DMTF Technologies Overview

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Technical Council Vice-Chair, DMTF
Agenda

- 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.
Distributed Management Task Force

- 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
- 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

Web Services

*OASIS*

Open Grid Forum

Grids

SNIA

Blade Systems

Alliance

Systems/Storage

IETF

VMAN

Networks

TeleManagement Forum

App Server

JCP

Application

The

Open Group

Technology Area

WS-Man

WBEM

CDM

DASH

SMASH

VMAN

SNMP

Others

Management Protocol Layer

Management Models

*(DMTF/CIM)*

W3C

OMG

TCG

UEFI

Core Technologies

Storage Developer Conference 2008
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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 Management Initiatives

- 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
Open Virtualization Format (OVF)

- 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 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

- 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 WS-Management
  - Infrastructure: developing certification repository
- 2.0 announced, 9/2007
  - Including WS-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 1.0 Final Standards and most of the rest are 1.0 Preliminary Standards

- Standard completed Apr, 2007
  - [www.dmtf.org/standards/dash](http://www.dmtf.org/standards/dash)
  - Made public at Microsoft Management Summit (MMS), 2007
  - Plans include a rolling “train” model for updates.
  - DASH 1.0 and DASH 1.1 Preliminary Standards
## Management Functionality Overview

<table>
<thead>
<tr>
<th>DASH 1.0</th>
<th>DASH 1.1</th>
<th>Functionality being considered for future versions</th>
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<tbody>
<tr>
<td>• Power control</td>
<td>• Wired NIC Management</td>
<td>• Video Controller</td>
</tr>
<tr>
<td>• Boot Control</td>
<td>• Record Log</td>
<td>• VLAN Management</td>
</tr>
<tr>
<td>• Push Indications (equivalent to PET alerts)</td>
<td>• FW/SW Update</td>
<td>• Port/Device Management</td>
</tr>
<tr>
<td>• Correlatable System ID</td>
<td>• BIOS Management</td>
<td>• PCI, USB, Serial, Parallel, IR, 1394, Card Bus, Optical Drives</td>
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<tr>
<td>• FW Version info</td>
<td>• Opaque Data (Offline Mailbox/Data Store)</td>
<td>• TPM</td>
</tr>
<tr>
<td>• HW info</td>
<td>• Text Console Redirection</td>
<td>• Storage Management</td>
</tr>
<tr>
<td>• Chassis model/serial, CPU, Memory, Fan, Power Supply, Sensor</td>
<td>• USB Redirection</td>
<td>• Wireless NIC Management</td>
</tr>
<tr>
<td>• Login credentials and Roles</td>
<td>• Media Redirection</td>
<td>• Certificate Management</td>
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<tr>
<td>• Profile Registration Profile</td>
<td>• KVM Redirection</td>
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<tr>
<td>• OS Status</td>
<td>• Battery</td>
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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, Bindings, Generic Operations

- 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
Profiles & Registries

- 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
PMCI & NC-SI

- 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

- 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.
Summary

- 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](http://www.dmtf.org)