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Portland, OR

# Open Source Toolchains for Cloud and OVF Management

Jeff Wheeler- Huawei  
Distinguished Engineer  
Chief Architect Cloud Management

## 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.





# Intent and Goals

- Introduce you to the wide body of Open Source material
- Discuss the relevancy of Open Source to our work
- Apply Open Source projects to major categories
- Look intently at OVF and Open Source with demo



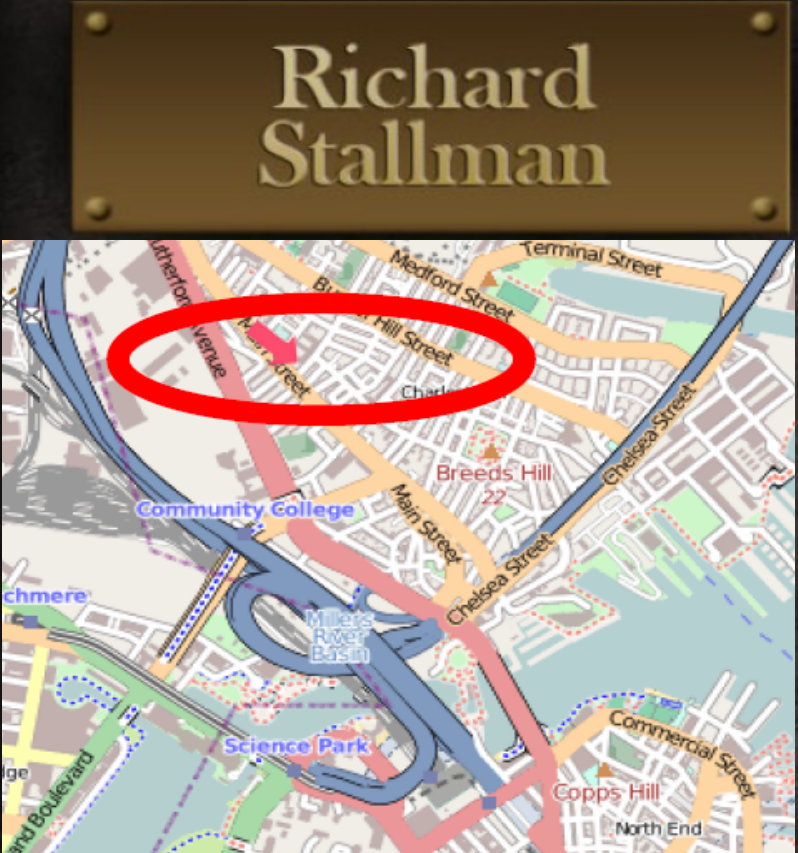
The DMTF was formed to lead the development, adoption and unification of management standards and initiatives for desktop, enterprise and internet environments

# The Beginnings



**M**iddle  
Ages  
1970s and 1980s

# The Beginnings



Richard Stallman

# The Beginnings

Subject: new Unix implementation

Date: Tue, 27-Sep-83 12:35:59 EST

Organization: MIT AI Lab, Cambridge, MA

Starting this Thanksgiving I am going to

Not Unix), and give it away free(1) to

equipment are greatly needed. To be

programs: editor, shell, C compiler

textformatter, a YACC, an Empire

eventually, everything useful that

and hardcopy documentation.

GNU will be able to run Unix pr

convenient, based on our experi

file version numbers, a crashpre

and eventually a Lisp-based wind

share a screen.

Both C and Lisp will be available

chaosnet protocol, far superio

Who Am I? I am R

Intelligen

Incor

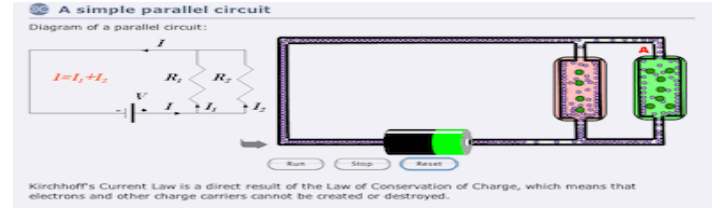
Subject: New UNIX  
implementation

"Starting this Thanksgiving I am going to write a complete Unix-compatible software system [...] Contributions of time, money, programs and equipment are greatly needed. I consider that the golden rule requires that if I like a program I must share it with other people who like it. [...] I have decided to put together a sufficient body of free software so that I will be able to get along without any software that is not free."

- Richard Stallman, 27 Sep 1983

In addition I have implemented one cr... and two window systems for

# Open Source



## OW2 in top-4 global open source organizations with diversified code



Diversified-code organizations



Product line organizations



Technology-oriented communities



Legal resources organizations



Open Source Initiative



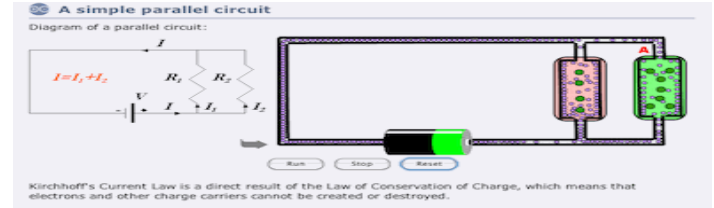
Standards organizations



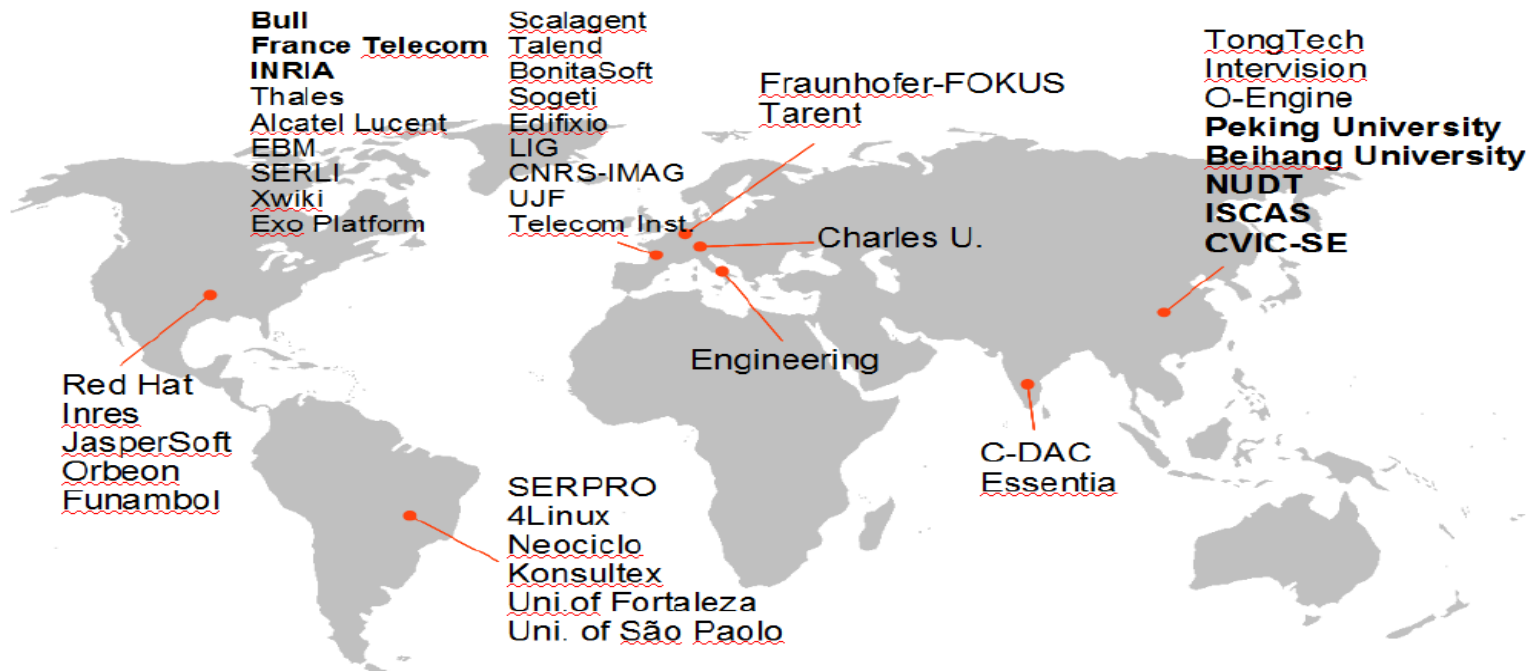
Advocacy and lobbying organizations



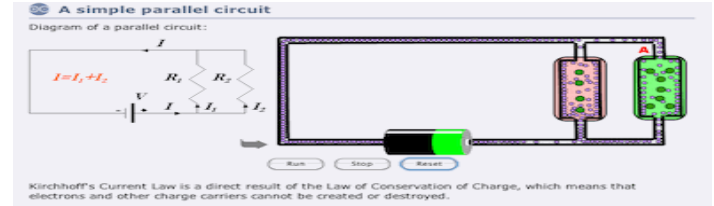
# Open Source



## A truly global membership







## Some 80 Open Source Middleware Projects

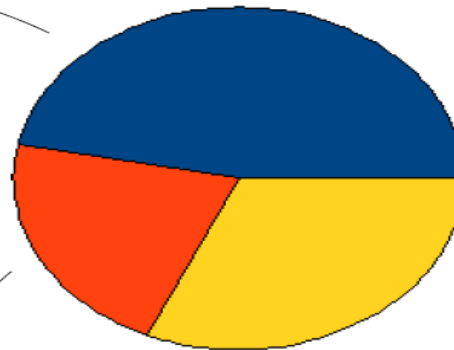


### Mature Projects

(37)

Acceleo  
ASM  
Bonita  
CARDAMOM  
CAROL  
CLIF  
Enhydra  
Shark  
EasyBeans  
eXo Platform  
FederID  
Fractal  
sync4j  
GASP  
InterLDAP  
JavaService  
JOnAS  
JOPE  
JORAM

JOTM  
Lomboz  
NovaForge  
Open Mobile IS  
OPS  
Orchestra  
PEtALS  
ProActive  
RmiJdbc  
RUBiS  
Salome-TMF  
Sat4J  
SOFA  
Spagic  
Spago  
Spago4Q  
SpagoBI  
Telosys  
XWiki



### Projects in Incubation

(23)

Aspire RFID  
BEEN  
CMI  
Demoiselle  
Dragon  
Dream  
Dysoweb  
EasyWSDL  
Elastic-Grid  
FraSCAti  
J2WS  
JASMINE

JASptE  
JWTGen  
LeWYS  
OpenSuit  
OSLC  
Perseus  
Q-ImPRESS  
Scarbo  
Ubistar  
xPlus

### Projects in Archive

(26)

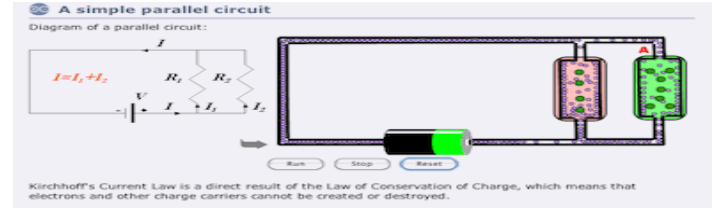
Azuki  
BarracudaMVC  
C-JDBC  
DotNetJ  
DryverI  
EclipseJDO  
Enhydra XMLC  
GOTM  
HOWL  
Introspector  
Jalisto  
Jonathan  
JORM

Massiv  
MEDOR  
MobiliTools  
Monolog  
Odette FTP  
Oscar  
ParGRES  
SNAP  
Speedo  
SURF  
Tribe  
XAPool  
XQuare



2,5 million downloads  
per year since 2007

# Open Source



<http://www.ow2.org>

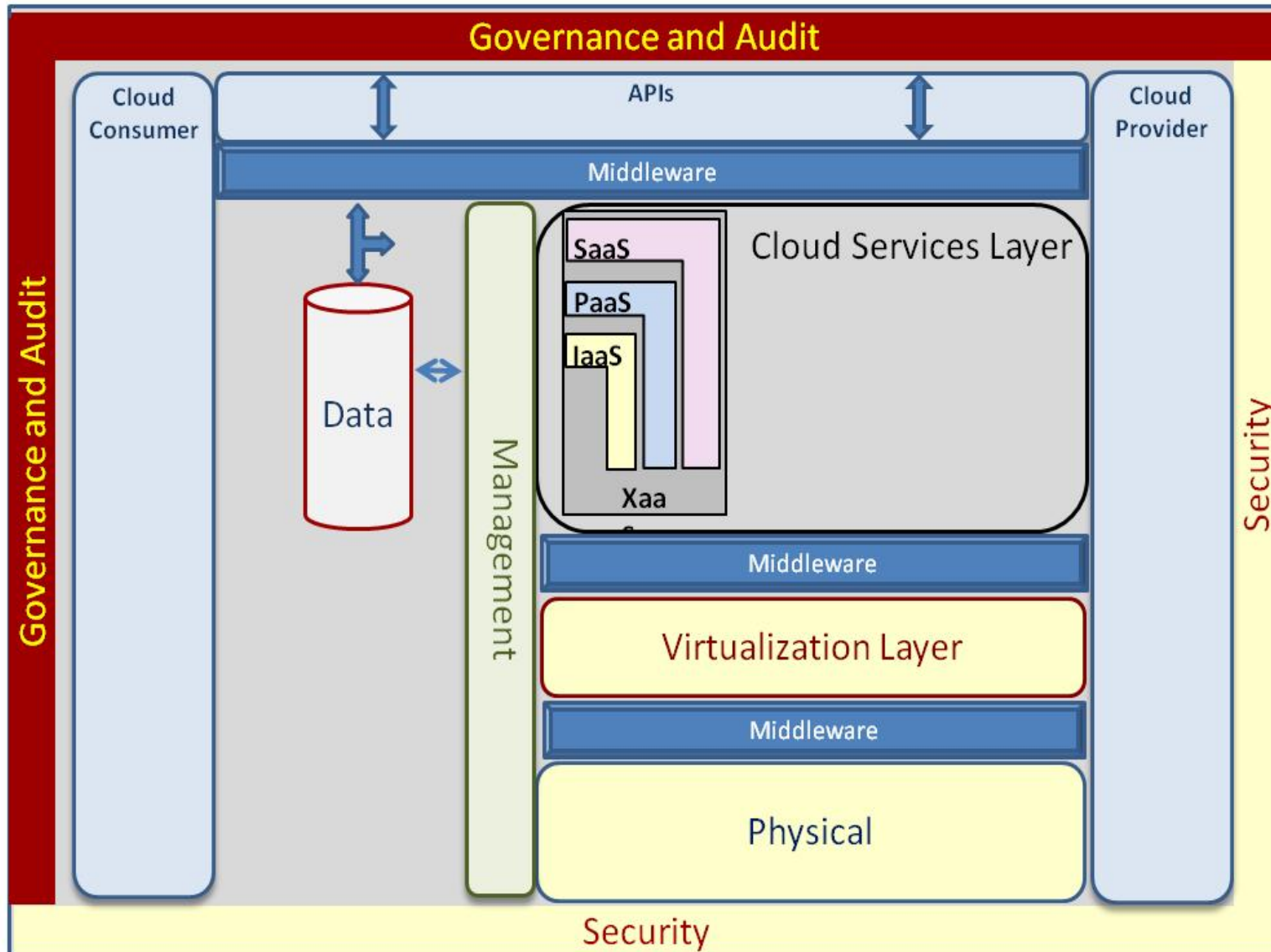
2  
2



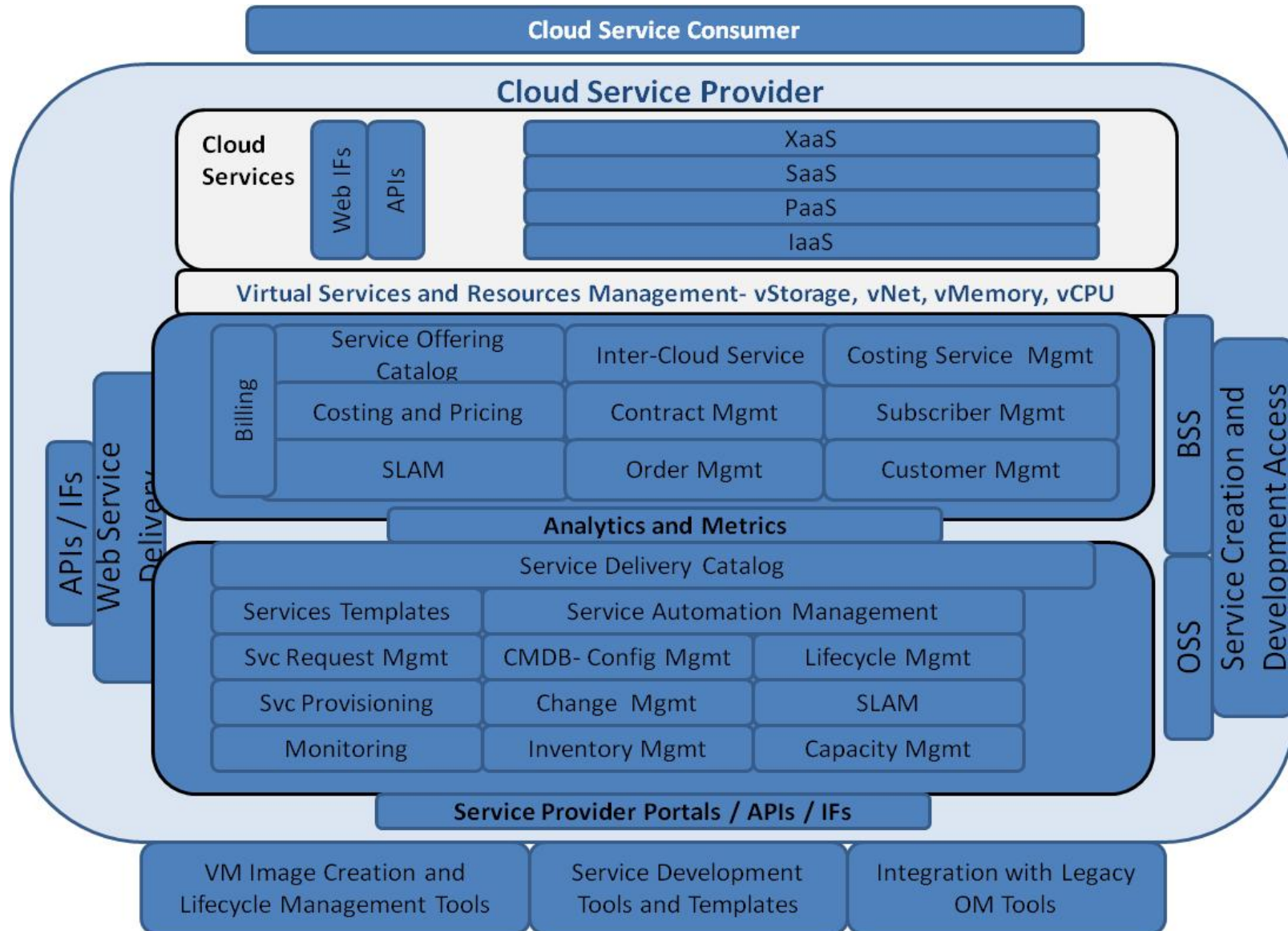
# IT, Cloud, Virtualization and Open Source

- IT Services are now synonymous with Cloud
- In most respects Open Source projects die a premature death but live a full life- we can learn from observing and participating in that life!- albeit short as it is...
- The lists are growing
- What about CIM specific Open Source offerings?
  - We'll get into that but until then
    - 5,6,7,8,9,10

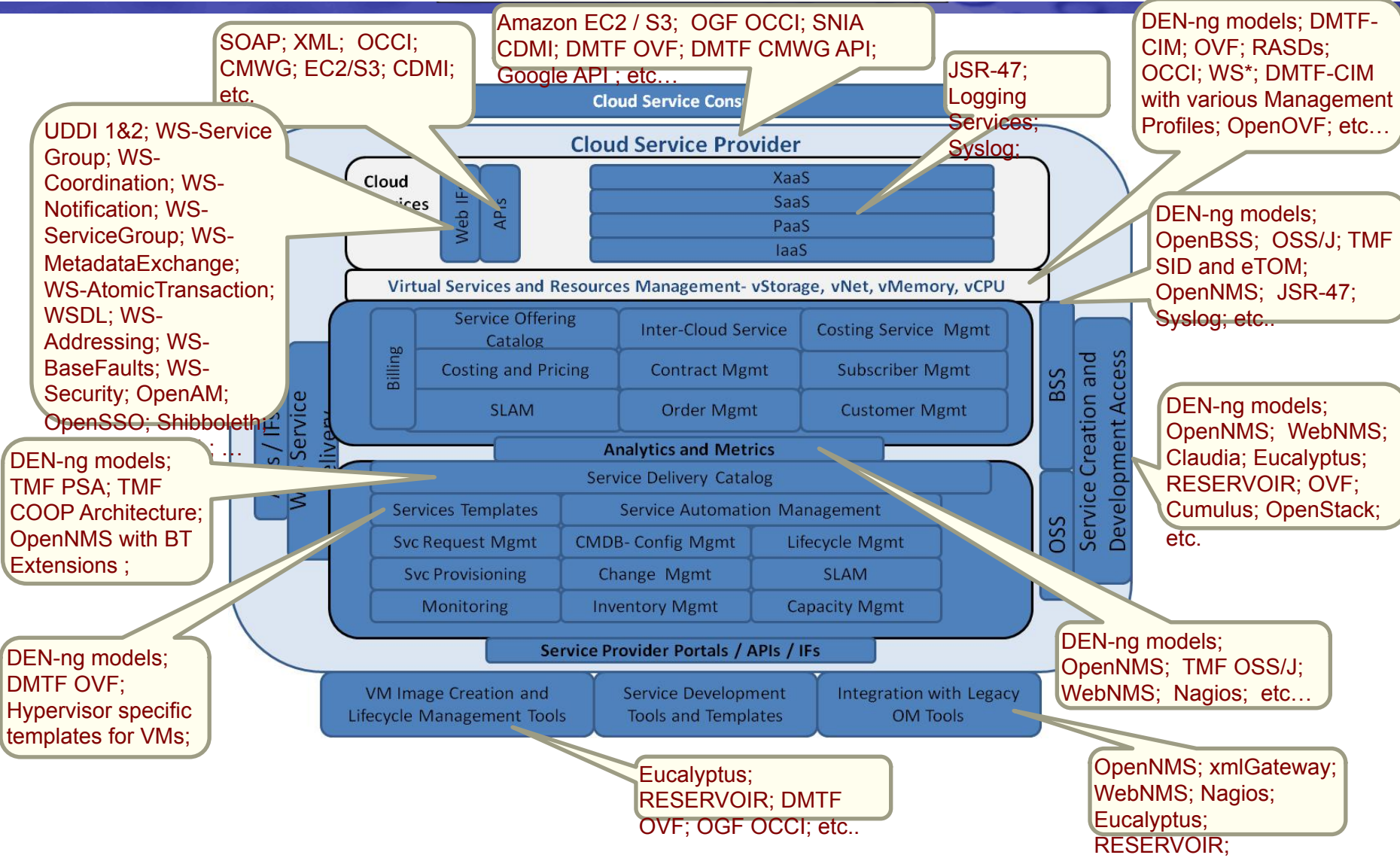
# So, what are we really talking about?



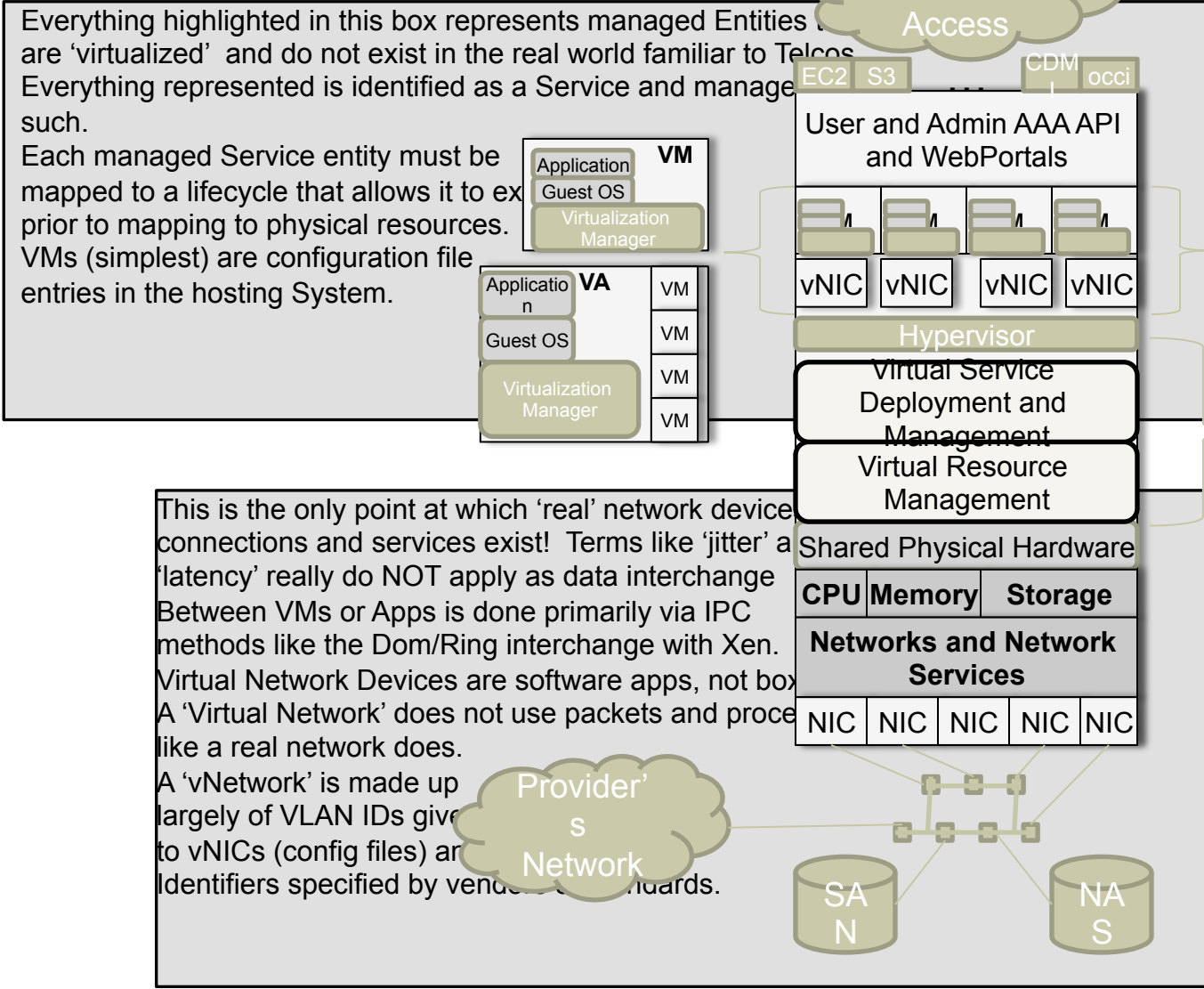
# Moron, cloud, virtualization and CIM



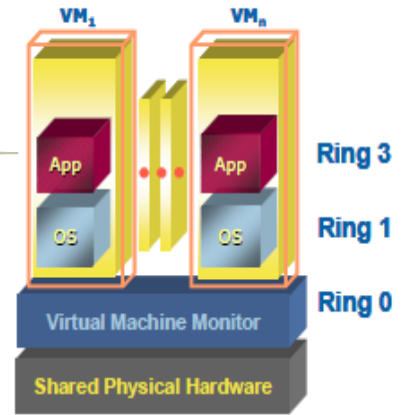
# Still, as of old....



# Real World still exists

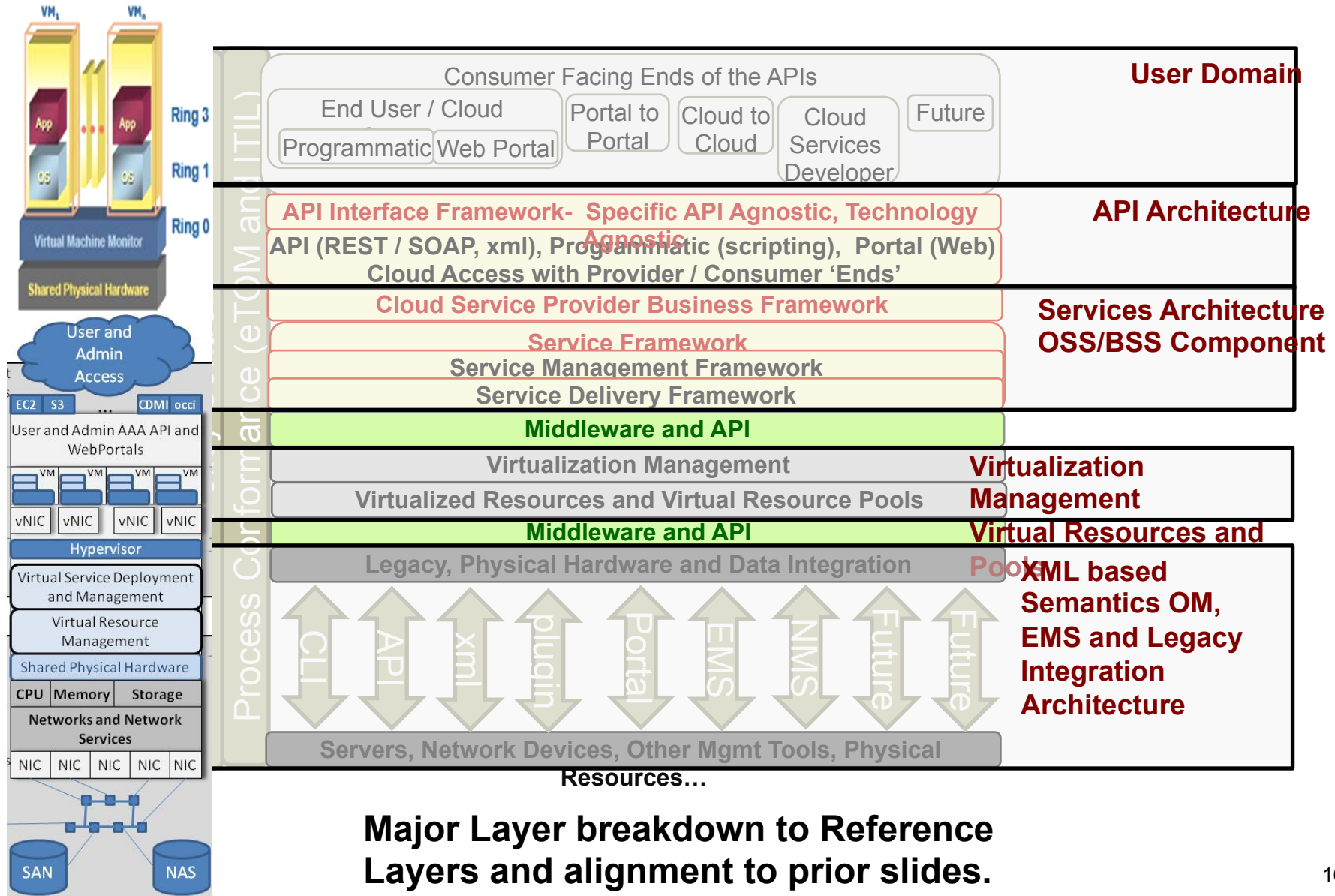


Mainly Configuration File entries in the 'System'



- VMM deprives the guest OS into ring 1 and takes up ring 0
- OS unaware it is not running in traditional ring 0 privilege
- Requires compute-intensive software translation to mitigate

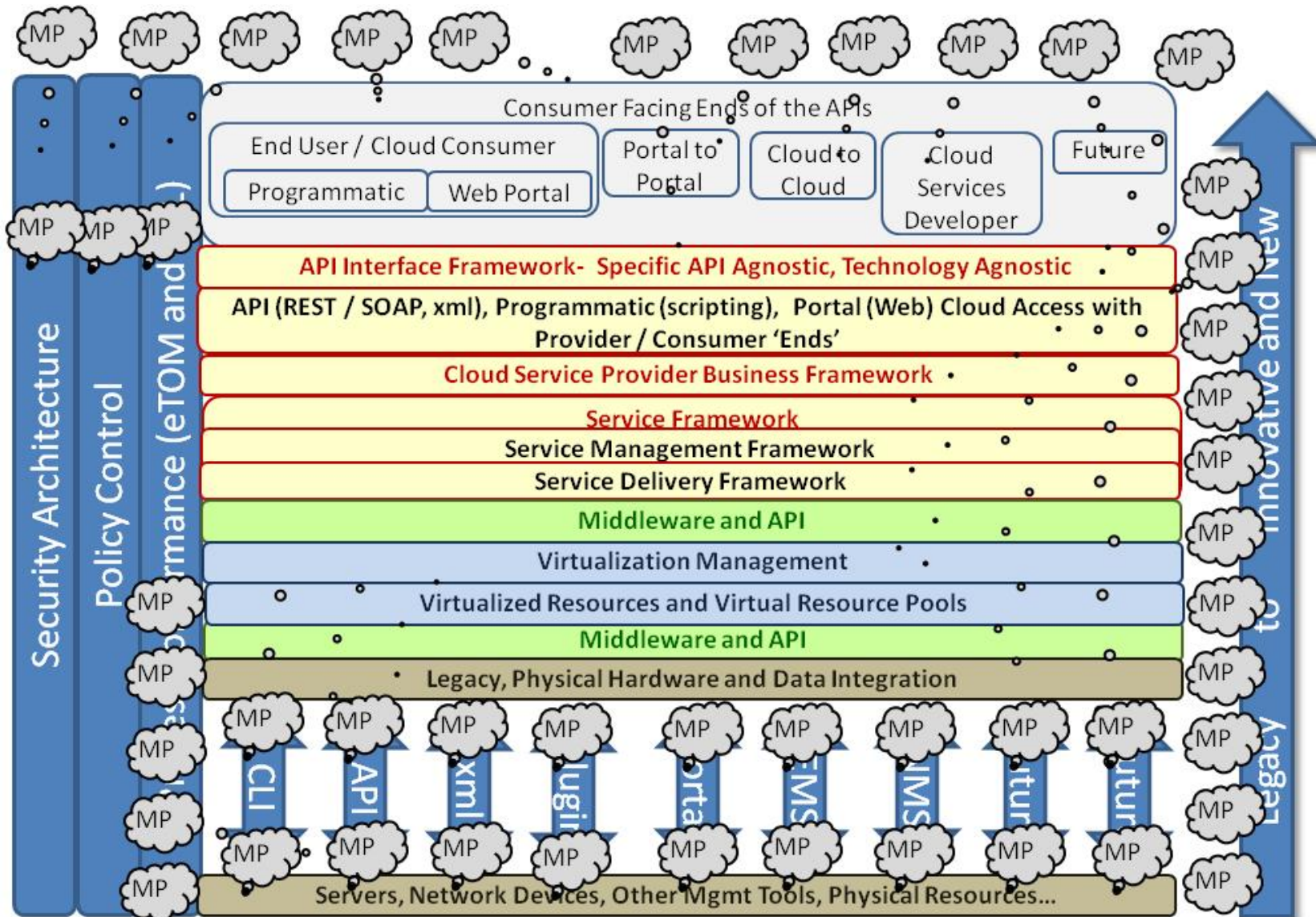
# Open Source Domain



Major Layer breakdown to Reference Layers and alignment to prior slides.



# And still has to be managed!



# IT, Cloud, Virtualization and Open Source

- What about CIM specific Open Source offerings?
  - And don't forget my favorite- OpenNMS – 22s
  - Zenoss is a peer NMS for cloud, virtualization and CIM mamt

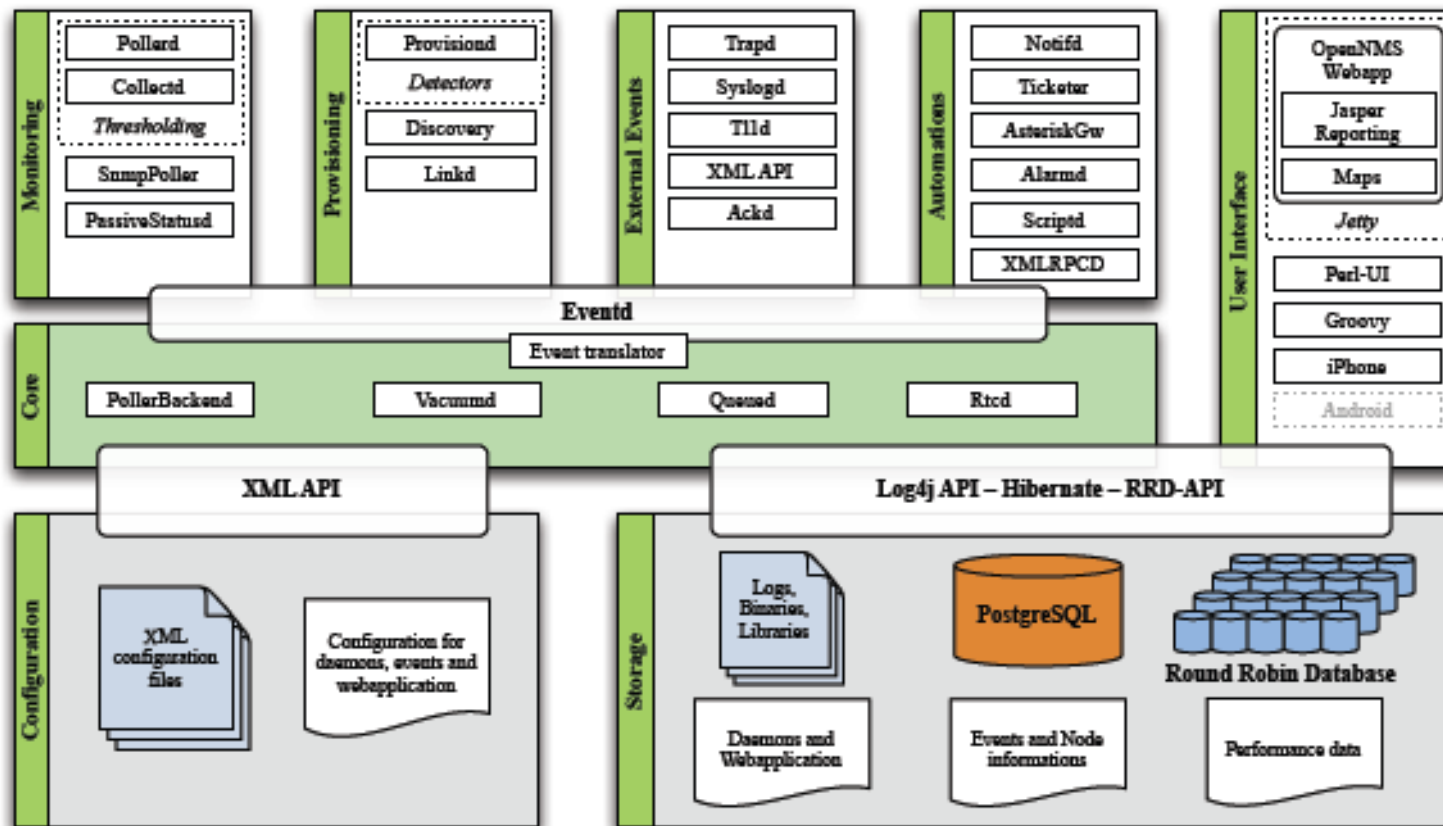


Figure 1: The OpenNMS architecture



# Managing most everything with Open Source

- All the parts are there

- **Cloud**

- Hypervisors / Virtualization

- Operating Systems

- Everything Else

In some fashion or another (this is not a turn key presentation! – neither is open source)



# Managing Cloud with Open Source

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- Provisioning
  - Configuration Management
  - Automation / Orchestration
  - Monitoring
- (FCAPS)

# Managing Cloud with Open Source

- Provisioning

Pckg	Language	License	Targets
Cobbler	Python	GPL	RedHat, OpenSUSE, Fedora, Debian, Ubuntu
FAI	Perl	GPL	Debian
Kickstart	Python	GPL	Most Debian and RH distros
Viper	Perl	GPL	Debian

# Managing Cloud with Open Source

- Configuration Management

Pckg	Year launched	Language	License
Bcfg2	2003	Python	BSD
Cfengine	1993	C	Apache
<b>Chef</b>	<b>2009</b>	<b>Ruby</b>	<b>Apache</b>
<b>Puppet</b>	<b>2004</b>	<b>Ruby</b>	<b>GPL</b>

# Managing Cloud with Open Source

- Automation / Orchestration

Pckg	Language	License	Community
AutomateIT	Ruby	GPL	None
Capistrano	Ruby	MIT	None
Control Tier	Java	Apache	DTO Solutions
Func	Python	GPL	Fedora project
RunDeck	Java	Apache	DTO Solutions

# Managing Cloud with Open Source

- Monitoring

Pckg	License	Lang uage	Functionality	Collection Methods
Cacti	GPL	Php	Performance	SNMP, syslog
Nagios	GPL	C/php	Availability	SNMP, TCP, ICMP, IPMI, syslog
Zabbix	GPL	C/php	Availability, Performance	SNMP, TCP, ICMP, IPMI, Synthetic Transactions
Zenoss	GPL	Python	Availability, Performance, Event Management	SNMP, ICMP, SSH, syslog, WMI

11, 12,

And many more like OpenNMS 22s (the best in my book...)



# Managing Cloud with Open Source

And many more- like 13,

## Cloud Toolkits: Market Overview

	VMware vSphere	RHEV	Xen-Server	Hyper-V	Euca-lyptus	Nimbus	Open Nebula	oVirt
Hypervisor	VMware	KVM	Xen, Hyper-V	Hyper-V, Xen	Xen, KVM, VMware	Xen	Xen, KVM, VMware	KVM
VLAN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Scheduling	Yes	Yes	N/A	N/A	Limited	External	External	No
Live Migr.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
High Avail.	Yes	Yes	Yes	Yes	No	No	No	No
Hybrid Cloud	No	No	No	No	Partially	Partially	Yes	No
Admin GUI	Yes	Yes	Yes	Yes	No	No	No	Yes
Req. Intel VT / AMD-V	No	Yes	only for Windows guests	No	if KVM hypervisor is used	only for Windows guests	if KVM hypervisor is used	if KVM hypervisor is used
Guest OSs	W/L/So/N	W/R	W/R/C/S/D	W/S/R	Depends	Depends	Depends	Depends
License	Propr.	Propr.	Propr.	Propr.	BSD	Apache 2	Apache 2	GPLv2
Annual Cost	up to \$4400 per CPU	up to \$750 per socket	Free / up to \$5500 per host	up to \$3300 per CPU	Free / N/A	Free	Free	Free

# Managing Cloud with Open Source

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**Or-**

**14s**

**15**

**And what about CIM and Cloud Management?**

**16s**

**Or Cloud simulators?**

**17**

**Or Microsoft?**

**18**



# Managing Virtualization with Open Source

- All the parts are there
  - Cloud
  - **Hypervisors / Virtualization**
  - Operating Systems
  - Everything Else

In some fashion or another (this is not a turn key presentation! – neither is open source)



# Hypervisor /Virtualization are synonymous in Open Source

- **Most every hypervisor instrumented with CIM of sorts**
  - **Xen- 19s**
  - **KVM- 20s**
  - **Microsoft- 21s**
  - **Tools – 22**
  - **Vendors – 23**
  - **Most using ‘libvirt’- 24**

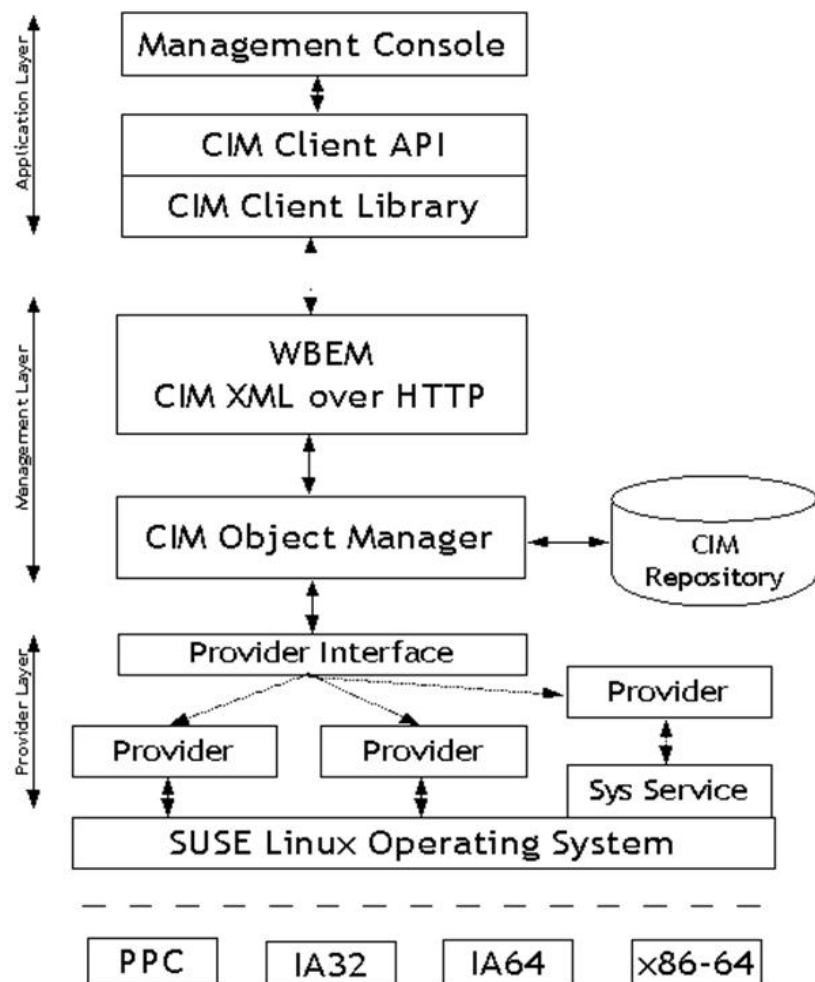


# Managing Operating Systems with Open Source

- All the parts are there
  - Cloud
  - DC
  - Hypervisors
  - **Operating Systems**
  - Everything Else

In some fashion or another (this is not a turn key presentation! – neither is open source)

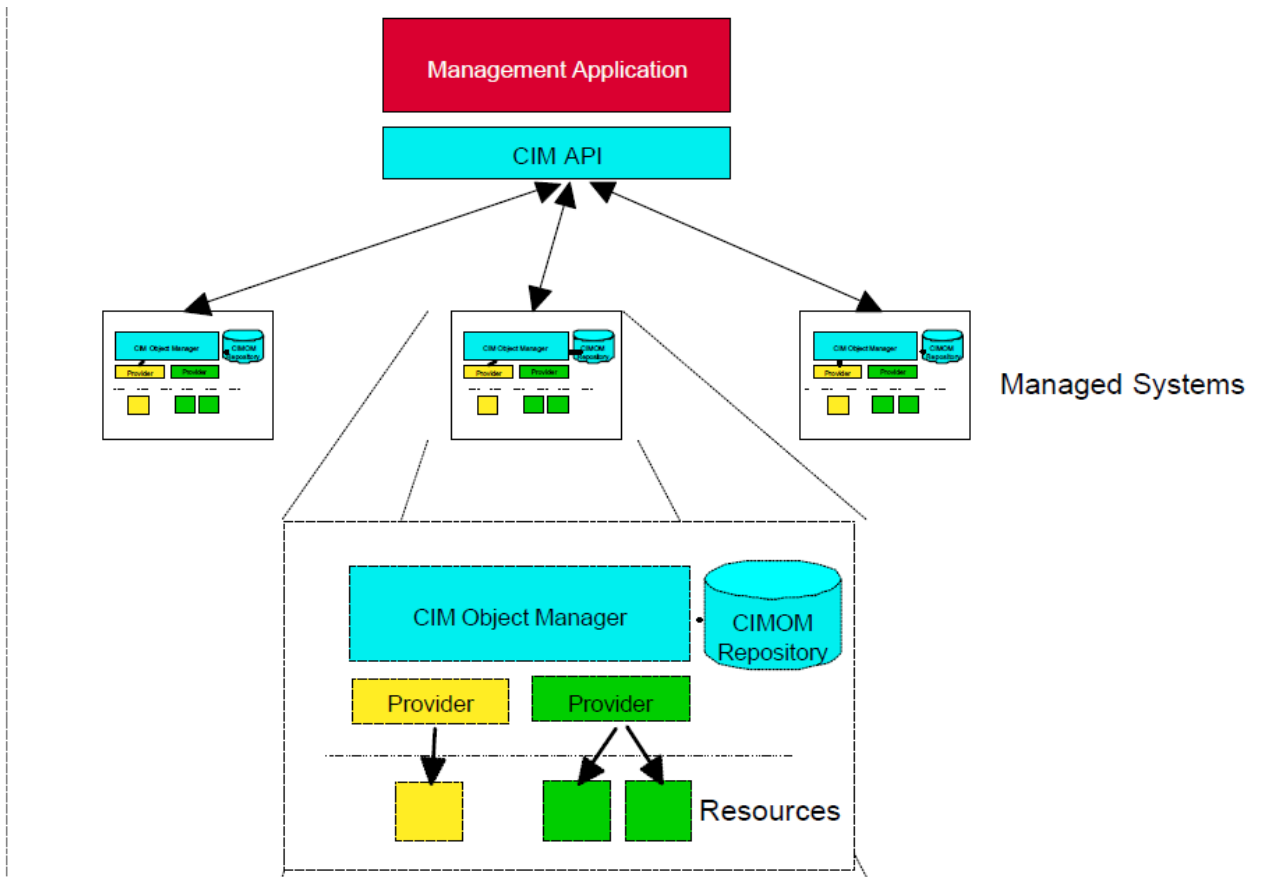
# Operating System Management with CIM and Open Source



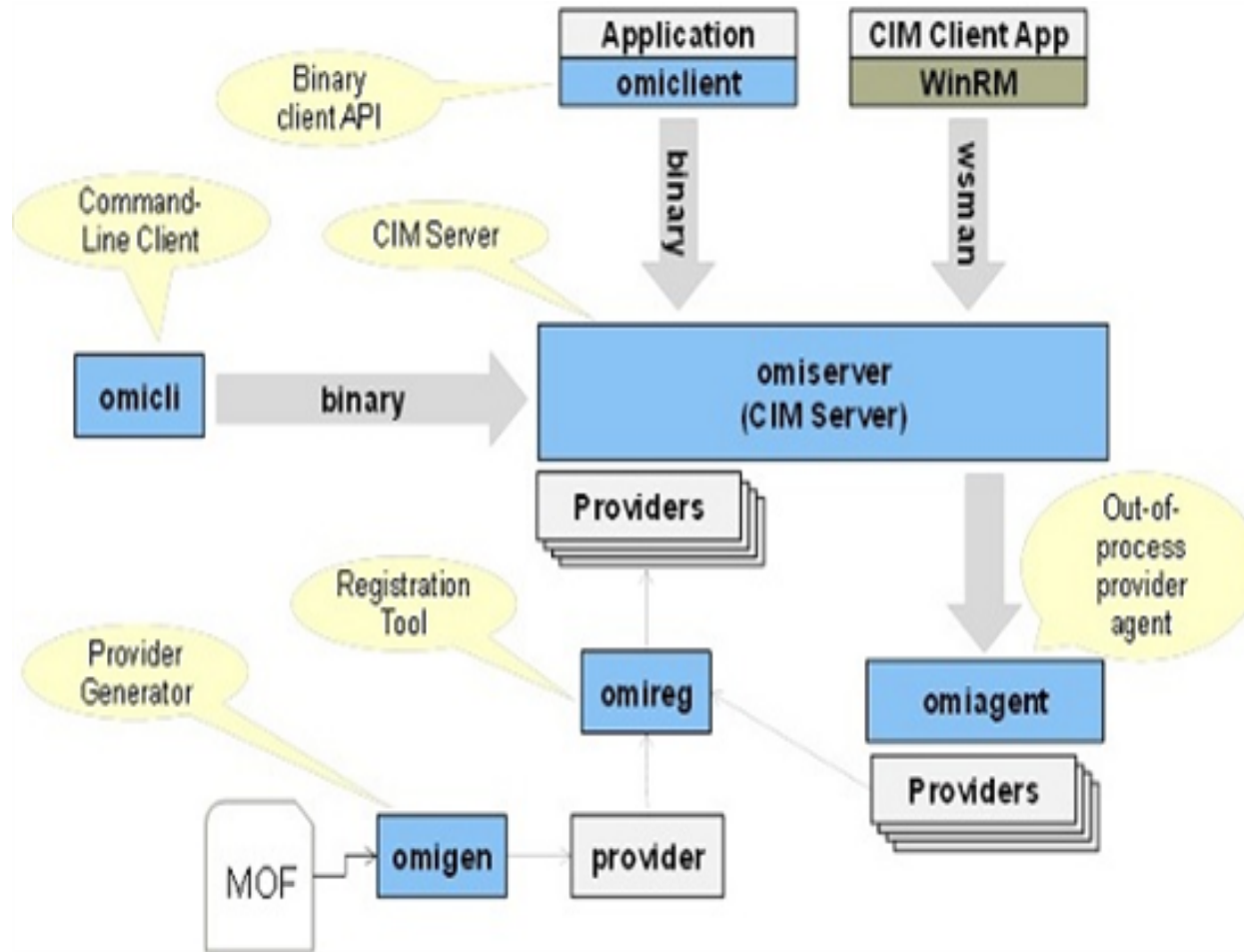
Most every distro of linux would fit into this diagram in some fashion

# Operating System Management with CIM and Open Source

Or this one- see 25s



# Or Microsoft!



- OMI can even be thought of as a Data Center Abstraction Layer!
- OMI will perform the same functions for Cloud / SDDCs as HAL did for x86 platforms!
- I believe Microsoft is being too humble and not promoting this approach well enough into standards and open source communities!

Look again at 18s!!!



## More OS Info!

- ‘Deep Dive CIM and SBLIM’ – 26
- ‘CIM Models of Apache Web Server apps’ – 27
- ‘HPC Cluster Management with CIM’ – 28
- ‘Using CIM Tools to Manage Dell’ – 29
- Various WBEM Research papers, topics and tutorials from RedHat, SUSE, Fedora, linux general – 30s
- The Open Group past APTS on CIM and OMI- 31
- “Love Story” – 32
- IBM and CIM Management- 33



# Everything Else with Open Source

- CIM as, with, on, in Ontologies- 34s
- Open Source Tools – 35 (especially Wheeler's top 20)
- And on...

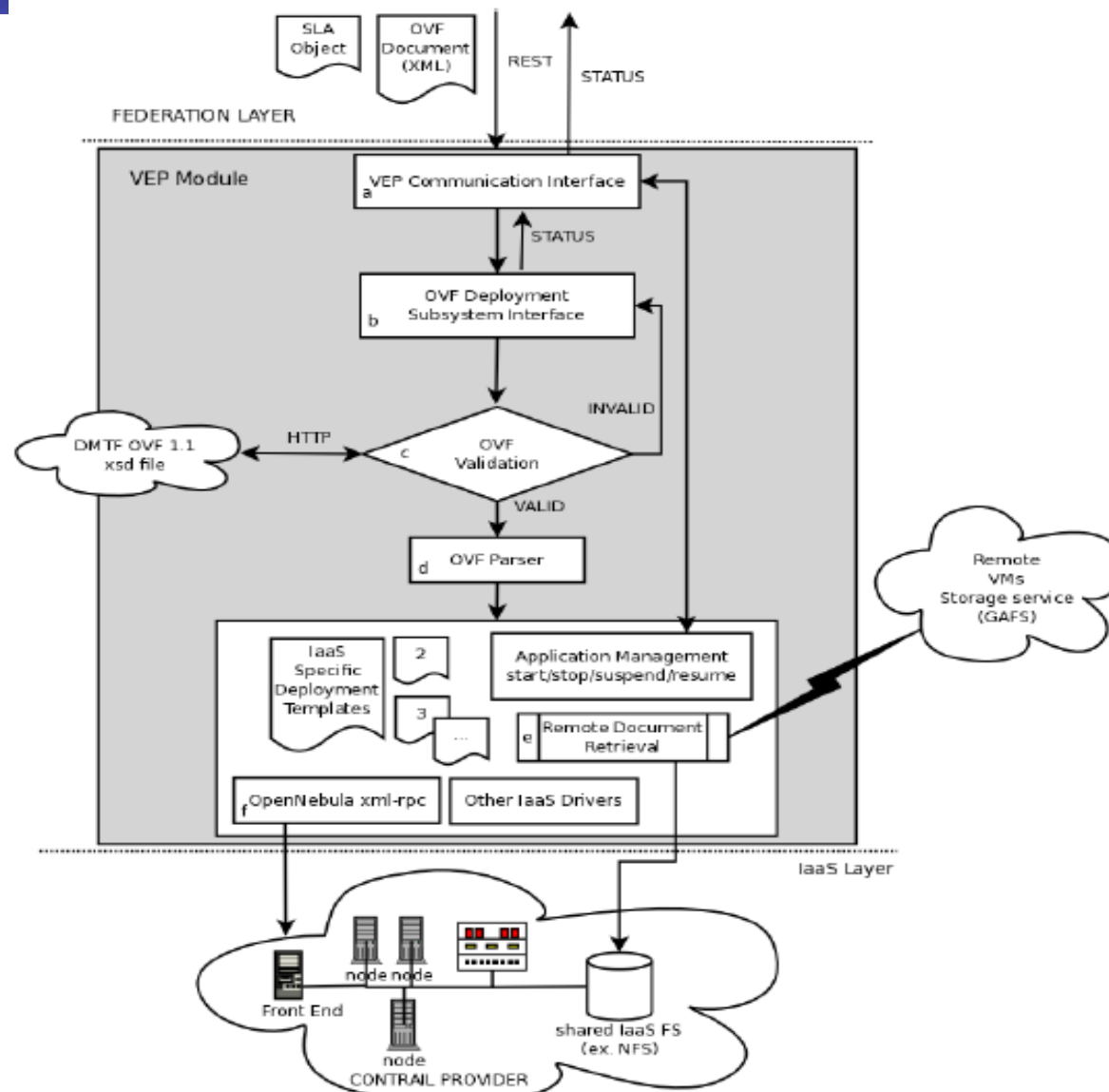
**NEXT!!!**

*BREAK first*

- *2-Part Ganeti tutorial with VirtualBox “Hands-on Virtualization” - 36s*

# OVF and Open Source Tools

- Must Start with Contrail Infrastructure Management with OVF! - 37



# OVF Tool Demos

- 38- Building Virtual Appliances using the OVF Toolkit

# References

- Text