Functional Test Case: Verify MMU Configuration

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Test App

Location

- Repo: GTC_Foundation_Software/Development/Kernel/Tools/Elina_Utilities
- Branch: master
- Path: <Elina_Utilities>/functional_test/ram_integrity

Compilation Info

- Compilation Options
  - Build profile:-
    Option: BUILD_PROFILE
    Possible values: release(default), debug, profile, coverage

- Compilation Steps
  - Pre-requisite: Tool chain path and required environment is set.
  - Compile:
    make all
  - Output File Path:
    ./build/aarch64le-$(BUILD_PROFILE)/mmu_test
    For e.g.: with default option where 'BUILD_PROFILE' is 'release' -
    ./build/aarch64le-release/mmu_test
  - Clean
    make clean

Usage

- Test App

```
# ./mmu_test -h
Usage: ./mmu_test <test_case> [OPTION]
Test MMU config (Version 1.0)

Options:
  -v           Increase the verbosity of logs
  -h           Print this help message

Test cases:
  1: read from unallocated memory
  2: write to unallocated memory
  3: execute unallocated memory
  4: read from kernel memory
  5: write to kernel memory
  6: execute kernel memory
  7: write to read-only memory
  8: execute data memory
  9: execute stack memory
  10: execute heap memory
```

- Script to run test cases and generate report: ram_integrity.sh

```
 # ./ram_integrity.sh
Usage error
Usage:
  ./ram_integrity.sh <test> <total_test_cases> [optional_args_for_test]
```

Test Cases

Number	Test Case Name	Test Result
1	Read from unallocated memory	
2	Write to unallocated memory	
3	Execute unallocated memory	
4	Read from kernel memory	
5	Write to kernel memory	
6	Execute kernel memory	
7	Write to read-only memory	
8	Execute data memory	
9	Execute stack memory	

```
# ./ram_integrity.sh ./mmu_test 10 -v

================= RAM Integrity verification test-suite =================

------------------------------------------------------------
Performing test case 1: read from unallocated memory
Unallocated addr: 0x5589b02020
./ram_integrity.sh: line 50: 23136 Segmentation fault      "$TEST" $i "$@"
[TEST CASE 1 - exited(139)]: PASS
------------------------------------------------------------

------------------------------------------------------------
Performing test case 2: write to unallocated memory
Unallocated addr: 0x55925b2020
./ram_integrity.sh: line 50: 23137 Segmentation fault      "$TEST" $i "$@"
[TEST CASE 2 - exited(139)]: PASS
------------------------------------------------------------

------------------------------------------------------------
Performing test case 3: execute unallocated memory
Unallocated addr: 0x557c1e2020
./ram_integrity.sh: line 50: 23138 Segmentation fault      "$TEST" $i "$@"
[TEST CASE 3 - exited(139)]: PASS
------------------------------------------------------------

------------------------------------------------------------
Performing test case 4: read from kernel memory
Kernel memory addr: 0xfff0000000000000
./ram_integrity.sh: line 50: 23139 Segmentation fault      "$TEST" $i "$@"
[TEST CASE 4 - exited(139)]: PASS
------------------------------------------------------------

------------------------------------------------------------
Performing test case 5: write to kernel memory
Kernel memory addr: 0xfff0000000000000
./ram_integrity.sh: line 50: 23140 Segmentation fault      "$TEST" $i "$@"
[TEST CASE 5 - exited(139)]: PASS
------------------------------------------------------------

------------------------------------------------------------
Performing test case 6: execute kernel memory
Kernel memory addr: 0xfff0000000000000
./ram_integrity.sh: line 50: 23141 Segmentation fault      "$TEST" $i "$@"
[TEST CASE 6 - exited(139)]: PASS
------------------------------------------------------------

------------------------------------------------------------
Performing test case 7: write to read-only memory
Read-only memory 0x556ef51b80
./ram_integrity.sh: line 50: 23142 Segmentation fault      "$TEST" $i "$@"
[TEST CASE 7 - exited(139)]: PASS
------------------------------------------------------------

------------------------------------------------------------
Performing test case 8: execute data memory
Data memory addr: 0x5573dc3010
./ram_integrity.sh: line 50: 23143 Segmentation fault      "$TEST" $i "$@"
[TEST CASE 8 - exited(139)]: PASS
------------------------------------------------------------

------------------------------------------------------------
Performing test case 9: execute stack memory
Stack memory addr: 0x7fc7861720
./ram_integrity.sh: line 50: 23144 Segmentation fault      "$TEST" $i "$@"
[TEST CASE 9 - exited(139)]: PASS
------------------------------------------------------------
```

10	Execute heap memory	``` -- Performing test case 10: execute heap memory Heap memory addr: 0x55a66ee2b0 ./ram_integrity.sh: line 50: 23145 Segmentation fault "$TEST" $i "$@" [TEST CASE 10 - exited(139)]: PASS -- ## 10 test cases passed out of 10 Pass Percentage: 100.00% ## ```