

Network Working Group
Internet-Draft
Updates: [4572](#) (if approved)
Intended status: Standards Track
Expires: December 12, 2016

C. Holmberg
Ericsson
June 10, 2016

Updates to [RFC 4572](#)
draft-ietf-mmusic-4572-update-05.txt

Abstract

This document updates [RFC 4572](#) by clarifying the usage of multiple SDP 'fingerprint' attributes with a single TLS connection. The document also updates the preferred cipher suite with a stronger cipher suite, and removes the requirement to use the same hash function for calculating a certificate fingerprint that is used to calculate the certificate signature.

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."

This Internet-Draft will expire on December 12, 2016.

Copyright Notice

Copyright (c) 2016 IETF Trust 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

Internet-Draft

Updates to [RFC 4572](#)

June 2016

the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1.	Introduction	2
2.	Conventions	3
3.	Update to RFC 4572	3
3.1.	Update to the sixth paragraph of section 5	3
3.2.	New paragraphs to the end of section 5	4
4.	Security Considerations	5
5.	IANA Considerations	6
6.	Acknowledgements	6
7.	Change Log	6
8.	Normative References	7
	Author's Address	7

[1.](#) Introduction

[RFC 4572](#) [[RFC4572](#)] specifies how to establish Transport Layer Security (TLS) connections using the Session Description Protocol (SDP) [[RFC4566](#)].

[RFC 4572](#) defines the SDP 'fingerprint' attribute, which is used to carry a secure hash value (fingerprint) associated with a certificate. However, [RFC 4572](#) is currently unclear on whether multiple 'fingerprint' attributes can be associated with a single SDP media description ("m= line") [[RFC4566](#)], and the associated semantics. Multiple fingerprints are needed if an endpoints wants to provide fingerprints associated with multiple certificates. For example, with RTP-based media, an endpoint might use different certificates for RTP and RTCP.

[RFC 4572](#) also specifies a preferred cipher suite. However, the currently preferred cipher suite is considered outdated, and the preference needs to be updated.

[RFC 4572](#) mandates that the hash function used to calculate the fingerprint is the same hash function used to calculate the certificate signature. That requirement might prevent usage of newer, stronger and more collision-safe hash functions for calculating certificate fingerprints. This change also requires that multiple 'fingerprint' attributes can be associated with a single

"m=" line, so that implementations are able to provide fingerprints calculated using updated hash functions alongside those that are needed to interoperate with existing implementations.

This document updates [RFC 4572](#) [[RFC4572](#)] by clarifying the usage of multiple SDP 'fingerprint' attributes. It is clarified that multiple 'fingerprint' attributes can be used to carry fingerprints, calculated using different hash functions, associated with a given certificate, and to carry fingerprints associated with multiple certificates. The fingerprint matching procedure, when multiple fingerprints are provided, are also clarified. The document also updates the preferred cipher suite with a stronger cipher suite, and removes the requirement to use the same hash function for calculating a certificate fingerprint and certificate signature.

[2.](#) Conventions

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](#)].

[3.](#) Update to [RFC 4572](#)

This section updates [section 5 of RFC 4572](#).

[3.1.](#) Update to the sixth paragraph of [section 5](#)

Internet-Draft

Updates to [RFC 4572](#)

June 2016

OLD TEXT:

A certificate fingerprint MUST be computed using the same one-way hash function as is used in the certificate's signature algorithm. (This ensures that the security properties required for the certificate also apply for the fingerprint. It also guarantees that the fingerprint will be usable by the other endpoint, so long as the certificate itself is.) Following [RFC 3279](#) [7] as updated by [RFC 4055](#) [9], therefore, the defined hash functions are 'SHA-1' [11] [19], 'SHA-224' [11], 'SHA-256' [11], 'SHA-384' [11], 'SHA-512' [11], 'MD5' [12], and 'MD2' [13], with 'SHA-1' preferred. A new IANA registry of Hash Function Textual Names, specified in [Section 8](#), allows for addition of future tokens, but they may only be added if they are included in RFCs that update or obsolete [RFC 3279](#) [7]. Self-signed certificates (for which legacy certificates are not a consideration) MUST use one of the FIPS 180 algorithms (SHA-1, SHA-224, SHA-256, SHA-384, or SHA-512) as their signature algorithm, and thus also MUST use it to calculate certificate fingerprints.

NEW TEXT:

Following [RFC 3279](#) [7] as updated by [RFC 4055](#) [9], therefore, the defined hash functions are 'SHA-1' [11] [19], 'SHA-224' [11], 'SHA-256' [11], 'SHA-384' [11], 'SHA-512' [11], 'MD5' [12], and 'MD2' [13], with 'SHA-256' preferred. A new IANA registry of Hash Function Textual Names, specified in [Section 8](#), allows for addition of future tokens, but they may only be added if they are included in RFCs that update or obsolete [RFC 3279](#) [7].

3.2. New paragraphs to the end of [section 5](#)

Holmberg

Expires December 12, 2016

[Page 4]

Internet-Draft

Updates to [RFC 4572](#)

June 2016

NEW TEXT:

Multiple SDP fingerprint attributes can be associated with an m-line. This can occur if multiple fingerprints have been calculated for a certificate using different hash functions. It can also occur if one or more fingerprints associated with multiple certificates have been calculated. This might be needed if multiple certificates will be used for media associated with an m-line (e.g. if separate certificates are used for RTP and RTCP), or where it is not known which certificate will be used when the fingerprints are exchanged. In such cases, one or more fingerprints MUST be calculated for each possible certificate. An endpoint MUST, as a minimum, calculate a fingerprint using the 'SHA-256' hash function algorithm for each possible certificate, unless the endpoint knows that the peer supports a stronger algorithm, or unless the endpoint knows that the peer has not been upgraded to support the 'SHA-256' algorithm, or unless the endpoint is used for a service, or within an environment that mandates usage of a stronger algorithm.

If fingerprints associated with multiple certificates are calculated, the same set of hash functions MUST be used to

calculate fingerprints for each certificate associated with the m- line.

For each used certificate, an endpoint MUST be able to match at least one fingerprint, calculated using the hash function that the endpoint supports and considers most secure, with the used certificate. If the checked fingerprint does not match the used certificate, the endpoint MUST NOT establish the TLS connection. In addition, the endpoint MAY also check fingerprints calculated using other hash functions that it has received for a match. For each hash function checked, one of the received fingerprints calculated using the hash function MUST match the used certificate.

NOTE: The SDP fingerprint attribute does not contain a reference to a specific certificate. Endpoints need to compare the fingerprint with a certificate hash in order to look for a match.

[4.](#) Security Considerations

This document improves security. It updates the preferred hash function cipher suite from SHA-1 to SHA-256. By clarifying the usage and handling of multiple fingerprints, the document also enables hash agility, and incremental deployment of newer, and more secure, cipher suites.

Holmberg

Expires December 12, 2016

[Page 5]

Internet-Draft

Updates to [RFC 4572](#)

June 2016

[5.](#) IANA Considerations

This document makes no requests from IANA.

[6.](#) Acknowledgements

Martin Thomson, Paul Kyzivat, Jonathan Lennox and Roman Shpount provided valuable comments and input on this document.

[7.](#) Change Log

[RFC EDITOR NOTE: Please remove this section when publishing]

Changes from [draft-ietf-mmusic-4572-update-04](#)

- o Removed previously added requirement that endpoint must calculate at least one fingerprint using a hash function that was also used by the peer.

Changes from [draft-ietf-mmusic-4572-update-03](#)

- o Mandatory (except in specific situations) to provide a fingerprint calculated using SHA-256.
- o When an endpoint receives fingerprints from its peer, the endpoint must (except in specific situations) calculate at least one fingerprint using a hash function that was also used by the peer.

Changes from [draft-ietf-mmusic-4572-update-02](#)

- o Editorial fixes based on comments from Martin Thomson.
- o Non-used references removed.

Changes from [draft-ietf-mmusic-4572-update-01](#)

- o Changes based on comments from Martin Thomson.
- o - Editorial fixes
- o Changes in handling of multiple fingerprints.
- o - Sender must send same set of hash functions for each offered certificate.
- o - Receiver must check the hash function it considers most secure for a match. It may check other hash functions.

Changes from [draft-ietf-mmusic-4572-update-00](#)

- o Changes in handling of multiple fingerprints.
- o - Number of fingerprints calculated for each certificate does not have to match.
- o - Clarified that receiver shall check fingerprints using

hash algorithms it considers safe.

- o - Additional text added to security considerations section.

Changes from [draft-holmberg-mmusic-4572-update-01](#)

- o Adopted WG document ([draft-ietf-mmusic-4572-update-00](#)) submitted.
- o IANA considerations section added.

8. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<http://www.rfc-editor.org/info/rfc2119>>.
- [RFC4566] Handley, M., Jacobson, V., and C. Perkins, "SDP: Session Description Protocol", [RFC 4566](#), DOI 10.17487/RFC4566, July 2006, <<http://www.rfc-editor.org/info/rfc4566>>.
- [RFC4572] Lennox, J., "Connection-Oriented Media Transport over the Transport Layer Security (TLS) Protocol in the Session Description Protocol (SDP)", [RFC 4572](#), DOI 10.17487/RFC4572, July 2006, <<http://www.rfc-editor.org/info/rfc4572>>.

Author's Address

Christer Holmberg
Ericsson
Hirsalantie 11
Jorvas 02420
Finland

Email: christer.holmberg@ericsson.com