Chapter 16

Enable SONET Payload Scrambling

This chapter describes SONET payload scrambling and how to check and configure it. (See Table 34.)

Table 34: Checklist for Enabling SONET Payload Scrambling

SONET Payload Scrambling Tasks	Command or Action
Understand SONET Payload Scrambling on page 172	
1. Check SONET HDLC Payload Scrambling on page 173	show configuration interfaces | *interface-name* show interfaces *interface-name*
2. Configure SONET HDLC Payload Scrambling on page 174	[edit] edit interfaces *so-fpc/pic/port* sonet-options set payload-scrambler show commit

Understand SONET Payload Scrambling

SONET payload scrambling preserves data integrity. Scrambling is designed to randomize the digital bits (pattern of 1s and 0s) carried in the Asynchronous Transfer Mode (ATM) cells (physical layer frame). Randomizing the digital bits can prevent continuous, long strings of all 1s or all 0s. Transitions between 1s and 0s are used by some physical layer protocols to maintain clocking. SONET interfaces support two levels of scrambling, as follows:

SONET frame scrambling mode required by the International Telecommunications Union Telecommunication Standardization (ITU-T) GR-253 standard. This mode uses a $1 + x^6 + x^7$ algorithm to scramble the section overhead of the SONET frame. It does not scramble the first row of the section overhead.

Cell payload scrambling is optional and is defined in ITU-T I.432, section 4.5.3. This mode randomizes the bits in the payload portion of an ATM cell to make sure that the beginning of each new cell is recognized. It leaves the 5-byte header unscrambled.

Synchronous Transport System (STS) stream scrambling must be enabled on every SONET device and is the default for SONET interfaces.

Cell payload scrambling or SONET High-level Data Link Control (HDLC) scrambling can be enabled or disabled, and on Juniper routers is enabled by default to provide better link stability. Both sides of a connection must either use scrambling or not use it.

NOTE: HDLC payload scrambling conflicts with traffic shaping configured using leaky bucket properties. If you configure leaky bucket properties, you must disable payload scrambling because the software rejects configurations that have both features enabled. For more information, see the *JUNOS Netw ork Interf aces and Class of Service Configur ation Guide*.

On a Channelized OC-12 interface, the SONET payload-scrambler statement is ignored. To configure scrambling on the DS-3 channels on the interface, include the t3-options payload-scrambler statement in the configuration for each DS-3 channel.

Steps To Take This chapter describes the following tasks:

1. Check SONET HDLC Payload Scrambling on page 173
2. Configure SONET HDLC Payload Scrambling on page 174

Check SONET HDLC Payload Scrambling

Purpose If you find that payload scrambling is not enabled, you might want to enable or configure it because it provides better link stability when it is working.

Action In the JUNOS command-line interface (CLI) operational mode, you can use one of the following two commands to check for SONET HDLC control payload scrambling:

user@host> **show configuration interfaces** | *interface-name*

or

user@host> **show interfaces** *interface-name*

Sample Output 1

```
user@host> show configuration interfaces so-0/0/0
encapsulation cisco-hdlc;
sonet-options {
   payload-scrambler;
}
unit 0 {
   family inet {
      address 9.0.0.2/32 {
         destination 9.0.0.1;
      }
   }
   family mpls;
}
```

Sample Output 2

```
user@host> show configuration interfaces so-0/0/0
encapsulation cisco-hdlc;
sonet-options {
   no-payload-scrambler;
}
unit 0 {
   family inet {
      address 9.0.0.2/32 {
         destination 9.0.0.1;
      }
   }
   family mpls;
}
```

Sample Output 3

```
user@host> show interfaces so-0/0/1
Physical interface: so-0/0/1, Enabled, Physical link is Up
  Interface index: 48, SNMP ifIndex: 114
  Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: OC3, Loopback: None, FCS: 32,
  Payload scrambler: Disabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive: Input: 70627 (00:00:07 ago), Output: 70791 (00:00:08 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Opened, mpls: Not-configured
  Input rate     : 78056456 bps (6504 pps)
  Output rate    : 78044840 bps (6503 pps)
  SONET alarms   : None
  SONET defects  : None
```

```
Logical interface so-0/0/1.0 (Index 61) (SNMP ifIndex 118)
  Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
  Protocol inet, MTU: 4470, Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 192.168.50.0/30, Local: 192.168.50.1
  Protocol iso, MTU: 4470, Flags: None
```

What It Means Sample output 1 shows that the SONET interface payload scrambling has been enabled.

Sample output 2 shows that HDLC payload scrambling has been disabled. If you use the show configuration or show configuration interfaces command, you must scroll to the particular interface for payload scrambling status.

Sample output 3 shows that payload scrambling has been disabled. To explicitly configure payload scrambling, see “Configure SONET HDLC Payload Scrambling” on page 174.

Configure SONET HDLC Payload Scrambling

Purpose You might want to configure SONET HDLC payload scrambling (which is the configurable cell payload scrambling mentioned earlier) if it has been disabled. Configuring payload scrambling provides better link stability.

NOTE: Payload scrambling is the default for Juniper Networks routers. To return to the default, that is, to re-enable payload scrambling, delete the no-payload-scrambler statement from the configuration.

Action To explicitly configure HDLC payload scrambling, follow these steps:

1. In configuration mode, go to the following hierarchy level:

   ```
   [edit]
   user@host# edit interfaces so-fpc/pic/port sonet-options
   ```

2. Configure payload scrambling:

   ```
   [edit interfaces so-fpc/pic/port sonet-options]
   user@host# set payload-scrambler
   ```

3. Verify the configuration:

   ```
   user@host# show
   ```

   For example:

   ```
   [edit interfaces so-0/0/0 sonet-options]
   user@host# show
   payload-scrambler;
   ```

4. Commit the configuration:

   ```
   user@host# commit
   ```