



Power Management Microconference

# Fast CPU DVFS using ARM SCMI firmware interface

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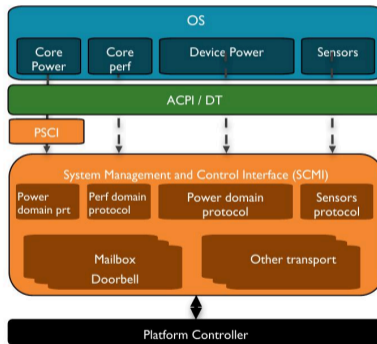
## Why is fast switching not possible on ARM platforms ?

- Most ARM platforms have external power management ICs(PMIC) to provide CPU DVFS
- PMICs are generally connected with a slow SPI/I2C communication interface
- PMICs are also sometimes multi-function device(MFD) providing other functionality requiring serialized access
- I2C/SPI bus may also be shared amongst other slave devices
- Difficult to achieve fast switching if Linux drives these I2C/SPI bus or PMIC
- Recent trend is embedded microcontrollers in systems to abstract various power and other system management tasks

# Standard firmware interface ... really ?

- PSCI covers only CPU power management but not CPU performance or peripheral device management
- SCMI(System Control and Management Interface) is an extensible interface covering performance, power and various other system management functions
- Builds on strong trend in the industry towards embedded platform microcontroller
- *Reference: SCMI Specification*

## SCMI Design Overview



## So, can we do fast switching using SCMI ?

- Operate in a fire and forget fashion
- Not need to handle interrupts/notifications
- Just poll until remote receives DVFS request
- But... is that loss in accuracy ?
- Counters like x86 aperf/mperf may help!

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### References to patches/discussions

- Frequency invariance support by Dietmar
- SCMI support
- SCMI Fast Switch support

# Activity Monitors/Counters

- OK we have some aperf/mperf like counters
  - so what's the problem ?
- Fragmented!
  - we have variety of them
- Counters may not be clocked at same rate
- Not yet architected
- SCMI has some DVFS statistics support
  - the accuracy and timing may not be sufficient



# Thank You

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