

## Configuring an IP Router with CLI

This section provides information to configure an IP router.

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# Router Configuration Overview

In an Alcatel-Lucent router, an interface is a logical named entity. An interface is created by specifying an interface name under the `configure>router` context. This is the global router configuration context where objects like static routes are defined. An IP interface name can be up to 32 alphanumeric characters long, must start with a letter, and is case-sensitive; for example, the interface name “1.1.1.1” is not allowed, but “int-1.1.1.1” is allowed.

To create an interface, the basic configuration tasks that must be performed are:

- Assign a name to the interface.
- Associate an IP address with the interface.
- Associate the interface with a network interface or the system interface.
- Configure appropriate routing protocols.

A system interface and network interface should be configured.

---

## System Interface

The system interface is associated with the network entity (such as a specific Alcatel-Lucent router), not a specific interface. The system interface is also referred to as the loopback address. The system interface is associated during the configuration of the following entities:

- The termination point of service tunnels
- The hops when configuring MPLS paths and LSPs
- The addresses on a target router for BGP and LDP peering.

The system interface is used to preserve connectivity (when routing reconvergence is possible) when an interface fails or is removed. The system interface is used as the router identifier. A system interface must have an IP address with a 32-bit subnet mask.

---

## Network Interface

A network interface can be configured on one of the following entities a physical port or LAG:

- A physical or logical port
- A SONET/SDH channel

## Basic Configuration

NOTE: Refer to each specific chapter for specific routing protocol information and command syntax to configure protocols such as OSPF and BGP.

The most basic router configuration must have the following:

- System name
- System address

The following example displays a router configuration:

```
A:ALA-A> config# info
. . .
#-----
# Router Configuration
#-----
    router
        interface "system"
            address 10.10.10.103/32
        exit
        interface "to-104"
            address 10.0.0.103/24
            port 1/1/1
        exit
        exit
        autonomous-system 100
        confederation 1000 members 100 200 300
    router-id 10.10.10.103
. . .
    exit
    isis
    exit
. . .
#-----
A:ALA-A> config#
```

# Common Configuration Tasks

The following sections describe basic system tasks.

- [Configuring a System Name on page 64](#)
  - [Configuring Interfaces on page 65](#)
    - [Configuring a System Interface on page 65](#)
    - [Configuring a Network Interface on page 65](#)
  - [Configuring Proxy ARP on page 80](#)
  - [Creating an IP Address Range on page 82](#)
  - [Configuring an Autonomous System on page 88](#)
  - [Configuring Overload State on a Single SFM on page 89](#)
- 

## Configuring a System Name

Use the `system` command to configure a name for the device. The name is used in the prompt string. Only one system name can be configured. If multiple system names are configured, the last one configured will overwrite the previous entry.

If special characters are included in the system name string, such as spaces, #, or ?, the entire string must be enclosed in double quotes. Use the following CLI syntax to configure the system name:

**CLI Syntax:** `config# system`  
`name system-name`

**Example:** `config# system`  
`config>system# name ALA-A`  
`ALA-A>config>system# exit all`  
`ALA-A#`

The following example displays the system name output.

```
A:ALA-A>config>system# info
#-----
# System Configuration
#-----
name "ALA-A"
location "Mt.View, CA, NE corner of FERG 1 Building"
coordinates "37.390, -122.05500 degrees lat."
snmp
exit
. . .
exit
```

## Configuring Interfaces

The following command sequences create a system and a logical IP interface. The system interface assigns an IP address to the interface, and then associates the IP interface with a physical port. The logical interface can associate attributes like an IP address or port.

Note that the system interface cannot be deleted.

---

### Configuring a System Interface

To configure a system interface:

**CLI Syntax:**

```
config>router
  interface interface-name
    address {[ip-address/mask]|[ip-address] [netmask]}
      [broadcast {all-ones|host-ones}]
    secondary {[address/mask|ip-address] [netmask]}
      [broadcast {all-ones|host-ones}] [igp-inhibit]
```

---

### Configuring a Network Interface

To configure a network interface:

**CLI Syntax:**

```
config>router
  interface interface-name
    address ip-addr{/mask-length | mask} [broadcast {all-ones | host-ones}]
    cflowd {acl | interface}
    egress
      filter ip ip-filter-id
      filter ipv6 ipv6-filter-id
    ingress
      filter ip ip-filter-id
      filter ipv6 ipv6-filter-id
    port port-name
```

The following displays an IP configuration output showing interface information.

```
A:ALA-A>config>router# info
#-----
# IP Configuration
#-----
    interface "system"
      address 10.10.0.4/32
    exit
    interface "to-ALA-2"
      address 10.10.24.4/24
      port 1/1/1
      egress
        filter ip 10
      exit
    exit
...
#-----
A:ALA-A>config>router#
```

To enable CPU protection:

**CLI Syntax:** config>router  
                  interface *interface-name*  
                  cpu-protection *policy-id*

CPU protection policies are configured in the **config>sys>security>cpu-protection** context. See the OS System Management Guide.

## Configuring IPv6 Parameters

IPv6 interfaces and associated routing protocols may only be configured on the following systems:

- Chassis systems running in chassis mode c or d.
- Chassis systems running in mixed-mode, with IPv6 functionality limited to those interface on slots with IOM3-XP/IMMs or later line cards.
- 7750 SR-c4/12.

The following displays the interface configuration showing the IPv6 default configuration when IPv6 is enabled on the interface.

```
A:ALA-49>config>router>if>ipv6# info detail
-----
` port 1/2/37
  ipv6
    packet-too-big 100 10
    param-problem 100 10
    redirects 100 10
    time-exceeded 100 10
    unreachablees 100 10
  exit
-----
A:ALA-49>config>router>if>ipv6# exit all
```

Use the following CLI syntax to configure IPv6 parameters on a router interface.

**CLI Syntax:** config>router# interface *interface-name*  
 port *port-name*  
 ipv6  
 address {*ipv6-address/prefix-length*} [*eui-64*]  
 icmp6  
 packet-too-big [*number seconds*]  
 param-problem [*number seconds*]  
 redirects [*number seconds*]  
 time-exceeded [*number seconds*]  
 unreachablees [*number seconds*]  
 neighbor *ipv6-address mac-address*

The following displays a configuration example showing interface information.

```
A:ALA-49>config>router>if# info
-----
  address 10.11.10.1/24
  port 1/2/37
  ipv6
    address 10::1/24
  exit
-----
A:ALA-49>config>router>if#
```

## Configuring IPv6 Over IPv4 Parameters

This section provides several examples of the features that must be configured in order to implement IPv6 over IPv4 relay services.

- [Tunnel Ingress Node on page 68](#)
  - [Learning the Tunnel Endpoint IPv4 System Address on page 70](#)
  - [Configuring an IPv4 BGP Peer on page 71](#)
  - [An Example of a IPv6 Over IPv4 Tunnel Configuration on page 72](#)
- [Tunnel Egress Node on page 73](#)
  - [Learning the Tunnel Endpoint IPv4 System Address on page 74](#)
  - [Configuring an IPv4 BGP Peer on page 75](#)
  - [An Example of a IPv6 Over IPv4 Tunnel Configuration on page 76](#)

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## Tunnel Ingress Node

This configuration shows how the interface through which the IPv6 over IPv4 traffic leaves the node. This must be configured on a network interface.

**CLI Syntax:**

```
config>router
  static-route ::C8C8:C802/128 indirect 200.200.200.2
  interface ip-int-name
    address {ip-address/mask|ip-address netmask} [broadcast
    all-ones|host-ones]
    port port-name
```

The following displays configuration output showing interface configuration.

```
A:ALA-49>configure>router# info
-----
...
    interface "ip-1.1.1.1"
      address 1.1.1.1/30
      port 1/1/1
    exit
...
-----
A:ALA-49>configure>router#
```



Both the IPv4 and IPv6 system addresses must to configured

**CLI Syntax:** config>router  
    interface *ip-int-name*  
        address {*ip-address/mask|ip-address netmask*} [broadcast all-ones|host-ones]  
    ipv6  
        address *ipv6-address/prefix-length* [eui-64]

The following displays configuration output showing interface information.

```
A:ALA-49>configure>router# info
-----
...
    interface "system"
        address 200.200.200.1/32
        ipv6
            address 3FFE::C8C8:C801/128
        exit
    exit
...
-----
A:ALA-49>configure>router#
```

## Learning the Tunnel Endpoint IPv4 System Address

This configuration displays the OSPF configuration to learn the IPv4 system address of the tunnel endpoint.

**CLI Syntax:** config>router  
ospf  
area *area-id*  
interface *ip-int-name*

The following displays a configuration showing OSPF output.

```
A:ALA-49>configure>router# info
-----
...
    ospf
      area 0.0.0.0
        interface "system"
          exit
        interface "ip-1.1.1.1"
          exit
      exit
    exit
-----
A:ALA-49>configure>router#
```

## Configuring an IPv4 BGP Peer

This configuration display the commands to configure an IPv4 BGP peer with (IPv4 and) IPv6 protocol families.

**CLI Syntax:**

```
config>router
      bgp
      export policy-name [policy-name...(upto 5 max)]
      router-id ip-address
      group name
        family [ipv4][vpn-ipv4] [ipv6] [mcast-ipv4]
        type {internal|external}
        neighbor ip-address
          local-as as-number [private]
          peer-as as-number
```

The following displays a configuration showing BGP output.

```
A:ALA-49>configure>router# info
-----
...
      bgp
      export "ospf3"
      router-id 200.200.200.1
      group "main"
        family ipv4 ipv6
        type internal
        neighbor 200.200.200.2
          local-as 1
          peer-as 1
        exit
      exit
    exit
  ...
-----
A:ALA-49>configure>router#
```

## An Example of a IPv6 Over IPv4 Tunnel Configuration

The IPv6 address is the next-hop as it is received through BGP. The IPv4 address is the system address of the tunnel's endpoint static-route ::C8C8:C802/128 indirect 200.200.200.2.

This configuration displays an example to configure a policy to export IPv6 routes into BGP.

```
CLI Syntax: config>router
                bgp
                export policy-name [policy-name...(upto 5 max)]
                router-id ip-address
                group name
                    family [ipv4] [vpn-ipv4] [ipv6] [mcast-ipv4]
                    type {internal|external}
                    neighbor ip-address
                        local-as as-number [private]
                        peer-as as-number
```

The following displays the configuration output.

```
A:ALA-49>configure>router# info
-----
...
    policy-options
      policy-statement "ospf3"
        description "Plcy Stmt For 'From ospf3 To bgp'"
        entry 10
          description "Entry From Protocol ospf3 To bgp"
          from
            protocol ospf3
          exit
          to
            protocol bgp
          exit
          action accept
          exit
        exit
      exit
    exit
  ...
-----
A:ALA-49>configure>router#
```

## Tunnel Egress Node

This configuration shows how the interface through which the IPv6 over IPv4 traffic leaves the node. It must be configured on a network interface. Both the IPv4 and IPv6 system addresses must be configured.

**CLI Syntax:**

```

config>router
configure router static-route ::C8C8:C801/128 indirect
200.200.200.1
    interface ip-int-name
        address {ip-address/mask>|ip-address netmask} [broadcast
            all-ones|host-ones]
        ipv6
            address ipv6-address/prefix-length [eui-64]
        port port-name
  
```

The following displays interface configuration.

```

A:ALA-49>configure>router# info
-----
...
    interface "ip-1.1.1.2"
        address 1.1.1.2/30
        port 1/1/1
    exit
    interface "system"
        address 200.200.200.2/32
        ipv6
            address 3FFE::C8C8:C802/128
        exit
    exit
-----
  
```

## Learning the Tunnel Endpoint IPv4 System Address

This configuration displays the OSPF configuration to learn the IPv4 system address of the tunnel endpoint.

**CLI Syntax:** config>router  
ospf  
area *area-id*  
interface *ip-int-name*

The following displays OSPF configuration information.

```
A:ALA-49>configure>router# info
-----
...
    ospf
      area 0.0.0.0
        interface "system"
        exit
        interface "ip-1.1.1.2"
        exit
      exit
    exit
-----
A:ALA-49>configure>router#
```

## Configuring an IPv4 BGP Peer

This configuration display the commands to configure an IPv4 BGP peer with (IPv4 and) IPv6 protocol families.

**CLI Syntax:**

```
config>router
      bgp
      export policy-name [policy-name...(upto 5 max)]
      router-id ip-address
      group name
        family [ipv4] [vpn-ipv4] [ipv6] [mcast-ipv4]
        type {internal|external}
        neighbor ip-address
          local-as as-number [private]
          peer-as as-number
```

The following displays the IPv4 BGP peer configuration example.

```
A:ALA-49>configure>router# info
-----
...
      bgp
      export "ospf3"
      router-id 200.200.200.2
      group "main"
        family ipv4 ipv6
        type internal
        neighbor 200.200.200.1
          local-as 1
          peer-as 1
        exit
      exit
    exit
  ...
-----
A:ALA-49>configure>router#
```

## An Example of a IPv6 Over IPv4 Tunnel Configuration

The IPv6 address is the next-hop as it is received through BGP. The IPv4 address is the system address of the tunnel's endpoint static-route ::C8C8:C802/128 indirect 200.200.200.2

This configuration displays an example to configure a policy to export IPv6 routes into BGP.

```
CLI Syntax: config>router
                bgp
                export policy-name [policy-name...(upto 5 max)]
                router-id ip-address
                group name
                    family [ipv4] [vpn-ipv4] [ipv6] [mcast-ipv4]
                    type {internal|external}
                    neighbor ip-address
                        local-as as-number [private]
                        peer-as as-number
```

The following displays an IPv6 over IPv4 tunnel configuration

```
A:ALA-49>configure>router# info
-----
...
    policy-options
      policy-statement "ospf3"
        description "Plcy Stmt For 'From ospf3 To bgp'"
        entry 10
          description "Entry From Protocol ospf3 To bgp"
          from
            protocol ospf3
          exit
          to
            protocol bgp
          exit
          action accept
          exit
        exit
      exit
    exit
  exit
-----
A:ALA-49>configure>router#
```



## Router Advertisement

To configure the router to originate router advertisement messages on an interface, the interface must be configured under the router-advertisement context and be enabled (no shutdown). All other router advertisement configuration parameters are optional.

Use the following CLI syntax to enable router advertisement and configure router advertisement parameters:

```
CLI Syntax: config>router# router-advertisement
                interface ip-int-name
                    current-hop-limit number
                    managed-configuration
                    max-advertisement-interval seconds
                    min-advertisement-interval seconds
                    mtu mtu-bytes
                    other-stateful-configuration
                    prefix ipv6-prefix/prefix-length
                    autonomous
                    on-link
                    preferred-lifetime {seconds | infinite}
                    valid-lifetime {seconds | infinite}
                    reachable-time milli-seconds
                    retransmit-time milli-seconds
                    router-lifetime seconds
                    no shutdown
                    use-virtual-mac
```

The following displays a router advertisement configuration example.

```
*A:sim131>config>router>router-advert# info
-----
                interface "n1"
                    prefix 3::/64
                    exit
                    use-virtual-mac
                    no shutdown
                exit
-----
*A:sim131>config>router>router-advert# interface n1
*A:sim131>config>router>router-advert>if# prefix 3::/64
*A:sim131>config>router>router-advert>if>prefix# info detail
-----
                    autonomous
                    on-link
                    preferred-lifetime 604800
                    valid-lifetime 2592000
-----
*A:tahi>config>router>router-advert>if>prefix#
```

## Configuring IPv6 Parameters

The following displays the interface configuration showing the IPv6 default configuration when IPv6 is enabled on the interface.

```
A:ALA-49>config>router>if>ipv6# info detail
-----
port 1/3/37
  ipv6
    packet-too-big 100 10
    param-problem 100 10
    redirects 100 10
    time-exceeded 100 10
    unreachablees 100 10
  exit
-----
A:ALA-49>config>router>if>ipv6# exit all
```

The following displays an IPv6 configuration example.

```
A:ALA-49>config>router>if# info
-----
address 10.11.10.1/24
port 1/3/37
  ipv6
    address 10::1/24
  exit
-----
A:ALA-49>config>router>if#
```

---

## An Example of a IPv6 Over IPv4 Tunnel Configuration

The IPv6 address is the next-hop as it is received through BGP. The IPv4 address is the system address of the tunnel's endpoint static-route ::C8C8:C802/128 indirect 200.200.200.2

This configuration displays an example to configure a policy to export IPv6 routes into BGP.

**CLI Syntax:**

```
config>router
  bgp
    export policy-name [policy-name...(upto 5 max)]
    router-id ip-address
    group name
      family [ipv4] [vpn-ipv4] [ipv6] [mcast-ipv4]
      type {internal|external}
      neighbor ip-address
        local-as as-number [private]
        peer-as as-number
```

The following displays the configuration showing the policy output.

```
A:ALA-49>configure>router# info
-----
...
    policy-options
      policy-statement "ospf3"
        description "Plcy Stmt For 'From ospf3 To bgp'"
        entry 10
          description "Entry From Protocol ospf3 To bgp"
          from
            protocol ospf3
          exit
          to
            protocol bgp
          exit
          action accept
          exit
        exit
      exit
    exit
  exit
-----
A:ALA-49>configure>router#
```

## Configuring Proxy ARP

To configure proxy ARP, you can configure:

- A prefix list in the **config>router>policy-options>prefix-list** context.
- A route policy statement in the **config>router>policy-options>policy-statement** context and apply the specified prefix list.
  - In the policy statement **entry>to** context, specify the host source address(es) for which ARP requests can or cannot be forwarded to non-local networks, depending on the specified action.
  - In the policy statement **entry>from** context, specify network prefixes that ARP requests will or will not be forwarded to depending on the action if a match is found. For more information about route policies, refer to the OS Routing Protocols Guide.
- Apply the policy statement to the **proxy-arp** configuration in the **config>router>interface** context.

**CLI Syntax:**

```
config>router# policy-options
begin
commit
prefix-list name
    prefix ip-prefix/mask [exact|longer|through
    length|prefix-length-range length1-length2]
```

Use the following CLI syntax to configure the policy statement specified in the **proxy-arp-policy policy-statement** command.

**CLI Syntax:**

```
config>router# policy-options
begin
commit
policy-statement name
    default-action {accept | next-entry | next-policy | re-
    ject}
    entry entry-id
        action {accept | next-entry | next-policy | reject}
    to
        prefix-list name [name...(upto 5 max)]
    from
        prefix-list name [name...(upto 5 max)]
```

The following displays prefix list and policy statement configuration examples:

```
A:ALA-49>config>router>policy-options# info
-----
prefix-list "prefixlist1"
    prefix 10.20.30.0/24 through 32
exit
```

```

prefix-list "prefixlist2"
    prefix 10.10.10.0/24 through 32
exit
...
policy-statement "ProxyARPolicy"
    entry 10
        from
            prefix-list "prefixlist1"
        exit
        to
            prefix-list "prefixlist2"
        exit
        action reject
    exit
    default-action accept
    exit
exit
exit
-----
A:ALA-49>config>router>policy-options#

```

Use the following CLI to configure proxy ARP:

**CLI Syntax:** config>router>interface *interface-name*  
 local-proxy-arp  
 proxy-arp-policy *policy-name* [*policy-name...*(upto 5 max)]  
 remote-proxy-arp

The following displays a proxy ARP configuration example:

```

A:ALA-49>config>router>if# info
-----
    address 128.251.10.59/24
    local-proxy-arp
    proxy-arp
        policy-statement "ProxyARPolicy"
    exit
-----
A:ALA-49>config>router>if#

```

## Creating an IP Address Range

An IP address range can be reserved for exclusive use for services by defining the `config>router>service-prefix` command. When the service is configured, the IP address must be in the range specified as a service prefix. If no service prefix command is configured, then no limitation exists.

The `no service-prefix ip-prefix/mask` command removes all address reservations. A service prefix cannot be removed while one or more services use address(es) in the range to be removed.

**CLI Syntax:** `config>router  
service-prefix ip-prefix/mask [exclusive]`

---

## Configuring an LDP Shortcut

This command enables you to forward user IP packets and specified control IP packets using LDP shortcuts over all network interfaces in the system that participate in the IS-IS and OSPF routing protocols. The default is to disable the LDP shortcut across all interfaces in the system.

---

## IGP Route Resolution

When LDP shortcut is enabled, LDP populates the RTM with next-hop entries corresponding to all prefixes for which it activated an LDP FEC. For a given prefix, two route entries are populated in RTM. One corresponds to the LDP shortcut next-hop and has an owner of LDP. The other one is the regular IP next-hop. The LDP shortcut next-hop always has preference over the regular IP next-hop for forwarding user packets and specified control packets over a given outgoing interface to the route next-hop.

The prior activation of the FEC by LDP is done by performing an exact match with an IGP route prefix in RTM. It can also be done by performing a longest prefix-match with an IGP route in RTM if the `aggregate-prefix-match` option is enabled globally in LDP `ldp-interarea-prd`.

Note that the LDP next-hop entry is not exported to LDP control plane or to any other control plane protocols except OSPF, IS-IS, and specific OAM control plane as specified in [Handling of Control Packets on page 84](#).

This feature is not restricted to /32 FEC prefixes. However only /32 FEC prefixes will be populated in the Tunnel Table for use as a tunnel by services.

All user and specified control packets for which the longest prefix match in RTM yields the FEC prefix will be forwarded over the LDP LSP. The following is an example of the resolution process.

Assume the egress LER advertised a FEC for some /24 prefix using the fec-originate command. At the ingress LER, LDP resolves the FEC by checking in RTM that an exact match exists for this prefix. Once LDP activated the FEC, it programs the NHLFE in the egress data path and the LDP tunnel information in the ingress data path tunnel table.

Next, LDP provides the shortcut route to RTM which will associate it with the same /24 prefix. There will be two entries for this /24 prefix, the LDP shortcut next-hop and the regular IP next-hop. The latter was used by LDP to validate and activate the FEC. RTM then resolves all user prefixes which succeed a longest prefix match against the /24 route entry to use the LDP LSP.

Assume now the aggregate-prefix-match was enabled and that LDP found a /16 prefix in RTM to activate the FEC for the /24 FEC prefix. In this case, RTM adds a new more specific route entry of /24 and has the next-hop as the LDP LSP but it will still not have a specific /24 IP route entry. RTM then resolves all user prefixes which succeed a longest prefix match against the /24 route entry to use the LDP LSP while all other prefixes which succeed a longest prefix-match against the /16 route entry will use the IP next-hop. LDP shortcut will also work when using RIP for routing.

---

### LDP Shortcut Forwarding Plane

Once LDP activated a FEC for a given prefix and programmed RTM, it also programs the ingress Tunnel Table in IOM with the LDP tunnel information.

When an IPv4 packet is received on an ingress network interface, a subscriber IES interface, or a regular IES interface, the lookup of the packet by the ingress IOM will result in the packet being sent labeled with the label stack corresponding to the NHLFE of the LDP LSP when the preferred RTM entry corresponds to an LDP shortcut.

If the preferred RTM entry corresponds to an IP next-hop, the IPv4 packet is forwarded unlabelled.

The switching from the LDP shortcut next-hop to the regular IP next-hop when the LDP FEC becomes unavailable depends on whether the next-hop is still available. If it is (for example, the LDP FEC was withdrawn due to LDP control plane issues) the switchover should be faster. If the next-hop determination requires IGP to re-converge, this will take longer. However no target is set.

The switching from a regular IP next-hop to an LDP shortcut next-hop will normally occur only when both are available. However, the programming of the NHLFE by LDP and the programming of the LDP tunnel information in the ingress IOM tunnel table are asynchronous. If Tunnel Table is configured first, it is possible that traffic will be black holed for some time .

---

### ECMP Considerations

When ECMP is enabled and multiple equal-cost next-hops exit for the IGP route, the ingress IOM will spray the packets for this route based on hashing routine currently supported for IPv4 packets.

When the preferred RTM entry corresponds to an LDP shortcut route, spraying will be performed across the multiple next-hops for the LDP FEC. The FEC next-hops can either be direct link LDP neighbors or T-LDP neighbors reachable over RSVP LSPs in the case of LDP-over-RSVP but not both. This is as per ECMP for LDP in existing implementation.

When the preferred RTM entry corresponds to a regular IP route, spraying will be performed across regular IP next-hops for the prefix.

Spraying across regular IP next-hops and LDP-shortcut next-hops concurrently is not supported.

---

## Handling of Control Packets

All control plane packets will not see the LDP shortcut route entry in RTM with the exception of the following control packets which will be forwarded over an LDP shortcut when enabled:

- A locally generated or in transit ICMP Ping and trace route of an IGP route. The transit message appears as a user packet to the ingress LER node.
- A locally generated response to a received ICMP ping or trace route message.

All other control plane packets that require an RTM lookup and knowledge of which destination is reachable over the LDP shortcut will continue to be forwarded over the IP next-hop route in RTM.

---

## Handling of Multicast Packets

Multicast packets cannot be forwarded or received from an LDP LSP. This is because there is no support for the configuration of such an LSP as a tunnel interfaces in PIM. Only an RSVP P2MP LSP is currently allowed.

If a multicast packet is received over the physical interface, the RPF check will not resolve to the LDP shortcut as the LDP shortcut route in RTM is not made available to multicast application.

---

## Interaction with LDP Shortcut for BGP Route Resolution

There is no interaction between an LDP shortcut for BGP next-hop resolution and the LDP shortcut for IGP route resolution. BGP will continue to resolve a BGP next-hop to an LDP shortcut if the user enabled the LDP shortcut option in BGP *BGP-Shortcut*:

**CLI Syntax:** `config>router>bgp>igp-shortcut ldp`



## Interaction with LDP Shortcut for Static Route Resolution

There is no interaction between LDP shortcut for static route resolution and the LDP shortcut for IGP route resolution. A static route will continue to be resolved by searching an LDP LSP which FEC prefix matches the specified indirect next-hop for the route. In contrast, the LDP shortcut for IGP route resolution uses the LDP LSP as a route.

---

## LDP Control Plane

In order for the LDP shortcut to be usable, an SR-OS router must originate a <FEC, label> binding for each IGP route it learns of even if it did not receive a binding from the next-hop for that route. In other words, it must assume it is an egress LER for the FEC until the route disappears from the routing table or the next-hop advertised a binding for the FEC prefix. In the latter case, the SR-OS router becomes a transit LSR for the FEC.

An SR-OS router will originate a <FEC, label> binding for its system interface address only by default. The only way to originate a binding for local interfaces and routes which are not local to the system is by using the fec-originate capability.

You must use the **fec-originate** command to generate bindings for all non-local routes for which this node acts as an egress LER for the corresponding LDP FEC. Specifically, this feature must support the FEC origination of IGP learned routes and subscriber/host routes statically configured or dynamically learned over subscriber IES interfaces.

An LDP LSP used as a shortcut by IPv4 packets may also be tunneled using the LDP-over-RSVP feature.

## Deriving the Router ID

The router ID defaults to the address specified in the system interface command. If the system interface is not configured with an IP address, then the router ID inherits the last four bytes of the MAC address. The router ID can also be manually configured in the `config>router router-id` context. On the BGP protocol level, a BGP router ID can be defined in the `config>router>bgp router-id` context and is only used within BGP.

Note that if a new router ID is configured, protocols are not automatically restarted with the new router ID. The next time a protocol is initialized the new router ID is used. An interim period of time can occur when different protocols use different router IDs. To force the new router ID, issue the `shutdown` and `no shutdown` commands for each protocol that uses the router ID, or restart the entire router.

Use the following CLI syntax to configure the router ID:

**CLI Syntax:**

```
config>router
  router-id router-id
  interface ip-int-name
    address {ip-address/mask | ip-address netmask} [broad-
      cast all-ones | host-ones]
```

The following example displays a router ID configuration:

```
A:ALA-4>config>router# info
#-----
# IP Configuration
#-----
      interface "system"
        address 10.10.0.4/32
      exit
      . . .
      router-id 10.10.0.4
#-----
A:ALA-4>config>router#
```

## Configuring a Confederation

Configuring a confederation is optional. The AS and confederation topology design should be carefully planned. Autonomous system (AS), confederation, and BGP connection and peering parameters must be explicitly created on each participating router. Identify AS numbers, confederation numbers, and members participating in the confederation.

Refer to the BGP section for CLI syntax and command descriptions.

Use the following CLI syntax to configure a confederation:

**CLI Syntax:** `config>router`  
`confederation confed-as-num members member-as-num`

The following example displays the commands to configure the confederation topology diagram displayed in [Figure 2 on page 39](#).

### NOTES:

- Confederations can be preconfigured prior to configuring BGP connections and peering.
- Each confederation can have up to 15 members.

The following displays a confederation example.

```
A:ALA-B>config>router# info
#-----
# IP Configuration
#-----
    interface "system"
      address 10.10.10.103/32
    exit
    interface "to-104"
      shutdown
      address 10.0.0.103/24
      port 1/1/1
    exit
    autonomous-system 100
    confederation 2002 members 200 300 400
    router-id 10.10.10.103
#-----
A:ALA-B>config>router#
```

## Configuring an Autonomous System

Configuring an autonomous system is optional. Use the following CLI syntax to configure an autonomous system:

**CLI Syntax:** `config>router`  
`autonomous-system as-number`

The following displays an autonomous system configuration example:

```
A:ALA-A>config>router# info
#-----
# IP Configuration
#-----
      interface "system"
        address 10.10.10.103/32
      exit
    interface "to-104"
      address 10.0.0.103/24
      port 1/1/1
      exit
    exit
    autonomous-system 100
    router-id 10.10.10.103
#-----
A:ALA-A>config>router#
```

## Configuring Overload State on a Single SFM

A 7x50 system with a single SFM installed has a system multicast throughput that is only a half of a 7x50 system with dual SFMs installed. For example, in a mixed environment in which IOM1s, IOM2s, and IOM3s are installed in the same system (chassis mode B or C), system multicast throughput doubles when redundant SFMs are used instead of a single SFM. If the required system multicast throughput is between 16G and 32G (which means both SFMs are being actively used), when there is an SFM failure, multicast traffic needs to be rerouted around the node.

Some scenarios include:

- There is only one SFM installed in the system
- One SFM (active or standby) failed in a dual SFM configuration
- The system is in the ISSU process

You can use an overload state in IGP to trigger the traffic reroute by setting the overload bit in IS-IS or setting the metric to maximum in OSPF. Since PIM uses IGP to find out the upstream router, a next-hop change in IGP will cause PIM to join the new path and prune the old path, which effectively reroutes the multicast traffic downstream. When the problem is resolved, the overload condition is cleared, which will cause the traffic to be routed back to the router.

# Service Management Tasks

This section discusses the following service management tasks:

- [Changing the System Name on page 90](#)
  - [Modifying Interface Parameters on page 91](#)
  - [Deleting a Logical IP Interface on page 92](#)
- 

## Changing the System Name

The `system` command sets the name of the device and is used in the prompt string. Only one system name can be configured. If multiple system names are configured, the last one configured will overwrite the previous entry.

Use the following CLI syntax to change the system name:

**CLI Syntax:** `config# system`  
                  name *system-name*

The following example displays the command usage to change the system name:

**Example:**       A:ALA-A>config>system# name tgif  
                  A:TGIF>config>system#

The following example displays the system name change:

```
A:ALA-A>config>system# name TGIF
A:TGIF>config>system# info
#-----
# System Configuration
#-----
      name "TGIF"
      location "Mt.View, CA, NE corner of FERG 1 Building"
      coordinates "37.390, -122.05500 degrees lat."
      synchronize
      snmp
          exit
          security
              snmp
                  community "private" rwa version both
          exit
      . . .
#-----
A:TGIF>config>system#
```

## Modifying Interface Parameters

Starting at the `config>router` level, navigate down to the router interface context.

To modify an IP address, perform the following steps:

```
Example:A:ALA-A>config>router# interface "to-sr1"
A:ALA-A>config>router>if# shutdown
A:ALA-A>config>router>if# no address
A:ALA-A>config>router>if# address 10.0.0.25/24
A:ALA-A>config>router>if# no shutdown
```

To modify a port, perform the following steps:

```
Example:A:ALA-A>config>router# interface "to-sr1"
A:ALA-A>config>router>if# shutdown
A:ALA-A>config>router>if# no port
A:ALA-A>config>router>if# port 1/1/2
A:ALA-A>config>router>if# no shutdown
```

The following example displays the interface configuration:

```
A:ALA-A>config>router# info
#-----
# IP Configuration
#-----
    interface "system"
        address 10.0.0.103/32
    exit
    interface "to-sr1"
        address 10.0.0.25/24
        port 1/1/2
    exit
    router-id 10.10.0.3
#-----
A:ALA-A>config>router#
```

## Deleting a Logical IP Interface

The `no` form of the `interface` command typically removes the entry, but all entity associations must be shut down and/or deleted before an interface can be deleted.

1. Before an IP interface can be deleted, it must first be administratively disabled with the `shutdown` command.
2. After the interface has been shut down, it can then be deleted with the **`no interface`** command.

**CLI Syntax:** `config>router`  
`no interface ip-int-name`

**Example:** `config>router# interface test-interface`  
`config>router>if# shutdown`  
`config>router>if# exit`  
`config>router# no interface test-interface`  
`config>router#`