

# System Management BIOS

Intel Corporation

September 29, 1997



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# Purpose of Presentation

- Provide SM BIOS overview
- Show that SM BIOS can offer system information obtainable no where else
- Highlight the importance of SM BIOS event logging

# Agenda

- **SM BIOS Overview**
- **SM BIOS Interface**
- **SM BIOS Structures**
- **SM BIOS Event log**

# Definitions

- **DM - Desktop Management**
- **SM - System Management**
- **ACPI - Advanced Configuration and Power Interface**
- **BBS - BIOS Boot Specification**
- **UUID - Universally Unique ID**
- **SYSID - System ID**
- **ESCD - Extended System Configuration Data**
- **PnP - Plug and Play**
- **GPNV - General Purpose Non-Volatile Area**
- **ECC - Error Checking and Correcting**
- **DMTF - Desktop Management Task Force**

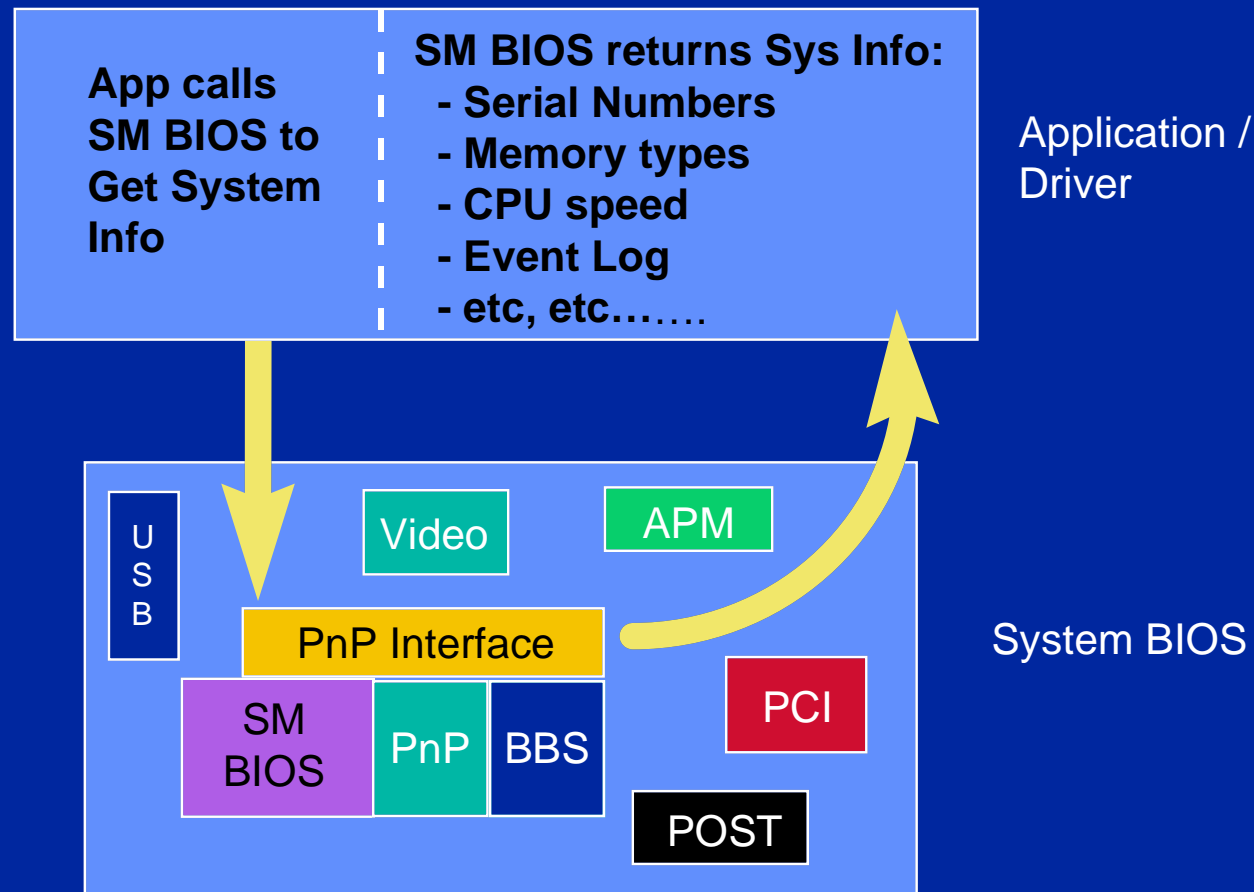


# Agenda

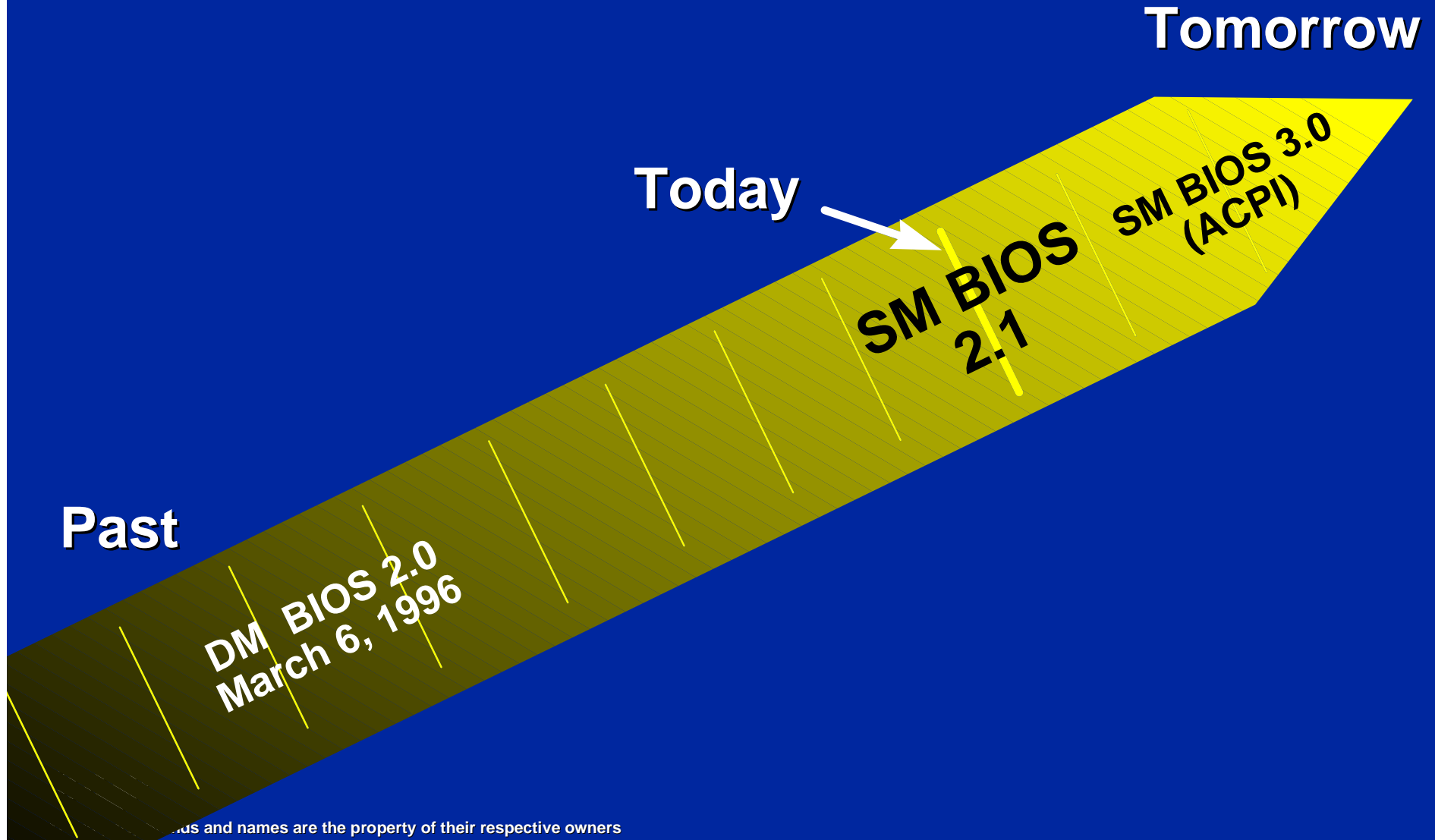
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- **SM BIOS Event log**

# What is SM BIOS?

- A method of obtaining System Info and system Status



# SM BIOS Specification History



# Co-Authors of the SM BIOS Specification

- Award Software International Inc.
- Dell Computer Corporation
- Hewlett-Packard Company
- Intel Corporation
- International Business Machines Corporation
- Phoenix Technologies Limited
- SystemSoft Corporation





# SM BIOS

## Goals

- Allow access to all OSs
- Align BIOS structure with DMTF groups
- Support for Mobile and Servers
- More robust event-log control
- Clarify and correct functions and structures

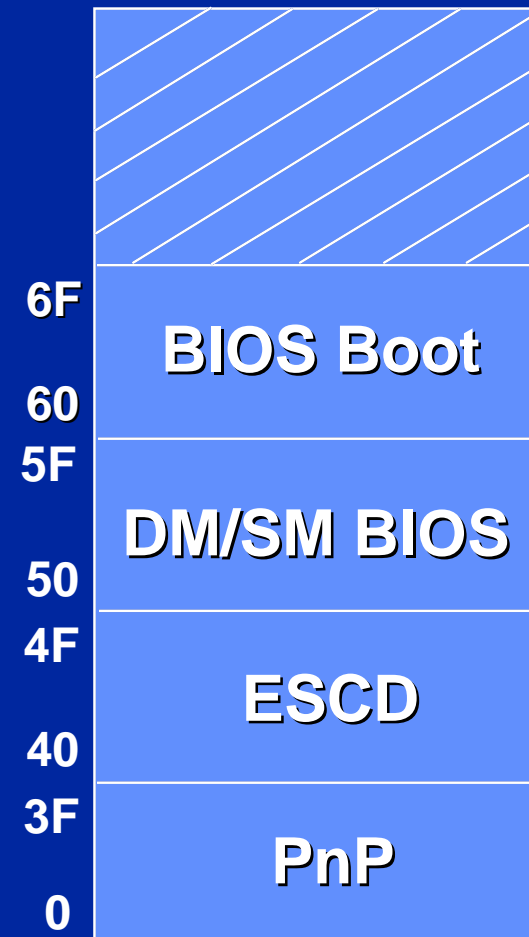
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# SM BIOS

## Traditional PnP Interface

Set of PnP calls to retrieve information that describes that particular system



# SM BIOS

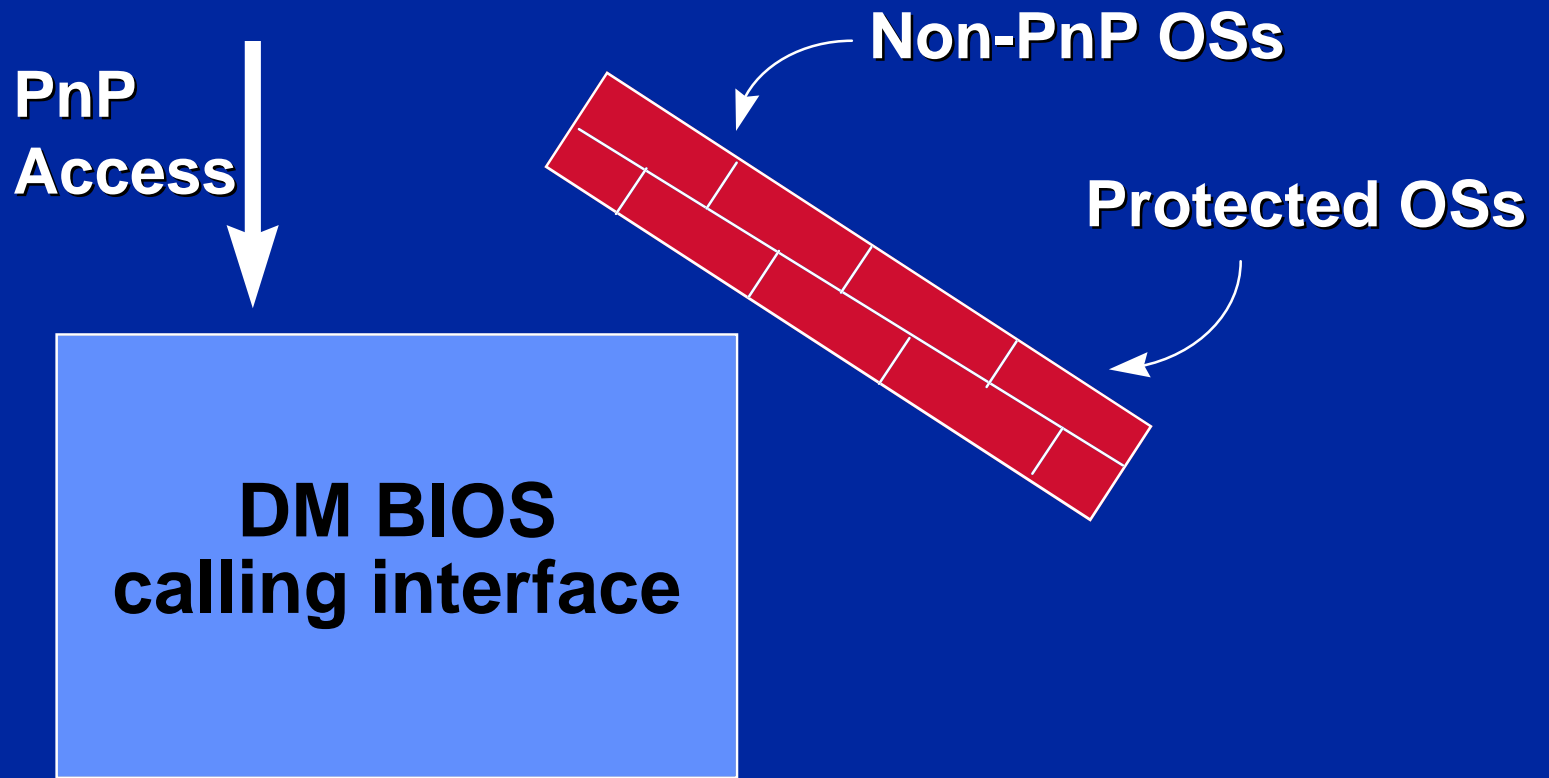
## List of PnP SM BIOS Calls

<u>SMBIOS Function</u>	<u>Function Number</u>	<u>Required/Optional</u>
GET_DMI_INFORMATION	50h	Required for calling interface
GET_DMI_STRUCTURE	51h	Required for calling interface
SET_DMI_STRUCTURE	52h	Optional
DMI_CHANGE_INFO	53h	Required for Dynamic Structure Change Notification Support
DMI_CONTROL	54h	Required for Event Logging Support
GPNV Functions	55-57h	Required for GPNV Support



# SM BIOS

## PnP Not Total Solution



# SM BIOS

## Interface (Get SM BIOS Information)

### Structure table interface

Alternative to Get DMI Info (51h)

PnP  
Access



Non-PnP OSs



Protected OSs



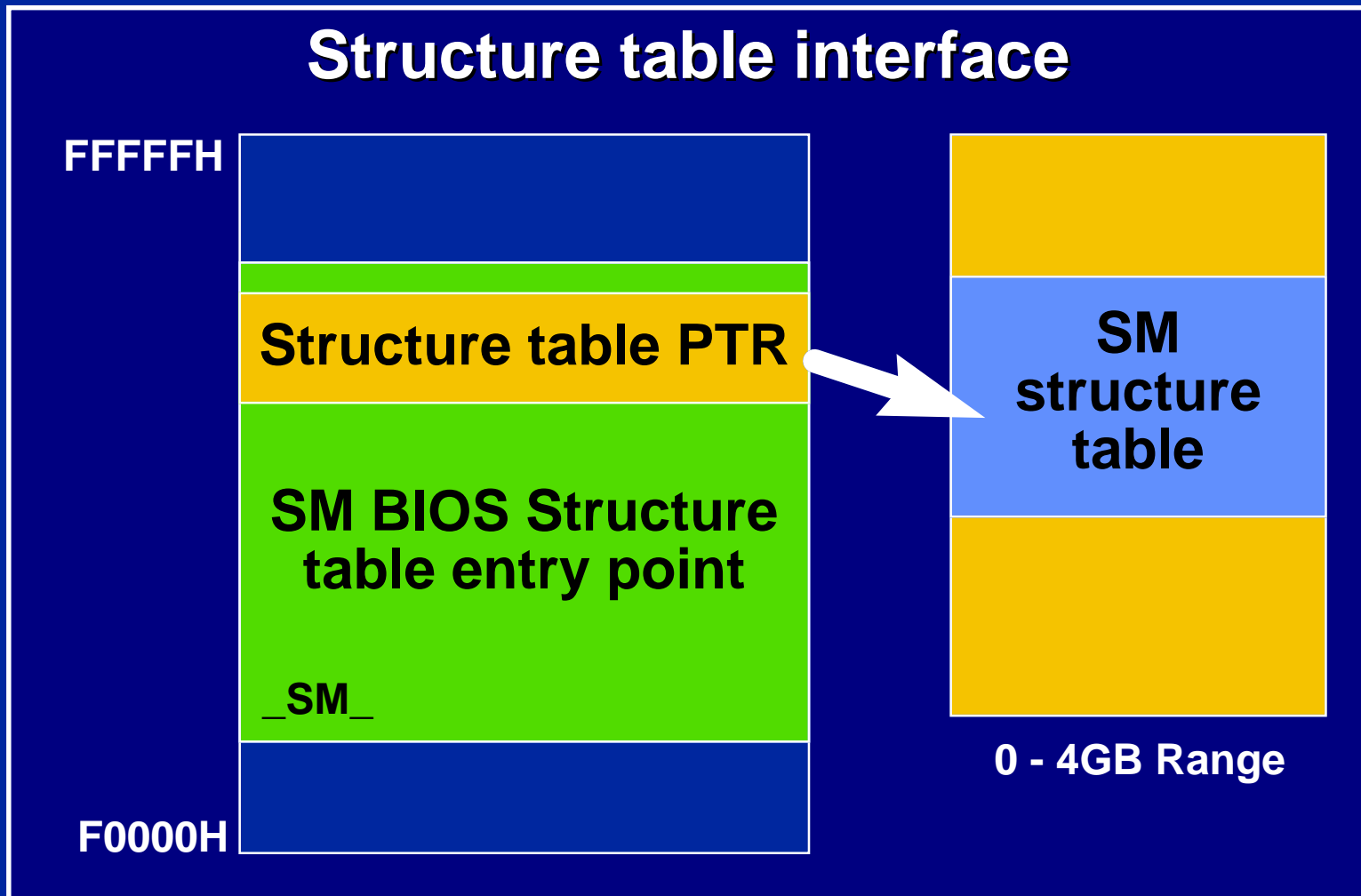
DM BIOS  
calling interface

SM BIOS  
table  
interface



# SM BIOS

## Interface (Get SM BIOS Information)



# SM BIOS

## Interface (Set SM BIOS Structure)

- **Function 52h**
- **Ability to change/add various structure items:**
  - ◆ **Byte**
  - ◆ **Word**
  - ◆ **Dword**
  - ◆ **Structure (add)**
  - ◆ **Structure (delete)**
  - ◆ **String**



# SM BIOS

## Interface (Set SM BIOS Structure)

- **Set SM BIOS structure ideas**
  - ◆ **MFG time:**
    - ◆ Serial numbers
    - ◆ Manufacturer
    - ◆ Product version
    - ◆ Chassis type
    - ◆ Etc. (all structure type 1, 2, 3) strings
  - ◆ **User site**
    - ◆ Asset Tag (Structure Type 3)



# SM BIOS

## Interface (SM BIOS Control)

- **Function 54h**
- **Subfunction 0000 to clear the event log:**
  - ◆ **New preferred method is than 0002h.**
  - ◆ **Supplies work buffer for BIOS**
- **Subfunction 0001h,  
DMI\_CONTROL\_LOGGING**  
**Allows enabling and disabling POST,  
ECC, or Global events**

# SM BIOS

## Interface (GPNV)

- **GPNV**
- **Can be defined for anything:**
  - ◆ CMOS backup
  - ◆ Internal data storage
  - ◆ Event Log
- **Fn 55h - get GPNV information**
- **Fn 56h - read GPNV data**
- **Fn 57h - write GPNV data**



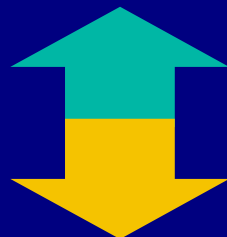
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# SM BIOS Structures

**Better alignment with  
DMTF groups**

**DMTF  
groups**



**SM BIOS structures**



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# SM BIOS

## New Structures

- DMTF standard groups
- Replaces structure type 5 and 6:
  - ◆ Physical memory array (16)
  - ◆ Memory device type (17)
  - ◆ Memory error information (18)
  - ◆ Memory array mapped address (19)
  - ◆ Memory device mapped address (20)
- Mobile:
  - ◆ Built-in pointing device (21)
  - ◆ Portable battery (22)



# SM BIOS

## Structure enhancements

Name	Type	Enhancements
<b>BIOS</b>	0	Characteristics
<b>Sys Info</b>	1	UUID, wake up type
<b>Chassis</b>	3	State of power supply, thermal, security
<b>Processor</b>	4	Updated type and voltage
<b>Cache</b>	7	Added speed, type, correction
<b>Port</b>	8	Added port types
<b>Slot</b>	9	AGP
<b>Language</b>	13	Traditional or abbreviated language strings



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# SM BIOS

## Event Logging

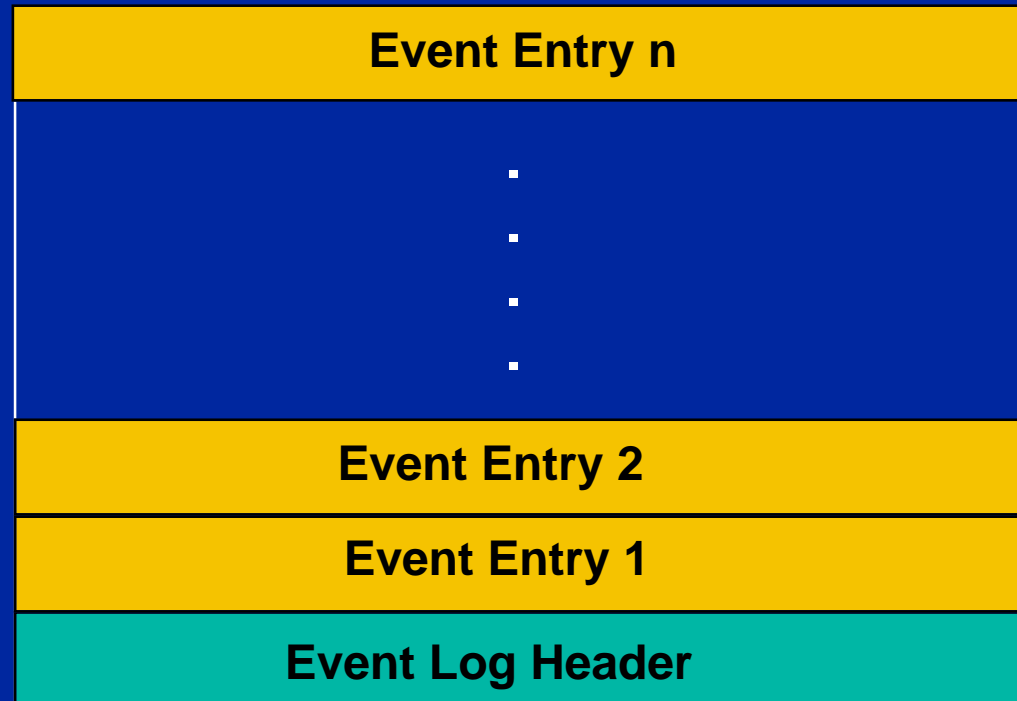
- **System Event Log (Type 15):**
  - ◆ **Describes Info about Event Log**
  - ◆ **Enhancements**
    - ◆ **User-defined access methods**
    - ◆ **Log header format defined**
    - ◆ **Number of supported events**
    - ◆ **Type of events**
    - ◆ **Format of event when entered**

# SMBIOS

## Event Logging

- Typical Event Log

GPNV



# SM BIOS

## Event Logging

- Event Log Header

### Type 1 format



**METW = Multiple Event Time Window**  
**MECI = Multiple Event Count Increment**

# SM BIOS

## Event Log Entry Formats

### DM BIOS format

Type	Length	Date and Time	Log Variable Data	
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Undefined Region

### POST results bitmap

Dword

Dword

08	10	Date and Time	0001	0200
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64#bit bitmap

### SB ECC Error using multi-event handle

Dword

Dword

01	10	Date and Time	0015	FFFC
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Handle

MEC



# Summary

- **SM BIOS is a critical element for supporting the WFM baseline**
- **SM BIOS:**
  - ◆ All OSs can access information
  - ◆ Additional structures add richness
  - ◆ Event log is a valuable management tool
- **Fully comply and/or demand compliance in your BIOS**
- **Stay tuned for ACPI version**

# Reference Documents

- **SM BIOS specification 2.1**
- **Wired for management baseline specification 1.1**
- **PXE BIOS support 1.1**
- **SYSID BIOS support 1.2**
- **Additional specs:**
  - ◆ **SYSID programming interface 1.2**
  - ◆ **ECC and parity BIOS guideline 1.2**