



**Rethink IT.**  
**Reinvent Business.**  
Smart, Secure and Ready for Business

# SmartCloud Enterprise

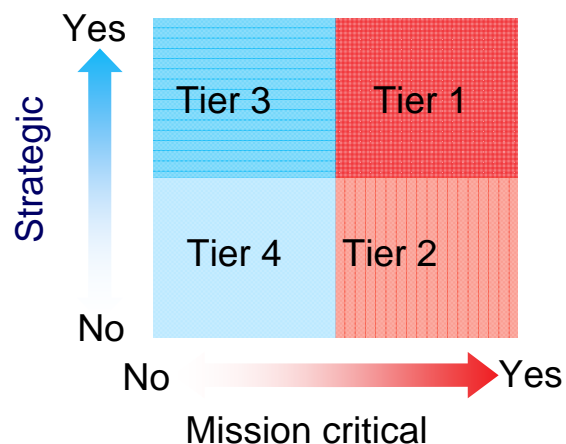
*Choice & Control*

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Dec 4, 2012



# A good way to start realizing the cost benefits of cloud is to segment your application portfolio into tiers.

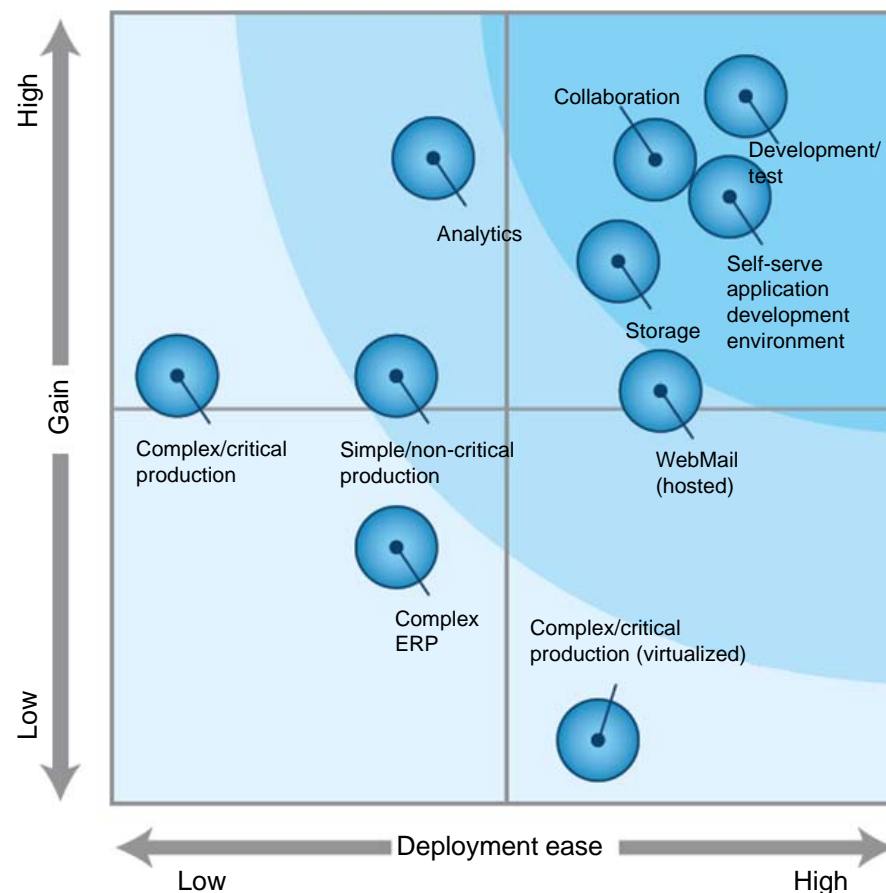


- Most clients have many Tier 4 and relatively few Tier 1 applications.
- Start by migrating Tier 4 applications to the cloud environment, moving lowest-risk applications first.
- Apply lessons learned to subsequent migrations of higher tier applications.

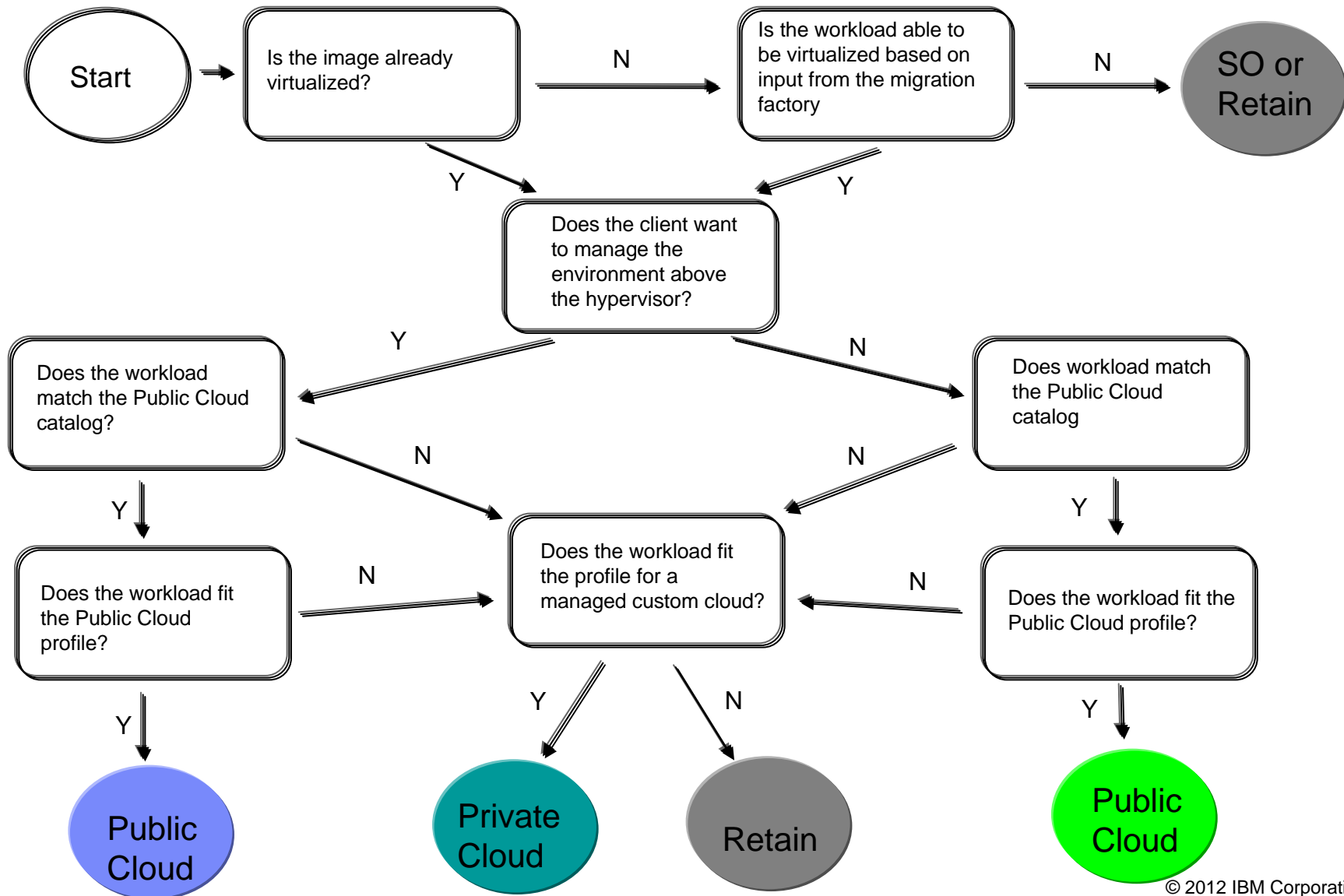
	Tier 4	Tier 3	Tier 2	Tier 1
Application Class	Not strategic or mission critical	Strategic but not mission critical	Mission critical	Key – Most critical
Typical distribution	55%	20%	20%	5%
Availability required	Low 95% or less	Medium 95-98.5%	High 98.5-99.7%	Very high Never down
Support effort	Best effort	Business hours	24*7	24*7
Monitoring	No monitoring	Basic server	Infrastructure	Application level

# It is critical that you understand your current portfolio of applications and services and align it with a cloud deployment strategy.

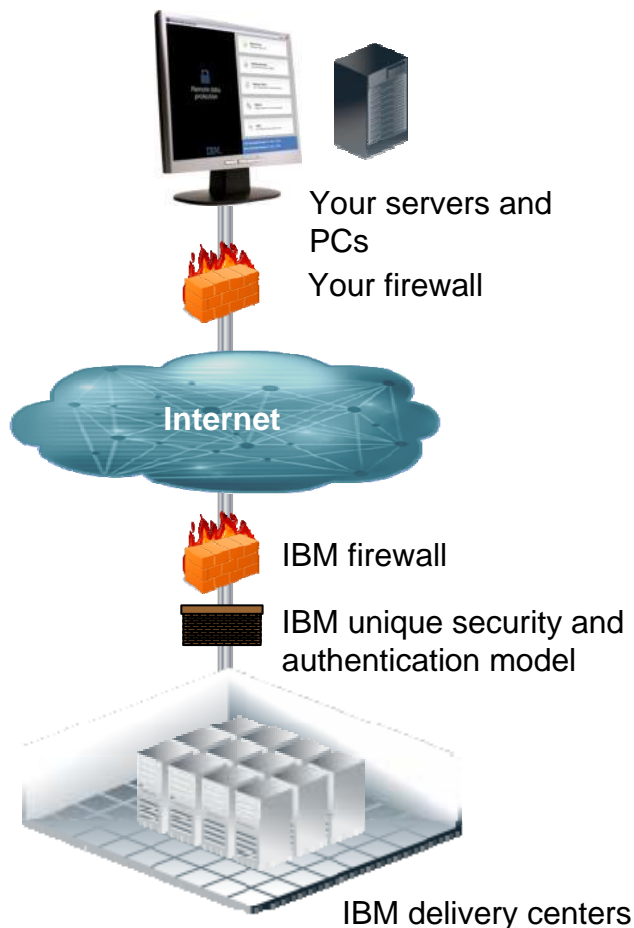
- A quantitative analysis of a workload's fit for a targeted cloud, including cost and migration impact
- Insights to make better strategic decisions about which workloads to migrate to the cloud
- Expertise and ability to integrate existing and new capabilities into cloud-based solutions
- Infrastructure Strategy & Design Services for Cloud Computing: **IBM Workload Transformation Analysis (WTA) for Cloud**



# Basic Cloud Service Model Decision Tree



# What is IBM Smart Cloud Enterprise?



## ▪ Enterprise-class IT infrastructure

- Offering control, reliability, data security and massive scalability in performance and capacity

## ▪ IBM owned and managed

- Multi-tenant shared infrastructure
- Highly virtualized
- Multiple IBM delivery centers
- Preconfigured software images

## ▪ Enhanced security

- Secured access through the Internet
- Virtual private network option
- Based on IBM security standards

## ▪ Pay-per-use

- Virtualized IT resources delivered on a usage-based billing model

# The IBM Cloud Computing Reference Architecture (CCRA)

**Represents the aggregate experience from hundreds of cloud client engagements and IBM-hosted cloud implementations**

- Based on knowledge of IBM's services, software & system experiences, including IBM Research

**Reflected in the design of**

- Clouds IBM implements for clients
- IBM-hosted cloud services
- IBM cloud appliances
- IBM cloud service management products

**Focuses on cloud specifics**

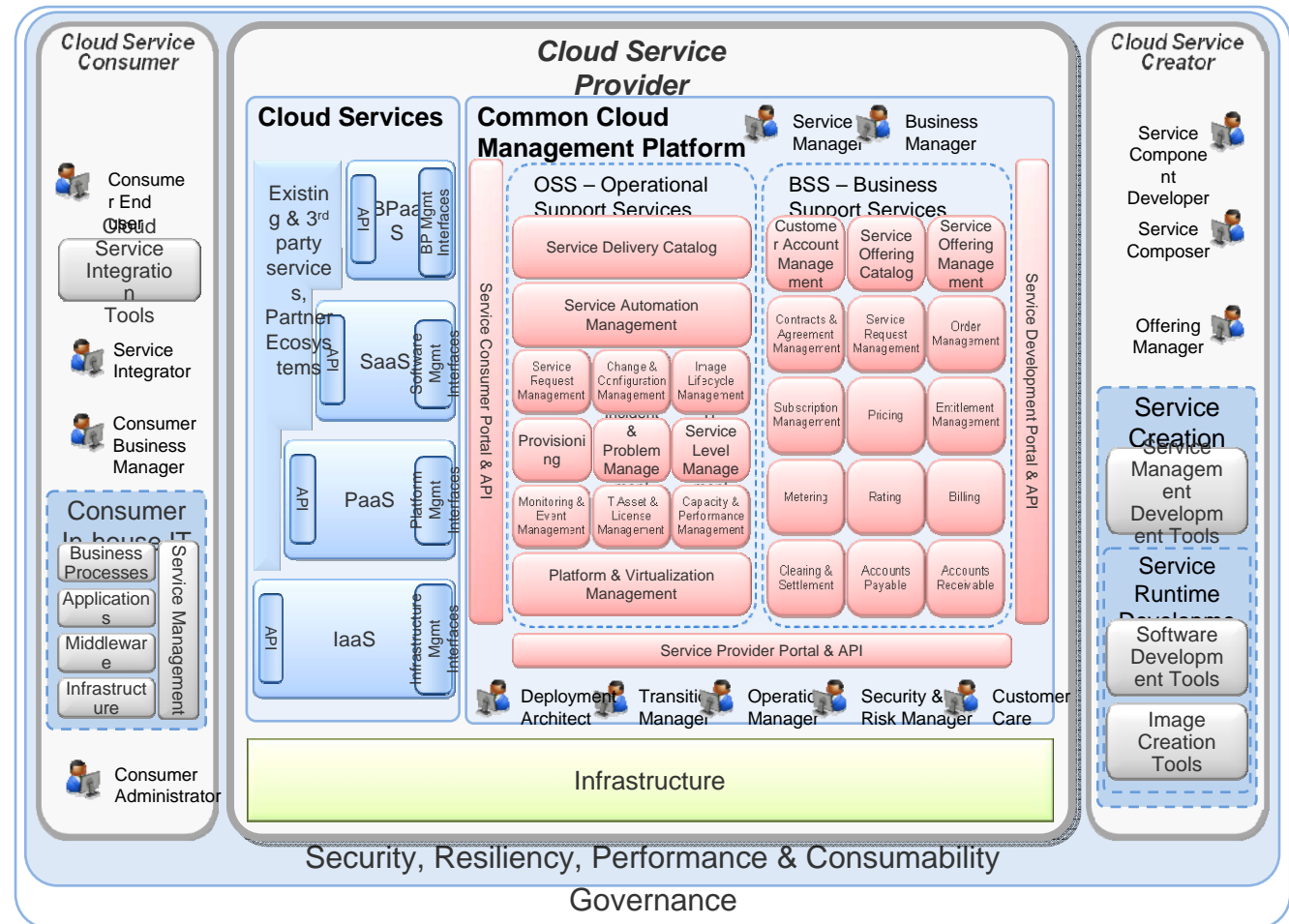
- Radical cost reduction
- Achievement of high degrees of security, reliability, scalability and control

**Consists of multiple detailed documents representing best-of-industry knowledge and insight**

- How to architect, design and implement clouds

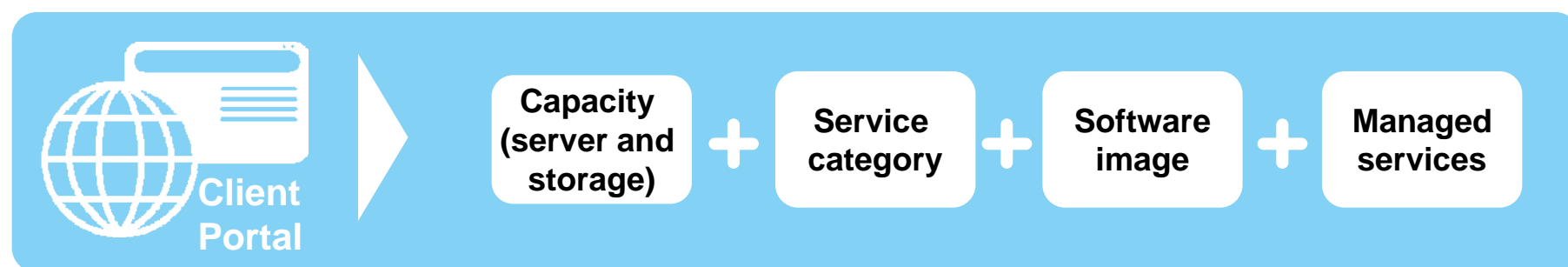
Public Cloud RA whitepaper available on ibm.com:  
<http://public.dhe.ibm.com/common/ssi/ecm/en/ciw03078usen/CIW03078USEN.PDF>

CCRA OpenGroup submission:  
<http://www.opengroup.org/cloudcomputing/uploads/40/23840/CCRA.IBMSubmission.02282011.doc>



# A self-service web portal is designed to provide more rapid access to the IBM SmartCloud Enterprise+ environment.

You activate your service through the client portal.



## Example

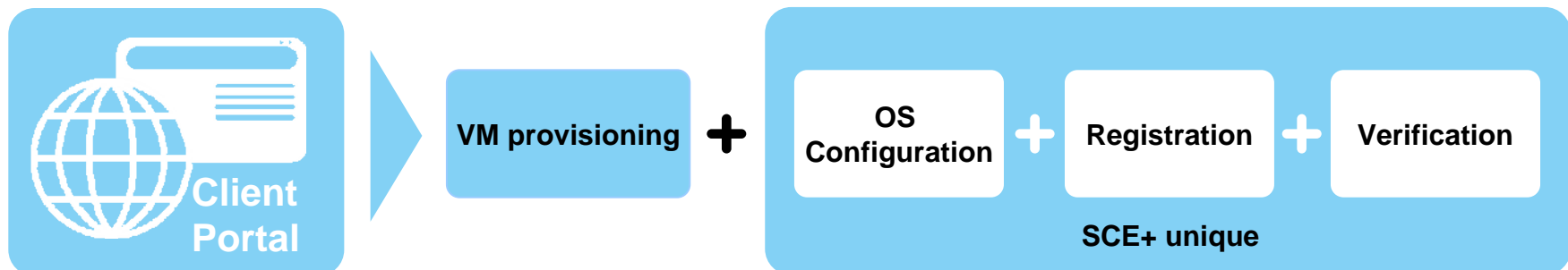
Capacity	Service category	Software image	Managed services
64-bit IBM System x® virtual machine 8 central processing unit, 16 gigabytes (GB) random access memory (RAM), 384 GB storage	99.5 Silver service-level agreement 24-hour service request fulfillment	RHEL Linux 5.4 IBM DB2® Enterprise Edition v9.7.1	Operating system



# IBM SmartCloud Enterprise+ can deliver a more robust cloud environment in hours

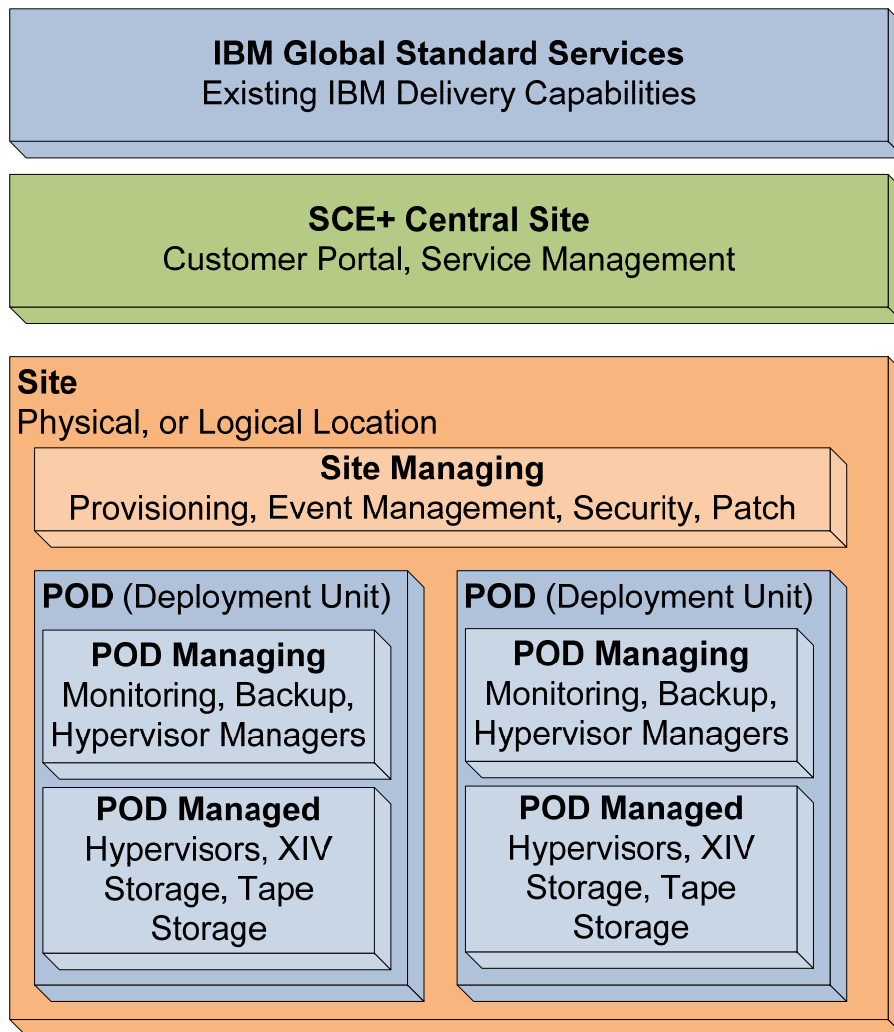
## Steps for creation of a virtual machine (VM) in SmartCloud Enterprise+

- Customer requests VM through the cloud web portal
- Virtual machine – virtual resource provisioning of server and storage resources
- Execution of automated tooling for preparation of operating system. Examples:
  - Patching operating system (OS) to current levels
  - Install, configure and test agents (for example, monitoring and backup)
  - Security scans
- Registration into management tools. Examples:
  - Asset – VM and installed software
  - ID and password – maintain password policy including revalidation
  - Compliance – contain records of full compliance to security policies and standards
- Verification by IBM Delivery Executive and turnover to customer for use





# SCE+ Architecture: Centrally Managed and Distributed Deployment



**Key components of the central cloud management system are:**

- IT Service Management
- Portal
- Service Offering Catalog
- Service Desk
- Asset Management
- Change and Configuration Management

**The key components of a distributed site are:**

- Hardware: Server and Storage
- Service Automation and Provisioning
- Virtualization Managers
- Hardware Management
- Monitoring
- Storage Management
- Image Management
- Network Requirements





## The SmartCloud Enterprise+ environment is supported by a comprehensive set of managed services and tools

Monitoring and management of operating systems (OS)	ITIL-based managed services enable more consistent and efficient service management	Supporting managed services to enable additional management and resiliency
<p>Monitoring and patch management of OS components</p> <p>Antivirus on Microsoft Windows OS Accounting of software licenses</p> <p>OS-level security and compliance</p> <ul style="list-style-type: none"> <li>• Security policy management and compliance support</li> </ul> <p>Base audit support for the environment and regulatory program management</p>	<p>Service catalog</p> <p>Service request – activation and deactivation (SA&amp;D)</p> <p>Incident, problem and change management</p> <p>Event management</p> <p>Configuration management</p> <p>Asset management</p>	<p>Management above the operating system (such as database and middleware)</p> <ul style="list-style-type: none"> <li>• Monitoring and response to alerts</li> <li>• Patch management</li> </ul> <p>Vulnerability management for the managed environment</p> <ul style="list-style-type: none"> <li>• Scanning using IBM security services</li> <li>• Response to alerts and events</li> </ul>

## Comparison of IaaS Platform Functionality

	SmartCloud Enterprise	SmartCloud Enterprise+
<b>Core Technology</b>	KVM, x86 only	VMWare, AIX (x86 and Power Platform)
<b>Application Applicability</b>	Emerging application architectures that build resiliency into the application	Production, with full stack enablement for existing application designs
<b>Service Scope</b>	Unmanaged, cost optimized to compete with public IaaS providers	Managed Hosting service scope, 30%+ more efficient than traditional managed hosting deployments
<b>Service Activation Performance</b>	Self-service, ungoverned	~ 1 day, including full service activation: shorter than hosted BAU today (2-4 weeks)
<b>Guest Management</b>	Client responsibility	Complete ITIL process support
<b>Compliance</b>	IBM internal security standards	ISEC above hypervisor, IBM internal below
<b>SLA</b>	99.9% for infrastructure (not instance)	98.5-99.9% for VM availability;
<b>Service management</b>	Below hypervisor	Above and below the hypervisor
<b>Backup and recovery</b>	Client Responsibility	Integrated Service
<b>Pricing</b>	Hourly pay-as-you-go rates	Monthly rates with annual baselines

## Service Level Agreement for the Virtual Machine (VM)

Package	Virtual machine (VM) availability service-level agreement	Infrastructure services
 <b>Bronze</b>	98.5%	<ul style="list-style-type: none"> <li>• 32-bit and 64-bit IBM System x® – Microsoft Windows and Linux</li> <li>• 64-bit IBM Power Systems™ - IBM AIX®</li> <li>• Pre-defined selectable VM sizes (CPU, memory, storage)</li> <li>• 24-hour service request fulfillment</li> </ul>
 <b>Silver</b>	99.5%	<ul style="list-style-type: none"> <li>• VM mobility within a virtual cluster</li> <li>• 24-hour service request fulfillment</li> </ul>
 <b>Gold</b>	99.7%	<ul style="list-style-type: none"> <li>• Automated restart on VM failure</li> <li>• 48-hour total service request fulfillment</li> </ul>
 <b>Platinum</b>	99.9%	<ul style="list-style-type: none"> <li>• Storage replication across different physical storage devices</li> <li>• 72-hour total service request fulfillment</li> </ul>

# The IBM SmartCloud Enterprise offering is designed to be security-rich.

## Virtual infrastructure

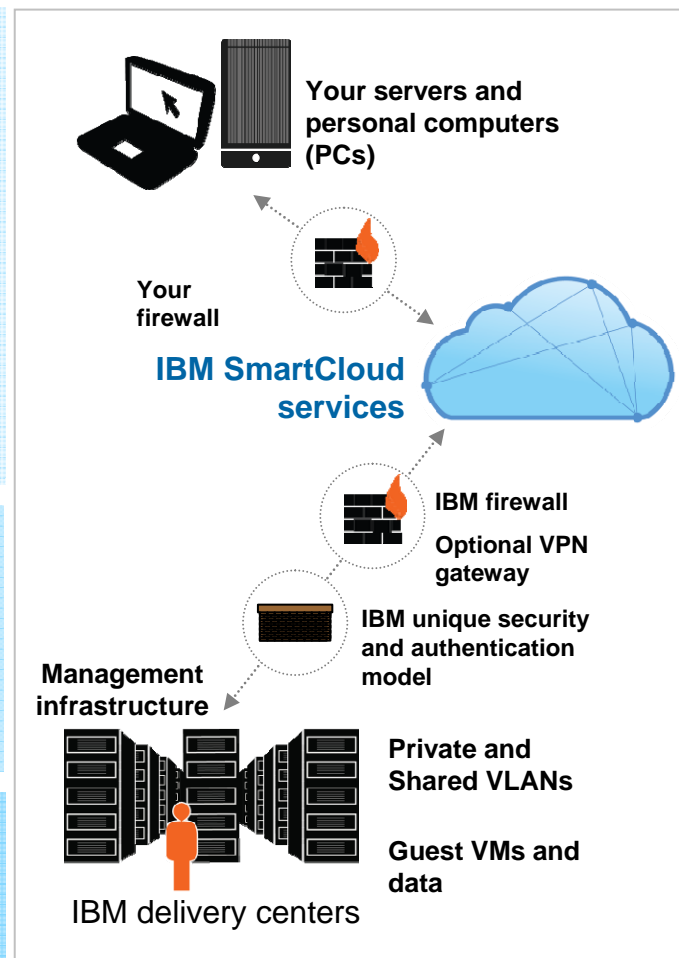
- Hypervisor-based isolation with customer configurable firewall rules
- Firewall and IPS and IDS between guest VMs and Internet
- Multiple IP addresses per instance with which to enable security zones
- Optional VPN and private VLAN isolation of instances
- Connections may be encrypted and IBM is isolated from VMs by design (using secure shell [SSH] keys in Linux and Microsoft Windows Server user access control)
- Client has root access to guest virtual machines to further harden VMs
- Shared images patched and scanned regularly

## Management infrastructure

- Access to the infrastructure is only enabled using web identity through the user interface portal or APIs
- Complies with IBM security policies, including regular security scans
- Controlled and audited administrative actions and operations

## Data centers

- Customer data and VMs are kept in the data center where provisioned
- Physical security same as for IBM's internal data centers



# Buyers focus on three technical and nine commercial buying criteria

Technical Buying Criteria	
<b>Security</b>	<ul style="list-style-type: none"> <li>Physical, network and information, e.g., firewall, access, isolated server environment</li> </ul>
<b>SLA</b>	<ul style="list-style-type: none"> <li>SLA/availability; supported by quality/redundancy of physical DC, HW/SW infra</li> </ul>
<b>Initial Set-Up and On-Going Provisioning Time</b>	<ul style="list-style-type: none"> <li>Includes account creation, image selection, image provisioning, firewall configurations, and integration of relevant software</li> </ul>
Commercial Buying Criteria	
<b>Relative Price</b>	<ul style="list-style-type: none"> <li>Competitively priced across infra services and implementation support</li> </ul>
<b>Contract Flexibility/Terms</b>	<ul style="list-style-type: none"> <li>Commitment/term length; termination/wind-down charges; T's &amp; C's; lock-in</li> </ul>
<b>Pricing/Billing Flexibility</b>	<ul style="list-style-type: none"> <li>Predictability and transparency: Ability for client to accurately predict customer service expense; Consistency, e.g., across geos; no surprises</li> <li>Balance of Complexity/Single View: All-in-one vs. detailed billing</li> </ul>
<b>Value Add Services</b>	<ul style="list-style-type: none"> <li>Technical support; migration, consulting, managed services beyond infra provisioning</li> </ul>
<b>Experience/ Capabilities</b>	<ul style="list-style-type: none"> <li>Broad experience – from infra provisioning to managing specific apps, e.g., SAP; Migration</li> </ul>
<b>Quality/Ability to Deliver</b>	<ul style="list-style-type: none"> <li>Response time (initial and on-going), level of technical and customer knowledge; Global consistency in support; Use of open standards</li> </ul>
<b>Relationship</b>	<ul style="list-style-type: none"> <li>Centered on trust; Ability to define cloud in client terms</li> </ul>
<b>Financial Stability/Brand</b>	<ul style="list-style-type: none"> <li>Financial stability present/over time; Reputation (uptime, security, staying power)</li> </ul>
<b>Ability to transform</b>	<ul style="list-style-type: none"> <li>Ability to provide continuous innovation and transformation in both process and technology</li> </ul>

Source: SAI interviews and analysis, SME interviews, secondary analysis, and field interviews





## IBM SmartCloud Enterprise is designed to address key client concerns of security, reliability and control.



**Security.** Built into the solution, ranging from tight physical security of the IBM SmartCloud delivery centers to IPS and vulnerability scanning of the IBM SmartCloud infrastructure. Optional security options such as virtual private networking can help you extend your existing security disciplines to the cloud.



**Reliability.** Around-the-clock monitoring and management of the IBM SmartCloud infrastructure with a service level agreement. Features like 'anti-collocation' and 'virtual IP addressing' help enable you to build resiliency into your cloud server environments. Backup and recovery and monitoring services are available separately.



**Control.** Web-based portal allows authorized users to log on at any time and monitor, manage and control their virtual environments. Administrator and user roles offer enterprise-level control of cloud assets and spending, including full usage detail downloads. Built-in APIs allow you to customize and automatically control your cloud server capacity.





# HKPC launches Hong Kong's first cloud computing application for education to improve educational outcomes and efficiencies

## The need:

Hong Kong Productivity Council (HKPC) is a statutory organization with the mission to promote productivity excellence and competitiveness of Hong Kong enterprises through the provision of integrated support across the value chain. They saw the adoption of cloud and the transformation of education essential to maintaining Hong Kong's long term competitiveness to meet the demands of a globalized, knowledge economy.

## The solution:

The Education Cloud, running on IBM SmartCloud Enterprise, is a scalable and robust cloud computing platform that allows HKPC Productivity Training Institute (PTI) to put their training courses on the cloud, transforming education by enabling students to study anytime, anywhere at their own pace. It was developed in China Cloud Computing Lab, part of IBM China Development Lab and a member of IBM's global network of twelve cloud labs.

## The benefit:

Students can study outside the classroom, anytime, anywhere at their own pace. Teachers have bigger flexibility in designing course and interacting with students online, and improving course materials through collaboration.

PTI is able to provide a new training option for local enterprises on top of its existing services, offering flexibility and efficiency for knowledge sharing.

## Deployment:

Pilot on private cloud model: Nov 2010

Production on IBM SmartCloud Enterprise: Dec 2011

*“We are confident that the pilot will bring tremendous benefits to both teachers and students. Our vision is to extend the Education Cloud to other continued learning institutions for greater collaboration and sharing.”*

— K T Yung, General Manager, IT Industry Development of HKPC  
November 2010

## Solution components:

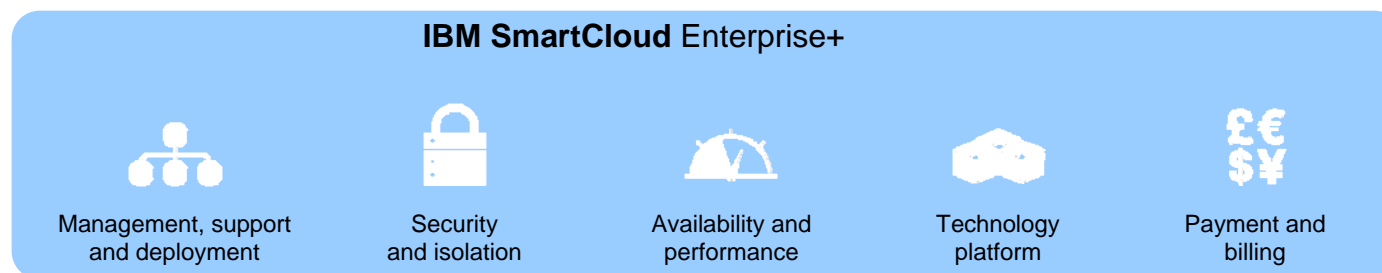
- Education cloud solution developed by IBM China Cloud Computing Lab
- IBM SmartCloud Enterprise



**Hong Kong  
Productivity Council**  
香港生產力促進局



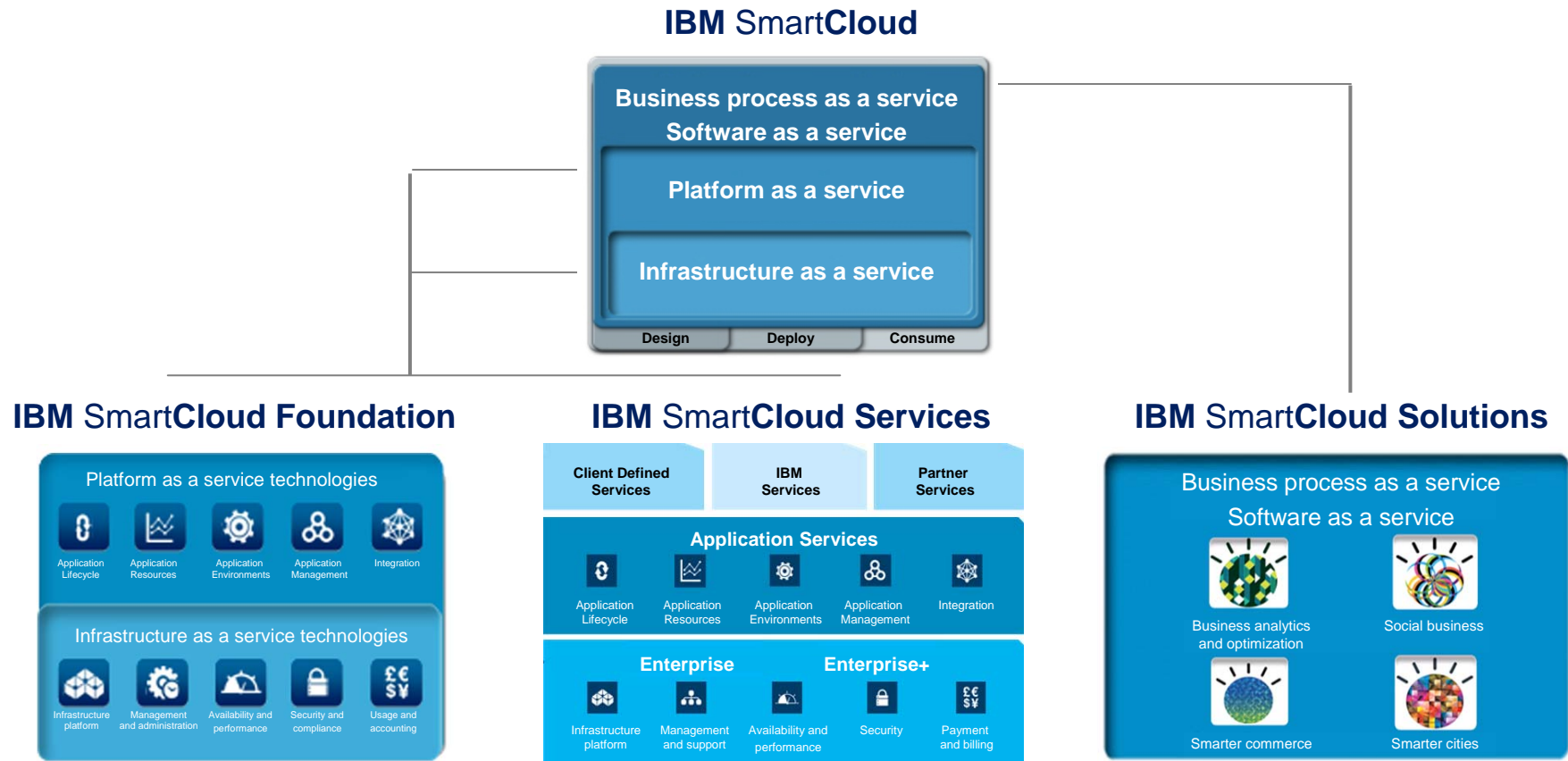
## IBM SmartCloud Enterprise+ has been designed to support enterprise-class workloads and includes a full suite of managed services



- Shared or dedicated managed environments
- Shared management environments
- Standard set of software images (operating system, middleware, databases) offered in fixed sizes and service-level agreements (SLA) packages
- Cloud-based ITIL processes such as image lifecycle management, asset and license management and configuration management
- Architecture designed to support workloads requiring a highly available infrastructure
- High-speed Tier 1 storage



Through the IBM SmartCloud family, we offer one of the broadest bases of cloud solutions in the market.



Commitment to open standards and a broad ecosystem

# IBM Workload Transformation Analysis for Cloud (WTA) can help you accelerate adoption of your cloud strategy.



## The challenges we can address

- Now that I am ready for cloud, which workloads fit my target cloud?
- What is the migration impact?
- What is the real cost-benefit of moving those workloads to the cloud?



## What our service can do

- Analyze workloads of business applications and infrastructure components
- Provide a granular and quantitative analysis of IT and business workloads
- Determine which applications can move to cloud



## The value we can deliver

- Automation of manual tasks to help reduce analysis time by up to 66 percent<sup>1</sup>
- Quantitative analysis using an IBM Research-based algorithm and filtering
- Identification and prioritization of workloads for delivery from a target cloud
- Analytics to facilitate better decision making when moving to cloud

<sup>1</sup> Source: Based on use in IBM's IT transformation project. Time may vary based on availability and extent of client data.

## Smart Cloud Enterprise+ will help companies obtain benefits from optimized cloud infrastructure and expert managed services

### SCE+ Opportunities

- **Reduce capital expenditure on underlying mission-critical infrastructure**
- **Improve application scalability; handle spikes in processing/seasonal workloads**
- **Run applications securely in an optimized cloud**
- **Find a long-term strategic partner**

### Smart Cloud Enterprise+ Benefits

- ➔ • Reduce the need to install IT infrastructure and own extensive software licenses – pay per use
- ➔ • Reduce time to provision and configure server environments and reduce configuration errors. Support peak loads with provisioning cycle times reduced from weeks to days
- ➔ • Enjoy benefits of both cloud infrastructure and expert management services from one vendor and trusted advisor, Experience managing and operating security-rich, reliable enterprise data centers around the world.
- ➔ • Benefit from true partnership that will help continue evolution into cloud usage and provide transformation as technology and processes evolve

# Our virtual private network environment services let you configure the cloud as a secured extension of your data center or as a standalone layered network.

▪ Enables scenarios with tighter integration between in-house, third party and cloud IT resources, for example:

- Collaborative development
- Shared user authentication/ authorization (AD / LDAP)
- Layered architecture with security zones



Your in-house environments



- Your:
- Network and locations
  - Routing and access policies
  - Identity management

