

This four day, hands-on boot camp begins with an examination of the Cloud Computing concept, the structure and key characteristics of Clouds, and takes a look under the hood at how they operate. From there, students are introduced to a Cloud Reference Model and explore various aspects of Cloud solution design from discovery throughout the lifecycle of a Cloud solution all the way to retirement. Special attention is given to requirements and Cloud utilization analysis, Cloud solution design strategies, and deployment scenarios. Upon completion of this course, students will have an understanding of the Cloud Computing environment and practical experience in designing, developing, and deploying Cloud-based solutions.

Course Objectives:

- **Understanding the origination of the Cloud**
- **Calculating the Cloud’s value**
- **Categorizing Clouds**
- **Analysis of Case Studies**
- **Weigh Cloud Risks**
- **Build on Standards and Design**
- **Define Cloud Services**
- **Design & Develop Strategies**
- **Adopt Your Own Cloud**

Audience: Enterprise Architects, Solution Architects, Information Technology Architects, Senior Developers, and Team Leads.

Prerequisites: Foundational knowledge in distributed computing and Web-based architecture

Number of Days: 4 days

<p>1 The Rise of the Cloud Where did Cloud Computing originate? Cloud Computing Wikipedia Entry Gartner on Cloud The NIST Perspective Five Characteristics The Cloud Computing Spectrum / Service Models Cloud Deployment Models Understanding by Phone Service Analogy Understanding by Electrical Power Grid Service Analogy What is so special about Cloud? Synergy is Powerful Moving to the Cloud</p>	<p>Capacity Planning Challenge – Measuring Capacity Capacity Planning Concepts and Challenges Capacity Planning – Utilization Risk Utilization Risk – Mitigation Capacity Planning – Different Workloads Multi-Tenancy Model Common Characteristics of Multi-tenant Applications (1/2) Common Characteristics of Multi-tenant Applications (2/2) Data Management in the Cloud Data Physics By the Numbers</p>
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<p>2 Cloud Computing Value Proposition Why does Cloud matter? Cloud Value Proposition Cloud Value Business Case #1 Cloud Value Business Case #2 Cloud Value Business Case #3 Cloud Value Business Case #4 Cloud Business Cases Cloud Economics Do Clouds Compute? Select Expected Benefits Identify applicable cost scenario Calculate initial, simple return Calculate returns for on-going usage</p> <p>3 Cloud Computing Myths Myth #1: Cloud = Virtualization Myth #2: Cloud = Grid Myth #3: Cloud = SAAS Myth #4: Cloud = SOA Myth #5: Cloud = Security Risk</p> <p>4 Cloud Computing Components The Cloud Computing Stack Cloud Computing Components Tightly Coupled Enterprise Breaking the Silos Understanding the SOA Applying SOA to the Cloud Cloud Computing without SOA Cloud Component – Virtualization Hypervisors Hypervisor Types Applying Virtualization to the Cloud Cloud Component – SaaS Applying SaaS to the Cloud Web 2.0 Should I upgrade? Web 1.0 vs Web 2.0 Applying Web 2.0 to the Cloud</p> <p>5 Categorizing Clouds Consider the kind of Cloud Cloud Scope - Public Clouds Cloud Scope - Private Clouds Cloud Scope - Hybrid Clouds Discussing Cloud Scope Cloud Types Discussing Cloud Types Intersection of Scope & Type</p>	<p>Cloud Role Discussing Cloud Categories Cloud Integration</p> <p>6 Real World Case Study Analysis Case Study – Amazon Web Services (AWS) Amazon EC2 Value Discussing Amazon TuneCore s Value Discussing TuneCore Salesforce.com Value Discussing SalesForce Google Apps Value Discussing Google Pitney Bowes Value Discussing Pitney Bowes OpenStack Value Discussing X.Commerce/OpenStack</p> <p>7 Cloud Risks and Risk Mitigation Failure-As-A-Service in 2009 Failure-As-A-Service in 2010 Notable Breaches in 2011 The Cost of Failed Clouds Risks When Consuming Clouds: Service Reliability Service Quality Problem Resolution Data Back-up Total Cost of Ownership (TCO) Risks When Supporting Clouds: Provisioning The Scale of Scale Financial Management How to Practically Estimate Your Cloud Bill? Managing Service Levels Redundancy / Failover Vendor Lock-In Liability Security Cloud Security Access Control Application Security Application Multi-Layer Security Design Information and Data Security</p>
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	Network Security		More Cloud Management Strategies
	Operational Security		Abstracted Networking
	Mitigating Cloud Computing Risks:		Abstracted Computing
	Identifying Cloud-ready		Abstracted Storage
	Solutions		Pulling it all together
	Governing Cloud Services		Eucalyptus
	Business alignment		OpenStack
	Asset Ownership		What is OpenStack?
	Contract-driven Services		OpenStack main components
	Financial Management and Tracking		OpenStack Conceptual Architecture
	Governance and Risk Mitigation	10	Looking Under the Cloud Hood
	Some Best Practices		Amazon Cloud Overview
8	Cloud Standards		Working with Amazon Web Services
	What Exactly Are We Standardizing?		(AWS)
	Standardizing on a Definition		Building an Amazon Cloud Service
	Why Standardize?		Google Cloud Storage
	Simple Concept, Difficult		Working with the Google App Engine
	Implementation		Building a Google App
	Turf Wars		Microsoft Azure Overview
	Other Groups Defining Standards		Working with Windows Azure
	Recent Progress		Building an Azure Cloud Service
	Perspective #2 – Let the Market Decide		OpenStack Overview
	Standardization is Restrictive not		Working with OpenStack
	Creative		Building OpenStack Environment
	Fostering Creativity		Building OpenStack environment by
	Survival of the Fittest		hand
	OpenStack Foundation Model		Using automated configurators
	Perspective #3 – The Simple View		Creating OpenStack VM Instances
	Standards to Date		Managing OpenStack Clouds
	OCCI Details	11	Cloud Services
	OCCI Client Handshake		Defining Cloud Services
	OCCI Server Response...		The Typical Cloud Services
	OCCI Cloud Infrastructure Categories		Application Services
	Best Practices for Working with Cloud		Messaging Application Service
	Standards: Building Cloud		Email Application Service
	Solutions Today		Cache Application Service
	Advice #1 – Build on Proven Standards		Specialized Application Service
	Advice #2 – Focus on Solid Design		Storage Services
	Advice #3 – Good Standards Take Time		Object Storage
9	Cloud Computing Infrastructure		Archive Storage
	Does It Really Matter?		Relational Storage
	Cloud Infrastructure Categories		NoSQL Storage
	Understanding Virtualization		Monitoring Services
	Cloud Management	12	Cloud Computing Sanity Check
	Controllers and Agents		The Cloud Shift
			Adapting to a Broader Market

	Before you leap to the Cloud		Identity (Keystone)
	Cloud Sanity Check #1		Network (Quantum)
	Cloud Sanity Check #2		Dashboard (Horizon)
	Cloud Sanity Check #3		Pulling It All Together
	Cloud Sanity Check #4		The Typical Cloud Services
13	Adopting your very own Cloud		Application Services
	How can my organization explore Cloud?		Messaging Application Service
	Cloud Adoption Best Practices		Email Application Service
	Cloud Adoption Phase 1		Cache Application Service
	Identify your business drivers		Specialized Application Service
	Get Educated		Storage Services
	Articulate a Value Proposition		Object Storage
	Define one or more scenarios		Archive Storage
	Cloud adoption Phase 1		Relational Storage
	Cloud adoption Phase 2		NoSQL Storage
	Produce a Road Map	15	Monitoring Services
	Gain Stakeholder Buy-In		Cloud Layering
	Cloud Adoption Phase 2		Cloud Layering
	Cloud Adoption Phase 3		Cloud Layering Overview
	Establish Governance		Content Services
	Invest in Infrastructure		Logic Services
	Cloud Pilot		Orchestration in the Cloud
	Scoping the Pilot Project		Utility - Security Services
	Enterprise Roll-out		Security Service Example
	Start small and grow incrementally		Utility - Data Services
14	Cloud Reference Model		Layering Example – 1/5
	Defining Cloud Services		Layering Example – 2/5
	Parsing the Cloud Service Model		Layering Example – 3/5
	Cloud Reference Model		Layering Example – 4/5
	Cloud Infrastructure		Layering Example – 5/5
	Cloud Infrastructure – Vendor Comparison	16	SDLC in The Cloud
	Cloud Infrastructure - Cloud Storage		Software Development Lifecycle Phases
	Cloud Platform		SDLC Models
	Cloud Software		Waterfall
	SaaS - Cloud Services		RAD SDLC Practices
	SaaS - Cloud Applications		The Criticisms of RAD
	OpenStack Solution Stack		Enterprise Technology Delivery Frameworks
	OpenStack main components/services		ETDF Phases
	Compute (Nova)		Project Initiation
	Main Compute (Nova) modules/services		Project Classification
	Image (Glance)		Requirements Discovery
	Object Store (Swift)		Analysis and Design
	Components of Swift		Development
	Block Storage (Cinder)		Testing
			Production Implementation

	Post-implementation Monitoring of Cloud Solutions Retirement		
17	Requirements Discovery Discovering Cloud Requirements Discovery Workshops Running a Discovery Workshop Cloud Requirements Scoping Cloud Requirements Documenting Expected, Average and Peak Usage Defining Cloud Service Levels Discovery Best Practices What is Six Sigma? Discovery Gotchas		
18	Analysis and Design Analysis and Design in the Cloud Analyzing Cloud Requirements Requirements Management Analysis Workflow Mapping Cloud Requirements to Usage Scenarios "Good/Not so Good" Use Cases for the Cloud Introduction to Cloud Design Designing Cloud Service Solutions Design the Cloud Service Interface Designing for Cloud Non-Functional Requirements Analysis and Design Best Practices A&D Best Practices - Prototyping A&D Best Practices – System Partitioning A&D Best Practices -Leveraging Cloud Platform Services A&D Best Practices - Using Asynchronous Communication Patterns A&D Best Practices - Design for Failure A&D Best Practices - Caching A&D Best Practices - Staying Hands-On Analysis and Design Gotchas More Design Gotchas		
		19	Cloud Design Strategies Cloud Design Strategies Designing for Cloud Availability Designing for Cloud Security Designing for Cloud Security - OWASP 10 Designing for Cloud Security – Multi-Factor Security Designing for Cloud Storage Stepping Across Site Silos Stepping Across Site Silos – SAML and OpenID Stepping Across Site Silos – OAuth Selecting the Right Storage Cloud Storage Model Designing for Cloud Management Designing for Cloud Maintainability Designing for Cloud Service Reuse Designing for Cloud Agility Designing for Cloud Usability Additional Usability Considerations
		20	Cloud Development Implementing Cloud Services Common Pitfalls for Cloud Developers Building Composite Solutions Cloud Development Stacks Creating Services for Amazon WS AWS Toolkit for Eclipse AWS Explorer AWS Toolkit for Visual Studio Testing in the Amazon Cloud Deploying Amazon Web Services Consuming Amazon Web Services Creating Services for OpenStack Creating Applications for OpenStack Testing OpenStack Solutions Consuming OpenStack Solutions Creating Services for Google Testing Google Cloud Services Deploying Google Services Consuming Google Services
		21	Cloud Governance IT Governance Agile IT in the Cloud SOA Governance Overview SOA Governance in Practice

- Cloud Governance
- Top Cloud Computing Consumer Risks
- Top Cloud Computing Provider Risks
- Risk Mitigation
- Defining Cloud Governance
- Cloud Governance Model
- Key Artifacts
- Governance Life Cycle
- Policies and Procedures
- Roles and Responsibilities
- Governance Best Practices
- Governance Gotchas

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Cloud SLAS

- The Importance of Cloud SLAs
- What Belongs in a Cloud SLA?
- Minimal Cloud SLA
- Robust Cloud SLA
- More SLA Items...
- Governing Cloud Service Quality
- Supporting Clouds
- Summary