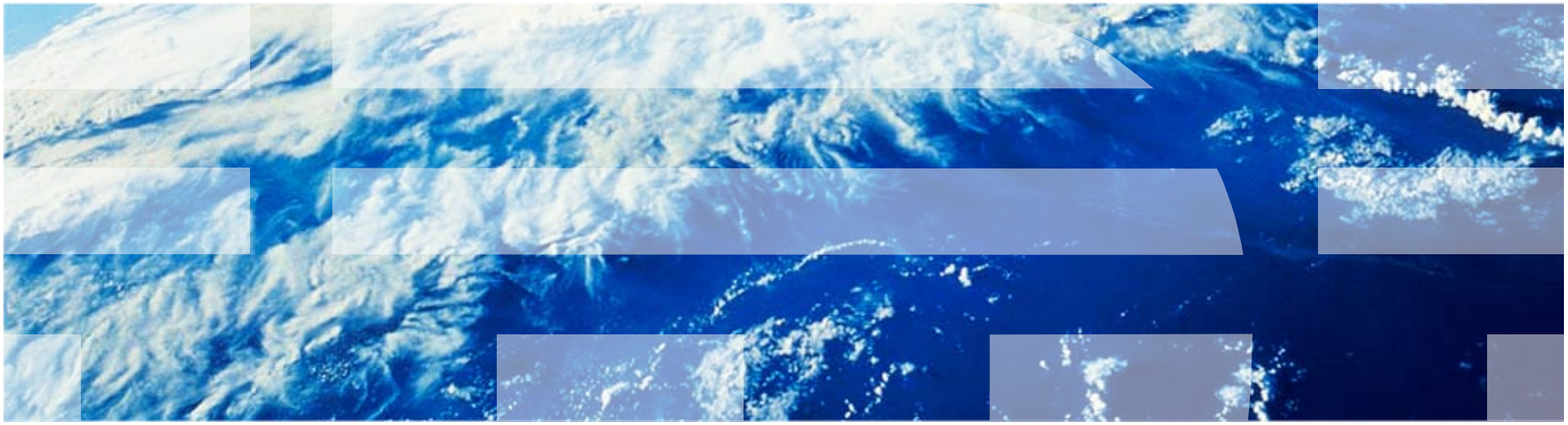
Welcome &
Update on Tivoli Cloud Strategy



Outline

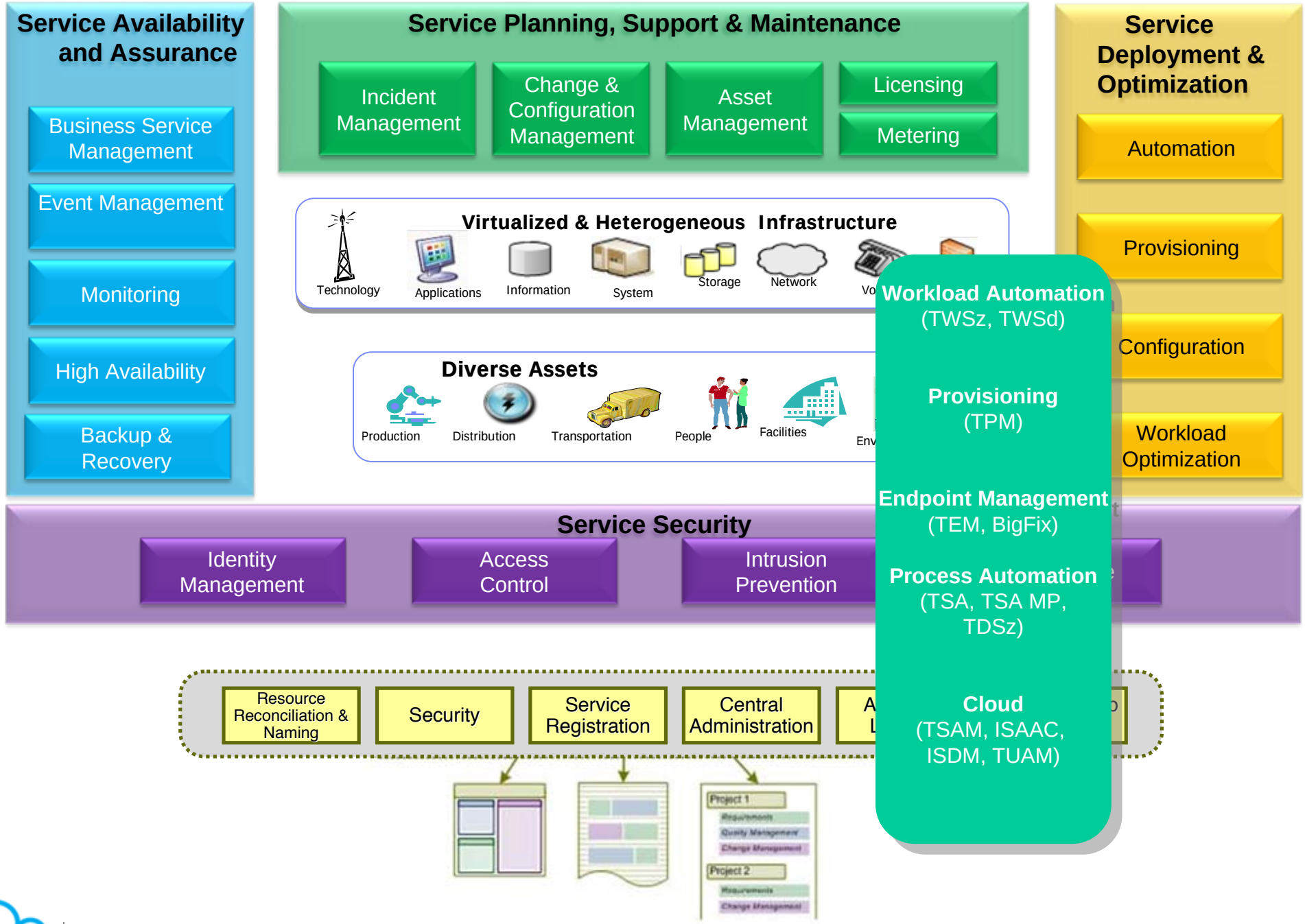
- Tivoli overall
  - Key values . Focus on Service Process Automation and Rome Tivoli Lab

- Market Trends in Cloud
  - The Business Imperative
  - Cloud Entry and Adoption Patterns
  - Cloud expectations through the buyer lens (Infrastructure, Operations and Line of Business teams)
  - Consumption Models - Private, Public and Hybrid Requirements

- Enabling Cloud Adoption
  - IBM's Cloud Service Delivery Platform
  - Role of open architecture and standards in enriching and strengthening the platform
  - Key strategic focus areas

Tivoli overall
with a zoom on Service Process Automation
and Rome Tivoli Lab

Overall view and zoom in SPA



An example of Global Development: Service Process Automation

A Culturally and Geographically diverse team with Common Goals

Key priorities

- Become a successful globally integrated development organization (with key business focus)
- Gain relevance cross Tivoli / SWG / IBM and the entire Industry with a constant focus on the "Innovation that matters"
- Unleash (the power of) our Labs to customers and market (establishing a two-ways linkage)
- Build and nurture a passionate and vital technical community

IBM Rome Lab History

1979-1980

Telecommunications Development Center

IBM Program Product Development Center

Early 1990

Rome Networking System Laboratory (1991)

WorldWide Missions

ISO Certifications (1992)

1996

Tivoli Acquisition

Software Distribution
Workload Automation
License Management
Monitoring

Late 1990

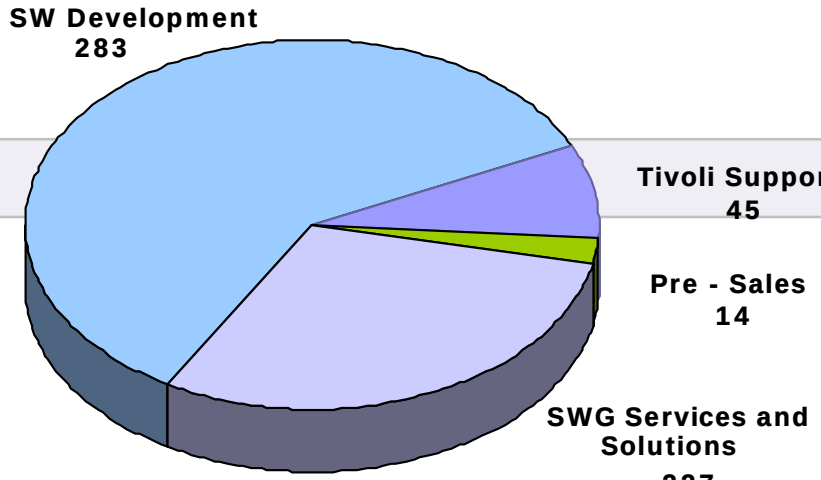
Configuration Mgmt
Network Management
Workload Automation
License Management
Wireless & VOIP mission
Executive Briefing Center
Solutions Lab
SWG Lab Services

2000-2007

Image Lifecycle Mgmt
Data Center Provisioning
Cloud Computing
Workload Automation
Monitoring
Executive Briefing Center
Cloud Competence Center
Solution Lab
SWG Lab Services

2008-2010

TODAY

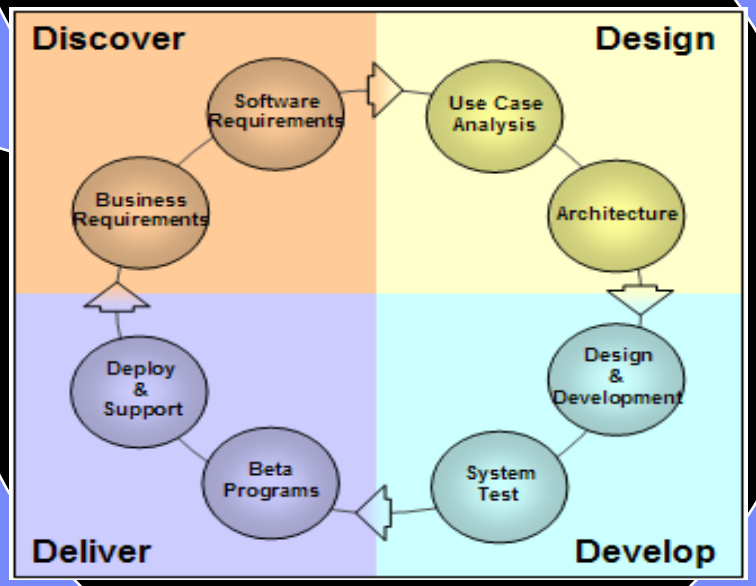


Tivoli's Approach to Quality – Connect the Lab to our Clients!

Capture how well our solutions solve client business problems as well as how well they perform the job

Interaction Design (IAD)
Business Scenarios Review

Requirements and Design Review



Field Support and Validation

Prototype Reviews
Technical Previews
Hands on Early Validation

Cloud

IBM Point of View: Cloud

IT and Business are attracted to cloud for different reasons.

- IT is drawn to cloud's cost, efficiency and control
- Business users are drawn to cloud's simplified, self-service experience and new service capabilities.

Aggressive Standardization Cloud brings a new way to deliver running applications, avoiding labor-intensive and error-prone setup and configuration.

End to End Automation Cloud pushes service requests all the way to the end user, with a catalogue based consumption model, and high degree of automation.

Business critical reliability Cloud provisioning systems become part of the business runtime, not a passive collector or processor of information.

54%

of surveyed enterprise IT budgets in 2010 were spent on ongoing operations and maintenance costs.*

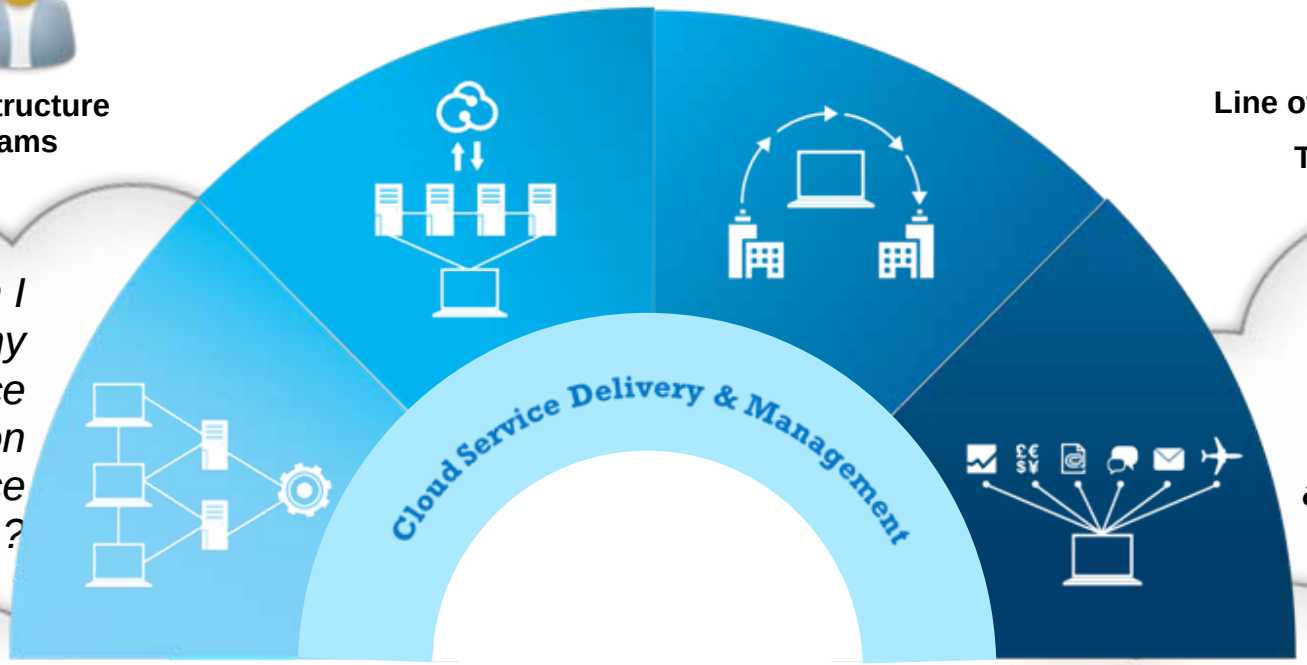
*Source: Forrester Research, Inc. "2011 IT Budget Planning Guide," October 7, 2010 by Craig Symons

Market trends

What are IBM clients and partners asking for?

Infrastructure Teams

How can I improve my resource utilization and reduce cost ?



Line of Business Teams

How can I accelerate my application release cycle and optimize its deployment ?

How can I improve the performance of my infrastructure, gain insight into my operations and deliver service assurance ?

How can I scale my infrastructure to support scaled, accelerated deployment while reducing operational costs ?

How can I ensure continued business operations, deliver resiliency and security ?

Development & Operations Teams

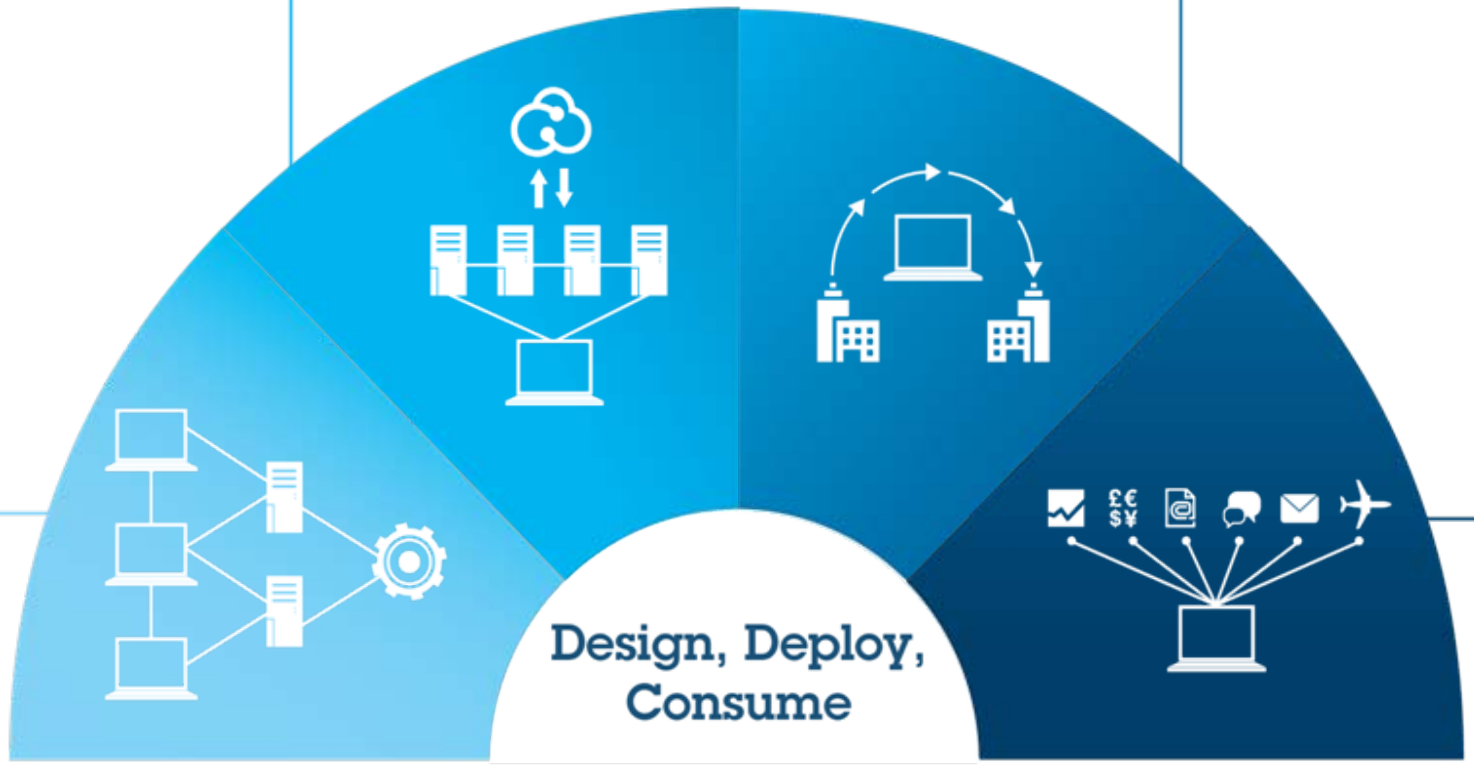
Adoption patterns are emerging for successfully beginning and progressing cloud initiatives.

IaaS: Cut IT expense and complexity through a cloud enabled data center

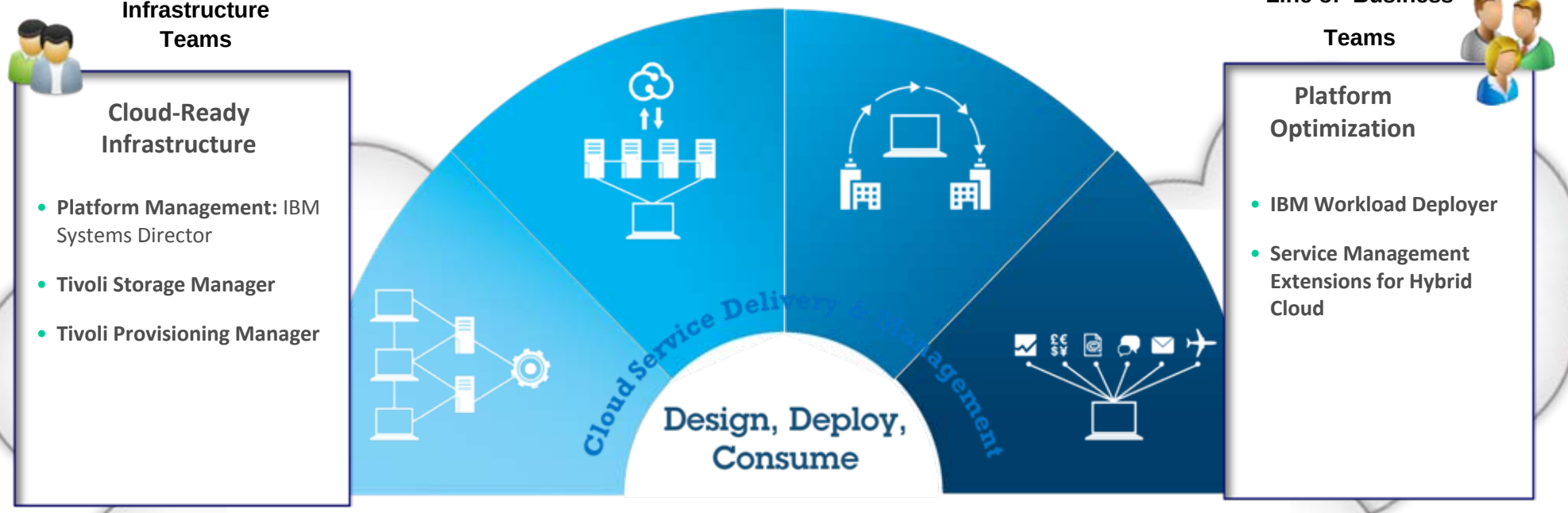
PaaS: Accelerate time to market with cloud platform services

Innovate business models by becoming a cloud service provider

SaaS: Gain immediate access with business solutions on cloud



Capabilities to Support Adoption : a product family view



Infrastructure Teams

Cloud-Ready Infrastructure

- **Platform Management:** IBM Systems Director
- **Tivoli Storage Manager**
- **Tivoli Provisioning Manager**

Line of Business Teams

Platform Optimization

- **IBM Workload Deployer**
- **Service Management Extensions for Hybrid Cloud**

Development & Operations Teams

Service Assurance

- **Monitoring:** for Virtual Servers, for Applications
- **Tivoli Business Service Manager**
- **Tivoli OMNIbus and Network Manager,Netcool/Impact,**
- **Tivoli Workload Scheduler**

Service Agility

- **Automation:** IBM Service Agility Accelerator, IBM Service Delivery Manager, Service Automation Manager
- **Usage and Accounting Manager**
- **Storage and Network:** Tivoli Storage Productivity Center, Tivoli Network Configuration Manager
- **Tivoli Asset Manager**

Service Defense

- **Security:** IBM Security Virtual Server Protection, Tivoli Identity Manager, Tivoli Endpoint Manager, IBM Security Network Intrusion Prevention System
- **Resiliency:** Tivoli System Automation
- **Recovery:** Tivoli Storage Manager Suite for Unified Recovery

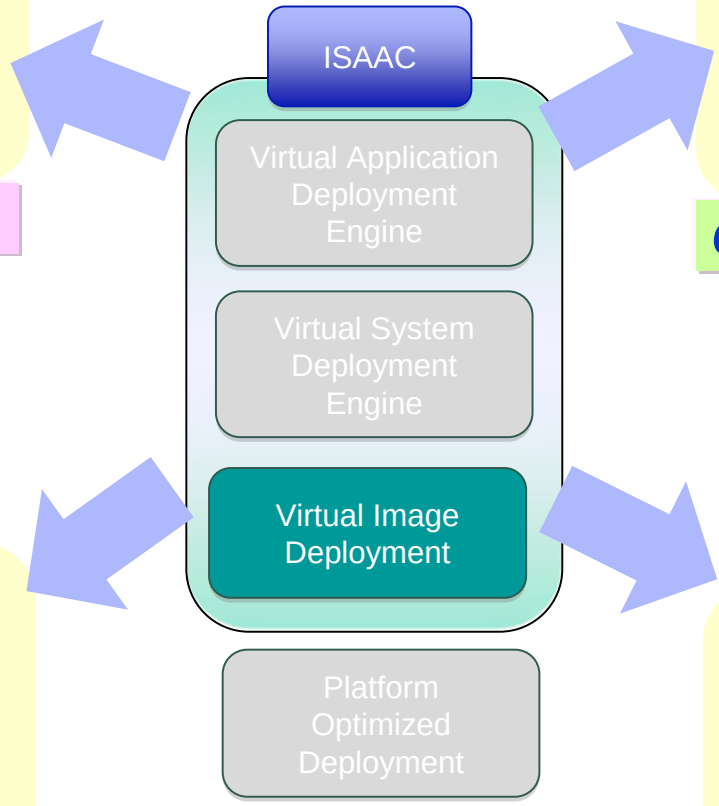
Cloud Accelerator Business Outcomes

- Enable lines of business to deploy and manage applications on the cloud with sophisticated infrastructure and process requirements
- Enable the operational team to automate across silos to support complex on-boarding and lifecycle management of applications

Cloud Orchestration

- Enable lines of business users to proactively understand the performance and status of business applications and processes
- Enable the operational team to proactively manage the cloud infrastructure to assure capacity, availability and performance of applications

Cloud Assurance: Health



Cloud Agility

- Enable lines of business to deploy applications to the cloud with confidence that they are secure, compliant, and meet regulatory requirements
- Enable the operational team to secure the infrastructure and application in the presence of dynamic changes to applications, workloads and users and demonstrate compliance for audits

Cloud Defense: Security

- Enable lines of business users to create and maintain a resilient application environment in the presence of hardware, software, upgrade and configuration failures
- Enable the operational team to consistently implement best practices for business continuity and high availability of business applications

Cloud Defense: Resilience

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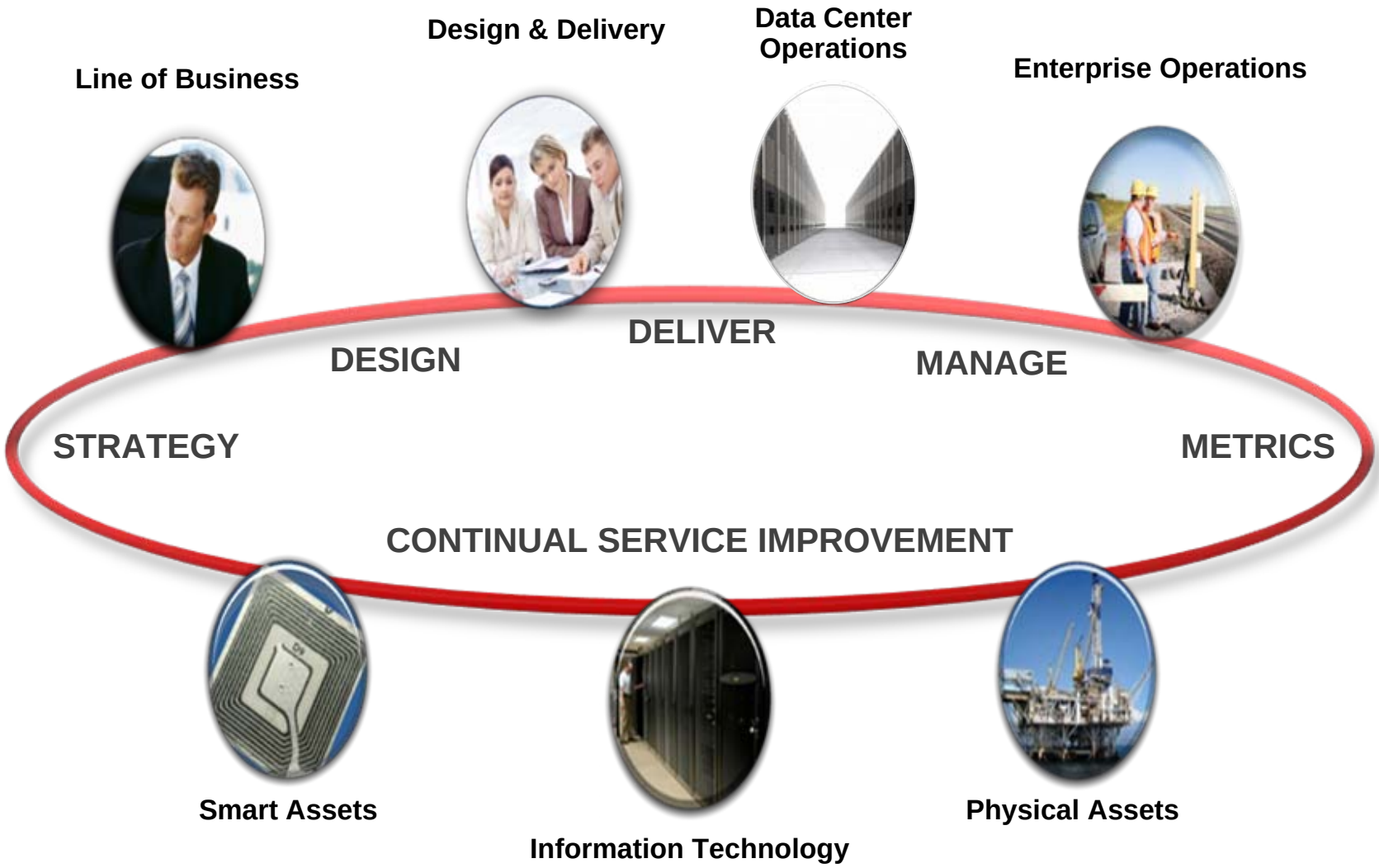
Enabling Cloud Adoption

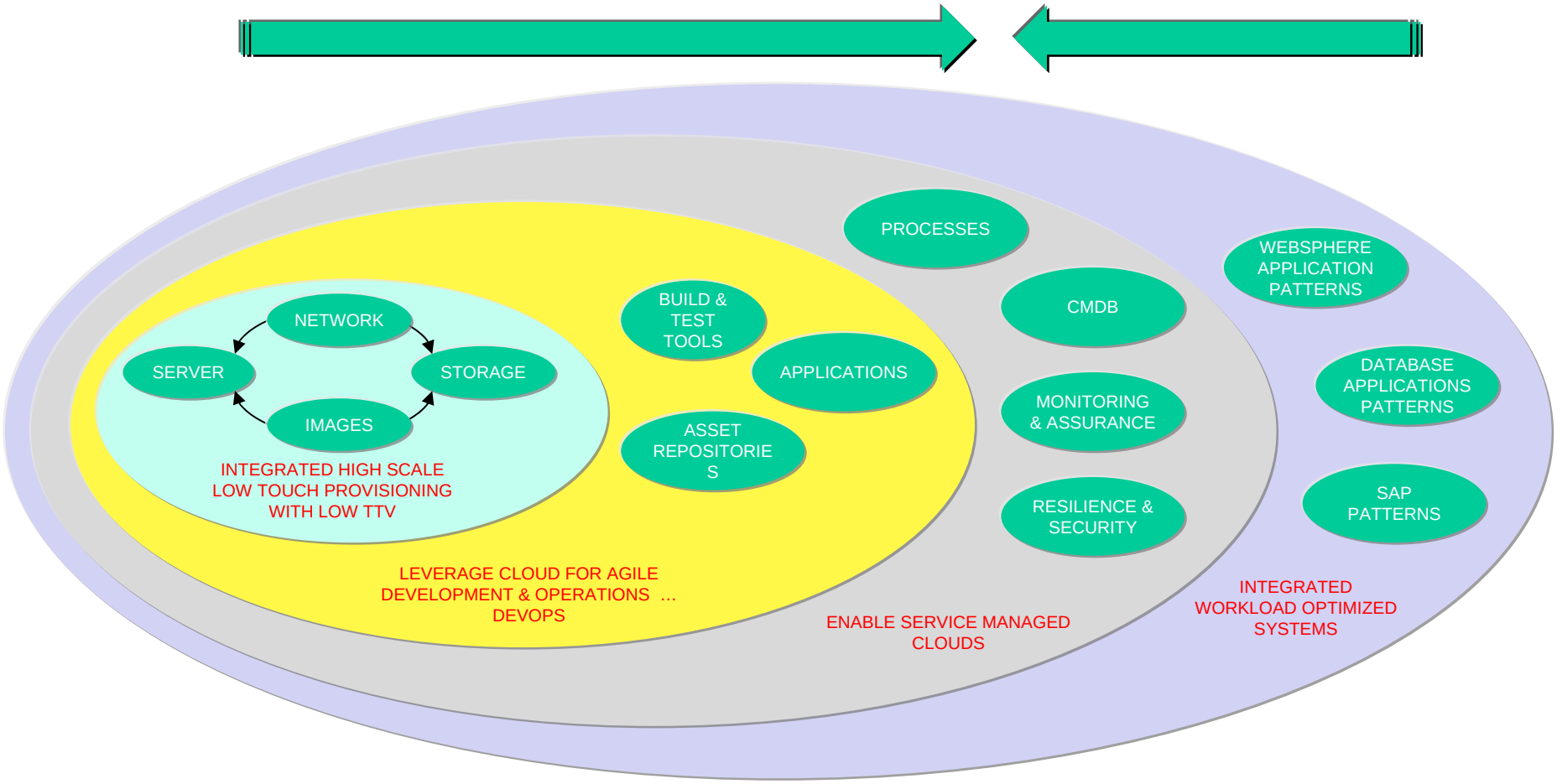
Cloud Computing Enables Collaborative, Automated Delivery and Management Across the Business Service Lifecycle



Adoption patterns are emerging for successfully beginning and progressing cloud initiatives

Start with focused IaaS solutions & DevOps

Start with workload Optimized solutions



Focus Area 1

Cloud Platform

Focus Area 2

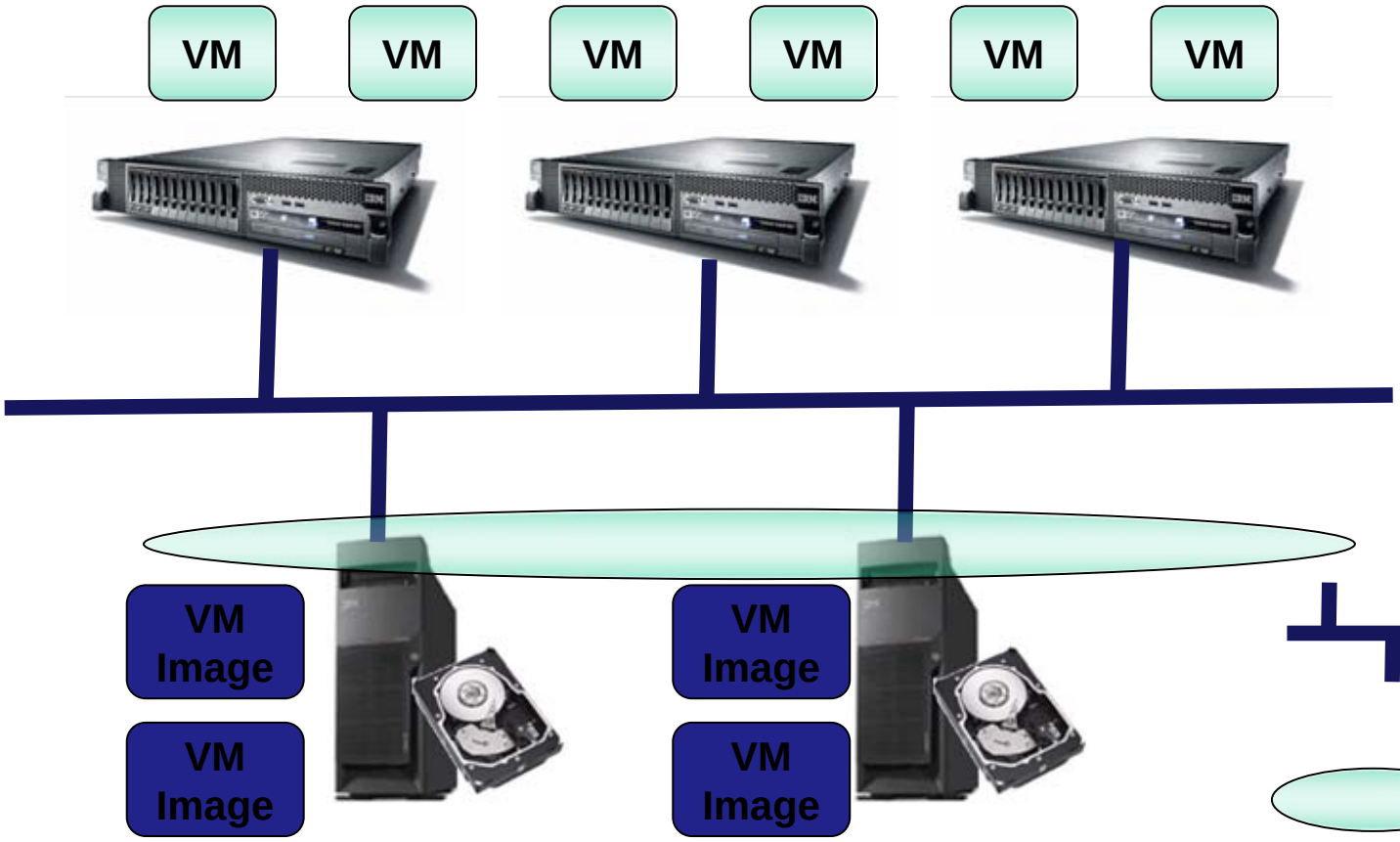
Orchestration & Content

Focus Area 3

Workload Optimized

Focus Area 1 - Cloud Platform: Deploy the Service in the Cloud

- Can provision & boot **100 VMs in less than 1 minute** (1 VM in **20-30 seconds**)
- **Greater than 100,000 VMs** provisioned to date on our largest cloud (88 servers running for **~11 months**)
- Peak usage **greater than 4000 VMs/Hour**
- Sustained production usage of **1600 VMs/Hour** for over 100 minutes
- Can tolerate multiple failures by dynamically working around failed elements
- **Near 0 downtime** due to faults, hypervisor/management software upgrades, addition/removal of hardware



Linux-based compute servers hosting both user VMs as well as clustered, redundant IaaS management services

GigE (or better) network with multiple redundant connections to servers

Software-based peer-to-peer communication and health monitoring framework

Redundant Linux-based storage servers managing VM images

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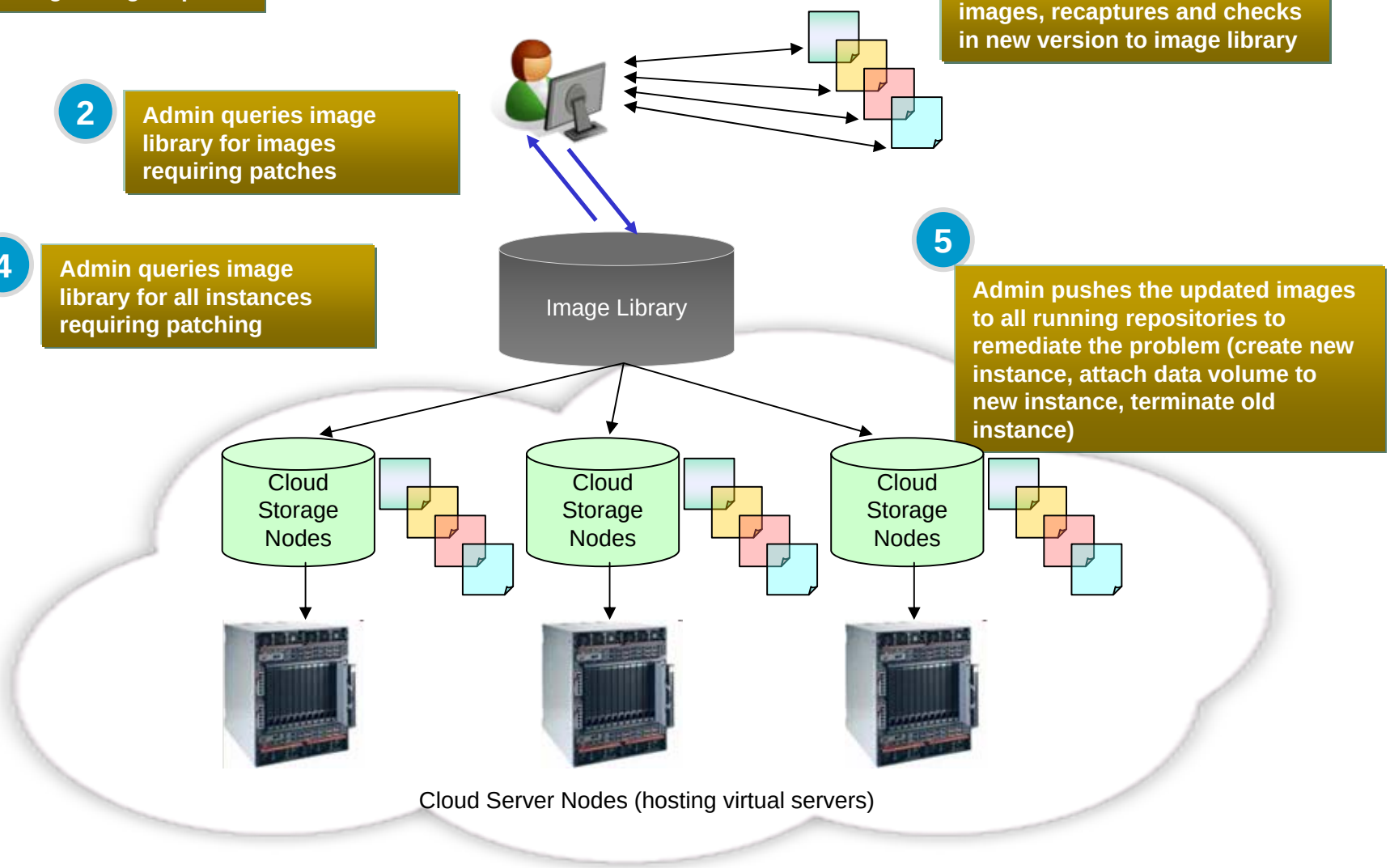
Scenario: Updating Virtual Machines for Security Vulnerabilities

Image Lifecycle Management

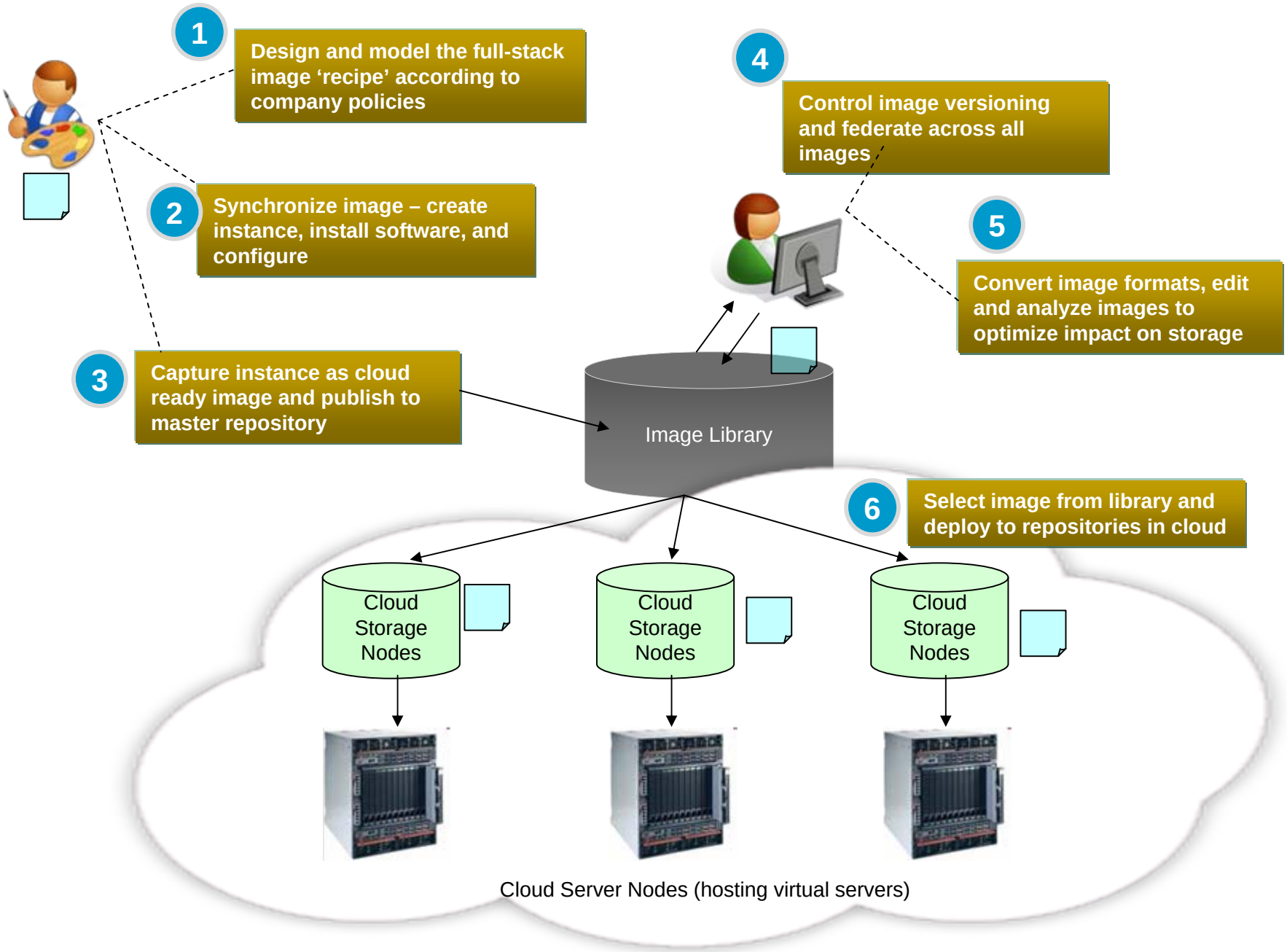
1. Company issues a high severity security alert requiring an urgent patch
2. Admin queries image library for images requiring patches
3. Admin patches the affected images, recaptures and checks in new version to image library
4. Admin queries image library for all instances requiring patching
5. Admin pushes the updated images to all running repositories to remediate the problem (create new instance, attach data volume to new instance, terminate old instance)



***Customer Value**: Quickly update virtual servers for critical security patches without impacting application availability*

Scenario: Controlling image sprawl to reduce cost and risk

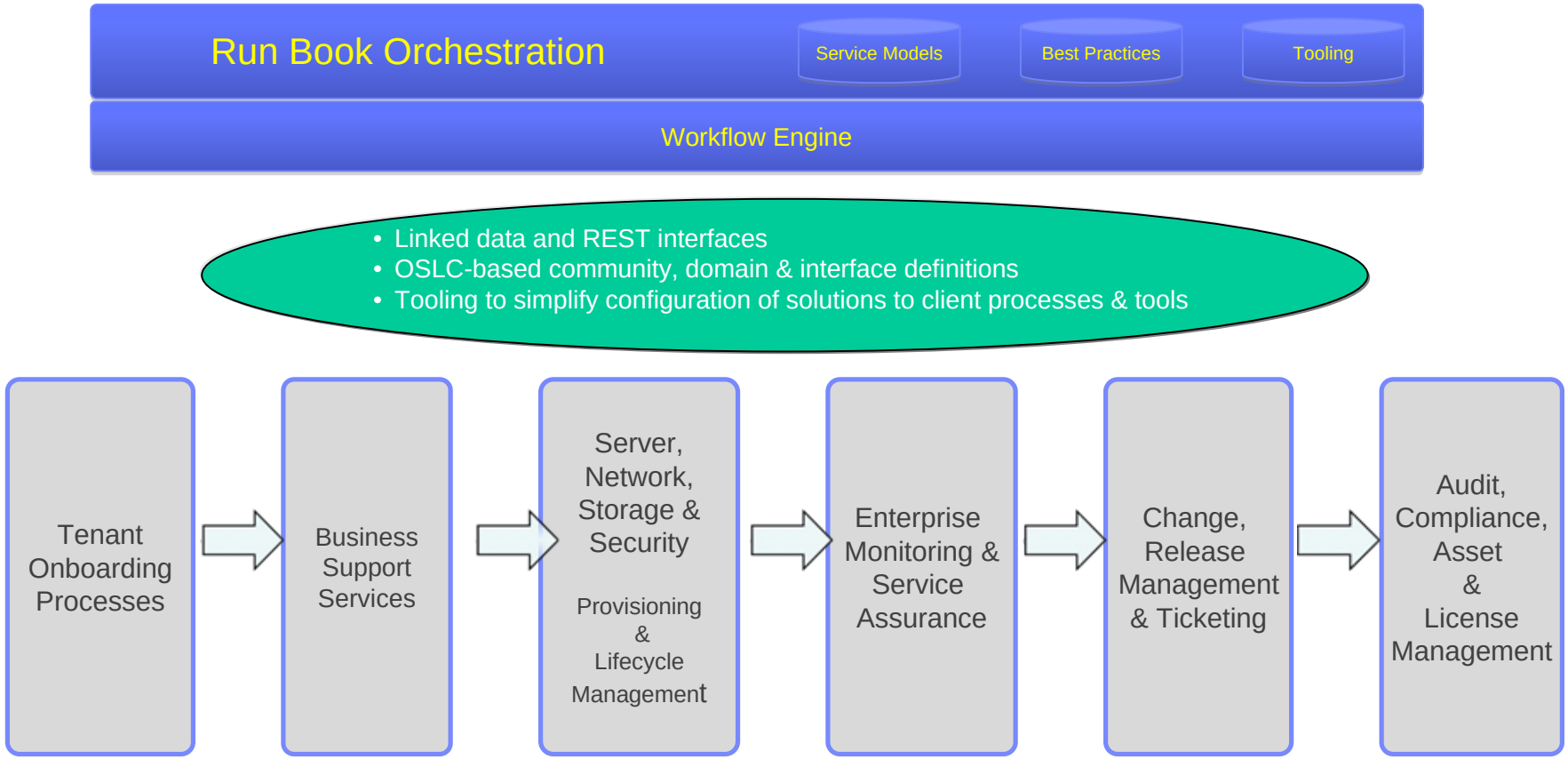
Image Lifecycle Management



<u>Customer Value</u>: Reduced risk of using non-compliant images that could have security exposures; Reduced costs of storing (up to 80%) and managing images

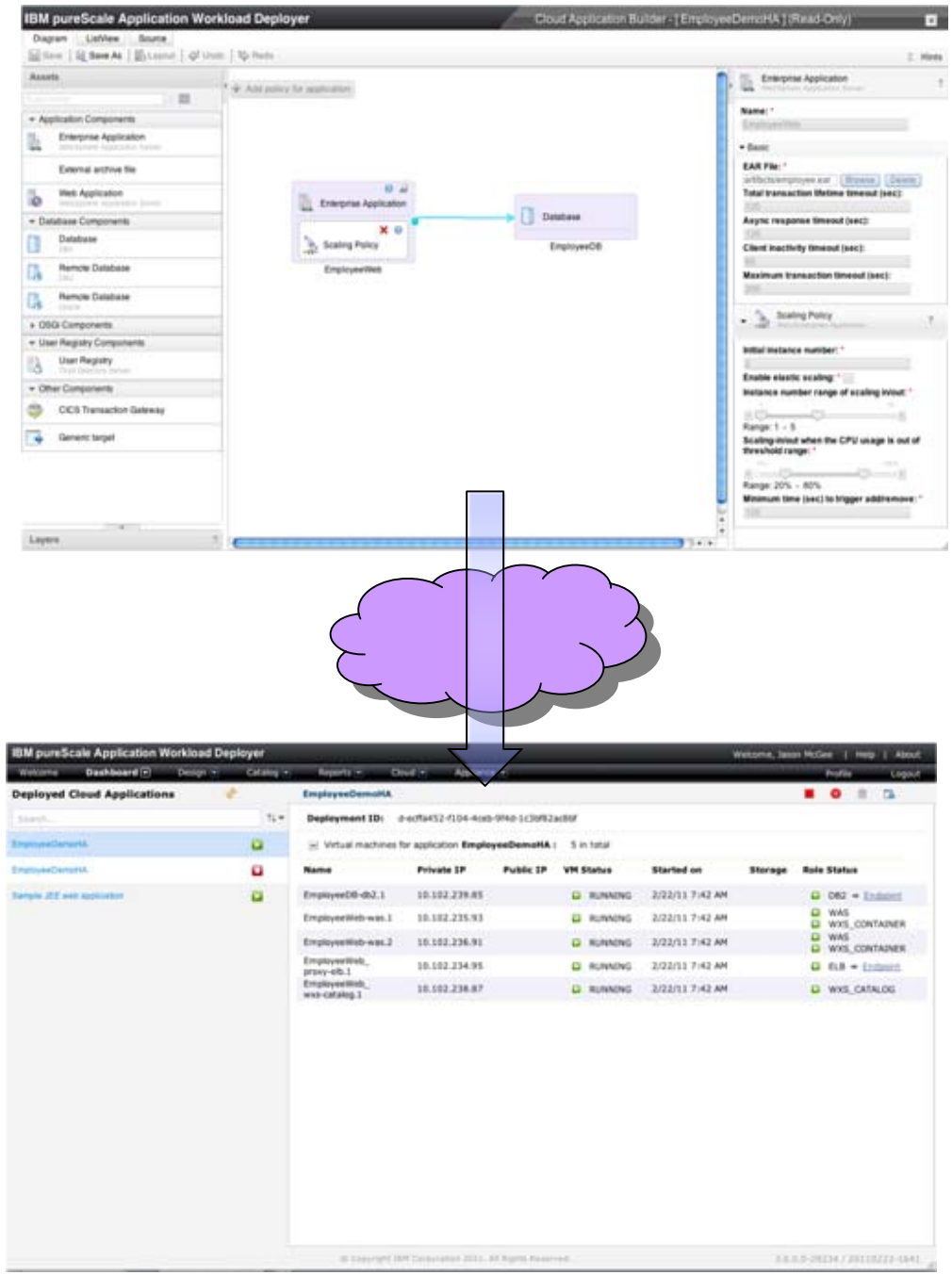
Focus Area 2 - Orchestrate Automation across Silos

- Enable the rapid integration of capabilities to support the lifecycle of cloud resources
- Open, loosely-coupled interfaces to rapidly add capability leveraging multiple vendor products and versions
- Out-of-the-box content to improve TTV
- Tooling and standards to enable extensive ecosystem across vendors, ISVs, Sis, clients and open source providers



Focus Area 3 – Enabling Lines of Business to Optimize Workload Patterns

- Focus on the application and workload structure and characteristics
- Exploit cloud to provide elasticity, resiliency and qualities of service to meet SLAs
- Integrate and simplify creation, deployment and manageability
- Simplify acquisition, deployment and upgrade paths



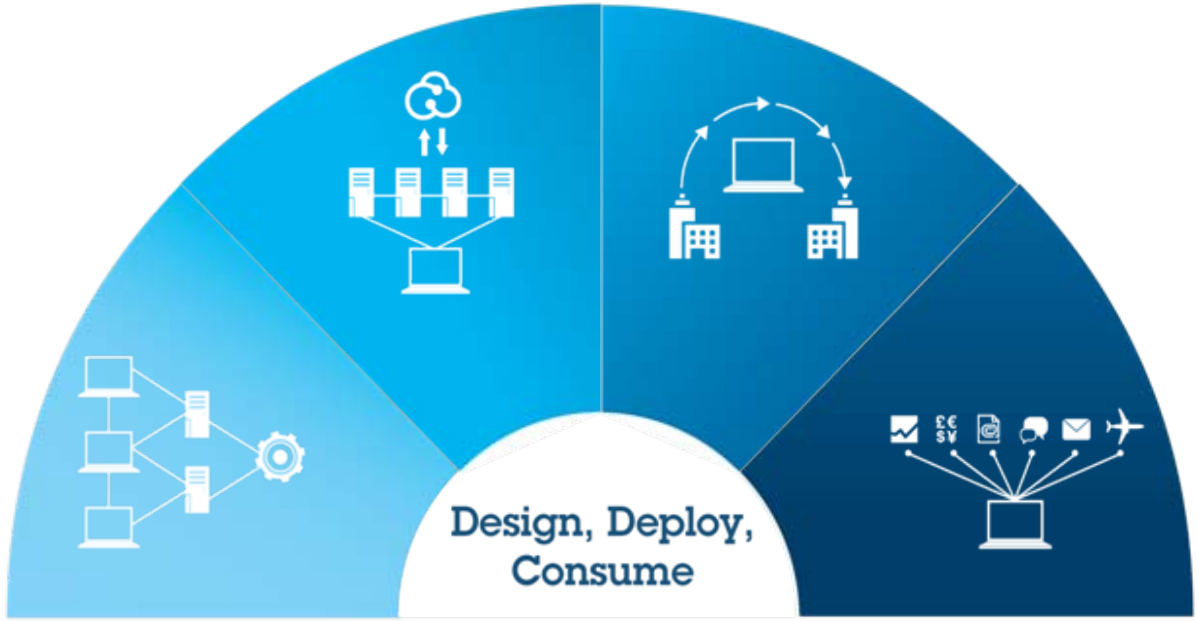
CREATE

DEPLOY

MANAGE

IBM Cloud differentiators

- Support an heterogeneous set of platforms and hypervisors
- Image management
- Single platform to support multiple delivery models: private, hybrid, public
- Integration across disciplines: design the service (Rational)
  deploy the service (Tivoli / AIM / STG)
  manage the service (Tivoli)
- Workload optimized hardware - Next Generation Platform exploitation
- Out of the box content and extensibility



Thanks!

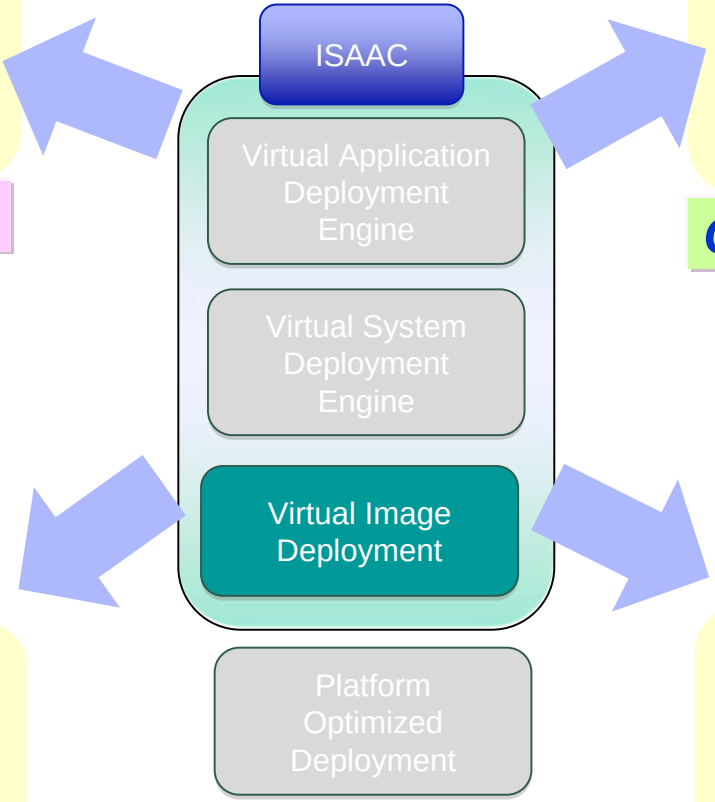
Cloud Accelerator Roles and Key Use Cases

- **Cloud Service Consumer:** Request Infrastructure to be provisioned
- **Cloud Administrator:** Provision storage and network in cloud to support infrastructure being provisioned. Define and automate sequences of activities to deploy and configure applications spanning infrastructure domains

Cloud Orchestration

- **Cloud Service Consumer:** See status and performance of workloads in the infrastructure
- **Cloud Administrator:** Monitor the health of the cloud. Automate detection and remediation of problems and predictive failures. Employ capacity planning to optimize the cloud infrastructure and workloads. Enable infrastructure events to be enriched with application context and impacted users.

Cloud Assurance: Health



Cloud Agility

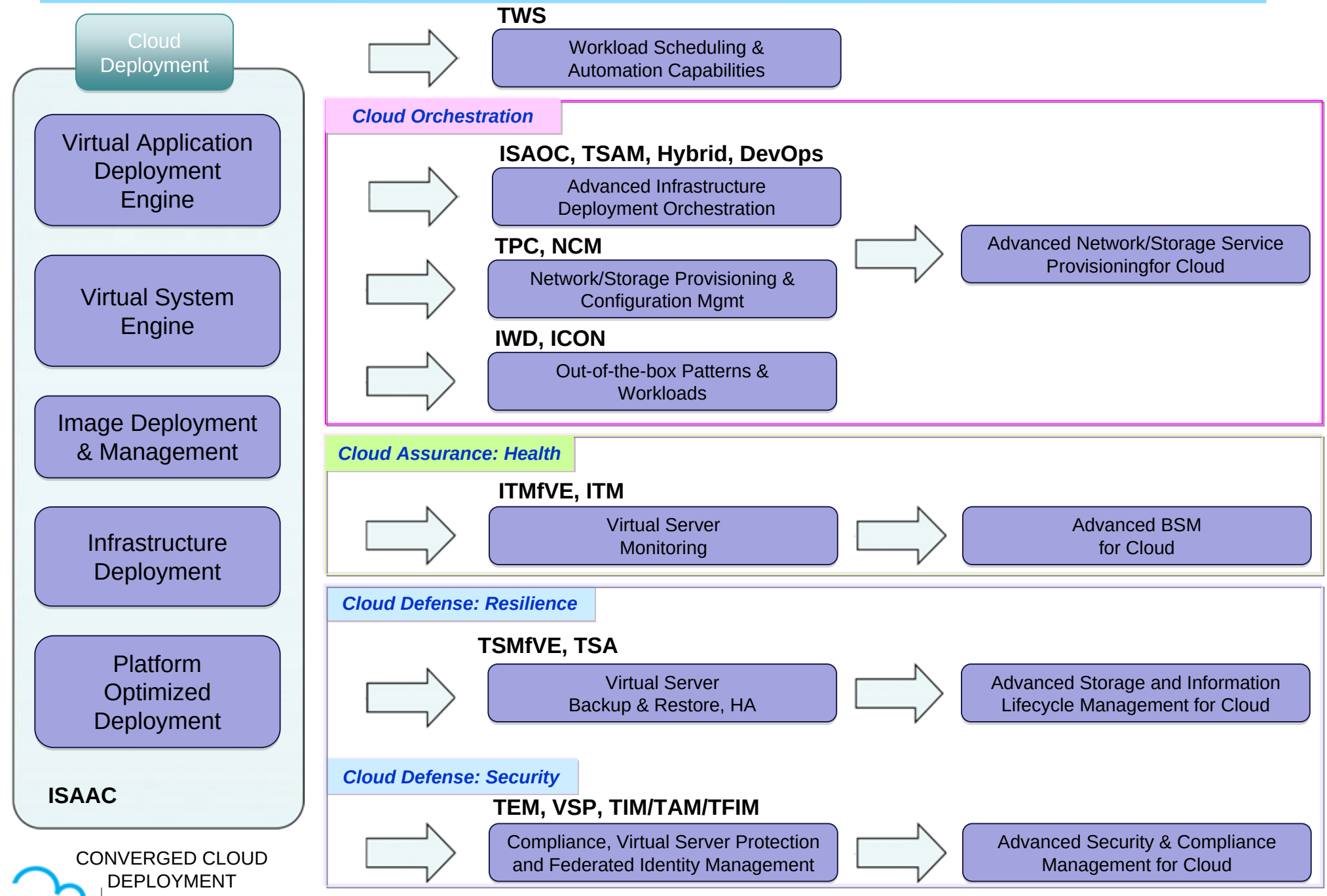
- **Cloud Service Consumer:** Specify security policy for infrastructure being provisioned
- **Cloud Administrator:** Secure the cloud infrastructure. Provide scalable patch and server provisioning and compliance for end points and servers

Cloud Defense: Security

- **Cloud Service Consumer:** Specify backup policy for infrastructure being provisioned
- **Cloud Administrator:** Backup the cloud infrastructure. Enable application-aware automated high availability and disaster recovery capabilities

Cloud Defense: Resilience

Cloud Accelerator Product Mappings to Realize Capabilities



CONVERGED CLOUD DEPLOYMENT CAPABILITIES

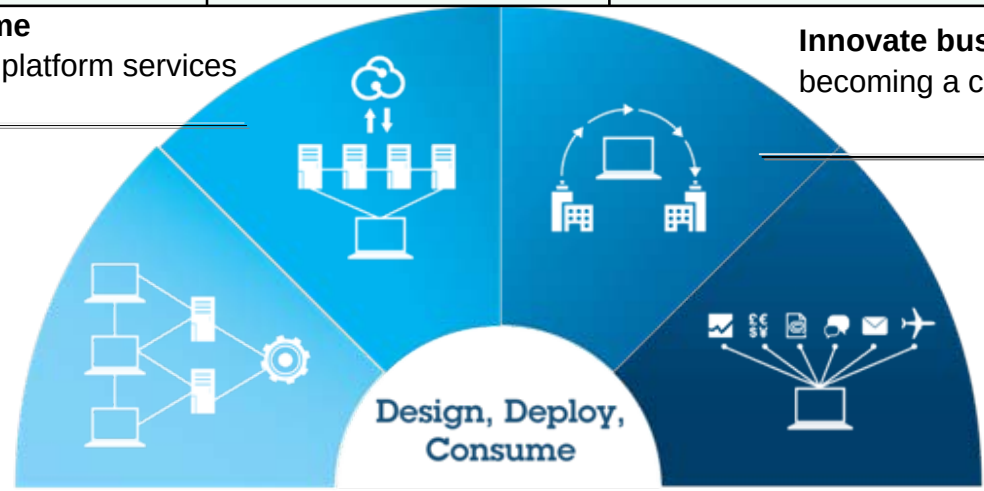
EXTEND CLOUD DEPLOYMENT & MANAGEMENT CAPABILITIES

How IBM competitors play in the Cloud domain

Competitors	vmware	bmcsoftware	cisco	hp
IaaS	• Leverages its dominance in virtualization to sell up the stack to cloud management automation • Starting to compete with partners like Cisco, BMC and CA in automation	• Reposition their Business Service Management (BSM) portfolio for cloud • Leverage Remedy base and Strong RBA	• Leverage market leadership in Networking	• Exploit leadership in x86 HW to upsell automation • Repackage traditional automation solutions for cloud • Use appliances to provide turnkey service automation
PaaS	• Establishing PaaS platform with Spring and Cloud Foundry	NA	NA	•Exploit run book and modeling tools to deploy pattern of images
Innovative Business Model	• Team with SP (Singtel, Terramark, Bluelock & Softbank) to establish public clouds with vCloud Director	• Teamed with partners Cisco through joint development to sell SP solution	• Acquired newScale for Service Catalog and Tidal for automation & RBA • Leverage VMware for Cisco UCS sales and partner with BMC	• Sell same automation solution to SP • Offer flexibility pricing and joint development with SP
SaaS	• Acquired Digital Fuel for IT Financial Management • Limited SaaS Portfolio	• Team with SalesForce.com to sell RemedyForce • Has Remedy SaaS but is behind ServiceNow	NA	• Has SaaS offering based on automation portfolio but not leading

PaaS: Accelerate time to market with cloud platform services

Innovate business models by becoming a cloud service provider

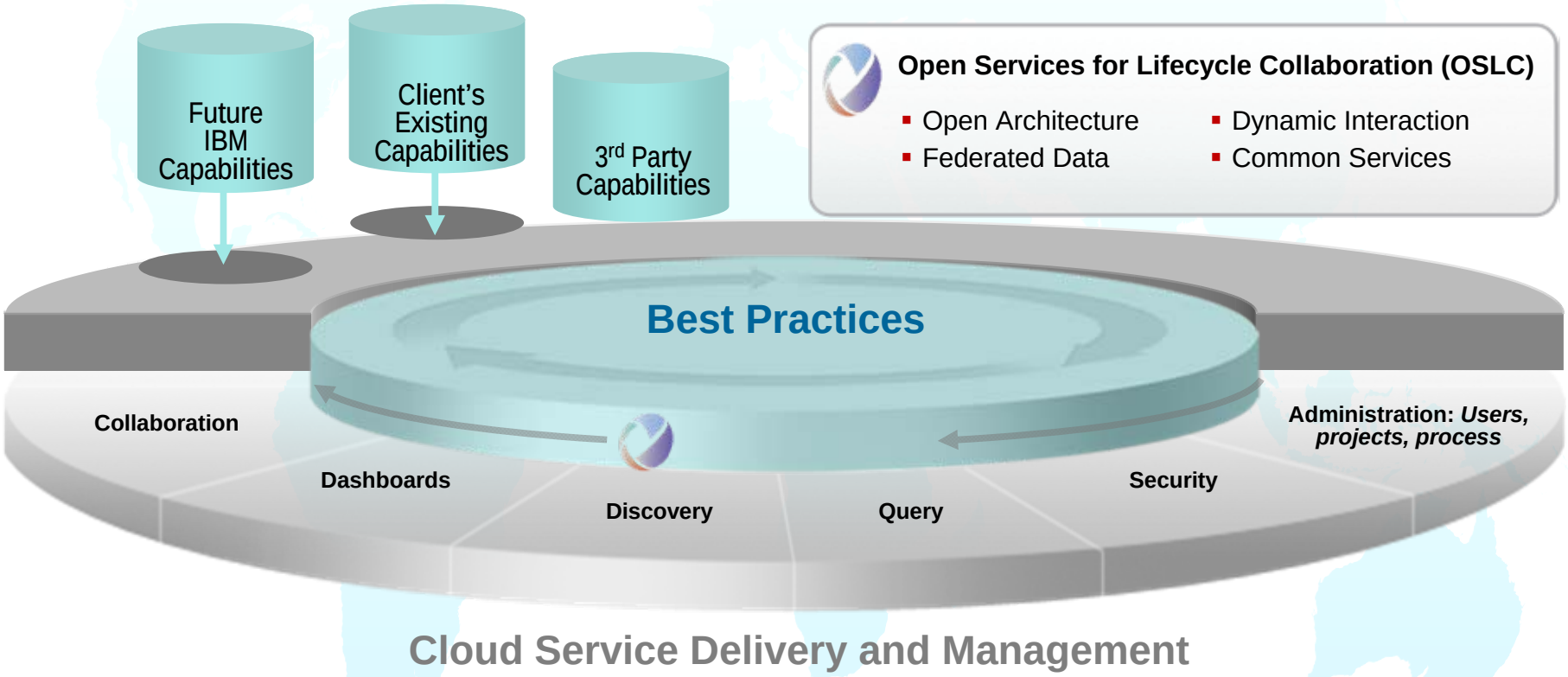


IaaS: Cut IT expense and complexity through a cloud enabled data center

SaaS: Gain immediate access with business solutions on cloud

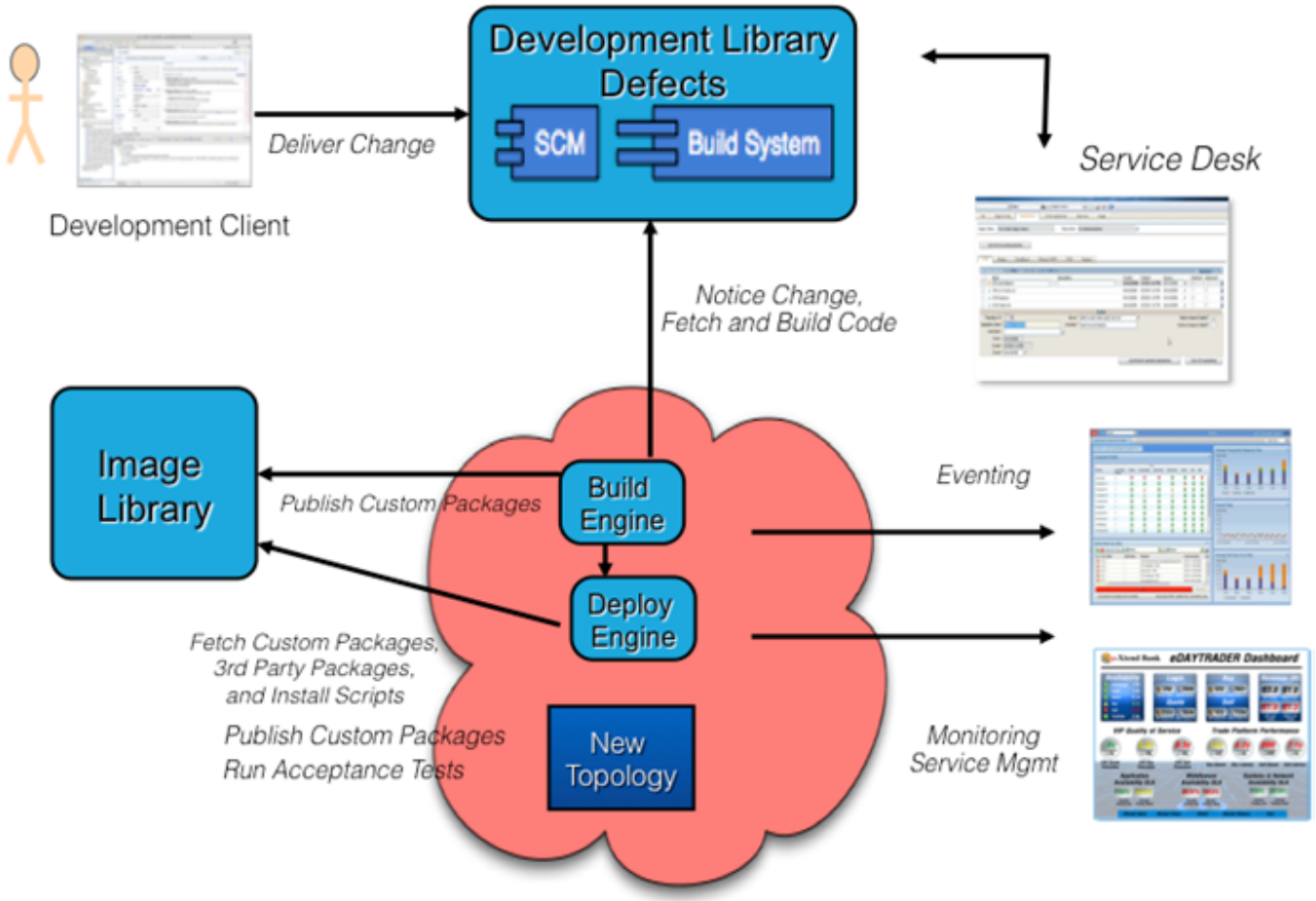
Cloud Adoption
and business outcome

Leveraging an Open, Standards Based Architecture



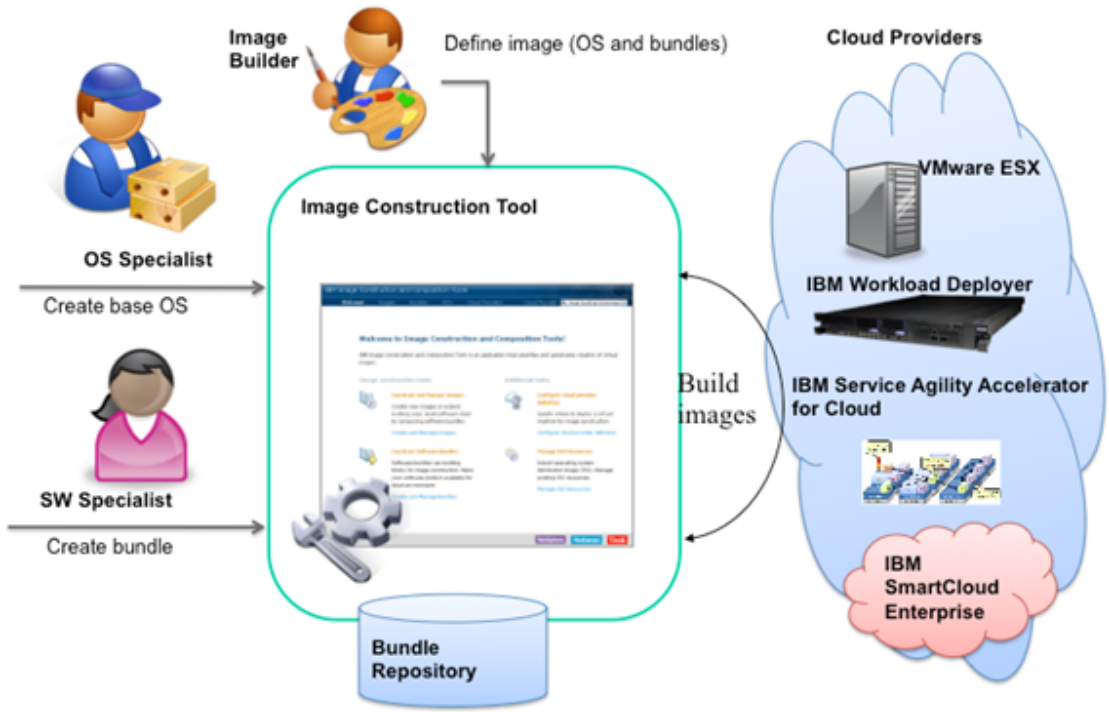
Focus Area 3 – DevOps – Transforming Development & Operations

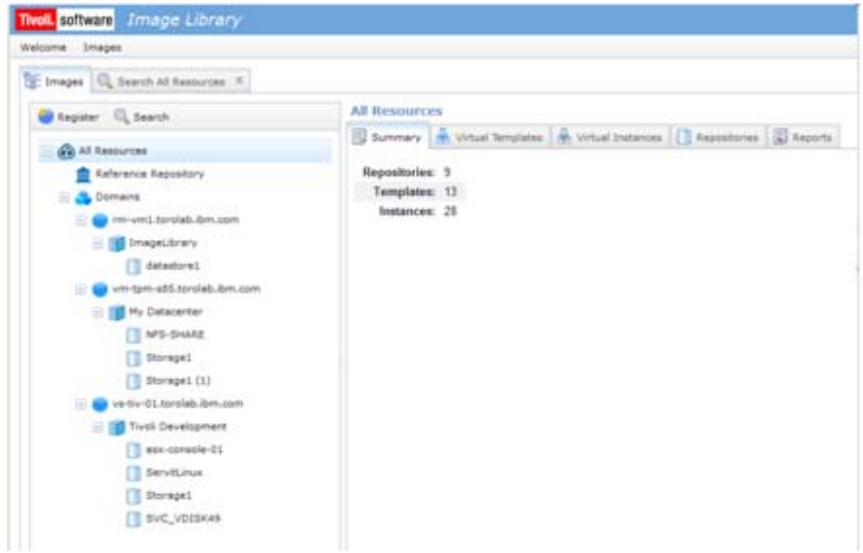
- Deliver new and enhanced business services faster, more reliably, and with high quality leveraging agile/continuous integration and extending it to the full lifecycle
- Reduce business service risk (outages, service degradations, introduction of security holes) by increasing both quantity of automated testing and frequency at which it is run.
- Increase transparency of what exactly is changing by putting entire business service definition and implementation (application implementation, node configuration, topology configuration) under source control.



Focus Area 2 –Image Creation as a key Standardization Approach for Cloud

- Tools to build images that are reusable, self-descriptive, customizable, shareable, manageable
- Unified, easy-to-follow process
- Low entry level – does not require IT expert knowledge to build an image
- Addresses multiple roles & skills
- Ability to support different cloud technologies and providers
- Specific content and support for IBM products
- Integrates with Image Library and Deployment systems to support Image Lifecycle





Focus Area 3 - Workload Optimized Systems

1. An solution from IBM…

Includes

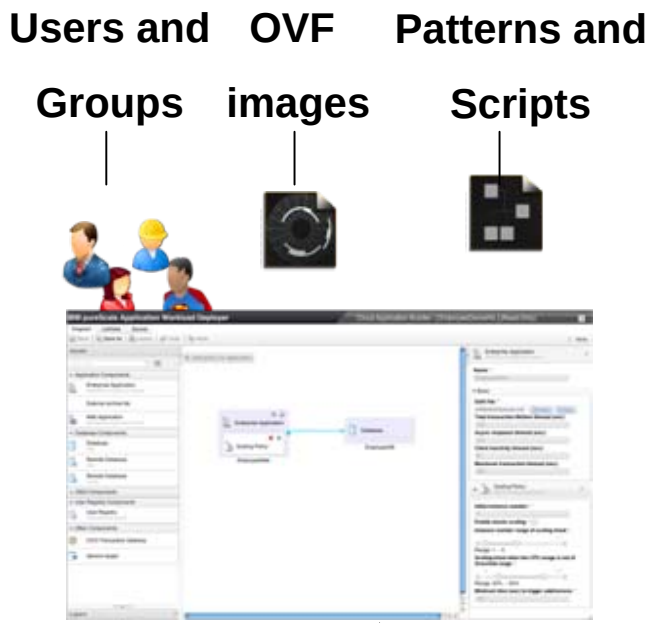
- hardware

- IBM Workload Deployer function

- Hypervisor Edition images

- Best practice topology patterns

- Web Application workload pattern



Web 2.0 UI, CLI, and REST APIs

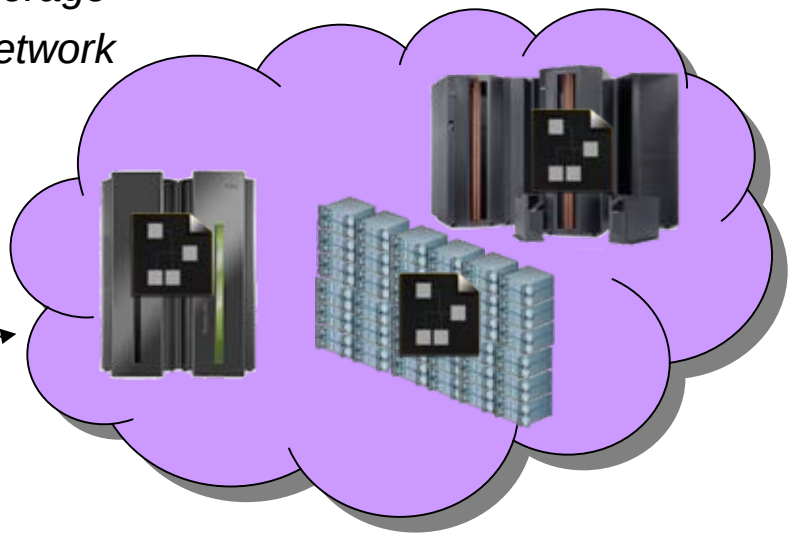
2. …that manages your on-premise cloud…

Bring your own Enterprise cloud

- hypervisors (VMware, PowerVM, zVM)

- storage

- network



3. … comprising Virtual Systems

- Customize and extend images and patterns for your applications

- Dispense and run in the cloud

- Life-cycle management, optimization, license tracking