

Network Working Group
Internet-Draft
Intended status: Standards Track
Expires: November 15, 2020

A. Melnikov, Ed.
Isode Ltd
May 14, 2020

SCRAM-SHA-512 and SCRAM-SHA-512-PLUS Simple Authentication and Security
Layer (SASL) Mechanisms
[draft-melnikov-scam-sha-512-00](#)

Abstract

This document registers the Simple Authentication and Security Layer (SASL) mechanisms SCRAM-SHA-512 and SCRAM-SHA-512-PLUS.

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 <https://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 November 15, 2020.

Copyright Notice

Copyright (c) 2020 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 (<https://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 the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1.	Introduction	2
2.	Key Word Definitions	2
3.	SCRAM-SHA-512 and SCRAM-SHA-512-PLUS	2
4.	Security Considerations	3
5.	IANA Considerations	3
6.	References	4
6.1.	Normative References	4
6.2.	Informative References	5
	Acknowledgements	6
	Author's Address	6

[1.](#) Introduction

This document registers the SASL [[RFC4422](#)] mechanisms SCRAM-SHA-512 and SCRAM-SHA-512-PLUS. SHA-512 has stronger security properties than SHA-1, and it is expected that SCRAM mechanisms based on it will have greater predicted longevity than the SCRAM mechanisms based on SHA-1.

[2.](#) Key Word Definitions

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

[3.](#) SCRAM-SHA-512 and SCRAM-SHA-512-PLUS

The SCRAM-SHA-512 and SCRAM-SHA-512-PLUS SASL mechanisms are defined in the same way that SCRAM-SHA-1 and SCRAM-SHA-1-PLUS are defined in [[RFC5802](#)], except that the hash function for HMAC() and H() uses SHA-512 instead of SHA-1 [[RFC6234](#)].

For the SCRAM-SHA-512 and SCRAM-SHA-512-PLUS SASL mechanisms, the hash iteration-count announced by a server SHOULD be at least 4096.

The GSS-API mechanism OID for SCRAM-SHA-512 is 1.3.6.1.5.5.<TBD> (see [Section 5](#)).

This is a simple example of a SCRAM-SHA-512 authentication exchange when the client doesn't support channel bindings. The username 'user' and password 'pencil' are being used.

4. Security Considerations

The security considerations from [\[RFC5802\]](#) still apply.

To be secure, either SCRAM-SHA-512-PLUS and SCRAM-SHA-1-PLUS MUST be used over a TLS channel that has had the session hash extension [\[RFC7627\]](#) negotiated, or session resumption MUST NOT have been used.

See [\[RFC4270\]](#) and [\[RFC6194\]](#) for reasons to move from SHA-1 to a strong security mechanism like SHA-512.

The strength of this mechanism is dependent in part on the hash iteration-count, as denoted by "i" in [\[RFC5802\]](#). As a rule of thumb, the hash iteration-count should be such that a modern machine will take 0.1 seconds to perform the complete algorithm; however, this is unlikely to be practical on mobile devices and other relatively low-performance systems. At the time this was written, the rule of thumb gives around 15,000 iterations required; however, a hash iteration-count of 4096 takes around 0.5 seconds on current mobile handsets. This computational cost can be avoided by caching the ClientKey (assuming the Salt and hash iteration-count is stable). Therefore, the recommendation of this specification is that the hash iteration-count SHOULD be at least 4096, but careful consideration ought to be given to using a significantly higher value, particularly where mobile use is less important.

5. IANA Considerations

IANA is requested to add the following new SASL SCRAM mechanisms to the "SASL SCRAM Family Mechanisms" registry:

To: iana@iana.org

Subject: Registration of a new SASL SCRAM Family mechanism SCRAM-SHA-512

SASL mechanism name (or prefix for the family): SCRAM-SHA-512

Security considerations: [Section 4](#) of RFC XXXX

Published specification (optional, recommended): RFC XXXX

Minimum iteration-count: 4096

OID: 1.3.6.1.5.5.<TBD>

Person & email address to contact for further information: IETF
KITTEN WG <kitten@ietf.org>

Intended usage: COMMON

Owner/Change controller: IESG <iesg@ietf.org>

Note:

To: iana@iana.org

Subject: Registration of a new SASL SCRAM Family mechanism SCRAM-
SHA-512-PLUS

SASL mechanism name (or prefix for the family): SCRAM-SHA-
512-PLUS

Security considerations: [Section 4](#) of RFC XXXX

Published specification (optional, recommended): RFC XXXX

Minimum iteration-count: 4096

OID: 1.3.6.1.5.5.<TBD>

Person & email address to contact for further information: IETF
KITTEN WG <kitten@ietf.org>

Intended usage: COMMON

Owner/Change controller: IESG <iesg@ietf.org>

Note:

[6.](#) References

[6.1.](#) 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, <<https://www.rfc-editor.org/info/rfc2119>>.
- [RFC4422] Melnikov, A., Ed. and K. Zeilenga, Ed., "Simple Authentication and Security Layer (SASL)", [RFC 4422](#), DOI 10.17487/RFC4422, June 2006, <<https://www.rfc-editor.org/info/rfc4422>>.

- [RFC5802] Newman, C., Menon-Sen, A., Melnikov, A., and N. Williams, "Salted Challenge Response Authentication Mechanism (SCRAM) SASL and GSS-API Mechanisms", [RFC 5802](#), DOI 10.17487/RFC5802, July 2010, <<https://www.rfc-editor.org/info/rfc5802>>.
- [RFC6234] Eastlake 3rd, D. and T. Hansen, "US Secure Hash Algorithms (SHA and SHA-based HMAC and HKDF)", [RFC 6234](#), DOI 10.17487/RFC6234, May 2011, <<https://www.rfc-editor.org/info/rfc6234>>.
- [RFC7627] Bhargavan, K., Ed., Delignat-Lavaud, A., Pironti, A., Langley, A., and M. Ray, "Transport Layer Security (TLS) Session Hash and Extended Master Secret Extension", [RFC 7627](#), DOI 10.17487/RFC7627, September 2015, <<https://www.rfc-editor.org/info/rfc7627>>.
- [RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in [RFC 2119](#) Key Words", [BCP 14](#), [RFC 8174](#), DOI 10.17487/RFC8174, May 2017, <<https://www.rfc-editor.org/info/rfc8174>>.

[6.2](#). Informative References

- [RFC4270] Hoffman, P. and B. Schneier, "Attacks on Cryptographic Hashes in Internet Protocols", [RFC 4270](#), DOI 10.17487/RFC4270, November 2005, <<https://www.rfc-editor.org/info/rfc4270>>.
- [RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [RFC 5226](#), DOI 10.17487/RFC5226, May 2008, <<https://www.rfc-editor.org/info/rfc5226>>.
- [RFC6194] Polk, T., Chen, L., Turner, S., and P. Hoffman, "Security Considerations for the SHA-0 and SHA-1 Message-Digest Algorithms", [RFC 6194](#), DOI 10.17487/RFC6194, March 2011, <<https://www.rfc-editor.org/info/rfc6194>>.
- [RFC5246] Dierks, T. and E. Rescorla, "The Transport Layer Security (TLS) Protocol Version 1.2", [RFC 5246](#), DOI 10.17487/RFC5246, August 2008, <<https://www.rfc-editor.org/info/rfc5246>>.

Acknowledgements

This document is based on [RFC 7677](#) by Tony Hansen.

Author's Address

Alexey Melnikov (editor)
Isode Ltd
14 Castle Mews
Hampton, Middlesex TW12 2NP
UK

EMail: alexey.melnikov@isode.com