



Dynamic Infrastructure with IBM CloudBurst

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TMCC Boeblingen – New Design Center since July 22nd, 2009

Customized client solutions by design

IBM Worldwide Design Center expands to meet client needs

Whether it is a brainstorming session about solution options or creating a high level design or assessing the clients' own design, the IBM Worldwide Design Center is here to help IBM clients.

Call upon the [IBM Worldwide Design Center](#) to help clients simplify their infrastructure, share more and more resources and move into a totally [dynamic infrastructure](#) that is well aligned with today's very dynamic nature of the business. The Center's team can also help win business with clients by offering tailored advice that will enable clients to provide seamless services internally and externally through [cloud computing](#).



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Manager Market Planning, Program Manager Dynamic Infrastructure, IBM Systems & Technology Group, Systems Software Development

Clients come to IBM for industry-leading expertise, and the IBM Worldwide Design Center has demonstrated our dedication to every client's success for ten years. This team of IBMers brings our company's solutions to life with its holistic approach to infrastructure modernization – servers, software, networking and applications to help clients optimize their IT environments.

Hello Boeblingen

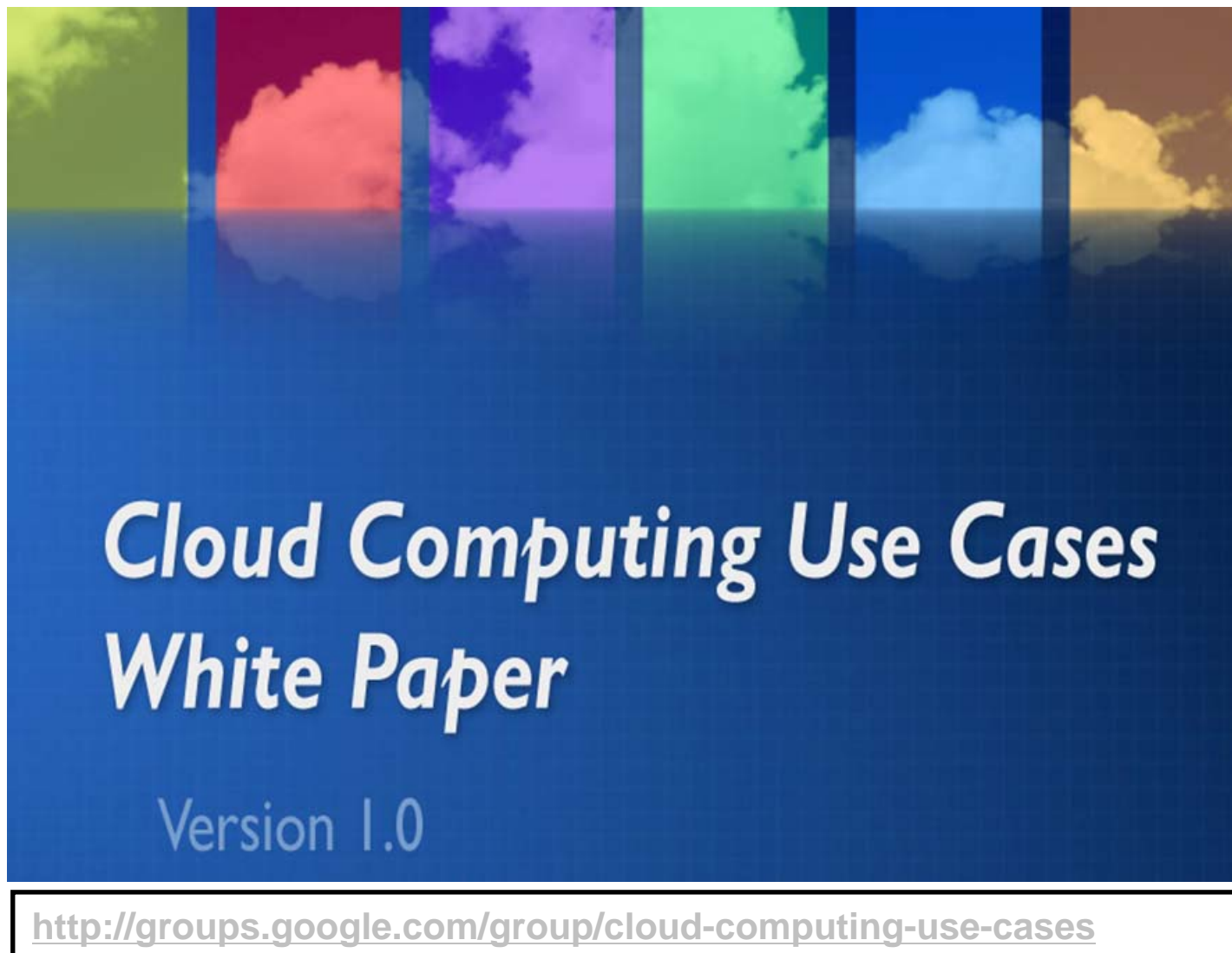
With three locations around the world in Poughkeepsie, Montpellier and Makuhari, the Design Center recently expanded its operations to meet more clients' needs with a center in Boeblingen, Germany. As one of the major IBM technology centers in Europe, the Boeblingen Lab is known for having the necessary skills to help IBM clients in Europe,

http://w3.ibm.com/news/w3news/top_stories/2009/07/stg_swg_ww_design_center.html

Agenda

- **Cloud Computing Introduction**
 - An Evolution from Known Technologies
 - It's More than Virtualization
 - Delivery Models – Private -> Public Clouds
 - What Kind of Clouds Do Exist – Layers
 - Software as a Service (SaaS) – Sample 'IBM LotusLive'
 - Platform as a Service (PaaS) – Sample 'WebSphere on Amazon Machine Images'
 - Infrastructure as a Service (IaaS) – Samples 'Amazon EC2', 'IBM CloudBurst'
- **IBM CloudBurst**
 - Minimum Configuration Components
 - Further Configuration Options
 - It's More Than Virtualization
 - Details - Self-Service Catalog, Standardisation – Image Catalogue plus Automation, Reporting, further Functions + IBM Services
 - Flexible Choices – Build-up Your Cloud Development & Test Environment
 - Roadmap
- **IBM Tivoli Service Automation Manager**
- **Development & Test Cloud – IBM Boeblingen R & D – TSAM Based**
- Appendix

National Institute of Standards and Technology (NIST) – August 5, 2009



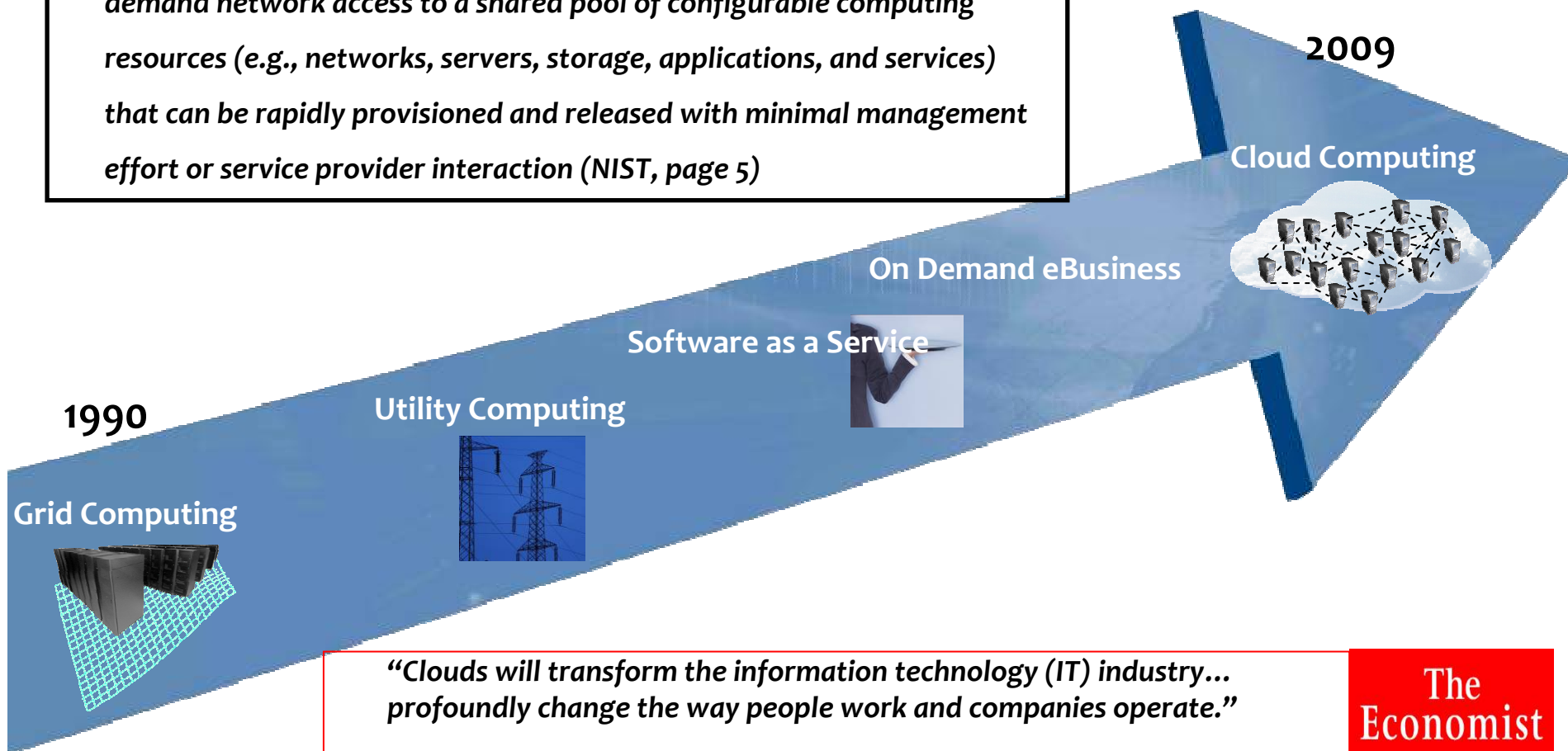
Cloud Computing Use Cases
White Paper

Version 1.0

<http://groups.google.com/group/cloud-computing-use-cases>

Cloud Computing – An Evolution From Known Technologies

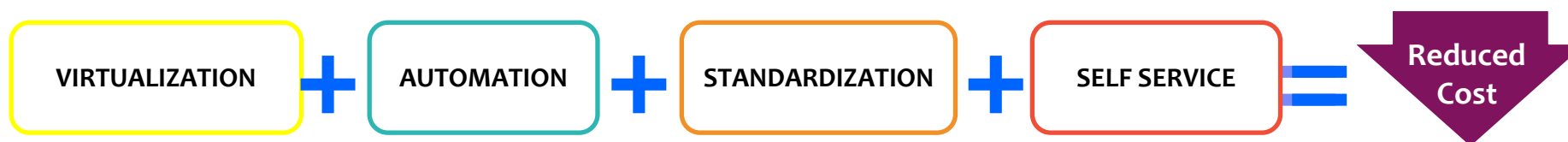
Cloud Computing: Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction (NIST, page 5)



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

The Economist

Cloud Computing – It's More Than Virtualization



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



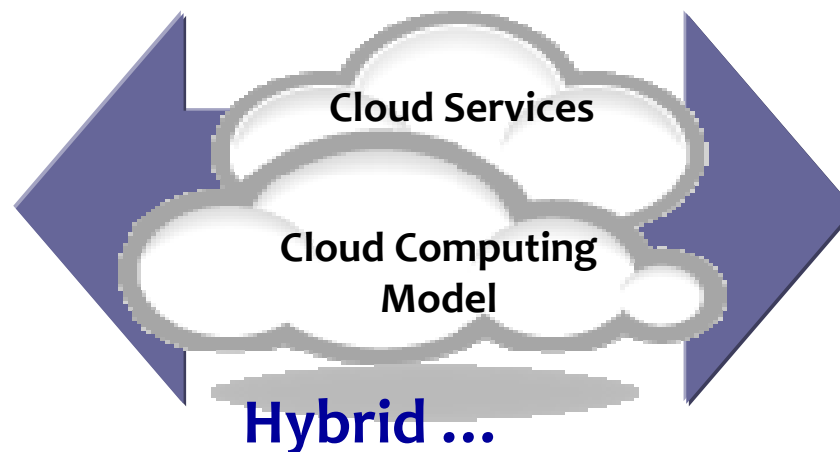
... allowing you to optimize new investments for direct business benefits

Delivery Models – Page 6

Public ...

Service provider owned and managed.
 Access by subscription
 Delivers select set of standardized business process, application and/or infrastructure services on a flexible price per use basis

.... Standardization, capital preservation, flexibility and time to deploy



Access to client, partner network, and third party

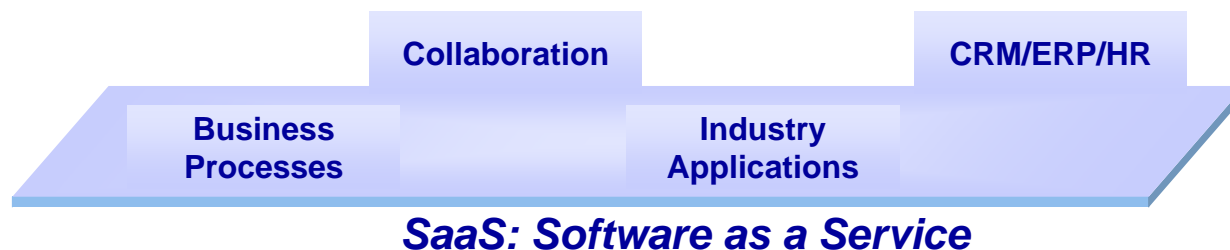
Community ...

Private ...

Privately owned and managed.
 Access limited to client and its partner network.
 Drives efficiency, standardization and best practices while retaining greater customization and control

.... Customization, efficiency, availability, resiliency, security and privacy

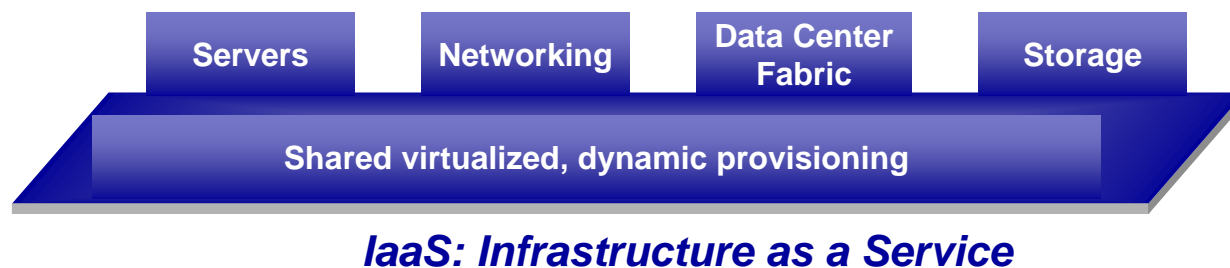
What Kind of Clouds Do Exist - Layers - Page 5



Cloud consumer uses an application
E.g. LotusLive



Cloud consumer uses an application framework
E.g. WebSphere on Amazon Machine Images



Cloud consumer uses IT resources (server, storage, network)
E.g. Amazon EC2, IBM CloudBurst

Software as a Service

– Sample



Delivery of application functionality via **subscription** model over Internet.

Consumer does not own the application, but **rents** a total solution



Web Conferencing

- **LotusLive Meetings**
• A full-featured, easy to use Web conferencing service
-

LotusLive Events
Provides tools to create, manage and conduct webinars for up to 999 attendees



Collaboration

LotusLive Engage
An integrated suite of tools that combines your business network with collaboration and conferencing services

LotusLive Connections *Combines your business network with collaboration services*



eMail

LotusLive Notes
An online version of IBM's popular Lotus Notes email and calendaring & scheduling product

LotusLive iNotes
Web-based messaging service for e-mail and personal calendar

www.LotusLive.com

Flexible Delivery – Hybrid Model



No cost trials available at www.lotuslive.com

On-Premise
MANAGED BY IT DEPARTMENT OR PARTNER

Software  Appliance

Cloud Delivered
IBM MANAGED

Dedicated Hosted Environment  Multi-Tenant SaaS Environment

- **Benefits**
- Allows for advanced customization to meet customer needs
- Managed by IT dept
- All data resides local and inside the firewall

- **Benefits**
- Easy to install/maintain
- Managed by customer or partner
- Toolkits available for customization by partner or customer
- All data inside your firewall

- **Benefits**
- Negotiated SLAs
- Monthly Pricing available for hosting
- Can leverage toolkits available for customization
- Updates are applied transparently

- **Benefits**
- Low cost of entry
- Zero Infrastructure – Reduced Overhead
- Risk Mitigation
- Flexible contracts
- Scales to meet customer demand
- Immediate access to the latest innovations

Business network - Collaborative & social networking in- and out-side of the enterprise

Platform as a Service

– Sample Public Cloud



Amazon Machine Images (AMIs) are available for the following IBM products:

Information Management Software
Enterprise content and data integration

Product
DB2 Express-C 9.7 (32- and 64-bit) UPDATED
DB2 Express Edition 9.5 (32-bit)
DB2 Workgroup Server Edition 9.5 (64-bit)
Informix Dynamic Server Developer Edition 11.5
Informix Dynamic Server Express Edition 11.5
Informix Dynamic Server Workgroup Edition 11.5

Lotus software
Collaboration and human productivity

Product
IBM Mashup Center UPDATED
Lotus Forms Turbo V3.5 UPDATED
Lotus Web Content Management Standard Edition V6.1
WebSphere Portal Server V6.1 and Lotus Web Content Management Standard Edition V6.1
WebSphere Portal and Lotus Web Content Management Open Beta

WebSphere software
Integration and application infrastructure

Product
WebSphere Application Server V7
WebSphere eXtreme Scale V7 NEW
WebSphere sMash V1.1

IBM Software on Amazon Machine Images

http://www.ibm.com/developmentworks/downloads/cloud.html?ca=dth-cloud&S_TACT=105AGX01&S_CMP=LP

Platform as a Service (PaaS)



- Sample

Cloud Computing Central | IBM Software on Amazon Web Services | IBM Cloud for developers | IBM Smart Business | Cloud Events | Software as a Service

Information Management | Lotus. software | WebSphere. software

DB2

· DB2 production ready AMIs: DB2 Express (32-bit) and DB2 Workgroup (64-bit) AMIs are available to use on Amazon EC2 at an hourly rate

Informix Dynamic Server

· Informix Dynamic Server Express Edition 11.5: Use Informix Dynamic Server Express Edition Amazon Machine Image (AMI) at an hourly rate

Portal & WCM

· WebSphere Portal Server and Lotus Web Content Management Standard Edition: Combine personalized powerful websites with your own business applications and external web services to deliver an exceptional web experience

Mashup Center

· Mashup Center AMI: Develop your applications using IBM Mashup Center, software that supports quick assembly of dynamic situational applications

Lotus Forms Turbo

Flexible, scalable eForms to speed process automation

· Lotus Forms Turbo AMIs: Independent Software Vendors (ISVs) can develop applications on Amazon EC2 using the Lotus Forms Turbo development Amazon Machine Image (AMI)

Application Server

· WebSphere Application Server (WAS): As the foundation of the IBM WebSphere software platform, WAS delivers a secure, scalable, resilient application infrastructure

WebSphere sMash

· WebSphere sMash: WebSphere sMash enables developers to quickly build and execute agile, Web 2.0-based applications

www.ibm.com/developerworks/spaces/cloud?pageid=757&S_TACT=105AGX01&S_CMP=LP

What is IBM offering on Amazon Web Services?

1. Hourly priced, full production environments of leading IBM software products.
 - ▶ Prices start at \$0.38c an hour and includes IBM software, Novell SuSe Linux and underlying Amazon Elastic Compute Cloud (EC2) charges.
 - ▶ No commitments, contracts or minimums. Pay as you go.
2. BYOL - Bring your own licenses
 - ▶ Customers can deploy their purchased IBM software on AWS using an easy conversion table.
3. ISV Development Environment
 - ▶ For ISVs and other companies developing commercially available applications, IBM, Novell and AWS provide no-charge development environments.
 - ▶ Get started in minutes, just pay for the EC2 charges starting at \$0.10c an hour.

<http://aws.amazon.com/ibm/>

Infrastructure as a Service (IaaS)

Servers

Network
ingData
Center
Fabric

Storage

Shared virtualized, dynamic provisioning

- Sample Public Cloud



On-demand compute and storage infrastructure for hosting IT solutions

- Elastic Compute Cloud (EC2)
 - Starting at \$.10/Hr
- Simple Storage Service (S3)
 - Starting at \$.15/GB/Month
- Simple Queue Service (SQS)
 - Messaging in the Cloud
- Elastic Map Reduce
 - Hosted Hadoop Framework

Infrastructure as a Service



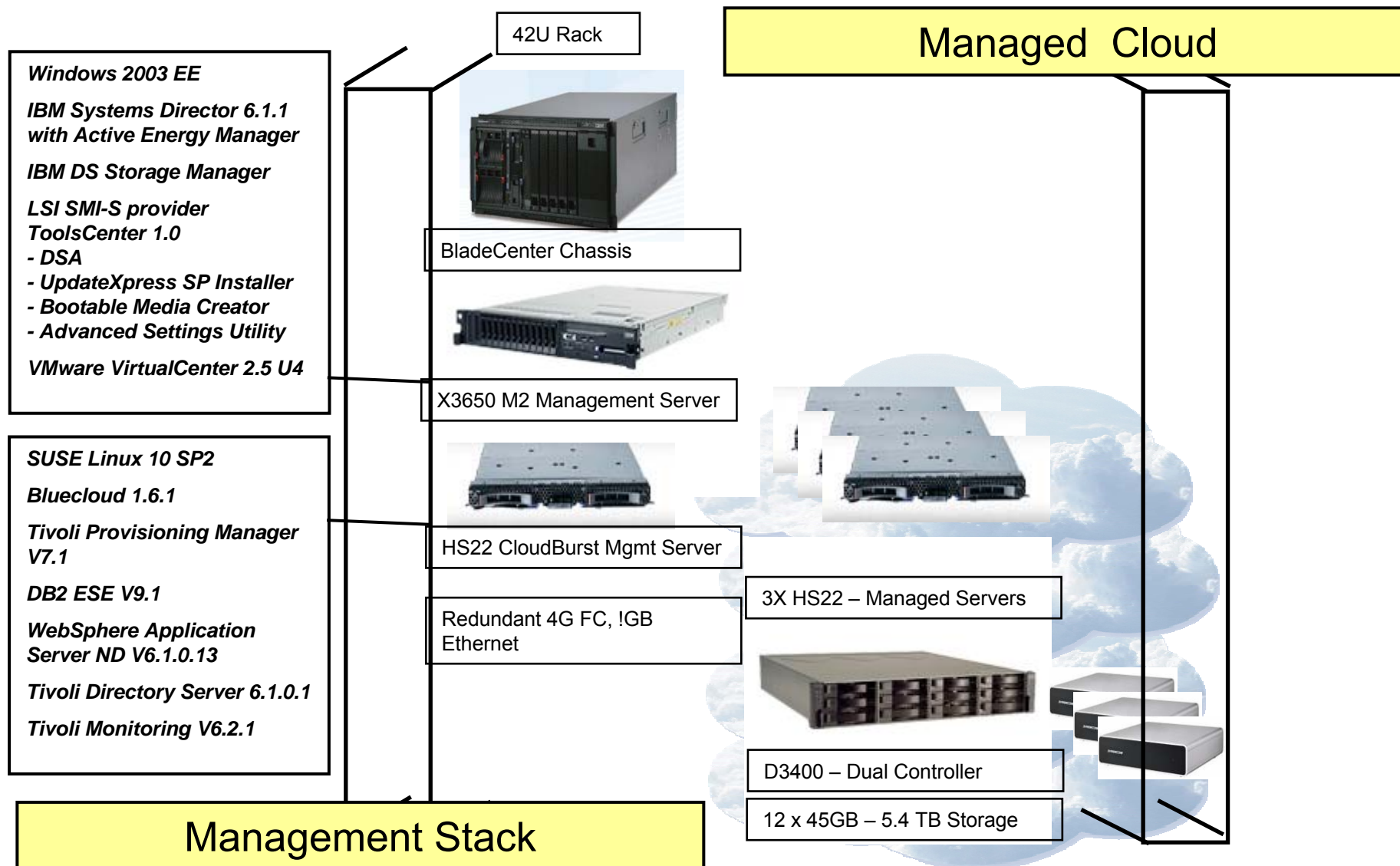
- Sample Privat Cloud

NIST Page 8 - **Cloud bursting**: Cloud bursting is a technique used by hybrid clouds to provide additional resources to private clouds on an as-needed basis. If the private cloud has the processing power to handle its workloads, the hybrid cloud is not used. When workloads exceed the private cloud's capacity, the hybrid cloud automatically allocates additional resources to the private cloud.

IBM CloudBurst

- IBM CloudBurst is a pre-packaged private cloud offering that brings together the hardware, software and services needed to establish a private cloud.
- This offering takes the guesswork out of establishing a private cloud by pre-installing and configuring the necessary software on the hardware and leveraging services for customization to your environment.

IBM CloudBurst – Components Minimum Configuration



CloudBurst – Further Configuration Options

Entry	Small	Medium	Large
<ul style="list-style-type: none"> One 42U Rack One BladeCenter Chassis One 3650M2 Mgmt Server Four HS22 Blades Redundant 1G Ethernet Networking – Bigbird HSSM Redundant 4G FC Network - Qlogic FC SM Redundant 1G Ethernet Networking One DS3400 - 2 Controllers each Storage Capacity = 12 450GB SAS (5.4TB raw) 	<ul style="list-style-type: none"> One 42U Rack One BladeCenter Chassis One 3650M2 Mgmt Server Four HS22 Blades Redundant 10G Ethernet Networking – Bigbird HSSM Redundant 4G FC Network - Qlogic FC SM Redundant 10G Ethernet Networking One DS3400 - 2 Controllers each Storage Capacity = 12 450GB SAS (5.4TB raw) 	<ul style="list-style-type: none"> One 42U Rack One BladeCenter Chassis One 3650M2 Mgmt Server 14 HS22 Blades Redundant 10G Ethernet Networking – Bigbird HSSM Redundant 4G FC Network - Qlogic FC SM Redundant 10G Ethernet Networking One DS3400 - 2 Controllers each Up to 3 EXP3000 Storage Capacity = 12 – 48 450GB SAS (5.4 – 21.6TB raw) 	<ul style="list-style-type: none"> One 42U Rack Two BladeCenter Chassis One 3650M2 Mgmt Server 28 HS22 Blades Redundant 10G Ethernet Networking – Bigbird HSSM Redundant 4G FC Network - Qlogic FC SM Redundant 10G Ethernet Networking Two DS3400 - 2 Controllers each Up to 6 EXP3000 Storage Capacity = 48 – 96 450GB SAS (21.6 – 43.2TB raw)

GTS QuickStart Services:

Installation and configuration

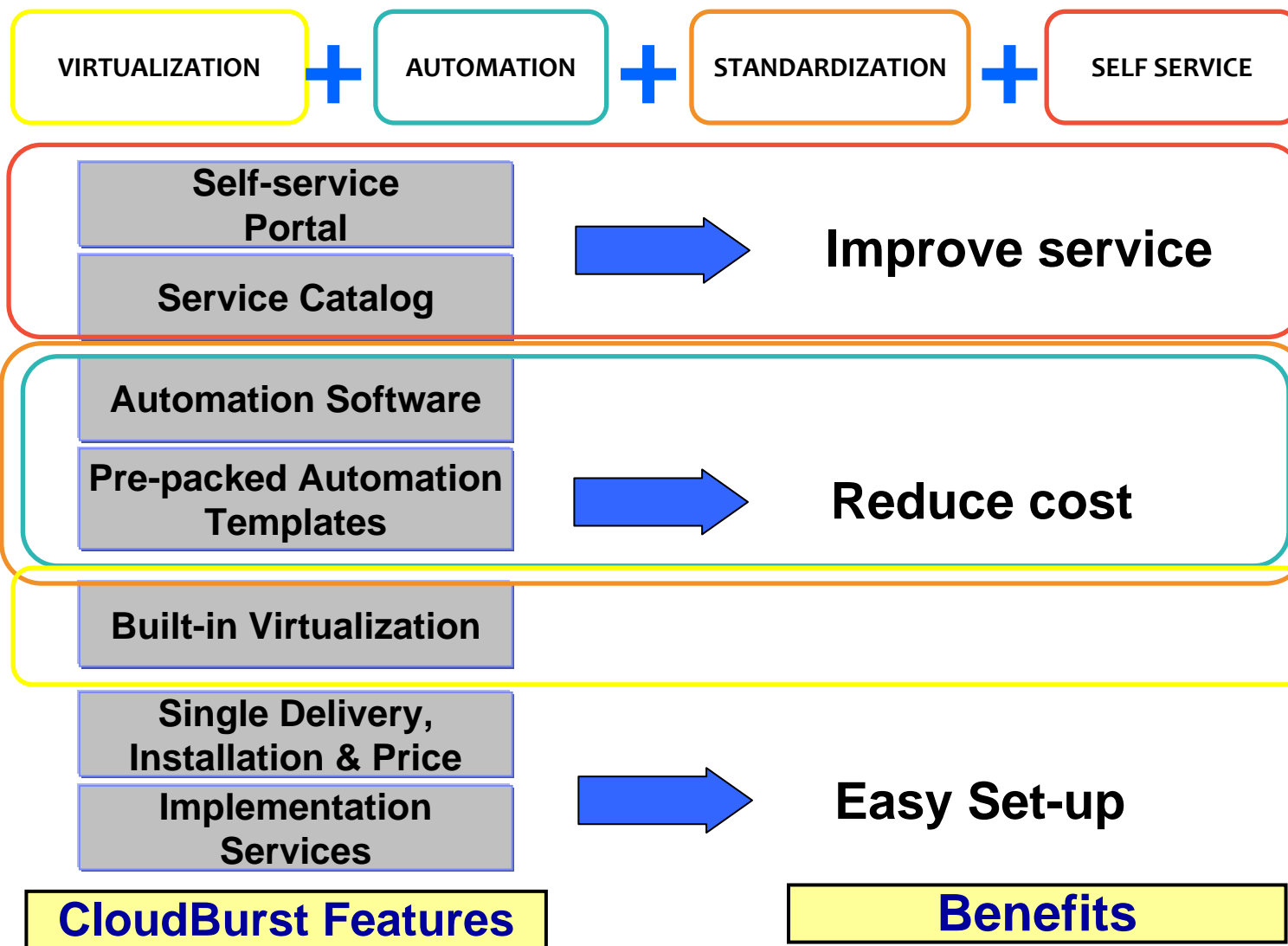
- Deploy and integrate BladeCenter hardware in customer data center and network
- Configure local storage area network
- Configure users and security profiles
- Setup and discovery of virtualized compute, network and storage resources
- Configure self- service portal
- Platform verification

On-Site introductory training (hands-on)

- BladeCenter, local SAN and network switch management
- Administrator and user level training



IBM CloudBurst – It's More Than Virtualization



Self-Service

Catalog

Available Cloud resources. ...

Request New Cloud Project

1. Browse available infrastructure and choose dates 2. Select servers and configure software

Select Reservation Dates

Start Date: 06/11/2009 End Date: 06/25/2009 Duration: 14 days

Available Resources

VMware System x Cloud Resources

Resource	Available/Total	Max for single VM
CPU	20.6 / 23.8	4
Memory	55.99GB / 63.99GB	8GB
Disk	817GB / 897GB	299GB

... Dependent on selected time frame

<http://depot.tivlab.raleigh.ibm.com/DemoLib.nsf/Demos/E66CC1F6C5F5CF96852575D30071D05A?OpenDocument>

Standardization – Image Catalog

plus Automation

Start Date **06/11/2009** End Date **07/01/2009** Duration **20 days**

Complete New Project Details

Select and Configure your Virtual Machines

Project Name:

1. Choose a Virtual Resource Cloud

See Roadmap (25) for future support

2. Choose an Image

- Select an image...
- Select an image...
- Microsoft Windows Server 2003 SP2
- VMware Red Hat Linux 5.3

Offered Images

Select and Configure your Virtual Machines

Needed Resources

1. Choose a Virtual Resource Cloud

2. Choose an Image

Image Details

Operating System

Recommended Resources

CPU Units: 0.4
Mem: 1024MB
Disk: 10GB

3. Choose resources for your virtual machine(s)

	CPU	Memory	Disk
Absolute Max	4	8192 MB	299 GB
Relative Max	4	8192 MB	299 GB
Chosen	<input type="text" value="0.4"/>	<input type="text" value="1024"/> MB	<input type="text" value="10"/> GB
Min	0.2	512 MB	5 GB
Number of Virtual CPUs (1 recommended)			<input type="text" value="1"/>
Amount of disk to use for swap partition (1.50GB recommended, 5GB max)			<input type="text" value="1.50"/> GB

Number of VMs: (maximum 51)

[next step >](#)

Controlled Process Management

3. Choose resources for your virtual machine(s)

4 x	CPU	Memory	Disk
	0.2	1024 MB	20 GB
Swap partition size: 1.50 GB			

4. Choose any software or additional options (* = required)

Enable Monitoring (installs agent)	<input checked="" type="checkbox"/>
------------------------------------	-------------------------------------

[< previous step](#) [Add VMs to project](#)

Submit

Rechecking resource availability...	done
Creating project...	done
Reserving infrastructure...	done
Scheduling resources...	done
Request Completed Successfully!	OK

Admin Approval requested

My Projects

Front Office Web App v3.1	Integration Testing	0 active servers (4 requested)	6/11/09 to 7/1/09	Pending Approval...	New
Mobile Calendar v2.0	Development	2 active servers (2 requested)	6/10/09 to 7/11/09	Approved	Active ● (Dates Changed)
Mobile Calendar v1.5	Performance Testing	3 active servers (3 requested)	6/10/09 to 7/15/09	Approved	Active ●

Reporting

Project Approved

After project approval ...

... requested VMs are provisioned

Project Infrastructure

Name	Hardware Configuration	Base Image	Status
VMware System x VM	0.2CPU (1 vcpu) - 1024MB Memory - 20GB Disk (incl. 1536MB swap)	VMware Red Hat Linux 5.3	Provisioning...
VMware System x VM	0.2CPU (1 vcpu) - 1024MB Memory - 20GB Disk (incl. 1536MB swap)	VMware Red Hat Linux 5.3	Provisioning...
VMware System x VM	0.2CPU (1 vcpu) - 1024MB Memory - 20GB Disk (incl. 1536MB swap)	VMware Red Hat Linux 5.3	Provisioning...
VMware System x VM	0.2CPU (1 vcpu) - 1024MB Memory - 20GB Disk (incl. 1536MB swap)	VMware Red Hat Linux 5.3	Provisioning...

Project Report

Reports by team


Choose a team






Team	Project Name	Server Name	Server IP	Start Date	Duration	Software List
Development	Mobile Calendar v2.0	10-180-0-1	10.180.0.1	Jun 10, 2009 9:41:32 PM	3 hrs	VMware Red Hat Linux 5.3_5.3 IBM Tivoli Monitoring Agent_6.2.1
Development	Mobile Calendar v2.0	10-180-0-2	10.180.0.2	Jun 10, 2009 9:41:32 PM	3 hrs	VMware Red Hat Linux 5.3_5.3 IBM Tivoli Monitoring Agent_6.2.1
Performance Testing	Mobile Calendar v1.5	10-180-0-5	10.180.0.5	Jun 10, 2009 9:43:01 PM	3 hrs	VMware Red Hat Linux 5.3_5.3 IBM Tivoli Monitoring Agent_6.2.1
Performance Testing	Mobile Calendar v1.5	10-180-0-4	10.180.0.4	Jun 10, 2009 9:43:01 PM	3 hrs	VMware Red Hat Linux 5.3_5.3 IBM Tivoli Monitoring Agent_6.2.1
Performance Testing	Mobile Calendar v1.5	10-180-0-3	10.180.0.3	Jun 10, 2009 9:43:01 PM	3 hrs	VMware Red Hat Linux 5.3_5.3 IBM Tivoli Monitoring Agent_6.2.1
Function Testing	Back Office Web App v4.0	10-180-0-8	10.180.0.8	Jun 10, 2009 9:54:15 PM	3 hrs	VMware Red Hat Linux 5.3_5.3 IBM Tivoli Monitoring Agent_6.2.1
Function Testing	Back Office Web App v4.0	10-180-0-6	10.180.0.6	Jun 10, 2009 9:54:15 PM	3 hrs	VMware Red Hat Linux 5.3_5.3 IBM Tivoli Monitoring Agent_6.2.1
Function Testing	Back Office Web App v4.0	10-180-0-7	10.180.0.7	Jun 10, 2009 9:54:15 PM	3 hrs	VMware Red Hat Linux 5.3_5.3 IBM Tivoli Monitoring Agent_6.2.1

Further Functions + IBM Services

Further functions

Project Infrastructure

Name	Hardware Configuration	Base Image	Status
 10-180-0-3	0.4CPU (1 vcpu) - 1024MB Memory - 10GB Disk (incl. 1536MB swap)	VMware Red Hat Linux 5.3	Active

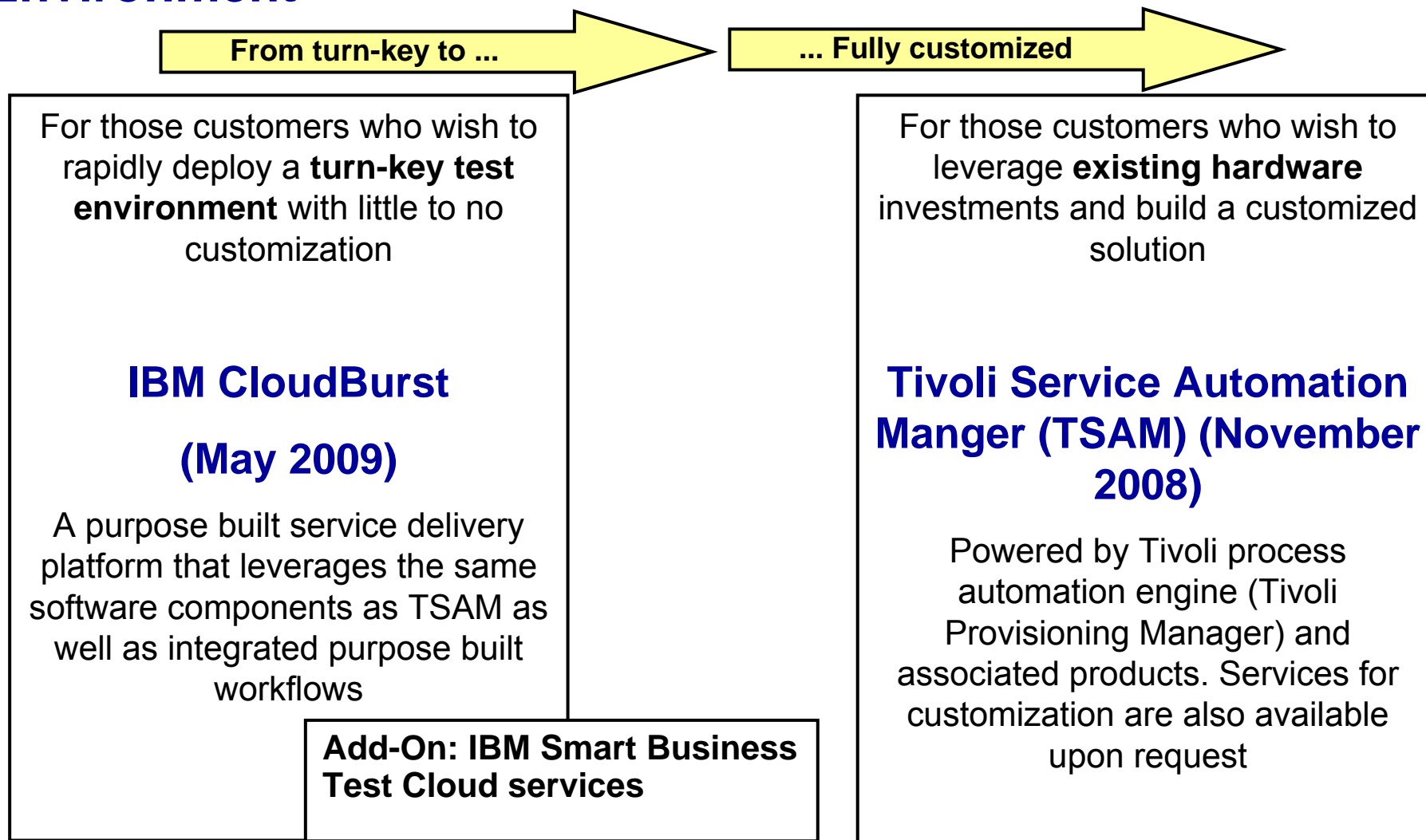
	System Info	Additional Software	Real Time Monitoring	Remote Control
IP	10.180.0.3	IBM Tivoli Monitoring Agent	CPU Usage ■ 3 %	 Power On
OS Type	VMware Red Hat Linux 5.3		Memory Free ■ 22 MB	 Power Off
Pool / Type	VMware System x (Esx)		Disk Free ■ 5.56 GB	 Restart
Admin Password	4Juusj9W			 Reset Password
Mgmt Name/IP	10-160-9-2 / 10.160.9.2			 Backup

Integrated IBM Global Technology Services QuickStart service - Integrate IBM CloudBurst in data center and network, configure local storage, set up users and security profiles, configure virtualization resources and self-serve portal

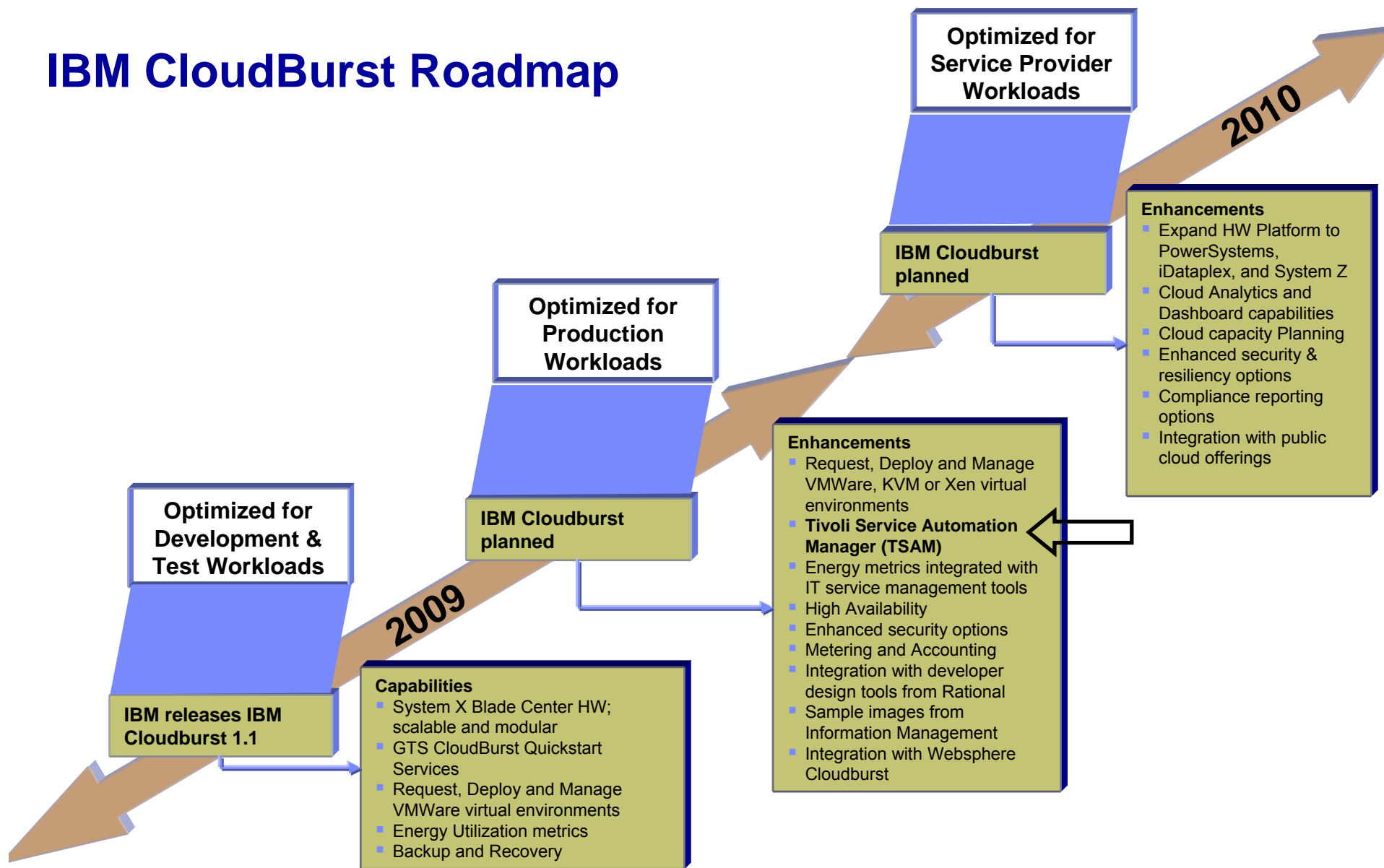
Hands-on Training

Add-On: IBM Smart Business Test Cloud services - support of IBM CloudBurst to also leverage **existing IT infrastructure** (systems and storage) for a cloud solution with full customization and integration support.

Flexible Choices – Build-up Your Cloud Development & Test Environment



IBM CloudBurst Roadmap

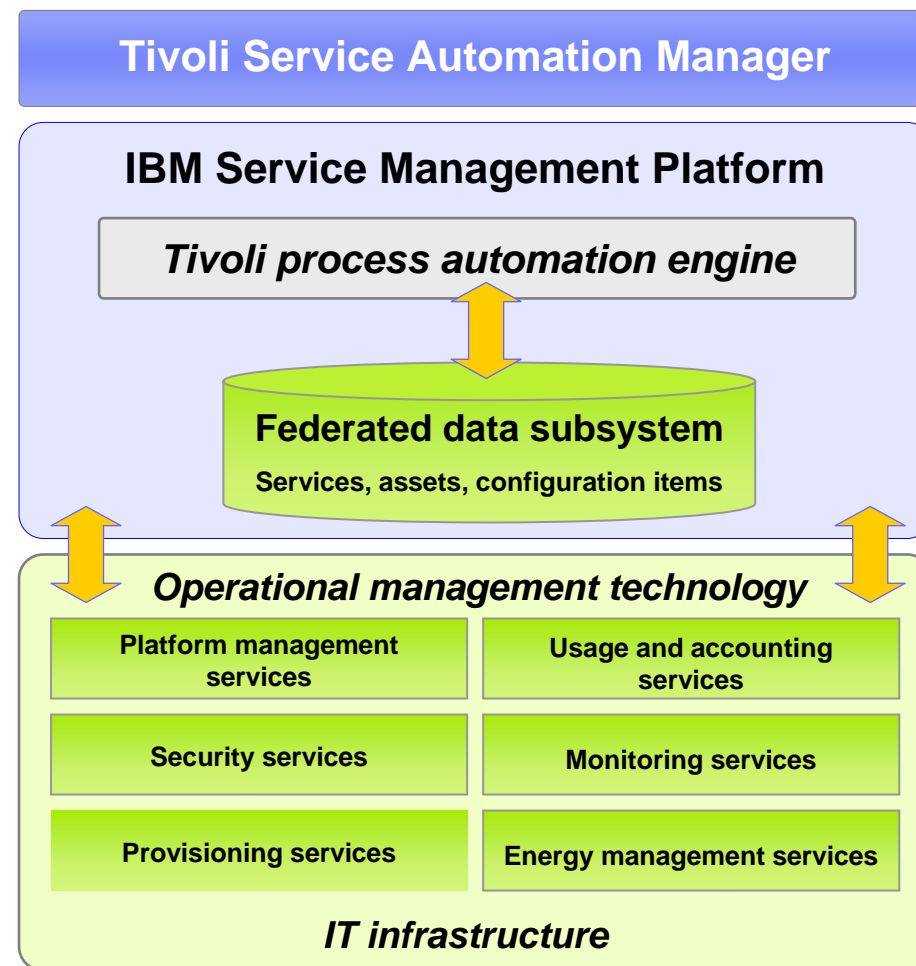


IBM Tivoli Service Automation Manager

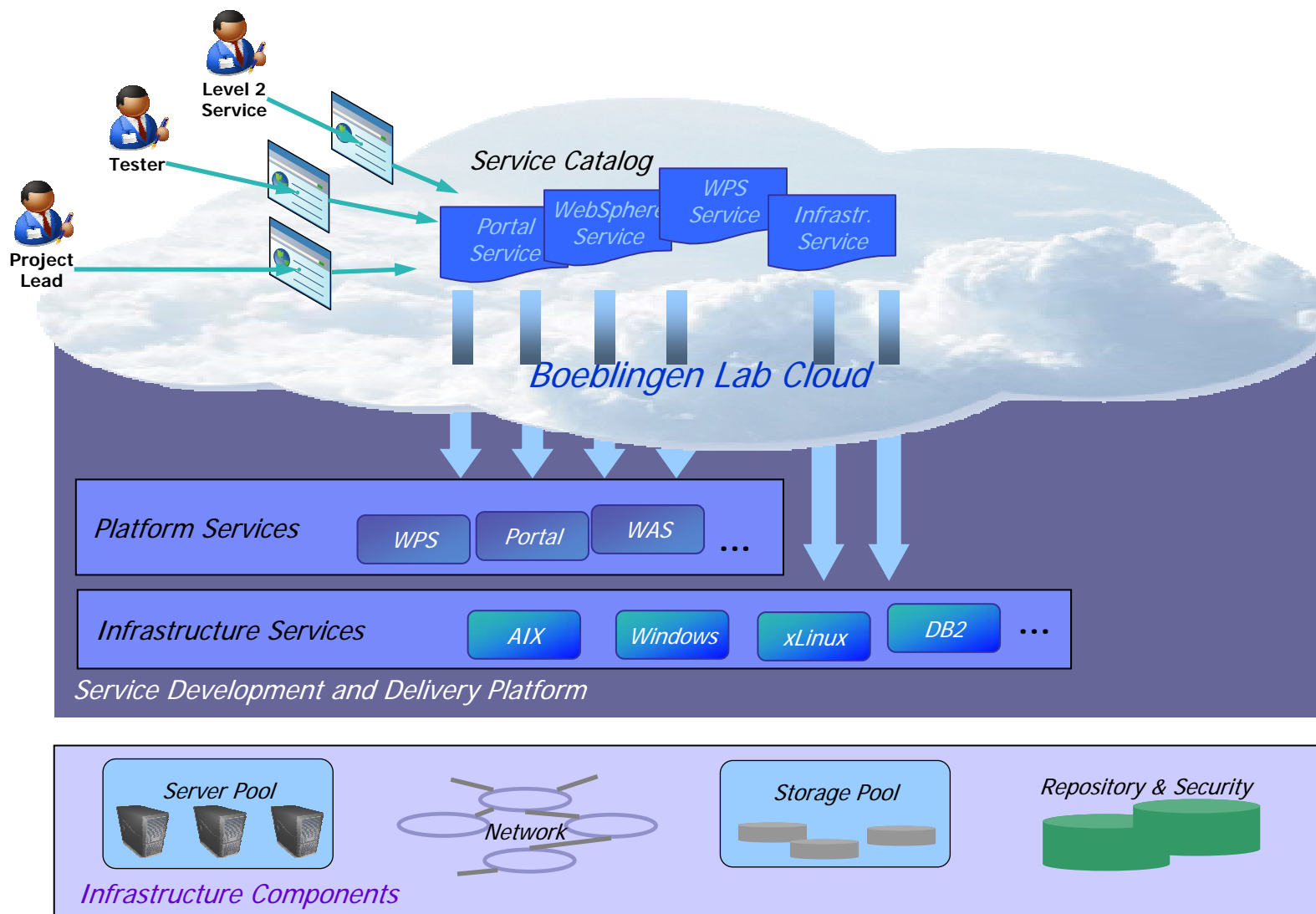
IBM Tivoli Service Automation Manager

- 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

http://www-142.ibm.com/software/dre/ecatalog/detail.wss?locale=en_US&synkey=R915766U47567F18



Development & Test Cloud – IBM Boeblingen R & D –TSAM Based



Task Flow to Create Virtual Server within a Cloud

RQ ISS 01	Create Virtual Server	Creation of a new virtual server and grant user access
	Service	Infrastructure Service
	Description	This request creates a new virtual server with installed operating system.
	Actor	R4 CC Client User
	Assumptions	Customer Container activated, user assigned to a CC
	Input-Paramter	CCID, Image Name,
	Task flow	<ol style="list-style-type: none"> 1. TK ISS01-01 Get OS and Application Licences 2. TK ISS01-02 Get IP Address and <u>Hostname</u> 3. TK ISS01-03 Get Host 4. TK ISS01-04 Get Storage Space 5. TK ISS01-05 Create/Start Virtual Server 6. TK ISS01-06 Create SCC Document 7. TK ISS01-07 Update Server 8. TK ISS01-08 Set ITCS 104 compliance on Server 9. TK ISS01-09 Administrate Server according to Security Guidelines 10. TK ISS01-10 Add User to System 11. TK ISS01-11 Change Firewall Rules 12. TK ISS01-12 Configuration Management 13. TK ISS01-13 Set up Monitoring

Cloud Computing
– It's not just another hype
- There's real technology to build up clouds

Thank You





Backup

Today's Workloads Delivered via Cloud Services

- 1 Single virtual appliance workloads
- 2 Test and Pre-production systems
- 3 Mature packaged offerings, like e-mail and collaboration
(see <http://www.lotuslive.com>)
- 4 Software development environments
- 5 Batch processing jobs with limited security requirements
- 6 Isolated workloads where latency between components is not an issue
- 7 Storage Solutions/Storage as a Service
- 8 Backup Solutions/Backup & Restore as a Service
- 9 Some data intensive workloads if the provider has a cloud storage offering tied to the cloud compute offering

Workloads Not Yet Ready as Cloud Service

- 1** Workloads which depend on sensitive data normally restricted to the Enterprise
 - Employee Information - Most companies are not ready to move their LDAP server into a public cloud because of the sensitivity of the data
 - Health Care Records - May not be ready to move until the security of the cloud provider is well established
- 2** Workloads composed of multiple, co-dependent services
 - High throughput online transaction processing
- 3** Workloads requiring a high level of auditability, accountability
 - Workloads subject to Sarbanes-Oxley, for example
- 4** Workloads based on 3rd party software which does not have a virtualization or cloud aware licensing strategy
- 5** Workloads requiring detailed chargeback or utilization measurement as required for capacity planning or departmental level billing
- 6** Workloads requiring customization (e.g. customized SaaS)