**Legend & Tips**

| Prompt | Mode |
| --- | --- |
| Router> | User-exec |
| Router# | Privileged-exec |
| Router(config)# | Global config |
| Router(config-line)# | Line config |
| Router(config-router)# | Router config |
| Router(config-if)# | Interface config |
| Router(config-vlan)# | VLAN config |
| Router(config-cmap)# | Class-map config |
| Router(config-pmap)# | Policy-map config |
| Router(config-zone-pair)# | Zone-pair config |
| Router(config-std-nacl)# | Standard ACL config |
| Router(config-ext-nacl)# | Extended ACL config |
| Router(config-if-range)# | Interface-range config |
| Router(config-subif)# | Sub-interface config |

**Tip:**

**After any config block, run:**

Router# copy running-config startup-config

Router# show running-config | section <section\_name>

**to save and verify your changes. ​**

**Authentication & Remote Access**

**Console Password Login**Set a simple console-line password.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | line console 0 |
| Router(config-line)# | password cisco |
| Router(config-line)# | login |
| Router(config-line)# | exit |
| Router(config)# | exit |

**Local Username Login on VTY**Force VTY logins to use local user account.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | username james secret 4321 |
| Router(config)# | line vty 0 15 |
| Router(config-line)# | login local |
| Router(config-line)# | exit |
| Router(config)# | exit |

**Enable SSH**Configure hostname, domain, RSA keys, local user, and require SSH.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | hostname S1 |
| Router(config)# | ip domain name cisco.com |
| Router(config)# | crypto key generate rsa general-keys modulus 1024 |
| Router(config)# | username bob secret 9876 |
| Router(config)# | line vty 0 15 |
| Router(config-line)# | login local |
| Router(config-line)# | transport input ssh |
| Router(config-line)# | exit |
| Router(config)# | exit |

**Time Services & Logging**

**Time-Stamping Logs**Prepend date/time to all log messages.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | service timestamps log datetime |
| Router(config)# | exit |

**Logging of Alarms**Send severity-3 console, buffered (2K), and trap-1 logs to 192.168.0.1.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | logging console 3 |
| Router(config)# | logging buffered 2 |
| Router(config)# | logging host 192.168.0.1 |
| Router(config)# | logging trap 1 |
| Router(config)# | exit |

**Management & Monitoring**

**SNMP Management**Configure SNMP read/write community, location, contact, and trap host.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | snmp-server community public RO |
| Router(config)# | snmp-server community private RW |
| Router(config)# | snmp-server location "Data Center 1" |
| Router(config)# | snmp-server contact "NetOps Team" |
| Router(config)# | snmp-server host 192.168.0.10 version 2c public |
| Router(config)# | exit |

**Banner & Login Messages**Set MOTD banner and console timeout.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | banner motd # |
| *(enter banner text)* | \* Unauthorized access prohibited! \* # |
| Router(config)# | line console 0 |
| Router(config-line)# | exec-timeout 5 0 |
| Router(config-line)# | exit |
| Router(config)# | exit |

**Interface Descriptions**Label interfaces for clarity.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | interface GigabitEthernet0/1 |
| Router(config-if)# | description Uplink to Core1 |
| Router(config-if)# | exit |
| Router(config)# | exit |

**Switching & VLAN**

**VLAN Configuration**Create VLAN 20 named “Management” and assign Fa0/1 to VLAN 10.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | vlan 20 |
| Router(config-vlan)# | name Management |
| Router(config-vlan)# | exit |
| Router(config)# | interface fastEthernet0/1 |
| Router(config-if)# | switchport mode access |
| Router(config-if)# | switchport access vlan 10 |
| Router(config-if)# | exit |
| Router(config)# | exit |

**VLAN Trunk Pruning & VTP**Limit VLANs on a trunk and set VTP domain/server.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | interface FastEthernet0/2 |
| Router(config-if)# | switchport trunk pruning vlan 5-20 |
| Router(config-if)# | exit |
| Router(config)# | vtp domain ACME\_Corp |
| Router(config)# | vtp mode server |
| Router(config)# | exit |

**Spanning Tree Protocol (STP)**Primary/secondary root for VLAN 1, Rapid-PVST, PortFast & BPDU Guard.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | spanning-tree vlan 1 root primary |
| Router(config)# | spanning-tree vlan 1 root secondary |
| Router(config)# | spanning-tree mode rapid-pvst |
| Router(config)# | spanning-tree portfast default |
| Router(config)# | interface range fastEthernet0/1 - 10, fastEthernet0/20 - 24 |
| Router(config-if-range)# | spanning-tree portfast |
| Router(config-if-range)# | spanning-tree bpduguard enable |
| Router(config-if-range)# | exit |
| Router(config)# | exit |

**IP Services & NAT**

**DHCP Server Pool**Provide DHCP leases on 192.168.0.0/24 with gateway and DNS.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | ip dhcp pool LAN\_POOL |
| Router(dhcp-config)# | network 192.168.0.0 255.255.255.0 |
| Router(dhcp-config)# | default-router 192.168.0.1 |
| Router(dhcp-config)# | dns-server 8.8.8.8 |
| Router(dhcp-config)# | exit |
| Router(config)# | exit |

**NAT Overload (PAT)**Translate 192.168.0.0/24 to a single public IP on Serial0/0/0.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | access-list 1 permit 192.168.0.0 0.0.0.255 |
| Router(config)# | ip nat inside source list 1 interface Serial0/0/0 overload |
| Router(config)# | interface Serial0/0/0 |
| Router(config-if)# | ip nat outside |
| Router(config-if)# | exit |
| Router(config)# | interface GigabitEthernet0/1 |
| Router(config-if)# | ip nat inside |
| Router(config-if)# | exit |
| Router(config)# | exit |

**QoS - Quality of Service**

**Simple HTTP Policing**Limit HTTP traffic to 1 Mbps on Gi0/1, drop excess.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | class-map match-any CM\_HTTP |
| Router(config-cmap)# | match protocol http |
| Router(config-cmap)# | exit |
| Router(config)# | policy-map PM\_POLICE\_HTTP |
| Router(config-pmap)# | class CM\_HTTP |
| Router(config-pmap-c)# | police 1000000 20000 exceed-action drop |
| Router(config-pmap-c)# | exit |
| Router(config-pmap)# | exit |
| Router(config)# | interface GigabitEthernet0/1 |
| Router(config-if)# | service-policy input PM\_POLICE\_HTTP |
| Router(config-if)# | exit |
| Router(config)# | exit |

**Routing**

**EIGRP Basic**Enable EIGRP AS 100 for 192.168.0.0/24, disable auto-summary.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | router eigrp 100 |
| Router(config-router)# | network 192.168.0.0 0.0.0.255 |
| Router(config-router)# | no auto-summary |
| Router(config-router)# | exit |
| Router(config)# | exit |

**BGP Example**Peer with neighbor 192.168.0.2 in AS 65002; advertise 10.1.1.0/24.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | router bgp 65001 |
| Router(config-router)# | neighbor 192.168.0.2 remote-as 65002 |
| Router(config-router)# | network 10.1.1.0 mask 255.255.255.0 |
| Router(config-router)# | exit |
| Router(config)# | exit |

**OSPF MD5 Authentication**Enable MD5 on OSPF area 0, key “cisco123” on S0/1/1.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | router ospf 1 |
| Router(config-router)# | area 0 authentication message-digest |
| Router(config-router)# | exit |
| Router(config)# | interface serial0/1/1 |
| Router(config-if)# | ip ospf message-digest-key 1 md5 cisco123 |
| Router(config-if)# | exit |
| Router(config)# | exit |

**Router-on-a-Stick**  
Subinterfaces for VLAN 10 (192.168.0.1/24) & VLAN 20 (192.168.0.2/24).

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | interface GigabitEthernet0/0/0 |
| Router(config-if)# | no shutdown |
| Router(config-if)# | interface GigabitEthernet0/0/0.10 |
| Router(config-subif)# | encapsulation dot1q 10 native |
| Router(config-subif)# | ip address 192.168.0.1 255.255.255.0 |
| Router(config-subif)# | exit |
| Router(config-if)# | interface GigabitEthernet0/0/0.20 |
| Router(config-subif)# | encapsulation dot1q 20 |
| Router(config-subif)# | ip address 192.168.0.2 255.255.255.0 |
| Router(config-subif)# | exit |
| Router(config)# | exit |

Backup & Archiving

**Archive Configuration & Backups**  
Automatically save every config change to TFTP server.

|  |  |
| --- | --- |
| Router> | enable |
| Router# | configure terminal |
| Router(config)# | archive |
| Router(config-archive)# | path tftp://192.168.0.20/router-config-backup |
| Router(config-archive)# | write-memory |
| Router(config-archive)# | exit |
| Router(config)# | exit |

Show & Troubleshooting

|  |  |  |
| --- | --- | --- |
| **Router#** | show ip interface brief | Interface status & IP summary |
| **Router#** | show ip route | Routing table |
| **Router#** | show logging | Buffered log messages |
| **Router#** | show access-lists | ACL entries & hit counts |
| **Router#** | show cdp neighbors detail | Connected devices & their details |
| **Router#** | ping 192.168.0.1 | Test basic IP reachability |
| **Router#** | traceroute 8.8.8.8 | Trace path to a destination |