# Increase business agility by building the workload-optimized cloud

IBM SmartCloud Provisioning *combines infrastructure and platform capabilities to deliver elastic workload aware management, image lifecycle management and resilient, high-scale provisioning across heterogeneous platforms*

Differentiating capabilities of the business-ready cloud:

1. Accelerate application deployment with workload aware management
   Reduced standardized topology deployment from over 2 months to 18 minutes

1. Manage virtual environment with rich image management and analytics
   40% - 80% labor cost reduction by increasing image/admin ratio efficiency

1. Avoid vendor lock-in with choice of Hypervisor and Hardware
   KVM is 24% cheaper in up front server & software costs compared to competition

1. Improve agility with robust, automated, high-scale provisioning
   Deploy 100s of new VMs in less than 5 minutes
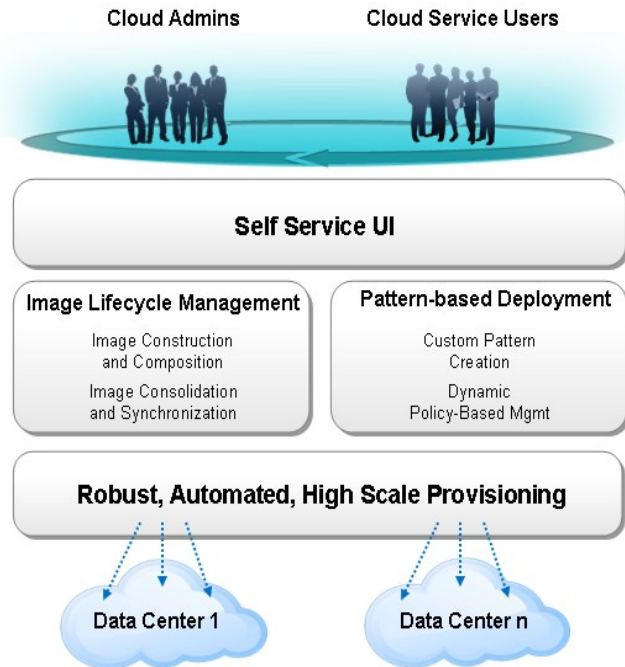
| Components	Value Proposition
High Scale Low Touch	Deploy hundreds of virtual machines in an hour; provides automatic recovery and high tolerance to failures in the network. Optimizes admin tasks.
Virtual Image Library	Provide image management services such as federation, comparison, inventory, search, versioning, replication, portability check and remediation
Image Construction and Composition Tool	Help build images that are reusable, self-descriptive, customizable, shareable, and manageable. Images can contain the basic operating system plus additional software bundles
Workload Deployer	Integrated support for virtual systems patterns
Virtualization Layer	Vendors agnostic: support KVM, Microsoft Hyper-V, PowerVM, VMware, Xen with one single technology

Lower operational costs by leveraging existing hardware and hypervisors

- **Single management platform** across different infrastructures reduces complexity and operational cost.

- Supports deployment of virtual servers with multiple platforms on **Power and VMWare**

- Design and deploy consistent and repeatable composite applications into a cloud of virtualized hardware running a supported hypervisor : **KVM, Xen, Hyper V, PowerVM**

- Integrates compute, network, storage and application delivery: **enable organizational integration**

KVM

VMware

Xen

PowerVM

Hyper-V
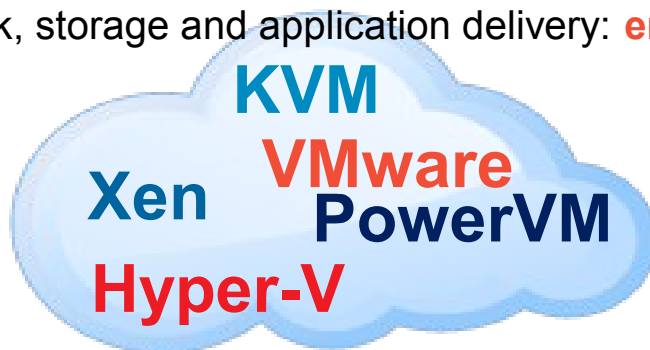
# IaaS and PaaS with SmartCloud Provisioning
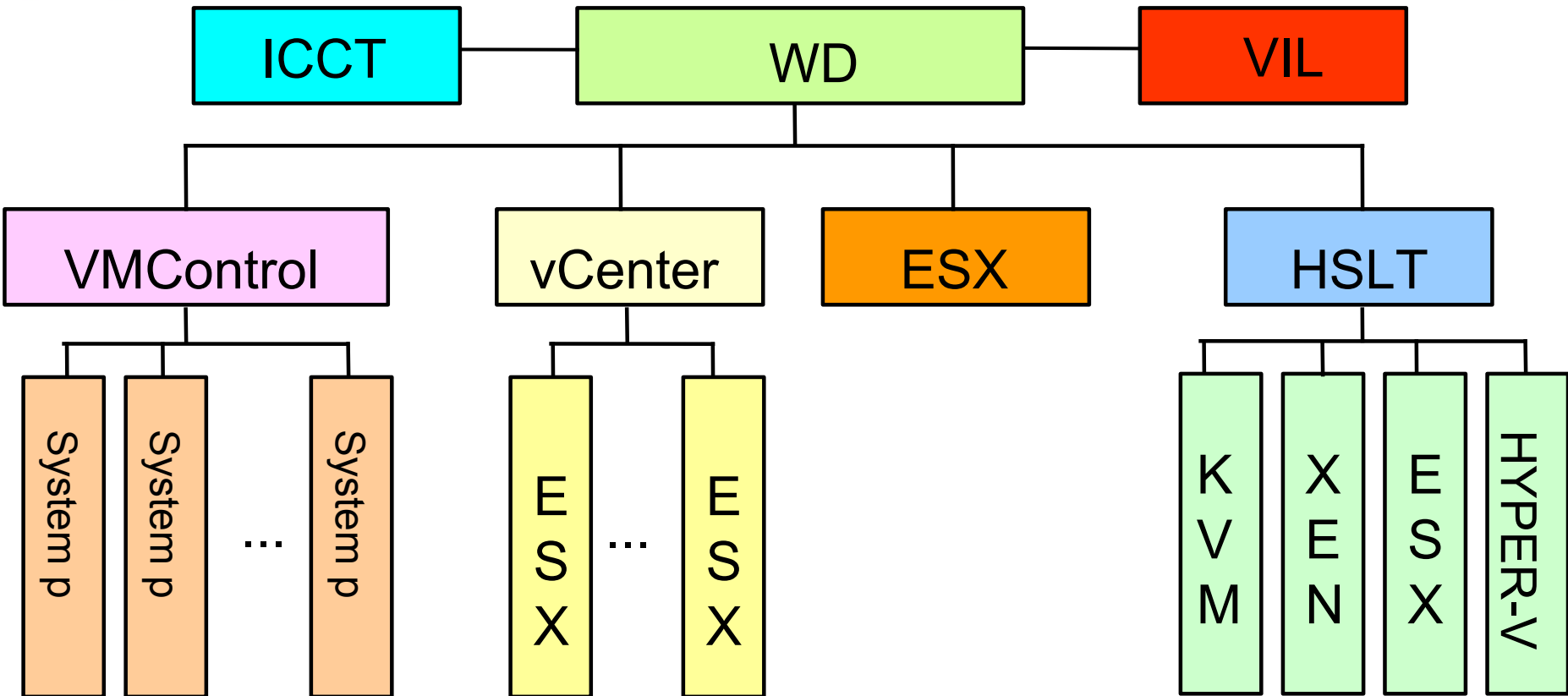
Respond to business changes quickly with resilient, high-scale provisioning

- **Fast VM provisioning** for near-instant deployment of 100s of virtual machines and scale based on business needs

- **Rich set of web interfaces into the cloud** that can be driven by a user or scripts for complete automation

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

- **Near-zero downtime** due to faults, hypervisor/management software upgrades or addition/removal of hardware

Requested VMs will be up and running under a minute using standard HW
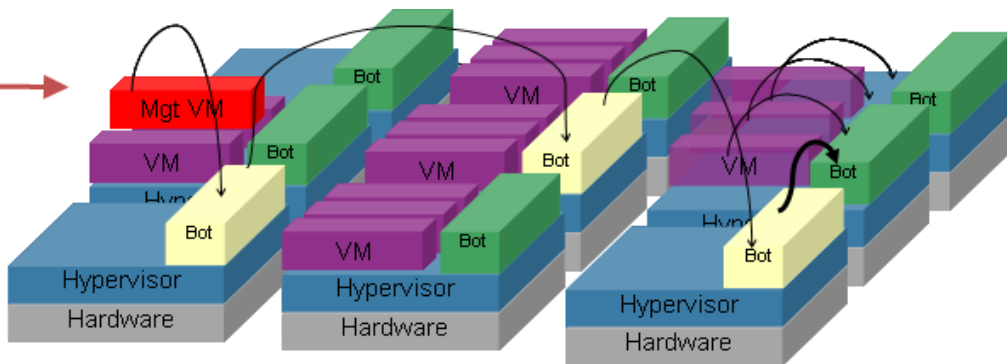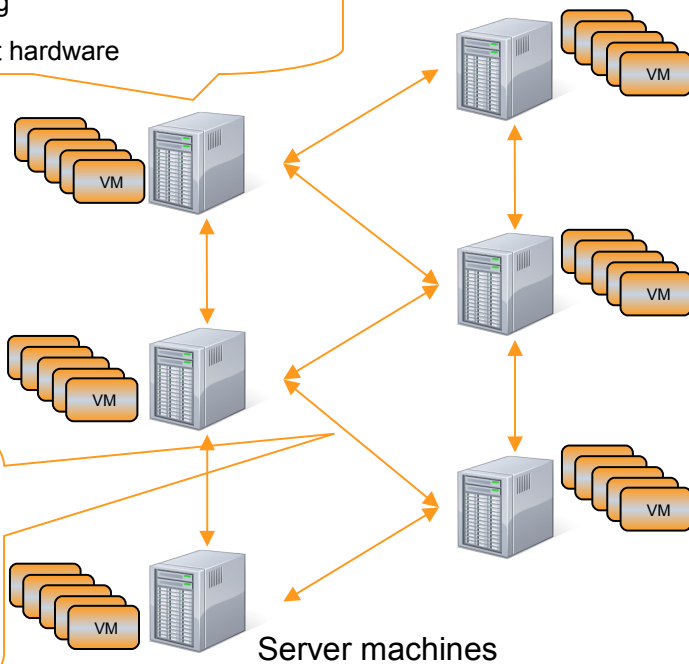
Innovative cloud architecture: 4 Key Ingredients

1. Multiple, load-balanced instances of all services

• Distributed request processing

• Designed to run on lower cost hardware

2. Parallel processing against storage

• Serve images and user data (streaming simultaneously from multiple devices like a file sharing network)

End Users

VM

VM

VM

VM

4. SW is deployed using network loading and image updating

• Base software is loaded via network boot (PXE)

• Services are images, so update themselves by restarting with new image version

3. Self-adapting peer-peer communication and coordination

• All services monitor and restart each other, and dynamically elect the leader

Storage devices (iSCSI)

Server machines

No single points of failure, no bottlenecks in data serving/processing, no intervention to repair broken parts!

Workload-optimized cloud maximizes business outcomes

- *Performance*

- *Availability*

- *Isolation*

- *Security*

Workload placement
Intuitive load balancing for storage and compute nodes each workload

+

Workload awareness
Deployment and management in the context of the needs of each workload

=

Workload Optimized

Characteristics of successful cloud deployments

- ✓ Automatic scalability and on-demand service to respond to business changes quickly
- ✓ Built-in intelligence to track and manage virtual images to increase utilization and efficiency
- ✓ Workload aware management for repeatability and faster deployment

Workload Deployer Deployment Models

Custom Images

- Basic execution services for standalone VM images
- Complete control over image contents
- Basic image management/ library functions
- IBM provided product images
- Ability to create custom images
- Leverages IBM image management tools

Virtual Systems

- IBM defined product images and patterns for common topologies
- Ability to create custom patterns
- Traditional configuration and administration model
- Aligned around existing products
- Automated provisioning of images into patterns

Virtual Patterns

- Application awareness
- Fully integrated software stacks
- IBM defined topologies
- Simplified interaction model
- Highly standardized and automated
- Integrated middleware with cloud capabilities
- Integrated lifecycle management

Accelerate **<u>time to market</u>** with repeatable, composite application deployment across private and public clouds

- **Rapid application deployment**: Deploy business applications in minutes

- **Dynamic, policy-based management** of elastic and scalable workloads

- Enables **third-party software deployments** to "build once" and deploy across private and public clouds
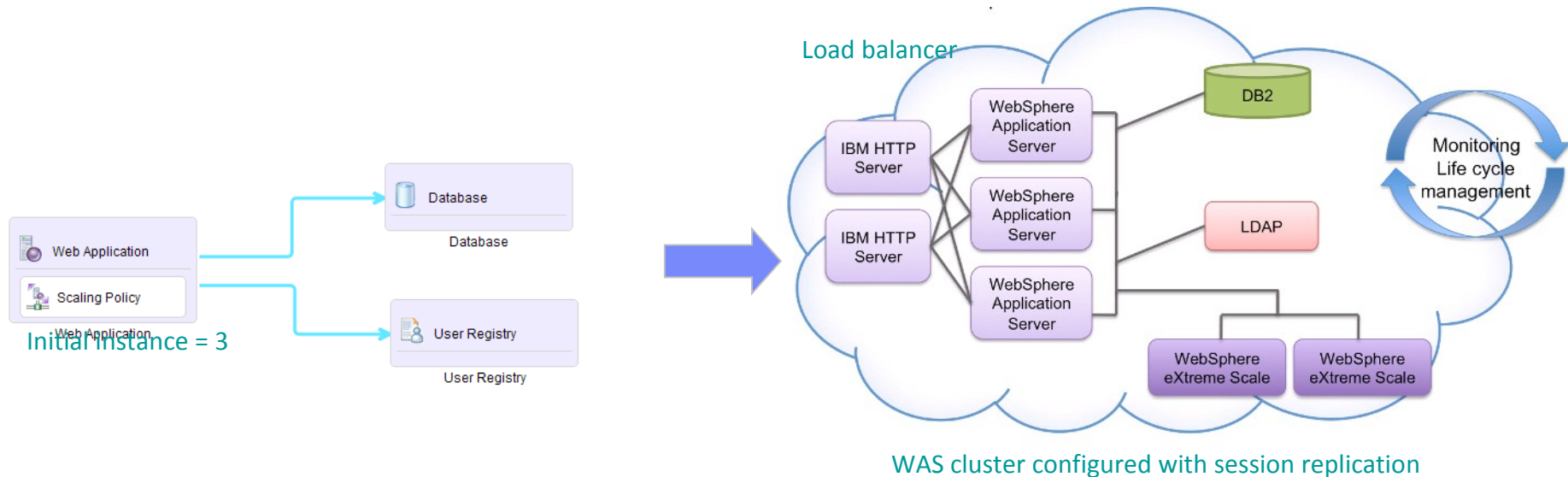
Elastic and Scalable Workloads

Deploy applications faster

Virtual System / Patterns

Pattern creation and deployment: with a simple drag and drop mechanism it is possible to create patterns representing middleware topologies and deploy them with a few clicks into the cloud
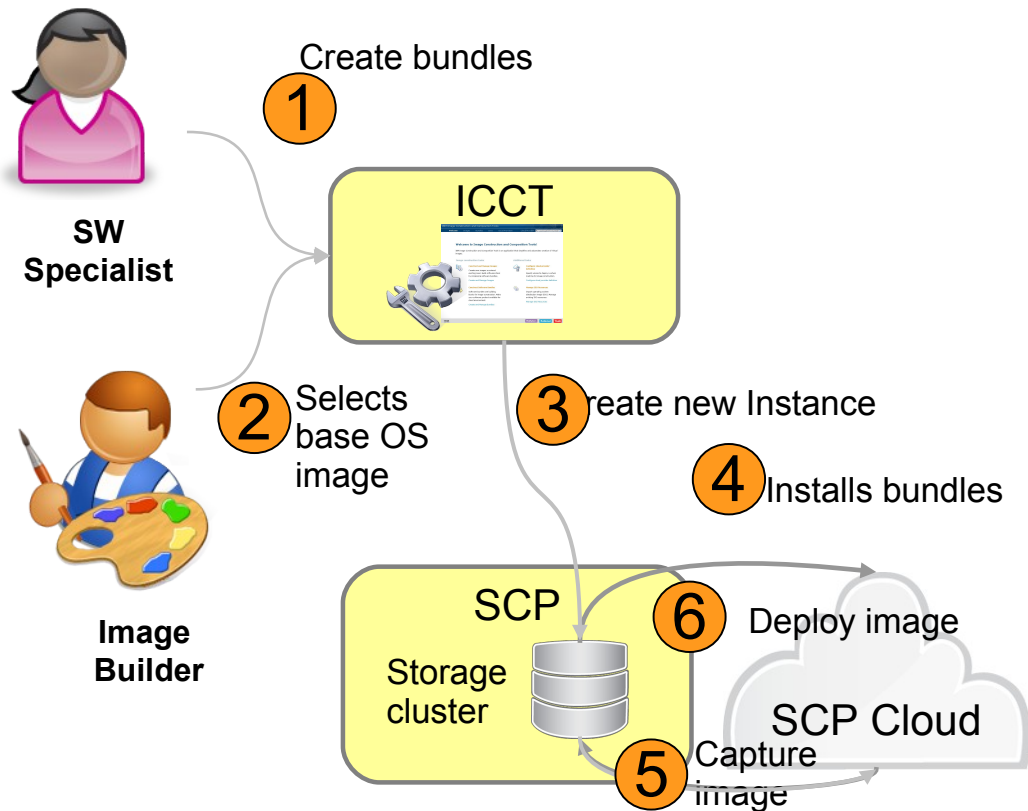

Load balancer

Initial instance = 3

WAS cluster configured with session replication

Manage virtual environments with rich image lifecycle management and analytics

- **Image construction and composition tool** simplifies complex and time consuming process of creating virtual images and deployment through a simple graphical tool

- **Federated image library** allows management of VM image sprawl, drift and image complexity across multiple image repositories and hypervisors

- **Detect vulnerabilities exposures in images** to ensure that no virtual machines are created without the proper level of security patches

- **Images stored in hypervisor-neutral format**, avoiding duplication and allowing conversion to mix/match hypervisor technologies

Virtual Image
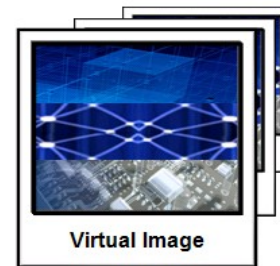
Construct images with ICCT and SCP as a cloud provider

1. Using ICCT, the Software Specialist creates new Software bundles to extend a base image

2. Using ICCT, the Image Builder selects a base OS image available inside SCP

3. The Image Builder creates a new instance of the selected image in SCP (cloud provider)

4. Using ICCT, the Image Builder installs the selected software bundles

5. The Image Builder captures the new image

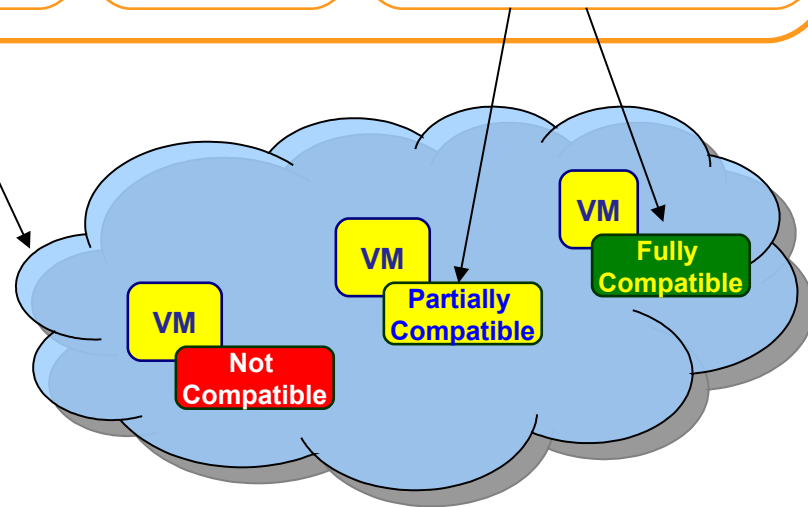6. The new image is now available for deployment via the SCP component

Create bundles

1

SW Specialist

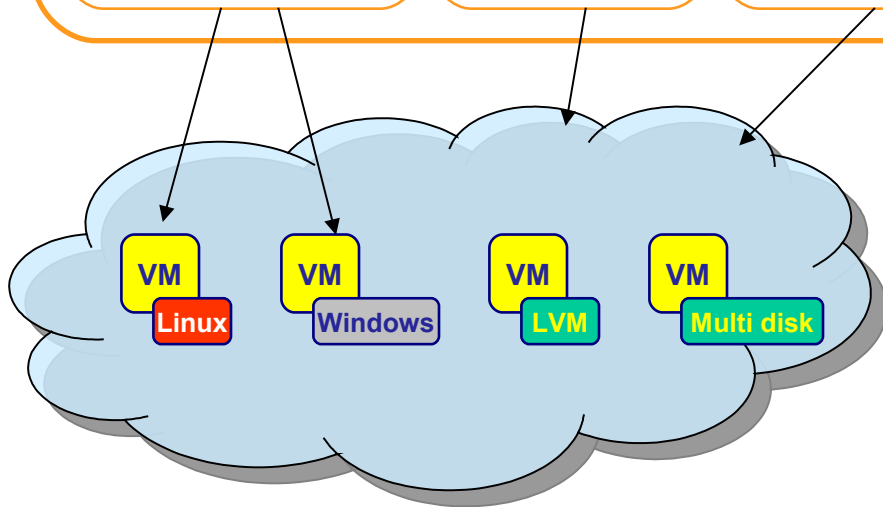ICCT

2 Selects base OS image

3 Create new Instance

4 Installs bundles

Image Builder

SCP

Storage cluster

6 Deploy image
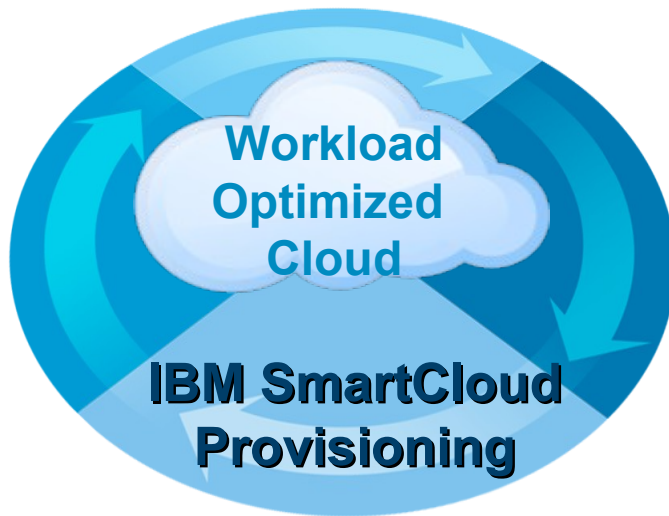
5 Capture image

SCP Cloud

Extend the workload-optimized cloud for greater levels of security, resilience and optimization

Assurance

Monitor the health and performance of virtualized and cloud environments

Endpoint Security

Unify real-time visibility and enforcement to deploy and manage patches to all endpoints

Workload Optimized Cloud

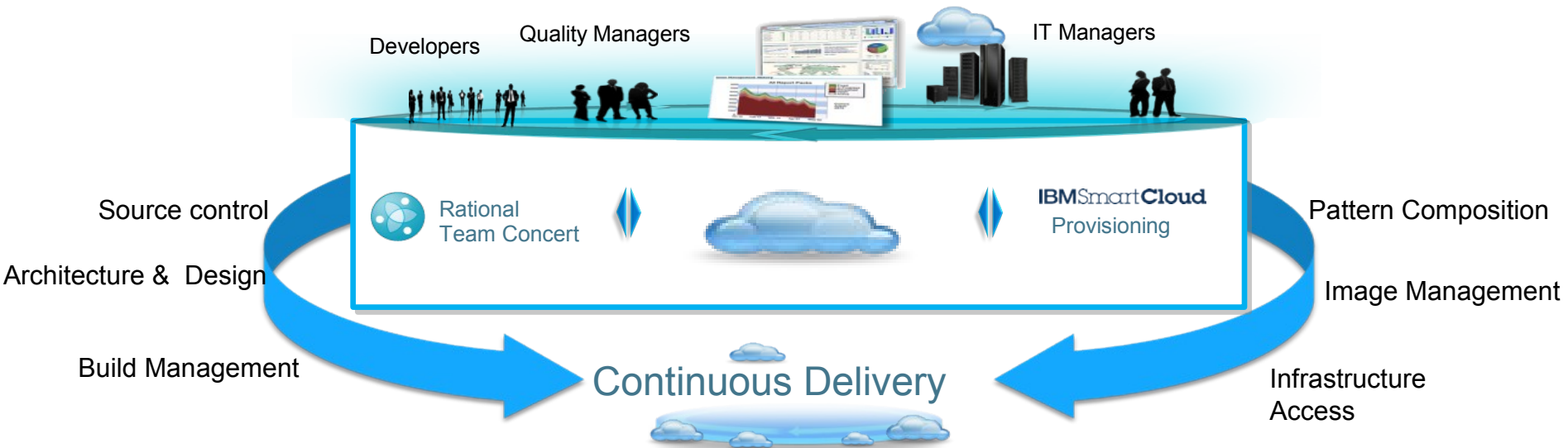**IBM SmartCloud Provisioning**

Cost Management

Usage and accounting integration, rating engine and tiered pricing for cloud

Continuous Delivery (DevOps)
One-touch automated continuous delivery and integration of software delivery process

Resilience

Simplify the protection and management of data

SmartCloud Continuous Delivery (DevOps)

Developers   Quality Managers   IT Managers

Source control

Rational Team Concert

IBMSmart**Cloud** Provisioning

Pattern Composition

Architecture & Design

Image Management

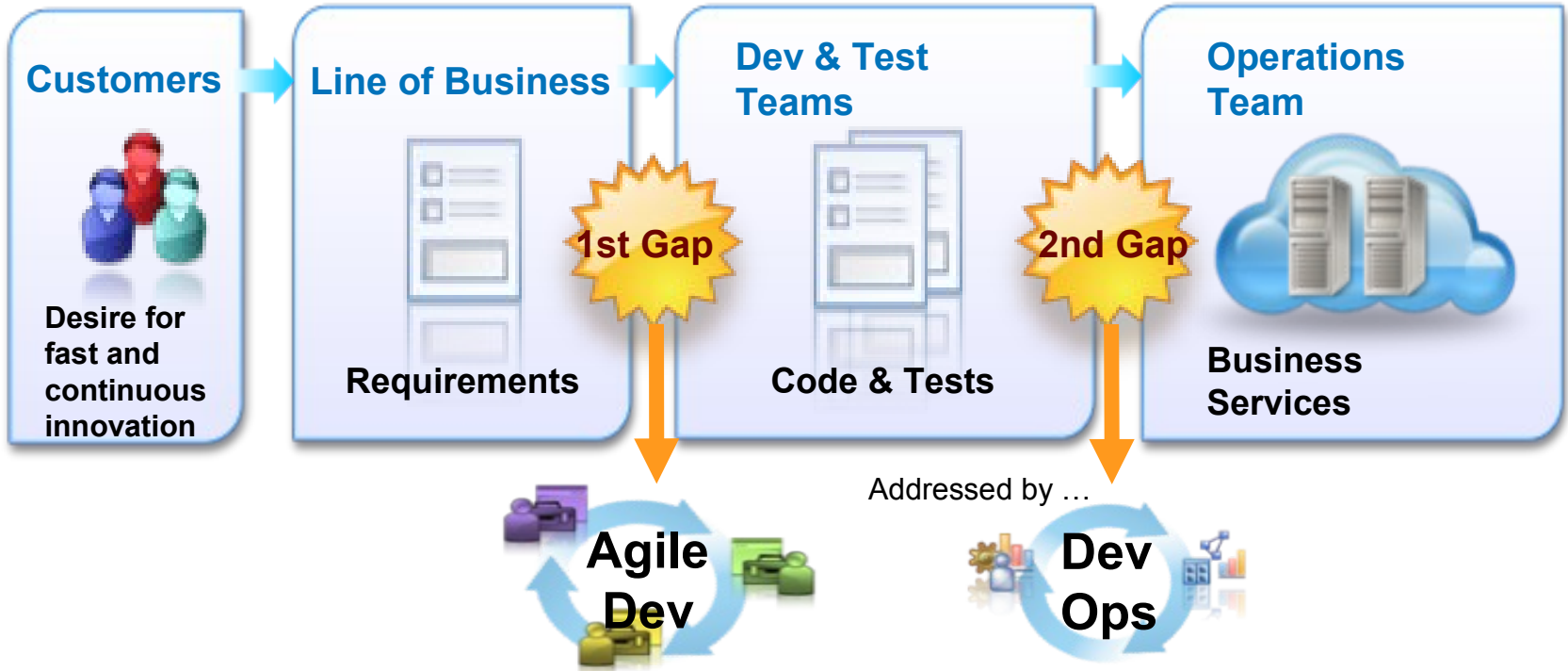Build Management

Continuous Delivery

Infrastructure Access

Business Value

- Improved efficiency, accelerated delivery; automated hand-off between processes

- Reduced risk, improved quality; Managed change from development to deployment

- Optimized resources; Best Practices utilized via workload patterns

Continuous Delivery (DevOps): Gaps between Customers – Business – Dev&Test - Ops

Customers

Desire for fast and continuous innovation

Line of Business

Requirements

1st Gap

Dev & Test Teams

Code & Tests

2nd Gap

Operations Team

Business Services

Addressed by …

Agile Dev

Dev Ops

Continuous Delivery (DevOps): Full lifecycle scenarios

Scenario 1: Collaborative creation of production-like environment patterns

Scenario 2: Testing application changes continuously by Dev and Test teams
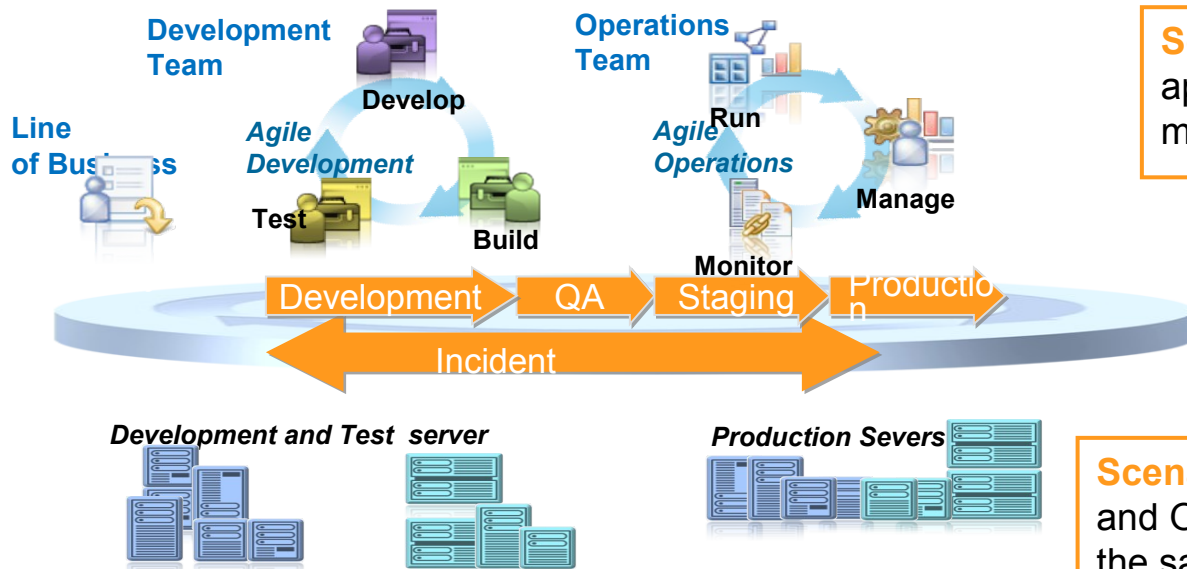
Scenario 3: Deliver application changes into multiple environments

Scenario 4: Collaborative incident management

Scenario 5: Collaborative Dev and Ops troubleshooting using the same analysis and instrumentation

Scenario 6: Management of entire delivery pipeline with end-to-end visibility and dashboards

Development Team

Operations Team

Line of Business

Develop

Run

Agile Development

Agile Operations

Test

Build

Manage

Monitor

Development → QA → Staging → Production

Incident

Development and Test server

Production Severs