System Control & Management Interface (SCMI)

Extending SCMI beyond Embedded
Agenda

- Introduction
- SCMIv3.0 Updates
- Using SCMI compliant firmware in ACPI systems
- SCMI & Virtualization
Introduction

System Control & Management Interface (SCMI)

• Firmware Interface specification for Power Management and System Control in bare-metal or virtualized systems.

• Comprised of two layers:
  • Messaging
  • Transport – choice of transports with ability to select the most optimal.

• The specification continues to evolve in collaboration with partners and opensource community.

• Reference kernel & firmware support readily available through opensource software.
SCMI v3.0 Updates

Voltage Domain Protocol (New)
- Voltage regulator support.

Sensor Protocol (Extension)
- Multi-axis sensor support for Industrial IO type (IIO) sensors (like Inertial Measurement Units, accelerometers etc.)
- Automotive use-cases.

Enhanced support for Virtualization
- Virtual IO (VIRTIO) based transport.
- Companion SCMI VIRTIO Device specification proposal in OASIS VIRTIO mailing list.
Using SCMI compliant firmware in ACPI systems - I

Unified firmware for both ACPI & Device Tree based implementations

In combination with Arm Functional Fixed Hardware (FFH) Specification.

Processor Idle States

- Uses _LPI (Low Power Idle)
- FFH is used to discover entry methods, power state residency and usage statistics through PSCI.
- PSCI agent can use SCMI.
- Status: FFH is supported in mainline kernel for low power idle and maps to PSCI calls.

Processor Performance Management

- Uses _CPC (Continuous Performance Control)
  - Performance Capabilities encoded as DWORDS.
  - Performance Monitoring using Arm Activity Monitors Unit (AMU) – enabled through FFH.
  - Performance Control using SCMI FastChannels.
  - Performance Limited Register points to unused zeroed location.
- Status: Patches for Performance Monitoring using FFH is WIP.
Using SCMI compliant firmware in ACPI systems - II

Unified firmware for both ACPI & Device Tree based implementations

Other use-cases

PCC Channel Type 3 for communicating with firmware using SCMI messages.
SCMI & Virtualization
Standardized Power Control Path for Virtual Machines

**Key Considerations**
- Minimal Hypervisor change.
- Standard kernel power control path.

![Diagram of SCMI & Virtualization](image-url)
Useful Links

- SCP Firmware: [https://github.com/ARM-software/SCP-firmware](https://github.com/ARM-software/SCP-firmware)
- VIRTIO SCMI Device:
  - [https://www.mail-archive.com/virtio-dev@lists.oasis-open.org/msg06486.html](https://www.mail-archive.com/virtio-dev@lists.oasis-open.org/msg06486.html)
Thank You
Danke
Merci
Merci
Gracias
Kiitos
감사합니다
धन्यवाद
شكرًا
ধন্যবাদ
תודה