

Chapter 17

Check the SONET Frame Checksum

This chapter describes the SONET frame checksum and how to check and configure it. (See Table 35.)

Table 35: Checklist for Checking the SONET Frame Checksum

SONET Frame Checksum Tasks	Command or Action
Understand the SONET Frame Checksum on page 176	
Check the SONET Frame Checksum on page 176	
1. Examine Output for Framing Errors on page 176	show interfaces <i>interface-name</i> extensive
2. Check the FCS Configuration on page 178	show configuration interfaces <i>interface-name</i> show interfaces <i>interface-name</i>
Configure a SONET Frame Checksum on page 180	
1. Return to the Default 16-Bit Checksum on page 180	[edit] edit interfaces <i>so-fpc/pic/port</i> sonet-options delete fcs 32 show commit
2. Configure a 16-Bit Checksum on page 180	[edit] edit interfaces <i>so-fpc/pic/port</i> sonet-options set fcs 16 show commit
3. Configure a 32-Bit Checksum on page 181	[edit] edit interfaces <i>so-fpc/pic/port</i> sonet-options set (fcs 32 rfc-2615) show commit

Understand the SONET Frame Checksum

The SONET frame checksum is a calculation that is added to a frame for error control purposes. SONET frame checksum is used in High-level Data Link Control (HDLC), Frame Relay, and other data-link layer protocols. For example, Router A calculates the frame check sequence (FCS) and adds it to the outgoing message. Router B, on receiving the message recalculates the FCS and compares it to the FCS from Router A. If there is a difference, both sides of the connection might not match in relation to the FCS configuration.

Steps To Take This chapter describes the following tasks:

1. Check the SONET Frame Checksum on page 176
2. Configure a SONET Frame Checksum on page 180

Check the SONET Frame Checksum

Purpose If you are having problems with a connection, check that the FCS matches on both sides of the connection.

Steps To Take To check the SONET frame checksum, follow these steps:

1. Examine Output for Framing Errors on page 176
2. Check the FCS Configuration on page 178

Examine Output for Framing Errors

Purpose By examining the output for an interface, you can determine if framing errors are incrementing in the absence of any SONET alarms or defects.

Action From the JUNOS command-line interface (CLI) operational mode, use the following command to check for framing errors:

```
user@host> show interfaces interface-name extensive
```

Sample Output

```
user@router1> show interfaces so-1/0/0 extensive
Physical interface: so-1/0/0, Enabled, Physical link is Up
  Interface index: 13, SNMP ifIndex: 18, Generation: 12
  Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: OC3, Loopback: None, FCS: 16, Payload
  scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 6 (last seen 00:00:52 ago)
    Output: 11 (last sent 00:00:05 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Opened, mpls: Conf-req-sent
  CHAP state: Not-configured
  Last flapped  : 2002-11-01 22:28:30 UTC (1w5d 23:26 ago)
  Statistics last cleared: 2002-11-14 21:52:51 UTC (00:01:50 ago)
  Traffic statistics:
```

```

Input bytes :          692          0 bps
Output bytes :         716          32 bps
Input packets:         23          0 pps
Output packets:        72          0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 27, Runts: 0, Giants: 0, Bucket drops: 0, Policed discards: 0, L3 incompletes: 0,
  L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0, HS link FIFO overflows: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, HS link FIFO underflows: 0
SONET alarms : None
SONET defects : None
SONET PHY:
  Seconds    Count State
  PLL Lock   0      0 OK
  PHY Light  0      0 OK
SONET section:
  BIP-B1     0      0
  SEF        0      0 OK
  LOS        0      0 OK
  LOF        0      0 OK
  ES-S       0
  SES-S      0
  SEFS-S     0
SONET line:
  BIP-B2     0      0
  REI-L      0      0
  RDI-L      0      0 OK
  AIS-L      0      0 OK
  BERR-SF    0      0 OK
  BERR-SD    0      0 OK
  ES-L       0
  SES-L      0
  UAS-L      0
  ES-LFE     0
  SES-LFE    0
  UAS-LFE    0
SONET path:
  BIP-B3     0      0
  REI-P      0      0
  LOP-P      0      0 OK
  AIS-P      0      0 OK
  RDI-P      0      0 OK
  UNEQ-P     0      0 OK
  PLM-P      0      0 OK
  ES-P       0
  SES-P      0
  UAS-P      0
  ES-PFE     0
  SES-PFE    0
  UAS-PFE    0
Received SONET overhead:
  F1 : 0x00, J0 : 0x00, K1 : 0x00, K2 : 0x00
  S1 : 0x00, C2 : 0xcf, C2(cmp) : 0xcf, F2 : 0x00
  Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00, V5 : 0x00
  V5(cmp) : 0x00
Transmitted SONET overhead:
  F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
  S1 : 0x00, C2 : 0xcf, F2 : 0x00, Z3 : 0x00
  Z4 : 0x00, V5 : 0x00
Received path trace: router2 so-1/3/1
  73 6c 69 70 70 65 72 79 20 73 6f 2d 31 2f 33 2f router2 so-1/3/1
  31 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 0d 0a .....

```

```

Transmitted path trace: router1 so-1/0/0
68 61 69 72 79 20 73 6f 2d 31 2f 30 2f 30 00 00  router1 so-1/0/0
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
HDLC configuration:
  Policing bucket: Disabled
  Shaping bucket : Disabled
  Giant threshold: 4484, Runt threshold: 3
Packet Forwarding Engine configuration:
  Destination slot: 1, PLP byte: 1 (0x00)
  CoS transmit queue      Bandwidth      Buffer Priority Limit
                        %      bps %      bytes
0 best-effort             95  147744000 95      0  low  none
3 network-control         5   7776000  5      0  low  none

Logical interface so-1/0/0.0 (Index 8) (SNMP ifIndex 108) (Generation 9)
Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: PPP
Protocol inet, MTU: 4470, Generation: 15, Route table: 1
  Flags: Is-Primary
  Addresses, Flags: Dest-route-down Is-Default Is-Preferred Is-Primary
    Destination: 1.1.6.1, Local: 1.1.6.2, Broadcast: Unspecified, Generation: 15
Protocol iso, MTU: 4470, Generation: 16, Route table: 1
  Flags: Is-Primary
Protocol mpls, MTU: 4458, Generation: 17, Route table: 1
  Flags: Protocol-Down, Is-Primary

```

What It Means The sample output shows that Router1 is configured for FCS 16, that framing errors have incremented to 27, and that there are no SONET alarms or defects. Incrementing framing errors, in the absence of any SONET alarms or defects, are a symptom of SONET frame checksum errors.

Check the FCS Configuration

Purpose If you are having problems with a connection, check your router's FCS configuration and, if possible, the FCS configuration on the router on the other side of the connection.

Action From the JUNOS CLI operational mode, use one of the following two commands to check the SONET frame checksum:

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

or

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



NOTE: The option to display a specific configuration with the show configuration command hierarchy was introduced in JUNOS Release 5.3.

Sample Output 1

```

user@host> show configuration interfaces so-0/0/0
encapsulation cisco-hdlc;
sonet-options {
  fcs 32;
  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 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 FCS 32 is configured. If you use the show configuration or show configuration interfaces command, you must scroll to the particular interface for the FCS configuration status.

What It Means Sample output 2 shows that FCS 32 is configured. To change the FCS configuration, see “Return to the Default 16-Bit Checksum” on page 180, “Configure a 16-Bit Checksum” on page 180, or “Configure a 32-Bit Checksum” on page 181.

Configure a SONET Frame Checksum

Purpose After you have checked the FCS and determined that a problem exists, you might need to do one of the following, depending on the situation:

Return to the Default 16-Bit Checksum on page 180

Configure a 16-Bit Checksum on page 180

Configure a 32-Bit Checksum on page 181



NOTE: By default, SONET interfaces use a 16-bit frame checksum. You can configure a 32-bit checksum, which provides more reliable packet verification. However, some older equipment may not support 32-bit checksums.

Return to the Default 16-Bit Checksum

Action To return to the default 16-bit frame checksum, 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. Delete the fcs 32 statement from the configuration:

```
[edit]
user@host# delete fcs 32
```

3. Verify the deletion:

```
user@host# show
```

4. Commit the configuration:

```
user@host# commit
```

Configure a 16-Bit Checksum

Action To explicitly configure the 16-bit checksum, 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 the 16-bit checksum:

```
[edit interfaces so-fpc/pic/port sonet-options]
user@host# set fcs 16
```

3. Verify the configuration:

```
user@host# show
```

For example:

```
[edit interfaces so-0/0/0 sonet-options]
user@host# show
fcs 16;
```

4. Commit the configuration:

```
user@host# commit
```

Configure a 32-Bit Checksum

Action To explicitly configure the 32-bit checksum, 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 the 32-bit checksum:

```
[edit interfaces so-fpc/pic/port sonet-options]
user@host# set (fcs 32 | rfc-2615)
```



NOTE: The rfc-2615 statement automatically configures the interface to use FCS 32 and changes the C2 byte to 0x16, as per the RFC.

3. Verify the configuration:

```
user@host# show
```

For example:

```
[edit interfaces so-0/0/0 sonet-options]
user@host# show
fcs 32;
```

or

```
[edit interfaces so-0/0/0 sonet-options]
user@host# show
rfc-2615;
```

4. Commit the configuration:

```
user@host# commit
```



NOTE: On a Channelized OC-12 interface, the sonet-options fcs statement is not supported. To configure FCS on each DS-3 channel, you must include the t3-options fcs statement in the configuration for each channel.
