Core Based Trees (CBT) Multicast Routing MIB
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Abstract

This memo defines an experimental portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. More precisely, it describes managed objects specific to the Core Based Trees (CBT) multicast routing protocol version 2 [5]. Managed objects which are common to all multicast routing protocols, including CBT, can be found in [6].

This MIB module is applicable to IP multicast routers which implement CBTv2.

1. Introduction

This memo defines an experimental portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. More precisely, it describes managed objects specific to the
Core Based Trees (CBT) multicast routing protocol version 2 [5]. Managed objects which are common to all multicast routing protocols, including CBT, can be found in [6].

This MIB module is applicable to IP multicast routers which implement CBTv2.

2. The SNMPv2 Network Management Framework

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

- RFC 1902 [1] defines the structure of management information (SMI) for SNMPv2. This deals with the mechanisms used for describing and naming objects for the purpose of management.

- STD 17, RFC 1213 [2] defines MIB-II, the core set of managed objects for the Internet suite of protocols.

- RFC 1157 [3] and RFC 1905 [4] define two versions of the protocol used for network access to managed objects. This protocol is called the "Simple Network Management Protocol".

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

2.1. Object Definitions

Managed objects are accessed via a virtual information store, known as the Management Information Base or MIB. Objects in the MIB are defined using a subset of the Abstract Syntax Notation One (ASN.1) data definition language; this subset is defined in the SMI [1]. 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.

3. Overview

This MIB controls all aspects of the CBT protocol. It consists of five groups:
- The cbtGeneralGroup is used to describe general configuration information for all CBT routers.

- The cbtInterfaceGroup is used to describe interface configuration and statistics.

- The cbtBootstrapGroup is used to describe information relating to auto-bootstrapping for core discovery.

- The cbtStaticMappingGroup is used to describe static <core,group> mappings when auto-bootstrapping is not in use.

- The cbtBorderGroup is used to describe configuration information for CBT border routers.
4. Definitions

CBT-MIB DEFINITIONS ::= BEGIN

IMPORTS
   MODULE-IDENTITY, OBJECT-TYPE, experimental,
   Integer32, IpAddress, TimeTicks FROM SNMPv2-SMI
   RowStatus, TruthValue FROM SNMPv2-TC
   MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF;

cbtMIB MODULE-IDENTITY
   LAST-UPDATED "9706041500Z"
   ORGANIZATION "IETF IDMR Working Group."
   CONTACT-INFO
      " Tony Ballardie,
          Research Consultant,
          Email: ABallardie@acm.org"
   DESCRIPTION
      "The MIB module for management of CBT routers."
   ::= { experimental XX }

cbtMIBObjects OBJECT IDENTIFIER ::= { cbtMIB 1 }

cbt OBJECT IDENTIFIER ::= { cbtMIBObjects 1 }

--
-- The CBT General Group
--

cbtCoreDiscoveryMethod OBJECT-TYPE
   SYNTAX INTEGER {
      static(1), -- using static <core,group> configuration
      bootstrap(2) -- using bootstrap for core discovery
   }
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "Indicates which method this CBT router is using for core
discovery. Note that all routers in the CBT domain must use
the same method."
   ::= { cbt 3 }
-- The CBT Interface Group

cbtInterfaceTable OBJECT-TYPE
SYNTAX     SEQUENCE OF CbtInterfaceEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
   "The (conceptual) table listing the router’s CBT interfaces.
   CBT is enabled on all interfaces listed in this table."
::= { cbt 4 }

CbtInterfaceEntry ::= SEQUENCE {
    cbtInterfaceIfIndex          Integer32,
    cbtInterfaceAddress          IpAddress,
    cbtInterfaceDR               IpAddress,
    cbtInterfaceHelloPreference  Integer32,
    cbtInterfaceHelloInterval    Integer32,
    cbtInterfaceStatus           RowStatus
}

cbtInterfaceIfIndex OBJECT-TYPE
SYNTAX     Integer32
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
   "The ifIndex value of this CBT interface."
::= { cbtInterfaceEntry 1 }

cbtInterfaceAddress OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
   "The IP address of the CBT interface."
cbtInterfaceDR OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The Designated Router’s address on this CBT interface. For point-to-point interfaces, this object has the value 0.0.0.0. If the local router is the DR, then the value will be equal to cbtInterfaceAddress."
::= { cbtInterfaceEntry 2 }

cbtInterfaceHelloPreference OBJECT-TYPE
SYNTAX     Integer32 (1..255)
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
"This router’s configured Hello preference value on this interface. This object does not report the preference value currently in use by the DR, which is always zero."
DEFVAL     { 255 }
::= { cbtInterfaceEntry 5 }

cbtInterfaceHelloInterval OBJECT-TYPE
SYNTAX     Integer32
UNITS      "seconds"
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
"The frequency at which CBT HELLO messages are transmitted on this CBT interface."
DEFVAL     { 60 }
::= { cbtInterfaceEntry 6 }

cbtInterfaceStatus OBJECT-TYPE
SYNTAX     RowStatus
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
"The status of this entry. Creating the entry enables CBT on the interface; destroying the entry disables CBT on the interface."
::= { cbtInterfaceEntry 10 }
cbtBSRAddress OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The IP address of the bootstrap router (BSR) for the local
CBT region."
::= { cbt 8 }

cbtBSRExpiryTime OBJECT-TYPE
SYNTAX     TimeTicks
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The minimum time remaining before the bootstrap router will
be declared down. For candidate BSRs, this is the time until
it sends a Core-Set message. For other routers, this is the
time until it may accept a Core-Set message from a lower
candidate BSR."
::= { cbt 9 }

cbtCandidateBSRPreference OBJECT-TYPE
SYNTAX     Integer32 (-1..255)
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"The preference value for the local system as a candidate
bootstrap router. The value of -1 is used to indicate that
the local system is not a candidate BSR."
::= { cbt 10 }

cbtCandidateCoreHoldTime OBJECT-TYPE
SYNTAX     Integer32 (0..255)
UNITS      "seconds"
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"The holdtime of the local system when it is a candidate
Core. The value of 0 is used to indicate that the local
system is not a Candidate-Core."
::= { cbt 11 }
-- The CBT Core-Set Table

cbtCoreSetTable OBJECT-TYPE
SYNTAX SEQUENCE OF CbtCoreSetEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The (conceptual) table listing CBT information for
candidate Core routers for IP multicast groups. When the
local router is the BSR, this information is obtained from
received Candidate-Core-Advertisements. When the local
router is not the BSR, this information is obtained from
received Core-Set messages."
::= { cbt 5 }

cbtCoreSetEntry OBJECT-TYPE
SYNTAX CbtCoreSetEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An entry (conceptual row) in the cbtCoreSetTable."
INDEX { cbtCoreSetGroupAddress, cbtCoreSetGroupMask,
cbtCoreSetAddress }
::= { cbtCoreSetTable 1 }

CbtCoreSetEntry ::= SEQUENCE {
  cbtCoreSetGroupAddress  IpAddress,
  cbtCoreSetGroupMask     IpAddress,
  cbtCoreSetAddress       IpAddress,
  cbtCoreSetHoldTime      Integer32,
  cbtCoreSetExpiryTime    TimeTicks
}

cbtCoreSetGroupAddress OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The IP multicast group address which, when combined with
cbtCoreSetGroupMask, gives the group prefix for which this
entry contains information about the Candidate-Core."
::= { cbtCoreSetEntry 1 }

cbtCoreSetGroupMask OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The multicast group address mask which, when combined with
  cbtCoreSetGroupAddress, gives the group prefix for which
  this entry contains information about the Candidate-Core."
 ::= { cbtCoreSetEntry 2 }

cbtCoreSetAddress OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The IP address of the Candidate-Core."
 ::= { cbtCoreSetEntry 3 }

cbtCoreSetHoldTime OBJECT-TYPE
SYNTAX Integer32 (0..255)
UNITS "seconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The holdtime of a Candidate-Core. If the local router is
  not the BSR, this value is 0."
 ::= { cbtCoreSetEntry 4 }

cbtCoreSetExpiryTime OBJECT-TYPE
SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The minimum time remaining before the Candidate-Core will
  be declared down. If the local router is not the BSR, this
  value is 0."
 ::= { cbtCoreSetEntry 5 }

-- The CBT Candidate-Core Table

cbtCandidateCoreTable OBJECT-TYPE
SYNTAX SEQUENCE OF CbtCandidateCoreEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The (conceptual) table listing the IP multicast groups for
which the local router is to advertise itself as a
Candidate-Core when the value of cbtCandidateCoreHoldTime is
non-zero. If this table is empty, then the local router
will advertise itself as a Candidate-Core for all groups
(providing the value of cbtCandidateCoreHoldTime is non-
zero)."
 ::= { cbt 6 }

cbtCandidateCoreEntry OBJECT-TYPE
SYNTAX CbtCandidateCoreEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "An entry (conceptual row) in the cbtCandidateCoreTable."
INDEX { cbtCandidateCoreGroupAddress,
        cbtCandidateCoreGroupMask }
 ::= { cbtCandidateCoreTable 1 }

CbtCandidateCoreEntry ::= SEQUENCE {
    cbtCandidateCoreGroupAddress   IpAddress,
    cbtCandidateCoreGroupMask   IpAddress,
    cbtCandidateCoreAddress     IpAddress,
    cbtCandidateCoreRowStatus   RowStatus
}

cbtCandidateCoreGroupAddress OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The IP multicast group address which, when combined with
cbtCandidateCoreGroupMask, identifies a group prefix for
which the local router will advertise itself as a
Candidate-Core."
 ::= { cbtCandidateCoreEntry 1 }

cbtCandidateCoreGroupMask OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The multicast group address mask which, when combined with
cbtCandidateCoreGroupMask, identifies a group prefix for
which the local router will advertise itself as a
Candidate-Core."
::= { cbtCandidateCoreEntry 2 }

cbtCandidateCoreAddress OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS read-create
STATUS current
DESCRIPTION "The (unicast) address of the interface which will be advertised as a Candidate-Core."
 ::= { cbtCandidateCoreEntry 3 }

cbtCandidateCoreRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION "The status of this row, by which new entries may be created, or old entries deleted from this table."
 ::= { cbtCandidateCoreEntry 4 }
-- The CBT Static Mapping Group

-- CBT Static Core Mapping Table

cbtStaticCoreTable OBJECT-TYPE
SYNTAX     SEQUENCE OF CbtStaticCoreEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION   "The (conceptual) table containing <core,group> mappings."
 ::= { cbt 7 }

cbtStaticCoreEntry OBJECT-TYPE
SYNTAX     CbtStaticCoreEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION   "An entry (conceptual row) containing <group, core> mapping information."
INDEX { cbtCoreGroupAddress,
          cbtCoreGroupMask }
 ::= { cbtStaticCoreTable 1 }

CbtStaticCoreEntry ::= SEQUENCE {
  cbtCoreGroupAddress     IpAddress,
  cbtCoreGroupMask        IpAddress,
  cbtCoreAddress          IpAddress,
  cbtCoreRowStatus        RowStatus
}

cbtCoreGroupAddress OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION   "IP class D (group) address."
 ::= { cbtStaticCoreEntry 1 }

cbtCoreGroupMask OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION

Expires December 1997
"Network mask covering group address to represent a contiguous range of group addresses associated with a particular core router."
 ::= { cbtStaticCoreEntry 2 }

cbtCoreAddress OBJECT-TYPE
 SYNTAX     IpAddress
 MAX-ACCESS read-create
 STATUS     current
 DESCRIPTION
 "IP address of core router for the given group(s)."
 ::= { cbtStaticCoreEntry 3 }

cbtCoreRowStatus OBJECT-TYPE
 SYNTAX     RowStatus
 MAX-ACCESS read-create
 STATUS     current
 DESCRIPTION
 "The status of this row, by which entries may be created or deleted from this table."
 ::= { cbtStaticCoreEntry 4 }
cbtBorderRouterAddress OBJECT-TYPE
SYNTAX     TruthValue
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
    "The IP address which the router is using as the source
    address in BR_HELLO messages."
::= { cbt 1 }

cbtDesignatedBR OBJECT-TYPE
SYNTAX     IpAddress
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "The IP address of the domain’s designated border router."
::= { cbt 2 }

cbtBRHelloPreference OBJECT-TYPE
SYNTAX     Integer32 (0..255)
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
    "This router’s preference value for BR Hello messages. This
    object does not report the DBR preference value, which is
    zero. A value of 0 indicates that the router is not acting
    as a border router."
::= { cbt 12 }
-- conformance information

cbtMIBConformance OBJECT IDENTIFIER ::= { cbtMIB 2 }

-- compliance statements

cbtRouterMIBCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION "The compliance statement for routers running CBTv2, and
  implementing the CBT MIB."
  MODULE -- this module
    MANDATORY-GROUPS { cbtGeneralGroup, cbtInterfaceGroup }

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

    GROUP cbtBootstrapGroup
    DESCRIPTION "The cbtBootstrapGroup is mandatory only for those CBTv2
    routers which implement auto-bootstrap for Core Discovery."

    GROUP cbtStaticMappingGroup
    DESCRIPTION "The cbtBootstrapGroup is mandatory only for those CBTv2
    routers which implement static <core,group> mappings."

    GROUP cbtBorderGroup
    DESCRIPTION "The cbtBorderGroup is mandatory only for those CBTv2
    routers which implement multicast border router
    functionality."

::= { cbtMIBCompliances 1 }

-- units of conformance

cbtGeneralGroup OBJECT-GROUP
  OBJECTS { cbtCoreDiscoveryMethod }
STATUS  current
DESCRIPTION  "A collection of objects to support management of general
CBT configuration information."
::= { cbtMIBGroups 1 }

cbtInterfaceGroup OBJECT-GROUP
OBJECTS { cbtInterfaceAddress, cbtInterfaceDR,
cbtInterfaceHelloPreference,
cbtInterfaceHelloInterval,
cbtInterfaceStatus }
STATUS  current
DESCRIPTION  "A collection of objects to support management of CBT
interfaces."
::= { cbtMIBGroups 2 }

cbtBorderGroup OBJECT-GROUP
OBJECTS { cbtBorderRouterAddress, cbtDesignatedBR,
cbtBRHelloPreference }
STATUS  current
DESCRIPTION  "A collection of objects to support management of CBT border
routers."
::= { cbtMIBGroups 3 }

cbtBootstrapGroup OBJECT-GROUP
OBJECTS { cbtBSRAddress, cbtBSRExpiryTime,
cbtCandidateBSRPreference, cbtCandidateCoreHoldTime,
cbtCoreSetHoldTime, cbtCoreSetExpiryTime,
cbtCandidateCoreAddress, cbtCandidateCoreRowStatus }
STATUS  current
DESCRIPTION  "A collection of objects to support management of
information relating to auto-bootstrap as the core discovery
mechanism."
::= { cbtMIBGroups 4 }

cbtStaticMappingGroup OBJECT-GROUP
OBJECTS { cbtCoreAddress, cbtCoreRowStatus }
STATUS  current
DESCRIPTION  "A collection of objects to support management of
information relating to static configuration as the core
discovery mechanism."
::= { cbtMIBGroups 5 }

END
5. Security Considerations

Security issues are not discussed in this memo.

6. Acknowledgements

Thanks to James Cowan for his review and comments.

7. References


8. Authors’ Addresses

Tony Ballardie,
Research Consultant.
E-mail: ABallardie@acm.org

Dave Thaler
Department of Electrical Engineering and Computer Science
University of Michigan
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