

## **Everything as a Service** *Elements of an Effective Enterprise Cloud Computing Strategy*

Guy B. Sereff 16 July 2014



## **About The Presenter**

### Guy B. Sereff

- Author, Speaker and Technology Practitioner
- Vice President / Enterprise Architecture
- Technology Industry Experience
  - Application Research & Development (12 years)
  - Large-Scale Technology Management (8 years)
  - Global Enterprise Architecture (8 years)
- Enterprise Architecture Domain Experience
  - Business Architecture
  - Information Architecture
  - Application Architecture
  - Solution Architecture
  - Architecture Governance
- Pragmatic Blend of Strategy and Tactical Execution







### Agenda

### **Cloud Computing Concepts and Characteristics**

- Definitions
- Conceptual Cloud Computing Reference Model
- Common Characteristics
- Cloud Service Models
- Cloud Deployment Models

### **Enterprise Cloud Computing Strategy**

- Business-Orientation
- Strategic Pace of Adoption
- Implementation Patterns
- Cloud Computing Reference Architecture
- Information Security

### **Recommended Next Steps**

### **Questions and Closing Comments**





## **Cloud Computing Defined**

### **Common Themes**

- A pool of compute, network and storage resources and services that are made available by one party for consumption by another party
- Elastic scalability is provided and driven by consumptive demand
- Rapid resource provisioning and release capabilities are required
- Resources are made available through a network-based service, typically in a provider/subscriber model over an internet-like communication channel

### **Merriam-Webster**

Cloud Computing: the practice of storing regularly used computer data on multiple servers that can be accessed through the Internet. First known use of the term Cloud Computing: 1996.

### U.S. NIST

Cloud Computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

### Gartner

Gartner defines Cloud Computing as a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service using Internet technologies.

### Forrester

Cloud Computing: A standardized IT capability (services, software, or infrastructure) delivered via Internet technologies in a payper-use, self-service way.



## NIST Cloud Computing Concentual Reference Madel

Provides cloud services to Cloud Consumers, either as a thirdparty service provider or as an internal service organization





### **Three Pillars of Cloud Computing**



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### **Common Characteristics**

On-Demand Self-Service	<ul> <li>The ability of a Cloud Service Consumer to request services from the Cloud Service Provider as needed without requiring the participation of an intermediary party</li> </ul>
Broad Network Access	<ul> <li>The ability of a Cloud Service Consumer to reach the Cloud Computing resources of a Cloud Service Provider through widely available network solutions based on Internet connectivity</li> </ul>
Resource Pooling	<ul> <li>The ability of a Cloud Service Provider to support the processing needs of multiple Cloud Service Consumers across the provider's collection of physical computing, storage and network resources</li> </ul>
Rapid Elasticity	<ul> <li>The ability of a Cloud Service Provider to quickly scale Cloud Computing resources up or down to meet Cloud Service Consumers' capacity demands with minimal latency and negligible manual intervention</li> </ul>
Measured Service	• The ability of a Cloud Service Provider to maintain and produce accurate metrics regarding Cloud Service Consumer capacity utilization for the purpose of environmental control, resource optimization and billing
16 July 2014	7



### **Cloud Service Models**





## '...as a Service' Branding is Getting out of Hand

Some of the more interesting (or questionable) capabilities tagged with the 'as a Service' distinction discovered online, either describing a true (or narrowing) variation of Cloud Computing or looking more like an exaggerated designation intended to be perceived as being 'cloud-oriented'

BaaS: Backend-as-a-Service BPaaS: Business-Process-as-a-Service CaaS: Communication-as-a-Service CaaS: Cognition-as-a-Service DaaS: Desktop-as-a-Service DaaS: Display-as-a-Service DBaaS: Data-Base-as-a-Service DIGIPASSaaS: DIGIPASS-as-a-Service EaaS: Email-as-a-Service EaaS: Everything-as-a-Service HaaS: Hive-as-a-Service ITaaS: IT-as-a-Service MaaS: Monitoring-as-a-Service PaaS: Presto-as-a-Service RaaS: [Disaster] Recovery-as-a-Service RaaS: Registration-as-a-Service SaaSS: Service-as-a-Software-Substitute SaaS: Security-as-a-Service SaaS: Selection-as-a-Service SaaS: Storage-as-a-Service TaaS: Terminology-as-a-Service WaaS: Windows-as-a-Service WaaS: Workspace-as-a-Service XaaS: X-as-a-Service [X = 'Anything']



## **Cloud Deployment Models**

- Four Common Deployment Models
  - Public
  - Private
  - Community
  - Hybrid
- Primary Distinctions
  - Connectivity (*i.e.* public versus private network connectivity)
  - User Community Exclusivity (*i.e. non-restrictive versus highly restrictive*)
- Most organizations wind up utilizing a combination of cloud deployment models based on their contextual needs





## **Public Clouds / Private Clouds**





**Public Cloud:** Cloud resources made available to the general public through public network access, typically providing services to a diverse population of end users.

- Cloud infrastructure is provisioned for open use by the general public
- Typically located on the cloud provider's premises
- Access is open or registered with limited credential validation

**Private Cloud:** Cloud resources made exclusively to members within the cloud service consumer's organization.

- Cloud infrastructure is provisioned for private use
- May be hosted either on or off premise
- Access is controlled within the organization entity



## **Community Clouds / Hybrid Clouds**



**Community Cloud:** Access is granted to a collection of private clouds to a select group of members from the cloud service consuming organizations.

- Cloud infrastructure is provisioned for private community use
- Typically located at multiple physical sites
- Access is controlled but spans multiple organizations



*Hybrid Cloud:* Employs two or more cloud deployment models on behalf of the cloud service consumer.

- Composite deployment pattern
- Leverage unique properties of other deployment models
- Access control is dependent on the cloud models deployed



### **Enterprise Cloud Computing Strategy**

How do I separate the realities of the cloud from the hype?

What are my options for adopting Cloud Computing?

How concerned should I be about privacy and regulation?

> Which of my missioncritical applications are candidates for cloud?

How does the cloud change my strategic investments, now and in the future?

How do I procure for the cloud?

What steps should I take to get started in the cloud?

The cloud seems very tactical – why do I need such a broad strategy?

How does my operating model need to evolve to support a cloud strategy?



### **Business-Oriented Strategic Elements**

- Need to identify and quantify what strategic business outcomes will be realized through the introduction of Cloud Computing
- Cost Savings from Cloud Computing are often compelling, but savings alone may not be enough to make a sufficient business case

One of the biggest misguided perceptions of Cloud Computing is that cloud initiatives will greatly reduce the cost of doing business. That may be true for some initiatives, but not for all of them; <u>after all, cost is not</u> <u>the only reason to leverage the cloud...Not every</u> <u>problem is one that needs to be solved by Cloud</u> <u>Computing</u>.

- Kavis, Architecting the Cloud

The important lesson for CIOs is that IT, or the cloud, by itself, may not accomplish very much. It is <u>important to</u> <u>determine how cloud adoption aligns with the strategy of</u> <u>the business</u> and its Web of relationships and complements other changes to products, process, people, and partners.

Different firms will find different opportunities to leverage the cloud...<u>reducing costs</u> within the IT function <u>via the</u> <u>cloud is beneficial but not [necessarily] strategic</u>.

...If IT costs are an average of 4% of revenues, and the cloud could [hypothetically] reduce IT costs by 25%, the net impact to the corporation is only 1%, or perhaps a few percent of its cost structure, [which is] hardly compelling for a costleadership strategy.

- Weinman, Cloudonomics



## The Open Group Cloud Computing ROI Model



### TIME COST **QUALITY** MARGIN Recognizes the advantages and Identifies the more common Focuses on the potential experiential Assess how Cloud Computing metrics related to the anticipated financial impacts resulting from improvements (or degradation) over solutions impact the financial acceleration of solution delivery in a Cloud Computing and the means to the current computing model. bottom line of the organization to Cloud Computing environment. assess the net operating cost gauge investment effectiveness. benefits being received.



## **Strategic Pace of Adoption**

- Ease of implementing an off-premise public cloud offerings encourage 'grassroots' introduction of Cloud Computing, often outside the purview of the IT organization
- Many internal resources are setting up in-house private cloud services
- Rapid deployment doesn't always equate to rapid operational readiness
- An effective Enterprise Cloud Computing Strategy needs to outline the firm's position on how quickly and to what extent Cloud Computing will be adopted across the enterprise





## **Strategic Pace of Adoption**

Adopter Categories as defined in *Diffusion of Innovation:* 

- Innovators Venturesome
- Early Adopters *Respectful*
- Early Majority Deliberate
- Late Majority Skeptical
- Laggards Traditional





## **Available Cloud Computing Patterns**

### Sample from cloudpatterns.org

### Mechanisms

Technology mechanisms represent well-defined IT artifacts that are established within an IT industry and commonly distinct to a certain computing model or platform.

### • Design Patterns

The simplest way to describe a [design] pattern is that it provides a proven solution to a common problem individually documented in a consistent format and usually as part of a larger collection.

### Compound Patterns

A coarse-grained pattern comprised of a set of finer-grained patterns.

### Audit Monitor Ready-Made Environment Automated Scaling Listener Remote Administration System **Billing Management System Resource Cluster Cloud Storage Device Resource Management Cloud Usage Monitor** System Failover System Resource Replication Hypervisor SLA Management System Load Balancer **SLA Monitor** Logical Network Perimeter State Management Database **Multi-Device Broker Virtual Server** Pay-Per-Use Monitor

### Cloud Mechanisms – cloudpatterns.org



### **Cloud Pattern Sample – Automated Administration**







## **Cloud Implementation Patterns – Mechanism/Pattern Matrix**

- Build a simple matrix to map Cloud Mechanisms to Cloud Design Patterns
- Identify critical dependencies and potential gaps or suboptimal topology designs
- Validate designs accounts for proper resiliency of highly leveraged Mechanisms
- Good resource for generating Cloud Service Provider Requests for Proposals (RFPs)

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## **Cloud Implementation Patterns – Compound Pattern Matrix**

- 39 of the Cloud Patterns can be combined into 13 Compound Patterns
  - R = Required Pattern
  - O = Optional Pattern
- 9 of the Compound Cloud Patterns include other Compound Patterns, creating complex solutions
- Enterprise Architects can accelerate Cloud Computing pattern evaluation, selection and adaptation by leveraging available

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## **Establish a Cloud Computing Reference Architecture**

- Leverage the enterprise reference architecture practice already in
  - Same level of granularity
  - Apply existing governance policies and procedures
  - Establish roadmaps to realign non-strategic Cloud Computing already in place
- Incorporate cloud suitability evaluation into the Reference Architecture
  - Tightly coupled, linear legacy applications may prove costly and challenging for implementations beyond laaS
  - Contemplate transactional patterns and scalar volume fluctuation requirements
  - Create a clear path for solution designers and engineers that leads them to a decisive platform conclusion



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## **Information Security Considerations**

- Understand and account for the security needs of the planned Cloud Computing environment
  - Internal or External Cloud Service Provider
  - On-Premise or Off-Premise deployment
- Determine how much risk can / should be shouldered by the Cloud Services Provider
  - Financial Loss
  - Data Loss
  - Availability of Critical Functions
  - Reputation Loss
- Carefully weigh multi-tenancy policy controls, segregation and governance



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## **Information Security Considerations**





### **Recommended Next Steps**

Establish (or refresh) the Enterprise Cloud Computing Strategy, including key business, technical and operational elements

Assess the current and impending Cloud Computing landscape across your organization

Determine the delta between the 'as is' and 'to be' state of Cloud Computing within the organization

Monitor for potential benefits:

- Aligned with the broader Enterprise Strategy
- Providing clear cloud engineering guidance
- Assess, challenge and evaluate Cloud Service Providers
- Readily available Reference Architecture definitions and images
- Strategic Cloud Computing convergence roadmaps

### **Cloud Computing Strategy Tips**

- Plan for a hybrid cloud/non-cloud operating environment as enterprise-grade cloud capabilities continue to mature
- Reorganize and align IT to support greater business agility through cloud technology
- Recruit, train and retain top cloud talent now
- Track and publish financial contributions from cloud implementations
- Establish a SaaS Application Review Framework with vendor performance monitoring and accountability
- Create a Cloud Decision Framework aligned to business strategies
- Design security management at the cloud platform level

Forbes Tech: First Steps to Creating a Cloud Computing Strategy for 2013 25



## **Any Questions?**



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