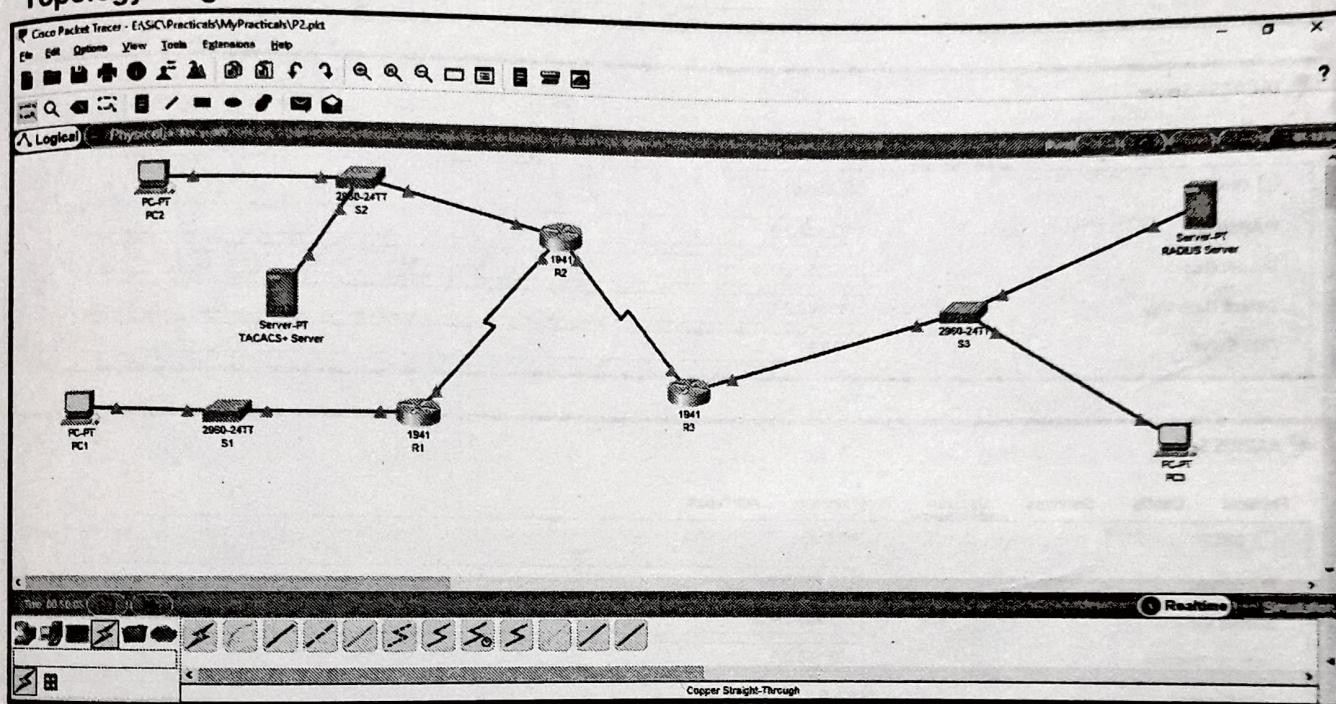
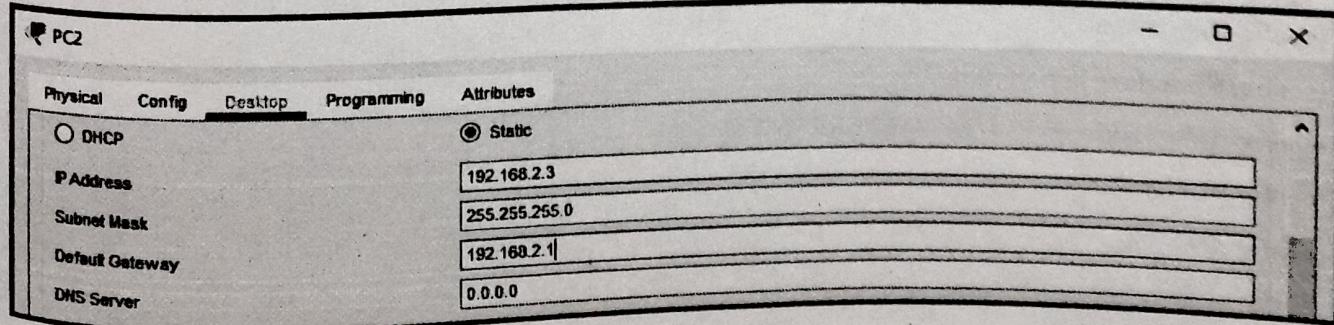
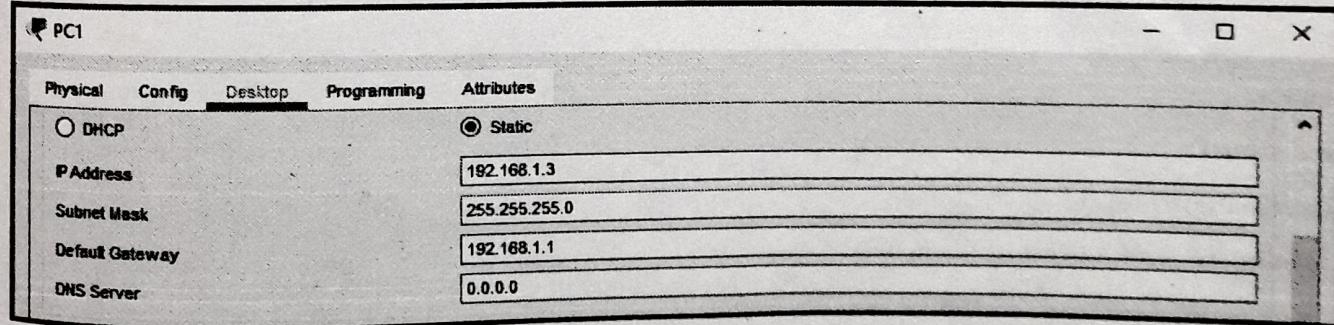
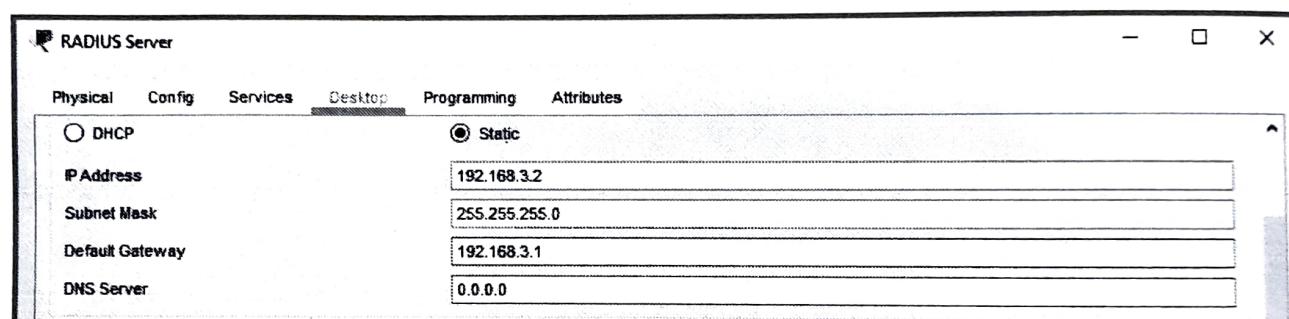
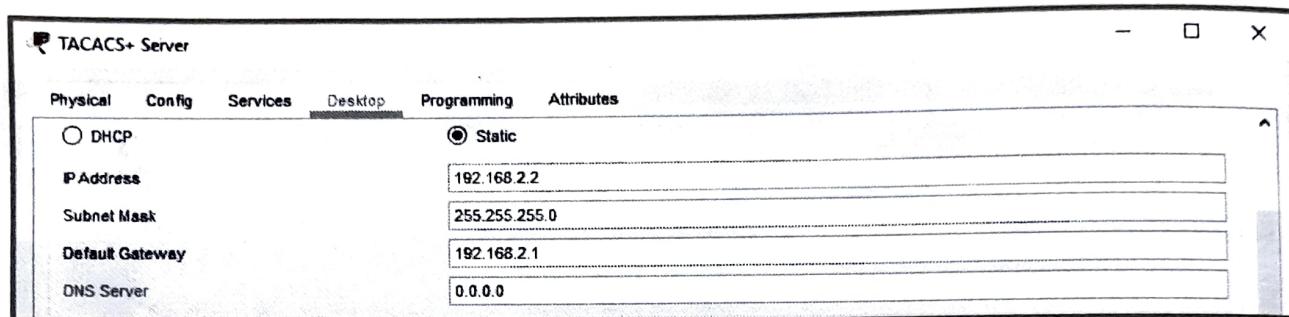
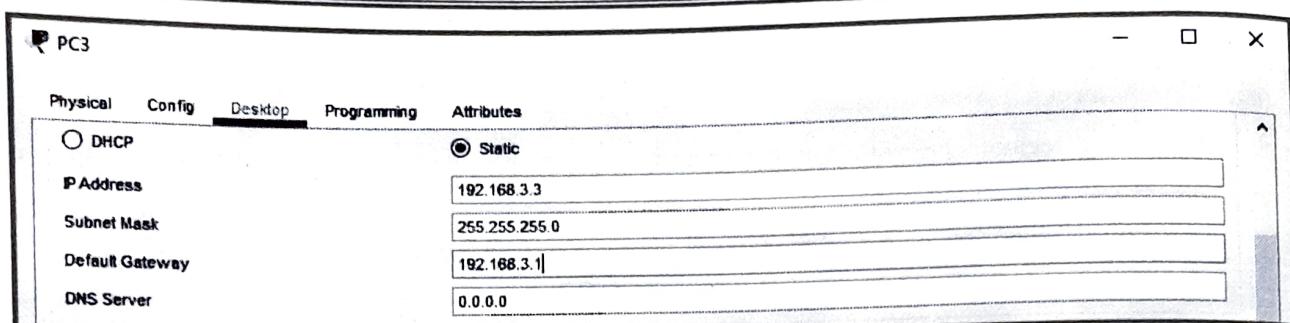


Practical 2**Aim : Configure AAA Authentication**

- Configure a local user account on Router and configure authenticate on the console and vty lines using local AAA
- Verify local AAA authentication from the Router console and the PC-A client

Topology Diagram**Assign IP Addresses**



Router>en

Router#conf t

Router(config)#host R1

R1(config)#interface GigabitEthernet0/0

R1(config-if)#ip address 192.168.1.1 255.255.255.0

R1(config-if)#no shut

R1(config)#interface Serial0/0/0

R1(config-if)#ip address 10.1.1.2 255.255.255.252

R1(config-if)#no shut

R1(config-if)#^Z

R1#exit

```
Router>en
Router#conf t
Router(config)#host R2
R2(config)#interface GigabitEthernet0/0
R2(config-if)#ip address 192.168.2.1 255.255.255.0
R2(config-if)#no shut
R2(config)#interface Serial0/0/0
R2(config-if)#ip address 10.1.1.1 255.255.255.252
R2(config-if)#no shut
R2(config)#interface Serial0/0/1
R2(config-if)#ip address 10.2.2.1 255.255.255.252
R2(config-if)#no shut
R2(config-if)# ^ Z
R2#exit
```

```
Router>en
Router#conf t
Router(config)#host R3
R3(config)#interface GigabitEthernet0/0
R3(config-if)#ip address 192.168.3.1 255.255.255.0
R3(config-if)#no shut
R3(config)#interface Serial0/0/0
R3(config-if)#ip address 10.2.2.2 255.255.255.252
R3(config-if)#no shut
R3(config-if)# ^ Z
R3#exit
```

Displaying IP Address Details of Routers

```
R1>show ip interface brief
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/0 192.168.1.1 YES manual up up
```



```
GigabitEthernet0/1 unassigned YES unset administratively down down
Serial0/0/0 10.1.1.2 YES manual up up
Serial0/0/1 unassigned YES unset administratively down down
Vlan1 unassigned YES unset administratively down down
```

```
R2>show ip interface brief
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/0 192.168.2.1 YES manual up up
GigabitEthernet0/1 unassigned YES unset administratively down down
Serial0/0/0 10.1.1.1 YES manual up up
Serial0/0/1 10.2.2.1 YES manual up up
Vlan1 unassigned YES unset administratively down down
```

```
R3>show ip interface brief
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/0 192.168.3.1 YES manual up up
GigabitEthernet0/1 unassigned YES unset administratively down down
Serial0/0/0 10.2.2.2 YES manual up up
Serial0/0/1 unassigned YES unset administratively down down
Vlan1 unassigned YES unset administratively down down
```

☛ Configure RIP on routers

```
R1>en
R1#conf t
R1(config)#router rip
R1(config-router)#network 192.168.1.0
R1(config-router)#network 10.1.1.0
R1(config-router)# ^ Z
R1#exit
```

```
R2>en
R2#conf t
R2(config)#router rip
R2(config-router)#network 10.1.1.0
R2(config-router)#network 192.168.2.0
R2(config-router)#network 10.2.2.0
R2(config-router)# ^Z
R2#exit
```

```
R3>en
R3#conf t
R3(config)#router rip
R3(config-router)#network 192.168.3.0
R3(config-router)#network 10.2.2.0
R3(config-router)# ^Z
R3#exit
```

Displaying routing table of routers

```
R1>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, E - EGP
i - IS-IS, 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
```

► Gateway of last resort is not set

```
10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C 10.1.1.0/30 is directly connected, Serial0/0/0
L 10.1.1.2/32 is directly connected, Serial0/0/0
R 10.2.2.0/30 [120/1] via 10.1.1.1, 00:00:00, Serial0/0/0
192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.1.0/24 is directly connected, GigabitEthernet0/0
L 192.168.1.1/32 is directly connected, GigabitEthernet0/0
R 192.168.2.0/24 [120/1] via 10.1.1.1, 00:00:00, Serial0/0/0
R 192.168.3.0/24 [120/2] via 10.1.1.1, 00:00:00, Serial0/0/0
```



R2>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, E - EGP

i - IS-IS, 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

► Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks

C 10.1.1.0/30 is directly connected, Serial0/0/0

L 10.1.1.1/32 is directly connected, Serial0/0/0

C 10.2.2.0/30 is directly connected, Serial0/0/1

L 10.2.2.1/32 is directly connected, Serial0/0/1

R 192.168.1.0/24 [120/1] via 10.1.1.2, 00:00:26, Serial0/0/0

192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.2.0/24 is directly connected, GigabitEthernet0/0

L 192.168.2.1/32 is directly connected, GigabitEthernet0/0

R 192.168.3.0/24 [120/1] via 10.2.2.2, 00:00:08, Serial0/0/1

R3>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, E - EGP

i - IS-IS, 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

► Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
R 10.1.1.0/30 [120/1] via 10.2.2.1, 00:00:10, Serial0/0/0
C 10.2.2.0/30 is directly connected, Serial0/0/0
L 10.2.2.2/32 is directly connected, Serial0/0/0
R 192.168.1.0/24 [120/2] via 10.2.2.1, 00:00:10, Serial0/0/0
R 192.168.2.0/24 [120/1] via 10.2.2.1, 00:00:10, Serial0/0/0
192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.3.0/24 is directly connected, GigabitEthernet0/0
L 192.168.3.1/32 is directly connected, GigabitEthernet0/0

☒ Configure Local AAA Authentication for Console Lines on R1

```
R1>en
R1#conf t
R1(config)#username aaaAdmin secret aaapwd
R1(config)#aaa new-model
R1(config)#aaa authentication login default local
R1(config)#line console 0
R1(config-line)#login authentication default
R1(config-line)# ^Z
R1#exit
```

User Access Verification

Username: aaaAdmin

Password:

R1>

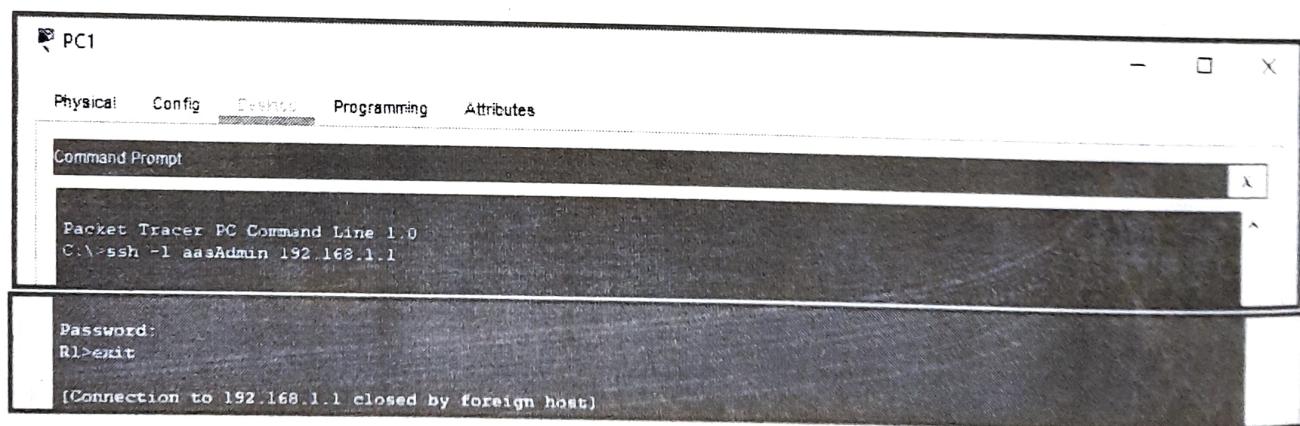


☞ Configure Local AAA Authentication for vty Lines on R1

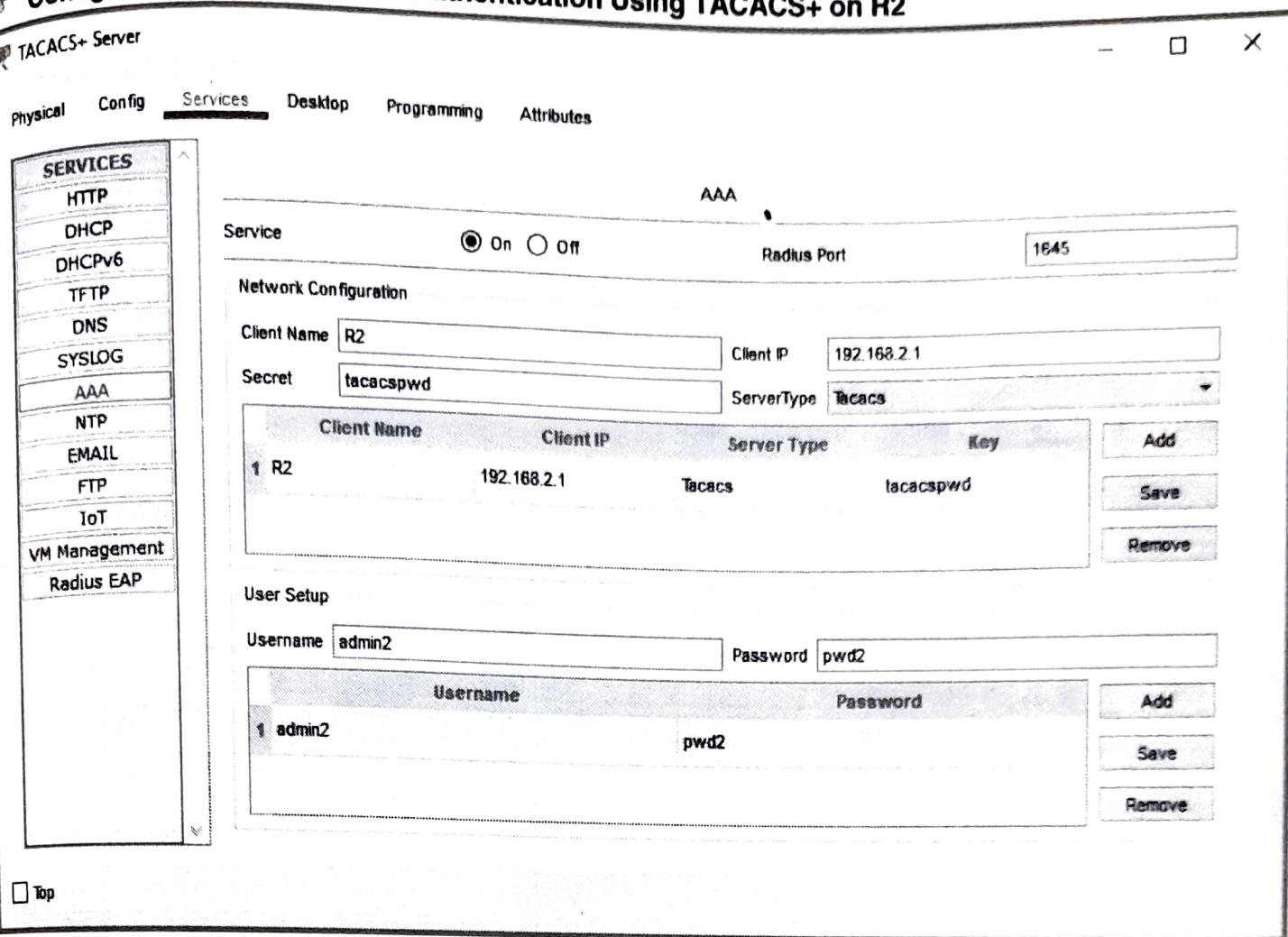
```
R1>en  
R1#conf t  
R1(config)#ip domain-name sic.com  
R1(config)#crypto key generate rsa
```

- The name for the keys will be: R1.sic.com
- 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]

```
R1(config)#aaa authentication login SSH-LOGIN local  
*Mar 1 2:2:12.412: %SSH-5-ENABLED: SSH 1.99 has been enabled  
R1(config)#line vty 0 4  
R1(config-line)#login authentication SSH-LOGIN  
R1(config-line)#transport input ssh  
R1(config-line)# ^Z  
R1#exit
```



Configure Server-Based AAA Authentication Using TACACS+ on R2



R2>en

R2#conf t

R2(config)#username admin2 secret pwd2

R2(config)#tacacs-server host 192.168.2.2

R2(config)#tacacs-server key tacacspwd

R2(config)#aaa new-model

R2(config)#aaa authentication login default group tacacs+ local

R2(config)#line console 0

R2(config-line)#login authentication default

R2(config-line)# ^Z

R2#exit



Configure Server-Based AAA Authentication Using TACACS+ on R2

The screenshot shows the configuration interface for a TACACS+ server. The left sidebar lists various services: HTTP, DHCP, DHCPv6, TFTP, DNS, SYSLOG, AAA (selected), NTP, EMAIL, FTP, IoT, VM Management, and Radius EAP. The main window has tabs for Physical, Config, Services, Desktop, Programming, and Attributes. The Services tab is active, displaying the AAA configuration. The AAA section includes a service status (On), radius port (1645), network configuration (Client Name: R2, Client IP: 192.168.2.1, Secret: tacacsPWD, Server Type: Tacacs), and a client list table:

Client Name	Client IP	Server Type	Key
1 R2	192.168.2.1	Tacacs	tacacsPWD

Below this is a User Setup section with a table:

Username	Password
1 admin2	pwd2

Buttons for Add, Save, and Remove are available for both the client and user tables.

R2>en

R2#conf t

R2(config)#username admin2 secret pwd2

R2(config)#tacacs-server host 192.168.2.2

R2(config)#tacacs-server key tacacsPWD

R2(config)#aaa new-model

R2(config)#aaa authentication login default group tacacs+ local

R2(config)#line console 0

R2(config-line)#login authentication default

R2(config-line)# ^Z

R2#exit



User Access Verification

Username: admin2

Password:

R2>

Configure Server-Based AAA Authentication Using RADIUS on R3

The screenshot shows the RADIUS Server configuration interface. The top navigation bar includes Physical, Config, Services, Desktop, Programming, and Attributes. The Services tab is selected, displaying a list of protocols: HTTP, DHCP, DHCPv6, TFTP, DNS, SYSLOG, AAA, NTP, EMAIL, FTP, IoT, VM Management, and Radius EAP. The AAA section is expanded, showing Client Name (R3), Client IP (192.168.3.1), Secret (radiuspwd), and Server Type (Radius). Below this, a table lists a single entry: Client Name (R3), Client IP (192.168.3.1), Server Type (Radius), and Key (radiuspwd). Buttons for Add, Save, and Remove are available. The User Setup section shows a user entry: Username (admin3) and Password (pwd3). A 'Top' checkbox is at the bottom left.

R3>en

R3#conf t

R3(config)#username admin3 secret pwd3

R3(config)#radius-server host 192.168.3.2

R3(config)#radius-server key radiuspwd

R3(config)#aaa new-model

R3(config)#aaa authentication login default group radius local

R3(config)#line console 0

R3(config-line)#login authentication default

R3(config-line)# ^ Z

R3#exit



User Access Verification

Username: admin3

Password: