IBM SOA Architect Summit

SOA on your terms and our expertise
Infrastructure Architecture:
Architecting your SOA Infrastructure with Cloud and other best practices

Claus T Jensen
STSM, Architectural synergies & lifecycles
Infrastructure Considerations leveraging SOA and Cloud

- How do I architect the right Infrastructure?
- What are the best practices and how can I ensure compliance?
- How do I build my applications to run well in a highly virtualized environment?
- How do non-functional requirements impact my choices for infrastructure?
- How do we manage our infrastructure?
Agenda

- Business Drivers
- Architectural Context
- SOA, Cloud Computing and Service Management
- Considerations and Requirements
- Examples
- Summary
A Crisis of Complexity and Inefficiency. The Need for Progress is Clear.

1.5x
Explosion of information driving 54% growth in storage shipments every year.

70¢ per $1
70% on average is spent on maintaining current IT infrastructures versus adding new capabilities.

85% idle
In distributed computing environments, up to 85% of computing capacity sits idle.
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SOA Foundation Reference Model

Guidance in Planning Infrastructure
Cloud Computing Delivery Models

**Flexible Delivery Models**

**Public ...**
Service provider owned and managed. Access by subscription. Delivers select set of standardized business process, application and/or infrastructure services on a flexible price per use basis.

**Private ...**
Privately owned and managed. Access limited to client and its partner network. Drives efficiency, standardization and best practices while retaining greater customization and control.

**Hybrid ...**
Access to client, partner network, and third party.

- Standardization, capital preservation, flexibility and time to deploy
- Customization, efficiency, availability, resiliency, security and privacy

**Service sourcing and service value**

**Organization** → **Culture** → **Governance**
Cloud Advances Abstraction into the Infrastructure

Cloud is a consumption and delivery model for many types of IT-based services, in which the user sees only the service, and has no need to know anything about the technology or implementation.
Virtualization Decouples IT Infrastructure from Applications

Complex
- Islands of computing and data
- Physical resources are bound to applications
- Disparate management tools
- Manual provisioning

Consolidated
- Fewer devices and licenses
- Increased utilization
- Physical resources still bound to applications
- Disparate management tools
- Labor intensive provisioning

Virtualized
- Pools of resources
- Logic and physical resources decoupled
- Standardized, automated infrastructure management
- Automated, Self-Service provisioning
An Architectural Model for Cloud Computing

Cloud Services
- Application, Process and Information services
- Software Platform Services
- Infrastructure Services

Cloud Platform
- Business Support Systems (BSS)
- Operational Support Systems (OSS)

Service Creation & Deployment
- Service Planning
- Service Definition Tools
- Service Publishing Tools
- Service Fulfillment & Configuration Tools
- Service Reporting & Analytics

Service Request & Operations
- End Users, Operators
- Service Catalog
- Operational Console
- Role-based Access

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What is Cloud Computing?

- A user experience and a business model
  - Standardized offerings
  - Rapidly provisioned
  - Flexibly priced
  - Ease of access

- An infrastructure management and services delivery method
  - Virtualized resources
  - Managed as a single large resource
  - Delivering services with elastic scaling

Similar to Banking ATMs and Retail Point of Sale, Cloud is Driven by:
- Self-Service
- Economies of Scale
- Technology Advancement
What’s different with Cloud Computing?

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<thead>
<tr>
<th>Capability</th>
<th>From</th>
<th>To</th>
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<tbody>
<tr>
<td>Server/Storage Utilization</td>
<td>10-20%</td>
<td>70-90%</td>
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<tr>
<td>Self service</td>
<td>None</td>
<td>Unlimited</td>
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<td>Test Provisioning</td>
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<td>Change Management</td>
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<td>Release Management</td>
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<td>Metering/Billing</td>
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<td>Payback period for new services</td>
<td>Years</td>
<td>Months</td>
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Legacy environments ※ Cloud enabled enterprise

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SOA and Dynamic Infrastructure Next To Each Other

SOA
Focus on Efficiency in Application Development and Reuse tied to Business Process

Dynamic Infrastructure
Focus on Dynamicity / Elasticity / Scalability

You can have each without the other, but they are better together!
Together, SOA and Dynamic Infrastructure Result in Cloud Computing

**SOA Framework**

Applications are:
- Reused as appropriate
- Decoupled
- Easily composed
- Conform to standards for interoperability

**Dynamic Infrastructure**

The Cloud Infrastructure is:
- Completely Virtualized
- Continuously Optimized
- Dynamically Responsive
- Heterogeneous to Support Differing Workloads

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Integrated Service Management

Visibility, Control and Automation of Data Center Management, Configuration and Topology

**Visibility of ....**

All Elements and Services (e.g. Assets, server, storage, network, and virtual/logical elements and relationships for configuration, availability, security and performance)

**Control of ....**

IT Policy to assure service delivery and compliance (e.g. correlation of resources against desired compliance patterns)

**Automation of ....**

All datacenter processes from element run-books to broad provisioning and compliance scenarios (e.g. Industry specific process standards for Enterprises, Telcos or Utilities)

Integrated Service Management

- Discovery
- Monitoring
- Security
- Provisioning
- Dashboards & Reporting
- Usage & Accounting
- Dynamic Workload Management
- Image Management

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ISM - Service Delivery and Process Automation

Visibility, Control and Automation of all aspects of the IT service delivery and support lifecycle:

- Single role-based service management environment to manage, inventory, and execute client processes and work
- Enforce process standards and controls through defined, managed, workflows and auditable approvals and escalations
- Eliminate cost and error by automating change, configuration, provisioning, release and asset management tasks
ISM - Service Availability and Performance Management

Visibility, Control and Automation of all aspects of managing the availability and performance of infrastructure, applications and business services:

- Visualize service performance and health across all network, server, middleware and application components.
- Increase effectiveness and productivity, reduce errors and improve availability through consolidated tooling.
- Keep costs under control as all aspects of infrastructure grows with integrated policy-based automation.
ISM - Storage Management

- **Visibility, Control and Automation** of all aspects of protecting data, managing storage infrastructure and resources, and controlling the information lifecycle:
  - Create complete transparency across the information lifecycle for all business data and records
  - Policy-based management of information access, retention, and disposal of data aligned to business controls
  - Increase productivity of storage and security personnel through integrated tooling and policy-based workflows
ISM – Security, Risk and Compliance

- **Visibility, Control and Automation** of all aspects of securing the IT infrastructure, applications and business services:
  - Timely insight into business continuity risks and compliance posture across infrastructure, data and applications.
  - Effective control of the configuration, protection, access and utilization of information, applications, networks, servers and end-points.
  - Efficient automation of the identification and remediation of vulnerabilities and addressing compliance mandates.
ISM – Datacenter Transformation

- **Visibility, Control and Automation** of all aspects of creating a simplified, shared and dynamic data center:
  - Eliminate silo views of infrastructure and applications and monitor workloads across physical, logical and grid/cloud infrastructure.
  - Transform provisioning and change management to create a dynamic computing, middleware and application environment.
  - Increase agility and responsiveness to business demands by creating a flexible, self-managing computing and data infrastructure.
ISM – Asset and Financial Management

- **Visibility, Control and Automation** of all aspects of managing both IT and non-IT assets.
  - Enable access to all aspects of asset description, configuration and financial information in a service context.
  - Improve quality and reduce risks across the asset management lifecycle through integrated management tools.
  - Create integrated workflows to speed delivery and service times, increase efficiency and reduce re-work costs and quality problems.
ISM – Network and Service Assurance

- **Visibility, Control and Automation** of all aspects of all aspects of managing networks and service quality.
  - Deliver a single point of monitoring for all network traffic, event/fault and service quality management across converged infrastructures.
  - Enforce policies for service quality and traffic prioritization to deliver optimized service within agreed service levels.
  - Speed problem resolution times and reduce diagnostic errors through automated root cause analysis.
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Non-Functional Requirements

The non-functional requirements are the same whether you are deploying into a Cloud or a traditional infrastructure.

But Cloud adds a new dimension to the architecture
Cloud Delivery Models and Workloads

- **Private**
  - Mission-critical workloads, personal information

- **Hybrid**
  - Analysis & simulation with public data
  - Quality of protection adapted to risk
  - Direct visibility and control
  - Significant level of assurance

- **Public**
  - Training, testing with non-sensitive data

Today’s clouds are primarily here:
- Lower risk workloads
- One-size-fits-all approach to data protection
- No significant assurance
- Price is key

Need for Security Assurance

- Low
- High

Business Risk

- Low-risk
- Mid-risk
- High-risk

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- IBM Capabilities to Support SOA and Cloud Computing
- Summary
Customer Example: Requesting a Development or Test Environment Service

1. User requests and schedules resource

2. Reserve and allocate from resource pool

3. Retrieve and configure VM Image

4. Provision the image

5. Retrieve App, Middleware, Config

6. Configure and Deploy Software

Configured Machine Image
Virtual Machine
Virtual Machine
Hypervisor

Resource Pool

CMDB
Image Library
Asset Library
Machine Image
Source, Config Binaries
Service Request Portal
Service Automation Manager

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New Deployment and Sourcing Choices

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IBM Information Archive
IBM Smart Business Storage Cloud
IBM Smart Business Expense Reporting on the IBM Cloud

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http://www.ibm.com/cloud
SOA and Cloud Computing Observations

- Confluence of emerging and maturing capabilities such as Virtualization, Service Oriented Architecture (SOA), Information Architecture and Service Management
  - Both architectural and Organizational models
  - Optimization, Innovation and Value Delivery
  - Flexibility and Agility
  - Secure, reuse and sharing of ‘services’
  - Governance becomes ever more important
  - Separation of Concerns (Requestors, Providers, Creators, Brokers, etc.)
  - Improved Admin:Server/Service/Application Ratios

- Virtualization at all layers of the architecture: Abstraction of resources from their physical environment allowing for the flexibility needed from both business and technology perspectives

- Employ SOA for the benefits it provides (flexibility, reuse, separate the concerns, etc.); Exploit a dynamic and elastic environment to enable innovation and to get optimum use from resources

- This is a Journey…Roadmaps need to be defined based on core architectural principles, business purpose, context, security and current environment state
References and Useful Links

- Wikipedia: Cloud Computing
- IBM Cloud Computing
- IBM SOA
- IBM Think
- IBM Service Management (ISM)
- IBM Smarter Planet (Confluence of SOA, Cloud, Service Management, etc.)
Thank You

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