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CableLabs® Specifications

CableLabs' Assigned Names and Numbers

CL-SP-CANN-I05-110210

ISSUED

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Work in Progress	An incomplete document, designed to guide discussion and generate feedback, that may include several alternative requirements for consideration.
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1 SCOPE

This specification establishes a set of CableLabs registries and namespaces for Names and Numbers authoritatively assigned by CableLabs.

Numerous protocol fields make use of identifiers with well-known names or number values; for example, the IETF DHCP protocol and vendor-specific option values, the IETF RADIUS and DIAMETER protocols and associated CableLabs attributes, etc. To insure that such quantities have consistent values and interpretations in different implementations, their assignment must be administered by a central authority. For IETF protocols, that role is provided by the Internet Assigned Numbers Authority (IANA). For vendor-specific protocol fields that are defined by CableLabs specifications, or when the use of such protocol identifiers may be common to multiple CableLabs projects and specifications, this document defines a common repository to hold these values.

This document borrows some of the terminology and guidelines of IETF [RFC 2434].

The scope of this version of this specification includes:

- A DHCP registry for protocol fields authoritatively assigned by CableLabs that are in use in eDOCSIS, DOCSIS, CableHome, PacketCable, and OpenCable, for both IPv4 and DHCPv6.
- An XML registry for XML namespaces for DOCSIS, PacketCable and Stewardship and Fulfillment Interfaces.
- A DIAMETER registry for PacketCable.
- A Receive Channel Profile (RCP) registry for CableLabs-defined Standard RCPs and Vendor-defined Manufacturer RCPs that are used in DOCSIS 3.0 and beyond to communicate the receiver capabilities of a cable modem.

1.1 Requirements

Throughout this document, the words that are used to define the significance of particular requirements are capitalized. These words are:

"MUST"	This word or the adjective "REQUIRED" means that the item is an absolute requirement of this specification.
"MUST NOT"	This phrase means that the item is an absolute prohibition of this specification.
"SHOULD"	This word or the adjective "RECOMMENDED" means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.
"SHOULD NOT"	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
"MAY"	This word or the adjective "OPTIONAL" means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

2 REFERENCES

2.1 Normative References

None.

2.2 Informative References

This specification uses the following informative references.

[CANN DHCP]	CableLabs' DHCP Options Registry, CL-SP-CANN-DHCP-Reg-I06-110210, February 10, 2011, Cable Television Laboratories, Inc.
[CH CAP-MIB]	CableHome CAP MIB Specification, CH-SP-MIB-CAP-C01-060728, July 28, 2006, Cable Television Laboratories, Inc.
[CH CDP-MIB]	CableHome CDP MIB Specification, CH-SP-MIB-CDP-C01-060728, July 28, 2006, Cable Television Laboratories, Inc.
[CH CTP-MIB]	CableHome CTP MIB Specification, CH-SP-MIB-CTP-C01-060728, July 28, 2006, Cable Television Laboratories, Inc.
[CH PSDEV-MIB]	CableHome PSDEV MIB Specification, CH-SP-MIB-PSDEV-C01-060728, July 28, 2006, Cable Television Laboratories, Inc.
[CH QOS-MIB]	CableHome QOS MIB Specification, CH-SP-MIB-QOS-C01-060728, July 28, 2006, Cable Television Laboratories, Inc.
[CH SEC-MIB]	CableHome Security MIB Specification, CH-SP-MIB-SEC-C01-060728, July 28, 2006, Cable Television Laboratories, Inc.
[CO CSA-MIB]	CableOffice Commercial Services Annex MIB Definition, CH-SP-CO-MIB-CSA-C01-060728, July 28, 2006, Cable Television Laboratories, Inc.
[DOCS TEST]	DOCSIS Testing MIB Specification, CM-SP-TestMIB-D05-100118, January 18, 2010, Cable Television Laboratories, Inc.
[DSG]	DOCSIS Set-top Gateway (DSG) Interface Specification, CM-SP-DSG-I17-110210, February 10, 2011, Cable Television Laboratories, Inc.
[eDOCSIS]	eDOCSIS Specification, CM-SP-eDOCSIS-I21-101008, October 8, 2010, Cable Television Laboratories, Inc.
[IANA EN]	IANA's Enterprise-Numbers: http://www.iana.org/assignments/enterprise-numbers
[IANA AAA]	IANA's AAA parameters register: ftp://ftp.iana.org/assignments/aaa-parameters/
[L2VPN]	Layer 2 Virtual Private Networks, CM-SP-L2VPN-I08-080522, May 22, 2008, Cable Television Laboratories, Inc.

[M-OSSI]	Modular Operations Support System Interface Specification, CM-SP-M-OSSI-I08-081209, December 9, 2008, Cable Television Laboratories, Inc.
[MIB-BB]	CableLabs Battery Backup MIB Specification, CL-SP-MIB-BB-I03-090811, August 11, 2009, Cable Television Laboratories, Inc.
[MIB-CLABDEF]	CableLabs Definition MIB Specification, CL-SP-MIB-CLABDEF-I09-110210, February 10, 2011, Cable Television Laboratories, Inc.
[MULPI]	DOCSIS 3.0 MAC and Upper Layer Protocols Interface Specification, CM-SP-MULPIv3.0-I15-110210, February 10, 2011, Cable Television Laboratories, Inc.
[OC MIB-HN]	OpenCable Home Networking MIB Specification, OC-SP-MIB-HN-I03-100910, September 10, 2010, Cable Television Laboratories, Inc.
[OC MIB-HOST2.X]	OpenCable Host Device 2.X MIB Specification, OC-SP-MIB-HOST2.X-I11-110204, February 4, 2011, Cable Television Laboratories, Inc.
[OLCA AUTH]	Online Content Access Authentication and Authorization Interface Specification, CL-SP-AUTH1.0-I01-101029, October 10, 2010, Cable Television Laboratories Inc
[OSSI]	Operations Support System Interface Specification, SP-OSSI-C01-011119, November 19, 2001, Cable Television Laboratories, Inc.
[OSSI1.1]	Operations Support System Interface Specification, CM-SP-OSSIV1.1-C01-050907, September 7, 2005.
[OSSIv2.0]	Data-Over-Cable Service Interface Specifications, Operations Support System Interface Specification, CM-SP-OSSIV2.0-C01-081104, November 4, 2008, Cable Television Laboratories Inc.
[OSSIv3.0]	DOCSIS 3.0 Operations Support System Interface Specification, CM-SP-OSSIV3.0-I14-110210, February 10, 2011, Cable Television Laboratories, Inc.
[PKT 29.229]	PacketCable 2.0 IMS Delta Specifications Cx/Dx Interfaces based on the Diameter Protocol Specification 3GPP TS 29.229, PKT-SP-29.229-I03-080425, April 25, 2008, Cable Television Laboratories, Inc.
[PKT ACCT]	PacketCable Accounting Specification, PKT-SP-ACCT-I04-080425, April 25, 2008, Cable Television Laboratories, Inc.
[PKT ES-INF]	PacketCable Electronic Surveillance - Intra-Network Functions Specification, PKT-SP-ES-INF-I04-080425, April 25, 2008, Cable Television Laboratories, Inc.
[PKT ESP]	PacketCable Electronic Surveillance Specification, PKT-SP-ESP1.5-I02-070412, April 12, 2007, Cable Television Laboratories, Inc.
[PKT EUE-DATA]	E-UE Provisioning Data Model Specification, PKT-SP-EUE-DATA-I06-110127, January 27, 2011, Cable Television Laboratories, Inc.
[PKT EVE MIB1.5]	PacketCable Management Event MIB Specification, PKT-SP-EVEMIB1.5-I02-050812, August 12, 2005, Cable Television Laboratories, Inc.
[PKT MIB EXMTA1.5]	PacketCable MTA Extension MIB Specification, PKT-SP-MIB-EXMTA1.5-I01-050128, January 28, 2005, Cable Television Laboratories, Inc.

[PKT MIB EXSIG1.5]	PacketCable Signaling Extension MIB Specification, PKT-SP-MIB-EXSIG1.5-I04-090624, June 24, 2009, Cable Television Laboratories, Inc.
[PKT MIB MTA1.5]	PacketCable MTA MIB Specification, PKT-SP-MIB-MTA1.5-I01-050128, January 28, 2005, Cable Television Laboratories, Inc.
[PKT MIB SIG1.5]	PacketCable 1.5 Signaling MIB Specification, PKT-SP-MIB-SIG1.5-I01-050128, January 28, 2005, Cable Television Laboratories, Inc.
[PKT PROV]	PacketCable MTA Device Provisioning Specification, PKT-SP-PROV-C01-071129, November 29, 2007, Cable Television Laboratories, Inc.
[PKT PROV1.5]	PacketCable 1.5 MTA Device Provisioning Specification, PKT-SP-PROV1.5-I04-090624, June 24, 2009, Cable Television Laboratories, Inc.
[PKT RST-ACCT]	PacketCable Residential SIP Telephony Accounting Specification, PKT-SP-RST-ACCT-I05-100527, May 27, 2010, Cable Television Laboratories, Inc.
[PKT SP-RSTF]	PacketCable Residential SIP Telephony Feature Specification, PKT-SP-RSTF-I08-110127, January 27, 2011, Cable Television Laboratories, Inc.
[PKT RST-EUE-PROV]	RST E-UE Provisioning Specification, PKT-SP-RST-EUE-PROV-I06-110127, January 27, 2011, Cable Television Laboratories, Inc.
[RFC 2434]	IETF RFC 2434/BCP0026, Guidelines for Writing an IANA Considerations Section in RFCs, October 1998.
[RFC 2617]	IETF RFC 2617, "HTTP Authentication: Basic and Digest Access Authentication", June 1999.
[RFC 3261]	IETF RFC 3261, "SIP: Session Initiation Protocol", June 2002.
[RFC 3315]	IETF RFC 3315, Dynamic Host Configuration Protocol for IPv6 (DHCPv6), July 2003.
[RFC 3495]	IETF RFC 3495, Dynamic Host Configuration Protocol (DHCP) Option for CableLabs Client Configuration, March 2003.
[RFC 3588]	IETF RFC 3588, Diameter Base Protocol, September 2003.
[RFC 3634]	IETF RFC 3634, Key Distribution Center (KDC) Server Address Sub-option for the Dynamic Host Configuration Protocol (DHCP) CableLabs Client Configuration (CCC) Option, December 2003.
[TEI]	TDM Emulation Interface Specification, CM-SP-TEI-I06-100611, June 6, 2010, Cable Television Laboratories, Inc.

2.3 Reference Acquisition

- Cable Television Laboratories, Inc., 858 Coal Creek Circle, Louisville, CO 80027, Phone +1-303-661-9100; Fax +1-303-661-9199, <http://www.cablelabs.com>.
- Internet Engineering Task Force (IETF) Secretariat, 48377 Fremont Blvd., Suite 117, Fremont, California 94538, USA, Phone: +1-510-492-4080, Fax: +1-510-492-4001.
- Internet Assigned Numbers Authority (IANA), <http://www.iana.org>.

3 ABBREVIATIONS

This document uses the following abbreviations and acronyms.

AVP	Attribute-Value Pairs
DHCP	Dynamic Host Configuration Protocol
RCC	Receive Channel Configurations
RCP	Receive Channel Profile
SMA	Security, Monitoring, Automation
URL	Uniform Resource Locator
URN	Uniform Resource Name
XML	Extensible Markup Language

4 CABLELABS DHCP PROTOCOL FIELD REGISTRY

4.1 Definition

This document establishes the CableLabs DHCP registry and defines new name spaces associated with CableLabs DHCPv4 and DHCPv6 options:

- CableLabs project codes,
- Sub-option codes for DHCPv4 options,
- CableLabs Vendor-specific Information Option codes for DHCPv6.

The CableLabs Assigned Name and Number authority has established a registry of values for each of these name spaces which are found in [CANN DHCP].

4.2 Format of the DHCPv6 CableLabs Vendor-specific Information Option

DHCPv6 defines a Vendor-specific Information Option (see the option code `OPTION_VENDOR_OPTS` in Section 22.17 of [RFC 3315]). This section defines the structure or format of the option data for the CableLabs Vendor-specific Information Option.

The format of the DHCPv6 CableLabs Vendor-specific Information option is:

```

  0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
  +-----+-----+-----+-----+-----+-----+-----+-----+
  |   OPTION_VENDOR_OPTS   |   option-len   |
  +-----+-----+-----+-----+-----+-----+-----+-----+
  |   enterprise-number (4491 for CableLabs)   |
  +-----+-----+-----+-----+-----+-----+-----+-----+
  .
  .           CableLabs-defined option-data           .
  .
  +-----+-----+-----+-----+-----+-----+-----+-----+

```

option-code `OPTION_VENDOR_OPTS` (17)

option-len 4 + length of option-data field

enterprise-number The CableLabs' registered Enterprise Number:
4491, as registered with IANA in the Private
Enterprise Numbers:
<http://www.iana.org/assignments/enterprise-numbers.html>

CableLabs-defined

option-data An object containing one or more
CableLabs sub-options

The option-data field of the DHCPv6 CableLabs Vendor-specific Information option contains sub-option values. Each sub-option is structured as follows:

```

0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-----+-----+-----+-----+-----+-----+-----+-----+
| CableLabs sub-option-code | sub-option-len |
+-----+-----+-----+-----+-----+-----+-----+-----+
| sub-option-data |
| (sub-option-len octets) |
+-----+-----+-----+-----+-----+-----+-----+-----+

```

CableLabs sub-option-code:

```

0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7
+-----+-----+-----+-----+-----+-----+-----+
| res | code | sub-option type |
+-----+-----+-----+-----+-----+-----+-----+

```

res: reserved for CableLabs, do not use; bits must be zero value.

code: identifies the CableLabs project code for this sub-option. The null value for these 3 bits ('000') identifies a generic DHCPv6 option that may be common to multiple projects. See the Values for the CableLabs Project Codes section of the CableLabs DHCP registry specification for the values of the CableLabs Project Codes for DHCPv6 options.

sub-option type: defines the option type.

sub-option-len length of sub-option-data field

sub-option-data the value of the CableLabs sub-option

4.3 Template for defining new DHCPv6 CableLabs Vendor-specific Information Option codes

Each request for a new definition of a DHCPv6 CableLabs Vendor-specific Information Option must include:

- A definition of the sub-option compliant with the format specified in this section.
- An Engineering Change Request against the CableLabs DHCP registry requesting the addition of the new option.

New DHCPv6 CableLabs Vendor-specific Information Option code must be defined using the following format:

```

  0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
  +-----+-----+-----+-----+-----+-----+-----+-----+
  |   CL-sub-option-code           |   sub-option-len           |
  +-----+-----+-----+-----+-----+-----+-----+-----+
  .
  .           CableLabs-defined sub-option-data           .
  .
  +-----+-----+-----+-----+-----+-----+-----+-----+

```

CL-sub-option-code CL_OPTION_XXXXXXXX where XXXXXXXX is descriptive name of the sub-option being defined.

Sub-option-len length of sub-option-data field

CableLabs-defined

Sub-option-data An object definition with normative requirements on how a DHCP client and server must use this information.

CableLabs Project The requested CableLabs Project under which this new option should be assigned (a registered CableLabs Project code).

4.4 List of Relevant Specifications

The following list includes CableLabs and IETF specifications that contain definitions of DHCP option field values, or, references to the values defined in this document.

- CableLabs DHCP registry [CANN DHCP]
- DOCSIS OSSI specifications for DOCSIS 1.0 [OSSI], DOCSIS 1.1 [OSSI1.1], DOCSIS 2.0 [OSSIv2.0]
- DOCSIS 3.0 MULPI [MULPI], OSSI [OSSIv3.0]
- PacketCable MTA Device Provisioning specifications version 1.0 [PKT PROV] and 1.5 [PKT PROV1.5]
- IETF [RFC 3495] and [RFC 3634]

5 CABLELABS XML REGISTRY

5.1 Guidelines

The goal of this section is to provide guidelines for the definition of new XML namespaces under CableLabs management and some recommendations to align the target namespaces and to allow consistent versioning.

It is RECOMMENDED to define CableLabs XML namespaces as follows:

Organization Identifier	Identifier	CableLabs Project Name	Version	Type of Document	Identifier	XSD Identifier
For CableLabs: www.cablelabs.com	namespaces	PacketCable DOCSIS CableHome	2.03.0	'DTD' 'XSD'	'smi' 'reg' 'ipdr' 'netconf'	e.g., CLAB-PACM-MIB

5.2 Examples

A few examples include:

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/>

<http://www.cablelabs.com/namespaces/PacketCable/2.0/xsd/smi/>

5.3 Registered XML name spaces

The following name spaces are registered:

5.3.1 DOCSIS

5.3.1.1 DOCSIS IPDR Service Definition Namespaces

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-SAMIS-TYPE-1>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-SAMIS-TYPE-2>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CMTS-CM-US-STATS-TYPE>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CMTS-CM-REG-STATUS-TYPE>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CMTS-TOPOLOGY-TYPE>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-SPECTRUM-MEASUREMENT-TYPE>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CPE-TYPE>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-DIAG-LOG-TYPE>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-DIAG-LOG-EVENT-TYPE>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-DIAG-LOG-DETAIL-TYPE>

5.3.1.2 DOCSIS Auxiliary Schema Namespaces

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CMTS>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CM>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CPE>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-QOS>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-REC>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CMTS-CM-US>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CMTS-CM-NODE-CH>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-MD-NODE>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-SPECTRUM>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-DIAG-LOG>

<http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-DIAG-LOG-DETAIL>

5.3.2 PacketCable

5.3.2.1 PacketCable 2.0 PACM namespaces

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/SMI/v1/CL-PKTC-UE>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/SMI/v1/CL-PKTC-User>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/SMI/v1/CL-PKTC-TC>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/v1/CL-PKTC-ACL>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/v1/CL-PKTC-BASE-SVC>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/SMI/v1/CL-PKTC-RST>

5.3.2.2 PacketCable 2.0 Auxiliary namespaces

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/smi/CLAB-DEF-MIB>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/smi/SNMP-FRAMEWORK-MIB>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/smi/SNMPv2-TC>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/smi/SMI>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/smi/SNMPv2-SMI>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/smi/INET-ADDRESS-MIB>

<http://www.cablelabs.com/namespaces/PacketCable/R2/XSD/smi/SNMPv2-CONF>

5.3.2.3 PacketCable SMA namespaces

urn:cablelabs:packetcable:sma:xsd:v1:instruction

urn:cablelabs:packetcable:sma:xsd:v1:event

urn:cablelabs:packetcable:sma:xsd:v1:reg

urn:cablelabs:packetcable:sma:xsd:v1:dereg

urn:cablelabs:packetcable:sma:xsd:v1:devprofile:response

urn:cablelabs:packetcable:sma:xsd:v1:devlist

urn:cablelabs:packetcable:sma:xsd:v1:heartbeat

urn:cablelabs:packetcable:sma:xsd:v1:smalogic

urn:cablelabs:packetcable:sma:xsd:v1:deviceprofile

urn:cablelabs:packetcable:sma:xsd:v1:cfgenv

urn:cablelabs:packetcable:sma:xsd:v1:sig

urn:cablelabs:packetcable:sma:xsd:v1:ns

urn:cablelabs:packetcable:sma:xsd:v1:certs

urn:cablelabs:packetcable:sma:xsd:v1:base

urn:cablelabs:packetcable:sma:xsd:v1:op

urn:cablelabs:packetcable:sma:xsd:v1:ipv6cfg

urn:cablelabs:packetcable:sma:xsd:v1:ipv4cfg

urn:cablelabs:packetcable:sma:xsd:v1:mem

5.3.3 Stewardship and Fulfillment Interfaces

5.3.3.1 Stewardship and Fulfillment Interfaces namespaces

<http://www.cablelabs.com/namespaces/safi/xsd/com>

<http://www.cablelabs.com/namespaces/safi/xsd/cip>

<http://www.cablelabs.com/namespaces/safi/xsd/iaf>

<http://www.cablelabs.com/namespaces/safi/xsd/iam>

<http://www.cablelabs.com/namespaces/safi/xsd/sms>

6 CABLELABS DIAMETER AVP REGISTRY

This section lists any IANA assigned CableLabs-specific DIAMETER applications and Command Codes, as well as CableLabs assigned DIAMETER protocol codes, including the Attribute-Value Pairs (AVP) and Experimental result codes.

For assignment of DIAMETER applications, command codes, AVP and result codes, please see the procedures in Section 6.6.

6.1 Application Identifiers

The Diameter applications are identified with the application identifiers as specified in [RFC 3588]. There are two kinds of applications: IETF standards track applications and vendor-specific applications. All application identifiers are assigned by [IANA AAA]. This chapter lists the application identifiers assigned by IANA to all CableLabs Diameter applications.

The application identifiers are transferred in Diameter command's header in the Application-ID field.

6.1.1 CableLabs-specific Application Identifiers

There are no CableLabs-specific application identifiers at this time.

6.2 Command Codes

The command codes are used for communicating the command associated with the Diameter message. The command code is carried in the Diameter header's Command-Code field. The command codes can be divided into standard command codes allocated by IANA and experimental command codes for testing purposes only.

6.2.1 Command Codes Allocated for CableLabs

There are no CableLabs-specific command codes at this time.

6.3 Vendor Identifier

The vendor identifier (also known as Enterprise number) indicates the vendor-specific attributes, result codes and application identifiers in Diameter commands. The vendor identifier is used in the Vendor-ID field of the AVP header and in the Vendor-ID AVP. The Vendor-ID AVP is used to identify the vendor in the Vendor-Specific-Application-Id and Experimental-Result-Code grouped AVPs.

6.3.1 CableLabs' Vendor Identifier

The IANA has allocated a vendor identifier value 4491 for CableLabs [IANA EN].

6.4 Attribute-Value-Pair Codes

The AVP codes are used together with the vendor identifier to identify each attribute uniquely. There are multiple AVP namespaces. The IETF IANA namespace, that is, the AVPs with vendor identifier zero or without vendor identifier, is controlled by IANA. Each vendor controls the AVP codes within his AVP namespaces.

6.4.1 CableLabs-specific AVP Codes

The CableLabs-specific AVPs have the Vendor-Specific bit ('V' bit) set in the AVP header and they carry the CableLabs' vendor identifier in the Vendor-ID field of the AVP header. The CableLabs-specific AVP codes are presented in the following table. AVP Names of "Obsolete" indicate that the AVP Code was previously assigned but is no longer used, and re-assignment of the AVP Code should be avoided.

Table 1 - CableLabs-specific AVP Codes

AVP Name	AVP Code	Specification Reference	Data Type	AVP Flag rules				
				Must	May	Should not	Must not	May Encr.
BCID	200	[PKT ES-INF]	UTF8String	V, M	P			N
Call-Transfer	201	[PKT RST-ACCT]	Group	V, M	P			N
Correlate-Reason	202	[PKT ES-INF]	Enumerated	V, M	P			N
Dialog-Id	203	[PKT ES-INF]	UTF8String	V, M	P			N
Digest-Algorithm	204	[PKT 29.229]	UTF8String	V			M	N
Digest-Auth-Param	205	[PKT 29.229]	OctetString	V			M	N
Digest-Domain	206	[PKT 29.229]	UTF8String	V			M	N
Digest-HA1	207	[PKT 29.229]	OctetString	V			M	N
Digest-QoP	208	[PKT 29.229]	UTF8String	V			M	N
Digest-Realm	209	[PKT 29.229]	UTF8String	V			M	N
Direction	210	[PKT ES-INF]	Enumerated	V, M	P			N
Direct-Message	211	[PKT ES-INF]	Enumerated	V, M	P			N
Element-ID	212	[PKT ES-INF]	UTF8String	V, M	P			N
Element-Type	213	[PKT ES-INF]	Enumerated	V, M	P			N
Event-Message-Type	214	[PKT ES-INF]	Enumerated	V, M	P			N
Location-Routing- Number	215	[PKT ACCT]	UTF8String	V, M	P			N
LRN-Source-Indicator	216	[PKT ACCT]	Integer32	V, M	P			N
LRN-Query-Status	217	[PKT ACCT]	Integer32	V, M	P			N
LI-Information	218	[PKT ES-INF]	Grouped	V, M	P			N
New-Dialog-Id	219	[PKT ES-INF]	UTF8String	V, M	P			N
NP-Data	220	[PKT ACCT]	Grouped	V, M	P			N
Obsolete (previously PCMM BCID)	221	[PKT ACCT]						
PCMM-Information	222	[PKT ACCT]	Grouped	V, M	P			N
Refer-To	223	[PKT RST-ACCT], [PKT ACCT]	UTF8String	V, M	P			N
RST-Information	224	[PKT RST-ACCT]	Grouped	V, M	P			N
RST-Subscriber-ID	225	[PKT RST-ACCT]	UTF8String	V, M	P			N
Server-Role	226	[PKT RST-ACCT]	Enumerated	V, M	P			N
Session-Type	227	[PKT RST-ACCT]	Enumerated	V, M	P			N
SIP-Digest-Authenticate	228	[PKT 29.229]	Grouped	V			M	N

AVP Name	AVP Code	Specification Reference	Data Type	AVP Flag rules				
				Must	May	Should not	Must not	May Encr.
SIP-Message	229	[PKT ES-INF]	OctetString	V, M	P			N
Target	230	[PKT RST-ACCT], [PKT ACCT]	UTF8String	V, M	P			N
Tap-Id	231	[PKT ES-INF]	UTF8String	V, M	P			N
Transfer-Session-Call-ID	232	[PKT RST-ACCT]	UTF8String	V, M	P			N

6.5 Experimental Result Codes

The Diameter answer messages must carry either Result-Code AVP or Experimental-Result AVP. The values of Result-Code AVP are controlled by IANA. The Experimental-Result AVP is a grouped AVP containing the Vendor-ID AVP and Experimental-Result-Code AVP, thus the experimental result codes are controlled in a vendor-specific manner.

6.5.1 CableLabs-specific Experimental Result Codes

There are no CableLabs-specific result codes at this time.

6.6 Assignment of the Diameter Codes and Identifiers

6.6.1 Application Identifiers

If a specification determines it will require a new application identifier based on the rules defined in [RFC 3588], a request for an application identifier should be sent to IANA. When the application identifier is received, an Engineering Change Request needs to be submitted against this document adding the newly assigned application identifier.

6.6.2 Command Codes

If a specification determines there is a need for a new command code(s) and no CableLabs allocated command code values are available, the procedures defined in [RFC 3588] need to be followed.

It should be noted that the standard command codes allocated for 3GPP are scarce resources and getting new ones would require IETF specification work to be done. Therefore it is recommended to use the existing command codes whenever possible.

Once a new command code is assigned, an Engineering Change Request should be submitted against this document adding the newly assigned command codes.

6.6.3 AVP Codes

If a specification determines a Diameter application needs new CableLabs-specific AVP code(s), an Engineering Change Request needs to be submitted against this document adding the newly assigned AVP code value. AVP codes are available on a first-come-first-serve basis and are assigned in numerical order. Skipping AVP code values is discouraged as is reserving blocks of AVP codes for further assignment. Given the possibility for multiple Engineering Change Requests assigning AVP codes at the same time, conflicts may occur. As such, AVP code values are only guaranteed to be unique and allocated once the Engineering Change Request becomes an

Engineering Change Notice. To ensure unique AVP code values, oversight of the allocation process is required and the responsibility of the CableLabs employee currently responsible for this specification.

Re-use of the existing AVPs is recommended, but special attention should be paid to the use of enumerated AVPs. Defining new values for an enumerated AVP should be agreed to case by case with the specification group responsible for the particular enumerated AVP.

6.6.4 Result Codes

If a specification determines that a Diameter application needs new CableLabs-specific result code(s), an Engineering Change Request needs to be submitted against this document adding the newly assigned result code value. Result codes are available on a first-come-first-serve basis and are assigned in numerical order. Skipping result code values is discouraged as is reserving blocks of result codes for further assignment. Given the possibility for multiple Engineering Change Requests assigning result codes at the same time, conflicts may occur. As such, result code values are only guaranteed to be unique and allocated once the Engineering Change Request becomes an Engineering Change Notice. To ensure unique result code values, oversight of the allocation process is required and the responsibility of the CableLabs employee currently responsible for this specification.

7 CABLELABS RCP REGISTRY

7.1 Definition

This document establishes a CableLabs Receive Channel Profile (RCP) registry. RCPs are used by DOCSIS 3.0 cable modems to advertise their receiver capabilities. RCPs can be "Standard RCPs" defined by CableLabs (and existing in the CableLabs RCP namespace) or "Manufacturer RCPs" defined by the Manufacturer of a cable modem or cable modem silicon (and existing in the Manufacturer's RCP namespace).

DOCSIS 3.0 Cable Modem Termination Systems (CMTSs) support the cable operator configuration of Receive Channel Configurations (RCCs) based on the deployed downstream channel lineup and the details of a CM's receiver capabilities as described in an RCP encoding. Each RCC in the CMTS is indexed by the RCP-ID of the RCP upon which it is based. The CM itself may only advertise the RCP-ID, which is then used by the CMTS to match the CM to an appropriate RCC at Registration time. This registry provides the detailed RCP encoding associated with each RCP-ID to allow proper configuration of RCCs by the cable operator.

7.2 Format

Two encoding formats are defined for an RCP. The first is an XML encoding defined in [OSSIV3.0], the second is a Type-Length-Value encoding defined in [MULPI]. The encoding format used for the CableLabs RCP registry is the XML format.

7.3 Defining New Receive Channel Profiles

Each request for a new entry in the CableLabs RCP registry must include the full XML encoding of the RCP, including an RCP-ID using either the CableLabs OUI (for a proposed new Standard RCP) or the Vendor's OUI (for a Manufacturer RCP), and an RCP Name.

8 CABLELABS ASN.1 CODES REGISTRY

8.1 Definition

This document establishes a CableLabs ASN.1 Codes registry. The purpose of this registry is to define a common repository for assignment of ASN.1 codes value of the type Object Identifier (OID) for CableLabs projects. Typically this registry contains the MIB Module Identities within the CableLabs enterprise branch for use within the Simple Network Management Protocol (SNMP), but can also contain any other ASN.1 definition used by other protocols or specifications.

8.2 SMI Network Management Codes

8.2.1 CableLabs Enterprise Number

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs (1.3.6.1.4.1.4491)

Table 2 - CableLabs Enterprise Number Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	clabFunction	CableLabs	[MIB-CLABDEF]
2	clabProject	CableLabs Projects	[MIB-CLABDEF]
3	clabSecurity	CableLabs Security	[MIB-CLABDEF]
4	clabCommonMibs	CableLabs common SMI information	[MIB-CLABDEF]

8.2.2 CableLabs DOCSIS Project

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjDocsis (1.3.6.1.4.1.4491.2.1)

Table 3 - CableLabs DOCSIS Project Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	dsgMIB	DSG-MIB	
2	docsLoadBalanceMib	DOCS-LOADBAL-MIB	[OSSiv2.0]
3	dsgIfMIB	DSG-IF-MIB	[DSG]
4	dsgIfStdMib	DSG-IF-STD-MIB	[DSG]
5	docsIfExt2Mib	DOCS-IF-EXT2-MIB	[OSSiv2.0]
6	docsIfMCmtsMib	DOCS-IF-M-CMTS-MIB	[M-OSSI]
7	dtiMib	DTI-MIB	[M-OSSI]
8	docsL2vpnMIB	DOCS-L2VPN-MIB	[L2VPN]
9	docsDiagMib	DOCS-DIAG-MIB	[OSSiv3.0]
10	docsSubmgt3Mib	DOCS-SUBMGT3-MIB	[OSSiv3.0]

Decimal	Name	Description	References
11	docsSecMib	DOCS-SEC-MIB	[OSSiv3.0]
12	docsTestMIB	DOCS-TEST-MIB	[DOCS TEST]
13	sledMib	SLED-MIB	[eDOCSIS]
14	esafeMib	ESAFE-MIB	[eDOCSIS]
15	teaPwMIB	TEA-PW-MIB	[TEI]
16	teaPwTDMIB	TEA-PW-TDM-MIB	[TEI]
17	teaPwTcMIB	TEA-PW-TC-MIB	[TEI]
18	docsMcastMib	DOCS-MCAST-MIB	[OSSiv3.0]
19	docsMcastAuthMib	DOCS-MCAST-AUTH-MIB	[OSSiv3.0]
20	docsIf3Mib	DOCS-IF3-MIB	[OSSiv3.0]
21	docsQos3Mib	DOCS-QOS3-MIB	[OSSiv3.0]
22	docsLoadbal3Mib	DOCS-LOADBAL3-MIB	[OSSiv3.0]
23	docsDrfMib	DOCS-DRF-MIB	[M-OSSI]

8.2.3 CableLabs PacketCable Project

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjPacketCable
(1.3.6.1.4.1.4491.2.2)

Table 4 - CableLabs PacketCable Project Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	pktcMtaMib	PKTC-MTA-MIB	[PKT MIB MTA1.5]
2	pktcSigMib	PKTC-SIG-MIB	[PKT MIB SIG1.5]
3	pktcEventMib	PKTC-EVENT-MIB	[PKT EVE MIB1.5]
4	pktcSecurity	PacketCable Security Node	[MIB-CLABDEF]
5	pktcLawfulIntercept	PacketCable Lawful intercept node	[MIB-CLABDEF]
6	pktcEnhancements	PacketCable Enhancements node	[MIB-CLABDEF]
7	pktcPACMMibs	PacketCable PACM node	[MIB-CLABDEF]
8	pktcApplicationMibs	PacketCable Service node	[MIB-CLABDEF]
9	pktcSupportMibs	PacketCable Support node	[MIB-CLABDEF]
10	pktcEUEMibs	PacketCable EUE node	[MIB-CLABDEF]
11	pktcSMAMibs	PacketCable SMA node	[MIB-CLABDEF]

8.2.3.1 CableLabs PacketCable Project Lawful Intercept Codes

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjPacketCable.
pktcLawfulIntercept (1.3.6.1.4.1.4491.2.2.5)

Table 5 - CableLabs PacketCable Project Electronic Surveillance Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	pcesp	PCESP	[PKT ESP]

8.2.3.2 CableLabs PacketCable Project Enhancements

Prefix:

```
iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjPacketCable.
pktcEnhancements (1.3.6.1.4.1.4491.2.2.6)
```

Table 6 - CableLabs PacketCable Project Enhancements Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	pktcEnMtaMib	PKTC-EN-MTA-MIB	[PKT MIB EXMTA1.5]
2	pktcEnSigMib	PKTC-EN-SIG-MIB	[PKT MIB SIG1.5]
3	pktcEnEventMib	Reserved for future use	
4	pktcEnSecurityMib	Reserved for future use	
5	pktcEnEUEMib	Reserved for future use	

8.2.3.3 CableLabs PacketCable Project PACM

Prefix:

```
iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjPacketCable.
pktcPACMMibs (1.3.6.1.4.1.4491.2.2.7)
```

Table 7 - CableLabs PacketCable Project PACM Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	pktcPACMTC	Reserved - withdrawn	
2	pktcPACMUEMib	Reserved - withdrawn	
3	pktcPACMUserMib	Reserved - withdrawn	
4		Reserved for future use	
5		Reserved for future use	
6	pktcPACMMgtMIB	Reserved - withdrawn	
7	pktcPACMEventMib	Reserved - withdrawn	

CableLabs PacketCable Project Application

Prefix:

```
iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjPacketCable.
pktcApplicationMibs (1.3.6.1.4.1.4491.2.2.8)
```

Table 8 - CableLabs PacketCable Project Application Codes

Decimal	Name	Description	References
0		Reserved for future use	
1		Reserved for future use	
2	pktcEUERSTMIB	CL-PKTC-EUE-RST-MIB	[PKT RST-EUE-PROV]

8.2.3.4 CableLabs PacketCable Project Support

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjPacketCable.pktcSupportMibs (1.3.6.1.4.1.4491.2.2.9)

Table 9 - CableLabs PacketCable Project Support Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	pktcESSupportMibs	PacketCable ES node	[MIB-CLABDEF]

8.2.3.4.1 CableLabs PacketCable Project Support Electronic Surveillance

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjPacketCable.pktcSupportMibs.pktcESSupportMibs (1.3.6.1.4.1.4491.2.2.9.1)

Table 10 - CableLabs PacketCable Project Support Electronic SurveillanceCodes

Decimal	Name	Description	References
0		Reserved for future use	
1	pktcESTapMib	PKTC-ES-TAP-MIB	[PKT ES-INF]
2	pktcESIpTapMIB	PKTC-ES-IPTAP-MIB	[PKT ES-INF]

8.2.3.5 CableLabs PacketCable Project EUE

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjPacketCable.pktcEUEMibs (1.3.6.1.4.1.4491.2.2.10)

Table 11- CableLabs PacketCable Project EUE Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	pktcEUEDeviceMibs	PacketCable EUE Device node	[MIB-CLABDEF]
2	pktcEUETCMIB	CL-PKTC-EUE-TC-MIB	[PKT EUE-DATA]
3	pktcEUEDevMIB	CL-PKTC-EUE-DEV-MIB	[PKT EUE-DATA]
4	pktcEUEUserMIB	CL-PKTC-EUE-USER-MIB	[PKT EUE-DATA]
5	pktcEUEProvMgmtMIB	CL-PKTC-EUE-PROV-MGMT-MIB	[PKT EUE-DATA]
6	pktcEUEEventMIB	CL-PKTC-EUE-EVENT-MIB	[PKT EUE-DATA]
7	pktcEUEPrsMIB	CL-PKTC-EUE-PRS-MIB	[PKT EUE-DATA]

8.2.3.5.1 CableLabs PacketCable Project EUE Specific

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjPacketCable.pktcEUEMibs.pktcEUEDeviceMibs (1.3.6.1.4.1.4491.2.2.10.1)

Table 12 - CableLabs PacketCable Project EUE Device Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	pktcEDVAMIB	CL-PKTC-EUE-EDVA-MIB	[PKT RST-EUE-PROV]

8.2.4 CableLabs OpenCable Project

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjOpenCable (1.3.6.1.4.1.4491.2.3)

Table 13 - CableLabs OpenCable Project Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	ocStbHostMibModule	OC-STB-HOST-MIB	[OC MIB-HOST2.X]
2	ocHnMibModule	OC-HOME-NETWORK-MIB	[OC MIB-HN]

8.2.5 CableLabs CableHome Project

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabProject.clabProjCableHome (1.3.6.1.4.1.4491.2.4)

Table 14 - CableLabs CableHome Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	cabhPsDevMib	CABH-PS-DEV-MIB	[CH PSDEV-MIB]
2	cabhSecMib	CABH-SEC-MIB	[CH SEC-MIB]
3	cabhCapMib	CABH-CAP-MIB	[CH CAP-MIB]
4	cabhCdpMib	CABH-CDP-MIB	[CH CDP-MIB]
5	cabhCtpMib	CABH-CTP-MIB	[CH CTP-MIB]
6	cabhQosMib	CABH-QOS-MIB Reserved	
7	cabhCsaMib	CABH-CSA-MIB	[CO CSA-MIB]
8	cabhQos2Mib	CABH-QOS2-MIB	[CH QOS-MIB]

8.2.6 CableLabs Security

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabSecurity (1.3.6.1.4.1.4491.3)

Table 15 - CableLabs Security Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	clabSecCertObject	Security Certificates node	[MIB-CLABDEF]
2	clabSecOlcaObject	OLCA Object Class	[MIB-CLABDEF] [OLCA AUTH]

8.2.7 CableLabs Common SMI MIB Modules

Prefix:

iso.org.dod.internet.private.enterprises.cableLabs.clabCommonMibs (1.3.6.1.4.1.4491.4)

Table 16 - CableLabs Common Codes

Decimal	Name	Description	References
0		Reserved for future use	
1	clabUpsMib	CLAB-UPS-MIB	[MIB-BB]
2	clabTopoMib	CLAB-TOPO-MIB	[OSSiv3.0]

9 CABLELABS APPLICATIONS REGISTRY

This section contains CableLabs assigned application identifiers, represented as unique integer values, to identify applications specified for cable clients. Each application identifier is accompanied by the CableLabs project specifying the application, the name of the application, an integer value representing the application identifier, and a reference specification. The principal use for application identifiers is within data definitions, such as MIB modules.

As an example, the PacketCable application identifier "1" represents the PacketCable RST application. Within PacketCable MIBs, it is used within the user MIB to associate specific users with the CableLabs RST application. Using the MIBs specified in [PKT EUE-DATA], specifically the MIB table pktCEUEUsrAppMapTable, the following row entries are of relevance:

pktCEUEUsrAppMapAppOrgID.<user A>.<application index>=4491 (identifies CableLabs)

pktCEUEUsrAppMapAppIdentifier.<user A>.<application index>=1 (identifies RST)

The above example specifies that user A is associated with the CableLabs specified application, RST.

The registry is specified in Table 17.

Table 17 - PacketCable Application Identifiers

Project	Application	Identifier	Reference Specification
PacketCable	Residential SIP Telephony (RST)	1	[PKT SP-RSTF]

Appendix I Acknowledgements

On behalf of CableLabs and its participating member companies, we would like to extend our thanks to all member and vendor participants who contributed to the development of the protocol fields registered in this specification. Key contributors to this document are recognized individually in each of the CableLabs project-specific specifications.

CableLabs Standards Department

Appendix II Revision History (Informative)

II.1 Engineering Changes for CM-SP-CL-SP-CANN-I02-080306

The following engineering changes are incorporated into CM-SP-CL-SP-CANN-I02-080306:

ECN	Date Accepted	Summary
CANN-N-07.0028-3	7/25/2007	Registration of additional Diameter AVPs for PacketCable 2.0
CANN-N-07.0029-2	7/18/2007	Update to DIAMETER Registrations
CANN-N-07.0033-2	11/28/2007	New Section CableLabs ASN.1 Codes Registry
CANN-N-07.0036-3	2/20/2008	Addition of application registry

II.2 Engineering Change for CM-SP-CL-SP-CANN-I03-090811

The following engineering change is incorporated into CM-SP-CL-SP-CANN I03-090811:

ECN	Date Accepted	Summary
CANN-N-08.0038-2	1/28/2009	Modifications to support SMA devices

II.3 Engineering Changes for CM-SP-CL-SP-CANN-I04-100212

The following engineering changes are incorporated into CM-SP-CL-SP-CANN-I04-100212:

ECN	Date Accepted	Summary
CANN-N-09.0045-1	11/11/2009	SAFI namespace update
CANN-N-09.0046-1	12/16/2009	Home Networking Addition

II.4 Engineering Change for CM-SP-CL-SP-CANN-I05-110210

The following engineering change is incorporated into CM-SP-CL-SP-CANN-I05-110210:

ECN	Date Accepted	Summary
CANN-N-10.0091-1	1/5/2011	New OID for Online Content Access Project