Switch Configuration

hostname [Switch_Name]
banner motd #[Message_Text]#
service password-encryption
enable secret [password]

line con 0
 password [password]
 login
 logging synchronous
 exec-timeout [minutes] [seconds]
exit

line vty 0 4
 password [password]
 login
 transport input [ssh | telnet | ssh telnet]
 exec-timeout [minutes] [seconds]
exit

no ip domain-lookup

vlan [vlan_id]
 name [vlan_name]
exit

Interface VLAN (SVI)
interface vlan [vlan_id]
 ip address [ip_address] [subnet_mask]
 no shutdown
exit

Trunk Ports

```
interface [interface_id]
 switchport mode trunk
 switchport trunk encapsulation dot1q   ! if required
 switchport trunk allowed vlan [vlan_list]
 switchport trunk native vlan [vlan_id]
 no shutdown
exit
```

Access Ports

```
interface [interface_id]

 switchport mode access
```

```
 switchport access vlan [vlan_id]
 spanning-tree portfast       ! For end devices
 switchport port-security     ! Optional security
 switchport port-security maximum [num_macs]
 switchport port-security violation {shutdown | restrict | protect}
 no shutdown
exit
```

spanning-tree

```
spanning-tree mode rapid-pvst
spanning-tree vlan [vlan_id] root {primary | secondary}
```

vtp

```
vtp mode {server | client | transparent}
vtp domain [domain_name]
vtp password [password]
```

ACLs

```
ip access-list standard [acl_name]
 permit [source_ip] [wildcard_mask]
```

Extending to Extended ACLs

```
ip access-list extended [acl_name]
 permit tcp [src_ip] [src_wc] [dest_ip] [dest_wc] eq [port]
 deny ip any any
```

Spanning Tree Protocol (STP)

```
bash
spanning-tree mode rapid-pvst
spanning-tree vlan [vlan_id] root primary
spanning-tree vlan [vlan_id] root secondary
interface [interface_id]
 spanning-tree portfast
 spanning-tree bpduguard enable
spanning-tree vlan [vlan_id] priority [value]
spanning-tree vlan [vlan_id] root primary
```

VLAN Trunking Protocol (VTP)

```
bash
vtp mode {server | client | transparent}
vtp domain [domain_name]
vtp password [password]
```

Inter-VLAN Communication (Using Switch Virtual Interfaces - SVI)

```
bash
interface vlan [vlan_id]
 ip address [ip_address] [subnet_mask]
 no shutdown
```

Cisco Discovery Protocol (CDP)

```
bash
cdp run                    ! Enable globally
interface [interface_id]
 cdp enable               ! Enable per interface
```

Telnet (VTY lines)

```
bash
line vty 0 4
 password [password]
 login
 transport input telnet
```

SNMP Basic Configuration

```
bash
snmp-server community [community_string] ro
snmp-server community [community_string] rw
```

```
snmp-server host [host_ip] version 2c [community_string]
```

Traceroute (exec mode command)

```
bash
traceroute [destination_ip]
```

Switch (applied on SVI interface):

```
bash
interface vlan 10
 ip access-group MY_ACL in
exit
```

IP Access Control Lists (Applied on Switch SVI)

```
bash
interface vlan 10
 ip access-group MY_ACL in
exit
```

Router Commands Interface Configuration

```
hostname [Router_Name]

banner motd #[Message_Text]#

service password-encryption

enable secret [password]


line con 0

 password [password]

 login

 logging synchronous

 exec-timeout [minutes] [seconds]
```

```
exit



line vty 0 4

 password [password]

 login

 transport input [ssh | telnet | ssh telnet]

 exec-timeout [minutes] [seconds]

exit



no ip domain-lookup



interface [interface_id]

 ip address [ip_address] [subnet_mask]
 description [text]
 no shutdown
exit
```

Subinterface for Router-on-a-Stick

```
text
interface [interface_id].[vlan_id]
 encapsulation dot1Q [vlan_id]
 ip address [ip_address] [subnet_mask]
 no shutdown
exit
```

Static Routing

```
text
ip route [destination_network] [subnet_mask] [next_hop_ip]
```

Routing Protocols

- RIPv2:

```
text
router rip
 version 2
 network [network_address]
 no auto-summary
```

- EIGRP:

```
text
```

```
router eigrp [asn]
 network [network_address] [wildcard_mask]
 no auto-summary
```

- OSPFv2:

```
text
router ospf [process_id]
 router-id [ip_address]
 network [network_address] [wildcard_mask] area [area_id]
```

NAT Configuration

```
text
interface [interface_id]
 ip nat inside | ip nat outside
ip nat inside source static [local_ip] [global_ip]
ip nat inside source list [acl_name_or_number] interface [interface_id] overload
ip nat pool [pool_name] [start_ip] [end_ip] netmask [subnet_mask]
```

DHCP Server Configuration

```
text
ip dhcp excluded-address [start_ip] [end_ip]
ip dhcp pool [pool_name]
 network [network_address] [subnet_mask]
 default-router [router_ip]
 dns-server [dns_ip]
 lease [days] [hours] [minutes]
```

HSRP Example Configuration on Router or Layer 3 Switch Interface

```
interface [interface_id]

 standby [group_number] ip [virtual_ip]

 standby [group_number] priority [priority_value]

 standby [group_number] preempt

exit
```

DHCP Relay Configuration (on Router or Switch Layer 3 Interface)

```
interface [interface_id]
```

```
 ip helper-address [dhcp_server_ip]

 no shutdown

exit
```

IGRP (Interior Gateway Routing Protocol) — legacy, rarely used now

```
bash
router igrp [asn]
 network [network_address]
 exit
```

- `[asn]` is an autonomous system number (e.g., 1)
- IGRP is old and replaced by EIGRP in most cases.

EIGRP (Enhanced Interior Gateway Routing Protocol)

```
bash
router eigrp [asn]
 network [network_address] [wildcard_mask]
 no auto-summary          ! recommended
 exit
```

- `[asn]` is autonomous system number (e.g., 100)
- Use wildcard mask instead of subnet mask in network command.

Example:

```
bash
router eigrp 100
 network 192.168.1.0 0.0.0.255
 no auto-summary
 exit
```

OSPFv2 (Single Area)

```
bash
router ospf [process_id]
 router-id [router_id]        ! optional but best practice
 network [network_address] [wildcard_mask] area 0
 exit
```

- `[process_id]` is locally significant (e.g., 1)
- Use area 0 for single area OSPF.

Example:

```
bash
router ospf 1
 router-id 1.1.1.1
 network 192.168.1.0 0.0.0.255 area 0
 exit
```

NAT (Network Address Translation)

```
bash
interface [interface_id]
 ip nat inside
exit
interface [interface_id]
 ip nat outside
exit
ip nat inside source static [local_ip] [global_ip]
ip nat inside source list [acl_name_or_number] interface [outside_interface_id]
overload
ip nat pool [pool_name] [start_ip] [end_ip] netmask [subnet_mask]
```

DHCP Server

```
bash
ip dhcp excluded-address [start_ip] [end_ip]
ip dhcp pool [pool_name]
 network [network_address] [subnet_mask]
 default-router [router_ip]
 dns-server [dns_ip]
 lease [days] [hours] [minutes]
```

HDLC (on serial interface)

```
bash
interface [serial_interface_id]
 encapsulation hdlc
 no shutdown
```

PPP (Point-to-Point Protocol)

```
bash
interface [serial_interface_id]
 encapsulation ppp
 ppp authentication pap | chap
```

```
 ppp pap sent-username [username] password [password]
 ppp chap hostname [hostname]
 ppp chap password [password]
 no shutdown
```

ISDN (Basic Rate Interface)

```
bash
isdn switch-type basic-ni   ! on interface or globally
dialer-list [list_number] protocol ip permit
interface bri [interface_id]
 isdn incoming-voice voice
```

DDR (Dial-on-Demand Routing)

```
bash
interface [serial_interface_id]
 dialer map ip [remote_ip] [layer1_address]
 dialer-group [group_number]
 dialer idle-timeout [seconds]
```

Frame Relay

```
bash
interface [serial_interface_id]
 encapsulation frame-relay
 frame-relay map ip [ip_address] [dlci] broadcast
```

IP Access Control Lists (ACLs)

Standard ACL:

```
bash
ip access-list standard [acl_name]
 permit [source_ip] [wildcard_mask]
```

Extended ACL:

```
bash
ip access-list extended [acl_name]
 permit tcp [src_ip] [src_wc] [dest_ip] [dest_wc] eq [port]
 deny ip any any
```

```
interface serial 0/0/0

 encapsulation frame-relay
 ip address [ip_address] [subnet_mask]
 frame-relay interface-dlci [dlci_number]
```

```
 frame-relay lmi-type ansi    ! or cisco or q933a depending on the provider
 no shutdown
exit

! For multipoint subinterface example (optional)
interface serial 0/0/0.1 multipoint
 ip address [ip_address] [subnet_mask]
 frame-relay interface-dlci [dlci_number]
 no shutdown
exit
```

ISDN Configuration (Router)

```
bash
configure terminal
isdn switch-type basic-ni   ! set ISDN switch type

interface bri 0
 isdn incoming-voice voice
 no shutdown
exit
```

DDR (Dial-on-Demand Routing) (Router)

```
bash
configure terminal
interface serial 0/0/0
 dialer pool-member 1
 dialer-group 1
 no shutdown
exit

dialer-list 1 protocol ip permit
dialer-list 1 protocol ip permit
dialer-list 1 local-group 1
```

IP Access Control Lists (sample application)

Router:

```
bash
ip access-list standard MY_ACL
 permit 192.168.1.0 0.0.0.255

interface GigabitEthernet0/0
 ip access-group MY_ACL in
exit
```

```
interface serial 0/0/0
 encapsulation frame-relay
 ip address [ip_address] [subnet_mask]
 frame-relay interface-dlci [dlci_number]
 frame-relay lmi-type ansi     ! or cisco or q933a
 no shutdown
exit
```

(Optional for multipoint subinterfaces)

```
bash
interface serial 0/0/0.1 multipoint
 ip address [ip_address] [subnet_mask]
 frame-relay interface-dlci [dlci_number]
 no shutdown
exit
```

ISDN Configuration

```
bash
configure terminal
isdn switch-type basic-ni      ! set ISDN switch type globally or per interface

interface bri 0
 isdn incoming-voice voice
 no shutdown
exit
```

Dial-on-Demand Routing (DDR)

```
bash
configure terminal
interface serial 0/0/0
 dialer pool-member 1
 dialer-group 1
 no shutdown
exit

dialer-list 1 protocol ip permit
dialer-list 1 protocol ip permit
dialer-list 1 local-group 1
```

IP Access Control Lists (Router)

```
bash
ip access-list standard MY_ACL
 permit 192.168.1.0 0.0.0.255

interface GigabitEthernet0/0
 ip access-group MY_ACL in
exit
```