

Cloud Computing for Architects

First
time in
the UK

Jason Bloomberg

18-19 October 2012,
London

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Presenter



Jason Bloomberg is President of ZapThink, a Dovell Technologies Company. He is a thought leader in the areas of Enterprise

Architecture, Service-Oriented Architecture, and Cloud Computing, and helps organizations around the world better leverage their IT resources to meet changing business needs. He is a frequent speaker, prolific writer, and pundit. Mr. Bloomberg is one of the original Managing Partners of ZapThink LLC, the leading SOA advisory and analysis firm, which was acquired by Dovell Technologies in August 2011. His book, *Service Orient or Be Doomed! How Service Orientation Will Change Your Business* (John Wiley & Sons, 2006, coauthored with Ron Schmelzer), is recognized as the leading business book on Service Orientation.

He also co-authored the books *XML and Web Services Unleashed* (SAMS Publishing, 2002), and *Web Page Scripting Techniques* (Hayden Books, 1996).

Audience

Anyone involved in the IT decision making process can get substantial value from this course. No specific technical knowledge is required. Some of the roles that will feel comfortable in this course include:

- Enterprise Architect
- IT Manager
- CIO
- IT Strategist
- Technical Architect
- Infrastructure Architect
- IT Consultant
- Solution Architect
- Infrastructure Manager
- Operations Manager

Overview

Cloud Computing is the latest buzzword in enterprise IT shops around the world—but scratch the surface, and Cloud Computing consists of a number of existing trends in IT, including virtualization, Software-as-a-Service, utility computing, and more. Adding to the confusion is a large helping of vendor hype, as both software and hardware vendors push Cloud Computing as an excuse to buy more gear. The reality, however, is quite different. Cloud Computing presents a variety of operational and deployment models that can help enterprises reduce infrastructure costs, provide better customer value, and position themselves for the future. But organizations won't succeed with the Cloud unless they understand the strengths and weaknesses of Cloud Computing and have a carefully planned architectural approach that positions Cloud-based capabilities in the context of existing IT assets and challenges.

Learning Objectives

- A clear, vendor-independent understanding of Cloud Computing.
- A well-delineated conception of the strengths and weaknesses of Cloud's three service models: Software-as-a-Service, Platform-as-a-Service, and Infrastructure-as-a-Service, as well as Cloud's four deployment models: public, private, community, and hybrid.
- The tools and expertise necessary to put together a Cloud roadmap and migration plan for their organizations.
- An understanding of how to place the Cloud into the context of their current Enterprise Architecture.
- Practical intelligence and advice on securing the Cloud and putting together a robust Cloud governance framework.

Seminar & Workshop Outline

Day 1

Module 1: Introduction & Definitions

Enterprise Cloud Computing Agenda
Cloud Philosophy
Cloud Computing: Old Wine in New Bottles
Formal Definition of Cloud Computing
NIST Cloud Computing Definition Framework

- Essential Cloud Characteristics
- Cloud Service Models
- Cloud Deployment Models

Managed Hosting vs. Cloud Computing
Conceptual Reference Model
Cloud Actors
Cloud Deployment Scenarios
The Enterprise Context
Relationship between Cloud & SOA

Module 2: Virtualization

Virtualization Basics

- Paravirtualization
- Full Virtualization (without Hardware Assist)
- Full Virtualization (with Hardware Assist)
- OS Virtualization
- Hosted Virtualization

Hardware/Software Separation
Hypervisors

- Type 1 (Bare Metal) Hypervisors
- Type 2 (Hosted) Hypervisors

Protection Rings
Server & Desktop Virtualization Landscape
VMWare Virtual Infrastructure Management

Module 3: Workloads & Pods

Cloud Workloads
Pods

- Pods & Cloud Control Systems
- Pod Sizing Guidelines
- VMWare 5000-User Pod Example
- Pod Sizing Specifics
- Aggregating Workloads & Pods
- Pod Architectures

Availability Zones
Direct Attached Storage (DAS)

- DAS Management Challenges

Storage Area Networks (SAN)

- Sizing SANs

Data Center & Resource Optimization
Using a Cloud Control System (CCS)

Module 4: Cloud Deployment Options: Strategies & Caveats

The Cloud Deployment Models
Different Multitenancy Models
Services available to Cloud Consumers

Common IaaS Examples

- IaaS Providers
- IaaS Caveats
- IaaS Consumers

PaaS Examples

- PaaS Providers
- PaaS Caveats
- PaaS Consumers

Common SaaS Apps

- SaaS Providers
- SaaS Caveats
- SaaS Consumers

Case Study: M-Dot / Inmar

Module 5: Enterprise Architecture and the Cloud

Cloud is an Emerging Market
Vendor Spin

- Oracle's Shopping List

- IBM's Shopping List
- Microsoft Cloud Computing Strategy

Cutting Through the Hype
EA Cloud Strategy

- Cloud Computing Roadmap
- Phased Strategy for Cloud Migration
- Cloud Deployment Choices

Architect for the Cloud

- The Challenge of Elasticity

Transactions in the Cloud

- Partition Tolerance
- BASE instead of ACID
- Are you Ready for Inconsistent Data?

Exercise: Application consolidation & migration

Day 2

Module 6: Cloud Configuration

The Context for Automated Cloud Configuration
Fully Automated Provisioning

- VM Images
- Automated Provisioning of Environment from Spec
- No Direct Management of Individual Boxes
- Revert to "Previously Good State" at Any Time
- Easier to Reprovision Than Repair
- Anyone can Deploy or Update an Environment

The Toss Test (Hypothetical!)
Netflix Chaos Monkey (Real!)

Toolchain for Automated Provisioning

- OS/System Config Scenario
- Application-Level Change Scenario

GigaSpaces Cloudify Example
Cloud Configuration Maturity Levels

Case Study: reddit Condé Nast

Module 7: Building RESTful Clouds

The Challenge of State

- Scalability & State, The Old Way
- The Secret to Transferring App State to the Client

Representational State Transfer (REST)

- Essential REST Terminology
- Uniform Interface

Four Architectural Constraints

- Separation of Resource from Representation
- Manipulation of Resources by Representations
- Self-Descriptive Messages
- Hypermedia as the Engine of Application State

Is REST about APIs?

- Deltacloud: RESTful APIs to the Cloud
- Deltacloud Example

HATEOAS in Action

- State Transitions in REST

Cloud Coding Best Practices

Module 8: Cloud Security

Security Fundamentals

- Essential Security Standards
- Applying the Security Control Model

Message-Level Security: Is SSL Sufficient?

- Beyond SSL/TLS

The Three Core Cloud Access Control Concerns

- Cloud Security: Authorization
- Cloud Security: Policy
- Cloud Security: Provisioning

Federated Security

- Security Assertion Markup Language (SAML)
- OAuth as Federated Authentication Mechanism
- Cloud Authentication: Federated Identity Management
- The Big Picture: Retaining Control

Cloud Security: Data Confidentiality

- Key Management is "Key"
- Alternative Approaches to Data Confidentiality
- Data Lineage & Provenance
- Data Remanence

Cloud Security: Data Availability
Virtual Security (VirtSec)

- VirtSec Gotchas
- Typical DMZ (No Virtualization)
- Partially Virtualized DMZ
- Completely Screened DMZ

Public vs. Private Clouds: Which Are More Secure?
What about a Virtual Private Cloud (VPC)?
Case Study: Amazon.com

Module 9: Cloud Governance

What is Governance?
Cloud Compliance Model
Some Cloud Realities

- Legal Issues

Cloud Governance Challenges

- Rogue Clouds
- Cloud Governance: Run Time Considerations
- Cloud Availability & Failover

Extending SOA Governance to the Cloud
Dealing with Cloud Reliability
Cloud Governance as VM Governance

- Sample Amazon Simple Queue Service Policy

Cloud Governance: Auditing

- Strategies for Dealing with Cloud Audit

Example: Vordel Cloud Gateway

- Vordel's Drag & Drop Policy Development

Cloud Governance Checklist
Exercise: Cloud Governance

Module 10: Big Data & the Cloud

What are "Big Data"?

- Big Data Motivations

On-Premise: Partition-Intolerant Data Approach
Big Data & The Cloud

- Supporting Big Data in the Cloud: Two Approaches

Enter Hadoop

- Hadoop Value Proposition
- Hadoop Distributed File System
- HDFS Nodes
- Hadoop App Requirements
- Hadoop Ecosystem
- Data Warehousing & Hadoop

MapReduce

- Benefits of HDFS Replication
- Key-Value Pairs
- MapReduce Illustration
- Exhaustive Processing
- MapReduce Job Scheduler
- MapReduce Input Split
- MapReduce Reducer
- Amazon Elastic MapReduce

Big Data at Apache: Pig, Hive & Zookeeper
Setting the Bar for Private Clouds

Registration Information

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12.30 – 13.30 Lunch 13.30 – 17.00 Event

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