

# Cloud Computing with IBM System z

## Share Boston Session 7151 August 2010

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IBM Cloud Computing

## Cloud Computing with System z

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- This document represents the author's views and opinions.

It does not necessarily represent IBM's position or strategies

Thanks to the following people for there contribution

-Dr. Kristof Kloeckner, Gerd Breiter, Michael Behrendt, Dr. Michael Waidner,  
Claudia Prawirakusuma, Elisabeth Puritscher,



## Agenda

- **Cloud Computing Introduction**

- On it's Way to Become a Standard ... NIST and DMTF
- An Evolution from Known Technologies It's More than Virtualization
- Delivery Models – Private -> Public Clouds
- Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), Business process as a Service

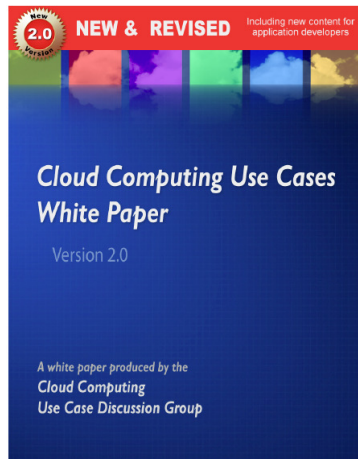
- **IBM System z Cloud Solution's**

- A World Wide Federated Cloud project on IBM System z
- Boeblingen Tivoli Service Automation Manager setup and example
- A walk to Tivoli Service Automation Manager setup after installation
- Solution Edition for Cloud Computing and Data Cloud

- **Summary & Discussion**

## Cloud Computing – On Its Way to become a Standard ... NIST

<http://csrc.nist.gov/groups/SNS/cloud-computing/>



5

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## Cloud Computing – On Its Way to become a Standard ... DMTF

DMTF- Total 100 member companies

### DMTF Board Companies



### DMTF Leadership Companies

BMC Software  
Brocade Communications  
Cisco  
ETRI  
Lenovo  
Rackspace  
Red Hat  
Savvis  
SunGard  
WBEM Solutions  
Yahoo, Inc.



<http://www.brighttalk.com/webcasts/7078/play>

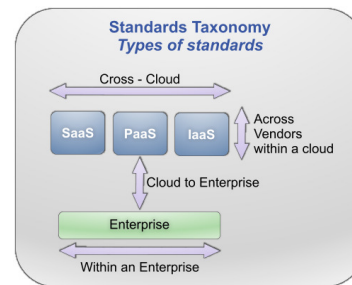
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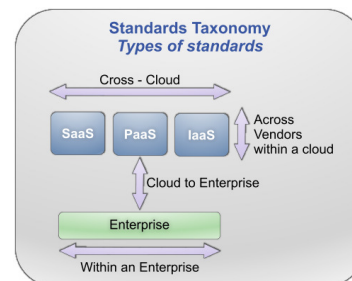
## IBM's Perspective on Cloud Standards

- Since there is a diversity in the types of cloud platforms and models, open standards are a critical customer requirement
- IBM believes that the industry should align around a core set of principles defined by the Open Cloud Manifesto. The most important of these principles are:
  - Existing standards should be reused
  - All standards efforts should be based on customer requirements
  - Standards development efforts should stay coordinated
- IBM initiated a community based use case effort that collects customer requirements for an open cloud:
  - First draft completed 8/2009. Broad industry participation/interest (1000 participants with 30+ contributors)
  - Common API's was a common theme for version 2
  - Version 3 is focused on Security and SLA's

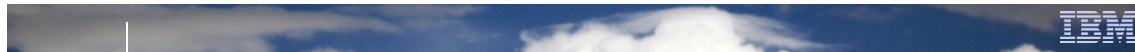


## IBM's Perspective on Cloud Standards

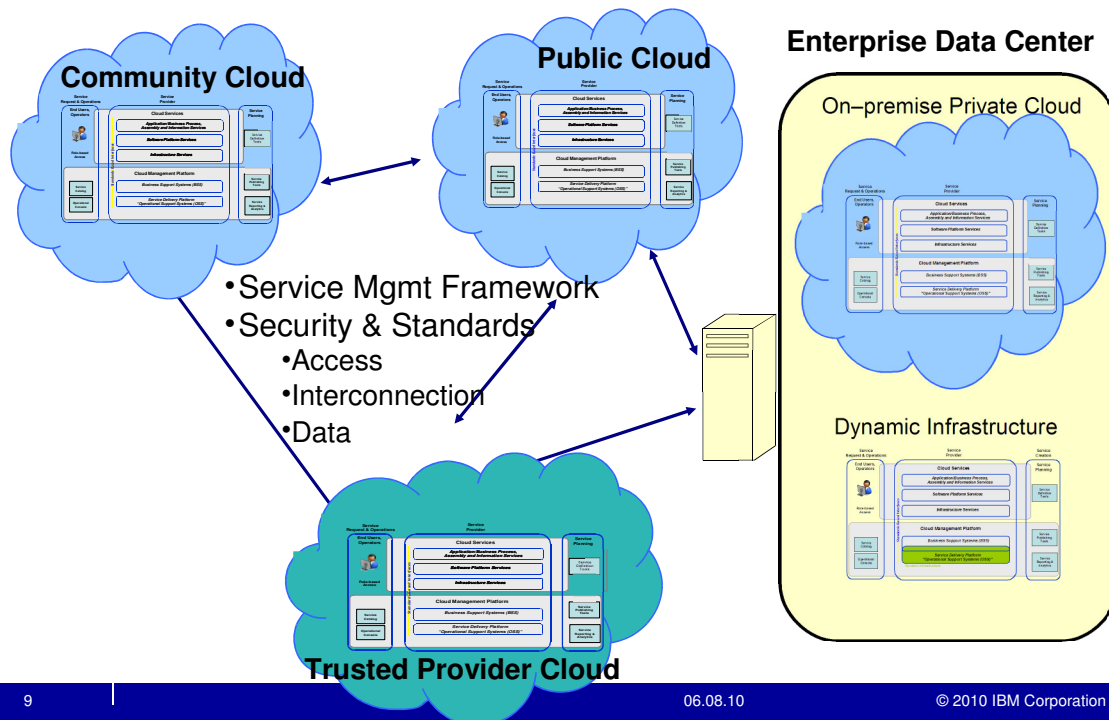
- IBM partners with Zend, Microsoft and others on common API's for developers: SimpleCloudAPI.org
  - A new open source initiative which enables developers to build truly portable cloud applications.
- We are working with standard orgs to drive standards in several key areas:
  - Virtualization
  - Security
  - Common interfaces to ensure flexibility in moving applications and data (API's)
  - Tools and development languages
  - Programming / Platform model / Data Integration
  - Management and governance systems interfaces (API's)
  - Metering, monitoring, deployment, service lifecycle
  - Network







## Standards, Interconnects, & Management will drive Cloud Adoption



9

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## Cloud Computing: The next step in the evolution of IT

### 1. Centralized Computing: 1960 –

- Optimized for sharing, industrial strength, systems management, ...
- Managed by central IT organization
- Back office applications involving transactions, shared data bases, ...
- Mainframes, supercomputers, minicomputers, ...

### 2. Client/Server: 1985 –

- Optimized for low costs, simplicity, flexibility, ...
- Distributed management across multiple departments and organizations
- Large numbers of PC-based applications
- PC-based clients and servers, Unix, Linux, ...

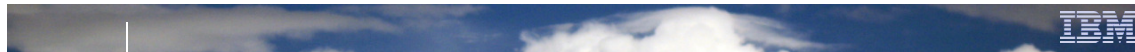
### 3. Cloud Computing: 2010 –

- **New consumption and delivery model**
- Optimized for massive scalability, delivery of services, ...
- Centralized model, hybrid service acquisition models
- Supports huge numbers of mobile devices and sensors
- Internet technology-based architecture

**Just like introducing the Client/Server model impacted almost everything we did in IT (operation IT, developing applications, ...), Cloud computing has severe impact on the IT industry**

10

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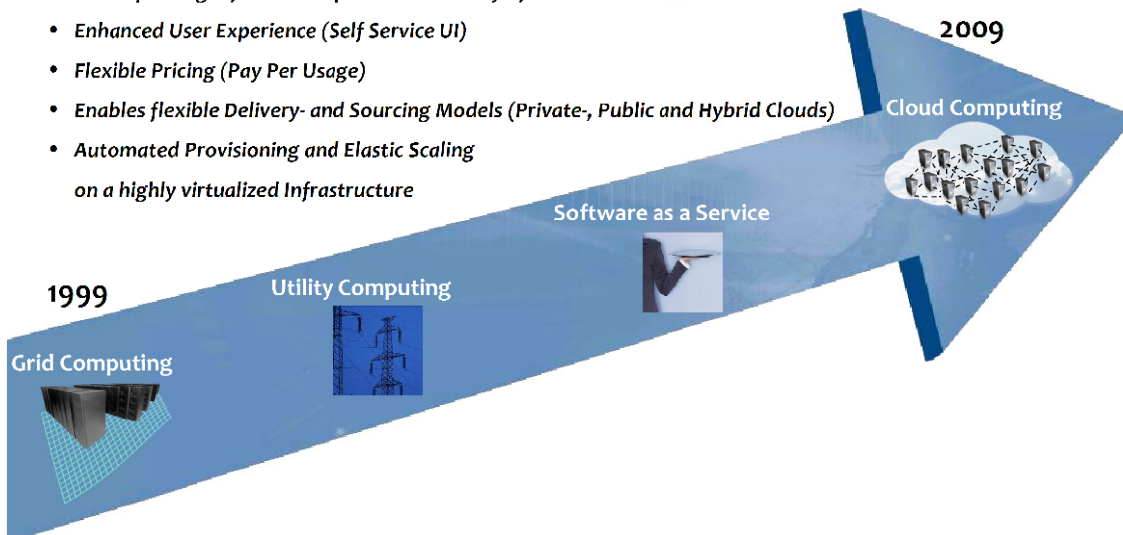


## Cloud Computing – a Disruptive New Paradigm

*“Clouds will transform the information technology (IT) industry... profoundly change the way people work and companies operate.”*

**The Economist**

- A new paradigm for consumption and delivery of IT based services
- Enhanced User Experience (Self Service UI)
- Flexible Pricing (Pay Per Usage)
- Enables flexible Delivery- and Sourcing Models (Private-, Public and Hybrid Clouds)
- Automated Provisioning and Elastic Scaling on a highly virtualized Infrastructure



11

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## Cloud-onomics...

### Cloud Computing – It's More Than Virtualization



...leverages virtualization, standardization and automation to free up operational budget for new investment



...allowing you to optimize new investments for direct business benefits

12

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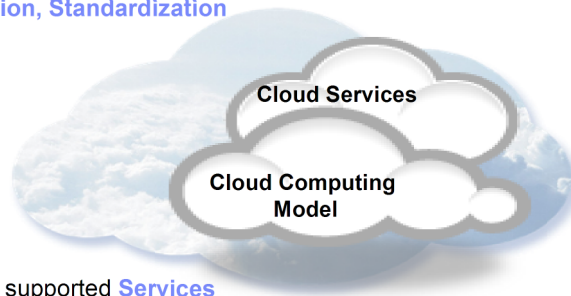
## Cloud: Consumption & Delivery Models Optimized by Workload

“Cloud” is a **new consumption and delivery model** inspired by consumer Internet services.

Enabled by **Virtualization, (Service) Automation, Standardization**

Cloud enables:

- Self-service
- Sourcing options
- Economies-of-scale



“Cloud” represents:

- The **Industrialization** of **Delivery** for IT supported **Services**

Multiple Types of Clouds will co-exist:

- **Private, Public** and Hybrid
- **Workload** and / or **Programming Model** Specific

13

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## Cloud Computing – More Challenges To Come – Security, ROI,...

Next on BrightTALK	Previously on BrightTALK
<p>View more upcoming webcasts (12)</p> <p><b>Building Cloud Infrastructures</b></p> <p>14 Jan 2010 8:00 pm Presenting Mike Adams, vSphere Senior Product.. Channel Virtualization Tags virtualization, vSphere, service-level, automation</p> <p>Attend</p>	<p>View more recorded webcasts (119)</p> <p><b>Implementing Hybrid Clouds</b></p> <p>Presenting David Griffin Channel Storage Management Insight integrated Date 17 Dec 2009 Duration 00h 57m Tags cloud</p> <p>***** Play</p>
<p><b>Virtualization Leading to Intelligent, On-Demand Computing</b></p> <p>14 Jan 2010 10:00 pm Presenting Ed Sladek, Dell Data Center &amp;... Channel Virtualization Tags virtualization, best practices, cloud computing</p> <p>Attend</p>	<p><b>Securing the Physical, Virtual, Cloud Continuum</b></p> <p>Presenting Ted Ritter &amp; Harish Agastya Channel Trend Micro Enterprise Webinar Series Date 17 Dec 2009 Duration 01h 01m Tags security, virtual, data, center, cloud, computing</p> <p>***** Play</p>
	<p><b>Cloud Implementation: Where does Payback &amp; ROI Come From?</b></p> <p>Presenting Richard Mayo, Senior Marketing Mgr... Channel Cloud Computing Date 16 Dec 2009 Duration 00h 41m Tags cloud, implementation, ROI, payback</p> <p>***** Play</p>
	<p><b>Compliance in the Cloud, a Roundtable Discussion</b></p> <p>Presenting Justin Steinman of Novell, Russ Dietz of... Channel Governance, Risk, and Compliance Date 15 Dec 2009 Duration 00h 48m Tags Compliance, GRC, Cloud Computing, Cloud Security</p> <p>***** Play</p>

<http://www.brighttalk.com/webcasts/search/cloud>

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## Security Is Limited By The Weakest Link



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## Security Remains the Top Concern for Cloud Adoption

# 80%

Of enterprises consider security the #1 inhibitor to cloud adoptions

# 48%

Of enterprises are concerned about the reliability of clouds

# 33%

Of respondents are concerned with cloud interfering with their ability to comply with regulations

*"How can we be assured that our data will not be leaked and that the vendors have the technology and the governance to control its employees from stealing data?"*

*"Security is the biggest concern. I don't worry much about the other '-ities' – reliability, availability, etc."*

*"I prefer internal cloud to IaaS. When the service is kept internally, I am more comfortable with the security that it offers."*

Source: Driving Profitable Growth Through Cloud Computing, IBM Study (conducted by Oliver Wyman)

16

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## Specific Customer Concerns Related to Security

Protection of intellectual property and <u>data</u>	30%
Ability to enforce regulatory or contractual obligations	21%
Unauthorized use of <u>data</u>	15%
Confidentiality of <u>data</u>	12%
Availability of <u>data</u>	9%
Integrity of <u>data</u>	8%
Ability to test or audit a provider's environment	6%
Other	3%

Source: Deloitte Enterprise@Risk: Privacy and Data Protection Survey



## Top Security Threats and Risks

### Gartner: Top Risks (2008)

- Privileged user access
- Regulatory compliance
- Data location
- Data segregation
- Recovery
- Investigative support
- Long-term viability [Heiser 09]

### ENISA: Top Security Risks (2009)

- Loss of governance
- Lock-in
- Isolation failure
- Compliance risks
- Management interface compromise
- Data protection
- Insecure or incomplete data deletion
- Malicious insider

[ENISA 09/a]

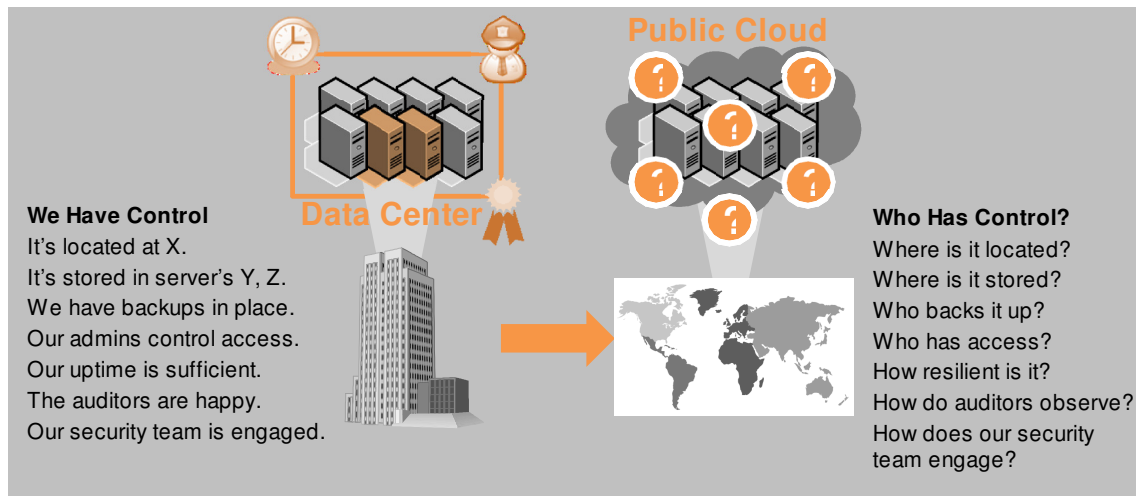
### CSA: Top Threats (2010)

- Abuse and nefarious use of cloud
- Insecure interfaces and APIs
- Malicious insiders
- Shared technology issues
- Data loss or leakage
- Account or service hijacking
- Unknown risk profile

[CSA 10]



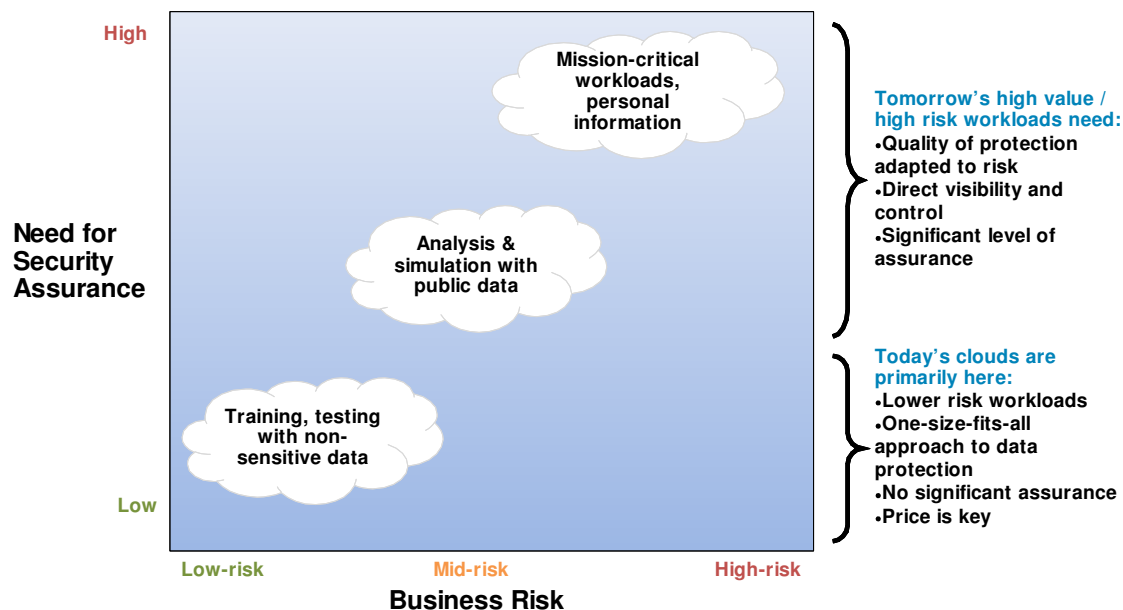
## Why is Cloud Security Perceived as Such a Big Problem?

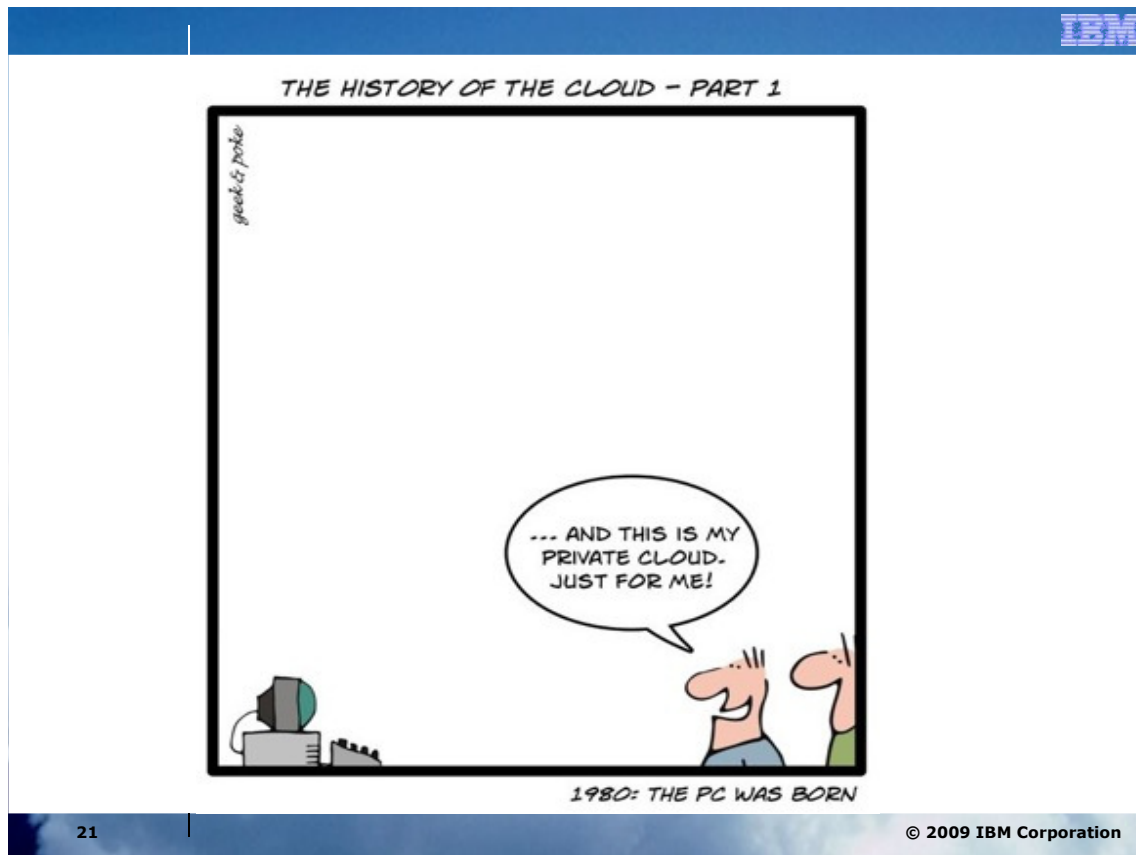


- Loss of control, perceived or real
- Lack of experience
- No established standards
- Uncertainty on how to interpret regulations and practices
- Effects
  - Public clouds rarely used for mission critical workloads
  - Preference for application-as-a-service
  - Preference for private and hybrid cloud

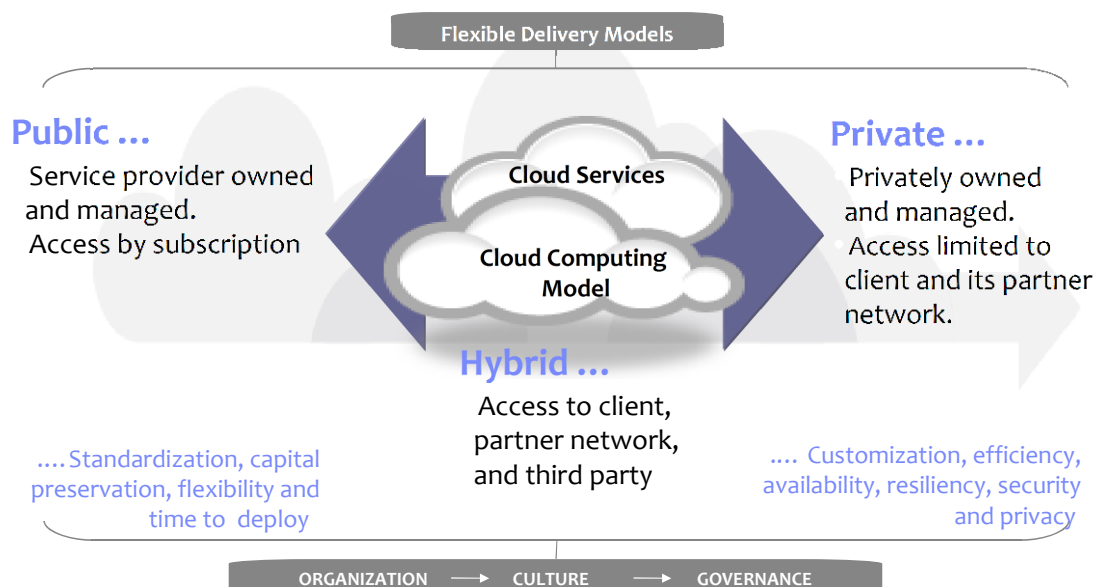
## One-size does not fit-all:

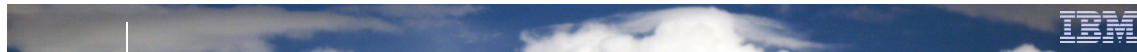
### Different cloud workloads have different risk profiles



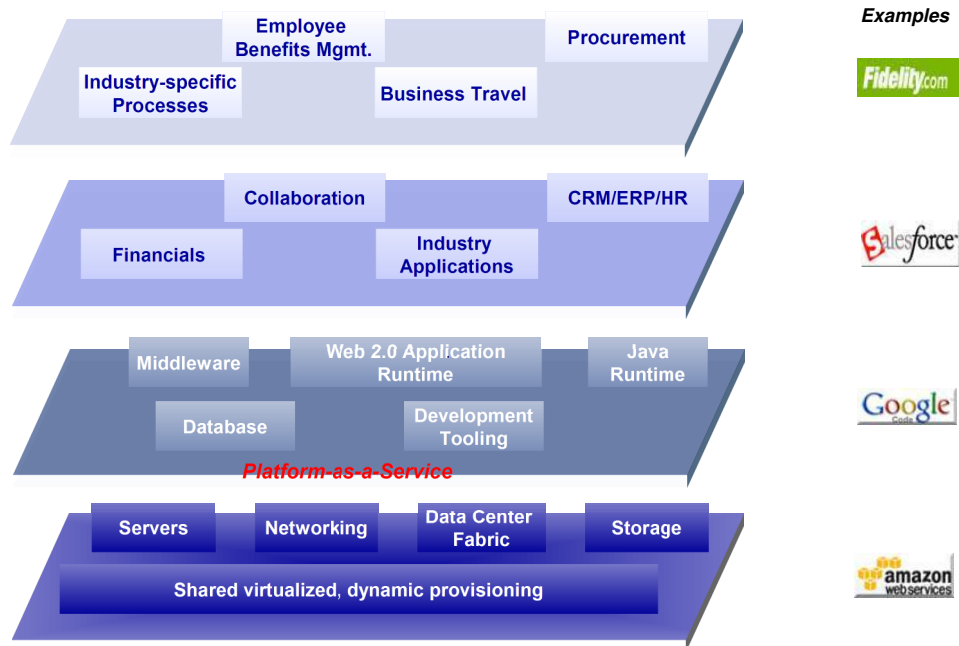


## Cloud Computing Delivery Models





## Cloud Computing Layers



23

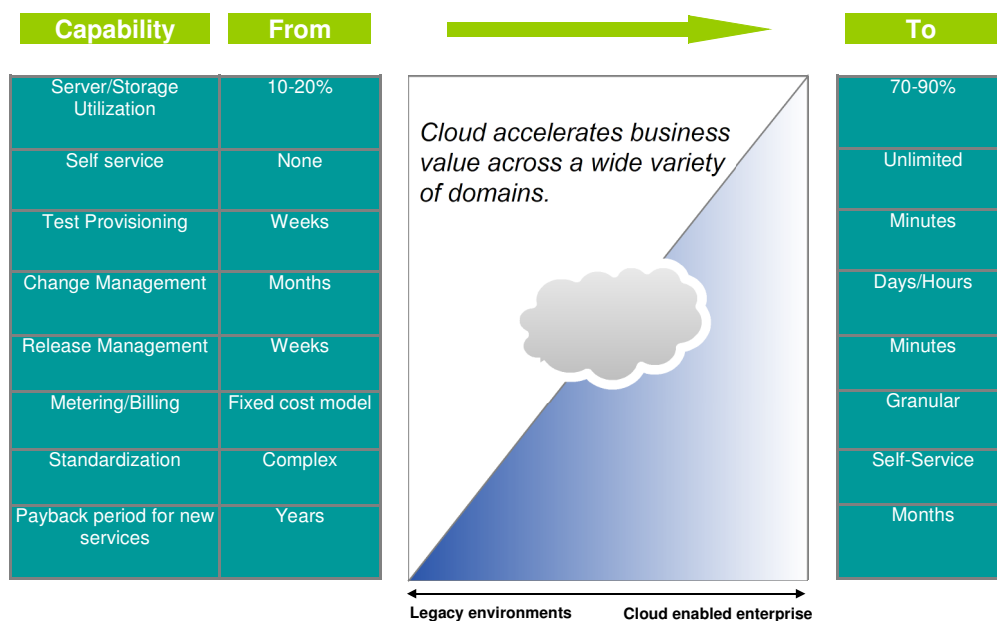
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## Enterprises Have Achieved Significant Benefits through Cloud Computing

Most of the financial benefits are due to standardization and service management automation



24

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## Five Cloud Architectures Are Emerging

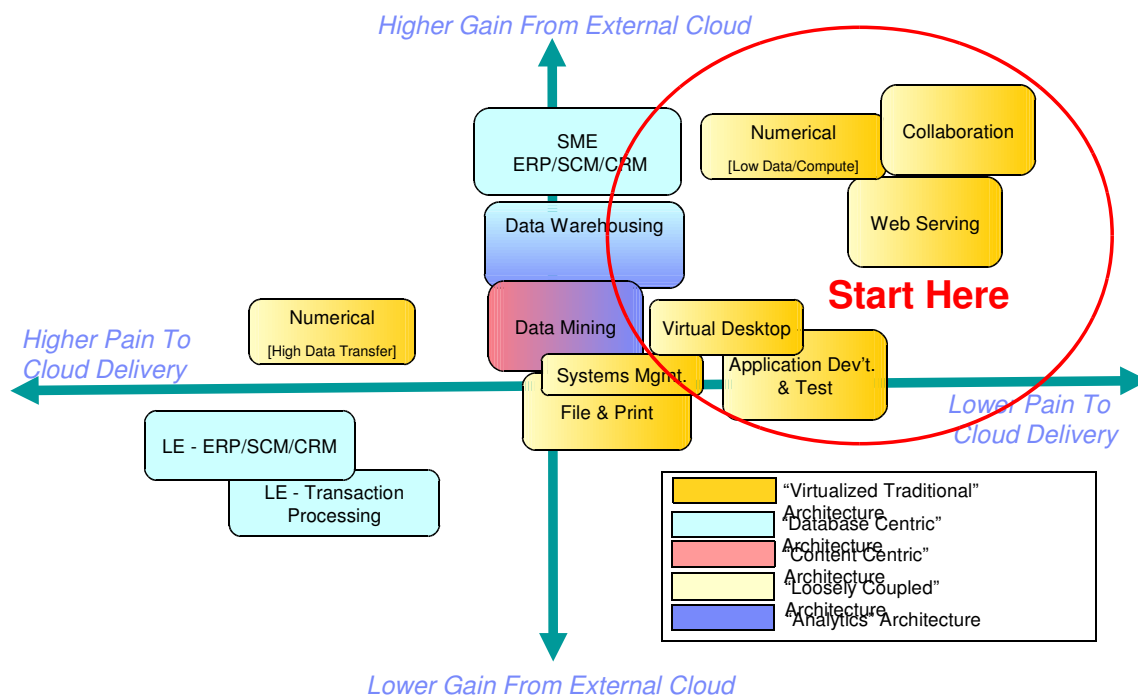


- Virtualized Traditional - Extensions of Java Application Servers, Support for 'Traditional' Transactional Workloads
  - Moving existing workloads to the cloud
  - Requires best practices, patterns, tooling
- Database Centric - data driven + small computation on small data
  - With multi-tenancy attractive for enterprise and service providers
- Content Centric - computation needs to be close to data + large computation on large data
  - Data Mining, Analytics, Data Warehouse,
- Loosely Coupled - computation and data are separate
  - Can be addressed by existing middleware, but 'relaxed consistency' models emerging
- Analytics - Data and Storage Integration

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## Clients will adopt cloud computing based on workload affinity. IBM



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## What questions to ask to determine if Cloud is a good fit?

### Key Pain Points

- Lost business opportunity because IT too slow to react. Lack of agility.
- Long deployment timelines for new systems (weeks/months+).
- Many people involved in the process, high cost & complexity.
- Many steps are manual and prone to error.
- Huge up front investment for new infrastructure when I want to start small.
- Server Sprawl
- Low Utilization
- Compliance, auditing, and security patching costly.
- Don't know what compute resources are used or how much they cost?

### Key Questions to ask?

- How quickly can you react to deliver a new IT service?
- How many steps are in the provisioning process?
- What is the ratio of system admins to servers?
- Have you experienced outages due to human error ?
- How are systems sized and scaled quickly (peak usage, CUOD)?
- How many images per user?
- Am I sized for min, mean, or peak ?
- How many different configurations used?
- What level of metering and method of charging used? How do we manage license compliance ?

27

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## Workload Fit for Public Clouds

### Workloads Moving to Public Clouds

- **Test** and Pre-production systems
- Non-business critical application domains, like **e-mail and collaboration** (e.g. LotusLive)
- Software **development environments**
- **Batch processing jobs** with limited security requirements (e.g. HPC)
- Isolated workloads where latency between components is not an issue
- **Storage** Solutions/Storage as a Service
- **Backup** Solutions/Backup & Restore as a Service
- **Data intensive** workloads if the provider has storage capabilities tied to the cloud compute offering
- **Purposed and Pre-Integrated** SW/HW solutions (virtual appliances)

### Workloads Not Yet Moving to Public Clouds

- Highly **sensitive data** workloads (e.g. employee and health care records)
- Multiple, co-dependent services (e.g. **high throughput online transaction processing**)
- Workloads requiring a high level of **auditability, accountability** (e.g. those subject to Sarbanes-Oxley)
- 3<sup>rd</sup> party software which **does not have a virtualization or cloud aware licensing** strategy
- Workloads requiring **detailed chargeback or utilization measurement** (e.g. capacity planning, dept. level billing)

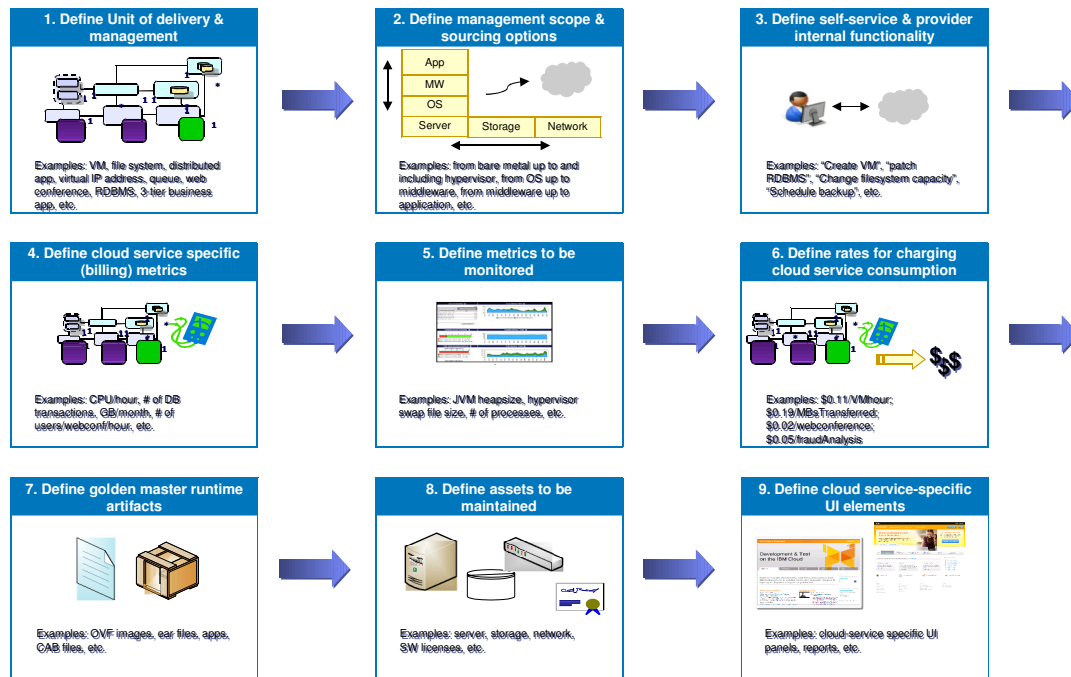
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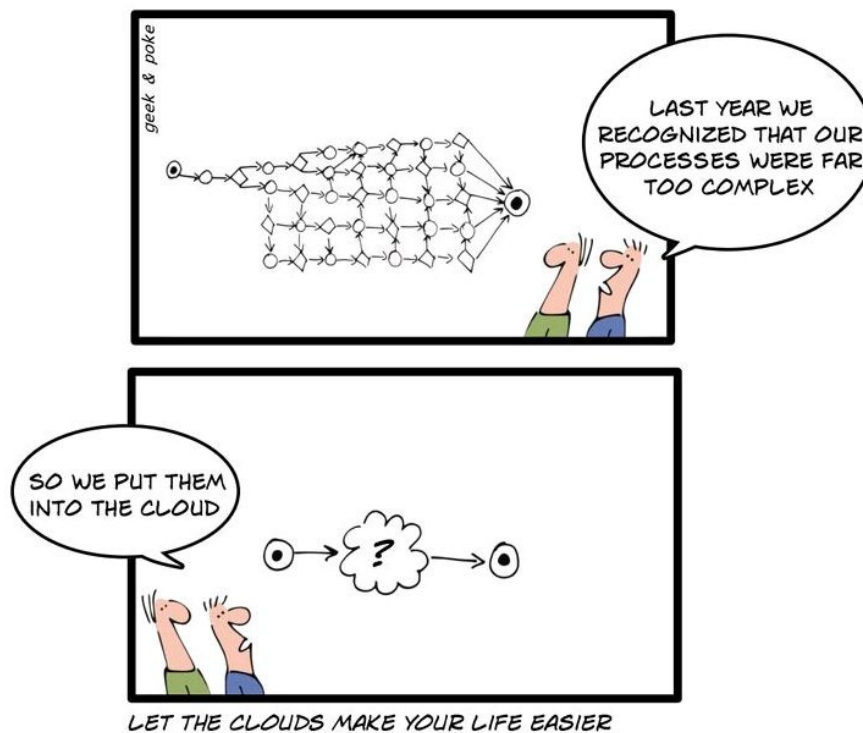
## 9 steps towards implementing a managed cloud service



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## Does Cloud Computing solve problems ?






30

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## Universal interest across all industries and geographies

Cost takeout is cited as the top value consideration		<ul style="list-style-type: none"> <li>• Cost savings are the key driver of public cloud adoption with clients seeking a 20 - 30% improvement in order to adopt</li> </ul>
Security and control are top concerns		69% say security is the top inhibitor to their use of public clouds
Workloads and patterns are emerging		<ul style="list-style-type: none"> <li>• Almost all workloads require connection to other IT services</li> <li>• Collaboration and analytics meta-patterns are emerging</li> </ul>
Industries with the greatest cost pressures lead adoption		<ul style="list-style-type: none"> <li>• Over 50% of clients in Retail, Manufacturing, Utilities, Government have cloud projects budgeted or in process</li> </ul>

31

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## Lessons learned summary (1)



- Cloud Computing does achieve cost savings – really.
  - Cost savings justify the investment
- It's a transformative process
  - Drive from executive level
  - Focus on people and process rather than technology
  - Requires new roles and changes methods
- All usual laws for introducing new technology apply
  - Start with a pilot
  - Sound project foundations need to in place
  - Be driven by the requirements, not the solution
  - Use incremental and phased approach to balance risk, build consensus and demonstrate early savings

32

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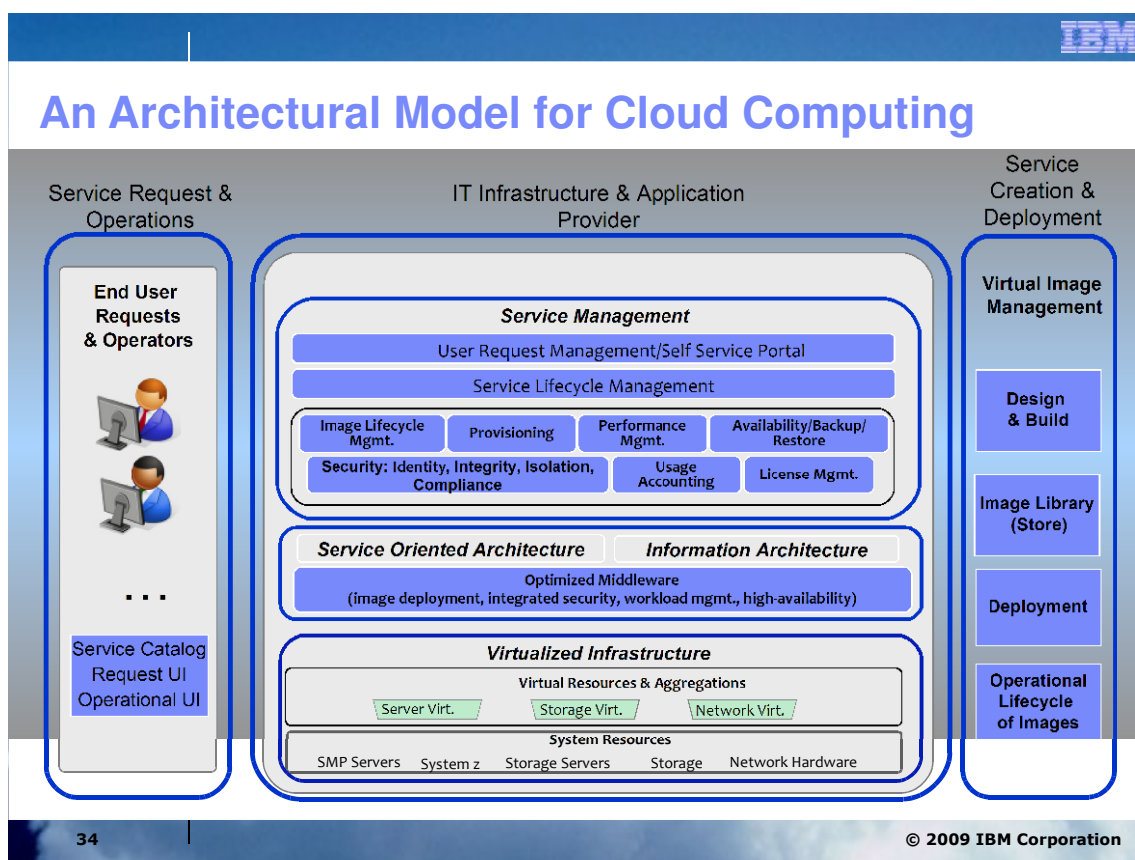
## Lessons learned summary (2)



- Cloud has its sceptics and challenges – stakeholder management is critical
- Automate & optimize across technology, processes and organizations
  - Optimize deployment process to maximise greatest benefits of automation move non-critical path steps out entirely
  - Design Service Catalog carefully to minimise the number of variations and achieve standardization
- Cloud Computing is maturing very rapidly – significant business benefits can already be achieved today

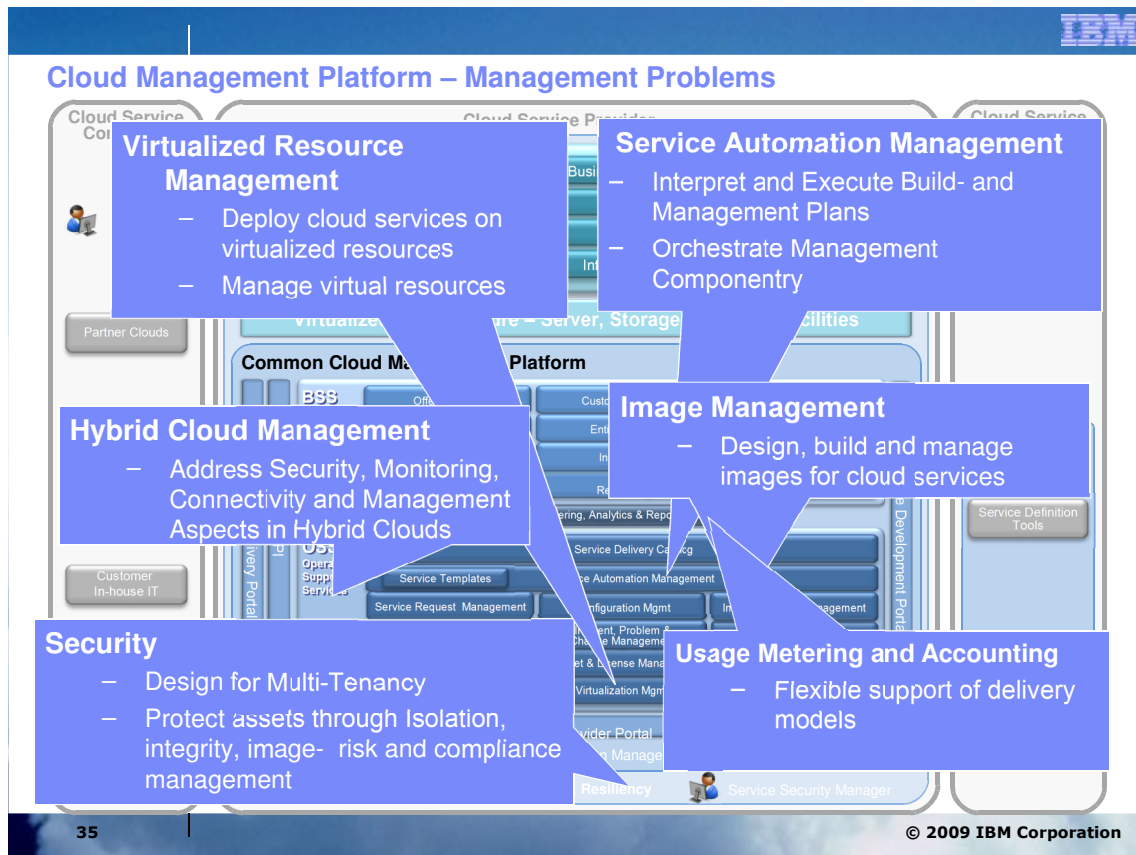
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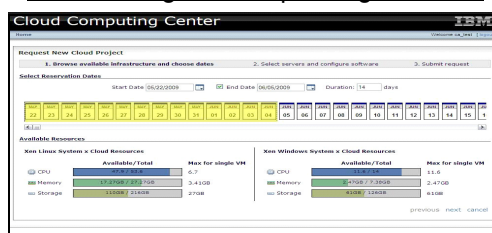
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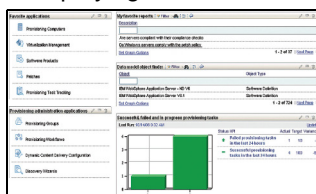
## Integrated Service Management is the Underpinning of Clouds



### For Locating and Requesting Services



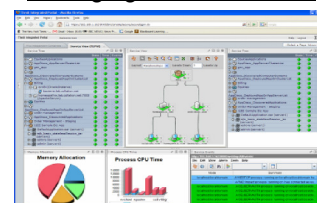
### Deploying Cloud Services



Automated Provisioning and Image Management

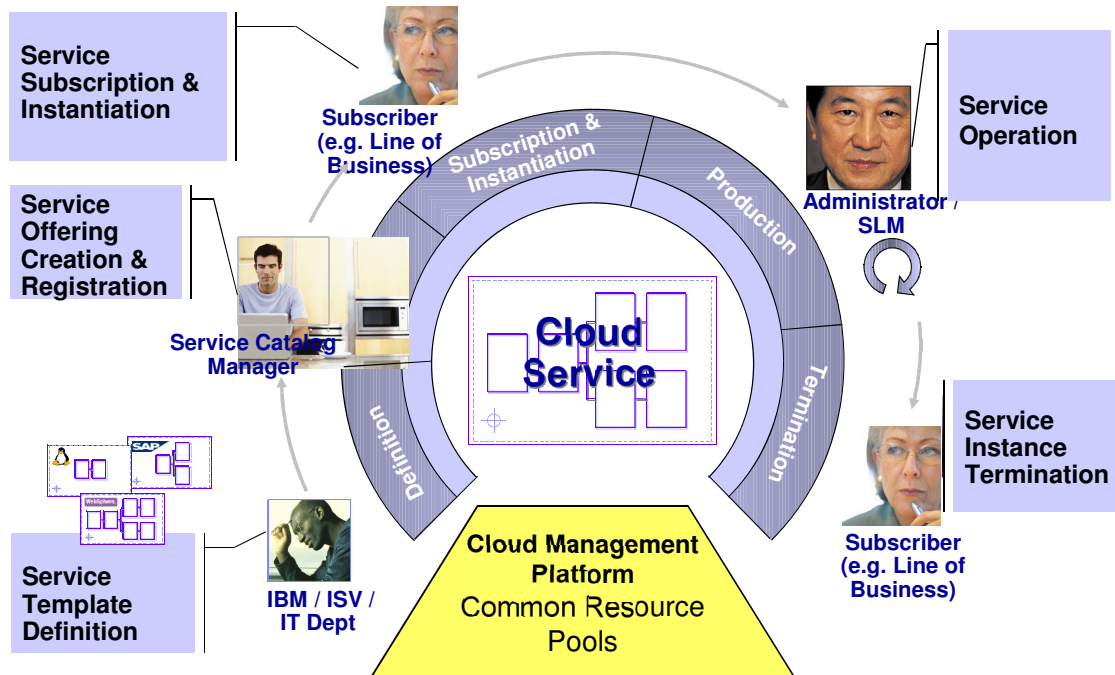
Secure User Centric Self-Service Portal, Automation Engine and Catalog

### Managing Cloud Services



Monitoring, Security and Metering

## Lifecycle of a Cloud Service



37

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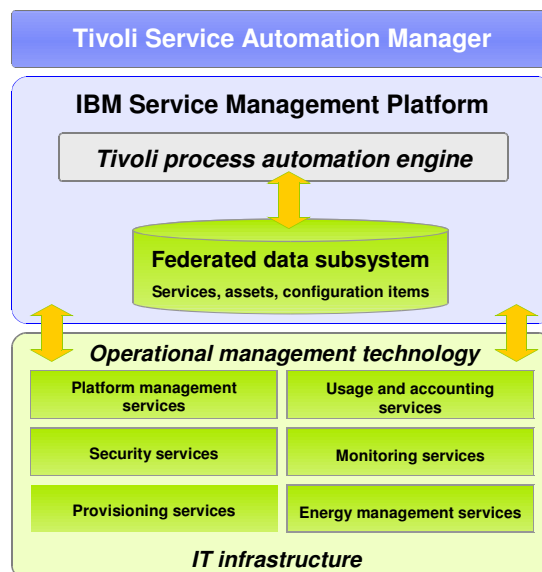


## IBM Tivoli Service Automation Manager

*Aggregated capabilities for managing your cloud environment*

### IBM Tivoli® Service Automation Manager

- Built on top of the IBM Service Management Platform
- Orchestrates technology, processes, people and data to provide cloud computing services and service management of cloud computing
- Provides rapid provisioning of physical and virtual resources



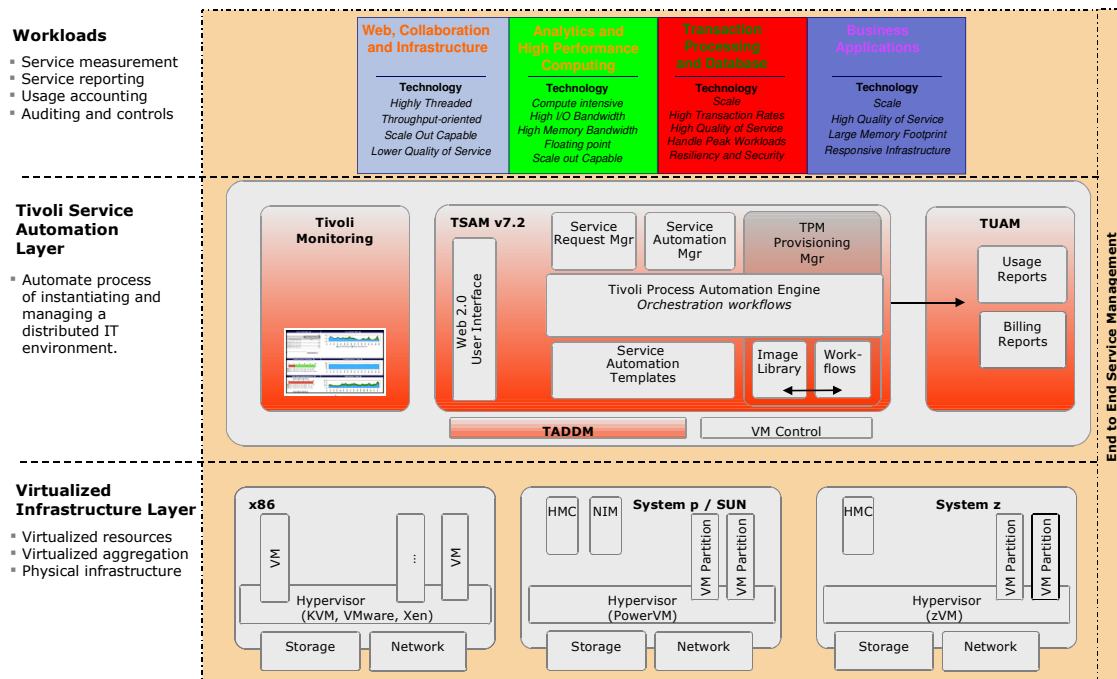
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## Typical Cloud Management Platform Middleware Stack

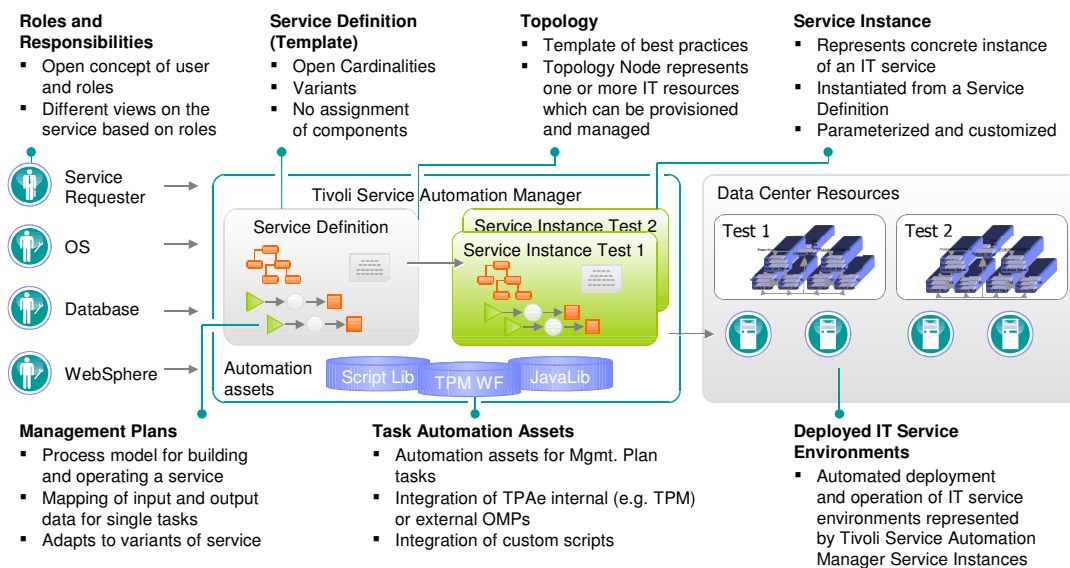


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## Tivoli Service Automation Manager Concepts



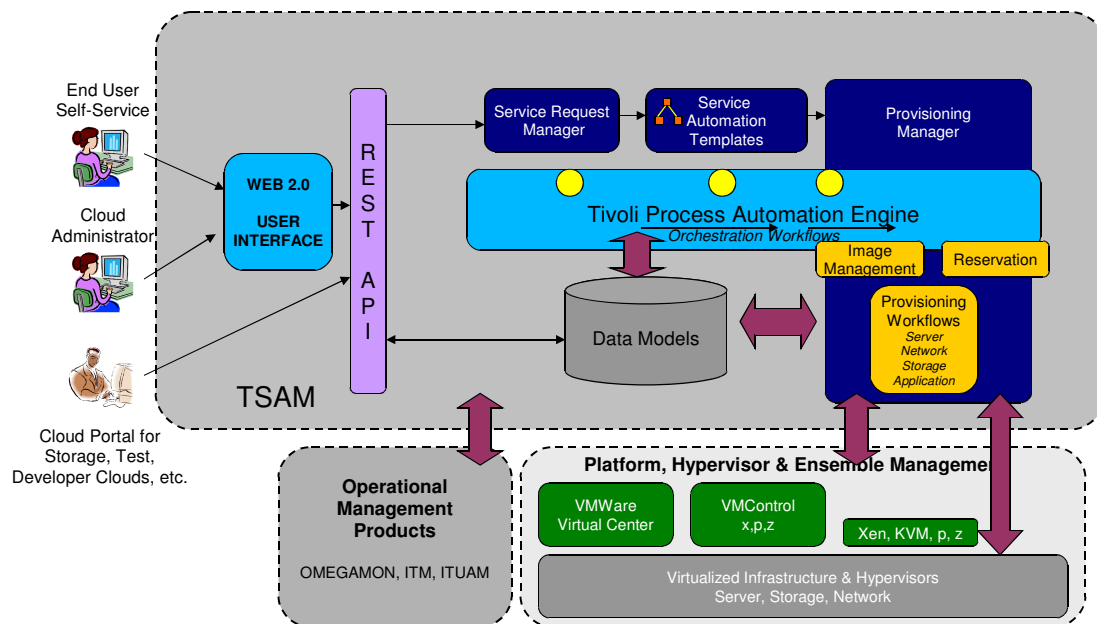
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## The management services from Tivoli



*Converged service delivery platform for cloud computing*



41

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## Tivoli Service Automation Manager Supported Systems



Management Server

Platform	OS	OS Comment	Admin WS support
System-z	SLES 10 64bit		-- not available --
System-p	AIX 6.1 / AIX 5.3 64bit		-- not available --
System-x	SLES 10 RH 5.4 64bit		Win2003, Win2008, WinXP, WinVista SLES 10.2 64bit (required for Cloudburst)

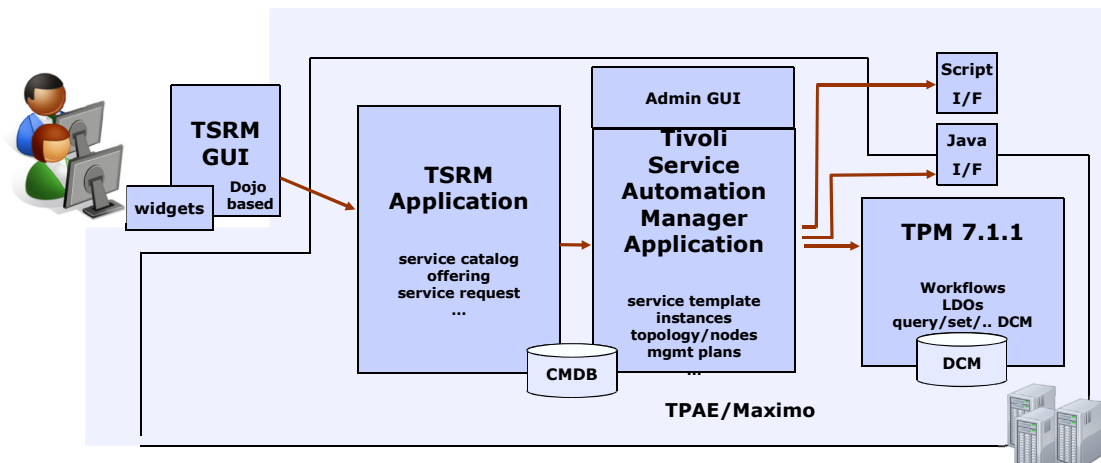
Managed Server

Platform	Hypervisor	Guest
System-z	z/VM 5.4	RHEL 5.4 64 bit SLES 10 64 bit
System-p	P-Hypervisor	AIX 5.3, AIX 6.1 64 bit,
System-x	VMware ESXi 3.5 U4	RHEL 5.4, SLES 10.2, CentOS 5.3 32/64 bit, Windows XP/Vista/2008
System-x	XEN on RHEL	RHEL 5.4, SLES 10.2, CentOS 5.3 32/64 bit
System-x	KVM on RHEL 5.4	RHEL 5.4 64 bit

42

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## IBM Tivoli Service Automation Manager 7.2 – Components



### GUI

- Interaction with end user
- Collect parameters for management plans

### SRM

- Prepare service request from given input parameters
- Perform reservation of resources
- Approval and notifications on business level

### Tivoli Service Automation Mgr

- Topology definition
- Orchestration by management plans
- Management plan definition
- Management plan execution - push down on eg. TPM (or Script)
- Approval and notifications on technical level (admin)
- Situation governance incl. error handling by admin
- Work assignments on admin level ("inbox")

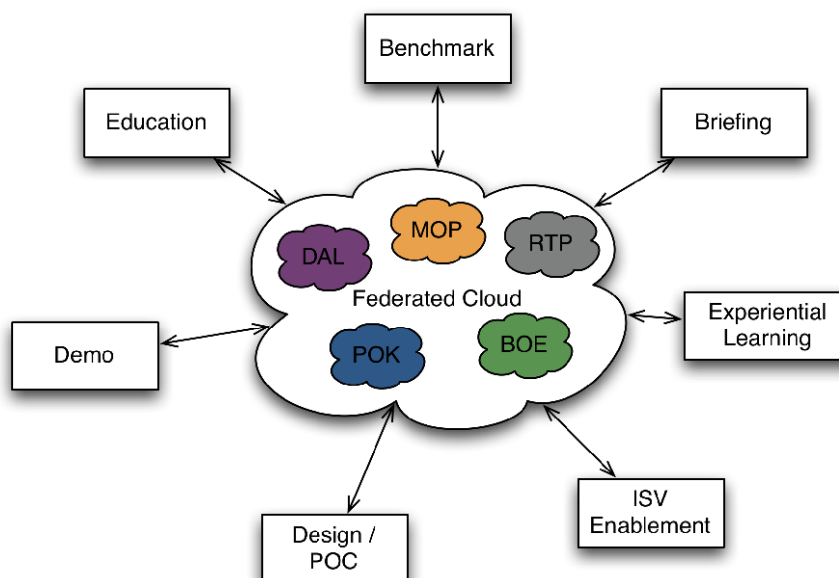
### TPM

- Management plan fulfillment by executing TPM workflows/LDOs ... or native scripts ... or Java based actions ... or manual tasks
- Change resource state

43

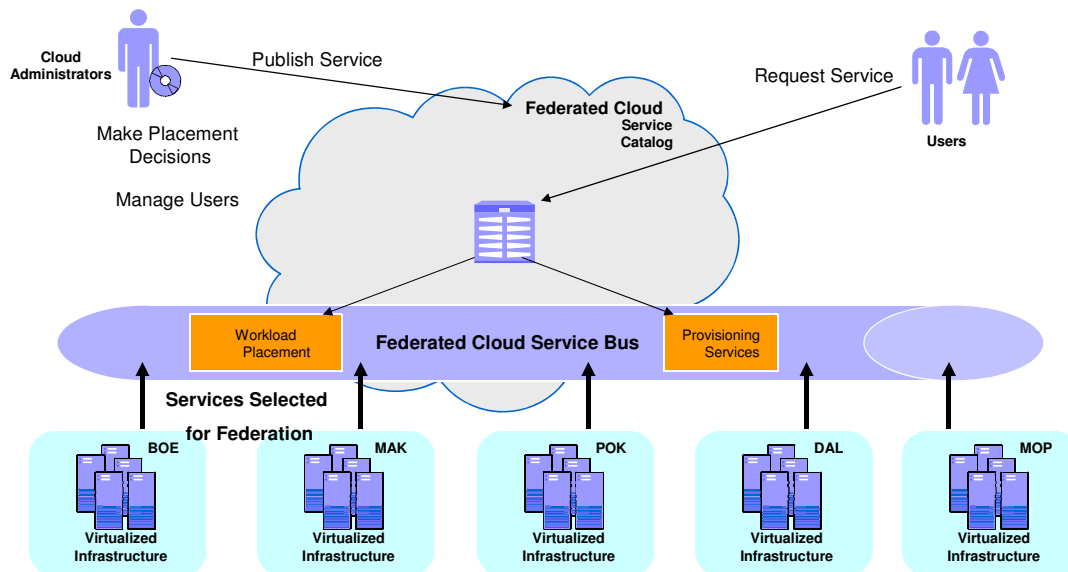
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## Local and or Federated Business Services

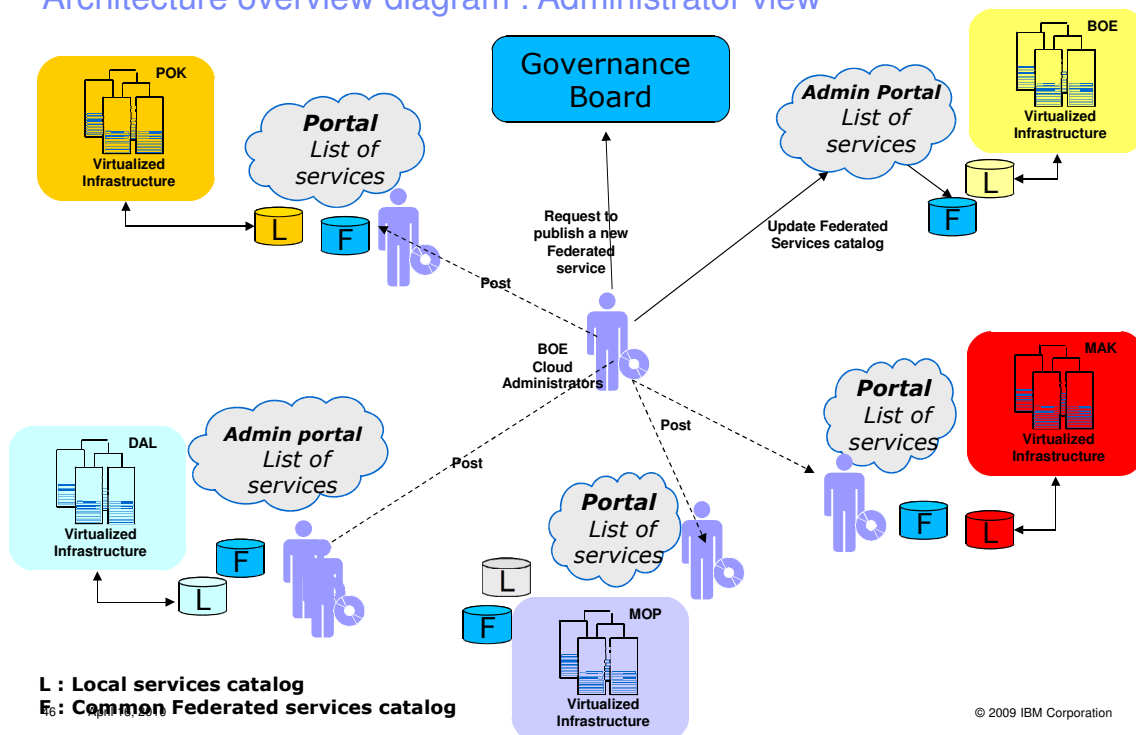




## STG Federated Cloud



## Architecture overview diagram : Administrator view





## Criteria for service federation : Work in Progress

- Business value of the service with measurable KPI:
  - Leverage others centers capabilities
  - Avoid development/ownership of assets...reuse existing solutions and assets
  - Increase HW utilization...could optimize it
- Frequency of utilization of the service:
  - Several times a month
- Standardization of the service
  - Few choices among options
  - Limited set of functions
- Robustness of the service
  - No important requirement for availability of support for the service
  - Potential issues and fixes
- Others

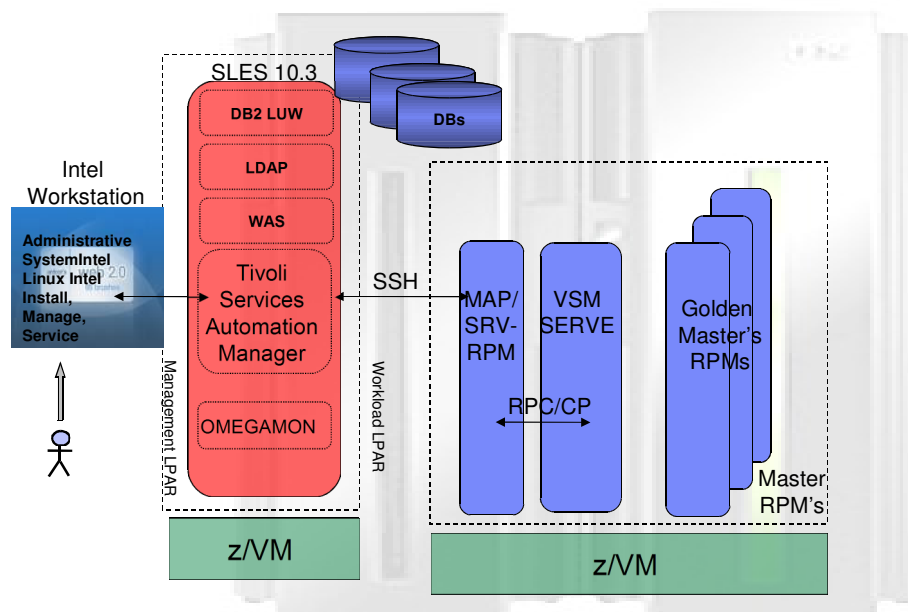
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## Tivoli Service Automation Manager Boeblingen Setup

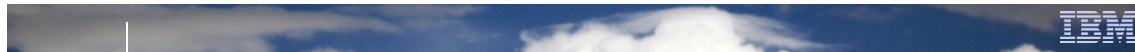


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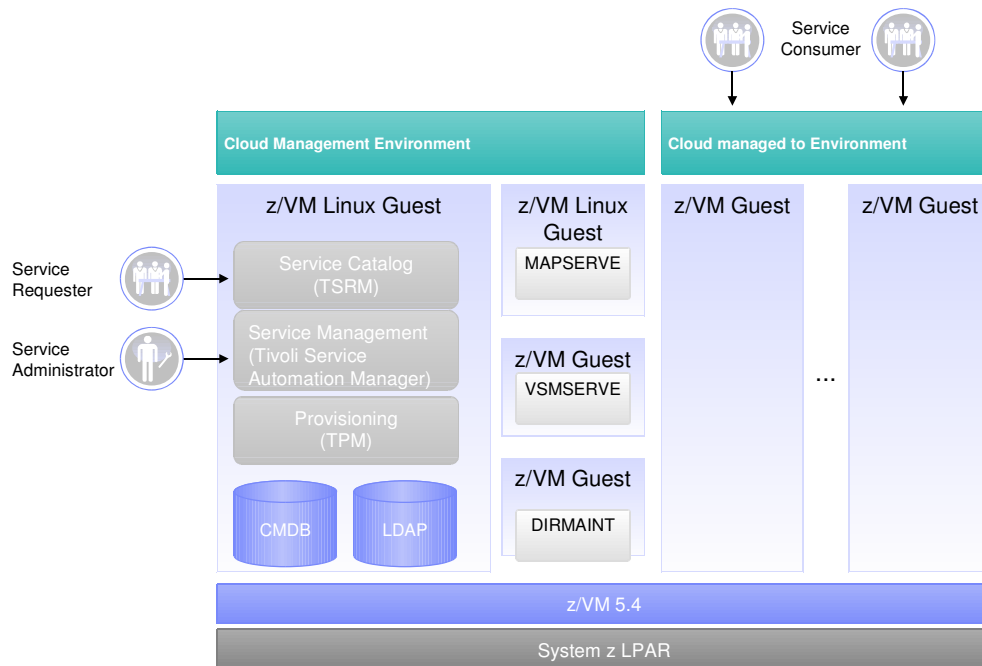
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## Environment Setup - Example



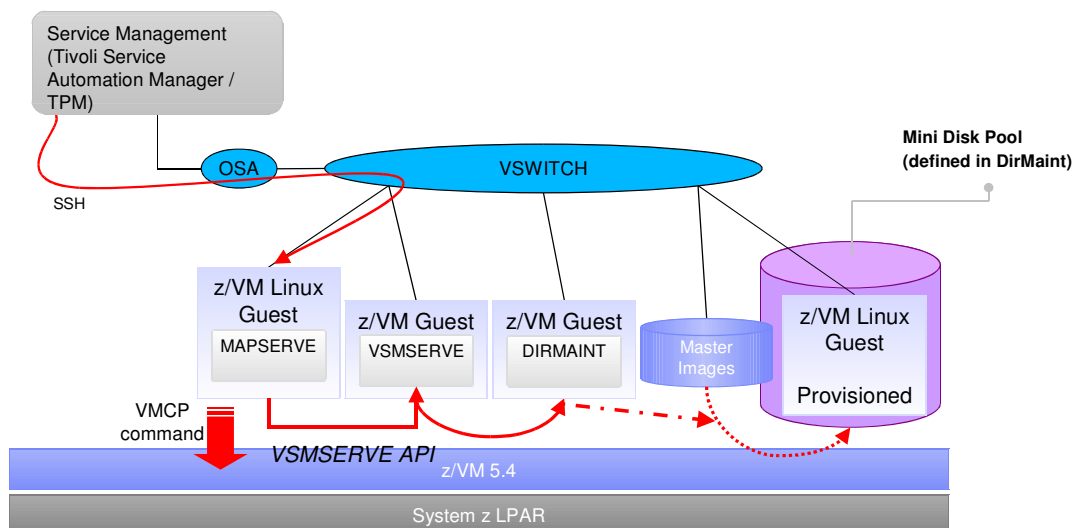
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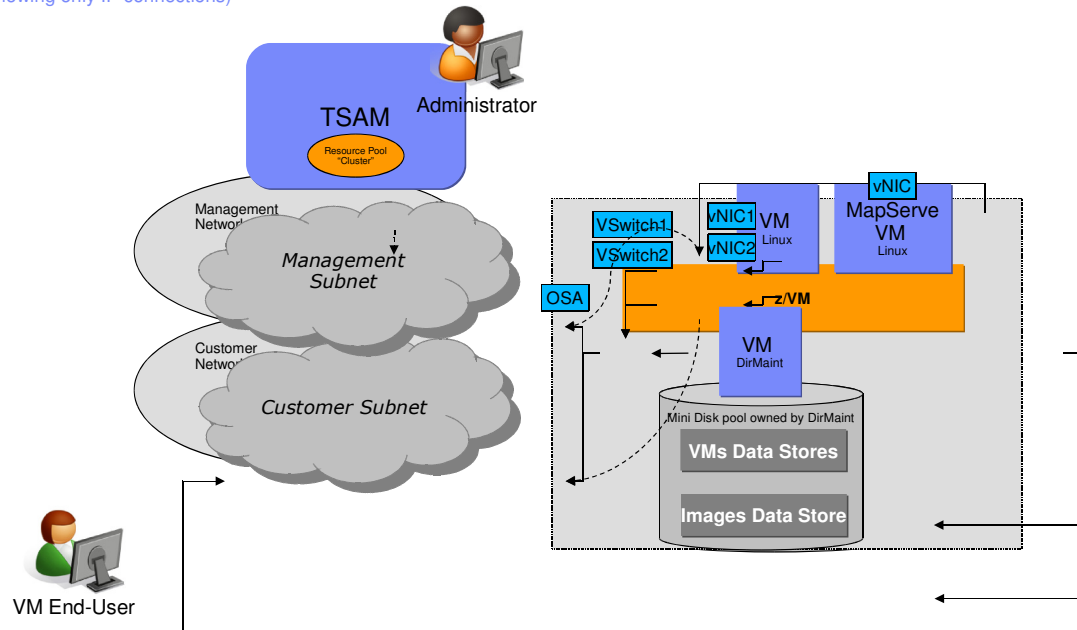
## z/VM Configuration Provisioning Details



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50

## Dual Subnets, z/VM, Multiple Shared Data Store Configuration (showing only IP connections)



## Tivoli Service Automation Manager on Linux on System z – Service Catalog after Installation

### Service Offerings – Entry Page

### Status Information

The screenshot shows the Tivoli Service Automation Manager interface. The top navigation bar includes the Tivoli logo, 'Service Automation Manager', and a 'Welcome TSAM CloudAdmin' message. The main content area is divided into two sections: 'Service Offerings – Entry Page' and 'Status Information'.

**Service Offerings – Entry Page:** This section displays a 'Home' page with a search bar and a 'Request a New Service' button. Below this, there are two options: 'Request a New Service' (with a description 'Open a request to acquire a new asset or service.') and 'Frequent requests' (with a description 'Easy access to the services you most often request.'). A yellow arrow points to the 'Request a New Service' button, which has a 'Select' label next to it.

**Status Information:** This section provides a summary of the system's status. It includes a 'My Requests' section with a progress bar showing 'Resolved (15)', 'Failed (1)', and 'Total (16)'. Below this is a 'Recent Activity' section listing several tasks and their status (Resolved, Failed, or Resolved). The 'My Projects' section shows a progress bar and a 'Recent Activity' section. The 'My Approvals' section shows a 'Recent Activity' section with 'No recent activity'.

## Offering – Register Image and Unregister Image

**Register Image**  
Register a new server image in the Image Library.

**General**  
\*Name of Virtual Server Image  
SLES10 with eyeOS on system z  
Description of Virtual Server Image  
SLES10 with eyeOS on system z

\*Resource Pool  
System z pool

\*Discovered Image  
None

**Resources**

	Minimum	Recommended
*Number of Virtual CPUs	1	1
*Amount of Physical CPUs	1.0	1.0
*Amount of Memory (in GBs)	1.000	1.000
*Disk Space Size (in GBs)	1	1

OK Cancel

**Definition of Resource Pool**

**No images discovered yet**

**Perform Configuration to set up Cloud Management Subsystem**

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53

## Configuration to Set Up Cloud Management Subsystem

Set up the Tivoli Service Automation Manager Cloud Management Subsystem to enable provisioning of Linux guests on z/VM:

- Resource pool 'System z pool'

Add the following lines to /etc/cloud/vrpool.properties:

```
5.tpmHPTType=zVM
5.maxVCPU=4
5.name=System z TMCC16 pool
5.order=6
5.PtoVCPUfactor=1.0
5.tpmPool=TMCC16 z pool
```

- Customize XML template files to import following data into the Tivoli Provisioning Manager (TPM) Data Center Model:

- Network components
- Host platforms
- Virtual Server templates
- Boot servers
- Software definitions

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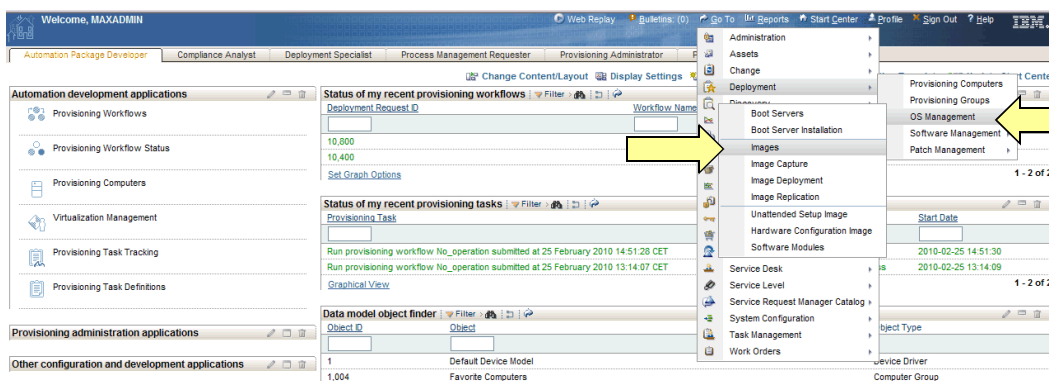
54

## XML Template File to Configure System z Cloud Management Subsystem

```
<!-- Define all involved virtual server templates in the following section -->
<virtual-server-template name="TMOC default VST - 1NIC (QDIO) - 2IFL - 1GB storage - 1 MDISK">
</virtual-server-template>
<virtual-server-template name="TMOC test VST - 2NIC (QDIO) - 2IFL - 1GB storage - 2 MDISK">
</virtual-server-template>
<virtual-server-template name="TMOC test VST - 2NIC (QDIO) - 2IFL - 1GB storage - dedicated DISK">
</virtual-server-template>
<!-- Define all involved boot servers in the following section -->
<boot-server name="TMOC16-bootserver" locale="en_US" is-device-model="zVM RootServer" type="zVM" failed="false">
</boot-server>
<!-- Define all involved zLinux software images -->
<!-- software stack is a software module containing software module(s) or images -->
<!-- Name is a description for the software stack -->
<software-stack name="SLES10 GM OS with eyeOS" locale="en_US" is-device-model="Cloud Suse Linux Operating System" version="N/A" stack-type="Declared">
</software-stack>
<software-stack name="SLES10 GM OS with mediawiki" locale="en_US" is-device-model="Cloud Suse Linux Operating System" version="N/A" stack-type="Declared">
</software-stack>
<software-stack name="SLES10 GM OS with wordpress" locale="en_US" is-device-model="Cloud Suse Linux Operating System" version="N/A" stack-type="Declared">
</software-stack>
<software-stack name="RHEL GM OS dedicated" locale="en_US" is-device-model="Cloud RedHat Linux Operating System" version="N/A" stack-type="Declared">
</software-stack>
<image name="SLES SP2 with eyeOS on system z" image-type="Golden Master" description="Prepared for TSAM" locale="en_US" version="1.0" boot-server="TMOC16-bootserver"
status="tested" is-device-model="SOAonRAMPImage" software-module="SLES10.3 GM" priority="1">
</image>
<image name="SLES SP2 with mediawiki on system z" locale="en_US" version="1.0" description="Prepared for TSAM" boot-server="TMOC16-bootserver" image-type=
"Golden Master" status="tested" software-module="SLES10.3 GM" priority="2" is-device-model="SOAonRAMPImage">
</image>
<image name="SLES SP2 with wordpress on system z" locale="en_US" version="1.0" description="Prepared for TSAM" boot-server="TMOC16-bootserver" image-type=
"Golden Master" status="tested" software-module="SLES10.3 GM" priority="3" is-device-model="SOAonRAMPImage">
</image>
<image name="SLES SP2 with opensource apps on system z" locale="en_US" version="1.0" description="Prepared for TSAM" boot-server="TMOC16-bootserver" image-type=
"Golden Master" status="tested" software-module="SLES10.3 GM" priority="4" is-device-model="SOAonRAMPImage">
</image>
<image name="RHEL 5.4 with dedicated disk" locale="en_US" version="1.0" description="Prepared for TSAM" boot-server="TMOC16-bootserver" image-type="Golden Master"
status="tested" software-module="RHEL5.4 VM" priority="1" is-device-model="SOAonRAMPImage">
</image>
<!-- Define all involved Hostplatforms -->
<spare-pool name="TMOC16 z pool">
<server name="mapsrv16" locale="en_US" is-device-model="SOAonRAMP HostPlatform" ignored-by-resource-broker="false" failed="false" pool="TMOC16 z pool">
<property component="KANAHA" name="cloud" value="true"/>
<property component="KANAHA" name="Cloud.Subnetwork" value="Cloud Management LAN"/>
</server>
</spare-pool>
<!-- ... -->
```

## Administration Console – Manage Cloud Subsystem

Manage Software Stack and Image Library



## Software Stacks – IBM Delivered and XML Template Configured

Software Stack	Version	Vendor
CDS Depot Stack	7.1.1.0	IBM
QSDS Pool 8246 Stack		
RHEL GM OS dedicated	N/A	
SLES10 GM OS with opensource apps	N/A	
SLES10 GM OS with wordpress	N/A	
SLES10 with eyeOS on system z	unknown	
SLES10 with mediawiki on system z	unknown	
Tivoli Common Agent Stack	7.1.1.0	IBM

☐ Select Records

Capabilities	Capability Type	Capability Value
os.family	OS	Linux
os.distribution	OS	SLES10 s390x
os.name	OS	SLES10 for IBM S/390 and IBM zSeries
os.version	OS	10
os.servicepack	OS	SP2

## Image Library – XML Template Configured Images

The screenshot displays the Red Hat Ansible Tower web interface. At the top, the 'Images' section is active. A yellow callout box highlights a list of image names: 'SLES10 with eyeOS on system z', 'SLES10 SP2 with wordpress', 'SLES10 with mediawiki on system z', 'SLES10 SP2 with opensource apps', and 'RHEL 5.4 dedicated disks'. A yellow arrow points from this box to the 'Variables' tab, which is selected. The 'Variables' tab shows a table of variables for the selected image 'SLES 10.3 with eyeOS on system z'. The table has columns for Variable, Component, Value, and Is Array. The variable 'sooanramp\_vst' is expanded, showing its value as '8236' and 'Is Array?' as 'false'.

Variable	Component	Value	Is Array
recCpu	Entire system	1	<input type="checkbox"/>
recDiskGB	Entire system	7	<input type="checkbox"/>
recMemMB	Entire system	1024	<input type="checkbox"/>
sooanramp_vst	Entire system	8236	<input type="checkbox"/>
swType	Entire system	OS	<input type="checkbox"/>

Details for 'sooanramp\_vst':

- Variable: sooanramp\_vst
- Component: Entire system
- Value: 8236
- Is Array?: ☐



## Tivoli Service Automation Manager Offering – System z Resource Pool Configured

Register Image

Register a new server image in the Image Library.

**General**

\*Name of Virtual Server Image  
SLES10 with wordpress on system z

Description of Virtual Server Image  
SLES10 with wordpress on system z

\*Resource Pool  
System z TMCC16 pool

**Resources**

	Minimum	Recommended
*Number of Virtual CPUs	1	1
*Amount of Physical CPUs	1.0	1.0
*Amount of Memory (in GBs)	1.000	1.000
*Disk Space Size (in GBs)	1	1

OK Cancel

Available Resource Pools



## Tivoli Service Automation Manager Offering – Linux System z Images Configured

Register Image

Register a new server image in the Image Library.

**General**

\*Name of Virtual Server Image  
SLES10 with wordpress on system z

Description of Virtual Server Image  
SLES10 with wordpress on system z

\*Resource Pool  
System z TMCC16 pool

\*Discovered Image  
SLES10 GM OS with wordpress

**Resources**

	Minimum	Recommended
*Number of Virtual CPUs	1	1
*Amount of Physical CPUs	1.0	1.0
*Amount of Memory (in GBs)	1.000	1.000
*Disk Space Size (in GBs)	1	1

OK Cancel

Unregister Image

Unregister a server image from the Image Library.

\*Resource Pool  
System z TMCC16 pool

\*Select an image to unregister

Select	Name	Hypervisor	CPUs	Memory	Storage
<input checked="" type="radio"/>	SLES10 with eyeOS on sys	zVM	1	1 GB	1 GB
<input type="radio"/>	SLES10 with mediawiki on s	zVM	1	1 GB	1 GB
<input type="radio"/>	SLES10 with wordpress on	zVM	1	1 GB	1 GB
<input type="radio"/>	SLES10 with opensource ap	zVM	1	1 GB	1 GB

Available Images



## Provisioning Workflows

The screenshot shows the 'Provisioning Workflows' interface. On the left, a list of workflows is displayed, including 'Cloud\_Discover\_zVM'. A yellow callout box points to this workflow with the text: 'Discover Cloud z/VM subsystem for later provisioning'. On the right, the 'Run Workflow' dialog box is open, showing the 'Provisioning Workflow' set to 'Cloud\_Discover\_zVM'. The 'Workflow Parameters' section shows 'MapServerName' as 'MAPSRV16' and 'PoolName' as 'LXDASD'. The 'Scheduling' section shows 'Scheduled: Now'. The 'Run' button is highlighted.

## Administration Console – Workflow ‘Discover z/VM’ Status

The screenshot shows the 'Administration Console' interface. The left sidebar contains navigation links for 'Automation development applications' and 'Provisioning administration applications'. The main content area displays the 'Status of my recent provisioning workflows' table, which lists the workflow 'Cloud\_Discover\_zVM' with a status of 'No\_operation'. Below this, the 'Status of my recent provisioning tasks' table shows the task 'Run provisioning workflow Cloud\_Discover\_zVM submitted at 04 March 2010 13:57:22 CET' with a status of 'In Progress'.

Deployment Request ID	Workflow Name	Error Mes
11,202	UHub_Rpc_Call	
11,201	UHub_Rpc_Call	
11,200	Cloud_Discover_zVM	
10,800	No_operation	
10,400	No_operation	

Provisioning Task	Status
Run provisioning workflow Cloud_Discover_zVM submitted at 04 March 2010 13:57:22 CET	In Progress
Run provisioning workflow No_operation submitted at 25 February 2010 14:51:28 CET	Success
Run provisioning workflow No_operation submitted at 25 February 2010 13:14:07 CET	Success



## IBM System z Solution Edition for Cloud Computing

	Creates...	That delivers ...
Solution Edition for Cloud Computing	An infrastructure solution for cloud computing built on Tivoli & System z	The framework to migrate workloads for rapid adoption of cloud computing benefits

### The solution components...

#### IBM Software



#### IBM Hardware

*Centralize, Virtualize, and Simplify*

#### IBM Services

- Phase 1: Create cloud computing use cases within the enterprise
- Phase 2: Implement the service automation and management tooling to support cloud workloads
- Phase 3: Educate the client on cloud computing for on-going success and provide a sample workload



Learn more at: <http://www.ibm.com/systems/z/solutions/editions/cloud/index.html>

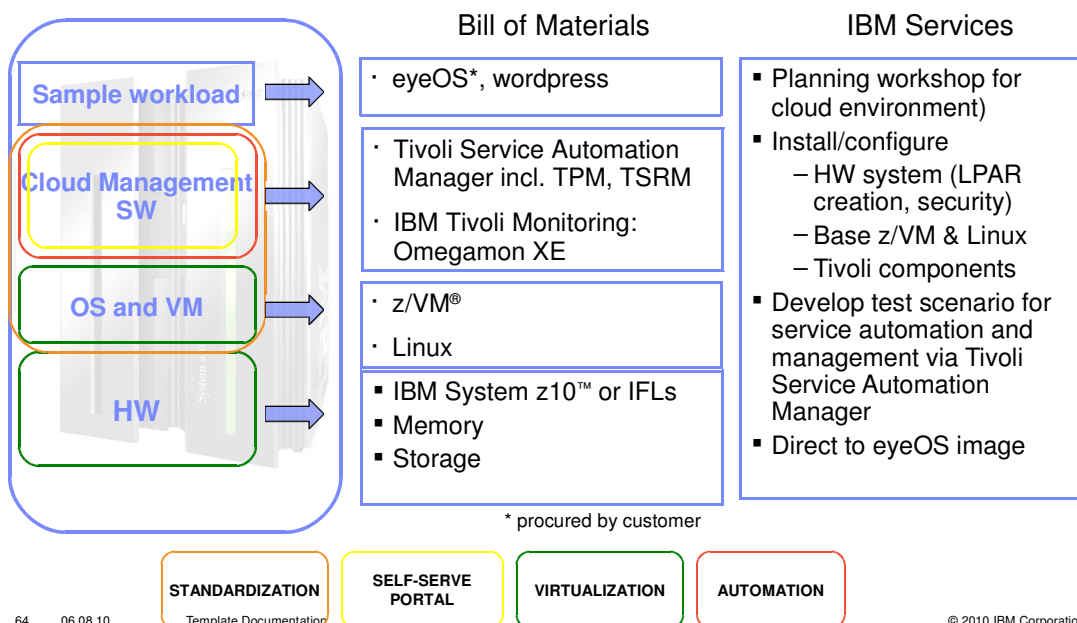
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63

Tivoli Service Automation Manager: Essentials for Cloud Computing on System z



## Solution Edition for System z Cloud Computing - Components



64 06.08.10

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## Summary



- Enterprises need to consider cloud deployments as part of their IT roadmaps
- Enterprise adoption is driven by workload considerations and will happen across a spectrum of deployment options
- Governance and architecture are critical for success – introducing cloud computing is transformational
- There will be many clouds and many enterprise deployments will be hybrid
- IBM is investing in enabling deployment choices and offering services 'on the IBM cloud'
- We would like to stay engaged with you as you develop your cloud strategy

65

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## Questions?



**Cloud Computing is real -- It's not just another hype**  
**There's real technology available today to build clouds**



**Thank You**

**For more information, please visit:**  
 ibm.com/cloud

**Or contact me at:**  
 amrehn@de.ibm.com



## **Additional Resources**

- IBM Tivoli Service Automation Manager:
  - <http://www-01.ibm.com/software/tivoli/products/tsam-facts.html>
- Solution Edition for Cloud Computing:
  - <http://www.ibm.com/systems/z/solutions/editions/cloud/index.html>
- Provisioning Linux on System z Redpaper:
  - <http://www.redbooks.ibm.com/abstracts/redp4663.html?Open>
- IBM WebSphere Cloudburst Appliance (WAC):
  - [http://www-01.ibm.com/software/webervers/cloudburst/features/?S\\_CMP=wspace](http://www-01.ibm.com/software/webervers/cloudburst/features/?S_CMP=wspace)
  - <http://www.youtube.com/websphereclouds#p/search/3/yya-gvCMiwQ>
- Linux Distributions Supported by each System z Platform:
  - [http://www-03.ibm.com/systems/z/os/linux/support\\_testedplatforms.html](http://www-03.ibm.com/systems/z/os/linux/support_testedplatforms.html)
- IBM Software available for Linux on System z:
  - <http://www-1.ibm.com/servers/eserver/zseries/os/linux/software.html>
- Destination z
  - <http://www-03.ibm.com/systems/z/destinationz/>



## TRANSZAP Mainframes for SW As a Service

Leading SaaS provider of ePayable, digital data, and spend analysis solutions

- 44,000+ users
- 4,200 companies
- \$80 B in transaction detail, processed



• Available • Secure • Elastic

Traditional Intel shop

- Challenge to scale, manage, secure
- Complex configurations
- Linear costs for growth



New z9 Business Class shop

- 100% YTY growth-plan to production
- Flexible capacity on demand
- Centrally managed & secured
- Manageable cost of incremental growth

***“The IBM z9 provides the stability and scalability needed to accommodate Transzap’s triple digit volume growth in a SaaS environment.”***

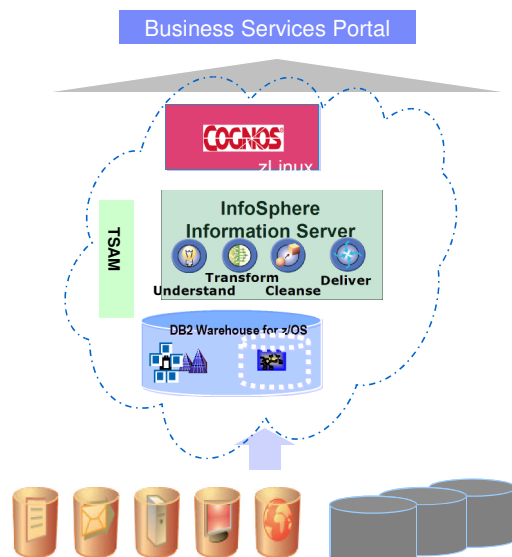
*– Peter Flanagan, President*



## System z Data Cloud allows customers to bring BI services with less cost and higher qualities of availability and security.

### What is a Data Cloud?

- Centralize BI for optimization using Cognos on z/Linux
- Take Data from anywhere: structured, unstructured, applications, mainframe, or distributed
- Deliver consumer driven services to a broad set of users / lines of business
- Automate delivery of services



Leverage the data centric strengths of z: allows for multi-tenant data support, Sysplex enablement and massive consolidation at the application layer

### Why z for data clouds?

- Save costs with operational efficiencies of z and virtualization
- Deliver qualities of service: availability, security, recoverability
- Allow for elastic growth in tenants and data
- Prevent unforeseen operations costs that occurs with a patchwork IT investment pattern