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Definitions of Textual Conventions (TCs) for Bidirectional Forwarding Detection (BFD) Management

Abstract

This document 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.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 5741.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc7330.

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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 that 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, whereas others are IANA maintained.

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

1.1. 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].

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                                 -- RFC 2578

     TEXTUAL-CONVENTION
         FROM SNMPv2-TC;                                 -- RFC 2579

 bfdTCStdMib MODULE-IDENTITY
     LAST-UPDATED
                "201408120000Z" -- 12 August 2014 00:00:00 GMT

     ORGANIZATION "IETF Bidirectional Forwarding Detection
                   Working Group"
     CONTACT-INFO
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          Comments about this document should be emailed directly
          to the BFD working group mailing list at
          rtg-bfd@ietf.org"

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      REVISION "201408120000Z" -- 12 August 2014 00:00:00 GMT
      DESCRIPTION
        "Initial version.  Published as RFC 7330."

  ::= { mib-2 223 }

  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 Link Aggregation Group (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 documents.
```

```
         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 documents.

         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                                 -- RFC 2578

        TEXTUAL-CONVENTION
            FROM SNMPv2-TC;                                 -- RFC 2579
```

```
    ianaBfdTCStdMib MODULE-IDENTITY

        LAST-UPDATED
                   "201408120000Z" -- 12 August 2014 00:00:00 GMT
        ORGANIZATION
                   "IANA"
        CONTACT-INFO
                   "Internet Assigned Numbers Authority
                    Postal: 12025 Waterfront Drive, Suite 300
                            Los Angeles, CA  90094-2536
                    Tel:    +1 310 301 5800
                    EMail:  iana@iana.org"

        DESCRIPTION
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        REVISION
          "201408120000Z" -- 12 August 2014 00:00:00 GMT
        DESCRIPTION
          "Initial version.  Published as RFC 7330."

    ::= { mib-2 224 }

    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
        "Katz, D. and D. Ward, Bidirectional Forwarding
         Detection (BFD), RFC 5880, 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 an IANAbfdSessAuthenticationKeyTC must
        always be consistent with the value of the associated
        IANAbfdSessAuthenticationTypeTC object.  Attempts to set an
        IANAbfdSessAuthenticationKeyTC object to a value inconsistent
        with the associated IANAbfdSessAuthenticationTypeTC must fail
        with an inconsistentValue error.

        The following size constraints for an
        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
        "Sections 4.2 - 4.4 from Katz, D. and D. Ward, Bidirectional
         Forwarding Detection (BFD), RFC 5880, June 2010."
    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. This document has therefore 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. See Section 3 for the initial contents. See the most updated version of this MIB at <http://www.iana.org/assignments/ianabfdtcstd-mib>. 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-2 223 }.

IANA assigned an OID to the IANA-BFD-TC-STD-MIB module specified in this document as { mib-2 224 }.

6. Acknowledgments

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7. References

7.1. Normative References

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[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.

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[RFC5880] Katz, D. and D. Ward, "Bidirectional Forwarding Detection (BFD)", RFC 5880, June 2010.

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[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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