



arm

Linaro Virtual Connect 2020

# System Control & Management Interface (SCMI)

Extending SCMI beyond Embedded

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# 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)

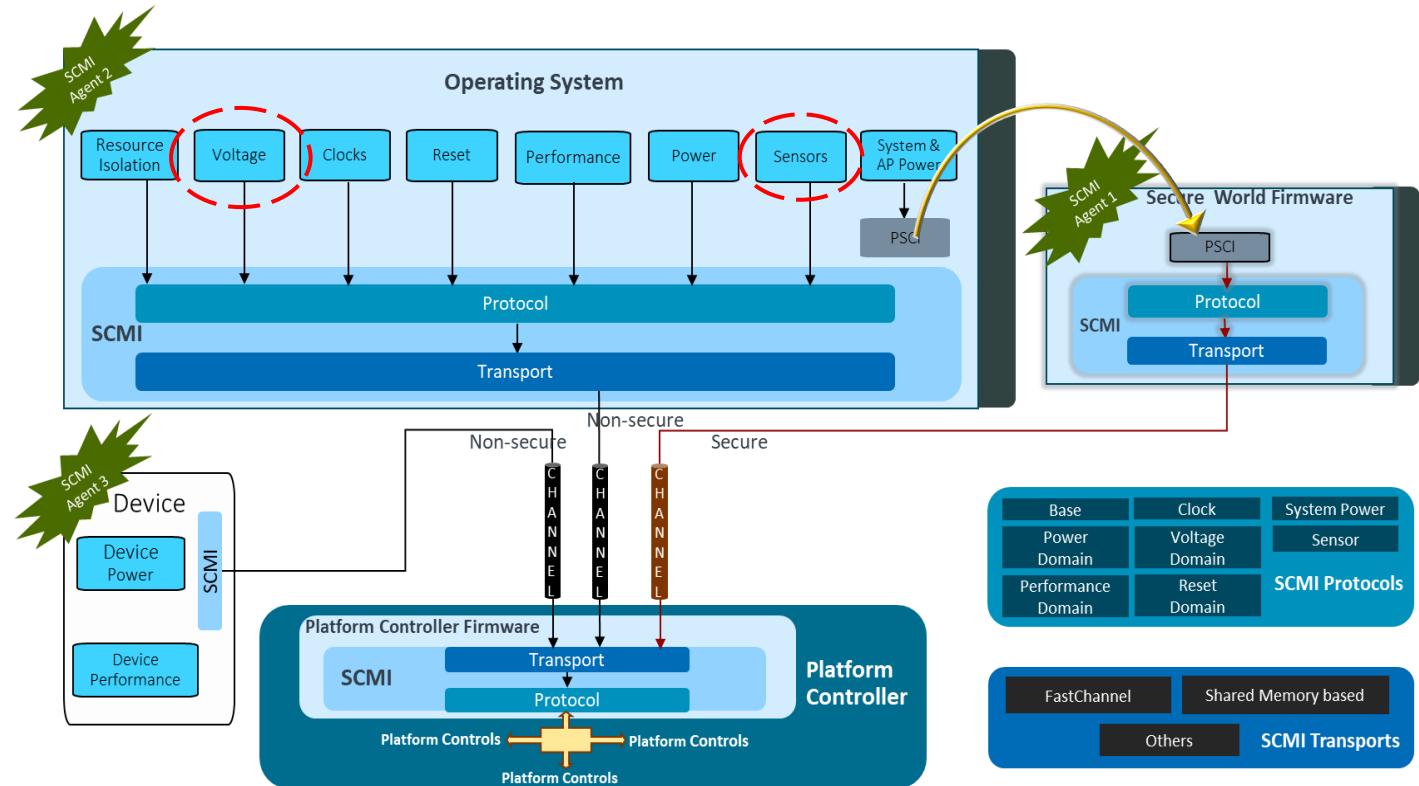
- Voltage regulator support.

## 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

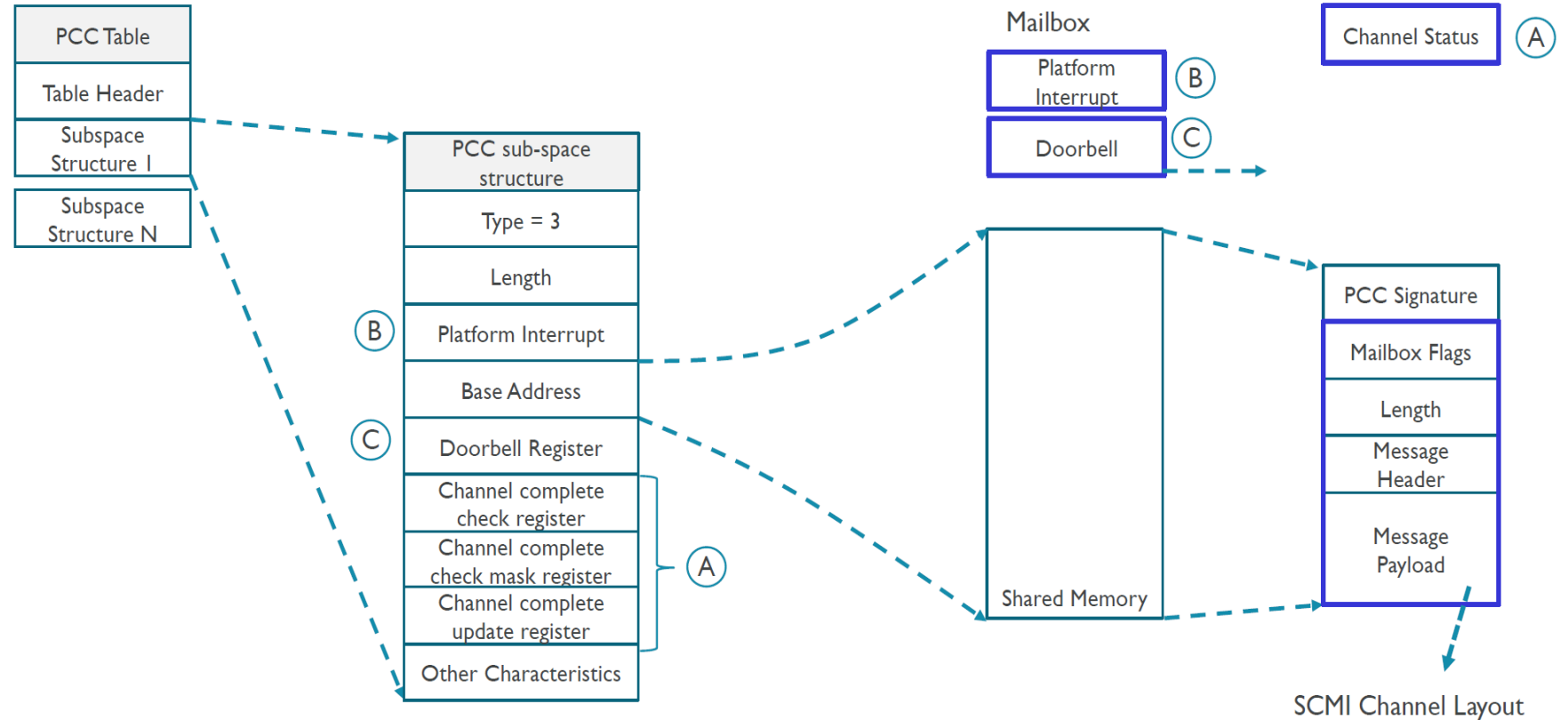
- Uses `_CPC` (Continuous Performance Control)
  - **Performance Capabilities** encoded as DWORDS.
  - **Performance Monitoring** using Arm Activity Monitors Unit (AMU) – enabled through FFH.
  - **Performance Control** using SCMI FastChannels.
  - **Performance Limited Register** points to unused zeroed 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.



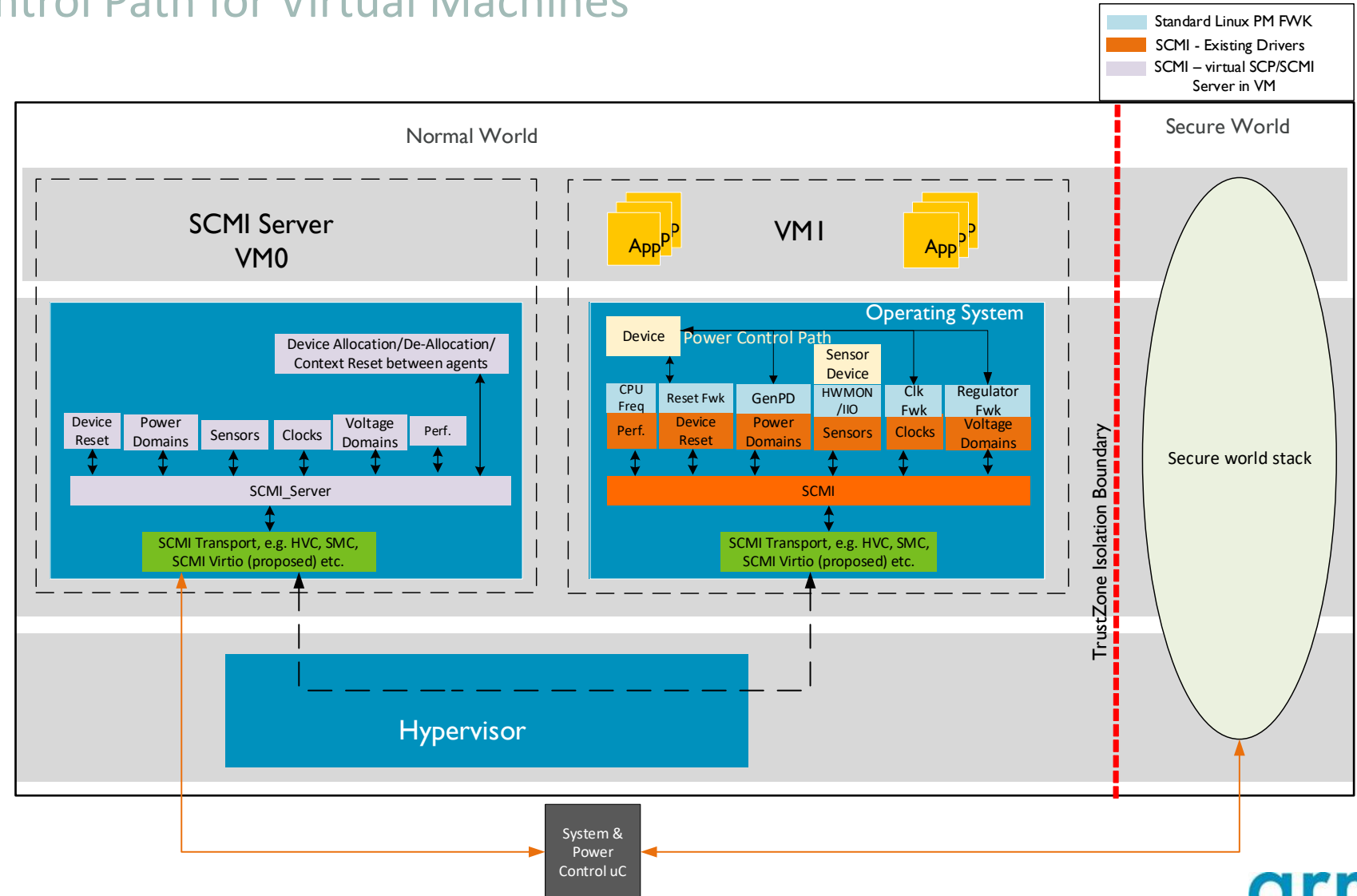
# SCMI & Virtualization

## Standardized Power Control Path for Virtual Machines

### + SCMI Server in VM

#### + Key Considerations

- Minimal Hypervisor change.
- Standard kernel power control path.



# Useful Links

- SCMI Specification: <https://developer.arm.com/documentation/den0056/latest>
- Arm FFH Specification: <https://developer.arm.com/documentation/den0048/latest>
- 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.oasis-open.org/committees/ballot.php?id=3496>



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Thank You

Danke

Merci

谢谢

ありがとう

Gracias

Kiitos

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