arm ServerReady

ServerReady and Open Standards Accelerating Delivery

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Arm

#Arm Tech Symposia

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The Cloud to Edge Infrastructure Foundation
for a World of 1T Intelligent Devices

High Performance, Secure IP and Architectures

Diverse Solutions and Ecosystem

Scalable from Hyperscale to the Edge

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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
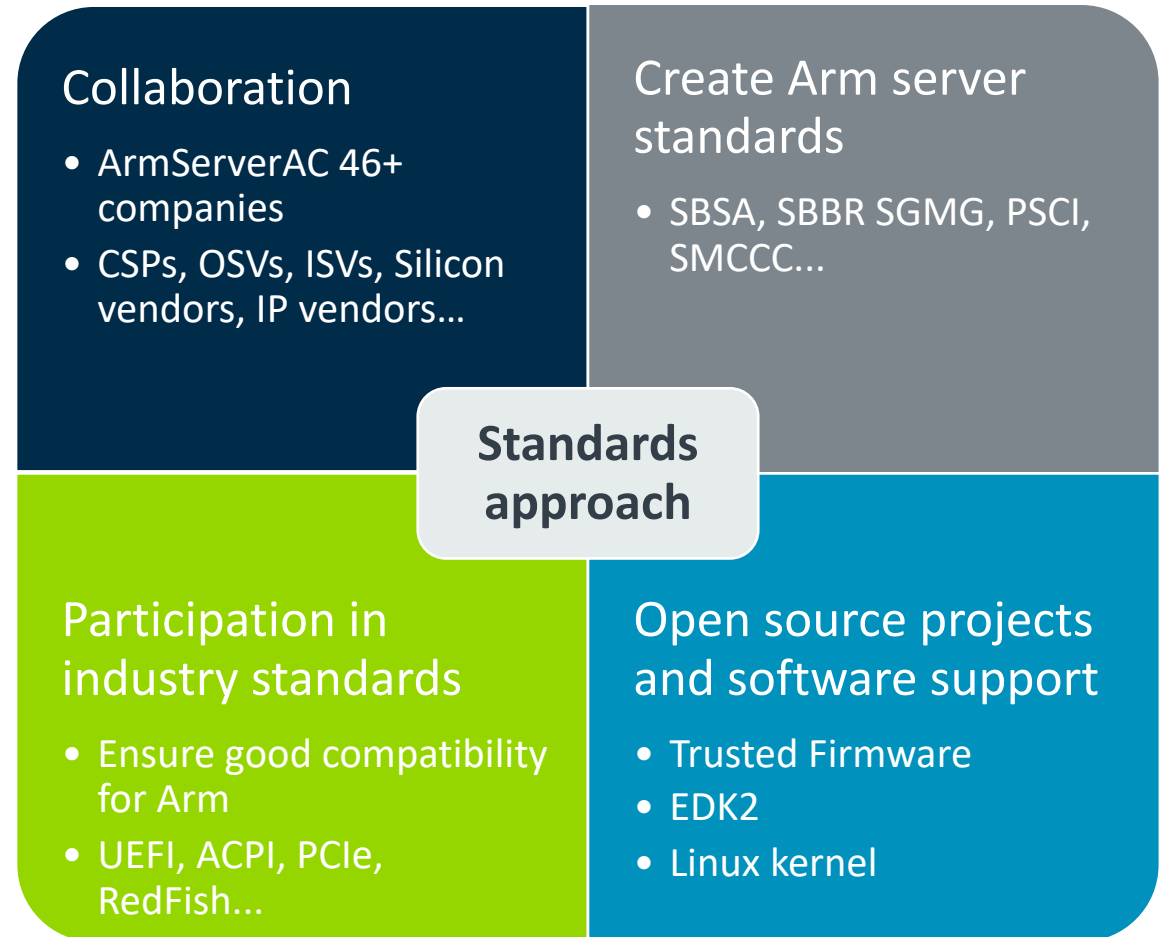
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What is the Arm standards-based approach to servers

Arm takes a collaborative standards-based approach to servers

We collaborate with companies across the server ecosystem to create Arm standards for servers

We ensure existing industry standards work well with the Arm architecture

Support open source projects for software and firmware

Collaboration

- ArmServerAC 46+ companies
- CSPs, OSVs, ISVs, Silicon vendors, IP vendors…

Create Arm server standards

- SBSA, SBBR SGMG, PSCI, SMCCC…

Standards approach

Participation in industry standards

- Ensure good compatibility for Arm
- UEFI, ACPI, PCIe, RedFish…

Open source projects and software support

- Trusted Firmware
- EDK2
- Linux kernel

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# Arm Server Advisory Committee

Formed in 2011 to create hardware and firmware ground rules to enable standard OSs to work on Arm-based servers.

Initially, it consisted of OS vendors, OEMs, and BIOS vendors; later we added silicon vendors and ODMs.

Today, it consists of 46+ 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 <u>mailing list</u> and an <u>issue tracker</u>, monthly meets and yearly events in Asia and the US.

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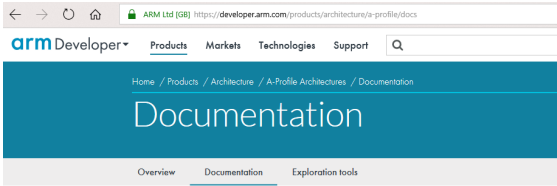
A-Profile Architecture Specifications

Arm Arch:

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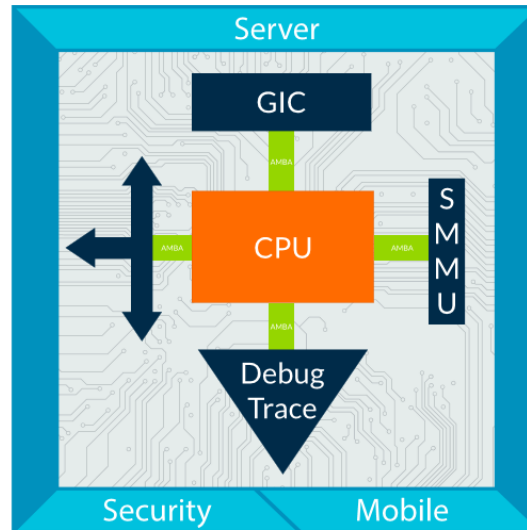- Extensions:
  - RAS
  - MPAM

SBSA: Server Base System Architecture

Hardware requirements for Arm-based infrastructure SoCs
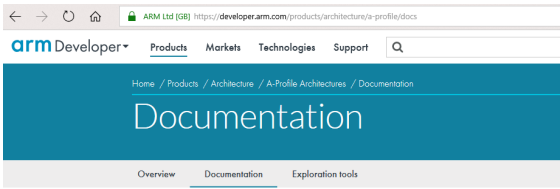
Developed in conjunction with the server ecosystem

Arm architecture and system architecture and standards

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

Industry Standards

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SBBR: Server Base Boot Requirements

A-Profile Architecture Specifications

Arm Specs

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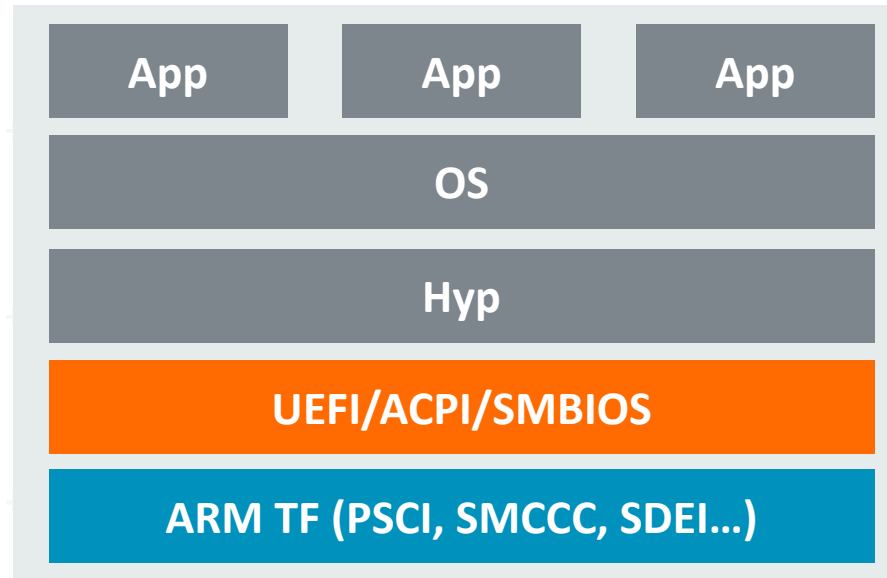- Arm MM

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

App	App	App
OS		
Hyp		
UEFI/ACPI/SMBIOS		
ARM TF (PSCI, SMCCC, SDEI...)		

Industry Standards

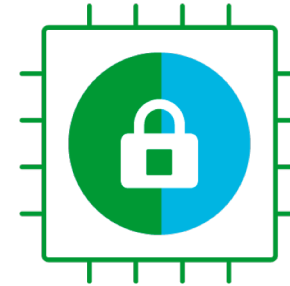- UEFI
- ACPI
- SMBIOS
- TCG FW spec
- PCI FW spec

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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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Server journey

2011

2014

2016

2017

2018

ServerAC created
- First OSVs
- Later SiPs

First release of **S**erver **B**ase **S**ystem **A**rchitecture (2.2) **S**erver **B**oard **B**oot **R**equirements 0.9

SBBR v1.0 Alpha releases of SBSA ACS Enterprise ACS

SBSA 3.0/3.1 SBSA ACS Enterprise (SBBR) ACS

SBSA 5.0 SBBR 1.1

Strong OS support

Red Hat Strengthens Hybrid Cloud's Backbone with Latest Version of Red Hat Enterprise Linux

Red Hat Enterprise Linux 7.5 provides consistency for hybrid IT environments, delivers enhanced security at scale, Windows interoperability, and storage cost reductions

Availability across multiple architectures
Red Hat Enterprise Linux 7.5 is **simultaneously available across all supported architectures, including … 64-bit Arm.**

SUSE Blog

It's all coming together for Arm in High Performance Computing

By: Jay Kruemcke | 2,948 views

SLES 12 for HPC is tailored for HPC workloads by including the HPC Module. The HPC Module consists of a number of HPC packages that are fully supported on 64-bit Arm

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Ubuntu 18.04 LTS optimised for security, multi-cloud, containers & AI

Canonical
on 26 April 2018

26th April 2018, London, UK:
Ubuntu 18.04 LTS – the newest version of the most widely used Linux for workstations, cloud and IoT, is now available.

June 24, 2018

ORACLE

Oracle Linux 7 for Arm is now Generally Available

We released Oracle Linux 7 for Arm …. General Availability. We have been making previews available for a few months now but **the time has come to put support behind it and make clear to customers and partners that this is a real product, not just a preview.**

Microsoft Azure

"We're announcing that we are driving innovation with ARM server processors for use in our datacenters"

ESXi on Arm? Yes, ESXi on Arm. VMware teases bare-metal hypervisor for 64-bit Arm servers

No, we're not pulling your leg

By Chris Williams, Editor in Chief 27 Aug 2018 at 19:52   13   SHARE ▼

Workspace ONE:
Cross-Platform Modern Management
with Insights and Automation

ESXi for Arm®
Bring the power of ESX to the Edge on 64-bit Arm platforms

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Diverse Solutions and Ecosystem

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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

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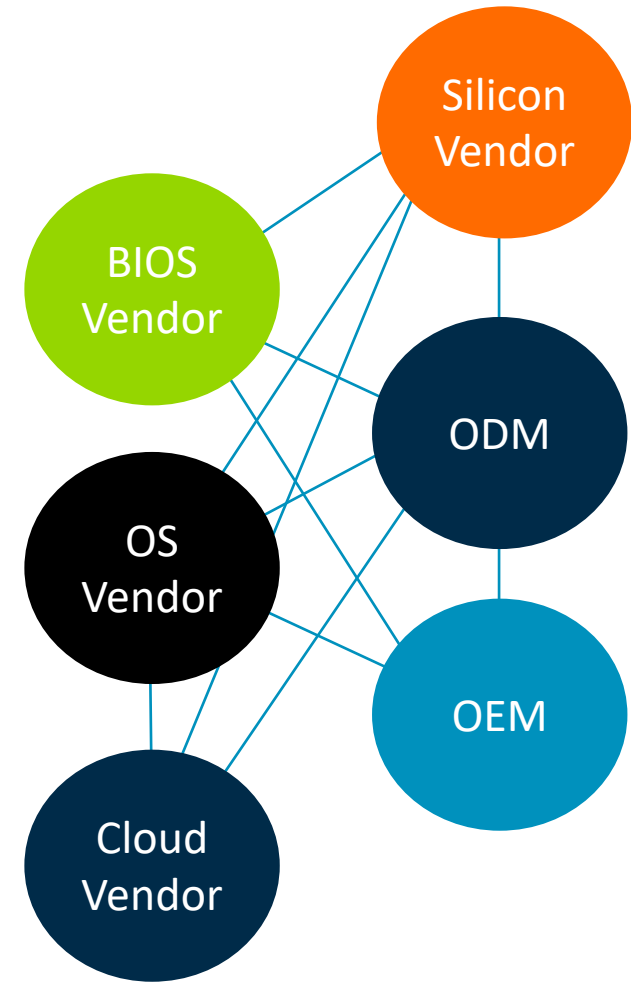
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It's a set of tests:

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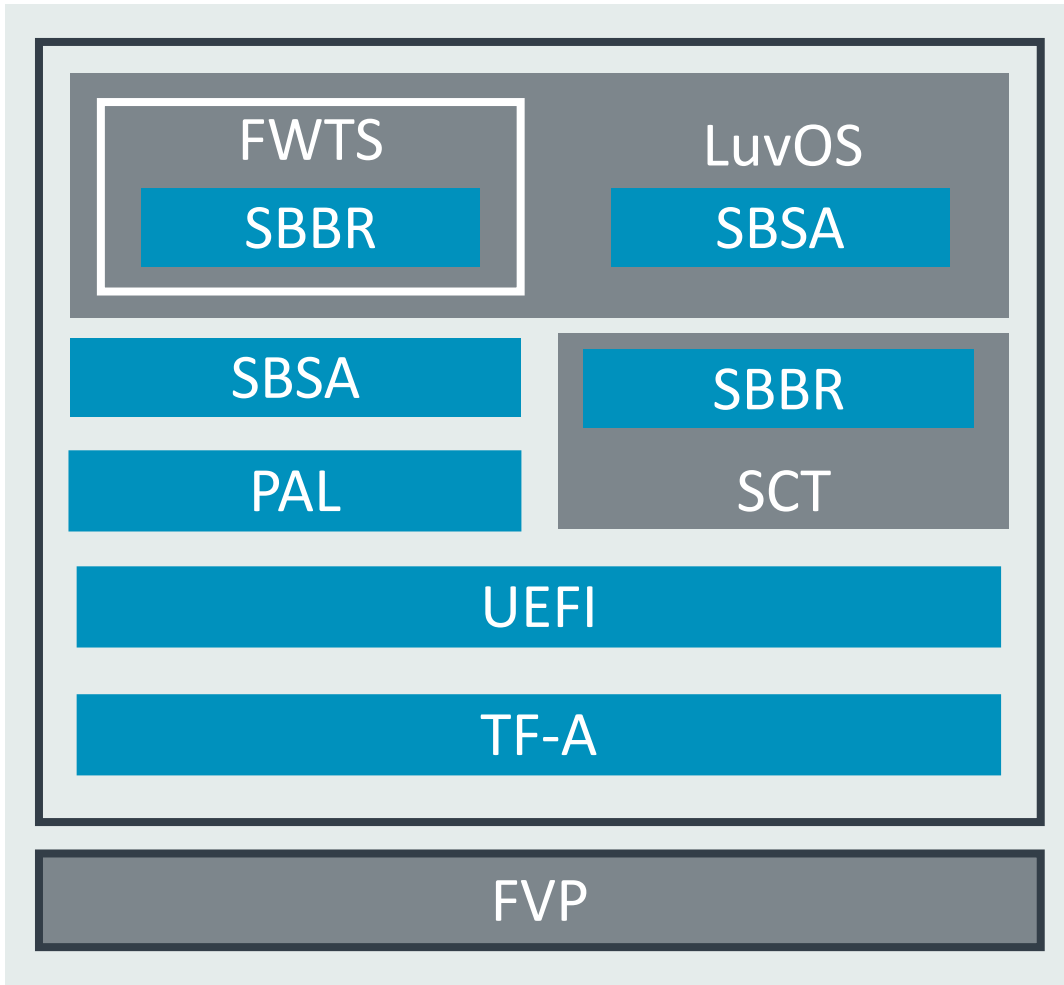- Booting of standard linux distros and smoke tests

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

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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

Diagram

FWTS	LuvOS
SBBR	SBSA

SBSA	SBBR
PAL	SCT

UEFI

TF-A

FVP

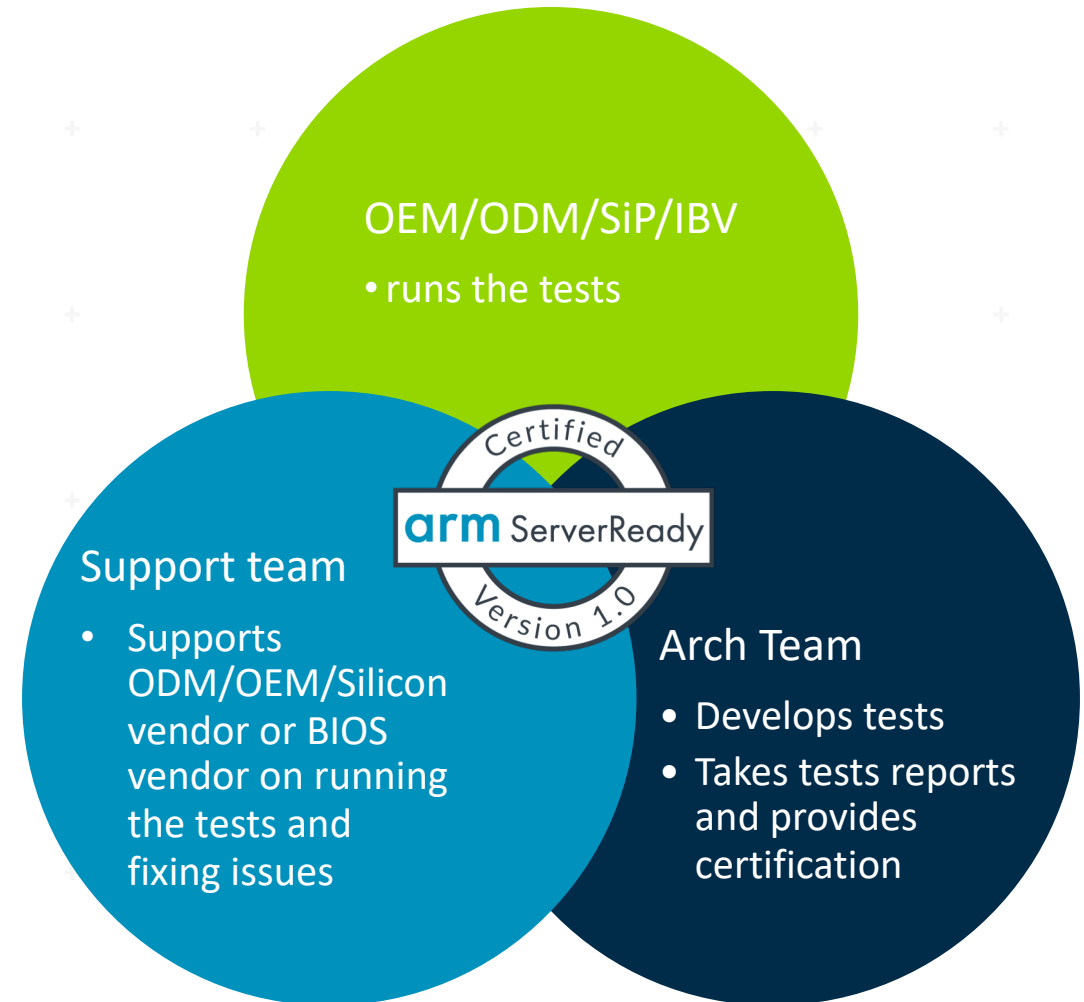| Arm | Partner | OSS |

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Testing

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

OEM/ODM/SiP/IBV
- runs the tests

Support team
- Supports ODM/OEM/Silicon vendor or BIOS vendor on running the tests and fixing issues

Arch Team
- Develops tests
- Takes tests reports and provides certification

Certified
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Version 1.0

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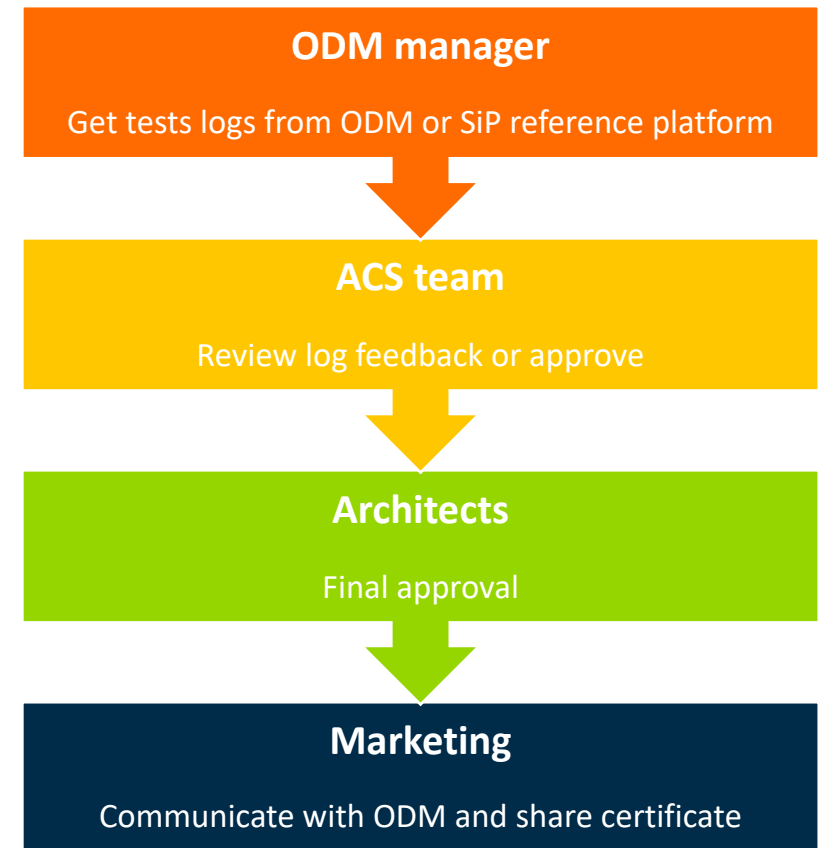# How do we support you – What's the process?

ArmServerAC mailing list.

A support team in Taipei.

A certification team in Bangalore.

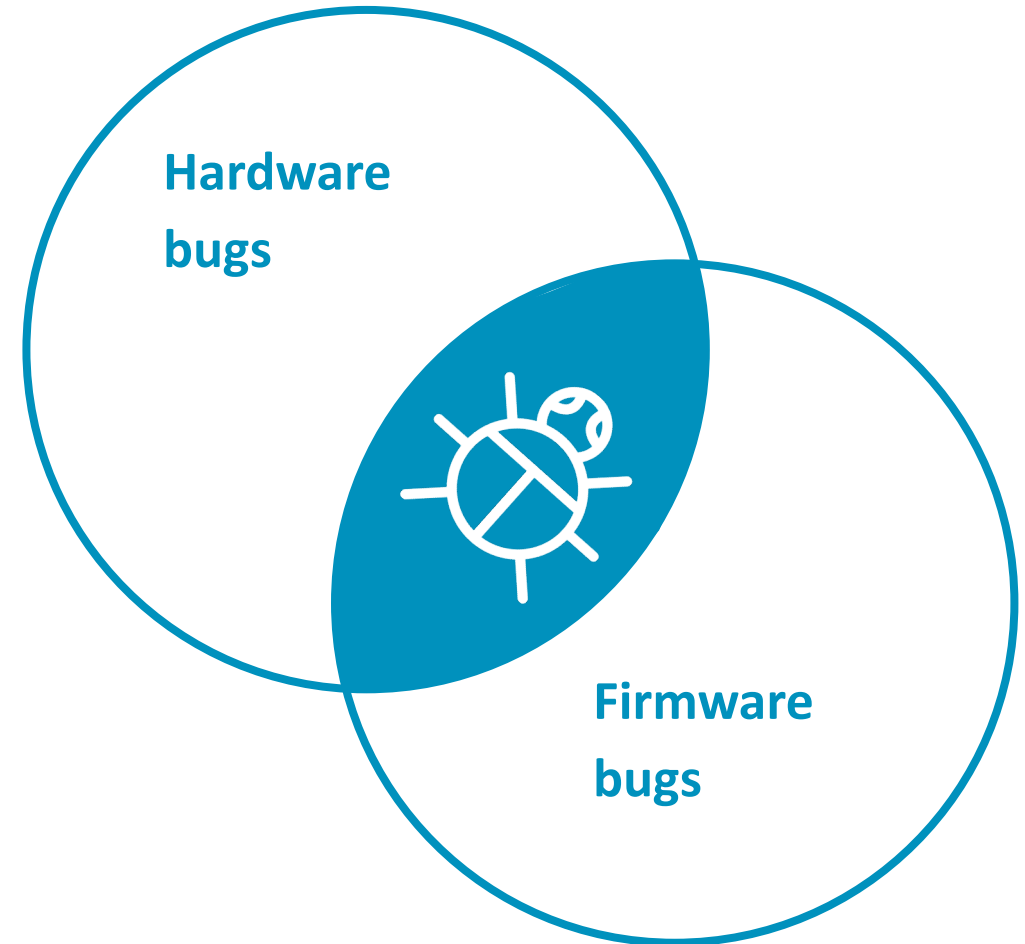We help you run the tests and fix any issues.

We are well placed to help!

Once passed, our marketing team gives you the certificate and helps with communication.

ODM manager

Get tests logs from ODM or SiP reference platform

ACS team

Review log feedback or approve

Architects

Final approval

Marketing

Communicate with ODM and share certificate

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Where have we seen problems?

- PCIe enumeration

- SBSA Watchdog

- Coherency and powering cores up and down:
  - Bugs in Trusted FW
- Firmware – 100s of bugs fixed in ACPI description and SMBIOS

Hardware bugs

Firmware bugs

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Supporters

American Megatrends

BYOSOFT®
百 敖® 软 件

cadence

Hewlett Packard
Enterprise

Linaro

Microsoft
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和 碩 聯 合 科 技

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Certified **arm** ServerReady Version 1.0

Partners

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"The Arm ServerReady compliance program builds on Arm's server standards and community contributions to the infrastructure industry. It enforces a set of common principles that software developers and customers alike can rely on. I am pleased to see this come to fruition with several server platforms already certified as ServerReady."
- **Dr. Leendert van Doorn,**

   Distinguished Engineer, Microsoft Azure, Microsoft Corp.

As technological innovations spanning silicon, networking and storage spawn new server architectures and enable new workloads, it's important that enterprises have common standards upon which they can base their decisions. Red Hat has long supported standards in open source innovation, from common microprocessor criteria to the base components of the Linux kernel, and today we're pleased to extend this support to include the Arm ServerReady program which is designed to help enterprises adopt microarchitecture innovation with greater confidence.

- Jon Masters, Chief Arm Architect, RedHat

Where next?

We are planning annual updates to our server standards

With updated test suites

We are working with other vendors to enable testing upstream and downstream

Find out more

https://developer.arm.com/products/architecture/platform-design/server-and-infrastructure

Contact us: arm.serverreadyprogram@arm.com

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