

THINKTEL COMMUNICATIONS CISCO CUCM 10.5.2

SIP-TRUNK Configuration



CUCM SIP-TRUNK Configuration



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1 INTRODUCTION

1.1 INTRODUCTION

This Chapter explains how to configure the SIP-TRUNK connection between the CISCO C881 Voice ISR and the telephone service provider THINKTEL COMMUNICATIONS.

THINKTEL COMMUNICATIONS as a VOIP Provider gives you an account with accompanying credentials (username - password - Proxy IP Address)





2 SETTING UP CUBES

2.1 SETUP CUBE1

2.1.1 IP ADDRESSES LIST

- ISR 3825 Router vlan11 (Data) : 10.0.2.1
- ISR 3825 Router vlan15 (Voice) : 10.0.15.1 •
- ISR 3825 GIG0/1 •
- Default Gateway
- ThinkTel Proxy Server 1 : 206.80.250.100 •
- ThinkTel SIP Domain Name 1 : tor.trk.tprm.ca •
- ThinkTel Proxy Server 2 • : 208.68.17.52
- ThinkTel SIP Domain Name 2 : edm.trk.tprm.ca •

: 192.168.1.106

: 192.168.1.1

Public IP Address : vvv.xxx.yyy.zzz

2.1.2 CUBE1 IP ROUTES

CUBE1#show ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2 i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2 ia - IS-IS inter area, * - candidate default, U - per-user static route o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP + - replicated route, % - next hop override

Gateway of last resort is 192.168.1.1 to network 0.0.0.0

S* 0.0.0.0/0 [1/0] via 192.168.1.1

10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks

- С 10.0.2.0/24 is directly connected, GigabitEthernet0/0.11
- 10.0.2.1/32 is directly connected, GigabitEthernet0/0.11 L
- С 10.0.15.0/24 is directly connected, GigabitEthernet0/0.15
- L 10.0.15.1/32 is directly connected, GigabitEthernet0/0.15

192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks

- С 192.168.1.0/24 is directly connected, GigabitEthernet0/1
- L 192.168.1.106/32 is directly connected, GigabitEthernet0/1
- vvv.xxx.yyy.0/32 is subnetted, 1 subnets
- С vvv.xxx.yyy.zzz is directly connected, Loopback1000

CUBE1#



CUBE1#show running-config



2.1.3 CUBE1 RUNNING CONFIGURATION

```
Building configuration...
Current configuration : 6996 bytes
!
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
1
hostname CUBE1
T.
boot-start-marker
boot-end-marker
!
enable secret 5 $1$krE0$zqeRZx9liRKH053FrZSYN0
!
no aaa new-model
!
no network-clock-participate wic 1
1
dot11 syslog
ip source-route
!
ip cef
!
ip dhcp excluded-address 10.0.2.1 10.0.2.20
ip dhcp excluded-address 10.0.15.1 10.0.15.20
!
ip dhcp pool Data
network 10.0.2.0 255.255.255.0
default-router 10.0.2.1
option 150 ip 10.0.2.181
dns-server 192.168.1.10
I
ip dhcp pool Voice
network 10.0.15.0 255.255.255.0
default-router 10.0.15.1
option 150 ip 10.0.2.181
dns-server 192.168.1.10
```





```
!
ip domain lookup source-interface GigabitEthernet0/1
ip name-server 192.168.1.10
no ipv6 cef
1
multilink bundle-name authenticated
voice-card 0
voice service pots
voice service voip
ip address trusted list
 ipv4 206.80.250.100 (Thinktel Proxy 1)
 ipv4 159.18.161.101 (Thinktel Meta Switch)
 ipv4 10.0.2.181
                      (CUCM1 TFTP Server)
 ipv4 10.0.2.182
                      (CUCM2 Server)
 ipv4 208.68.17.52
                      (Thinktel Proxy 2)
 ipv4 192.168.3.106
address-hiding
allow-connections sip to sip
fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback pass-through g711ulaw
sip
 options-ping 60
 early-offer forced
 g729 annexb-all
 sip-profiles 1
!
voice class codec 1
codec preference 1 g711ulaw
1
voice class codec 10
codec preference 1 g711ulaw
I.
voice class sip-profiles 1
request INVITE sdp-header Connection-Info modify "192.168.1.106" "vvv.xxx.yyy.zzz"
request INVITE sdp-header Audio-Connection-Info modify "192.168.1.106" "vvv.xxx.yyy.zzz"
!
voice translation-rule 1
rule 1 /^9\(.+\)/ /\1/
1
voice translation-profile Strip9FromOutgoingCalls
translate called 1
L
```



CUCM SIP-TRUNK Configuration



```
crypto pki token default removal timeout 0
1
crypto pki trustpoint TP-self-signed-3803704253
enrollment selfsigned
subject-name cn=IOS-Self-Signed-Certificate-3803704253
revocation-check none
rsakeypair TP-self-signed-3803704253
!
crypto pki certificate chain TP-self-signed-3803704253
certificate self-signed 01
 3082022B 30820194 A0030201 02020101 300D0609 2A864886 F70D0101 05050030
 31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274
 69666963 6174652D 33383033 37303432 3533301E 170D3135 31313235 32313539
 30395A17 0D323030 31303130 30303030 305A3031 312F302D 06035504 03132649
 4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D33 38303337
 30343235 3330819F 300D0609 2A864886 F70D0101 01050003 818D0030 81890281
 8100F75B 99D36AD4 2FEC1B41 4CC6D7E4 F5C68E3B 99B8AF63 CCD15184 905DA1E3
 B90E08D8 1D392915 639C86FB C27BFB57 8C06F2D2 D0FA22F2 7B58D649 03B98919
 B8C22C7E D9721887 806A68A1 E1ED3D44 4D807E7D F8C00FDB 90027046 1D81DF88
 89B08043 4615542D 03FD11D8 617F21F8 CDE059E6 53570422 CA36B760 90E57C7C
 FD770203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF 301F0603
 551D2304 18301680 147EE674 B57713F7 02DD4B9B 4B26FFF4 4623515F 63301D06
 03551D0E 04160414 7EE674B5 7713F702 DD4B9B4B 26FFF446 23515F63 300D0609
 2A864886 F70D0101 05050003 81810013 8D2BD5CF D8071658 21190BCC 46469E66
 E6E8A593 8CCAC65F A96B1713 86F6E56B BC140E2F A0B37CEE 5DEC30F7 AFDD491E
 77EA6F24 28AEA656 9E2395B7 33A04291 1B25ABB6 243B85EF 6AA66AA0 6C4198A9
 C03803A9 5F3C238D 9D777501 0A745E0F F574E8BA A03ABF19 09A638A2 B8D586ED
 00E15EA5 B85147D5 EDFB9C03 E09EB1
     quit
!
license udi pid CISCO3825 sn FCZ113071GD
username student privilege 15 secret 5 $1$.foz$KdNxZTRCLIW6lK6xD.7K9.
1
redundancy
I
controller T1 0/1/0
interface Loopback1000
ip address vvv.xxx.yyy.zzz 255.255.255.255
!
interface GigabitEthernet0/0
no ip address
duplex auto
speed 100
```

Reference

·IIIII CISCO.

CUCM SIP-TRUNK Configuration



```
media-type rj45
!
interface GigabitEthernet0/0.11
description data VLAN
encapsulation dot1Q 11
ip address 10.0.2.1 255.255.255.0
ip nat inside
ip virtual-reassembly in
!
interface GigabitEthernet0/0.15
description voice VLAN
encapsulation dot1Q 15
ip address 10.0.15.1 255.255.255.0
ip nat inside
ip virtual-reassembly in
!
interface GigabitEthernet0/1
ip address 192.168.1.106 255.255.255.0
ip nat outside
ip virtual-reassembly in
duplex auto
speed 10
media-type rj45
!
ip forward-protocol nd
ip http server
ip http authentication local
ip http secure-server
1
ip nat pool overload 192.168.1.106 192.168.1.106 prefix-length 24
ip nat inside source list 1 pool overload overload
ip route 0.0.0.0 0.0.0.0 192.168.1.1
1
control-plane
voice-port 0/2/0
!
voice-port 0/2/1
1
voice-port 0/2/2
1
voice-port 0/2/3
!
voice-port 0/3/0
```

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```
caller-id enable
!
voice-port 0/3/1
!
mgcp profile default
!
dial-peer voice 1500 pots
destination-pattern 4388998320
port 0/3/0
!
dial-peer voice 1501 pots
group-name elie
destination-pattern 5144160246
port 0/3/1
!
dial-peer voice 1003 voip
destination-pattern 4506887676
session protocol sipv2
session target ipv4:208.68.17.52
!
dial-peer voice 1004 voip
destination-pattern 5145872514
session protocol sipv2
session target ipv4:10.0.2.181
!
dial-peer voice 1502 voip
translation-profile outgoing Strip9FromOutgoingCalls
destination-pattern 9[2-9]..[2-9].....
session protocol sipv2
session target ipv4:206.80.250.100:5060
dtmf-relay rtp-nte
codec g711ulaw
no vad
I
dial-peer voice 1503 voip
translation-profile outgoing Strip9FromOutgoingCalls
destination-pattern 91[2-9]...[2-9].....
session protocol sipv2
session target ipv4:206.80.250.100:5060
dtmf-relay rtp-nte
codec g711ulaw
no vad
!
dial-peer voice 1504 voip
```



CUCM SIP-TRUNK Configuration



```
destination-pattern 4..
session protocol sipv2
session target ipv4:96.23.160.51:5060
codec g711ulaw
!
dial-peer voice 1505 voip
destination-pattern 5...
session protocol sipv2
session target ipv4:10.0.2.181:5060
codec g711ulaw
I
dial-peer voice 1506 voip
translation-profile outgoing Strip9FromOutgoingCalls
destination-pattern 9[2-9]...[2-9].....
session protocol sipv2
session target ipv4:208.68.17.52:5060
dtmf-relay rtp-nte
codec g711ulaw
no vad
!
dial-peer voice 53 voip
!
gateway
timer receive-rtp 1200
1
sip-ua
credentials username 5144160245 password 7 072A0D454B582A241A13392D56 realm tor.trk.tprm.ca
credentials username 5144160245 password 7 072A0D454B582A241A13392D56 realm edm.trk.tprm.ca
authentication username 5144160245 password 7 15372705017B18052532070341 realm tor.trk.tprm.ca
authentication username 5144160245 password 7 080460470C4836361F0A3E2578 realm edm.trk.tprm.ca
connection-reuse
I.
gatekeeper
shutdown
line con 0
exec-timeout 120 0
password cisco
logging synchronous
login
line aux 0
line vty 04
login local
transport input telnet ssh
```





line vty 5 15 login local transport input telnet ssh I. scheduler allocate 20000 1000 ntp master 1 end

2.2 SETUP CUBE2

2.2.1 IP ADDRESSES LIST

•

•

- ISR 2811 Router vlan11 (Data) : 10.0.3.1
- ISR 2811 Router vlan15 (Voice) : 10.0.17.1
- ISR 2811 FAST0/1 : 192.168.3.106 •
 - : 192.168.3.1
- Default Gateway ThinkTel Proxy Server 1 : 206.80.250.100 •
- ThinkTel SIP Domain Name 1 : tor.trk.tprm.ca •
 - ThinkTel Proxy Server 2 : 208.68.17.52
- ThinkTel SIP Domain Name 2 : edm.trk.tprm.ca
- Public IP Address : aaa.bbb.ccc.ddd

2.2.2 CUBE2 IP ROUTES

CUBE2#show ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

- D EIGRP, EX EIGRP external, O OSPF, IA OSPF inter area
- N1 OSPF NSSA external type 1, N2 OSPF NSSA external type 2
- E1 OSPF external type 1, E2 OSPF external type 2
- i IS-IS, su IS-IS summary, L1 IS-IS level-1, L2 IS-IS level-2
- ia IS-IS inter area, * candidate default, U per-user static route
- o ODR, P periodic downloaded static route, H NHRP, l LISP
- + replicated route, % next hop override

Gateway of last resort is 192.168.3.1 to network 0.0.0.0

- S* 0.0.0.0/0 [1/0] via 192.168.3.1
 - 10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
- 10.0.3.0/24 is directly connected, FastEthernet0/0.11 С
- L 10.0.3.1/32 is directly connected, FastEthernet0/0.11
- С 10.0.17.0/24 is directly connected, FastEthernet0/0.17
- L 10.0.17.1/32 is directly connected, FastEthernet0/0.17

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192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.3.0/24 is directly connected, FastEthernet0/1
L 192.168.3.106/32 is directly connected, FastEthernet0/1
CUBE2#

2.2.3 CUBE2 RUNNING CONFIGURATION

CUBE2#show running-config Building configuration...

```
Current configuration : 5028 bytes
! Last configuration change at 16:38:03 UTC Sun Jan 10 2016
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname CUBE2
boot-start-marker
boot-end-marker
!
enable secret 5 $1$WWE2$Wgb2nW0NLCv5aAlC4Egjy1
!
no aaa new-model
!
dot11 syslog
ip source-route
1
ip cef
ip dhcp excluded-address 10.0.3.1 10.0.3.20
ip dhcp excluded-address 10.0.17.1 10.0.17.20
!
ip dhcp pool Data
network 10.0.3.0 255.255.255.0
default-router 10.0.3.1
option 150 ip 10.0.2.181
dns-server 192.168.1.10
!
ip dhcp pool Voice
network 10.0.17.0 255.255.255.0
```



CUCM SIP-TRUNK Configuration



```
default-router 10.0.17.1
option 150 ip 10.0.2.181
dns-server 192.168.1.10
!
ip domain lookup source-interface FastEthernet0/1
ip name-server 192.168.1.10
no ipv6 cef
!
multilink bundle-name authenticated
voice service voip
ip address trusted list
 ipv4 192.168.3.9
 ipv4 206.80.250.100
 ipv4 208.68.17.52
 ipv4 10.0.2.181
 ipv4 10.0.2.182
 ipv4 10.0.2.183
 ipv4 vvv.xxx.yyy.zzz
 ipv4 159.18.161.101
 ipv4 192.168.2.9
address-hiding
allow-connections sip to sip
fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback pass-through g711ulaw
sip
 options-ping 60
 early-offer forced
 g729 annexb-all
 pass-thru content sdp
 no call service stop
voice class sip-profiles 1
request INVITE sdp-header Connection-Info modify "192.168.1.106" "aaa.bbb.ccc.ddd"
request INVITE sdp-header Audio-Connection-Info modify "192.168.3.106" "aaa.bbb.ccc.ddd"
voice translation-rule 1
rule 1 /^9\(.+\)/ /\1/
!
voice translation-profile Strip9FromOutgoingCalls
translate called 1
I
voice-card 0
crypto pki token default removal timeout 0
```



!



```
license udi pid CISCO2811 sn FTX1023A2Z6
archive
log config
 hidekeys
!
redundancy
!
interface Loopback1000
ip address aaa.bbb.ccc.ddd 255.255.255.0
I.
interface FastEthernet0/0
no ip address
duplex auto
speed auto
!
interface FastEthernet0/0.11
description data VLAN
encapsulation dot1Q 11
ip address 10.0.3.1 255.255.255.0
ip nat inside
ip virtual-reassembly in
interface FastEthernet0/0.17
encapsulation dot1Q 17
ip address 10.0.17.1 255.255.255.0
ip nat inside
ip virtual-reassembly in
interface FastEthernet0/1
ip address 192.168.3.106 255.255.255.0
ip nat outside
ip virtual-reassembly in
duplex auto
speed auto
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
ip nat pool overload 192.168.3.106 192.168.3.106 prefix-length 24
ip nat inside source list 1 pool overload overload
ip route 0.0.0.0 0.0.0.0 192.168.3.1
I.
```







```
nls resp-timeout 1
cpd cr-id 1
1
control-plane
1
voice-port 0/1/0
1
voice-port 0/1/1
!
mgcp profile default
!
dial-peer voice 10 voip
destination-pattern 438968....
session protocol sipv2
session target ipv4:192.168.3.9
dtmf-relay rtp-nte
codec g711ulaw
no vad
I
dial-peer voice 100 voip
destination-pattern 514317....
session protocol sipv2
session target ipv4:206.80.250.100
dtmf-relay rtp-nte
codec g711ulaw
no vad
I
dial-peer voice 1502 voip
translation-profile outgoing Strip9FromOutgoingCalls
destination-pattern 9[2-9]...[2-9].....
session protocol sipv2
session target ipv4:206.80.250.100:5060
voice-class sip profiles 1
dtmf-relay rtp-nte
codec g711ulaw
no vad
!
dial-peer voice 1503 voip
translation-profile outgoing Strip9FromOutgoingCalls
destination-pattern 91[2-9]...[2-9].....
session protocol sipv2
session target ipv4:206.80.250.100:5060
dtmf-relay rtp-nte
codec g711ulaw
```



CUCM SIP-TRUNK Configuration



```
no vad
!
dial-peer voice 1506 voip
translation-profile outgoing Strip9FromOutgoingCalls
destination-pattern 9[2-9]..[2-9].....
session protocol sipv2
session target ipv4:208.68.17.52:5060
dtmf-relay rtp-nte
codec g711ulaw
no vad
I
dial-peer voice 1504 voip
destination-pattern 4..
session protocol sipv2
session target ipv4:96.23.160.51:5060
codec g711ulaw
I
dial-peer voice 1003 voip
destination-pattern 5144160245
session protocol sipv2
session target ipv4:192.168.1.106:5060
codec g711ulaw
no vad
L
dial-peer voice 1004 voip
destination-pattern 5145872514
session protocol sipv2
session target ipv4:192.168.1.106:5060
codec g711ulaw
!
dial-peer voice 1505 voip
destination-pattern 5...
session protocol sipv2
session target ipv4:10.0.3.184
codec g711ulaw
no vad
!
gateway
timer receive-rtp 1200
!
sip-ua
credentials username 5144160245 password 7 13203B1B0E5D370B26251A1267 realm tor.trk.tprm.ca
credentials username 5144160245 password 7 03217702035E126D43082B2445 realm edm.trk.tprm.ca
authentication username 5144160245 password 7 13203B1B0E5D370B26251A1267 realm tor.trk.tprm.ca
```





authentication username 5144160245 password 7 06232328491F3A380816202A5E realm edm.trk.tprm.ca retry invite 3 connection-reuse ! gatekeeper shutdown 1 line con 0 password cisco login line aux 0 line vty 04 password cisco login transport input all line vty 5 15 password cisco login transport input all ! scheduler allocate 20000 1000 end





3 SETTING UP SWITCHS

3.1 SETUP SWITCH CONNECTED TO CUBE1

A catalyst 3560 POE SWITCH interface FastEthernet0/33 is connected to the CUBE1 interface GIG0/0 with a VLAN trunking Port

3.1.1 IP ADDRESS LIST

- SWITCH1 VLAN11 interface : 10.0.2.2
- Default Gateway : 10.0.2.1

3.1.2 SWITCH 3560 (SWITCH1) RUNNING CONFIGURATION

3560_1#show running-config Building configuration...

```
Current configuration : 3685 bytes
1
version 12.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
1
hostname 3560_1
1
boot-start-marker
boot-end-marker
!
enable password cisco
I.
no aaa new-model
system mtu routing 1500
1
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
interface FastEthernet0/1
I
interface FastEthernet0/2
```

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! interface FastEthernet0/3 interface FastEthernet0/4 ! interface FastEthernet0/5 interface FastEthernet0/6 I interface FastEthernet0/7 interface FastEthernet0/8 interface FastEthernet0/9 I interface FastEthernet0/10 interface FastEthernet0/11 interface FastEthernet0/12 interface FastEthernet0/13 1 interface FastEthernet0/14 ! interface FastEthernet0/15 interface FastEthernet0/16 interface FastEthernet0/17 ! interface FastEthernet0/18 1 interface FastEthernet0/19 interface FastEthernet0/20 ! interface FastEthernet0/21 I interface FastEthernet0/22 interface FastEthernet0/23 ! interface FastEthernet0/24





! interface FastEthernet0/25 interface FastEthernet0/26 I. interface FastEthernet0/27 interface FastEthernet0/28 I interface FastEthernet0/29 I interface FastEthernet0/30 interface FastEthernet0/31 interface FastEthernet0/32 I interface FastEthernet0/33 switchport trunk encapsulation dot1q switchport mode trunk I interface FastEthernet0/34 switchport trunk encapsulation dot1q switchport mode trunk ! interface FastEthernet0/35 switchport trunk encapsulation dot1q switchport mode trunk spanning-tree portfast ! interface FastEthernet0/36 switchport access vlan 11 switchport mode access switchport voice vlan 15 spanning-tree portfast ! interface FastEthernet0/37 switchport access vlan 11 switchport mode access switchport voice vlan 15 spanning-tree portfast ! interface FastEthernet0/38 switchport access vlan 11

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switchport mode access switchport voice vlan 15 spanning-tree portfast ! interface FastEthernet0/39 switchport access vlan 11 switchport mode access switchport voice vlan 15 spanning-tree portfast ! interface FastEthernet0/40 switchport access vlan 11 switchport mode access switchport voice vlan 15 spanning-tree portfast ! interface FastEthernet0/41 switchport access vlan 11 switchport mode access switchport voice vlan 15 spanning-tree portfast ! interface FastEthernet0/42 switchport access vlan 11 switchport mode access switchport voice vlan 15 spanning-tree portfast ! interface FastEthernet0/43 switchport access vlan 11 switchport mode access switchport voice vlan 15 spanning-tree portfast I interface FastEthernet0/44 switchport access vlan 11 switchport mode access switchport voice vlan 15 spanning-tree portfast ! interface FastEthernet0/45 switchport access vlan 11 switchport mode access switchport voice vlan 15

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```
spanning-tree portfast
!
interface FastEthernet0/46
switchport access vlan 11
switchport mode access
switchport voice vlan 15
spanning-tree portfast
!
interface FastEthernet0/47
switchport access vlan 11
switchport mode access
switchport voice vlan 15
spanning-tree portfast
L
interface FastEthernet0/48
switchport access vlan 11
switchport mode access
spanning-tree portfast
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
1
interface GigabitEthernet0/3
1
interface GigabitEthernet0/4
1
interface Vlan1
no ip address
shutdown
I.
interface Vlan11
ip address 10.0.2.2 255.255.255.0
!
ip default-gateway 10.0.2.1
ip classless
ip http server
ip http secure-server
!
line con 0
password cisco
login
line vty 04
password cisco
```

Reference





login line vty 5 15 password cisco login ! end

3560_1#

3.2 SETUP SWITCH CONNECTED TO CUBE2

A catalyst 2900 SWITCH interface FastEthernet0/1 is connected to the CUBE2 interface FASTO/0 with a VLAN trunking Port

3.2.1 IP ADDRESS LIST

- SWITCH1 VLAN11 interface : 10.0.3.2
- Default Gateway : 10.0.3.1

3.2.2 Switch 2900 (Switch2) RUNNING CONFIGURATION

2900_3#show running-config Building configuration...

```
Current configuration:
!
version 12.0
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname 2900_3
!
ip subnet-zero
I.
interface FastEthernet0/1
switchport trunk encapsulation dot1q
switchport mode trunk
I.
interface FastEthernet0/2
switchport trunk encapsulation dot1q
```





switchport mode trunk ! interface FastEthernet0/3 I. interface FastEthernet0/4 interface FastEthernet0/5 1 interface FastEthernet0/6 I. interface FastEthernet0/7 I. interface FastEthernet0/8 ! interface FastEthernet0/9 switchport access vlan 11 switchport voice vlan 17 spanning-tree portfast ! interface FastEthernet0/10 switchport access vlan 17 ! interface FastEthernet0/11 switchport access vlan 11 1 interface FastEthernet0/12 I interface FastEthernet0/13 interface FastEthernet0/14 ! interface FastEthernet0/15 1 interface FastEthernet0/16 interface FastEthernet0/17 ! interface FastEthernet0/18 I interface FastEthernet0/19 interface FastEthernet0/20 ! interface FastEthernet0/21



CUCM SIP-TRUNK Configuration



! interface FastEthernet0/22 1 interface FastEthernet0/23 ! interface FastEthernet0/24 1 interface VLAN1 no ip directed-broadcast no ip route-cache shutdown ! interface VLAN11 ip address 10.0.3.2 255.255.255.0 no ip directed-broadcast no ip route-cache ! ip default-gateway 10.0.3.1 ! line con 0 password cisco login transport input none stopbits 1 line vty 04 password cisco login line vty 5 15 password cisco login ! end 2900_3#

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4 CALL MANAGER

4.1 How TO INSTALL THE FIRST CISCO UNIFIED COMMUNICATIONS MANAGER (PUBLISHER)

4.1.1 PREPARE THE VIRTUAL MACHINE

As a virtual platform it is strongly recommended to stick to VMware products as they are successfully passing the hardware checks of the CUCM installation.

You can use the vSphere or a VMware player. In order to do that, you have to configure a new virtual machine with the following parameters:

- Operating system Red Hat Enterprise Linux 6 (64 bit).
- Processors dedicate at least 2 Cores for faster installation. You can reduce it to 1 after installation.
- Memory dedicate at least 4GB, you can reduce them to 2 after installation.
- HDD one partition of 80GB is the minimum required.
- Network adapter bridge it to the physical interface.
- CD/DVD attach the bootable ISO version of Call Manager
- Display 0- Auto
- Remove all other peripherals as they will consume more resources.

lardware Options		
Device	Summary 4 GB 2 80 GB Using drive G: Bridged (Automatic) Auto detect	Memory Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB. Memory for this virtual machine: 4096 MB 64 GB - 32 GB - 16 GB - 8 GB - 4 GB - 2 GB - 1 GB - 2 GB - 1 GB - 2 5948 MB 512 MB - 5948 MB 512 MB - 64 MB - 128 MB - 64 MB - 8 MB - 4 MB - 16 MB - 17 MB - 18 MB
	Add Remov	/e

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4.1.2 CUCM1 SERVER STEP-BY-STEP

• Power on the virtual machine





Click on "SKIP"

Running the system installer - please wait. mount: block device /dev/sr0 is write-protected, mounting read-only Detecting Server Hardware - this can take several minutes VMware: passed detection validation Detecting Server Hardware - this can take several minutes VMware: passed detection validation Beginning Hardware Setup and Firmware Management Hardware Setup Complete





	Product Deployment Selection
Select th	e product or product suite to be installed:
(<mark>#</mark>) Cisco	Unified Communications Manager
Products	not supported on current hardware:
Cisco Uni	ty Connection
	ОК
1	

Choose Cisco Unified Communications Manager and click on "OK"



- Click on "Yes"
- This step will trigger the installation wizard which is going to ask you some details regarding this particular installation.



Click on "Proceed"



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The first question in the pseudo GUI is regarding the type of the installation , is it an upgrade or it is a new installation ?

• Click on "No"



Click on "Continue"



Choose your Time zone and click on "OK"







• Click on "Continue"



Click on "No"



• In order to use a static IP Address click on "No"







- Enter the hostname you choose e.g. "cucm1"
- Enter your static IP Address e.g. "10.0.2.181" and the IP MASK
- Enter your GW Address e.g. "10.0.2.1"



Click on "Yes" enable the DNS Client

DNS Clie	nt Configuration
Primary DNS	192.168.1.10
Secondary DNS (optional)	
Doma i n	elsa-telecom.com
OK	Back Help

- Enter your Primary DNS IP Address e.g. "192.168.1.10"
- Add the host "cucm1.elsa-telecom.com" to your DNS

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å		DNS Manager			_		>
File Action View Help							
DNS	Name Mame	Туре	Data	Timestamp			
	<pre></pre>						
 2.0.10.in-addr.arpa 3.0.10.in-addr.arpa Trust Points Conditional Forwarders Global Logs 	ForestDnsZones (same as parent folder) (same as parent folder) (same as parent folder) (same as parent folder) (same as parent folder) admin	Start of Authority (SOA) Name Server (NS) Host (A) Host (A) Host (A) Host (A)	[714], dc02.elsa-telecom.c dc02.elsa-telecom.com. 192.168.1.10 10.0.2.10 192.168.1.12 10.0.2.181	static static 1/1/2016 8:00:00 AM 1/1/2016 8:00:00 AM static static			

• The host having the FQDN "cucm1.elsa-telecom.com" should be created in your DNS server



• Enter your administrative login configuration ID and password



• Enter the details for the local Certificate Authority

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• Because it is your first Node in the cluster choose "Yes"



• Enter the IP Address for the NTP servers , e.g. your router IP Address



• Enter the InterCluster password , this same password will be used to encrypt your archive as well







Click on "No"



• Choose "Remind me later to configure Smart Call Home"



• Enter the credentials for the Web interface







- By selecting "OK" the installation process will begin.
- The whole installation process can take up to one hour, if everything was fine during the installation process in the end you should get the following screen.

The installation of Cisco Unified lly.	Communications	Manager 1	has	completed	successfu
Cisco Unified Communications Mana cucm5 login: _	ger 10.5.2.1000	0-5			

4.1.3 CUCM1 ACCESSING THE SYSTEM

You can access the system by using Internet Explorer browser and enter the http://cucm-ip-address URL e.g. or http://cucm1-fqdn e.g. http://cucm1.elsa-telecom.com

\frown		
(4)	(->) 🔰 https://cucm1.elsa-telecom.com	C
~)		
€€	Example 2 A start for the second seco	60 12 29
8	There is a problem with this website's security certificate.	
	The security certificate presented by this website was not issued by a trusted certificate	e authority.
	Security certificate problems may indicate an attempt to fool you or intercept any data server.	a you send to the
	We recommend that you close this webpage and do not continue to this website	
		•
	Click here to close this webpage.	•
	 Click here to close this webpage. Continue to this website (not recommended). 	•

• Click on "Continue to this website"

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Click on "Cisco Unified Communications Manager"



• Enter your administrative login configuration ID and password

aluda Cisco Unified CM Administration		Navigation Cisco Unified CM Administration 💙 Go
CISCO For Cisco Unified Communications Solutions		elie Search Documentation About Logout
System Call Routing Media Resources Advanced Features I	Device Application User Management Bulk Administration Help	
A The system is operating on demo licenses t expiration in order to avoid losing the ability	hat will expire in 59 days. Add this system to a Cisco Pr cy to provision users and devices.	ime License Manager and install sufficient licenses to cover its usage before
🔥 WARNING: No backup device is configured.	This is required to recover your system in case of failu	re.
🔥 Smart Call Home is not configured. To confi	gure Smart Call Home or disable the reminder, please g	jo to Cisco Unified Serviceability > Call Home or <u>click here.</u>

4.1.4 CUCM1 ACTIVATING FEATURE SERVICES

Cisco Unified CM Administration For Cisco Unified Communications Solutions System • Cal Routing • Media Resources • Advanced Features •	Device Application User Management Bulk Administration Help	Navigator <mark>Cako Unified Serviceability V</mark> GG elie Search Documentation About Logout
The system is operating on demo licenses characteristics in order to avoid losing the ab WARNING: No backup device is configure Smart Call Home is not configured. To con	that will expire in 59 days. Add this system to a Cisco P lity to provision users and devices. d. This is required to recover your system in case of failu ifigure Smart Call Home or disable the reminder, please	rime License Manager and install sufficient licenses to cover its usage before ire. go to Cisco Unified Serviceability > Call Home or <u>click here</u> .

• Use the Navigation drop-down list at the upper right to select the "Cisco Unified Serviceability" item and click on "Go"







• On the Cisco Unified Serviceability page, navigate to Tools >> Service Activation



• Select the Server "cucm1.elsa-telecom.com" and click on "Go"

CM Services				
	Service Name	Activation Status		
	Cisco CallManager	Deactivated		
	Cisco Unified Mobile Voice Access Service	Deactivated		
✓	Cisco IP Voice Media Streaming App	Deactivated		
	Cisco CTIManager	Deactivated		
	Cisco Extension Mobility	Deactivated		
	Cisco Extended Functions	Deactivated		
	Cisco DHCP Monitor Service	Deactivated		
	Cisco Intercluster Lookup Service	Deactivated		
	Cisco Location Bandwidth Manager	Deactivated		
	Cisco Directory Number Alias Sync	Deactivated		
	Cisco Directory Number Alias Lookup	Deactivated		
	Cisco Dialed Number Analyzer Server	Deactivated		
	Cisco Dialed Number Analyzer	Deactivated		
	Cisco Tftp	Deactivated		

- Check Mark the following services: "Cisco CallManager"
 "Cisco IP Voice Media Streaming App"
 - "Cisco Tftp"



Click on "Save"





Activating/Deactivating services will take a while for the page to refresh.	e Please wait
	Activating/Deactivating services will take a while for the page to refresh.

Click on "Save" and then click "OK"

СМ	Services					
	Service Name	Activation Status				
	Cisco CallManager	Activated				
	Cisco Unified Mobile Voice Access Service	Deactivated				
✓	Cisco IP Voice Media Streaming App	Activated				
	Cisco CTIManager	Deactivated				
	Cisco Extension Mobility	Deactivated				
	Cisco Extended Functions	Deactivated				
	Cisco DHCP Monitor Service	Deactivated				
	Cisco Intercluster Lookup Service	Deactivated				
	Cisco Location Bandwidth Manager	Deactivated				
	Cisco Directory Number Alias Sync	Deactivated				
	Cisco Directory Number Alias Lookup	Deactivated				
	Cisco Dialed Number Analyzer Server	Deactivated				
	Cisco Dialed Number Analyzer	Deactivated				
✓	Cisco Tftp	Activated				
СТІ	Services					
	Service Name	Activation Status				
	Cisco IP Manager Assistant	Deactivated				
	Cisco WebDialer Web Service	Deactivated				
	Self Provisioning IVR	Deactivated				
CDR	Services					
	Service Name	Activation Status				
	Cisco SOAP - CDRonDemand Service	Deactivated				
	Cisco CAR Web Service	Deactivated				
Data	Database and Admin Services					
	Service Name	Activation Status				
	Cisco Bulk Provisioning Service	Deactivated				
✓	Cisco AXL Web Service	Activated				
	Cisco UXL Web Service	Deactivated				
	Cisco TAPS Service	Deactivated				





4.2 How TO INSTALL THE SECOND CISCO UNIFIED COMMUNICATIONS MANAGER (SUBSCRIBER)

4.2.1 ADDING THE NEW SERVER TO THE SYSTEM

- Access to the system http://cucm1.elsa-telecom.com
- Navigation >> CUCM Administration >> GO
- System >> Server >>

cisco	Cisco Unified CM Administrat				
System 👻	Call Routing Media Resources Advanced Feature				
Find and List Servers					
Add Ne	w				

Click on "Add New"

Cisco Unified CM Administration For Cisco Unified Communications Solutions			Navi	gation Cisco Unified CM A	dministration 🗸
System Call Routing Media Resources Advanced Features	Device • Application •	User Management 👻	Bulk Administration 👻	Help 👻	About Logo
Server Configuration				Related Links: Back	To Find/List 🗸 🤇
Next					
- Status					
i) Status: Ready					
- Add a Sonior					
Server Type* CUCM Voice/Video	2				
Next					

Choose "CUCM Voice/Video" as Sever Type and click on "Next"

System Call Routing	 Media Resources • 	Advanced Features	✓ Device ✓	Application -	User Management 👻
Server Configuration					
Save					
Status: Ready					
- Server Information -					
Server Type	CUCM Voice	/Video			
Host Name/IP Address*	cucm2.elsa	-telecom.com		×	
IPv6 Address (for dual I	Pv4/IPv6)				
MAC Address					
Description					
LBM Intercluster Replica	tion Group C None >	iation —		× Mio	w Dotaile
	< None >			• <u>vie</u>	w Details
Save					

• Click on "Save"







4.2.2 ADDING THE NEW SERVER TO THE DNS SERVER

• Add the host "cucm2.elsa-telecom.com" to your DNS

Å		DNS Manager			
File Action View Help					
🔶 🧼 🙍 📰 🔀 📄 🙆					
NS	Name	Туре	Data	Timestamp	
DC02	📳 _msdcs				
🛯 🧮 Forward Lookup Zones	🛄 _sites				
Image: Second	🚞 _tcp				
⊿ 🛐 elsa-telecom.com	🛄 _udp				
Image: Second	DomainDnsZones				
isites	ForestDnsZones				
⊳ <u>t</u> cp	(same as parent folder)	Start of Authority (SOA)	[728], dc02.elsa-telecom.c	static	
⊳ iii _udp	(same as parent folder)	Name Server (NS)	dc02.elsa-telecom.com.	static	
DomainDnsZones	(same as parent folder)	Host (A)	10.0.2.10	1/8/2016 9:00:00 AM	
ForestUnsZones	(same as parent folder)	Host (A)	192.168.1.10	1/8/2016 9:00:00 AM	
Keverse Lookup Zones	admin	Host (A)	192.168.1.12	static	
1.108.192.in-addr.arpa	cucm1	Host (A)	10.0.2.181	static	
2.0.10.in-addr.arpa	cucm2	Host (A)	10.0.2.182	static	
Trust Points	cucm3	Host (A)	10.0.2.183	static	
Conditional Forwarders	Cucm4	Host (A)	10.0.3.184	static	
		Host (A)	10.0.2.185	static	
Giobal Logs	Cochis	i lost (rij	1010121100	20000	

4.2.3 CREATING THE NEW VIRTUAL MACHINE

- Create the virtual machine as described in chapter 4.1.1
- Power on the virtual machine and follow the same steps as described in chapter 4.1.2

	— Static Network Configur	ration
Host Name	cucm2	
IP Address	10.0.2.182	
IP Mask	255.255.255.0	
GW Address	10.0.2.1	
OR	Back	Help

• On Static Network Configuration enter the hostname and the IP Address of the CUCM2

ahaha CISCO.





Click on "No"



• Click on "Ok"



Click on "No"





First	Node Access Configu	iration
Connectivity to Fi	rst Node:	
Host Name	cucm1	
IP Address	10.0.2.181	
Security Password	****	
Confirm Password	*****	
OK	Back	Help

- Enter the CUCM1 InterCluster credentials already created for CUCM1 and the IP Address of CUCM1
- Click on "OK"
- By selecting "OK" the installation process will begin.
- The whole installation process can take up to one hour, if everything was fine during the installation process in the end you should get the following screen.

The installation of Cisco Unified Communications Manager has completed successfully. Cisco Unified Communications Manager 10.5.2.10000-5 cucm5 login: _

4.2.4 CUCM2 ACTIVATING FEATURE SERVICES



- Use the Navigation drop-down list at the upper right to select the "Cisco Unified Serviceability" item and click on "Go"
- On the Cisco Unified Serviceability page, navigate to Tools >> Service Activation
- Select the Server "cucm2.elsa-telecom.com" and click on "Go"





CM Services						
	Service Name	Activation Status				
\checkmark	Cisco CallManager	Deactivated				
\checkmark	Cisco IP Voice Media Streaming App	Deactivated				
\checkmark	Cisco CTIManager	Deactivated				
	Cisco Extension Mobility	Deactivated				
	Cisco Extended Functions	Deactivated				
	Cisco DHCP Monitor Service	Deactivated				
	Cisco Location Bandwidth Manager	Deactivated				
	Cisco Directory Number Alias Lookup	Deactivated				
\checkmark	Cisco Dialed Number Analyzer Server	Deactivated				
	Cisco Dialed Number Analyzer	Deactivated				
	Cisco Tftp	Deactivated				
сті	CTI Services					

Service Name	Activation Status
Cisco IP Manager Assistant	Deactivated
Cisco WebDialer Web Service	Deactivated

Database and Admin Services				
	Service Name	Activation Status		
\checkmark	Cisco AXL Web Service	Activated		
	Cisco UXL Web Service	Deactivated		

 Check Mark the following services: "Cisco CallManager" "Cisco IP Voice Media Streaming App" "Cisco CTIManager" "Cisco Dialed Number Analyzer Server" "Cisco AXL Web Service"



Click on "OK"

•





- 4.3 CONFIGURING CALL MANAGER
- 4.3.1 CREATING CM GROUPS