STM32MPx series key generator software description

Introduction

The STM32MPx series key generator software (named STM32MP-KeyGen in this document) is integrated in the STM32CubeProgrammer (STM32CubeProg).

STM32MP-KeyGen is a tool that generates the ECC keys pair needed for signing binary images. The generated keys are used by the STM32 Signing tool for signing process.

STM32MP-KeyGen generates a public key file, a private key file and a hash public key file.

The public key file contains the generated ECC public key in PEM format.

The private key file contains the encrypted ECC private key in PEM format. The encryption can be done using the aes 128 cbc or aes 256 cbc ciphers. The cipher selection is done using the --prvkey-enc option.

The hash public key file contains the SHA-256 hash of the public key in binary format. The SHA-256 hash is calculated based on the public key without any encoding format. The first byte of the public key is present just to indicate whether the public key is in compressed or uncompressed format. Since only uncompressed format is supported, this byte is removed.

1 Install STM32MP-KeyGen

This tool is installed with the STM32CubeProgrammer package (STM32CubeProg). For more information about the set-up procedure, refer to the section 1.2 of the user manual *STM32CubeProgrammer software description* (UM2237).

This software applies to the STM32MPx series Arm®-based MPUs.

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2 STM32MP-KeyGen command line interface

The following sections describe how to use STM32MP-KeyGen from command line.

2.1 Commands

The available commands are listed below:

- `--private-key (-prvk)`
  - Description: private key file path (.pem extension)
  - Syntax: `-prvk <private_key_file_path>`
  - Example: `-prvk ../privateKey.pem`
- `--public-key (-pubk)`
  - Description: Public key file path (.pem extension)
  - Syntax: `-pubk <public_key_file_path>`
  - Example: `-pubk C:\publicKey.pem`
- `--public-key-hash (-hash)`
  - Description: Hash image file path (.bin extension)
  - Syntax: `-hash <hash_file_path>`
- `--absolute-path (-abs)`
  - Description: Absolute path for output files
  - Syntax: `-abs <absolue_path_folder_path>`
  - Example: `-abs C:\KeyFolder\`
- `--password (-pwd)`
  - Description: Password of the private key (this password must contain at least four characters)
  - Example: `-pwd azerty`

Note: Include eight passwords to generate eight keypairs.

  - Syntax 1:`-pwd <Password>`
  - Syntax 2: `-pwd <Password1> <Password2> <Password3> <Password4> <Password5> <Password6> <Password7> <Password8>`
- `--prvkey-enc (-pe)`
  - Description: Encrypting private key algorithm (aes128/aes256) (aes256 algorithm is the default algorithm)
  - Syntax: `-pe aes128`
- `--ecc-algo (-ecc)`
  - Description: ECC algorithm for keys generation (prime256v1/brainpoolP256t1) (prime256v1 is the default algorithm)
  - Syntax: `-ecc prime256v1`
- `--help (-h and -?)`
  - Description: Shows help.
- `--version (-v)`
  - Description: Displays the tool version.
- `--number-key (-n)`
  - Description: Generate number of key pairs {1 or 8} with Hash of table file
  - Syntax: `-n <number>`

2.2 Examples

The following examples show how to use STM32MP-KeyGen:

- **Example 1**

```
-abs /home/user/KeyFolder/ -pwd azerty
```

All files (publicKey.pem, privateKey.pem and publicKeyhash.bin) are created in the */home/user/KeyFolder/* folder. The private key is encrypted with the aes256 default algorithm.

- **Example 2**

```
-abs /home/user/keyFolder/ -pwd azerty -pe aes128
```

All files (publicKey.pem, privateKey.pem and publicKeyhash.bin) are created in the */home/user/KeyFolder/* folder. The private key is encrypted with the aes128 algorithm.

- **Example 3**

```
-pubk /home/user/public.pem -prvk /home/user/Folder1/Folder2/private.pem -hash
/home/user/pubKeyHash.bin -pwd azerty
```

Even if the Folder1 and Folder2 does not exist, they are created.

- **Example 4**
Generate eight key pairs in the working directory:

```
./STM32MP_KeyGen_CLI.exe -abs . -pwd abc1 abc2 abc3 abc4 abc5 abc6 abc7 abc8 -n 8
```

The output gives the following files:

– eight public key files: publicKey0x{0..7}.pem
– eight private key files: privateKey0x{0..7}.pem
– eight public key hash files: publicKeyHash0x{0..7}.bin
– one file of PKTH: publicKeysHashHashes.bin

- **Example 5**
Generate one key pair in the working directory:

```
./STM32MP_KeyGen_CLI.exe -abs . -pwd abc1 -n 1
```

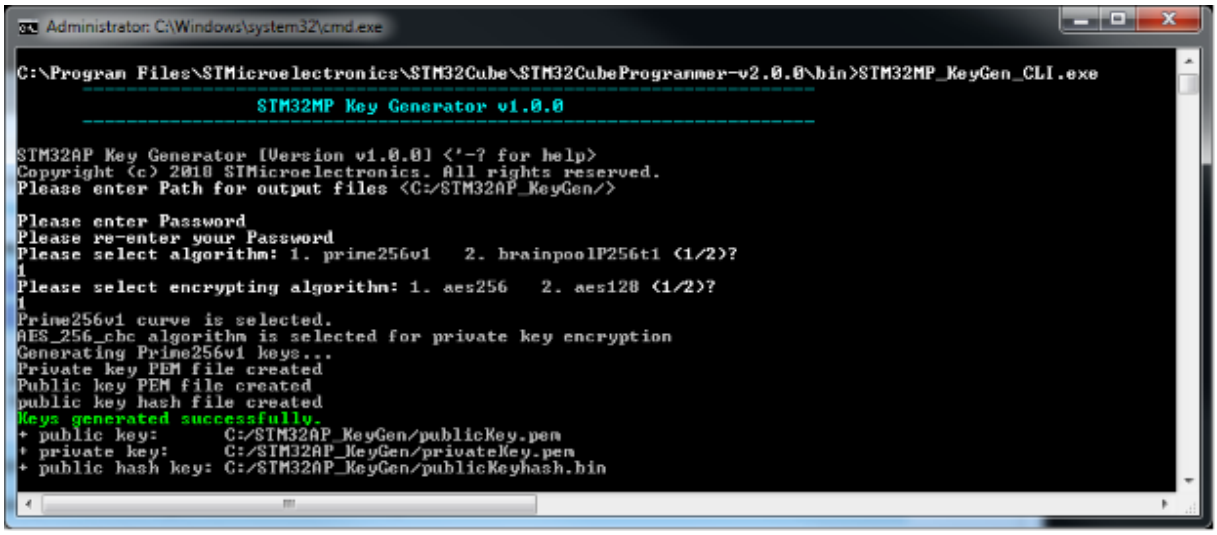
The output gives the following files:

– one public key file: publicKey.pem
– one private key file: privateKey.pem
– one public key hash file: publicKeyHash.bin
– one file of PKTH: publicKeysHashHashes.bin

2.3 Standalone mode

When executing STM32MP-KeyGen in Standalone mode, an absolute path and a password are requested as shown in the figure below.

Figure 1. STM32MP-KeyGen in Standalone mode



When the user press <Enter>, the files are generated in the <*C:\Users\User_Name\.STM32AP_KeyGen/*> folder.

Then enter the password twice and select one of the two algorithms (prime256v1 or brainpoolP256t1) by pressing the respective key (1 or 2).

Finally select an encrypting algorithm (aes256 or aes128) by pressing the respective key (1 or 2).

Revision history

Table 1. **Document revision history**

Date	Version	Changes
14-Feb-2019	1	Initial release.
24-Nov-2021	2	Updated: • Section 2.1: Commands • Section 2.2: Examples
26-Jun-2024	3	Replaced in the whole document: • STM32MP1 series by STM32MPx series • STM32MP1-KeyGen by STM32MP-KeyGen

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