

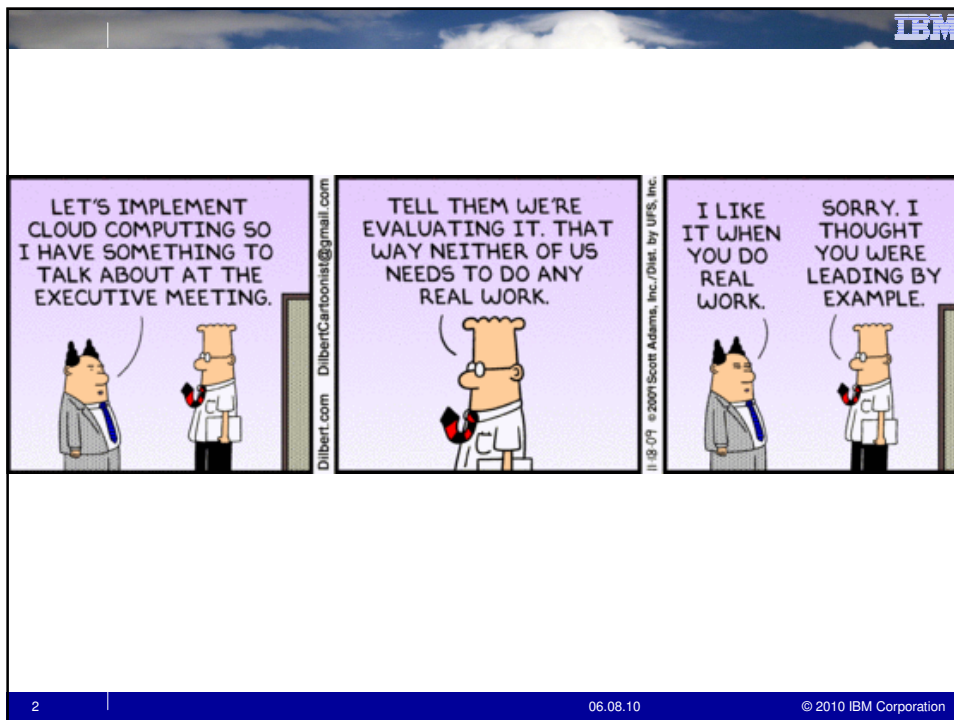
# Cloud Computing with IBM System z Share Anaheim Session 8462 August 2011

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IBM Cloud Computing

## Cloud Computing with System z

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The comic strip features three panels. In the first panel, a boss in a suit says to Dilbert, "LET'S IMPLEMENT CLOUD COMPUTING SO I HAVE SOMETHING TO TALK ABOUT AT THE EXECUTIVE MEETING." Dilbert replies, "TELL THEM WE'RE EVALUATING IT. THAT WAY NEITHER OF US NEEDS TO DO ANY REAL WORK." In the second panel, Dilbert is on the phone. In the third panel, the boss says, "I LIKE IT WHEN YOU DO REAL WORK." Dilbert replies, "SORRY. I THOUGHT YOU WERE LEADING BY EXAMPLE." The comic is signed "© 2009 Scott Adams, Inc./Dist. by UFS, Inc." and includes the URL "Dilbert.com - DilbertCartoonist@gmail.com".

## Disclaimer

- 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 their contribution

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

## Agenda

- **Cloud Computing Introduction**

- On its 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/>

**2.0 NEW & REVISED** Including new content for application developers

### Cloud Computing Use Cases White Paper

Version 2.0

A white paper produced by the Cloud Computing Use Case Discussion Group

NIST National Institute of Standards and Technology  
Information Technology Laboratory

SEARCH CSRC:

ABOUT MISSION CONTACT STAFF SITE MAP

### Computer Security Division Computer Security Resource Center

CSRC HOME GROUPS PUBLICATIONS DRIVERS NEWS & EVENTS ARCHIVE

CSRC HOME > GROUPS > SNS > CLOUD COMPUTING

#### CLOUD COMPUTING

**CLOUD COMPUTING**

NIST's role in cloud computing is to promote the effective and secure use of the technology within government and industry by providing technical guidance and promoting standards. To learn more about NIST's cloud efforts, join the NIST cloud computing announcement mailing list (very low volume) by sending an email to "listproc@nist.gov" with "subscribe cloudlist" in the message body text.

This website contains NIST's definition of cloud computing as well as related guidance. This definition will serve as a foundation for our upcoming publication on cloud models, architectures, and deployment strategies. Computer scientists at NIST developed this draft definition in collaboration with industry and government and we expect it to evolve over time as the cloud industry and cloud technology matures.

[NIST Definition of Cloud Computing v1.6](#)

[Presentation on Effectively and Securely Using the Cloud Computing Paradigm v2.6](#)

This material is public domain although attribution to NIST is requested. It may be freely duplicated and translated.

NIST Cloud Computing Project Lead: Peter Mell

CSRC Webmaster: [Disclaimer Notice & Privacy Policy](#)  
NIST is an Agency of the U.S. Department of Commerce

Last updated: October 7, 2009  
Page created: May 11, 2009

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

Will Cloud Computing be Open and Interoperable? \*\*\*\*\*

DETAILS ASK A QUESTION VOTE RATE THIS SHARE THIS

DMTF- Total 100 member companies

**DMTF Board Companies**

AMD BROADCOM CA CITRIX DELL EMC  
FUJITSU hp HITACHI Inspire the Next IBM intel Microsoft  
NOVELL ORACLE Sun vmware

**DMTF Leadership Companies**

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

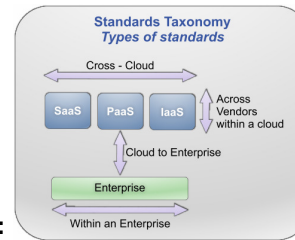
OpenGridForum tmforum DMTF  
OPEN FORUM | OPEN STANDARDS OBJECT MANAGEMENT GROUP

cloud security alliance SNIA THE Open GROUP  
Making standards work

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

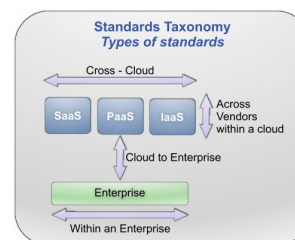
## IBM's Perspective on Cloud Standards

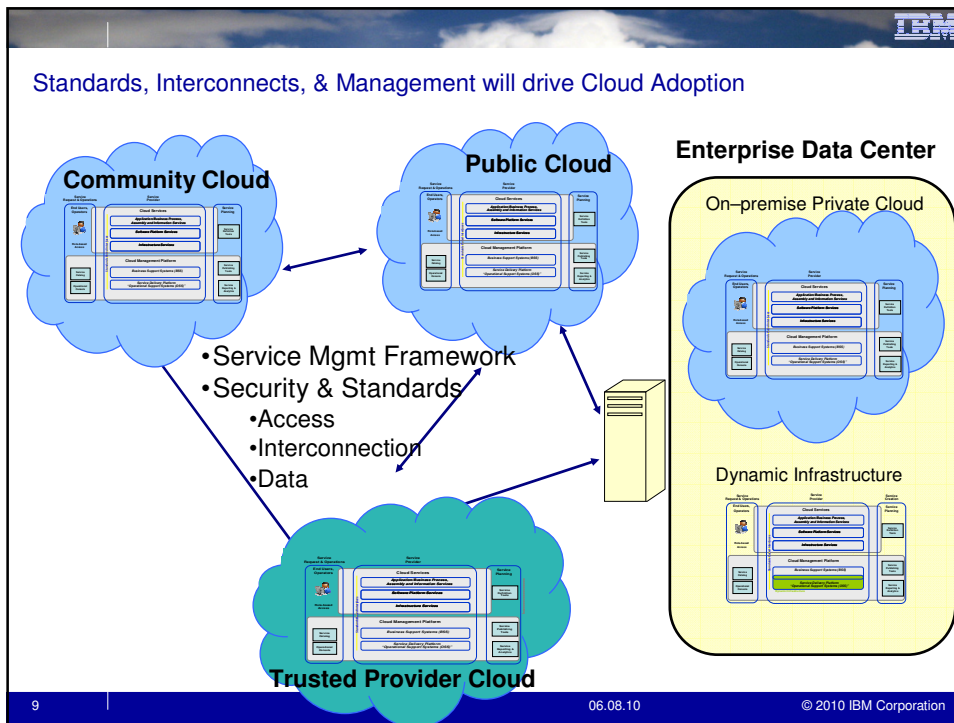
- **Since there is a diversity in the types of cloud platforms and models, open standards are a critical customer requirement**
- **IBM believes that the industry should align around a core set of principles defined by the Open Cloud Manifesto. The most important of these principles are:**
  - Existing 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





**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**

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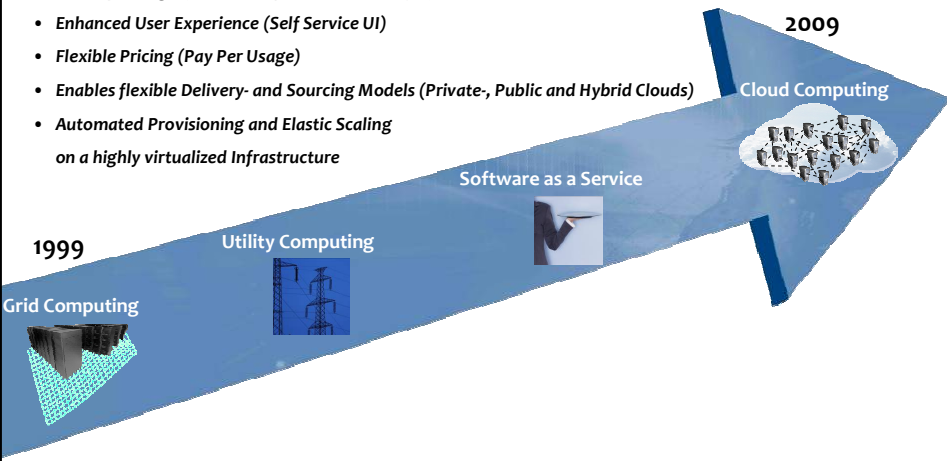


## Cloud Computing – a Disruptive New Paradigm

*“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



1999      2009


Grid Computing      Utility Computing      Software as a Service      Cloud Computing

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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

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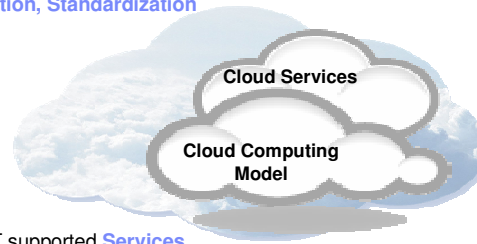
## Cloud: Consumption & Delivery Models Optimized by Workload

“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

## Security Is Limited By The Weakest Link



## Security Remains the Top Concern for Cloud Adoption

**80%**

Of enterprises consider security the #1 inhibitor to cloud adoptions

*"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?"*

**48%**

Of enterprises are concerned about the reliability of clouds

*much about the other "ities"—reliability, availability, etc."*

**33%**

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

*"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)

## Specific Customer Concerns Related to Security

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

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

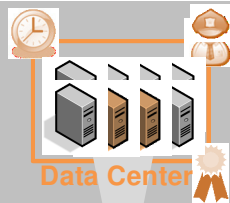
[ENISA 09/a]

### 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?



### We Have Control

It's located at X.  
It's stored in server's Y, Z.  
We have backups in place.  
Our admins control access.  
Our uptime is sufficient.  
The auditors are happy.  
Our security team is engaged.



### Public Cloud



### Who Has Control?

Where is it located?  
Where is it stored?  
Who backs it up?  
Who has access?  
How resilient is it?  
How do auditors observe?  
How does our security team engage?



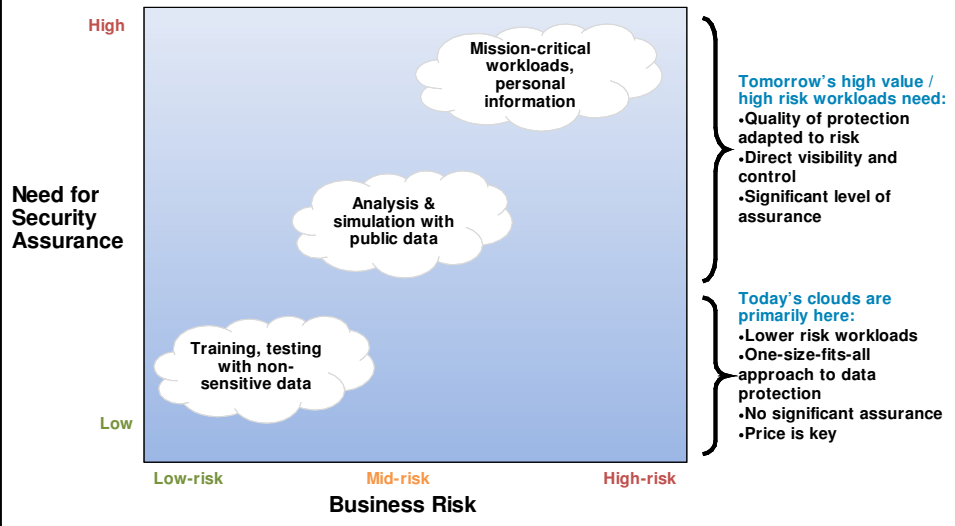
- Loss of control, perceived or real
- Lack of experience
- No established standards
- Uncertainty on how to interpret regulations and practices

### • Effects

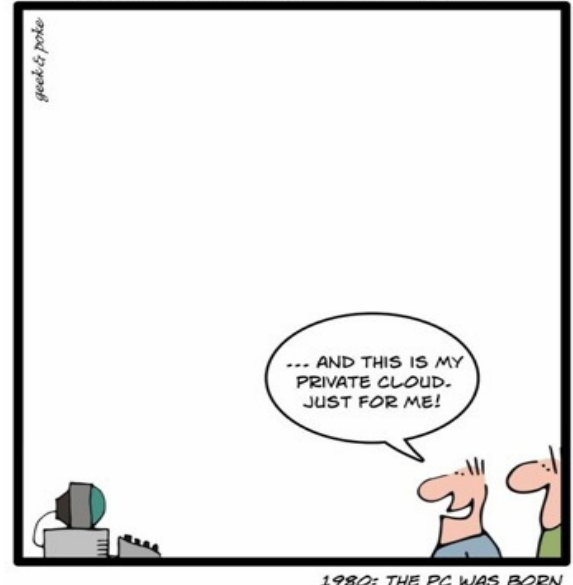
- Public clouds rarely used for mission critical workloads
- Preference for application-as-a-service
- Preference for private and hybrid cloud

### One-size does not fit-all:

### Different cloud workloads have different risk profiles

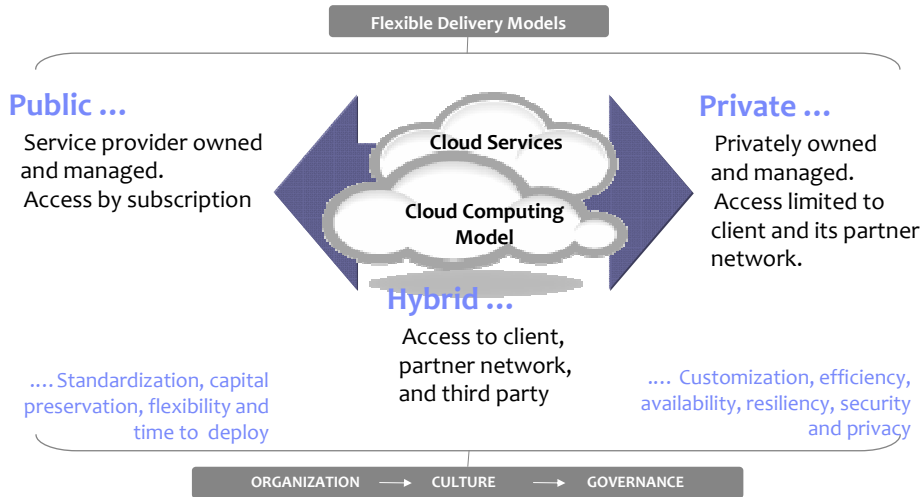


### THE HISTORY OF THE CLOUD - PART 1



1980: THE PC WAS BORN

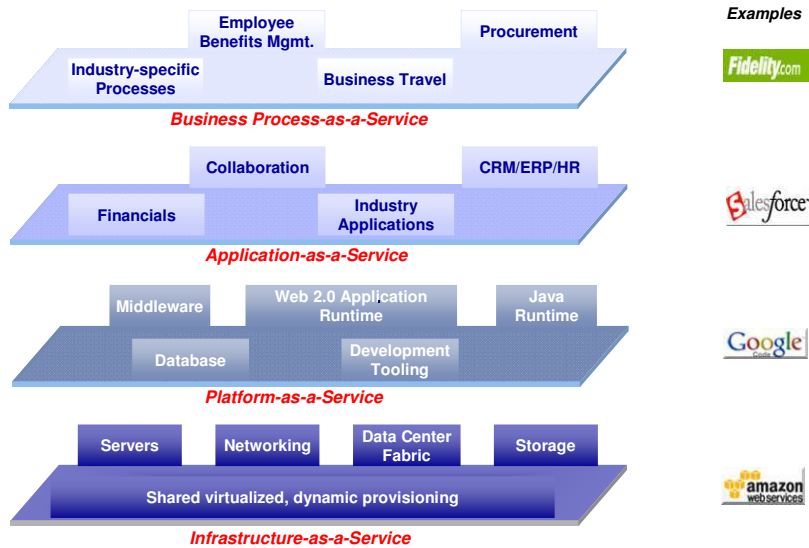
# Cloud Computing Delivery Models



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# Cloud Computing Layers



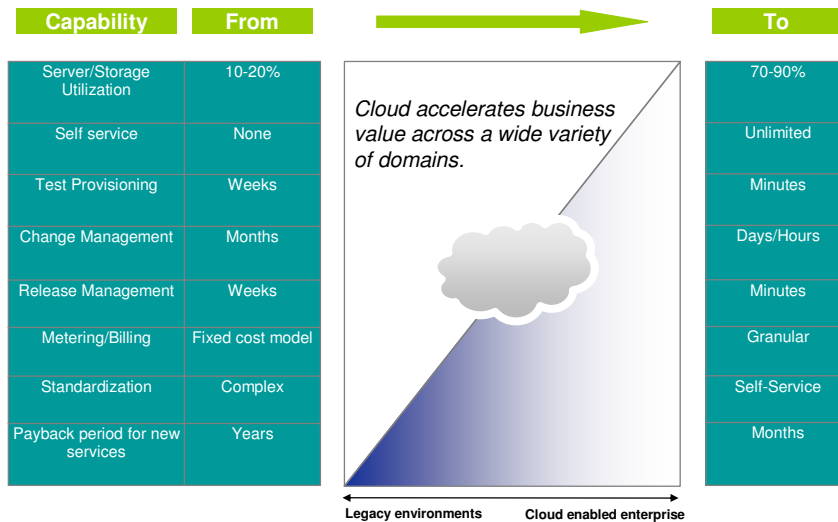
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## Enterprises Have Achieved Significant Benefits through Cloud Computing

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



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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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## 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 ?

## Workload Fit for Public Clouds

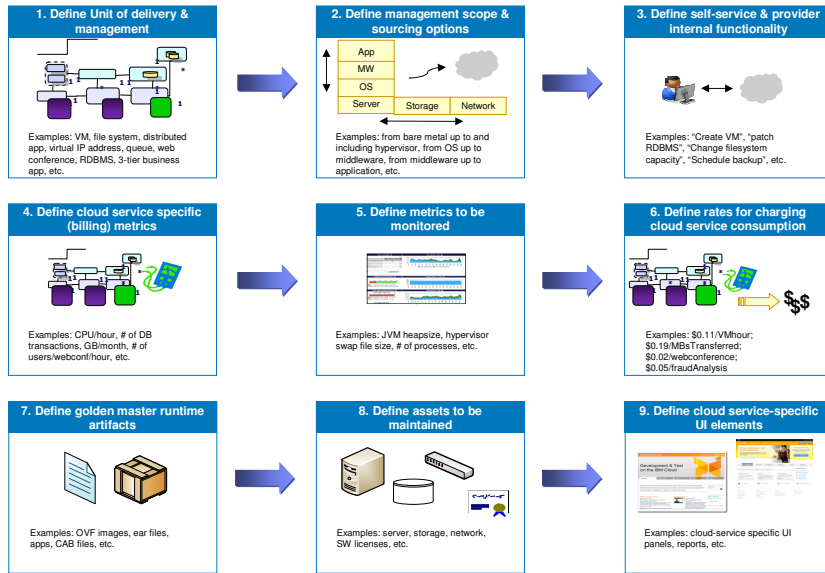
### Workloads Moving to Public Clouds

- **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)

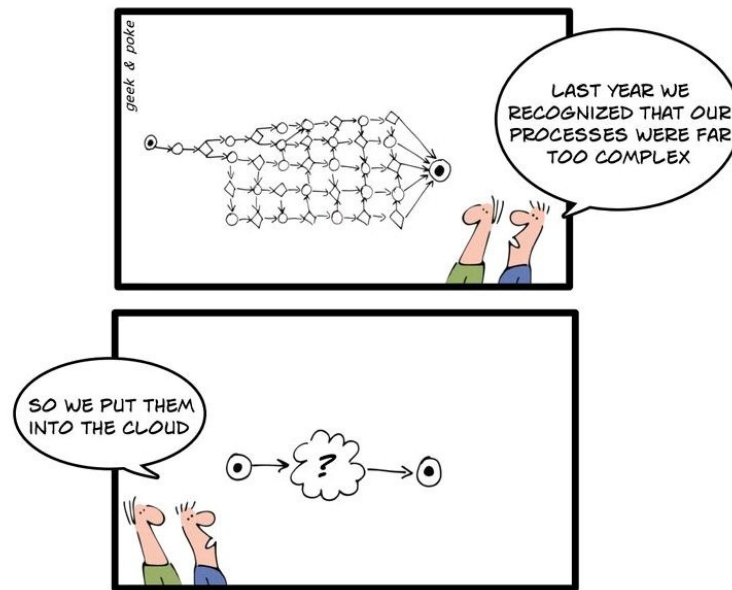
## 9 steps towards implementing a managed cloud service



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## Does Cloud Computing solve problems ?



LET THE CLOUDS MAKE YOUR LIFE EASIER

30

IM Corporation

## Universal interest across all industries and geographies

Cost takeout is cited as the top value consideration



• Cost savings are the key driver of public cloud adoption with clients seeking a 20 - 30% improvement in order to adopt

Security and control are top concerns



69% say security is the top inhibitor to their use of public clouds

Workloads and patterns are emerging



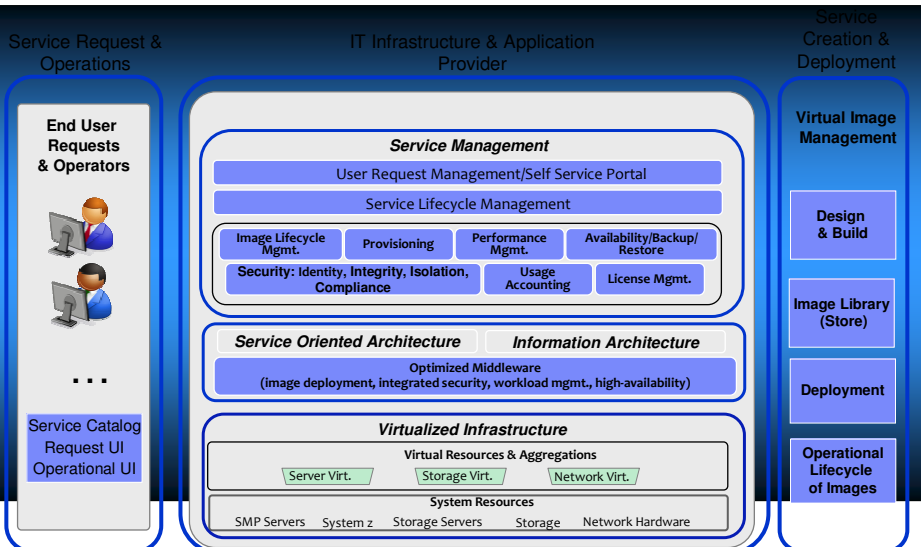
• Almost all workloads require connection to other IT services  
• Collaboration and analytics meta-patterns are emerging

Industries with the greatest cost pressures lead adoption



• Over 50% of clients in Retail, Manufacturing, Utilities, Government have cloud projects budgeted or in process

## An Architectural Model for Cloud Computing



## Cloud Management Platform – Management Problems

### Virtualized Resource Management

- Deploy cloud services on virtualized resources
- Manage virtual resources

### Service Automation Management

- Interpret and Execute Build- and Management Plans
- Orchestrate Management Componentry

### Hybrid Cloud Management

- Address Security, Monitoring, Connectivity and Management Aspects in Hybrid Clouds

### Image Management

- Design, build and manage images for cloud services

### Security

- Design for Multi-Tenancy
- Protect assets through Isolation, integrity, image- risk and compliance management

### Usage Metering and Accounting

- Flexible support of delivery models

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## Integrated Service Management is the Underpinning of Clouds

### For Locating and Requesting Services

Resource	Availability/Total	Max for single VM
CPU	0/1	1.0
Memory	3.4/100	2.4/100
Storage	100/100	1000

### Deploying Cloud Services

Automated Provisioning and Image Management

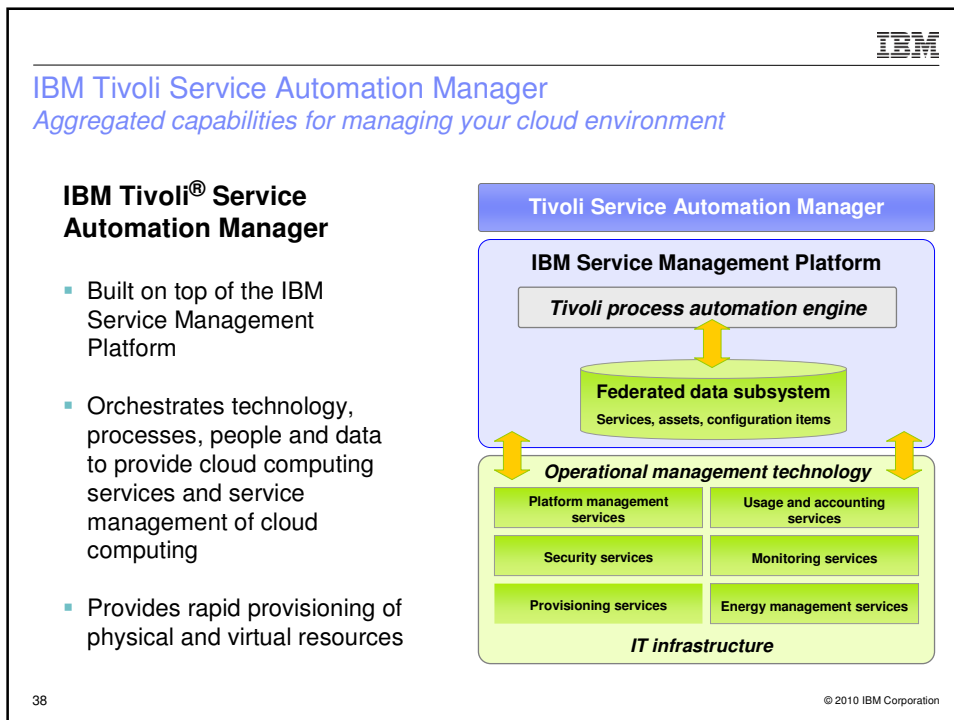
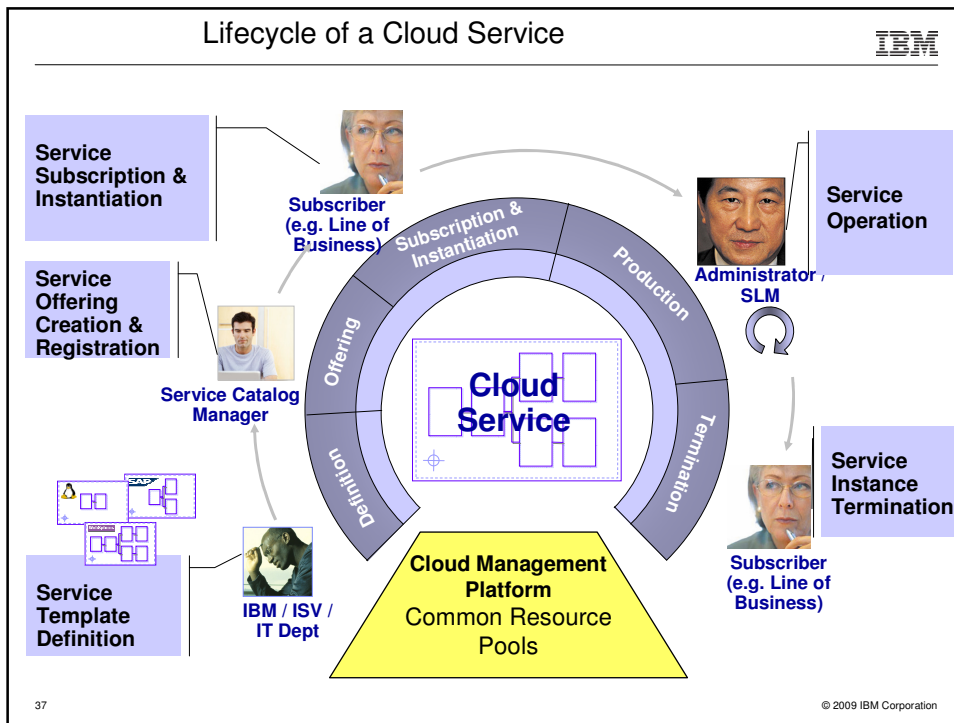
### Managing Cloud Services

Monitoring, Security and Metering

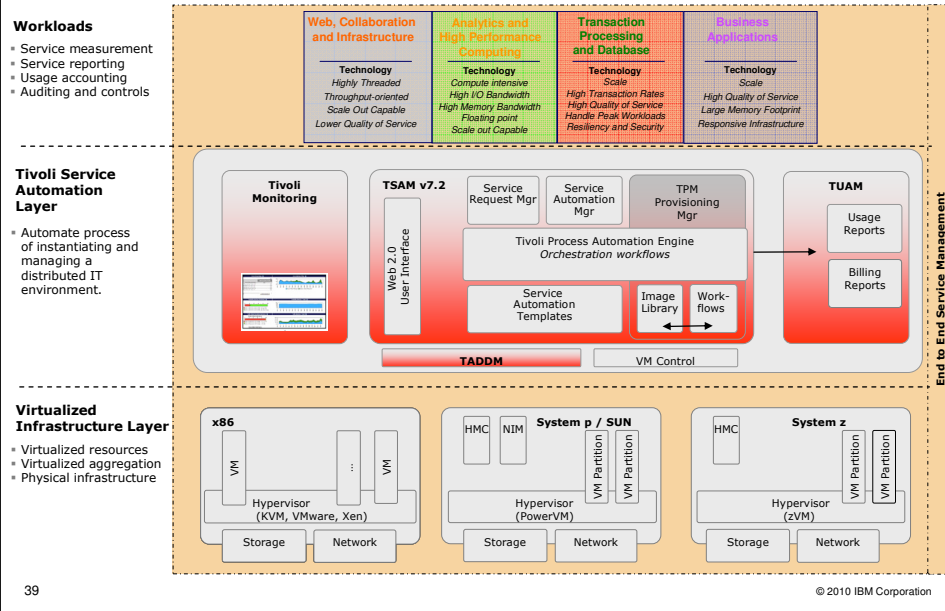
Secure User Centric Self-Service Portal, Automation Engine and Catalog

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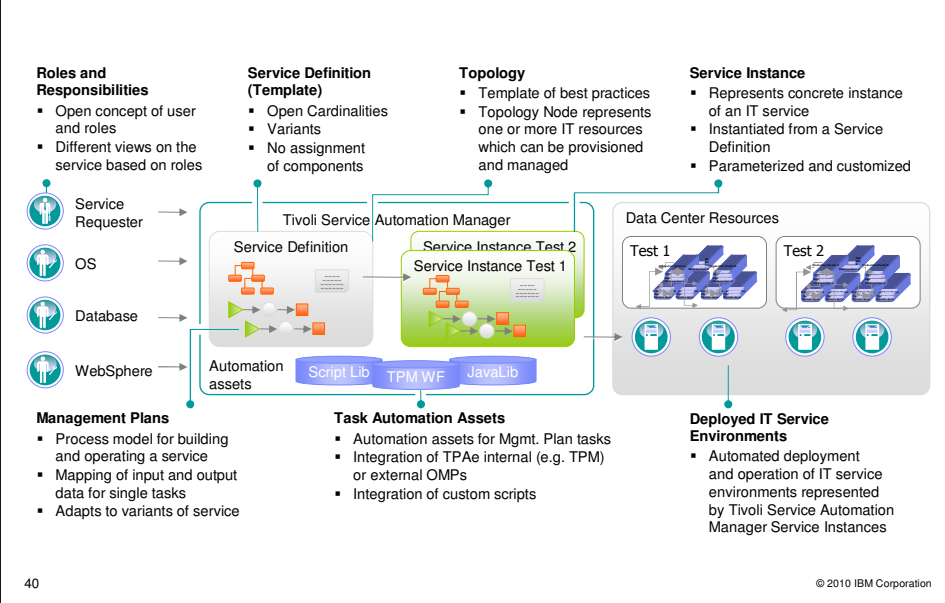




## Typical Cloud Management Platform Middleware Stack



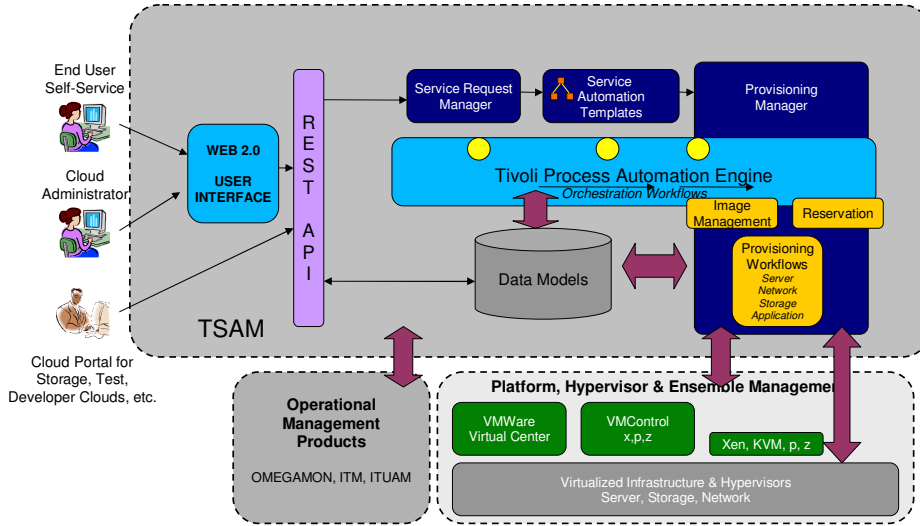
## Tivoli Service Automation Manager Concepts



# The management services from Tivoli



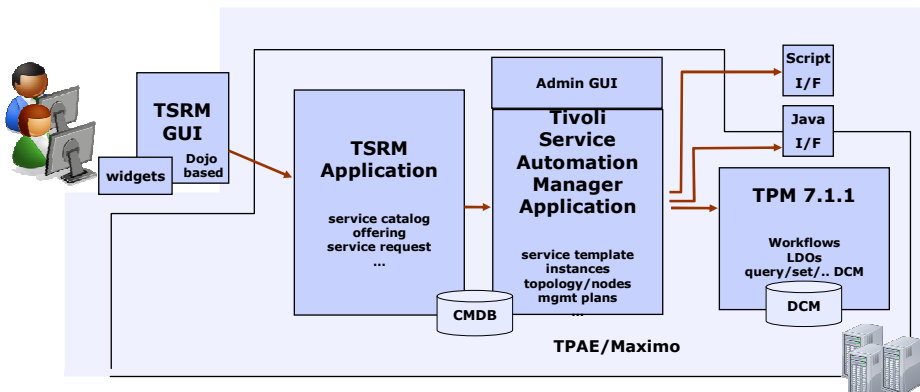
Converged service delivery platform for cloud computing



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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")

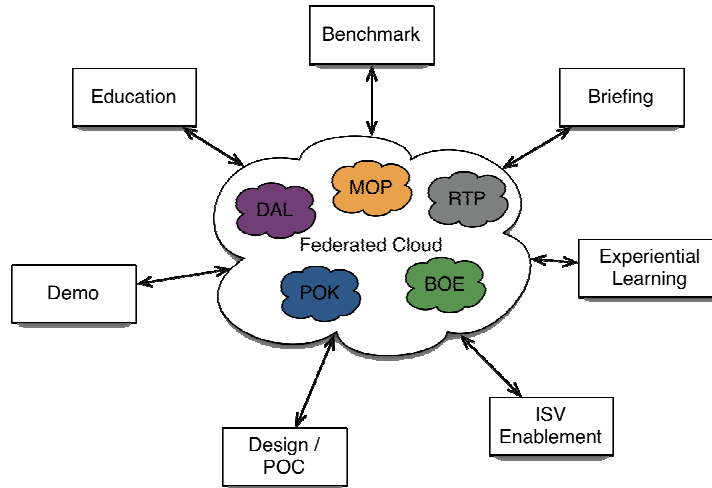
### TPM

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

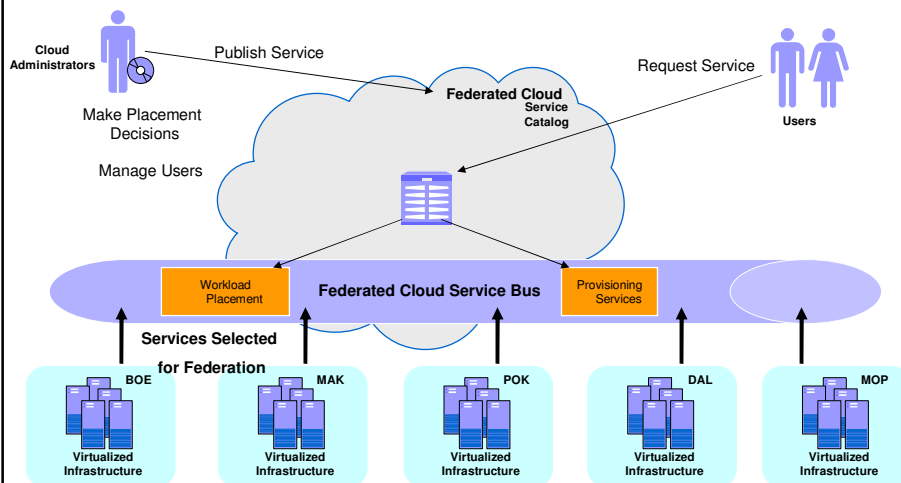
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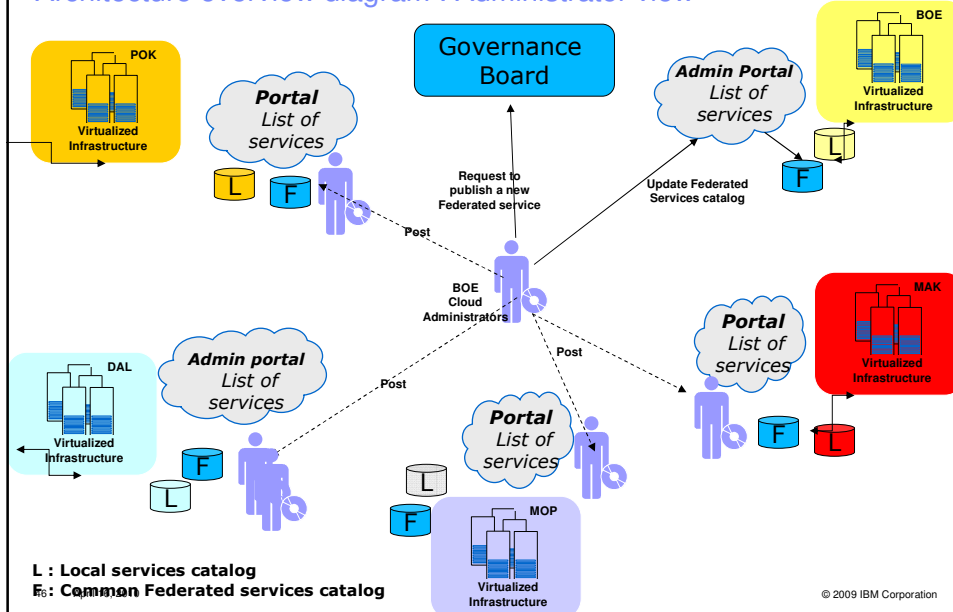
## Local and or Federated Business Services



## STG Federated Cloud

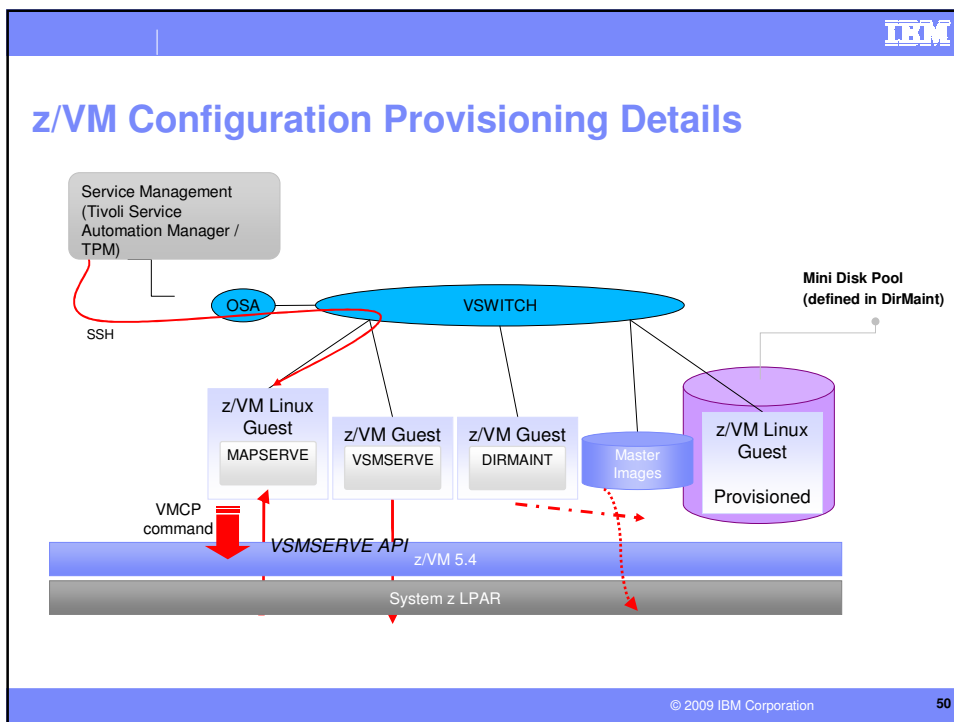
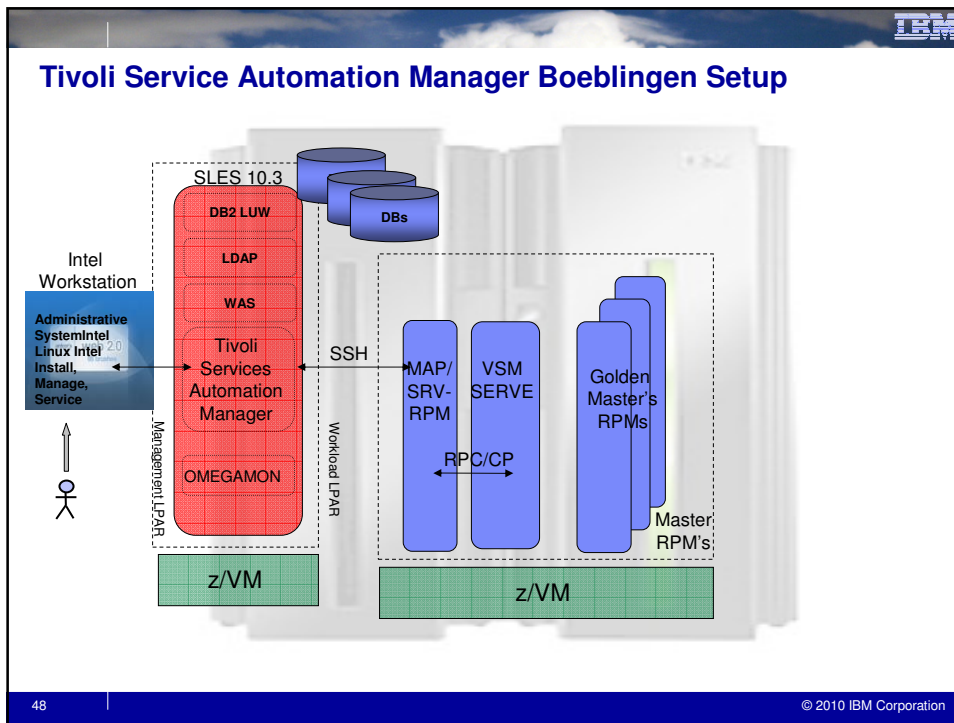


Architecture overview diagram : Administrator view



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



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

Service Offerings – Entry Page

Status Information

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## Offering – Register Image and Unregister Image

	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

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# 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.maxVCPUs=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

# XML Template File to Configure System z Cloud Management Subsystem

```
<!-- Define all involved virtual server templates in the following section -->
<virtual-server-template name="TMCC default VST - 1NIC (QDIO) - 2IPL - 1GB storage - 1 HDISK">
</virtual-server-template name="TMCC test VST - 2NIC (QDIO) - 2IPL - 1GB storage - 2 HDISK">
<virtual-server-template name="TMCC test VST - 2NIC (QDIO) - 2IPL - 1GB storage - dedicated DISK">
<!-- Define all involved boot servers in the following section -->
<boot-server name="TMCC16-bootserv" locale="en_US" is-device-model="zVM_BootServer" type="zVM" failed="false">
<!-- Define all involved zlinux software 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 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 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 name="SLES10 GM OS with opensource apps" locale="en_US" is-device-model="Cloud Suse Linux Operating System" version="N/A" stack-type="Declared">
<software-stack name="RHEL GM OS dedicated" locale="en_US" is-device-model="Cloud RedHat Linux Operating System" version="N/A" stack-type="Declared">
<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="TMCC16-bootserv"
status="tested" is-device-model="SOAonRAMPImage" software-module="SLES10.3 GM" priority="1">
<!-- ... -->
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<!-- ... -->
<image name="SLES SP2 with opensource apps on system z" locale="en_US" version="1.0" description="Prepared for TSAM" boot-server="TMCC16-bootserv" image-type="
Golden_Master" status="tested" software-module="SLES10.3 GM" priority="4" is-device-model="SOAonRAMPImage">
<!-- ... -->
<image name="RHEL 5.4 with dedicated disk" locale="en_US" version="1.0" description="Prepared for TSAM" boot-server="TMCC16-bootserv" image-type="Golden_Master"
status="tested" software-module="RHEL5.4 GM" priority="1" is-device-model="SOAonRAMPImage">
<!-- ... -->
<!-- Define all involved Hostplatforms -->
<spare-pool name="TMCC16 z pool">
<server name="saperv10" locale="en_US" is-device-model="SOAonRAMP_HostPlatform" ignored-by-resource-broker="false" failed="false" pool="TMCC16 z pool">
<property component="IBMABA" name="cloud" value="true"/>
<property component="IBMABA" name="Cloud_Subnetwork" value="Cloud Management LAN">
</server>
</spare-pool>
<!-- ... -->
```



# Administration Console – Manage Cloud Subsystem

Manage Software Stack and Image Library

The screenshot shows the IBM Administration Console interface. The main content area displays 'Status of my recent provisioning workflows' with a table of deployment request IDs and workflow names. A navigation menu on the right is open, showing options like 'Provisioning Computers', 'OS Management', and 'Images'. A yellow arrow points to the 'Images' option.

# Software Stacks – IBM Delivered and XML Template Configured

The screenshot shows the 'Software Stacks' section of the IBM Administration Console. It displays a table of software stacks with columns for 'Software Stack', 'Version', and 'Vendor'. A yellow box highlights the 'SLES10 with eyeOS on system z' stack. Below the table, a 'Capabilities' section shows a list of capabilities and their values for the selected stack.

Software Stack	Version	Vendor
CDS Depot Stack	7.1.1.0	IBM
ODSDS 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	
Twilio Common Agent Stack	7.1.1.0	IBM

Capability	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 shows the IBM Image Library interface. At the top, there are tabs for 'List', 'Image', 'Variables', 'Provisioning Workflows', and 'Credentials'. Below the tabs, there is a search bar and a list of images. A yellow 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 list to the 'Variables' tab. The 'Variables' tab shows a table of variables for the selected image 'SLES 10.3 with eyeOS on system z'.

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"/>
soaonramp_vst	Entire system	8236	<input type="checkbox"/>
swType	Entire system	OS	<input type="checkbox"/>

Below the table, there is a 'Details' section for the 'soaonramp\_vst' variable, showing its component as 'Entire system' and its value as '8236'.

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

The screenshot shows the 'Register Image' dialog box in Tivoli Service Automation Manager. The dialog has a 'General' section with fields for 'Name of Virtual Server Image' (SLES10 with wordpress on system z) and 'Description of Virtual Server Image' (SLES10 with wordpress on system z). Below this is the 'Resource Pool' section, which has a dropdown menu showing a list of available resource pools: 'System z TMCC16 pool', 'System p LPAR', 'System z TMCC16 pool', 'System z TMCC17 pool', 'VMware System x', and 'Xen Local disk'. A yellow box labeled 'Available Resource Pools' has a yellow arrow pointing to the dropdown menu. Below the resource pool selection is the 'Resources' section, which has a table for configuring resource requirements.

	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

## 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  
**SLES10 GM OS with wordpress**  
SLES10 GM OS with opensource apps  
RHEL GM OS dedicated

**Available Images**

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

Minimum Recommended

\*Number of Virtual CPUs: 1 (Minimum) / 1 (Recommended)

\*Amount of Physical CPUs: 1.0 (Minimum) / 1.0 (Recommended)

\*Amount of Memory (in GBs): 1.000 (Minimum) / 1.000 (Recommended)

\*Disk Space Size (in GBs): 1 (Minimum) / 1 (Recommended)

OK Cancel

**Unregister Image**  
Unregister a server image from the Image Library.

\*Resource Pool  
System z TMCC16 pool

\*Select an image to unregister

## Provisioning Workflows

**Provisioning Workflows**

Find: [ ] Select Action [ ]

List Workflows Status

Advanced Search Save Query Bookmarks

Workflows Filter 41 - 60 of 238

Provisioning Workflow

cloud\*

**Cloud\_Configure\_Teaming\_Windows2003**

Cloud\_Configure\_Teaming\_Windows2008

Cloud\_Configure\_Xen\_Host\_SAN

Cloud\_Copy\_EndPointKeys

Cloud\_Create\_Mount\_Windows\_Temp\_Image

Cloud\_Create\_Mount\_Windows\_Temp\_Partition

Cloud\_Cywin\_Install

cloud\_Delete\_Cluster

cloud\_Destroy\_Server

Cloud\_Discover\_And\_Register\_VMs

Cloud\_Discover\_Blade

Cloud\_Discover\_Blade\_Center

Cloud\_Discover\_Blade\_Switch

Cloud\_Discover\_Hosts\_Range

Cloud\_Discover\_VMWare\_Cluster\_Data

Cloud\_Discover\_VirtualCenter

Cloud\_Discover\_VirtualCenter\_Cluster

Cloud\_Discover\_VirtualCenter\_Info\_Multi\_Pool

Cloud\_Discover\_zVM

Cloud\_Evacuate\_Host

Select Records

**Discover Cloud z/VM subsystem for later provisioning**

**Run Workflow**

Provisioning Workflow: Cloud\_Discover\_zVM

Logical Management Operation: [ ]

Workflow Parameters

Name	Is Array	Parameter value
MapServeName	N	MAPSRV16
PoolName	N	[LXDASD]

Hide Encrypted Input?

Data Model Object Finder

Scheduling: Scheduled: Now [Schedule]

Run Cancel

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

Welcome, MAXADMIN

Automation Package Developer | Compliance Analyst | Deployment Specialist | Process Management Requester | Provisioning Administrator | Provisioning Configuration Librarian

Change Content/Layout | Display Settings | Create New Template | Modify Existing Te

**Automation development applications**

- Provisioning Workflows
- Provisioning Workflow Status
- Provisioning Computers
- Virtualization Management
- Provisioning Task Tracking
- Provisioning Task Definitions

**Provisioning administration applications**

**Status of my recent provisioning workflows**

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

Set Graph Options

**Status of my recent provisioning tasks**

Provisioning Task	Status
Run provisioning workflow Cloud_Discover_z/VM 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

Graphical View

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## 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
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### The solution components...

#### IBM Software

Tivoli software

Visibility | Control | Automation

#### IBM Hardware

Centralize, Virtualize, and Simplify

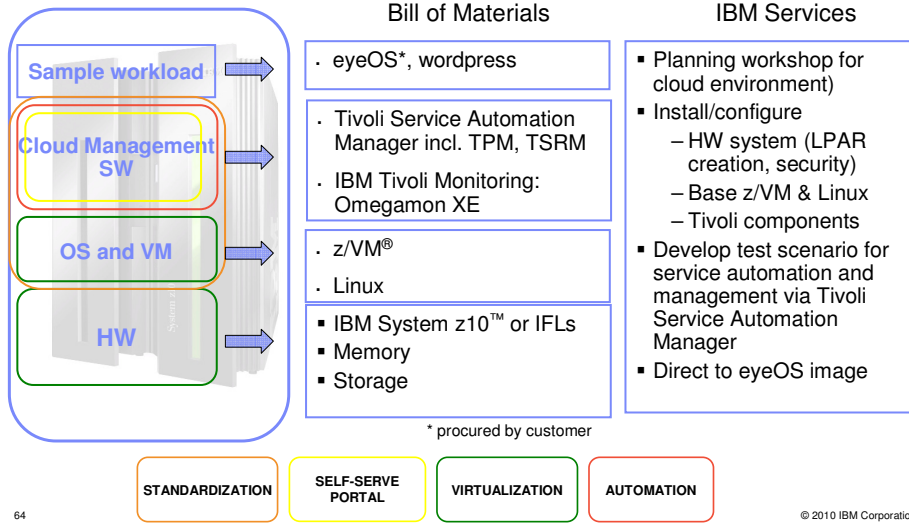
#### IBM Services

- 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>

## Solution Edition for System z Cloud Computing - Components



## 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



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](http://ibm.com/cloud)

**Or contact me at:**  
[amrehn@de.ibm.com](mailto: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/webservers/cloudburst/features/?S\\_CMP=wspace](http://www-01.ibm.com/software/webservers/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

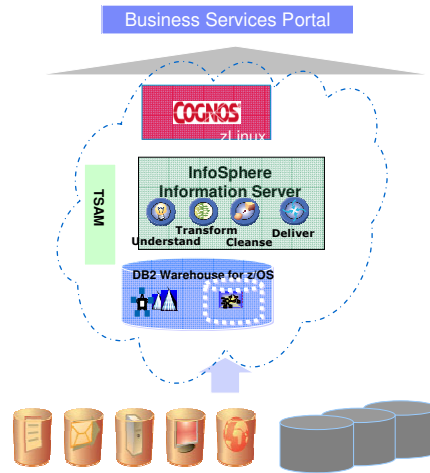
***“The IBM z9 provides the stability and scalability needed to accommodate Transzap’s triple digit volume growth in a SaaS environment.”***

*– 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