OPTIGA™ Trust M

Product Version: V3

About this document

Scope and purpose

This document specifies the Release Notes for OPTIGA™ Trust M solution.

Intended audience

This document addresses the audience: customers, solution providers and system integrators.

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1 Product Version Overview

1.1 Release versions

The Release versions defined in the below table is the overall version of OPTIGA™ Trust M which includes the OPTIGA™ Trust M Host library package and OPTIGA™ Trust M security chip version.

Release Version	Build Date	Description
v3.02.2564	2025-02-03	Maintenance Release of OPTIGA™ Trust M
v3.01.2558	2021-09-29	Maintenance Release of OPTIGA™ Trust M and its corresponding host libraries
v3.00.2490	2020-10-01	Release to Production of OPTIGA™ Trust M and its corresponding host libraries
v3.00.2468	2020-05-28	Engineering Sample Release of OPTIGA™ Trust M and its corresponding host libraries

1.2 Versioning Scheme

1. **Product Version:**

   It defines the version of the product. (Example: OPTIGA Trust M **V1**, **V2, V3 etc...)**

2. **Release version:**

   Defines the revision of the product released with encoding scheme **Major, Minor,** and **Build** number. **Example** – v3.02.2564 (Major version : 3, Minor version : 01, Build version : 2564)

   2.1. **Major version** - It depicts the major changes/revisions of the product. Early engineering sample releases will always have the release major version as zero. (Example - v**x**.yy.zzzz)

   2.2. **Minor version** - It changes with releases or/and significant changes in the product. (Example - vx.**yy**.zzzz)

   2.3. **Build version** – It increments based on each change/release of the product. (Example - vx.yy.**zzzz**)

Note: Every release will have an OPTIGA™ security chip version [6], which defines the version of the software loaded on the OPTIGA™ security chip.

OPTIGA™ Trust M security chip version will have the same major version number of that particular release version. But the build number of OPTIGA™ Trust M security chip version might be different from the overall release version.

Example:

Release Version : v3.02.2564 (Major version : 3, Minor version : 02, Build version : 2564)
Security chip version : v3.02.2564 (Major version : 3, Minor version : 02, Build version : 2564)

1.3 Identifying eSW Release version

By reading out the OPTIGA™ Trust M “Coprocessor UID” data object (OID: 0xE0C2), it is possible to identify the used OPTIGA™ Trust M embedded Software version (eSW).

The command “GetDataObject” with the respective input values (OID: 0xE0C2) can be used to retrieve the Coprocessor UID. Byte 25-26 will specify the BCD encoded Software build Version.

For more information on how to read data objects on the OPTIGA™ Trust M, refer to Chapter 2.2.1 of the Solution Reference Manual.

For more information on the Coprocessor UID, refer to Table 76 in the Solution Reference Manual

Example:

Data in 0xE0C2 : CD 16 33 4D 01 00 1C 00 05 00 00 0A 09 1B 5C 00 15 00 77 00 89 80 10 10 70 **25 64**.
Software Build Version : 2564

2 Maintenance Release v3.02.2564

2.1 Product Description

OPTIGA™ Trust M v3.02.2564 is an Embedded Security Solution covering use cases to protect the authenticity, integrity and confidentiality of your device: mutual authentication, secure communication, data storage protection, cryptographic toolbox functionalities and lifecycle management for connected devices.

2.2 Scope of Release

OPTIGA™ Trust M v3.02. 2564 is released as Maintenance Release. The Product is qualified by Infineon with complete documentation describing all features as stated below.

2.3 Contents of the Evaluation Kit

1. OPTIGA™ Trust M security chip with software build v3.02.2564
2. OPTIGA™ Trust M Host Library for C
   2.1. See Github: https://github.com/Infineon/optiga-trust-m
3. Documentation and Example Package
   3.1. See Github: https://github.com/Infineon/optiga-trust-m-overview
4. Evalution Kit
   4.1. PSOC™ 62S2 WiFi-BT Pioneer Kit (CY8CKIT-062S2-43012)

   https://www.infineon.com/cms/en/product/evaluation-boards/cy8ckit-062s2-43012/

   4.2. OPTIGA™ Trust Adapter

   https://www.infineon.com/cms/en/product/evaluation-boards/optiga-trust-adapter

   4.3. OPTIGA™ Trust M Shield

   https://www.infineon.com/cms/en/product/evaluation-boards/trust-m-shield

2.4 Features

1. OPTIGA™ Trust M Security Chip Software
   a. Infineon I2C protocol v2.03 based communication with Shielded Connection support.
   b. Configurable protected data storage.
   c. Life cycle management.
   d. Crypto ToolBox commands with
      i. ECC NIST P256/P384/P521, Brainpool P256/384/512, SHA-256/384/512 (sign, verify, key generation, ECDH, key derivation)
      ii. RSA 1024/2048 (Sign, Verify, Key generation, Encrypt, Decrypt, Pre-master secret generation for RSA Key exchange (reference TLS V1.2))
      iii. Symmetric encryption and decryption using AES-128/192/256 (ECB, CBC, CBC-MAC, CMAC) and HMAC SHA256/384/512.
      iv. KeyDerivation using HKDF SHA256/384/512

e. Hibernate and restore support.
f. Integrity and confidentiality protected update of data, metadata and key objects
g. Boot phase flag(Global and Application security states) based access to protected keys and data
h. HMAC verification with authorization reference states.
i. Configurable security monitor.

2. OPTIGA™ Trust M Host Software

2.5 Fixes

See the Github changelog (https://github.com/Infineon/optiga-trust-m/blob/main/CHANGELOG.md) for more information

2.6 Enhancements

Changes: Updated Security chip software with latest Asymmetric Crypto Library v02.09.002.

Additional Information: Recent scientific developments have led to a new side channel attack scenario. The firmware implements improved side channel resilience capabilities in order to protect against future advances in this new attack scenario.

2.7 Known Issues

1. Disconnecting the power (VDD pin) of the Host MCU during the communication with OPTIGA™ Trust M and re-establishing the connection might end up in Infineon I2C protocol stack non responsive state due to the low level driver issue observed.

2.8 Limitations

1. The maximum number of OPTIGA™ crypt instances which would be based on session is limited to 4 in parallel.
2. Third-party libraries such as mbed TLS might invoke memory allocation functions during optiga comms protection (shielded connection) operations (pal_crypt). There could be collision during memory allocation, if a create API from service layer is invoked at the same time.
3. OPTIGA™ is a singleton resource. The number of instances that can run in parallel is limited to 6 (1 active instance and 5 instances will be queued up internally). To increase the maximum number of parallel instances, re-configure the macro OPTIGA_CMD_MAX_REGISTRATIONS (minimum value is 1) in optiga_lib_config.h.
4. As the RSA key generation can go beyond 50 seconds, the default timeout of ifx i2c protocol (TL_MAX_EXIT_TIMEOUT) is set to 180 seconds. Otherwise, 10 seconds is sufficient.
5. In a multi-thread scenario where user continuously creates and destroys the optiga crypt or util instances might lead to incorrect synchronization and would lead the optiga command scheduler into uninitialized state.

2.9 Environment

None

3 Maintenance Release v3.01.2558

3.1 Product Description

OPTIGA™ Trust M v3.01.2558 is an Embedded Security Solution covering use cases to protect the authenticity, integrity and confidentiality of your device: mutual authentication, secure communication, data storage protection, cryptographic toolbox functionalities and lifecycle management for connected devices.

3.2 Scope of Release

OPTIGA™ Trust M v3.01.2558 is released as Maintenance Release. The Product is qualified by Infineon with complete documentation describing all features as stated below.

3.3 Contents of the Evaluation Kit

1. OPTIGA™ Trust M security chip with software build v3.00.2440
2. Package containing following Software and Documentation
   - 2.1. binaries
     - 2.1.1. Examples for XMC4800 IOT Connectivity kit
   - 2.2. certificates
     - 2.2.1. Contains Infineon Test and Productive CA certificates for execution of use cases
   - 2.3. documents
     - 2.3.1. OPTIGA™ Trust M Datasheet v3.30
     - 2.3.2. Infineon I2C Protocol v2.03
     - 2.3.3. OPTIGA™ Trust M Solution Reference Manual v3.30
     - 2.3.4. OPTIGA™ Trust M Release Notes v3.01
     - 2.3.5. OPTIGA™ Trust M Keys And Certificates v3.10
     - 2.3.6. OPTIGA™ Trust M Host Library Documentation
     - 2.3.7. OPTIGA™ Trust M Getting Started Guide v3.10
     - 2.3.8. OPTIGA™ Trust M License Information
   - 2.4. examples
     - 2.4.1. optiga
       - 2.4.1.1. Example files for OPTIGA™ host library APIs
     - 2.4.2. tools

2.4.2.1. Tool to generate protected update data set for the data objects, key set for key objects and metadata set for data/key objects (used for optiga_util_protected_update API example).

2.5. externals

2.5.1. Directory for 3rd party libraries (e.g. mbed TLS)

2.6. optiga

2.6.1. OPTIGA™ host library with source and header files

2.7. pal

2.7.1. Platform specific implementation for XMC4800 IoT Connectivity Kit

2.8. projects

2.8.1. DAVE™ Eclipse project for XMC4800 IoT Connectivity Kit

3. Hardware

3.1. XMC4800 IoT Connectivity Kit

3.2. Shield2Go with OPTIGA™ Trust M security chip

3.3. My IoT Adapter

4. Open Source Software – subject to separate licensing terms as below

4.1. Applicable for XMC4800 IoT Connectivity Kit

4.1.1. mbed TLS v2.16.0 crypto library (https://tls.mbed.org/download)

4.1.2. LUFA USB stack (https://www.lufa-lib.org)

3.4 Features

1. OPTIGA™ Trust M Security Chip Software
   a. Infineon I2C protocol v2.03 based communication with Shielded Connection support.
   b. Configurable protected data storage.
   c. Life cycle management.
   d. Crypto ToolBox commands with
      i. ECC NIST P256/P384/P521, Brainpool P256/384/512, SHA-256/384/512 (sign, verify, key generation, ECDH, key derivation)
      ii. RSA 1024/2048 (Sign, Verify, Key generation, Encrypt, Decrypt, Pre-master secret generation for RSA Key exchange (reference TLS V1.2))
      iii. Symmetric encryption and decryption using AES-128/192/256 (ECB, CBC, CBC-MAC, CMAC) and HMAC SHA256/384/512.
      iv. KeyDerivation using HKDF SHA256/384/512
   e. Hibernate and restore support.
   f. Integrity and confidentiality protected update of data, metadata and key objects
   g. Boot phase flag(Global and Application security states) based access to protected keys and data

h. HMAC verification with authorization reference states.
i. Configurable security monitor.

2. OPTIGA™ Trust M Host Software
   a. Support for XMC4800 IoT Connectivity Kit added.
   b. DAVE Eclipse project added to release package. This project can be used for compilation and debugging.
   c. Optiga Crypt Library (Crypto Toolbox command APIs)
   d. Optiga Util Library (Open/Close Application, Read/Write and Protected Update command APIs)
   e. Infineon I2C protocol v2.03 based communication with Shielded Connection support.
   f. Tool to generate CBOR based manifest and payload fragments for optiga_util_protected_update API example.

3.5 Fixes

1. Fixed the below issues,

1.1. Missing of error handling for pal_i2c_init failure keeps the local host application in hung state when optiga_util_open_application is invoked.

1.2. *ifx_i2c_context* structure and other structure members are not arranged in the descending order of their sizes, leading to incorrect memory access in case of few compilers.

1.3. Re-entrancy issues in execution handler of optiga command layer and ifx_i2c layer in linux environment, when the CPU load is high.

1.4. In Protected update tool, unicast option is considered as Octet string instead of hex array, creating an invalid Manifest.

1.5. Few of the resources created/initialized as part of optiga_util_create / optiga_crypt_create / optiga_util_open_application are not de-allocated / destroyed as part of optiga_util_destroy / optiga_crypt_destroy / optiga_util_close_application, creating problems in multi-process linux execution environment.

3.6 Enhancements

None

3.7 Known Issues

1. Disconnecting the power (VDD pin) of the Host MCU during the communication with OPTIGA™ Trust M and re-establishing the connection might end up in Infineon I2C protocol stack non responsive state due to the low level driver issue observed.

3.8 Limitations

1. The maximum number of OPTIGA™ crypt instances which would be based on session is limited to 4 in parallel.
2. Third-party libraries such as mbed TLS might invoke memory allocation functions during optiga comms protection (shielded connection) operations (pal_crypt). There could be collision during memory allocation, if a create API from service layer is invoked at the same time.

3. OPTIGA™ is a singleton resource. The number of instances that can run in parallel is limited to 6 (1 active instance and 5 instances will be queued up internally). To increase the maximum number of parallel instances, re-configure the macro OPTIGA_CMD_MAX_REGISTRATIONS (minimum value is 1) in optiga_lib_config.h.
4. As the RSA key generation can go beyond 50 seconds, the default timeout of ifx i2c protocol (TL_MAX_EXIT_TIMEOUT) is set to 180 seconds. Otherwise, 10 seconds is sufficient.
5. In a multi-thread scenario where user continuously creates and destroys the optiga crypt or util instances might lead to incorrect synchronization and would lead the optiga command scheduler into uninitialized state.

3.9 Environment

1. None
2.
3.

4 Release to Production v3.00.2490

4.1 Product Description

OPTIGA™ Trust M v3.00.2490 is an Embedded Security Solution covering use cases to protect the authenticity, integrity and confidentiality of your device: mutual authentication, secure communication, data storage protection, cryptographic toolbox functionalities and lifecycle management for connected devices.

4.2 Scope of Release

OPTIGA™ Trust M v3.00.2490 is released as Release to Production. The Product is qualified by Infineon with complete documentation describing all features as stated below.

4.3 Contents of the Evaluation Kit

1. OPTIGA™ Trust M security chip with software build v3.00.2440
2. Package containing following Software and Documentation
   - 2.1. binaries
     - 2.1.1. Examples for XMC4800 IOT Connectivity kit
   - 2.2. certificates
     - 2.2.1. Contains Infineon Test and Productive CA certificates for execution of use cases
   - 2.3. documents
     - 2.3.1. OPTIGA™ Trust M Datasheet v3.10
     - 2.3.2. Infineon I2C Protocol v2.03
     - 2.3.3. OPTIGA™ Trust M Solution Reference Manual v3.15
     - 2.3.4. OPTIGA™ Trust M Release Notes v3.00
     - 2.3.5. OPTIGA™ Trust M Keys And Certificates v3.10
     - 2.3.6. OPTIGA™ Trust M Host Library Documentation
     - 2.3.7. OPTIGA™ Trust M Getting Started Guide v3.10
     - 2.3.8. OPTIGA™ Trust M License Information
   - 2.4. examples
     - 2.4.1. optiga
       - 2.4.1.1. Example files for OPTIGA™ host library APIs
     - 2.4.2. tools

2.4.2.1. Tool to generate protected update data set for the data objects, key set for key objects and metadata set for data/key objects (used for optiga_util_protected_update API example).

2.5. externals

2.5.1. Directory for 3rd party libraries (e.g. mbed TLS)

2.6. optiga

2.6.1. OPTIGA™ host library with source and header files

2.7. pal

2.7.1. Platform specific implementation for XMC4800 IoT Connectivity Kit

2.8. projects

2.8.1. DAVE™ Eclipse project for XMC4800 IoT Connectivity Kit

3. Hardware

3.1. XMC4800 IoT Connectivity Kit

3.2. Shield2Go with OPTIGA™ Trust M security chip

3.3. My IoT Adapter

4. Open Source Software – subject to separate licensing terms as below

4.1. Applicable for XMC4800 IoT Connectivity Kit

4.1.1. mbed TLS v2.16.0 crypto library (https://tls.mbed.org/download)

4.1.2. LUFA USB stack (https://www.lufa-lib.org)

4.4 Features

1. OPTIGA™ Trust M Security Chip Software
   a. Infineon I2C protocol v2.03 based communication with Shielded Connection support.
   b. Configurable protected data storage.
   c. Life cycle management.
   d. Crypto ToolBox commands with
      i. ECC NIST P256/P384/P521, Brainpool P256/384/512, SHA-256/384/512 (sign, verify, key generation, ECDH, key derivation)
      ii. RSA 1024/2048 (Sign, Verify, Key generation, Encrypt, Decrypt, Pre-master secret generation for RSA Key exchange (reference TLS V1.2))
      iii. Symmetric encryption and decryption using AES-128/192/256 (ECB, CBC, CBC-MAC, CMAC) and HMAC SHA256/384/512.
      iv. KeyDerivation using HKDF SHA256/384/512
   e. Hibernate and restore support.
   f. Integrity and confidentiality protected update of data, metadata and key objects
   g. Boot phase flag(Global and Application security states) based access to protected keys and data

h. HMAC verification with authorization reference states.
i. Configurable security monitor.

2. OPTIGA™ Trust M Host Software
   a. Support for XMC4800 IoT Connectivity Kit added.
   b. DAVE Eclipse project added to release package. This project can be used for compilation and debugging.
   c. Optiga Crypt Library (Crypto Toolbox command APIs)
   d. Optiga Util Library (Open/Close Application, Read/Write and Protected Update command APIs)
   e. Infineon I2C protocol v2.03 based communication with Shielded Connection support.
   f. Tool to generate CBOR based manifest and payload fragments for optiga_util_protected_update API example.

4.5 Fixes

1. Fixed the below issues,

   1.1. optiga_shell_init function execution was exiting without waiting for asynchronous call to complete. This was leading to the failure of optiga_shell_deinit function execution with an error.

   1.2. optiga_cmd_gen_keypair function was not validating the private key tag length in response buffer against the expected private key length. This was leading to memory corruption.

   1.3. optiga_crypt_hash_generic function was not validating the hash length in response buffer against the expected hash length. This was leading to memory corruption.

4.6 Enhancements

None

4.7 Known Issues

1. Disconnecting the power (VDD pin) of the Host MCU during the communication with OPTIGA™ Trust M and re-establishing the connection might end up in Infineon I2C protocol stack non-responsive state due to the low level driver issue observed.

4.8 Limitations

1. The maximum number of OPTIGA™ crypt instances which would be based on session is limited to 4 in parallel.
2. Third-party libraries such as mbed TLS might invoke memory allocation functions during optiga comms protection (shielded connection) operations (pal_crypt). There could be collision during memory allocation, if a create API from service layer is invoked at the same time.
3. OPTIGA™ is a singleton resource. The number of instances that can run in parallel is limited to 6 (1 active instance and 5 instances will be queued up internally). To increase the maximum number of parallel instances, re-configure the macro OPTIGA_CMD_MAX_REGISTRATIONS (minimum value is 1) in optiga_lib_config.h.
4. As the RSA key generation can go beyond 50 seconds, the default timeout of ifx i2c protocol (TL_MAX_EXIT_TIMEOUT) is set to 180 seconds. Otherwise, 10 seconds is sufficient.

4.9 Environment

None

4.

5.

6.

7.

8.

5 Engineering Sample Release v3.00.2468

5.1 Product Description

OPTIGA™ Trust M v3.00.2468 is an Embedded Security Solution covering use cases to protect the authenticity, integrity and confidentiality of your device: mutual authentication, secure communication, data storage protection, cryptographic toolbox functionalities and lifecycle management for connected devices.

5.2 Scope of Release

OPTIGA™ Trust M v3.00.2468 is released as Engineering Sample Release. The Product is qualified by Infineon with complete documentation describing all features as stated below.

5.3 Contents of the Evaluation Kit

1. OPTIGA™ Trust M security chip with software build v3.00.2440
2. Package containing following Software and Documentation
   - 2.1. binaries
     - 2.1.1. Examples for XMC4800 IOT Connectivity kit
   - 2.2. certificates
     - 2.2.1. Contains Infineon Test CA certificate for execution of use cases
   - 2.3. documents
     - 2.3.1. OPTIGA™ Trust M Datasheet v3.00
     - 2.3.2. Infineon I2C Protocol v2.02
     - 2.3.3. OPTIGA™ Trust M Solution Reference Manual v3.00
     - 2.3.4. OPTIGA™ Trust M Release Notes v3.00
     - 2.3.5. OPTIGA™ Trust M Keys And Certificates v3.00
     - 2.3.6. OPTIGA™ Trust M Host Library Documentation
     - 2.3.7. OPTIGA™ Trust M Getting Started Guide v3.00
     - 2.3.8. OPTIGA™ Trust M License Information
   - 2.4. examples
     - 2.4.1. optiga
       - 2.4.1.1. Example files for OPTIGA™ host library APIs
     - 2.4.2. tools

2.4.2.1. Tool to generate protected update data set for the data objects, key set for key objects and metadata set for data/key objects (used for optiga_util_protected_update API example).

2.5. externals

2.5.1. Directory for 3rd party libraries (e.g. mbed TLS)

2.6. optiga

2.6.1. OPTIGA™ host library with source and header files

2.7. pal

2.7.1. Platform specific implementation for XMC4800 IoT Connectivity Kit

2.8. projects

2.8.1. DAVE™ Eclipse project for XMC4800 IoT Connectivity Kit

3. Hardware

3.1. XMC4800 IoT Connectivity Kit

3.2. Shield2Go with OPTIGA™ Trust M security chip

3.3. My IoT Adapter

4. Open Source Software – subject to separate licensing terms as below

4.1. Applicable for XMC4800 IoT Connectivity Kit

4.1.1. mbed TLS v2.16.0 crypto library (https://tls.mbed.org/download)

4.1.2. LUFA USB stack (https://www.lufa-lib.org)

5.4 Features

1. OPTIGA™ Trust M Security Chip Software
   a. Infineon I2C protocol v2.02 based communication with Shielded Connection support.
   b. Configurable protected data storage.
   c. Life cycle management.
   d. Crypto ToolBox commands with
      i. ECC NIST P256/P384/P521, Brainpool P256/384/512, SHA-256/384/512 (sign, verify, key generation, ECDH, key derivation)
      ii. RSA 1024/2048 (Sign, Verify, Key generation, Encrypt, Decrypt, Pre-master secret generation for RSA Key exchange (reference TLS V1.2))
      iii. Symmetric encryption and decryption using AES-128/192/256 (ECB, CBC, CBC-MAC, CMAC) and HMAC SHA256/384/512.
      iv. KeyDerivation using HKDF SHA256/384/512
   e. Hibernate and restore support.
   f. Integrity and confidentiality protected update of data, metadata and key objects
   g. Boot phase flag(Global and Application security states) based access to protected keys and data

h. HMAC verification with authorization reference states.
i. Configurable security monitor.

2. OPTIGA™ Trust M Host Software
   a. Support for XMC4800 IoT Connectivity Kit added.
   b. DAVE Eclipse project added to release package. This project can be used for compilation and debugging.
   c. Optiga Crypt Library (Crypto Toolbox command APIs)
   d. Optiga Util Library (Open/Close Application, Read/Write and Protected Update command APIs)
   e. Infineon I2C protocol v2.02 based communication with Shielded Connection support.
   f. Tool to generate CBOR based manifest and payload fragments for optiga_util_protected_update API example.

5.5 Fixes

None

5.6 Enhancements

None

5.7 Known Issues

1. Disconnecting the power (VDD pin) of the Host MCU during the communication with OPTIGA™ Trust M and re-establishing the connection might end up in Infineon I2C protocol stack non responsive state due to the low level driver issue observed.

5.8 Limitations

1. The maximum number of OPTIGA™ crypt instances which would be based on session is limited to 4 in parallel.
2. Third-party libraries such as mbed TLS might invoke memory allocation functions during optiga comms protection (shielded connection) operations (pal_crypt). There could be collision during memory allocation, if a create API from service layer is invoked at the same time.
3. OPTIGA™ is a singleton resource. The number of instances that can run in parallel is limited to 6 (1 active instance and 5 instances will be queued up internally). To increase the maximum number of parallel instances, re-configure the macro OPTIGA_CMD_MAX_REGISTRATIONS (minimum value is 1) in optiga_lib_config.h.
4. As the RSA key generation can go beyond 50 seconds, the default timeout of ifx i2c protocol (TL_MAX_EXIT_TIMEOUT) is set to 180 seconds. Otherwise, 10 seconds is sufficient.

5.9 Environment

None

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Document reference

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