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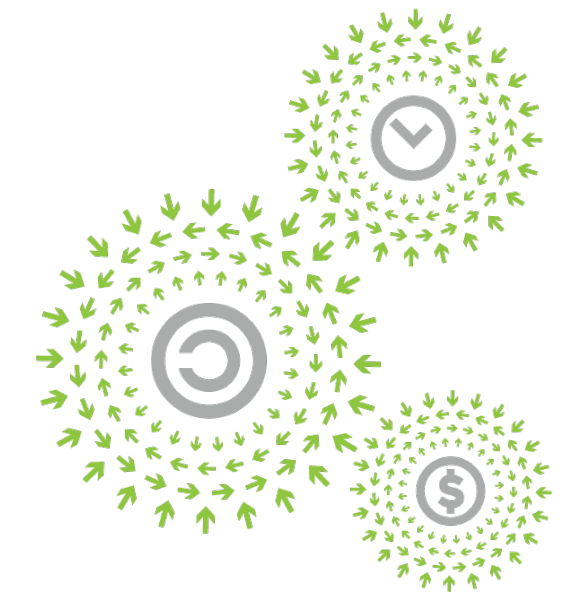


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Open System Firmware/OpenRMC

# Server Base Manageability Guide for SBSA Compliant Arm (AArch64) Servers

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# Agenda

- Rationale
- History
- Introduction
- Prototype
- Roadmap/Plan
- Call to Action



HARDWARE  
MANAGEMENT



Specifications

# Rationale



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- Arm Ecosystem Partners value standardized common server manageability capabilities with scope for flexible customizations which add value to the end user.
- Standardization is key to ensure that Arm Ecosystem does not get fragmented by point solutions that plague the industry today.
- Leverage industry standard system management specifications including but not limited to Redfish, Platform Level Data Model (PLDM), Management Component Transport Protocol (MCTP) as defined by the Distributed Management Task Force (DMTF).
- Leverage Hardware Management Specifications and designs as defined by Open Compute Project (OCP).



Specifications

# History



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- Server Base System Architecture (SBSA)
  - Hardware system architecture for servers based on 64-bit ARM processors.
  - Standardizes processor element features and key aspects of system architecture.
- Server Base Boot Requirements (SBBR)
  - Defines the Boot and Runtime Services expected by an enterprise platform Operating System or hypervisor, for an SBSA-compliant Arm AArch64 server.
  - Based on UEFI, SMBIOS and ACPI specifications.



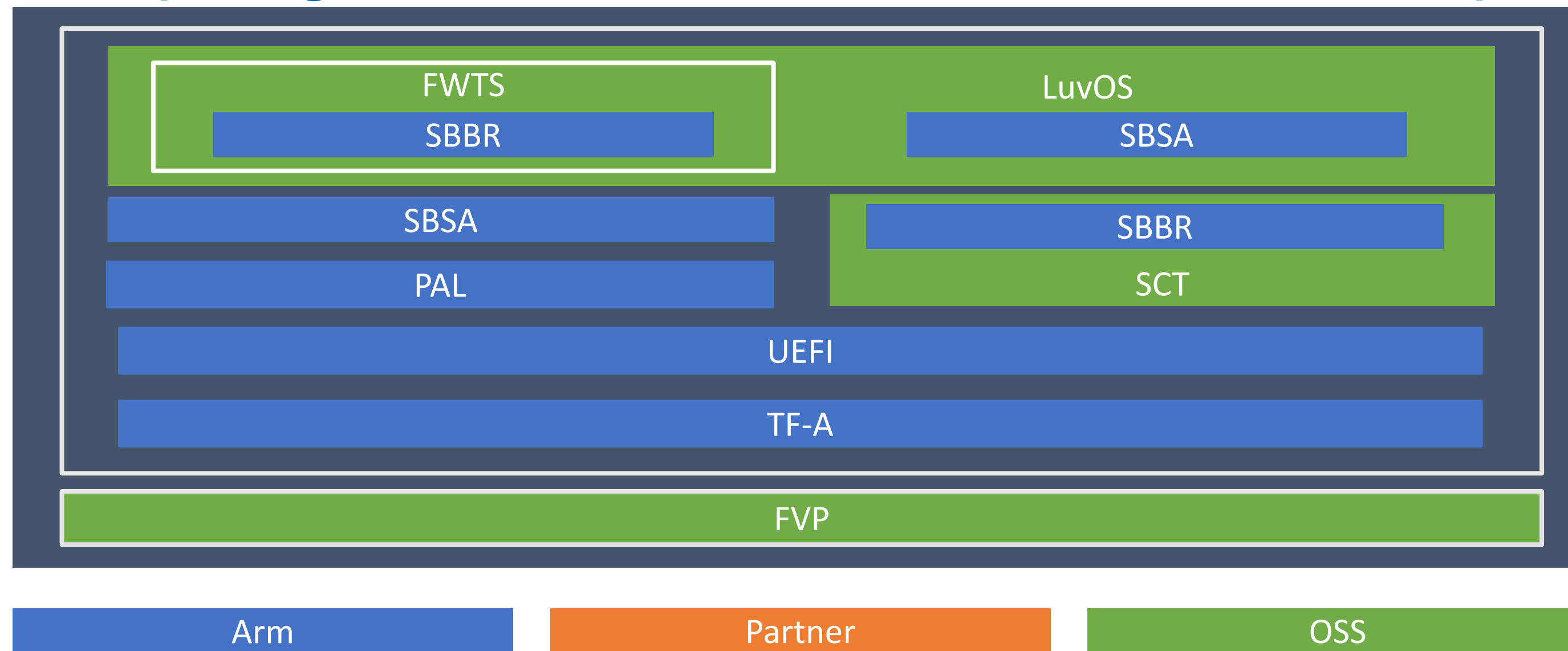
Specifications

# History



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- ARM Enterprise ACS
  - Architecture Compliance Suite tests SBSA and SBBR specifications.
  - <https://github.com/ARM-software/arm-enterprise-acs>



Specifications

# Introduction



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- Server Base Manageability is a specification that is under development in conjunction with partners across the industry.
- Together with SBSA and SBBR, the SBMG provides a standard based approach to building Arm servers, their firmware and their server management capabilities.
- SBMG is developed within the Arm ServerAC community.
- Engineering change request process similar to other standards bodies.
- Anybody in the community can raise a request for a change. Public to community by sending a mail to [armserverac-discuss@arm.com](mailto:armserverac-discuss@arm.com) Or raising a public ticket on the mantis DB <https://atg-mantis.arm.com/>



Specifications

# Introduction



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- Help guide the Arm server designers to provide common manageability functions to the end users.
- To accelerate development of Server Base Manageability Guide (SBMG), three different teams within Arm ServerAC community with participation from several different Arm Ecosystem Partners have been formed.
  - Reliability, Availability, Serviceability (RAS) team.
  - Platform Monitoring and Control team.
  - Remote Debug team.



Specifications



# Introduction – RAS



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- Define error record formats for RAS errors leveraging existing common platform error record (CPER) as specified in unified extensible firmware interface specification (UEFI).
- Define the SOC - BMC manageability interface requirements for RAS errors including in-band and out-of-band interfaces.
- Define fault notification signal.
- Define the interface and mechanism for injecting RAS hardware errors.



Specifications

# Introduction – Monitoring & Control



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- Define interfaces and protocol needed for BMC – SOC communication in the scope of Platform Monitoring leveraging Open Hardware Management Specification for Remote Machine Management defined by OCP.
- List of use cases analyzed for Standardizing
  - BMC to Multiple SOC communication.
  - BMC assisted SOC power actions.
  - BMC to monitor critical health of SOC.
  - BMC to monitor SOC boot progress.
  - BMC watchdog use cases.



Specifications

# Introduction – RAS, Monitoring and Control



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- As of September 2019, RAS and Monitoring teams have been merged with the common goal of defining interfaces between the Soc and BMC.
- The merged team is entrusted with interface definition for communication between Arm based BMC and Satellite/Service Management Controller within/outside of the Soc. This is termed as “Soc side band” communication.
- “Soc side band communication” leverages MCTP transport layer specifications.



Specifications

# Introduction – Remote Debug



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- Server Remote Debug is the act of gaining visibility of the hardware and software behaviors of an SoC, using a debugger which is not directly connected to the Server SoC.
- Define protocols for communicating between the debugger and the BMC.
- Define physical interfaces between BMC and SoC.
- Define protocols for communicating between the BMC and the SoC.
- Define mechanisms for ensuring only suitable debuggers can access the SoC.



Specifications

# Prototype



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- OpenBMC is a Linux foundation project. It is a highly extensible framework for BMC software and implement for data-center computer systems.
- OpenBMC implementation will be used as a medium to realize Server Base Manageability Guide.
- Arm and Arm SiPs are participating in the OpenBMC development so that there will be an open source implementation to the SBMG requirements.
- Arm has joined OpenBMC Technical Steering Committee (Arm, IBM, Intel, Facebook, Google & Microsoft).

<https://github.com/openbmc/docs/blob/master/README.md#technical-steering-committee>



OpenBMC

Implementation



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# Prototype – Remote Debug



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- Proposed Design proposal is to integrate OpenOCD within OpenBMC stack.  
<https://lists.ozlabs.org/pipermail/openbmc/2019-July/017122.html>
- OpenOCD is an open source on-chip debugging solution for JTAG connected processors. It enables source level debugging with GNU gdb. It can also integrate with and GDB aware IDE, such as eclipse.
- Completed first phase of implementation which includes the demonstration of GDB connection on port 3333 to OpenOCD debug server daemon running on OpenBMC.
- Next phase of implementation to utilize a wrapper which adds JTAG master core infrastructure by defining new JTAG class and provide generic JTAG interface to allow hardware specific drivers to connect this interface.  
<https://patchwork.ozlabs.org/cover/848652/>  
This will enable all JTAG drivers to use the common interface part and will have separate drivers for hardware implementation.



OpenBMC

Implementation

# Roadmap/Plan



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- Open Compute Project (OCP)
  1. Plan to contribute SBDR document to OCP.
  2. Plan to participate in several OCP WGs including but not limited to Security, Open System Firmware, Server, Hardware Management, etc.
- OpenBMC
  1. Design proposal for remote debug use case, RAS use case (Planned).
  2. PLDM reviews and contributions.
- DMTF Standards
  1. Contribute to PMCI WG specifications.
  2. Contribute to Redfish WG specifications.

# Call to Action



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- Participate in OCP to influence Hardware Management Specifications and designs.
- Participate in ServerAC to help define SBMG.
- Send an email to Arm ([armserverac-request@arm.com](mailto:armserverac-request@arm.com)).
- Participate in OpenBMC to enable reference implementation and open source delivery option.
- Participate in Redfish, PMCI and other DMTF Workgroups.





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OCP Regional Summit  
26-27, September, 2019