

Final Project

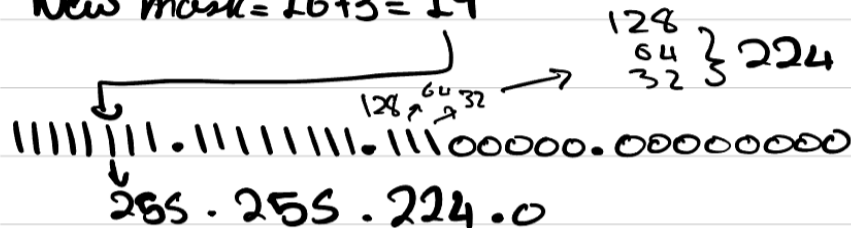
Lab Task 1: Design an IP Address Scheme [site24x7](#)

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

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
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

```

4. int range fa0/1-24
   switchport nonegotiate
   exit
wr

```

S1-Office1# show vlan brief

S2-Office1# show vlan brief

```

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              Fa0/9, Fa0/10
20   Marketing              active    Fa0/11, Fa0/12,
Fa0/13, Fa0/14            Fa0/15, Fa0/16,
Fa0/17, Fa0/18            Fa0/19, Fa0/20
30   Accounting              active    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

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              Fa0/9, Fa0/10
20   Marketing              active    Fa0/11, Fa0/12,
Fa0/13, Fa0/14            Fa0/15, Fa0/16,
Fa0/17, Fa0/18            Fa0/19, Fa0/20
30   Accounting              active    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

S2-Office1#show int trunk

```

S1-Office1# show int trunk

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

Port      Vlans allowed on trunk
Gig0/2    1-1005

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

Port      Vlans in spanning tree forwarding state and not
pruned
Gig0/2    1,10,20,30,100
S1-Office1#

```

```

S2-Office1# show int trunk

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

Port      Vlans allowed on trunk
Gig0/1    1-1005

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

Port      Vlans 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	172.16.64.2	255.255.224.0	172.16.64.1
Copywriter2	FastEthernet0/2	172.16.64.3	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

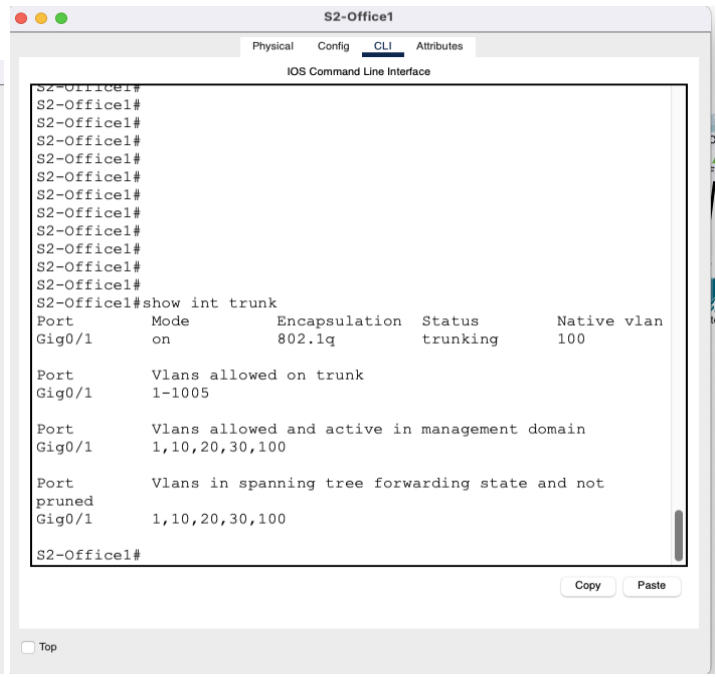
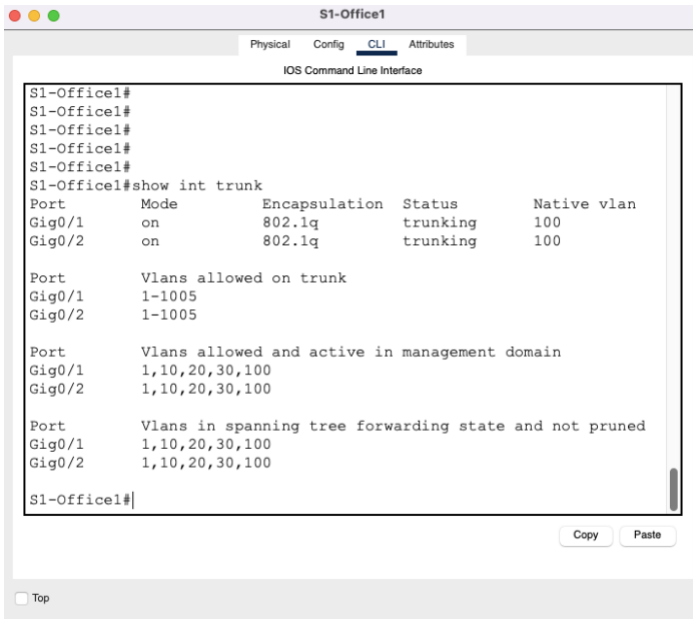
```
interface GigabitEthernet0/0/0
no ip address
duplex auto
speed auto
!
interface GigabitEthernet0/0/0.10
encapsulation dot1Q 10
ip address 172.16.0.1 255.255.224.0
!
interface GigabitEthernet0/0/0.20
encapsulation dot1Q 20
ip address 172.16.32.1 255.255.224.0
!
interface GigabitEthernet0/0/0.30
encapsulation 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

```

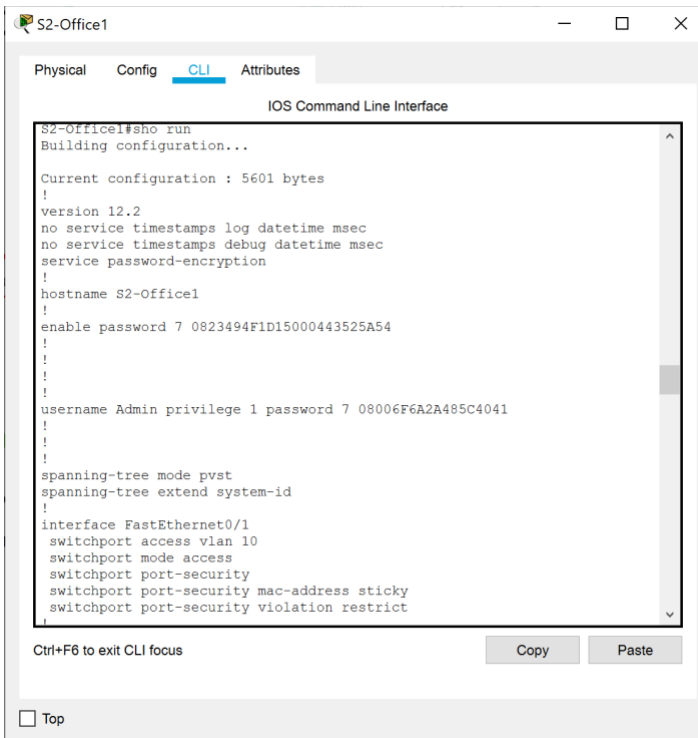
- **R1-Office 1:**

```
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 7: Initial and Security Settings for Network Devices

(Listed commands were executed on all routers and switches)

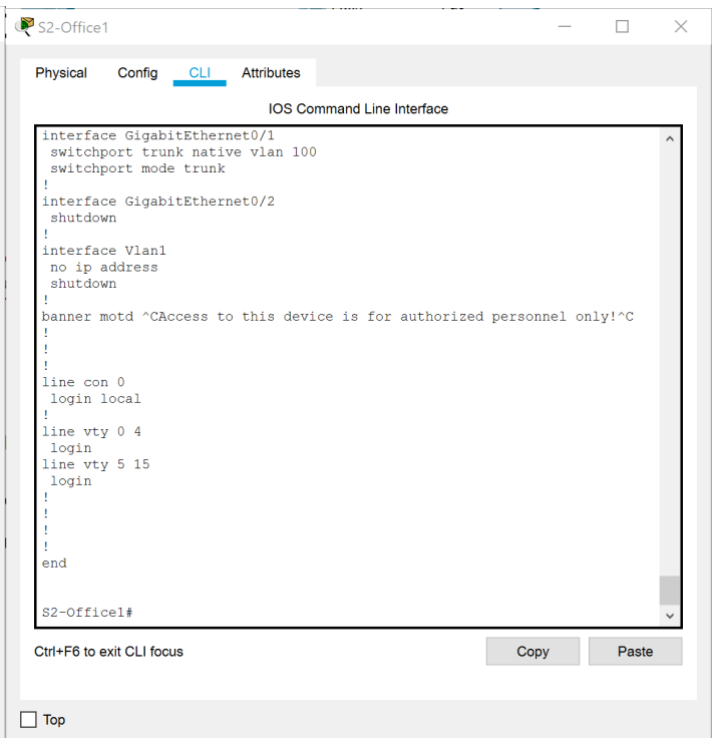
1. en
conf t
username Admin password ACDC1973
2. line console 0
login local
exit
3. enable password beatles1960
4. service password-encryption
5. banner motd #Access to this device is for authorized personnel only!#
ex
wr
ex



The screenshot shows the CLI of S2-Office1 with the 'CLI' tab selected. The command 'show run' has been executed, displaying the current configuration. The output includes the version (12.2), service settings (timestamps, debugging, password encryption), hostname (S2-Office1), enable password, username 'Admin' with privilege 1 and password, spanning-tree settings, and interface FastEthernet0/1 configuration (access vlan 10, port-security).

```
S2-Office1#sho run
Building configuration...

Current configuration : 5601 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname S2-Office1
!
enable password 7 0823494F1D15000443525A54
!
!
!
username Admin privilege 1 password 7 08006F6A2A485C4041
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
 switchport access vlan 10
 switchport mode access
 switchport port-security
 switchport port-security mac-address sticky
 switchport port-security violation restrict
!
```



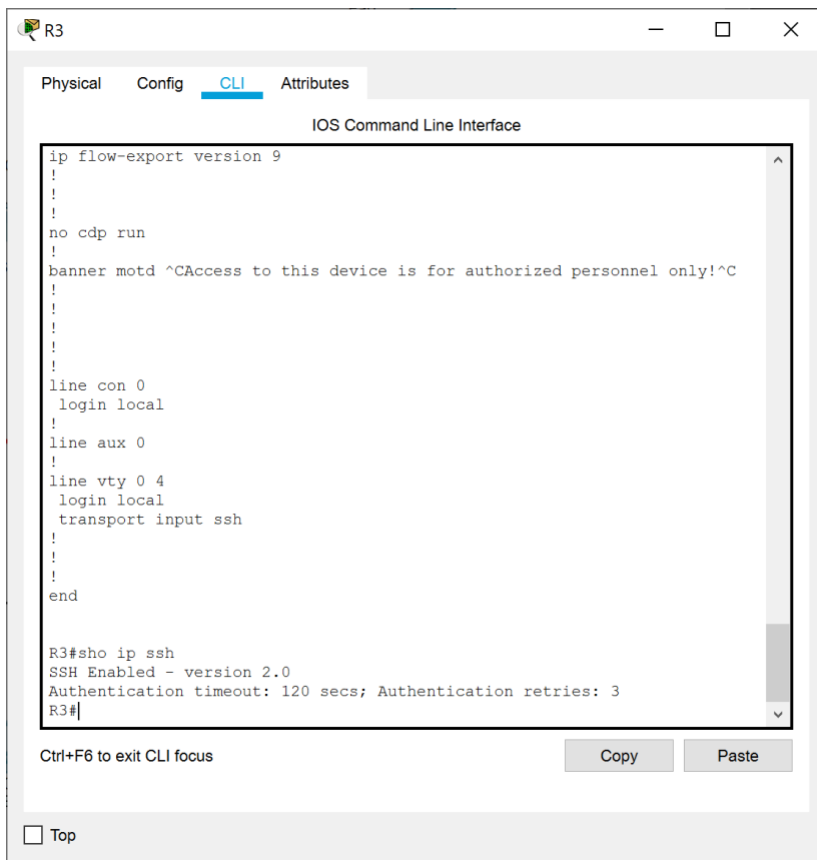
The screenshot shows the CLI of S2-Office1 with the 'CLI' tab selected. The command 'show run' has been executed, displaying the current configuration. The output includes interface GigabitEthernet0/1 configuration (trunk native vlan 100, mode trunk), interface GigabitEthernet0/2 (shutdown), interface Vlan1 (no ip address, shutdown), banner motd, line console 0 (login local), line vty 0 4 (login), line vty 5 15 (login), and the end of the configuration.

```
S2-Office1#
interface GigabitEthernet0/1
 switchport trunk native vlan 100
 switchport mode trunk
!
interface GigabitEthernet0/2
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
banner motd ^CAccess to this device is for authorized personnel only!^C
!
!
!
line con 0
 login local
!
line vty 0 4
 login
line vty 5 15
 login
!
!
!
end
S2-Office1#
```

Lab Task 8: Secure Remote Access

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

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



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

