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The Addition of SRTP crypto suites based on the ARIA algorithms to the
SDP Security Descriptions
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Abstract

This document defines SRTP crypto suites based on the ARIA block cipher algorithm for use with the Session Description Protocol (SDP) security descriptions.

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[1.](#) Introduction

This document defines the SDP Security Descriptions attributes [[RFC4568](#)] corresponding to the ARIA transforms which are defined in [[I-D.ietf-avtcore-aria-srtp](#)].

[1.1.](#) ARIA

ARIA is a general-purpose block cipher algorithm developed by Korean cryptographers in 2003. It is an iterated block cipher with 128-, 192-, and 256-bit keys and encrypts 128-bit blocks in 12, 14, and 16 rounds, depending on the key size. It is secure and suitable for most software and hardware implementations on 32-bit and 8-bit processors. It was established as a Korean standard block cipher algorithm in 2004 [[ARIAKS](#)] and has been widely used in Korea, especially for government-to-public services. It was included in PKCS #11 in 2007 [[ARIAPKCS](#)]. The algorithm specification and object identifiers are described in [[RFC5794](#)].

[1.2.](#) SRTP Crypto Suites

The transforms based on ARIA and the corresponding SRTP protection profiles for DTLS-SRTP are defined in [[I-D.ietf-avtcore-aria-srtp](#)]. The SDP Security Descriptions [[RFC4568](#)] crypto suites corresponding to ARIA transforms [[I-D.ietf-avtcore-aria-srtp](#)] are sets as shown in Table 1.

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| Name | Enc. Key Length | Auth. Tag Length |
|---------------------------|-----------------|------------------|
| ARIA_128_CTR_HMAC_SHA1_80 | 16 octets | 10 octets |
| ARIA_128_CTR_HMAC_SHA1_32 | 16 octets | 4 octets |
| ARIA_192_CTR_HMAC_SHA1_80 | 24 octets | 10 octets |
| ARIA_192_CTR_HMAC_SHA1_32 | 24 octets | 4 octets |
| ARIA_256_CTR_HMAC_SHA1_80 | 32 octets | 10 octets |
| ARIA_256_CTR_HMAC_SHA1_32 | 32 octets | 4 octets |
| AEAD_ARIA_128_GCM | 16 octets | 16 octets |
| AEAD_ARIA_256_GCM | 32 octets | 16 octets |

Table 1: ARIA Crypto Suites for SRTP

1.3. 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 [[RFC2119](#)].

2. Parameters

The parameters in each crypto suite listed in Table 1 are described for use with the SDP Security Descriptions attributes [[RFC4568](#)].

| Parameter | Value |
|------------------------------|-------------------------|
| Master key length | 128 bits |
| Master salt length | 112 bits |
| Key Derivation Function | ARIA_128_CTR_PRF |
| Default key lifetime (SRTP) | 2 ⁴⁸ packets |
| Default key lifetime (SRTCP) | 2 ³¹ packets |
| Cipher (for SRTP and SRTCP) | ARIA_128_CTR |
| SRTP authentication function | HMAC-SHA1 |

| | | |
|---------------------------------|-----------|--|
| SRTP authentication key length | 160 bits | |
| SRTP authentication tag length | 80 bits | |
| SRTCP authentication function | HMAC-SHA1 | |
| SRTCP authentication key length | 160 bits | |
| SRTCP authentication tag length | 80 bits | |

Table 2: The ARIA_128_CTR_HMAC_SHA1_80 Crypto Suite

| Parameter | Value | |
|---------------------------------|-------------------------|--|
| Master key length | 128 bits | |
| Master salt length | 112 bits | |
| Key Derivation Function | ARIA_128_CTR_PRF | |
| Default key lifetime (SRTP) | 2 ⁴⁸ packets | |
| Default key lifetime (SRTCP) | 2 ³¹ packets | |
| Cipher (for SRTP and SRTCP) | ARIA_128_CTR | |
| SRTP authentication function | HMAC-SHA1 | |
| SRTP authentication key length | 160 bits | |
| SRTP authentication tag length | 32 bits | |
| SRTCP authentication function | HMAC-SHA1 | |
| SRTCP authentication key length | 160 bits | |
| SRTCP authentication tag length | 80 bits | |

Table 3: The ARIA_128_CTR_HMAC_SHA1_32 Crypto Suite

| Parameter | Value | |
|------------------------------|-------------------------|--|
| Master key length | 192 bits | |
| Master salt length | 112 bits | |
| Key Derivation Function | ARIA_192_CTR_PRF | |
| Default key lifetime (SRTP) | 2 ⁴⁸ packets | |
| Default key lifetime (SRTCP) | 2 ³¹ packets | |
| Cipher (for SRTP and SRTCP) | ARIA_192_CTR | |
| SRTP authentication function | HMAC-SHA1 | |

| | | |
|---------------------------------|-----------|--|
| SRTCP authentication key length | 160 bits | |
| SRTCP authentication tag length | 80 bits | |
| SRTCP authentication function | HMAC-SHA1 | |
| SRTCP authentication key length | 160 bits | |
| SRTCP authentication tag length | 80 bits | |

Table 4: The ARIA_192_CTR_HMAC_SHA1_80 Crypto Suite

| Parameter | Value | |
|---------------------------------|-------------------------|--|
| Master key length | 192 bits | |
| Master salt length | 112 bits | |
| Key Derivation Function | ARIA_192_CTR_PRF | |
| Default key lifetime (SRTCP) | 2 ⁴⁸ packets | |
| Default key lifetime (SRTCP) | 2 ³¹ packets | |
| Cipher (for SRTCP and SRTCP) | ARIA_192_CTR | |
| SRTCP authentication function | HMAC-SHA1 | |
| SRTCP authentication key length | 160 bits | |
| SRTCP authentication tag length | 32 bits | |
| SRTCP authentication function | HMAC-SHA1 | |
| SRTCP authentication key length | 160 bits | |
| SRTCP authentication tag length | 80 bits | |

Table 5: The ARIA_192_CTR_HMAC_SHA1_32 Crypto Suite

| Parameter | Value | |
|-----------|-------|--|
|-----------|-------|--|

| | |
|---------------------------------|-------------------------|
| Master key length | 256 bits |
| Master salt length | 112 bits |
| Key Derivation Function | ARIA_256_CTR_PRF |
| Default key lifetime (SRTP) | 2 ⁴⁸ packets |
| Default key lifetime (SRTCP) | 2 ³¹ packets |
| Cipher (for SRTP and SRTCP) | ARIA_256_CTR |
| SRTP authentication function | HMAC-SHA1 |
| SRTP authentication key length | 160 bits |
| SRTP authentication tag length | 80 bits |
| SRTCP authentication function | HMAC-SHA1 |
| SRTCP authentication key length | 160 bits |
| SRTCP authentication tag length | 80 bits |

Table 6: The ARIA_256_CTR_HMAC_SHA1_80 Crypto Suite

| Parameter | Value |
|---------------------------------|-------------------------|
| Master key length | 256 bits |
| Master salt length | 112 bits |
| Key Derivation Function | ARIA_256_CTR_PRF |
| Default key lifetime (SRTP) | 2 ⁴⁸ packets |
| Default key lifetime (SRTCP) | 2 ³¹ packets |
| Cipher (for SRTP and SRTCP) | ARIA_256_CTR |
| SRTP authentication function | HMAC-SHA1 |
| SRTP authentication key length | 160 bits |
| SRTP authentication tag length | 32 bits |
| SRTCP authentication function | HMAC-SHA1 |
| SRTCP authentication key length | 160 bits |
| SRTCP authentication tag length | 80 bits |

Table 7: The ARIA_256_CTR_HMAC_SHA1_32 Crypto Suite

| Parameter | Value |
|--------------------------------|-------------------------|
| Master key length | 128 bits |
| Master salt length | 96 bits |
| Key Derivation Function | ARIA_128_CTR_PRF |
| Default key lifetime (SRTP) | 2 ⁴⁸ packets |
| Default key lifetime (SRTCP) | 2 ³¹ packets |
| Cipher (for SRTP and SRTCP) | AEAD_ARIA_128_GCM |
| AEAD authentication tag length | 128 bits |

Table 8: The AEAD_ARIA_128_GCM Crypto Suite

| Parameter | Value |
|--------------------------------|-------------------------|
| Master key length | 256 bits |
| Master salt length | 96 bits |
| Key Derivation Function | ARIA_256_CTR_PRF |
| Default key lifetime (SRTP) | 2 ⁴⁸ packets |
| Default key lifetime (SRTCP) | 2 ³¹ packets |
| Cipher (for SRTP and SRTCP) | AEAD_ARIA_256_GCM |
| AEAD authentication tag length | 128 bits |

Table 9: The AEAD_ARIA_256_GCM Crypto Suite

3. IANA Considerations

SDP Security Descriptions [RFC4568] defines SRTP "crypto suites". In order to allow SDP to signal the use of the algorithms defined in this document, IANA is requested to add the below crypto suites to the "SRTP Crypto Suite Registrations" created by [RFC4568], at time of writing located on the following IANA page:

<http://www.iana.org/assignments/sdp-security-descriptions/> .

```
srtp-crypto-suite-ext = "ARIA_128_CTR_HMAC_SHA1_80"/
                        "ARIA_128_CTR_HMAC_SHA1_32"/
                        "ARIA_192_CTR_HMAC_SHA1_80"/
                        "ARIA_192_CTR_HMAC_SHA1_32"/
                        "ARIA_256_CTR_HMAC_SHA1_80"/
                        "ARIA_256_CTR_HMAC_SHA1_32"/
                        "AEAD_ARIA_128_GCM"      /
                        "AEAD_ARIA_256_GCM"      /
                        srtp-crypto-suite-ext
```

4. References

4.1. Normative References

[I-D.ietf-avtcore-aria-srtp]

Kim, W., Lee, J., Park, J., and D. Kwon, "The ARIA Algorithm and Its Use with the Secure Real-time Transport Protocol (SRTP)", [draft-ietf-avtcore-aria-srtp-09](#) (work in progress), November 2015.

[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>>.

[RFC4568] Andreasen, F., Baugher, M., and D. Wing, "Session Description Protocol (SDP) Security Descriptions for Media Streams", [RFC 4568](#), DOI 10.17487/RFC4568, July 2006, <<http://www.rfc-editor.org/info/rfc4568>>.

4.2. Informative References

[ARIAKS] Korean Agency for Technology and Standards, "128 bit block encryption algorithm ARIA - Part 1: General (in Korean)", KS X 1213-1:2009, December 2009.

[ARIAPKCS]

RSA Laboratories, "Additional PKCS #11 Mechanisms", PKCS #11 v2.20 Amendment 3 Revision 1, January 2007.

Description of the ARIA Encryption Algorithm", [RFC 5794](#),
DOI 10.17487/RFC5794, March 2010,
<<http://www.rfc-editor.org/info/rfc5794>>.

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