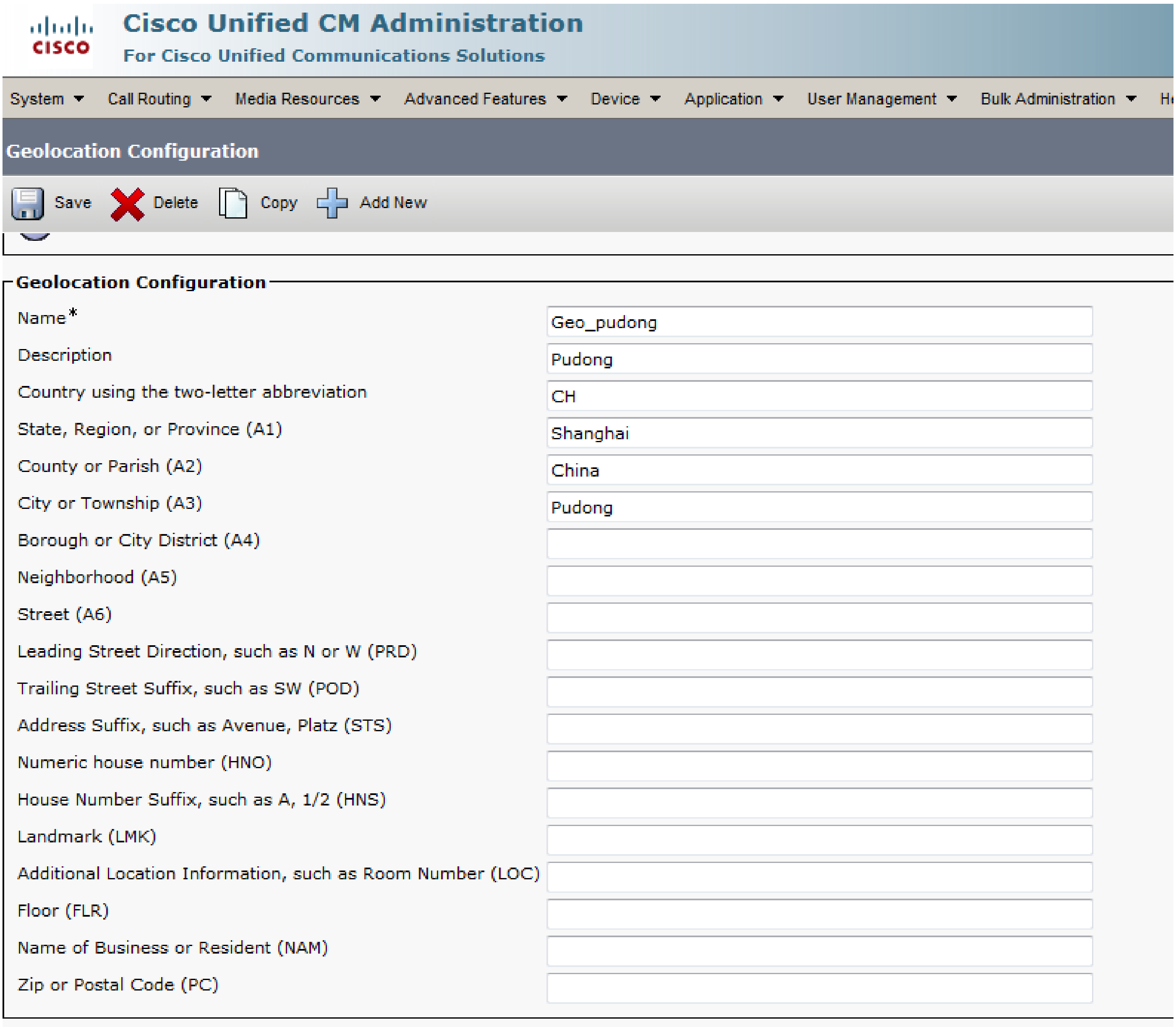
Logical Partitioning Configuration

Enable Logical Partitioning *	True	False
Default Geolocation *	Unspecified	Unspecified
Logical Partitioning Default Policy *	Deny	Deny
Logical Partitioning Default Filter	< None >	

步骤2.转到System-> Geolocation Configuration并添加与位置相关的信息。这充当与此特定地理位置关联的设备的标识符。


Google
Find and List Geolocations
New Tab
https://10.127.236.140/ccmadmin/geolocationFindList.do
Search
Cisco Unified CM Administration
For Cisco Unified Communications Solutions
Navigation
Cisco Unified CM Administration
Go
administrator
Search Documentation
About
Logout
System
Call Routing
Media Resources
Advanced Features
Device
Application
User Management
Bulk Administration
Help
Server
Cisco Unified CM
Cisco Unified CM Group
Presence Redundancy Groups
Phone NTP Reference
Date/Time Group
BLF Presence Group
Region Information
Device Pool
Device Mobility
DHCP
LDAP
SAML Single Sign-On
Location Info
Physical Location
SRST
MLPP
Enterprise Parameters
Enterprise Phone Configuration
Service Parameters
Security
Application Server
Licensing
Geolocation Configuration
Geolocation Filter
E911 Messages
begins with
Find
Clear Filter
https://10.127.236.140/ccmadmin/geolocationFindList.do
2:15 PM
8/1/2016

No active query. Please enter your search criteria using the options above.

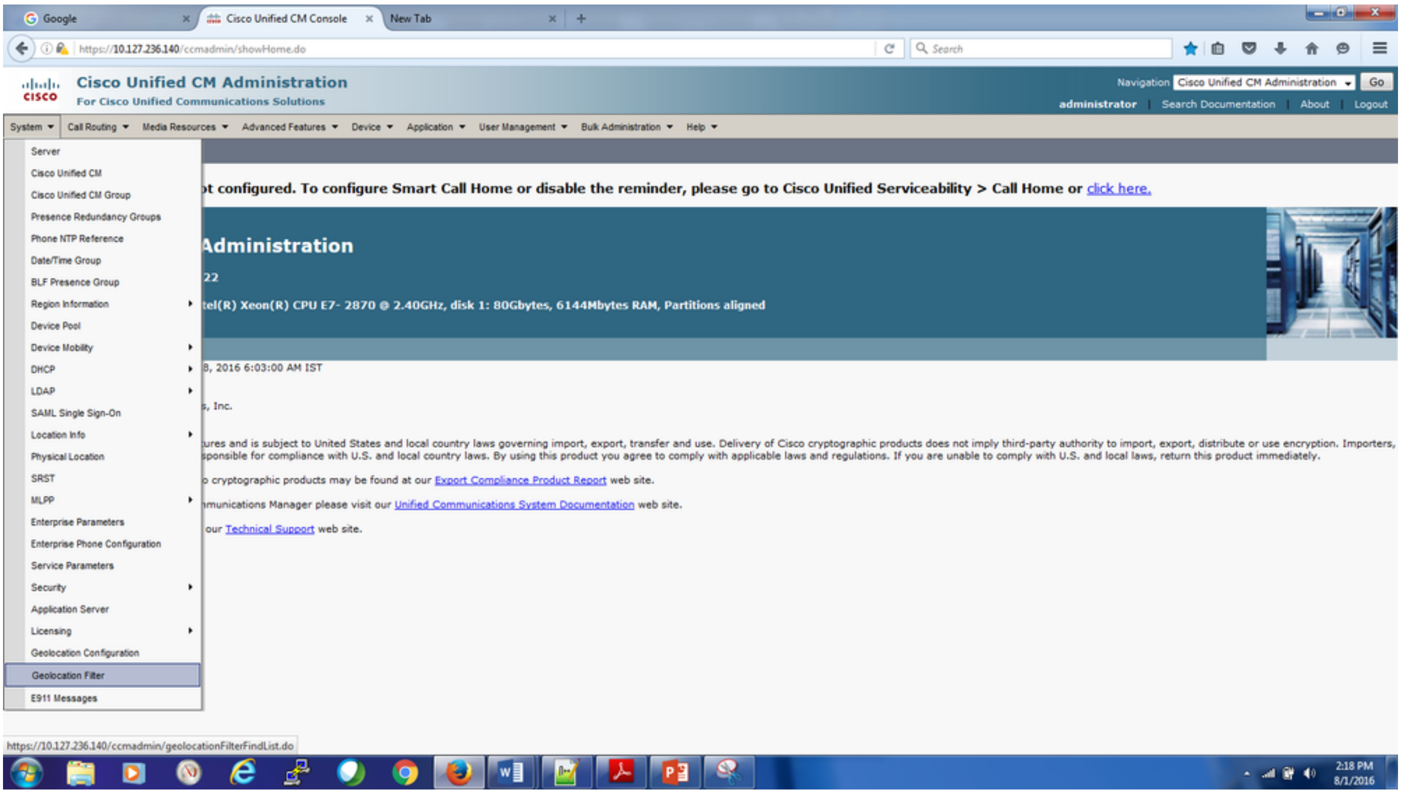

Cisco Unified CM Administration
For Cisco Unified Communications Solutions
System
Call Routing
Media Resources
Advanced Features
Device
Application
User Management
Bulk Administration
Save
Delete
Copy
Add New

Geolocation Configuration

Geolocation Configuration

Name*	Geo_pudong
Description	Pudong
Country using the two-letter abbreviation	CH
State, Region, or Province (A1)	Shanghai
County or Parish (A2)	China
City or Township (A3)	Pudong
Borough or City District (A4)	
Neighborhood (A5)	
Street (A6)	
Leading Street Direction, such as N or W (PRD)	
Trailing Street Suffix, such as SW (POD)	
Address Suffix, such as Avenue, Platz (STS)	
Numeric house number (HNO)	
House Number Suffix, such as A, 1/2 (HNS)	
Landmark (LMK)	
Additional Location Information, such as Room Number (LOC)	
Floor (FLR)	
Name of Business or Resident (NAM)	
Zip or Postal Code (PC)	

步骤3.转到System-> Geolocation Filter，并根据过滤所需的逻辑策略检查Geolocation Filter配置中的字段。


Google
Cisco Unified CM Console
New Tab
https://10.127.236.140/ccmadmin/showHome.do
Search
Cisco Unified CM Administration
For Cisco Unified Communications Solutions
Navigation
Cisco Unified CM Administration
Go
administrator
Search Documentation
About
Logout
System
Call Routing
Media Resources
Advanced Features
Device
Application
User Management
Bulk Administration
Help
Server
Cisco Unified CM
Cisco Unified CM Group
Presence Redundancy Groups
Phone NTP Reference
Date/Time Group
BLF Presence Group
Region Information
Device Pool
Device Mobility
DHCP
LDAP
SAML Single Sign-On
Location Info
Physical Location
SRST
MLPP
Enterprise Parameters
Enterprise Phone Configuration
Service Parameters
Security
Application Server
Licensing
Geolocation Configuration
Geolocation Filter
E911 Messages
https://10.127.236.140/ccmadmin/geolocationFilterFindList.do
2:18 PM
8/1/2016

ɒt configured. To configure Smart Call Home or disable the reminder, please go to Cisco Unified Serviceability > Call Home or click here.

Administration

22

tel(R) Xeon(R) CPU E7- 2870 @ 2.40GHz, disk 1: 80Gbytes, 6144Mbytes RAM, Partitions aligned

8, 2016 6:03:00 AM IST

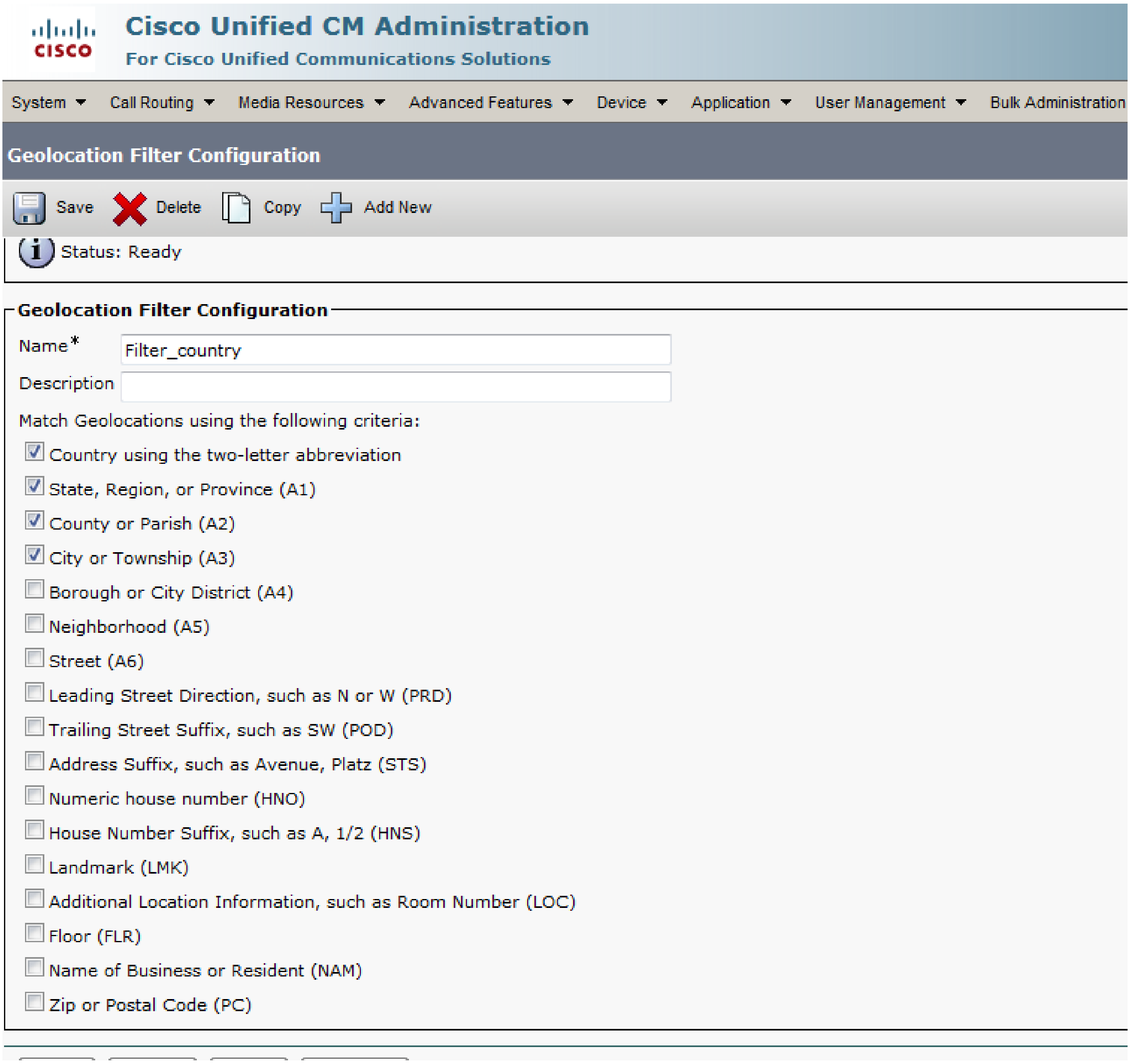
s, Inc.

tures and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, sponsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

o cryptographic products may be found at our Export Compliance Product Report web site.

nmunications Manager please visit our Unified Communications System Documentation web site.

our Technical Support web site.


Cisco Unified CM Administration
For Cisco Unified Communications Solutions
System
Call Routing
Media Resources
Advanced Features
Device
Application
User Management
Bulk Administration
Geolocation Filter Configuration
Save
Delete
Copy
Add New

Status: Ready

Geolocation Filter Configuration

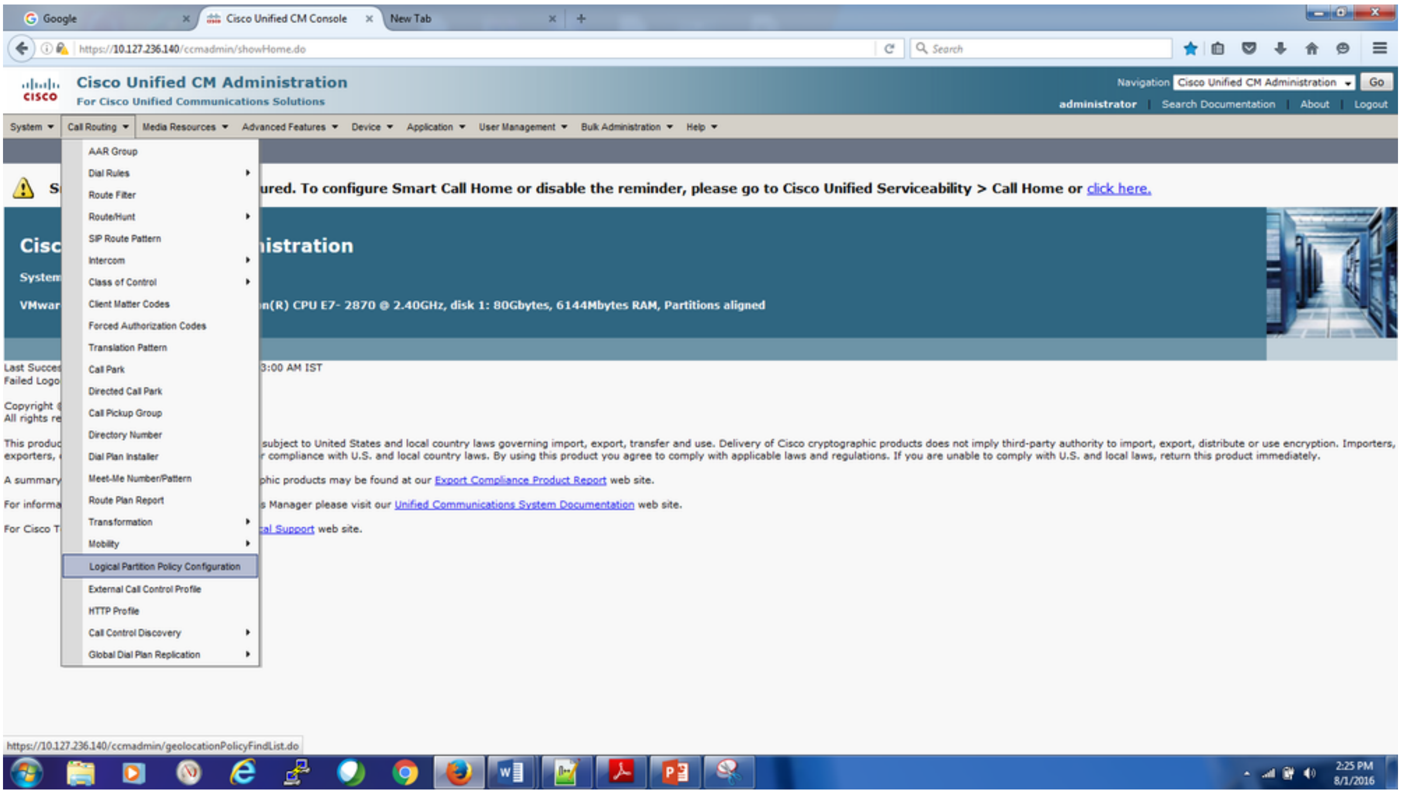
Name* Filter_country

Description

Match Geolocations using the following criteria:

☑ Country using the two-letter abbreviation
☑ State, Region, or Province (A1)
☑ County or Parish (A2)
☑ City or Township (A3)
☐ Borough or City District (A4)
☐ Neighborhood (A5)
☐ Street (A6)
☐ Leading Street Direction, such as N or W (PRD)
☐ Trailing Street Suffix, such as SW (POD)
☐ Address Suffix, such as Avenue, Platz (STS)
☐ Numeric house number (HNO)
☐ House Number Suffix, such as A, 1/2 (HNS)
☐ Landmark (LMK)
☐ Additional Location Information, such as Room Number (LOC)
☐ Floor (FLR)
☐ Name of Business or Resident (NAM)
☐ Zip or Postal Code (PC)

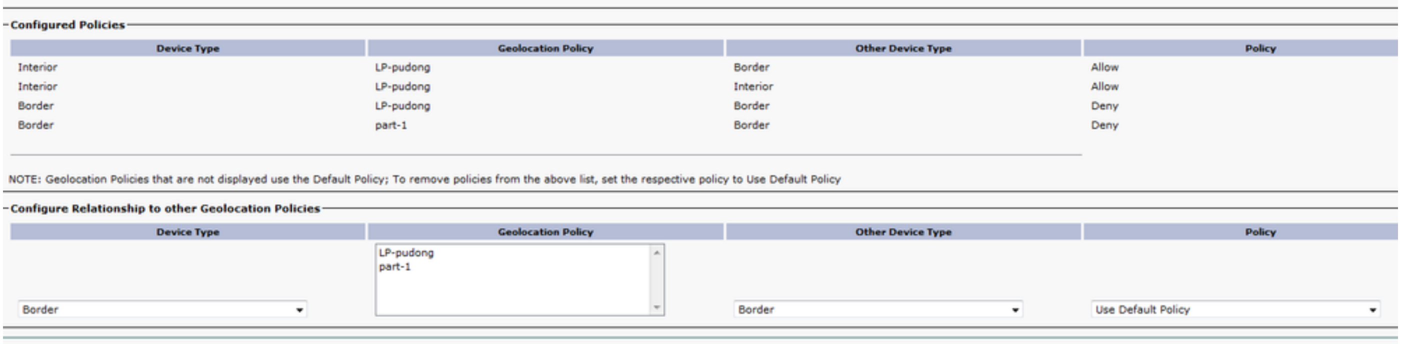
步骤4.配置逻辑分区策略。这是配置中最重要的部分，因为允许或拒绝呼叫的所有决定都取决于其配置。


Cisco Unified CM Administration
For Cisco Unified Communications Solutions
Navigation Cisco Unified CM Administration Go
administrator | Search Documentation | About | Logout
System
Call Routing
Media Resources
Advanced Features
Device
Application
User Management
Bulk Administration
Help
AAR Group
Dial Rules
Route Filter
Route/Hunt
SIP Route Pattern
Intercom
Class of Control
Client Matter Codes
Forced Authorization Codes
Translation Pattern
Call Park
Directed Call Park
Call Pickup Group
Directory Number
Dial Plan Installer
Meet-Me Number/Pattern
Route Plan Report
Transformation
Mobility
Logical Partition Policy Configuration
External Call Control Profile
HTTP Profile
Call Control Discovery
Global Dial Plan Replication

ured. To configure Smart Call Home or disable the reminder, please go to Cisco Unified Serviceability > Call Home or click here.

n(R) CPU E7- 2870 @ 2.40GHz, disk 1: 80Gbytes, 6144Mbytes RAM, Partitions aligned

https://10.127.236.140/ccmadmin/geolocationPolicyFindList.do



Configured Policies

Device Type	Geolocation Policy	Other Device Type	Policy
Interior	LP-pudong	Border	Allow
Interior	LP-pudong	Interior	Allow
Border	LP-pudong	Border	Deny
Border	part-1	Border	Deny

NOTE: Geolocation Policies that are not displayed use the Default Policy; To remove policies from the above list, set the respective policy to Use Default Policy

Configure Relationship to other Geolocation Policies

Device Type	Geolocation Policy	Other Device Type	Policy
Border	LP-pudong part-1	Border	Use Default Policy

步骤5.转到电话的设备配置页面，根据电话所在位置应用地理位置。

同样，转到设备池并添加地理定位配置。

步骤6.接下来转到充当PSTN接口的网关/中继/MGCP端口的配置页面，并应用地理定位配置和地理定位过滤器。

故障排除

步骤1.签入启用逻辑分区**选项的企**业参数设置为**True**。

步骤2.确保设备与设备或设备池级别的有效地理位置相关联。

步骤3.在配置页面中，检查设备是否与有效的地理定位过滤器关联，并在设备或设备池级别选择一些地理定位字段。

步骤4.确保LP GeolocationPolicy记录的字段区分大小写正确，并与地理位置记录配置匹配。

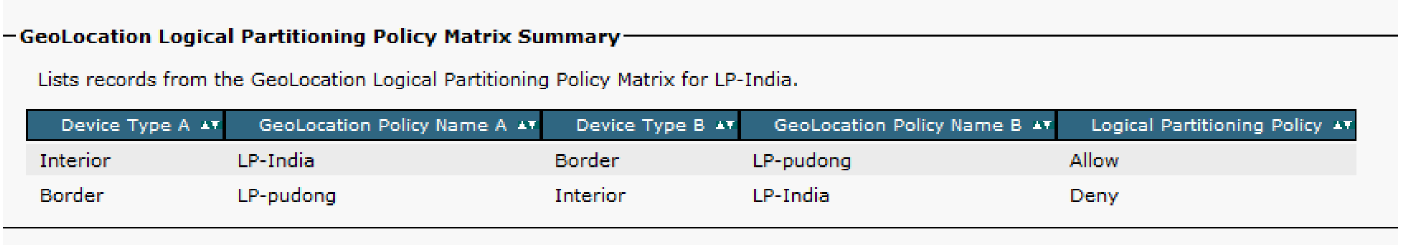
步骤5.也可以借助这些SQL命令从CLI验证地理定位配置、过滤器和策略。

```
run sql select * from geolocationfilter
run sql select * from geolocationpolicy
run sql select * from geolocationpolicymatrix
run sql select * from typelogicalpartitionpolicy
```

步骤6.检查基本配置后，检验地理定位策略之间的关系集。当Enterprise Parameter Logical **Partitioning Default Policy**设**置为Deny**时，检查是否在网关和VoIP站点的Geolocation Policy之间配置了**Allow**逻辑分区策略。相反，如果默认策略为“允许”**，则**检查是否**配置**了“拒绝逻辑分区策略”。

步骤7.确保没有配置重叠或冲突的策略。

示例。



GeoLocation Logical Partitioning Policy Matrix Summary

Lists records from the GeoLocation Logical Partitioning Policy Matrix for LP-India.

Device Type A	GeoLocation Policy Name A	Device Type B	GeoLocation Policy Name B	Logical Partitioning Policy
Interior	LP-India	Border	LP-pudong	Allow
Border	LP-pudong	Interior	LP-India	Deny

LP-India->Interior LP-Poudon->Border Allow

LP-Poudon->Border LP-India->Interior Deny

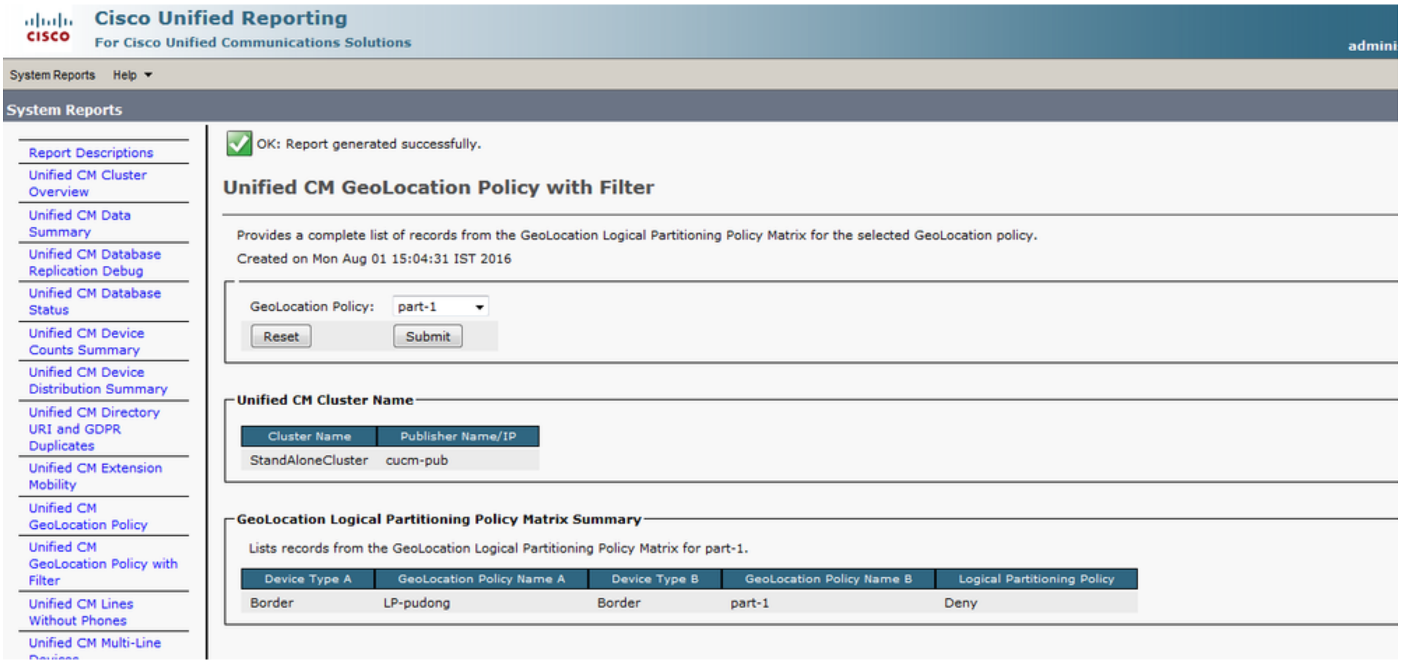
这里，政策之间的逻辑关系是冲突的，如果配置了逻辑内部LP-India到边界LP-Poudon，则表明该关系适用于边界LP-India。这些策略本质上是双向的。

因此，在本例中，根据第一项政策，浦东地区的内部IP电话可以通过PRI-India呼出。同时，允许从PRI-India到浦东地理位置的IP电话的PSTN呼叫。

但是，根据第二项政策，从印度 — PRI到浦东IP电话的呼叫被拒绝，反之亦然。

在这种情况下，切记最后添加的策略将优先。

步骤8.使用Unified Reporting功能跟踪重叠策略以获取逻辑分区策略矩阵。排除故障非常有帮助，因为您可以从单个屏幕了解CUCM中配置的所有逻辑分区策略。Unified CM地理位置策略与过滤器报告为所选地理位置策略提供来自地理位置逻辑分区策略矩阵的完整记录列表，而Unified CM地理位置策略报告提供所有逻辑分区策略的完整记录列表。


Cisco Unified Reporting
For Cisco Unified Communications Solutions
admini
System Reports
Help
System Reports
Report Descriptions
Unified CM Cluster Overview
Unified CM Data Summary
Unified CM Database Replication Debug
Unified CM Database Status
Unified CM Device Counts Summary
Unified CM Device Distribution Summary
Unified CM Directory URI and GDPR Duplicates
Unified CM Extension Mobility
Unified CM GeoLocation Policy
Unified CM GeoLocation Policy with Filter
Unified CM Lines Without Phones
Unified CM Multi-Line
Reset
Submit

OK: Report generated successfully.

Unified CM GeoLocation Policy with Filter

Provides a complete list of records from the GeoLocation Logical Partitioning Policy Matrix for the selected GeoLocation policy.
Created on Mon Aug 01 15:04:31 IST 2016

GeoLocation Policy: part-1

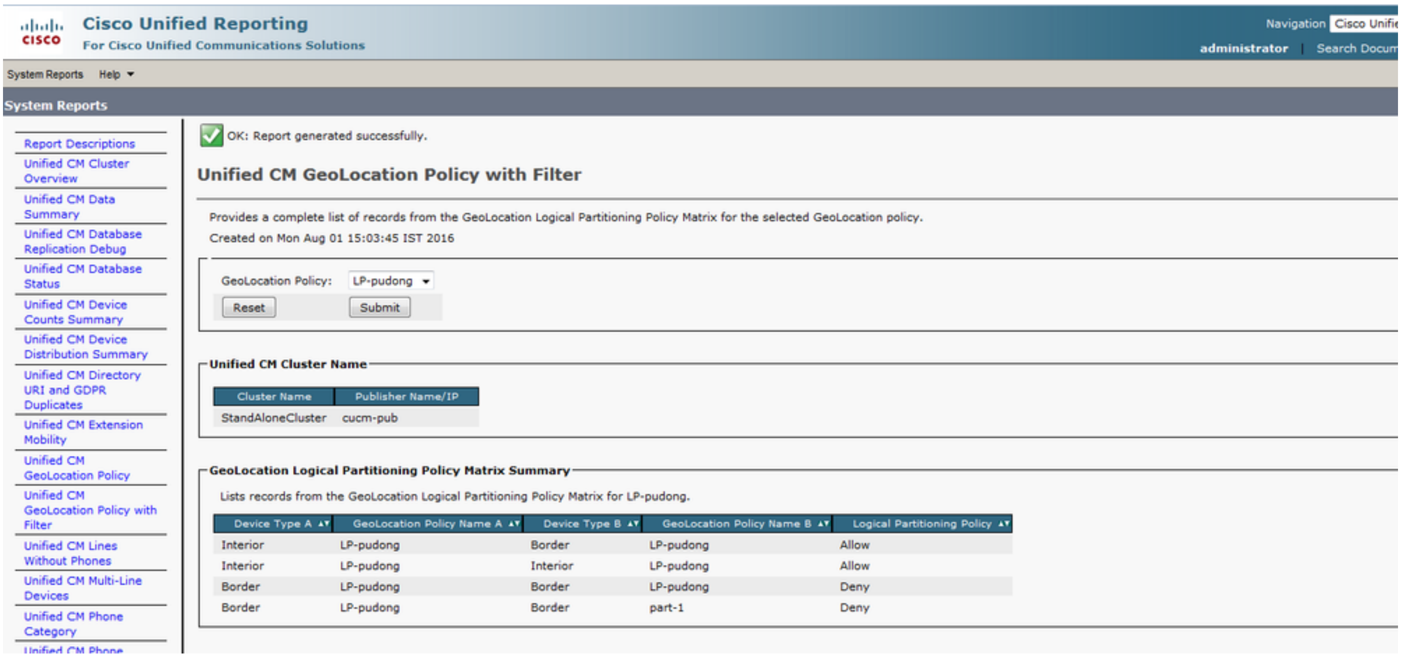
Unified CM Cluster Name

Cluster Name	Publisher Name/IP
StandAloneCluster	cucm-pub

GeoLocation Logical Partitioning Policy Matrix Summary

Lists records from the GeoLocation Logical Partitioning Policy Matrix for part-1.

Device Type A	GeoLocation Policy Name A	Device Type B	GeoLocation Policy Name B	Logical Partitioning Policy
Border	LP-pudong	Border	part-1	Deny


Cisco Unified Reporting
For Cisco Unified Communications Solutions
Navigation
Cisco Unifie
administrator
Search Docum
System Reports
Help
System Reports
Report Descriptions
Unified CM Cluster Overview
Unified CM Data Summary
Unified CM Database Replication Debug
Unified CM Database Status
Unified CM Device Counts Summary
Unified CM Device Distribution Summary
Unified CM Directory URI and GDPR Duplicates
Unified CM Extension Mobility
Unified CM GeoLocation Policy
Unified CM GeoLocation Policy with Filter
Unified CM Lines Without Phones
Unified CM Multi-Line Devices
Unified CM Phone Category
Reset
Submit

OK: Report generated successfully.

Unified CM GeoLocation Policy with Filter

Provides a complete list of records from the GeoLocation Logical Partitioning Policy Matrix for the selected GeoLocation policy.
Created on Mon Aug 01 15:03:45 IST 2016

GeoLocation Policy: LP-pudong

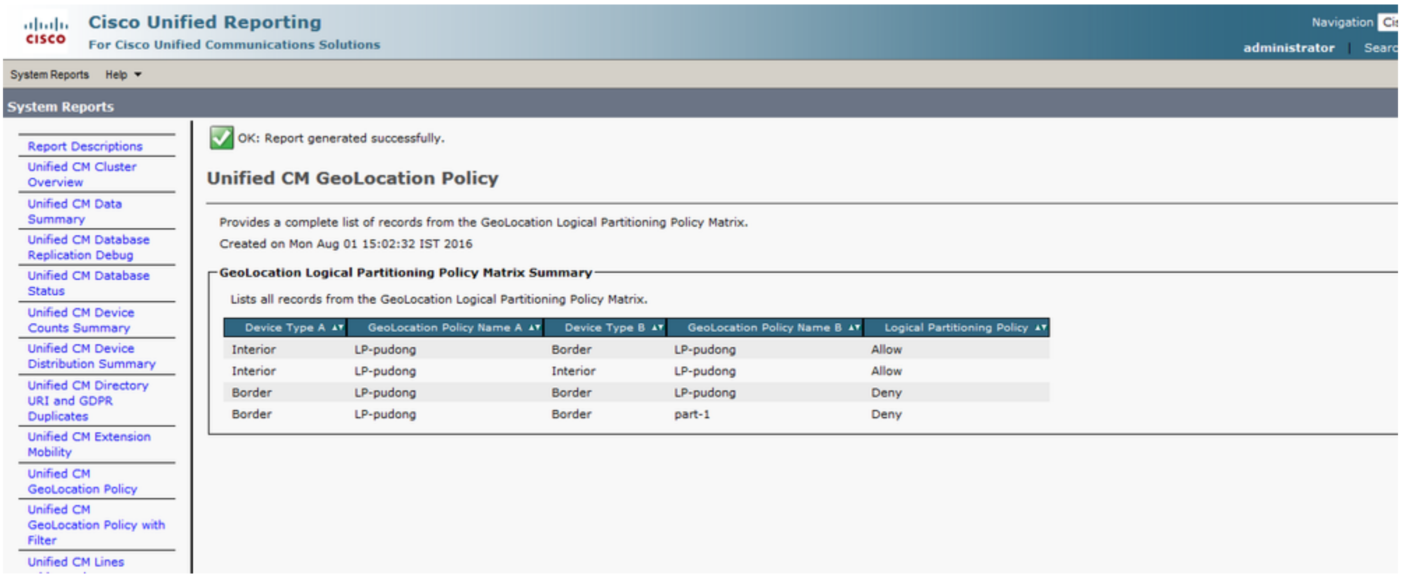
Unified CM Cluster Name

Cluster Name	Publisher Name/IP
StandAloneCluster	cucm-pub

GeoLocation Logical Partitioning Policy Matrix Summary

Lists records from the GeoLocation Logical Partitioning Policy Matrix for LP-pudong.

Device Type A	GeoLocation Policy Name A	Device Type B	GeoLocation Policy Name B	Logical Partitioning Policy
Interior	LP-pudong	Border	LP-pudong	Allow
Interior	LP-pudong	Interior	LP-pudong	Allow
Border	LP-pudong	Border	LP-pudong	Deny
Border	LP-pudong	Border	part-1	Deny


Cisco Unified Reporting
For Cisco Unified Communications Solutions
Navigation
Ci
administrator
Searc
System Reports
Help
System Reports
Report Descriptions
Unified CM Cluster Overview
Unified CM Data Summary
Unified CM Database Replication Debug
Unified CM Database Status
Unified CM Device Counts Summary
Unified CM Device Distribution Summary
Unified CM Directory URI and GDPR Duplicates
Unified CM Extension Mobility
Unified CM GeoLocation Policy
Unified CM GeoLocation Policy with Filter
Unified CM Lines

OK: Report generated successfully.

Unified CM GeoLocation Policy

Provides a complete list of records from the GeoLocation Logical Partitioning Policy Matrix.
Created on Mon Aug 01 15:02:32 IST 2016

GeoLocation Logical Partitioning Policy Matrix Summary

Lists all records from the GeoLocation Logical Partitioning Policy Matrix.

Device Type A	GeoLocation Policy Name A	Device Type B	GeoLocation Policy Name B	Logical Partitioning Policy
Interior	LP-pudong	Border	LP-pudong	Allow
Interior	LP-pudong	Interior	LP-pudong	Allow
Border	LP-pudong	Border	LP-pudong	Deny
Border	LP-pudong	Border	part-1	Deny

步骤9.进行一些测试呼叫并检查其是否有效。实时监控工具(RTMT)经过增强，可跟踪由于新Perfmon计数器中的逻辑分区策略限制而导致的故障数。Perfmon计数器有一个名为Cisco Call Restriction**的新组**。从那里，我们可以跟踪不同场景中的许多呼叫故障，如转接故障、临时会议故障、我开会会议故障、转接故障、基本呼叫故障、呼叫中故障、总呼叫限制故障等。

步骤10.在呼叫期间从RTMT收集CUCM跟踪。在信令分布层(SDL)跟踪中，您可以看到正在选择的策略以及在地理位置策略对之间配置的策略。

CC信号中地理定位信息的通信。

```
| SdlSig    | CcRegisterPartyA                        | restart0                        |
LineControl(1,100,139,3)        | SIPCdpc(1,100,55,17)            | (1,100,45,1).3035-
(SEP0019555CBAE3:10.76.253.14)| [R:NP - HP: 0, NP: 2, LP: 0, VLP: 0, LZP: 0 DBP: 0]CI=23624774
CI.branch=0  CSS= cssIns=0 aarCSS= aarDev=T doNotAppendLineCSS=F lrg= ccBearCap.itc=0
ccBearCap.l=3 ccBearCap.itr=1 protected=1 flushCapIns=0 geolocInfo={geolocPkid=9dc76052-3a37-
78c2-639a-1c02e8f5d3a2, filterPkid=d5bdda76-6a86-56c5-b5fd-6dff82b37493, geolocVal=, devType=4}
locPkid= locName=
```

策略和RSVP信号中地理定位信息的通信。

```
| SdlSig    | PolicyAndRSVPRegisterReq                | wait                            |
RSVPSessionMgr(1,100,76,1)      | SIPCdpc(1,100,55,17)            | (1,100,45,1).3035-
(SEP0019555CBAE3:10.76.253.14)| [R:NP - HP: 0, NP: 0, LP: 0, VLP: 0, LZP: 0 DBP: 0]CI= 23624774
Branch= 0  reg=Default cap=5 loc=0 MRGLPkid= PrecLev=5 VCall=F VCapa=F regiState=0 medReq=0
dataCapFl=2 ipAddrMode=0 status=0 geolocInfo={geolocPkid=9dc76052-3a37-78c2-639a-1c02e8f5d3a2,
filterPkid=d5bdda76-6a86-56c5-b5fd-6dff82b37493, geolocVal=, devType=4}
| SdlSig    | PolicyRegisterReq                       | await_init                      |
LPSession(1,100,26,21)          | RSVPSessionMgr(1,100,76,1)      | (1,100,45,1).3035-
(SEP0019555CBAE3:10.76.253.14)| [R:NP - HP: 0, NP: 0, LP: 0, VLP: 0, LZP: 0 DBP: 0]CI= 23624774
Branch= 0  geolocInfo={geolocPkid=9dc76052-3a37-78c2-639a-1c02e8f5d3a2, filterPkid=d5bdda76-
6a86-56c5-b5fd-6dff82b37493, geolocVal=, devType=4}
```

需要考虑的要点

- 媒体设备（如媒体终端点）MTP、（会议网桥）CFB、信号器、（通话等待音乐）MoH不需要与地理定位值关联。
- 对于VoIP到VoIP设备呼叫或仅包含VoIP参与者的功能，没有LP策略检查。换句话说，“内部到内部”政策始终是允许的。
- LPPolicyManager是一个单一进程，它与InMemDB接口，并作为LP策略树在呼叫处理中维护策略。在CUCM服务启动期间，LPPolicyManager从InMemDB表读取策略并构建LP策略树。DB中策略的添加/删除/更新会导致将通知更改为LPolicyManager，并且更改在LP策略树中受影响。

逻辑分区策略检查。

```
001853112| 2008/09/26 11:50:39.687| 001| AppInfo   |                                        |
|                                 |                                 |
| LPPolicyManager -getLogicalPartitionPolicy, GeolocInfoA[pkid=31396408-3d83-74a9-1655-
d2f0a05dd0a4, filter=d5bdda76-6a86-56c5-b5fd-6dff82b37493, val=, devType=4]
001853113| 2008/09/26 11:50:39.687| 001| AppInfo   |                                      |
|                                 |                                 |
| LPPolicyManager -getLogicalPartitionPolicy, GeolocInfoB[pkid=9dc76052-3a37-78c2-639a-
1c02e8f5d3a2, filter=d5bdda76-6a86-56c5-b5fd-6dff82b37493, val=, devType=8]
```

- 跟踪中显示的DevType描述设备类型。

devType **=4(**UserDevice)用于这些设备。

- 电话（SCCP、SIP、第三方）
- VG224模拟电话
- CTI路由点和CTI端口
- 思科Unity语音邮件(SCCP)
- MGCP端口(FXS)

如果这些**设备为**devType =3(AccessDevice)。

- 集群间中继(ICT)，网守控制和非网守控制H.225中继
- MGCP端口(E1、T1、PRI、BRI、FXO)
- 网关（例如H.323网关）

此**设备的**devType =8(SIPAccessDevice)。

- SIP 中继

参考

- http://www.cisco.com/c/en/us/td/docs/voice_ip_comm/cucm/admin/10_0_1/ccmfeat/CUCM_BK_F3AC1C0F_00_cucm-features-services-guide-100/CUCM_BK_F3AC1C0F_00_cucm-features-services-guide-100_chapter_011100.html?bookSearch=true
- http://www.cisco.com/c/en/us/support/docs/voice-unified-communications/unified-communications-manager-callmanager/116038-logical-partition-geolocation-00.html

已知的 Bug

https://bst.cloudapps.cisco.com/bugsearch/bug/CSCsz91044

https://bst.cloudapps.cisco.com/bugsearch/bug/CSCuo85770

https://bst.cloudapps.cisco.com/bugsearch/bug/CSCsq79192

https://bst.cloudapps.cisco.com/bugsearch/bug/CSCsr91423

https://bst.cloudapps.cisco.com/bugsearch/bug/CSCsy73509

https://bst.cloudapps.cisco.com/bugsearch/bug/CSCtb33479

https://bst.cloudapps.cisco.com/bugsearch/bug/CSCtb05434

https://bst.cloudapps.cisco.com/bugsearch/bug/CSCsv65724

https://bst.cloudapps.cisco.com/bugsearch/bug/CSCsq73894

https://bst.cloudapps.cisco.com/bugsearch/bug/CSCsr38397