Common Criteria Crypto Working Group

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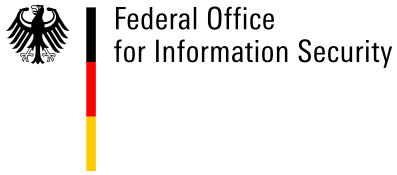
Fritz Bollmann (BSI)

Mary Baish (NIAP)



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Crypto in Common Criteria

Cryptography is ubiquitous in Common Criteria Protection Profiles

- Primarily defined using CC class ‘FCS’
- PPs and SDs specify SFRs and evaluation activities to verify cryptographic security functionality
- Consistency in specification and verification is difficult to achieve

Goal: *Harmonization of the specification and evaluation of crypto mechanisms in collaborative Protection Profiles (cPPs) and product evaluations within CCRA*

Overview

- WG Established in 2015

- Chairpersons
  - Federal Office for Information Security, BSI
  - National Information Assurance Partnership (NIAP)

- The tasks of the WG are to:
  - Assist the iTCs in terms of crypto SFRs and evaluation activities
  - Collate and harmonize crypto evaluation for recognition in the CCRA
  - Develop and maintain crypto Supporting Documents

Challenges

- Coverage of all possible ‘FCS’ components
  - Technology dependent?
  - Guidance needed for iTCs?
- Algorithm agreement
  - 27 nations
  - Clarity in SFRs
- Security strength
  - Not addressed

Covering ‘FCS’ for iTCs

- Piloting Agreed Crypto SFRs
  - USB Portable Storage Device cPP
  - SFR definition complete and delivered to iTC
  - Evaluation activities nearly finished (2-3 outstanding)

Algorithm Agreement

- Approach –
  - provide a means to express all CCRA Participants' needs regarding cryptography – both in the specification of cryptographic functions and the evaluation methodology used to determine TOE compliance with the SFRs
  - tables capture all alternatives
  - Nations specify preferences (or mandates) via position/endorsement statements

Example – Key Generation

FCS_CKM.1.1/Asymm The TSF shall generate **asymmetric** cryptographic keys **[selection: *key name*]** ~~in accordance with a specified cryptographic key generation algorithm [selection: *cryptographic key generation algorithm*] and~~ **with** specified cryptographic key sizes [selection: *key sizes*] that meet the following: [selection: *list of standards*].

The following table provides the allowed choices for completion of the selection operations of FCS_CKM.1.1/Asymm.

Identifier	key name	key sizes	list of standards
AKG1	RSA	[selection: 2048 bit, 3072 bit]	FIPS PUB 186-4 (Section B.3)
AKG2	ECC	[selection: 256 (P-256), 384 (P-384), 512 (P-521)]	FIPS PUB 186-4 (Section B.4 & D.1.2)
AKG3	ECC	[selection: 256 (brainpoolP256r1), 384 (brainpoolP384r1), 512 (brainpoolP512r1)]	RFC5639 (Section 3) [Brainpool Curves] FIPS PUB 186-4 (Section B.4)

Example – User Data Encryption

FCS_COP.1.1/UDE The TSF shall perform *user data encryption/decryption* in accordance with a specified cryptographic algorithm [selection: *cryptographic algorithm*] and cryptographic key sizes [selection: *cryptographic key sizes*] that meet the following: [selection: *list of standards*]

The following table provides the allowed choices for completion of the selection operations of FCS_COP.1/UDE.

Identifier	cryptographic algorithm	key sizes	list of standards
UDE1	AES in CBC mode with non-repeating and unpredictable IVs	[selection: 128 bits, 256 bits]	ISO 18033-3 (AES) ISO 10116 (CBC)
UDE2	AES in CCM mode with unpredictable, non-repeating nonce, minimum size of 64 bits	[selection: 128 bits, 256 bits]	ISO 18033-3 (AES) ISO 19772, sec. 8 (CCM) NIST SP800-38C
UDE3	AES in GCM mode with non-repeating IVs IV length must be equal to 96 bits; the deterministic IV construction method [SP800-38D, Section 8.2.1] must be used; the MAC length t must be one of the values 96, 104, 112, 120, and 128 bits.	[selection: 128 bits, 256 bits]	ISO 18033-3 (AES) ISO 19772, sec.11 (GCM) NIST SP800-38D
UDE4	AES in XTS mode with unique [selection: consecutive non-negative integers starting at an arbitrary non-negative integer, data unit sequence numbers] tweak values	[selection: 256 bits, 512 bits]	ISO 18033-3 (AES) [selection: IEEE 1619, NIST SP800-38E] (XTS)
UDE5	Camellia in CBC mode with non-repeating and unpredictable IVs	[selection: 128 bits, 256 bits]	ISO 18033-3 (Camellia) ISO 10116 (CBC)
UDE6	Camellia in CCM mode with unpredictable, non-repeating nonce, minimum size of 64 bits	[selection: 128 bits, 256 bits]	ISO 18033-3 (Camellia) ISO 19772, sec. 8 (CCM) SP800-38C
UDE7	Camellia in GCM mode with non-repeating IVs the IV length must be equal to 96 bits; the deterministic IV construction method [SP800-38D, Section 8.2.1] must be used; the MAC length t must be one of the values 96, 104, 112, 120, and 128 bits.	[selection: 128 bits, 256 bits]	ISO 18033-3 (Camellia) ISO 19772, sec.11 (GCM) NIST SP800-38D
UDE8	Camellia in XTS mode with unique [selection: consecutive non-negative integers starting at an arbitrary non-negative integer, data unit sequence numbers] tweak values	[selection: 256 bits, 512 bits]	ISO 18033-3 (Camellia) [selection: IEEE 1619, SP800-38E] (XTS)

Next Steps

- Expand set of SFRs for general use in cPPs/iTCs
  - Deliverables:
    - Cryptographic Definitions
    - Specification of Security Functional Requirements for Cryptography
    - Evaluation methodology of Cryptographic Functional Requirements

- Further engage CCUF Crypto WG
  - Protocol specification?
  - Maintenance of SFR and EA documentation?

Questions or concerns? Contact

zertifizierung@bsi.bund.de
niap@niap-ccevs.org