

Inter-Domain Multicast Routing (IDMR)  
INTERNET-DRAFT  
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Core Based Trees (CBT) Multicast Routing MIB  
<[draft-ietf-idmr-cbt-mib-00.txt](#)>

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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

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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:

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

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- o The cbtGeneralGroup is used to describe general configuration information for all CBT routers.
- o The cbtInterfaceGroup is used to describe interface configuration and statistics.
- o The cbtBootstrapGroup is used to describe information relating to auto-bootstrapping for core discovery.
- o The cbtStaticMappingGroup is used to describe static <core,group> mappings when auto-bootstrapping is not in use.
- o The cbtBorderGroup is used to describe configuration information for CBT border routers.

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#### [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 }

```

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```

--
-- 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 OBJECT-TYPE
    SYNTAX      CbtInterfaceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry (conceptual row) in the cbtInterfaceTable."
    INDEX       { cbtInterfaceIfIndex }
    ::= { cbtInterfaceTable 1 }

```

```

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."

```

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```

    ::= { cbtInterfaceEntry 2 }

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 5 }

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 6 }

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 7 }

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 }

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--

-- The CBT Bootstrap Group

--

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 an Core-Set message. For other routers, this is the time until it may accept an 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 }

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-- 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

```

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."

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```
::= { 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 }
```

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--

-- 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 &lt;core,group&gt; mappings."

::= { cbt 7 }

cbtStaticCoreEntry OBJECT-TYPE

SYNTAX CbtStaticCoreEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) containing &lt;group, core&gt; 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

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"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 }

---

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--

-- The CBT Border Group

--

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 }
```

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---

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-- conformance information

cbtMIBConformance

OBJECT IDENTIFIER ::= { cbtMIB 2 }

cbtMIBCompliances

OBJECT IDENTIFIER ::= { cbtMIBConformance 1 }

cbtMIBGroups OBJECT IDENTIFIER ::= { cbtMIBConformance 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 }

```

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```

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

- [1] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Structure of Management Information for version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1902](#), January 1996.
- [2] McCloghrie, K., and M. Rose, Editors, "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", STD 17, [RFC 1213](#), March 1991.
- [3] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol", [RFC 1157](#), May 1990.
- [4] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Protocol Operations for version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1905](#), January 1996.
- [5] A. Ballardie, "Core Based Trees (CBT version 2) Multicast Routing: Protocol Specification", Working Draft, April 1997.
- [6] McCloghrie, K., Farinacci, D., and D. Thaler, "IP Multicast Routing MIB", Working draft, [draft-ietf-idmr-multicast-routmib-05.txt](#), March 1997.

## 8. Authors' Addresses

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