OpenPOWER™

OpenPOWER Compliance

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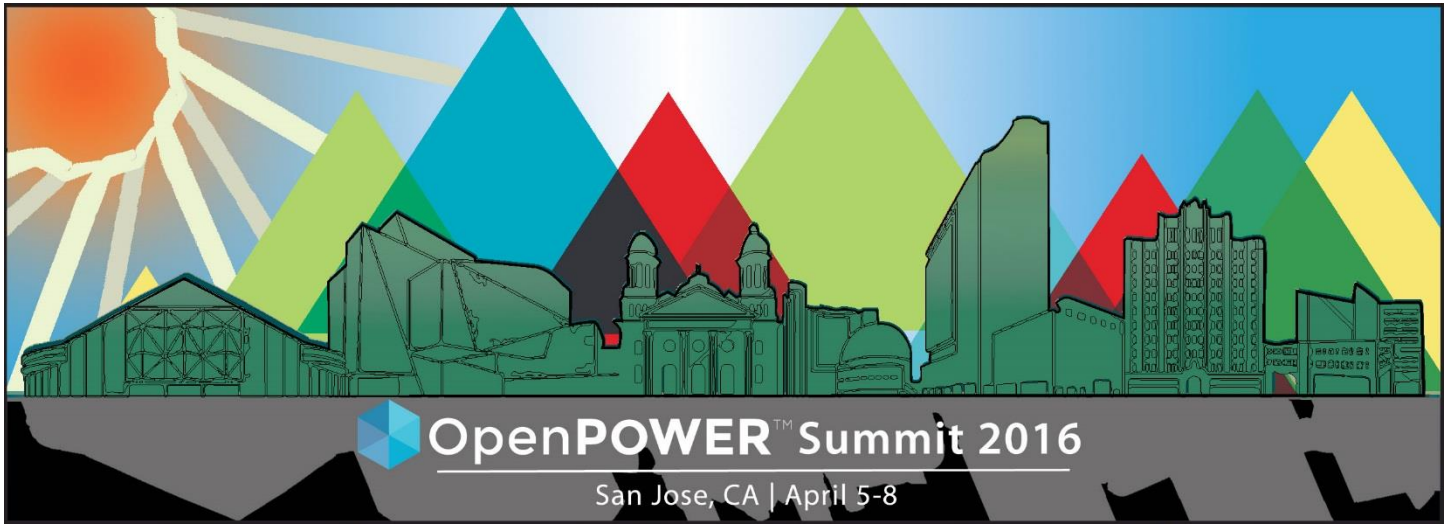
Revolutionizing the Datacenter



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OpenPOWER Compliance

Agenda

- OpenPOWER Compliance Introduction
- OpenPOWER CAPI Accelerator Compliance
- Outlook for 2016

OpenPOWER Compliance Introduction

OpenPOWER Architecture Compliance Definition

- **Documents OpenPOWER Specifications** which contain interfaces required to be OpenPOWER Compliant
- **Documents overview** of Compliance Test Harness and Test Suite (TH/TS) specifications
- **Documents procedures**
  - How to measure and document compliance
  - Where to submit compliance report
- See OpenPOWER Architecture Compliance Definition Workgroup Specification for more details (https://openpowerfoundation.org)

OpenPOWER Compliance

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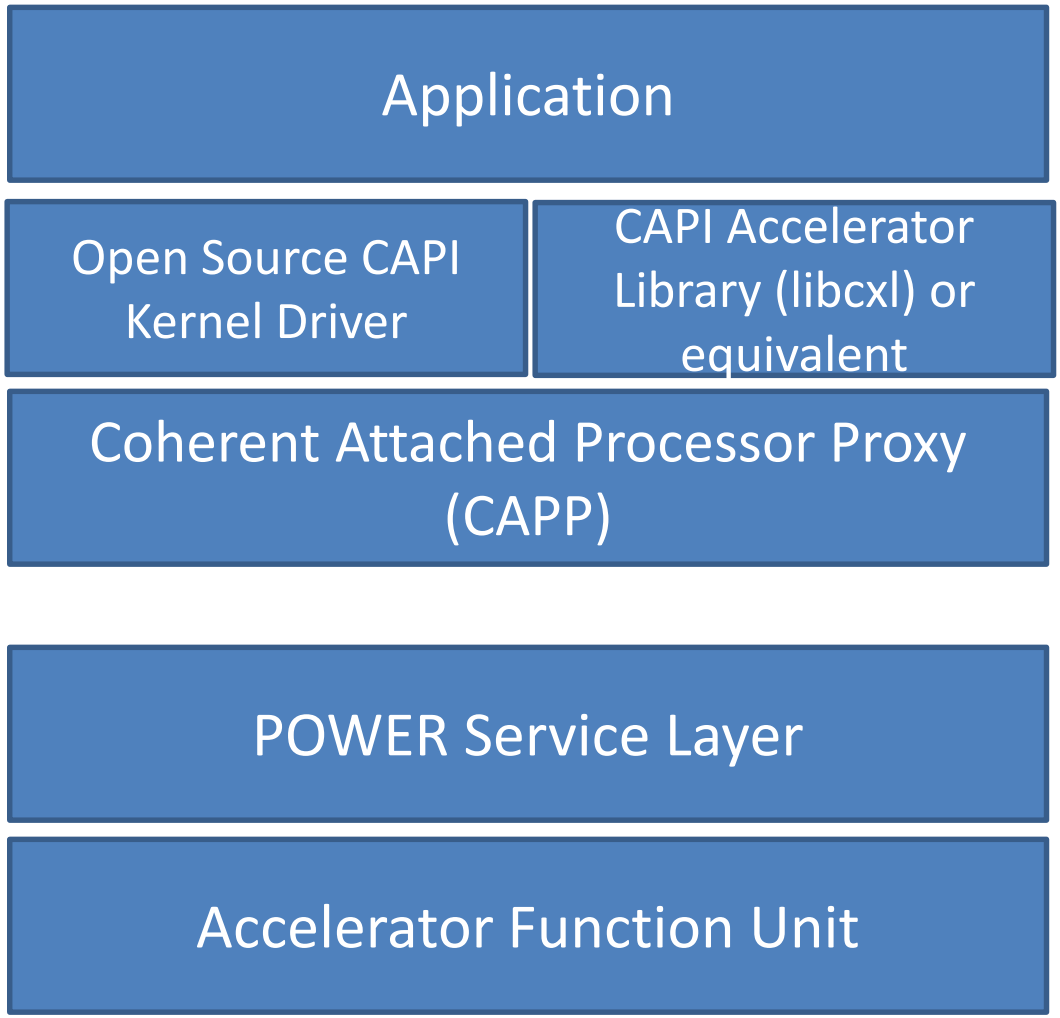
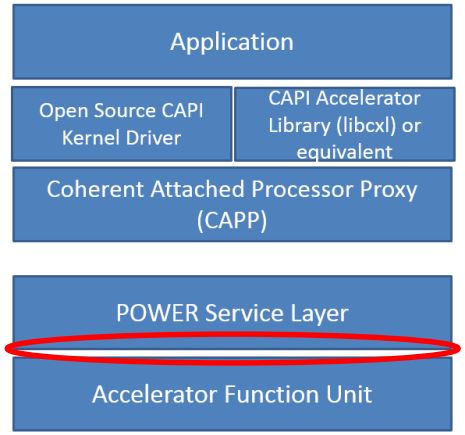
OpenPOWER CAPI Accelerator Compliance



Hardware interface defined in Coherent Accelerator Interface Architecture (CAIA) spec

Hardware interface defined in POWER Service Layer (PSL) to Accelerator Function Unit (AFU) Interface spec

OpenPOWER CAPI Accelerator Compliance



Test Harness to Execute the PSL-AFU Test Suite

- **Emulates PSL hardware behavior** as it reacts to and drives the PSL-AFU Interface
  - Verify that the PSL-AFU Interface Specification is not violated
  - Test required and implemented optional PSL-AFU facilities
- **PSL Simulation Engine (PSLSE)** is one example
  - PSLSE is available on GITHUB: https://github.com/ibm-capi/pslse
- **Specific tests** are determined by what the Application and AFU are programmed to do
- **General recommendations** for verification with PSLSE
  - PSLSE provides some randomness on the interface
  - Long running testcases will provide the most coverage
  - Ensure the pslse.parms file is set correctly

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PSL-AFU Test Suite Tests

- Verify AFU adheres to the PSL-AFU Interface Specification
- Exercise each of the AFU Interfaces
  - AFU MMIO Interface
    - Decode AFU descriptor space correctly and return valid values
  - AFU Buffer Interface
    - Support Read Buffer Latency of either 1 or 3
  - PSL Response Interface
    - Complete successfully with Done; handle Address and Data Errors
  - AFU Control Interface
    - Decode Reset and Start Commands and operate correctly
- Exercise the implemented optional facilities

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Successful Execution of PSL-AFU Tests

- PSL Simulation Engine or any other test harness
  - Should have a return code 0
    - To indicate successful completion with no errors
  - Should have a non-zero return code
    - To indicate failures
    - Have error messages indicating what failed
- If there is a non-zero return code
  - Debug and fix the design
  - Run the tests again

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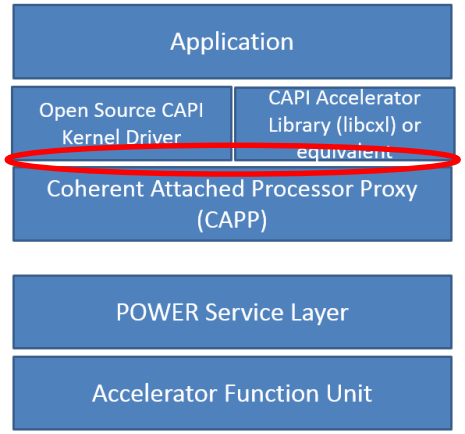

Test Harness to Execute the CAIA Test Suite

- **Provides environment** to test for the existence and operation of required and implemented optional CAIA facilities
- **OpenPOWER Ready system** can be used
  - OpenPOWER ISA Profile processor chipset
    - POWER8™, POWER8 with NVIDIA® NVLink™, or CP1
    - At least one Centaur memory buffer with memory
  - Modest derivative of OpenPOWER Abstraction Layer (OPAL) firmware
  - At least one boot device
  - See OpenPOWER Ready™ 2016 Definition and Criteria Workgroup Notes for complete definition (https://openpowerfoundation.org)

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CAIA Test Suite Tests

- **Develop functional application** that tests the existence of required and implemented optional CAIA facilities
  - Verifies correct behavior
- **Open Source CAPI Kernel Driver** or equivalent can be used to get access to privileged CAIA facilities
- **CAPI Accelerator Library (libcxl)** or equivalent can be used to get access to user-mode CAIA facilities

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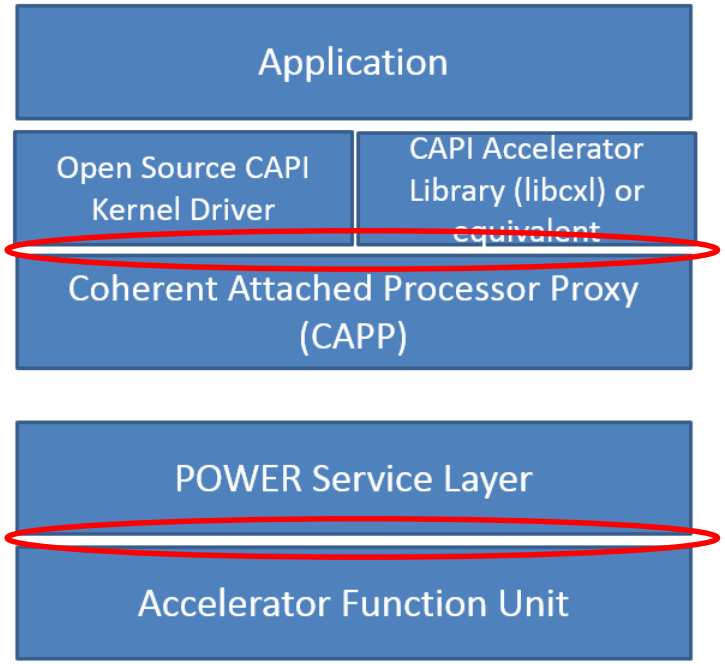
Successful Execution of CAIA Tests

- Each test in the suite of tests
  - Should have a return code 0
    - To indicate successful completion with no errors
  - Should have a non-zero return code
    - To indicate failures
- Test harness
  - Should summarize the results
  - If there is a non-zero return code
    - Show error messages indicating what failed
- If there is a non-zero return code
  - Debug and fix the design
  - Run the tests again

OpenPOWER CAPI Accelerator Compliance

To be OpenPOWER CAPI Accelerator Compliant

- Successful Execution of PSL-AFU Tests
- Successful Execution of CAIA Tests



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OpenPOWER Compliance

2016 Outlook

- Develop OpenPOWER Compliance Test Harness and Test Suite (TH/TS) Specifications, such as:
  - OpenPOWER Instruction Set Architecture (ISA) Profile Compliance TH/TS Specification
  - OpenPOWER I/O Design Architecture Version 2 Compliance TH/TS Specification
  - More Compliance Specifications as other Workgroups complete their Workgroup Specifications

Thank you

If you are an OpenPOWER Foundation member, I invite you to join and participate in the Compliance Workgroup meetings