



arm

TF-M test configuration refinements

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Purposes

- Easily split TF-M tests to decrease image size
- Help developers focus on specific test cases

Refinements

- Adding test configurations
 - *The test suites are under the path: tf-m-tests/test/suites/*, they are already isolated in different folders. We can split them with CMAKE configurations and macros in header file.”*
- Apply the test configurations to both test suites and test services
 - *The test services are under the path: tf-m-test/test/test_services/*, they are used for one or several test suites, so the flags need to be synchronized to decrease the code size.*
- Change the usage/meaning of TEST_NS and TEST_S
 - *We can use single test suite flag to start the test rather than use TEST_NS or TEST_S. Meanwhile we need to make the logic compatible with current CI’s logic.*

Adding test configurations

- Flags : also used as macros in C header files and code files.

-DTEST_NS=OFF

```
-DTEST_NS_ATTESTATION=OFF  
-DTEST_NS_AUDIT=OFF  
-DTEST_NS_CRYPTO=OFF  
-DTEST_NS_ITS=OFF  
-DTEST_NS_PS=OFF  
-DTEST_NS_PLATFORM=OFF  
-DTEST_NS_FWU=OFF  
-DTEST_NS_IPC=OFF
```

```
-DTEST_NS_CORE=OFF  
-DTEST_NS_QCBOR=OFF  
-DTEST_NS_T_COSE=OFF  
-DTEST_NS_MULTI_CORE=OFF  
-DTEST_NS_SLIH_IRQ=OFF  
-DTEST_NS_FLIH_IRQ=OFF
```

-DTEST_S=OFF

```
-DTEST_S_ATTESTATION=OFF  
-DTEST_S_AUDIT=OFF  
-DTEST_S_CRYPTO=OFF  
-DTEST_S_ITS=OFF  
-DTEST_S_PS=OFF  
-DTEST_S_PLATFORM=OFF  
-DTEST_S_FWU=OFF  
-DTEST_S_IPC=OFF
```

Adding test configurations

- CMakeLists.txt

```
...
if(NOT TEST_NS_CRYPT0 AND NOT TEST_S_CRYPT0)
    return()
endif()

##### Non Secure #####
if(TEST_NS_CRYPT0)
    target_compile_definitions(tfm_test_suite_crypto_ns
        INTERFACE
            TEST_NS_CRYPT0
    )
endif()

##### Secure #####
if(TEST_S_CRYPT0)
    target_compile_definitions(tfm_test_suite_crypto_s
        INTERFACE
            TEST_S_CRYPT0
    )
endif()
```

- non_secure_suites.c

```
#ifndef TEST_NS_CRYPT0
#include "crypto_ns_tests.h"
#endif

#ifdef TEST_NS_CRYPT0
    /* Non-secure Crypto test cases */
    {&register_testsuite_ns_crypto_interface, 0, 0, 0},
#endif
```

- secure_suites.c

```
#ifndef TEST_S_CRYPT0
#include "crypto_s_tests.h"
#endif

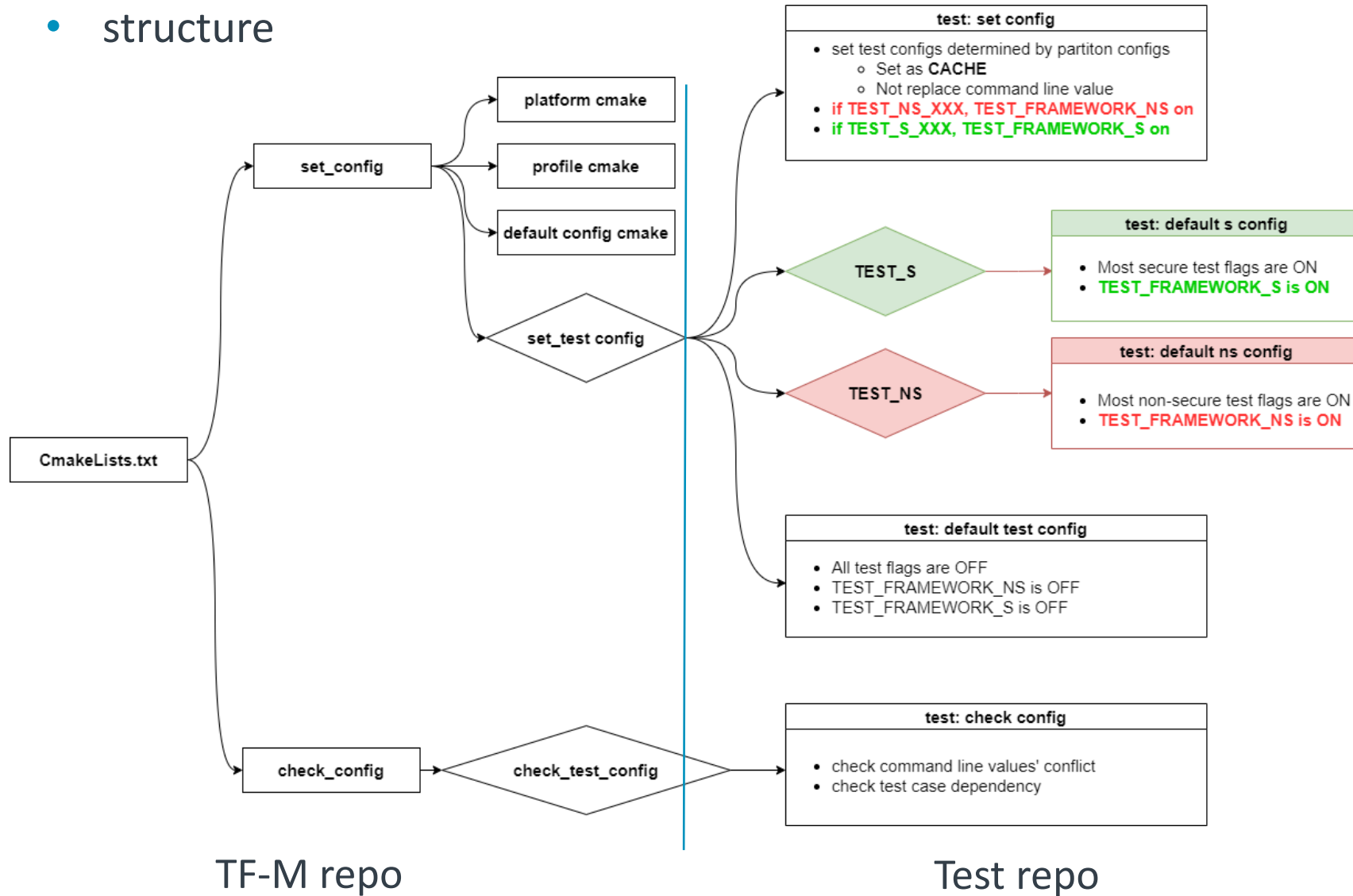
#ifdef TEST_S_CRYPT0
    /* Crypto test cases */
    {&register_testsuite_s_crypto_interface, 0, 0, 0},
#endif
```


CMAKE rules about SET CACHE

- Setting CACHE without keyword FORCE cannot replace value from command line
- Second CACHE set cannot replace first CACHE value
- Ex1:
 - -DCONFIG_A=ON
 - SET(CONFIG_A OFF CACHE BOOL "test config")
 - The CONFIG_A is still ON
- Ex2:
 - SET(CONFIG_A ON CACHE BOOL "test config")
 - SET(CONFIG_A OFF CACHE BOOL "test config")
 - The CONFIG_A is still ON

Add build flags in CMAKE configuration

- structure



- **TEST_FRAMEWORK_XX**
 - Used to link test framework code in test repo. They are internal flags.

Check config

- check_config is to validate the configuration dependencies
- For example:
 - “e.g. `tfm_invalid_config((NOT TFM_PARTITION_CRYPTO AND NOT FORWARD_PROT_MSG) AND (TEST_NS_CRYPTO OR TEST_S_CRYPTO))`”
 - “e.g. `tfm_invalid_config(TEST_NS_PS AND (NOT TEST_NS_ITS OR NOT TFM_PARTITION_INTERNAL_TRUSTED_STORAGE))`”

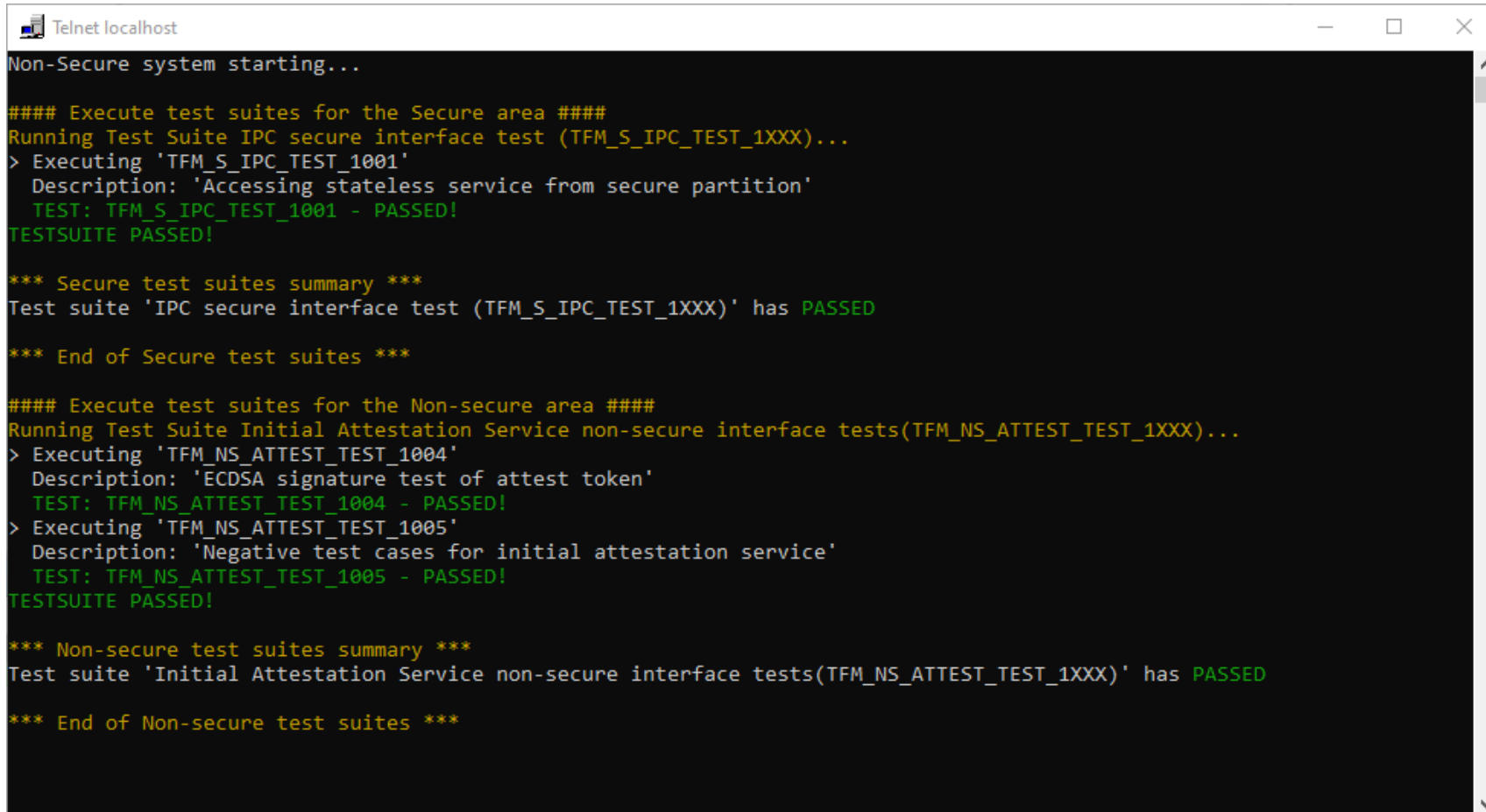
Examples

- **-DTEST_NS_CRYPTON=ON / -DTEST_S_CRYPTON=ON**
 - ONLY NS CRYPTO test is ON
- **-DTEST_NS=ON -DTEST_S=ON**
 - Same as the past
 - They won't be the main switch to start test build.
- **-DTEST_NS=ON -DTEST_NS_CRYPTON=OFF**
 - Open all Non-secure test suites exclude CRYPTO.

- **-DTEST_NS=OFF -DTEST_NS_CRYPTON=ON equals -DTEST_NS_CRYPTON=ON**
 - It can work but we do not suggest to configurate like this because it is confusing.

Examples

```
cmake -S . -B cmake_build -DTFM_PLATFORM=arm/mps2/an521 -DTFM_TOOLCHAIN_FILE=toolchain_GNUARM.cmake  
-DCMAKE_BUILD_TYPE=Release -DTFM_PSA_API=ON -DTEST_NS_ATTESTATION=ON -DTEST_S_IPC=ON
```



```
Telnet localhost  
Non-Secure system starting...  
  
#### Execute test suites for the Secure area ####  
Running Test Suite IPC secure interface test (TFM_S_IPC_TEST_1XXX)...  
> Executing 'TFM_S_IPC_TEST_1001'  
Description: 'Accessing stateless service from secure partition'  
TEST: TFM_S_IPC_TEST_1001 - PASSED!  
TESTSUITE PASSED!  
  
*** Secure test suites summary ***  
Test suite 'IPC secure interface test (TFM_S_IPC_TEST_1XXX)' has PASSED  
  
*** End of Secure test suites ***  
  
#### Execute test suites for the Non-secure area ####  
Running Test Suite Initial Attestation Service non-secure interface tests(TFM_NS_ATTEST_TEST_1XXX)...  
> Executing 'TFM_NS_ATTEST_TEST_1004'  
Description: 'ECDSA signature test of attest token'  
TEST: TFM_NS_ATTEST_TEST_1004 - PASSED!  
> Executing 'TFM_NS_ATTEST_TEST_1005'  
Description: 'Negative test cases for initial attestation service'  
TEST: TFM_NS_ATTEST_TEST_1005 - PASSED!  
TESTSUITE PASSED!  
  
*** Non-secure test suites summary ***  
Test suite 'Initial Attestation Service non-secure interface tests(TFM_NS_ATTEST_TEST_1XXX)' has PASSED  
  
*** End of Non-secure test suites ***
```

How to add a test case with the change:

- Add config
 - *Add the configuration with default value in default cmake file under tf-m-tests/test/config.*
- Add code
 - *Add code under tf-m-tests/test/suites and create CMakeLists.txt with the flag, then add macros in framework/non_secure_suites.c or secure_suites.c*
 - *Add code under tf-m-test/test/test_services if necessary and config it with the flag, then config the service in TF-M repo.*
- Set and check config
 - *Add set and check configurations rules under set_config and check_config files.*
- Use config
 - *Add entry under TF-M/config/set_config.cmake.*

Patch link

- 10767: Build: Control single test without TEST_S/TEST_NS [TF-M repo] <https://review.trustedfirmware.org/c/TF-M/trusted-firmware-m/+10767>
- 10768: Build: Control single test without TEST_S/TEST_NS [Test repo] | <https://review.trustedfirmware.org/c/TF-M/tf-m-tests/+10768>

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Thank You

Danke

Gracias

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Asante

Merci

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