

# NST41092 Practical for Secure Network Infrastructure

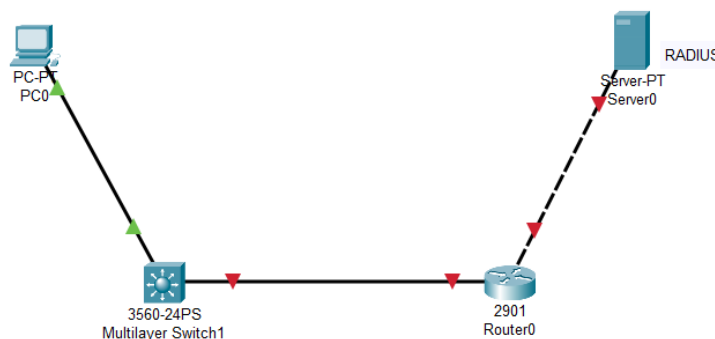
## Continuous Assessment 1

Submission date 30/11/2022

Submission guideline:

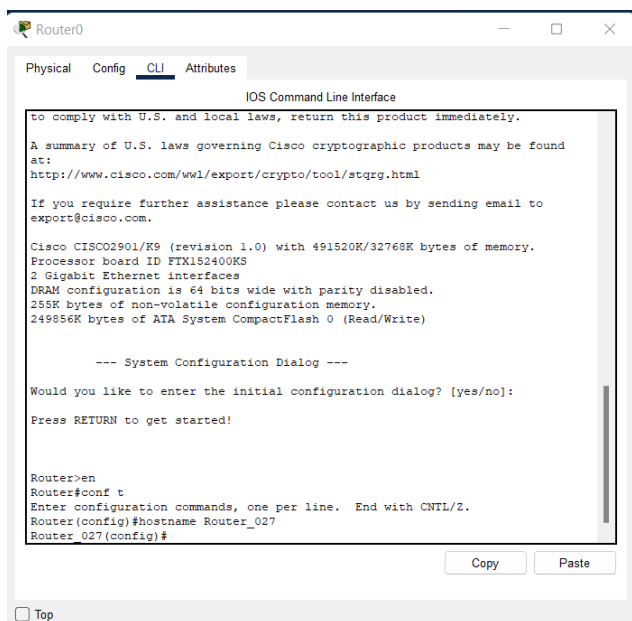
Mark your registration numbers clearly in your assessment files and forward it to razmik@gmail.com with the subject "NST41092 assessment1 - <your registration number>" on or before the deadline.

Prepare a sample network as shown in Packet Tracer networking simulation tools.

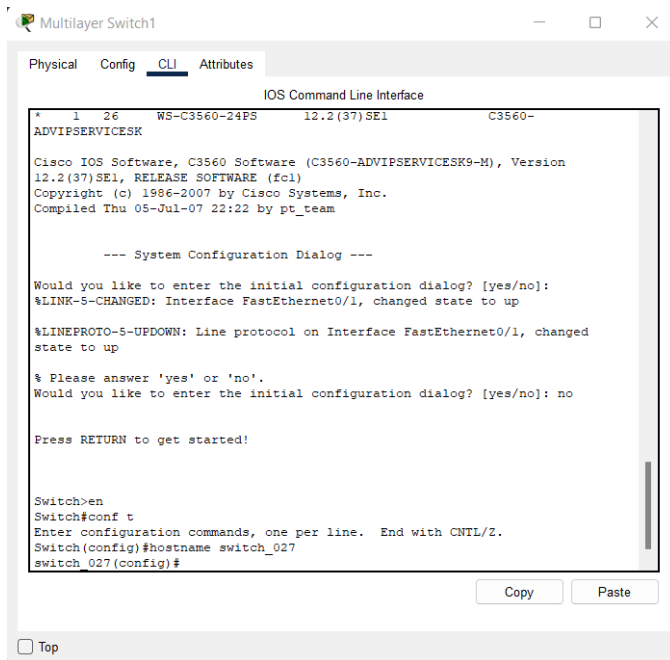


- Set the hostname of the router as Router\_<last three digits of your registration number>

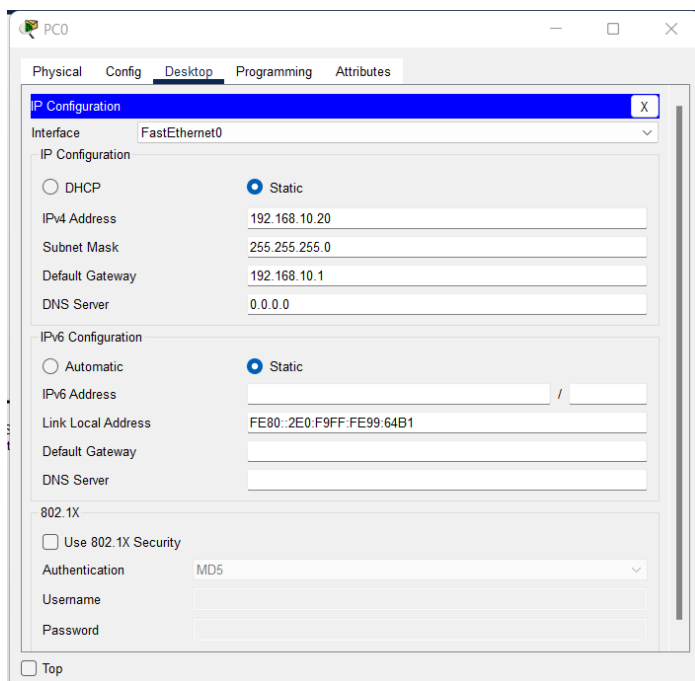
(E.g. Router\_029 )



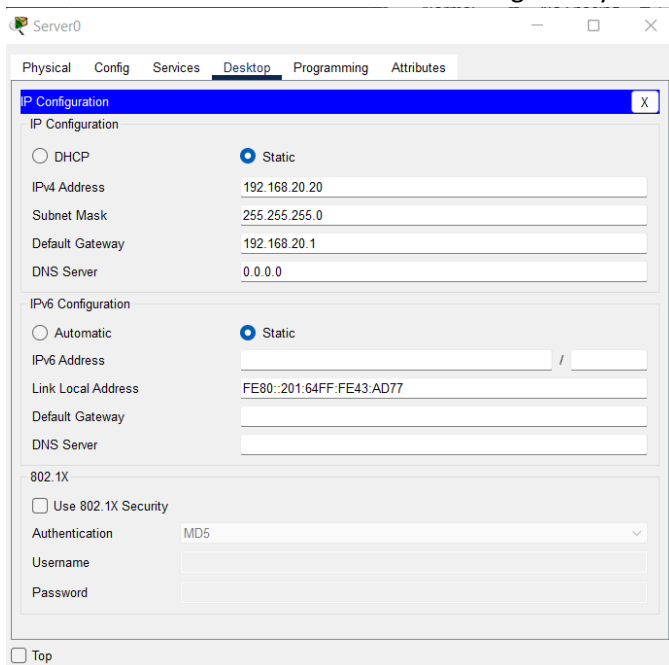
- Set the hostname of the switch as switch\_<last three digits of your registration number>



- PC – IP address 192.168.10.20 Default gateway 192.168.10.1



- Server IP address 192.168.20.20 Default gateway 192.168.20.1



- Configure the default gateway addresses 192.168.10.1 and 192.168.20.1 in the router

```
Router_027(config)#interface GigabitEthernet0/0
Router_027(config-if)#ip address 192.168.10.1 255.255.255.0
Router_027(config-if)#no shut

Router_027(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed
state to up

Router_027(config-if)#exit

Router_027(config)#interface GigabitEthernet0/1
Router_027(config-if)#ip address 192.168.20.1 255.255.255.0
Router_027(config-if)#no shut

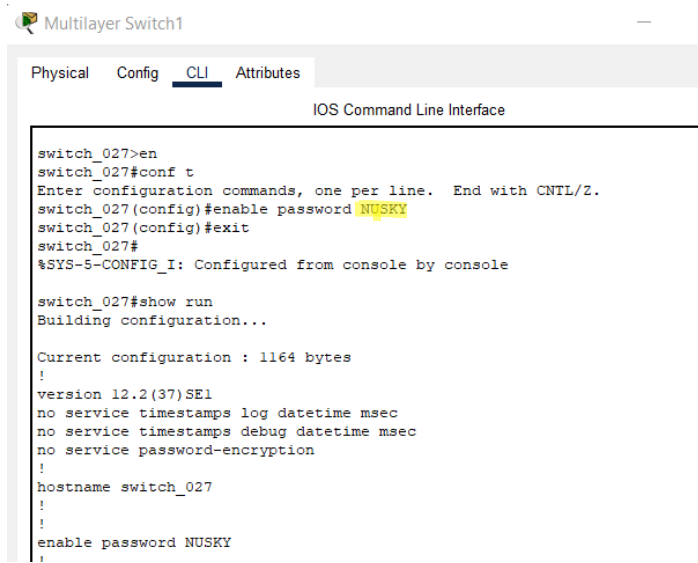
Router_027(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed
state to up
```

- Configure a local user and set enable password and enable secret on the switch and router.

Make sure no password information is in clear text.

### Multi Layer Switch



Multilayer Switch1

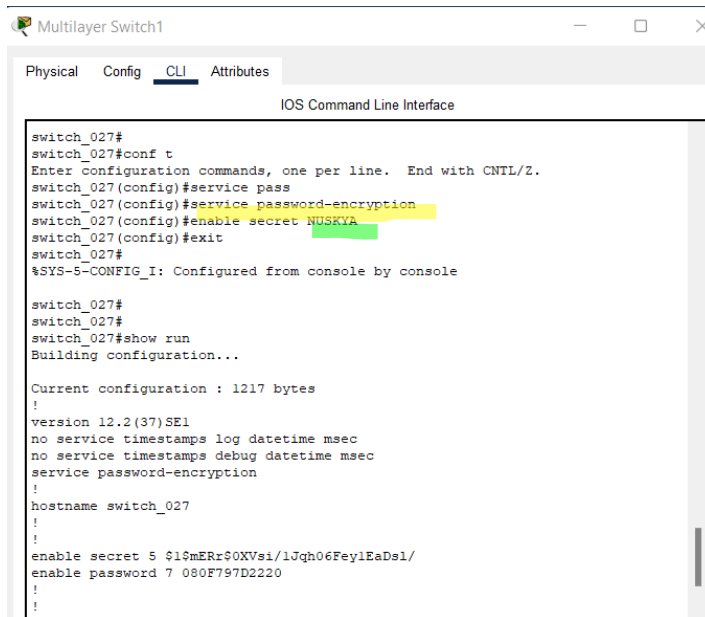
Physical Config **CLI** Attributes

IOS Command Line Interface

```
switch_027>en
switch_027#conf t
Enter configuration commands, one per line. End with CNTL/Z.
switch_027(config)#enable password NUSKY
switch_027(config)#exit
switch_027#
%SYS-5-CONFIG_I: Configured from console by console

switch_027#show run
Building configuration...

Current configuration : 1164 bytes
!
version 12.2(37)SE1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname switch_027
!
!
enable password NUSKY
!
```



Multilayer Switch1

Physical Config **CLI** Attributes

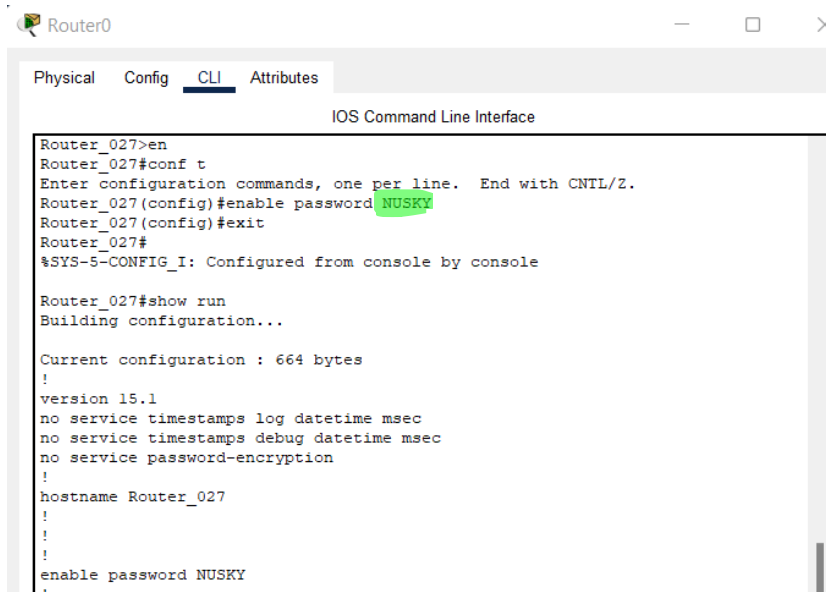
IOS Command Line Interface

```
switch_027#
switch_027#conf t
Enter configuration commands, one per line. End with CNTL/Z.
switch_027(config)#service pass
switch_027(config)#service password-encryption
switch_027(config)#enable secret NUSKYA
switch_027(config)#exit
switch_027#
%SYS-5-CONFIG_I: Configured from console by console

switch_027#
switch_027#
switch_027#show run
Building configuration...

Current configuration : 1217 bytes
!
version 12.2(37)SE1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname switch_027
!
!
enable secret 5 $1$mERr$0XVsi/1Jqh06FeylEaDsl/
enable password 7 080F797D2220
!
!
```

## ROUTER



Router0

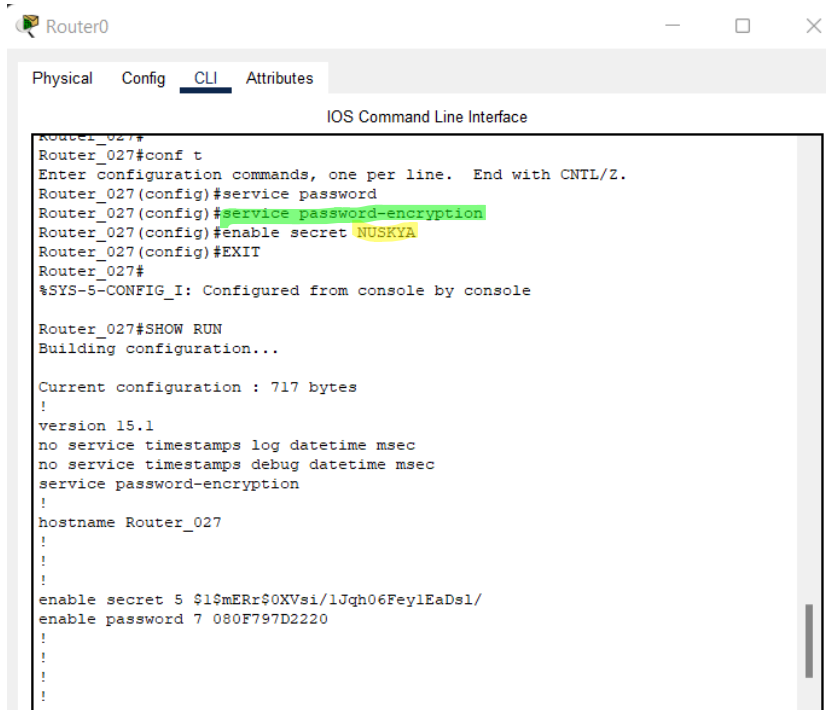
Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router_027>en
Router_027#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router_027(config)#enable password NUSKY
Router_027(config)#exit
Router_027#
%SYS-5-CONFIG_I: Configured from console by console

Router_027#show run
Building configuration...

Current configuration : 664 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router_027
!
!
!
enable password NUSKY
!
```



Router0

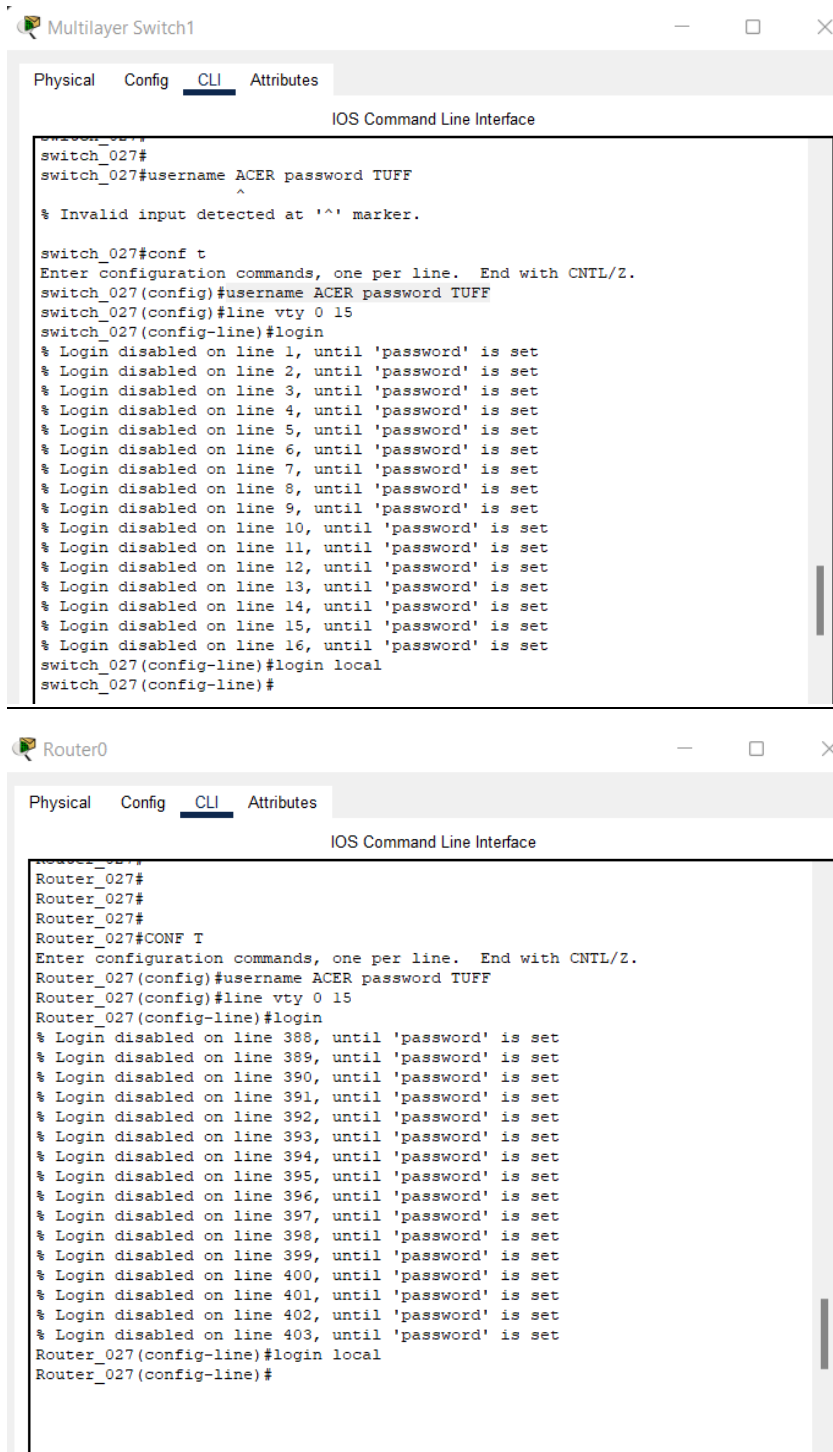
Physical Config **CLI** Attributes

IOS Command Line Interface

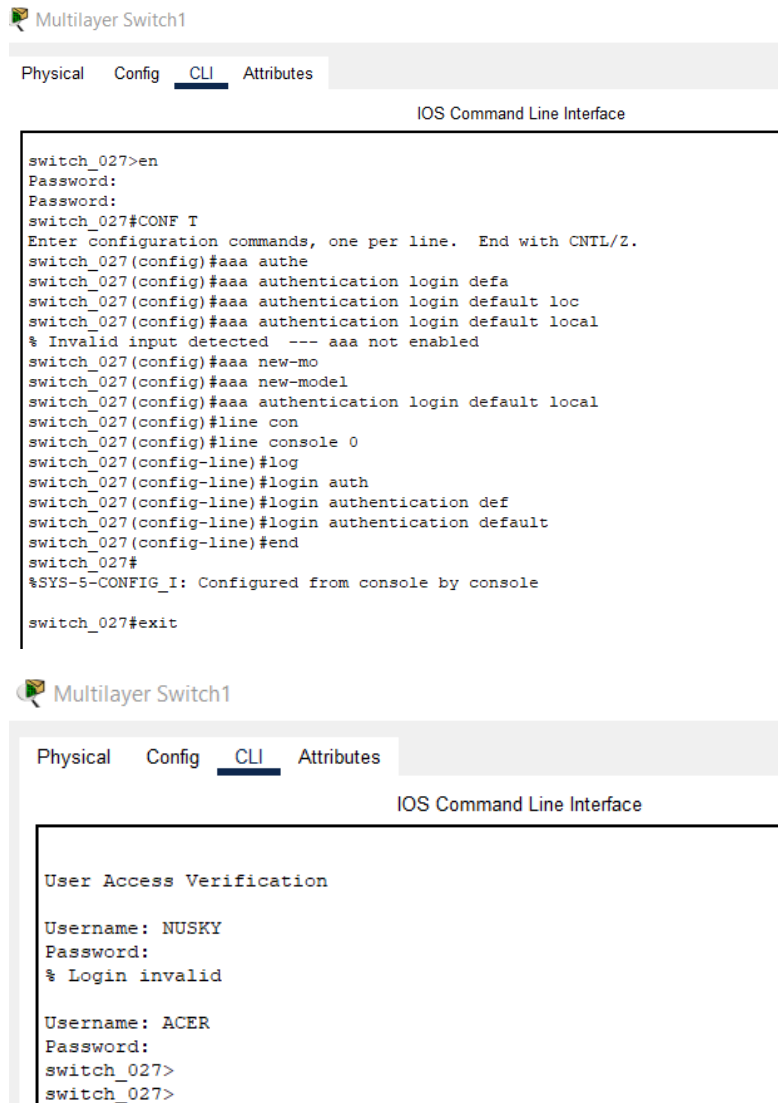
```
Router_027#
Router_027#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router_027(config)#service password
Router_027(config)#service password-encryption
Router_027(config)#enable secret NUSKYA
Router_027(config)#EXIT
Router_027#
%SYS-5-CONFIG_I: Configured from console by console

Router_027#SHOW RUN
Building configuration...

Current configuration : 717 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname Router_027
!
!
!
enable secret 5 $1$mERr$0XVsi/1Jqh06FeylEaDsl/
enable password 7 080F797D2220
!
!
!
```



b. Configure AAA authentication for the console login to use the local user. Verify your configurations on the switch.



Multilayer Switch1

Physical Config CLI Attributes

IOS Command Line Interface

```
switch_027>en
Password:
Password:
switch_027#CONF T
Enter Configuration commands, one per line. End with CNTL/Z.
switch_027(config)#aaa authe
switch_027(config)#aaa authentication login defa
switch_027(config)#aaa authentication login default loc
switch_027(config)#aaa authentication login default local
% Invalid input detected --- aaa not enabled
switch_027(config)#aaa new-mo
switch_027(config)#aaa new-model
switch_027(config)#aaa authentication login default local
switch_027(config)#line con
switch_027(config)#line console 0
switch_027(config-line)#log
switch_027(config-line)#login auth
switch_027(config-line)#login authentication def
switch_027(config-line)#login authentication default
switch_027(config-line)#end
switch_027#
%SYS-5-CONFIG_I: Configured from console by console
switch_027#exit
```

Multilayer Switch1

Physical Config CLI Attributes

IOS Command Line Interface

```
User Access Verification

Username: NUSKY
Password:
% Login invalid

Username: ACER
Password:
switch_027>
switch_027>
```

c. Enable only SSH as a connection method for line VTY.

```

switch_027>en
Password:
switch_027#EN
switch_027#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
switch_027(config)#line console 0
switch_027(config-line)#login auth
switch_027(config-line)#login authentication de
switch_027(config-line)#login authentication default
switch_027(config-line)#end
switch_027#
%SYS-5-CONFIG_I: Configured from console by console

switch_027#conf t
Enter configuration commands, one per line. End with CNTL/Z.
switch_027(config)#ip domain-name ceb.lk
switch_027(config)#crypto key generate rsa
The name for the keys will be: switch_027.ceb.lk
Choose the size of the key modulus in the range of 360 to 2048 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

switch_027(config)#aaa authen
*Mar 3 10:26:59.924: %SSH-5-ENABLED: SSH 1.99 has been enabled
switch_027(config)#aaa authentication login ssh-login local
switch_027(config)#line vty 0 15
switch_027(config-line)#login auth
switch_027(config-line)#login authentication ssh-login
switch_027(config-line)#transport input ssh
switch_027(config-line)#end
switch_027#
%SYS-5-CONFIG_I: Configured from console by console

switch_027#
switch_027#

```

d. Configure RADIUS server based AAA authentication for VTY lines on the router.

**Server0**

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

**AAA**

Service ☒ On ☐ Off Radius Port 1645

**Network Configuration**

Client Name Router\_027 Client IP 192.168.20.1

Secret nusky027 ServerType Radius

	Client Name	Client IP	Server Type	Key
1	Router_027	192.168.20.1	Radius	nusky027

Add Save Remove

**User Setup**

Username nuskyRAD Password nuskyRADP

	Username	Password
1	nuskyRAD	nuskyRADP

Add Save Remove

☐ Top



```

Router0
Physical Config CLI Attributes
IOS Command Line Interface

Router_027>en
Password:
Router_027#CONF T
Translating "CONF T"...domain server (255.255.255.255)
% Unknown command or computer name, or unable to find computer address

Router_027#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router_027(config)#aaa auth
Router_027(config)#aaa authen
Router_027(config)#aaa authentication login default group radius local
% Invalid input detected --- aaa not enabled
Router_027(config)#
Router_027(config)#aaa new-model
Router_027(config)#aaa authentication login default group radius local
Router_027(config)#radius server RADIUS
Router_027(config-radius-server)#add
Router_027(config-radius-server)#address ipv4 192.168.20.20
Router_027(config-radius-server)#key nusky027
WARNING: Command has been added to the configuration using a type 0
password. However, type 0 passwords will soon be deprecated. Migrate to a
supported password type
*Nov 30 22:17:44.339: %AAAA-4-CLI_DEPRECATED: WARNING: Command has been added
to the configuration using a type 0 password. However, type 0 passwords will
soon be deprecated. Migrate to a supported password type
Router_027(config-radius-server)#exit
Router_027(config)#ip domain-name ceb.lk
Router_027(config)#crypto key generate rsa
The name for the keys will be: Router_027.ceb.lk
Choose the size of the key modulus in the range of 360 to 2048 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

Router_027(config)#line vty 0 15
*Mar 3 10:36:7.460: %SSH-5-ENABLED: SSH 1.99 has been enabled
Router_027(config-line)#tran
Router_027(config-line)#transport inp
Router_027(config-line)#transport input ssh
Router_027(config-line)#log
Router_027(config-line)#login auth
Router_027(config-line)#login authentication def
Router_027(config-line)#login authentication default
Router_027(config-line)#exit
Router_027(config)#line console 0
Router_027(config-line)#login authentication default
Router_027(config-line)#

```

e. Verify the AAA configuration by establishing a connection to the router from the PC.

```

PC0
Physical Config Desktop Programming Attributes
Command Prompt

[Connection to 192.168.20.1 closed by foreign host]
C:\>ssh -l nuskyRAD 192.168.20.1

Password:
Router_027>en
Password:

```



```
!  
!  
!  
ip domain-name ceb.lk  
!  
!  
spanning-tree mode pvst  
!  
!  
!  
!  
!  
interface GigabitEthernet0/0  
ip address 192.168.10.1 255.255.255.0  
duplex auto  
speed auto  
!  
interface GigabitEthernet0/1  
ip address 192.168.20.1 255.255.255.0  
duplex auto  
speed auto  
!  
interface Vlan1  
no ip address  
shutdown  
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
!  
radius server RADIUS  
address ipv4 192.168.20.20 auth-port 1645  
key nusky027  
radius server 192.168.20.20  
address ipv4 192.168.20.20 auth-port 1645  
key nusky027  
!  
!  
!  
line con 0  
login authentication default  
!  
line aux 0  
!  
!
```

```
!  
line vty 0 4  
login authentication default  
transport input ssh  
line vty 5 15  
login authentication default  
transport input ssh  
!  
!  
!  
end  
  
Router_027#  
Router_027#  
Router_027#
```