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Elliptic Curve Algorithms for Cryptographic Message Syntax (CMS) Asymmetric Key Package Content Type

Abstract

This document describes conventions for using Elliptic Curve cryptographic algorithms with SignedData and EnvelopedData to protect the AsymmetricKeyPackage content type. Specifically, it includes conventions necessary to implement Elliptic Curve Diffie-Hellman (ECDH) with EnvelopedData and Elliptic Curve Digital Signature Algorithm (ECDSA) with SignedData. This document extends RFC 5959.

Status of This Memo

This is an Internet Standards Track document.

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1. Introduction

[RFC5959] describes conventions necessary to protect the AsymmetricKeyPackage content type [RFC5958] with Cryptographic Message Syntax (CMS) protecting the following content types: SignedData [RFC5652], EnvelopedData [RFC5652], EncryptedData [RFC5652], AuthenticatedData [RFC5652], and AuthEnvelopedData [RFC5083]. This document amends [RFC5959] by extending the algorithms used with SignedData and EnvelopedData to include Elliptic Curve Digital Signature Algorithm (ECDSA) and Elliptic Curve Diffie-Hellman (ECDH), respectively. Familiarity with [RFC5959] and [RFC5753] is assumed.

This document does not define any new algorithms; instead, it refers to previously defined algorithms.

1.1 Terminology

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

2. AsymmetricKeyPackage

As noted in Asymmetric Key Packages [RFC5958], CMS can be used to protect the AsymmetricKeyPackage. The following provides guidance for SignedData [RFC5652] and EnvelopedData [RFC5652] when used with Elliptic Curve algorithms.

2.1. SignedData

If an implementation supports SignedData, then it MAY support ECDSA [RFC6090][RFC5753].

2.2. EnvelopedData

When key agreement is used, standard (as opposed to cofactor) ECDH [RFC6090][RFC5753] MAY be supported.

3. Public Key Sizes

The easiest way to implement SignedData and EnvelopedData is with public key certificates [RFC5280][RFC5480]. If an implementation supports ECDSA or ECDH, then it MUST support keys on the P-256 curve.

4. Security Considerations

The security considerations from [RFC5280], [RFC5480], [RFC5652], [RFC5753], [RFC5959], and [RFC6090] apply.

5. References

5.1. Normative References

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- [RFC5280] Cooper, D., Santesson, S., Farrell, S., Boeyen, S., Housley, R., and W. Polk, "Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile", RFC 5280, May 2008.
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- [RFC5753] Turner, S. and D. Brown, "Use of Elliptic Curve Cryptography (ECC) Algorithms in Cryptographic Message Syntax (CMS)", RFC 5753, January 2010.
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5.2. Informative Reference

- [RFC5083] Housley, R., "Cryptographic Message Syntax (CMS) Authenticated-Enveloped-Data Content Type", RFC 5083, November 2007.

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