X.509 Certificate Extension for Secure/Multipurpose Internet Mail Extensions (S/MIME) Capabilities

Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Copyright Notice

Copyright (C) The Internet Society (2005).

Abstract

This document defines a certificate extension for inclusion of Secure/Multipurpose Internet Mail Extensions (S/MIME) Capabilities in X.509 public key certificates, as defined by RFC 3280. This certificate extension provides an optional method to indicate the cryptographic capabilities of an entity as a complement to the S/MIME Capabilities signed attribute in S/MIME messages according to RFC 3851.

1. Introduction

This document defines a certificate extension for inclusion of S/MIME Capabilities in X.509 public key certificates, as defined by RFC 3280 [RFC3280].

The S/MIME Capabilities attribute, defined in RFC 3851 [RFC3851], is defined to indicate cryptographic capabilities of the sender of a signed S/MIME message. This information can be used by the recipient in subsequent S/MIME secured exchanges to select appropriate cryptographic properties.

However, S/MIME does involve also the scenario where, for example, a sender of an encrypted message has no prior established knowledge of the recipient’s cryptographic capabilities through recent S/MIME exchanges.
In such a case, the sender is forced to rely on out-of-band means or its default configuration to select a content encryption algorithm for encrypted messages to recipients with unknown capabilities. Such default configuration may, however, be incompatible with the recipient’s capabilities and/or security policy.

The solution defined in this specification leverages the fact that S/MIME encryption requires possession of the recipient’s public key certificate. This certificate already contains information about the recipient’s public key and the cryptographic capabilities of this key. Through the extension mechanism defined in this specification, the certificate may also identify the subject’s cryptographic S/MIME capabilities. This may then be used as an optional information resource to select appropriate encryption settings for the communication.

This document is limited to the "static" approach where asserted cryptographic capabilities remain unchanged until the certificate expires or is revoked. Other "dynamic" approaches, which allow retrieval of certified dynamically updateable capabilities during the lifetime of a certificate, are out of scope of this document.

1.1. 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 RFC 2119 [STDWORDS].

2. S/MIME Capabilities Extension

This section defines the S/MIME Capabilities extension.

The S/MIME Capabilities extension data structure used in this specification is identical to the data structure of the SMIMECapabilities attribute defined in RFC 3851 [RFC3851]. (The ASN.1 structure of smimeCapabilities is included below for illustrative purposes only.)

```
smimeCapabilities OBJECT IDENTIFIER ::= 
    {iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1) 
      pkcs-9(9) 15}

SMIMECapabilities ::= SEQUENCE OF SMIMECapability

SMIMECapability ::= SEQUENCE { 
    capabilityID OBJECT IDENTIFIER, 
    parameters ANY DEFINED BY capabilityID OPTIONAL }
```
All content requirements defined for the SMIMECapabilities attribute in RFC 3851 apply also to this extension.

There are numerous different types of S/MIME Capabilities that have been defined in various documents. While all of the different capabilities can be placed in this extension, the intended purpose of this specification is mainly to support inclusion of S/MIME Capabilities specifying content encryption algorithms.

Certification Authorities (CAs) SHOULD limit the type of included S/MIME Capabilities in this extension to types that are considered relevant to the intended use of the certificate.

Client applications processing this extension MAY at their own discretion ignore any present S/MIME Capabilities and SHOULD always gracefully ignore any present S/MIME Capabilities that are not considered relevant to the particular use of the certificate.

This extension MUST NOT be marked critical.

3. Use in Applications

Applications using the S/MIME Capabilities extension SHOULD NOT use information in the extension if more reliable and relevant authenticated capabilities information is available to the application.

It is outside the scope of this specification to define what is, or is not, regarded as a more reliable source of information by the application that is using the certificate.

4. Security Considerations

The S/MIME Capabilities extension contains a statement about the subject’s capabilities made at the time of certificate issuance. Implementers should therefore take into account any effect caused by the change of these capabilities during the lifetime of the certificate.

Change in the subject’s capabilities during the lifetime of a certificate may require revocation of the certificate. Revocation should, however, only be motivated if a listed algorithm is considered broken or considered too weak for the governing security policy.
Implementers should take into account that the use of this extension does not change the fact that it is always the responsibility of the sender to choose sufficiently strong encryption for its information disclosure.

5. Normative References


Author’s Address

Stefan Santesson
Microsoft
Tuborg Boulevard 12
2900 Hellerup
Denmark

EMail: stefans@microsoft.com
Full Copyright Statement

Copyright (C) The Internet Society (2005).

This document is subject to the rights, licenses and restrictions contained in BCP 78, and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in BCP 78 and BCP 79.

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at http://www.ietf.org/ipr.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at ietf-ipr@ietf.org.

Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.