IBM SmartCloud Foundation

Cloud Enablement Technologies with Tivoli offerings

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Pulse Comes to You

Optimizing the World's Infrastructure
15 May 2012

# Cloud adoption patterns are emerging backed by proven best practices

Cloud Enabled Data Center (IaaS)

Cut IT expense, risk and complexity

Transition IT from a "cost center" to a strategic center of business value

Projects to get started:

- Create a Cloud Strategy and Roadmap
- Consolidate and Virtualize your Infrastructure
- Image and Virtual Environment Management
- **Implementing an Entry Cloud Infrastructure**
- **Implementing an Advanced Cloud Infrastructure**
- Access Compute and Storage as a Service
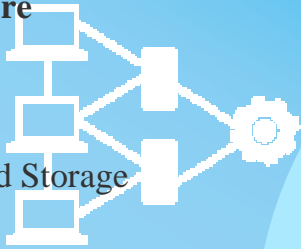
Cloud Platform Services (PaaS)

Accelerate time-to-market with new workloads

Enable dynamic Cloud based service delivery "On Demand" and at lower cost

Business Solutions on Cloud (SaaS)
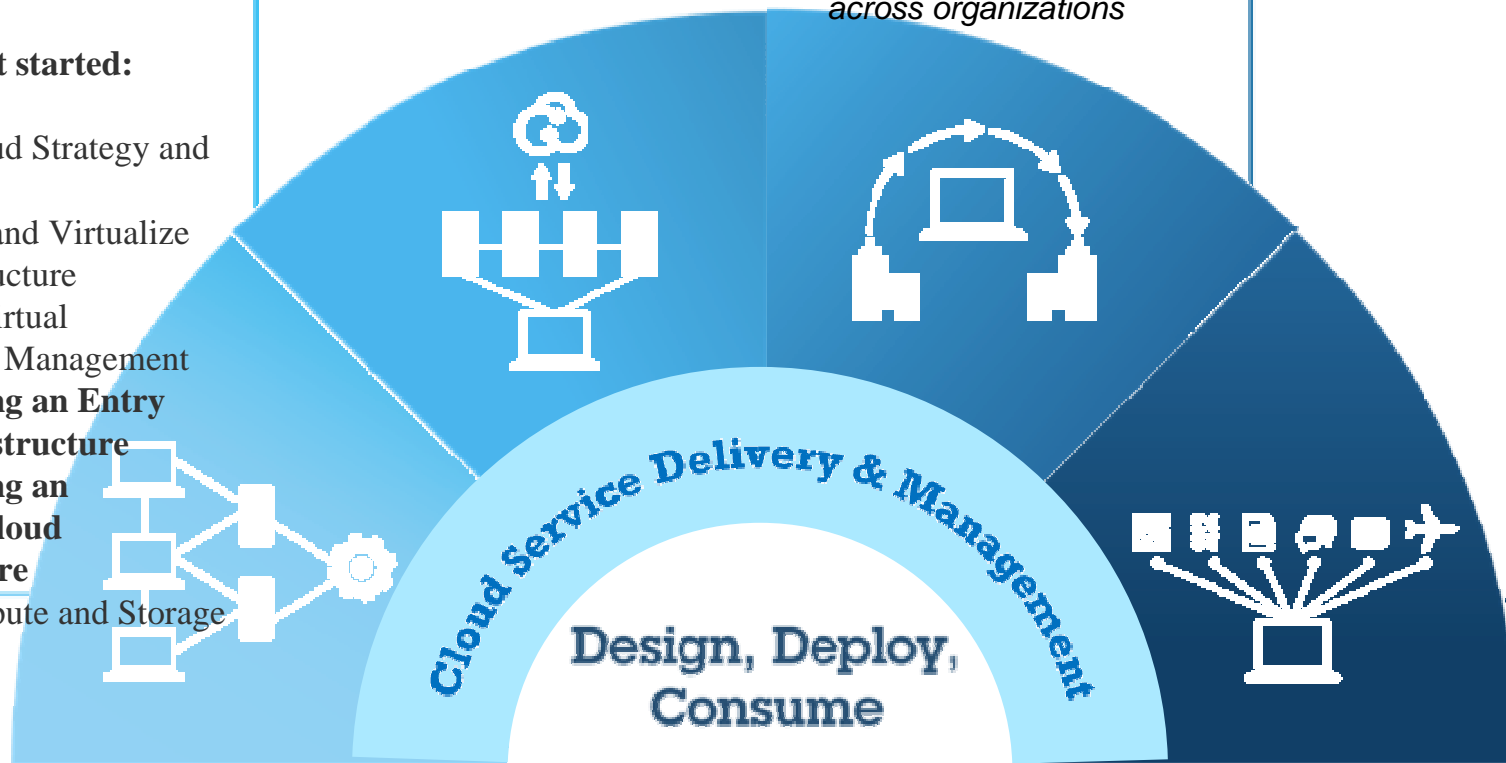
Gain immediate access to applications

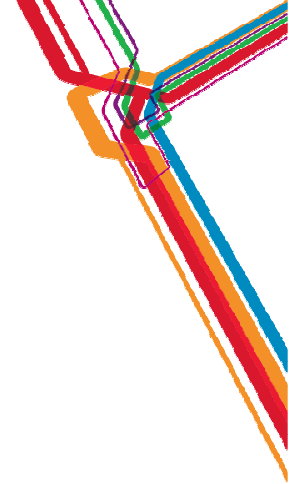*Software-as-a-Service delivering IT and process orchestration within and across organizations*

Cloud Service Provider

Deliver innovative business services

Implement new business models for internal and/or external services

Cloud Service Delivery & Management

Design, Deploy, Consume

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IBM SmartCloud Platform

IBMSmart**Cloud**

> **Business Process as a Service**
>
> **Software as a Service**
>
> **Platform as a Service**
>
> **Infrastructure as a Service**
>
> Design | Deploy | Consume

IBMSmart**Cloud** Foundation

IBMSmart**Cloud** Services

IBMSmart**Cloud** Solutions

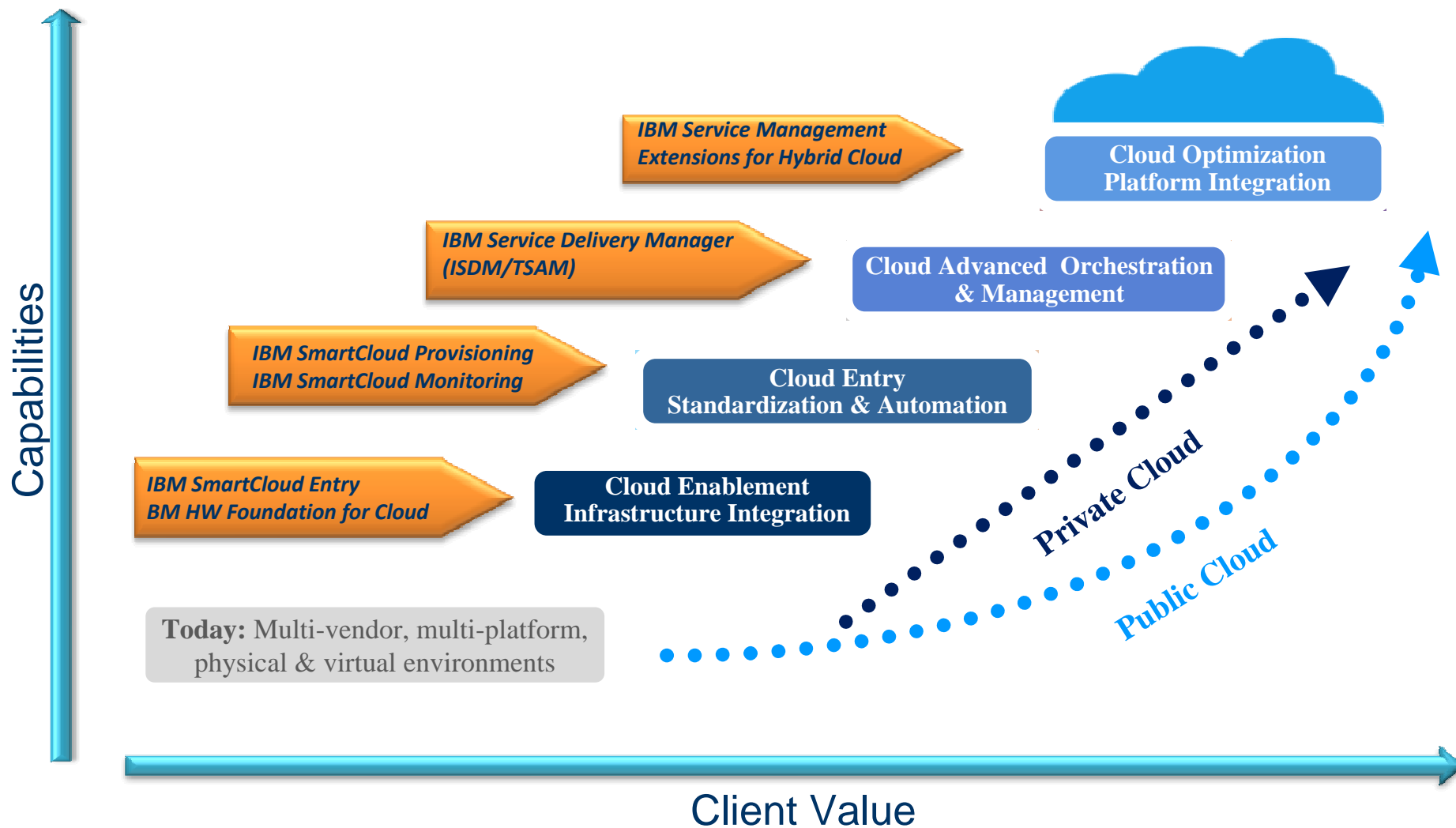| **Cloud Enablement Technologies**	**Managed Cloud Services**	**Cloud Business Solutions**
A foundation for enabling and managing Cloud services	A secure, scalable Cloud platform for deploying applications rapidly and efficiently	Accelerate business impact by leveraging Cloud business applications

Cloud Standards Customer Council

Commitment to open standards and a broad ecosystem

IBM SmartCloud Foundation offerings provide the foundation for advanced agility and assurance capabilities

Roadmap for optimizing cloud service delivery and management

Capabilities (vertical axis)

Client Value (horizontal axis)

IBM Service Management Extensions for Hybrid Cloud

Cloud Optimization Platform Integration

IBM Service Delivery Manager (ISDM/TSAM)

Cloud Advanced Orchestration & Management

IBM SmartCloud Provisioning
IBM SmartCloud Monitoring

Cloud Entry Standardization & Automation

IBM SmartCloud Entry
BM HW Foundation for Cloud

Cloud Enablement Infrastructure Integration

Today: Multi-vendor, multi-platform, physical & virtual environments

Private Cloud

Public Cloud

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Road to Cloud Adoption with SmartCloud Foundations

Key Cloud Capabilities	Delivered by
■ Rapidly scalable and low-touch cloud operation ■ Life-cycle image management ■ Self-service interface hiding infrastructure complexities **Differentiator with rapid, fault tolerant heterogeneous provisioning with rich image analytics**	**IBM SmartCloud Provisioning** **Drive reduced operational costs through automation**
■ Policy-driven workload placement ■ Receive real-time proactive & predictive alerts ■ Visibility into the cloud infrastructure **Differentiator Side-by-side and historical data to identify problems quickly**	**IBM SmartCloud Monitoring** **Control and visibility**
■ Cloud services, customizable via service templates ■ Integration of homegrown process tools and applications ■ Enterprise-level service management: monitoring, usage and accounting, security **Differentiator with leading performance and infrastructure scale through rich runbook automation and customizable service catalogue**	**IBM Service Delivery Manager (ISDM/TSAM)** **Carrier grade cloud infrastructure** **with comprehensive management capabilities**

IBM

Rethink IT. Reinvent Business.

Cloud Computing

Smart Cloud Provisioning

Build and Manage a low-touch, high scalable Cloud

www.ibm.com/software/tivoli/products/smartcloud-provsioning

Build a low-touch service, highly scalable cloud with IBM SmartCloud Provisioning

- **IBM SmartCloud Provisioning** is a true Infrastructure-as-a-Service cloud, reducing cost and providing a highly scalable, rapid-deployment environment with near- zero downtime and automated recovery across heterogeneous platforms.

Key capabilities:

➢ **Rapid scalable deployment** designed to meet business growth with near-instant deployment of 100s of virtual machines

➢ **Reliable, non-stop cloud** capable of automatically tolerating and recovering from software and hardware failures

➢ **Control image sprawl** and reduce business risk through rich analytics, image versioning and federated image library features

➢ **Image construction and composition tool** transforms the complex and time consuming process of creating virtual images into simple graphical tool.

Key benefits:

➢ **Improve time-to-value** with a realible non-stop Cloud

➢ **Save IT labor resources at scale** by enabling self-service requests

➢ **Reduce complexity** by highly automated operations

Rapid scalable deployment with SmartCloud Provisioning

Quickly stand up a cloud
- Start small and scale based on need
- No additional pre-reqs such as databases, app servers, messaging middleware
- Freedom of choice for hypervisors
- Avoid expensive vendor lock in VMWare ESX, KVM, Xen

Highly cost effective solution
- Requires no additional hypervisor management tools
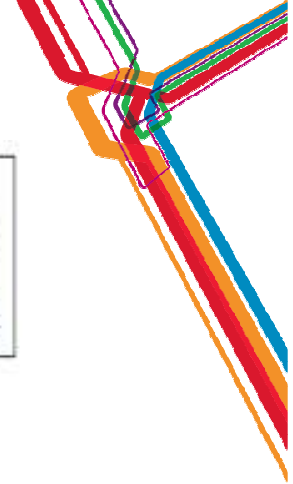- Requires no HA hardware or software

Rich set of interfaces into the cloud
- Web Interface, scripting and web services
- All function can be driven by a user or by scripts for complete automation

IBMSmartCloud
Provisioning

Compute node

Compute node

First Box

Storage node

Storage node
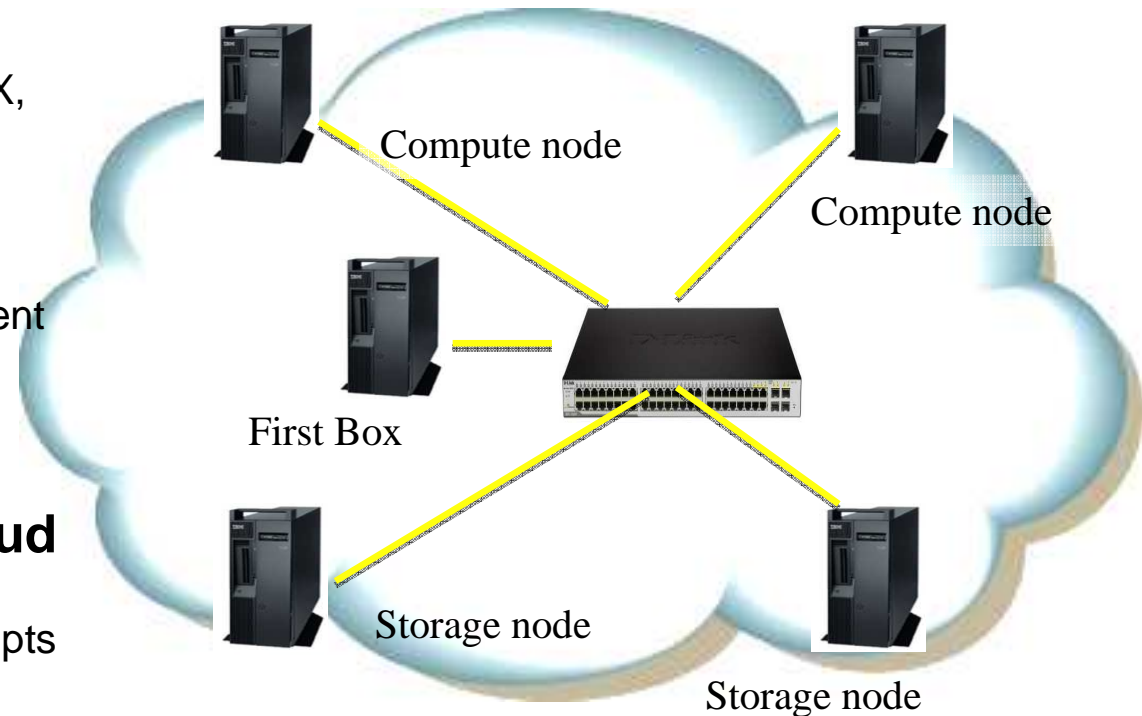
- Out-of-the-box and running in less than 4 hours
- Get started with only 4 servers

SmartCloud Provisioning Environment

Reliable, non-stop cloud with SmartCloud Provisioning

IBM SmartCloud Provisioning vs traditional hierarchical architecture

End Users

Server machines

Storage devices (iSCSI)

End Users
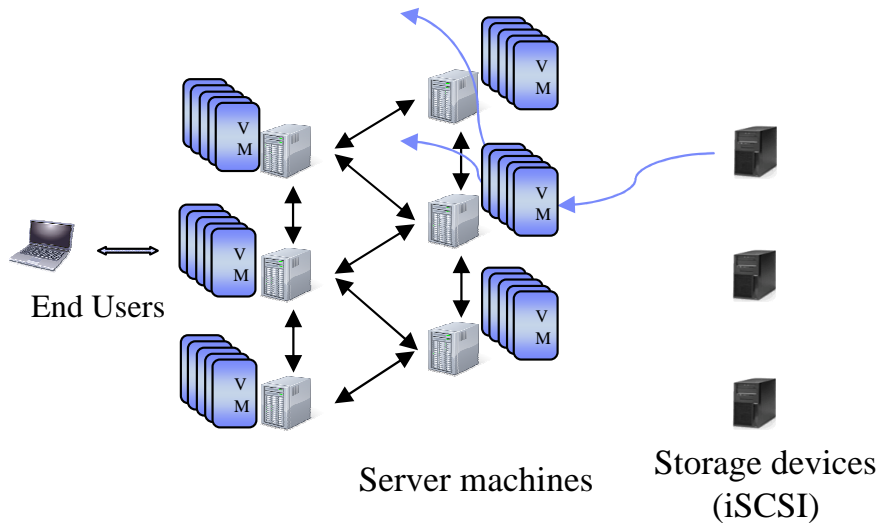
No single points of failure, no bottlenecks in data serving/processing, no intervention to repair broken parts!
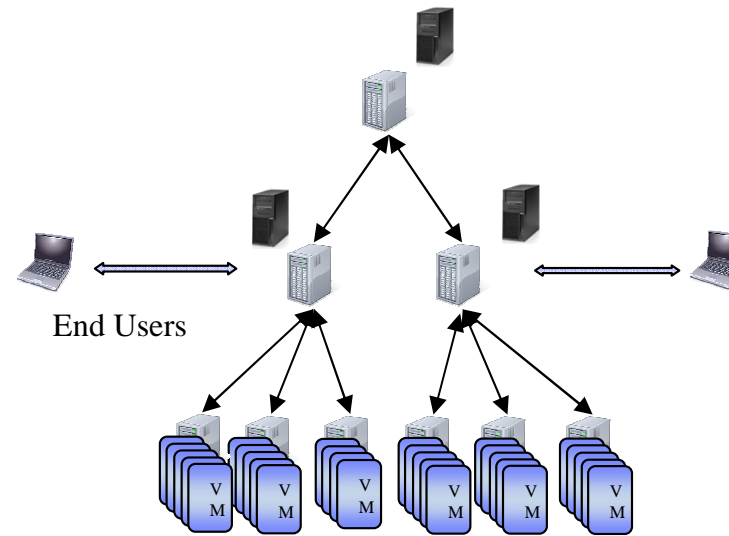
Failures that will impact your users, slowdowns that your users will notice, and extra work for the admin team!

Control image sprawl with SmartCloud Provisioning

- Control over Image Versions, Content and Locations

  - Image library allows check in, check out, and tracking of versions in the environment: Changes can finally be tracked

  - Powerful image analytics finds the content you need and can show the specific changes from one image to another: Encourages reuse and gives needed visibility to analyzing whole systems at a glance

  - Images are tracked across multiple Clouds and/or multiple sites: Critical for disaster recovery arrangements and decentralized use

- Control over Image Construction

  - Build images using Company-certified OS, middleware, and application packages: Avoids images being taken out of production due to non-compliance applications

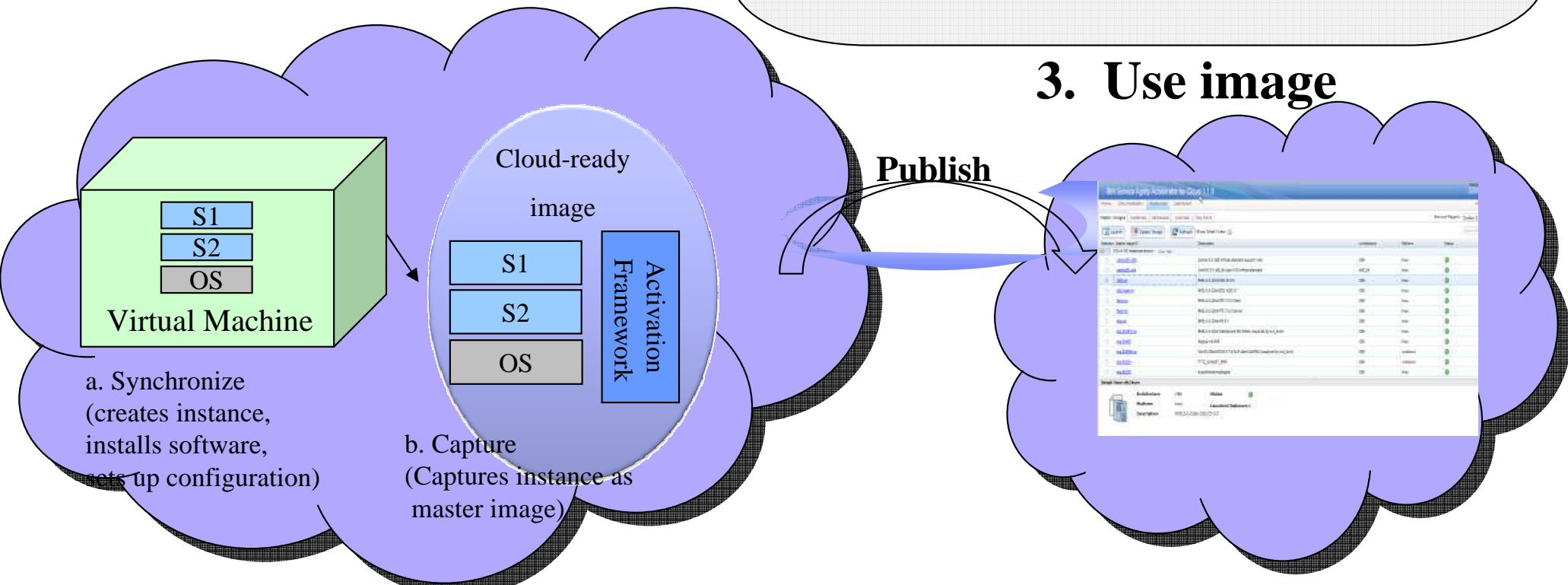# Image construction and composition tool with SmartCloud Provisioning

1. Design the image

Software 1

Software 2

OS

+
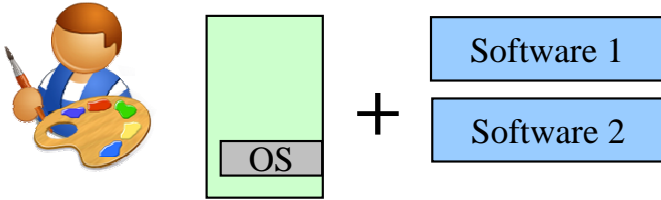
> •Images often have predefined versions of software that don't match corporate policies for security or licensing
>
> •The Image Construction and Composition Tool allows you build an "image recipe", using your company's approved OS and software as ingredients, and then "cook" an image that delivers what the users want and keeps you out of audit jail

2. Build the image

S1
S2
OS

Virtual Machine

a. Synchronize
(creates instance,
installs software,
sets up configuration)

Cloud-ready
image

S1

S2

OS

Activation Framework

b. Capture
(Captures instance as
master image)

Publish

3. Use image

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Optimizing the World's Infrastructure

What Users can perfome with SmartCloud Provisioning

Users can perform Provisioning and deprovisioning of virtual machines and manage Images, network and storage services.

- **Launching virtual machines**
  - Non Persistent
  - Persistent on a storage Volume
- **Attaching and detaching volumes**
  - Volume is not visible to other user
  - Volume can be attached to a VM
- **Associating and Dissociating Addresses**
  - Associate to VM IP Address Private or Static, or public from a Pool
- **Capturing Images**
  - Non persistent VM can be captured and mergedinto a new image

Multi-tenancy in SmartCloud Provisioning

- **Network:**
  - Single users or group of users can have their own set of networks.
  - Requires trunks to be created in advance.
- **Master images:**
  - Everybody can see images registered by the administrator.
  - A user cannot see images registered by other users.
- **Deployed instances:**
  - A user can see only his own deployed images.
  - Images belonging to different users can be deployed on isolated networks.
  - The administrator can see all deployed images.
- **Storage:**
  - Regions can be used for physical segregation
  - Volumes belonging to a user cannot be seen by other users
- **Images backups:**
  - No need to backup images
  - Volumes need to be manually backed up
- **Quotas per tenant:**
  - Quotas can be defined per group or per user (# deployed instances, # virtual CPUs, memory, # volumes, # master images, # elastic Ips, # networks)

IBM

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Cloud Computing

Smart Cloud Monitoring

IBM SmartCloud Monitoring is an IaaS Monitoring tool , providing scale, performance and availability data on cloud resources

Key Capabilities:

➢ **Visibility into the cloud infrastructure**

o Integrated "out-of-the-box" contextual views of health and performance in the complete context of the virtual environment to include physical and virtual servers, storage and network resources
o Receive real-time proactive & predictive alerts
o Side-by-side and historical data to identify problems quickly

➢**Control Virtual environment management**

o Out-of-the-box alerts, best practices, expert advice and workflows for detecting performance problems and identifying their source
o Web 2.0 dashboards, operational workspaces and reports

➢ **Capacity planning**

o Predict physical and virtual resource capacity bottlenecks and trends
o Gain business agility by determining room for expansion

➢ **Optimization**

o Right-size virtual machines
o Policy-driven workload placement for performance and security optimization

Benefits:

o Provide capacity information and healt check on cloud resouces
o Enjoy real cost savings with cloud optimization and automation,
 and resiliency from resource and workload analytics

IBM SmartCloud Monitoring Logical View

Assures that health of cloud environment meets customer needs (reduces MTTR, lower operations cost, etc)

Helps to consolidate and reduce IT footprint (reduces TCO, optimizes resource usage, etc)

Integrated Services Management

Tivoli

Part of broader IBM Services Management

Capacity Assessment

Capacity Planning

Forecasting

Health Dashboards

Integrated monitoring

SmartCloud Monitoring
(ITM, ITMfVE)

TDW

OMNIbus

IBM Director

TPC

TADDM

Networks

Applications

Transactions

XenApp

XenDesktop

Databases

Middleware

HP-UX

Linux

AIX

Windows

Hyper-V

KVM

Solaris/Zones

z/VM

VMware

IBM Power VM

XenServer

Storage (NetApp, IBM, EMC, etc)

Network (Cisco, IBM, HP, Juniper, Brocade, etc

Servers/platforms (NGP, zEnterprise, x86, IBM Power, Sun, system z, Cisco UCS, PureScale, etc)

Visibility into the cloud infrastructure

- **Collect data for the following Hypervisors and Operating Systems**
  - IBM Power VM (CEC, HMC, VIOS, LPARs (AIX, Linux), DLPARs, WPARs
  - VMWare, KVM (IBM, Redhat), Citrix XenServer, XenApp, XenDesktop, Hyper-V
  - Windows, Linux, Linux on P, Solaris, HP-UX, zVM, zLinux
- **Additional Monitoring data can be gathered by** installing additional ITM Agents for
  - Storage/network devices
  - Applications, Middleware, Databases
  - Transactions, etc..

• Pre-canned _ITM workspaces and situations_ allow to monitor the health status of Cloud management and managed infrastructures

• Existing ITM workspaces and situations can be edited or new ones can be created

Control Virtual environment management

Determine trends, patterns and forecasts for comparisons across environments

- Resource usage trends at VMs, host server and cluster levels

- Historical trends and linear forecast

- Drill-down to other reports for more problem determination.
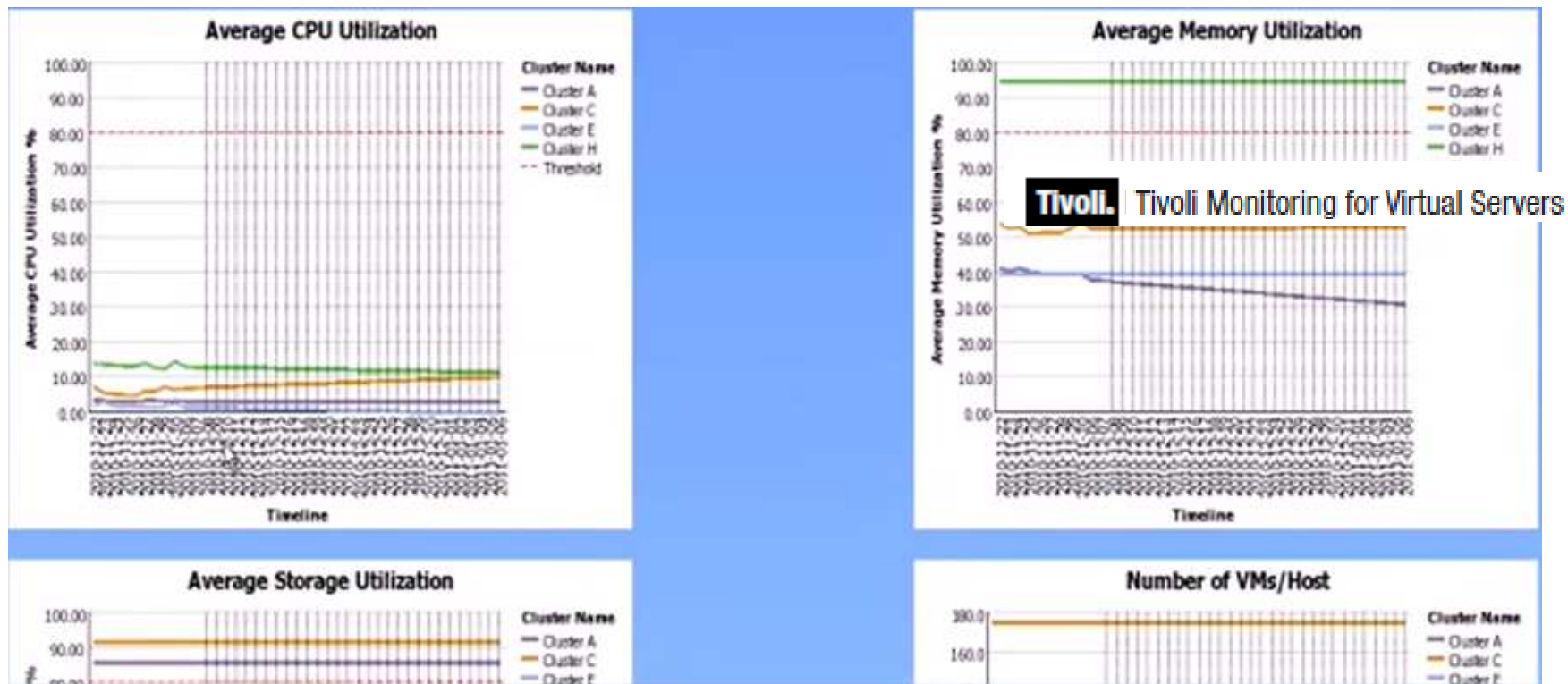
Capacity Planning with Workload right sizing and balancing reports

Determine the right balancing and performances of workloads across the whole VMWare environment

- Provides overall view from VMs to resource-pools and clusters
- Discover resources utilization bottleneck
- Discover underutilized capacity
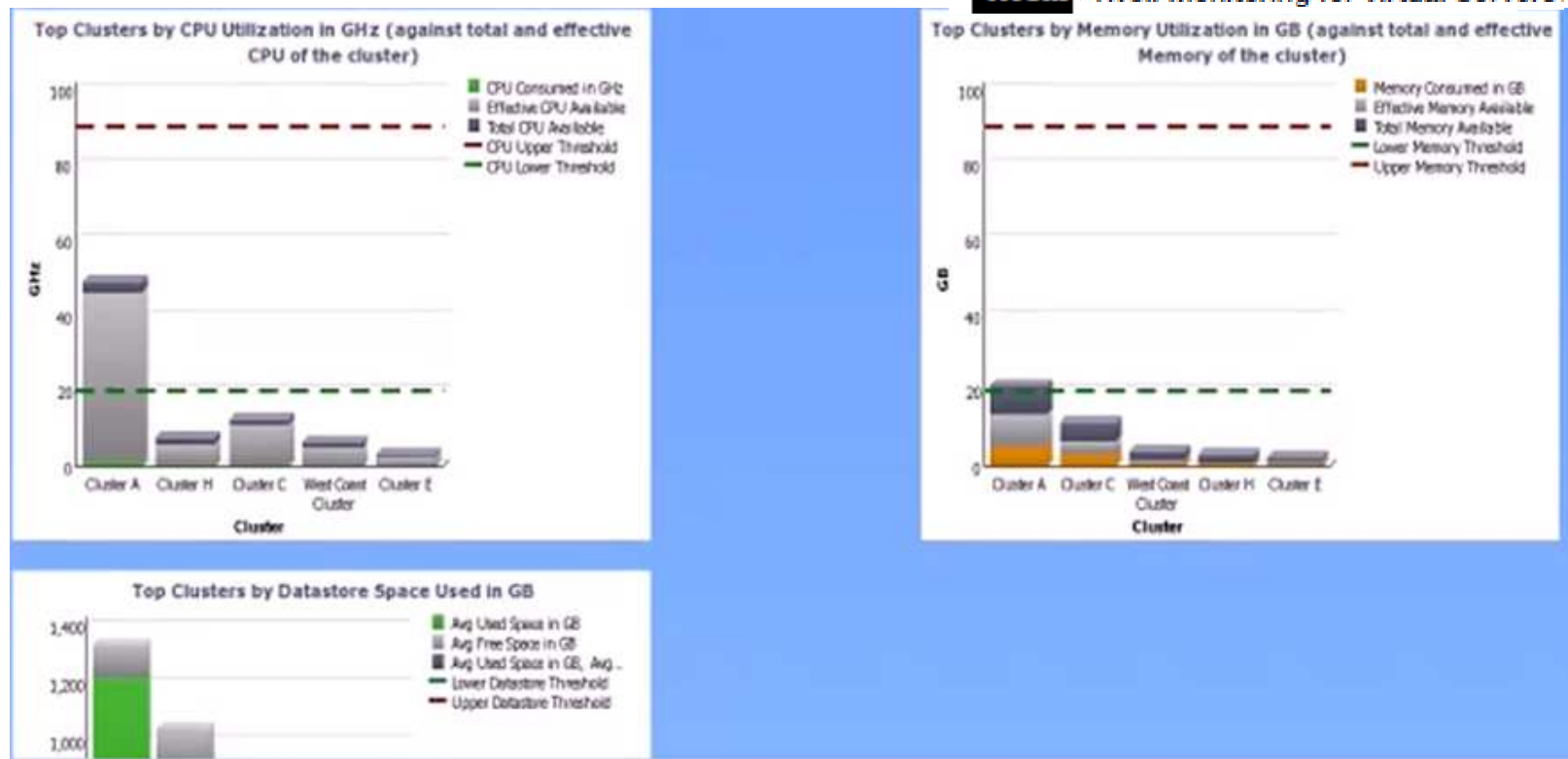
Optimization with What-If analysis for workload placement reports

Simple what-if analysis tool to determine approximately how many more workloads your environment can accommodate and what additional resources you would need

- You can modify several parameters to obtain the desired output

- Workload placement reports take into consideration purely historical usage data collected