

Virtualization Into Cloud

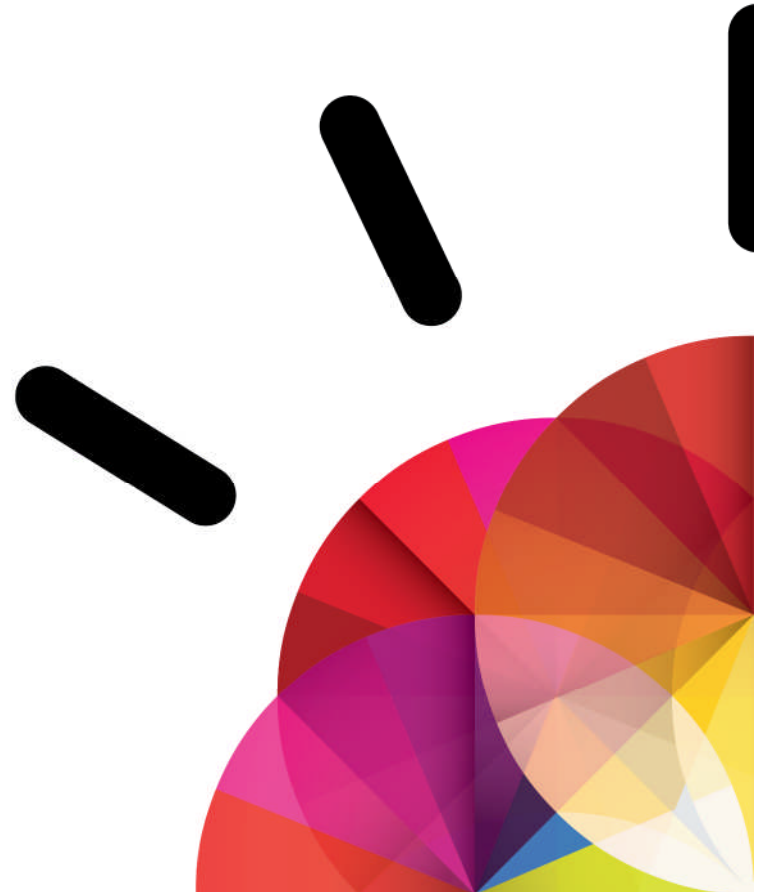
Andy Wachs

Systems Software Strategy

May 11



Systems Software



Our clients are struggling to progress toward a more flexible infrastructure



- How do I respond to the pressure to cut costs, reduce risk and complexity?
- How do I react more quickly to take advantage of new opportunities?
- How do I move my data center architecture into the future?
- A lot of buzz on cloud, where is the best place to start and how?



Cloud computing is a new way of thinking for delivering IT services to users

Cloud is:

- A new consumption and delivery model inspired by consumer Internet services
- End-user focused

Cloud represents:

- The delivery of IT as services

Cloud enables:

- On-demand self-service, sourcing options, economies of scale
- Through private, public and hybrid models

IBM and clients are seeing benefits from cloud computing

| | | |
|----------------------------|--------------|---------------|
| Test provisioning | Weeks | Minutes |
| Change management | Months | Days/hours |
| Release management | Weeks | Minutes |
| Service access | Administered | Self-service |
| Standardization | Complex | Reuse/share |
| Metering/billing | Fixed cost | Variable cost |
| Server/storage utilization | 10–20% | 70–90% |
| Payback period | Years | Months |



Clients are more comfortable with private clouds

Many are ready to deploy fundamental business applications in a private cloud

Private Clouds are viewed as suitable for many workloads

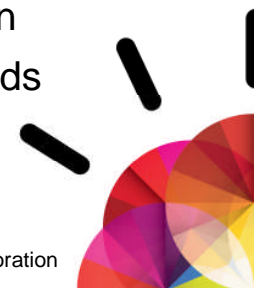
- Strong interest in moving many IT activities or workloads to a Private Cloud
- Over 60% use or plan to use in the next 12 months

Clients are experimenting with Public Clouds for certain workloads

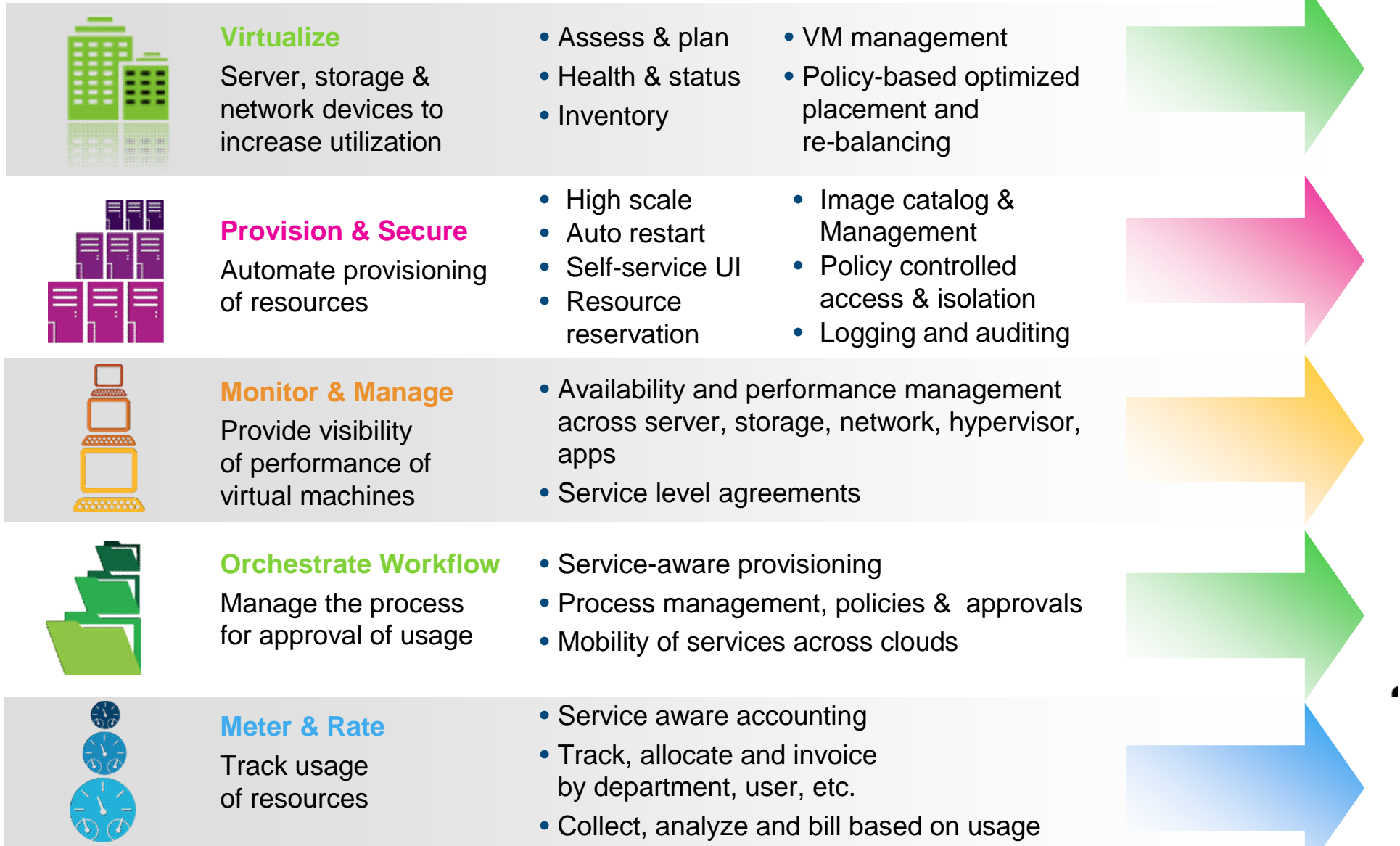
- Public Clouds used for web conferencing, email, and CRM/sales force automation
- 20-30% use or plan to use in the next 12 months

Private Clouds appeal across all industries while Public Clouds appeal to industries under margin pressure

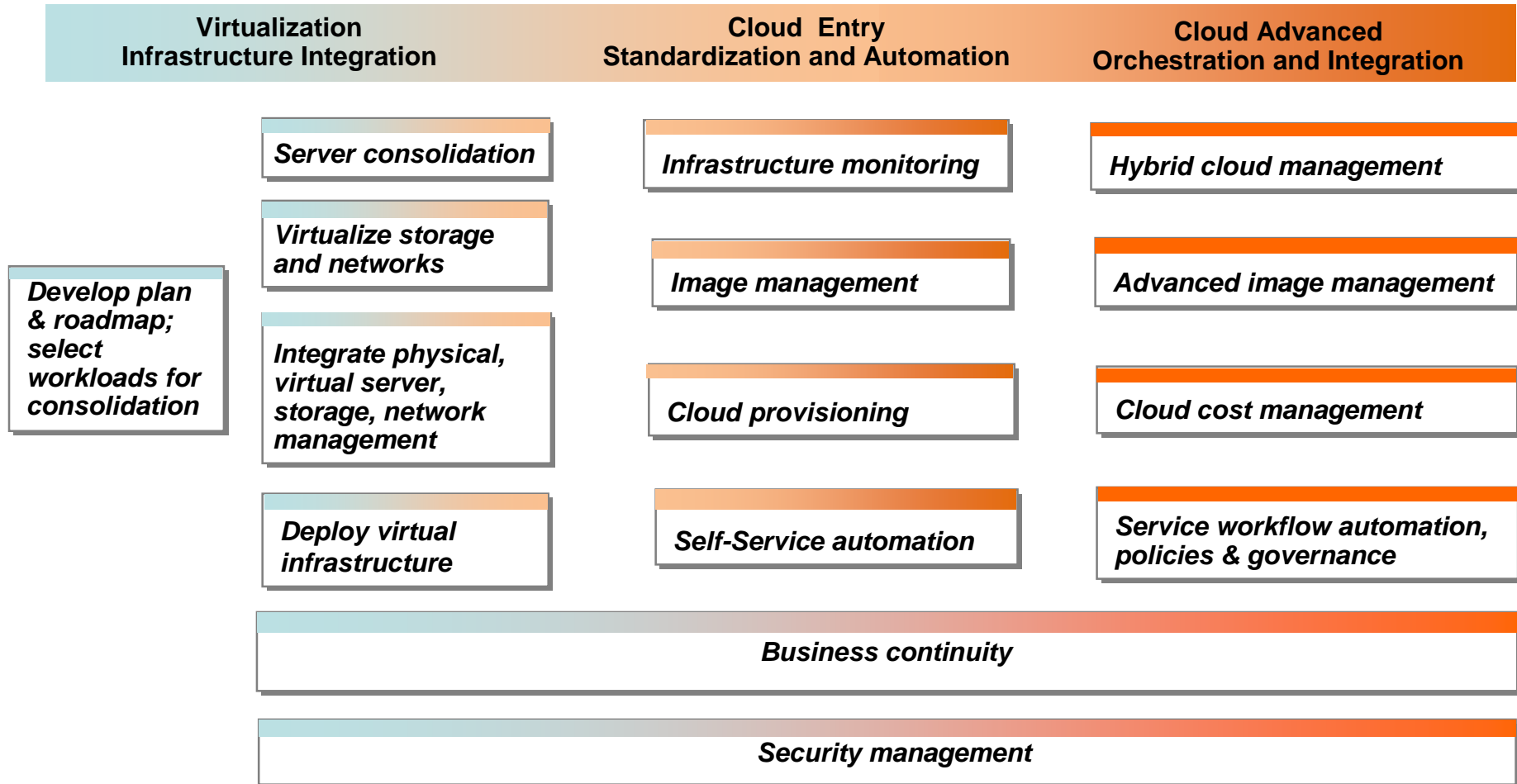
- Private Clouds appeal to all industries with highest interest by Banking, Government, Healthcare, Insurance, Manufacturing, Transportation
- Public Clouds appeal for certain workloads in industries with high margin pressure



The journey to cloud-delivered services...



A simple progression can ease a client's journey into Cloud



Early IaaS cloud usage scenarios

Manage Images

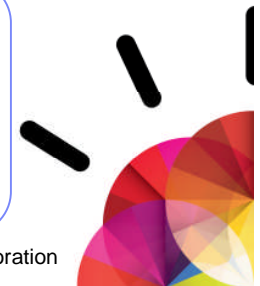
- Create/convert virtual images from physical server stack
- Store images in a library for better tracking
- Manage physical and virtual images with a simple interface
- Create image templates for standardization

Automate Provisioning with a self service interface

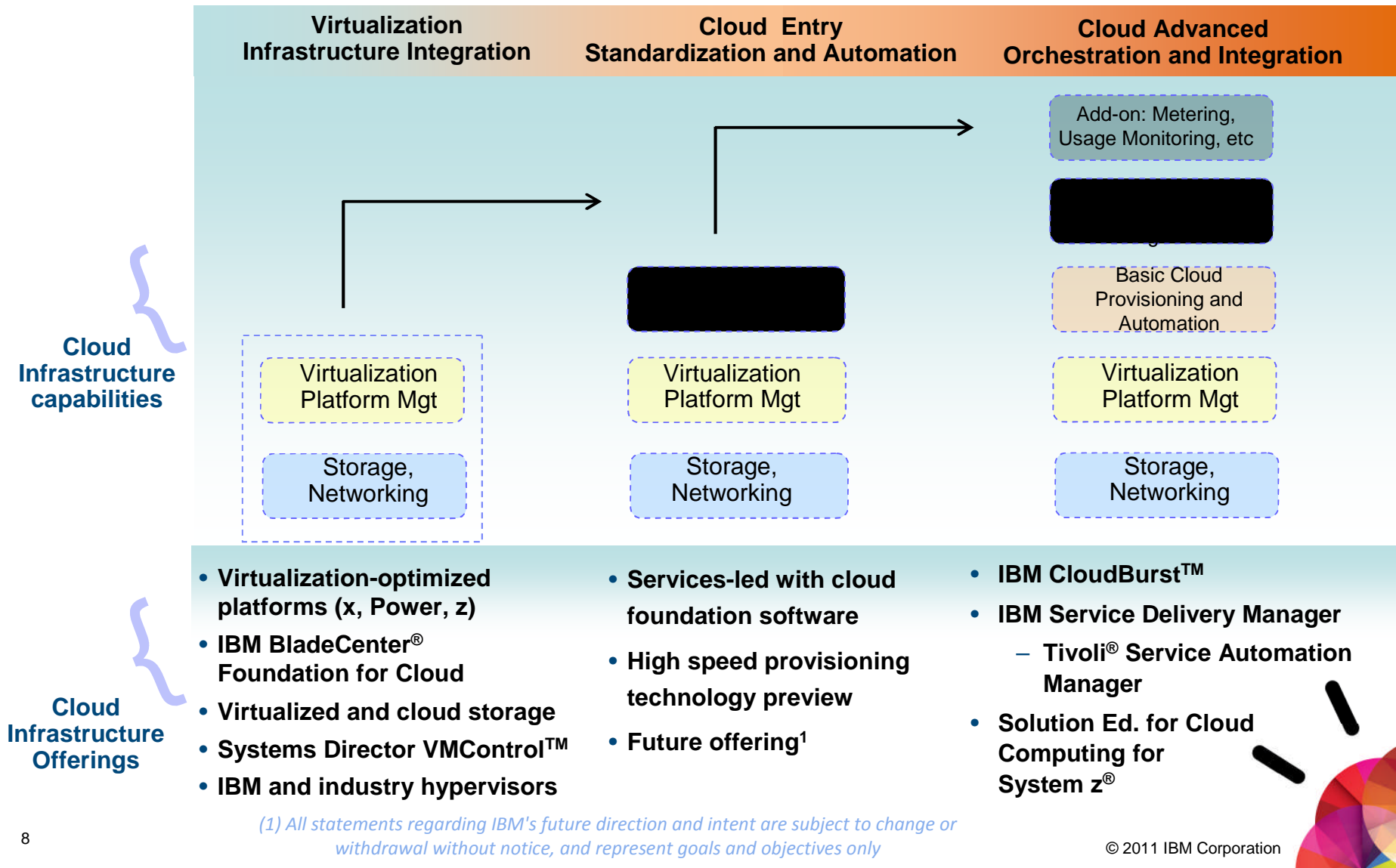
- Provide a self service interface to deploy virtual images as-a-service
- Obtain resources on a temporary basis which are released when done
- Set-up provisioning rules and defaults at project or group level
- Easily adjust resource allocations within limits
- Provide basic usage accounting, audit & approvals

Build a highly scalable and persistent cloud infrastructure

- Perform high-scale, frequent, repetitive provisioning of cloud workloads
- Add new nodes to the cloud easily and transparently to the services delivered in the cloud
- Enable persistent execution of applications in a cloud
- Enable administration of large clouds using minimal staffing to lower cost



IBM offers simple entry points for easing the path through the journey

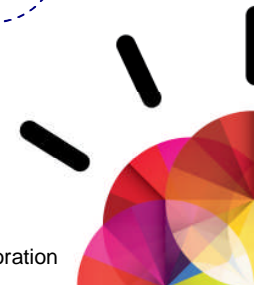
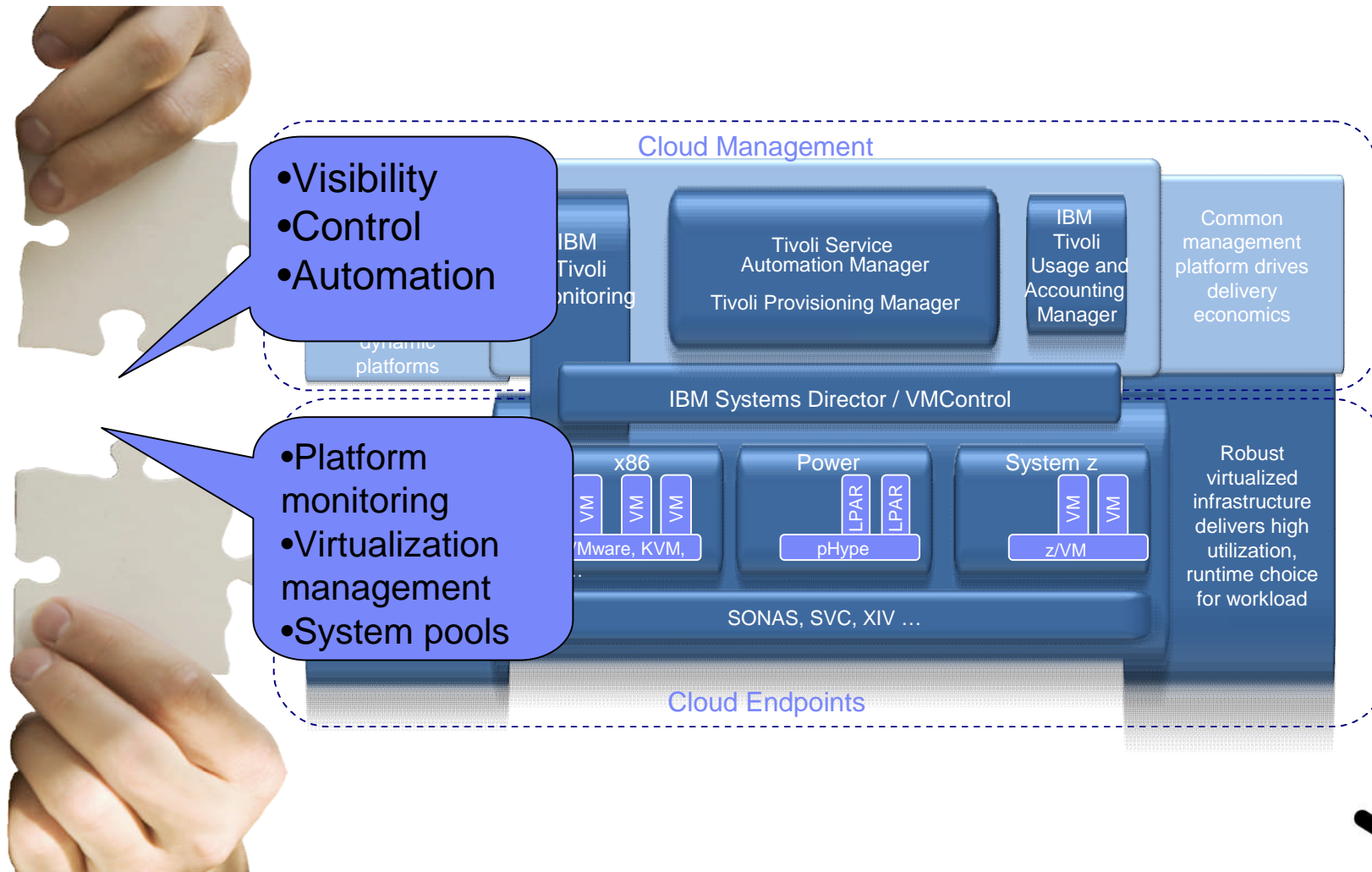


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Delivering differentiated cloud capabilities

Common architecture and focus alignment between SWG and STG



Enabling cloud usage: services + cloud foundation software

Services-led offering for the Power Systems Platform

*Basic cloud management for STG
cloud enabled systems (Power
Systems™ today¹)*



Benefits

- Easy entry into Cloud
- Reduce capital and administration expenses
- Accelerate “time to value” launch of new applications
- Metering & reconciliation of settlements
- Business approval of end user requests
- Easy integration with back-end systems and process

Design Points

- Easy to use workflow optimized for users
- Customizable UI enabled for Lab Service delivery
- Extensible via REST APIs

Key Capabilities

- Create, edit, manage virtual servers
- Capture a running virtual server
- Deploy virtual appliances quickly
- Monitor state of deployments
- Create projects

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China Telecom Jiangxi Branch:

Reducing complexity and operational costs with private cloud

Business need:

- Seize greater market share
- Reduce time to market for new products & services
- Address high cost of floor space & power

China Telecom:

74M mobile subscribers

77% mobile revenue growth
(1H 2010/ yty)

58M broadband subscribers

180M access lines

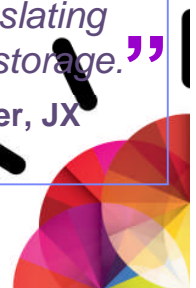
Benefits:

- Time to market for new business applications reduced from 3-4 months to 2-3 days
- Improved hardware utilization and cut hardware costs by over 50 %
- Cut energy consumption and CO² emissions



“ Our primary estimate is that the IBM solution has improved hardware utilization by over **50 percent**, although this may in fact be higher. Sharing resources through the internal cloud has allowed us to consolidate hardware, translating into **50 percent** cost savings in terms of CPU and storage.”

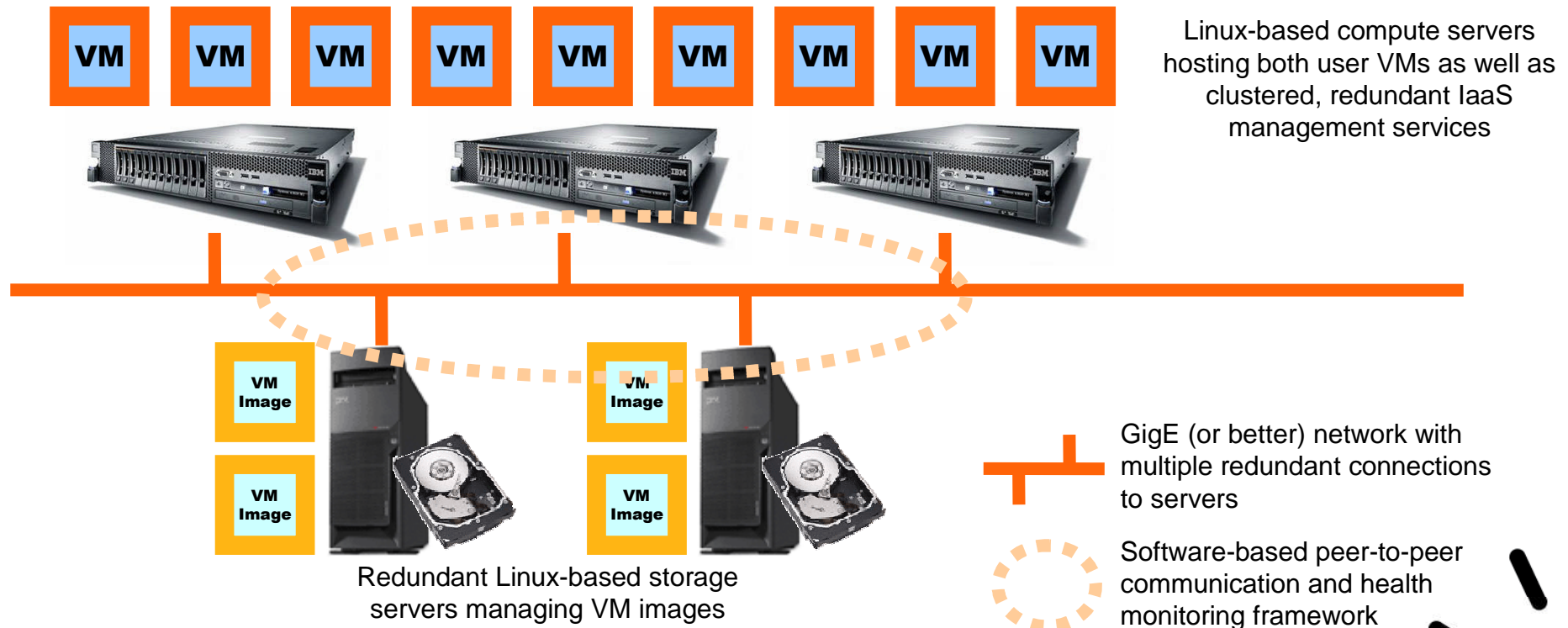
Mr. Xu Qi Supervisor of IT, Design & Support Center, JX CT, China Telecom



Enabling cloud usage: High speed, low-touch provisioning

IBM Technology Preview¹

- Can provision & boot **100 VMs in ~1 minute** (1 VM in **20-30 seconds**)
- **>100,000 VMs** provisioned to date on an internal cloud (88 servers running for **11 months**)
- Can tolerate multiple failures by dynamically working around failed elements
- **Near 0 downtime** due to faults, management software upgrades, addition/removal of hardware



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STG private & Service Provider cloud offerings

Cloud-enabled Datacenter

Driving new workloads to the cloud

- Most start with optimizing Test and Development
- Moving to ERP, CRM, HPC and storage workloads
- Hybrid cloud: IBM Systems that link to IBM cloud services

Industry Focused Solutions

- Service Provider Platform (CSP2)
- Education clouds to provide compute services to large or small schools that fit within their budget constraints.

Integrated Solutions

- IBM CloudBurst for System x®, Power Systems
- BladeCenter Foundation for Cloud
- Solution Edition for Cloud Computing for System z
- IBM Scale out Network Attachable Storage (SONAS)

Custom Cloud Solutions

- IBM Service Delivery Manager + IBM virtualized systems
- IBM Smart Analytics Cloud
- Custom storage cloud
- Open implementations



IBM Server Systems provide choice and workload optimization

Providing an infrastructure to span systems because one size does not fit all

Universita di Bari

Extreme scale w/ Linux on z supports community cloud used by fishing industry, wine cooperative, logistics for trucking industry

[Press release](#)

Audi

Migrate SAP Infrastructure on POWER7® and DB2® to cloud resulting in better performance, low costs and high energy efficiency

[Press release](#)

US Federal Systems Integrator

IBM CloudBurst on BladeCenter, dramatically improving time-to-market for Development & Test requirement

Multimedia Development Corp (MDeC)

Malaysia's most advanced animation cloud optimized for flexibility and scale with iDataplex®

[Press release](#)



Introducing: IBM BladeCenter Foundation for Cloud

A complete virtualized platform that is cloud ready

Built-in virtualization

- Allows for significant consolidation of workloads
- Enables cost avoidance via higher asset utilization
- Resource pools for agile workload deployments
- BladeCenter Open Fabric Manager
- VMware vSphere Enterprise 4.1

Management

- Monitor and manage physical and virtual resources in same manner
- Automatically migrate virtual machines across systems to maintain service levels
- Network isolation via multiple VLANs
- Energy monitoring & management
- IBM Systems Director with Active Energy Manager
- BladeCenter Open Fabric Manager

Infrastructure

- Four (4) pre-integrated Configurations, pre-Built at Factory
- Servers, storage & networks enabling: from 100 to 2000 VMs¹
- Optional IBM SAN Volume Controller can be added via on site services

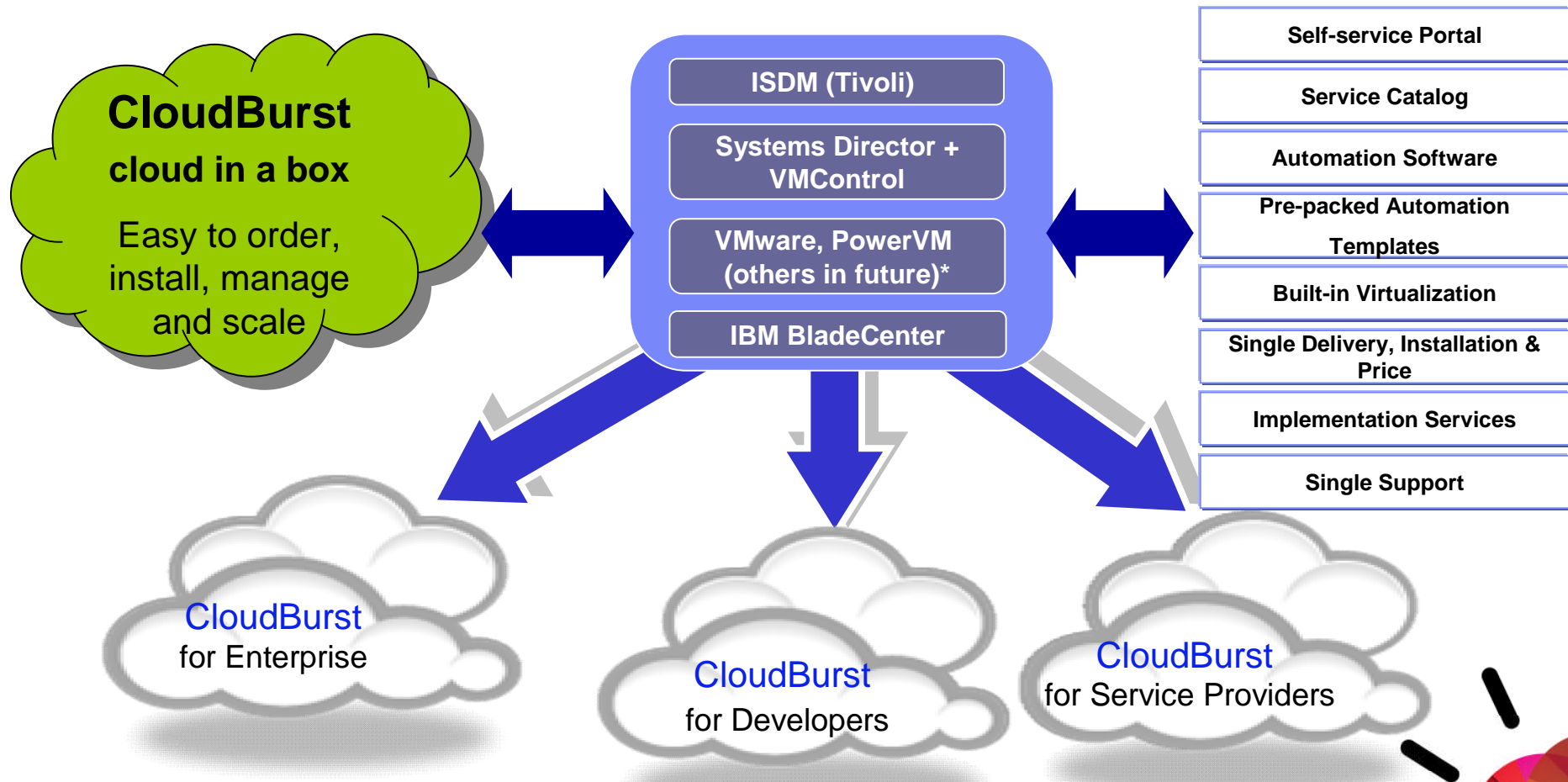
(1) Based on IBM internal estimates of standard virtualization blade
•HS22V with Intel Xeon 5660 2.8 GHz processors and 72GB memory
•Each blade can support up to 36 VMs of 4GB size

Single product, single delivery, single installation, single invoice, single support structure



IBM CloudBurst -- advanced Cloud service delivery platform

Pre-packaged offering that integrates the service management system, server, storage and services needed to establish a private cloud



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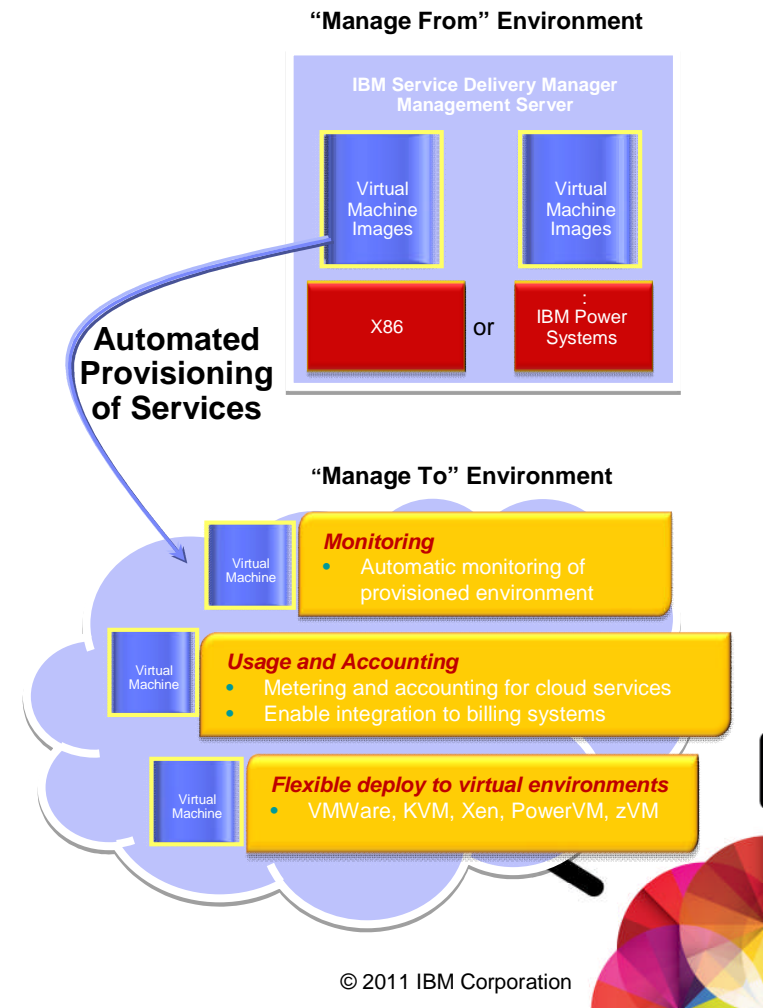


IBM Service Delivery Manager

A pre-integrated software stack, deployed as a set of virtual images, that automate IT service deployment and provide resource monitoring, cost management, and high availability of services in a cloud

Benefits of IBM Service Delivery Manager

- **Leverage existing hardware** - allows businesses to leverage existing hardware while reducing capital expenditures and generate greater ROI
- **Improved time to value** - Reduces the amount of integration work required to deploy a cloud by offering a pre-bundled and integrated service delivery software stack
- **Accelerated deployment** - Automated image deployment, cross connection and activation of components. Allows clients to shorten deployment times.
- **Reduce complexity** - Self service, standardization and automation simplify use and minimize errors



IBM custom cloud server solutions provide choice of optimized infrastructure



- IBM BladeCenter has **no single point of failure** unlike competition
- HS22V supports **~35% more VMs per blade** than standard competitor blades
- BladeCenter H provides 67% to 250% **more Ethernet uplink bandwidth** than competitor blades which is critical for VM movement (vMotion)

IBM System
z the Ideal
Cloud
Platform



- Drive systems to over **90% utilization**
- **Live Partition Mobility** with VM's of any size up to the entire system that can easily move between your POWER6 and POWER7 systems
- **Scales seamlessly from 1/10 of a core to 256 cores** and can use all resources of the host server
- **Dynamic changes** to any IT resource without reboot

- Achieve nearly **100% utilization** of system resources nearly 100% of the time
- Enjoy the **highest levels of resource sharing**, I/O bandwidth, and system availability
- Add hardware resources to an already-running system **without disruption**



IBM Storage Systems provide availability and scalability



Link your compute cloud to your existing SAN



High availability and performance for the most demanding cloud workloads



Create a highly scalable storage cloud with unified management.

“The IBM XIV Storage System allows us to provide a highly reliable, highly performing platform to our customers that should help NaviSite gain an advantage over its competitors.”

*-Mark Clayman,
Senior Vice President of hosting services for NaviSite.*

[Case Study](#)



- ✓ Joint research initiative with 15 European Partners
- ✓ Migrate and federate data across geographically distributed domains
- ✓ Facilitating access to data by content and its relationships



IBM Systems provide the best foundation for an end-to-end cloud infrastructure

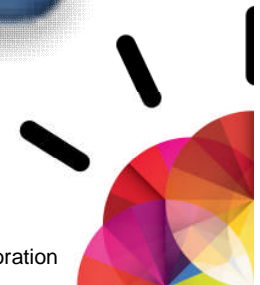
The best cloud infrastructures are built on secure and available foundations

Clients need a prescriptive, easy progression to ease their journey to Cloud

Service Management is a critical component of an optimized cloud infrastructure

Cloud computing is becoming a key element in data center transformations

IBM Systems help our customers: Achieve higher security, ensure IT resource availability, lower costs and relieve pressure on internal resources, and accelerate time to value







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