Definitions of Managed Objects for the Fourth Version of the Border Gateway Protocol (BGP-4) using SMIv2

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

1. 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 used for managing the Border Gateway Protocol Version 4 or lower [1, 2].

2. The SNMPv2 Network Management Framework

The SNMPv2 Network Management Framework consists of four major components. They are:

- **RFC 1442** which defines the SMI, the mechanisms used for describing and naming objects for the purpose of management.

- **STD 17, RFC 1213** defines MIB-II, the core set of managed objects for the Internet suite of protocols.

- **RFC 1445** which defines the administrative and other architectural aspects of the framework.

- **RFC 1448** which defines the protocol used for network access to managed objects.

The Framework permits new objects to be defined for the purpose of experimentation and evaluation.
3. Object Definitions

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) defined in the SMI. In particular, each object type is named by an OBJECT IDENTIFIER, an administratively assigned name. The object type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the descriptor, to refer to the object type.

4. Overview

These objects are used to control and manage a BGP-4 implementation.

Apart from a few system-wide scalar objects, this MIB is broken into three tables: the BGP Peer Table, the BGP Received Path Attribute Table, and the BGP-4 Received Path Attribute Table. The BGP Peer Table contains information about state and current activity of connections with the BGP peers. The Received Path Attribute Table contains path attributes received from all peers running BGP version 3 or less. The BGP-4 Received Path Attribute Table contains path attributes received from all BGP-4 peers. The actual attributes used in determining a route are a subset of the received attribute tables after local routing policy has been applied.

5. Definitions

BGP4-MIB DEFINITIONS ::= BEGIN

IMPORTS
  MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
  IpAddress, Integer32, Counter32, Gauge32
FROM SNMPv2-SMI
mib-2
FROM RFC1213-MIB;

bgp MODULE-IDENTITY
  LAST-UPDATED "9405050000Z"
  ORGANIZATION "IETF BGP Working Group"
  CONTACT-INFO
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bgpVersion OBJECT-TYPE
SYNTAX OCTET STRING (SIZE (1..255))
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Vector of supported BGP protocol version numbers. Each peer negotiates the version from this vector. Versions are identified via the string of bits contained within this object. The first octet contains bits 0 to 7, the second octet contains bits 8 to 15, and so on, with the most significant bit referring to the lowest bit number in the octet (e.g., the MSB of the first octet refers to bit 0). If a bit, i, is present and set, then the version (i+1) of the BGP is supported."
 ::= { bgp 1 }

bgpLocalAs OBJECT-TYPE
SYNTAX INTEGER (0..65535)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The local autonomous system number."
 ::= { bgp 2 }

-- BGP Peer table. This table contains, one entry per BGP peer, information about the BGP peer.

bgpPeerTable OBJECT-TYPE
SYNTAX SEQUENCE OF BgpPeerEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"BGP peer table. This table contains, one entry per BGP peer, information about the connections with BGP peers."
 ::= { bgp 3 }
bgpPeerEntry OBJECT-TYPE
SYNTAX     BgpPeerEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"Entry containing information about the
connection with a BGP peer."
INDEX { bgpPeerRemoteAddr }
 ::= { bgpPeerTable 1 }

BgpPeerEntry ::= SEQUENCE {
   bgpPeerIdentifier
      IpAddress,
   bgpPeerState
      INTEGER,
   bgpPeerAdminStatus
      INTEGER,
   bgpPeerNegotiatedVersion
      Integer32,
   bgpPeerLocalAddr
      IpAddress,
   bgpPeerLocalPort
      INTEGER,
   bgpPeerRemoteAddr
      IpAddress,
   bgpPeerRemotePort
      INTEGER,
   bgpPeerRemoteAs
      INTEGER,
   bgpPeerInUpdates
      Counter32,
   bgpPeerOutUpdates
      Counter32,
   bgpPeerInTotalMessages
      Counter32,
   bgpPeerOutTotalMessages
      Counter32,
   bgpPeerLastError
      OCTET STRING,
   bgpPeerFsmEstablishedTransitions
      Counter32,
   bgpPeerFsmEstablishedTime
      Gauge32,
   bgpPeerConnectRetryInterval
      INTEGER,
   bgpPeerHoldTime
      INTEGER,
   bgpPeerKeepAlive
     }
bgpPeerIdentifier OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The BGP Identifier of this entry’s BGP peer."
 ::= { bgpPeerEntry 1 }

bgpPeerState OBJECT-TYPE
SYNTAX INTEGER {
  idle(1),
  connect(2),
  active(3),
  opensent(4),
  openconfirm(5),
  established(6)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The BGP peer connection state."
 ::= { bgpPeerEntry 2 }

bgpPeerAdminStatus OBJECT-TYPE
SYNTAX INTEGER {
  stop(1),
  start(2)
}
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The desired state of the BGP connection. A transition from ‘stop’ to ‘start’ will cause the BGP Start Event to be generated."
A transition from 'start' to 'stop' will cause the BGP Stop Event to be generated. This parameter can be used to restart BGP peer connections. Care should be used in providing write access to this object without adequate authentication.

::= { bgpPeerEntry 3 }

bgpPeerNegotiatedVersion OBJECT-TYPE
SYNTAX     Integer32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "The negotiated version of BGP running between the two peers."
::= { bgpPeerEntry 4 }

bgpPeerLocalAddr OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "The local IP address of this entry’s BGP connection."
::= { bgpPeerEntry 5 }

bgpPeerLocalPort OBJECT-TYPE
SYNTAX     INTEGER (0..65535)
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "The local port for the TCP connection between the BGP peers."
::= { bgpPeerEntry 6 }

bgpPeerRemoteAddr OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "The remote IP address of this entry’s BGP peer."
::= { bgpPeerEntry 7 }

bgpPeerRemotePort OBJECT-TYPE
SYNTAX     INTEGER (0..65535)
MAX-ACCESS read-only
STATUS     current
DESCRIPTION

"The remote port for the TCP connection between the BGP peers. Note that the objects bgpPeerLocalAddr, bgpPeerLocalPort, bgpPeerRemoteAddr and bgpPeerRemotePort provide the appropriate reference to the standard MIB TCP connection table."

::= { bgpPeerEntry 8 }

bgpPeerRemoteAs OBJECT-TYPE
SYNTAX       INTEGER (0..65535)
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
"The remote autonomous system number."
::= { bgpPeerEntry 9 }

bgpPeerInUpdates OBJECT-TYPE
SYNTAX       Counter32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
"The number of BGP UPDATE messages received on this connection. This object should be initialized to zero (0) when the connection is established."
::= { bgpPeerEntry 10 }

bgpPeerOutUpdates OBJECT-TYPE
SYNTAX       Counter32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
"The number of BGP UPDATE messages transmitted on this connection. This object should be initialized to zero (0) when the connection is established."
::= { bgpPeerEntry 11 }

bgpPeerInTotalMessages OBJECT-TYPE
SYNTAX       Counter32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
"The total number of messages received from the remote peer on this connection. This object should be initialized to zero
::= { bgpPeerEntry 12 }

bgpPeerOutTotalMessages OBJECT-TYPE
SYNTAX     Counter32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The total number of messages transmitted to
the remote peer on this connection. This
object should be initialized to zero when
the connection is established."
::= { bgpPeerEntry 13 }

bgpPeerLastError OBJECT-TYPE
SYNTAX     OCTET STRING (SIZE (2))
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The last error code and subcode seen by this
peer on this connection. If no error has
occurred, this field is zero. Otherwise, the
first byte of this two byte OCTET STRING
contains the error code, and the second byte
contains the subcode."
::= { bgpPeerEntry 14 }

bgpPeerFsmEstablishedTransitions OBJECT-TYPE
SYNTAX     Counter32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The total number of times the BGP FSM
transitioned into the established state."
::= { bgpPeerEntry 15 }

bgpPeerFsmEstablishedTime OBJECT-TYPE
SYNTAX     Gauge32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"This timer indicates how long (in
seconds) this peer has been in the
Established state or how long
since this peer was last in the
Established state. It is set to zero when
a new peer is configured or the router is
booted."
 ::= { bgpPeerEntry 16 }

bgpPeerConnectRetryInterval OBJECT-TYPE
SYNTAX INTEGER (1..65535)
MAX-ACCESS read-write
STATUS current
DESCRIPTION "Time interval in seconds for the ConnectRetry timer. The suggested value for this timer is 120 seconds."
 ::= { bgpPeerEntry 17 }

bgpPeerHoldTime OBJECT-TYPE
SYNTAX INTEGER (0 | 3..65535)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Time interval in seconds for the Hold Timer established with the peer. The value of this object is calculated by this BGP speaker by using the smaller of the value in bgpPeerHoldTimeConfigured and the Hold Time received in the OPEN message. This value must be at least three seconds if it is not zero (0) in which case the Hold Timer has not been established with the peer, or, the value of bgpPeerHoldTimeConfigured is zero (0)."
 ::= { bgpPeerEntry 18 }

bgpPeerKeepAlive OBJECT-TYPE
SYNTAX INTEGER (0 | 1..21845)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Time interval in seconds for the KeepAlive timer established with the peer. The value of this object is calculated by this BGP speaker such that, when compared with bgpPeerHoldTime, it has the same proportion as what bgpPeerKeepAliveConfigured has when compared with bgpPeerHoldTimeConfigured. If the value of this object is zero (0), it indicates that the KeepAlive timer has not been established with the peer, or, the value of bgpPeerKeepAliveConfigured is zero (0)."
::= { bgpPeerEntry 19 }

bgpPeerHoldTimeConfigured OBJECT-TYPE
SYNTAX     INTEGER ( 0 | 3..65535 )
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"Time interval in seconds for the Hold Time configured for this BGP speaker with this peer. This value is placed in an OPEN message sent to this peer by this BGP speaker, and is compared with the Hold Time field in an OPEN message received from the peer when determining the Hold Time (bgpPeerHoldTime) with the peer. This value must not be less than three seconds if it is not zero (0) in which case the Hold Time is NOT to be established with the peer. The suggested value for this timer is 90 seconds."

::= { bgpPeerEntry 20 }

bgpPeerKeepAliveConfigured OBJECT-TYPE
SYNTAX     INTEGER ( 0 | 1..21845 )
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"Time interval in seconds for the KeepAlive timer configured for this BGP speaker with this peer. The value of this object will only determine the KEEPALIVE messages’ frequency relative to the value specified in bgpPeerHoldTimeConfigured; the actual time interval for the KEEPALIVE messages is indicated by bgpPeerKeepAlive. A reasonable maximum value for this timer would be configured to be one third of that of bgpPeerHoldTimeConfigured. If the value of this object is zero (0), no periodical KEEPALIVE messages are sent to the peer after the BGP connection has been established. The suggested value for this timer is 30 seconds."
bgpPeerMinASOriginationInterval OBJECT-TYPE
SYNTAX     INTEGER (1..65535)
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"Time interval in seconds for the
MinASOriginationInterval timer.
The suggested value for this timer is 15
seconds."
::= { bgpPeerEntry 22 }

bgpPeerMinRouteAdvertisementInterval OBJECT-TYPE
SYNTAX     INTEGER (1..65535)
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"Time interval in seconds for the
MinRouteAdvertisementInterval timer.
The suggested value for this timer is 30
seconds."
::= { bgpPeerEntry 23 }

bgpPeerInUpdateElapsedTime OBJECT-TYPE
SYNTAX     Gauge32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"Elapsed time in seconds since the last BGP
UPDATE message was received from the peer.
Each time bgpPeerInUpdates is incremented,
the value of this object is set to zero
(0)."
::= { bgpPeerEntry 24 }

bgpIdentifier OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The BGP Identifier of local system."
::= { bgp 4 }
-- Received Path Attribute Table.  This table contains,
-- one entry per path to a network, path attributes
-- received from all peers running BGP version 3 or
-- less.  This table is deprecated.

bgpRcvdPathAttrTable OBJECT-TYPE
SYNTAX     SEQUENCE OF BgpPathAttrEntry
MAX-ACCESS not-accessible
STATUS     obsolete
DESCRIPTION
"The BGP Received Path Attribute Table
contains information about paths to
destination networks received from all
peers running BGP version 3 or less."
 ::= { bgp 5 }

bgpPathAttrEntry OBJECT-TYPE
SYNTAX     BgpPathAttrEntry
MAX-ACCESS not-accessible
STATUS     obsolete
DESCRIPTION
"Information about a path to a network."
INDEX { bgpPathAttrDestNetwork,
        bgpPathAttrPeer   }
 ::= { bgpRcvdPathAttrTable 1 }

BgpPathAttrEntry ::= SEQUENCE {
    bgpPathAttrPeer
        IpAddress,
    bgpPathAttrDestNetwork
        IpAddress,
    bgpPathAttrOrigin
        INTEGER,
    bgpPathAttrASPath
        OCTET STRING,
    bgpPathAttrNextHop
        IpAddress,
    bgpPathAttrInterASMetric
        Integer32
}

bgpPathAttrPeer OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     obsolete
DESCRIPTION
"The IP address of the peer where the path
information was learned."
::= { bgpPathAttrEntry 1 }

bgpPathAttrDestNetwork OBJECT-TYPE
SYNTAX  IpAddress
MAX-ACCESS read-only
STATUS  obsolete
DESCRIPTION
"The address of the destination network."
::= { bgpPathAttrEntry 2 }

bgpPathAttrOrigin OBJECT-TYPE
SYNTAX  INTEGER {
  igp(1), -- networks are interior
  egp(2), -- networks learned via EGP
  incomplete(3) -- undetermined
}
MAX-ACCESS read-only
STATUS  obsolete
DESCRIPTION
"The ultimate origin of the path information."
::= { bgpPathAttrEntry 3 }

bgpPathAttrASPath OBJECT-TYPE
SYNTAX  OCTET STRING (SIZE (2..255))
MAX-ACCESS read-only
STATUS  obsolete
DESCRIPTION
"The set of ASs that must be traversed to
reach the network. This object is
probably best represented as SEQUENCE OF
INTEGER. For SMI compatibility, though,
it is represented as OCTET STRING. Each
AS is represented as a pair of octets
according to the following algorithm:

  first-byte-of-pair = ASNumber / 256;
  second-byte-of-pair = ASNumber & 255;"
::= { bgpPathAttrEntry 4 }

bgpPathAttrNextHop OBJECT-TYPE
SYNTAX  IpAddress
MAX-ACCESS read-only
STATUS  obsolete
DESCRIPTION
"The address of the border router that
should be used for the destination
network."
::= { bgpPathAttrEntry 5 }

Willis, Burruss & Chu
bgpPathAttrInterASMetric OBJECT-TYPE
SYNTAX     Integer32
MAX-ACCESS read-only
STATUS     obsolete
DESCRIPTION
 "The optional inter-AS metric. If this
 attribute has not been provided for this
 route, the value for this object is 0."
 ::= { bgpPathAttrEntry 6 }

-- BGP-4 Received Path Attribute Table. This table
-- contains, one entry per path to a network, path
-- attributes received from all peers running BGP-4.

bgp4PathAttrTable OBJECT-TYPE
SYNTAX     SEQUENCE OF Bgp4PathAttrEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
 "The BGP-4 Received Path Attribute Table
 contains information about paths to
destination networks received from all
BGP4 peers."
 ::= { bgp 6 }

Bgp4PathAttrEntry OBJECT-TYPE
SYNTAX     Bgp4PathAttrEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
 "Information about a path to a network."
INDEX { bgp4PathAttrIpAddress,
           bgp4PathAttrIpAddressPrefixLen,
           bgp4PathAttrPeer }
 ::= { bgp4PathAttrTable 1 }

Bgp4PathAttrEntry ::= SEQUENCE {
   bgp4PathAttrPeer
      IpAddress,
   bgp4PathAttrIpAddressPrefixLen
      INTEGER,
   bgp4PathAttrIpAddressPrefix
      IpAddress,
   bgp4PathAttrOrigin
      INTEGER,
   bgp4PathAttrASPathSegment
}
OCTET STRING,
bgp4PathAttrNextHop
IpAddress,
bgp4PathAttrMultiExitDisc
INTEGER,
bgp4PathAttrLocalPref
INTEGER,
bgp4PathAttrAtomicAggregate
INTEGER,
bgp4PathAttrAggregatorAS
INTEGER,
bgp4PathAttrAggregatorAddr
IpAddress,
bgp4PathAttrCalcLocalPref
INTEGER,
bgp4PathAttrBest
INTEGER,
bgp4PathAttrUnknown
OCTET STRING

bgp4PathAttrPeer OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The IP address of the peer where the path information was learned."
::= { bgp4PathAttrEntry 1 }

bgp4PathAttrIpAddrPrefixLen OBJECT-TYPE
SYNTAX     INTEGER (0..32)
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"Length in bits of the IP address prefix in the Network Layer Reachability Information field."
::= { bgp4PathAttrEntry 2 }

bgp4PathAttrIpAddrPrefix OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"An IP address prefix in the Network Layer Reachability Information field. This object
is an IP address containing the prefix with length specified by bgp4PathAttrIpAddrPrefixLen. Any bits beyond the length specified by bgp4PathAttrIpAddrPrefixLen are zeroed.

::= { bgp4PathAttrEntry 3 }

bgp4PathAttrOrigin OBJECT-TYPE
SYNTAX INTEGER {
  igp(1), -- networks are interior
  egp(2), -- networks learned
    -- via EGP
  incomplete(3) -- undetermined
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The ultimate origin of the path information."
::= { bgp4PathAttrEntry 4 }

bgp4PathAttrASPathSegment OBJECT-TYPE
SYNTAX OCTET STRING (SIZE (2..255))
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The sequence of AS path segments. Each AS path segment is represented by a triple <type, length, value>.

The type is a 1-octet field which has two possible values:
  1  AS_SET: unordered set of ASs a route in the UPDATE message has traversed
  2  AS_SEQUENCE: ordered set of ASs a route in the UPDATE message has traversed.

The length is a 1-octet field containing the number of ASs in the value field.

The value field contains one or more AS numbers, each AS is represented in the octet string as a pair of octets according to the following algorithm:
first-byte-of-pair = ASNumber / 256;
second-byte-of-pair = ASNumber & 255;

::= { bgp4PathAttrEntry 5 }

bgp4PathAttrNextHop OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "The address of the border router that should be used for the destination
  network."
::= { bgp4PathAttrEntry 6 }

bgp4PathAttrMultiExitDisc OBJECT-TYPE
SYNTAX     INTEGER (-1..2147483647)
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "This metric is used to discriminate between multiple exit points to an
  adjacent autonomous system. A value of -1 indicates the absence of this
  attribute."
::= { bgp4PathAttrEntry 7 }

bgp4PathAttrLocalPref OBJECT-TYPE
SYNTAX     INTEGER (-1..2147483647)
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "The originating BGP4 speaker’s degree of preference for an advertised route. A
  value of -1 indicates the absence of this attribute."
::= { bgp4PathAttrEntry 8 }

bgp4PathAttrAtomicAggregate OBJECT-TYPE
SYNTAX     INTEGER {
            lessSpecificRouteNotSelected(1),
            lessSpecificRouteSelected(2)
        }
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "Whether or not the local system has selected a less specific route without
  selecting a more specific route."
::= { bgp4PathAttrEntry 9 }
bgp4PathAttrAggregatorAS OBJECT-TYPE
SYNTAX  INTEGER (0..65535)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The AS number of the last BGP4 speaker that performed route aggregation. A value of zero (0) indicates the absence of this attribute."
::= { bgp4PathAttrEntry 10 }

bgp4PathAttrAggregatorAddr OBJECT-TYPE
SYNTAX  IpAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The IP address of the last BGP4 speaker that performed route aggregation. A value of 0.0.0.0 indicates the absence of this attribute."
::= { bgp4PathAttrEntry 11 }

bgp4PathAttrCalcLocalPref OBJECT-TYPE
SYNTAX  INTEGER (-1..2147483647)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The degree of preference calculated by the receiving BGP4 speaker for an advertised route. A value of -1 indicates the absence of this attribute."
::= { bgp4PathAttrEntry 12 }

bgp4PathAttrBest OBJECT-TYPE
SYNTAX  INTEGER {
    false(1),-- not chosen as best route
    true(2) -- chosen as best route
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"An indication of whether or not this route was chosen as the best BGP4 route."
::= { bgp4PathAttrEntry 13 }

bgp4PathAttrUnknown OBJECT-TYPE
SYNTAX  OCTET STRING (SIZE(0..255))
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"One or more path attributes not understood by this BGP4 speaker. Size zero (0) indicates the absence of such attribute(s). Octets beyond the maximum size, if any, are not recorded by this object."
 ::= { bgp4PathAttrEntry 14 }

-- Traps.

bgpTraps OBJECT IDENTIFIER ::= { bgp 7 }

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 }

END
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7. References


8. Security Considerations

Security issues are not discussed in this memo.
9. Authors' Addresses

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