Using ArcGIS for Server in the Amazon Cloud
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Agenda

- What is ArcGIS for Server on Amazon Web Services
- Sounds good! How much does it cost?
- ArcGIS Server Architecture On Amazon Web Services
- How to start using ArcGIS for Server on Amazon Web Services
- Templates and backup
- Storage and data migration strategies
- Deploying Web Application
- Security
- Limitations and best practices
- Q&A
What is ArcGIS for Server on Amazon Web Services

No Installation
Scalable on Demand
No Hardware to maintain

Monitoring
Low Ongoing Cost
Low upfront Investment
Apps not Opps
Compute
Global reach
Flexibility and Agility
Storage
What is ArcGIS for Server on Amazon Web Services

Terminology

AMI

Create Template for
the toot volume

Register

Launch

Instance

Copy

AMI #1

AMI #2
What is ArcGIS for Server on Amazon Web Services

AMI options with ArcGIS for Server

- Ubuntu + ArcGIS Server + PostgreSQL
- Windows Server + ArcGIS Server + SQL Server
- Windows Server + ArcGIS Server + SQL Express

Esri AMI + My Services + Application = Custom AMI
What is ArcGIS for Server on Amazon Web Services

Terminology

Cloud Builder

- Create Site
- Create custom site
- Maintain Site
- Backup Site
- Allows to setup auto-scaling
- Allows setting https
- Create ELB
What is ArcGIS for Server on Amazon Web Services

Terminology

AWS Management Console
What is ArcGIS for Server on Amazon Web Services

Terminology

EC2 Instance

General Purpose

Hardware optimized

- CPU
- Memory
- GPU
- Storage
What is ArcGIS for Server on Amazon Web Services

Terminology

EBS Volume
What is ArcGIS for Server on Amazon Web Services

Terminology

Regions and Availability Zones
What is ArcGIS for Server on Amazon Web Services
Terminology-Regions and Availability Zones

ArcGIS for Server is available in
AWS GovCloud (US) Region

- ap-northeast-1 Asia Pacific (Tokyo) Region
- ap-southeast-1 Asia Pacific (Singapore) Region
- ap-southeast-2 Asia Pacific (Sydney) Region
- eu-west-1 EU (Ireland) Region
- sa-east-1 South America (Sao Paulo) Region
- us-east-1 US East (Northern Virginia) Region
- us-west-1 US West (Northern California) Region
- us-west-2 US West (Oregon) Region
What is ArcGIS for Server on Amazon Web Services

Terminology

VPC

Virtual Private Cloud

AWS in a virtual network with full control
IP Ranges, subnets, route tables, gateways

Public Subnet

Private Subnets (NAT)

Connect securely to your corporate
datacenter
Encrypted IPsec hardware VPN

Extend your corporate network
What is ArcGIS for Server on Amazon Web Services

Terminology

S3
COST

- Two separate costs

  - Amazon EC2
    - Pay by the hour for resources consumed: http://aws.amazon.com/pricing/
    - Reserved Instances vs. On-Demand Instances

  - Esri Licensing cost
COST
EC2 cost components

• EC2 cost
  - Machine cost
    - Instance Size and Type
    - Storage
    - Bandwidth
  - Other costs
    - Extra Storage, S3, CloudFront
    - Elastic Load Balancer
    - CloudWatch
Cost

Example

• On-Demand Instance:
  - Windows Xlarge, 4vCPU, 15 GiB, 2x40 SSD
  - US East (N. Virginia)
  - $0.532/Hour
  - $4673.16/year

• Reserved Instance (1year heavy):
  - Windows Xlarge, 4vCPU, 15 GiB, 2x40 SSD
  - US East (N. Virginia)
  - $0.211/Hour ($1200 upfront)
  - $1853.52/year
Bill Dashboard

Monthly Spend

Welcome to the AWS Account Billing console. Your current monthly balance appears below. The accompanying graph shows the proportion of costs spent for each service you use.

Current month-to-date balance for July 2014

$583.14

Top Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC2</td>
<td>$565.04</td>
</tr>
<tr>
<td>VPC</td>
<td>$15.40</td>
</tr>
<tr>
<td>DataTransfer</td>
<td>$1.70</td>
</tr>
<tr>
<td>S3</td>
<td>$1.00</td>
</tr>
</tbody>
</table>

Total $583.14

Alerts & Notifications

⚠️ The payment method associated with your account is not valid. Please update your payment method to enable access to your service.

Your account is enabled for monitoring estimated charges. Set your first billing alarm to receive an e-mail when charges reach

By Service

Bill Details
## Using ArcGIS for Server in the Amazon Cloud

<table>
<thead>
<tr>
<th>Service</th>
<th>Rate</th>
<th>Quantity</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amazon CloudWatch</strong></td>
<td>$0.100002673 per alarm-month</td>
<td>6,344 Alarms</td>
<td>$0.63</td>
</tr>
<tr>
<td></td>
<td>(blended price)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Amazon Elastic Compute Cloud running Linux/UNIX</strong></td>
<td>$0.077 per On Demand Linux m3.medium Instance Hour</td>
<td>323 Hrs</td>
<td>$24.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Amazon Elastic Compute Cloud running Red Hat Enterprise Linux</strong></td>
<td>$0.137 per On Demand RHEL m3.medium Instance Hour</td>
<td>191 Hrs</td>
<td>$26.17</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Amazon Elastic Compute Cloud running Windows</strong></td>
<td>$0.0143676782 per Windows Micro Instance (t1.micro) instance-hour (blended price)*</td>
<td>219 Hrs</td>
<td>$3.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EBS</strong></td>
<td>$0.079999939 per GB-month</td>
<td>159,597 GB-Mo</td>
<td>$12.77</td>
</tr>
<tr>
<td></td>
<td>of Magnetic provisioned storage - US West (Northern California) (blended price)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$0.08 per 1 million I/O requests - US West (Northern California)</td>
<td>7,382,642 I/Os</td>
<td>$0.59</td>
</tr>
<tr>
<td></td>
<td>$0.10499992 per GB-month of snapshot data stored - US West (Northern California) (blended price)*</td>
<td>16,409 GB-Mo</td>
<td>$1.72</td>
</tr>
<tr>
<td></td>
<td>$0.1200000020 per GB-month of General Purpose (SSD) provisioned storage - US West (Northern California) (blended price)*</td>
<td>94,832 GB-Mo</td>
<td>$11.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Elastic IP Addresses</strong></td>
<td>$0.004999763 per Elastic IP</td>
<td>924 Hrs</td>
<td>$4.62</td>
</tr>
<tr>
<td></td>
<td>address not attached to a running instance per hour (prorated) (blended price)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Elastic Load Balancing</strong></td>
<td>$0.0000017099 per GB Data Processed by the LoadBalancer (blended price)*</td>
<td>0.154 GB</td>
<td>$0.00</td>
</tr>
<tr>
<td></td>
<td>$0.026 per LoadBalancer-hour</td>
<td>1,168 Hrs</td>
<td>$32.70</td>
</tr>
<tr>
<td></td>
<td>(or partial hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>$344.35</td>
</tr>
</tbody>
</table>

*Prices and quantities are subject to change and may vary based on usage and region.
ArcGIS Server Architecture On Amazon Web Services

SiteHost with multiple GIS Servers

Cloud Builder

Clients

ELB

SiteHost

Auto-Scaling

Geodatabase or SQL RDS

N
ArcGIS Server Architecture On Amazon Web Services

Siloed

AWS Management Console, CloudFormation

Clients

ELB

Site  Site  Site  Site

Geodatabase or SQL RDS
How to start using ArcGIS for Server on Amazon Web Services

- Amazon Account
- Esri Customer Service
- Cloud Builder
- Create Site
- Load Data
- Create Service
- Build App…. so on.
Demo
Templates and Backup

• Templates
  - Customize Esri AMIs with your own Services and Apps
  - Store and Share
  - Create new sites quickly from template
  - Incurs storage fee

• Backup
  - Minimize downtime in the event of a disaster
  - ArcGIS Server Backup and Restore Utility
  - Cloud Builder Backup
  - Cloud Builder Template
Demo
Storage and data migration strategies

• Places to Store
  - EBS Volume
  - S3
  - EC2 Instance

• Options
  - Publishing from ArcGIS for Desktop
  - RDP
  - S3 Client Utilities
  - FTP/HTTP Server
  - AWS Export/Import
Deploying Web Application

- Hosting on Amazon S3
  - Static - No server side scripting

- EC2 Instance in your server site

- EC2 instance apart from your server site
Security

• AWS
  - Compliance- HIPAA, FISMA, ISO 27001, ITAR
  - [https://aws.amazon.com/compliance/](https://aws.amazon.com/compliance/)
  - Identity Access Management
  - AWS multi-factor authentication
  - Firewall- Security Groups
  - Security Logs

• ArcGIS Server
  - Services, Data Access, application - identify and access management
  - Encrypt ArcGIS Server communication
  - Logs
Monitoring

- CloudWatch
  - Monitor EC2
  - Monitor other AWS resources
  - Monitor custom metrics
  - Store logs
  - Set alarms
  - Graphs and Stats
Limitation and best practices

• Limitations
  - Amazon
    - [http://docs.aws.amazon.com/general/latest/gr/aws_service_limits.html#limits_ec2](http://docs.aws.amazon.com/general/latest/gr/aws_service_limits.html#limits_ec2)
  - ArcGIS Server
    - GIS Server Cluster

• Best Practices
  - Plan cost
  - Create custom AMI
  - Plan security
  - Plan data management
  - Take advantage of Elasticity
  - Use reporting
Thank you…

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