Configuring LDP with CLI

This section provides information to configure LDP using the command line interface.

Topics in this section include:

LDP Configuration Overview

When the implementation of LDP is instantiated, the protocol is in the `no shutdown` state. In addition, targeted sessions are then enabled. The default parameters for LDP are set to the documented values for targeted sessions in *draft-ietf-mpls-ldp-mib-09.txt*.

LDP must be enabled in order for signaling to be used to obtain the ingress and egress labels in frames transmitted and received on the service distribution path (SDP). When signaling is *off*, labels must be manually configured when the SDP is bound to a service.

Basic LDP Configuration

This chapter provides information to configure LDP and remove configuration examples of common configuration tasks.

The LDP protocol instance is created in the `no shutdown` (enabled) state.

The following displays the default LDP configuration.

```
A:ALA-1>config>router>ldp# info
----------------------------------------------
            interface-parameters
            exit
            targeted-session
            exit
----------------------------------------------
A:ALA-1>config>router>ldp#
```

Common Configuration Tasks

This section provides information to configure:

Enabling LDP

LDP must be enabled in order for the protocol to be active. MPLS must also be enabled. MPLS is enabled in the `config>router>mpls` context.

Use the following syntax to enable LDP on a router:

CLI Syntax: `ldp`

Example: `config>router# ldp`

The following displays the enabled LDP configuration.

```
A:ALA-1>config>router# info
----------------------------------------------
...
#------------------------------------------
echo "LDP Configuration"
#------------------------------------------
        ldp
            interface-parameters
            exit
            targeted-session
            exit
        exit
----------------------------------------------
...
A:ALA-1>config>router#
```

Configuring FEC Originate Parameters

A FEC can be added to the LDP IP prefix database with a specific label operation on the node. Permitted operations are pop or swap. For a swap operation, an incoming label can be swapped with a label in the range of 16 to 1048575. If a swap- label is not configured then the default value is 3.

A route table entry is required for a FEC with a pop operation to be advertised. For a FEC with a swap operation, a route-table entry must exist and user configured next-hop for swap operation must match one of the next-hops in route-table entry.

Use the following syntax to configure FEC originate parameters:

CLI Syntax:
```
config>router>ldp
             fec-originate ip-prefix/mask [advertised-label in-label]
                next-hop ip-address [swap-label out-label]
             fec-originate ip-prefix/mask [advertised-label in-label] pop
```

The following displays a FEC originate configuration example.

```
A:ALA-5>config>router# info
----------------------------------------------
            fec-originate 100.1.1.1/32 pop
            fec-originate 100.2.1.1/32 advertised-label 1000 next-hop 10.10.1.2
            fec-originate 100.3.1.1/32 advertised-label 1001 next-hop 10.10.2.3
              swap-label 131071
            interface-parameters
            exit
            targeted-session
            exit
        exit
----------------------------------------------
A:ALA-5>config>router>ldp#
```

Configuring Graceful-Restart Helper Parameters

Graceful-restart helper advertises to its LDP neighbors by carrying the fault tolerant (FT) session TLV in the LDP initialization message, assisting the LDP in preserving its IP forwarding state across the restart. Alcatel-Lucent's recovery is self-contained and relies on information stored internally to self-heal. This feature is only used to help third-party routers without a self-healing capability to recover.

Maximum recovery time is the time (in seconds) the sender of the TLV would like the receiver to wait, after detecting the failure of LDP communication with the sender.

Neighbor liveness time is the time (in seconds) the LSR is willing to retain its MPLS forwarding state. The time should be long enough to allow the neighboring LSRs to re-sync all the LSPs in a graceful manner, without creating congestion in the LDP control plane.

Use the following syntax to configure graceful-restart parameters:

CLI Syntax:
```
config>router>ldp
      [no] graceful-restart
```

Applying Export and Import Policies

Both inbound and outbound label binding filtering are supported. Inbound filtering allows a route policy to control the label bindings an LSR accepts from its peers. An import policy can accept or reject label bindings received from LDP peers.

Label bindings can be filtered based on:

- Neighbor — Match on bindings received from the specified peer.
- Interface — Match on bindings received from a neighbor or neighbors adjacent over the specified interface.
- Prefix-list — Match on bindings with the specified prefix/prefixes.

Outbound filtering allows a route policy to control the set of LDP label bindings advertised by the LSR. An export policy can control the set of LDP label bindings advertised by the router. By default, label bindings for only the system address are advertised and propagate all FECs that are received.Matches can be based on:

- Loopback — loopback interfaces.
- All — all local subnets.
- Match — match on bindings with the specified prefix/prefixes.

Use the following syntax to apply import and export policies:

CLI Syntax:
```
config>router>ldp
    export policy-name [policy-name...(upto 32 max)]
    import policy-name [policy-name...(upto 32 max)]
```

The following displays export and import policy configuration examples.

```
A:ALA-1>config>router# info
----------------------------------------------
            export "LDP-export"
            fec-originate 100.1.1.1/32 pop
            fec-originate 100.2.1.1/32 advertised-label 1000 next-hop 10.10.1.2
            import "LDP-import"
            interface-parameters
            exit
            targeted-session
            exit
----------------------------------------------
A:ALA-1>config>router#
```

Targeted Session Parameters

Use the following syntax to specify **targeted-session** parameters:

CLI Syntax:
```
config>router# ldp
               targeted-session
                  disable-targeted-session
                  export-prefixes policy-name [policy-name...(up to 5 max)]
                  hello timeout factor
                  import-prefixes policy-name [policy-name...(up to 5 max)]
                  keepalive timeout factor
                  peer ip-address
                     hello timeout factor
                     keepalive timeout factor
                     no shutdown
                     tunneling
                        lsp lsp-name
```

The following example displays an LDP configuration example:

```
A:ALA-1>config>router>ldp# info
----------------------------------------------
...
            targeted-session
                hello 5000 255
                keepalive 5000 255
                peer 10.10.10.104
                    hello 2500 104
                    keepalive 15 3
                exit
            exit
----------------------------------------------
A:ALA-1>config>router>ldp#
```

Interface Parameters

Use the following syntax to configure interface parameters:

CLI Syntax:
```
config>router# ldp
 interface-parameters
    hello timeout factor
    keepalive timeout factor
    transport-address {system|interface}
    interface ip-int-name
       hello timeout factor
       keepalive timeout factor
       transport-address {system|interface}
       no shutdown
```

The following example displays an interface parameter configuration example:

```
A:ALA-1>config>router>ldp# info
----------------------------------------------
...
            targeted-session
                no disable-targeted-session
                hello 5000 255
                keepalive 5000 255
                peer 10.10.10.104
                    hello 2500 104
                    keepalive 15 3
                    no shutdown
                exit
            exit
            no shutdown
----------------------------------------------
A:ALA-1>config>router>ldp#
```

Peer Parameters

Use the following syntax to specify interface parameters:

CLI Syntax:
```
config>router# ldp
             peer-parameters
                peer ip-address
                   auth-keychain name
                   authentication-key [authentication-key|hash-key]
                   [hash|hash2]
                   ttl-security min-ttl-value [log log-id]
```

The following example displays an LDP configuration example:

```
A:ALA-1>config>router>ldp# info
----------------------------------------------
            export "LDP-export"
            import "LDP-import"
            peer-parameters
                peer 10.10.10.104
                    authentication-key "3WErEDozxyQ" hash
                exit
            exit
            interface-parameters
                interface "test"
                exit
                interface "to-104"
                    hello 15 3
                exit
            exit
            targeted-session
                hello 5000 255
                keepalive 5000 255
                peer 10.10.10.104
                    hello 2500 100
                    keepalive 15 3
                exit
            exit
----------------------------------------------
A:ALA-1>config>router>ldp#
```

LDP Signaling and Services

When LDP is enabled, targeted sessions can be established to create remote adjacencies with nodes that are not directly connected. When service distribution paths (SDPs) are configured, extended discovery mechanisms enable LDP to send periodic targeted hello messages to the SDP far-end point. The exchange of LDP hellos trigger session establishment. The SDP signaling default enables **tldp**. The service SDP uses the targeted-session parameters configured in the **config>router>ldp>targeted-session** context.

The SDP LDP and LSP commands are mutually exclusive; either one LSP can be specified or LDP can be enabled. If LDP is already enabled on an MPLS SDP, then an LSP cannot be specified on the SDP. If an LSP is specified on an MPLS SDP, then LDP cannot be enabled on the SDP.

To enable LDP on the SDP when an LSP is already specified, the LSP must be removed from the configuration using the **no lsp** ***lsp-name*** command. For further information about configuring SDPs, refer to the 7750 SR OS Services Guide.

The following example displays the command syntax usage to configure enable LDP on an MPLS SDP:

CLI Syntax:
```
config>service>sdp#
    ldp
    signaling {off|tldp}
```

The following displays an example of an SDP configuration showing the signaling default `tldp` enabled.

```
A:ALA-1>config>service>sdp# info detail
----------------------------------------------
            description "MPLS: to-99"
            far-end 10.10.10.99
            ldp
            signaling tldp
            path-mtu 4462
            keep-alive
                hello-time 10
                hold-down-time 10
                max-drop-count 3
                timeout 5
                no message-length
                no shutdown
            exit
            no shutdown
----------------------------------------------
A:ALA-1>config>service>sdp#
```

The following shows a working configuration of LDP over RSVP-TE (1) where tunnels look like the second example (2):

1.
```
*A:ALA-1>config>router>ldp# info
----------------------------------------------
            prefer-tunnel-in-tunnel
            interface-parameters
                interface "port-1/1/3"
                exit
                interface "port-lag-1"
                exit
            exit
            targeted-session
                peer 10.51.0.1
                    shutdown
                    tunneling
                        lsp "to_P_1"
                    exit
                exit
                peer 10.51.0.17
                    shutdown
                    tunneling
                        lsp "to_P_6"
                    exit
                exit
            exit
----------------------------------------------
*A:ALA-1>config>router>ldp#
```

2.
```
*A:ALA-1>config>router>mpls# info
----------------------------------------------
            resignal-timer 30
            admin-group "lower" 2
            admin-group "upper" 1
            interface "system"
            exit
            interface "port-1/1/3"
            exit
            interface "port-lag-1"
            exit
            path "dyn"
                no shutdown
            exit
            lsp "to_P_1"
                to 10.51.0.1
                cspf
                fast-reroute facility
                exit
                primary "dyn"
                exit
                no shutdown
            exit
            lsp "to_P_6"
                to 10.51.0.17
                cspf
                fast-reroute facility
```

```
                exit
                primary "dyn"
                exit
                no shutdown
            exit
            no shutdown
-----------------------------------------------
*A:ALA-1>config>router>mpls#
```

LDP Configuration Management Tasks

This section discusses the following LDP configuration management tasks:

Disabling LDP

The **no ldp** command disables the LDP protocol on the router. All parameters revert to the default settings. LDP must be shut down before it can be disabled.

Use the following command syntax to disable LDP:

CLI Syntax:
```
no ldp
  shutdown
```

Modifying Targeted Session Parameters

The modification of LDP targeted session parameters does not take effect until the next time the session goes down and is re-establishes. Individual parameters cannot be deleted. The `no` form of a **targeted-session** parameter command reverts modified values back to the default.

The following example displays the command syntax usage to revert targeted session parameters back to the default values:

Example:

```
config>router# ldp
config>router>ldp# targeted-session
config>router>ldp>targeted# no authentication-key
config>router>ldp>targeted# no disable-targeted-session
config>router>ldp>targeted# no hello
config>router>ldp>targeted# no keepalive
config>router>ldp>targeted# no peer 10.10.10.99
```

The following output displays the default values:

```
A:ALA-1>config>router>ldp>targeted# info detail
----------------------------------------------
                no disable-targeted-session
                hello 45 3
                keepalive 40 4
----------------------------------------------
A:ALA-1>config>router>ldp>targeted#
```

Modifying Interface Parameters

Individual parameters cannot be deleted. The **no** form of a **interface-parameter** command reverts modified values back to the defaults.

The following output displays the default values:

```
A:ALA-1>config>router>ldp>targeted# info detail
----------------------------------------------
                hello 15 3
                keepalive 30 3
                no transport-address
----------------------------------------------
A:ALA-1>config>router>ldp>targeted#
```