

Internet Engineering Task Force (IETF)  
Internet Draft  
Intended Status: Informational  
Expires: December 24, 2013

S. Turner  
IECA  
R. Housley  
Vigil Security  
J. Schaad  
Soaring Hawk Consulting  
June 22, 2013

The application/cms media type  
draft-turner-application-cms-media-type-05.txt

## Abstract

This document registers the application/cms media types for use with the corresponding CMS (Cryptographic Message Syntax) content types.

## Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of [BCP 78](#) and [BCP 79](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <http://datatracker.ietf.org/drafts/current/>.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

## Copyright Notice

Copyright (c) 2013 IETFTrust and the persons identified as the document authors. All rights reserved.

This document is subject to [BCP 78](#) and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Internet-Draft

application/cms Media Type

June 22, 2013

## 1. Introduction

[RFC5751] registered the application/pkcs7-mime media type. That document defined five optional smime-type parameters. The smime-type parameter originally conveyed details about the security applied (signed or enveloped) to the data content type, hence signed-data and enveloped-data, the name of the data, and was later expanded to also indicate that the message was compressed, compressed-data, and that the message is a certs-only message. This document does not affect those registrations as this document places no requirements on S/MIME (Secure Multipurpose Internet Mail Extensions) agents.

The registration done by the S/MIME documents was done assuming that there would be a MIME (Multipurpose Internet Mail Extensions) wrapping layer around each of the different enveloping contents, thus there was no need to include more than one item in each smime-type. This is no longer the case with some of the more advanced enveloping types. Some protocols such as the CMC (Certificate Management over Cryptographic Message Syntax) [RFC5273] have defined additional S/MIME types. New protocols that intend to wrap MIME content should continue to define a smime-type string, however new protocols that intend to wrap non-mime types should use this mechanism instead.

CMS (Cryptographic Message Syntax) [RFC5652] associates a content type identifier (OID) with a content; CMS content types have been widely used to define contents that can be enveloped using other CMS content types and to define enveloping content types some of which provide security services. CMS protecting content types, those that provide security services, include: id-signedData [RFC5652], id-envelopedData [RFC5652], id-digestData [RFC5652], id-encryptedData [RFC5652], id-ct-authData [RFC5652], id-ct-authEnvelopedData [RFC5083], and id-ct-KP-encryptedKeyPkg [RFC6032]. CMS non-protecting content types, those that provide no security services but encapsulate other CMS content types, include: id-ct-contentInfo [RFC5652], id-compressedData [RFC3274], id-ct-contentCollection [RFC4073], and id-ct-contentWithAttrs [RFC4073]. Then, there are the inner most content types that include: id-data [RFC5652], id-ct-KP-aKeyPackage [RFC5958], id-ct-KP-sKeyPackage [RFC6031], id-ct-firmwarePackage [RFC4108], id-ct-firmwareLoadReceipt [RFC4108], id-ct-firmwareLoadError [RFC4108], id-ct-trustAnchorList [RFC5914], id-ct-KP-keyPackageReceipt [ID.housley-keypackage-receipt-n-error], and id-ct-KP-keyPackageError [ID.housley-keypackage-receipt-n-error].

To support conveying CMS content types, this document defines a media type and parameters that indicate the enveloping and embedded CMS content types.

New CMS content types should be affirmative in defining the string

Internet-Draft

application/cms Media Type

June 22, 2013

that identifies the new content type and should additionally define if the new content type is expected to appear in the encapsulatedContent or innerContent field.

### [1.1](#). Requirements Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

## [2](#). CMS Media Type Registration Applications

This section provides the media type registration application for the application/cms media type (see [[RFC6838](#)], [Section 5.6](#)).

Type name: application

Subtype name: cms

Required parameters: None.

Optional parameters:

encapsulatedContent=y; where y is one or more CMS ECT (Encapsulating Content Type) identifiers; multiple values are encapsulated in quotes and separated by a folding-whitespace comma folding-whitespace. ECT values are based on content types found in [[RFC3274](#)], [[RFC4073](#)], [[RFC5083](#)], [[RFC5652](#)], and [[RFC6032](#)]. This list can later be extended, see [Section 3](#).

- authData
- compressedData
- contentCollection
- contentInfo
- contentWithAttrs
- authEnvelopedData
- encryptedKeyPkg

digestData  
encryptedData  
envelopedData  
signedData

innerContent=x; where x is one or more CMS ICT (Inner Content Type) identifiers; multiple values encapsulated in quotes and are separated by a folding-whitespace comma folding-whitespace. ICT values are based on content types found in [\[RFC4108\]](#), [\[RFC5914\]](#), [\[RFC5958\]](#), [\[RFC6031\]](#), and [\[ID.housley-keypackage-receipt-n-error\]](#). This list can later be extended, see [Section 3](#).

firmwarePackage

firmwareLoadReceipt  
firmwareLoadError  
aKeyPackage  
sKeyPackage  
trustAnchorList  
keyPackageReceipt  
keyPackageError

id-data [\[RFC5652\]](#) MUST NOT be used if it is the only inner content listed and the data is MIME content; when id-data is used to encapsulate MIME, the media type application/pkcs7-mime media type defined in [\[RFC5751\]](#) SHOULD be used.

The optional parameters are case-sensitive.

#### Encoding considerations:

Binary.

[\[RFC5652\]](#) requires that the outer most encapsulation be ContentInfo.

#### Security considerations:

The following security considerations apply:

RFC	CMS Protecting Content Type and Algorithms
-----+-----	
<a href="#">[RFC3370]</a>	id-signedData, id-envelopedData,

<a href="#">[RFC5652]</a>	id-digestedData, id-encryptedData, and
<a href="#">[RFC5753]</a>	id-ct-authData
<a href="#">[RFC5754]</a>	
-----+-----	
<a href="#">[RFC5958]</a>	id-ct-KP-aKeyPackage
<a href="#">[RFC5959]</a>	
<a href="#">[RFC6162]</a>	
-----+-----	
<a href="#">[RFC6031]</a>	id-ct-KP-sKeyPackage
<a href="#">[RFC6160]</a>	
-----+-----	
<a href="#">[RFC6032]</a>	id-ct-KP-encryptedKeyPkg
<a href="#">[RFC6033]</a>	
<a href="#">[RFC6161]</a>	
-----+-----	
<a href="#">[RFC5914]</a>	id-ct-trustAnchorList
-----+-----	
<a href="#">[RFC3274]</a>	id-compressedData
-----+-----	

<a href="#">[RFC5083]</a>	id-ct-authEnvelopedData
<a href="#">[RFC5084]</a>	
-----+-----	
<a href="#">[RFC4073]</a>	id-ct-contentCollection and
	id-ct-contentWithAttrs
-----+-----	
<a href="#">[RFC4108]</a>	id-ct-firmwarePackage,
	id-ct-firmwareLoadReceipt, and
	id-ct-firmwareLoadError
-----+-----	
<a href="#">[ID.housley-keypackage-receipt-n-error]</a>	
	id-ct-KP-keyPackageReceipt and
	id-ct-KP-keyPackageError
-----+-----	

In some circumstances, significant information can be leaked by disclosing what the innermost ASN.1 structure is. In these cases it is acceptable to disclose the wrappers without disclosing the inner content type.

ASN.1 encoding rules (e.g., DER and BER) have a type-length-value structure, and it is easy to construct malicious content with

invalid length fields that can cause buffer overrun conditions. ASN.1 encoding rules allows for arbitrary levels of nesting, which may make it possible to construct malicious content that will cause a stack overflow. Interpreters of ASN.1 structures should be aware of these issues and should take appropriate measures to guard against buffer overflows and stack overruns in particular and malicious content in general.

Interoperability considerations:

See [[RFC3274](#)], [[RFC4073](#)], [[RFC4108](#)], [[RFC5083](#)], [[RFC5652](#)], [[RFC5914](#)], [[RFC5958](#)], [[RFC6031](#)], [[RFC6032](#)], and [ID.housley-keypackage-receipt-n-error].

In all cases, CMS content types are encapsulated within ContentInfo structures [[RFC5652](#)]; that is the outer most enveloping structure is ContentInfo.

When processing a SignedData around any of the inner content type the [[RFC5652](#)] validation rules MUST be used. The PKCS #7 [[RFC2315](#)] validation rules MUST NOT be used.

Published specification: This specification.

Applications which use this media type:

Applications that support CMS (Cryptographic Message Syntax) content types.

Additional information:

Magic number(s): None

File extension(s): .cmsc

Macintosh File Type Code(s):

Person & email address to contact for further information:

Sean Turner <turners@ieca.com>

Restrictions on usage: none

Author: Sean Turner <turners@ieca.com>

Intended usage: COMMON

Change controller: The IESG <iesg@ietf.org>

### 3. IANA Considerations

IANA is asked to register the media type application/cms in the Standards tree using the applications provided in [Section 2](#) of this document.

IANA is also asked to establish two subtype registries called "CMS Encapsulating Content Types" and "CMS Inner Content Types". Entries in these registries is by Expert Review [[RFC5226](#)]. The Expert will determine whether the content is an ECT or an ICT; where the rule is that an ICT does not encapsulate another content type while an ECT does encapsulate another content type.

Initial values are as follows:

#### CMS Encapsulating Content Type

Name	Document	Object Identifier
authData	[ <a href="#">RFC5652</a> ]	1.2.840.113549.1.9.16.1.2
compressedData	[ <a href="#">RFC3274</a> ]	1.2.840.113549.1.9.16.1.9
contentCollection	[ <a href="#">RFC4073</a> ]	1.2.840.113549.1.9.16.1.19
contentInfo	[ <a href="#">RFC5652</a> ]	1.2.840.113549.1.9.16.1.6
contentWithAttrs	[ <a href="#">RFC4073</a> ]	1.2.840.113549.1.9.16.1.20
authEnvelopedData	[ <a href="#">RFC5083</a> ]	1.2.840.113549.1.9.16.1.23
encryptedKeyPkg	[ <a href="#">RFC6030</a> ]	2.16.840.1.101.2.1.2.78.2

digestData	[ <a href="#">RFC5652</a> ]	1.2.840.113549.1.9.16.1.5
encryptedData	[ <a href="#">RFC5652</a> ]	1.2.840.113549.1.9.16.1.6
envelopedData	[ <a href="#">RFC5652</a> ]	1.2.840.113549.1.9.16.1.3
signedData	[ <a href="#">RFC5652</a> ]	1.2.840.113549.1.9.16.1.2

#### CMS Inner Content Type

Name	Document	Object Identifier
------	----------	-------------------

firmwarePackage	[ <a href="#">RFC4108</a> ]	1.2.840.113549.1.9.16.1.16
firmwareLoadReceipt	[ <a href="#">RFC4108</a> ]	1.2.840.113549.1.9.16.1.17
firmwareLoadError	[ <a href="#">RFC4108</a> ]	1.2.840.113549.1.9.16.1.18
aKeyPackage	[ <a href="#">RFC5958</a> ]	2.16.840.1.101.2.1.2.78.5
sKeyPackage	[ <a href="#">RFC6031</a> ]	1.2.840.113549.1.9.16.1.25
trustAnchorList	[ <a href="#">RFC5914</a> ]	1.2.840.113549.1.9.16.1.34
keyPackageReceipt	[ <a href="#">ID.housley-keypackage-receipt-n-error</a> ]	
		2.16.840.1.101.2.1.2.78.3
keyPackageError	[ <a href="#">ID.housley-keypackage-receipt-n-error</a> ]	
		2.16.840.1.101.2.1.2.78.6

#### [4.](#) Security Considerations

See the answer to the Security Considerations template questions in [Section 2](#).

#### [5.](#) References

##### [5.1.](#) Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC3274] Gutmann, P., "Compressed Data Content Type for Cryptographic Message Syntax (CMS)", [RFC 3274](#), June 2002.
- [RFC3370] Housley, R., "Cryptographic Message Syntax (CMS) Algorithms", [RFC 3370](#), August 2002.
- [RFC4073] Housley, R., "Protecting Multiple Contents with the Cryptographic Message Syntax (CMS)", [RFC 4073](#), May 2005.
- [RFC4108] Housley, R., "Using Cryptographic Message Syntax (CMS) to Protect Firmware Packages", [RFC 4108](#), August 2005.
- [RFC5083] Housley, R., "Cryptographic Message Syntax (CMS) Authenticated-Enveloped-Data Content Type", [RFC 5083](#), November 2007.



Encryption in the Cryptographic Message Syntax (CMS)", [RFC 5084](#), November 2007.

- [RFC5226] Narten, T., and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [RFC 5226](#), May 2008.
- [RFC5273] Schaad, J. and M. Myers, "Certificate Management over CMS (CMC): Transport Protocols", [RFC 5273](#), June 2008.
- [RFC5652] Housley, R., "Cryptographic Message Syntax (CMS)", STD 70, [RFC 5652](#), September 2009.
- [RFC5753] Turner, S. and D. Brown, "Use of Elliptic Curve Cryptography (ECC) Algorithms in Cryptographic Message Syntax (CMS)", [RFC 5753](#), January 2010.
- [RFC5754] Turner, S., "Using SHA2 Algorithms with Cryptographic Message Syntax", [RFC 5754](#), January 2010.
- [RFC5914] Housley, R., Ashmore, S., and C. Wallace, "Trust Anchor Format", [RFC 5914](#), June 2010.
- [RFC5958] Turner, S., "Asymmetric Key Packages", [RFC 5958](#), August 2010.
- [RFC5959] Turner, S., "Algorithms for Asymmetric Key Package Content Type", [RFC 5959](#), August 2010.
- [RFC6031] Turner, S. and R. Housley, "Cryptographic Message Syntax (CMS) Symmetric Key Package Content Type", [RFC 6031](#), December 2010.
- [RFC6032] Turner, S. and R. Housley, "Cryptographic Message Syntax (CMS) Encrypted Key Package Content Type", [RFC 6032](#), December 2010.
- [RFC6033] Turner, S., "Algorithms for Cryptographic Message Syntax (CMS) Encrypted Key Package Content Type", [RFC 6033](#), December 2010.
- [RFC6160] Turner, S., "Algorithms for Cryptographic Message Syntax (CMS) Protection of Symmetric Key Package Content Types", [RFC 6160](#), April 2011.
- [RFC6161] Turner, S., "Elliptic Curve Algorithms for Cryptographic Message Syntax (CMS) Encrypted Key Package Content Type", [RFC 6161](#), April 2011.

- [RFC6162] Turner, S., "Elliptic Curve Algorithms for Cryptographic Message Syntax (CMS) Asymmetric Key Package Content Type", [RFC 6162](#), April 2012.
- [RFC6838] Freed, N., Klensin, J., and T. Hansen, "Media Type Specifications and Registration Procedures", [BCP 13](#), [RFC 6838](#), January 2013.
- [ID.housley-keypackage-receipt-n-error] Housley, R., "Cryptographic Message Syntax (CMS) Key Package Receipt and Error Content Types", [draft-housley-ct-keypackage-receipt-n-error](#), June 2013.

## [5.2](#). Informative References

- [RFC2315] Kaliski, B., "PKCS #7: Cryptographic Message Syntax Version 1.5", [RFC 2315](#), March 1998.
- [RFC5751] Ramsdell, B. and S. Turner, "Secure/Multipurpose Internet Mail Extensions (S/MIME) Version 3.2 Message Specification", [RFC 5751](#), January 2010.

## Authors' Addresses

Sean Turner  
IECA, Inc.  
3057 Nutley Street, Suite 106  
Fairfax, VA 22031  
USA

EMail: [turners@ieca.com](mailto:turners@ieca.com)  
Phone: +1.703.628.3180

Russell Housley  
Vigil Security, LLC  
918 Spring Knoll Drive  
Herndon, VA 20170  
USA

EMail: [housley@vigilsec.com](mailto:housley@vigilsec.com)

Jim Schaad  
Soaring Hawk Consulting

EMail: [ietf@augustcellars.com](mailto:ietf@augustcellars.com)

