DMTF: Focus & Insight

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Disclaimer

- The information in this presentation represents a snapshot of work in progress within the DMTF.
- This information is subject to change. The Standard Specifications remain the normative reference for all information.
- For additional information, see the Distributed Management Task Force (DMTF) Web site.

Agenda

- DMTF Background
  - Who is the DMTF?
  - DMTF Alliance Partners
  - Reorganization
- Technology as a whole
  - Management Diagram
- Technical Committee
  - Organizational Chart
  - Process Changes
  - Current Technical Work
  - Opportunities for Involvement
- Working with the DMTF

Who is the DMTF?

More than 3,500 participants from well over 180 organizations crossing 43 countries

DMTF Board Companies

Broadcom, CA, Dell, Emerson Network Power, Hewlett Packard Enterprise, Hitachi, Intel, Lenovo For Those Who Do, Microsoft, NetApp, Software AG, Telecom Italia, VMware

DMTF Leadership Companies

Advanced Micro Devices
Arquimedes Automacao e Informatica Ltda
Brocade Communications Systems
China Academy of Telecommunication Research, MIIT
China Electronics Standardization Institute
Citrix Systems Inc.
Daten Tecnologia Ltda
EMC
Fujitsu
Huawei
Inspur
Mellanox Technologies
MIMOS Berhad
NetIQ Corporation
Oracle
Positivo Informática SA / Positivo Informática da Amazônia LTDA
Supermicro
WBEM Solutions
ZTE Corporation

DMTF Background

- Distributed Management Task Force: Formed in 1992 with a focus on desktop management
- Evolved from desktop management to web based enterprise management

1994: Desktop Management Interface (DMI)
1996: Common Information Model (CIM)
1997: Directory Enabled Networks (DEN)
1998: Web Based Enterprise Management (WBEM)
1999: System Management BIOS (SMBIOS)
2001: Alerting Standards Format (ASF)

2005: Common Diagnostics Model (CDM)
2005: System Management Architecture for Server Hardware (SMASH)
2006: Desktop and Mobile Architecture for System Hardware (DASH)
2007: Platform Management Components Intercommunication (PMCI): NC-SI, MCTP, PLDM
2008: Open Virtualization Format (OVF), Virtualization Management (VMAN) & WS-Management
2009: Configuration Management Database Format (CMDBf)

2010: Cloud Initiative/Incubator
2011: Cloud Audit Data Format (CADF)
2012: Cloud Infrastructure Management Interface (CIMI), Software Licensing Model (SLM), MRP, VPP
2013: Software Defined Data Center (SDDC), Network Management (NETMAN)
2014: Redfish for Scalable Platform Management

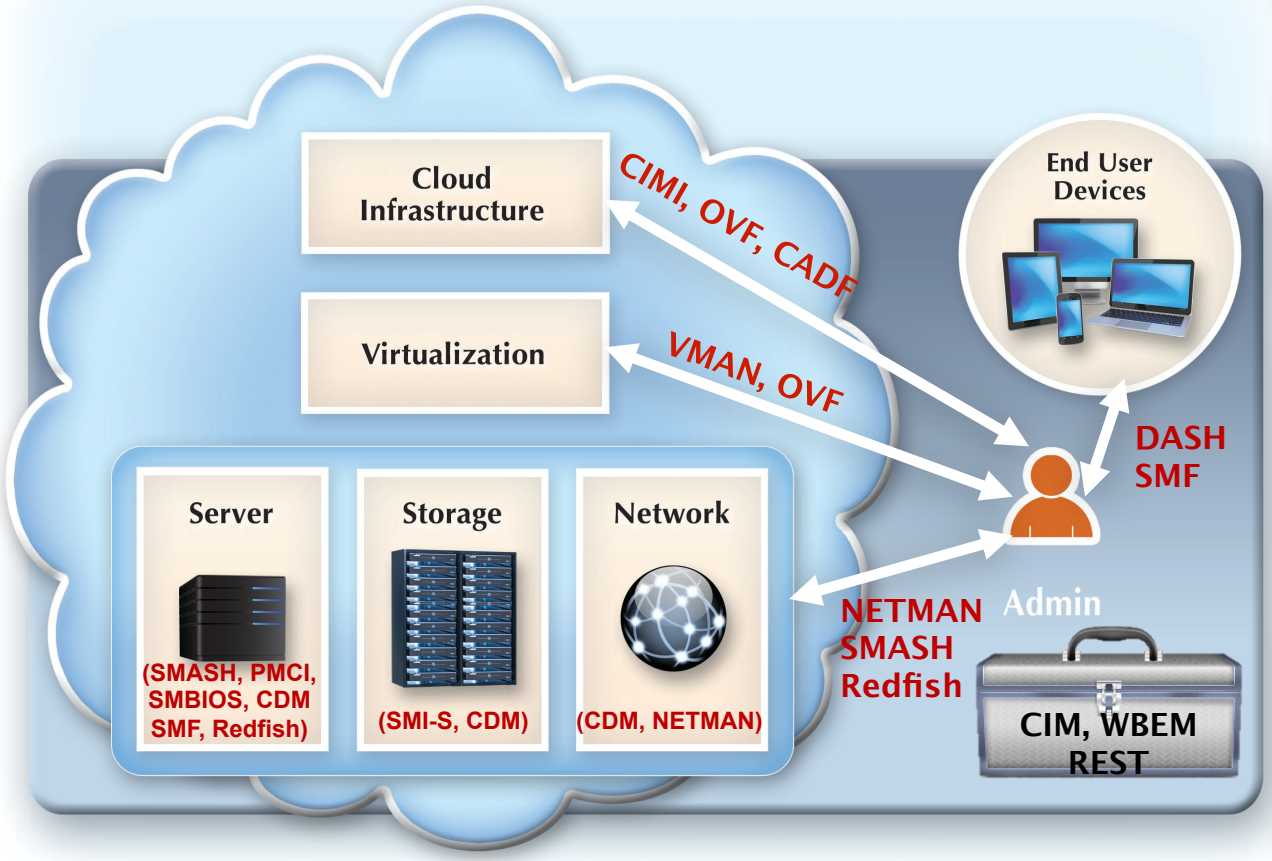
- Evolving work includes
  - DMTF Management Initiatives, Protocols (Web Services), Profile Development, Schema Evolution, Internal Interfaces, Operations, Messages, Registries, Federation & more.

DMTF Reorganization

- DMTF has reorganized our structure and processes
  - Now only two committees:
    - Technical – handles standards, incubators and forums
    - Executive – handles operations, process, marketing, alliances, chapters
- Quickest path to standard in the industry
  - Works in progress out in 7 to 10 days
  - Standards published in 32-45 days (due to 30 day IP review)
- Ability to publish and work with open source
  - Bodies can work in open source on published standards
    - Sample implementations and test code.
  - Bodies can work on code privately as well

- Benefits: Agile standards development, simultaneous development of code & standard, path to ISO standard

DMTF Management Technologies



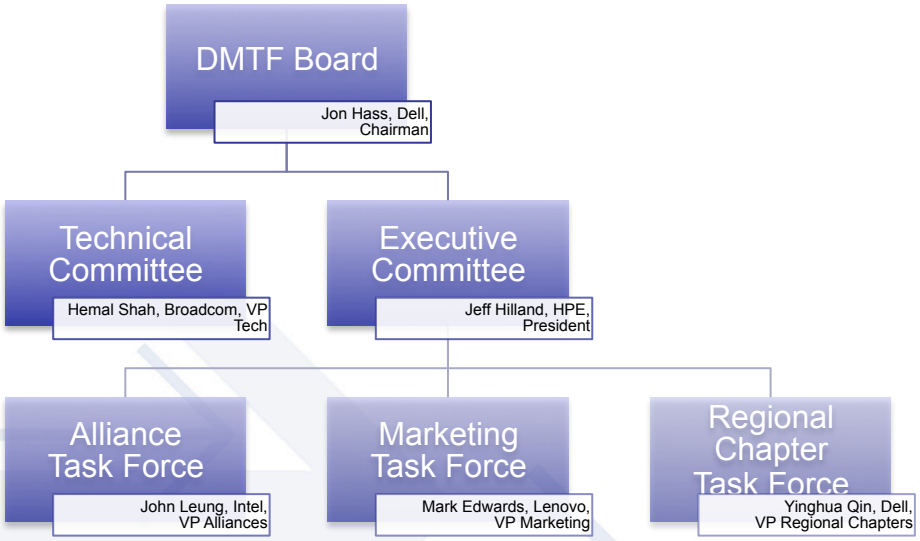
Infrastructure Management
- Cloud
- Virtualization
- Data Center

Platform Management
- Server & Network
- Storage (SNIA)
- Desktop & Mobile

Services Management
- Network services
- Software Entitlement
- Security & audit

Protocols & Data Models
- WS-Man/CIM-XML
- REST/JSON/OData
- CIM & Diagnostics
- PLDM/MCTP

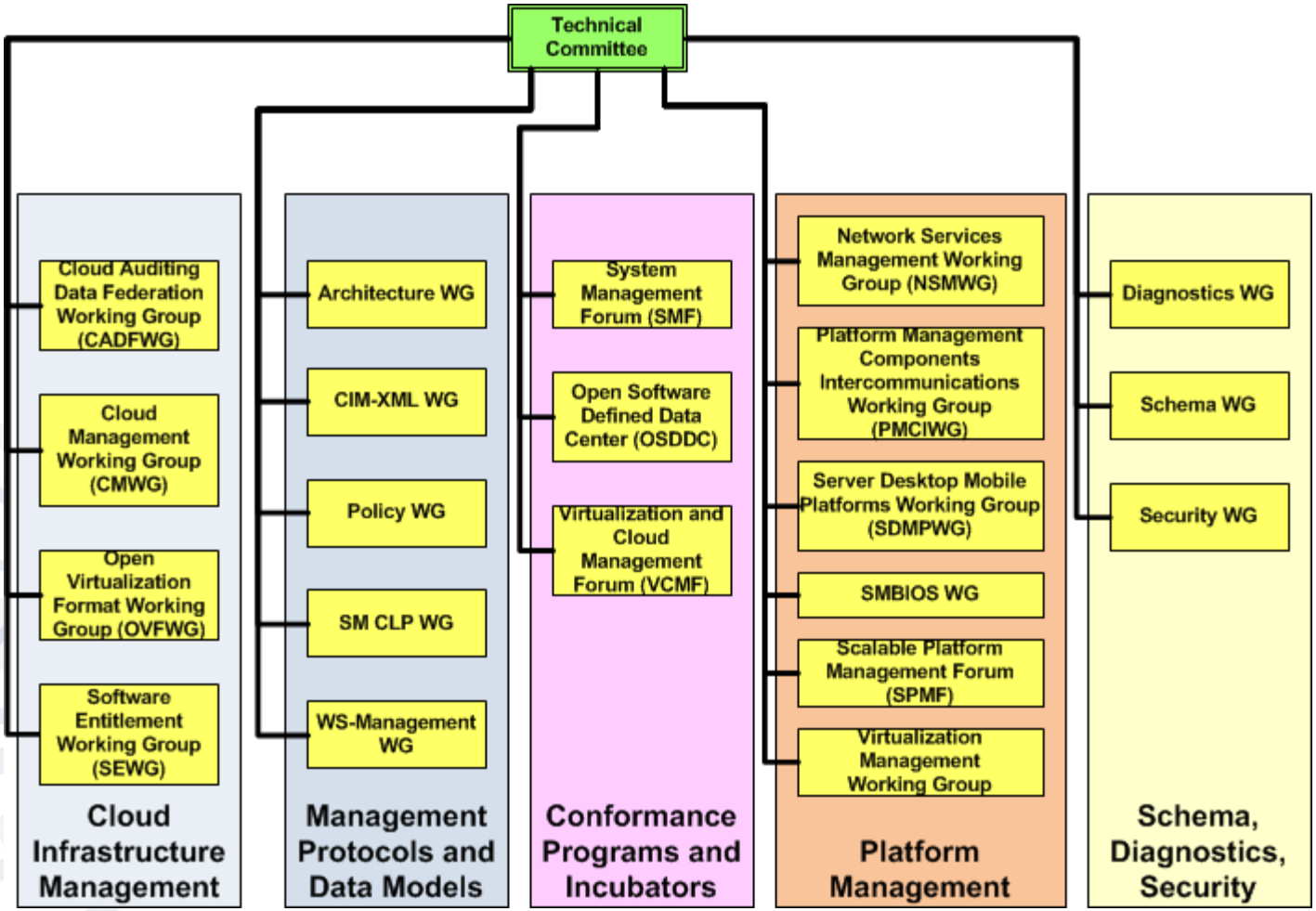
DMTF Organization



DMTF Officers

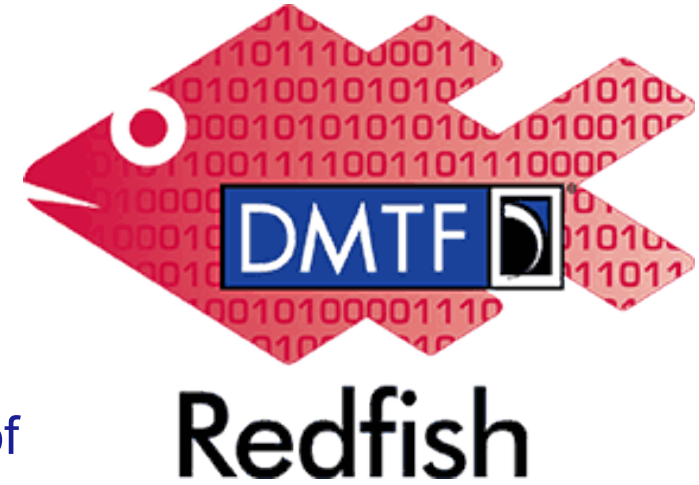
- Chair of the Board
  - Jon Hass, Dell
- Vice-Chair of the Board
  - Colleen Evans, Microsoft
- President
  - Jeff Hilland, Hewlett Packard Enterprise
- Senior VP of Technology
  - Hemal Shah, Broadcom
- VP of Membership
  - Mark Nicolas, Emerson Network Power
- VP of Alliances
  - John Leung, Intel Corporation
- VP of Finance
  - Selva Subbiah, Dell
- VP of Marketing
  - Mark Edwards, Lenovo
- VP of Regional Chapters
  - Yinghua Qin, Dell
- Executive Director and Corporate Secretary
  - Kes Wold, Wold Consulting

TC Organization



Redfish Scope and Goals

- The DMTF's Scalable Platforms Management Forum (SPMF) is working to create and publish an open industry standard specification and schema that meets the expectations of end users for simple, modern and secure management of scalable platform hardware.



- RESTful interface over HTTPS in JSON format based on OData v4
- A secure, multi-node capable replacement for IPMI-over-LAN
- Schema-backed but human-readable output
- Covers popular use cases and customer requirements
- Intended to meet OCP Remote Machine Management requirements

Redfish v1.0 Feature Set

Retrieve "IPMI class" data
- Basic server identification and asset info
- Health state
- Temperature sensors and fans
- Power supply, power consumption and thresholds

Basic I/O infrastructure data
- Host NIC MAC address(es) for LOM devices
- Simple hard drive status / fault reporting

Discovery
- Service endpoint (network-based discovery)
- System topology (rack/chassis/server/node)

Security
- Session-based leverages HTTPS

Perform Common Actions
- Reboot / power cycle server
- Change boot order / device
- Set power thresholds

Access and Notification
- Serial console access via SSH
- Alert / event notification method(s)
- Event Log access method(s)

BMC infrastructure
- View / configure BMC network settings
- Manage local BMC user accounts

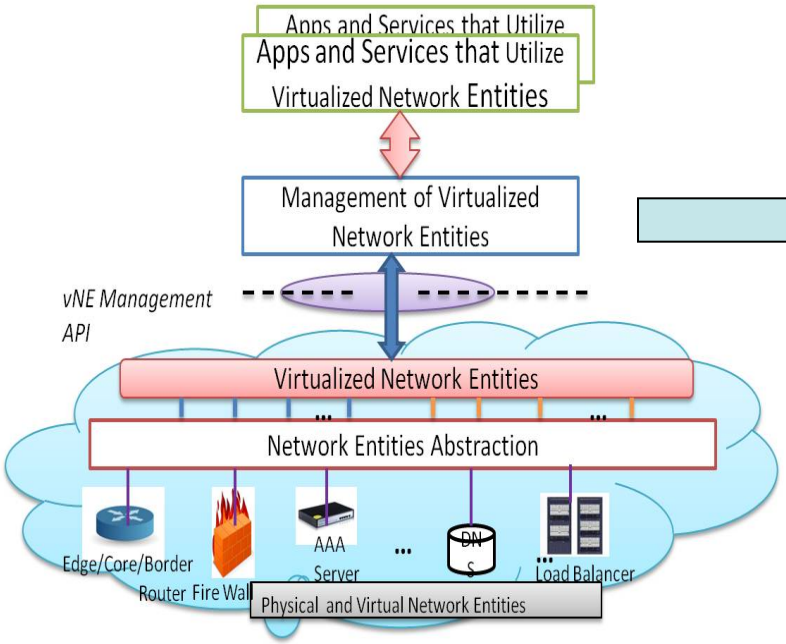
Working on more…

NETMAN

- Existing and emerging network management standards still do not attempt to integrate across server, virtualization and cloud platforms
  - Narrowly focused on the individual domains (compute, network, storage)
  - Customer facing service management still requires expensive integration between various individually standard-compliant systems
- Rapid development of cloud, virtualization and software defined networks magnified the management challenges for service providers
  - Without seamless network management the consumers will not be able to fully benefit from the dynamic, cost-effective and fault tolerant services
- The goal of the DMTF Network Management (**NETMAN**) Initiative is to develop and promote the network management standards that span across these technology domains

Network Management Profiles Architecture

Network entities (resources and services) abstraction, virtualization and management



Leverage protocols, data models, infrastructure created for managing

- **Server**
- **Storage (SNIA)**
- **Desktop & Mobile**
- **Virtualization**

to perform

- **Network Management**
- **And Network Policy Management**

Thus

Unify compute, storage, and network management domains

Cloud Infrastructure Management Interface (CIMI)

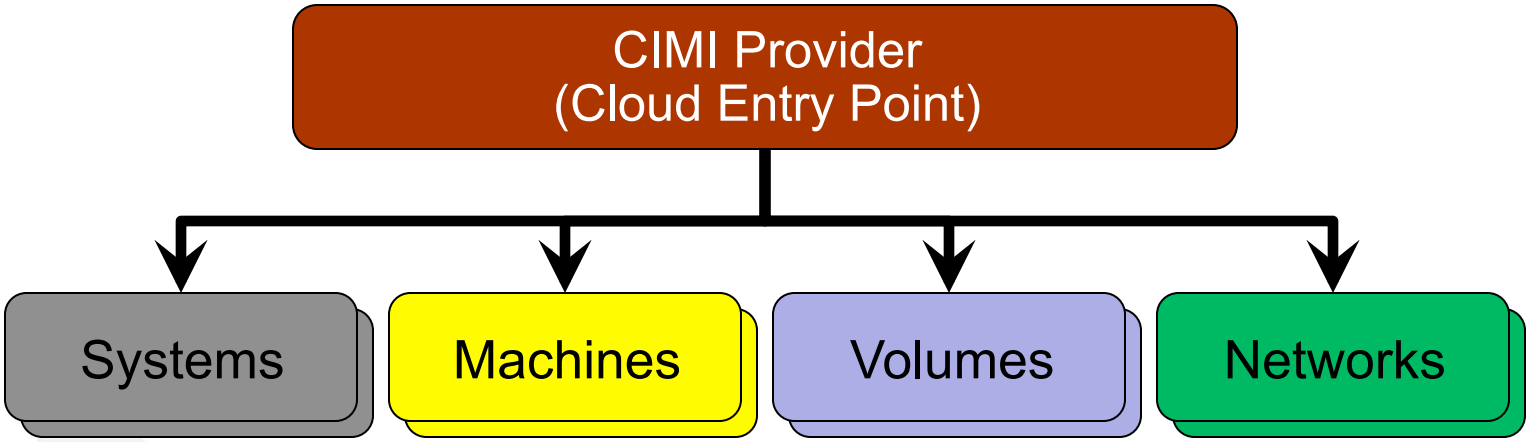
What is it?

- A Management interface between the cloud service consumer / provider
- Includes a cloud resource model and a REST/HTTP binding to the model

What problems does CIMI solve?

- Cloud customers are using **various interfaces** to manage clouds:
  - EC2, OpenStack Nova, Cloud Stack, Open Nebula, vendor specific
- Each API **involves work to develop**, **test** and **maintain**
  - Little to no stability, versioning support, or backward compatibility
- APIs are **under control of specific vendors**, not open standards
- Open Source projects (CloudStack, OpenStack, Eucalyptus) only interoperate if everybody is **using the same code** – no winners here
- Customers need multiple clouds to balance risk and so they must either use only clouds with the same code, or **write multiple adapters** to each cloud

CIMI Model – Core Resources



Grouping of resources meant to be managed as a single unit.

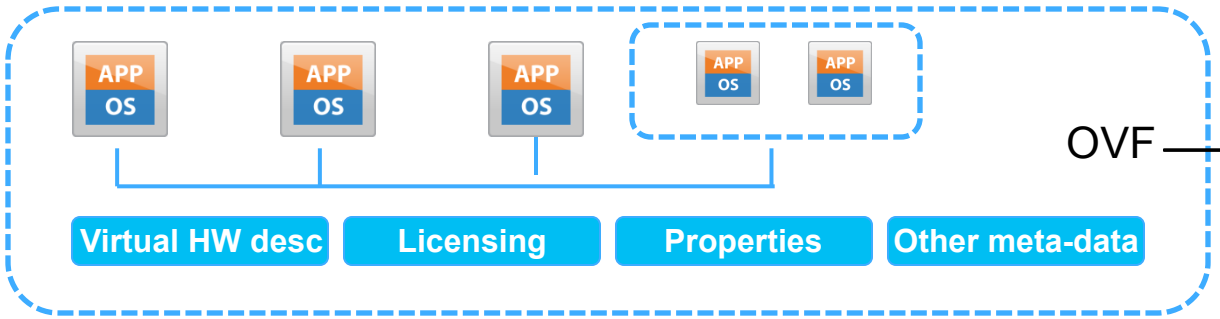
An instantiated compute resource that encapsulates both CPU and Memory.

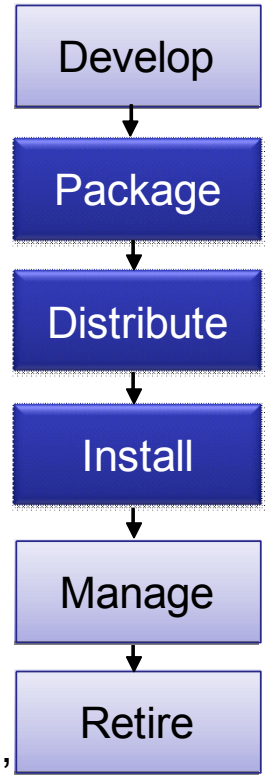
A Volume represents storage at either the block or file-system level. Volumes can be attached to Machines.

A Network is a realized entity that represents an abstraction of a layer 2 broadcast domain.

Open Virtualization Format

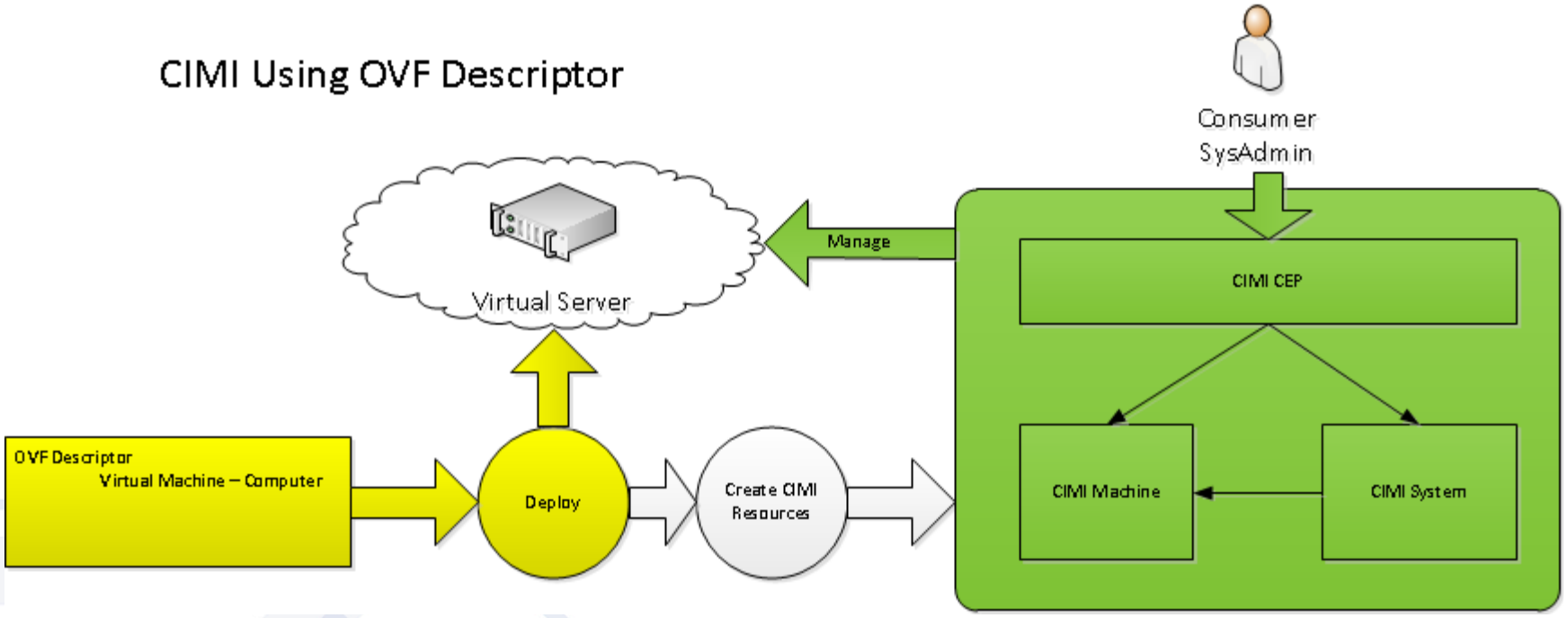
- A **distribution format** for virtual appliances
- Provides a complete description of a VM or multi-VMs in XML





- Vendor and platform independent: Interoperable across platforms
- Extensible: Facilitate value-added features by DMTF or 3rd parties
- DMTF specifications
  - Version 1.1 - Jan 2010 (Virtual machines, Product Information, Licensing, hardware requirements, Deployment Options, Resource Requirements…)
  - Version 2.0 – Dec 2012 (Network Port Profiles, Scaling, placement policies, Encryption, Disk sharing, device boot order, advanced data transfer to guest…)
  - Version 2.1 – Dec 2013 (Activation Process, Meta data, Network Policy Service…)
  - ANSI/INCITS 469-2010 - Sept 2010 (national standard)
  - ISO/IEC 17203 - August 2011 (international standard)

OVF and CIMI


CIMI Using OVF Descriptor
Consumer
SysAdmin
Virtual Server
Manage
CIMI CEP
OVF Descriptor
Virtual Machine – Computer
Deploy
Create CIMI
Resources
CIMI Machine
CIMI System

Cloud Audit Data Federation (CADF)

- Standard for the Federation of Cloud Audit Data
- Data Model with a Normative, Prescriptive Audit Event Data Format
- REST based Interface definitions and a compatible Interaction Model

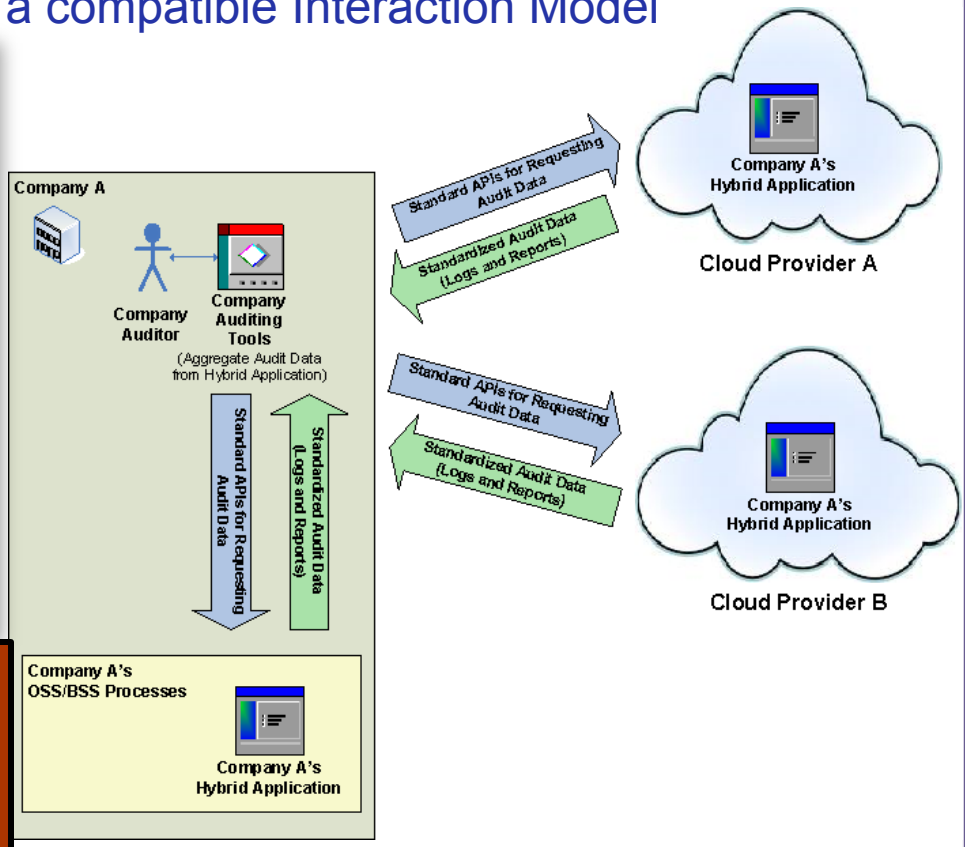
Key Consumers / Audience

Professionals Responsible for Certifying Compliance with IT, Industry, Government, Regional and Corporate Policies

e.g. Auditors, Chief Compliance Officer (CCO), Chief Risk Officer (CRO), Chief Info. Sec. Officer (CISO), CIO, CFO, etc.

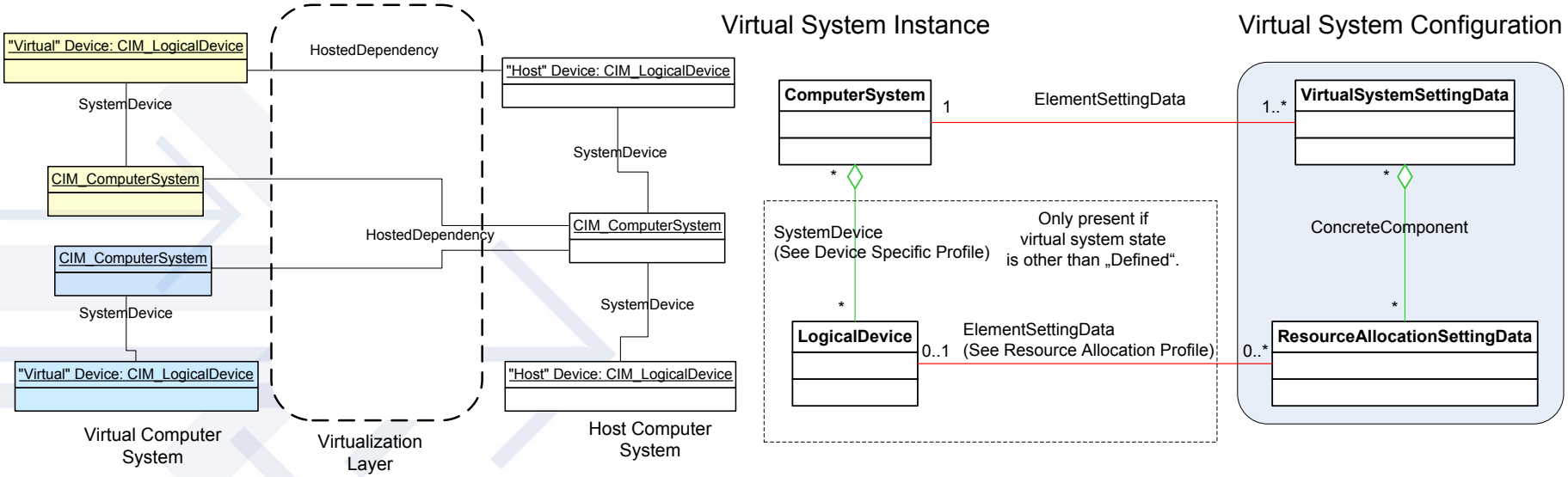
Implemented in OpenStack Ceilometer

Demonstrating strength of collaboration between standards and open source.



Virtualization Management (VMAN)

- Addresses the management lifecycle of a virtual environment
- VMAN's CIM profiles standardize many aspects of the operational management of a heterogeneous virtualized environment
  - Supports creation, modification, deletion and inventory of virtual resources
  - Enable mapping of virtual resources to underlying resources
  - VMAN has been adopted and published by the American National Standard Institute (ANSI) International Committee for Information Technology Standards (INCITS) as INCITS 483-2012.



Software Entitlement Work Group

- List of Software Products whose entitlement metrics can be managed
- Product - unit of acquisition, primary access point for manageability.
  - Product Identification
  - Entitlement Usage Metrics
  - Events on a per Product basis
  - For the key events in the product lifecycle, events and relevant statistics are accumulated
- Software Entitlement Projects
  - DSP1067 Software ID Tag Profile (work in progress release)
  - DSP IS0301 Software Identification and Entitlement Metrics
- Aligned with ISO/IEC 19770-3, *Information technology — Software asset management — Part 3: Software entitlement tag*

What is SMASH?

- Systems Management Architecture for Server Hardware
- A suite of specifications that deliver industry standard protocols/profiles to unify the management of servers
  - Vendor independent
  - Platform neutral
  - Independent of machine state
- SMASH specifications utilize the CIM data model and industry standard transports/security mechanisms
  - Align out-of-service with in-service manageability.
  - Align in-band with out-of-band manageability.
  - Customer Driven
- 1.0 Standard published Dec 2006
- 2.0 Standard published Sep 2007
- 2.1 Standard published in Dec 2014

SMASH 2.0 Features

Inventory
- Physical Asset including Asset Tags
- CPUs, Caches, System Memory
- Fans and Power Supplies
- Ethernet NICs and Storage
- PCI Devices
- BIOS/Firmware/Software components
- OS Type and Version

Monitoring
- Sensors
- LEDs
- Fan Speed
- Power Usage

System Control
- Power State Control
- Boot Control
- Fan Speed Control
- Power Supply Control
- BIOS Management

System Diagnostics
- Event Logs
- Text Console Redirection
- KVM Redirection

Base System
- Base Server
- Modular System
- Service Processor
- SMASH Collection

Alerts and Events
- Progress events
- System Failures
- Operational Errors
- Watchdog events

System Repair
- Firmware Update
- Software Update
- Remote Boot

BMC Configuration Management
- CLP Service & Admin Domain
- OOB Management Service
- Telnet/SSH configuration
- Media/KVM redirection services configuration
- Ethernet Port, IP Interface, DHCP Client, DNS Client

User Account Management
- Username/password
- Roles and privileges

What is DASH?

- Desktop and mobile Architecture for System Hardware
- Web services based programmatic interface for desktop to mobile environment, including bladed PCs
- Utilizes the CIM Data Model
- Leveraging SMASH Profiles & Architecture
- Tackling tough issues like standardized Eventing
- 1.0 published Apr, 2007
- 1.1 published Dec 2007
- 1.2 published Dec 2014

DASH 1.2 Features

Inventory
- Physical Asset including Asset Tags
- CPUs, Caches, System Memory
- Fans, Power Supplies, and Battery
- Ethernet NICs
- Wi-Fi Devices & PCI Devices
- BIOS/Firmware/Software components
- OS Type and Version

Monitoring
- Sensors
- LEDs
- Fan Speed
- Power Usage

System Control
- Power State Control
- Boot Control
- Fan Speed Control
- Power Supply Control
- BIOS Management

System Diagnostics
- Event Logs
- Text Console Redirection
- KVM Redirection

Base System
- Desktops
- Mobile Platforms
- Bladed PCs

Alerts and Events
- Progress events
- System Failures
- Operational Errors
- Watchdog events

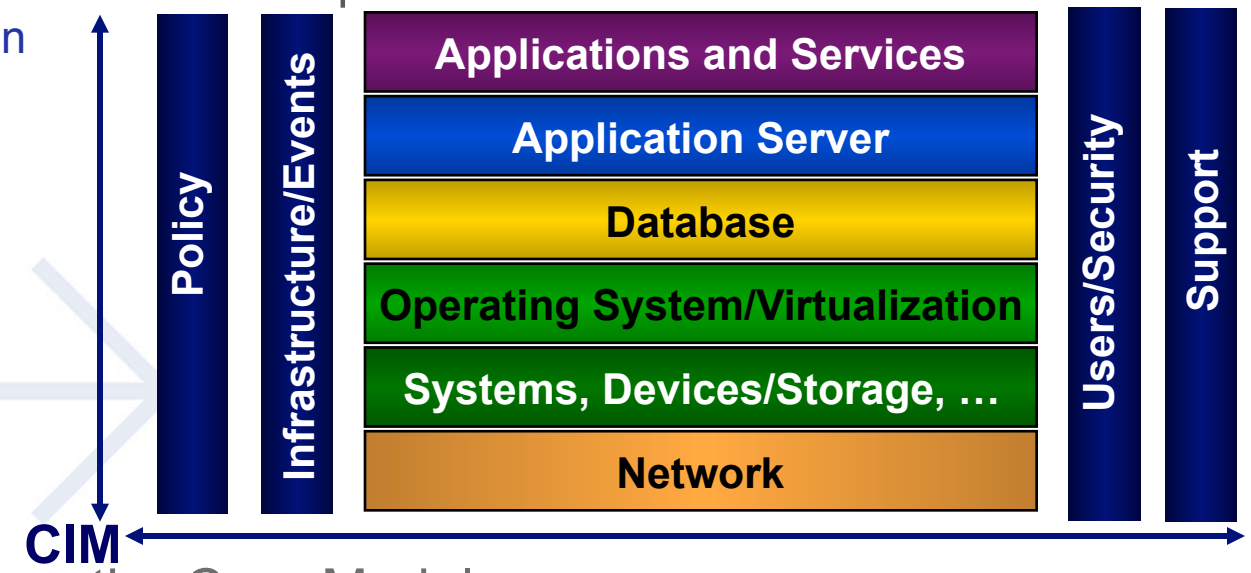
System Repair
- Firmware Update
- Software Update
- Remote Boot

Management Controller Configuration Management
- OOB Management Service
- Telnet/SSH configuration
- Media/KVM redirection services configuration
- Ethernet Port, IP Interface, DHCP Client, DNS Client

User Account Management
- Username/password
- Roles and privileges

What is CIM?

- Common Information Model
- Core Specification
  - "Meta"-model, high level concepts and language definitions
- "Core" and "Common" Models
  - Core Model contains info applicable to all management domains
  - Common Models address specific domains
    - Application
    - Database
    - Device
    - Event
    - Interop
    - Metrics
    - Network
    - Policy
    - Systems
    - User
  - Subclass from the Core Model



CIM/WBEM Infrastructure

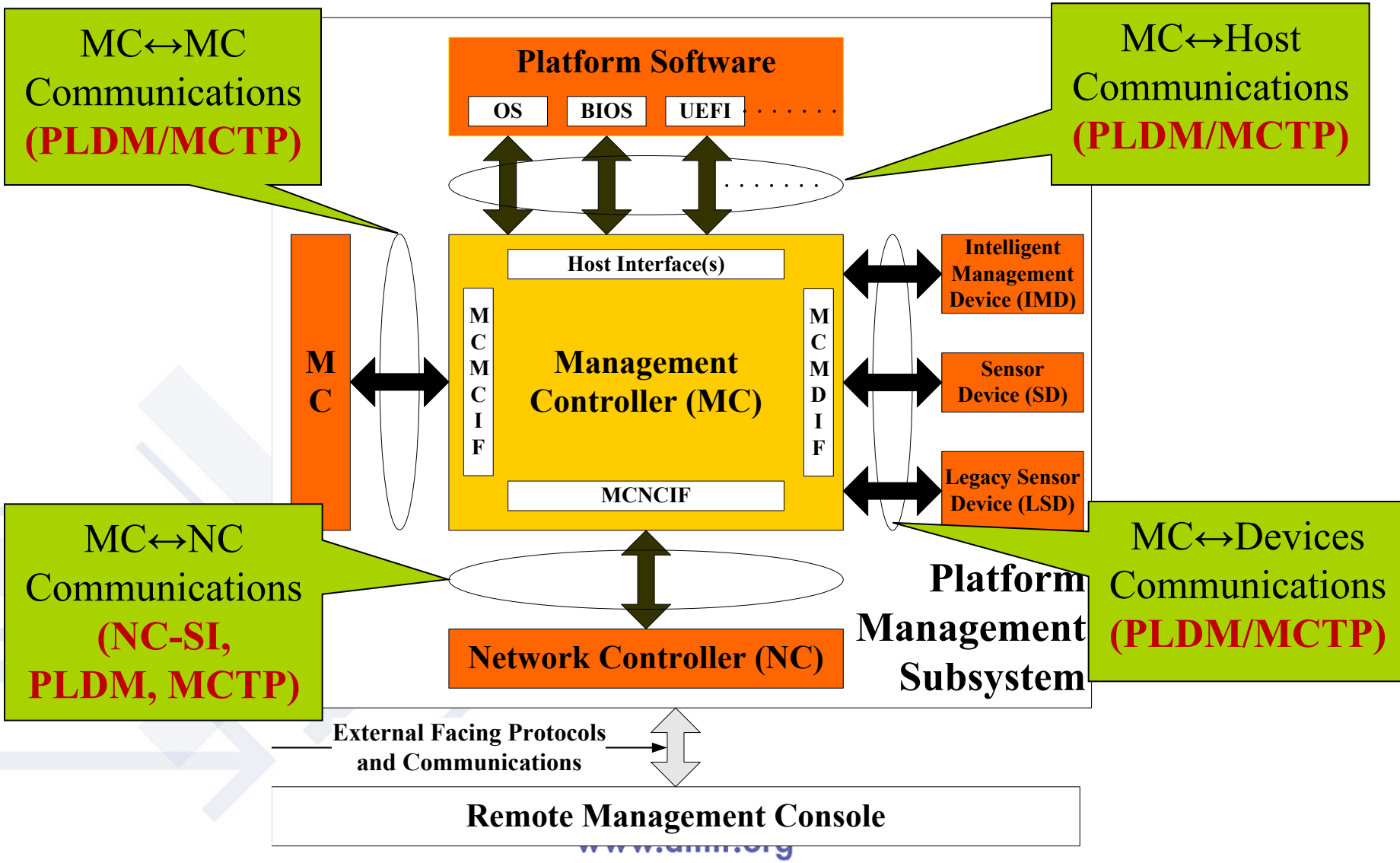
- A set of specifications published by DMTF
- Defines how resources modeled using the CIM can be discovered, accessed and manipulated.
- Provides the ability for the industry to deliver a well-integrated set of standard-based management tools
- Facilitates the exchange of data across otherwise disparate technologies and platforms
- Protocols
  - CIM-XML – CIM Operations over HTTP(S)
  - WS-Management - SOAP/XML over HTTP(S)
  - CIM-RS – Restful protocol (JSON/XML) over HTTP(S)

PMCI Working Group

- Platform Management Component Intercommunications
- **Scope: "Inside the box" communication and functional interfaces between components within the platform management subsystem**
  - Mgmt Controller (MC) to Mgmt Controller
  - Mgmt Controller to Intelligent Management Device
  - Mgmt Controller to Network Controller
  - FW / SW to Mgmt Controller
- **Builds on learning from SMBIOS, ASF, & NC-SI**
- **Leverages SMBus, PCIe & other industry technologies**

PMCI technologies and interfaces are complementary to DMTF CIM Profiles/remote management protocols

Platform Management Subsystem



SMBIOS and CDM

SMBIOS

- 15+ years life
- 2B+ devices
- BIOS extension
- Provides system info
  - Make, Model, Serial #
  - BIOS version
  - Processor, memory…
- Table based access

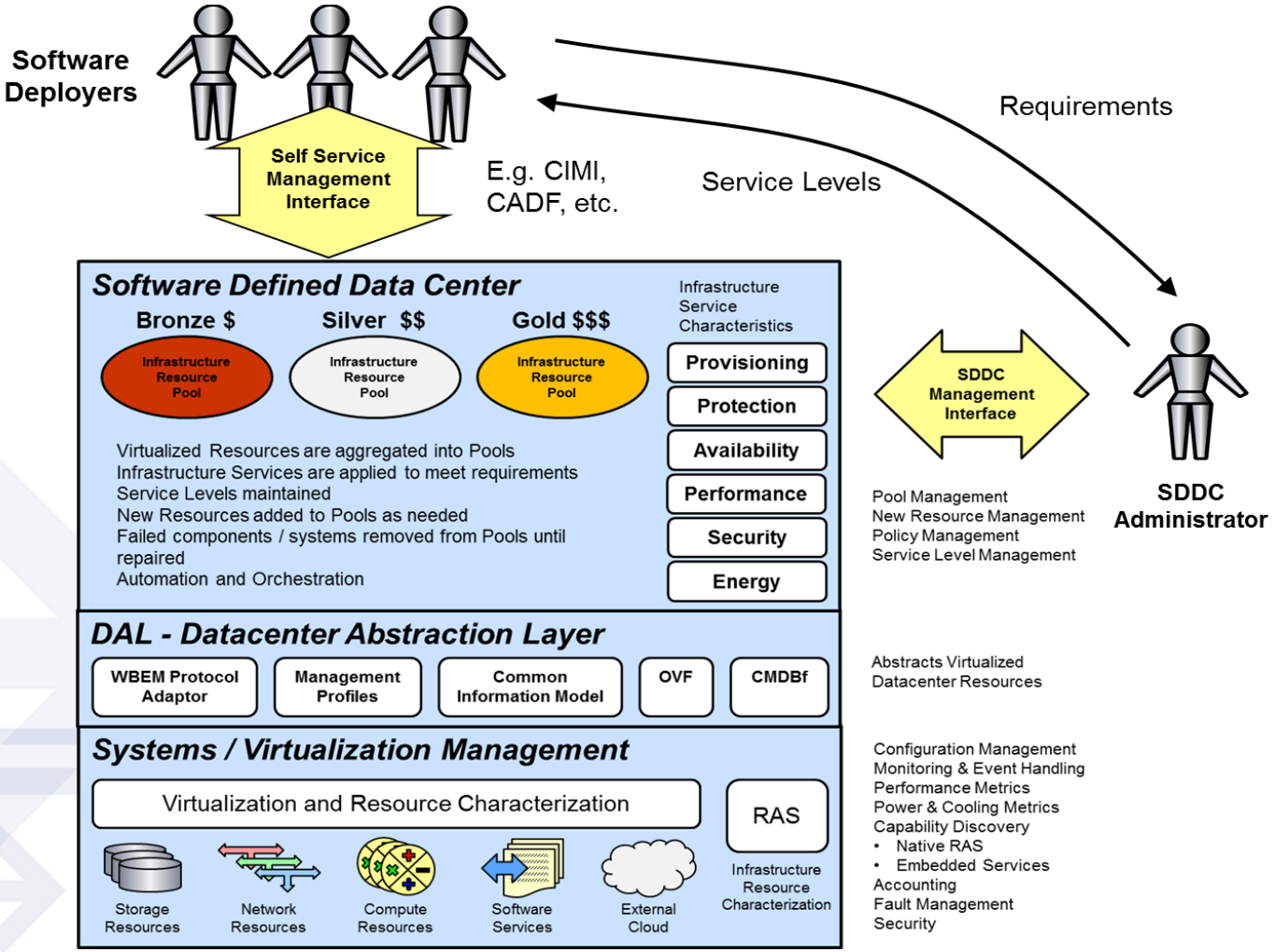
CDM

- Common Diag Model
- Based on CIM
- Leverages CIM/WBEM
- Covers
  - Processor/Memory
  - Network Devices
  - Storage…
- Built in discovery

OSDDC Incubator – Deliverables

- Use Cases
  - Data Center Administrator View
  - Data Center User View
- Taxonomy and Terminology
  - What is part of a Data Center (Power & Cooling? Apps and Middleware?)
  - Define components: Software Defined Storage, Software Defined Networking
- High-level Architecture
  - Where does the automation happen?
  - What part of the automation itself is standardized (i.e. Policy)
- Standards Gap Analysis
  - What is the role of existing standards?
  - DMTF standards: CIM, CIMI, OVF, SMASH, SPMF, WBEM, etc. ?
  - Other standards: CAMP, CDMI, ETSI/NFV, ODCA, TOSCA, etc. ?
- White Paper
  - SDDC Definition – DSP-IS0501 V1.0.1m

SDDC – The Big Picture



Standards in a Changing World

- International Support Critical
  - DMTF formed Regional Chapter Task Force, China Chapter and Japan Task Force.
  - DMTF member on INCITS EB and ISO JTC1/SC 38 representation and a ISO PAS submitter.
- Open Source Involvement
  - DMTF now has ability, through adoption of a CLA, to enable WGs/Forums to either develop Software and publish it or to work with open source efforts developing standards.
- Openness
  - Public facing web pages for each effort and each working group
  - Deliverable progress published monthly
- Alliances
  - Cooperation among SDOs to ensure interoperability and avoid overlap

How to Work with the DMTF

- Join the DMTF
  - Scope of the DMTF is clear: it's all about management
  - Drive specifications through TC, conformance through the Interoperability Committee, messaging through the Marketing Committee and ground breaking areas through Incubators and International partnerships through Alliance and Regional Chapters
- Members
  - Active participation brings about standards based on best practices
  - Drive standards through participation
  - Consider bringing work into the DMTF
- Alliance Partners
  - DMTF Originated Work
    - Feedback from the DMTF
      - DSP Acquisition
      - Work In Progress Release capability
    - Feedback into the DMTF
      - Alliance Liaison
      - Joint Member (companies that are members of both organizations).
      - The DMTF Technology Adoption Policy
      - The DMTF Feedback Portal
  - Alliance Partner Originated Work
    - Similar mechanisms would speed things along if you wish DMTF input
- Academic Partners

Thank you