COSE Algorithms for Web Authentication (WebAuthn)
draft-jones-webauthn-cose-algorithms-00

Abstract

The W3C Web Authentication (WebAuthn) specification uses COSE algorithm identifiers. This specification registers algorithms in the IANA "COSE Algorithms" registry that are used by WebAuthn that are not already registered. Also, they are registered in the IANA "JSON Web Signature and Encryption Algorithms" registry, when not already registered there.

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This specification defines how to use several algorithms with COSE [RFC8152] that are used by the W3C Web Authentication (WebAuthn) [WebAuthn] specification. These algorithms are registered in the IANA "COSE Algorithms" registry [IANA.COSE.Algorithms] and also in the IANA "JSON Web Signature and Encryption Algorithms" registry [IANA.JOSE.Algorithms], when not already registered there.

1. Introduction

This specification defines how to use several algorithms with COSE [RFC8152] that are used by the W3C Web Authentication (WebAuthn) [WebAuthn] specification. These algorithms are registered in the IANA "COSE Algorithms" registry [IANA.COSE.Algorithms] and also in the IANA "JSON Web Signature and Encryption Algorithms" registry [IANA.JOSE.Algorithms], when not already registered there.

1.1. Requirements Notation and Conventions

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 BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. RSASSA-PKCS1-v1_5 Signature Algorithm

The RSASSA-PKCS1-v1_5 signature algorithm is defined in [RFC8017]. The RSASSA-PKCS1-v1_5 signature algorithm is parameterized with a hash function (h).

A key of size 2048 bits or larger MUST be used with these algorithms. Implementations need to check that the key type is ‘RSA’ when creating or verifying a signature.
The RSASSA-PKCS1-v1_5 algorithms specified in this document are in the following table.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Hash</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS256</td>
<td>TBD (requested</td>
<td>SHA-256</td>
<td>RSASSA-PKCS1-v1_5 w/</td>
</tr>
<tr>
<td></td>
<td>assignment -257)</td>
<td></td>
<td>SHA-256</td>
</tr>
<tr>
<td>RS384</td>
<td>TBD (requested</td>
<td>SHA-384</td>
<td>RSASSA-PKCS1-v1_5 w/</td>
</tr>
<tr>
<td></td>
<td>assignment -258)</td>
<td></td>
<td>SHA-384</td>
</tr>
<tr>
<td>RS512</td>
<td>TBD (requested</td>
<td>SHA-512</td>
<td>RSASSA-PKCS1-v1_5 w/</td>
</tr>
<tr>
<td></td>
<td>assignment -259)</td>
<td></td>
<td>SHA-512</td>
</tr>
<tr>
<td></td>
<td>assignment -262)</td>
<td></td>
<td>SHA-1</td>
</tr>
</tbody>
</table>

Table 1: RSASSA-PKCS1-v1_5 Algorithm Values

3. IANA Considerations

3.1. COSE Algorithms Registrations

This section registers the following values in the IANA "COSE Algorithms" registry [IANA.COSE.Algorithms].

- Name: RS256
  - Value: TBD (requested assignment -257)
  - Description: RSASSA-PKCS1-v1_5 w/ SHA-256
  - Reference: Section 2 of this document
  - Recommended: No

- Name: RS384
  - Value: TBD (requested assignment -258)
  - Description: RSASSA-PKCS1-v1_5 w/ SHA-384
  - Reference: Section 2 of this document
  - Recommended: No

- Name: RS512
  - Value: TBD (requested assignment -259)
  - Description: RSASSA-PKCS1-v1_5 w/ SHA-512
  - Reference: Section 2 of this document
  - Recommended: No

- Name: RS1
  - Value: TBD (requested assignment -262)
  - Description: RSASSA-PKCS1-v1_5 w/ SHA-1
  - Reference: Section 2 of this document
  - Recommended: No
4. Security Considerations

4.1. RSA Key Size Security Considerations

The security considerations on key sizes for RSA algorithms from Section 6.1 of [RFC8230] also apply to the RSA algorithms in this specification.

4.2. RSASSA-PKCS1-v1_5 with SHA-2 Security Considerations

The security considerations on the use of RSASSA-PKCS1-v1_5 with SHA-2 hash functions from Section 8.3 of [RFC7518] also apply to their use in this specification. For that reason, these algorithms are registered as being "Not Recommended".

4.3. RSASSA-PKCS1-v1_5 with SHA-1 Security Considerations

The security considerations on the use of the SHA-1 hash function from [RFC6194] apply in this specification. For that reason, the "RS1" algorithm is registered as "Not Recommended". It MUST NOT be used by COSE implementations.

A COSE algorithm identifier for this algorithm is nonetheless being registered because deployed TPMs continue to use it, and therefore WebAuthn implementations need a COSE algorithm identifier for "RS1" when TPM attestations using this algorithm are being represented.

5. References

5.1. Normative References


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5.2. Informative References

[IANA.COSE.Algorithms]
IANA, "COSE Algorithms",
<https://www.iana.org/assignments/cose/cose.xhtml#algorithms>.

[IANA.JOSE.Algorithms]
IANA, "JSON Web Signature and Encryption Algorithms",
<https://www.iana.org/assignments/jose/jose.xhtml#web-signature-encryption-algorithms>.

[WebAuthn]
Balfanz, D., Czeskis, A., Hodges, J., Jones, J., Jones, M., Kumar, A., Liao, A., Lindemann, R., and E. Lundberg,
"Web Authentication: An API for accessing Public Key Credentials", Candidate Recommendation, World Wide Web Consortium (W3C) Recommendation-track, March 2018,
<https://w3c.github.io/webauthn/>.

Acknowledgements

TBD