



# Open. Together.



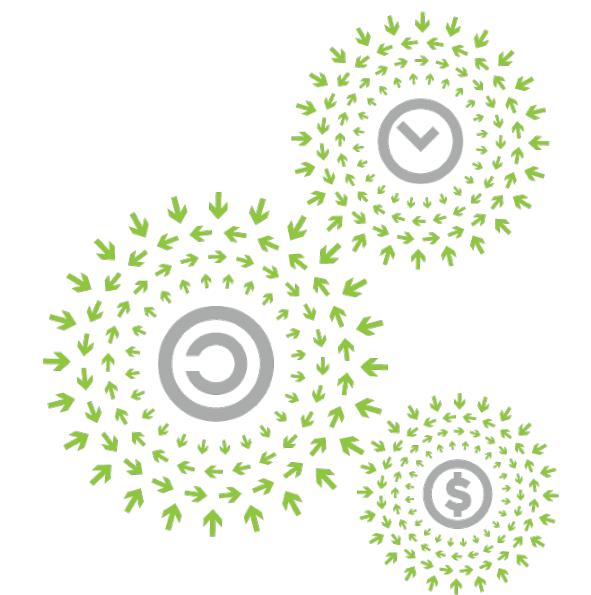
**OCP**  
REGIONAL  
SUMMIT



Open System  
Firmware/OpenRMC

# Arm SBBR and ServerReady Program

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# Background

- The Open System Firmware Project is an open source firmware project lead by contributors, code committers, and a technical steering committee. The goal of this project is to create and deploy, at scale, an open source hardware platform initialization and OS load firmware optimized for web-scale cloud hardware, including documentation, testing, integration and any other artifacts that aid the development, deployment, operation or adoption of the open source project.
- Arm ServerReady is a compliance program, based on standards, that allows partners to deploy Arm servers with confidence. It ensures that Arm-based servers work out-of-the-box, offering seamless interoperability with operating systems and software.
- Arm seeks to collaborate with Open Systems Firmware



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Specifications



# Why do we need a standards-based approach?

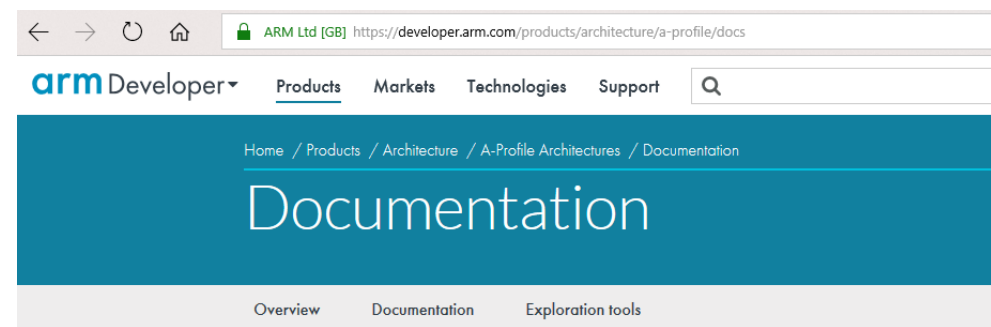
Arm architecture supports a very diverse variety of devices



Diversity is good, but uncontrolled diversity is bad, particularly for servers

- Servers are very different to embedded devices – you have to install standard OSs which may even pre-date the SoC
- Installation process needs to ‘just work’
- Modifying the operating to suit the HW is not a viable option, as it is in embedded

Servers rely on standards to solve this - Common rules for hardware and for firmware



A-Profile Architecture Specifications

## Arm Specs

- PSCI
- SMCCC
- TF-A
- Arm FFH
- Arm MM

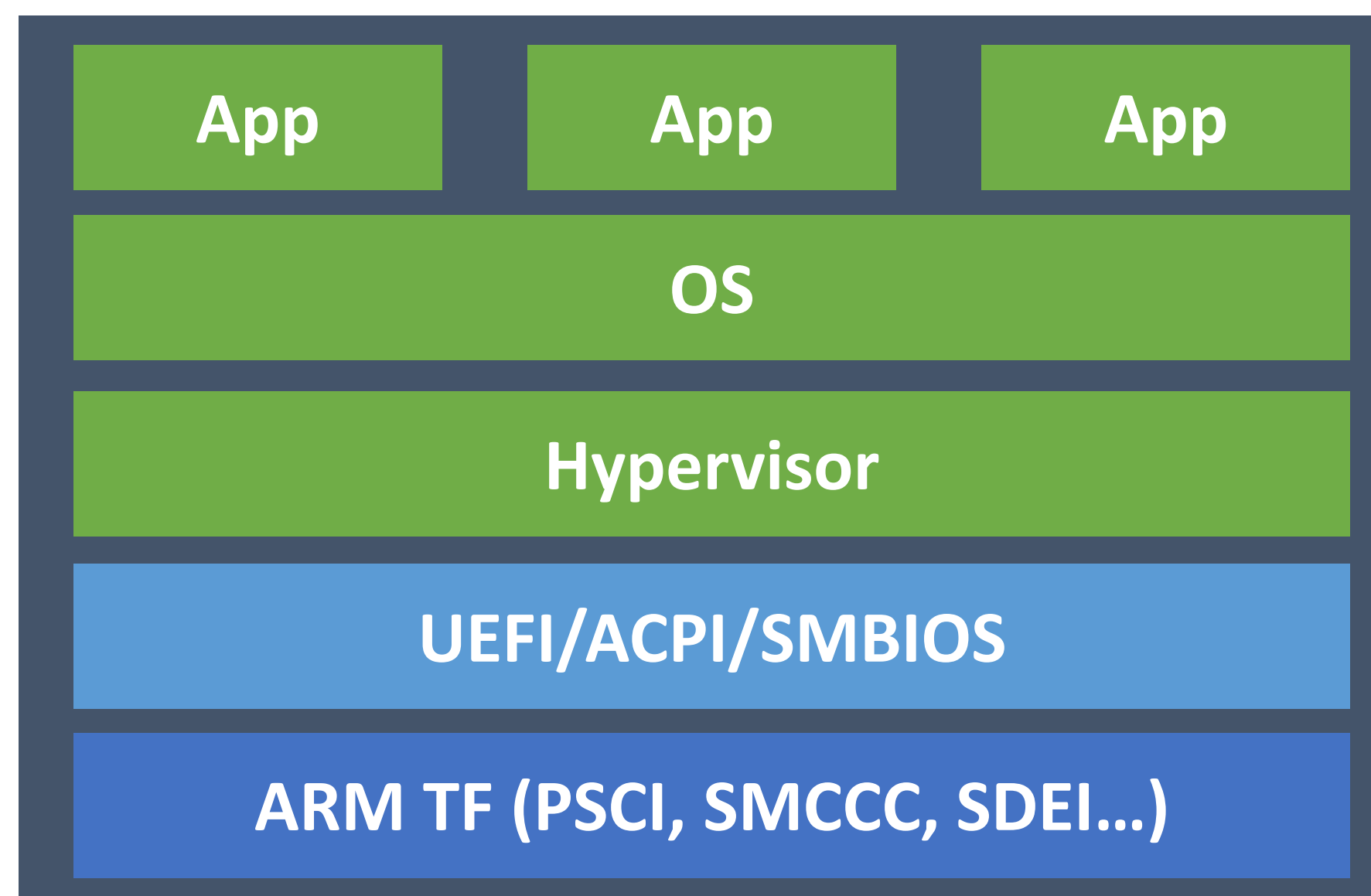
## SBBR: Server Base Boot Requirements

Firmware requirements for Arm based infrastructure SoCs

Developed in conjunction with the server ecosystem

Requirements for industry standards and Arm firmware specifications

<https://developer.arm.com/products/architecture/system-architecture/server-system-architecture>



## Industry Standards



- UEFI
- ACPI



- SMBIOS



- TCG FW spec



- PCI FW spec



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# Why SBDR

- In server ecosystem, integration model is mostly horizontal
  - System manufacturers and OS vendors are separate
- Horizontal integration requires standard firmware interfaces
- SBDR provides firmware ground rules for BIOS, SoC and ODM/OEM vendors



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## What's in SBDR

SBDR provides guidance for the required interfaces from

- UEFI Specification
- ACPI Specification
- SMBIOS Specification
- Arm Specifications (PSCI, SMCCC, TF-A, Arm MM, etc.)



Specifications

# Arm ServerReady

## It's a set of tests:

- Architecture compliance test suites for SBSA/SBBR
- Booting of standard linux distros, WinPE and smoke tests

## It's a compliance process:

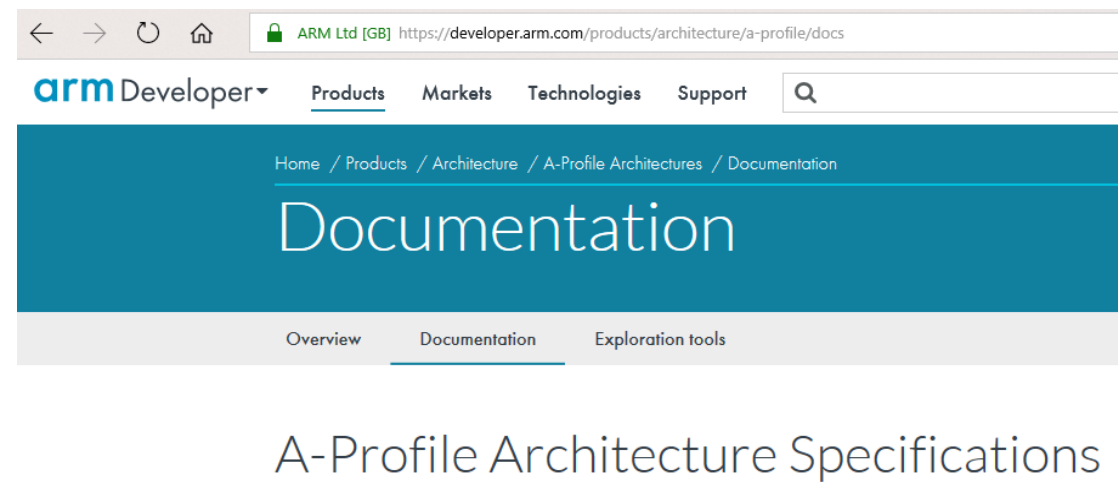
- Partners run the tests, we help debug issues
- Once successful we provide a certificate

## It's a right to marketing materials:

- Partners can use the logo if they pass the process







## Arm Arch:

- Armv8.x-A
- SMMU
- GIC
- Extensions:
  - RAS
  - MPAM

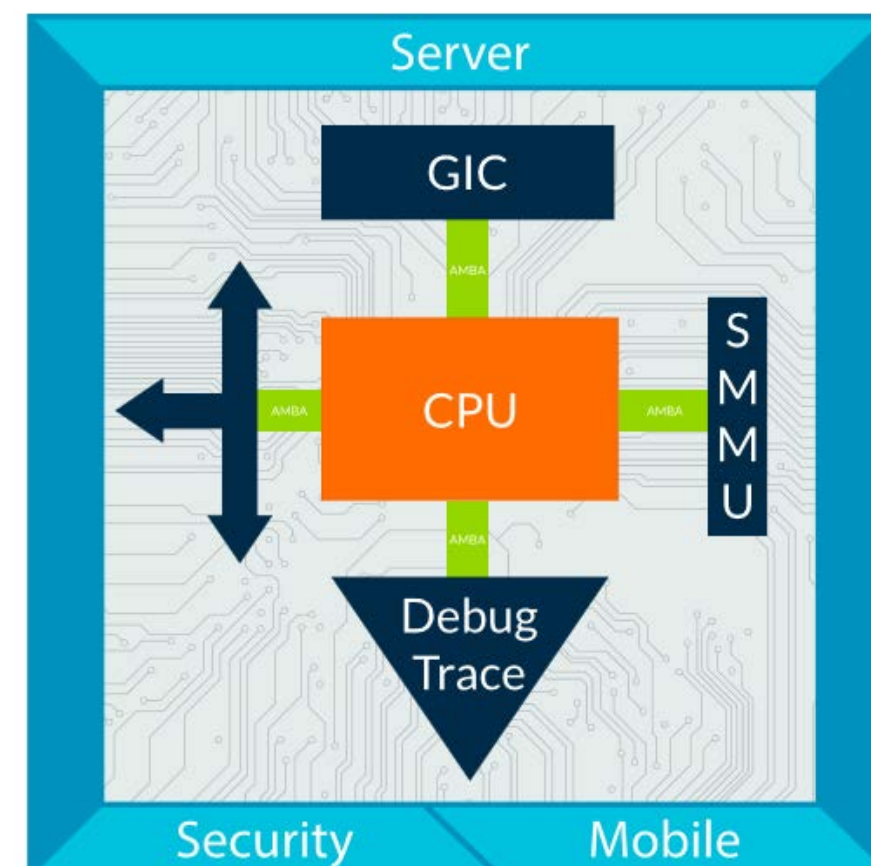
## SBSA: Server Base System Architecture

Hardware requirements for Arm-based infrastructure SoCs

Developed in conjunction with the server ecosystem

Arm architecture and system architecture and standards

<https://developer.arm.com/products/architecture/system-architecture/server-system-architecture>



## Industry Standards



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# Software and Firmware Development

We participate in important open source projects for server

- Linux kernel
- EDK2 for UEFI firmware
- Trusted Firmware-A – formerly Arm Trusted FW
- Open BMC

We also work with OS vendors that are not open source.

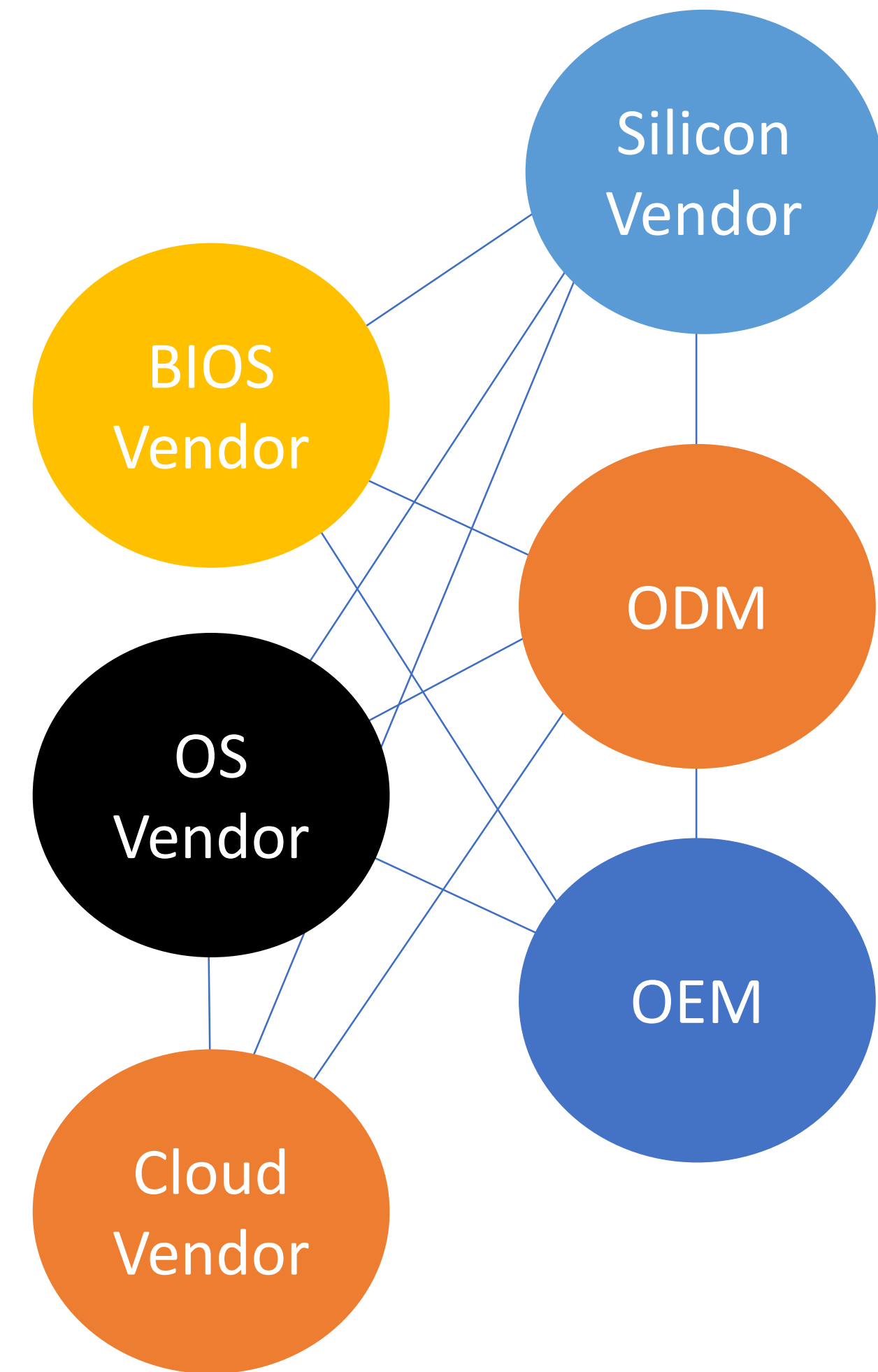


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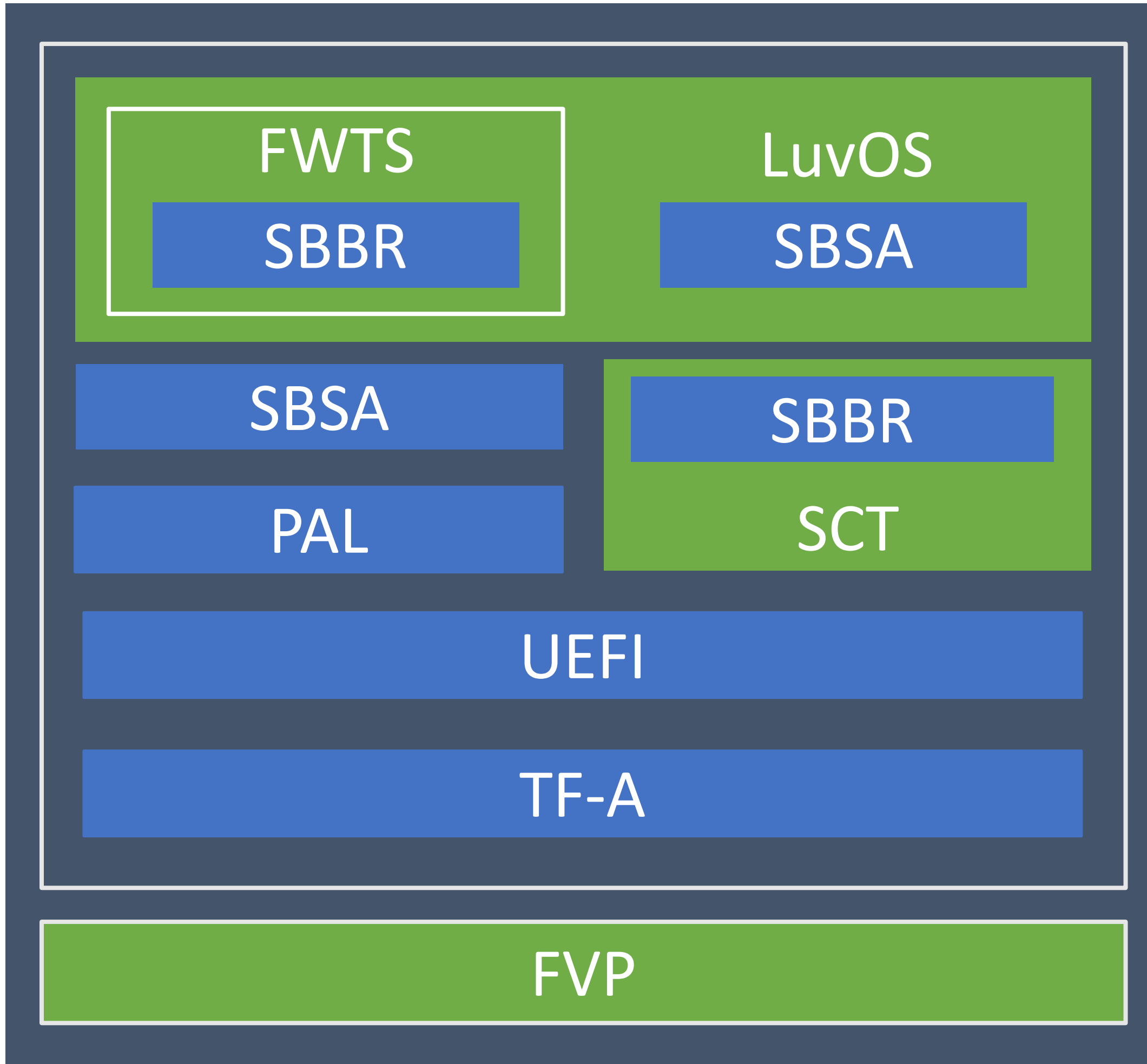


# Compliance tools help in scaling out

- Like other segments the server ecosystem is complex and contains multiple vendors
- An OS vendor cannot check every possible system
- Compliance tools can help one vendor check the input they receive from another
  - e.g. OEM can check Silicon vendor HW is compliant with SBSA hardware requirements
  - OSV can check ODM is compliant with SBSA hardware requirements and SBBR firmware requirements
- There is no specification without verification
- For these reasons, we introduced tests for our specifications and a compliance program







## ACS: Architectural Compliance Suites

SBSA hardware requirements (CPU, GIC, SMMU, PCIe...) properties

- SBSA CPU properties
- SBSA defined system components
- SBSA rules for PCIe integration
  - Based on the PCIe specification
  - Based on standard OS drivers with no quirks enabled

SBBR defined FW requirements (UEFI, ACPI and SMBIOS tests)

- UEFI testing based on the UEFI SCT
- ACPI testing based on FWTS
- SMBIOS testing

The test suites are hosted in GitHub and are open source (Apache v2):

<https://github.com/ARM-software/sbsa-acs>

<https://github.com/ARM-software/arm-enterprise-acs>

Arm

Partner

OSS



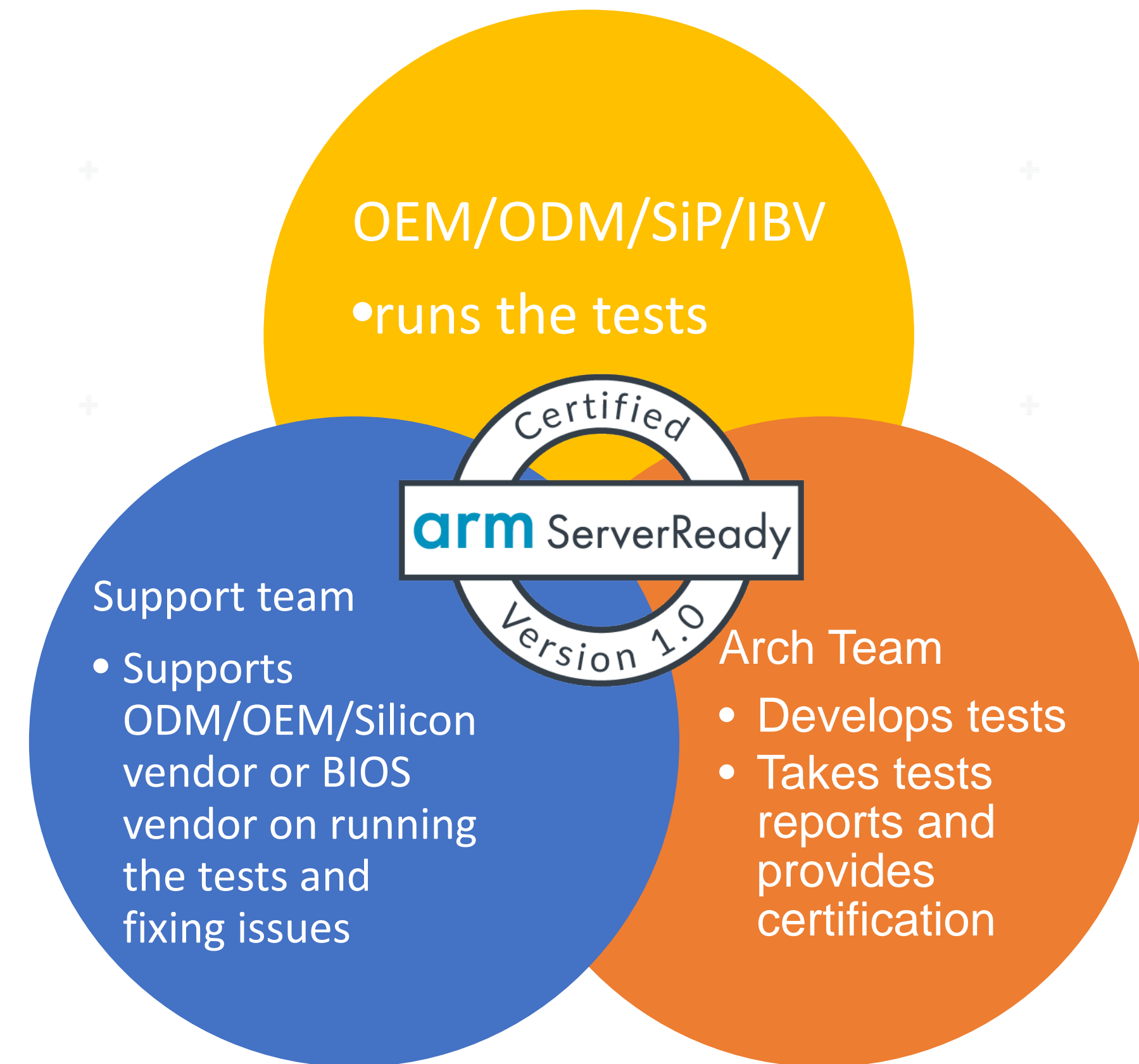
# Testing

arm ServerReady

We are engaging with silicon vendors, ODMs, OEMs and BIOS vendors to run the tests

Tests are developed by our architecture team, which also develops the specifications

We have a support team that helps in running of test, debugging etc





# SBBR & OSF

- SBBR/SBSA are defined in the Arm Server Advisory Committee
  - Formed in 2011
  - it consists of 43+ companies with members from every sector server ecosystem (SoC, ODM, OSV, BIOS, ISV, CSP, IP vendors...).
  - Members have an NDA with Arm and can access specifications whilst they are in development – helping us to shape the specs.
  - The forum has a mailing list and an issue tracker, monthly meets and yearly events in Asia and the US.
- Published SBBR Spec and the ACS are planned to be Contributed to OCP



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# Call to Action

- Collaborate between Arm and OSF to
  - support the OSF workstreams <https://github.com/opencomputeproject/OSF>  
OpenEDK2 Project: <https://github.com/tianocore/edk2-platforms/tree/devel-MinPlatform/Platform/Intel/PurleyOpenBoardPkg/BoardMtOlympus>  
LinuxBoot: <https://www.linuxboot.org/>
  - Provide inputs to future versions of SBRR
- Where to find additional information (URL links)

Where to find the published SBRR/SBSA specs: <https://developer.arm.com/products/architecture/system-architecture/server-system-architecture>

Arm ServerReady ACS:

<https://github.com/ARM-software/sbsa-ac>  
<https://github.com/ARM-software/arm-enterprise-ac>

Arm Trusted Firmware-A: <https://www.trustedfirmware.org/>

EDK2 Project: <https://www.tianocore.org/>





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OCP Regional Summit  
26–27, September, 2019