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BFD Management Information Base
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Status of this Memo

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Abstract

This draft defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for modeling Bidirectional Forwarding Detection (BFD) protocol.

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[1. Requirements notation](#)

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

[2. The Internet-Standard Management Framework](#)

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For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to [section 7 of \[RFC3410\]](#).

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, [[RFC2578](#)], STD 58, [[RFC2579](#)] and STD 58, [[RFC2580](#)].

3. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects to configure and/or monitor Bi-Directional Forwarding Detection for [[BFD](#)], [[BFD-1HOP](#)] and [[BFD-MH](#)], BFD versions 0 and/or 1, on devices supporting this feature.

Comments should be made directly to the BFD mailing list at rtg-bfd@ietf.org.

4. Terminology

This document adopts the definitions, acronyms and mechanisms described in [[BFD](#)], [[BFD-1HOP](#)] and [[BFD-MH](#)]. Unless otherwise stated, the mechanisms described therein will not be re-described here.

5. Brief Description of MIB Objects

This section describes objects pertaining to BFD. The MIB objects are derived from [[BFD](#)] and [[BFD-MH](#)].

5.1. General Variables

The General Variables are used to identify parameters that are global to the BFD process.

5.2. Session Table (bfdSessionTable)

The session table is used to identify a BFD session between a pair of nodes.

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5.3. Session Performance Table (bfdSessionPerfTable)

The session performance table is used for collecting BFD performance counters on a per session basis. This table is an AUGMENT to the bfdSessionTable.

5.4. BFD Session Discriminator Mapping Table (bfdSessDiscMapTable)

The BFD Session Discriminator Mapping Table maps a local discriminator value to associated BFD session's BfdSessIndexTC used in the bfdSessionTable.

5.5. BFD Session IP Mapping Table (bfdSessIpMapTable)

The BFD Session IP Mapping Table maps, given bfdSessInterface, bfdSessSrcAddrType, bfdSessSrcAddr, bfdSessDstAddrType, and bfdSessDstAddr, to an associated BFD session's BfdSessIndexTC used in the bfdSessionTable. This table SHOULD contain those BFD sessions that are of IP type.

6. BFD MIB Module Definitions

This MIB module makes references to the following documents.
[[RFC2579](#)], [[RFC2580](#)], [[RFC2863](#)], [[RFC4001](#)], and [[RFC3413](#)].

```
BFD-STD-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
    mib-2, Integer32, Unsigned32, Counter32, Counter64
    FROM SNMPv2-SMI

    TruthValue, RowStatus, StorageType, TimeStamp
    FROM SNMPv2-TC

    MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
    FROM SNMPv2-CONF

    InterfaceIndexOrZero
    FROM IF-MIB

    InetAddress, InetAddressType, InetPortNumber
    FROM INET-ADDRESS-MIB

    BfdSessIndexTC, BfdIntervalTC, BfdMultiplierTC, BfdDiagTC,
    BfdSessTypeTC, BfdSessOperModeTC, BfdCtrlDestPortNumberTC,
    BfdCtrlSourcePortNumberTC, BfdSessStateTC,
```

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```
BfdSessAuthenticationTypeTC, BfdSessionAuthenticationKeyTC
    FROM BFD-TC-STD-MIB;
```

bfdMib MODULE-IDENTITY

```
LAST-UPDATED "201007081200Z" -- 8 July 2010 12:00:00 EST
ORGANIZATION "IETF Bidirectional Forwarding Detection
                Working Group"
```

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```

DESCRIPTION

```
"Bidirectional Forwarding Management Information Base."
REVISION "201007081200Z" -- 8 July 2010 12:00:00 EST
```

DESCRIPTION

```
"Initial version. Published as RFC xxxx."
```

```
-- RFC Ed.: RFC-editor pls fill in xxxx
      ::= { mib-2 XXX }
```

```
-- RFC Ed.: assigned by IANA, see section 7.1 for details
```

```
-- Top level components of this MIB module.
```

```
bfdNotifications OBJECT IDENTIFIER ::= { bfdMIB 0 }
```

```
bfdObjects OBJECT IDENTIFIER ::= { bfdMIB 1 }
```

```
bfdConformance OBJECT IDENTIFIER ::= { bfdMIB 2 }
```

```
bfdScalarObjects OBJECT IDENTIFIER ::= { bfdObjects 1 }
```

```
-- BFD General Variables
```

```
-- These parameters apply globally to the Systems'
-- BFD Process.
```

```
bfdAdminStatus OBJECT-TYPE
```

```
SYNTAX      INTEGER {
            enabled(1),
            disabled(2)
}
```

```
MAX-ACCESS read-write
```

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STATUS current
DESCRIPTION
"The global administrative status of BFD in this router.
The value 'enabled' denotes that the BFD Process is
active on at least one interface; 'disabled' disables
it on all interfaces."
DEFVAL { enabled }
 ::= { bfdScalarObjects 1 }

bfdsessNotificationsEnable OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"If this object is set to true(1), then it enables
the emission of bfdSessUp and bfdSessDown
notifications; otherwise these notifications are not
emitted."
REFERENCE
"See also [RFC3413](#) for explanation that
notifications are under the ultimate control of the
MIB modules in this document."
DEFVAL { false }
 ::= { bfdScalarObjects 2 }

-- BFD Session Table
-- The BFD Session Table specifies BFD session specific
-- information.

bfdsessTable OBJECT-TYPE
SYNTAX SEQUENCE OF BfdSessEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The BFD Session Table describes the BFD sessions."
REFERENCE
"BFD Version 0 ([draft-katz-ward-bfd-02.txt](#)) and
BFD Version 1 ([RFC5880](#))"
 ::= { bfdObjects 2 }

bfdsessEntry OBJECT-TYPE
SYNTAX BfdSessEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The BFD Session Entry describes BFD session."
INDEX { bfdsessIndex }
 ::= { bfdsessTable 1 }

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```

BfdSessEntry ::= SEQUENCE {
    bfdSessIndex                                BfdSessIndexTC,
    bfdSessVersionNumber                         Unsigned32,
    bfdSessType                                  BfdSessTypeTC,
    bfdSessDiscriminator                         Unsigned32,
    bfdSessRemoteDiscr                           Unsigned32,
    bfdSessDestinationUdpPort                   BfdCtrlDestPortNumberTC,
    bfdSessSourceUdpPort                        BfdCtrlSourcePortNumberTC,
    bfdSessEchoSourceUdpPort                   InetPortNumber,
    bfdSessAdminStatus                          INTEGER,
    bfdSessState                                BfdSessStateTC,
    bfdSessRemoteHeardFlag                      TruthValue,
    bfdSessDiag                                 BfdDiagTC,
    bfdSessOperMode                            BfdSessOperModeTC,
    bfdSessDemandModeDesiredFlag               TruthValue,
    bfdSessControlPlaneIndepFlag              TruthValue,
    bfdSessMultipointFlag                      TruthValue,
    bfdSessInterface                           InterfaceIndexOrZero,
    bfdSessSrcAddrType                         InetAddressType,
    bfdSessSrcAddr                             InetAddress,
    bfdSessDstAddrType                         InetAddressType,
    bfdSessDstAddr                            InetAddress,
    bfdSessGTSM                                TruthValue,
    bfdSessGTSM TTL                           Unsigned32,
    bfdSessDesiredMinTxInterval                BfdIntervalTC,
    bfdSessReqMinRxInterval                   BfdIntervalTC,
    bfdSessReqMinEchoRxInterval              BfdIntervalTC,
    bfdSessDetectMult                          BfdMultiplierTC,
    bfdSessNegotiatedInterval                 BfdIntervalTC,
    bfdSessNegotiatedEchoInterval             BfdIntervalTC,
    bfdSessNegotiatedDetectMult              BfdMultiplierTC,
    bfdSessAuthPresFlag                       TruthValue,
    bfdSessAuthenticationType                BfdSessAuthenticationTypeTC,
    bfdSessAuthenticationKeyID                Integer32,
    bfdSessAuthenticationKey                 BfdSessionAuthenticationKeyTC,
    bfdSessStorType                           StorageType,
    bfdSessRowStatus                          RowStatus
}

bfdSessIndex OBJECT-TYPE
  SYNTAX      BfdSessIndexTC
  MAX-ACCESS not-accessible
  STATUS      current
  DESCRIPTION
    "This object contains an index used to represent a
     unique BFD session on this device."
 ::= { bfdSessEntry 1 }

```

bfdSessVersionNumber OBJECT-TYPE

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```
SYNTAX      Unsigned32 (0..7)
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The version number of the BFD protocol that this session
     is running in. Write access is available for this object
     to provide ability to set desired version for this
     BFD session."
REFERENCE
    "BFD Version 0 (draft-katz-ward-bfd-02.txt) and
     BFD Version 1 (RFC5880)"
DEFVAL { 1 }
 ::= { bfdSessEntry 2 }

bfdSessType OBJECT-TYPE
SYNTAX      BfdSessTypeTC
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object specifies the type of this BFD session."
 ::= { bfdSessEntry 3 }

bfdSessDiscriminator OBJECT-TYPE
SYNTAX      Unsigned32 (1..4294967295)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "This object specifies the local discriminator for this BFD
     session, used to uniquely identify it."
 ::= { bfdSessEntry 4 }

bfdSessRemoteDiscr OBJECT-TYPE
SYNTAX      Unsigned32 (0 | 1..4294967295)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "This object specifies the session discriminator chosen
     by the remote system for this BFD session. The value may
     be zero(0) if the remote discriminator is not yet known
     or if the session is in the down or adminDown(1) state."
REFERENCE
    "RFC5880, Section 6.8.6"
 ::= { bfdSessEntry 5 }

bfdSessDestinationUdpPort OBJECT-TYPE
SYNTAX      BfdCtrlDestPortNumberTC
MAX-ACCESS  read-create
STATUS      current
```

DESCRIPTION

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```
"This object specifies the destination UDP port number
used for this BFD session's control packets. The value
may be zero(0) if the session is in adminDown(1) state."
DEFVAL { 0 }
 ::= { bfdSessEntry 6 }

bfdSessSourceUdpPort OBJECT-TYPE
SYNTAX      BfdCtrlSourcePortNumberTC
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object specifies the source UDP port number used
    for this BFD session's control packets. The value may be
    zero(0) if the session is in adminDown(1) state. Upon
    creation of a new BFD session via this MIB, the value of
    zero(0) specified would permit the implementation to
    chose its own source port number."
DEFVAL { 0 }
 ::= { bfdSessEntry 7 }

bfdSessEchoSourceUdpPort OBJECT-TYPE
SYNTAX      InetPortNumber
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object specifies the source UDP port number used for
    this BFD session's echo packets. The value may be zero(0)
    if the session is not running in the echo mode, or the
    session is in adminDown(1) state. Upon creation of a new
    BFD session via this MIB, the value of zero(0) would
    permit the implementation to chose its own source port
    number."
DEFVAL { 0 }
 ::= { bfdSessEntry 8 }

bfdSessAdminStatus OBJECT-TYPE
SYNTAX      INTEGER {
                stop(1),
                start(2)
            }
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "A transition from 'stop' to 'start' will start
    the BFD state machine for the session. The state
    machine will have an initial state of down.
    A transition from 'start' to 'stop' will cause
    the BFD session to be brought down to
```

adminDown(1). Care should be used in providing

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```
        write access to this object without adequate
        authentication."
DEFVAL { 2 }
 ::= { bfdSessEntry 9 }

bfdSessState OBJECT-TYPE
SYNTAX      BfdSessStateTC
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "BFD session state."
DEFVAL { 2 }
 ::= { bfdSessEntry 10 }

bfdSessRemoteHeardFlag OBJECT-TYPE
SYNTAX      TruthValue
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "This object specifies status of BFD packet reception from
     the remote system. Specifically, it is set to true(1) if
     the local system is actively receiving BFD packets from the
     remote system, and is set to false(2) if the local system
     has not received BFD packets recently (within the detection
     time) or if the local system is attempting to tear down
     the BFD session."
REFERENCE
    "BFD Version 0 (draft-katz-ward-bfd-02.txt) and
     BFD Version 1 (RFC5880)"
DEFVAL { false }
 ::= { bfdSessEntry 11 }

bfdSessDiag OBJECT-TYPE
SYNTAX      BfdDiagTC
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "A diagnostic code specifying the local system's reason
     for the last transition of the session from up(4)
     to some other state."
 ::= { bfdSessEntry 12 }

bfdSessOperMode OBJECT-TYPE
SYNTAX      BfdSessOperModeTC
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object specifies current operating mode that BFD
```

session is operating in."

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```
::= { bfdSessEntry 13 }
```

bfdSessDemandModeDesiredFlag OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object indicates that the local system's desire to use Demand mode. Specifically, it is set to true(1) if the local system wishes to use Demand mode or false(2) if not"

DEFVAL { false }

```
::= { bfdSessEntry 14 }
```

bfdSessControlPlaneIndepFlag OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object indicates that the local system's ability to continue to function through a disruption of the control plane. Specifically, it is set to true(1) if the local system BFD implementation is independent of the control plane. Otherwise, the value is set to false(2)"

DEFVAL { false }

```
::= { bfdSessEntry 15 }
```

bfdSessMultipointFlag OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object indicates the Multipoint (M) bit for this session. It is set to true(1) if Multipoint (M) bit is set to 1. Otherwise, the value is set to false(2)"

DEFVAL { false }

```
::= { bfdSessEntry 16 }
```

bfdSessInterface OBJECT-TYPE

SYNTAX InterfaceIndexOrZero

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object contains an interface index used to indicate the interface which this BFD session is running on. This value can be zero if there is no interface associated with this BFD session."

`::= { bfdSessEntry 17 }`

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```
bfdSessSrcAddrType OBJECT-TYPE
  SYNTAX      InetAddressType
  MAX-ACCESS  read-create
  STATUS      current
  DESCRIPTION
    "This object specifies IP address type of the source IP
     address of this BFD session. Only values unknown(0),
     ipv4(1), ipv6(2), or ipv6z(4) have to be supported.
     The value of unknown(0) is allowed only when the session
     is singleHop(1) and the source IP address of this BFD
     session is driven from the outgoing interface, or when
     the BFD session is not associated with a specific
     interface. If any other unsupported values are attempted
     in a set operation, the agent MUST return an
     inconsistentValue error."
 ::= { bfdSessEntry 18 }

bfdSessSrcAddr OBJECT-TYPE
  SYNTAX      InetAddress
  MAX-ACCESS  read-create
  STATUS      current
  DESCRIPTION
    "This object specifies the source IP address of this BFD
     session."
 ::= { bfdSessEntry 19 }

bfdSessDstAddrType OBJECT-TYPE
  SYNTAX      InetAddressType
  MAX-ACCESS  read-create
  STATUS      current
  DESCRIPTION
    "This object specifies IP address type of the neighboring IP
     address which is being monitored with this BFD session.
     Only values unknown(0), ipv4(1), ipv6(2), or ipv6z(4)
     have to be supported. The value of unknown(0) is allowed
     only when the session is singleHop(1) and the outgoing
     interface is of type point-to-point, or when the BFD
     session is not associated with a specific interface. If any
     other unsupported values are attempted in a set operation,
     the agent MUST return an inconsistentValue error."
 ::= { bfdSessEntry 20 }

bfdSessDstAddr OBJECT-TYPE
  SYNTAX      InetAddress
  MAX-ACCESS  read-create
  STATUS      current
  DESCRIPTION
```

"This object specifies the neighboring IP address which is

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```
        being monitored with this BFD session."
 ::= { bfdSessEntry 21 }

bfdSessGTSM OBJECT-TYPE
SYNTAX  TruthValue
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"Setting the value of this object to true(1) will enable GTSM
protection of the BFD session. GTSM MUST be enabled on a
singleHop(1) session if no authentication is in use."
REFERENCE
"RFC5082, The Generalized TTL Security Mechanism (GTSM).
RFC5881, Section 5"
DEFVAL { false }
 ::= { bfdSessEntry 22 }

bfdSessGTSMTTL OBJECT-TYPE
SYNTAX Unsigned32 (0..255)
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object is valid only when bfdSessGTSM protection is
enabled on the system. This object specifies the minimum
allowed TTL for received BFD control packets. For
singleHop(1) session, if GTSM protection is enabled,
this object SHOULD be set to maximum TTL allowed for
single hop. The value of zero(0) indicates that
bfdSessGTSM is disabled."
REFERENCE
"RFC5082, The Generalized TTL Security Mechanism (GTSM).
RFC5881, Section 5"
DEFVAL { 0 }
 ::= { bfdSessEntry 23 }

bfdSessDesiredMinTxInterval OBJECT-TYPE
SYNTAX      BfdIntervalTC
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
"This object specifies the minimum interval, in
microseconds, that the local system would like to use
when transmitting BFD Control packets. The value of
zero(0) is reserved, and should not be used."
REFERENCE
"RFC5880, Section 4.1"
 ::= { bfdSessEntry 24 }
```

`bfdSessReqMinRxInterval` OBJECT-TYPE

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SYNTAX BfdIntervalTC
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object specifies the minimum interval, in microseconds, between received BFD Control packets the local system is capable of supporting. The value of zero(0) can be specified when the transmitting system does not want the remote system to send any periodic BFD control packets."
REFERENCE
["RFC5880, Section 4.1"](#)
 ::= { bfdSessEntry 25 }

bfdsReqMinEchoRxInterval OBJECT-TYPE
SYNTAX BfdIntervalTC
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object specifies the minimum interval, in microseconds, between received BFD Echo packets that this system is capable of supporting. Value must be zero(0) if this is a multihop BFD session."
 ::= { bfdSessEntry 26 }

bfdsDetectMultiplier OBJECT-TYPE
SYNTAX BfdMultiplierTC
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object specifies the Detect time multiplier."
 ::= { bfdSessEntry 27 }

bfdsNegotiatedInterval OBJECT-TYPE
SYNTAX BfdIntervalTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This object specifies the negotiated interval, in microseconds, that the local system is transmitting BFD Control packets."
 ::= { bfdSessEntry 28 }

bfdsNegotiatedEchoInterval OBJECT-TYPE
SYNTAX BfdIntervalTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"This object specifies the negotiated interval, in

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```
 microseconds, that the local system is transmitting
 BFD echo packets. Value is expected to be zero if
 the sessions is not running in echo mode."
 ::= { bfdSessEntry 29 }

bfdSessNegotiatedDetectMult OBJECT-TYPE
SYNTAX      BfdMultiplierTC
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "This object specifies the Detect time multiplier."
 ::= { bfdSessEntry 30 }

bfdSessAuthPresFlag OBJECT-TYPE
SYNTAX      TruthValue
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object indicates that the local system's
 desire to use Authentication. Specifically, it is set
 to true(1) if the local system wishes the session
 to be authenticated or false(2) if not."
REFERENCE
    "RFC5880, Sections 4.2 - 4.4"
DEFVAL { false }
 ::= { bfdSessEntry 31 }

bfdSessAuthenticationType OBJECT-TYPE
SYNTAX      BfdSessAuthenticationTypeTC
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The Authentication Type used for this BFD session.
 This field is valid only when the Authentication
 Present bit is set. Max-access to this object as well as
 other authentication related objects are set to
 read-create in order to support management of a single
 key ID at a time, key rotation is not handled. Key update
 in practice must be done by atomic update using a set
 containing all affected objects in the same varBindList
 or otherwise risk the session dropping. Value -1
 indicates that no authentication is in use for this
 session."
REFERENCE
    "RFC5880, Sections 4.2 - 4.4"
DEFVAL { -1 }
 ::= { bfdSessEntry 32 }
```

bfdSessAuthenticationKeyID OBJECT-TYPE

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SYNTAX Integer32 (-1 | 0..255)
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"The authentication key ID in use for this session. This object permits multiple keys to be active simultaneously. When bfdSessAuthPresFlag is false(2), then the value of this object MUST be -1. The value -1 indicates that no Authentication Key ID will be present in the optional BFD Authentication Section."
REFERENCE
"[RFC5880](#), Sections [4.2](#) - [4.4](#)"
DEFVAL { -1 }
 ::= { bfdSessEntry 33 }

bfdSessAuthenticationKey OBJECT-TYPE
SYNTAX BfdSessionAuthenticationKeyTC
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"The authentication key. When the bfdSessAuthenticationType is simplePassword(1), the value of this object is the password present in the BFD packets.

When the bfdSessAuthentication type is one of the keyed authentication types, this value is used in the computation of the key present in the BFD authentication packet."
REFERENCE
"[RFC5880](#), Sections [4.2](#) - [4.4](#)"
 ::= { bfdSessEntry 34 }

bfdSessStorType OBJECT-TYPE
SYNTAX StorageType
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This variable indicates the storage type for this object. Conceptual rows having the value 'permanent' need not allow write-access to any columnar objects in the row."
 ::= { bfdSessEntry 35 }

bfdSessRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION

"This variable is used to create, modify, and/or

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```

        delete a row in this table. When a row in this
        table has a row in the active(1) state, no
        objects in this row can be modified except the
        bfdSessRowStatus and bfdSessStorageType."
 ::= { bfdSessEntry 36 }

-- BFD Session Performance Table

bfdSessPerfTable OBJECT-TYPE
  SYNTAX      SEQUENCE OF BfdSessPerfEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "This table specifies BFD Session performance counters."
 ::= { bfdObjects 3 }

bfdSessPerfEntry OBJECT-TYPE
  SYNTAX      BfdSessPerfEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "An entry in this table is created by a BFD-enabled node
     for every BFD Session. bfdSessPerfDiscTime is used to
     indicate potential discontinuity for all counter objects
     in this table."
  AUGMENTS   { bfdSessEntry }
 ::= { bfdSessPerfTable 1 }

BfdSessPerfEntry ::= SEQUENCE {
  bfdSessPerfCtrlPktIn          Counter32,
  bfdSessPerfCtrlPktOut         Counter32,
  bfdSessPerfCtrlPktDrop        Counter32,
  bfdSessPerfCtrlPktDropLastTime TimeStamp,
  bfdSessPerfEchoPktIn          Counter32,
  bfdSessPerfEchoPktOut         Counter32,
  bfdSessPerfEchoPktDrop        Counter32,
  bfdSessPerfEchoPktDropLastTime TimeStamp,
  bfdSessUpTime                 TimeStamp,
  bfdSessPerfLastSessDownTime   TimeStamp,
  bfdSessPerfLastCommLostDiag  BfdDiagTC,
  bfdSessPerfSessUpCount        Counter32,
  bfdSessPerfDiscTime           TimeStamp,

  -- High Capacity Counters
  bfdSessPerfCtrlPktInHC        Counter64,
  bfdSessPerfCtrlPktOutHC       Counter64,
  bfdSessPerfCtrlPktDropHC      Counter64,
  bfdSessPerfEchoPktInHC        Counter64,

```

bfdSessPerfEchoPktOutHC

Counter64,

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```
        bfdSessPerfEchoPktDropHC      Counter64
    }

-- Ed Note: should we add per-diag code counts here,

bfdSessPerfCtrlPktIn OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The total number of BFD control messages received for this
         BFD session. This value MUST be equal to the least
         significant 32 bits of bfdSessPerfCtrlPktInHC."
    ::= { bfdSessPerfEntry 1 }

bfdSessPerfCtrlPktOut OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The total number of BFD control messages sent for this BFD
         session. This value MUST be equal to the least significant
         32 bits of bfdSessPerfCtrlPktOutHC."
    ::= { bfdSessPerfEntry 2 }

bfdSessPerfCtrlPktDrop OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The total number of BFD control messages received for this
         session yet dropped for being invalid. This value MUST be
         equal to the least significant 32 bits of
         bfdSessPerfCtrlPktDropHC."
    ::= { bfdSessPerfEntry 3 }

bfdSessPerfCtrlPktDropLastTime OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of sysUpTime on the most recent occasion at
         which received BFD control message for this session was
         dropped. If no such up event exists, this object contains
         a zero value."
    ::= { bfdSessPerfEntry 4 }

bfdSessPerfEchoPktIn OBJECT-TYPE
```

SYNTAX Counter32

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MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The total number of BFD echo messages received for this BFD session. This value MUST be equal to the least significant 32 bits of bfdSessPerfEchoPktInHC."
 ::= { bfdSessPerfEntry 5 }

bfdSessPerfEchoPktOut OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The total number of BFD echo messages sent for this BFD session. This value MUST be equal to the least significant 32 bits of bfdSessPerfEchoPktOutHC."
 ::= { bfdSessPerfEntry 6 }

bfdSessPerfEchoPktDrop OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The total number of BFD echo messages received for this session yet dropped for being invalid. This value MUST be equal to the least significant 32 bits of bfdSessPerfEchoPktDropHC."
 ::= { bfdSessPerfEntry 7 }

bfdSessPerfEchoPktDropLastTime OBJECT-TYPE
SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The value of sysUpTime on the most recent occasion at which received BFD echo message for this session was dropped. If no such up event exists, this object contains a zero value."
 ::= { bfdSessPerfEntry 8 }

bfdSessUpTime OBJECT-TYPE
SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The value of sysUpTime on the most recent occasion at which the session came up. If no such up event exists this object contains a zero value."

`::= { bfdSessPerfEntry 9 }`

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```
bfdSessPerfLastSessDownTime OBJECT-TYPE
  SYNTAX      TimeStamp
  MAX-ACCESS read-only
  STATUS      current
  DESCRIPTION
    "The value of sysUpTime on the most recent occasion at
     which the last time communication was lost with the
     neighbor. If no such down event exist this object
     contains a zero value."
 ::= { bfdSessPerfEntry 10 }

bfdSessPerfLastCommLostDiag OBJECT-TYPE
  SYNTAX      BfdDiagTC
  MAX-ACCESS read-only
  STATUS      current
  DESCRIPTION
    "The BFD diag code for the last time communication was lost
     with the neighbor. If no such down event exists this object
     contains a zero value."
 ::= { bfdSessPerfEntry 11 }

bfdSessPerfSessUpCount OBJECT-TYPE
  SYNTAX      Counter32
  MAX-ACCESS read-only
  STATUS      current
  DESCRIPTION
    "The number of times this session has gone into the Up
     state since the system last rebooted."
 ::= { bfdSessPerfEntry 12 }

bfdSessPerfDiscTime OBJECT-TYPE
  SYNTAX      TimeStamp
  MAX-ACCESS read-only
  STATUS      current
  DESCRIPTION
    "The value of sysUpTime on the most recent occasion at
     which any one or more of the session counters suffered
     a discontinuity.
     The relevant counters are the specific instances associated
     with this BFD session of any Counter32 object contained in
     the BfdSessPerfTable. If no such discontinuities have
     occurred since the last re-initialization of the local
     management subsystem, then this object contains a zero
     value."
 ::= { bfdSessPerfEntry 13 }

bfdSessPerfCtrlPktInHC OBJECT-TYPE
```

SYNTAX Counter64

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```
MAX-ACCESS read-only
STATUS current
DESCRIPTION
  "This value represents the total number of BFD control
  messages received for this BFD session."
 ::= { bfdSessPerfEntry 14 }

bfdSessPerfCtrlPktOutHC OBJECT-TYPE
  SYNTAX Counter64
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "This value represents the total number of BFD control
    messages transmitted for this BFD session."
 ::= { bfdSessPerfEntry 15 }

bfdSessPerfCtrlPktDropHC OBJECT-TYPE
  SYNTAX Counter64
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "This value represents the total number of BFD control
    messages received for this BFD session yet dropped for
    being invalid."
 ::= { bfdSessPerfEntry 16 }

bfdSessPerfEchoPktInHC OBJECT-TYPE
  SYNTAX Counter64
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "This value represents the total number of BFD echo
    messages received for this BFD session."
 ::= { bfdSessPerfEntry 17 }

bfdSessPerfEchoPktOutHC OBJECT-TYPE
  SYNTAX Counter64
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "This value represents the total number of BFD echo
    messages transmitted for this BFD session."
 ::= { bfdSessPerfEntry 18 }

bfdSessPerfEchoPktDropHC OBJECT-TYPE
  SYNTAX Counter64
  MAX-ACCESS read-only
  STATUS current
```

DESCRIPTION

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```
"This value represents the total number of BFD echo
messages received for this BFD session yet dropped
for being invalid."
 ::= { bfdSessPerfEntry 19 }

-- BFD Session Discriminator Mapping Table

bfdSessDiscMapTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF BfdSessDiscMapEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The BFD Session Discriminator Mapping Table maps a
         local discriminator value to associated BFD session's
         BfdSessIndexTC used in the bfdSessionTable."
    ::= { bfdObjects 4 }

bfdSessDiscMapEntry OBJECT-TYPE
    SYNTAX      BfdSessDiscMapEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The BFD Session Discriminator Map Entry describes
         BFD session that is mapped to this BfdSessIndexTC."
INDEX { bfdSessDiscriminator }
 ::= { bfdSessDiscMapTable 1 }

BfdSessDiscMapEntry ::= SEQUENCE {
    bfdSessDiscMapIndex          BfdSessIndexTC
}

bfdSessDiscMapIndex OBJECT-TYPE
    SYNTAX      BfdSessIndexTC
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object specifies the BfdSessIndexTC referred to by
         the indices of this row. In essence, a mapping is
         provided between these indexes and the BfdSessTable."
    ::= { bfdSessDiscMapEntry 1 }

-- BFD Session IP Mapping Table

bfdSessIpMapTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF BfdSessIpMapEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

"The BFD Session IP Mapping Table maps given

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```
        bfdSessInterface, bfdSessSrcAddrType, bfdSessSrcAddr,
        bfdSessDstAddrType and bfdSessDstAddr
        to an associated BFD session's BfdSessIndexTC used in
        the bfdSessionTable."
 ::= { bfdObjects 5 }

bfdSessIpMapEntry OBJECT-TYPE
    SYNTAX      BfdSessIpMapEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The BFD Session IP Map Entry describes
        BFD session that is mapped to this BfdSessIndexTC."
INDEX {
    bfdSessInterface,
    bfdSessSrcAddrType,
    bfdSessSrcAddr,
    bfdSessDstAddrType,
    bfdSessDstAddr
}
 ::= { bfdSessIpMapTable 1 }

BfdSessIpMapEntry ::= SEQUENCE {
    bfdSessIpMapIndex          BfdSessIndexTC
}

bfdSessIpMapIndex OBJECT-TYPE
    SYNTAX      BfdSessIndexTC
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object specifies the BfdSessIndexTC referred to by
        the indexes of this row. In essence, a mapping is
        provided between these indexes and the BfdSessTable."
 ::= { bfdSessIpMapEntry 1 }

-- Notification Configuration

bfdSessUp NOTIFICATION-TYPE
    OBJECTS {
        bfdSessDiag, -- low range value
        bfdSessDiag -- high range value
    }
    STATUS      current
    DESCRIPTION
        "This notification is generated when the
        bfdSessState object for one or more contiguous
        entries in bfdSessTable are about to enter the up(4)
```

state from some other state. The included values of

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bfdSessDiag MUST both be set equal to this new state (i.e: up(4)). The two instances of bfdSessDiag in this notification indicate the range of indexes that are affected. Note that all the indexes of the two ends of the range can be derived from the instance identifiers of these two objects. For the cases where a contiguous range of sessions have transitioned into the up(4) state at roughly the same time, the device SHOULD issue a single notification for each range of contiguous indexes in an effort to minimize the emission of a large number of notifications. If a notification has to be issued for just a single bfdSessEntry, then the instance identifier (and values) of the two bfdSessDiag objects MUST be the identical."

::= { bfdNotifications 1 }

bfdsessDown NOTIFICATION-TYPE

OBJECTS {

 bfdSessDiag, -- low range value

 bfdSessDiag -- high range value

}

STATUS current

DESCRIPTION

 "This notification is generated when the bfdSessState object for one or more contiguous entries in bfdSessTable are about to enter the down(2) or adminDown(1) states from some other state. The included values of bfdSessDiag MUST both be set equal to this new state (i.e: down(2) or adminDown(1)). The two instances of bfdSessDiag in this notification indicate the range of indexes that are affected. Note that all the indexes of the two ends of the range can be derived from the instance identifiers of these two objects. For cases where a contiguous range of sessions have transitioned into the down(2) or adminDown(1) states at roughly the same time, the device SHOULD issue a single notification for each range of contiguous indexes in an effort to minimize the emission of a large number of notifications. If a notification has to be issued for just a single bfdSessEntry, then the instance identifier (and values) of the two bfdSessDiag objects MUST be the identical."

::= { bfdNotifications 2 }

-- Ed Note: We need to add notification for changes
-- when the two ends automatically negotiate to a new detection time
-- value or when detection multiplier changes.

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-- Module compliance.

bfdfGroups
OBJECT IDENTIFIER ::= { bfdConformance 1 }

bfdfCompliances
OBJECT IDENTIFIER ::= { bfdConformance 2 }

-- Compliance requirement for fully compliant implementations.

bfdfModuleFullCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
"Compliance statement for agents that provide full support for the BFD-MIB module. Such devices can then be monitored and also be configured using this MIB module."

MODULE -- This module.

MANDATORY-GROUPS {
 bfdfSessionGroup,
 bfdfSessionReadOnlyGroup,
 bfdfSessionPerfGroup,
 bfdfNotificationGroup
}

GROUP bfdfSessionPerfHCGroup
DESCRIPTION "This group is mandatory for all systems that are able to support the Counter64 date type."

OBJECT bfdfSessSrcAddrType
SYNTAX InetAddressType { unknown(0), ipv4(1),
 ipv6(2), ipv6z(4) }
DESCRIPTION "Only unknown(0), ipv4(1), ipv6(2) and ipv6z(4) support are required."

OBJECT bfdfSessSrcAddr
SYNTAX InetAddress (SIZE (0|4|16|20))
DESCRIPTION "An implementation is only required to support unknown(0), ipv4(1), ipv6(2) and ipv6z(4) sizes."

OBJECT bfdfSessDstAddrType
SYNTAX InetAddressType { unknown(0), ipv4(1),
 ipv6(2), ipv6z(4) }
DESCRIPTION "Only unknown(0), ipv4(1), ipv6(2) and ipv6z(4) support are required."

OBJECT bfdfSessDstAddr

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```
SYNTAX      InetAddress (SIZE (0|4|16|20))
DESCRIPTION "An implementation is only required to support
             unknown(0), ipv4(1), ipv6(2) and ipv6z(4) sizes."

OBJECT      bfdSessRowStatus
SYNTAX      RowStatus { active(1), notInService(2) }
WRITE-SYNTAX RowStatus { active(1), notInService(2),
                        createAndGo(4), destroy(6) }
DESCRIPTION "Support for createAndWait and notReady is not
            required.

 ::= { bfdCompliances 1 }

bfdModuleReadOnlyCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
  "Compliance requirement for implementations that only
   provide read-only support for BFD-MIB. Such devices
   can then be monitored but cannot be configured using
   this MIB module.

MODULE -- This module.

MANDATORY-GROUPS {
  bfdSessionGroup,
  bfdSessionReadOnlyGroup,
  bfdSessionPerfGroup,
  bfdNotificationGroup
}

GROUP      bfdSessionPerfHCGroup
DESCRIPTION "This group is mandatory for all systems that
            are able to support the Counter64 date type."

OBJECT      bfdSessVersionNumber
MIN-ACCESS  read-only
DESCRIPTION "Write access is not required."

OBJECT      bfdSessType
MIN-ACCESS  read-only
DESCRIPTION "Write access is not required."

OBJECT      bfdSessDestinationUdpPort
MIN-ACCESS  read-only
DESCRIPTION "Write access is not required."

OBJECT      bfdSessSourceUdpPort
MIN-ACCESS  read-only
DESCRIPTION "Write access is not required."
```

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OBJECT	bfdSessEchoSourceUdpPort
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	bfdSessAdminStatus
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	bfdSessOperMode
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	bfdSessDemandModeDesiredFlag
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	bfdSessControlPlaneIndepFlag
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	bfdSessMultipointFlag
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	bfdSessInterface
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	bfdSessSrcAddrType
SYNTAX	InetAddressType { unknown(0), ipv4(1), ipv6(2), ipv6z(4) }
MIN-ACCESS	read-only
DESCRIPTION	"Only unknown(0), ipv4(1), ipv6(2) and ipv6z(4) support are required."
OBJECT	bfdSessSrcAddr
SYNTAX	InetAddress (SIZE (0 4 16 20))
MIN-ACCESS	read-only
DESCRIPTION	"An implementation is only required to support unknown(0), ipv4(1), ipv6(2) and ipv6z(4) sizes."
OBJECT	bfdSessDstAddrType
SYNTAX	InetAddressType { unknown(0), ipv4(1), ipv6(2), ipv6z(4) }
MIN-ACCESS	read-only
DESCRIPTION	"Only unknown(0), ipv4(1), ipv6(2) and ipv6z(4) support are required."

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OBJECT bfdSessDstAddr
SYNTAX InetAddress (SIZE (0|4|16|20))
MIN-ACCESS read-only
DESCRIPTION "An implementation is only required to support
 unknown(0), ipv4(1), ipv6(2) and ipv6z(4) sizes."

OBJECT bfdSessGTSM
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

OBJECT bfdSessGTSMTTL
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

OBJECT bfdSessDesiredMinTxInterval
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

OBJECT bfdSessReqMinRxInterval
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

OBJECT bfdSessReqMinEchoRxInterval
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

OBJECT bfdSessDetectMult
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

OBJECT bfdSessAuthPresFlag
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

OBJECT bfdSessAuthenticationType
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

OBJECT bfdSessAuthenticationKeyID
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

OBJECT bfdSessAuthenticationKey
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

OBJECT bfdSessStorType
MIN-ACCESS read-only
DESCRIPTION "Write access is not required."

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```
OBJECT      bfdSessRowStatus
SYNTAX      RowStatus { active(1) }
MIN-ACCESS   read-only
DESCRIPTION  "Write access is not required."
 ::= { bfdCompliances 2 }
```

-- Units of conformance.

```
bfdSessionGroup OBJECT-GROUP
 OBJECTS {
    bfdAdminStatus,
    bfdSessNotificationsEnable,
    bfdSessVersionNumber,
    bfdSessType,
    bfdSessDestinationUdpPort,
    bfdSessSourceUdpPort,
    bfdSessEchoSourceUdpPort,
    bfdSessAdminStatus,
    bfdSessOperMode,
    bfdSessDemandModeDesiredFlag,
    bfdSessControlPlaneIndepFlag,
    bfdSessMultipointFlag,
    bfdSessInterface,
    bfdSessSrcAddrType,
    bfdSessSrcAddr,
    bfdSessDstAddrType,
    bfdSessDstAddr,
    bfdSessGTSM,
    bfdSessGTSMTTL,
    bfdSessDesiredMinTxInterval,
    bfdSessReqMinRxInterval,
    bfdSessReqMinEchoRxInterval,
    bfdSessDetectMult,
    bfdSessAuthPresFlag,
    bfdSessAuthenticationType,
    bfdSessAuthenticationKeyID,
    bfdSessAuthenticationKey,
    bfdSessStorType,
    bfdSessRowStatus
}
STATUS      current
DESCRIPTION
    "Collection of objects needed for BFD sessions."
 ::= { bfdGroups 1 }
```

```
bfdSessionReadOnlyGroup OBJECT-GROUP
```

OBJECTS {

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```
        bfdSessDiscriminator,
        bfdSessRemoteDiscr,
        bfdSessState,
        bfdSessRemoteHeardFlag,
        bfdSessDiag,
        bfdSessNegotiatedInterval,
        bfdSessNegotiatedEchoInterval,
        bfdSessNegotiatedDetectMult,
        bfdSessDiscMapIndex,
        bfdSessIpMapIndex
    }
STATUS      current
DESCRIPTION
    "Collection of read-only objects needed for BFD sessions."
 ::= { bfdGroups 2 }

bfdSessionPerfGroup OBJECT-GROUP
OBJECTS {
    bfdSessPerfCtrlPktIn,
    bfdSessPerfCtrlPktOut,
    bfdSessPerfCtrlPktDrop,
    bfdSessPerfCtrlPktDropLastTime,
    bfdSessPerfEchoPktIn,
    bfdSessPerfEchoPktOut,
    bfdSessPerfEchoPktDrop,
    bfdSessPerfEchoPktDropLastTime,
    bfdSessUpTime,
    bfdSessPerfLastSessDownTime,
    bfdSessPerfLastCommLostDiag,
    bfdSessPerfSessUpCount,
    bfdSessPerfDiscTime
}
STATUS      current
DESCRIPTION
    "Collection of objects needed to monitor the
     performance of BFD sessions."
 ::= { bfdGroups 3 }

bfdSessionPerfHCGroup OBJECT-GROUP
OBJECTS {
    bfdSessPerfCtrlPktInHC,
    bfdSessPerfCtrlPktOutHC,
    bfdSessPerfCtrlPktDropHC,
    bfdSessPerfEchoPktInHC,
    bfdSessPerfEchoPktOutHC,
    bfdSessPerfEchoPktDropHC
}
STATUS      current
```

DESCRIPTION

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```
"Collection of objects needed to monitor the
performance of BFD sessions for which the
values of bfdSessPerfPktIn, bfdSessPerfPktOut
wrap around too quickly."
 ::= { bfdGroups 4 }

bfdNotificationGroup NOTIFICATION-GROUP
  NOTIFICATIONS {
    bfdSessUp,
    bfdSessDown
  }
  STATUS      current
  DESCRIPTION
    "Set of notifications implemented in this
     module."
 ::= { bfdGroups 5 }

END
```

[7.](#) Security Considerations

As BFD may be tied into the stability of the network infrastructure (such as routing protocols), the effects of an attack on a BFD session may be very serious. This ultimately has denial-of-service effects, as links may be declared to be down (or falsely declared to be up.) As such, improper manipulation of the objects represented by this MIB may result in denial of service to a large number of end-users.

There are a number of management objects defined in this MIB module with a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations. These are the tables and objects and their sensitivity/vulnerability:

- o `bfdsessAdminStatus` - Improper change of `bfdsessAdminStatus`, from start to stop, can cause significant disruption of the connectivity to those portions of the Internet reached via the applicable remote BFD peer.
- o `bfdsessDesiredMinTxInterval`, `bfdsessReqMinRxInterval`, `bfdsessReqMinEchoRxInterval`, `bfdsessDetectMult` - Improper change of this object can cause connections to be disrupted for extremely long time periods when otherwise they would be restored in a relatively short period of time.

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There are a number of management objects defined in this MIB module with a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP.

- o The bfdSessTable may be used to directly configure BFD sessions. The bfdSessMapTable can be used indirectly in the same way. Unauthorized access to objects in this table could result in disruption of traffic on the network. This is especially true if an unauthorized user configures enough tables to invoke a denial of service attack on the device where they are configured, or on a remote device where the sessions terminate.

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

- o The bfdSessPerfTable both allows access to the performance characteristics of BFD sessions. Network administrators not wishing to show this information should consider this table sensitive.

The bfdSessAuthenticationType, bfdSessAuthenticationKeyID, and bfdSessAuthenticationKey objects hold security methods and associated security keys of BFD sessions. These objects SHOULD be considered highly sensitive objects. In order for these sensitive information from being improperly accessed, implementors MAY wish to disallow read and create access to these objects.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure "for example by using IPSec", even then, there is no control as to who on the secure network is allowed to access and GET/SET "read/change/create/delete" the objects in these MIB modules.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework "see [\[RFC3410\], section 8](#)", including full support for the SNMPv3 cryptographic mechanisms "for authentication and privacy".

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to

enable cryptographic security. It is then a customer/operator

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responsibility to ensure that the SNMP entity giving access to an instance of this MIB module, is properly configured to give access to the objects only to those principals "users" that have legitimate rights to indeed GET or SET "change/create/delete" them.

8. IANA Considerations

The MIB module in this document uses the following IANA-assigned OBJECT IDENTIFIER values recorded in the SMI Numbers registry:

Descriptor	OBJECT IDENTIFIER value
-----	-----
bfmMib	{ mib-2 XXX }

[Editor's Note (to be removed prior to publication): the IANA is requested to assign a value for "XXX" under the 'mib-2' subtree and to record the assignment in the SMI Numbers registry. When the assignment has been made, the RFC Editor is asked to replace "XXX" (here and in the MIB module) with the assigned value and to remove this note.]

This document also requests IANA to manage the registry for the BfdDiagTC object.

9. References

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Appendix A. Acknowledgments

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