ACPI Overview
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Advanced Power Management (APM)

- BIOS-based system power management
- Provides CPU and device power management
- Called when idle - provides CPU power mgmt.
- Uses device activity timeouts to determine when to transition devices into low power states
- OS has no knowledge of what APM does
- Each IBV must refine and maintain APM BIOS code/IP
- Wide variety of implementations and functionality
  - No uniform user experience
ACPI

**Advanced Configuration and Power Interface**
- Conceived by Intel, Microsoft, and Toshiba (the promoters)

**An “interface” specification**
- ACPI / OSPM replaces APM, MPS, and PnP BIOS Spec

**Allow OS-directed Power Management (OSPM)**

**Defines**
- Hardware registers - implemented in chipset silicon
- BIOS interfaces
  - Configuration tables
  - Interpreted executable function interface (Control Methods)
  - Motherboard device enumeration and configuration
- System and device power states
- ACPI Thermal Model
ACPI Global States and Transitions

Legacy

G3 - Mech Off

ACPI_ENABLE (SCI_EN=1)

Legacy Boot (SCI_EN=0)

G0 (S0) - Working

ACPI_DISABLE (SCI_EN=0)

ACPI_ENABLE (SCI_EN=1)

Legacy Boot (SCI_EN=0)

G2 (S5) - Soft Off

ACPI_BOOT (SCI_EN=1)

SLP_TYPx=(S1-S4) and SLP_EN or PWRBTN OR Wake Event

Power Failure

S4BIOS_REQ

S4BIOS_F

Modem

HDD

CDROM

CPU

D0 D1 D2 D3

D0 D1 D2 D3

D0 D1 D2 D3

D0 D1 D2 D3

D0 D1 D2 D3

C0 C1 C2 C3

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ACPI Software Components

- **ACPI Subsystem**
  - Consumes ACPI BIOS
  - Interacts with ACPI Hardware

- **Policy Manager (OSPM)**
  - Sets and Monitors System Policies
  - User Interface
    - Allows User Input to Policy

- **Device Drivers**
  - EC, SM Bus, CM Battery, Smart Battery
ACPI System Overview

Applications

Kernel

OSPM System Code

OS Specific technologies, interfaces, and code.

Device Driver

ACPI Register Interface

ACPI Registers

ACPI BIOS

ACPI Tables

Platform Hardware

BIOS

ACPI Driver/AML Interpreter

ACPI Table Interface

ACPI BIOS Interface

Existing industry standard register interfaces to: CMOS, PIC, PITs, ...

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ACPI Specification History

- ACPI 1.0 released December 1996
- ACPI 1.0a released July 1998
- ACPI 1.0b released February 1999
- ACPI 2.0 released July 2000
How does ACPI change?

- Periodic errata meetings held with promoters
- Either spec is updated (e.g. 1.0a, 1.0B, etc) or errata document is posted on the ACPI site: http://www.acpi.info