

Basic Router CLI Configuration

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Interface Naming

The supported hardware interfaces and their naming conventions are in the following table:

Hardware Interface	Naming Convention
Gigabit Ethernet	gigabitethernet 0/0/0 - 0/0/1
Cellular Interface	cellular 0/1/0 and cellular 0/1/1
Asynchronous Serial Interface	async 0/2/0
USB	usb0
Base Unit Alarm input	alarm contact 1

Note The IRM expansion modules do not apply to IR1001 Rugged Secure Routers.

Note The IR1001 Rugged Secure Routers supports an MTU of up to 2030 bytes.

Basic Configuration

The basic configuration is a result of the entries you made during the initial configuration dialog. This means the router has at least one interface set with an IP address to be reachable, either through WebUI or to allow the PnP process to work. Use the **show running-config** command to view the initial configuration, as shown in the following example:

```
Router# show running-config
Building configuration...

Current configuration : 7965 bytes
!
! Last configuration change at 06:49:52 UTC Fri Nov 13 2026
!
version 27.1
system mode insecure
service timestamps debug datetime msec localtime show-timezone
service timestamps log datetime msec localtime show-timezone
service internal
platform qfp utilization monitor load 80
!
hostname IR1001
!
boot-start-marker
boot system
flash:1794506406738-3zbenb2j4_ir1000-universalk9.BLD_POLARIS_DEV_LATEST_20261112_013150.SSA.bin
! Warning: Booting with bundle mode will be deprecated in the near future. Migration to
install mode is required.
boot-end-marker
!
!
logging buffered 21474836
no aaa new-model
!
powermgmt sense-voltage on-threshold 13 200 off-threshold 12 800
!
no powermgmt sense
!
no powermgmt low-power
!
powermgmt shutdown-delay 120
!
login on-success log
!
ipv6 unicast-routing
!
subscriber templating
!
crypto pki trustpoint TP-self-signed-3013195340
 enrollment selfsigned
 subject-name cn=IOS-Self-Signed-Certificate-3013195340
 revocation-check none
 rsakeypair TP-self-signed-3013195340
 hash sha512
!
```

```
crypto pki trustpoint SLA-TrustPoint
 enrollment pkcs12
 revocation-check crl
 hash sha512
!
!
crypto pki certificate chain TP-self-signed-3013195340
 certificate self-signed 01
  30820430 30820298 A0030201 02020101 300D0609 2A864886 F70D0101 0D050030
  31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274
  69666963 6174652D 33303133 31393533 3430301E 170D3236 30393037 30393135
  35315A17 0D333630 39303630 39313535 315A3031 312F302D 06035504 03132649
  4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D33 30313331
  39353334 30308201 A2300D06 092A8648 86F70D01 01010500 0382018F 00308201
  8A028201 8100D18F B4F1535B 21870B63 DCC0B6E1 53809397 AA1D3C6B D1FC4017
  79260D0A AB890E01 1FA00B12 36EF0207 104B1DCC BA3D9108 E72C8274 A68F14C3
  841F1865 96A9143F 87EF607B EC3A95DE ABBD873B F51956DD 1B0DAE52 7385EDA7
  A99FD69F B81E253F 8AEA174A 473B9B0E 3108E0B2 9954A8A7 06BD5CF2 42D1BA84
  E67BFFA0 884CC511 9C3D10CF B1302B1E AF673F60 975E3CD2 C373E0EC 726EA94B
  2C366666 4A720061 93E72067 36196500 ED9054A7 A1B474C6 11A7FAD8 7FA6557F
  2BF6BA66 7A6B7218 F6390D74 ED1C0990 477126AC 7B9EC2E0 3BD97382 40E2A734
  FE870920 8F710E6B 8649ACD3 1C43A40B F69E2251 1DC1C44F BAAF7598 253A889D
  D2E913FB CED9A086 F8513064 85B28001 ADD2FA76 8A23AE04 A421A86E 82C3FCE0
  D5E95C39 0402E374 D70F0A6C 94A545A3 AE8A1A6C 1717FAF5 2EF00D83 3B87C312
  8FBCFAFD 00ABA612 EEEB3818 558CF466 776E8C8F 359B6431 B0E89DD2 138EC039
  24014C89 20F85A1C 168FD73C BC1E80D4 CA55290E 12F5F9A3 A412D8B1 F31AD43E
  1E81BFA2 48170203 010001A3 53305130 1D060355 1D0E0416 041454F7 F1B8E077
  FB610143 7249F292 B9CB2DA5 5075301F 0603551D 23041830 16801454 F7F1B8E0
  77FB6101 437249F2 92B9CB2D A5507530 0F060355 1D130101 FF040530 030101FF
  300D0609 2A864886 F70D0101 0D050003 82018100 8D9363CB A207189B 18AB3A59
  0156EB8B E6FD005A 089C40D2 AD10C684 4388C744 5050B659 FC2325D2 8FD387FC
  FC500D2B B384ED21 CCBAF28B 918F0578 1F4DFD5C 5EF73A81 7E70F251 D4439B45
  2B2B1F83 E6BFC9BF 868ED773 EFEED2C7 0370B6FA BA3DC911 7AC888CC 296BC438
  5CC1EDB6 48BC0EA1 975A485B CD9DBD42 CDC1A6B6 D1F299FA 7DDAEF52 B999181F
  14BE74AB C301B9CD 349A499D E7F096A7 5A602639 87FF9C6C 84413711 FFBB9878
  F0B280BE 98A0DD64 E99BB8DE 745E3549 FE7935EB C7AED1D3 540DE84F 4D77DC8E
  F8B3E564 513140DE 979A1CF0 082D48C2 340317BD EF6569F6 F98D0A55 25F7229F
  21DA5806 BA563A35 14634220 16CBD9B0 BF41FD1C 89E0169F 3587DAC8 CCFFBE34
  2FB4BB71 A1BF3D59 C3A03157 E425B227 A3A0E783 17274BA1 E9C0C8A1 E5F38E93
  01E16198 BE0705A0 9E27BBC8 A4A6929D 32C9F93C 12DC8468 CED80513 C63FC4A1
  3965BFCC BABC9BA1 AFC4606D DF998320 1ECECDB8 8C9023F3 229E5680 79C465CF
  B38D7603 9DB8427E 77256F9F 35C2F517 B3363F32
  quit
crypto pki certificate chain SLA-TrustPoint
 certificate ca 01
  30820321 30820209 A0030201 02020101 300D0609 2A864886 F70D0101 0B050030
  32310E30 0C060355 040A1305 43697363 6F312030 1E060355 04031317 43697363
  6F204C69 63656E73 696E6720 526F6F74 20434130 1E170D31 33303533 30313934
  3834375A 170D3338 30353330 31393438 34375A30 32310E30 0C060355 040A1305
  43697363 6F312030 1E060355 04031317 43697363 6F204C69 63656E73 696E6720
  526F6F74 20434130 82012230 0D06092A 864886F7 0D010101 05000382 010F0030
  82010A02 82010100 A6BCBD96 131E05F7 145EA72C 2CD686E6 17222EA1 F1EFF64D
  CBB4C798 212AA147 C655D8D7 9471380D 8711441E 1AAF071A 9CAE6388 8A38E520
  1C394D78 462EF239 C659F715 B98C0A59 5BBB5CBD 0CFEBEA3 700A8BF7 D8F256EE
  4AA4E80D DB6FD1C9 60B1FD18 FFC69C96 6FA68957 A2617DE7 104FDC5F EA2956AC
  7390A3EB 2B5436AD C847A2C5 DAB553EB 69A9A535 58E9F3E3 C0BD23CF 58BD7188
  68E69491 20F320E7 948E71D7 AE3BCC84 F10684C7 4BC8E00F 539BA42B 42C68BB7
  C7479096 B4CB2D62 EA2F505D C7B062A4 6811D95B E8250FC4 5D5D5FB8 8F27D191
  C55F0D76 61F9A4CD 3D992327 A8BB03BD 4E6D7069 7CBADF8B DF5F4368 95135E44
  DFC7C6CF 04DD7FD1 02030100 01A34230 40300E06 03551D0F 0101FF04 04030201
  06300F06 03551D13 0101FF04 05300301 01FF301D 0603551D 0E041604 1449DC85
  4B3D31E5 1B3E6A17 606AF333 3D3B4C73 E8300D06 092A8648 86F70D01 010B0500
  03820101 00507F24 D3932A66 86025D9F E838AE5C 6D4DF6B0 49631C78 240DA905
  604EDCDE FF4FED2B 77FC460E CD636FDB DD44681E 3A5673AB 9093D3B1 6C9E3D8B
```

```
  D98987BF E40CBD9E 1AECA0C2 2189BB5C 8FA85686 CD98B646 5575B146 8DFC66A8
  467A3DF4 4D565700 6ADF0F0D CF835015 3C04FF7C 21E878AC 11BA9CD2 55A9232C
  7CA7B7E6 C1AF74F6 152E99B7 B1FCF9BB E973DE7F 5BDDEB86 C71E3B49 1765308B
  5FB0DA06 B92AFE7F 494E8A9E 07B85737 F3A58BE1 1A48A229 C37C1E69 39F08678
  80DDCD16 D6BACECA EEBC7CF9 8428787B 35202CDC 60E4616A B623CDBD 230E3AFB
  418616A9 4093E049 4D10AB75 27E86F73 932E35B5 8862FDAE 0275156F 719BB2F0
  D697DF7F 28
  quit
!
diagnostic bootup level minimal
!
license udi pid IR1001-G2 sn FVH3025L31F
license boot level advantage
license smart reservation
license smart transport off
memory free low-watermark processor 71175
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
!
username cisco privilege 15 password 0 Iotg@123
!
redundancy
 mode none
!
!
controller Cellular 0/1/0
 no lte gps enable
 no lte gps mode standalone
 profile id 1 apn ims authentication none pdn-type ipv4v6
!
vlan internal allocation policy ascending
!
!
interface GigabitEthernet0/0/0
 no switchport
 no ip address
 shutdown
 negotiation auto
!
interface GigabitEthernet0/0/1
 no switchport
 no ip address
 shutdown
 negotiation auto
!
interface Cellular0/1/0
 no ip address
 shutdown
!
interface Cellular0/1/1
 no ip address
!
interface Vlan1
 no ip address
!
interface Vlan5
 no ip address
 shutdown
!
interface Async0/2/0
 no ip address
 encapsulation scada
 shutdown
```

```
 media-type rs232 dce
!
iox
ip rcmd domain-lookup
ip forward-protocol nd
ip forward-protocol udp
ip forward-protocol udp tftp
ip telnet tos C0
ip telnet comport enable
ip telnet comport flow level 16
ip telnet comport receive window 4128
ip telnet comport disconnect delay 0
ip tftp arp-glean
ip tftp blocksize 512
ip ftp passive
ip http server
ip http authentication local
ip http secure-server
!
ip ssh bulk-mode 131072
ip ssh stricthostkeycheck accept-new
ip scp username root
ip scp password iotg@123
!
dialer watch-list 2 ip 5.6.7.8 255.255.255.255
dialer watch-list 2 delay route-check initial 60
dialer watch-list 2 delay connect 1
dialer-list 2 protocol ip list 1
dialer-list 2 protocol ipv6 permit
snmp-server community private RW
snmp-server contact public
!
control-plane
!
line con 0
 exec-timeout 0 0
 activation-character 13
 stopbits 1
line 0/0/0
 activation-character 13
line 0/2/0
 activation-character 13
line vty 0 4
 exec-timeout 0 0
 activation-character 13
 login
 transport input ssh
line vty 5 14
 activation-character 13
 login
 transport input ssh
line vty 15
 activation-character 13
 login
 transport input all
!
end
```

Configure interfaces

Use this task to configure interfaces related to different ports.

Procedure

Step 1 Use the **configure terminal** command to enter the global configuration mode.

Example:

```
Router# configure terminal
```

Step 2 Use the **interface gigabitethernet** *interface-id* command to configure an interface for Layer 2.

Example:

```
Router(config)# interface GigabitEthernet0/0/0
```

Step 3 Use the **switchport** command to convert a router port to switch port for Layer 2.

Example:

```
Router(config)# switchport
```

Step 4 Use the **interface async** *interface-id* command to configure an asynchronous serial interface.

Example:

```
Router(config)# interface Async0/2/0
```

Step 5 Use the **media-type rs232 dce** command to configure the Data Communications Equipment (DCE) mode.

Example:

```
Router(config)# media-type rs232 dce
```

Note DCE mode configures a serial interface as a Data Communications Equipment (DCE) device, which controls the timing of data transmission in serial communication.

Step 6 Use the **media-type rs232 dte** command to configure the Data Terminal Equipment (DTE) mode.

Example:

```
Router(config)# media-type rs232 dte
```

Note DTE mode refers to configuring a serial interface as DTE in an RS-232 serial connection.

Configuring Global Parameters

To configure global parameters for your router, follow these steps.

Procedure

Step 1 **configure terminal**

Example:

```
Router> enable
Router# configure terminal
Router(config)#
```

Enters global configuration mode when using the console port.

Use the following to connect to the router with a remote terminal:

```
telnet router-name or address
Login: login-id
Password: *********
Router> enable
```

Step 2 **hostname** *name*

Example:

```
Router(config)# hostname Router
```

Specifies the name for the router.

Step 3 **enable password** *password*

Example:

```
Router(config)# enable password cr1ny5ho
```

Specifies a password to prevent unauthorized access to the router.



Note In this form of the command, password is not encrypted. To encrypt the password use enable secret password as noted in the previously mentioned Device Hardening Guide.

Configuring the Gigabit Ethernet Interface

The default configuration for the Gigabit Ethernet Interface (GI0/0/0-GI0/0/1) on the router is Layer 3 (L3). It is possible to configure the interface as a Layer 2 (L2) interface.

To manually define the Gigabit Ethernet interface, follow these steps, beginning from global configuration mode.

Procedure

Step 1 **interface GigabitEthernet (GI0/0/0-GI0/0/1)** *slot/bay/port*

Example:

```
Router(config)# interface GigabitEthernet 0/0/0
```

Enters the configuration mode for an interface on the router.

Step 2 **ip address** *ip-address mask*

Example:

```
Router(config-if)# ip address 192.168.12.2 255.255.255.0
```

Sets the IP address and subnet mask for the specified interface. Use this Step if you are configuring an IPv4 address.

Step 3 **ipv6 address** *ipv6-address/prefix*

Example:

```
Router(config-if)# ipv6 address 2001.db8::ffff:1/128
```

Sets the IPv6 address and prefix for the specified interface. Use this step instead of Step 2, if you are configuring an IPv6 address. IPv6 unicast-routing needs to be set-up as well, see further information in the **IPv6 Addressing and Basic Connectivity Configuration Guide** located here: https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/ipv6_basic/configuration/xe-16-10/ip6b-xe-16-10-book/read-me-first.html

Step 4 **ipv6 unicast-routing**

Example:

```
Router (config)# ipv6 unicast-routing
```

Enables forwarding of IPv6 unicast data packets.

Step 5 **no shutdown**

Example:

```
Router(config-if)# no shutdown
```

Enables the interface and changes its state from administratively down to administratively up.

Step 6 **exit**

Example:

```
Router(config-if)# exit
```

Exits the configuration mode of interface and returns to the global configuration mode.

Support for sub-interface on GigabitEthernet0/0/0-0/0/1

The router supports sub-interfaces and dot1q configuration on the g0/0/0 and g0/0/1 interface. For example:

```
Router(config)#interface g0/0/0 ?
  <1-4294967295>  GigabitEthernet interface number
Router(config-subif)#encapsulation ?
  dot1Q           IEEE 802.1Q Virtual LAN
```

Configuring a Loopback Interface

Before you begin

The loopback interface acts as a placeholder for the static IP address and provides default routing information.

To configure a loopback interface, follow these steps.

Procedure

Step 1 **interface** *type number*

Example:

```
Router(config)# interface Loopback 0
```

Enters configuration mode on the loopback interface.

Step 2 (Option 1) **ip address** *ip-address mask*

Example:

```
Router(config-if)# ip address 10.108.1.1 255.255.255.0
```

Sets the IP address and subnet mask on the loopback interface. (If you are configuring an IPv6 address, use the **ipv6 address** *ipv6-address/prefix* command described below.

Step 3 (Option 2) **ipv6 address** *ipv6-address/prefix*

Example:

```
Router(config-if)# ipv6 address 2001:db8::ffff:1/128
```

Sets the IPv6 address and prefix on the loopback interface.

Step 4 **exit**

Example:

```
Router(config-if)# exit
```

Exits configuration mode for the loopback interface and returns to global configuration mode.

Example

Verifying Loopback Interface Configuration

Enter the **show interface loopback** command. You should see an output similar to the following example:

```
Router# show interface loopback 0
Loopback0 is up, line protocol is up
  Hardware is Loopback
  Internet address is 192.0.2.0/16
  MTU 1514 bytes, BW 8000000 Kbit, DLY 5000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation LOOPBACK, loopback not set
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/0, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

Alternatively, use the **ping** command to verify the loopback interface, as shown in the following example:

```
Router# ping 192.0.2.0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.0.2.0, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
```

Enabling Cisco Discovery Protocol

Cisco Discovery Protocol (CDP) is enabled by default on the router. It may be disabled if needed for security purposes.

For more information on using CDP, see Cisco Discovery Protocol Configuration Guide, Cisco IOS XE Release 3S.

Configuring Command-Line Access

To configure parameters to control access to the router, follow these steps.

Note Transport input must be set as explained in the previous Telnet and SSH sections of the guide.

Procedure

Step 1 **line** [**aux** | **console** | **tty** | **vty**] *line-number*

Example:

```
Router(config)# line console 0
```

Enters line configuration mode, and specifies the type of line.

The example provided here specifies a console terminal for access.

Step 2 **password** *password*

Example:

```
Router(config-line)# password 5dr4Hepw3
```

Specifies a unique password for the console terminal line.

Step 3 **login**

Example:

```
Router(config-line)# login
```

Enables password checking at terminal session login.

Step 4 **exec-timeout** *minutes* [*seconds*]

Example:

```
Router(config-line)# exec-timeout 5 30
Router(config-line)#
```

Sets the interval during which the EXEC command interpreter waits until user input is detected. The default is 10 minutes. Optionally, adds seconds to the interval value.

The example provided here shows a timeout of 5 minutes and 30 seconds. Entering a timeout of **0 0** specifies never to time out.

Step 5 **exit**

Example:

```
Router(config-line)# exit
```

Exits line configuration mode to re-enter global configuration mode.

Step 6 **line** [**aux** | **console** | **tty** | **vty**] *line-number*

Example:

```
Router(config)# line vty 0 4
Router(config-line)#
```

Specifies a virtual terminal for remote console access.

Step 7 **password** *password*

Example:

```
Router(config-line)# password aldf2ad1
```

Specifies a unique password for the virtual terminal line.

Step 8 **login**

Example:

```
Router(config-line)# login
```

Enables password checking at the virtual terminal session login.

Step 9 **end**

Example:

```
Router(config-line)# end
```

Exits line configuration mode, and returns to privileged EXEC mode.

Example

The following configuration shows the command-line access commands. Note that transport input none is the default, but if SSH is enabled this must be set to ssh.

You do not have to input the commands marked **default**. These commands appear automatically in the configuration file that is generated when you use the **show running-config** command.

```
!
line console 0
exec-timeout 10 0
password 4youreyesonly
login
transport input none (default)
stopbits 1 (default)
line vty 0 4
password secret
login
!
```

Configuring Static Routes

Static routes provide fixed routing paths through the network. They are manually configured on the router. If the network topology changes, the static route must be updated with a new route. Static routes are private routes unless they are redistributed by a routing protocol.

To configure static routes, follow these steps.

Procedure

Step 1 (Option 1) **ip route** *prefix mask* {*ip-address* | *interface-type interface-number* [*ip-address*]}

Example:

```
Router(config)# ip route 192.10.2.3 255.255.0.0 10.10.10.2
```

Specifies a static route for the IP packets. (If you are configuring an IPv6 address, use the **ipv6 route** command described below.)

Step 2 (Option 2) **ipv6 route** *prefix/mask* {*ipv6-address* | *interface-type interface-number* [*ipv6-address*]}

Example:

```
Router(config)# ipv6 route 2001:db8:2::/64 2001:db8:3::0
```

Specifies a static route for the IP packets. See additional information for IPv6 here: https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/ipv6_basic/configuration/xe-16-10/ip6b-xe-16-10-book/read-me-first.html

Step 3 **end**

Example:

```
Router(config)# end
```

Exits global configuration mode and enters privileged EXEC mode.

In the following configuration example, the static route sends out all IP packets with a destination IP address of 192.168.1.0 and a subnet mask of 255.255.255.0 on the Gigabit Ethernet interface to another device with an IP address of 10.10.10.2. Specifically, the packets are sent to the configured PVC.

You do not have to enter the command marked **default**. This command appears automatically in the configuration file generated when you use the **running-config** command.

```
!
ip classless (default)
ip route 2001:db8:2::/64 2001:db8:3::0
```

Verifying Configuration

To verify that you have configured static routing correctly, enter the **show ip route** command (or **show ipv6 route** command) and look for static routes marked with the letter S.

When you use an IPv4 address, you should see verification output similar to the following:

```
Router# 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, m - OMP
```

```
       n - NAT, Ni - NAT inside, No - NAT outside, Nd - NAT DIA
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       H - NHRP, G - NHRP registered, g - NHRP registration summary
       o - ODR, P - periodic downloaded static route, I - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR
       & - replicated local route overrides by connected

Gateway of last resort is not set

      11.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        11.1.0.0/16 is directly connected, GigabitEthernet0/0/1
L        11.1.23.90/32 is directly connected, GigabitEthernet0/0/1
```

When you use an IPv6 address, you should see verification output similar to the following:

```
Router# show ipv6 route
IPv6 Routing Table - default - 5 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, R - RIP, H - NHRP, I1 - ISIS L1
       I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP
       EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE -
Destination
       NDr - Redirect, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1
       OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       ls - LISP site, ld - LISP dyn-EID, a - Application

C   2001:DB8:3::/64 [0/0]
       via GigabitEthernet0/0/2, directly connected
S   2001:DB8:2::/64 [1/0]
       via 2001:DB8:3::1
```

Configuring Dynamic Routes

In dynamic routing, the network protocol adjusts the path automatically, based on network traffic or topology. Changes in dynamic routes are shared with other routers in the network.

All of the Cisco IOS-XE configuration guides can be found here: https://www.cisco.com/c/en/us/support/ios-nx-os-software/ios-xe-17/series.html#Configuration.

Configuring Routing Information Protocol

To configure the RIP on a router, follow these steps.

Procedure

Step 1 **router rip**

Example:

```
Router(config)# router rip
```

Enters router configuration mode, and enables RIP on the router.

Step 2 **version** {**1** | **2**}

Example:

```
Router(config-router)# version 2
```

Specifies use of RIP version 1 or 2.

Step 3 **network** *ip-address*

Example:

```
Router(config-router)# network 192.168.1.1
Router(config-router)# network 10.10.7.1
```

Specifies a list of networks on which RIP is to be applied, using the address of the network of each directly connected network.

Step 4 **no auto-summary**

Example:

```
Router(config-router)# no auto-summary
```

Disables automatic summarization of subnet routes into network-level routes. This allows subprefix routing information to pass across classful network boundaries.

Step 5 **end**

Example:

```
Router(config-router)# end
```

Exits router configuration mode, and enters privileged EXEC mode.

Example

Verifying Configuration

To verify that you have configured RIP correctly, enter the **show ip route** command and look for RIP routes marked with the letter R. You should see an output similar to the one shown in the following example:

```
Router# show ip route
Codes: 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
       i - IS-IS, su - IS-IS summary, 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

     10.0.0.0/24 is subnetted, 1 subnets
C       10.108.1.0 is directly connected, Loopback0
R    3.0.0.0/8 [120/1] via 2.2.2.1, 00:00:02, Ethernet0/0/0
```

Configuring Enhanced Interior Gateway Routing Protocol

The Enhanced Interior Gateway Routing Protocol (EIGRP) is an enhanced version of the Interior Gateway Routing Protocol (IGRP) developed by Cisco. The convergence properties and the operating efficiency of EIGRP have improved substantially over IGRP, and IGRP is now obsolete.

The convergence technology of EIGRP is based on an algorithm called the Diffusing Update Algorithm (DUAL). The algorithm guarantees loop-free operation at every instant throughout a route computation and allows all devices involved in a topology change to synchronize. Devices that are not affected by topology changes are not involved in recomputations

Details on configuring Enhanced Interior Gateway Routing Protocol (EIGRP), are found in the following guide: https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/ip-routing/b-ip-routing.html

Configuring the Serial Interface

This section describes configuring serial interface management.

The router supports asynchronous serial interface protocols used for SCADA, Raw-TCP, and Raw-UDP. It has a single serial interface, designated async 0/2/0, which supports RS232 in DCE and DTE modes and RS485.

Specifying an Asynchronous Serial Interface

To specify an asynchronous serial interface and enter interface configuration mode, use one of the following commands in global configuration mode.

Command or Action	Purpose
Router(config)# interface async 0/2/0	Enters interface configuration mode.

Specifying Asynchronous Serial Encapsulation

The asynchronous serial interfaces support the following serial encapsulation methods:

- Raw-TCP
- Raw-UDP
- SCADA

Command or Action	Purpose
Router(config-if)# encapsulation {raw-tcp | raw-udp | scada}	Configures asynchronous serial encapsulation.

Encapsulation methods are set according to the type of protocol or application you configure in the Cisco IOS software.

The remaining encapsulation methods are defined in their respective books and chapters describing the protocols or applications.

Configuring the Serial Port

To configure the serial port perform the steps in the following example:

```
Router#sh run int async 0/2/0
Building configuration...
Current configuration : 62 bytes
!
interface Async0/2/0
no ip address
encapsulation raw-tcp
end
Router#show line
   Tty Line Typ     Tx/Rx    A Modem  Roty AccO AccI  Uses  Noise Overruns  Int
*     0    0 CTY              -    -      -    -    -     0      0    0/0      -
  0/2/0   50 TTY   9600/9600  -    -      -    -    -     0      0    0/0      -
     74   74 VTY              -    -      -    -    -     3      0    0/0      -
     75   75 VTY              -    -      -    -    -     0      0    0/0      -
     76   76 VTY              -    -      -    -    -     0      0    0/0      -
     77   77 VTY              -    -      -    -    -     0      0    0/0      -
     78   78 VTY              -    -      -    -    -     0      0    0/0      -
```

Line(s) not in async mode -or- with no hardware support:

1-49, 51-73, 79-726