Application Power Control

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Opportunities and Challenges of Application-Power Control in the Age of Dark Silicon

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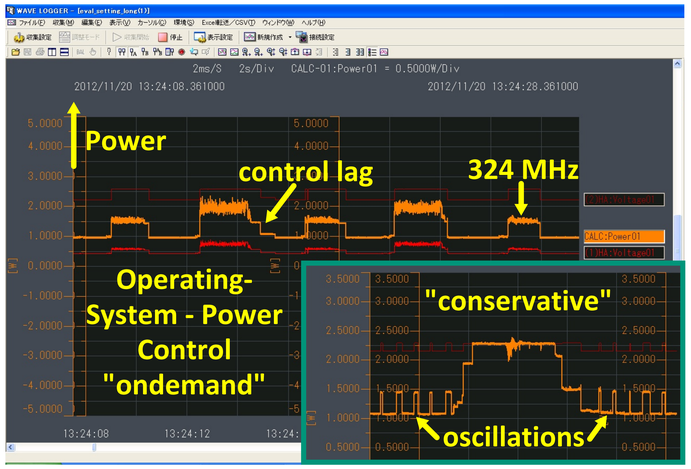
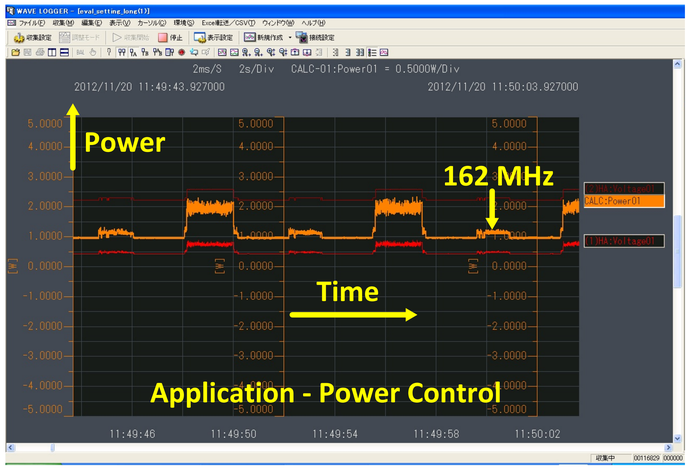
- **Low-latency DFVS**
- **Linux/Android-Kernel**
- **User-Space Driver**

Before: Webserver with **operating system** DFVS-control

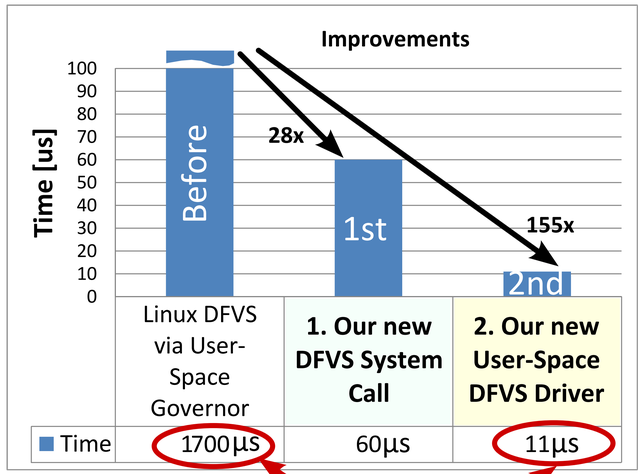


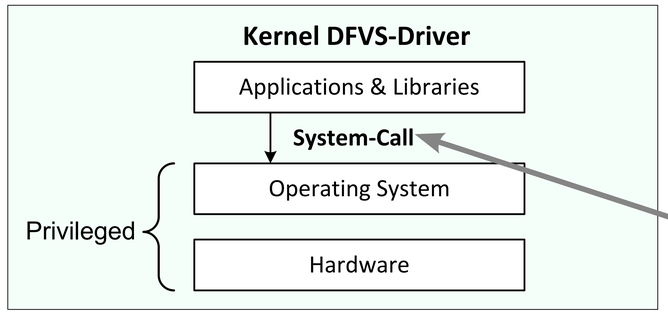
Now: Webserver with **application-level** DFVS-control

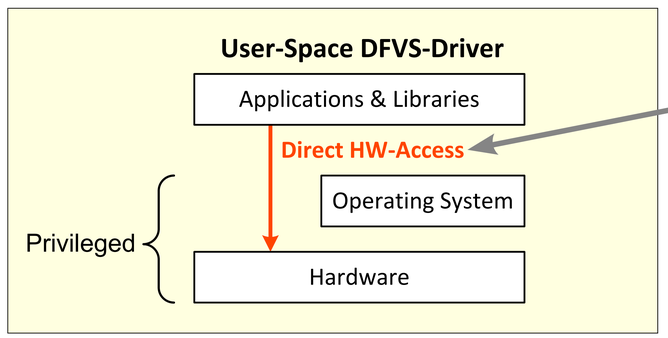


DFVS depends on HTTP-transfer type
- compressed @ 648 MHz
- uncompressed @ 162 MHz

Our **Two** Approaches to Low Latency DFVS



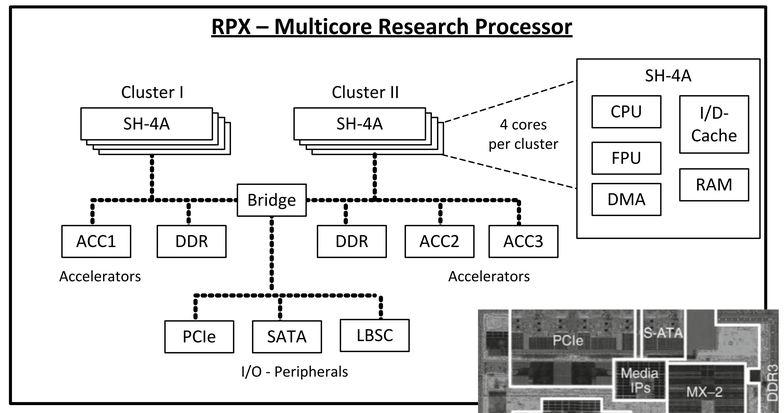


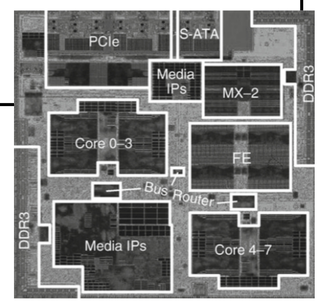


New System Call
+ Utilizes kernel DFVS-drivers
+ Portable
+ Works accross applications

User-Space DFVS-Driver
+ Very-low latency
- Temporary inconsistencies → Kernel-driver
  Requires HW/SW-Codesign
  Memory mapped register access on SH4

Our Target Architecture





RPX-Die - 45nm

Features
- Frequency-Voltage-Scaling
  - 648MHz @1.3V
  - 324MHz @1.16V
  - 162MHz @1.0V
- Frequency per core
- Fine grained clock/power gating