



THINKTEL COMMUNICATIONS

CISCO CUCM 10.5.2

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 : 192.168.1.106
- Default Gateway : 192.168.1.1
- 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 : 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

C 10.0.2.0/24 is directly connected, GigabitEthernet0/0.11

L 10.0.2.1/32 is directly connected, GigabitEthernet0/0.11

C 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

C 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

C vvv.xxx.yyy.zzz is directly connected, Loopback1000

CUBE1#

2.1.3 CUBE1 RUNNING CONFIGURATION

CUBE1#show running-config
Building configuration...

```
Current configuration : 6996 bytes
!
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname CUBE1
!
boot-start-marker
boot-end-marker
!
enable secret 5 $1$krE0$zqeRZx9liRKH053FrZSYNO
!
no aaa new-model
!
no network-clock-participate wic 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
!
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  
!  
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  
  !  
  voice class codec 10  
    codec preference 1 g711ulaw  
  !  
  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/  
  !  
  voice translation-profile Strip9FromOutgoingCalls  
    translate called 1  
  !
```

```
crypto pki token default removal timeout 0
!
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.
!
redundancy
!
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
```

```
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
!
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
!
control-plane
!
voice-port 0/2/0
!
voice-port 0/2/1
!
voice-port 0/2/2
!
voice-port 0/2/3
!
voice-port 0/3/0
```




```
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
!
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
```

```
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
!
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
!
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
!
gatekeeper
shutdown
!
line con 0
exec-timeout 120 0
password cisco
logging synchronous
login
line aux 0
line vty 0 4
login local
transport input telnet ssh
```

```
line vty 5 15
login local
transport input telnet ssh
!
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
- Default Gateway : 192.168.3.1
- 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

C 10.0.3.0/24 is directly connected, FastEthernet0/0.11

L 10.0.3.1/32 is directly connected, FastEthernet0/0.11

C 10.0.17.0/24 is directly connected, FastEthernet0/0.17

L 10.0.17.1/32 is directly connected, FastEthernet0/0.17

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$Wgb2nW0NLCv5aAIC4Eggy1
!
no aaa new-model
!
dot11 syslog
ip source-route
!
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
```

```
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
!
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  
!  
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  
!
```

```
nls resp-timeout 1
cpd cr-id 1
!
control-plane
!
voice-port 0/1/0
!
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
!
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
!
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
```

```
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
!
dial-peer voice 1504 voip
destination-pattern 4..
session protocol sipv2
session target ipv4:96.23.160.51:5060
codec g711ulaw
!
dial-peer voice 1003 voip
destination-pattern 5144160245
session protocol sipv2
session target ipv4:192.168.1.106:5060
codec g711ulaw
no vad
!
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
!
line con 0
password cisco
login
line aux 0
line vty 0 4
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
!
version 12.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname 3560_1
!
boot-start-marker
boot-end-marker
!
enable password cisco
!
no aaa new-model
system mtu routing 1500
!
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
interface FastEthernet0/1
!
interface FastEthernet0/2
```



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

```
!  
interface FastEthernet0/25  
!  
interface FastEthernet0/26  
!  
interface FastEthernet0/27  
!  
interface FastEthernet0/28  
!  
interface FastEthernet0/29  
!  
interface FastEthernet0/30  
!  
interface FastEthernet0/31  
!  
interface FastEthernet0/32  
!  
interface FastEthernet0/33  
  switchport trunk encapsulation dot1q  
  switchport mode trunk  
!  
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
```

```
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
!
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
```

```
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
!
interface FastEthernet0/48
switchport access vlan 11
switchport mode access
spanning-tree portfast
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface GigabitEthernet0/3
!
interface GigabitEthernet0/4
!
interface Vlan1
no ip address
shutdown
!
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 0 4
password cisco
```

```
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 FAST0/0 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
!
interface FastEthernet0/1
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface FastEthernet0/2
switchport trunk encapsulation dot1q
```



```
switchport mode trunk
!  
interface FastEthernet0/3
!  
interface FastEthernet0/4
!  
interface FastEthernet0/5
!  
interface FastEthernet0/6
!  
interface FastEthernet0/7
!  
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
!  
interface FastEthernet0/12
!  
interface FastEthernet0/13
!  
interface FastEthernet0/14
!  
interface FastEthernet0/15
!  
interface FastEthernet0/16
!  
interface FastEthernet0/17
!  
interface FastEthernet0/18
!  
interface FastEthernet0/19
!  
interface FastEthernet0/20
!  
interface FastEthernet0/21
```



```
!  
interface FastEthernet0/22  
!  
interface FastEthernet0/23  
!  
interface FastEthernet0/24  
!  
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 0 4  
password cisco  
login  
line vty 5 15  
password cisco  
login  
!  
end
```

2900_3#

4 CALL MANAGER

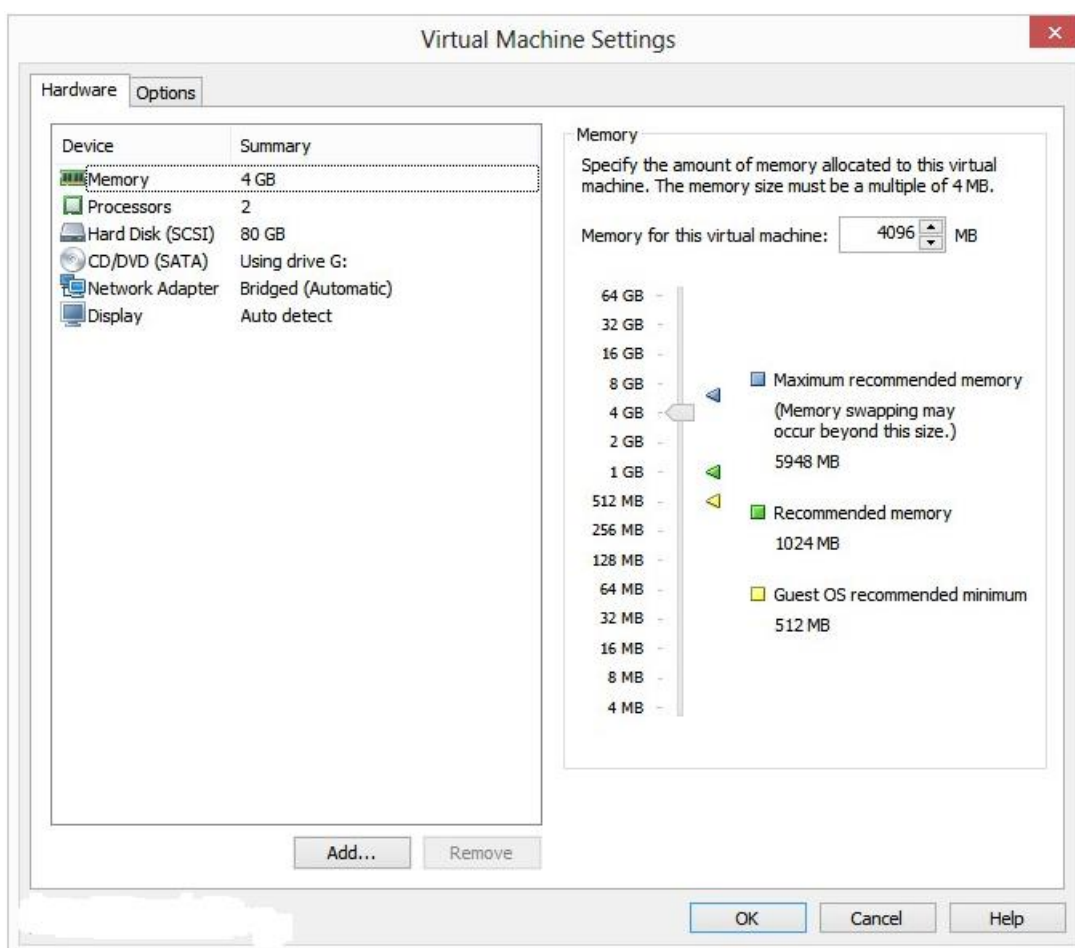
4.1 HOW TO INSTALL THE FIRST CISCO UNIFIED COMMUNICATIONS MANAGER (PUBLISHER)

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.

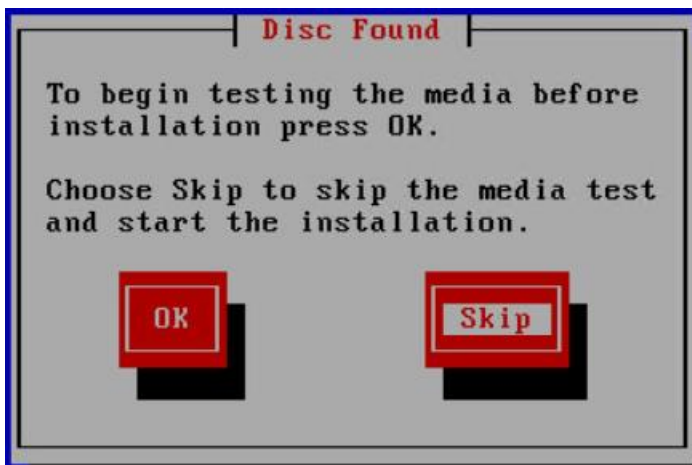


4.1.2 CUCM1 SERVER STEP-BY-STEP

- Power on the virtual machine

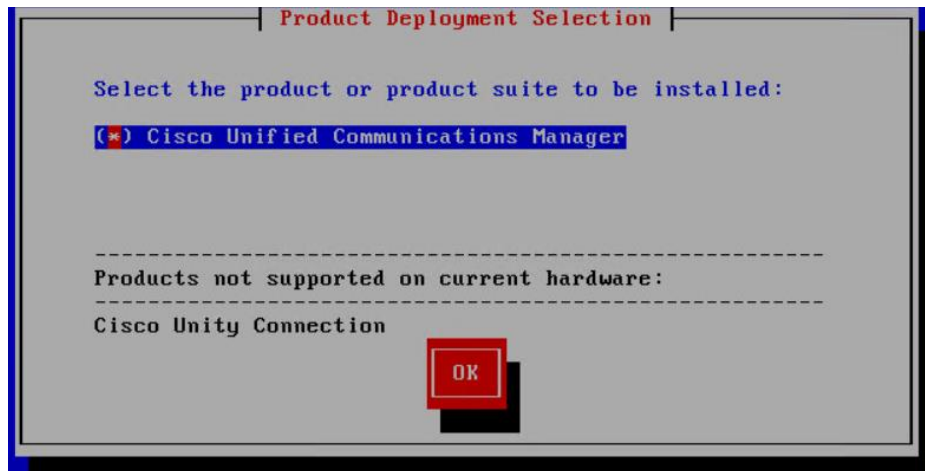
```
ISOLINUX 3.11 2005-09-02 Copyright (C) 1994-2005 H. Peter Anvin
Loading vmlinuz.....
..
Loading initrd.img.....
.....
.....
.....
Ready.
Probing EDD (edd=off to disable)... ok

Greetings.
anaconda installer init version 13.21.149 starting
mounting /proc filesystem... done
creating /dev filesystem... done
starting udev...done
mounting /dev/pts (unix98 pty) filesystem... done
mounting /sys filesystem... done
trying to remount root filesystem read write... done
mounting /tmp as tmpfs... done
-
```

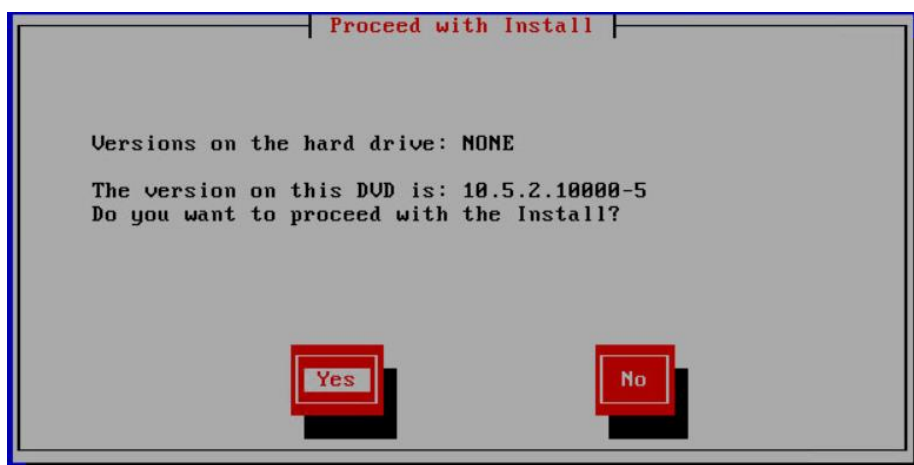


- Click on "SKIP"

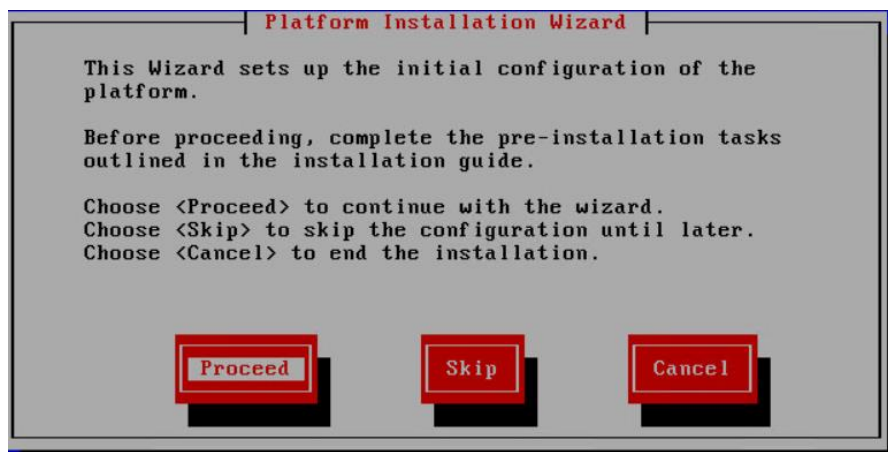
```
Running the system installer - please wait.
mount: block device /dev/sr0 is write-protected, mounting read-only
Detecting Server Hardware - this can take several minutes
VMware: passed detection validation
Detecting Server Hardware - this can take several minutes
VMware: passed detection validation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



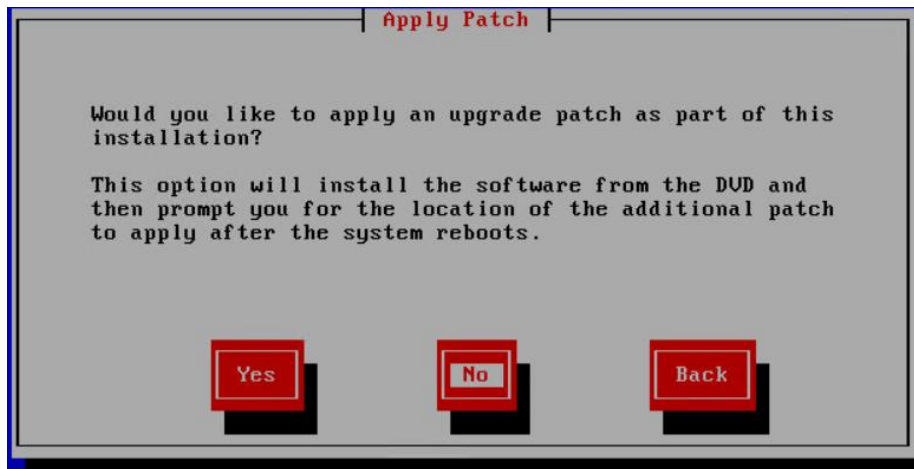
- Choose Cisco Unified Communications Manager and click on “OK”



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

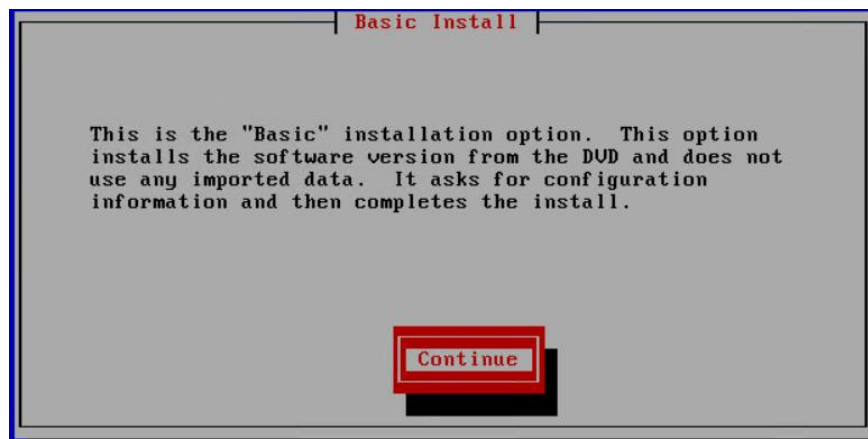


- Click on “Proceed”



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”



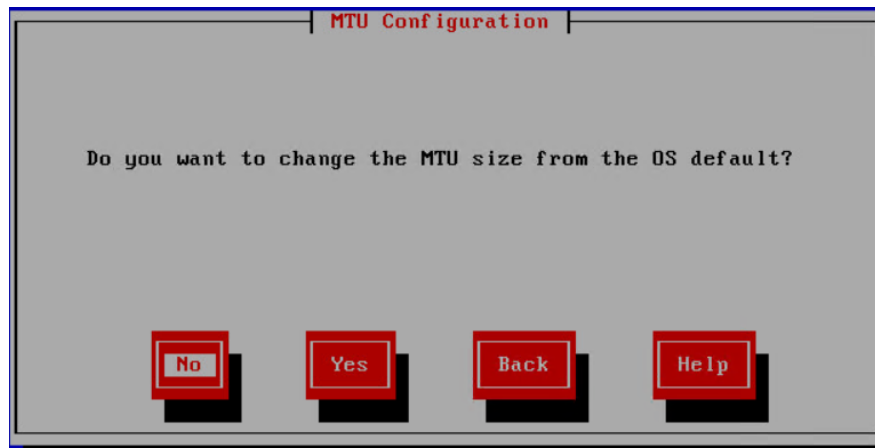
- Click on “Continue”



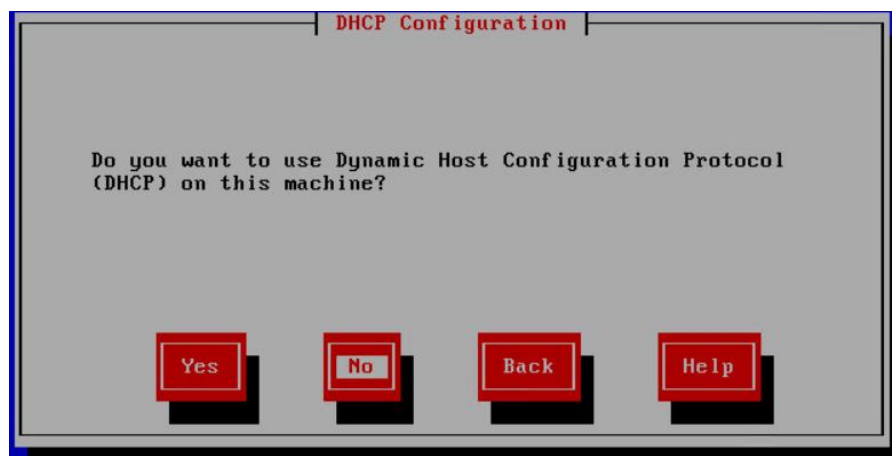
- Choose your Time zone and click on “OK”



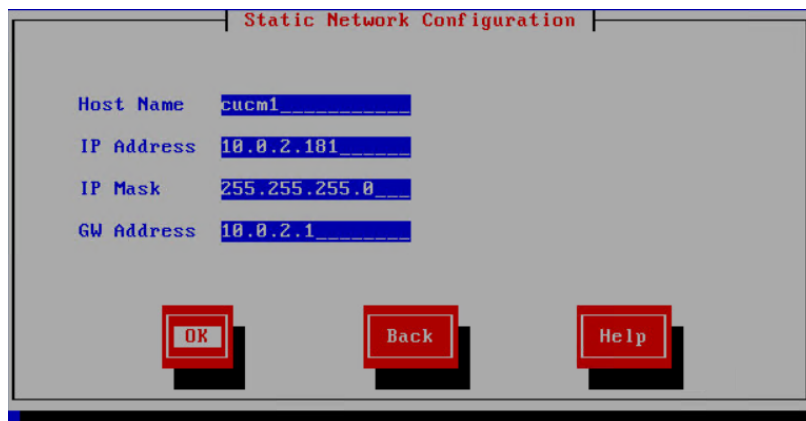
- Click on "Continue"



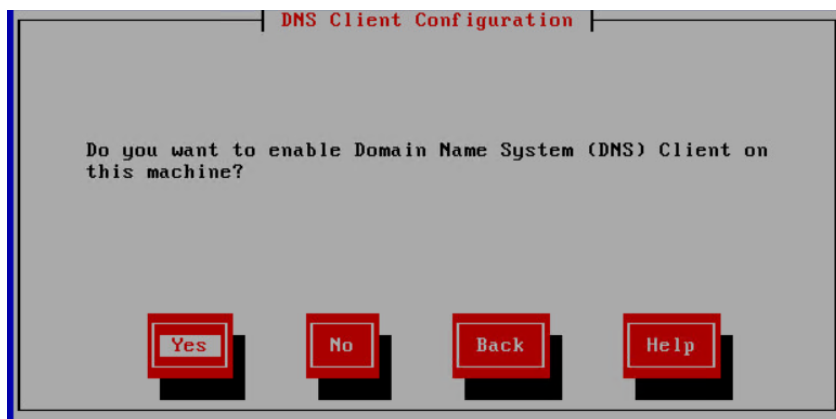
- Click on "No"



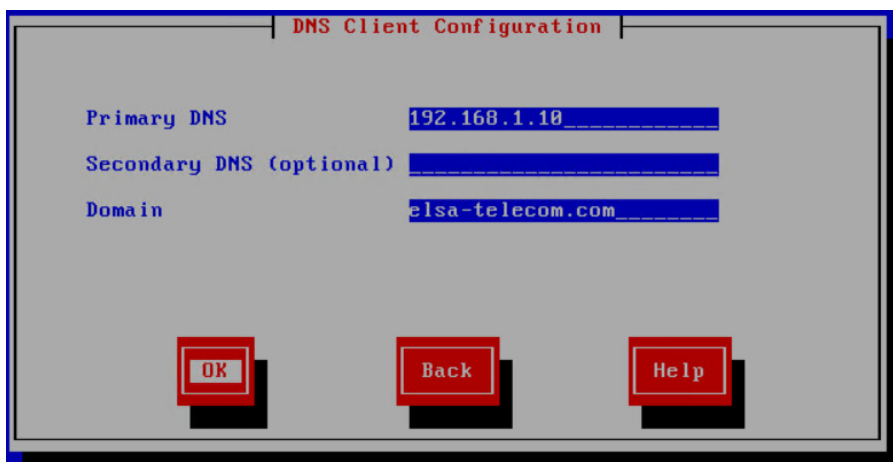
- In order to use a static IP Address click on "No"



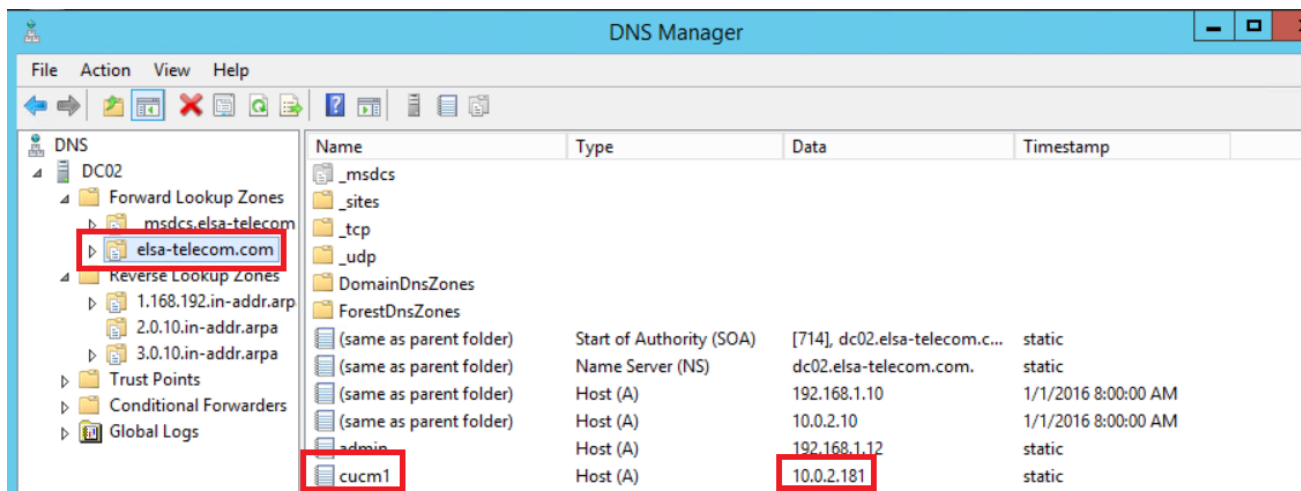
- Enter the hostname you choose e.g. "cucm1"
- Enter your static IP Address e.g. "10.0.2.181" and the IP MASK
- Enter your GW Address e.g. "10.0.2.1"



- Click on "Yes" enable the DNS Client



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



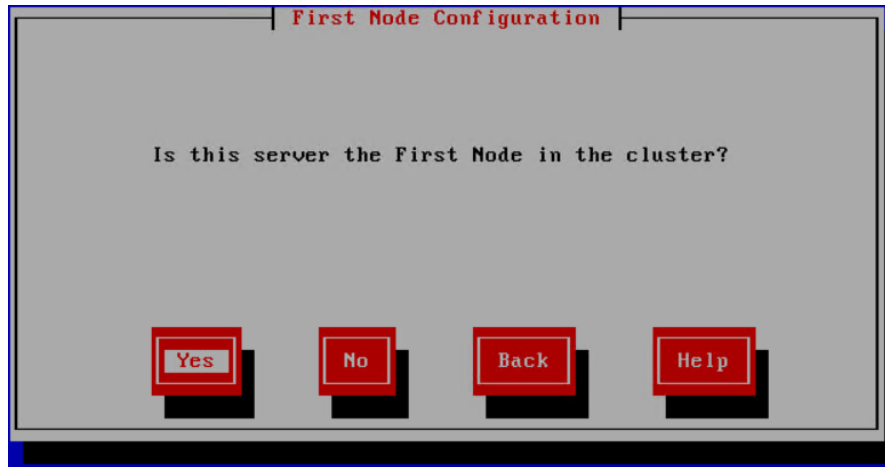
- The host having the FQDN “cucm1.elsa-telecom.com” should be created in your DNS server



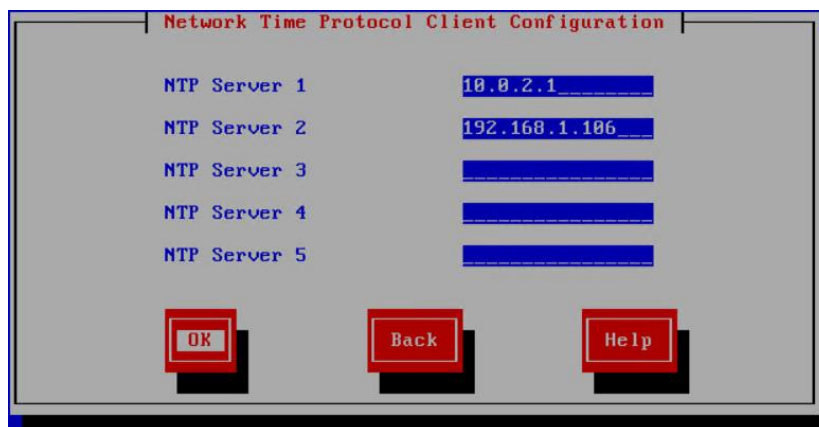
- Enter your administrative login configuration ID and password



- Enter the details for the local Certificate Authority



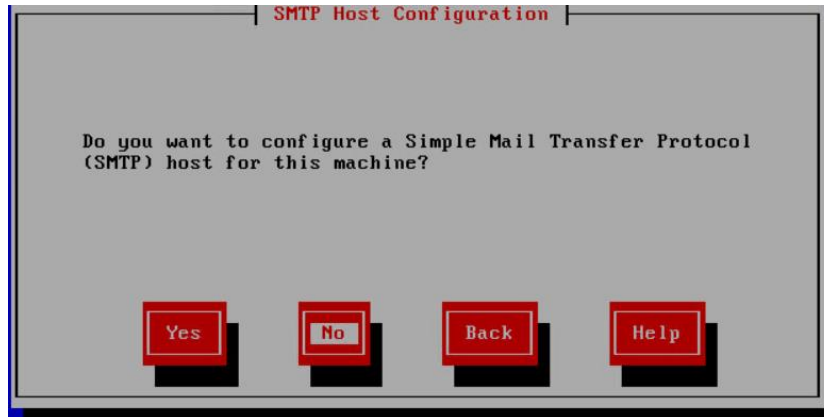
- Because it is your first Node in the cluster choose "Yes"



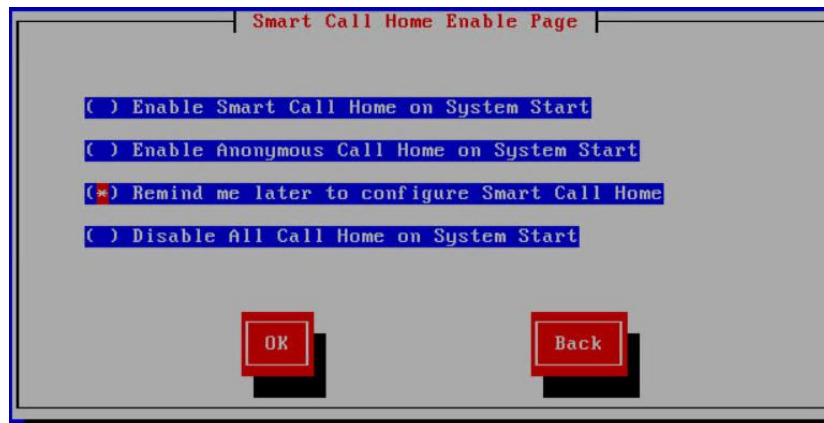
- Enter the IP Address for the NTP servers , e.g. your router IP Address



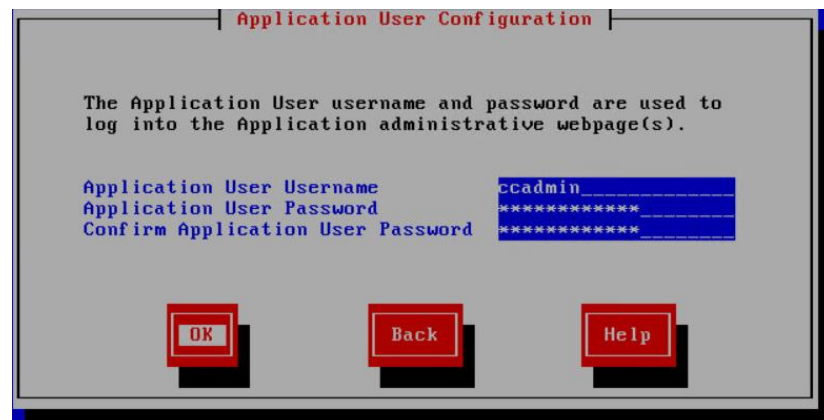
- Enter the InterCluster password , this same password will be used to encrypt your archive as well



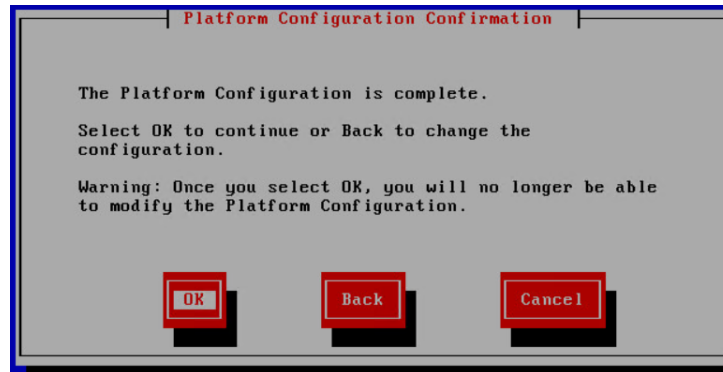
- Click on "No"



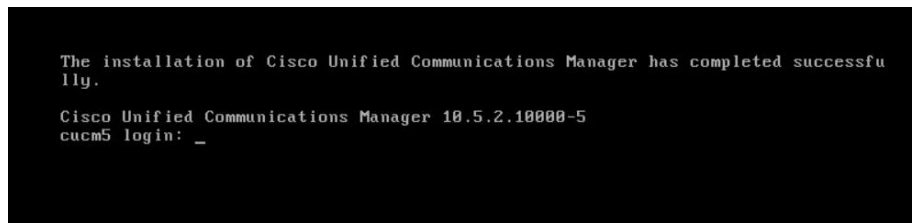
- Choose "Remind me later to configure Smart Call Home"



- Enter the credentials for the Web interface

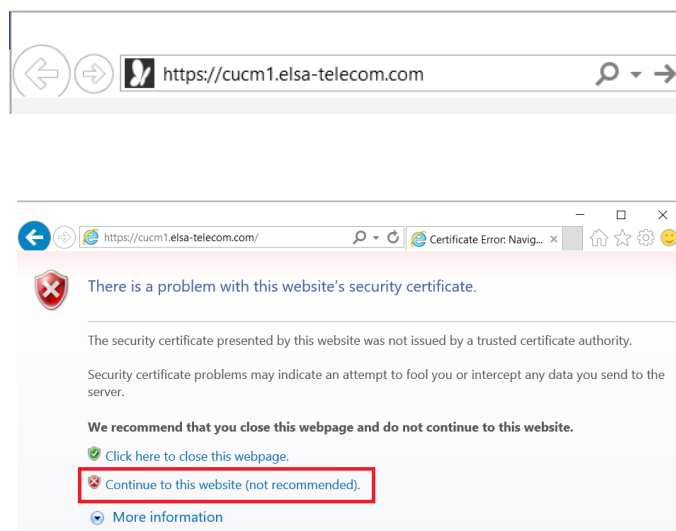


- By selecting “OK” the installation process will begin.
- The whole installation process can take up to one hour, if everything was fine during the installation process in the end you should get the following screen.

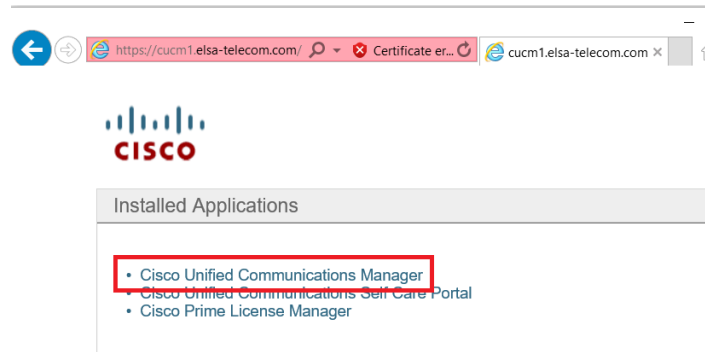


4.1.3 CUCM1 ACCESSING THE SYSTEM

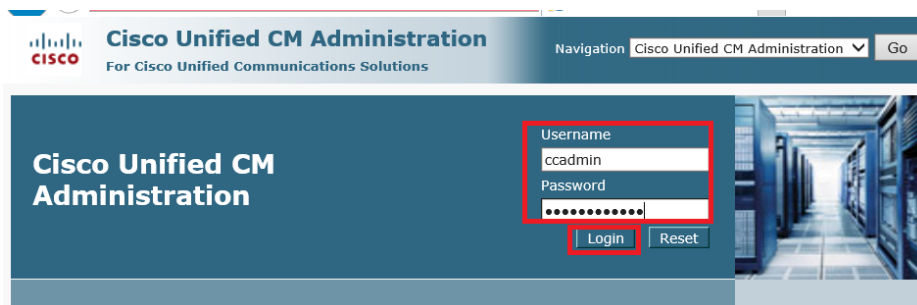
You can access the system by using Internet Explorer browser and enter the <http://cucm-ip-address> URL e.g. or <http://cucm1-fqdn> e.g. <http://cucm1.elsa-telecom.com>



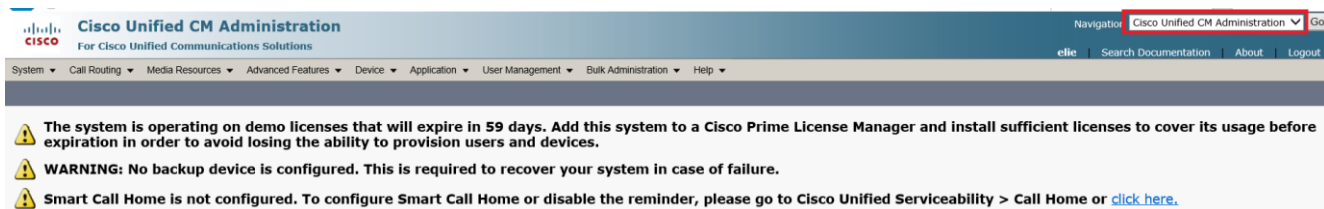
- Click on “Continue to this website”



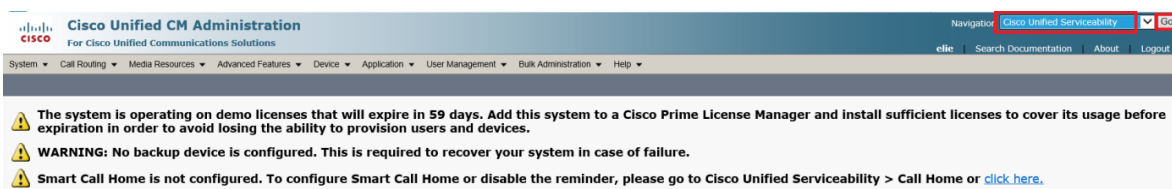
- Click on “Cisco Unified Communications Manager”



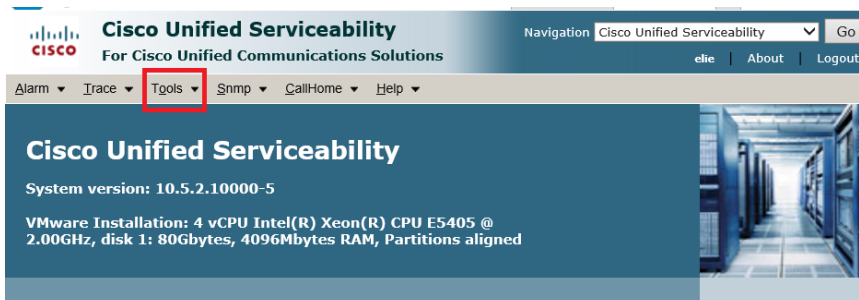
- Enter your administrative login configuration ID and password



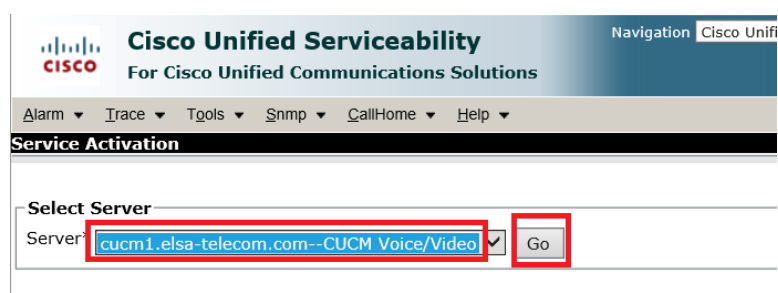
4.1.4 CUCM1 ACTIVATING FEATURE SERVICES



- 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



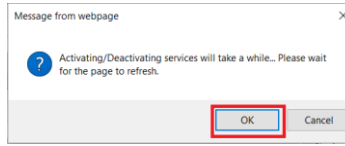
- Select the Server "cucm1.elsa-telecom.com" and click on "Go"

CM Services		
	Service Name	Activation Status
<input checked="" type="checkbox"/>	Cisco CallManager	Deactivated
<input type="checkbox"/>	Cisco Unified Mobile Voice Access Service	Deactivated
<input checked="" type="checkbox"/>	Cisco IP Voice Media Streaming App	Deactivated
<input type="checkbox"/>	Cisco CTIManager	Deactivated
<input type="checkbox"/>	Cisco Extension Mobility	Deactivated
<input type="checkbox"/>	Cisco Extended Functions	Deactivated
<input type="checkbox"/>	Cisco DHCP Monitor Service	Deactivated
<input type="checkbox"/>	Cisco Intercluster Lookup Service	Deactivated
<input type="checkbox"/>	Cisco Location Bandwidth Manager	Deactivated
<input type="checkbox"/>	Cisco Directory Number Alias Sync	Deactivated
<input type="checkbox"/>	Cisco Directory Number Alias Lookup	Deactivated
<input type="checkbox"/>	Cisco Dialed Number Analyzer Server	Deactivated
<input type="checkbox"/>	Cisco Dialed Number Analyzer	Deactivated
<input checked="" type="checkbox"/>	Cisco Tftp	Deactivated

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



- Click on "Save"



- Click on “Save” and then click “OK”

CM Services		
	Service Name	Activation Status
<input checked="" type="checkbox"/>	Cisco CallManager	Activated
<input type="checkbox"/>	Cisco Unified Mobile Voice Access Service	Deactivated
<input checked="" type="checkbox"/>	Cisco IP Voice Media Streaming App	Activated
<input type="checkbox"/>	Cisco CTIManager	Deactivated
<input type="checkbox"/>	Cisco Extension Mobility	Deactivated
<input type="checkbox"/>	Cisco Extended Functions	Deactivated
<input type="checkbox"/>	Cisco DHCP Monitor Service	Deactivated
<input type="checkbox"/>	Cisco Intercluster Lookup Service	Deactivated
<input type="checkbox"/>	Cisco Location Bandwidth Manager	Deactivated
<input type="checkbox"/>	Cisco Directory Number Alias Sync	Deactivated
<input type="checkbox"/>	Cisco Directory Number Alias Lookup	Deactivated
<input type="checkbox"/>	Cisco Dialed Number Analyzer Server	Deactivated
<input type="checkbox"/>	Cisco Dialed Number Analyzer	Deactivated
<input checked="" type="checkbox"/>	Cisco Tftp	Activated

CTI Services		
	Service Name	Activation Status
<input type="checkbox"/>	Cisco IP Manager Assistant	Deactivated
<input type="checkbox"/>	Cisco WebDialer Web Service	Deactivated
<input type="checkbox"/>	Self Provisioning IVR	Deactivated

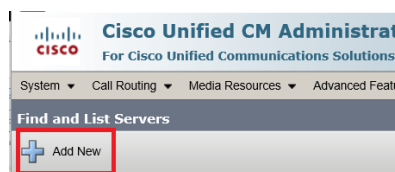
CDR Services		
	Service Name	Activation Status
<input type="checkbox"/>	Cisco SOAP - CDRonDemand Service	Deactivated
<input type="checkbox"/>	Cisco CAR Web Service	Deactivated

Database and Admin Services		
	Service Name	Activation Status
<input type="checkbox"/>	Cisco Bulk Provisioning Service	Deactivated
<input checked="" type="checkbox"/>	Cisco AXL Web Service	Activated
<input type="checkbox"/>	Cisco UXL Web Service	Deactivated
<input type="checkbox"/>	Cisco TAPS Service	Deactivated

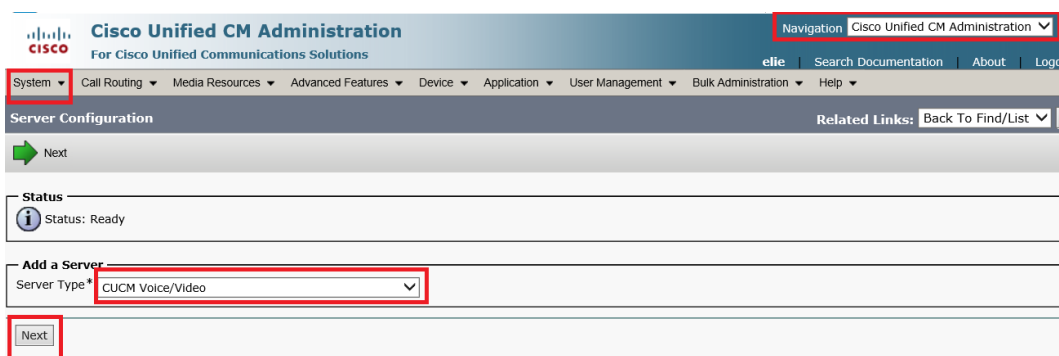
4.2 HOW TO INSTALL THE SECOND CISCO UNIFIED COMMUNICATIONS MANAGER (SUBSCRIBER)

4.2.1 ADDING THE NEW SERVER TO THE SYSTEM

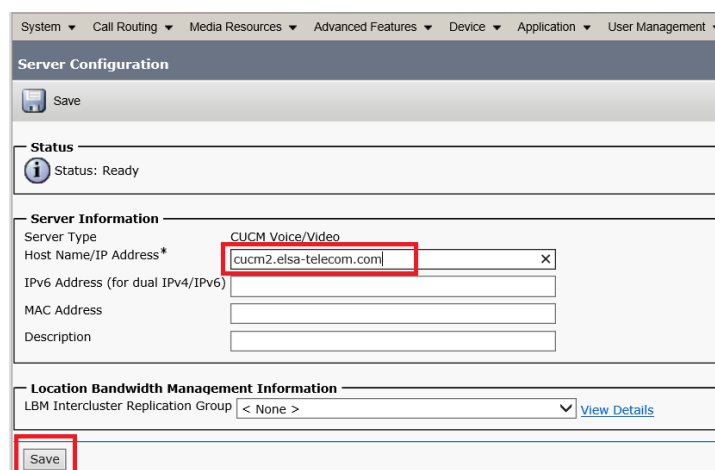
- Access to the system <http://cucm1.elsa-telecom.com>
- Navigation >> CUCM Administration >> GO
- System >> Server >>



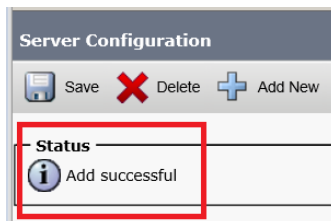
- Click on “Add New”



- Choose “CUCM Voice/Video” as Sever Type and click on “Next”

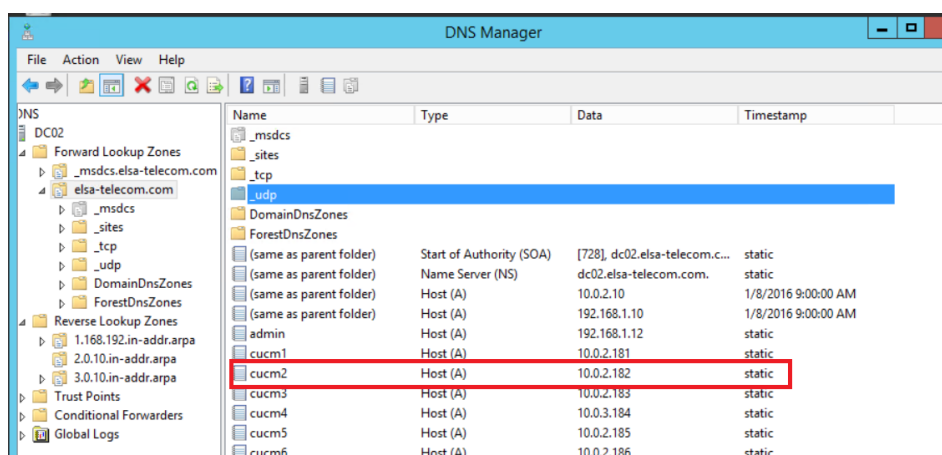


- Click on “Save”



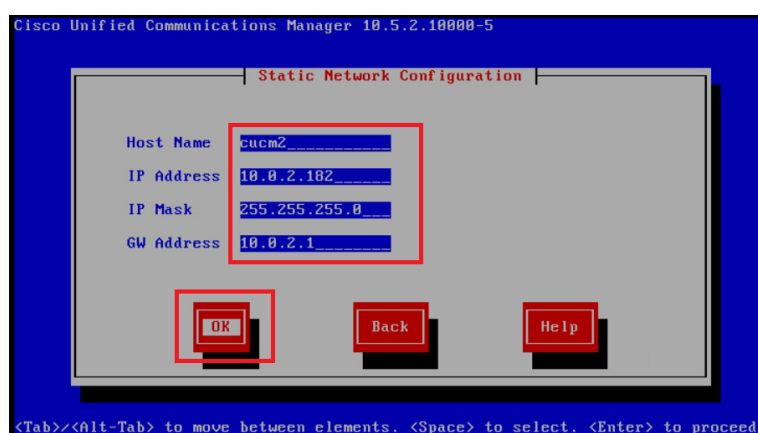
4.2.2 ADDING THE NEW SERVER TO THE DNS SERVER

- Add the host “cucm2.elsa-telecom.com” to your DNS

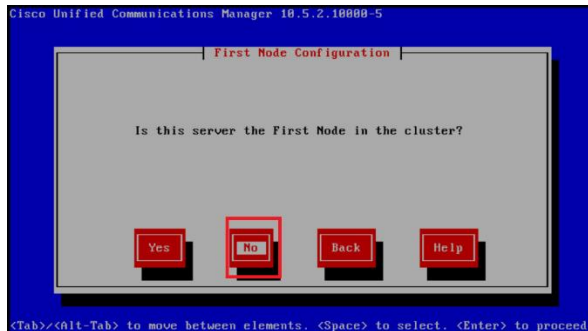


4.2.3 CREATING THE NEW VIRTUAL MACHINE

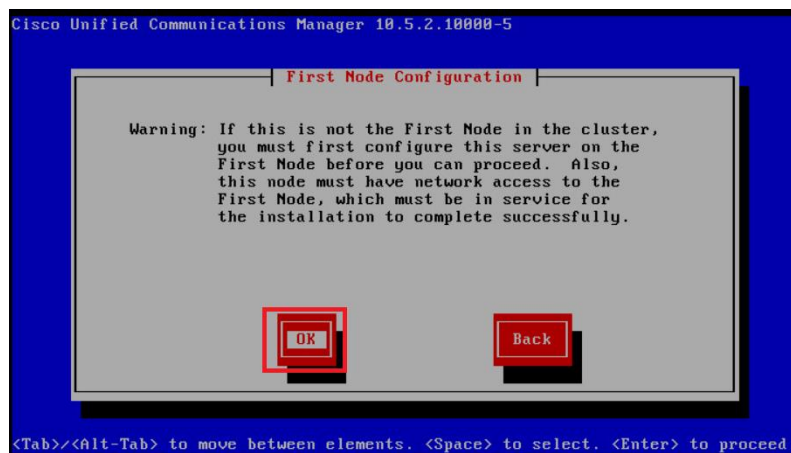
- Create the virtual machine as described in chapter 4.1.1
- Power on the virtual machine and follow the same steps as described in chapter 4.1.2



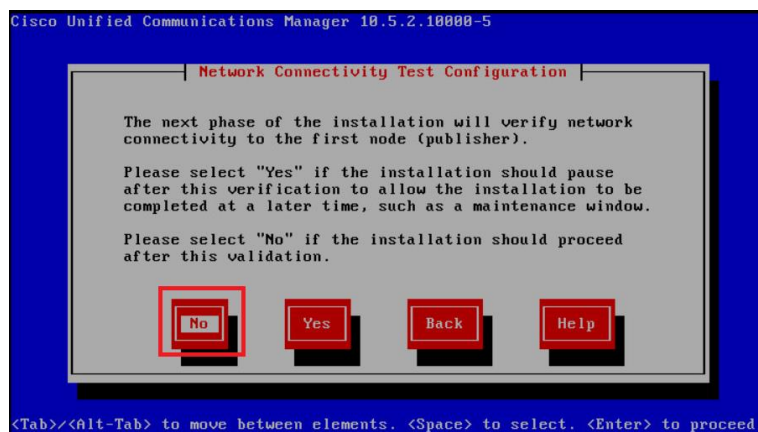
- On Static Network Configuration enter the hostname and the IP Address of the CUCM2



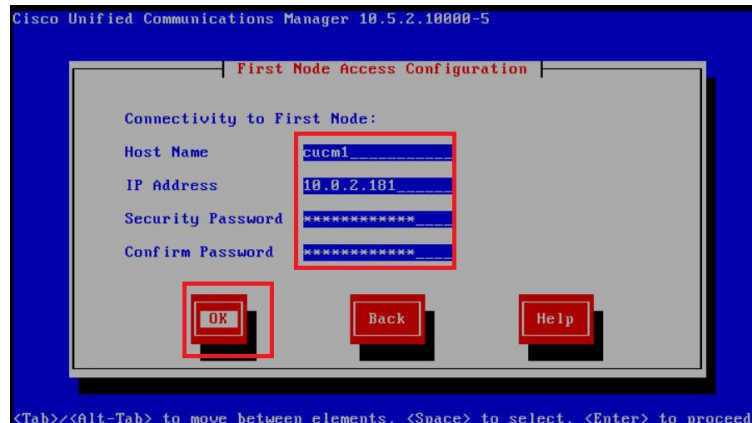
- Click on “No”



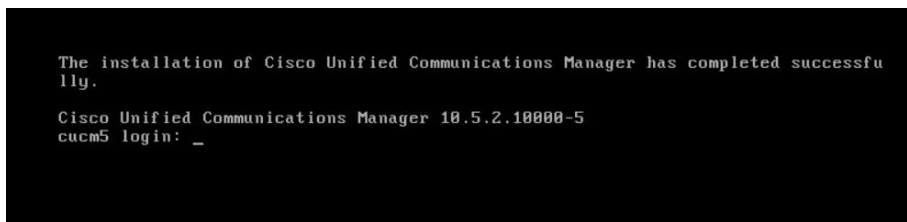
- Click on “Ok”



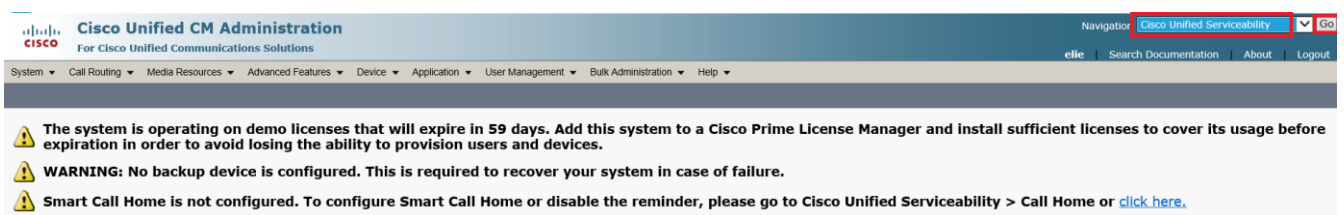
- Click on “No”



- 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.



4.2.4 CUCM2 ACTIVATING FEATURE SERVICES



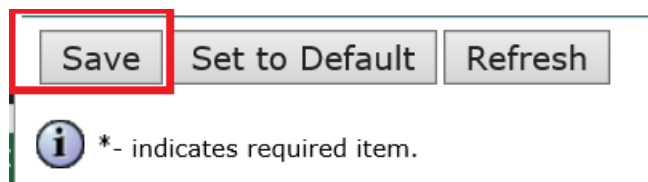
- Use the Navigation drop-down list at the upper right to select the “Cisco Unified Serviceability” item and click on “Go”
- On the Cisco Unified Serviceability page, navigate to Tools >> Service Activation
- Select the Server “cucm2.elsa-telecom.com” and click on “Go”

CM Services		
	Service Name	Activation Status
<input checked="" type="checkbox"/>	Cisco CallManager	Deactivated
<input checked="" type="checkbox"/>	Cisco IP Voice Media Streaming App	Deactivated
<input checked="" type="checkbox"/>	Cisco CTIManager	Deactivated
<input type="checkbox"/>	Cisco Extension Mobility	Deactivated
<input type="checkbox"/>	Cisco Extended Functions	Deactivated
<input type="checkbox"/>	Cisco DHCP Monitor Service	Deactivated
<input type="checkbox"/>	Cisco Location Bandwidth Manager	Deactivated
<input type="checkbox"/>	Cisco Directory Number Alias Lookup	Deactivated
<input checked="" type="checkbox"/>	Cisco Dialed Number Analyzer Server	Deactivated
<input type="checkbox"/>	Cisco Dialed Number Analyzer	Deactivated
<input type="checkbox"/>	Cisco Tftp	Deactivated

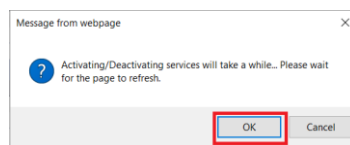
CTI Services		
	Service Name	Activation Status
<input type="checkbox"/>	Cisco IP Manager Assistant	Deactivated
<input type="checkbox"/>	Cisco WebDialer Web Service	Deactivated

Database and Admin Services		
	Service Name	Activation Status
<input checked="" type="checkbox"/>	Cisco AXL Web Service	Activated
<input type="checkbox"/>	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 “Save”



- Click on “OK”



4.3 CONFIGURING CALL MANAGER

4.3.1 CREATING CM GROUPS