Chapter 25
SNMP Overview

The Simple Network Management Protocol (SNMP) allows you to manage a router running the JUNOS Internet software.

The JUNOS software supports SNMP Version 1 and Version 2 (also known as Version 2c, or v2c). The JUNOS implementation of SNMP does not include any of the security features originally included in the IETF SNMP drafts, but later removed because the IETF community could not agree upon a standard.

The JUNOS SNMP software consists of an SNMP master agent and a MIB II agent.

The JUNOS implementation of SNMP supports the following features specified in RFC 1213 and RFC 1215:

- MIB II and its SNMP version 2 derivatives, including:
  - Statistics counters
  - IP and SNMP management
  - Interface management
- MIB II SNMP version 1 traps and version 2 notifications
- SNMP Version 1 Get and GetNext requests and Version 2 GetBulk requests
- JUNOS-specific secured access list
- Master configuration keywords
- Reconfigurations upon SIGHUP

The JUNOS SNMP implementation currently does not support IP forwarding tables or Set requests.

The JUNOS SNMP implementation listens on port 161 for SNMP requests and on port 162 for SNMP traps. These are the ports recommended by RFC 1906.

This chapter discusses the following topics:

SNMP Standards

The following standards documents define SNMP. For a list of the standard MIBs supported, see “MIBs” on page 18. RFCs can be found at http://www.ietf.org:

RFC 1213, *Management Information Base for Network Management of TCP/IP-Based Internets: MIB-II*

RFC 1215, *Convention for Defining Traps for Use with SNMP*

RFC 1906, *Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)*

SNMP Traps Supported by the JUNOS Software

Table 13 and Table 14 summarize the SNMP traps supported by the JUNOS software. The sections that follow provide the RFC descriptions of these traps.

For scalability reasons, the MPLS traps are generated by the ingress router only. For information about disabling the generation of MPLS traps, see the *JUNOS Internet Software Configuration Guide: MPLS Applications*.

Table 13: Supported SNMP Version 1 Traps

Trap Type	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number
Standard Traps	Cold start	1.3.6.1.4.1.2636	0	0
	Warm start	1.3.6.1.4.1.2636	1	0
	Link down	1.3.6.1.4.1.2636	2	0
	Link up	1.3.6.1.4.1.2636	3	0
	Authentication failure	1.3.6.1.4.1.2636	4	0
Enterprise-Specific Traps	BGP established	1.3.6.1.2.1.15.7	6	1
	BGP backward transition	1.3.6.1.2.1.15.7	6	2
	Power failure	1.3.6.1.4.1.2636.4.1	6	1
	Fan failure	1.3.6.1.4.1.2636.4.1	6	2
	Overtemperature	1.3.6.1.4.1.2636.4.1	6	3
	MPLS LSP up	1.3.6.1.4.1.2636.3.2.4	6	1
	MPLS LSP down	1.3.6.1.4.1.2636.3.2.4	6	2
	MPLS LSP change	1.3.6.1.4.1.2636.3.2.4	6	3
	OSPF virtual interface state change	1.3.6.1.2.1.14.16.2	6	1
	OSPF neighbor state change	1.3.6.1.2.1.14.16.2	6	2
	OSPF virtual neighbor state change	1.3.6.1.2.1.14.16.2	6	3
	OSPF interface configuration error	1.3.6.1.2.1.14.16.2	6	4
	OSPF virtual interface configuration error	1.3.6.1.2.1.14.16.2	6	5
	OSPF interface authentication error	1.3.6.1.2.1.14.16.2	6	6
	OSPF virtual interface authentication error	1.3.6.1.2.1.14.16.2	6	7
	OSPF interface receiving bad packet	1.3.6.1.2.1.14.16.2	6	8
	OSPF virtual interface receiving bad packet	1.3.6.1.2.1.14.16.2	6	9
	OSPF transmit packet retransmitted	1.3.6.1.2.1.14.16.2	6	10
	OSPF virtual interface transmit packet retransmitted	1.3.6.1.2.1.14.16.2	6	11
	OSPF originating LSA (currently not supported)	1.3.6.1.2.1.14.16.2	6	12
	OSPF maximum aged LSA	1.3.6.1.2.1.14.16.2	6	13
	OSPF LSDB overflow (currently not supported)	1.3.6.1.2.1.14.16.2	6	14
	OSPF LSDB approaching overflow (currently not supported)	1.3.6.1.2.1.14.16.2	6	15
	OSPF interface state change	1.3.6.1.2.1.14.16.2	6	16

Table 14: Supported SNMP Version 2 Traps

Trap Type	Trap Name	snmpTrapOID	Literal Meaning
Standard Traps	Cold start	1.3.6.1.6.3.1.1.5.1	coldStart
	Warm start	1.3.6.1.6.3.1.1.5.2	warmStart
	Link down	1.3.6.1.6.3.1.1.5.3	linkDown
	Link up	1.3.6.1.6.3.1.1.5.4	linkUp
	Authentication failure	1.3.6.1.6.3.1.1.5.5	authenticationFailure
	BGP established	1.3.6.1.2.1.15.7.1	bgpEstablished
	BGP backward transition	1.3.6.1.2.1.15.7.2	bgpBackwardTransition
	OSPF virtual interface state change	1.3.6.1.2.1.14.16.2.1	ospfVirtIfStateChange
	OSPF neighbor state change	1.3.6.1.2.1.14.16.2.2	ospfNbrStateChange
	OSPF virtual neighbor state change	1.3.6.1.2.1.14.16.2.3	ospfVirtNbrStateChange
	OSPF interface configuration error	1.3.6.1.2.1.14.16.2.4	ospfIfConfigError
	OSPF virtual interface configuration error	1.3.6.1.2.1.14.16.2.5	ospfVirtIfConfigError
	OSPF interface authentication failure	1.3.6.1.2.1.14.16.2.6	ospfIfAuthFailure
	OSPF virtual interface authentication failure	1.3.6.1.2.1.14.16.2.7	ospfVirtIfAuthFailure
	OSPF interface receiving bad packet	1.3.6.1.2.1.14.16.2.8	ospfIfRxBadPacket
	OSPF virtual interface receiving bad packet	1.3.6.1.2.1.14.16.2.9	ospfVirtIfRxBadPacket
	OSPF transmit packet retransmitted	1.3.6.1.2.1.14.16.2.10	ospfTxRetransmit
	OSPF virtual interface transmit packet retransmitted	1.3.6.1.2.1.14.16.2.11	ospfVirtIfTxRetransmit
	OSPF originating LSA (currently not supported)	1.3.6.1.2.1.14.16.2.12	ospfOriginateLsa
	OSPF maximum aged LSA	1.3.6.1.2.1.14.16.2.13	ospfMaxAgeLsa
	OSPF LSDB overflow (currently not supported)	1.3.6.1.2.1.14.16.2.14	ospfLsdbOverflow
	OSPF LSDB approaching overflow (currently not supported)	1.3.6.1.2.1.14.16.2.15	ospfLsdbApproachingOverflow
	OSPF interface state change	1.3.6.1.2.1.14.16.2.16	ospfIfStateChange
Enterprise-Specific Traps	Power failure	1.3.6.1.4.1.2636.4.1.1	jnxPowerSupplyFailure
	Fan failure	1.3.6.1.4.1.2636.4.1.2	jnxFanFailure
	Overtemperature	1.3.6.1.4.1.2636.4.1.3	jnxOverTemperature
	MPLS LSP up	1.3.6.1.4.1.2636.3.2.4.1	mplsLspUp
	MPLS LSP down	1.3.6.1.4.1.2636.3.2.4.2	mplsLspDown
	MPLS LSP change	1.3.6.1.4.1.2636.3.2.4.3	mplsLspChange

SNMP Version 1 Traps

Standard SNMP Version 1 Traps

The JUNOS software supports the following SNMP Version 1 traps. The descriptions are taken from RFC 1215, *Convention for defining traps for use with the SNMP*.

```
coldStart TRAP-TYPE
   ENTERPRISE snmp
   DESCRIPTION
      "A coldStart trap signifies that the sending protocol entity is reinitializing itself such
      that the agent's configuration or the protocol entity implementation may be altered."
   ::= 0
warmStart TRAP-TYPE
   ENTERPRISE snmp
   DESCRIPTION
      "A warmStart trap signifies that the sending protocol entity is reinitializing itself such
      that neither the agent configuration nor the protocol entity implementation is altered."
   ::= 1
linkDown TRAP-TYPE
   ENTERPRISE snmp
   VARIABLES   { ifIndex }
   DESCRIPTION
      "A linkDown trap signifies that the sending protocol entity recognizes a failure in one of
      the communication links represented in the agent's configuration."
   ::= 2
linkUp TRAP-TYPE
   ENTERPRISE snmp
   VARIABLES   { ifIndex }
   DESCRIPTION
      "A linkUp trap signifies that the sending protocol entity recognizes that one of the
      communication links represented in the agent's configuration has come up."
   ::= 3
authenticationFailure TRAP-TYPE
   ENTERPRISE snmp
   DESCRIPTION
      "An authenticationFailure trap signifies that the sending protocol entity is the addressee
      of a protocol message that is not properly authenticated. While implementations of the
      SNMP must be capable of generating this trap, they must also be capable of suppressing
      the emission of such traps via an implementation-specific mechanism."
   ::= 4
```

Enterprise-Specific SNMP Version 1 Traps

The four JUNOS proprietary trap MIBs support the enterprise-specific SNMP Version 1 traps for BGP, the chassis, MPLS, and OSPF:

BGP Version 1 Traps MIB on page 266

Chassis Version 1 Traps MIB on page 267

MPLS Version 1 Traps MIB on page 268

OSPF Version 1 Traps MIB on page 269

BGP Version 1 Traps MIB

```
--
-- Juniper Enterprise Specific BGP Traps for SNMP V1
--
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--
-- The contents of this document are subject to change without notice.
--

JUNIPER-V1-TRAPS-BGP
DEFINITIONS ::= BEGIN

IMPORTS
    enterprises         FROM RFC1155-SMI
    mib-2               FROM RFC1213-MIB
    TRAP-TYPE           FROM RFC-1215;

-- The following chassis objects are from Juniper Chassis MIB

    juniperMIB          OBJECT IDENTIFIER ::= { enterprises 2636 }

-- The following BGP objects are from RFC 1657

    bgp                 OBJECT IDENTIFIER ::= { mib-2 15 }

    bgpPeerTable          OBJECT IDENTIFIER ::= { bgp 3 }
    bgpPeerEntry          OBJECT IDENTIFIER ::= { bgpPeerTable 1 }
    bgpPeerState          OBJECT IDENTIFIER ::= { bgpPeerEntry 2 }
    bgpPeerLastError      OBJECT IDENTIFIER ::= { bgpPeerEntry 14 }

--
-- BGP traps
--

    bgpEstablishedV1    TRAP-TYPE
        ENTERPRISE      juniperMIB
        VARIABLES {
                bgpPeerLastError,
                bgpPeerState
              }
        DESCRIPTION
              "The BGP Established event is generated when the BGP FSM enters the ESTABLISHED
state."
        ::= 1

    bgpBackwardTransitionV1 TRAP-TYPE
        ENTERPRISE      juniperMIB
        VARIABLES {
                bgpPeerLastError,
                bgpPeerState
              }
        DESCRIPTION
              "The BGPBackwardTransition Event is generated when the BGP FSM moves from a higher
             numbered state to a lower numbered state."
        ::= 2

END
```

Chassis Version 1 Traps MIB

```
--
-- Juniper Enterprise Specific Chassis Traps for SNMP V1
--
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--
-- The contents of this document are subject to change without notice.
--

JUNIPER-V1-TRAPS-CHAS
DEFINITIONS ::= BEGIN

IMPORTS
    enterprises     FROM RFC1155-SMI
    TRAP-TYPE       FROM RFC-1215;


--  The following chassis objects are from Juniper Chassis MIB

    juniperMIB          OBJECT IDENTIFIER ::= { enterprises 2636 }

    jnxMibs             OBJECT IDENTIFIER ::= { juniperMIB 3 }
    jnxBoxAnatomy       OBJECT IDENTIFIER ::= { jnxMibs 1 }

    jnxContentsTable                OBJECT IDENTIFIER ::= { jnxBoxAnatomy 8 }
    jnxContentsEntry                OBJECT IDENTIFIER ::= { jnxContentsTable 1 }
    jnxContentsContainerIndex       OBJECT IDENTIFIER ::= { jnxContentsEntry 1 }
    jnxContentsL1Index              OBJECT IDENTIFIER ::= { jnxContentsEntry 2 }
    jnxContentsL2Index              OBJECT IDENTIFIER ::= { jnxContentsEntry 3 }
    jnxContentsL3Index              OBJECT IDENTIFIER ::= { jnxContentsEntry 4 }
    jnxContentsDescr                OBJECT IDENTIFIER ::= { jnxContentsEntry 6 }

--
--  Chassis traps
--

    jnxPowerSupplyFailureV1     TRAP-TYPE
        ENTERPRISE          juniperMIB
        VARIABLES {
                jnxContentsContainerIndex,
                jnxContentsL1Index,
                jnxContentsL2Index,
                jnxContentsL3Index,
                jnxContentsDescr
               }
        DESCRIPTION
              "A jnxPowerSupplyFailure trap signifies that
              the specified power supply in the chassis has
              been in the failure (bad DC output) condition."
        ::= 1


    jnxFanFailureV1       TRAP-TYPE
        ENTERPRISE          juniperMIB
        VARIABLES {
                jnxContentsContainerIndex,
                jnxContentsL1Index,
                jnxContentsL2Index,
                jnxContentsL3Index,
                jnxContentsDescr
               }
```

```
        DESCRIPTION
              "A jnxFanFailure trap signifies that the specified
              cooling fan or impeller in the chassis has been in
              the failure (not spinning) condition."
        ::= 2


    jnxOverTemperatureV1     TRAP-TYPE
        ENTERPRISE           juniperMIB
        VARIABLES {
                jnxContentsContainerIndex,
                jnxContentsL1Index,
                jnxContentsL2Index,
                jnxContentsL3Index,
                jnxContentsDescr
              }
        DESCRIPTION
              "A jnxOverTemperature trap signifies that the
              specified hardware component in the chassis has
              experienced over temperature condition."
        ::= 3

END
```

MPLS Version 1 Traps MIB

```
--
-- Juniper Enterprise Specific MPLS Traps for SNMP V1
--
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--
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--

JUNIPER-V1-TRAPS-MPLS
DEFINITIONS ::= BEGIN

IMPORTS
    enterprises         FROM RFC1155-SMI
    TRAP-TYPE           FROM RFC-1215;


--  The following chassis objects are from Juniper Chassis MIB

    juniperMIB      OBJECT IDENTIFIER ::= { enterprises 2636 }
    jnxMibs         OBJECT IDENTIFIER ::= { juniperMIB 3 }


--  The following MPLS objects are from Juniper MPLS MIB

    mpls            OBJECT IDENTIFIER ::= { jnxMibs 2 }

    mplsLspList     OBJECT IDENTIFIER ::= { mpls 3 }

    mplsLspEntry        OBJECT IDENTIFIER ::= { mplsLspList 1 }
    mplsLspName         OBJECT IDENTIFIER ::= { mplsLspEntry 1 }
    mplsPathName        OBJECT IDENTIFIER ::= { mplsLspEntry 17 }
```

```
--
--  MPLS traps
--

    mplsLspUpV1      TRAP-TYPE
       ENTERPRISE    juniperMIB
       VARIABLES {
                  mplsLspName,
                  mplsPathName   -- LspPath
                 }
       DESCRIPTION
             "An mplsLspUp trap signifies that the specified LSP is up. The current active
             path for the LSP is mplsPathName."
       ::= 1


    mplsLspDownV1  TRAP-TYPE
       ENTERPRISE    juniperMIB
       VARIABLES {
                  mplsLspName,
                  mplsPathName   -- LspPath
                 }
       DESCRIPTION
             "An mplsLspDown trap signifies that the specified LSP is down, because the current
             active path mplsPathName went down."
       ::= 2


    mplsLspChangeV1   TRAP-TYPE
       ENTERPRISE       juniperMIB
       VARIABLES {
                  mplsLspName,
                  mplsPathName   -- toLspPath
                 }
       DESCRIPTION
          "An mplsLspChange trap signifies that the specified LSP has switched traffic to
          the new active path 'toLspPath'. The LSP maintains up state before and after the switch over"
       ::= 3

END
```

OSPF Version 1 Traps MIB

```
--
-- Juniper Enterprise Specific OSPF Traps for SNMP V1
--
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--
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--

JUNIPER-V1-TRAPS-OSPF
DEFINITIONS ::= BEGIN

IMPORTS
    enterprises         FROM RFC1155-SMI
    mib-2               FROM RFC1213-MIB
    TRAP-TYPE           FROM RFC-1215;
```

```
-- The following chassis objects are from Juniper Chassis MIB

   juniperMIB          OBJECT IDENTIFIER ::= { enterprises 2636 }


-- The following OSPF objects are from RFC 1850

   ospf        OBJECT IDENTIFIER ::= { mib-2 14 }

   ospfGeneralGroup      OBJECT IDENTIFIER ::= { ospf 1 }
   ospfRouterId          OBJECT IDENTIFIER ::= { ospfGeneralGroup 1 }
   ospfExtLsdbLimit      OBJECT IDENTIFIER ::= { ospfGeneralGroup 11 }

   ospfLsdbTable         OBJECT IDENTIFIER ::= { ospf 4 }
   ospfLsdbEntry         OBJECT IDENTIFIER ::= { ospfLsdbTable 1 }
   ospfLsdbAreaId        OBJECT IDENTIFIER ::= { ospfLsdbEntry 1 }
   ospfLsdbType          OBJECT IDENTIFIER ::= { ospfLsdbEntry 2 }
   ospfLsdbLsid          OBJECT IDENTIFIER ::= { ospfLsdbEntry 3 }
   ospfLsdbRouterId      OBJECT IDENTIFIER ::= { ospfLsdbEntry 4 }

   ospfIfTable           OBJECT IDENTIFIER ::= { ospf 7 }
   ospfIfEntry           OBJECT IDENTIFIER ::= { ospfIfTable 1 }
   ospfIfIpAddress       OBJECT IDENTIFIER ::= { ospfIfEntry 1 }
   ospfAddressLessIf     OBJECT IDENTIFIER ::= { ospfIfEntry 2 }
   ospfIfState           OBJECT IDENTIFIER ::= { ospfIfEntry 12 }

   ospfVirtIfTable       OBJECT IDENTIFIER ::= { ospf 9 }
   ospfVirtIfEntry       OBJECT IDENTIFIER ::= { ospfVirtIfTable 1 }
   ospfVirtIfAreaId      OBJECT IDENTIFIER ::= { ospfVirtIfEntry 1 }
   ospfVirtIfNeighbor    OBJECT IDENTIFIER ::= { ospfVirtIfEntry 2 }
   ospfVirtIfState       OBJECT IDENTIFIER ::= { ospfVirtIfEntry 7 }

   ospfNbrTable          OBJECT IDENTIFIER ::= { ospf 10 }
   ospfNbrEntry          OBJECT IDENTIFIER ::= { ospfNbrTable 1 }
   ospfNbrIpAddr         OBJECT IDENTIFIER ::= { ospfNbrEntry 1 }
   ospfNbrAddressLessIndex     OBJECT IDENTIFIER ::= { ospfNbrEntry 2 }
   ospfNbrRtrId          OBJECT IDENTIFIER ::= { ospfNbrEntry 3 }
   ospfNbrState          OBJECT IDENTIFIER ::= { ospfNbrEntry 6 }

   ospfVirtNbrTable      OBJECT IDENTIFIER ::= { ospf 11 }
   ospfVirtNbrEntry      OBJECT IDENTIFIER ::= { ospfVirtNbrTable 1 }
   ospfVirtNbrArea       OBJECT IDENTIFIER ::= { ospfVirtNbrEntry 1 }
   ospfVirtNbrRtrId      OBJECT IDENTIFIER ::= { ospfVirtNbrEntry 2 }
   ospfVirtNbrState      OBJECT IDENTIFIER ::= { ospfVirtNbrEntry 5 }

   ospfTrap              OBJECT IDENTIFIER ::= { ospf 16 }
   ospfTrapControl       OBJECT IDENTIFIER ::= { ospfTrap 1 }
   ospfConfigErrorType   OBJECT IDENTIFIER ::= { ospfTrapControl 2 }
   ospfPacketType        OBJECT IDENTIFIER ::= { ospfTrapControl 3 }
   ospfPacketSrc         OBJECT IDENTIFIER ::= { ospfTrapControl 4 }

--
-- OSPF traps
--

   ospfVirtIfStateChangeV1     TRAP-TYPE
      ENTERPRISE          juniperMIB
      VARIABLES {
                ospfRouterId,        -- The originator of the trap
                ospfVirtIfAreaId,
                ospfVirtIfNeighbor,
                ospfVirtIfState      -- The new state
               }
```

```
    DESCRIPTION
          "An ospfIfStateChange trap signifies that there has  been a change in the state of an OSPF
          virtual interface. This trap should be generated when the interface state regresses
         (e.g., goes from Point-to-Point to Down) or progresses to a terminal state (i.e., Point-to-Point)."
    ::= 1


ospfNbrStateChangeV1       TRAP-TYPE
    ENTERPRISE          juniperMIB
    VARIABLES {
              ospfRouterId,     -- The originator of the trap
              ospfNbrIpAddr,
              ospfNbrAddressLessIndex,
              ospfNbrRtrId,
              ospfNbrState      -- The new state
             }
    DESCRIPTION
          "An  ospfNbrStateChange trap signifies that there has been a change in the state of a non-
          virtual OSPF neighbor. This trap should be generated when the neighbor state regresses
          (e.g., goes from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g.,
          2-Way or Full). When a neighbor transitions from or to Full on non-broadcast multi-access
         and broadcast networks, the trap should be generated by the designated router. A designated
          router transitioning to Down will be noted by ospfIfStateChange."
    ::= 2


ospfVirtNbrStateChangeV1      TRAP-TYPE
    ENTERPRISE          juniperMIB
    VARIABLES {
              ospfRouterId,     -- The originator of the trap
              ospfVirtNbrArea,
              ospfVirtNbrRtrId,
              ospfVirtNbrState -- The new state
             }
    DESCRIPTION
         "An ospfIfStateChange trap signifies that there has been a change in the state of an OSPF vir-
          tual neighbor. This trap should be generated when the neighbor state regresses (e.g., goes
          from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g., Full)."
    ::= 3


ospfIfConfigErrorV1            TRAP-TYPE
    ENTERPRISE                 juniperMIB
    VARIABLES {
              ospfRouterId,            -- The originator of the trap
              ospfIfIpAddress,
              ospfAddressLessIf,
              ospfPacketSrc,           -- The source IP address
              ospfConfigErrorType,     -- Type of error
              ospfPacketType
             }
    DESCRIPTION
          "An ospfIfConfigError trap signifies that a packet has been received on a non-virtual interface
          from a router whose configuration parameters conflict with this router's configuration
          parameters. Note that the event optionMismatch should cause a trap only if it
          prevents an adjacency from forming."
    ::= 4
```

```
ospfVirtIfConfigErrorV1    TRAP-TYPE
   ENTERPRISE          juniperMIB
   VARIABLES {
            ospfRouterId,          -- The originator of the trap
            ospfVirtIfAreaId,
            ospfVirtIfNeighbor,
            ospfConfigErrorType,   -- Type of error
            ospfPacketType
           }
   DESCRIPTION
         "An ospfConfigError trap signifies that a packet has been received on a virtual interface
         from a router whose configuration parameters conflict with this router's configuration
         parameters. Note that the event optionMismatch should cause a trap only if it prevents an
         adjacency from forming."
   ::= 5


ospfIfAuthFailureV1     TRAP-TYPE
   ENTERPRISE       juniperMIB
   VARIABLES {
            ospfRouterId,          -- The originator of the trap
            ospfIfIpAddress,
            ospfAddressLessIf,
            ospfPacketSrc,         -- The source IP address
            ospfConfigErrorType,   -- authTypeMismatch or
                                   -- authFailure
            ospfPacketType
           }
   DESCRIPTION
         "An ospfIfAuthFailure trap signifies that a packet has been received on a non-virtual
         interface from a router whose authentication key or authentication type conflicts with this
         router's authentication key or authentication type."
   ::= 6


ospfVirtIfAuthFailureV1    TRAP-TYPE
   ENTERPRISE          juniperMIB
   VARIABLES {
            ospfRouterId,          -- The originator of the trap
            ospfVirtIfAreaId,
            ospfVirtIfNeighbor,
            ospfConfigErrorType,   -- authTypeMismatch or
                                   -- authFailure
            ospfPacketType
           }
   DESCRIPTION
         "An ospfVirtIfAuthFailure trap signifies that a packet has been received on a virtual interface
         from a router whose authentication key or authentication type conflicts with this router's
         authentication key or authentication type."
   ::= 7


ospfIfRxBadPacketV1      TRAP-TYPE
   ENTERPRISE          juniperMIB
   VARIABLES {
            ospfRouterId,        -- The originator of the trap
            ospfIfIpAddress,
            ospfAddressLessIf,
            ospfPacketSrc,       -- The source IP address
            ospfPacketType
           }
```

```
    DESCRIPTION
          "An ospfIfRxBadPacket trap signifies that an OSPF packet has been received on a non-virtual
          interface that cannot be parsed."
    ::= 8


ospfVirtIfRxBadPacketV1     TRAP-TYPE
    ENTERPRISE              juniperMIB
    VARIABLES {
              ospfRouterId,         -- The originator of the trap
              ospfVirtIfAreaId,
              ospfVirtIfNeighbor,
              ospfPacketType
             }
    DESCRIPTION
          "An ospfRxBadPacket trap signifies that an OSPF
          packet has been received on a virtual interface that cannot be parsed."
    ::= 9


ospfTxRetransmitV1          TRAP-TYPE
    ENTERPRISE              juniperMIB
    VARIABLES {
              ospfRouterId,         -- The originator of the trap
              ospfIfIpAddress,
              ospfAddressLessIf,
              ospfNbrRtrId,         -- Destination
              ospfPacketType,
              ospfLsdbType,
              ospfLsdbLsid,
              ospfLsdbRouterId
             }
    DESCRIPTION
          "An ospfTxRetransmit  trap signifies than an OSPF packet has been retransmitted on a non-
          virtual interface. All packets that may be retransmitted are associated with an LSDB entry.
          The LS type, LS ID, and Router ID are used to identify the LSDB entry."
    ::= 10


ospfVirtIfTxRetransmitV1        TRAP-TYPE
    ENTERPRISE                  juniperMIB
    VARIABLES {
              ospfRouterId,         - The originator of the trap
              ospfVirtIfAreaId,
              ospfVirtIfNeighbor,
              ospfPacketType,
              ospfLsdbType,
              ospfLsdbLsid,
              ospfLsdbRouterId
             }
    DESCRIPTION
          "An ospfTxRetransmit trap signifies than an OSPF packet has been retransmitted on a virtual
          interface. All packets that may be retransmitted are associated with an LSDB entry. The LS
          type, LS ID, and Router ID are used to identify the LSDB entry."
    ::= 11
```

```
ospfOriginateLsaV1      TRAP-TYPE
   ENTERPRISE       juniperMIB
   VARIABLES {
            ospfRouterId,      -- The originator of the trap
            ospfLsdbAreaId,  -- 0.0.0.0 for AS Externals
            ospfLsdbType,
            ospfLsdbLsid,
            ospfLsdbRouterId
           }
   DESCRIPTION
         "An ospfOriginateLsa trap signifies that a new LSA has been originated by this router. This
         trap should not be invoked for simple refreshes of LSAs (which happen every 30 minutes),
         but instead will only be invoked when an LSA is (re)originated due to a topology change.
         Additionally, this trap does not include LSAs that are being flushed because they have
         reached MaxAge."
   ::= 12


ospfMaxAgeLsaV1       TRAP-TYPE
   ENTERPRISE       juniperMIB
   VARIABLES {
            ospfRouterId,      -- The originator of the trap
            ospfLsdbAreaId,  -- 0.0.0.0 for AS Externals
            ospfLsdbType,
            ospfLsdbLsid,
            ospfLsdbRouterId
           }
   DESCRIPTION
        "An ospfMaxAgeLsa trap signifies that one of the LSAs in the router's link-state database has
         aged to MaxAge."
   ::= 13


ospfLsdbOverflowV1     TRAP-TYPE
   ENTERPRISE       juniperMIB
   VARIABLES {
            ospfRouterId,      -- The originator of the trap
            ospfExtLsdbLimit
           }
   DESCRIPTION
         "An ospfLsdbOverflow trap signifies that the number of LSAs in the router's link-state data-
         base has exceeded ospfExtLsdbLimit."
   ::= 14


ospfLsdbApproachingOverflowV1      TRAP-TYPE
   ENTERPRISE       juniperMIB
   VARIABLES {
            ospfRouterId,      -- The originator of the trap
            ospfExtLsdbLimit
           }
   DESCRIPTION
         "An ospfLsdbApproachingOverflow trap signifies that the number of LSAs in the router's link-
         state database has exceeded ninety percent of ospfExtLsdbLimit."
   ::= 15
```

```
    ospfIfStateChangeV1       TRAP-TYPE
        ENTERPRISE          juniperMIB
        VARIABLES {
                ospfRouterId,      -- The originator of the trap
                ospfIfIpAddress,
                ospfAddressLessIf,
                ospfIfState        -- The new state
               }
        DESCRIPTION
              "An ospfIfStateChange trap signifies that there has been a change in the state of a non-
              virtual OSPF interface. This trap should be generated when the interface state regresses
              (e.g., goes from Dr to Down) or progresses to a terminal state (i.e., Point-to-Point, DR Other,
              Dr, or Backup)."
        ::= 16

END
```

SNMP Version 2 Traps

Standard SNMP Version 2 Traps

The JUNOS software supports the following standard SNMP Version 2 traps.

The following descriptions are taken from RFC 1907, *Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2)* :

```
coldStart NOTIFICATION-TYPE
   STATUS current
   DESCRIPTION
      “A coldStart trap signifies that the SNMPv2 entity, acting in an agent role, is
      reinitializing itself and that its configuration may have been altered.”
   ::= { snmpTraps 1 }
warmStart NOTIFICATION-TYPE
   STATUS current
   DESCRIPTION
      “A warmStart trap signifies that the SNMPv2 entity, acting in an agent role, is
      reinitializing itself such that its configuration is unaltered.”
   ::= { snmpTraps 2 }
authenticationFailure NOTIFICATION-TYPE
   STATUS current
   DESCRIPTION
      “An authenticationFailure trap signifies that the SNMPv2 entity, acting in an agent role,
      has received a protocol message that is not properly authenticated. While all
      implementations of the SNMPv2 must be capable of generating this trap, the
      snmpEnableAuthenTraps object indicates whether this trap will be generated.”
   ::= { snmpTraps 5 }
```

The following descriptions are taken from RFC 1573, *Evolution of the Interfaces Group of MIB-II*:

```
linkDown NOTIFICATION-TYPE
   OBJECTS { ifIndex, ifAdminStatus, ifOperStatus }
   STATUS current
   DESCRIPTION
      “A linkDown trap signifies that the SNMPv2 entity, acting in an agent role, has detected
      that the ifOperStatus object for one of its communication links is about to transition into
      the down state.”
   ::= { snmpTraps 3 }
linkUp NOTIFICATION-TYPE
```

```
    OBJECTS { ifIndex, ifAdminStatus, ifOperStatus }
    STATUS current
    DESCRIPTION
        "A linkUp trap signifies that the SNMPv2 entity, acting in an agent role, has detected
        that the ifOperStatus object for one of its communication links has transitioned out of
        the down state."
    ::= { snmpTraps 4 }
```

The following descriptions are taken from RFC 1657, *Definitions of Managed Objects for the Fourth Version of the Border Gateway Protocol (BGP-4) using SMIv2* :

```
bgpEstablished NOTIFICATION-TYPE
    OBJECTS { bgpPeerLastError, bgpPeerState }
    STATUS current
    DESCRIPTION
        "The BGP Established event is generated when the BGP FSM enters the ESTABLISHED state."
    ::= { bgpTraps 1 }
bgpBackwardTransition NOTIFICATION-TYPE
    OBJECTS { bgpPeerLastError, bgpPeerState }
    STATUS current
    DESCRIPTION
        "The BGPBackwardTransition Event is generated when the BGP FSM moves from a
        higher numbered state to a lower numbered state."
    ::= { bgpTraps 2 }
```

The following descriptions are taken from RFC 1850, *OSPF Version 2 Management Information Base* :

```
ospfIfStateChange NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                     ospfIfIpAddress,
                     ospfAddressLessIf,
                     ospfIfState } -- The new state
        STATUS              current
        DESCRIPTION
          "An ospfIfStateChange trap signifies that there has been a change in the state of a non-virtual
          OSPF interface. This trap should be generated when the interface state regresses (e.g., goes
          from Dr to Down) or progresses to a terminal state (i.e., Point-to-Point, DR Other, Dr, or
          Backup)."
    ::= { ospfTraps 16 }
ospfVirtIfStateChange NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                     ospfVirtIfAreaId,
                     ospfVirtIfNeighbor,
                     ospfVirtIfState } -- The new state
        STATUS              current
        DESCRIPTION
          "An ospfIfStateChange trap signifies that there has been a change in the state of an OSPF vir-
          tual interface. This trap should be generated when the interface state regresses (e.g., goes
          from Point-to-Point to Down) or progresses to a terminal state (i.e., Point-to-Point)."
    ::= { ospfTraps 1 }
ospfNbrStateChange NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                     ospfNbrIpAddr,
                     ospfNbrAddressLessIndex,
                     ospfNbrRtrId,
                     ospfNbrState } -- The new state
        STATUS              current
        DESCRIPTION
          "An  ospfNbrStateChange trap signifies that there  has been a change in the state of a non-
          virtual OSPF neighbor. This trap should  be  generated when the neighbor state regresses
          (e.g., goes from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g.,
```

```
        2-Way or Full). When a neighbor  transitions from or to Full on non-broadcast multi-access
        and broadcast networks, the trap should be generated  by the designated router. A designated
        router transitioning to Down will be noted by ospfIfStateChange."
    ::= { ospfTraps 2 }
ospfVirtNbrStateChange NOTIFICATION-TYPE
      OBJECTS     { ospfRouterId, -- The originator of the trap
                    ospfVirtNbrArea,
                    ospfVirtNbrRtrId,
                    ospfVirtNbrState } -- The new state
      STATUS            current
      DESCRIPTION
        "An ospfIfStateChange trap signifies that there has been a change in the state of an OSPF vir-
        tual neighbor. This trap should be generated when the neighbor state regresses (e.g., goes
        from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g., Full)."
    ::= { ospfTraps 3 }
ospfIfConfigError NOTIFICATION-TYPE
      OBJECTS     {ospfRouterId, -- The originator of the trap
                    ospfIfIpAddress,
                    ospfAddressLessIf,
                    ospfPacketSrc,  -- The source IP address
                    ospfConfigErrorType, -- Type of error
                    ospfPacketType  }
      STATUS            current
      DESCRIPTION
        "An ospfIfConfigError trap signifies that a packet has been received on a non-virtual in-
        terface from a router whose configuration parameters conflict with this router's confi-
        guration parameters. Note that the event optionMismatch should cause a trap only if it
        prevents an adjacency from forming."
            ::= { ospfTraps 4 }
ospfVirtIfConfigError NOTIFICATION-TYPE
      OBJECTS     {ospfRouterId, -- The originator of the trap
                    ospfVirtIfAreaId,
                    ospfVirtIfNeighbor,
                    ospfConfigErrorType, -- Type of error
                    ospfPacketType }
      STATUS            current
      DESCRIPTION
        "An ospfConfigError trap signifies that a packet has been received on a virtual interface
        from a router whose configuration parameters conflict with this router's configuration
        parameters. Note that the event optionMismatch should cause a trap only if it prevents an ad-
        jacency from forming."
    ::= { ospfTraps 5 }
ospfIfAuthFailure NOTIFICATION-TYPE
      OBJECTS     {ospfRouterId, -- The originator of the trap
                    ospfIfIpAddress,
                    ospfAddressLessIf,
                    ospfPacketSrc,  -- The source IP address
                    ospfConfigErrorType, -- authTypeMismatch or
                                         -- authFailure
                    ospfPacketType }
      STATUS            current
      DESCRIPTION
        "An ospfIfAuthFailure trap signifies that a packet has been received on a non-virtual in-
        terface from a router whose authentication key or authentication type conflicts with this
        router's authentication key or authentication type."
    ::= { ospfTraps 6 }
ospfVirtIfAuthFailure NOTIFICATION-TYPE
      OBJECTS     {ospfRouterId, -- The originator of the trap
                    ospfVirtIfAreaId,
                    ospfVirtIfNeighbor,
                    ospfConfigErrorType, -- authTypeMismatch or
                                         -- authFailure
                    ospfPacketType  }
```

```
        STATUS          current
        DESCRIPTION
          "An ospfVirtIfAuthFailure trap signifies that a packet has been received on a virtual interface
          from a router whose authentication key or authentication type conflicts with this router's
          authentication key or authentication type."
    ::= { ospfTraps 7 }
ospfIfRxBadPacket NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                     ospfIfIpAddress,
                     ospfAddressLessIf,
                     ospfPacketSrc,  -- The source IP address
                     ospfPacketType }
        STATUS          current
        DESCRIPTION
          "An ospfIfRxBadPacket trap signifies that an OSPF packet has been received on a non-virtual
          interface that cannot be parsed."
    ::= { ospfTraps 8 }
ospfVirtIfRxBadPacket NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                     ospfVirtIfAreaId,
                     ospfVirtIfNeighbor,
                     ospfPacketType  }
        STATUS          current
        DESCRIPTION
          "An ospfRxBadPacket trap signifies that an OSPF packet has been received on a virtual interface
          that cannot be parsed."
    ::= { ospfTraps 9 }
ospfTxRetransmit NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                     ospfIfIpAddress,
                     ospfAddressLessIf,
                     ospfNbrRtrId, -- Destination
                     ospfPacketType,
                     ospfLsdbType,
                     ospfLsdbLsid,
                     ospfLsdbRouterId  }
        STATUS          current
        DESCRIPTION
          "An ospfTxRetransmit trap signifies that an OSPF packet has been retransmitted on a non-
          virtual interface. All packets that may be re-transmitted are associated with an LSDB entry.
          The LS type, LS ID, and Router ID are used to identify the LSDB entry."
    ::= { ospfTraps 10 }
ospfVirtIfTxRetransmit NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                     ospfVirtIfAreaId,
                     ospfVirtIfNeighbor,
                     ospfPacketType,
                     ospfLsdbType,
                     ospfLsdbLsid,
                     ospfLsdbRouterId  }
        STATUS          current
        DESCRIPTION
          "An ospfTxRetransmit trap signifies that an OSPF packet has been retransmitted on a virtual
          interface.  All packets that may be retransmitted  are  associated with an LSDB entry. The LS
          type, LS ID, and Router ID are used to identify the LSDB entry."
    ::= { ospfTraps 11 }
ospfOriginateLsa NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                     ospfLsdbAreaId,  -- 0.0.0.0 for AS Externals
                     ospfLsdbType,
                     ospfLsdbLsid,
                     ospfLsdbRouterId }
        STATUS          current
```

```
        DESCRIPTION
          "An ospfOriginateLsa trap signifies that a new LSA has been originated by this router. This
          trap should not be invoked for simple refreshes of LSAs (which happesn every 30 minutes), but
          instead will only be invoked when an LSA is (re)originated due to a topology change.  Addi-
          tionally, this trap does not include LSAs that are being flushed because they have reached
          MaxAge."
    ::= { ospfTraps 12 }
ospfMaxAgeLsa NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                     ospfLsdbAreaId,  -- 0.0.0.0 for AS Externals
                     ospfLsdbType,
                     ospfLsdbLsid,
                     ospfLsdbRouterId }
        STATUS              current
        DESCRIPTION
          "An ospfMaxAgeLsa trap signifies that one of the LSAs in the router's link-state database has
          aged to MaxAge."
    ::= { ospfTraps 13 }
ospfLsdbOverflow NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                     ospfExtLsdbLimit }
        STATUS              current
        DESCRIPTION
          "An ospfLsdbOverflow trap signifies that the number of LSAs in the router's link-state data-
          base has exceeded ospfExtLsdbLimit."
    ::= { ospfTraps 14 }
ospfLsdbApproachingOverflow NOTIFICATION-TYPE
        OBJECTS     {ospfRouterId, -- The originator of the trap
                   ospfExtLsdbLimit }
        STATUS              current
        DESCRIPTION
          "An ospfLsdbApproachingOverflow trap signifies that the number of LSAs in the router's link-
          state database has exceeded ninety percent of ospfExtLsdbLimit."
    ::= { ospfTraps 15 }
```

Enterprise-Specific SNMP Version 2 Traps

The JUNOS software supports the following enterprise-specific SNMP Version 2 traps:

```
juniperMIB   OBJECT IDENTIFIER ::= { enterprises 2636 }
jnxTraps     OBJECT IDENTIFIER ::= { juniperMIB 4 }

jnxChassisTraps      OBJECT IDENTIFIER ::= { jnxTraps 1 }
jnxChassisTrapsZero OBJECT IDENTIFIER ::= { jnxChassisTraps 0 }

jnxPowerSupplyFailure NOTIFICATION-TYPE
    OBJECTS     { jnxContentsContainerIndex,
                  jnxContentsL1Index,
                  jnxContentsL2Index,
                  jnxContentsL3Index
                  jnxContentsDescr }
    STATUS    current
    DESCRIPTION
      "A jnxPowerSupplyFailure trap signifies that the SNMPv2 entity, acting in an agent role, has
      detected that the specified power supply in the chassis has been in the failure (bad DC
      output) condition."
    ::= { jnxChassisTrapsZero 1 }
jnxFanFailure NOTIFICATION-TYPE
    OBJECTS     { jnxContentsContainerIndex,
                  jnxContentsL1Index,
                  jnxContentsL2Index,
```

```
                    jnxContentsL3Index
                    jnxContentsDescr }
    STATUS    current
    DESCRIPTION
      "A jnxFanFailure trap signifies that the SNMPv2 entity, acting in an agent role, has detected
      that the specified cooling fan or impeller in the chassis has been in the failure (not spinning)
      condition."
    ::= { jnxChassisTrapsZero 2 }
jnxOverTemperature NOTIFICATION-TYPE
    OBJECTS     { jnxContentsContainerIndex,
                    jnxContentsL1Index,
                    jnxContentsL2Index,
                    jnxContentsL3Index
                    jnxContentsDescr }
    STATUS    current
    DESCRIPTION
      "A jnxOverTemperature trap signifies that the SNMPv2 entity, acting in an agent role, has
      detected that the specified hardware component in the chassis has experienced
      overtemperature condition."
    ::= { jnxChassisTrapsZero 3 }

mplsTraps OBJECT IDENTIFIER ::= { mpls 4 }

mplsLspUp NOTIFICATION-TYPE
    OBJECTS     { mplsLspName,
                    mplsPathName }  -- LspPath
    STATUS    current
    DESCRIPTION
      “An mplsLspUp trap signifies that the specified LSP is up. The current active
      path for the LSP is mplsPathName.”
    ::= { mplsTraps 1 }
mplsLspDown NOTIFICATION-TYPE
    OBJECTS     { mplsLspName,
                    mplsPathName }  -- LspPath
    STATUS    current
    DESCRIPTION
      “An mplsLspDown trap signifies that the specified LSP is down, because the current
      active path mplsPathName went down.”
    ::= { mplsTraps 2 }
mplsLspChange NOTIFICATION-TYPE
    OBJECTS     { mplsLspName,
                    mplsPathName }  -- toLspPath
    STATUS    current
    DESCRIPTION
      “An mplsLspChange trap signifies that the specified LSP has switched traffic to
      the new active path 'toLspPath'. The LSP maintains up state before and after the switchover.”
    ::= { mplsTraps 3 }
```

System Logging Severity Levels for SNMP Traps

Table 15 lists the system logging severity levels for some of the SNMP traps. These severity levels cannot be changed. For information about the meaning of the levels, see Table 11 on page 220.

Table 15: System Logging Severity Levels for SNMP Traps

Trap Type	Trap Name	Severity Level
Standard Traps	Cold start	critical
	Warm start	error
	Link down	warning
	Link up	info
	Authentication failure	notice
Enterprise-Specific Traps	Power failure	critical
	Fan failure	critical
	Overtemperature	alert