PM Changes in ACPI 6

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Low Power Idle (LPI)

Hierarchical representation of idle states

Idle states of CPU cores, CPU clusters (packages), groups of CPU clusters.

Key observation

Idle states at different levels of the hierarchy are not independent.
Processor Containers And Lists Of Idle States

Processor Container Device (ACPI0010)

- May contain other Processor Containers or Processors (ACPI0007).
- _LPI (Low Power Idle States).
- _RDI (Resource Dependencies for Idle) at the whole system level.
- _STA (Status).

The Low Power Idle States object

- _LPI: List of available idle states (in power consumption order).
- May be present under Processor Container or Processor Devices.
Low Power Idle Example

The diagram illustrates the low power idle example with various components and states. Each component (CPU, CLU, PROC) has a hierarchy of ACPI states, typically State 1 (active), State 2 (suspend), and State 3 (hibernation). The elements are labeled with ACPI identifiers and state indicators.
Platform Coordinated And OS Initiated LPI

Platform Coordinated LPI
- Platform responsible for the coordination of idle states.
- States requested for all levels of the hierarchy from each Processor.

OS Initiated LPI
- Last underlying Processor going idle triggers state selection.
- Requires software tracking of Processor states.

Linux support (v4.2)
- ACPICA: All what’s needed.
- Linux/ACPI: Not supported (work in progress by Linaro).
Device PM Update in ACPI 6

Clarification of the $D3_{hot}/D3_{cold}$ meaning

- $D3_{cold}$ only available if _PR3 is present.
- $D3_{hot}$ always available (if PM is supported at all).

Power state change sequence specification update

**Power up**: Turn on power resources and evaluate _PS0 (if present).

**Power down**: Evaluate _PSx (if present) and turn off power resources.

Linux support (v4.2)

Linux/ACPI: Updated to follow ACPI 6 (Rafael Wysocki).
CPPC And PCC

PCC: Platform Communication Channel
Update: Make it usable on HW-reduced ACPI platform.

CPPC: Collaborative Processor Performance Control
Update: Cover systems with different CPUs.