

Chapter 17

Configuring Fragmentation by Forwarding Class

For Adaptive Services (AS) Physical Interface Card (PIC) link services IQ (LSQ) and virtual LSQ redundancy (rlsq) interfaces, you can specify fragmentation properties for specific forwarding classes. Traffic on each forwarding class can be either multilink fragmented or interleaved. By default, traffic in all forwarding classes is fragmented.

If you do not configure fragmentation properties for particular forwarding classes in multilink Point-to-Point Protocol (MLPPP) interfaces, the fragmentation threshold you set at the [edit interfaces *interface-name* unit *logical-unit-number* fragment-threshold] hierarchy level is used for all forwarding classes within the MLPPP interface. For multilink Frame Relay (MLFR) FRF.16 interfaces, the fragmentation threshold you set at the [edit interfaces *interface-name* mlfr-uni-nni-bundle-options fragment-threshold] hierarchy level is used for all forwarding classes within the MLFR FRF.16 interface. If you do not set a maximum fragment size anywhere in the configuration, packets are still fragmented if they exceed the smallest maximum transmission unit (MTU) of all the links in the bundle.

To configure fragmentation by forwarding class, you can include the following statements at the [edit class-of-service] hierarchy level of the configuration:

```
class-of-service {
  fragmentation-maps {
    map-name {
      forwarding-class class-name {
        drop-timeout milliseconds;
        fragment-threshold bytes;
        multilink-class number;
        no-fragmentation;
      }
    }
  }
  interfaces {
    interface-name {
      unit logical-unit-number {
        fragmentation-map map-name;
      }
    }
  }
}
```

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Configuring Fragmentation by Forwarding Class

For AS PIC link services IQ interfaces (lsq) only, you can configure fragmentation properties on a particular forwarding class. To do this, include the `fragmentation-maps` statement at the `[edit class-of-service]` hierarchy level:

```
[edit class-of-service]
fragmentation-maps {
  map-name {
    forwarding-class class-name {
      drop-timeout milliseconds;
      fragment-threshold bytes;
      multilink-class number;
      no-fragmentation;
    }
  }
}
```

To set a per-forwarding class fragmentation threshold, include the `fragment-threshold` statement in the fragmentation map. This statement sets the maximum size of each multilink fragment.

To set traffic on a particular forwarding class to be interleaved rather than fragmented, include the `no-fragmentation` statement in the fragmentation map. This statement specifies that an extra fragmentation header is not prepended to the packets received on this queue and that static link load balancing is used to ensure in-order packet delivery.

To change the resequencing interval for each fragmentation class, include the `drop-timeout` statement in the forwarding class. The interval is in milliseconds, and the default is 500 ms for link speeds of T1 or greater and 1500 ms for links slower than T1 speeds. You must also include a `multilink-class` value for resequencing fragments. If you include these statements, you cannot configure `no-fragmentation` for the forwarding class; they are mutually exclusive.

For a given forwarding class, you can include either the `fragment-threshold` or `no-fragmentation` statement; they are mutually exclusive.

Associating a Fragmentation Map with an MLPPP Interface or MLFR FRF.16 DLCI

To associate a fragmentation map with an MLPPP interface or MLFR FRF.16 DLCI, include the `fragmentation-map` statement at the `[edit class-of-service interfaces interface-name unit logical-unit-number]` hierarchy level:

```
[edit class-of-service interfaces]
lsq-fpc/pic/port {
  unit logical-unit-number { # Multilink PPP
    fragmentation-map map-name;
  }
}
lsq-fpc/pic/port:channel { # MLFR FRF.16
  unit logical-unit-number {
    fragmentation-map map-name;
  }
}
```

For configuration examples, see the *JUNOS Services Interfaces Configuration Guide*.

Example: Configuring Fragmentation by Forwarding Class

Configure two logical units on an LSQ interface. The logical units use two different fragmentation maps.

```
class-of-service
  interfaces lsq-1/0/0 {
    unit 1 {
      fragmentation-map frag-map-A;
    }
    unit 2 {
      fragmentation-map frag-map-B;
    }
  }
  fragmentation-maps {
    frag-map-A {
      forwarding-class {
        AF {
          no-fragmentation;
        }
        EF {
          no-fragmentation;
        }
        BE {
          fragment-threshold 100;
        }
      }
    }
  }
```

```

frag-map-B {
  forwarding-class {
    EF {
      fragment-threshold 200;
    }
    BE {
      fragment-threshold 200;
    }
    AF {
      fragment-threshold 200;
    }
  }
}
}

```

Example: Configuring Drop Timeout Interval by Forwarding Class

For LSQ interfaces configured for multiclass MLPPP, you can change the drop timeout interval that the interface waits for fragment resequencing by forwarding class. This feature is mutually exclusive with the `no-fragmentation` statement configured for a forwarding class.

You can also disable the fragment resequencing function altogether by forwarding class. You do this by setting the `drop-timeout` interval to 0.

The `drop-timeout` interval can also be set at the bundle level. When the `drop-timeout` interval is set to 0 at the bundle level, *none* of the individual classes will forward fragmented packets. Sequencing is ignored also, and packets are forwarded in the order in which they were received. The `drop-timeout` interval value configured at the bundle level overrides the values configured at the class level.

This example configures a logical unit on an LSQ interface with a fragmentation map setting different drop timeout values for each forwarding class:

Best effort (BE)—The value of 0 means that no resequencing of fragments takes place for BE traffic.

Expedited Forwarding (EF)—The value of 800 milliseconds means that the multiclass MLPPP will wait 800 milliseconds for fragment to arrive on the link for EF traffic.

Assured Forwarding (AF)—The absence of the timeout statements means that the default timeouts of 500 ms for links at T1 and higher speeds and 1500 ms for lower speeds are in effect for AF traffic.

Network Control (NC)—The value of 100 milliseconds means that the multiclass MLPPP will wait 100 milliseconds for fragment to arrive on the link for NC traffic.

```

class-of-service
  interfaces lsq-1/0/0 {
    unit 1 {
      fragmentation-map Timeout_Frag_Map;
    }
  }

```

```

fragmentation-maps {
  Timeout_Frag_Map {
    forwarding-class {
      BE {
        drop-timeout 0; #no resequencing of fragments for this class
        multilink-class 3;
        fragment-threshold 128;
      }
      EF {
        drop-timeout 800; #timer set to 800 milliseconds for this class
        multilink-class 2;
      }
      AF {
        multilink-class 1;
        fragment-threshold 256; #default timeout is in effect for this class
      }
      NC {
        drop-timeout 100; #timer set to 100 milliseconds for this class
        multilink-class 0;
        fragment-threshold 512;
      }
    }
  }
}

```

