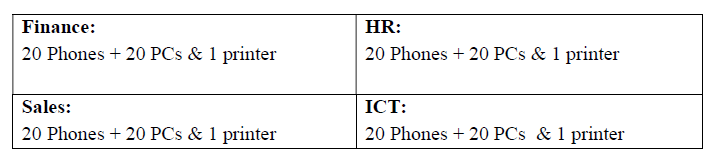
**IP Telephony (VoIP) and Dial-Peering Networking Project**

Turtle Consultancy Limited specialised in delivering IT infrastructure solutions to mediumsized organizations worldwide. With the expansion of the company, a newly acquired branch needs a network. Your manager is faced with the demands of business and a plethora of technology challenges.   
You have been recently hired as a Network Engineer and assigned the task of designing and implementing a [VoIP](https://gurutechnetworks.otombenard.com/assetsProject/project8) network that is based on the requirements and specifications outlined by your manager.   
All desktops have an associated [telephone](https://gurutechnetworks.otombenard.com/assetsProject/project8) set (each PC is connecting directly to a Phone, not a switch). The network consists of four servers (DHCP, EMAIL, DNS,HTTP) located at the server side site and is fully configured for the operations, and all servers are shared between all users.   
Each group has been assigned the task of designing, and implementing a network infrastructure for Turtle Consultancy Limited by internetworking three departments which are as follows:;



The IT Manager emphasized scalability and availability, and hence you are required to provide a complete network infrastructure design and implementation. Turtle Consultancy Limited will be using the following IP address: 192.168.100.0/24 for Data, 172.16.100.0/24 for Voice, and 10.10.10.0/24 between the routers.

* Design a networked system to meet the given specifications. Use packet tracer software to design your network.
* Routers- Each department is to have VoIP enabled router with server-side LAN attached to the ICT department router. Note: use Cisco 2811 router.
* Switches- Each department has an access layer switch. Note: use Cisco 2960 switch.
* Connections- Use serial connections between a router and a router, then a straightthrough cable between the router to switch, switch to hosts, phones to PCs.
* Subnets- Each department will be accessing two subnetworks, for example, data and voice subnets. Note: carry out appropriate subnetting.
* Basic settings- Configure basic device settings such as hostnames, console passwords, enable passwords, banner messages, encrypt all passwords, and disable IP domain lookup.
* DHCP Server- For voice (VoIP), use the respective router as the DHCP server while for Data use the DHCP server device at the server-side site.
* VLANs- Each department will be in two VLANS. One for data and another for voice. Note: All IP phones in the network should be in VLAN 100.
* Inter-VLAN Routing- Use router-on-a-stick to enable inter-VLAN routing on the network. Note: create subinterfaces for both data and voice VLANs.
* IP Addressing- All devices in the network are expected to obtain an IP address dynamically from the respective DHCP servers while the devices in the server room are to be allocated IP addresses statically.
* Routing protocol- Use OSPF as the routing protocol to advertise routes on the routers.
* Remote Access- Configure SSH in all the routers for remote login.
* Telephony service- Configure VoIP on the routers and allocate dial numbers in this format for the departments, Finance(1..), HR (2..), Sales (3..), and ICT (4..), (where 1.. can be 101 to 199) and so on.
* Routing for VoIP- Configure dial-peering on the routers to allow IP phones from different routers to communicate.
* Finalize- Test Communication, ensure everything configured is working as expected.

**Technologies Implemented**

1. Creating a network topology using Cisco Packet Tracer.
2. Hierarchical Network Design.
3. Connecting Networking devices with Correct cabling.
4. Configuring Basic device settings.
5. Creating VLANs and assigning ports VLAN numbers.
6. Creating both data and voice VLANs and assigning ports VLAN numbers.
7. Subnetting and IP Addressing.
8. Configuring Inter-VLAN Routing on the Routers (router-on-a-stick).
9. Configuring Dedicated DHCP Server device for Data to provide dynamic IP allocation.
10. Configuring

 [Routers](https://gurutechnetworks.otombenard.com/assetsProject/project8) as DHCP server for Voice to provide IP Phones dynamic IP allocation.

 Configuring SSH for secure Remote access.

 Configuring OSPF as the

 [routing](https://gurutechnetworks.otombenard.com/assetsProject/project8) protocol.

 Configuring VoIP or Telephony service configuration in all routers.

 Configuring Routing for VoIP or Dial peering configuration in all routers.

 Host Device Configurations.

 Test and Verifying Network Communication.

**FINANCE SWITCH**

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname FINANCE-SW

FINANCE-SW(config)#enable password cisco

FINANCE-SW(config)#line console 0

FINANCE-SW(config-line)#password cisco

FINANCE-SW(config-line)#login

FINANCE-SW(config-line)#exit

FINANCE-SW(config)#banner motd #NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!#

FINANCE-SW(config)#service password-encryption

FINANCE-SW(config)#no ip domain-lookup

FINANCE-SW(config)#do wr

Building configuration...

[OK]

**HR SWITCH**

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname HR-SW

HR-SW(config)#enable password cisco

HR-SW(config)#line console 0

HR-SW(config-line)#password cisco

HR-SW(config-line)#login

HR-SW(config-line)#exit

HR-SW(config)#banner motd #NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!#

HR-SW(config)#service password-encryption

HR-SW(config)#no ip domain-lookup

HR-SW(config)#do wr

Building configuration...

[OK]

**SALES SWITCH**

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname SALES-SW

SALES-SW(config)#enable password cisco

SALES-SW(config)#line console 0

SALES-SW(config-line)#password cisco

SALES-SW(config-line)#login

SALES-SW(config-line)#exit

SALES-SW(config)#banner motd #NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!#

SALES-SW(config)#service password-encryption

SALES-SW(config)#no ip domain-lookup

SALES-SW(config)#do wr

Building configuration...

[OK]

**ICT SWITCH**

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname ICT-SW

ICT-SW(config)#enable password cisco

ICT-SW(config)#line console 0

ICT-SW(config-line)#password cisco

ICT-SW(config-line)#login

ICT-SW(config-line)#exit

ICT-SW(config)#banner motd #NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!#

ICT-SW(config)#service password-encryption

ICT-SW(config)#no ip domain-lookup

ICT-SW(config)#do wr

Building configuration...

[OK]

**SERVER SWITCH**

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname SERVER-SW

SERVER-SW(config)#enable password cisco

SERVER-SW(config)#line console 0

SERVER-SW(config-line)#password cisco

SERVER-SW(config-line)#login

SERVER-SW(config-line)#exit

SERVER-SW(config)#banner motd #NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!#

SERVER-SW(config)#service password-encryption

SERVER-SW(config)#no ip domain-lookup

SERVER-SW(config)#do wr

Building configuration...

[OK]

**FINANCE ROUTER**

Router>en

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname FINANCE-ROUTER

FINANCE-ROUTER(config)#enable password cisco

FINANCE-ROUTER(config)#line console 0

FINANCE-ROUTER(config-line)#password cisco

FINANCE-ROUTER(config-line)#login

FINANCE-ROUTER(config-line)#exit

FINANCE-ROUTER(config)#banner motd #NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!#

FINANCE-ROUTER(config)#service pas

FINANCE-ROUTER(config)#service password-encryption

FINANCE-ROUTER(config)#no ip domain-l

FINANCE-ROUTER(config)#no ip domain-lookup

FINANCE-ROUTER(config)#do wr

Building configuration...

[OK]

FINANCE-ROUTER(config)#username cisco password cisco

FINANCE-ROUTER(config)#ip domain name cisco.net

FINANCE-ROUTER(config)#crypto key generate rsa general-keys modulus 1024

The name for the keys will be: FINANCE-ROUTER.cisco.net

% The key modulus size is 1024 bits

% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

\*Mar 1 1:9:55.759: %SSH-5-ENABLED: SSH 1.99 has been enabled

FINANCE-ROUTER(config)#ip ssh version 2

FINANCE-ROUTER(config)#line vty 0 15

FINANCE-ROUTER(config-line)#login local

FINANCE-ROUTER(config-line)#transport input ssh

FINANCE-ROUTER(config-line)#exit

FINANCE-ROUTER(config)#do wr

Building configuration...

[OK]

**HR ROUTER**

Router>en

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname HR-ROUTER

HR-ROUTER(config)#enable password cisco

HR-ROUTER(config)#line console 0

HR-ROUTER(config-line)#password cisco

HR-ROUTER(config-line)#login

HR-ROUTER(config-line)#exit

HR-ROUTER(config)#banner motd #NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!#

HR-ROUTER(config)#service password-encryption

HR-ROUTER(config)#no ip domain-lookup

HR-ROUTER(config)#

HR-ROUTER(config)#do wr

Building configuration...

[OK]

HR-ROUTER(config)#

HR-ROUTER(config)#username cisco password cisco

HR-ROUTER(config)#ip domain name cisco.net

HR-ROUTER(config)#crypto key generate rsa general-keys modulus 1024

The name for the keys will be: HR-ROUTER.cisco.net

% The key modulus size is 1024 bits

% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

\*Mar 1 1:20:34.281: %SSH-5-ENABLED: SSH 1.99 has been enabled

HR-ROUTER(config)#

HR-ROUTER(config)#line vty 0 15

HR-ROUTER(config-line)#login local

HR-ROUTER(config-line)#transport input ssh

HR-ROUTER(config-line)#exit

HR-ROUTER(config)#do wr

Building configuration...

[OK]

**SALES ROUTER**

Router>en

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname SALES-ROUTER

SALES-ROUTER(config)#enable password cisco

SALES-ROUTER(config)#line console 0

SALES-ROUTER(config-line)#password cisco

SALES-ROUTER(config-line)#login

SALES-ROUTER(config-line)#exit

SALES-ROUTER(config)#banner motd #NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!#

SALES-ROUTER(config)#service password-encryption

SALES-ROUTER(config)#no ip domain-lookup

SALES-ROUTER(config)#

SALES-ROUTER(config)#do wr

Building configuration...

[OK]

SALES-ROUTER(config)#

SALES-ROUTER(config)#username cisco password cisco

SALES-ROUTER(config)#ip domain name cisco.net

SALES-ROUTER(config)#crypto key generate rsa general-keys modulus 1024

The name for the keys will be: SALES-ROUTER.cisco.net

% The key modulus size is 1024 bits

% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

\*Mar 1 1:21:52.9: %SSH-5-ENABLED: SSH 1.99 has been enabled

SALES-ROUTER(config)#

SALES-ROUTER(config)#line vty 0 15

SALES-ROUTER(config-line)#login local

SALES-ROUTER(config-line)#transport input ssh

SALES-ROUTER(config-line)#exit

SALES-ROUTER(config)#do wr

Building configuration...

[OK]

**ICT ROUTER**

Router>en

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname ICT-ROUTER

ICT-ROUTER(config)#enable password cisco

ICT-ROUTER(config)#line console 0

ICT-ROUTER(config-line)#password cisco

ICT-ROUTER(config-line)#login

ICT-ROUTER(config-line)#exit

ICT-ROUTER(config)#banner motd #NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!#

ICT-ROUTER(config)#service password-encryption

ICT-ROUTER(config)#no ip domain-lookup

ICT-ROUTER(config)#

ICT-ROUTER(config)#do wr

Building configuration...

[OK]

ICT-ROUTER(config)#

ICT-ROUTER(config)#username cisco password cisco

ICT-ROUTER(config)#ip domain name cisco.net

ICT-ROUTER(config)#crypto key generate rsa general-keys modulus 1024

The name for the keys will be: ICT-ROUTER.cisco.net

% The key modulus size is 1024 bits

% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

\*Mar 1 1:22:59.870: %SSH-5-ENABLED: SSH 1.99 has been enabled

ICT-ROUTER(config)#

ICT-ROUTER(config)#line vty 0 15

ICT-ROUTER(config-line)#login local

ICT-ROUTER(config-line)#transport input ssh

ICT-ROUTER(config-line)#exit

ICT-ROUTER(config)#do wr

Building configuration...

[OK]

**FINANCE SWITCH**

NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!

User Access Verification

Password: cisco

FINANCE-SW>en

Password: cisco

FINANCE-SW#conf t

Enter configuration commands, one per line. End with CNTL/Z.

FINANCE-SW(config)#int f0/1

FINANCE-SW(config-if)#switchport mode trunk

FINANCE-SW(config-if)#exit

FINANCE-SW(config)#vlan 10

FINANCE-SW(config-vlan)#name DATA

FINANCE-SW(config-vlan)#vlan 100

FINANCE-SW(config-vlan)#name VOICE

FINANCE-SW(config-vlan)#int range f0/2-24

FINANCE-SW(config-if-range)#switchport mode access

FINANCE-SW(config-if-range)#sw

FINANCE-SW(config-if-range)#switchport access vlan 10

FINANCE-SW(config-if-range)#switchport voice vlan 100

FINANCE-SW(config-if-range)#exit

FINANCE-SW(config)#do wr

Building configuration...

[OK]

**HR SWITCH**

NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!

User Access Verification

Password:

HR-SW>en

Password:

HR-SW#conf t

Enter configuration commands, one per line. End with CNTL/Z.

HR-SW(config)#vlan 20

HR-SW(config-vlan)#name DATA

HR-SW(config-vlan)#vlan 100

HR-SW(config-vlan)#name VOICE

HR-SW(config-vlan)#int f0/1

HR-SW(config-if)#switchport mode trunk

HR-SW(config-if)#exit

HR-SW(config)#int range f0/2-24

HR-SW(config-if-range)#switchport mode access

HR-SW(config-if-range)#switchport access vlan 20

HR-SW(config-if-range)#switchport voice vlan 100

HR-SW(config-if-range)#do wr

Building configuration...

[OK]

**SALES SWITCH**

NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!

User Access Verification

Password:

SALES-SW>en

Password:

SALES-SW#conf t

Enter configuration commands, one per line. End with CNTL/Z.

SALES-SW(config)#vlan 30

SALES-SW(config-vlan)#name DATA

SALES-SW(config-vlan)#vlan 100

SALES-SW(config-vlan)#name VOICE

SALES-SW(config-vlan)#

SALES-SW(config-vlan)#int f0/1

SALES-SW(config-if)#switchport mode trunk

SALES-SW(config-if)#exit

SALES-SW(config)#int range f0/2-24

SALES-SW(config-if-range)#switchport mode access

SALES-SW(config-if-range)#switchport access vlan 30

SALES-SW(config-if-range)#switchport voice vlan 100

SALES-SW(config-if-range)#exit

SALES-SW(config)#

SALES-SW(config)#do wr

Building configuration...

[OK]

**ICT SWITCH**

NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!

User Access Verification

Password:

ICT-SW>en

Password:

ICT-SW#conf t

Enter configuration commands, one per line. End with CNTL/Z.

ICT-SW(config)#vlan 40

ICT-SW(config-vlan)#name DATA

ICT-SW(config-vlan)#vlan 100

ICT-SW(config-vlan)#name VOICE

ICT-SW(config-vlan)#

ICT-SW(config-vlan)#int f0/1

ICT-SW(config-if)#switchport mode trunk

ICT-SW(config-if)#exit

ICT-SW(config)#int range f0/2-24

ICT-SW(config-if-range)#switchport mode access

ICT-SW(config-if-range)#switchport access vlan 40

ICT-SW(config-if-range)#switchport voice vlan 100

ICT-SW(config-if-range)#exit

ICT-SW(config)#

ICT-SW(config)#do wr

Building configuration...

[OK]

**SERVER SWITCH**

User Access Verification

Password:

SERVER-SW>en

Password:

SERVER-SW#conf t

Enter configuration commands, one per line. End with CNTL/Z.

SERVER-SW(config)#int f0/1

SERVER-SW(config-if)#switchport mode trunk

SERVER-SW(config-if)#exit

SERVER-SW(config)#vlan 50

SERVER-SW(config-vlan)#name DATA

SERVER-SW(config-vlan)#int range f0/2-5

SERVER-SW(config-if-range)#switchport mode access

SERVER-SW(config-if-range)#switchport access vlan 50

SERVER-SW(config-if-range)#exit

SERVER-SW(config)#do wr

Building configuration...

[OK]

**FINANCE ROUTER**

FINANCE ROUTER

FINANCE-ROUTER(config)#interface FastEthernet0/0

FINANCE-ROUTER(config-if)#no shutdown

FINANCE-ROUTER(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

FINANCE-ROUTER(config-if)#exit

FINANCE-ROUTER(config)#interface Serial0/3/0

FINANCE-ROUTER(config-if)#no shutdown

FINANCE-ROUTER(config-if)#

FINANCE-ROUTER(config-if)#exit

FINANCE-ROUTER(config)#interface Serial0/3/1

FINANCE-ROUTER(config-if)#no shutdown

FINANCE-ROUTER(config-if)#

%LINK-5-CHANGED: Interface Serial0/3/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/1, changed state to up

%LINK-5-CHANGED: Interface Serial0/3/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up

FINANCE-ROUTER(config-if)#% Bad secrets

FINANCE-ROUTER(config-if)#exit

FINANCE-ROUTER(config)#interface Serial0/3/0

FINANCE-ROUTER(config-if)#clock rate 64000

This command applies only to DCE interfaces

FINANCE-ROUTER(config)#interface Serial0/3/0

FINANCE-ROUTER(config-if)#exit

FINANCE-ROUTER(config)#interface Serial0/3/0

FINANCE-ROUTER(config-if)#ip address 10.10.10.5 255.255.255.252

FINANCE-ROUTER(config-if)#exit

FINANCE-ROUTER(config)#interface Serial0/3/1

FINANCE-ROUTER(config-if)#ip address 10.10.10.1 255.255.255.252

**ICT ROUTER**

ICT-ROUTER(config)#interface Serial0/3/0

ICT-ROUTER(config-if)#ip address 10.10.10.6 255.255.255.252

ICT-ROUTER(config-if)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/1, changed state to up

ip address 10.10.10.6 255.255.255.252

ICT-ROUTER(config-if)#

ICT-ROUTER(config-if)#exit

ICT-ROUTER(config)#interface Serial0/3/1

ICT-ROUTER(config-if)#clock rate 64000

This command applies only to DCE interfaces

ICT-ROUTER(config-if)#ip address 10.10.10.13 255.255.255.252

ICT-ROUTER(config-if)#

**SALES ROUTER**

SALES-ROUTER(config)#interface Serial0/3/1

SALES-ROUTER(config-if)#ip address 10.10.10.14 255.255.255.252

SALES-ROUTER(config-if)#

SALES-ROUTER(config-if)#exit

SALES-ROUTER(config)#interface Serial0/3/0

SALES-ROUTER(config-if)#ip address 10.10.10.10 255.255.255.252

SALES-ROUTER(config-if)#

**HR ROUTER**

HR-ROUTER(config)#interface Serial0/3/1

HR-ROUTER(config-if)#clock rate 64000

This command applies only to DCE interfaces

HR-ROUTER(config-if)#ip address 10.10.10.2 255.255.255.252

HR-ROUTER(config-if)#

HR-ROUTER(config-if)#exit

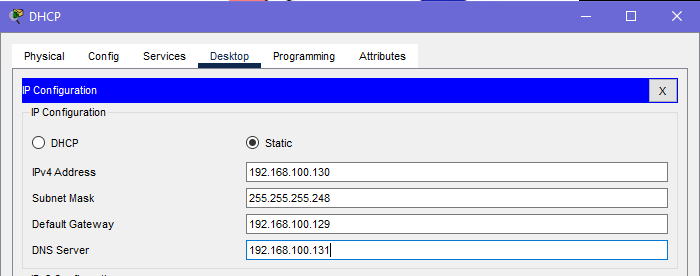
HR-ROUTER(config)#interface Serial0/3/0

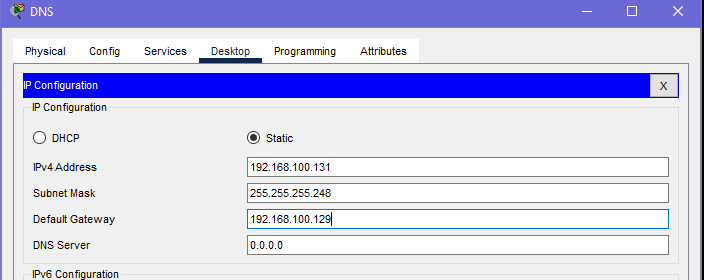
HR-ROUTER(config-if)#clock rate 64000

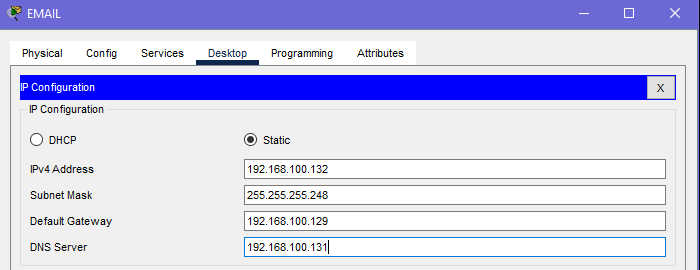
This command applies only to DCE interfaces

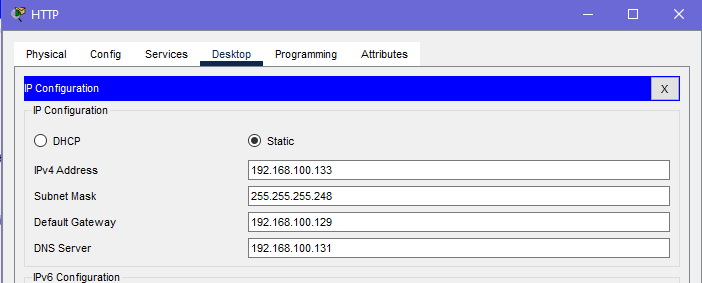
HR-ROUTER(config-if)#ip address 10.10.10.9 255.255.255.252

**SERVER IP**

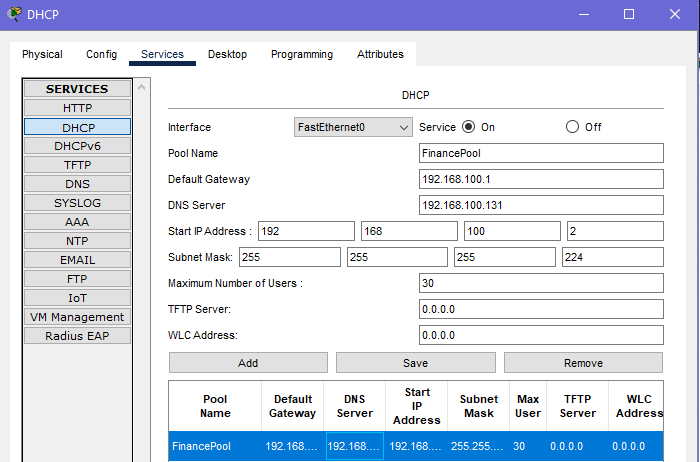




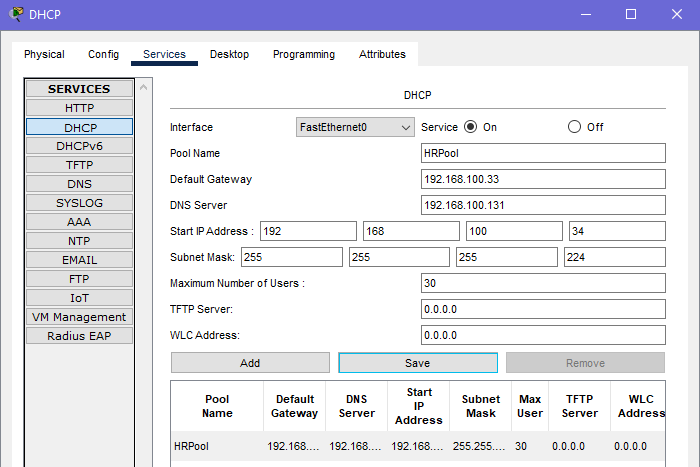




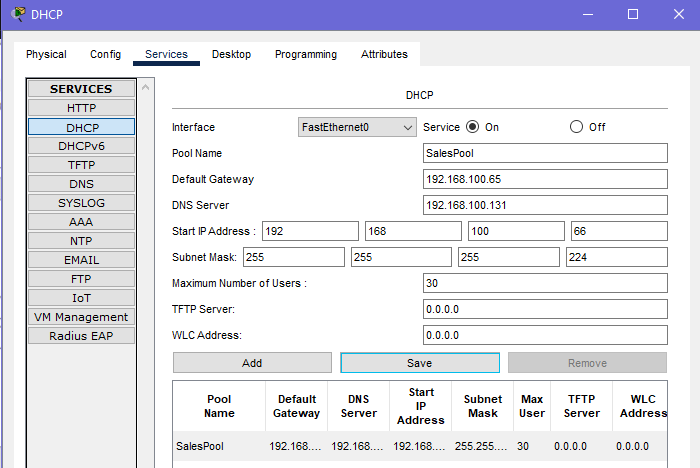
**FINANCE DHCP POOL**



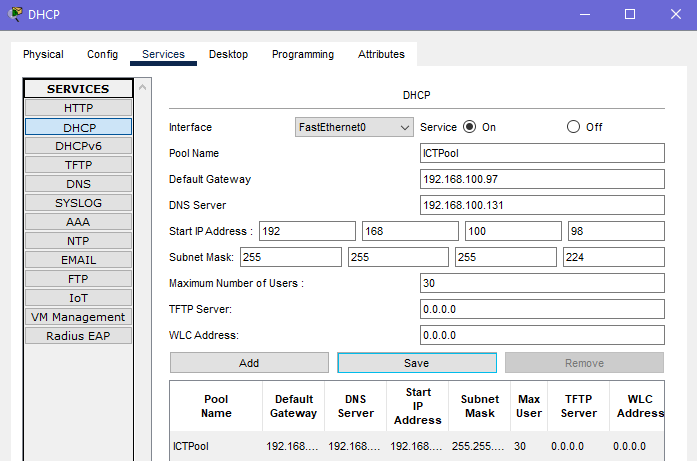
**HR DHCP POOL**



**SALES DHCP POOL**



**ICT DHCP POOL**



**FINANCE ROUTER DHCP VOICE**

NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!

User Access Verification

Password:

Password:

FINANCE-ROUTER>en

Password:

FINANCE-ROUTER#en

FINANCE-ROUTER#conf t

Enter configuration commands, one per line. End with CNTL/Z.

FINANCE-ROUTER(config)#service dhcp

FINANCE-ROUTER(config)#ip dhcp excluded-address 172.16.100.1

FINANCE-ROUTER(config)#ip dhcp pool FINANCEVOICE

FINANCE-ROUTER(dhcp-config)#network 172.16.100.0 255.255.255.224

FINANCE-ROUTER(dhcp-config)#default-router 172.16.100.1

FINANCE-ROUTER(dhcp-config)#option 150 ip 172.16.100.1

FINANCE-ROUTER(dhcp-config)#exit

FINANCE-ROUTER(config)#do wr

Building configuration...

[OK]

FINANCE-ROUTER(config)#do sh start

Using 1177 bytes

!

version 15.1

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname FINANCE-ROUTER

!

!

!

enable password 7 0822455D0A16

!

!

ip dhcp excluded-address 172.16.100.1

!

ip dhcp pool FINANCEVOICE

network 172.16.100.0 255.255.255.224

default-router 172.16.100.1

option 150 ip 172.16.100.1

**HR ROUTER DHCP VOICE**

NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!

User Access Verification

Password:

HR-ROUTER>en

Password:

HR-ROUTER#conf t

Enter configuration commands, one per line. End with CNTL/Z.

HR-ROUTER(config)#ip dhcp ex

HR-ROUTER(config)#ip dhcp excluded-address 172.16.100.33

HR-ROUTER(config)#ip dhcp pool HRVOICE

HR-ROUTER(dhcp-config)#network 172.16.100.32 255.255.255.224

HR-ROUTER(dhcp-config)#default

HR-ROUTER(dhcp-config)#default-router 172.16.100.33

HR-ROUTER(dhcp-config)#option 150 ip 172.16.100.33

HR-ROUTER(dhcp-config)#exit

HR-ROUTER(config)#do wr

Building configuration...

[OK]

HR-ROUTER(config)#do sh start

Using 1143 bytes

!

version 15.1

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname HR-ROUTER

!

!

!

enable password 7 0822455D0A16

!

!

ip dhcp excluded-address 172.16.100.33

!

ip dhcp pool HRVOICE

network 172.16.100.32 255.255.255.224

default-router 172.16.100.33

option 150 ip 172.16.100.33

**SALES ROUTER DHCP VOICE**

NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!

User Access Verification

Password:

SALES-ROUTER>en

Password:

SALES-ROUTER#conf t

Enter configuration commands, one per line. End with CNTL/Z.

SALES-ROUTER(config)#ip dhcp ex

SALES-ROUTER(config)#ip dhcp excluded-address 172.16.100.65

SALES-ROUTER(config)#ip dhcp pool SALESVOICE

SALES-ROUTER(dhcp-config)#network 172.16.100.64 255.255.255.224

SALES-ROUTER(dhcp-config)#defau

SALES-ROUTER(dhcp-config)#default-router 172.16.100.65

SALES-ROUTER(dhcp-config)#option 150 ip 172.16.100.65

SALES-ROUTER(dhcp-config)#exit

SALES-ROUTER(config)#do wr

Building configuration...

[OK]

SALES-ROUTER(config)#do sh start

Using 1191 bytes

!

version 15.1

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname SALES-ROUTER

!

!

!

enable password 7 0822455D0A16

!

!

ip dhcp excluded-address 172.16.100.65

!

ip dhcp pool SALESVOICE

network 172.16.100.64 255.255.255.224

default-router 172.16.100.65

option 150 ip 172.16.100.65

**ICT ROUTER DHCP VOICE**

NO UNAUTHORIZED ACCESS, THIS IS PUNISHABLE BY LOW!!!

User Access Verification

Password:

ICT-ROUTER>en

Password:

ICT-ROUTER#conf t

Enter configuration commands, one per line. End with CNTL/Z.

ICT-ROUTER(config)#ip dhcp excluded-address 172.16.100.97

ICT-ROUTER(config)#ip dhcp pool ICTVOICE

ICT-ROUTER(dhcp-config)#network 172.16.100.96 255.255.255.224

ICT-ROUTER(dhcp-config)#defa

ICT-ROUTER(dhcp-config)#default-router 172.16.100.97

ICT-ROUTER(dhcp-config)#option 150 ip 172.16.100.97

ICT-ROUTER(dhcp-config)#exit

ICT-ROUTER(config)#do wr

Building configuration...

[OK]

ICT-ROUTER(config)#do sh start

Using 1185 bytes

!

version 15.1

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname ICT-ROUTER

!

!

!

enable password 7 0822455D0A16

!

!

ip dhcp excluded-address 172.16.100.97

!

ip dhcp pool ICTVOICE

network 172.16.100.96 255.255.255.224

default-router 172.16.100.97

option 150 ip 172.16.100.97

**FINANCE ROUTER INTER-VLAN ROUTING & IP DHCP HELPER ADDRESS**

FINANCE-ROUTER(config)#int f0/0.10

FINANCE-ROUTER(config-subif)#

%LINK-5-CHANGED: Interface FastEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.10, changed state to up

FINANCE-ROUTER(config-subif)#encapsulation dot1q 10

FINANCE-ROUTER(config-subif)#ip add 192.168.100.1 255.255.255.224

FINANCE-ROUTER(config-subif)#exit

FINANCE-ROUTER(config)#int f0/0.100

FINANCE-ROUTER(config-subif)#

%LINK-5-CHANGED: Interface FastEthernet0/0.100, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.100, changed state to up

FINANCE-ROUTER(config-subif)#encapsulation dot1q 100

FINANCE-ROUTER(config-subif)#ip add 172.16.100.1 255.255.255.224

FINANCE-ROUTER(config-subif)#exit

FINANCE-ROUTER(config-subif)#int f0/0.10

FINANCE-ROUTER(config-subif)#ip helper-address 192.168.100.130

FINANCE-ROUTER(config-subif)#exit

FINANCE-ROUTER(config)#do wr

Building configuration...

[OK]

**HR ROUTER INTER-VLAN ROUTING & IP DHCP HELPER ADDRESS**

HR-ROUTER(config)#int f0/0.20

HR-ROUTER(config-subif)#

%LINK-5-CHANGED: Interface FastEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.20, changed state to up

HR-ROUTER(config-subif)#encapsulation dot1q 20

HR-ROUTER(config-subif)#ip add 192.168.100.33 255.255.255.224

HR-ROUTER(config-subif)#ip helper-address 192.165.100.130

HR-ROUTER(config-subif)#exit

HR-ROUTER(config)#int f0/0.100

HR-ROUTER(config-subif)#

%LINK-5-CHANGED: Interface FastEthernet0/0.100, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.100, changed state to up

HR-ROUTER(config-subif)#encapsulation dot1q 100

HR-ROUTER(config-subif)#ip add 172.16.100.33 255.255.255.224

HR-ROUTER(config-subif)#exit

HR-ROUTER(config)#do wr

Building configuration...

[OK]

**SALES ROUTER INTER-VLAN ROUTING & IP DHCP HELPER ADDRESS**

SALES-ROUTER(config)#int f0/0.30

SALES-ROUTER(config-subif)#

%LINK-5-CHANGED: Interface FastEthernet0/0.30, changed state to up

SALES-ROUTER(config-subif)#encapsulation dot1q 30

SALES-ROUTER(config-subif)#ip add 192.168.100.65 255.255.255.224

SALES-ROUTER(config-subif)#ip helper-address 192.168.100.130

SALES-ROUTER(config-subif)#exit

SALES-ROUTER(config)#int f0/0.100

SALES-ROUTER(config-subif)#

%LINK-5-CHANGED: Interface FastEthernet0/0.100, changed state to up

SALES-ROUTER(config-subif)#encapsulation dot1q 100

SALES-ROUTER(config-subif)#ip add 172.16.100.65 255.255.255.224

SALES-ROUTER(config-subif)#exit

SALES-ROUTER(config)#do wr

Building configuration...

[OK]

**ICT ROUTER INTER-VLAN ROUTING & IP DHCP HELPER ADDRESS**

ICT-ROUTER(config)#int f0/1.40

ICT-ROUTER(config-subif)#

%LINK-5-CHANGED: Interface FastEthernet0/1.40, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1.40, changed state to up

ICT-ROUTER(config-subif)#encapsulation dot1q 40

ICT-ROUTER(config-subif)#ip add 192.168.100.97 255.255.255.224

ICT-ROUTER(config-subif)#ip helper-address 192.168.100.130

ICT-ROUTER(config-subif)#exit

ICT-ROUTER(config)#int f0/1.100

ICT-ROUTER(config-subif)#

%LINK-5-CHANGED: Interface FastEthernet0/1.100, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1.100, changed state to up

ICT-ROUTER(config-subif)#encapsulation dot1q 100

ICT-ROUTER(config-subif)#ip add 172.16.100.97 255.255.255.224

ICT-ROUTER(config-subif)#exit

ICT-ROUTER(config)#do wr

Building configuration...

[OK]

**ICT ROUTER (SERVER) INTER-VLAN ROUTING & IP DHCP HELPER ADDRESS**

ICT-ROUTER(config)#int f0/0.50

ICT-ROUTER(config-subif)#

%LINK-5-CHANGED: Interface FastEthernet0/0.50, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.50, changed state to up

ICT-ROUTER(config-subif)#encapsulation dot1q 50

ICT-ROUTER(config-subif)#ip add 192.168.100.129 255.255.255.248

ICT-ROUTER(config-subif)#exit

ICT-ROUTER(config)#do wr

Building configuration...

[OK]

**ICT ROUTER OSPF ROUTING**

ICT-ROUTER(config)#router ospf 10

ICT-ROUTER(config-router)#network 10.10.10.4 0.0.0.3 area 0

ICT-ROUTER(config-router)#network 10.10.10.12 0.0.0.3 area 0

ICT-ROUTER(config-router)#network 192.168.100.128 0.0.0.7 area 0

ICT-ROUTER(config-router)#network 192.168.100.96 0.0.0.31 area 0

ICT-ROUTER(config-router)#network 172.16.100.96 0.0.0.31 area 0

ICT-ROUTER(config-router)#exit

ICT-ROUTER(config)#do wr

Building configuration...

[OK]

**FINANCE ROUTER OSPF ROUTING**

FINANCE-ROUTER(config)#router ospf 10

FINANCE-ROUTER(config-router)#network 10.10.10.4 0.0.0.3 area 0

FINANCE-ROUTER(config-router)#network 10.10.10.0 0.0.0.3 area 0

FINANCE-ROUTER(config-router)#network 192.168.100.0 0.0.0.31 area 0

FINANCE-ROUTER(config-router)#network 172.16.100.0 0.0.0.31 area 0

FINANCE-ROUTER(config-router)#exit

FINANCE-ROUTER(config)#do wr

Building configuration...

[OK]

**HR ROUTER OSPF ROUTING**

HR-ROUTER(config)#router ospf 10

HR-ROUTER(config-router)#network 10.10.10.8 0.0.0.3 area 0

HR-ROUTER(config-router)#network 10.10.10.0 0.0.0.3 area 0

HR-ROUTER(config-router)#network 192.168.100.32 0.0.0.31 area 0

HR-ROUTER(config-router)#network 172.16.100.32 0.0.0.31 area 0

HR-ROUTER(config-router)#exit

HR-ROUTER(config)#do wr

Building configuration...

[OK]

**SALES ROUTER OSPF ROUTING**

SALES-ROUTER(config)#router ospf 10

SALES-ROUTER(config-router)#network 10.10.10.8 0.0.0.3 area 0

SALES-ROUTER(config-router)#network 10.10.10.12 0.0.0.3 area 0

SALES-ROUTER(config-router)#network 192.168.100.64 0.0.0.31 area 0

SALES-ROUTER(config-router)#network 172.16.100.64 0.0.0.31 area 0

SALES-ROUTER(config-router)#exit

SALES-ROUTER(config)#do wr

Building configuration...

[OK]

**FINANCE ROUTER VOIP CONFIGURATION**

FINANCE-ROUTER(config)#telephony-service

FINANCE-ROUTER(config-telephony)#max-dn 6

FINANCE-ROUTER(config-telephony)#max-ephones 6

FINANCE-ROUTER(config-telephony)#ip source-address 172.16.100.1 port 2000

FINANCE-ROUTER(config-telephony)#auto assign 1 to 6

FINANCE-ROUTER(config-telephony)#exit

FINANCE-ROUTER(config)#ephone-dn 1

FINANCE-ROUTER(config-ephone-dn)#%LINK-3-UPDOWN: Interface ephone\_dsp DN 1.1, changed state to up

FINANCE-ROUTER(config-ephone-dn)#number 101

FINANCE-ROUTER(config-ephone-dn)#ephone-dn 2

FINANCE-ROUTER(config-ephone-dn)#%LINK-3-UPDOWN: Interface ephone\_dsp DN 2.1, changed state to up

FINANCE-ROUTER(config-ephone-dn)#number 102

FINANCE-ROUTER(config-ephone-dn)#ephone-dn 3

FINANCE-ROUTER(config-ephone-dn)#number 103

FINANCE-ROUTER(config-ephone-dn)#ephone-dn 4

FINANCE-ROUTER(config-ephone-dn)#%LINK-3-UPDOWN: Interface ephone\_dsp DN 4.1, changed state to up

FINANCE-ROUTER(config-ephone-dn)#number 104

FINANCE-ROUTER(config-ephone-dn)#ephone-dn 5

FINANCE-ROUTER(config-ephone-dn)#%LINK-3-UPDOWN: Interface ephone\_dsp DN 5.1, changed state to up

%IPPHONE-6-REGISTER: ephone-2 IP:172.16.100.3 Socket:2 DeviceType:Phone has registered.

FINANCE-ROUTER(config-ephone-dn)#number 105

FINANCE-ROUTER(config-ephone-dn)#ephone-dn

%IPPHONE-6-REGISTER: ephone-4 IP:172.16.100.6 Socket:2 DeviceType:Phone has registered.

6

FINANCE-ROUTER(config-ephone-dn)#%LINK-3-UPDOWN: Interface ephone\_dsp DN 6.1, changed state to up

%IPPHONE-6-REGISTER: ephone-5 IP:172.16.100.4 Socket:2 DeviceType:Phone has registered.

FINANCE-ROUTER(config-ephone-dn)#number 106

FINANCE-ROUTER(config-ephone-dn)#exit

FINANCE-ROUTER(config)#do wr

Building configuration...

[OK]

FINANCE-ROUTER(config)#

**HR ROUTER VOIP CONFIGURATION**

HR-ROUTER(config)#telephony-service

HR-ROUTER(config-telephony)#max-dn 6

HR-ROUTER(config-telephony)#max-ephones 6

HR-ROUTER(config-telephony)#ip source-address 172.16.100.33 port 2000

HR-ROUTER(config-telephony)#auto assign 1 to 6

HR-ROUTER(config-telephony)#exit

HR-ROUTER(config)#ephone-dn 1

HR-ROUTER(config-ephone-dn)#number 201

HR-ROUTER(config-ephone-dn)#ephone-dn 2

HR-ROUTER(config-ephone-dn)#number 202

HR-ROUTER(config-ephone-dn)#ephone-dn 3

HR-ROUTER(config-ephone-dn)#number 203

HR-ROUTER(config-ephone-dn)#ephone-dn 4

HR-ROUTER(config-ephone-dn)#number 204

HR-ROUTER(config-ephone-dn)#ephone-dn 5

HR-ROUTER(config-ephone-dn)#number 205

HR-ROUTER(config-ephone-dn)#ephone-dn 6

HR-ROUTER(config-ephone-dn)#number 206

**SALES ROUTER VOIP CONFIGURATION**

SALES-ROUTER(config)#telephony-service

SALES-ROUTER(config-telephony)#max-dn 6

SALES-ROUTER(config-telephony)#max-ephones 6

SALES-ROUTER(config-telephony)#ip source-address 172.16.100.65 port 2000

SALES-ROUTER(config-telephony)#auto assign 1 to 6

SALES-ROUTER(config-telephony)#exit

SALES-ROUTER(config)#ephone-dn 1

SALES-ROUTER(config-ephone-dn)#number 301

SALES-ROUTER(config-ephone-dn)#ephone-dn 2

SALES-ROUTER(config-ephone-dn)#number 302

SALES-ROUTER(config-ephone-dn)#ephone-dn 3

SALES-ROUTER(config-ephone-dn)#number 303

SALES-ROUTER(config-ephone-dn)#ephone-dn 4

SALES-ROUTER(config-ephone-dn)#number 304

SALES-ROUTER(config-ephone-dn)#ephone-dn 5

SALES-ROUTER(config-ephone-dn)#number 305

SALES-ROUTER(config-ephone-dn)#ephone-dn 6

SALES-ROUTER(config-ephone-dn)#number 306

SALES-ROUTER(config-ephone-dn)#exit

SALES-ROUTER(config)#do wr

Building configuration...

[OK]

**ICT ROUTER VOIP CONFIGURATION**

ICT-ROUTER(config)#telephony-service

ICT-ROUTER(config-telephony)#max-dn 6

ICT-ROUTER(config-telephony)#max-ephones 6

ICT-ROUTER(config-telephony)#ip source-address 172.16.100.97 port 2000

ICT-ROUTER(config-telephony)#auto assign 1 to 6

ICT-ROUTER(config-telephony)#exit

ICT-ROUTER(config)#ephone-dn 1

ICT-ROUTER(config-ephone-dn)#number 401

ICT-ROUTER(config-ephone-dn)#ephone-dn 2

ICT-ROUTER(config-ephone-dn)#number 402

ICT-ROUTER(config-ephone-dn)#ephone-dn 3

ICT-ROUTER(config-ephone-dn)#number 403

ICT-ROUTER(config-ephone-dn)#ephone-dn 4

ICT-ROUTER(config-ephone-dn)#number 404

ICT-ROUTER(config-ephone-dn)#ephone-dn 5

ICT-ROUTER(config-ephone-dn)#number 405

ICT-ROUTER(config-ephone-dn)#ephone-dn 6

ICT-ROUTER(config-ephone-dn)#number 406

ICT-ROUTER(config-ephone-dn)#exit

ICT-ROUTER(config)#do wr

**FINANCE ROUTER DIAL PEERING CONFIGURATION**

FINANCE-ROUTER#conf t

Enter configuration commands, one per line. End with CNTL/Z.

FINANCE-ROUTER(config)#dial-peer voice 1 voip

FINANCE-ROUTER(config-dial-peer)#des

FINANCE-ROUTER(config-dial-peer)#destination-pattern 2..

FINANCE-ROUTER(config-dial-peer)#ses

FINANCE-ROUTER(config-dial-peer)#session t

FINANCE-ROUTER(config-dial-peer)#session target ipv4:10.10.10.2

FINANCE-ROUTER(config-dial-peer)#exit

FINANCE-ROUTER(config)#dial-peer voice 2 voip

FINANCE-ROUTER(config-dial-peer)#destination-pattern 4..

FINANCE-ROUTER(config-dial-peer)#session target ipv4:10.10.10.6

FINANCE-ROUTER(config-dial-peer)#exit

FINANCE-ROUTER(config)#dial-peer voice 3 voip

FINANCE-ROUTER(config-dial-peer)#destination-pattern 3..

FINANCE-ROUTER(config-dial-peer)#session target ipv4:10.10.10.10

FINANCE-ROUTER(config-dial-peer)#exit

FINANCE-ROUTER(config)#do wr

Building configuration...

[OK]

**HR ROUTER DIAL PEERING CONFIGURATION**

HR-ROUTER(config)#dial-peer voice 1 voip

HR-ROUTER(config-dial-peer)#des

HR-ROUTER(config-dial-peer)#destination-pattern 1..

HR-ROUTER(config-dial-peer)#ses

HR-ROUTER(config-dial-peer)#session tar

HR-ROUTER(config-dial-peer)#session target ipv4:10.10.10.1

HR-ROUTER(config-dial-peer)#exit

HR-ROUTER(config)#dial-peer voice 4 voip

HR-ROUTER(config-dial-peer)#destination-pattern 3..

HR-ROUTER(config-dial-peer)#session target ipv4:10.10.10.10

HR-ROUTER(config-dial-peer)#exit

HR-ROUTER(config)#dial-peer voice 5 voip

HR-ROUTER(config-dial-peer)#destination-pattern 4..

HR-ROUTER(config-dial-peer)#session target ipv4:10.10.10.14

HR-ROUTER(config-dial-peer)#exit

HR-ROUTER(config)#do wr

Building configuration...

[OK]

**SALES ROUTER DIAL PEERING CONFIGURATION**

SALES-ROUTER(config)#dial-peer voice 3 voip

SALES-ROUTER(config-dial-peer)#des

SALES-ROUTER(config-dial-peer)#destination-pattern 1..

SALES-ROUTER(config-dial-peer)#ses

SALES-ROUTER(config-dial-peer)#session target ipv4:10.10.10.1

SALES-ROUTER(config-dial-peer)#exit

SALES-ROUTER(config)#dial-peer voice 4 voip

SALES-ROUTER(config-dial-peer)#des

SALES-ROUTER(config-dial-peer)#destination-pattern 2..

SALES-ROUTER(config-dial-peer)#sess

SALES-ROUTER(config-dial-peer)#session target ipv4:10.10.10.9

SALES-ROUTER(config-dial-peer)#exit

SALES-ROUTER(config)#dial-peer voice 5 voip

SALES-ROUTER(config-dial-peer)#destina

SALES-ROUTER(config-dial-peer)#destination-pattern 4..

SALES-ROUTER(config-dial-peer)#sess

SALES-ROUTER(config-dial-peer)#session target ipv4:10.10.10.14

SALES-ROUTER(config-dial-peer)#exit

SALES-ROUTER(config)#do wr

Building configuration...

[OK]

**ICT ROUTER DIAL PEERING CONFIGURATION**

ICT-ROUTER(config)#dial-peer voice 2 voip

ICT-ROUTER(config-dial-peer)#des

ICT-ROUTER(config-dial-peer)#destination-pattern 1..

ICT-ROUTER(config-dial-peer)#sess

ICT-ROUTER(config-dial-peer)#session traget ipv4:10.10.10.5

^

% Invalid input detected at '^' marker.

ICT-ROUTER(config-dial-peer)#session target ipv4:10.10.10.5

ICT-ROUTER(config-dial-peer)#dial-peer voice 5 voip

ICT-ROUTER(config-dial-peer)#destination-pattern 3..

ICT-ROUTER(config-dial-peer)#session target ipv4:10.10.10.14

ICT-ROUTER(config-dial-peer)#dial-peer voice 5 voip

ICT-ROUTER(config-dial-peer)#destination-pattern 2..

ICT-ROUTER(config-dial-peer)#session target ipv4:10.10.10.2

ICT-ROUTER(config-dial-peer)#exit

ICT-ROUTER(config)#do wr

Building configuration...

[OK]

**\*\* [NB- THERE MAYBE WRONG WITH DESTINATION PATTERN]**