

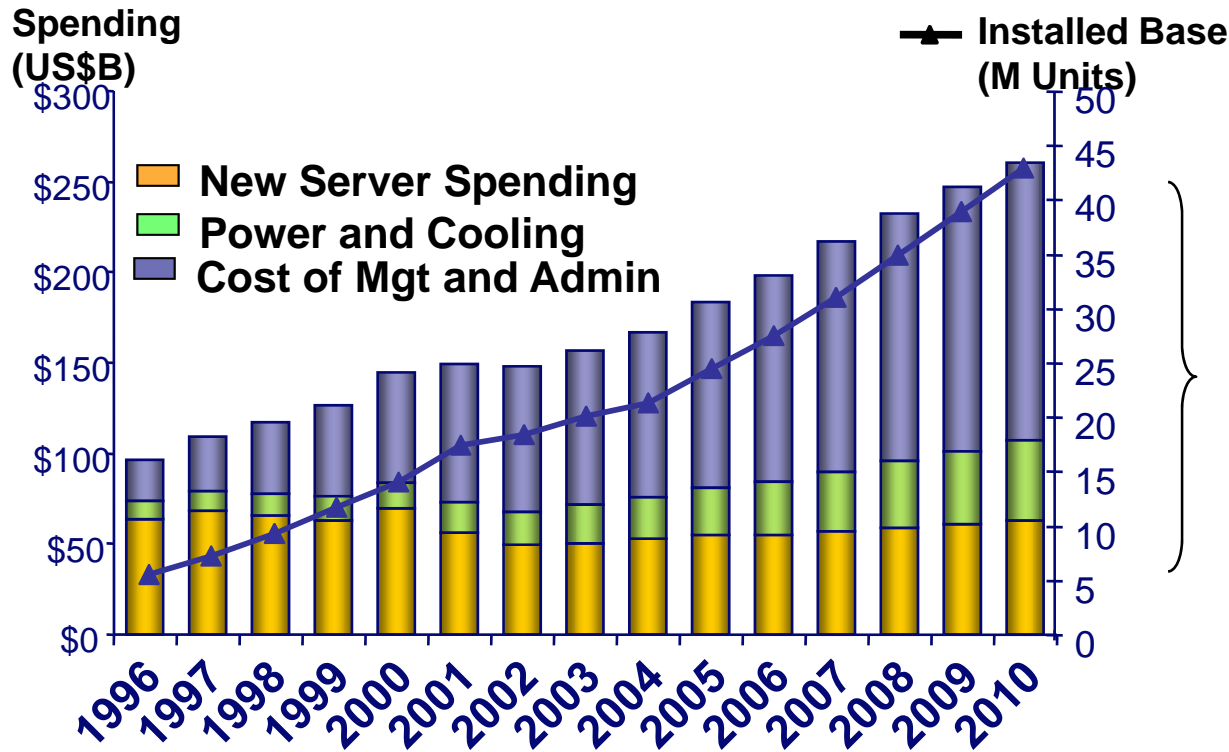
DMTF Technologies Overview

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Technical Council Vice-Chair, DMTF

- ❑ Standardizing Systems Management
 - ❑ What drives the need for standardization
- ❑ Introduction to the DMTF
 - ❑ Organization/History
 - ❑ Standardization
- ❑ DMTF Management Initiatives
 - ❑ VMAN
 - ❑ SMASH
 - ❑ DASH
 - ❑ CDM
- ❑ Additional DMTF Standardization
 - ❑ Protocols, Profiles, Generic Operations, Registries
 - ❑ Protocols/data models for intercommunications within a platform
 - ❑ Power & Cooling
- ❑ Summary

Effective systems management is critical



Systems management tools are designed to help reduce the costs of management and administration.

But customer spending is fixed, with costs of Management & Infrastructure increasing

This budget is spent on tools & personnel

Source - IDC -
2006

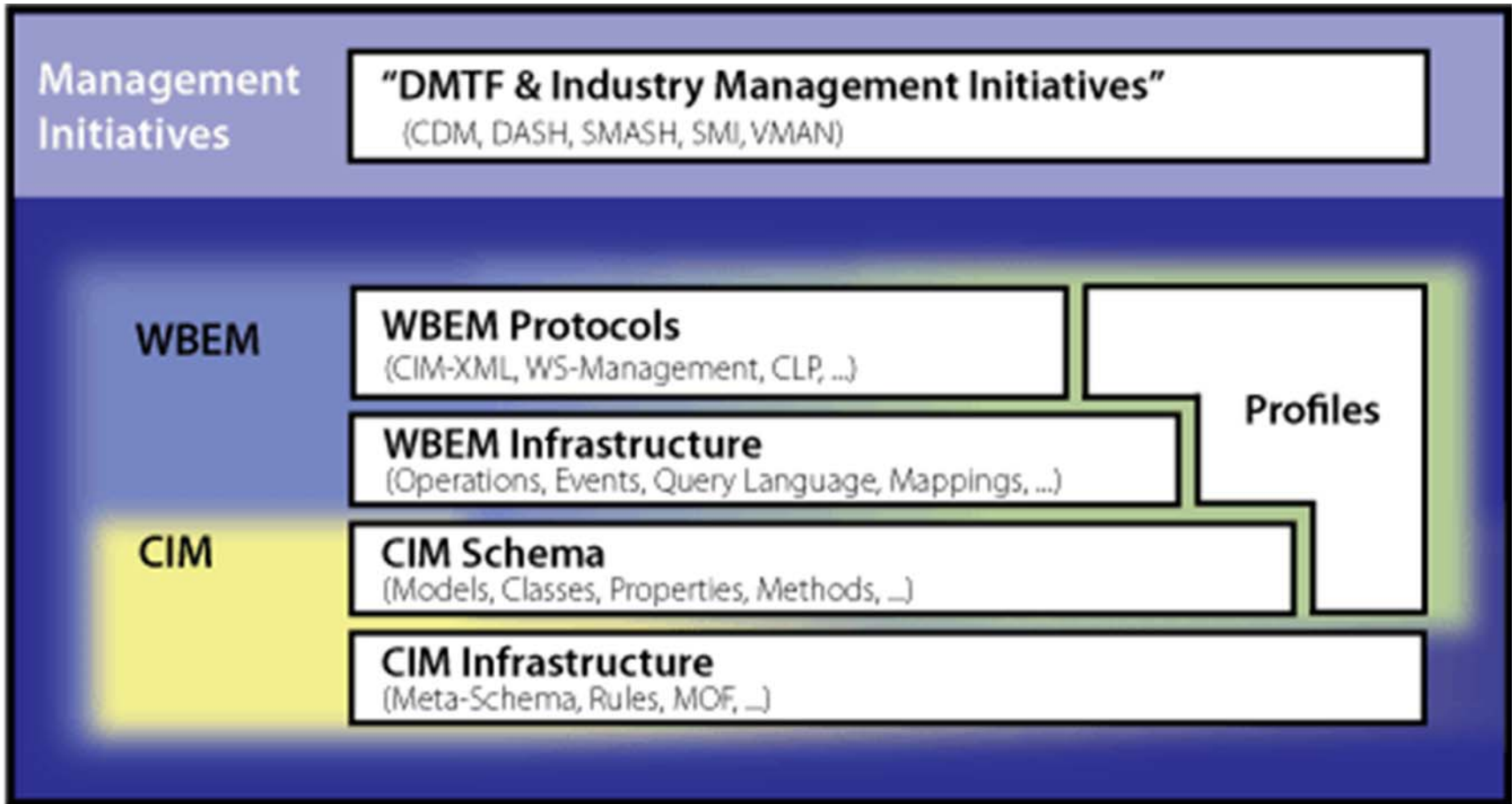
But management tools often contribute to the problem...

- ❑ Too many tools that perform commodity functions but fail to interoperate.
- ❑ Server, desktop, and mobile platforms management is time consuming and tools are costly to install, configure and maintain.
- ❑ Security integration & concerns
 - ❑ Poor authentication mechanism
 - ❑ Requires ports to be opened in firewall
 - ❑ Legacy protocols
- ❑ Perception that management agents consume too many cycles and destabilize OS.

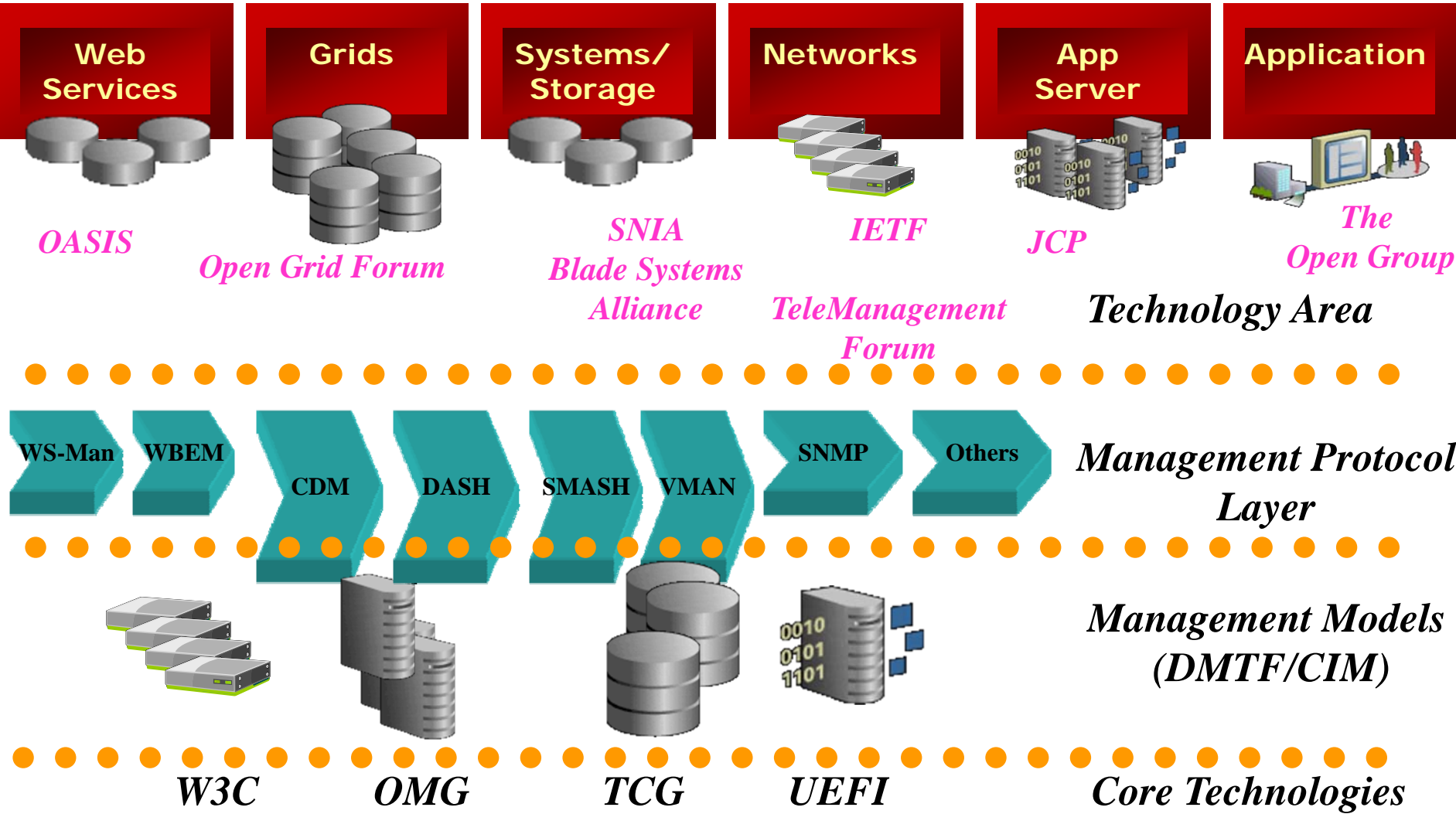


- ❑ Develops management standards and promotes interoperability for enterprise and internet environments
- ❑ More than 4,000 active participants from nearly 200 organizations in over 40 countries.
- ❑ Board Members:
 - ❑ AMD, Broadcom, CA, Dell, EMC, Fujitsu, HP, Hitachi, IBM, Intel, Microsoft, Novell, Oracle, Sun, Symantec and VmWare
- ❑ Formed in 1992.
- ❑ 3 Major committees (Technical, Marketing & Interoperability) with about 25 Working Groups/Forums.
- ❑ Developed the following standards & initiatives:
 - ❑ CIM, WBEM (CIM/XML), SMBIOS, CDM, DMI, ASF, SMASH, DASH, WS-Management...
- ❑ Over a dozen Alliance Partners
 - ❑ SNIA (Storage Network Industry Association) is the storage partner to the DMTF
 - ❑ OGF/GGF, NGN, TMF, TCG, OASIS, etc.

DMTF Technology Diagram



A Technology-Oriented View



Standardization driven by the types of Management Interfaces

- ❑ Types of Interfaces
 - ❑ External (Network) & Internal
 - ❑ Customers only see External (network) interfaces
 - ❑ As vendors, we see the internal interfaces as well
- ❑ Three types of External Interfaces
 - ❑ Command Line
 - ❑ High demand for Script-oriented clients, particularly Linux Administrators
 - ❑ High need for standardization
 - ❑ Programmatic
 - ❑ High demand for Application-oriented clients, particularly Windows Administrators
 - ❑ High need for standardization
 - ❑ Web Based
 - ❑ Web browser based management of system
 - ❑ Vendor / Platform unique, therefore hard to standardize
- ❑ Three Types of Internal Interfaces
 - ❑ Chip to Chip
 - ❑ Enables building an ecosystem
 - ❑ Chip to Operating System
 - ❑ Enables out-of-box support for subset of offerings.
 - ❑ Within the Operating System
 - ❑ Operating System Specific.

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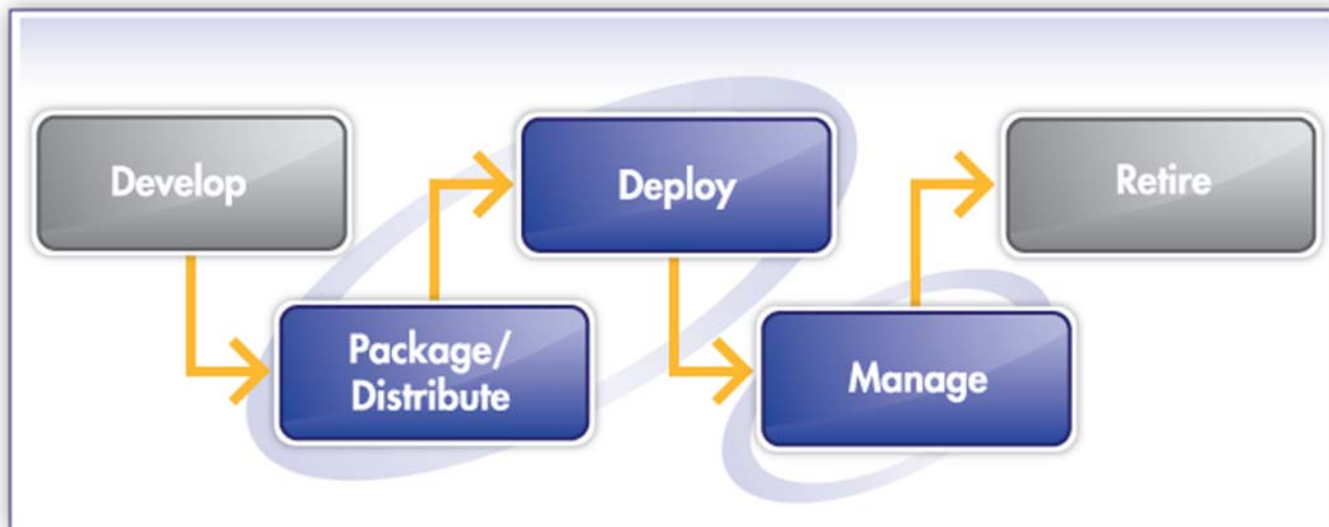
- ❑ DMTF currently has 4 Management Initiatives
 - ❑ VMAN – Virtualization Management
 - ❑ SMASH – Systems Management Architecture for Server Hardware
 - ❑ DASH – Desktop and mobile Architecture for System Hardware
 - ❑ CDM – Common Diagnostics Model
- ❑ DMTF Recognizes SMI as a Management Initiative

DMTF Profiles

- ❑ DSP1002 Diagnostics Profile (Preliminary)
- ❑ DSP1003 Policy Profile (Preliminary)
- ❑ DSP1004 Base Server Profile (Preliminary)
- ❑ DSP1005 CLP Service Profile (Preliminary)
- ❑ DSP1006 SMASH Collections Profile (Preliminary)
- ❑ DSP1007 SM CLP Admin Domain Profile (Preliminary)
- ❑ DSP1008 Modular Systems Profile (Preliminary)
- ❑ DSP1009 Sensors Profile (Final)
- ❑ DSP1010 Record Log Profile (Final)
- ❑ DSP1011 Physical Asset Profile (Final)
- ❑ DSP1012 Boot Control Profile (Preliminary)
- ❑ DSP1013 Fan Profile (Final)
- ❑ DSP1014 Ethernet Port Profile (Preliminary)
- ❑ DSP1015 Power Supply Profile (Final)
- ❑ DSP1016 Telnet Service Profile (Preliminary)
- ❑ DSP1017 SSH Service Profile (Preliminary)
- ❑ DSP1018 Service Processor Profile (Preliminary)
- ❑ DSP1019 Device Tray Profile (Preliminary)
- ❑ DSP1020 Pass-Through Module Profile (Preliminary)
- ❑ DSP1021 Shared Device Management Profile (Preliminary)
- ❑ DSP1022 CPU Profile (Preliminary)
- ❑ DSP1023 Software Inventory Profile (Final)
- ❑ DSP1024 Text Console Redirection Profile (Final)
- ❑ DSP1025 Software Update Profile (Preliminary)
- ❑ DSP1026 System Memory Profile (Final)
- ❑ DSP1027 Power State Management Profile (Final)
- ❑ DSP1028 Alarm Device Profile (Preliminary)
- ❑ DSP1029 OS Status Profile (Preliminary)
- ❑ DSP1030 Battery Profile (Preliminary)
- ❑ DSP1033 Profile Registration (Final)
- ❑ DSP1034 Simple Identity Management Profile (Final)
- ❑ DSP1035 Host LAN Network Port Profile (Final)
- ❑ DSP1036 IP Interface Profile (Final)
- ❑ DSP1037 DHCP Client Profile (Final)
- ❑ DSP1038 DNS Client Profile (Final)
- ❑ DSP1039 Role Based Authorization Profile (Preliminary)
- ❑ DSP1040 Platform Watchdog Profile (Preliminary)
- ❑ DSP1041 Resource Allocation Profile (Preliminary)
- ❑ DSP1042 System Virtualization Profile (Preliminary)
- ❑ DSP1043 Allocation Capabilities Profile (Preliminary)
- ❑ DSP1045 Memory Resource Virtualization Profile (Preliminary)
- ❑ DSP1052 Computer System Profile (Preliminary)
- ❑ DSP1053 Base Metrics Profile (Preliminary)
- ❑ DSP1054 Indications Profile (Preliminary)
- ❑ DSP1057 Virtual System Profile (Preliminary)
- ❑ DSP1058 Base Desktop and Mobile Profile (Preliminary)
- ❑ DSP1059 Generic Device Resource Virtualization Profile (Preliminary)
- ❑ DSP1061 Bios Management Profile (Preliminary)
- ❑ DSP1074 Indicator LED Profile (Preliminary)
- ❑ DSP1075 PCI Device Profile (Preliminary)
- ❑ DSP1076 KVM Redirection Profile (Preliminary)
- ❑ DSP1077 USB Redirection Profile (Preliminary)
- ❑ DSP1080 Enabled Logical Element Profile (Preliminary)
- ❑ DSP1086 Media Redirection Profile (Preliminary)

What is VMAN?

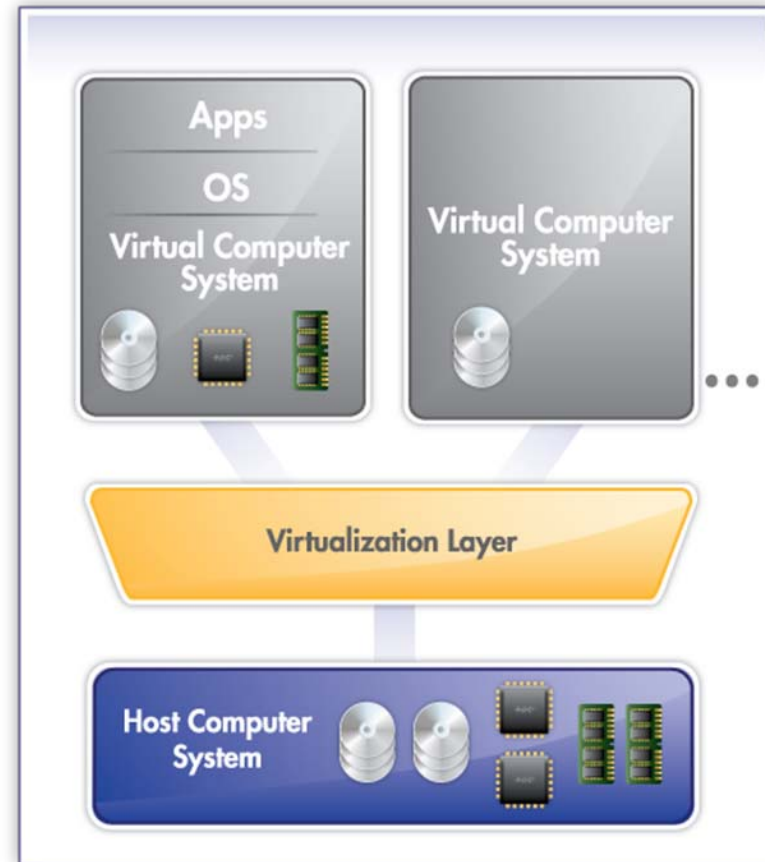
- ❑ VMAN Stands for Virtualization Management
- ❑ DMTF Standards for Management of Virtualization Systems
 - ❑ Open Virtualization Format (OVF) addresses the packaging/distribution and deployment/ installation aspects
 - ❑ System Virtualization Management standards target the management stage of a virtualized system life



- ❑ OVF is a DMTF standard for packaging and distributing virtual appliances.
- ❑ A Virtual Appliance is a pre-built software solution, comprised of one or more Virtual Machines that are packaged, maintained, updated and managed as a unit.
- ❑ OVF enables portability and simplifies installation and deployment of virtual appliances across multiple virtualization platforms.

System Virtualization Management

- ❑ System Virtualization Management Standards for system virtualization management define a consistent way for managing any virtualized environment (i.e. virtual machines manager and associated virtual machines).
 - ❑ Cover various aspects related to the control and management of the operational lifecycle of a virtual system including the creation, modification, enabling, disabling, suspending, creating snapshots, as well as monitoring a virtual computer system for these changes.
- ❑ Monitoring of both virtual and physical resources.
 - ❑ Monitoring includes the detection and tracking of changes to the environment, configuration, as well as monitoring of health and performance.
 - ❑ A mapping between virtual and physical resources



- Virtualization Profiles Released
 - Virtual System
 - System Virtualization (hyper-visor)
 - Resource Allocation
 - Allocation Capabilities
 - Memory Resource Virtualization
 - Generic Device Resource Virtualization
- More under way
 - CPU & Memory Virtualization
 - IO Virtualization
 - Virtual Switch

What is SMASH?

- ❑ SMASH Stands for Systems Management Architecture for Server Hardware
 - ❑ SMASH is a suite of specifications that deliver industry standard protocols and profiles to unify the management of the data center.
 - ❑ Vendor independent
 - ❑ Platform neutral
 - ❑ Independent of machine state
- ❑ The SMASH specifications utilize the **CIM data model** and industry standard transports and security mechanisms.
 - ❑ Align out-of-service with in-service manageability.
 - ❑ Align in-band with out-of-band manageability.
 - ❑ Customer Driven
- ❑ 1.0 Standard completed Dec, 2006
- ❑ 2.0 Standard completed Sep 2007

State of the SMASH

- ❑ 1.0 Specs Architecture White Paper
 - ❑ SM CLP at 1.0 Final Standard
 - ❑ SM ME Addressing at 1.0 Preliminary Standard
 - ❑ Profiles & Mapping Specs at 1.0 Preliminary Standard or final standard
 - ❑ www.dmtf.org/standards/smash
- ❑ Interoperability Forum formed in the DMTF
 - ❑ SMASH 1.0 CLP: tester completed, tests 40% complete
 - ❑ DASH 1.0/1.1, SMASH 2.0: choosing platform to test through VWS-Management
 - ❑ Infrastructure: developing certification repository
- ❑ 2.0 announced, 9/2007
 - ❑ Including VWS-Management Support
 - ❑ Added Discovery
 - ❑ Additional Profiles: PCI, LED, KVM Redirection, Watchdog, OS Status, Indications
 - ❑ Added reference to SMI-S Host Hardware Raid Profile
 - ❑ Updated White Paper
- ❑ Planning on periodic “train” to add features/functions

What is the SM CLP?

- ❑ SM CLP (Server Management Command Line Protocol) is
 - ❑ Designed for a human (primary) or a script (secondary)
 - ❑ Working over, but not limited to, industry standard transports
 - ❑ Telnet & SSHv2
 - ❑ Exposes CIM data model in a “human friendly” fashion through simple commands
 - ❑ SM ME Addressing Spec turns CIM containment into command targets like “system1\fan1”
 - ❑ NOT a full featured programming interface
 - ❑ Because it is a lightweight communication mechanism with some semantics were intentionally left out.
 - ❑ Therefore, a programmatic interface is still required for some operations
 - ❑ But input and output are fully machine-parsable.
 - ❑ BUT all of the Hardware Operations (provisioning, allocation, configuration, inventory, state change, security) can be done with the CLP.
 - ❑ Either by a human, script or program
 - ❑ Because there is a grammar that defines input and XSD defined output.
 - ❑ Very light weight implementations can be done.

What is DASH?

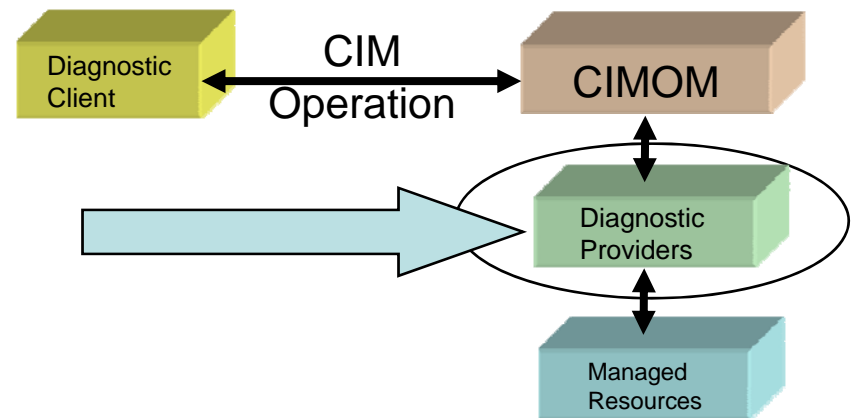
- ❑ DASH Stands for Desktop and mobile Architecture for System Hardware
 - ❑ Ultra light weight programmatic interface for desktop to mobile environment, including bladed PCs.
 - ❑ Utilizes the **CIM Data Model**, leveraging the SMASH Profiles & Architecture gives this effort a head start.
 - ❑ Tackling tough issues like standardized Eventing.
 - ❑ First revision maps to ASF functionality.
- ❑ DASH consists of:
 - ❑ Architecture White Paper
 - ❑ **WS-Management**
 - ❑ DASH Implementation Requirements Specification
 - ❑ Profiles (over 20 of them).
 - ❑ More than half of them are I.0 Final Standards and most of the rest are I.0 Preliminary Standards
- ❑ Standard completed Apr, 2007
 - ❑ www.dmtf.org/standards/dash
 - ❑ Made public at Microsoft Management Summit (MMS), 2007
 - ❑ Plans include a rolling “train” model for updates.
 - ❑ DASH I.0 and DASH I.1 Preliminary Standards

Management Functionality Overview

DASH 1.0	DASH 1.1	Functionality being considered for future versions
<ul style="list-style-type: none">• Power control• Boot Control• Push Indications (equivalent to PET alerts)• Correlatable System ID• FW Version info• HW info<ul style="list-style-type: none">• Chassis model/serial, CPU, Memory, Fan, Power Supply, Sensor• Login credentials and Roles• Profile Registration Profile	<ul style="list-style-type: none">• Wired NIC Management• Record Log• FW/SW Update• BIOS Management• Opaque Data (Offline Mailbox/Data Store)• Text Console Redirection• USB Redirection• Media Redirection• KVM Redirection• OS Status• Battery	<ul style="list-style-type: none">• Video Controller• VLAN Management• Port/Device Management<ul style="list-style-type: none">• PCI, USB, Serial, Parallel, IR, 1394, Card Bus, Optical Drives• TPM• Storage Management• Wireless NIC Management• Certificate Management

CDM (Common Diagnostics Model)

- A common industry standard diagnostics interface that enables seamless integration of vendor-supplied diagnostic services into system and SAN management frameworks that is Platform and OS independent:
 - *discover, configure and execute diagnostic tests*
 - *view progress and control test execution*
 - *view and manage test execution results*
- Not intended to be directly customer visible
 - Internal interface provider libraries to integrate in other tools via programmatic interfaces
 - Initial benefit from factory diags



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- ❑ Protocols in the DMTF
 - ❑ CIM/XML
 - ❑ Continues refinement – working on update to take to ISO
 - ❑ WS-Management
- ❑ Completing the specifications required
 - ❑ WS-CIM Binding Specifications
 - ❑ WS-Man CIM Binding Specification
 - ❑ Nearing final
 - ❑ Discovery
 - ❑ Expanding to include all WBEM Protocols
 - ❑ Generic Operations
 - ❑ Nearing Preliminary

- ❑ Profile Development continues
 - ❑ PUG/PRP continues
 - ❑ PRP 1.0 has gone final
 - ❑ Development of a PUG 2.0 under way.
 - ❑ “Higher level” profiles under way
 - ❑ Enabled Logical Element Profile
 - ❑ Computer System
 - ❑ Working on CIM Server & other services.
- ❑ DMTF tackling Registries
 - ❑ Develop schema & repositories for Messages
 - ❑ DSP8007 – Platform Message Registry
 - ❑ Working on others as well
 - ❑ Message, Metrics and others under consideration

- ❑ Platform Management Components Intercommunications (PMCI) Specifications
 - ❑ Management Component Transport Protocol (MCTP) Specification is a chip-to-chip interface with transport mapping to standard signaling technologies
 - ❑ First of these specifications has been released
 - ❑ Base transport, IDs, two transport bindings (PCIe, SMBus)
 - ❑ Platform Level Data Model (PLDM) to provide efficient access to low-level information like platform inventory, BIOS control and configuration data, platform monitoring and control, events...
 - ❑ Development of these specifications is still under way. Nearing preliminary
- ❑ Network Controller – Sideband Interface (NC-SI) Specification
 - ❑ Specifies management controller to NIC communication interface and protocol

- Power & Cooling Allocation model is being developed
 - Application of Resource Allocation Setting Data profile to Power & Cooling
 - Specification development & accompanying MOF changes beginning to make progress.

- ❑ Customer Advantages of Standards-Based Management for Data Center
 - ❑ Reduced Cost
 - ❑ Increased Choice
 - ❑ Improved Interoperability
- ❑ Industry is working together to improve Management of the Data Center
 - ❑ DMTF working on SMASH, DASH, CDM but also non-solution specific internal & external interfaces
 - ❑ Profiles, Protocols, Discovery, Registries
 - ❑ PMCI & NC-SI
- ❑ You can help by demanding & driving standardized solutions and getting involved in their adoption
- ❑ For more information www.dmtf.org