



# The Road to Interoperable Cloud Computing

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**Director of Standards Architecture, VMware**

## DMTF Focus

Effective management of millions of IT systems worldwide.

Achieved by bringing the IT industry together

Collaborate on many things such as

- Systems management-specification development and validation

- Promotion and industry-wide adoption.

Fosters multi-vendor interoperability in enterprise in

- Systems

- Tools

- Solutions

Enables a global IT management ecosystem

## DMTF Participation

Over 200 member companies and organizations,  
27 February 2011

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



## DMTF Alliance Partners





## DMTF Board Companies

















## DMTF Leadership Companies

Bechtel  
 BMC Software  
 Brocade Communications Systems  
 Cloudsoft Corporation  
 Compuware Corporation  
 Dell  
 Hitachi, LTD.  
 Lenovo

NetApp  
 Novell  
 Positivo Informatica S.A.  
 Samsung Electronics Ltd.  
 SAP AG  
 Software AG  
 SunGard Availability Services L.P.  
 Virtualstream, Inc.  
 WBEM Solutions



# Participating Members

- ATI Multimedia Communications Laboratories, Inc.
- Phoenicia Technologies, Ltd.
- Alpino Des Automacao e Informatica Ltda
- Quest Software, Inc.
- Blazefire Systems Pvt. Ltd.
- Bark Mobile Research Institute
- CEPAD S.A. Conductor
- Berkeley Technology, S. America/.
- Safen Tecnologia Ltda
- Saiure System (India) Ltd.
- ESAC AB
- EARLIS
- SEMPAT SOFTWARE INFORMATICA LTDA
- Sexon Engines LLC
- Scarta Telecomunications
- Qlan Microsystems
- SIA SERVICIOS SISTEMAS DE INFORMATICA LTDA
- Telecom S.A. Grupo Itautec
- JELONGA Chase
- US Department of Defense
- VOGTECH INFORMATICA
- Wave Systems Corp.
- Wapio Ltda
- WEV Corporation



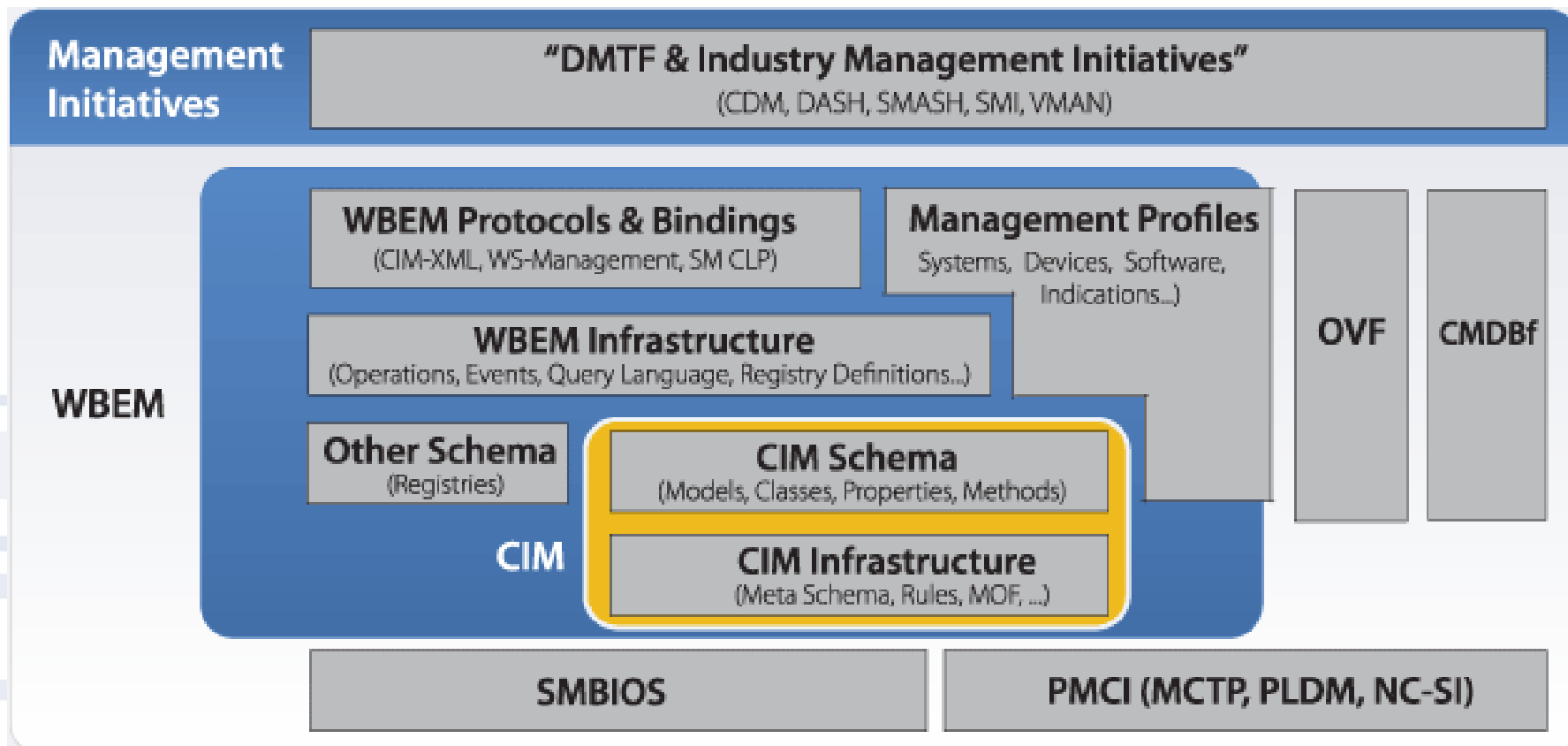
# Academic Alliances

Aberdeen University  
 Technische Universität Carolo-Wilhelms-Braunschweig  
 Bielefeld State University  
 Bharatiya Darshan University de Madrid  
 ENSI de Bretagne  
 Universidade Federal do Rio Grande do Sul  
 Georges Monod University of Grenoble  
 Goethe University Frankfurt  
 Hanyang University  
 HESB of Aveiro- Portugal  
 Huazhong University of Science and Technology  
 Imperial College Science Technology and Medicine  
 University of California Roorkee  
 University of California, Bombay  
 Universidade Tecnológica (IETEC)  
 KAIST University  
 Universität Hamburg  
 Universitat de València  
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 University of Leoben  
 Madrid State University  
 Marconi University-Bicocca  
 Modest College of Engineering, University of Pune  
 University of Valencia  
 Navarra University (Spain)  
 National Technical University  
 National Technical University of Athens  
 North Carolina State University  
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 Bundeswehr University of Munich  
 POLITECNICO DI TORINO  
 Pontifical Catholic University of Parana  
 Pontifical Catholic University of Rio Grande do Sul  
 Ruprecht-Karls-Universität Heidelberg  
 Selmer Institute of University for Aerospace Instrumentation  
 Shanghai University of Technology



# DMTF Technologies

DMTF standards provide well-defined, interoperable interfaces that build upon each other





## The Growing Importance of Cloud Standards

With the ever-increasing need for flexibility, availability and performance in today's distributed enterprises, management standards for IT professionals are now more important than ever.

### THE BENEFIT OF MANAGEMENT STANDARDS AND INTEROPERABILITY

Increase IT Flexibility and Choice

Choose the mix of solutions that best meet your business needs

Uniform management tools and consistent processes

Decrease Management Complexity

Reduce IT Management Costs

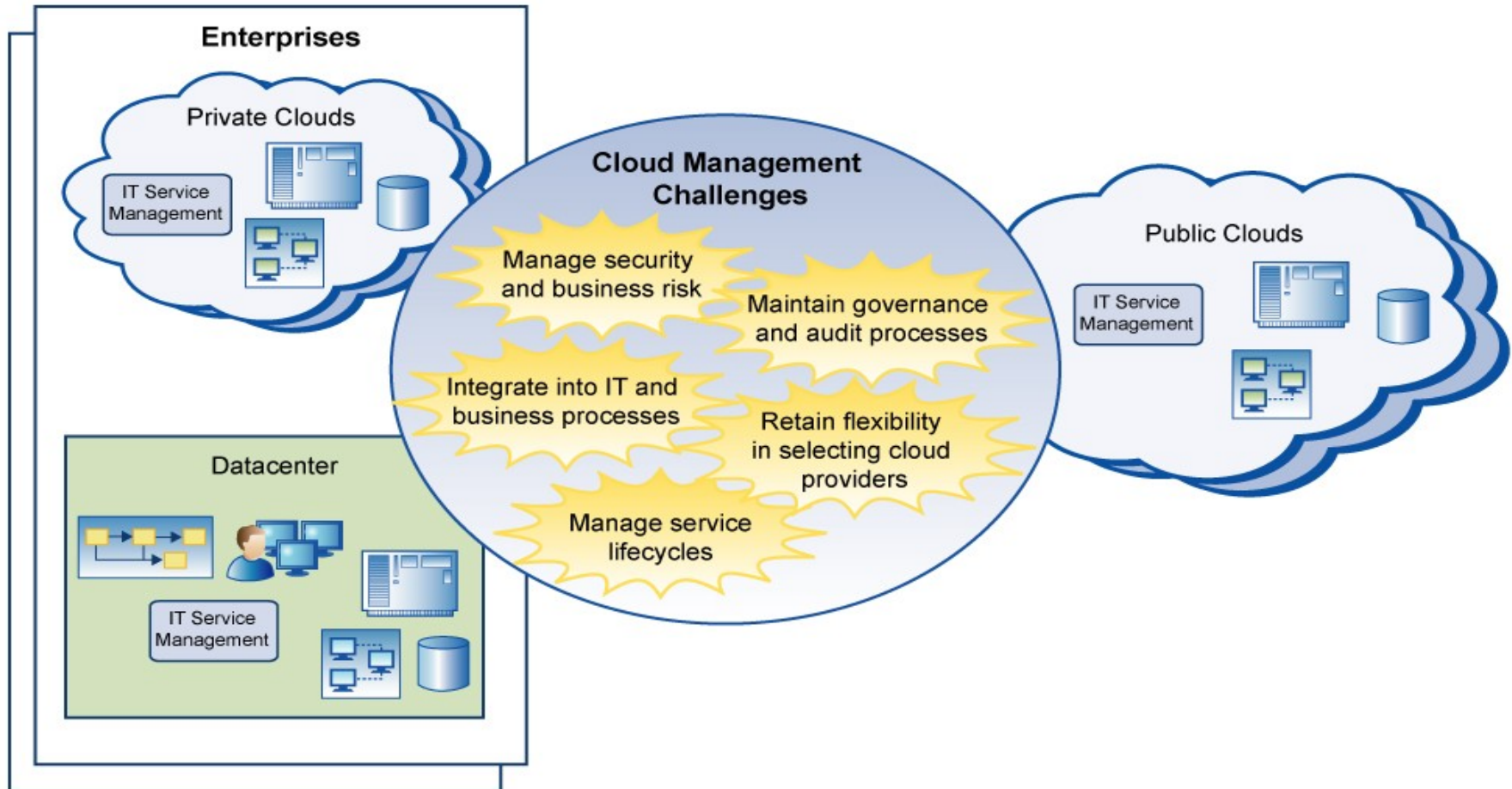
Through increased automation and more powerful tools

Deploying systems, tools and solutions that support management standards helps reduce system management complexity, lower costs and improve agility.



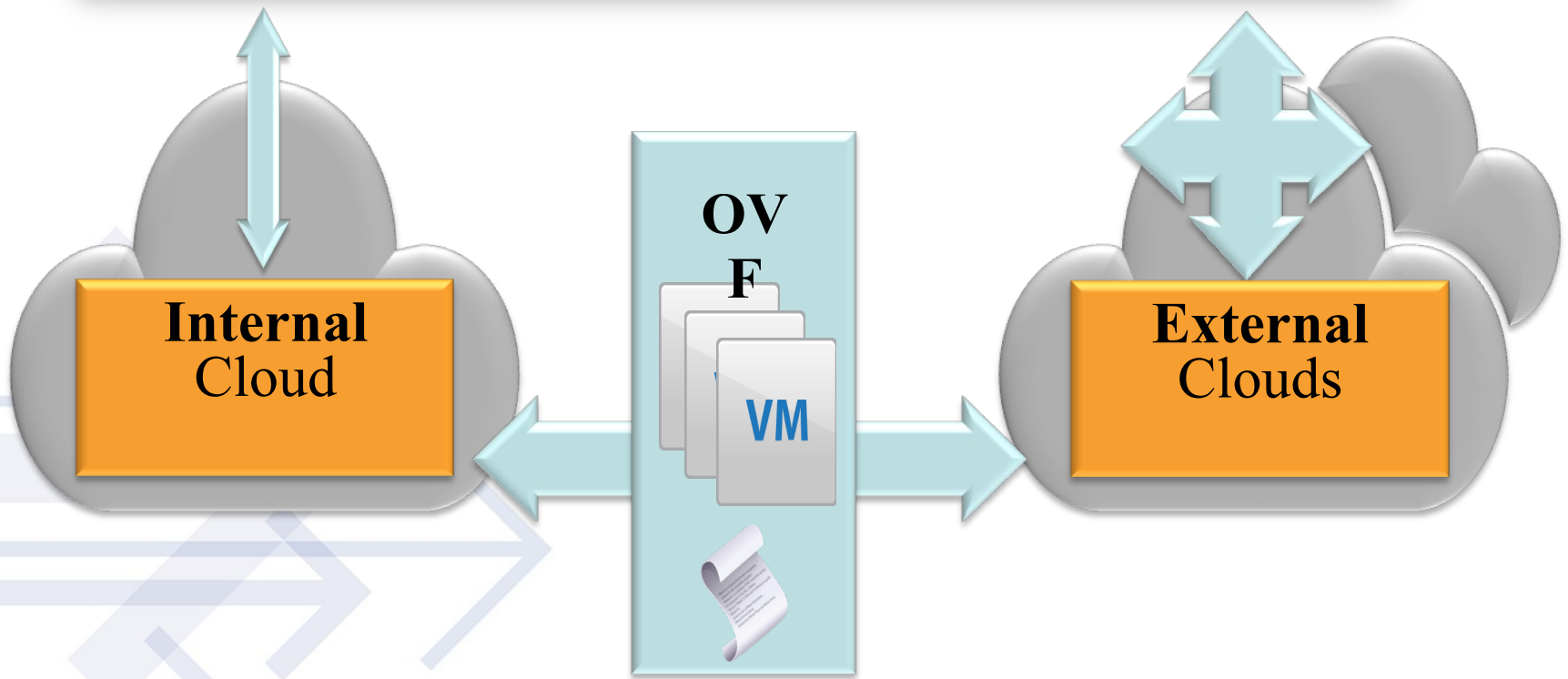


# Cloud Adoption Challenges





# APIs: Programmatic Access to Resources



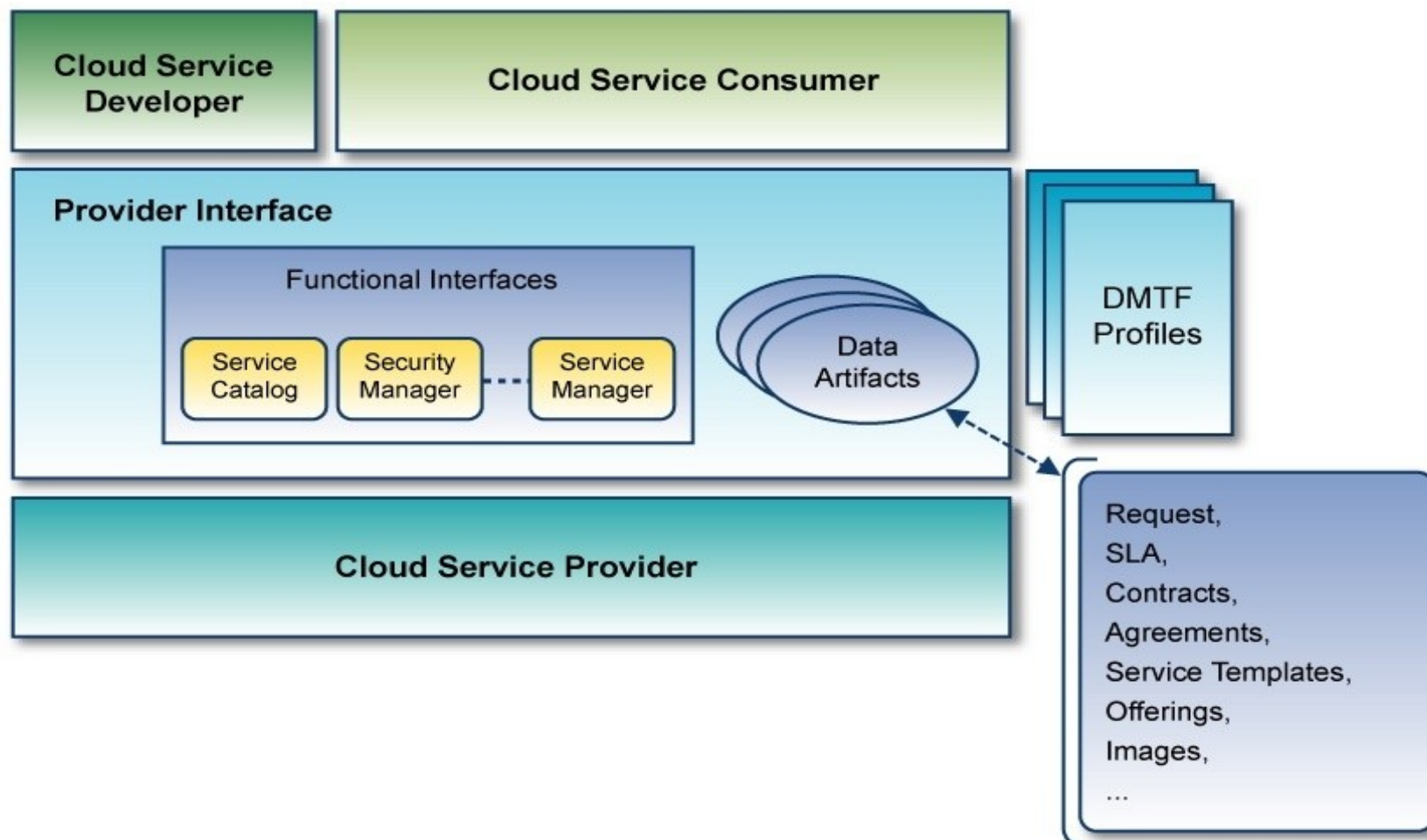


## Cloud Management Activities

- Cloud Incubator (2009-2010) published informational specifications
  - "Interoperable Clouds" white paper
  - Architecture and interfaces
  - Use cases and resource interaction model
- Cloud Management Working Group replaced incubator July 2010
  - Writing formal specifications
  - Focus on IaaS
  - Leverage other standards, e.g., OVF (Open Virtualization Format)
  - 34 actively involved companies + 10 academic or alliance members
- Virtualization and Cloud Management Forum
  - Interoperability and compliance testing
  - Cloud, OVF, and virtualization management

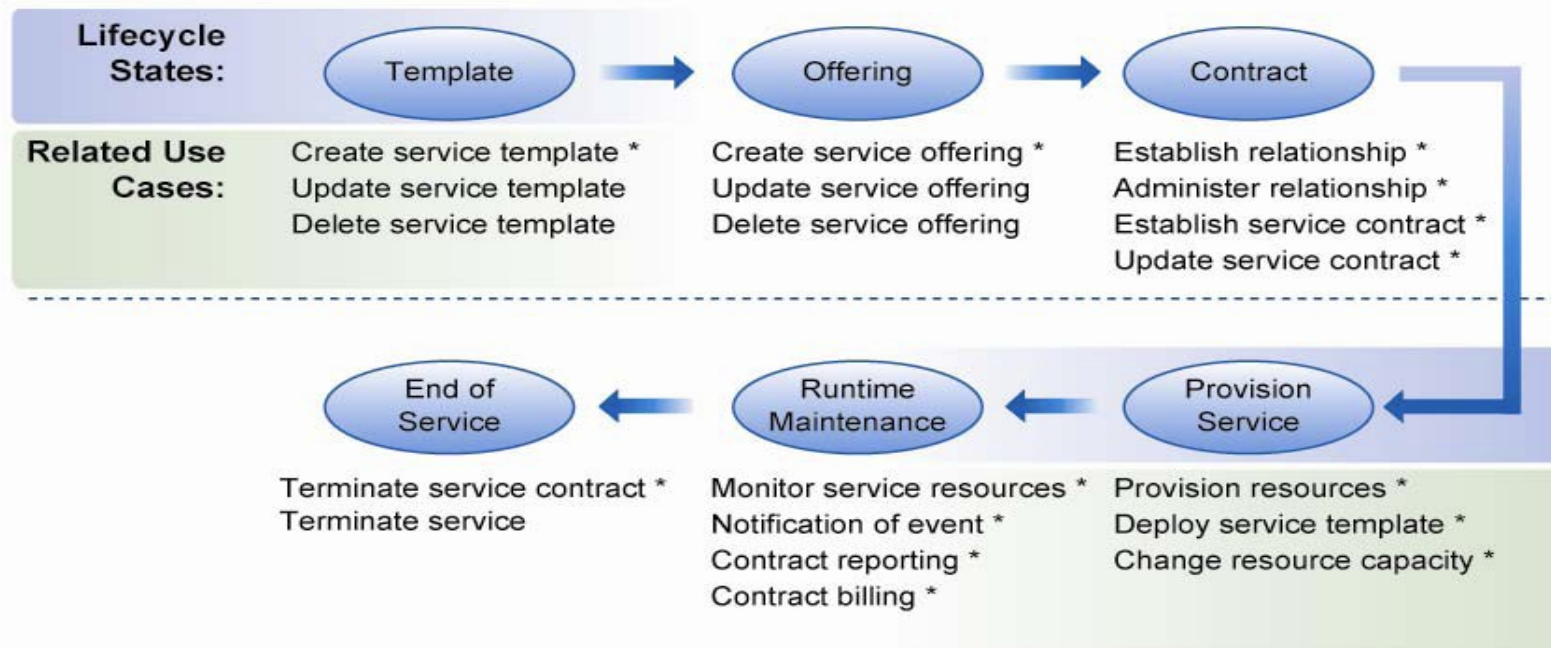


# Cloud Management Architecture



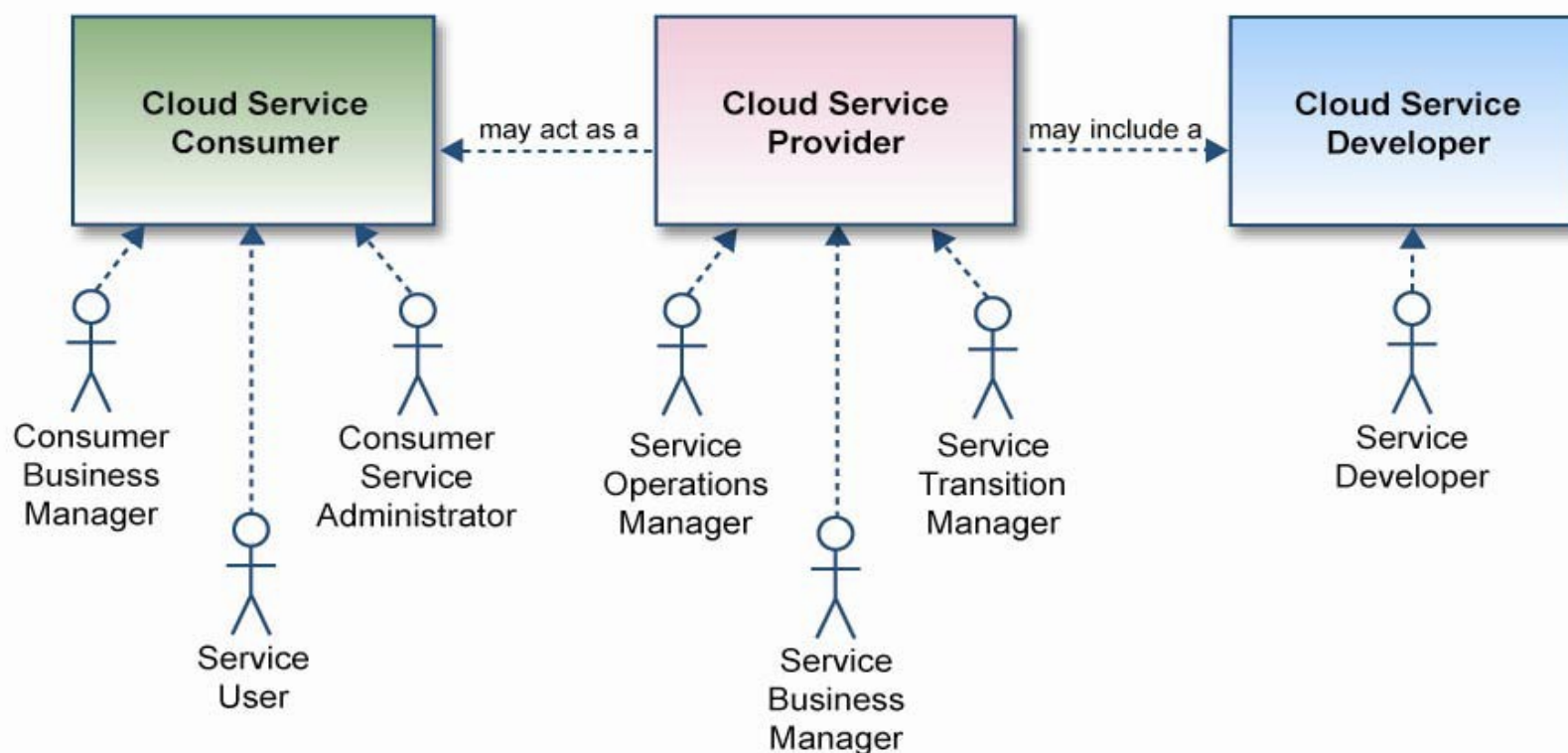


# Cloud Service Life Cycle & Use Cases



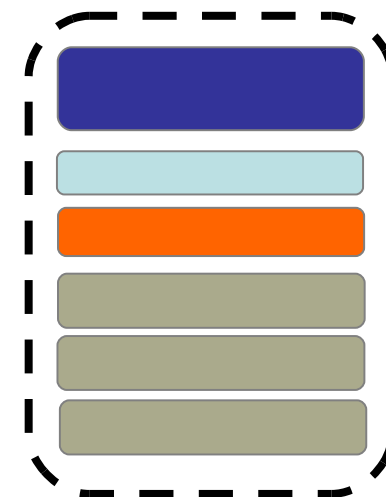
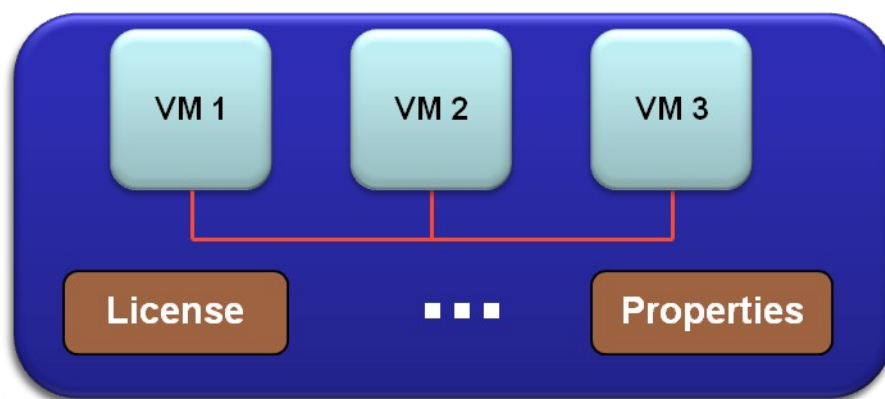


# Use Case Actors Taxonomy





## Open Virtualization Format (OVF)



myApp.ovf

o  
p  
v





# OVF – Open Virtualization Format

- Summary

- Packaging format for virtual appliances
- Metadata describing environment requirements (using CIM)
- Activation logic and artifacts

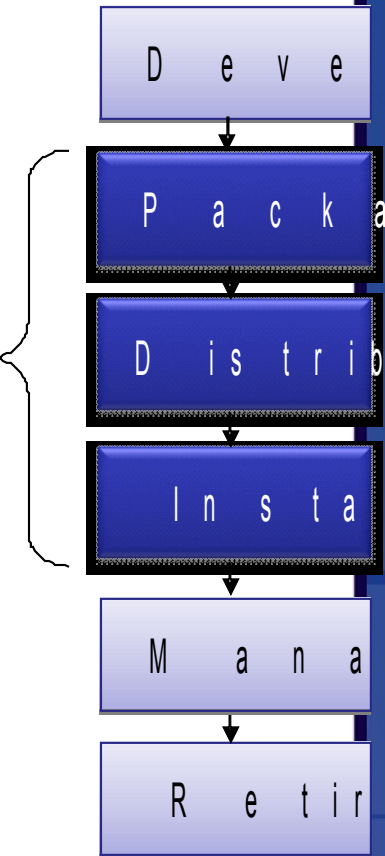
- Benefits

- Deliver software through portable virtual machines
- Streamlined installations
- Virtualization platform independence and flexibility
- Single-system and multiple-system services

- History

- OVF 1.0 & 1.1: published 2009 & 2010
- ANSI – INCITS 469-2010
- ISO/IEC 17203
- OVF 2.0: under development

O V F →







## Cloud Management update

The Cloud Management Working Group has released 3 new work in process drafts - [www.dmtf.org/cloud](http://www.dmtf.org/cloud)

### Work In Progress Documents

DSP#	Title
DSP0263	Cloud Infrastructure Management Interface (CIMI)
DSP0264	Cloud Infrastructure Management Interface – CIM (CIMI-CIM)
DSP2027	CIMI Primer

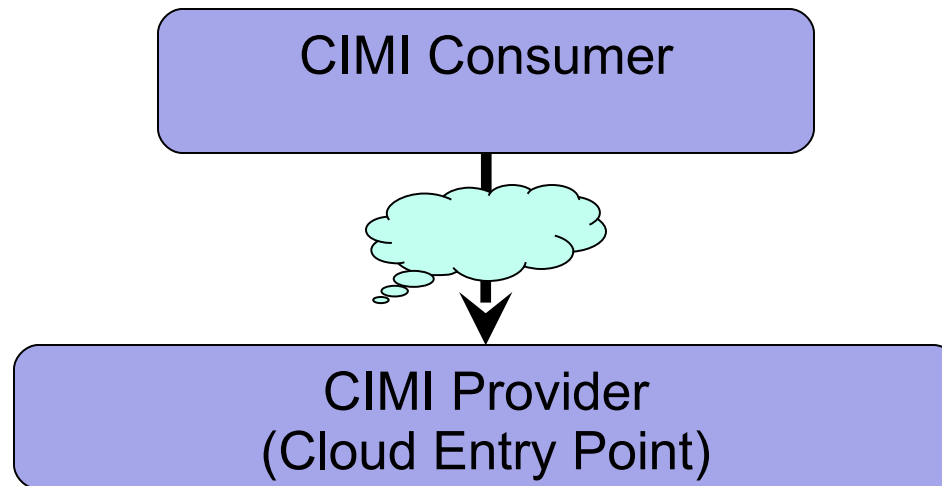
DMTF is looking for feedback on these documents

Please submit feedback through our portal:

<http://www.dmtf.org/standards/feedback>



## CIMI Model – Getting Started



### Cloud Entry Point (CEP):

Main entry into the IaaS provider

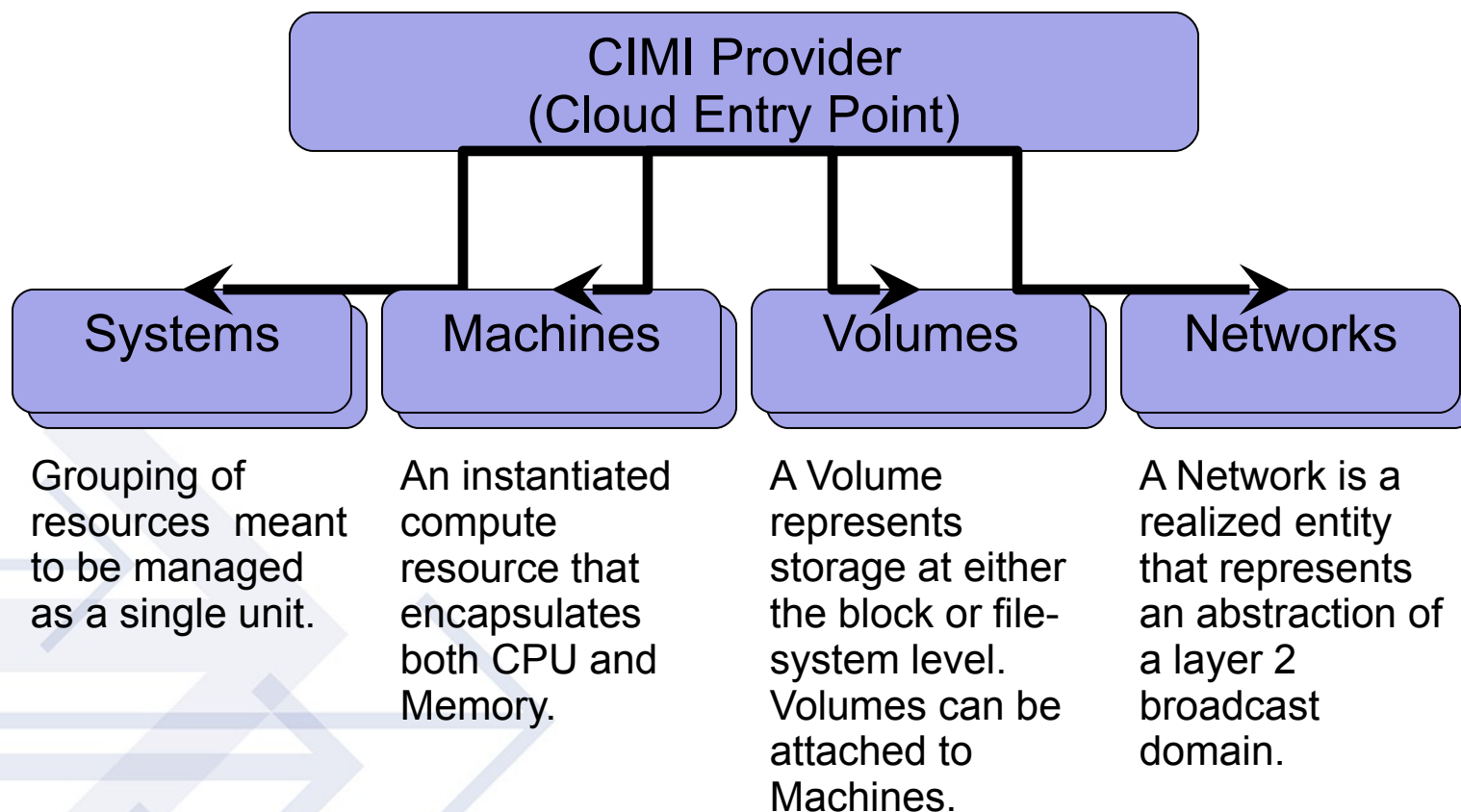
All other data is discovered, iteratively:

Pointers to Machines, Volumes, Networks, etc...

Metadata describing capabilities and resources constraints



## CIMI Model – Core Resources





# Cloud Auditing Data Federation (CADF) Update

## Scope / Objectives

### Develop Standards for the Federation of Cloud Audit Data

By Specifying a Normative, Prescriptive Audit Event Data Format along with Interface Definitions and a compatible Component and Interaction model.

The **Data Model** will include support for:

**Classification by Extensible Event Taxonomies** – normative, prescriptive taxonomies used to categorize cloud provider IT **Resources**, event **Actions** and **Outcomes**.

**Federation of Customized Audit Reports and Logs** - event data will support federation and be composable into customizable reports and logs.

The **Interface Model** includes:

**Definition of Service Methods** to Manage and Federate the Data Model's Events, Logs and Reports

*Interfaces will support audit data Submission, Import and Export, Query and Subscription.*

The **Component and Interaction Model** will

Demonstrate how the Interfaces and Data Format can be used by Cloud Providers and Consumers to Support Cloud Auditing use cases.

Future work may include **Profiles** that extend the core data and interface specifications to accommodate particular methods of consumption

# Cloud Auditing Data Federation (CADF) Update

## Working Group Current Status

### Reviewing of Liaison Group Cloud Audit Related Activities including:

#### CSA's Cloud Audit WG

Update, 6 Month Roadmap, GRC Toolkit Examples (AtomPub, Manifest)

#### The Open Group's (TOG)

Distributed Audit Services (DAS) v2 Update Project

### Accepting / Reviewing Member Use Cases and Requirements

as input for forthcoming data format and interface model development, including:

IBM Cloud Audit Use Cases

Novell / DAS v2 Use Cases

### Discussing Deliverables and Timeline

Primarily around a Federated Cloud Audit Data Format Specification



## Cloud Software License Management (incubator)

This Incubator will develop whitepaper(s) which focus on the challenges listed above to enable the industry to manage licensed software product(s) and product usage, and to move closer to interoperable solutions.

The white paper(s) may also recommend a solution to these challenges by leveraging or defining extensions to existing work. The purpose of this document is to define the technical aspects required to address the requirements, use cases, scenarios and solutions identified. For example:

- The representation of the identity of a licensable product (virtual machine instance, on premise product, etc)
- How it is associated with an instance or operating system
- Who and what (device) are assessing that instance, and
- The ability to discover if and where the licensable product is running.



## How Can We Work Together

- **Develop New Ideas and approaches**
  - Papers presented here today are a great help
  - Could be basis for new work
- **Provide input and feedback on existing work**
  - CIMI Specs
  - OVF 2.0
  - Soon to be released License Management Whitepaper
- **Develop Reference Implementations and Tools**
  - Need client and server side implementations
  - Need test tools to validate interoperability



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[www.dmtf.org/cloud](http://www.dmtf.org/cloud)

