Standards-based system architecture for cloud, edge and client

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Arm
arm Server Standards

Certified
Version 1.0

arm ServerReady
SBSA: Server Base System Architecture

Hardware requirements for generic off-the-shelf OSes
Developed originally with the server ecosystem
Arm architecture and system architecture and standards

Arm Arch:
• Armv8.x-A
• SMMU
• GIC
• Extensions:
  • RAS
  • MPAM
Arm Specs

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

SBBR: Server BBR

Firmware requirements for OSes/Hypervisors such as Windows, Red Hat, VMWare, etc.

**Horizontal Integration** requires standard firmware interfaces

Focus on interface requirements, not implementation


**Industry Standards**

• UEFI
• ACPI

DMTF

• SMBIOS

TRUSTED COMPUTING GROUP

• TCG FW spec

PCI SIG

• PCI FW spec

OPEN Compute Project
Arm ServerReady

Certifying SiP’s reference boards or OEM/ODM boards
V1.0 launched at Arm TechCon 2018
  • SBSA v3.1 and SBBR v1.0
    • SBSA Level 3
    • ACS testing + two distros of Linux installation testing
    • WinPE testing recommended
V2.0 is planned to be announced @Computex (June 2-6, 2020)
  • SBSA v5.0 and SBBR v1.1
    • SBSA Level 3-5
    • ACS v2.4 testing + OS installation logs (WinPE, RHEL/Fedora/CentOS or SuSe/OpenSuSe or Ubuntu or NetBSD)
Overall Strategy

• SBSA and SBBR have been successful but are targeting at a specific slice of the overall eco-system
• We would like to take the concept and apply more generically across the eco-system, essentially defining a generic Arm platform.
• In doing this we don’t want to undermine ServerReady.
• Hardware:
  ○ Current SBSA
  ○ Introduce BSA – generic hardware target
  ○ Introduce CBSA, adds a roadmap for “client” features
• Firmware:
  ○ Expand to include common firmware interfaces, but recognize that different software stacks will require different recipes
SBSA (Server Base System Architecture)

Two main goals:

1) Documents a minimal set of CPU and System architecture necessary (when accompanied by appropriate firmware) for an OS to boot and run. Includes aspects such as PCIe integration etc.

2) A roadmap of levels that document an increasing set of hardware features, largely following the progression of the CPU architecture
We recognize that there are many devices that want operating system to “just work” but are not “servers”.

We are proposing to properly separate out the “minimal hardware” piece from the SBSA and call it the “BSA”. This is largely just level 3 of the SBSA, but with the server specialisms removed, ie do not require large VMIDs.

The “BSA” becomes the minimal subset of hardware needed to boot and run an OS (when coupled with appropriate standard fw).

The SBSA adds market/eco-system specializations and desirable features on top of the BSA.

This will be done in a completely compatible form. While we are planning to restructure documents the material contents of the SBSA levels will not change.
We expect that the BSA will need to advance over time, for example: to include mandatory new security features, or maybe to require atomics. We expect these updates to be on a slow cadence.
We believe that it would be useful to develop an equivalent specification to the SBSA but targeted at the “client” market (phones, tablets, laptops etc).

- As the Arm eco-system moves towards powering “laptop” class devices the eco-system needs a standard platform (CBSA + fw) so that OSs “just work”
- Systems are becoming complex enough that establishing a common system architecture for key concepts is necessary (eg use of SMMU)
- Gives a language for the eco-system to talk about feature requirements
Which spec do I use?

- The vision is that many OSs would treat the BSA as a target
- The “server” eco-system drives the levels in the SBSA so will be biased towards large, high reliability systems
- The “client” eco-system will drive the levels in the CBSA so biased towards phones, tablets, laptops etc

- At the end of the day the SBSA and CBSA only offer up a language to the eco-system to talk about architecture requirements and adoption of levels will be decided over time in the various markets by the various players
Goals

• Define a BBR to cover ‘A’ profile markets beyond server
• Establish interface requirements
  ○ PSCI, SMCCC (Common for all)
  ○ UEFI
  ○ ACPI
  ○ SMBIOS
  ○ DT
• Recipes
  ○ SBBR: UEFI+ACPI+SMBIOS
    ■ Windows, VMware, Redhat, Oracle Linux, Amazon Linux require, SUSE, Ubuntu, FreeBSD, NetBSD, etc. also use
  ○ EBBR: Reduced UEFI (typically UEFI ABI on top of U-Boot)+DT (typical) or ACPI
  ○ LBBR: LinuxBoot replaces DXE + DT or ACPI
  ○ Etc.
Compliance Tests

The Architecture Compliance tests will be re-organized to match the BSA document.
Thank you

Accelerating deployment in the Arm Ecosystem