

PM Changes in ACPI 6

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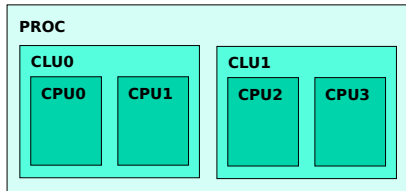
Intel Open Source Technology Center

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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

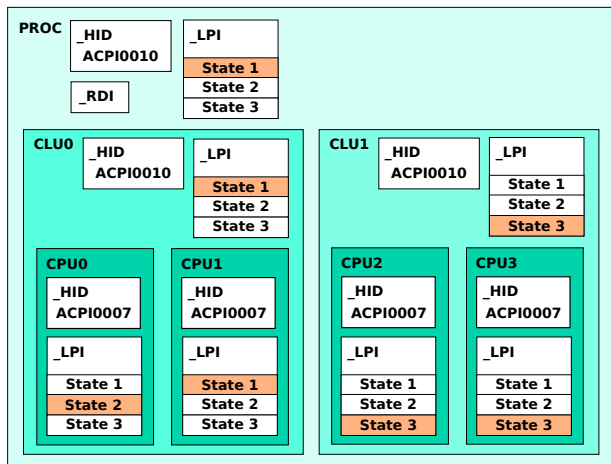
Processor Container Device (ACPI0010)

- 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



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.