

Chapter 20

GMPLS Configuration Guidelines

To configure GMPLS, you must complete the following tasks:

Configure LMP on page 299

Configure MPLS Label-Switched Paths for GMPLS on page 306



Although you can configure the GMPLS-related statements under the [edit logical-routers *logical-router-name*] hierarchy level, GMPLS is not supported on logical routers.

Configure LMP

You need to configure the Link Management Protocol (LMP) to define the data channel connection between devices.

```
[edit]
protocols {
  link-management {
    peer peer-name {
      address address;
      control-channel control-channel-name;
      te-link te-link-name;
    }
    te-link te-link-name {
      interface interface-name {
        local-address ip-address;
        remote-address ip-address;
        remote-id id-number;
      }
      local-address ip-address;
      remote-address ip-address;
      remote-id id-number;
    }
  }
  traceoptions {
    file filename <files number> <no-stamp> <replace> <size size>
      <(world-readable | no-world-readable)>;
    flag flag <flag-modifier> <disable>;
  }
}
```

You can configure these statements at the following hierarchy levels:

[edit logical-routers *logical-router-name* protocols link-management]

[edit protocols link-management]

The sections that follow describe how to configure LMP:

Configure LMP TE Links on page 300

Configure LMP Peers on page 302

Configure Peer Interfaces in RSVP and OSPF on page 303

Configure MPLS Paths for GMPLS on page 304

Trace LMP Traffic on page 305

Configure LMP TE Links

An LMP TE link acts as a data channel connection between GMPLS devices.

To configure a TE link, include the `te-link` statement:

```
te-link te-link-name {
  interface interface-name {
    local-address ip-address;
    remote-address ip-address;
    remote-id id-number;
  }
  local-address ip-address;
  remote-address ip-address;
  remote-id id-number;
}
```

You can configure these statements at the following hierarchy levels:

[edit logical-routers *logical-router-name* protocols link-management]

[edit protocols link-management]

Complete the procedures in the following sections to configure an LMP TE link:

Configure the Local IP Address for the TE Link on page 301

Configure the Remote IP Address for the TE Link on page 301

Configure the Remote ID for the TE Link on page 302

Configure the Local IP Address for the TE Link

Use the local-address statement to configure the local IP address associated with the TE link.

To configure the local IP address for the TE link, include the local-address statement:

```
te-link te-link-name {
  interface interface-name {
    local-address ip-address;
  }
  local-address ip-address;
}
```

For a list of hierarchy levels at which you can configure this statement, see the statement summary section for this statement.

We recommend that you configure a different IP address subnet for your TE link addresses from the subnet configured for your physical interfaces. This enables you to identify which addresses are physical and which addresses belong to the TE link.

Configure the Remote IP Address for the TE Link

You need to specify the address of the remote end of the data channel for each TE link. Use the remote-address statement to configure the remote IP address.

To configure the remote IP address for the TE link, include the remote-address statement:

```
te-link te-link-name {
  interface interface-name {
    remote-address ip-address;
  }
  remote-address ip-address;
}
```

For a list of hierarchy levels at which you can configure this statement, see the statement summary section for this statement.

We recommend that you configure a different IP address subnet for your TE link addresses from the subnet configured for your physical interfaces. This enables you to identify which addresses are physical and which addresses belong to the TE link.

Configure the Remote ID for the TE Link

The local ID for the TE link is automatically assigned by LMP. The post-identifier and labels for the interfaces (resources) in the TE link are also assigned automatically.

You do need to configure the remote ID for the peer node of the TE link. The remote ID for the interface must be based on the post-ID assignment of the peer node.

To obtain the TE link and interface local IDs, issue the `show link-management te-link` command. Once you have these IDs, configure them as the remote IDs on the peer node. The remote IDs are needed for static mapping of remote labels to local labels.

To configure a TE link, configure the following statements:

```
te-link te-link-name {
  interface interface-name {
    remote-id id-number;
  }
  remote-id id-number;
}
```

For a list of hierarchy levels at which you can configure this statement, see the statement summary section for this statement.

Configure LMP Peers

You need to configure network peers for GMPLS at the [edit protocols link-management] hierarchy level. A peer is a network device that your router communicates with when setting up the control and data channels. The peer is often an Optical Cross-Connect (OXC).

Configure a peer name with the `peer` statement and the peer's router ID with the `address` statement (often a loopback address). Specify the interface that will be used as a control channel with the `control-channel` statement, and configure the TE link to be associated with this peer with the `te-link` statement:

```
link-management {
  peer peer-name {
    address ip-address;
    control-channel control-channel-name;
    te-link te-link-name;
  }
}
```

You can configure these statements at the following hierarchy levels:

[edit logical-routers *logical-router-name* protocols link-management]

[edit protocols link-management]

Configure Peer Interfaces in RSVP and OSPF

After you have configured the LMP peers, add the peer interfaces to RSVP and OSPF. The peer interface name must match the peer name configured in LMP. Once the peer interfaces are added to the protocols, the TE link local and remote addresses can be signaled and advertised to peers like any other interface enabled for RSVP and OSPF. These act as virtual interfaces for GMPLS.



Note

When adding the virtual peer interfaces to RSVP and OSPF, do not configure the corresponding physical control channel interface in either protocol. If you include the interface all statement, you must disable the RSVP and OSPF protocols manually on the control channel interface.

To configure peer interfaces in RSVP and OSPF, complete the procedures in the following sections:

Configure Peer Interfaces in RSVP on page 303

Configure Peer Interfaces in OSPF on page 304

Configure Peer Interfaces in RSVP

To configure RSVP signaling for LMP peers, configure the LMP peer interface using the peer-interface statement:

```
peer-interface peer-interface-name {
  (aggregate | no-aggregate);
  authentication-key key;
  disable;
  hello-interval seconds;
  (reliable | no-reliable);
}
```

You can configure these statements at the following hierarchy levels:

```
[edit logical-routers logical-router-name protocols rsvp]
```

```
[edit protocols rsvp]
```

The statements at the following hierarchy levels:

```
[edit logical-routers logical-router-name protocols rsvp peer-interface peer-name]
```

```
[edit protocols rsvp peer-interface peer-name]
```

Have the same functionality as the statements at the following hierarchy levels:

```
[edit logical-routers logical-router-name protocols rsvp peer-interface peer-name]
```

```
[edit protocols rsvp interface]
```

Configure Peer Interfaces in OSPF

To configure OSPF routing for LMP peers, configure the name of the LMP peer using the peer-interface statement:

```
ospf {
  area area-number {
    peer-interface peer-interface-name {
      dead-interval seconds;
      disable;
      hello-interval seconds;
      retransmit-interval seconds;
      transit-delay seconds;
    }
  }
}
```

You can configure these statements at the following hierarchy levels:

```
[edit logical-routers logical-router-name protocols ospf area area-number]
```

```
[edit protocols ospf area area-number]
```

For information on how to configure OSPF statements see the *JUNOS Internet Software Configuration Guide: Routing and Routing Protocols*.

Configure MPLS Paths for GMPLS

As part of the configuration for GMPLS, you need to establish an MPLS path for each unique device connected through GMPLS. Configure the TE link remote address as the address at the [edit protocols mpls path *path-name*] hierarchy level. CSPF is supported so you can choose either the strict or loose option with the address.

See “Configure LMP” on page 299 for information about how to obtain a TE link remote address.

Configure the MPLS path as follows:

```
protocols {
  mpls {
    path path-name {
      next-hop-address (strict | loose);
    }
  }
}
```

You can configure these statements at the following hierarchy levels:

```
[edit logical-routers logical-router-name protocols mpls]
```

```
[edit protocols mpls]
```

See “Create a Named Path” on page 50 for information about how to configure MPLS paths.

Trace LMP Traffic

To trace LMP protocol traffic, include the traceoptions statement:

```
traceoptions {
  file filename <files number> <no-stamp> <replace> <size size>
  <(world-readable | no-world-readable)>;
  flag flag <flag-modifier> <disable>;
}
```

You can configure this statement at the following hierarchy levels:

```
[edit logical-routers logical-router-name protocols link-management]
```

```
[edit protocols link-management]
```

Use the file statement to specify the name of the file that receives the output of the tracing operation. All files are placed in the directory `/var/log`.

The following trace flags display the operations associated with the sending and receiving of various LMP messages:

- all—Trace all available operations
- init—Output from the initialization messages
- parse—Operation of the parser
- process—Operation of the general configuration
- route-socket—Operation of route socket events
- routing—Operation of the routing protocols
- server—Server processing operations
- show—Show command servicing operations

Each flag can carry one or more of the following flag modifiers:

- detail—Provide detailed trace information
- receive—Packets being received
- send—Packets being transmitted

Configure MPLS Label-Switched Paths for GMPLS

To enable the proper GMPLS switching parameters, configure the LSP attributes that are appropriate for your network connection. The default values, which are also appropriate for standard MPLS, are psc-1 for switching-type.

To configure the LSP attributes, include the `lsp-attributes` statement:

```
mpls {
  label-switched-path lsp-name {
    from ip-address;
    to ip-address;
    primary path-name;
    secondary path-name;
    lsp-attributes {
      gpid gpid;
      signal-bandwidth type;
      switching-type type;
    }
  }
}
```

You can configure these statements at the following hierarchy levels:

```
[edit logical-routers logical-router-name protocols mpls label-switched-path lsp-name]
```

```
[edit protocols mpls label-switched-path lsp-name]
```

If you configure the `no-cspf` statement for the label-switched path configuration, you must configure primary and secondary paths or the configuration cannot be committed.

Configure GMPLS Bidirectional LSPs

Because MPLS and GMPLS use the same configuration hierarchy for LSPs, it is helpful to know which LSP attributes control LSP functionality. Standard MPLS packet-switched LSPs are unidirectional, while GMPLS non-packet LSPs are bidirectional.

If you use the default packet switching type of psc-1, your LSP becomes unidirectional. To enable a GMPLS bidirectional LSP, you must select a non-packet switching type option, such as lambda, fiber, or ethernet, using the `switching-type` statement:

```
switching-type (lambda | fiber | ethernet);
```

You can configure this statement at the following hierarchy levels:

```
[edit logical-routers logical-router-name protocols mpls label-switched-path lsp-name
lsp-attributes]
```

```
[edit protocols mpls label-switched-path lsp-name lsp-attributes]
```