

Superseded

CableHome™ CAP MIB Specification

CH-SP-MIB-CAP-I05-040129

Issued

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- Work in Progress** An incomplete document, designed to guide discussion and generate feedback, which may include several alternative requirements for consideration.
- Draft** A document in specification format considered largely complete, but lacking review by Members and vendors. Drafts are susceptible to substantial change during the review process.
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1 SCOPE

This specification describes the CableHome Addressing Portal (CAP) MIB. It references

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2 REFERENCES

2.1 Normative References

In order to claim compliance with this specification, it is necessary to conform to the following standards and other works as indicated, in addition to the other requirements of this specification. Notwithstanding, intellectual property rights may be required to use or implement such normative references.

- [1] CableHome 1.0 Specification, CH-SP-CH1.0-I05-030801, August 1, 2003.
- [2] CableHome 1.1 Specification, CH-SP-CH1.1-I03-040129, January 29, 2004.
- [3] CableLabs® Definition MIB Specification, CL-SP-MIB-CLABDEF-I03-040113, January 13, 2004.

2.2 Reference Acquisition

CableLabs Specifications:

- Cable Television Laboratories, Inc., <http://www.cablelabs.com/>

3 ACRONYMS

This specification uses the following acronyms:

CAP	CableHome Addressing Portal
CDC	CableHome DHCP Client (component of CDP)
CDP	CableHome DHCP Portal
CDS	CableHome DHCP Server (component of CDP)
CMP	CableHome Management Portal
CTP	CableHome Test Portal
DHCP	Dynamic Host Configuration Protocol
NAPT	Network Address and Port Translation
NAT	Network Address Translation
PS	Portal Services

4 REQUIREMENTS

The CableHome™ CAP MIB MUST be implemented as defined below.

```

CABH-CAP-MIB DEFINITIONS ::= BEGIN
IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32          FROM SNMPv2-SMI
    TimeStamp,
    TruthValue,
    RowStatus,
    PhysAddress         FROM SNMPv2-TC
    OBJECT-GROUP,
    MODULE-COMPLIANCE FROM SNMPv2-CONF
    InetAddressType,
    InetAddress,
    InetPortNumber     FROM INET-ADDRESS-MIB
    clabProjCableHome  FROM CLAB-DEF-MIB;

cabhCapMib MODULE-IDENTITY
    LAST-UPDATED      "200401290000Z" --January 29, 2004
    ORGANIZATION      "CableLabs Broadband Access Department"
    CONTACT-INFO
        "Kevin Luehrs
        Postal: Cable Television
        858 Coal Creek Circle
        Louisville, Colorado 80027
        U.S.A.
        Phone: +1 303-661-9100
        Fax:   +1 303-661-9199
        E-mail: k.luehrs@cablelabs.com; mibs@cablelabs.com"
    DESCRIPTION
        "This MIB module supplies the basic management objects
        for the CableHome Addressing Portal (CAP) portion of
        the PS."
    ::= { clabProjCableHome 3 }

cabhCapObjects OBJECT IDENTIFIER ::= { cabhCapMib 1 }
cabhCapBase    OBJECT IDENTIFIER ::= { cabhCapObjects 1 }
cabhCapMap     OBJECT IDENTIFIER ::= { cabhCapObjects 2 }

-----
--
--      General CAP Parameters
--
-----

cabhCapTcpTimeWait OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "seconds"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object is the maximum inactivity time to wait before
        assuming TCP session is terminated. It has no relation to
        the TCP session TIME_WAIT state referred to in [RFC793]."
    REFERENCE

```

```

        "CableHome 1.1 Specification, Packet Handling & Address
        Translation section."
    DEFVAL { 300 }
    ::= { cabhCapBase 1 }

cabhCapUdpTimeWait OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "seconds"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The inactivity time to wait before destroying
        CAP mappings for UDP."
    REFERENCE
        "CableHome 1.1 Specification, Packet Handling & Address
        Translation section."
    DEFVAL { 300 } -- 5 minutes
    ::= { cabhCapBase 2 }

cabhCapIcmpTimeWait OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "seconds"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The inactivity time to wait before destroying
        CAP mappings for ICMP."
    REFERENCE
        "CableHome 1.1 Specification, Packet Handling & Address
        Translation section."
    DEFVAL { 300 } -- 5 minutes
    ::= { cabhCapBase 3 }

cabhCapPrimaryMode OBJECT-TYPE
    SYNTAX      INTEGER {
                    napt(1),          -- NAT with Port Translation Mode
                    nat(2),          -- Traditional NAT Mode
                    passthrough(3)   -- Passthrough/Bridging Mode
                }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The Primary Packet-handling Mode of the PS.
        The PS MUST delete dynamically-created row entries from
        the cabhCapMappingTable, i.e. those with
        cabhCapMappingMethod = dynamic(2), when the value of
        cabhCapPrimaryMode changes. The PS MUST NOT delete
        statically-created row entries from the cabhCapMappingTable
        where cabhCapMappingMethod = static(1), when the value of
        cabhCapPrimaryMode changes."
    REFERENCE
        "CableHome 1.1 Specification, Packet Handling & Address
        Translation section."
    DEFVAL { napt }
    ::= { cabhCapBase 4 }

cabhCapSetToFactory OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "Reading this object always returns false(2). When the
        cabhCapSetToFactory object is set to true(1), the PS must

```

take the following actions:

1. Clear all entries in the cabhCapMappingTable and cabhCapPassthroughTable.
2. Reset the following objects to their factory default values:
 - cabhCapTcpTimeWait,
 - cabhCapUdpTimeWait,
 - cabhCapIcmpTimeWait,
 - cabhCapPrimaryMode"

REFERENCE

"CableHome 1.1 Specification, Packet Handling & Address Translation section."

::= { cabhCapBase 5 }

cabhCapLastSetToFactory OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime when cabhCapSetToFactory was last set to true. Zero if never reset."

::= { cabhCapBase 6 }

```

=====
--
-- cabhCapMappingTable (CAP Mapping Table)
--
-- The cabhCapMappingTable contains information pertaining to all
-- NAPT and NAT mappings in a CableHome(TM) compliant residential
-- gateway device.
--
=====

```

cabhCapMappingTable OBJECT-TYPE

SYNTAX SEQUENCE OF CabhCapMappingEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains IP address mappings between private network addresses, or network addresses and port numbers/ICMP Identifiers, assigned to devices on the subscriber's home LAN, and network addresses, or network addresses and port numbers/ICMP Identifiers on the WAN, presumed to be on a separate subnetwork than the private IP addresses. The CAP Mapping Table is used by the CableHome Address Portal (CAP) function of the PS to make packet forwarding decisions."

REFERENCE

"CableHome 1.1 Specification, Packet Handling & Address Translation section."

::= { cabhCapMap 1 }

cabhCapMappingEntry OBJECT-TYPE

SYNTAX CabhCapMappingEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"List of the private IP (LAN) address - to - cable operator assigned IP (WAN) address mappings stored

```

        in the PS and used by the PS to make packet
        forwarding decisions."
INDEX { cabhCapMappingIndex }
 ::= { cabhCapMappingTable 1 }

CabhCapMappingEntry ::= SEQUENCE {
    cabhCapMappingIndex          INTEGER,
    cabhCapMappingWanAddrType    InetAddressType,
    cabhCapMappingWanAddr        InetAddress,
    cabhCapMappingWanPort        InetPortNumber,
    cabhCapMappingLanAddrType    InetAddressType,
    cabhCapMappingLanAddr        InetAddress,
    cabhCapMappingLanPort        InetPortNumber,
    cabhCapMappingMethod         INTEGER,
    cabhCapMappingProtocol       INTEGER,
    cabhCapMappingRowStatus      RowStatus
}

cabhCapMappingIndex OBJECT-TYPE
    SYNTAX      INTEGER      (1..65535)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Index into the CAP Mapping Table."
    ::= { cabhCapMappingEntry 1 }

cabhCapMappingWanAddrType OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The IP address type assigned on the WAN side."
    DEFVAL { ipv4 }
    ::= { cabhCapMappingEntry 2 }

cabhCapMappingWanAddr OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The IP address assigned by the cable operator's address
        (DHCP) server, and comprising the WAN-side IP address
        of the CAP Mapping tuple. This object is populated
        either dynamically by LAN-to-WAN outbound traffic or
        statically by the cable operator."
    ::= { cabhCapMappingEntry 3 }

cabhCapMappingWanPort OBJECT-TYPE
    SYNTAX      InetPortNumber
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The TCP/UDP port number or ICMP Identifier on the WAN
        side. A port number/Identifier of 0 indicates a NAT
        mapping. A non-zero port number/Identifier indicates a
        NAT mapping."
    DEFVAL { 0 }
    ::= { cabhCapMappingEntry 4 }

cabhCapMappingLanAddrType OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-create
    STATUS      current

```

```

DESCRIPTION
    "The IP address type assigned on the LAN side."
DEFVAL { ipv4 }
 ::= { cabhCapMappingEntry 5 }

cabhCapMappingLanAddr OBJECT-TYPE
SYNTAX      InetAddress
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The IP address of the LAN-Trans IP Device. This object is
    populated either dynamically as a result of LAN-to-WAN
    outbound traffic or statically by the cable operator."
 ::= { cabhCapMappingEntry 6 }

cabhCapMappingLanPort OBJECT-TYPE
SYNTAX      InetPortNumber
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The TCP/UDP port number or ICMP Identifier on the LAN
    side. A port number/Identifier of 0 indicates a NAT
    mapping. A non-zero port number/Identifier indicates a
    NAT mapping."
DEFVAL { 0 }
 ::= { cabhCapMappingEntry 7 }

cabhCapMappingMethod OBJECT-TYPE
SYNTAX      INTEGER {
                static(1),
                dynamic(2)
            }
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Indicates how this mapping was created. Static means
    that it was provisioned, and dynamic means that it
    was handled by the PS itself."
 ::= { cabhCapMappingEntry 8 }

cabhCapMappingProtocol OBJECT-TYPE
SYNTAX      INTEGER {
                other(1),    -- any other protocol; e.g. IGMP
                icmp(2),
                udp(3),
                tcp(4),
                all(255)    -- covers all the protocols
            }
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The protocol for this mapping entry. The value
    of other(1) represents a protocol other
    than ICMP, TCP, and UDP. Thus, when the value
    other(1) is specified for the cabhCapMappingProtocol
    value of a CAP Mapping Table entry,
    TCP, UDP or ICMP packets MUST NOT be forwarded even
    if the WAN and LAN IP address and port tuple
    of the packet matches with mapping entry.
    The value of all(255) represents all protocol types. Thus,
    when the cabhCapMappingProtocol value
    all(255) is specified for an entry in the CAP Mapping
    Table, traffic of all protocol types MUST be forwarded

```

```

        accordingly f the WAN and LAN IP address and port tuple
        in the packet matches the mapping entry."
 ::= { cabhCapMappingEntry 9 }

cabhCapMappingRowStatus OBJECT-TYPE
SYNTAX      RowStatus
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The RowStatus interlock for the creation and deletion
    of a cabhCapMappingTable entry. Changing the value of
    the IP address or port number columns of the CAP
    Mapping Table may have an effect on active traffic,
    so the PS will prevent modification of this table's
    columns and return an inconsistentValue error when
    cabhCapMappingRowStatus object is active(1).

    The PS must not allow RowStatus to be set to
    notInService(2) by a manager.

    A newly created row cannot be set to active(1) until
    the corresponding instances of cabhCapMappingWanAddr,
    cabhCapMappingLanAddr, and cabhCapMappingProtocol have
    been set.

    If the manager attempts to create a new row entry with
    a cabhCapMappingWanAddr and cabhCapMappingWanPort tuple
    whose value is not unique to the table or a
    cabhCapMappingLanAddr and cabhCapMappingLanPort tuple
    whose value is not unique to the table, the PS MUST
    prevent the creation of this row and return an
    inconsistentValue error.

    If the manager attempts to create a new row entry with
    a zero value for cabhCapMappingWanPort and a non-zero
    value for cabhCapMappingLanPort or a new row entry with a
    zero value for cabhCapMappingLanPort and a non-zero value
    for cabhCapMappingWanPort, the PS MUST prevent the
    creation of this row and return an inconsistentValue
    error.

    When Primary Packet-handling Mode is NAPT
    (cabhCapPrimaryMode is napt(1)), provisioned rows can be
    set to active(1) regardless of whether the value to which
    cabhCapMappingWanPort and cabhCapMappingLanPort have been
    set is zero or nonzero.

    When Primary Packet-handling Mode is NAT
    (cabhCapPrimaryMode is nat(2)), a newly created row can
    not be set to active(1) if a non-zero value of
    cabhCapMappingWanPort and cabhCapMappingLanPort have been
    set.

    In both NAPT and NAT Primary Packet-handling modes, a row
    entry with both a cabhCapMappingWanPort value of zero and
    a cabhCapMappingLanPort value of zero represents a NAT
    entry."
 ::= { cabhCapMappingEntry 10 }

-----
--
--      cabhCapPassthroughTable (CAP Passthrough Table)
--

```

```

-- The cabhCapPassthroughTable contains the hardware addresses
-- for all LAN IP Devices for which the PS will bridge traffic at
-- OSI Layer 2 when the PS's cabhCapPrimaryMode is set to forward
-- traffic at OSI Layer 3 (NAPT/NAT) for all other hardware
-- addresses.
--
-----

cabhCapPassthroughTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF CabhCapPassthroughEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains hardware addresses of LAN IP Devices
        for which the PS will bridge traffic at OSI Layer 2."
    REFERENCE
        "CableHome 1.1 Specification, Packet Handling & Address
        Translation section."
    ::= { cabhCapMap 2 }

cabhCapPassthroughEntry OBJECT-TYPE
    SYNTAX      CabhCapPassthroughEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "List of hardware addresses of LAN IP Devices for which
        the PS will bridge traffic at OSI Layer 2."
    INDEX { cabhCapPassthroughIndex }
    ::= { cabhCapPassthroughTable 1 }

CabhCapPassthroughEntry ::= SEQUENCE {
    cabhCapPassthroughIndex      INTEGER,
    cabhCapPassthroughMacAddr    PhysAddress,
    cabhCapPassthroughRowStatus  RowStatus
}

cabhCapPassthroughIndex OBJECT-TYPE
    SYNTAX      INTEGER (1..65535)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The index into the CAP Passthrough Table."
    ::= { cabhCapPassthroughEntry 1 }

cabhCapPassthroughMacAddr OBJECT-TYPE
    SYNTAX      PhysAddress (SIZE(0..16))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "Hardware address of the LAN IP Device for which the PS
        MUST bridge traffic at OSI Layer 2."
    ::= { cabhCapPassthroughEntry 2 }

cabhCapPassthroughRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The RowStatus interlock for the creation and
        deletion of a cabhCapPassthroughTable entry.
        Any writable object in each row can be modified
        at any time while the row is active(1)."
    ::= { cabhCapPassthroughEntry 3 }

```

```

--
-- notification group is for future extension.
--

cabhCapNotification      OBJECT IDENTIFIER ::= {
    cabhCapMib 2 0 }
cabhCapConformance      OBJECT IDENTIFIER ::= {
    cabhCapMib 3 }
cabhCapCompliances      OBJECT IDENTIFIER ::= {
    cabhCapConformance 1 }
cabhCapGroups           OBJECT IDENTIFIER ::= {
    cabhCapConformance 2 }

--
-- Notification Group
--

-- compliance statements

cabhCapBasicCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement for devices that implement
        the CableHome Portal Services functionality."
    MODULE      --cabhCapMib

-- unconditionally mandatory groups

MANDATORY-GROUPS {
    cabhCapGroup
}

OBJECT cabhCapMappingProtocol
    SYNTAX      INTEGER { icmp(2) }
    WRITE-SYNTAX INTEGER { other(1), udp(3), tcp(4), all(255) }
    DESCRIPTION
        "icmp(2) applies only to dynamic entries."

    ::= { cabhCapCompliances 1 }

cabhCapGroup OBJECT-GROUP
    OBJECTS {
        cabhCapTcpTimeWait,
        cabhCapUdpTimeWait,
        cabhCapIcmpTimeWait,
        cabhCapPrimaryMode,
        cabhCapSetToFactory,
        cabhCapLastSetToFactory,
        cabhCapMappingWanAddrType,
        cabhCapMappingWanAddr,
        cabhCapMappingWanPort,
        cabhCapMappingLanAddrType,
        cabhCapMappingLanAddr,
        cabhCapMappingLanPort,
        cabhCapMappingMethod,
        cabhCapMappingProtocol,
        cabhCapMappingRowStatus,
        cabhCapPassthroughMacAddr,
        cabhCapPassthroughRowStatus
    }
    STATUS      current

```

```
DESCRIPTION
    "Group of objects for CableHome CAP MIB."
 ::= { cabhCapGroups 1 }
```

END

5 ACKNOWLEDGEMENTS

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Appendix I Revision History

The following Engineering Change Notices were incorporated into CH-SP-MIB-CAP-I02-020920:

ECN Number	ECN Date	Summary
CH1-N-02007	6/20/02	Modify the default values of the CAP Mapping Table timeout values for UDP, TCP, and ICMP protocols.
CH1-N-02011	6/20/02	Eight technical/editorial changes.
CH1-N-02017	8/15/02	Four technical/editorial changes.
CH1-N-02019	8/15/02	Four technical/editorial changes.

The following Engineering Change Notices were incorporated into CH-SP-MIB-CAP-I03-030411:

ECN Number	ECN Date	Summary
CH1-N-02054	1/23/03	Provide more descriptive text in the CAP MIB for various tables and for Row Status of various tables.
CH1-N-03014	3/13/03	Clarify description of the cabhCapSetToFactory mib object.

The following Engineering Change Notices were incorporated into CH-SP-MIB-CAP-I04-030801:

ECN Number	ECN Date	Summary
CH1-N-03026	6/5/03	Define a Cap2MappingTable for CableHome 1.1, to support the static port forwarding feature.
CH-MIB-N-03052	7/3/03	Update CAP MIB to incorporate changes needed to align the CableLabs version with the version submitted to the IETF.

The following Engineering Change Notices were incorporated into CH-SP-MIB-CAP-I05-040129:

ECN Number	ECN Date	Summary
CH-MIB-N-03062	10/02/03	Update description related with change to ICMP sequence number.
MIB-CAP-N-03.0084-3	11/26/03	Removal of textual convention, CAP mapping table clarifications, and passthrough table clarifications.
MIB-CAP-N-03.0095-4	12/4/03	Add value of "all" for the protocol MIB in the CAP table.