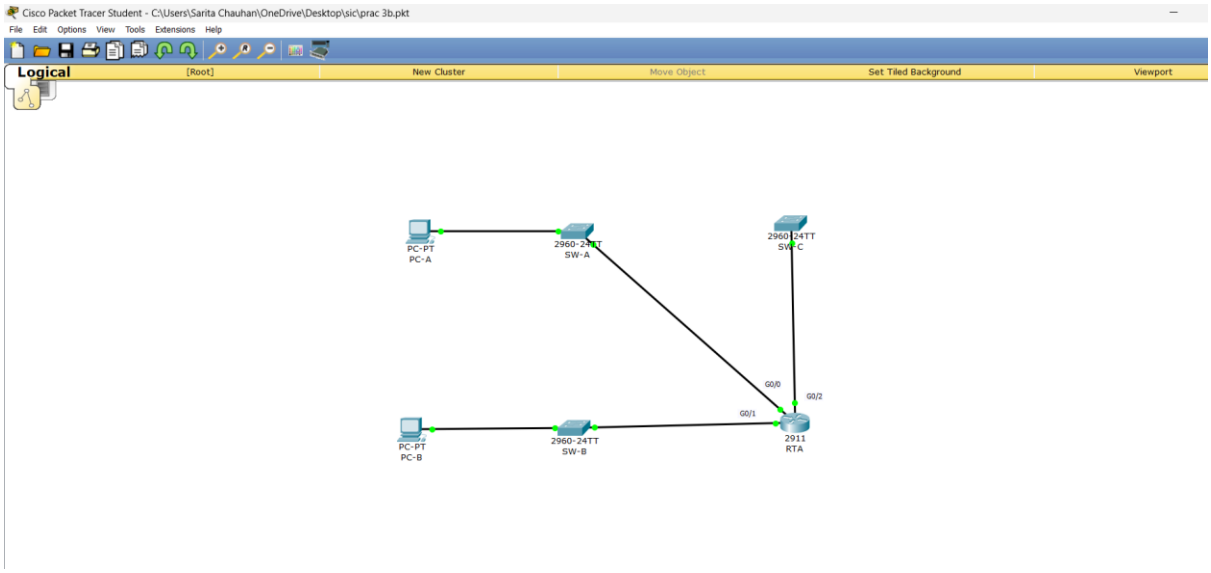
Date: 24/01/2024 **Security in Computing**

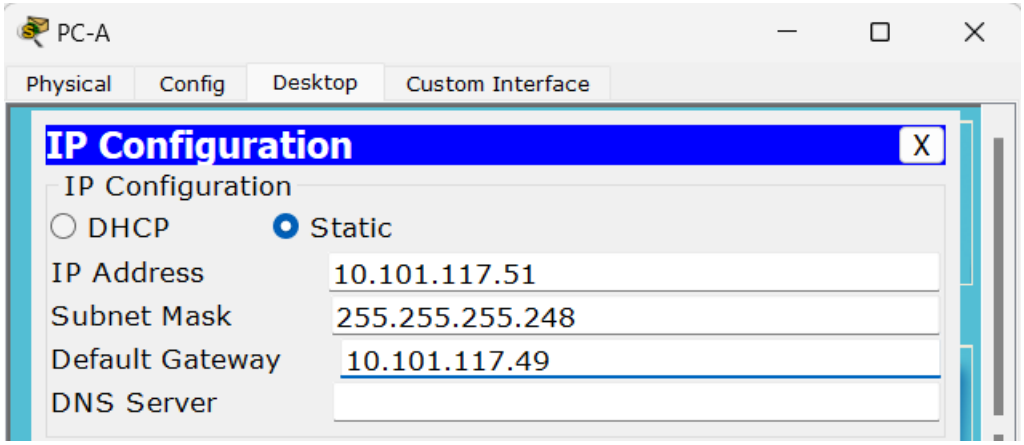
Practical 3B:

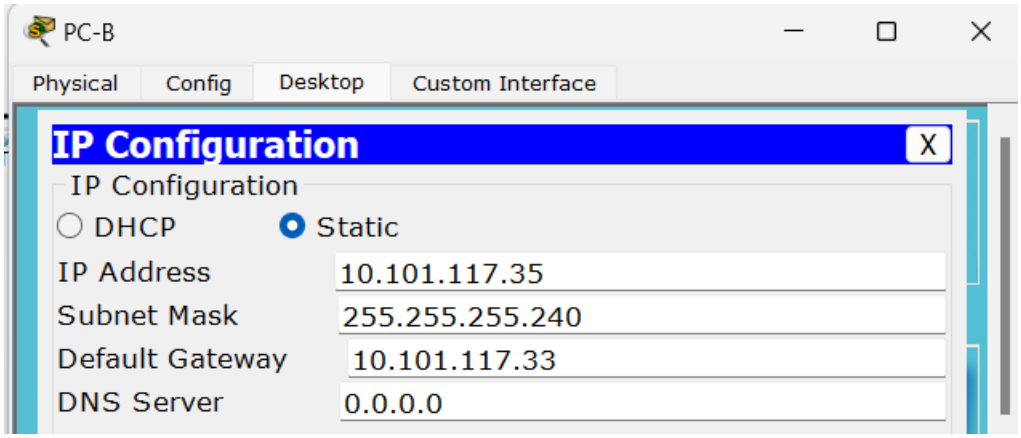
Aim: Configure, Apply and Verify an Extended Numbered ACL

- **Topology Diagram:**



- **Assign IP Addresses**





RTA

Physical Config CLI

IOS Command Line Interface

```
R1>en
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface GigabitEthernet0/0
R1(config-if)#ip address 10.101.117.49 255.255.255.248
R1(config-if)#no shut
R1(config-if)#interface GigabitEthernet0/1
R1(config-if)#ip address 10.101.117.33 255.255.255.240
R1(config-if)#no shut
R1(config-if)#interface GigabitEthernet0/2
R1(config-if)#ip address 10.101.117.1 255.255.255.224
R1(config-if)#no shut
R1(config-if)#^Z
R1#
%SYS-5-CONFIG_I: Configured from console by console
exit
```

SW-A

Physical Config CLI

IOS Command Line Interface

```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#host S1
S1(config)#interface vlan 1
S1(config-if)#ip address 10.101.117.50 255.255.255.248
S1(config-if)#no shut

S1(config-if)#ip default gateway 10.101.117.49
                 ^
% Invalid input detected at '^' marker.

S1(config-if)#ip default-gateway 10.101.117.49
S1(config)#^Z
S1#
%SYS-5-CONFIG_I: Configured from console by console
exit
```

SW-B

Physical Config CLI

IOS Command Line Interface

```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#host S2
S2(config)#interface vlan 1
S2(config-if)#ip address 10.101.117.34 255.255.255.240
S2(config-if)#no shut

S2(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to
up

S2(config-if)#exit
S2(config)#ip default-gateway 10.101.117.33
S2(config)#^Z
```

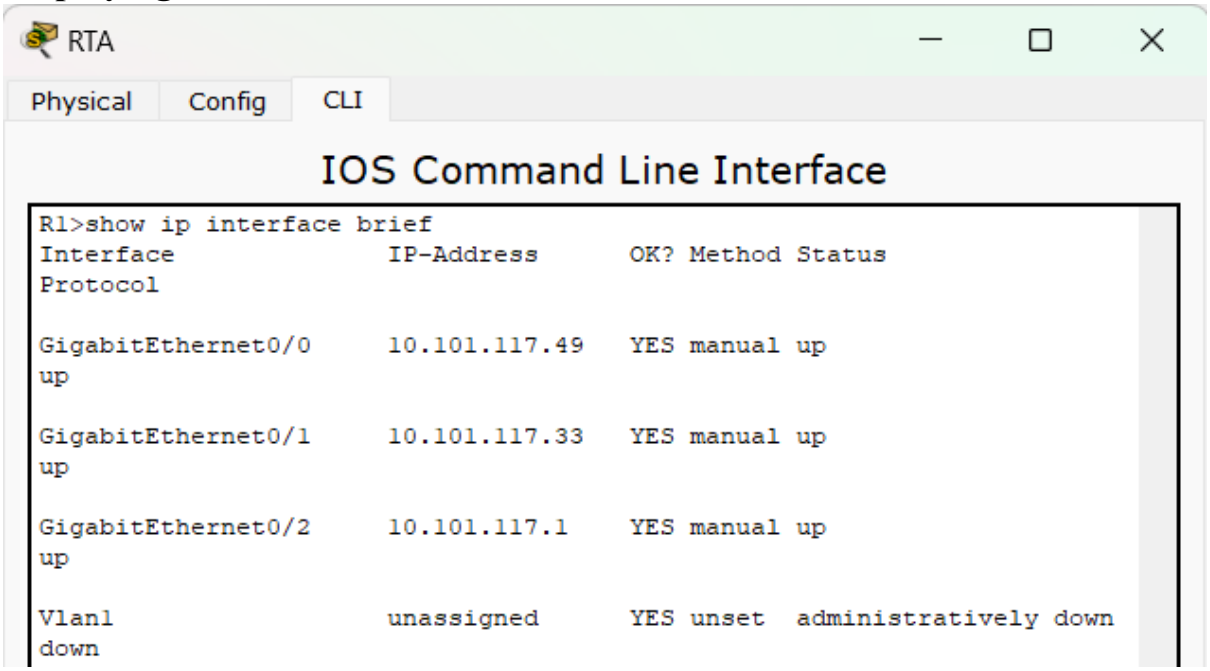
SW-C

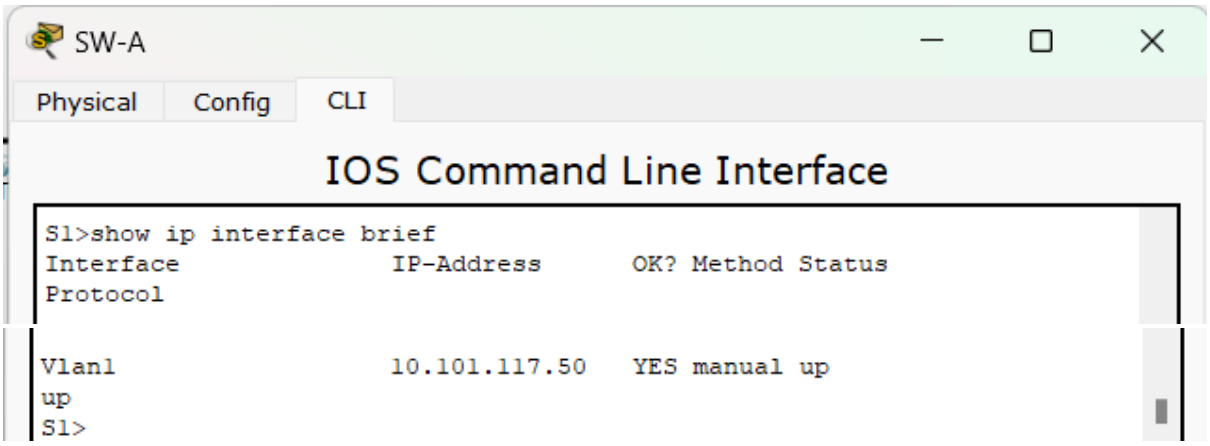
Physical Config CLI

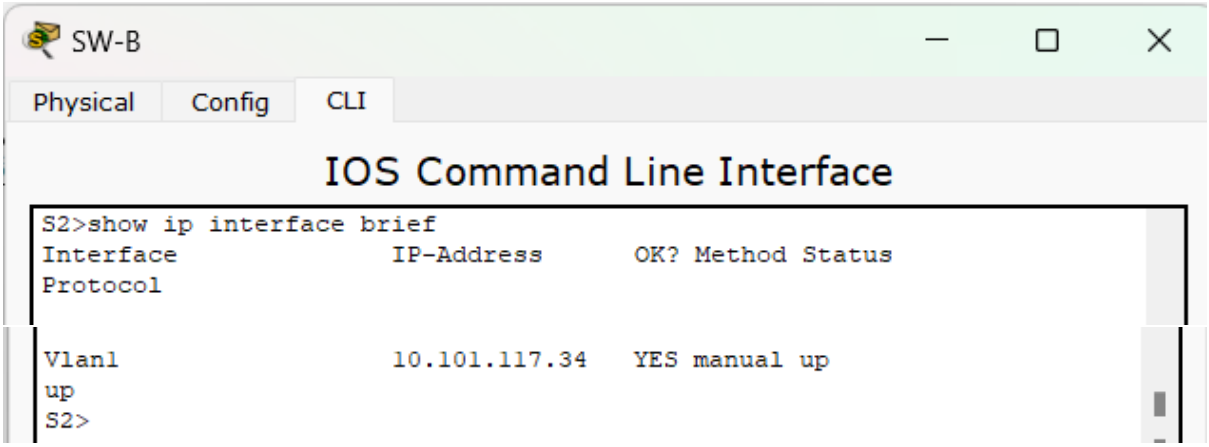
IOS Command Line Interface

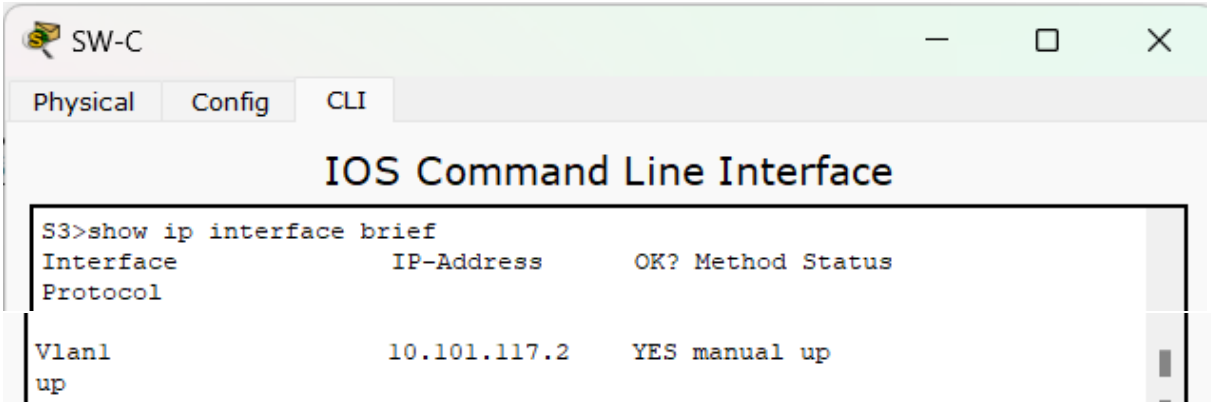
```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#host S3
S3(config)#interface vlan 1
S3(config-if)#ip address 10.101.117.2 255.255.255.224
S3(config-if)#no shut

S3(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to
up
exit
S3(config)#ip default-gateway 10.101.117.1
S3(config)#^Z
S3#
%SYS-5-CONFIG_I: Configured from console by console
exit
```

- **Displaying IP Address Details**

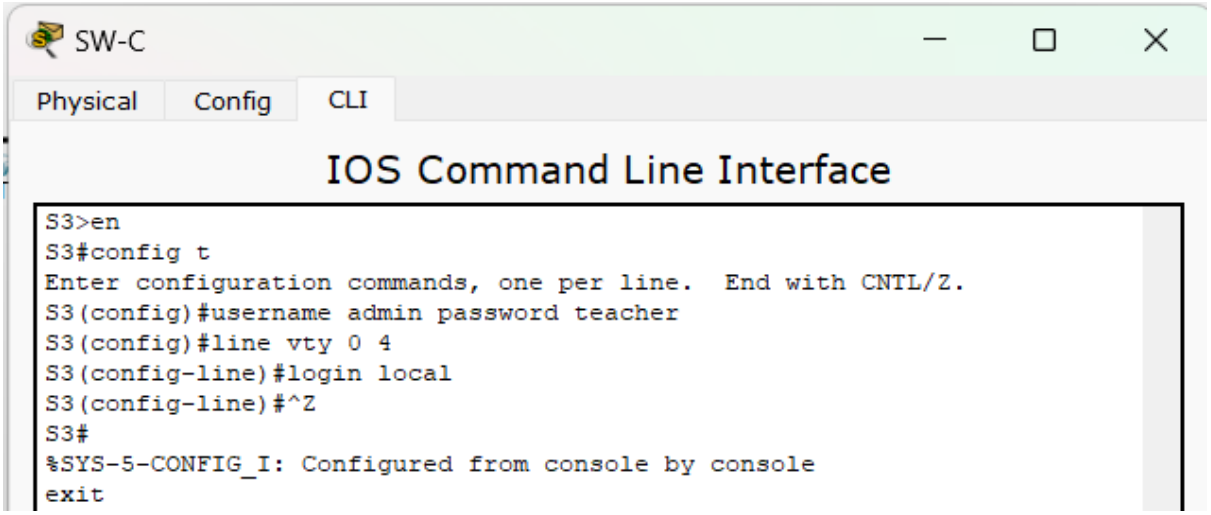






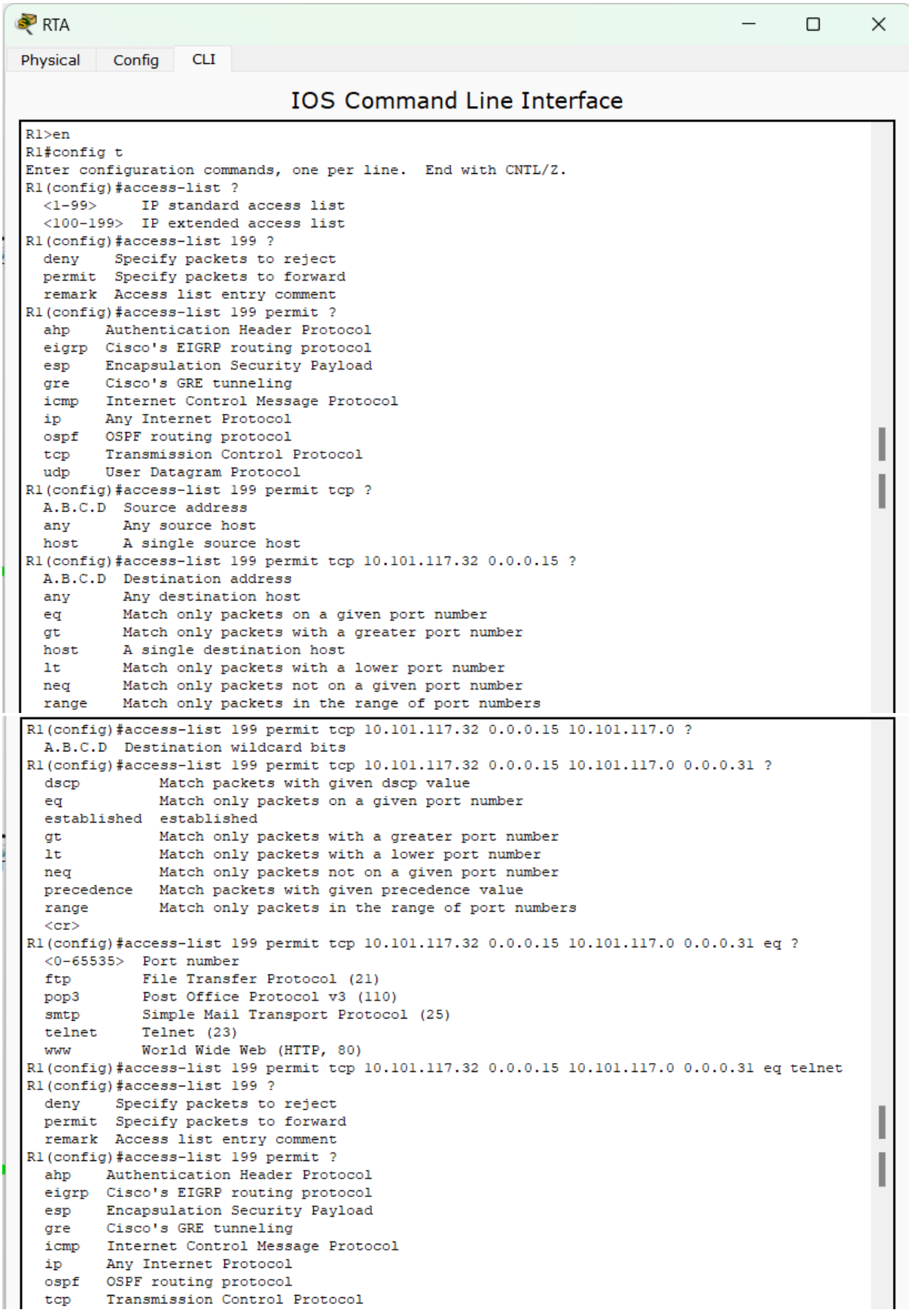


- **Configuring Telnet on S3**



- **Configure, Apply and Verify an Extended Numbered ACL**

  (Devices on LAN 10.101.117.32 are allowed to remotely access devices in LAN 10.101.117.0 using the TELNET protocol. Besides ICMP, all traffic from other networks is denied.)


RTA
Physical
Config
CLI
IOS Command Line Interface
R1>en
R1#config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#access-list ?
<1-99> IP standard access list
<100-199> IP extended access list
R1(config)#access-list 199 ?
deny Specify packets to reject
permit Specify packets to forward
remark Access list entry comment
R1(config)#access-list 199 permit ?
ahp Authentication Header Protocol
eigrp Cisco's EIGRP routing protocol
esp Encapsulation Security Payload
gre Cisco's GRE tunneling
icmp Internet Control Message Protocol
ip Any Internet Protocol
ospf OSPF routing protocol
tcp Transmission Control Protocol
udp User Datagram Protocol
R1(config)#access-list 199 permit tcp ?
A.B.C.D Source address
any Any source host
host A single source host
R1(config)#access-list 199 permit tcp 10.101.117.32 0.0.0.15 ?
A.B.C.D Destination address
any Any destination host
eq Match only packets on a given port number
gt Match only packets with a greater port number
host A single destination host
lt Match only packets with a lower port number
neq Match only packets not on a given port number
range Match only packets in the range of port numbers
R1(config)#access-list 199 permit tcp 10.101.117.32 0.0.0.15 10.101.117.0 ?
A.B.C.D Destination wildcard bits
R1(config)#access-list 199 permit tcp 10.101.117.32 0.0.0.15 10.101.117.0 0.0.0.31 ?
dscp Match packets with given dscp value
eq Match only packets on a given port number
established established
gt Match only packets with a greater port number
lt Match only packets with a lower port number
neq Match only packets not on a given port number
precedence Match packets with given precedence value
range Match only packets in the range of port numbers
<cr>
R1(config)#access-list 199 permit tcp 10.101.117.32 0.0.0.15 10.101.117.0 0.0.0.31 eq ?
<0-65535> Port number
ftp File Transfer Protocol (21)
pop3 Post Office Protocol v3 (110)
smtp Simple Mail Transport Protocol (25)
telnet Telnet (23)
www World Wide Web (HTTP, 80)
R1(config)#access-list 199 permit tcp 10.101.117.32 0.0.0.15 10.101.117.0 0.0.0.31 eq telnet
R1(config)#access-list 199 ?
deny Specify packets to reject
permit Specify packets to forward
remark Access list entry comment
R1(config)#access-list 199 permit ?
ahp Authentication Header Protocol
eigrp Cisco's EIGRP routing protocol
esp Encapsulation Security Payload
gre Cisco's GRE tunneling
icmp Internet Control Message Protocol
ip Any Internet Protocol
ospf OSPF routing protocol
tcp Transmission Control Protocol

```
  tcp    Transmission Control Protocol
  udp    User Datagram Protocol
R1(config)#access-list 199 permit icmp ?
  A.B.C.D  Source address
  any      Any source host
  host     A single source host
R1(config)#access-list 199 permit icmp any ?
  A.B.C.D  Destination address
  any      Any destination host
  host     A single destination host
R1(config)#access-list 199 permit icmp any any
R1(config)#interface GigabitEthernet0/2
R1(config-if)#ip access-group 199 out
R1(config-if)#^Z
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#exit
```

- **Verify the extended ACL implementation**