

## Final Project

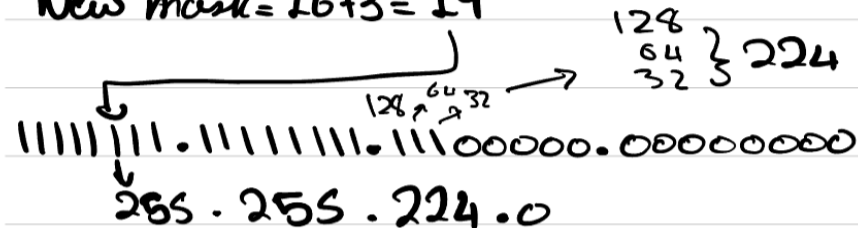
### Lab Task 1: Design an IP Address Scheme [site24x7](#)

1. The network 172.16.10.0/16 was divided into seven subnets, as outlined below:

Subnet Processing:

1. Divide 172.16.10.0/16, to create 7 subnets we need 3 additional bits ( $2^3=8$ )

New mask =  $16+3=19$



2. Calculating Usable host:

Host bits =  $32-19=13$  bits

Usable add Per subnet =  $2^{13}-2=8190$

we sub by 2 because there is 2

two specific addresses in each subnet are reserved & cannot be assigned to individual hosts.

1. Network Address    2. Broadcast Address.

2. The value of the new subnet mask is 255.255.224.0
3.  $2^{19}=8190$  usable hosts exist per subnet.
- 4.

Subnet ID	Network address	Host Address Range	Broadcast Address	Subnet mask
1	172.16.0.0	172.16.0.1 - 172.16.31.254	172.16.31.255	255.255.224.0
2	172.16.32.0	172.16.32.1 - 172.16.63.254	172.16.63.255	255.255.224.0
3	172.16.64.0	172.16.64.1 - 172.16.95.254	172.16.95.255	255.255.224.0
4	172.16.96.0	172.16.96.1 - 172.16.127.254	172.16.127.255	255.255.224.0
5	172.16.128.0	172.16.128.1 - 172.16.159.254	172.16.159.255	255.255.224.0
6	172.16.160.0	172.16.160.1 - 172.16.191.254	172.16.191.255	255.255.224.0
7	172.16.192.0	172.16.192.1 - 172.16.223.254	172.16.223.255	255.255.224.0

## **Lab Task 2: Implement VLANs and Trunk**

*(Listed commands were executed on S1-Office1 and S2-Office1.)*

1. en  
conf t  
vlan 10  
name Management  
exit  
vlan 20  
name Marketing  
exit  
vlan 30  
name Accounting  
exit  
vlan 100  
name Native  
exit
2. int range fa0/1-10  
switchport mode access  
switchport access vlan 10  
exit  
int range fa0/11-20  
switchport mode access  
switchport access vlan 20  
exit  
int range fa0/21-24  
switchport mode access  
switchport access vlan 30  
exit

**don't forget to make sure when connecting to pc's to be connected in the same order of vlan range's like CEO1 with fa0/1 in the same range of Vlan 10 and copywriter1 with fa0/24 in the same range of Vlan 30**

3.
  - **On S1-Office1:**  
  
int gi0/2  
switchport mode trunk  
switchport trunk native vlan 100  
exit  
show vlan brief  
show int trunk
  - **On S2-Office1:**  
  
int gi0/1  
switchport mode trunk

```

switchport trunk native vlan 100
exit
show vlan brief
show int trunk

```

- Interface gig0/1
 

```

switchport nonegotiate
exit
wr

```

S1-Office1# show vlan brief

Building configuration...  
[OK]  
S1-Office1#show vlan brief

VLAN Name	Status	Ports
1 default	active	Gig0/1
10 Management	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4, Fa0/5, Fa0/6, Fa0/7, Fa0/8
20 Marketing	active	Fa0/9, Fa0/10, Fa0/11, Fa0/12, Fa0/13, Fa0/14, Fa0/15, Fa0/16, Fa0/17, Fa0/18
30 Accounting	active	Fa0/19, Fa0/20, Fa0/21, Fa0/22, Fa0/23, Fa0/24
100 Native	active	
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

S1-Office1#

S2-Office1# show vlan brief

%SYS-5-CONFIG\_I: Configured from console by console  
S2-Office1#show vlan brief

VLAN Name	Status	Ports
1 default	active	Gig0/2
10 Management	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4, Fa0/5, Fa0/6, Fa0/7, Fa0/8
20 Marketing	active	Fa0/9, Fa0/10, Fa0/11, Fa0/12, Fa0/13, Fa0/14, Fa0/15, Fa0/16, Fa0/17, Fa0/18
30 Accounting	active	Fa0/19, Fa0/20, Fa0/21, Fa0/22, Fa0/23, Fa0/24
100 Native	active	
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

S2-Office1#

S1-Office1#show int trunk

1005 trnet-default active  
S1-Office1(config)#exit  
S1-Office1#  
%SYS-5-CONFIG\_I: Configured from console by console  
S1-Office1#show int trunk

Port	Mode	Encapsulation	Status	Native
Gig0/2	on	802.1q	trunking	100

Port Vlan allowed on trunk  
Gig0/2 1-1005

Port Vlan allowed and active in management domain  
Gig0/2 1,10,20,30,100

Port Vlan in spanning tree forwarding state and not pruned  
Gig0/2 1,10,20,30,100

S1-Office1#

S2-Office1#show int trunk

100 Native active  
1002 fddi-default active  
1003 token-ring-default active  
1004 fddinet-default active  
1005 trnet-default active  
S2-Office1#show int trunk

Port	Mode	Encapsulation	Status	Native
Gig0/1	on	802.1q	trunking	100

Port Vlan allowed on trunk  
Gig0/1 1-1005

Port Vlan allowed and active in management domain  
Gig0/1 1,10,20,30,100

Port Vlan in spanning tree forwarding state and not pruned  
Gig0/1 1,10,20,30,100

S2-Office1#

### Lab Task 3: Assign IP Addresses

Device	Interface	Address	Subnet Mask	Default Gateway
R1	Gig0/0/0	---	255.255.224.0	---
	Serial0/1/0	172.16.128.1	255.255.224.0	---
	Serial0/1/1	172.16.160.1	255.255.224.0	---
	Gig0/0/0.10	172.16.0.1	255.255.224.0	---
	Gig0/0/0.20	172.16.32.1	255.255.224.0	---
	Gig0/0/0.30	172.16.64.1	255.255.224.0	---
R2-Edge_router	Serial0/1/0	172.16.96.2	255.255.224.0	---
	Serial0/1/1	172.16.160.2	255.255.224.0	---
R3	Gig0/0/0	172.16.192.1	255.255.224.0	---
	Serial0/1/0	172.16.128.2	255.255.224.0	---
	Serial0/1/1	172.16.96.1	255.255.224.0	---
S1-Office1	VLAN 10 (Management)	---	255.255.224.0	172.16.32.1
	VLAN 20 (Marketing)	---	255.255.224.0	172.16.32.1
	VLAN 30 (Accounting)	---	255.255.224.0	172.16.32.1
S2-Office1	VLAN 10 (Management)	---	255.255.224.0	172.16.160.1
	VLAN 20 (Marketing)	---	255.255.224.0	172.16.160.1
	VLAN 30 (Accounting)	---	255.255.224.0	172.16.160.1
CEO1	FastEthernet0/0	172.16.0.2	255.255.224.0	172.16.0.1
CEO2	FastEthernet0/1	172.16.0.3	255.255.224.0	172.16.0.1
Dialer1	FastEthernet0/2	172.16.32.2	255.255.224.0	172.16.32.1
Dialer2	FastEthernet0/0	172.16.32.3	255.255.224.0	172.16.32.1
Copywriter1	FastEthernet0/1	172.16.64.9	255.255.224.0	172.16.64.1
Copywriter2	FastEthernet0/2	172.16.64.2	255.255.224.0	172.16.64.1
Emp1	FastEthernet0/0	172.16.192.2	255.255.224.0	172.16.192.1
Emp2	FastEthernet0/1	172.16.192.3	255.255.224.0	172.16.192.1
guest	FastEthernet0/2	172.16.192.4	255.255.224.0	172.16.192.1

### Configure R2:

- **Seiral 0/1/0:**  
 En  
 Conf t  
 Interface se0/1/0  
 Ip address 172.16.96.2 255.255.224.0  
 No shutdown  
 Exit
- **Seiral 0/1/1:**  
 Interface se0/1/1  
 Ip address 172.16.160.2 255.255.224.0  
 No shutdown  
 Exit  
 Exit  
 wr

### **Configure R3:**

- **Seiral 0/1/0:**  
En  
Conf t  
Interface se0/1/0  
Ip address 172.16.128.2 255.255.224.0  
No shutdown  
Exit
- **Seiral 0/1/1:**  
Interface se0/1/1  
Ip address 172.16.96.1 255.255.224.0  
No shutdown  
Exit
- **Gig 0/0/0:**  
Interface gig0/0/0  
Ip address 172.16.192.1 255.255.224.0  
No shutdown  
Exit  
Exit  
wr

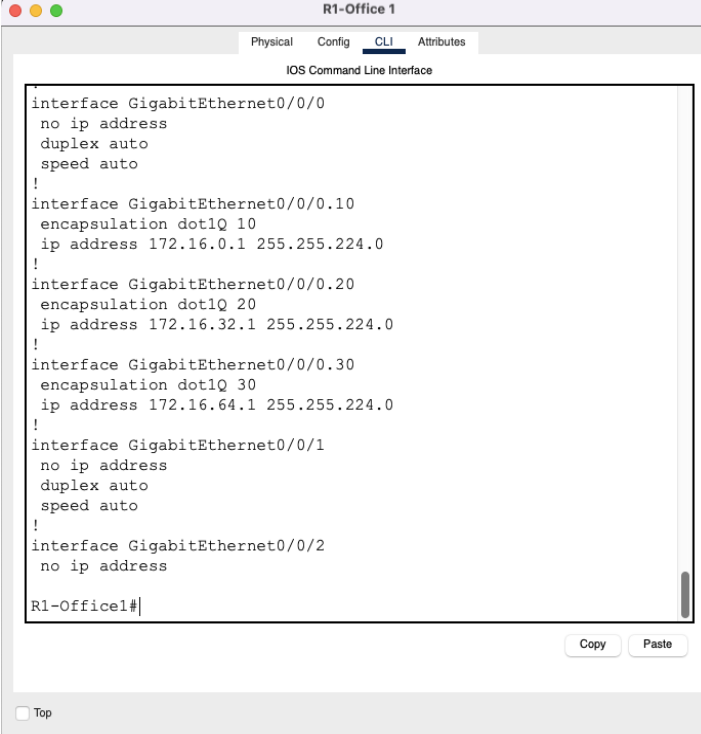
### **Configure R1:**

- **Seiral 0/1/0:**  
En  
Conf t  
Interface se0/1/0  
Ip address 172.16.128.1 255.255.224.0  
No shutdown  
Exit
- **Seiral 0/1/1:**  
Interface se0/1/1  
Ip address 172.16.160.1 255.255.224.0  
No shutdown  
Exit
- **Gig 0/0/0:**  
Interface gig0/0/0  
No shutdown  
Exit

### **Lab Task 4: Configure R1 for Inter-VLAN Routing**

*(Listed commands were executed on R1, unless otherwise stated.)*

- **Gig0/0/0.10**  
int g0/0/0.10  
encapsulation dot1q 10  
ip add 172.16.0.1 255.255.224.0  
exit
- **Gig0/0/0.20**  
int g0/0/0.20  
encapsulation dot1q 20  
ip add 172.16.32.1 255.255.224.0  
exit
- **Gig0/0/0.30**  
int g0/0/0.30  
encapsulation dot1q 30  
ip add 172.16.64.1 255.255.224.0  
exit



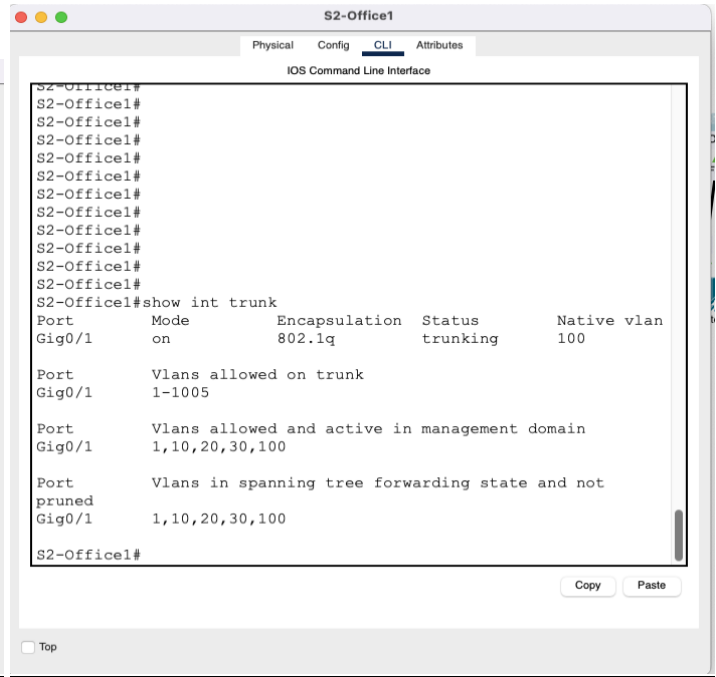
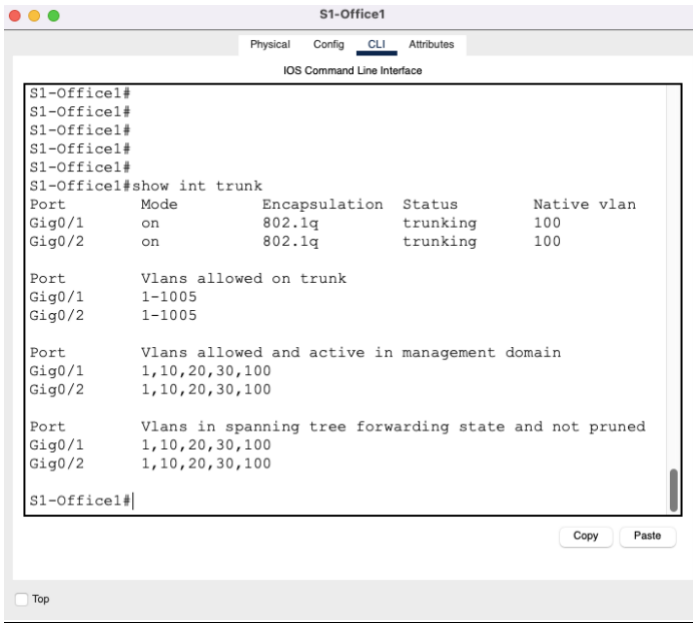
```
interface GigabitEthernet0/0/0
no ip address
duplex auto
speed auto
!
interface GigabitEthernet0/0/0.10
encapsulation dot1Q 10
ip address 172.16.0.1 255.255.224.0
!
interface GigabitEthernet0/0/0.20
encapsulation dot1Q 20
ip address 172.16.32.1 255.255.224.0
!
interface GigabitEthernet0/0/0.30
encapsulation dot1Q 30
ip address 172.16.64.1 255.255.224.0
!
interface GigabitEthernet0/0/1
no ip address
duplex auto
speed auto
!
interface GigabitEthernet0/0/2
no ip address
R1-Office1#
```

- **On S1-Office1 & S2-Office2, set GigabitEthernet 0/1 as Trunk, with appropriate Native VLAN.**

```

en
conf t
int gig0/1
switchport mode trunk
switchport trunk native vlan 100
no shutdown
exit

```



## **Lab Task 5: Static Routing for network devices**

- **R3-Office 2:**

```

En
Conf t
ip route 172.16.0.0 255.255.224.0 172.16.128.1
ip route 172.16.32.0 255.255.224.0 172.16.128.1
ip route 172.16.64.0 255.255.224.0 172.16.128.1
ip route 172.16.96.0 255.255.224.0 172.16.96.2
ip route 172.16.160.0 255.255.224.0 172.16.96.2
exit
wr

```

- **R2-Edge router:**

```

En
Conf t
ip route 172.16.0.0 255.255.224.0 172.16.160.1
ip route 172.16.32.0 255.255.224.0 172.16.160.1
ip route 172.16.64.0 255.255.224.0 172.16.160.1
ip route 172.16.128.0 255.255.224.0 172.16.96.1
ip route 172.16.192.0 255.255.224.0 172.16.96.1
exit
wr

```

- **R1-Office 1:**

```
en
conf t
ip route 172.16.96.0 255.255.224.0 172.16.96.2
ip route 172.16.192.0 255.255.224.0 172.16.128.2
ip route 0.0.0.0 0.0.0.0 172.16.160.2
exit
```

### **Lab Task 6: Initial and Security Settings for Network Devices**

*(Listed commands were executed on all routers and switches)*

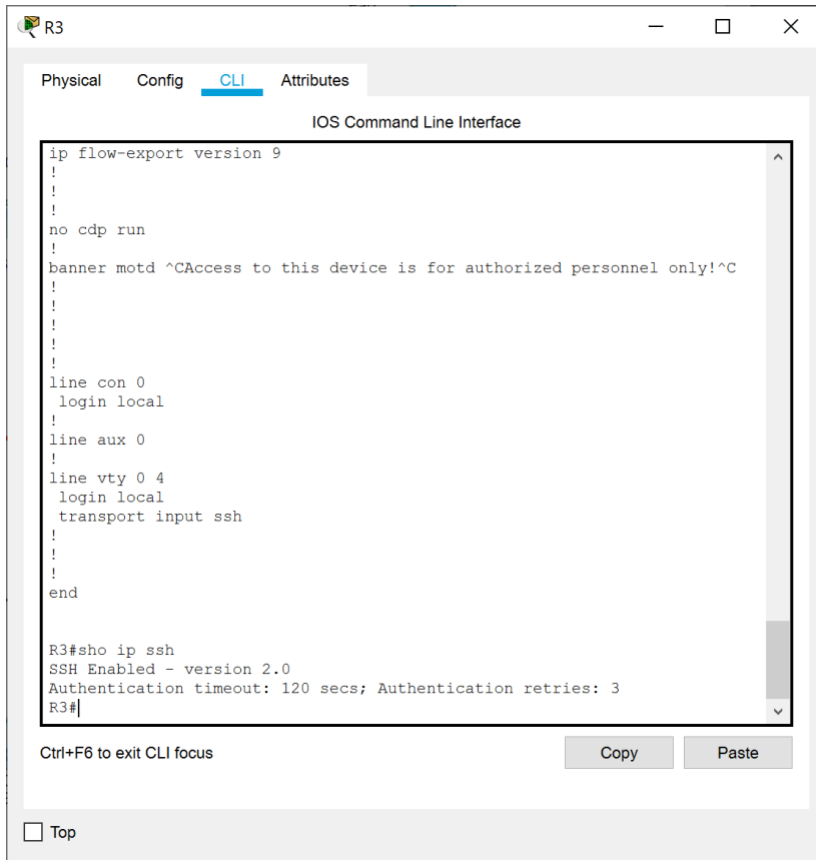
1. en  
conf t  
username Admin password ACDC1973
2. line console 0  
login local  
exit
3. enable password beatles1960
4. service password-encryption
5. banner motd #ONLY for admin's#  
ex  
wr  
ex



## Lab Task 7: Secure Remote Access

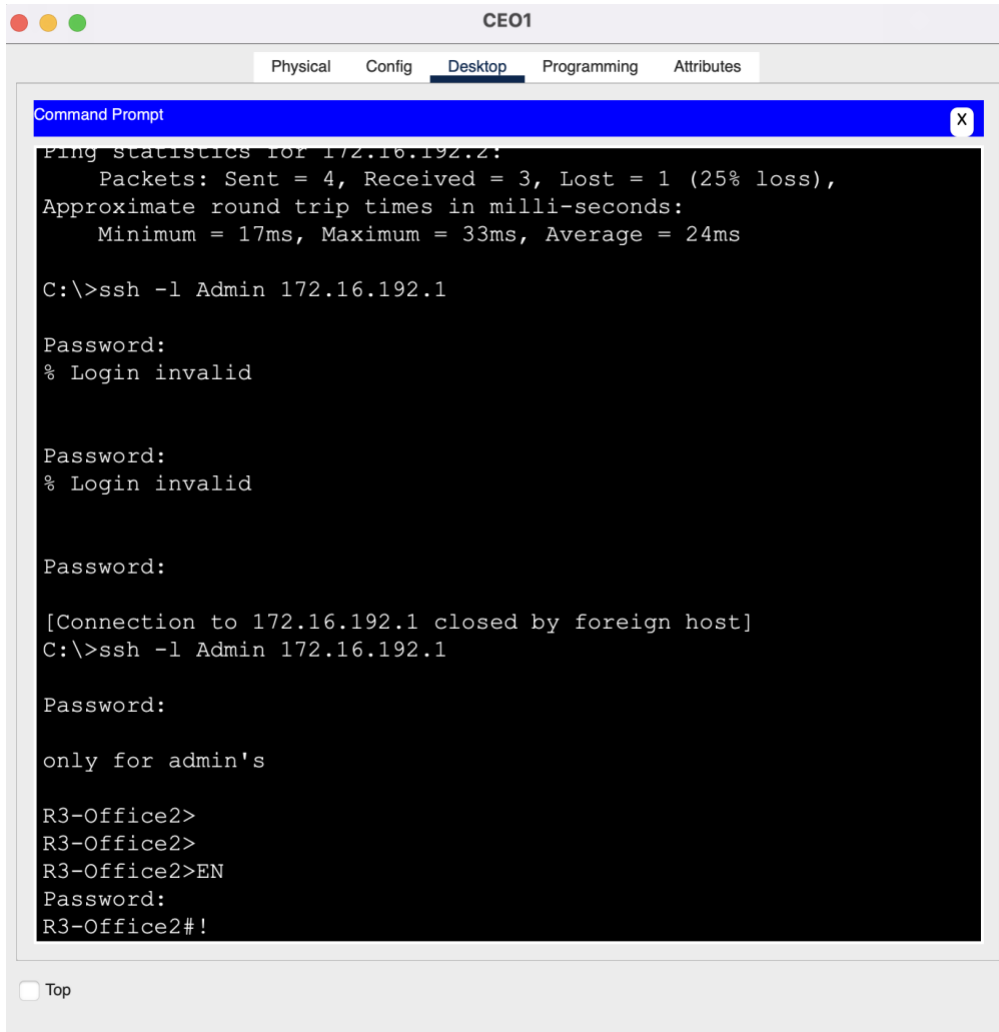
*(Listed commands were executed on R1, R2, and R3)*

1. ip domain-name aast.com
2. crypto key generate rsa
3. 1024
4. ip ssh version 2
5. line vty 0 4  
login local  
transport input ssh  
exit
6. ex  
sho ip ssh  
sho run  
wr





7. Using the command `ssh -l Admin IP-Address`, I was able to successfully SSH into the routers.



The screenshot shows a Cisco Packet Tracer desktop environment for a device named CE01. The 'Desktop' tab is selected, displaying a Windows Command Prompt window. The window title is 'Command Prompt' with a close button (X). The text in the window shows the results of a ping command and three failed SSH attempts, followed by a successful SSH connection to a router.

```
Command Prompt
Ping statistics for 172.16.192.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 17ms, Maximum = 33ms, Average = 24ms

C:\>ssh -l Admin 172.16.192.1

Password:
% Login invalid

Password:
% Login invalid

Password:

[Connection to 172.16.192.1 closed by foreign host]
C:\>ssh -l Admin 172.16.192.1

Password:

only for admin's

R3-Office2>
R3-Office2>
R3-Office2>EN
Password:
R3-Office2#!
```

At the bottom left of the desktop area, there is a checkbox labeled 'Top' which is currently unchecked.