# Command summary

## General router configuration

```
Router> enable
Router# erase startup-config
Router# configure terminal
Router# copy running-config startup-config
Router# write
Router(config)# hostname <name>
Router(config)# no ip domain-lookup
Router(config)# default interface <interface>
Router(config)# interface <interface>
Router(config-if)# ip address <address> <mask>
Router(config-if)# clock rate <bps>
Router(config-if)# no shutdown
Router(config-if)# description <text>

Router# show version
Router# show running-config
Router# show startup-config
Router# show ip route [vrf <name>]
Router# show ip protocols [vrf <name>]
Router# show ip interface [brief]
Router# show interface <interface>
Router# show controllers <interface>
```

## Static routing

```
Router(config)# ip route [vrf <name>] <address> <mask> [<next-hop-address>]
[<outgoing-interface>] [<administrative-distance>]
Router(config)# ip route [vrf <name>] 0.0.0.0 0.0.0.0 <outgoing-interface>
```

## Access control lists

```
Router(config)# access-list <num> {permit | deny} <source-ip> <wildcard-mask> [log]
Router(config)# access-list <num> {permit | deny} <protocol> <source-ip> <wildcard-
mask> [<operator> <source-port>] <dest-ip> <wildcard-mask> [<operator> <dest-port>]
[established] [log]
Router(config)# ip access-list {standard | extended} <name>
Router(config-ext-nacl)# {permit | deny} <protocol> <source-ip> <wildcard-mask>
[<operator> <source-port>] <dest-ip> <wildcard-mask> [<operator> <dest-port>]
[established] [log]

Router#show access-lists
```

## Prefix lists

```
Router(config)# ip prefix-list <name> [seq <num>] {permit | deny} <ip>/<prefix-
length> [ge <prefix-length>] [le <prefix-length>]

Router# show ip prefix-list {detail | summary} [<name>]
```

## AS-PATH filters

```
Router(config)# ip as-path access-list <num> {permit | deny} <regular-expression>
Router# show ip as-path access-list
```

## Route maps

```
Router(config)# route-map <name> [permit | deny] [<sequence-num>]
Router(config-route-map)# match ip address [<acl-num> | <acl-name> | prefix-list
<name>]
Router(config-route-map)# match as-path <as_path-filter-num>
Router(config-route-map)# set interface <output-interface>
Router(config-route-map)# set ip next-hop <next-hop-ip-address>
Router(config-route-map)# set tag <num>
```

```
Router(config-route-map)# set metric <metric | med-value>
Router(config-route-map)# set metric-type {type-1 | type-2}
Router(config-route-map)# set local-preference <value>
Router(config-route-map)# set origin {egp <as-num> | igp | incomplete}
Router(config-route-map)# set as-path prepend {<as-path-string> | last-as}

Router# show route-map [<name>]
```

## Policy-based routing

```
Router(config-if)# ip policy route-map <name>

Router# show ip policy
```

## VRF

```
Router(config)# ip vrf <name>
Router(config-vrf)# rd <as-num>:<num>
Router(config-vrf)# route-target {import | export | both} <as-num>:<num>
Router(config-vrf)# bgp next-hop Loopback <num>
Router(config-if)# ip vrf forwarding <name>

Router# show ip vrf [interfaces]
Router# show ip cef vrf <name>
Router# show ip route vrf <name>
Router# ping vrf <name> <ip-address>
```

## NAT

```
Router(config)# access-list <num> permit <lan-network> <wildcard-mask>
Router(config)# ip nat pool <name> <first-ip> <last-ip> netmask <mask>
Router(config)# ip nat inside source list <acl> pool <pool> [overload]
Router(config)# ip nat inside source list <acl> interface <int> overload
Router(config)# ip nat inside source static <local-IP> <global-IP>
Router(config)# ip nat inside source static <protocol> <local-IP> <local-port>
{<global-IP> | interface <int>} <global-port>
Router(config-if)# ip nat {inside | outside}

Router# show ip nat translations
Router# show ip nat statistics
Router# clear ip nat translations *
Router# clear ip nat statistics
Router# debug ip nat
```

## GRE

```
Router(config)# interface tunnel <number>
Router(config-if)# ip address <ip-address> <subnet-mask>
Router(config-if)# tunnel source { <interface> | <local-ip-address> }
Router(config-if)# tunnel destination <remote-ip-address>
Router(config-if)# tunnel mode gre ip

Router# show interfaces tunnel <number>
```

## DMVPN

```
Router(config-if)# tunnel mode gre multipoint
Router(config-if)# ip nhrp map multicast dynamic
Router(config-if)# ip nhrp map <tunnel-ip> <nbma-ip>
Router(config-if)# ip nhrp map multicast <nbma-ip>
Router(config-if)# ip nhrp network-id <num>
Router(config-if)# ip nhrp nhs <tunnel-ip>

Router# show ip nhrp [detail]
```

```
Router# debug nhrp [packet]
```

## RIP

```
Router(config)# router rip
Router(config-router)# network <network-address>
Router(config-router)# version 2
Router(config-router)# no auto-summary
Router(config-router)# passive-interface <interface>
Router(config-router)# default-information originate
Router(config-router)# redistribute {connected | static | rip | eigrp <as-num> |
ospf <process-id>} [metric <num>] [route-map <name>]
Router(config-router)# distribute-list {<acl-num> | <acl-name> | prefix <name> |
route-map <name>} {in | out}
Router(config-router)# address-family ipv4 vrf <name>
Router(config-router-af)# network <network-address>
Router(config-router-af)# no auto-summary
Router(config-if)# no ip split-horizon

Router# show ip rip database [vrf <name>]
Router# debug ip rip
```

## EIGRP

```
Router(config)# router eigrp <as-num>
Router(config-router)# network <network-address> [<wildcard-mask>]
Router(config-router)# no auto-summary
Router(config-router)# passive-interface <interface>
Router(config-router)# distance eigrp <internal> <external>
Router(config-router)# redistribute {connected | static | rip | eigrp <as-num> |
ospf <process-id>} [metric <bandwith> <delay> <reliability> <load> <mtu>] [route-
map <name>]
Router(config-router)# distribute-list {<acl-num> | <acl-name> | prefix <name> |
route-map <name>} {in | out}
Router(config-router)# address-family ipv4 vrf <name>
Router(config-router-af)# network <network-address> [<wildcard-mask>]
Router(config-router-af)# autonomous-system <as-num>
Router(config-router-af)# no auto-summary
Router(config-if)# no ip split-horizon
Router(config-if)# no ip next-hop-self eigrp <as-num>

Router# show ip eigrp [vrf <name>] neighbors [<interface> | <as-num>]
Router# show ip eigrp [vrf <name>] topology [as-num] | [<network-address> <mask>]
Router# show ip eigrp [vrf <name>] topology all-links
```

## OSPF

```
Router(config)# router ospf <process-id> [vrf <name>]
Router(config-router)# network <network-address> <wildcard-mask> area <area-id>
Router(config-router)# passive-interface <interface>
Router(config-router)# default-information originate [always]
Router(config-router)# neighbor <neighbor-address>
Router(config-router)# redistribute {connected | static | rip | eigrp <as-num> |
ospf <process-id>} [subnets] [tag <num>] [metric <num>] [metric-type {1 | 2}]
[route-map <name>]
Router(config-router)# distribute-list {<acl-num> | <acl-name> | prefix <name> |
route-map <name>} {in | out}
Router(config-if)# ip ospf network <network-type>

Router# show ip ospf neighbor
Router# show ip ospf database
Router# clear ip ospf process
```

## BGP

```
Router(config)# router bgp <as-num>
Router(config-router)# bgp router-id <ip-address>
Router(config-router)# neighbor <ip-address> remote-as <as-num>
Router(config-router)# neighbor <ip-address> next-hop-self
Router(config-router)# neighbor <ip-address> update-source <interface>
Router(config-router)# neighbor <ip-address> route-map <name> [in | out]
Router(config-router)# neighbor <ip-address> unsuppress-map <name>
Router(config-router)# neighbor <ip-address> ebgp-multihop <num>
Router(config-router)# neighbor <ip-address> shutdown
Router(config-router)# neighbor <ip-address> default-originate
Router(config-router)# neighbor <ip-address> route-reflector-client
Router(config-router)# bgp confederation identifier <as-num>
Router(config-router)# bgp confederation peer <peer-sub-as-num>
Router(config-router)# network <network-ip-address> mask <subnet-mask>
Router(config-router)# aggregate-address <address> <mask> [as-set] [summary-only]
[advertise-map <name>] [attribute-map <name>] [suppress-map <name>]
Router(config-router)# redistribute {connected | static | rip | eigrp <as-num> |
ospf <process-id>} [metric <num>] [route-map <name>]
Router(config-router)# bgp redistribute-internal
Router(config-router)# distribute-list {<acl-num> | <acl-name> | prefix <name> |
route-map <name>} {in | out}
Router(config-router)# address-family vpnv4
Router(config-router-af)# neighbor <ip-address> activate
Router(config-router)# address-family ipv4 vrf <name>

Router# clear ip bgp [<ip-address> | <as-num> | *] [soft] [in | out]
Router# show ip bgp [vpnv4 {vrf <name> | all}] neighbors
Router# show ip bgp [vpnv4 {vrf <name> | all}] summary
Router# show ip bgp [vpnv4 {vrf <name> | all}] [<network>/<mask>]
Router# show ip bgp [vpnv4 {vrf <name> | all}] rib-failure
Router# show bgp vpnv4 unicast all summary
Router# debug ip bgp
Router# debug ip bgp [<ip-address>] updates
```

## MPLS

```
Router(config)# ip cef
Router(config)# mpls ip
Router(config-if)# mpls ip
Router(config)# mpls label protocol ldp
Router(config)# mpls label range <low-num> <high-num>
Router(config)# mpls ldp router-id <interface> [force]
Router(config)# mpls ldp neighbor <ip-address> password <password>
Router(config)# mpls ldp discovery hello interval <time>
Router(config)# mpls ldp discovery hello holdtime <time>
Router(config)# mpls ip default-route

Router# clear mpls ldp neighbor [* | <ip-address>]
Router# show mpls ldp bindings
Router# show mpls forwarding-table [detail]
Router# show mpls ldp neighbor [detail]
```

## MPLS traffic engineering

```
Router(config)# mpls traffic-eng tunnels
Router(config-if)# mpls traffic-eng tunnels
Router(config-if)# ip rsvp bandwidth <kbps>
Router(config-router)# mpls traffic-eng router-id <interface>
Router(config-router)# mpls traffic-eng area <num>
Router(config)# interface tunnel <num>
```

```
Router(config-if)# ip unnumbered <interface>
Router(config-if)# tunnel destination <ip-address>
Router(config-if)# tunnel mode mpls traffic-eng
Router(config-if)# tunnel mpls traffic-eng autoroute announce
Router(config-if)# tunnel mpls traffic-eng path-option <num> {dynamic | {explicit
{{identifier <num>} | {name <name>}}}}
Router(config-if)# tunnel mpls traffic-eng priority <setup> [<hold>]
Router(config-if)# tunnel mpls traffic-eng bandwidth <kbps>

Router# show mpls traffic-eng tunnels [summary]
```

## Explicit paths

```
Router(config)# ip explicit-path {{identifier <num>} | {name <name>}}
Router(config-ip-expl-path)# next-address <ip-address>

Router# show ip explicit-paths
```

## L2TPv3

```
Router(config)# pseudowire-class <pw-class-name>
Router(config-pw-class)# encapsulation l2tpv3
Router(config-pw-class)# ip local interface <interface>
Router(config-if)# xconnect <peer-IP-address> <virtual-circuit-number> [pw-class
<pw-class-name>]

Router# show l2tun tunnel
Router# show l2tun session
```