Bake the Firmware Right

Validate ACPI, UEFI and SBBR with Firmware Test Suite

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Agenda

- Introduction to Firmware Test Suite
- FWTS Framework
- Installation and Source Code
- FWTS User Interfaces
- FWTS Tests for SBBR
Before talking about FWTS...
The Question

- We know all ingredients (specs)
- But do we bake bread (implement firmware) right?
What is Firmware Test Suite (FWTS)?

- A tool that automates firmware checking
  - It verifies functions and definitions in specs against implementations
  - It runs in Linux
  - It is open source (GPLv2)
- The recommended ACPI SCT
Firmware Test Suite

ACPI  BIOS  Device Tree  Kernel  SMBIOS  OPAL  PCI  UEFI  etc...

Linux Kernel

ACPICA  efi_test

ACPI Tables  UEFI Runtime  Hardware Devices  CPU  SMBIOS
Install FWTS

● In Ubuntu
  ○ Add repository for latest release
    ■ sudo add-apt-repository
        ppa:firmware-testing-team/ppa-fwts-stable
  ○ Install fwts
    ■ sudo apt update
    ■ sudo apt install fwts fwts-frontend

● Source Code
  ○ git clone git://kernel.ubuntu.com/hwe/fwts.git
    ■ git clone https://github.com/ColinIanKing/fwts
  ○ make clean && make -j4 && sudo make install
FWTS User Interfaces (Command Line)

- Run a single test, ex. C states
  - `sudo fwts cpufreq`

- Run multiple tests, ex. C states + PCIe ASPM
  - `sudo fwts cpufreq aspm`

- Run all ACPI tests + all UEFI tests
  - `sudo fwts --acpitests --uefitests`

- View all tests
  - `fwts --show-tests-full`
FWTS User Interfaces (GUI)

Command Line

fwts-frontend (GUI)

Firmware Test Suite

ACPI  BIOS  Device Tree  Kernel  SMBIOS  OPAL  PCI  UEFI  etc...
This will run a suite of firmware tests that will check the BIOS and ACPI tables. It can also find issues that can cause Linux problems.

The default below is to run just all the Batch Tests, but you can select more tests below if required.

Please select below (using cursor up/down and space) and press enter to continue.

- All
  - ACPI
  - UEFI
  - Recommended Tests
  - Selected Tests
  - Abort Tests

< OK >  < Cancel >  < Help >
Arm’s Server Base Boot Requirements

- SBBR “defines the base firmware requirements for out-of-box support of any Arm SBSA-compatible Operating System or hypervisor"
  - ACPI - fwts --acpitests ✔
  - SMBIOS - fwts dmicheck ✔
  - UEFI - fwts --uefittests ✔

- SBBR includes only subsets of ACPI, SMBIOS and UEFI
  - sudo fwts --sbbr

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This test run on 27/08/19 at 06:37:28 on host Linux awrep3 4.15.0-58-generic #64-Ubuntu SMP Tue Aug 6 11:12:58 UTC 2019 aarch64.

Command: "fwts --sbbr".
Running tests: dmicheck xsdt spcr rsdp_sbbr method madt gdt t fadt_sbbr dbg2
acpi_sbbr acpitable.

dmicheck: DMI/SMBIOS table tests.

-----------------------------
Test 1 of 4: Find and test SMBIOS Table Entry Points.
This test tries to find and sanity check the SMBIOS data structures.
SMBIOS30 entry loaded from /sys/firmware/dmi/tables/smbios_entry_point
PASSED: Test 1, Found SMBIOS30 Table Entry Point at 0xdfeae98
SMBIOS30 Entry Point Structure:
   _Anchor String : _SM3_

"arm results.log" 4315L, 211213C
Results.log (cont'd)

```
Low failures: NONE

Other failures: NONE

<table>
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<th>Test</th>
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<th>Fail</th>
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```

99% 4314: 1 [19]
Contact FWTS community

- Mailing List: fwts-devel@lists.ubuntu.com
- Website: https://wiki.ubuntu.com/FirmwareTestSuite
- Facebook: firmware testsuite
- Twitter: fwts_team
- UEFI Plugfest
Thank you

Join Linaro to accelerate deployment of your Arm-based solutions through collaboration

contactus@linaro.org