Strategy and Technology Roadmap of IBM SmartCloud Services

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Global SmartCloud Managed Services
## IBM SmartCloud in Action: Real clients.. with real results

<table>
<thead>
<tr>
<th>The Need</th>
<th>The Solution</th>
<th>The Benefits</th>
</tr>
</thead>
</table>
| - Transform **TP Vision** JV business model  
  - Enable new “intelligent” consumer services directly to the consumer | - Extend new service capability and platform with IBM SmartCloud  
  - Add new content, services and applications to new Internet TV platform | - Deeper customer relationships  
  - Flexible pricing model  
  - Management of millions of connected devices |
| - New bank set up in Spain to hold toxic assets  
  - Set up operations in weeks from scratch  
  - Needed managed SAP infrastructure and services | - GBS and GTS partnered to provide end to end solution in record time  
  - SAP design and implementation  
  - BPO  
  - Standardized cloud managed hosting SC4SAP | - Bank was created on December 1st.  
  - IBM completed implementation of dev/test systems on December 20th, 5 days in advance of committed date |
| - Modernize management of aging infrastructure  
  - Extend component life  
  - Address customer satisfaction | - Integrated over 30 city agencies  
  - Collect and share real time information  
  - Use advanced analytics to predict rainfall and its impact | - Deploy resources within hours, instead of days, saving lives  
  - Share information and synchronize rescue efforts |

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Two distinct patterns of cloud adoption have emerged

Cloud Native
- Elastic
- Multi-tenant
- Integrated Lifecycle
- Standardized Infrastructure
- Lowest pay-per-use cost

Highly scalable born on the web applications with built-in resiliency

Cloud Enabled
- Scalable
- Virtualized
- Managed
- Automated Lifecycle
- Heterogeneous Infrastructure
- High resiliency and performance

Traditional, production-grade applications that rely on high SLA infrastructure
Business Software Deployment Preferences Over Time

My company’s preference for deploying new business software (on a continuum from On-premise to Hybrid-Cloud to pure-play Cloud) will be:

<table>
<thead>
<tr>
<th>Year</th>
<th>On-premise</th>
<th>Cloud + On-premise (Hybrid or Highly Intertwined deployment)</th>
<th>Cloud-based (pure-play)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>50%</td>
<td>10%</td>
<td>40%</td>
</tr>
<tr>
<td>2014</td>
<td>18%</td>
<td>63%</td>
<td>19%</td>
</tr>
<tr>
<td>2016</td>
<td>13%</td>
<td>47%</td>
<td>39%</td>
</tr>
</tbody>
</table>

Notes on the Data

- Hybridized environments appear to be seen as transitional phase toward a Cloud-dominated future.
- Enterprises appear increasingly hopeful that more IT and business can and will be moved to Cloud over a very short period of time.
- The data suggest rapid and massive Cloud use growth from 2014 – 2016.
- Potential size-based, industry-based, and region-based differences need to be examined closely.

Saugatuck Insight: The data certainly suggest that what we currently consider as hybridized environments blending on-premises and Cloud are considered to be somewhat of a transitional phase, and that IT and business leaders see Cloud-based solutions as dominating the longer-term future. We believe that this view will change more in favor of hybridized, intertwined IT and business environments as enterprises increasingly experience them through 2014.

Saugatuck TECHNOLOGY
Shaping Business Through Cloud IT

Source: Saugatuck Technology p=228
Most clients will require a range of cloud consumption models.
IBM’s strategy and portfolio is designed to help clients adopt cloud models that best meet their unique requirements.

IBM has the hardware, software, services, research and delivery capabilities to address both new cloud applications and traditional IT to cloud transformations.
IBM SmartCloud Services offers the full spectrum of choices with market leading offerings in each category and best-of-breed interoperability and integration.

**SmartCloud Application Services**
- High productivity application development and runtime
  - Pattern-driven automated application deployment
  - Database as a Service
  - Application Lifecycle Management

**SmartCloud Managed Applications**
- Enterprise applications managed in the cloud
  - SmartCloud for SAP Applications
  - SmartCloud for Oracle Applications

**SmartCloud Enterprise**
- Pay-as-you-go self-service infrastructure with a rich catalog of preconfigured software
  - Linux and Windows
  - Highly dynamic
  - Access via the Internet

**SmartCloud Enterprise+**
- Resilient, managed infrastructure with strong SLAs for production applications
  - Linux, Windows, AIX
  - High resiliency and performance
  - Choice of shared or private hosted
  - Access via dedicated connection

**Consulting and Migration Services**
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 option
Flexible Architecture – Shared and Dedicated Options
SCE+ R1.1 is currently deployed in 8 shared sites globally

SC4SAP is already available in 4 locations and being deployed in all others

SC4Oracle to be announced in 2Q

Several other sites under consideration in all Continents
IBM SmartCloud Enterprise+ is a fully managed, security-rich and production-ready cloud environment designed to ensure enterprise-class performance and availability through automation and standardization.

<table>
<thead>
<tr>
<th>Traditional IT</th>
<th>SmartCloud Enterprise+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install middleware</td>
<td>Install middleware</td>
</tr>
<tr>
<td>Configure VLAN</td>
<td>Configure VLAN</td>
</tr>
<tr>
<td>Change default Root/Administrator password</td>
<td>Change default Root/Administrator password</td>
</tr>
<tr>
<td>Build a server with OS</td>
<td>Build a server with OS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Cloud</th>
<th>SmartCloud Enterprise+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform software inventory scan</td>
<td>Install and configure patching agent</td>
</tr>
<tr>
<td>Perform configuration scan</td>
<td>Install and configure file backup agent</td>
</tr>
<tr>
<td>Create change record</td>
<td>Install and configure security scan agent</td>
</tr>
<tr>
<td>Verify OS user ID authorization</td>
<td>Install and configure monitoring agent</td>
</tr>
<tr>
<td>Verify middleware user ID authorization</td>
<td>Install and configure license management agent</td>
</tr>
<tr>
<td>Check risk management database</td>
<td>Install and configure shared ID and password mgt agent</td>
</tr>
<tr>
<td>Check issue management database</td>
<td>Register with asset management database</td>
</tr>
<tr>
<td>Collect QA evidences and store them in a central DB</td>
<td>Record metering data for usage-based billing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audit and Control</th>
<th>Security and Compliance</th>
<th>Enterprise Integration</th>
<th>Basic Server Provisioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable OS audit log</td>
<td>Verify steady-state password rules</td>
<td>Install and configure patching agent</td>
<td>Install middleware</td>
</tr>
<tr>
<td>Enable middleware audit log</td>
<td>Update antivirus definition</td>
<td>Configure VLAN</td>
<td>Configure VLAN</td>
</tr>
<tr>
<td>Perform software inventory scan</td>
<td>Identify and fix missing security patches</td>
<td>Change default Root/Administrator password</td>
<td>Change default Root/Administrator password</td>
</tr>
<tr>
<td>Perform configuration scan</td>
<td>Verify subscription to patch advisory</td>
<td>Build a server with OS</td>
<td>Build a server with OS</td>
</tr>
<tr>
<td>Create change record</td>
<td>Perform port scan for vulnerability</td>
<td>Allocate storage space</td>
<td>Allocate storage space</td>
</tr>
<tr>
<td>Verify OS user ID authorization</td>
<td>Verify only necessary services are enabled</td>
<td>Install and configure file backup agent</td>
<td>Install middleware</td>
</tr>
<tr>
<td>Verify middleware user ID authorization</td>
<td>Perform middleware health check</td>
<td>Install and configure security scan agent</td>
<td>Configure VLAN</td>
</tr>
<tr>
<td>Check risk management database</td>
<td>Change password for system installed IDs</td>
<td>Install and configure monitoring agent</td>
<td>Change default Root/Administrator password</td>
</tr>
<tr>
<td>Check issue management database</td>
<td>Verify guest account access restriction</td>
<td>Install and configure license management agent</td>
<td>Build a server with OS</td>
</tr>
<tr>
<td>Collect QA evidences and store them in a central DB</td>
<td>Check permission of system files</td>
<td>Install and configure shared ID and password mgt agent</td>
<td>Allocate storage space</td>
</tr>
</tbody>
</table>

IBM SmartCloud Enterprise+ is a fully managed, security-rich and production-ready cloud environment designed to ensure enterprise-class performance and availability through automation and standardization.
MOVING WORKLOADS TO CLOUD

Workload Suitability

Examples:
- Benefit from rapid provisioning
- Workload variability
- Regulatory requirements
- Can be virtualized

Some examples include:
- Web apps
- Test & dev
- Collaboration
- Analytics

Business & Application Criteria

Examples:
- Operating System level
- Hypervisor
- Service Levels
- Single domain
- Data interconnectivity
- Service elements

Infrastructural & Technological Criteria

Answers the question of when to move:
- Impending HW refresh
- Upgrade
- Investment in new application replacement

Initial set of candidate workloads then reduced to specific applications

Screening is a continuous and ongoing process, not a one time event

Specific Applications Images with Timetable

This will identify target candidates for SCE+ as well as SCE and Custom
Cloud Migration Services is a four step process

1. **Rapid assessment analysis** to demonstrate client opportunities

2. Transformation **planning and design** benchmarks workload, consolidation and cost of transforming.

3. Standardized processes for **rapid migration** or **re-installation** selected

4. Post migration tests and **platform performance analysis**

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**Due diligence**

**Step 1**
- Data discovery and assessment
  - Collect key data on application and data dependencies
  - Profile existing applications, specifications, and environment

**Transformation and transition**

**Step 2**
- Transformation, planning, and design
  - Identify candidates fit for virtualization and Cloud using workload characteristics
  - Include full TCO analysis, proposed workload placement, and operating system (OS) and MW modernization

**Step 3**
- Migration, standardization, and remediation
  - Provision target test environment
  - Standardize, virtualize, and modernize applications, OS, and MW
  - Configure workload for testing and production using analytics, tools, and automation

**Step 4**
- Registration, testing, and deployment
  - Test workload
  - Gain customer acceptance
  - Perform cut-over to the target production environment

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**Supported Platforms**

- **Client Environment**: Private Cloud
- **Migration Strategies**: P2V based Rapid Migration, Re-Install (Automation tool Darwin)
- **Private Cloud**: Supported Platforms

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Life Cycle-as-a-Service on IBM SmartCloud

*Increase innovation, speed, and reduce ERP (SAP/Oracle) total cost of ownership*

<table>
<thead>
<tr>
<th>Demo</th>
<th>Prep</th>
<th>Blueprint</th>
<th>Realization</th>
<th>Test</th>
<th>Final prep and go-live</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovations from business transformation and ERP consulting services</td>
<td>ERP implementation and support services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IBM SmartCloud for ERP applications**

<table>
<thead>
<tr>
<th>Sample values delivered:</th>
<th>Traditional delivery:</th>
<th>IBM SmartCloud for ERP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Useful demo systems</td>
<td>None</td>
<td>Wide selection</td>
</tr>
<tr>
<td>Sandbox available</td>
<td>Middle of blueprint</td>
<td>Start of prep</td>
</tr>
<tr>
<td>Development available</td>
<td>Early realization</td>
<td>Start of blueprint</td>
</tr>
<tr>
<td>Processes and testing templates</td>
<td>None</td>
<td>Starter sets in Solution Manager</td>
</tr>
<tr>
<td>Support service level agreements</td>
<td>After go-live</td>
<td>Day one of project</td>
</tr>
<tr>
<td>Experienced infrastructure, database administration, and basis support</td>
<td>After internal training and experience</td>
<td>Day one of project</td>
</tr>
<tr>
<td>Long-term support</td>
<td>Transition</td>
<td>Leveraged for testing, no transition</td>
</tr>
</tbody>
</table>

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SmartCloud for Managed Applications – Scope of Services

- **Applications Administration**
  - App administration and availability
  - Application db administration
  - System performance tuning
  - Job scheduling

- **Database Management**
  - 24x7 service desk
  - Monitoring and SLA reporting
  - Service request management

- **Operations Services**
  - System and OS maintenance
  - System and OS changes
  - Capacity management

- **Systems Administration**
  - Storage administration
  - Hardware availability and fail over
  - Backup/restore/diagnostics

- **Data Availability Services**
  - Perimeter and network security
  - Server host security
  - Hardware and systems software assets

- **Security Services**
  - Network services
  - Network maintenance and change
  - Equipment configuration management
  - Network fail over

- **Network Services**
  - Enterprise+ (Amazon, etc)

- **Computing Infrastructure**

- **Data Center & Network**

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IBM SmartCloud Enterprise - a dynamic cloud infrastructure service

- Enterprise-class shared cloud infrastructure
  - Highly virtualized, automated and standardized multitenant IT infrastructure with massive capacity and global reach
  - Provides virtual servers and storage in minutes

- Pay-per-use with no up-front investment
  - Resources billed per hour of usage, including selected software, with no capital expense or long-term commitments required

- A flexible and feature-rich services platform
  - Flexibility and features to support a myriad of workloads.
  - An automated platform on which enterprises and their partners can base higher level services

- IBM owned and operated
  - Built to meet enterprise security, reliability and control requirements for on-demand IT resources

More at: ibm.com/smartcloud/solutions/enterprise
Cloud  ibm.com/cloud/enterprise

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Using the IBM SmartCloud Enterprise for mission critical applications

**Development & Test**
- A public broadcasting company is moving from tape-based assets to digital formats, stretching IT beyond capacity.
- The cloud solution allows virtual machines to be provisioned in hours rather than days providing a rapid response to changing testing and storage demands.

**Batch Processing**
- A university is using the IBM SmartCloud Enterprise and CloudBroker software to develop new antibiotics to fight disease.
- Researchers were able to analyze massive amounts of data within two weeks, a task that would have taken several months without cloud.

**Web Applications**
- An ISV created a collaborative website for a government sponsored “innovation challenge” on improving education.
- They needed to quickly develop and test the applications/website as well as host and run the back-end infrastructure to support the website.
The journey to platform as a service (PaaS)

Harnesses the expertise of industry leaders

16% of study respondents are already using PaaS and understand its strategic potential

Understand your current application environment | Prioritize your applications | Pilot a project | Integrate into the business | Harvest expertise and best practices

Thought leadership study:
**Exploring the frontiers of cloud computing: Insights from PaaS pioneers**

**Strategic benefits for pioneers**

- **52%** identified data management, integration and analysis as a highly valuable differentiator of PaaS
- **47%** stated the ability to integrate existing and future capabilities is key
- **45%** greatly valued leveraging the human expertise of external providers

Download the paper

A strong ecosystem of partners augment IBM SmartCloud capabilities

**Cloud Infrastructure Providers**
Leveraging the IBM Cloud to provide IaaS/PaaS capabilities

**Cloud Application Providers**
Delivering standardized SaaS solutions on IBM SmartCloud

**Cloud Services Solution Providers**
Create customized client solutions running on the IBM SmartCloud

**Cloud Technology Providers**
Extending the function and value of IBM SmartCloud

**Cloud Builders**
Creating customized private cloud solutions for client and provider infrastructures