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Definitions of Textual Conventions (TCs) for  
Bidirectional Forwarding Detection (BFD) Management  
draft-ietf-bfd-tc-mib-06

## Abstract

This draft defines two Management Information Base (MIB) modules that contain Textual Conventions to represent commonly used Bidirectional Forwarding Detection (BFD) management information. The intent is that these TEXTUAL CONVENTIONS (TCs) will be imported and used in BFD related MIB modules that would otherwise define their own representations.

## Requirements Language

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 BCP 14, RFC 2119 [RFC2119].

## Status of This Memo

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## 1. Introduction

This document defines two MIB modules that contain Textual Conventions for Bidirectional Forwarding Detection (BFD) protocols. These Textual Conventions should be imported by MIB modules which manage BFD protocols.

Note that names of Textual Conventions defined in this document are prefixed with either "Bfd" or "IANA" to make it obvious to readers that some are specific to BFD modules, while others are IANA maintained.

For an introduction to the concepts of BFD, see [RFC5880], [RFC5881], [RFC5883], [RFC6428] and [RFC7130].

## 2. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [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, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

### 3. BFD Textual Conventions MIB Definitions

This MIB module makes references to the following documents: [RFC2578], [RFC2579], [RFC5880], [RFC5881], [RFC5883], [RFC6428] and [RFC7130].

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

```
IMPORTS
```

```
    MODULE-IDENTITY, mib-2, Unsigned32
    FROM SNMPv2-SMI -- [RFC2578]
```

```
    TEXTUAL-CONVENTION
    FROM SNMPv2-TC; -- [RFC2579]
```

```
bfdTCStdMib MODULE-IDENTITY
```

```
    LAST-UPDATED
        "201404131200Z" -- 13 April 2014 12:00:00 EST
```

```
    ORGANIZATION "IETF Bidirectional Forwarding Detection
        Working Group"
```

```
    CONTACT-INFO
```

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        Brocade
        Email: tnadeau@lucidvision.com
```

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        Zafar Ali
        Cisco Systems, Inc.
        Email: zali@cisco.com
```

```
        Nobo Akiya
        Cisco Systems, Inc.
        Email: nobo@cisco.com
```

```
    Comments about this document should be emailed directly
    to the BFD working group mailing list at
    rtg-bfd@ietf.org"
```

```
DESCRIPTION
```

"Copyright (C) The IETF Trust (2014). The initial version of this MIB module was published in RFC xxxx. For full legal notices see the RFC itself. Supplementary information may be available on:  
<http://www.ietf.org/copyrights/ianamib.html>"

-- RFC Ed.: RFC-editor pls fill in xxxx

REVISION "201404131200Z" -- 13 April 2014 12:00:00 EST  
DESCRIPTION

"Initial version. Published as RFC xxxx."

-- RFC Ed.: RFC-editor pls fill in xxxx

::= { mib-2 XXX }

-- RFC Ed.: RFC-editor pls fill in XXX, see section 5 for details

BfdSessIndexTC ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"An index used to uniquely identify BFD sessions."

SYNTAX Unsigned32 (1..4294967295)

BfdIntervalTC ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"The BFD interval in microseconds."

SYNTAX Unsigned32 (0..4294967295)

BfdMultiplierTC ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"The BFD failure detection multiplier."

SYNTAX Unsigned32 (1..255)

BfdCtrlDestPortNumberTC ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"UDP destination port number of BFD control packets.

3784 represents single hop BFD session.

4784 represents multi hop BFD session.

6784 represents BFD on LAG session.

However, syntax is left open to wider range of values purposely for two reasons:

1. Implementation uses non-compliant port number for valid proprietary reason.
2. Potential future extension drafts.

The value of 0 is a special, reserved value used to indicate special conditions and should not be considered a valid port number."

## REFERENCE

"Use of port 3784 from Katz, D. and D. Ward, Bidirectional Forwarding Detection (BFD) for IPv4 and IPv6 (Single Hop), RFC 5881, June 2010.

Use of port 4784 from Katz, D. and D. Ward, Bidirectional Forwarding Detection (BFD) for Multihop Paths, RFC 5883, June 2010.

Use of port 6784 from Bhatia, M., Chen, M., Boutros, S., Binderberger, M., and J. Haas, Bidirectional Forwarding Detection (BFD) on Link Aggregation Group (LAG) Interfaces, RFC 7130, February 2014."

SYNTAX Unsigned32 (0..65535)

BfdCtrlSourcePortNumberTC ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"UDP source port number of BFD control packets.

However, syntax is left open to wider range of values purposely for two reasons:

1. Implementation uses non-compliant port number for valid proprietary reason.
2. Potential future extension drafts.

The value of 0 is a special, reserved value used to indicate special conditions and should not be considered a valid port number."

## REFERENCE

"Port 49152..65535 from RFC5881"

SYNTAX Unsigned32 (0..65535)

END

IANA-BFD-TC-STD-MIB DEFINITIONS ::= BEGIN

## IMPORTS

MODULE-IDENTITY, mib-2  
FROM SNMPv2-SMI -- [RFC2578]

TEXTUAL-CONVENTION  
FROM SNMPv2-TC; -- [RFC2579]

## ianaBfdTCStdMib MODULE-IDENTITY

## LAST-UPDATED

"201404131200Z" -- 13 April 2014 12:00:00 EST

## ORGANIZATION

"IANA"

## CONTACT-INFO

"Internet Assigned Numbers Authority  
Postal: 4676 Admiralty Way, Suite 330  
Marina del Rey, CA 90292  
Tel: +1 310 823 9358  
E-Mail: iana@iana.org"

## DESCRIPTION

"Copyright (C) The IETF Trust (2014). The initial version of this MIB module was published in RFC xxxx. For full legal notices see the RFC itself. Supplementary information may be available on:  
<http://www.ietf.org/copyrights/ianamib.html>"

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## REVISION

"201404131200Z" -- 13 April 2014 12:00:00 EST

## DESCRIPTION

"Initial version. Published as RFC xxxx."

-- RFC Ed.: RFC-editor pls fill in xxxx

::= { mib-2 XXX }

-- RFC Ed.: RFC-editor pls fill in XXX, see section 5 for details

IANAbfdDiagTC ::= TEXTUAL-CONVENTION

STATUS current

## DESCRIPTION

"A common BFD diagnostic code."

## REFERENCE

"Katz, D. and D. Ward, Bidirectional Forwarding Detection (BFD), RFC 5880, June 2010.

Allan, D., Swallow, G., and Drake, J., Proactive Connectivity

Verification, Continuity Check, and Remote Defect Indication for the MPLS Transport Profile, RFC 6428, November 2011."

```
SYNTAX INTEGER {
    noDiagnostic(0),
    controlDetectionTimeExpired(1),
    echoFunctionFailed(2),
    neighborSignaledSessionDown(3),
    forwardingPlaneReset(4),
    pathDown(5),
    concatenatedPathDown(6),
    administrativelyDown(7),
    reverseConcatenatedPathDown(8),
    misConnectivityDefect(9)
}
```

IANAbfdSessTypeTC ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"BFD session type"

REFERENCE

"Katz, D. and D. Ward, Bidirectional Forwarding Detection (BFD), RFC 5880, June 2010.

Katz, D. and D. Ward, Bidirectional Forwarding Detection (BFD) for IPv4 and IPv6 (Single Hop), RFC 5881, June 2010.

Katz, D. and D. Ward, Bidirectional Forwarding Detection (BFD) for Multihop Paths, RFC 5883, June 2010."

```
SYNTAX INTEGER {
    singleHop(1),
    multiHopTotallyArbitraryPaths(2),
    multiHopOutOfBandSignaling(3),
    multiHopUnidirectionalLinks(4)
}
```

IANAbfdSessOperModeTC ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"BFD session operating mode"

REFERENCE

"Katz, D. and D. Ward, Bidirectional Forwarding Detection (BFD), RFC 5880, June 2010."

```
SYNTAX INTEGER {
    asyncModeWEchoFunction(1),
    asynchModeWOEchoFunction(2),
}
```

```
    demandModeWEchoFunction(3),
    demandModeWOEchoFunction(4)
}
```

IANAbfdSessStateTC ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"BFD session state. State failing(5) is only applicable if corresponding session is running in BFD version 0."

REFERENCE

"RFC 5880 - Bidirectional Forwarding Detection (BFD), Katz, D., Ward, D., June 2010."

SYNTAX INTEGER {

```
    adminDown(1),
    down(2),
    init(3),
    up(4),
    failing(5)
}
```

IANAbfdSessAuthenticationTypeTC ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"BFD authentication type"

REFERENCE

"Sections 4.2 - 4.4 from Katz, D. and D. Ward, Bidirectional Forwarding Detection (BFD), RFC 5880, June 2010."

SYNTAX INTEGER {

```
    noAuthentication(-1),
    reserved(0),
    simplePassword(1),
    keyedMD5(2),
    meticulousKeyedMD5(3),
    keyedSHA1(4),
    meticulousKeyedSHA1(5)
}
```

IANAbfdSessAuthenticationKeyTC ::= TEXTUAL-CONVENTION

DISPLAY-HINT "1x "

STATUS current

DESCRIPTION

"BFD authentication key type."

An IANAbfdSessAuthenticationKeyTC is always interpreted within the context of an IANAbfdSessAuthenticationTypeTC value. Every usage of the IANAbfdSessAuthenticationTypeTC textual convention is required to specify the



IANAbfdSessAuthenticationKeyTC object that provides the context. It is suggested that the IANAbfdSessAuthenticationKeyTC object be logically registered before the object(s) that use the IANAbfdSessAuthenticationKeyTC textual convention, if they appear in the same logical row.

The value of a IANAbfdSessAuthenticationKeyTC must always be consistent with the value of the associated IANAbfdSessAuthenticationTypeTC object. Attempts to set a IANAbfdSessAuthenticationKeyTC object to a value inconsistent with the associated IANAbfdSessAuthenticationTypeTC must fail with an inconsistentValue error.

The following size constraints for a IANAbfdSessAuthenticationKeyTC object are defined for the associated IANAbfdSessAuthenticationTypeTC values show below:

```
noAuthentication(-1): SIZE(0)
reserved(0): SIZE(0)
simplePassword(1): SIZE(1..16)
keyedMD5(2): SIZE(16)
meticulousKeyedMD5(3): SIZE(16)
keyedSHA1(4): SIZE(20)
meticulousKeyedSHA1(5): SIZE(20)
```

When this textual convention is used as the syntax of an index object, there may be issues with the limit of 128 sub-identifiers specified in SMIV2, STD 58. In this case, the object definition MUST include a 'SIZE' clause to limit the number of potential instance sub-identifiers; otherwise the applicable constraints MUST be stated in the appropriate conceptual row DESCRIPTION clauses, or in the surrounding documentation if there is no single DESCRIPTION clause that is appropriate."

REFERENCE

"RFC5880, Sections 4.2 - 4.4"

SYNTAX OCTET STRING(SIZE(0..252))

END

#### 4. Security Considerations

This module does not define any management objects. Instead, it defines a set of textual conventions which may be used by other BFD MIB modules to define management objects.

Meaningful security considerations can only be written in the MIB modules that define management objects. Therefore, this document has no impact on the security of the Internet.

## 5. IANA Considerations

This document provides the base definition of the IANA-BFD-TC-STD-MIB module. This MIB module is under the direct control of IANA. Please see the most updated version of this MIB at <<http://www.iana.org/assignments/bfdtc-mib>>. [RFC-Editor's Note (to be removed prior to publication): the IANA is requested to create page pointed to by URL.] Assignments of IANA-BFD-TC-STD-MIB are via IETF Review [RFC5226].

This MIB makes reference to the following documents: [RFC2578], [RFC2579], [RFC5880], [RFC5881] and [RFC5883], [RFC6428] and [RFC7130].

IANA assigned an OID to the BFD-TC-STD-MIB module specified in this document as { mib-2 XXX }. [RFC-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.]

IANA assigned an OID to the IANA-BFD-TC-STD-MIB module specified in this document as { mib-2 YYY }. [RFC-Editor's Note (to be removed prior to publication): the IANA is requested to assign a value for "YYY" 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 "YYY" (here and in the MIB module) with the assigned value and to remove this note.]

## 6. Acknowledgments

Authors would like to thank Adrian Farrel and Jeffrey Haas for performing thorough reviews and providing number of suggestions. Authors would also like to thank David Ward for his comments and suggestions.

## 7. References

### 7.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

- [RFC2578] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.
- [RFC2579] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Textual Conventions for SMIv2", STD 58, RFC 2579, April 1999.
- [RFC2580] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Conformance Statements for SMIv2", STD 58, RFC 2580, April 1999.
- [RFC5880] Katz, D. and D. Ward, "Bidirectional Forwarding Detection (BFD)", RFC 5880, June 2010.
- [RFC5881] Katz, D. and D. Ward, "Bidirectional Forwarding Detection (BFD) for IPv4 and IPv6 (Single Hop)", RFC 5881, June 2010.
- [RFC5883] Katz, D. and D. Ward, "Bidirectional Forwarding Detection (BFD) for Multihop Paths", RFC 5883, June 2010.
- [RFC6428] Allan, D., Swallow Ed. , G., and J. Drake Ed. , "Proactive Connectivity Verification, Continuity Check, and Remote Defect Indication for the MPLS Transport Profile", RFC 6428, November 2011.
- [RFC7130] Bhatia, M., Chen, M., Boutros, S., Binderberger, M., and J. Haas, "Bidirectional Forwarding Detection (BFD) on Link Aggregation Group (LAG) Interfaces", RFC 7130, February 2014.

## 7.2. Informative References

- [RFC3410] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", RFC 3410, December 2002.
- [RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 5226, May 2008.

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