Enterprise Cloud Computing with AWS

for internal partner use only
How did Amazon Get into Cloud Computing?
On-Premise Infrastructure is Costly & Complex

Large Capital Expenditures

Underutilized IT Assets

Patching Software

Out of Datacenter Space

Scaling down as needed

Slow IT Deployments

Contract negotiation

Scaling up quickly

Prices too high for IT products

Managing physical growth

“IT spends 80% of its time and resources keeping the lights on”

Gartner (*)

(*) Gartner Press Release, 2006
Cloud Computing Benefits

- No Up-Front Capital Expense
- Self-Service Infrastructure
- Low Cost
- Easily Scale Up and Down
- Pay Only for What You Use
- Improve Agility & Time-to-Market
No Up-Front Capital Expense

On-Premise

- Physical Space
- Cabling
- Power
- Cooling
- Networking
- Racks
- Servers
- Storage
- Certification
- Labor

Cloud Computing

$0 to Get Started
“TCO savings inherent in a cloud provider’s environment relative to that of a tradition enterprise datacenter may be as high as 60%.”

Morgan Stanley Research(*)

(*) Cloud Computing Takes Off, 2011
Pay Only for What You Use

Unable to serve customers

Large Capital Expenditure

Opportunity Cost

Predicted Demand

Traditional Hardware

Actual Demand

Cloud Computing

Time

Infrastructure Cost
Self-Service Infrastructure

**On-Premise**
Build new environments can be complex and slow

1. Needs → Survey → Assess
2. Plan → Design → Engineer
3. Procure → Construct → Commission
4. Deploy

**Cloud Computing**
New infrastructure is always a few clicks away

- New Development Environment
- New Test Environment
- New Environment in Japan
- Add 1,000 Servers
- Remove 1,000 Servers

Source: PTS Data Center Solutions
Easily Scale Up and Down

Internet Video App on Amazon EC2 (*)
From 50 to 5,000 servers in 3 days

Scaled to peak of 5,000 instances in 3 days

Launch of a Facebook modification

(*) Amazon.com CEO Jeff Bezos on Animoto, The Animonot Blog, 2008
Improve Agility & Time to Market

Respond faster to internal & external demand

“AWS made it possible for our project to happen at the speed of breaking news.”

Focus resources on innovation & business growth

“We finished our first client project in 6 weeks with no upfront investment, no hardware purchases and no additional staff.”

Say “yes” more often to the business

“We were able to leverage the infrastructure created by AWS and decrease our time-to-market threefold.”
Cloud Computing is More Than Just Virtualization

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Cloud Computing</th>
<th>On-Premise Virtualization</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Up-Front Capital Expense</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Low Cost</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Pay Only for What You Use</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Self-Service Infrastructure</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Easily Scale Up and Down</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Improve Agility &amp; Time-to-Market</td>
<td>✓</td>
<td>✗</td>
</tr>
</tbody>
</table>
AWS Adoption

“In terms of market share, AWS is Coke and there isn't yet a Pepsi.”

The 451 Group (**)

“AWS is the market share leader, and a thought leader.”

Gartner (*)

(*) Gartner Magic Quadrant for Public Cloud Infrastructure as a Service, 2011
(**) The Wall Street Journal, Meet the Rainmakers, 2011
Hundreds of Thousands of Customers in 190 Countries
“AWS is extraordinarily innovative, exceptionally agile and very responsive to the market.”

Gartner (*)

(*) Gartner Magic Quadrant for Public Cloud Infrastructure as a Service, 2011
Large Partner Ecosystem

System Integrators

Independent Software Vendors

- Wipro
- Cognizant
- Deloitte
- Infosys
- Capgemini
- lifeline
- Mahindra Satyam
- model metrics
- CTE
- Dedalus
- Blue Gecko
- GENPACT
- Cloud Concept
- bluewolf
- FUJISOF
- razorfish
- Hitachi Solutions
- DATAPIPE
- IBM
- SAP
- ORACLE
- Microsoft
- Adobe
- Symantec
- heroku
- Infor
- Autodesk
- Citrix
- redhat
- CA
- BMC Software
- Dassault Systems
- OPEN TEXT
- MicroStrategy
- Progress Software
- Cycle Computing
- ESRI
- RightScale
AWS is Open and Flexible

Operating Systems
- Red Hat
- Windows
- Oracle Linux
- SUSE
- Ubuntu
- Debian

Languages & Libraries
- Java
- .NET
- Ruby
- PHP
- Python
- Android
- iOS

Certified Applications
- SAP
- Oracle
- Microsoft
- IBM
## AWS Platform

### Your Applications

#### Management & Administration
- Administration Console
- Identity & Access
- Deployment
- Monitoring

#### Application Platform Services
- Content Distribution
- Messaging
- Parallel Processing
- Libraries & SDKs

#### Foundation Services
- Compute
- Storage
- Database
- Networking

#### AWS Global Infrastructure
- Availability Zones
- Regions
- Edge Locations
AWS Global Infrastructure

<table>
<thead>
<tr>
<th>AWS Global Infrastructure</th>
<th>Availability Zones</th>
<th>Edge Locations</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Regions</td>
<td></td>
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</tbody>
</table>
Global Infrastructure for Global Enterprises

GovCloud (US ITAR Region)
US West (Northern California)
US West (Oregon)
US East (Northern Virginia)
South America (Sao Paulo)
EU (Ireland)
Asia Pacific (Singapore)
Asia Pacific (Tokyo)

AWS Regions
AWS Edge Locations
AWS Regions and Availability Zones

Customer Decides Where Applications and Data Reside
# Built for Enterprise Security Standards

<table>
<thead>
<tr>
<th>Certifications</th>
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<tbody>
<tr>
<td>SOC 1 Type 2 (formerly SAS-70)</td>
</tr>
<tr>
<td>ISO 27001</td>
</tr>
<tr>
<td>PCI DSS for EC2, S3, EBS, VPC, RDS, ELB, IAM</td>
</tr>
<tr>
<td>FISMA Moderate Compliant Controls</td>
</tr>
<tr>
<td>HIPAA &amp; ITAR Compliant Architecture</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datacenters in nondescript facilities</td>
</tr>
<tr>
<td>Physical access strictly controlled</td>
</tr>
<tr>
<td>Must pass two-factor authentication at least twice for floor access</td>
</tr>
<tr>
<td>Physical access logged and audited</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HW, SW, Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic change management</td>
</tr>
<tr>
<td>Phased updates deployment</td>
</tr>
<tr>
<td>Safe storage decommission</td>
</tr>
<tr>
<td>Automated monitoring and self-audit</td>
</tr>
<tr>
<td>Advanced network protection</td>
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AWS Foundation Services

- Compute
- Storage
- Database
- Networking

AWS Global Infrastructure
- Availability Zones
- Regions
- Edge Locations
Compute & Storage Services

**Amazon EC2**
- Virtual Servers in the Cloud
- Your Choice of Linux and Windows
- Easy to Scale Up and Down

**Amazon EBS**
- Hard Drive for Virtual Servers on EC2
- Designed for High-Performance
- You can Mount a Drive or Boot from EBS

**Amazon S3**
- High-Volume Storage in the Cloud
- Designed for Durability and Scalability
- Number of Objects You can Store is Unlimited
Storage: Scale of Amazon S3

Total Number of Objects Stored in Amazon S3

Peak Requests: 370,000+ per second

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Total Number of Objects Stored</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 2006</td>
<td>2.9 Billion</td>
</tr>
<tr>
<td>Q4 2007</td>
<td>14 Billion</td>
</tr>
<tr>
<td>Q4 2008</td>
<td>40 Billion</td>
</tr>
<tr>
<td>Q4 2009</td>
<td>102 Billion</td>
</tr>
<tr>
<td>Q4 2010</td>
<td>262 Billion</td>
</tr>
<tr>
<td>Q3 2011</td>
<td>566 Billion</td>
</tr>
</tbody>
</table>
Database Options

Self-Managed

- **Database Server on Amazon EC2**
  - Your choice of database running on Amazon EC2
  - Bring Your Own License (BYOL)

Managed Databases

- **Amazon Relational Database Service (RDS)**
  - Oracle or MySQL offered as a service
  - Flexible Licensing: BYOL or License Included

- **Amazon SimpleDB NoSQL Database**
  - Non-relational model; indices and queries
  - Zero admin overhead
Networking & Security

**AWS Direct Connect**
- Dedicated connection between your datacenter and AWS

**Amazon Virtual Private Cloud (VPC)**
- Private VPN connection to your AWS resources

**Dedicated Instances**
- Single Tenant Compute Instance
- Amazon EC2 resources running on private hardware
## AWS Application Platform Services

### Application Platform Services
- Content Distribution
- Messaging
- Parallel Processing
- Libraries & SDKs

### Foundation Services
- Compute
- Storage
- Database
- Networking

### AWS Global Infrastructure
- Availability Zones
- Regions
- Edge Locations
Content Distribution: Amazon CloudFront

Global content delivery network
21 edge locations across the globe
Self-service sign up, easy administration
Built using Amazon.com’s highly reliable infrastructure

Use Cases
- Video and Rich Media
- Online Gaming
- Interactive Agencies
- Software Downloads
- Static Websites

Key Features
- RTMP Streaming
- HTTPS Delivery
- Private Content for HTTP & Streaming
- Programmatic Invalidation
- Detailed Logs for HTTP & Streaming
- Default Root Object
## Higher-Level Services

<table>
<thead>
<tr>
<th>Messaging</th>
<th>Parallel Processing</th>
<th>Libraries &amp; SDKs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon Simple Queue Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliable and highly scalable message queue for cloud applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amazon Simple Notification Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Push notifications from the cloud to subscribers or client applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amazon Simple Email Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Send bulk and transactional emails in a quick and cost-effective manner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amazon Elastic MapReduce</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allows customers to easily and cost-effectively process vast amounts of data utilizing a Hadoop framework running Amazon EC2 instances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developer Centers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your choice of programming language (Java, PHP, Python, Ruby, .NET) and mobile platform (Android, iOS)</td>
<td></td>
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AWS Management & Administration

Management & Administration
- Administration Console
- Identity & Access
- Deployment
- Monitoring

Application Platform Services
- Content Distribution
- Messaging
- Parallel Processing
- Libraries & SDKs

Foundation Services
- Compute
- Storage
- Database
- Networking

AWS Global Infrastructure
- Availability Zones
- Regions
- Edge Locations
AWS Management Console

One-stop shop to manage your AWS services
Identity & Access Management (IAM)

IAM enables customers to create and manage users in AWS’s identity system
  • Identity Federation with local directory is an option for enterprises

Very familiar security model
  • Users, groups, permissions

Allows customers to
  • Create users
  • Assign individual passwords, access keys, multi-factor authentication devices
  • Grant fine-grained permissions
  • Optionally grant them access to the AWS Console
  • Organize users in groups
Consolidated Billing with IAM

• Allows you to get one bill for multiple accounts
• You can easily track each account's costs and download the cost data in CSV format
• You may be able to reduce costs by combining usage from all the accounts to qualify for volume pricing discounts
Deployment & Administration Services

**Deployment**

**AWS CloudFormation**

Use application templates to create a collection of related AWS in order to provision and update them in an orderly and predictable way.

**Monitoring**

**Amazon CloudWatch**

Monitor AWS resources and track metrics to gain insight and react immediately to keep applications running smoothly.

**Automation**

**AWS Elastic Beanstalk**

Provision an Apache Tomcat environment and deploy your Java applications in minutes.
# AWS Platform

## Your Applications

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<th>Management &amp; Administration</th>
<th>Application Platform Services</th>
<th>Foundation Services</th>
<th>AWS Global Infrastructure</th>
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What are Customer Running on AWS?

<table>
<thead>
<tr>
<th>Enterprise Applications</th>
<th>Oracle, SAP, Microsoft, IBM Line-of-Business Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Applications</td>
<td>Digital Media Distribution Gaming Media Sharing Social Media</td>
</tr>
<tr>
<td>Big Data &amp; High Performance Computing</td>
<td>Analytics for Consumer Web Genome Sequencing Large Scale Batch Processing</td>
</tr>
<tr>
<td>Disaster Recovery &amp; Archive</td>
<td>Backup &amp; Recovery Disaster Recovery Archive</td>
</tr>
</tbody>
</table>
Enterprize Applications

Capgemini

Runs its production Oracle E-Business Suite and Oracle RMAN on AWS

Lionsgate

Uses AWS to run Microsoft SharePoint and SAP Dev & Test environments

Shell

Connected corporate datacenter to the AWS cloud to run SAP & LOB applications

“The existing relationship between Amazon and Oracle made “not possible” become “push the button”. We have seen cost savings in excess of 70% with no new staff and hundreds of man hours saved each week.”

Michael Higgins, CTO, Advanced Technologies
Web Applications

Yelp stores images and analyzes logs with AWS.

Yelp uses AWS to process media files and deliver them to customers.

“We moved to the clouds looking for availability. We have also found a tremendous agility by eliminating complexity, process, and control.”

Kevin McEntee, VP of Content Engineering, Netflix
Big Data & High Performance Computing

**NASA**
- Runs parallel computations and image processing on AWS

**razorfish.**
- Uses AWS to analyzes massive click stream datasets for client campaigns

**Harvard Medical School**
- Runs genome sequencing project on AWS

“Our first client campaign experienced a 500% increase in their return on ad spend from a similar campaign a year before.”

Mark Taylor, Program Director, Razorfish
Uses AWS to store real-time stock market data for its financial products

Estimated cost savings of $70,000 on a single storage project

“It took less than a week to implement Amazon S3. If we’d stuck with our native photo store, our database would currently be 25 times its current size.”

Adam Doppelt, Co-Founder, Urbanspoon

Uses AWS to store billions of objects adding 10TB of new images each month
## Examples of How Amazon Uses AWS Today

**Web Hosting**: All traffic for [www.amazon.com](http://www.amazon.com) is now served by Amazon EC2

**Microsoft Sharepoint on AWS**: Corporate Intranet is running on the AWS infrastructure

**Consumer Storage Apps**: Cloud Drive uses Amazon S3 to store customer music, photos, videos and documents

**Cloud Backup**: Kindle automatic backup uses Amazon S3 to store digital purchases for all Kindle devices

**Big Data & Analytics**: Client Experience uses AWS to mimic 100 million active customers across 10+ web properties

**Archive**: Corporate IT archives Oracle application databases to durable Amazon S3 storage
Next Steps

Learn about Enterprise Cloud Computing with AWS
- aws.amazon.com/enterprise

Get started with a free trial
- aws.amazon.com/free
Thank You!
# AWS Platform

## Your Applications

### Management & Administration
- **Identity & Access**
  - AWS IAM
  - Identity Federation
  - Consolidated Billing
- **Web Interface**
  - Management Console
- **Monitoring**
  - Amazon CloudWatch
- **Deployment & Automation**
  - AWS Elastic Beanstalk
  - AWS CloudFormation

### Application Platform Services
- **Content Distribution**
  - Amazon CloudFront
- **Messaging**
  - Amazon SNS
  - Amazon SQS
  - Amazon SES
- **Parallel Processing**
  - Elastic MapReduce
- **Libraries & SDKs**
  - Java, PHP, Python, Ruby, .NET

### Foundation Services
- **Compute**
  - Amazon EC2
  - Auto Scale
- **Storage**
  - Amazon S3
  - Amazon EBS
- **Database**
  - Amazon RDS
  - Amazon SimpleDB
  - Amazon Elasticache
- **Networking**
  - Amazon VPC
  - Elastic Load Balancing
  - Amazon Route 53
  - AWS Direct Connect

### AWS Global Infrastructure
- **Availability Zones**
- **Regions**
- **Edge Locations**
Every day, AWS adds enough new server capacity to support all of Amazon’s global infrastructure in the company’s fifth full year of operation, when it was a $2.76B annual revenue enterprise.
Compute: Amazon Elastic Compute Cloud (EC2)

- **Amazon EC2: Virtual Servers in the Cloud**
  - Provision and boot new servers in minutes
  - Your choice of Linux or Windows
  - Quickly scale capacity up or down
  - Deploy across Regions and Availability Zones for reliability
- Getting started is free: [aws.amazon.com/free](http://aws.amazon.com/free)
- Flexible ways to buy Amazon EC2 instances
  - **On-Demand**: Pay as you go compute
  - **Reserved**: Small upfront fee for 34%-50% hourly discount
  - **Spot**: Bid on unused capacity
Storage: Amazon Elastic Block Store (EBS)

- **Amazon EBS: Hard Drive for Amazon EC2 Instances**
  - Persistent storage independent of any particular instance
  - Easy to create, attach, backup, restore and delete volumes
- Designed for high-performance
  - Equal to or faster than a local drive
- Volumes behave like unformatted block devices visible from Linux or Windows instances
  - You can create a file system on top of Amazon EBS
  - You can boot Amazon EC2 instances from Amazon EBS
Storage: Amazon Simple Storage Service (S3)

• **Amazon S3: Storage in the Cloud**
  • Write, read, delete objects containing from 1 byte to 5 TB
  • The number of objects you can store is virtually unlimited

• Authentication mechanisms are provided to help protect data from unauthorized access

• Options for secure data upload/download and encryption of data at rest are provided for additional data protection

• Fast, economical, highly available and durable