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February 12, 2008

Update to Use of Elliptic Curve Cryptography (ECC) Algorithms  
in Cryptographic Message Syntax (CMS)  
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## Abstract

[RFC 3278](#) describes how to use Elliptic Curve Cryptography (ECC) public-key algorithms in the Cryptographic Message Syntax (CMS). This document updates [RFC 3278](#) to add support for the SHA2 family of hash algorithms.

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## Conventions used in this document

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 [[MUST](#)].

## Discussion

This draft is being discussed on the 'ietf-smime' mailing list. To subscribe, send a message to [ietf-smime-request@imc.org](mailto:ietf-smime-request@imc.org) with the single word subscribe in the body of the message. There is a Web site for the mailing list at <http://www.imc.org/ietf-smime/>.

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## [1](#). Introduction

[RFC 3278](#) describes how to use Elliptic Curve Cryptography (ECC) public-key algorithms in the Cryptographic Message Syntax (CMS). This document updates [RFC 3278](#) to add support for the SHA2 family of hash algorithms.

There are changes to four paragraphs:

- Paragraph 2.1.1 limited the digest algorithm to SHA-1. This document expands the allowed algorithms to SHA-224, SHA-256, SHA-284, and SHA-512.
- Paragraph 8.1 listed the algorithm identifiers for SHA-1 and SHA-1 with ECDSA. This document adds algorithms for SHA-224, SHA-256, SHA-284, and SHA-512 and SHA-224, SHA-256, SHA-284, and SHA-512 with ECDSA.

- Paragraph 9 references need to be updated.

- Security considerations paragraph referring to definitions of SHA-224, SHA-256, SHA-284, and SHA-512 needs to be deleted.

## [2.](#) Updates to Paragraph 2.1.1

Old:

digestAlgorithm MUST contain the algorithm identifier sha-1 (see [Section 8.1](#)) which identifies the SHA-1 hash algorithm.

signatureAlgorithm contains the algorithm identifier ecdsa-with-SHA1 (see [Section 8.1](#)) which identifies the ECDSA signature algorithm.

New:

digestAlgorithm MUST contain the algorithm identifier of the hash algorithm (see [Section 8.1](#)): id-sha1 identifies the SHA-1 hash algorithm, id-sha224 identifies the SHA-224 hash algorithm, id-sha256 identifies the SHA-256 hash algorithm, id-sha384 identifies the SHA-384 algorithm, and id-sha512 identifies the SHA-512 algorithm.

signatureAlgorithm contains the signature algorithm identifier (see [Section 8.1](#)): ecdsa-with-SHA1, ecdsa-with-SHA224, ecdsa-with-SHA256, ecdsa-with-SHA384, ecdsa-with-SHA512.

## [3.](#) Updates to Paragraph 8.1

Old:

The algorithm identifiers used in this document are taken from [X9.62], [SEC1] and [SEC2].

The following object identifier indicates the hash algorithm used in this document:

sha-1 OBJECT IDENTIFIER ::= { iso(1) identified-organization(3)

oiw(14) secsig(3) algorithm(2) 26 }

New:

The algorithm identifiers used in this document are taken from [\[SMIME-SHA2\]](#)

The following object identifier indicates the hash algorithm used in this document:

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id-sha1 OBJECT IDENTIFIER ::= { iso(1) identified-organization(3) oiw(14) secsig(3) algorithm(2) 26 }

id-sha224 OBJECT IDENTIFIER ::= { joint-iso-itu-t(2) country(16) us(840) organization(1) gov(101) csor(3) nistalgorithm(4) hashalgs(2) 4 }

id-sha256 OBJECT IDENTIFIER ::= { joint-iso-itu-t(2) country(16) us(840) organization(1) gov(101) csor(3) nistalgorithm(4) hashalgs(2) 1 }

id-sha384 OBJECT IDENTIFIER ::= { joint-iso-itu-t(2) country(16) us(840) organization(1) gov(101) csor(3) nistalgorithm(4) hashalgs(2) 2 }

id-sha512 OBJECT IDENTIFIER ::= { joint-iso-itu-t(2) country(16) us(840) organization(1) gov(101) csor(3) nistalgorithm(4) hashalgs(2) 3 }

Old:

The following object identifier indicates the digital signature algorithm used in this document:

ecdsa-with-SHA1 OBJECT IDENTIFIER ::= { ansi-x9-62 signatures(4) 1 }

New:

The following object identifier indicates the digital signature algorithm used in this document:

ecdsa-with-SHA1 OBJECT IDENTIFIER ::= { ansi-x9-62

signatures(4) 1 }

ecdsa-with-SHA224 OBJECT IDENTIFIER ::= { ansi-x9-62  
signatures(4) ecdsa-with-SHA2(3) 1 }

ecdsa-with-SHA256 OBJECT IDENTIFIER ::= { ansi-x9-62  
signatures(4) ecdsa-with-SHA2(3) 2 }

ecdsa-with-SHA384 OBJECT IDENTIFIER ::= { ansi-x9-62  
signatures(4) ecdsa-with-SHA2(3) 3 }

ecdsa-with-SHA512 OBJECT IDENTIFIER ::= { ansi-x9-62  
signatures(4) ecdsa-with-SHA2(3) 4 }

#### [4.](#) Updates to Paragraph 9

Add the following reference:

[SMIME-SHA2] Turner, S., "Using SHA2 Algorithms with  
Cryptographic Message Syntax", work-in-progress.

Update the following references:

Old:

[PKI-ALG] Bassham, L., Housley R. and W. Polk, "Algorithms and  
Identifiers for the Internet X.509 Public Key Infrastructure  
Certificate and CRL Profile", [RFC 3279](#), April 2002.

[FIPS-180] FIPS 180-1, "Secure Hash Standard", National Institute  
of Standards and Technology, April 17, 1995.

New:

[PKI-ALG] Turner, S., Brown, D., Yiu, K., Housley, R., and W.  
Polk, " Elliptic Curve Cryptography Subject Public Key  
Information", work-in-progress.

[FIPS] FIPS 180-2, "Secure Hash Standard", National Institute of  
Standards and Technology, August 1, 2002.

#### [5.](#) Changes to Security Considerations

Delete the following:

When 256, 384, and 512 bit hash functions succeed SHA-1 in future revisions of [[FIPS](#)], [FIPS-186-2], [X9.62] and [SEC1], then they can similarly succeed SHA-1 in a future revision of this document.

## [6.](#) Security Considerations

No new security considerations to those already specified in [[RFC3278](#)], [[SMIME-SHA2](#)], and [[PKI-ALG](#)].

## [7.](#) IANA Considerations

None: All identifiers are already registered. Please remove this section prior to publication as an RFC.

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## [8.](#) References

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

- [MUST] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [RFC 2119](#), [BCP 14](#), March 1997.
- [PKI-ALG] Turner, S., Brown, D., Yiu, K., Housley, R., and W. Polk, "Elliptic Curve Cryptography Subject Public Key Information", work-in-progress.
- [SMIME-SHA2] Turner, S., "Using SHA2 Algorithms with Cryptographic Message Syntax", work-in-progress.
- [RFC3278] Blake-Wilson, S., Brown, D., and P. Lambert, "Use of Elliptic Curve Cryptography (ECC) Algorithms in Cryptographic Message Syntax (CMS)", [RFC 3278](#), April 2002.

### [8.2.](#) Informative References

None.

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