Errata for TCG Trusted Platform Module Library

Family “2.0”
Level 00 Revision 01.59
November 8, 2019

Version 1.4
January 9, 2023

Contact: admin@trustedcomputinggroup.org

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## CHANGE HISTORY

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<td>December 18, 2019</td>
<td>Added</td>
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<td>• 2.1 TPM_SPEC Date Constants [specification text, code]</td>
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<td>• 2.2 Non-orderly Shutdown – failedTries [code]</td>
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<td>1.1</td>
<td>June 18, 2020</td>
<td>Added</td>
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<td></td>
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<td>• 2.3 ACT preserveSignaled [specification text, code]</td>
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<td>1.2</td>
<td>November 10, 2020</td>
<td>Added</td>
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<td>• 2.4 RSAES_Decode - padding [code]</td>
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<tr>
<td>1.3</td>
<td>March 11, 2022</td>
<td>Added</td>
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<td>• 2.5 TPM_EO – two’s complement [code]</td>
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<td>• 3.1.1 TPM2_NV_WriteLock, TPM2_NV_ReadLock [specification text]</td>
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<td>1.4</td>
<td>January 9, 2023</td>
<td>Added</td>
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<td>• 2.6.1 CryptParameterEncryption/ Decryption [code]</td>
</tr>
<tr>
<td></td>
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<td>• 2.6.2 TPM2_PolicyAuthorize [code]</td>
</tr>
<tr>
<td></td>
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<td>• 2.6.3 CryptGenerateKeyDes [code]</td>
</tr>
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</table>
CONTENTS

DISCLAIMERS, NOTICES, AND LICENSE TERMS ................................................................. 1
CHANGE HISTORY .................................................................................................................. 2
1 Introduction ........................................................................................................................... 4
2 Errata .................................................................................................................................... 5
   2.1 TPM_SPEC Date Constants [specification text, code] ....................................................... 5
   2.2 Non-orderly Shutdown - failedTries [code] ....................................................................... 5
   2.3 ACT preserveSignaled [specification text, code] ............................................................. 5
   2.4 RSAES_Decode - padding [code] .................................................................................... 6
   2.5 TPM_EO – two’s complement [code] .............................................................................. 6
   2.6 Size Checks .................................................................................................................... 7
      2.6.1 CryptParameterEncryption/Decryption [code] .......................................................... 7
      2.6.2 TPM2_PolicyAuthorize [code] ................................................................................ 7
      2.6.3 CryptGenerateKeyDes [code] .................................................................................. 7
3 Clarifications ........................................................................................................................... 8
   3.1 Error Codes ................................................................................................................... 8
      3.1.1 TPM2_NV_WriteLock, TPM2_NV_ReadLock [specification text] ............................... 8
1 Introduction

This document describes errata and clarifications for the TCG Trusted Platform Module Library Family “2.0” Level 00 Revision 01.59 as published. The information in this document is likely – but not certain – to be incorporated into a future version of the specification. Suggested fixes proposed in this document may be modified before being published in a later TCG Specification. Therefore, the contents of this document are not normative and only become normative when included in an updated version of the published specification. Note that since the errata in this document are non-normative, the patent licensing rights granted by Section 16.4 of the Bylaws do not apply.

The heading of each errata in section 2 indicates whether the errata affects the specification text or the reference code implementation. This is indicated by the word “specification text” or “code” in square brackets (“[]”).
2 Errata

2.1 TPM_SPEC Date Constants [specification text, code]

Table 6 in Part 2, 6.1 TPM_SPEC (Specification Version Values) should be replaced with:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPM_SPEC_FAMILY</td>
<td>0x322E3000</td>
<td>ASCII “2.0” with null terminator</td>
</tr>
<tr>
<td>TPM_SPEC_LEVEL</td>
<td>00</td>
<td>the level number for the specification</td>
</tr>
<tr>
<td>TPM_SPEC_VERSION</td>
<td>159</td>
<td>the version number of the spec (001.59 * 100)</td>
</tr>
<tr>
<td>TPM_SPEC_YEAR</td>
<td>2023</td>
<td>the year of the version</td>
</tr>
<tr>
<td>TPM_SPEC_DAY_OF_YEAR</td>
<td>9</td>
<td>the day of the year (January 9)</td>
</tr>
</tbody>
</table>

That is, the spec date fields TPM_SPEC_YEAR and TPM_SPEC_DAY_OF_YEAR should be set to the date of this Errata document.

2.2 Non-orderly Shutdown - failedTries [code]

The following text in Part 1, 19.8.6 Non-orderly Shutdown describes the reference code implementation of TPM2_Startup() after a non-orderly Shutdown:

An alternative implementation sets an NV flag indicating that access to a DA protected object occurred during this boot cycle. After a non-orderly restart, if the flag is set, the TPM increments failedTries and clears the flag. If the flag is clear, there is no need to increment failedTries.

EXAMPLE This handles the case where a platform repeatedly does a non-orderly shutdown, possibly due to a low battery. Without the flag, failedTries would increment on each reboot and the TPM would go into lockout.

The reference code does not correctly implement the behavior described above if a DA protected object is accessed after a TPM2_Shutdown(). In this case, the NV flag (indicating that access to a DA protected object occurred during this boot cycle) is not set correctly. When a power loss happens, failedTries is not incremented on the next TPM2_Startup(). The reference code should be fixed.

The check and increment of failedTries on TPM2_Startup() ensures that a failed authorization attempt is recorded by the TPM (e.g. because NV memory is unavailable).

2.3 ACT preserveSignaled [specification text, code]

The ACT preserveSignaled attribute is incorrectly described in the Library Spec Part 2 and 3, and is incorrectly implemented in the reference code in Part 4, 7.8.3.2 ActStartup(). The reference code always returns zero for the preserveSignaled attribute.

In Part 2, 8.12 TPMA_ACT, the following text should be added to the description of the ACT attribute structure.

The preserveSignaled action over a power cycle is:
• Cold (with power loss between Shutdown and Startup) TPM Reset, TPM Restart, TPM Resume
  o preservedSignaled is set to CLEAR
• Warm (no power loss between Shutdown and Startup) TPM Reset, TPM Restart, TPM Resume
  o preserveSignaled holds the state of signaled before the power cycle

NOTE 1: preserveSignaled allows startup software to determine if the startup cycle was likely initiated by an ACT event. If power was lost, it doesn’t care.

In Part 2, 8.12 TPMA_ACT, Table 40 should be replaced with the following table:

<table>
<thead>
<tr>
<th>Bit</th>
<th>Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>signaled</td>
<td>SET (1): The ACT has signaled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLEAR (0): The ACT has not signaled</td>
</tr>
<tr>
<td>1</td>
<td>preserveSignaled</td>
<td>Preserves the state of signaled, depending on the power cycle</td>
</tr>
<tr>
<td>31:2</td>
<td>Reserved</td>
<td>shall be zero</td>
</tr>
</tbody>
</table>

In Part 3, 9.3 TPM2_Startup, in the general description of the command actions on TPM Reset and on TPM Restart, the following bullet point should be changed.

From:
• For each ACT the timeout is reset to zero, the signaled attribute is set to CLEAR (if preserveSignaled is CLEAR), and the authPolicy is set to the Empty Buffer and its hashAlg is set to TPM_ALG_NULL.

To:
• For each ACT the timeout is reset to zero, the signaled attribute is set to CLEAR, its authPolicy is set to the Empty Buffer, and its hashAlg is set to TPM_ALG_NULL.

That is, the condition in brackets “(if preserveSignaled is CLEAR)” should be removed.

In Part 3, 32.2 TPM2_ACT_SetTimeout, in the general description, the following sentence should be added:

When this command is successful, preserveSignaled will be CLEAR.

The reference code should be fixed following the (above) corrections in Part 2 and 3.

2.4 RSAES_Decode - padding [code]
The RSAES_Decode() function in Part 4, 10.2.17.4.12, which performs the decoding for RSAES-PKCS1-V1_5-DECRYPT as defined in PKCS#1V2.1, behaves incorrectly if the padding string (PS) is 7 octets.

According to PKCS#1V2.1, the length of the padding string (PS) must be at least 8 octets. However, the RSAES_Decode() reference code function permits a padding string of 7 bytes. The RSAES_Decode() function should be corrected to reject a padding string that is less than 8 bytes.

2.5 TPM_EO – two’s complement [code]
According to Part 3, 23.9 TPM2_PolicyNV and 23.10 TPM2_PolicyCounterTimer,

“The signed arithmetic operations are performed using two’s-complement.”
For two negative values, the reference code (in Part 4, 9.11.2.2 SignedCompareB()) implements the signed arithmetic operations using sign-magnitude. The reference code should be fixed to match the description in Part 3.

2.6 Size Checks

2.6.1 CryptParameterEncryption/Decryption [code]
The functions CryptParameterEncryption() and CryptParameterDecryption() in the reference code in Part 4, 10.2.6.6.5 and 10.2.6.6.6 do not correctly check the size of the parameter buffer to be encrypted or decrypted. To fix the issue, the functions should be corrected to check that the parameter buffer (a TPM2B type field) is at least 2 bytes in length and should use the function UINT16.Unmarshal() to read the size of the buffer instead of BYTE_ARRAY_TO_UINT16().

The fixed CryptParameterDecryption() function will return TPM_RC_INSUFFICIENT if the input buffer does not contain enough data to read the UINT16 size field.

The fixed CryptParameterEncryption() function will enter failure mode and return TPM_RC_FAILURE if the internal response buffer does not contain enough data for the UINT16 size field.

2.6.2 TPM2_PolicyAuthorize [code]
TPM2_PolicyAuthorize() in the reference code in Part 3, 23.16 does not correctly check the size of the keySign parameter. To fix the issue, the TPM will check that keySign (a TPM2B type field) is at least 2 bytes in length or otherwise return TPM_RC_INSUFFICIENT.

2.6.3 CryptGenerateKeyDes [code]
The function CryptGenerateKeyDes() in the reference code in Part 4, 10.2.9.2.3 does not correctly check the symmetric key size provided in the sensitive parameter. To fix the issue, the function will check that the size of the requested TDES key is a multiple of 8 bytes or otherwise the TPM will return TPM_RC_SYMMETRIC.
3 Clarifications

3.1 Error Codes

3.1.1 TPM2_NV_WriteLock, TPM2_NV_ReadLock [specification text]

There is an ambiguity in the command descriptions of TPM2_NV_WriteLock and TPM2_NV_ReadLock whether the TPM shall return success or an (authorization) error code if TPM2_NV_WriteLock or TPM2_NV_ReadLock is executed with improper authorization for an NV index that is already write or read-locked.

The description in Part 3, 31.11 TPM2_NV_WriteLock should be interpreted as if

TPM2_NV_WriteLock may either return TPM_RC_SUCCESS or TPM_RC_NV_AUTHORIZATION if TPMA_NV_WRITELOCKED for the NV Index is already SET, and proper write authorization (as determined by TPMA_NV_PPWRITE, TPMA_NV_OWNERWRITE, TPMA_NV_AUTHWRITE, and the authPolicy of the NV Index) is not provided.

The description in Part 3, 31.14 TPM2_NV_ReadLock should be interpreted as if

TPM2_NV_ReadLock may either return TPM_RC_SUCCESS or TPM_RC_NV_AUTHORIZATION if TPMA_NV_READLOCKED for the NV Index is already SET, and proper read authorization (as determined by TPMA_NV_PPREAD, TPMA_NV_OWNERREAD, TPMA_NV_AUTHREAD, and the authPolicy of the NV Index) is not provided.