



Power Management and Energy-awareness Microconference

Firmware Interfaces vs Direct Resource Control

Linux Plumbers Conference 2018
November 13 - 15 Vancouver Canada

Sudeep Holla <sudeep.holla@arm.com>

November 15, 2018

Problem Statement

- Power Resource Management is a key functionality especially for mobile/portable device
- Extremely difficult to generalise any solution if OS needs direct access control !
- Need for common interfaces for hardware identification and power management
- Platform dependent functionality in the firmware

OK, ... so what's the issue ?

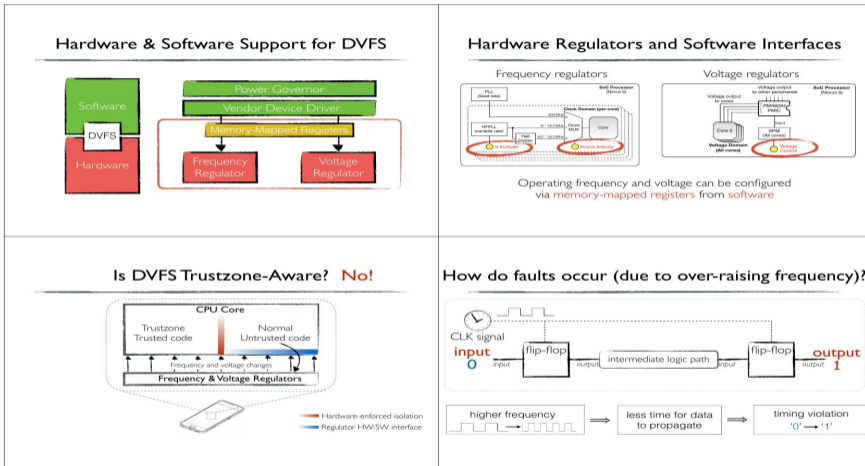
- Denial to give away the direct control
- Trying to explore micro-gains
- Sacrificing platform security(e.g. CLKScrew)
<https://www.usenix.org/system/files/conference/usenixsecurity17/sec17-tang.pdf>

Future energy management designs needs to be security-conscious!

Few Topics of Interest

- Voltage dependencies for clocks (DVFS) - genpd and performance domain integration
<https://www.spinics.net/lists/linux-clk/msg27587.html>
- Generic cpufreq governor for devfreq
<https://patchwork.ozlabs.org/cover/916114/>
- On-chip interconnect API
<https://patchwork.kernel.org/cover/10562761/>
- On-going OS initiated vs platform coordinated cpu idle states

Dynamic Voltage and Frequency Scaling (DVFS) - CLKScrew



(Source: <https://www.usenix.org/system/files/conference/usenixsecurity17/sec17-tang.pdf>)



Thank you

The Arm trademarks featured in this presentation are registered trademarks or trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere. All rights reserved. All other marks featured may be trademarks of their respective owners.

www.arm.com/company/policies/trademarks

Backup

Standard firmware interface ARM SCMI

- 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

