

Topics Covered

- **What is ArcGIS Server on Amazon Web Services?**
- **How do you run ArcGIS Server on AWS?**
- **Case studies**
- **Showcase: Map caching using the cloud**
- **Business considerations and costs**
- **Q & A**

What is ArcGIS Server on Amazon Web Services?



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feature.setSymbol,
} else if(f == 1) {
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symbol.SimpleLineSymbol(esri.symbol.
Color([0,0,0,0.5]), 1));
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}
```

Conceptual Overview

- **What is a Virtual Machine?**
 - Using a single physical machine to host multiple concurrently running Operating Systems.
 - Physical machine is a shared resource

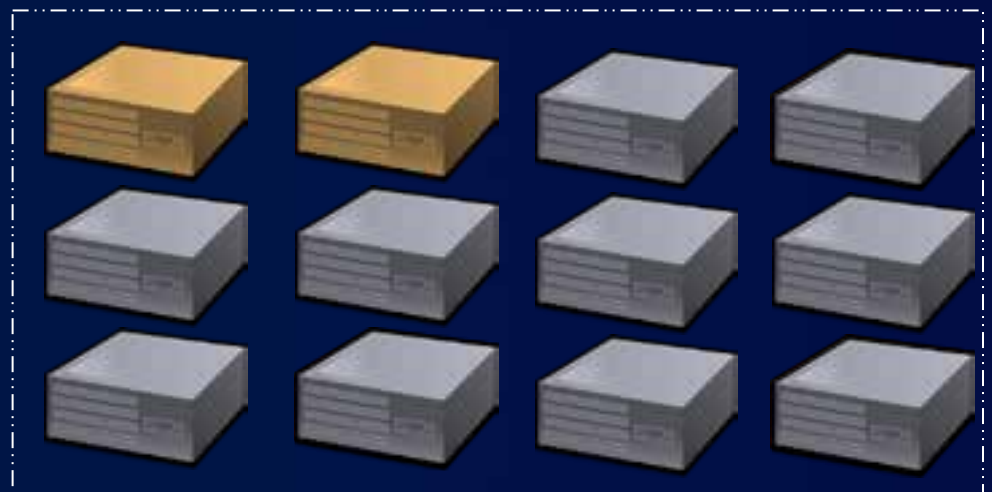
- **What is Amazon EC2?**
 - Amazon Elastic Compute Cloud
 - You run virtual machines on Amazon's hardware within data centers located in different geographic regions.

Conceptual Overview

Your Server Room



Amazon EC2



Advantages of EC2

- **Robust hardware and network infrastructure**
- **Elastic deployments**
- **Fast and inexpensive prototyping**
- **Easy short-term or emergency deployments**
- **Ease of setting up a public-facing site isolated from your own network**

Key terms: **EC2 instance** and **AMI**

- **EC2 instance**
 - Virtual machine running on Amazon EC2
 - You pick the size and spec
- **Amazon Machine Image (AMI)**
 - Defines OS and software on your EC2 instance



How do you run ArcGIS Server on Amazon Web Services?



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```


Esri-developed AMIs

- **ArcGIS for Server with PostgreSQL (Ubuntu Linux)**
- **ArcGIS for Server with SQL Server (Windows)**
- **ArcGIS for Server with SQL Server Express (Windows)**

**Contact Esri Customer Service to get the AMIs
shared with your Amazon account**

How do I work with ArcGIS Server on AWS?

- ArcGIS Server **Cloud Builder** on Amazon Web Services
- AWS Management Console
- Amazon EC2 API Tools
- Other Third Party Tools
 - Elastic Fox, O2 Amazon EC Browser

Demo: Use Cloud Builder to launch an EC2 instance running ArcGIS for Server

Getting data to your site

- Remote Desktop into instance and copy data

OR

- Copy data automatically when publishing a service
(New at 10.1)

Use Cases & Show Case

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Cloud Deployments Examples

High Availability Public facing web site

- **TxDOT, Texas Highway Conditions**
 - thc.txdot.gov
- **High volumes of visitors during storms**
- **Users depended on the app to get or leave home**
- **Updates are replicated to the cloud EGDB every 10 mins, and Servers used Autoscaling to serve the services and the app**

Cloud Deployments Examples

Development/ Testing Box

- **Isolated changes**
- **Start only when needed**
- **Custom AMI**
- **AMI backup versions**
- **Run multiple machines at any point when needed, ex: migration**

Cloud Deployments Examples

Geo-Processing

- **Many machines for limited time periods**
- **Snapshots for data**
- **Data size and redundancy**

Cloud Deployments Examples

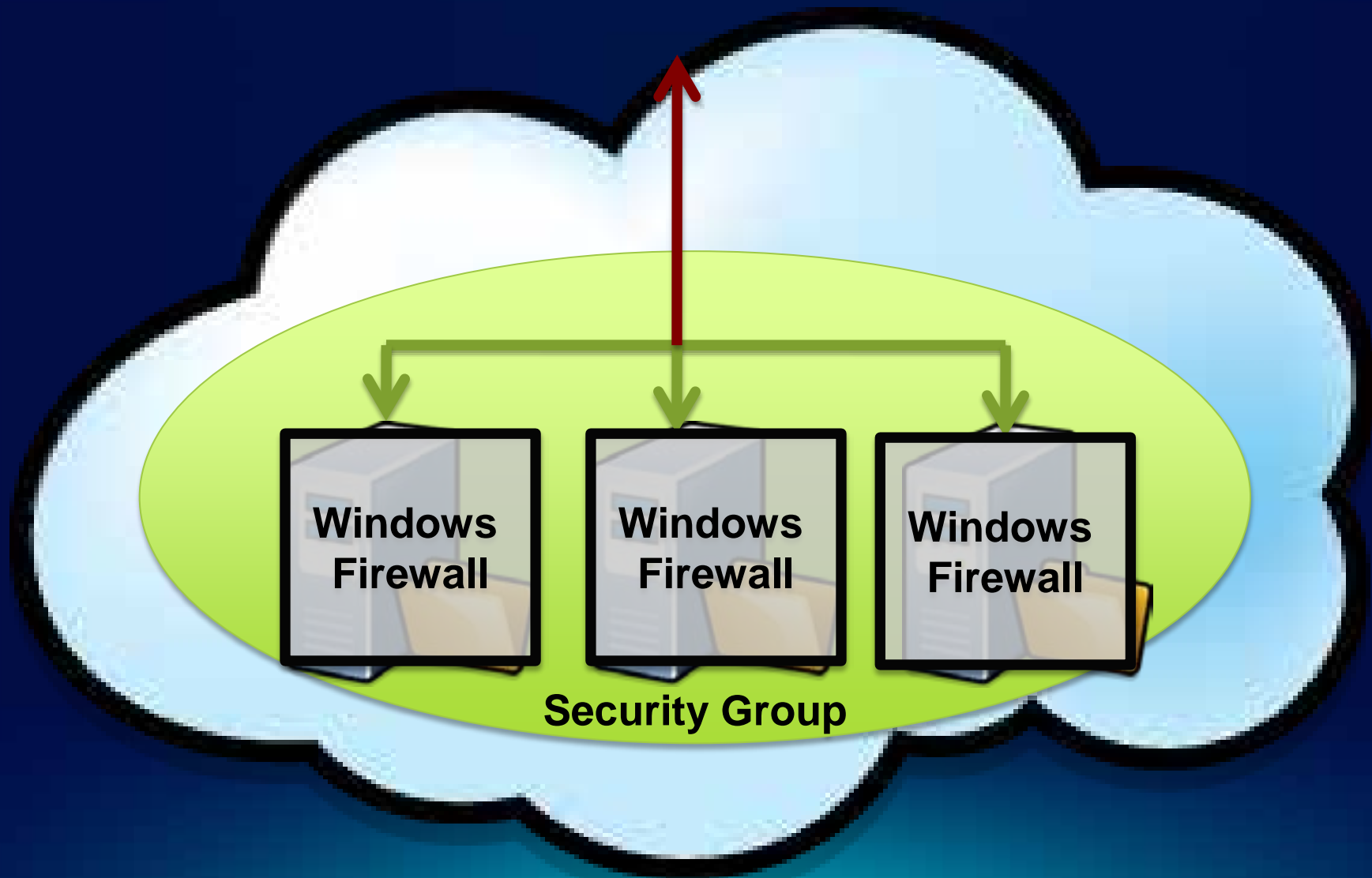
Cache Cooking

- **Many machines for limited time periods**
- **Snapshots for data**
- **Data size and redundancy**
- **Can be served from S3**

Custom AMIs



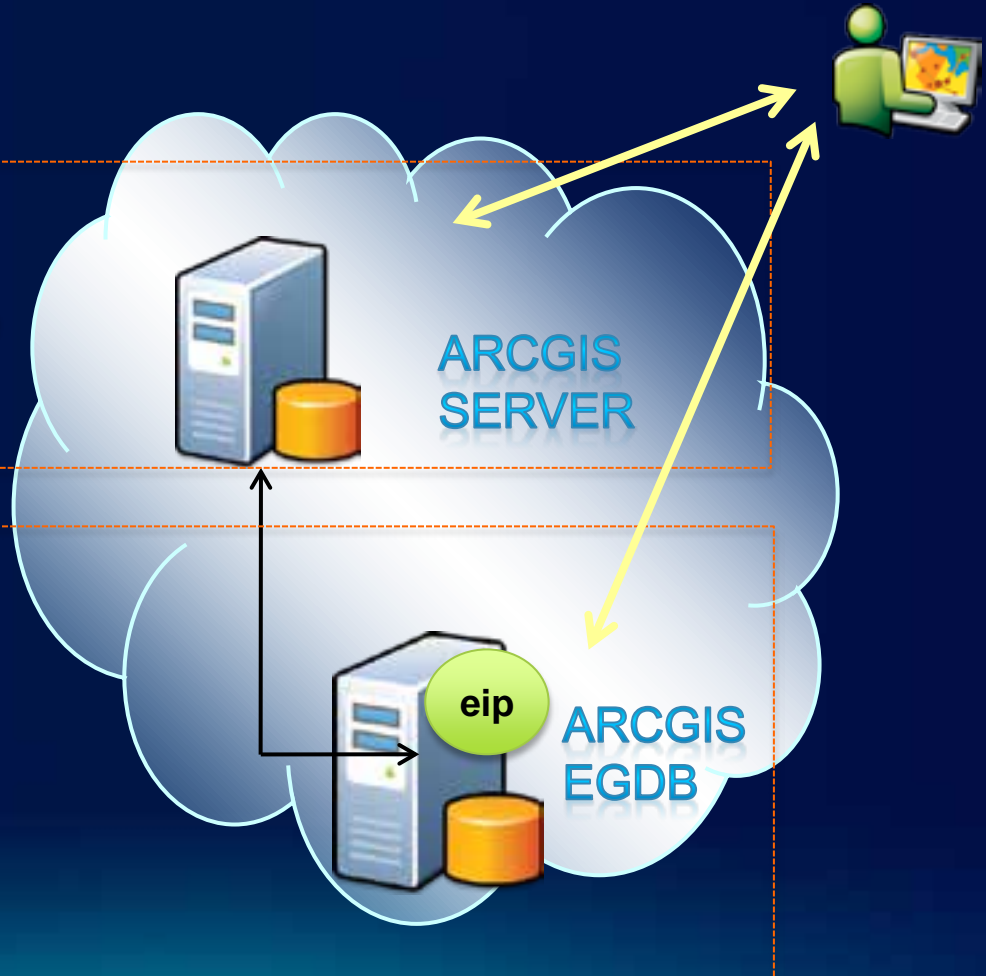
Understanding Cloud Security Basics



Security Group setup

Security group: web
http: Port 80 to everyone
RDP: Port 3389 to ip

Security group: DB
web
DB: 5432 to ip
RDP: Port 3389 to ip



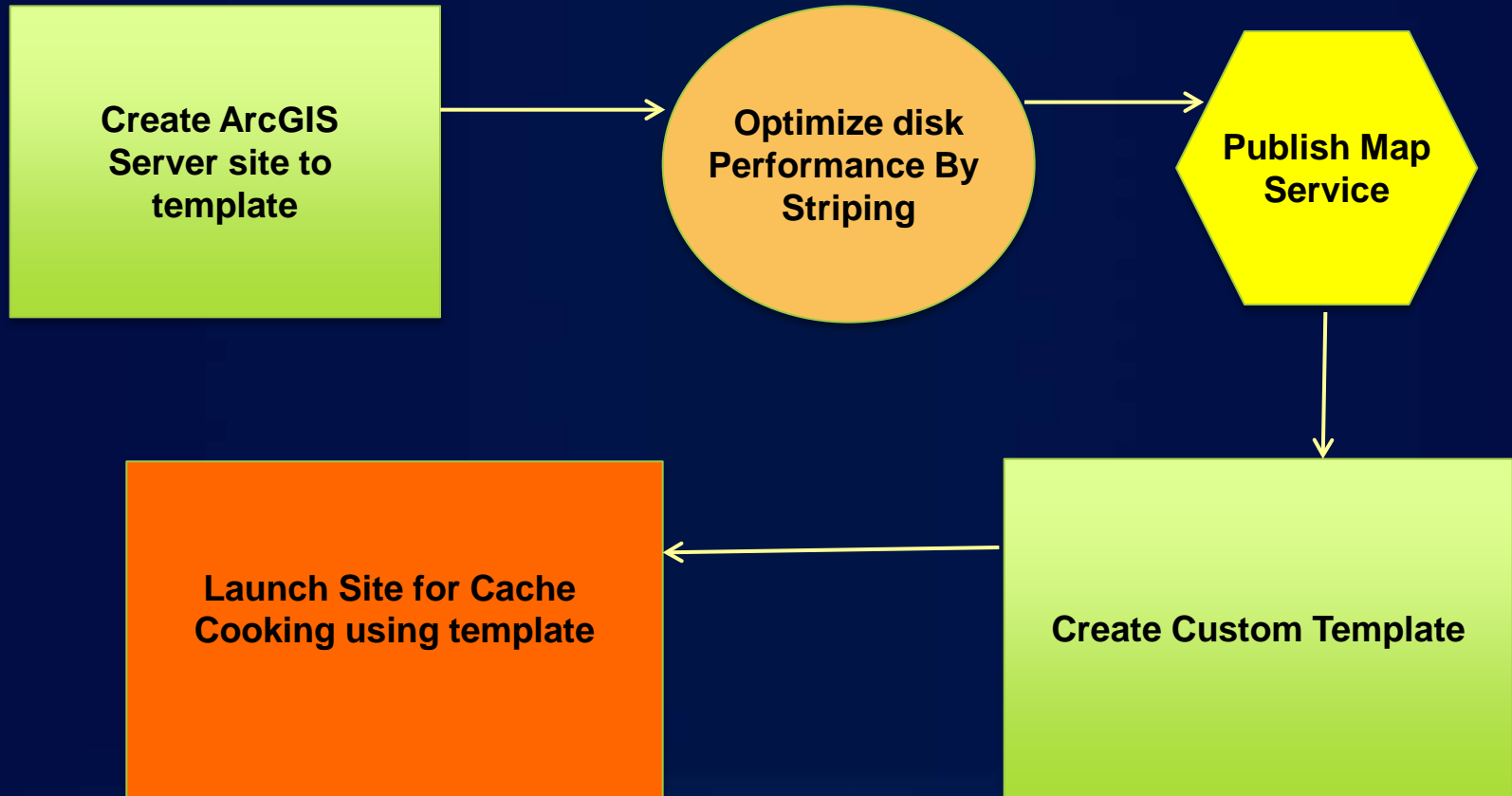
Storage Services

- **Simple Storage Service – S3**
 - Independent Web File Server
- **Elastic Block Storage – EBS**
 - Attachable disk
 - Max size per 1 unit is 1 TB
 - Can only be attached to one instance at a time
 - Does not disappear when instance is terminated
- **AWS Import / Export**

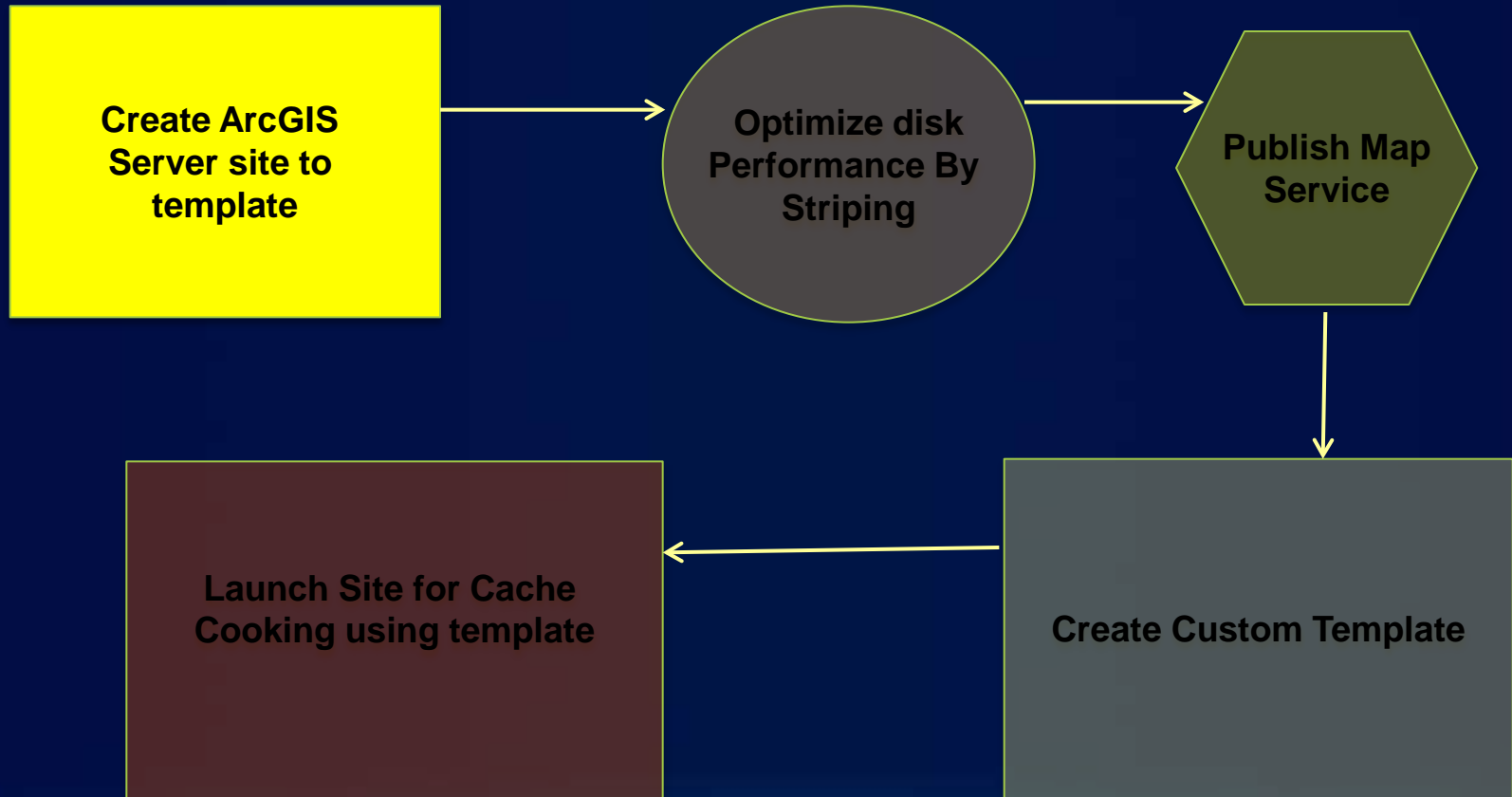
Data Management in the cloud

- **Upload data to S3 then to EBS drive**
 - S3 Client utilities
 - AWS Import/Export
- **Upload directly to EBS drive**
 - Copy/ Paste through RDP
 - FTP
- **Snapshots can be used for backup and data transfer across accounts.**

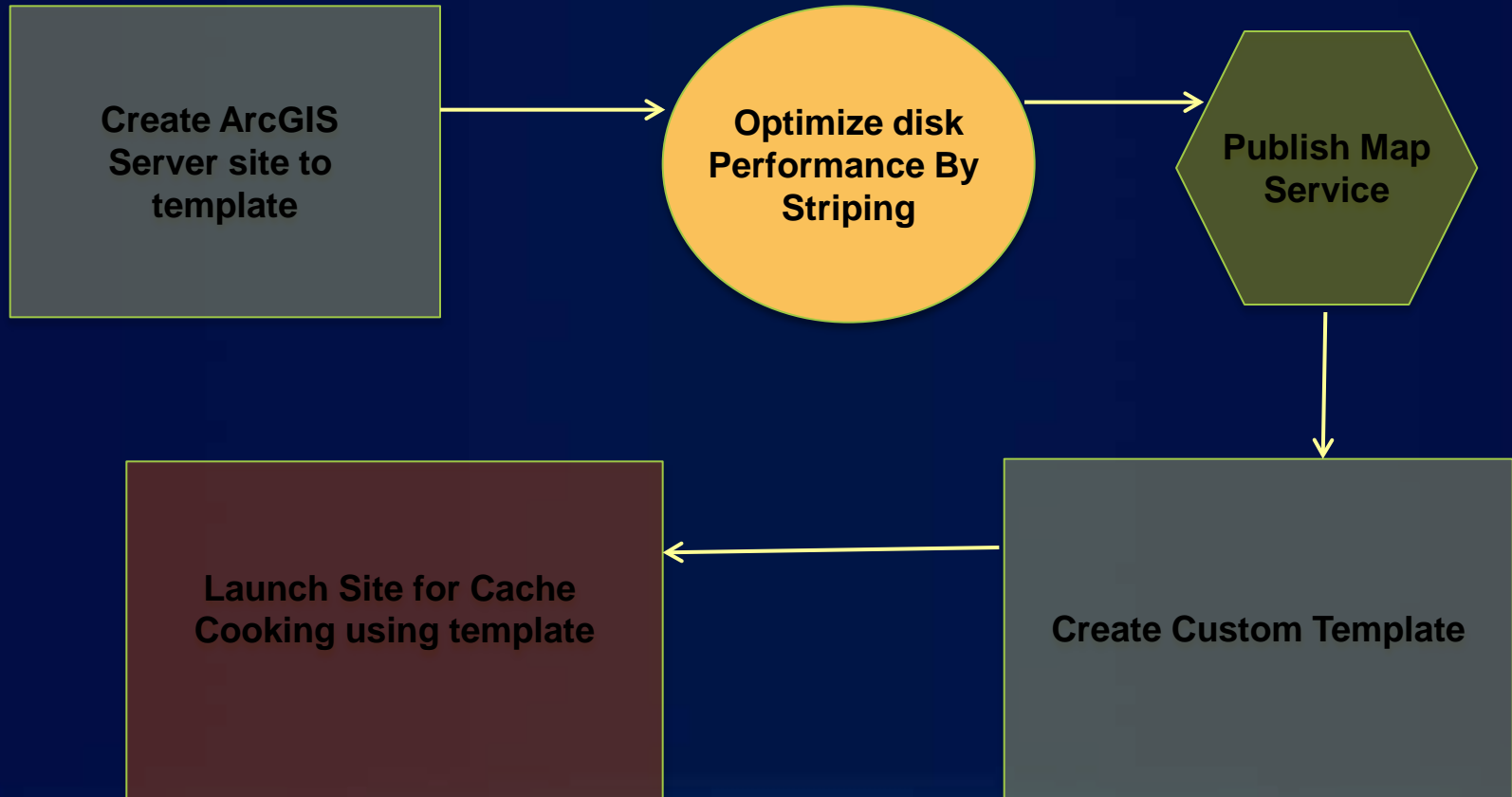
Demo Steps



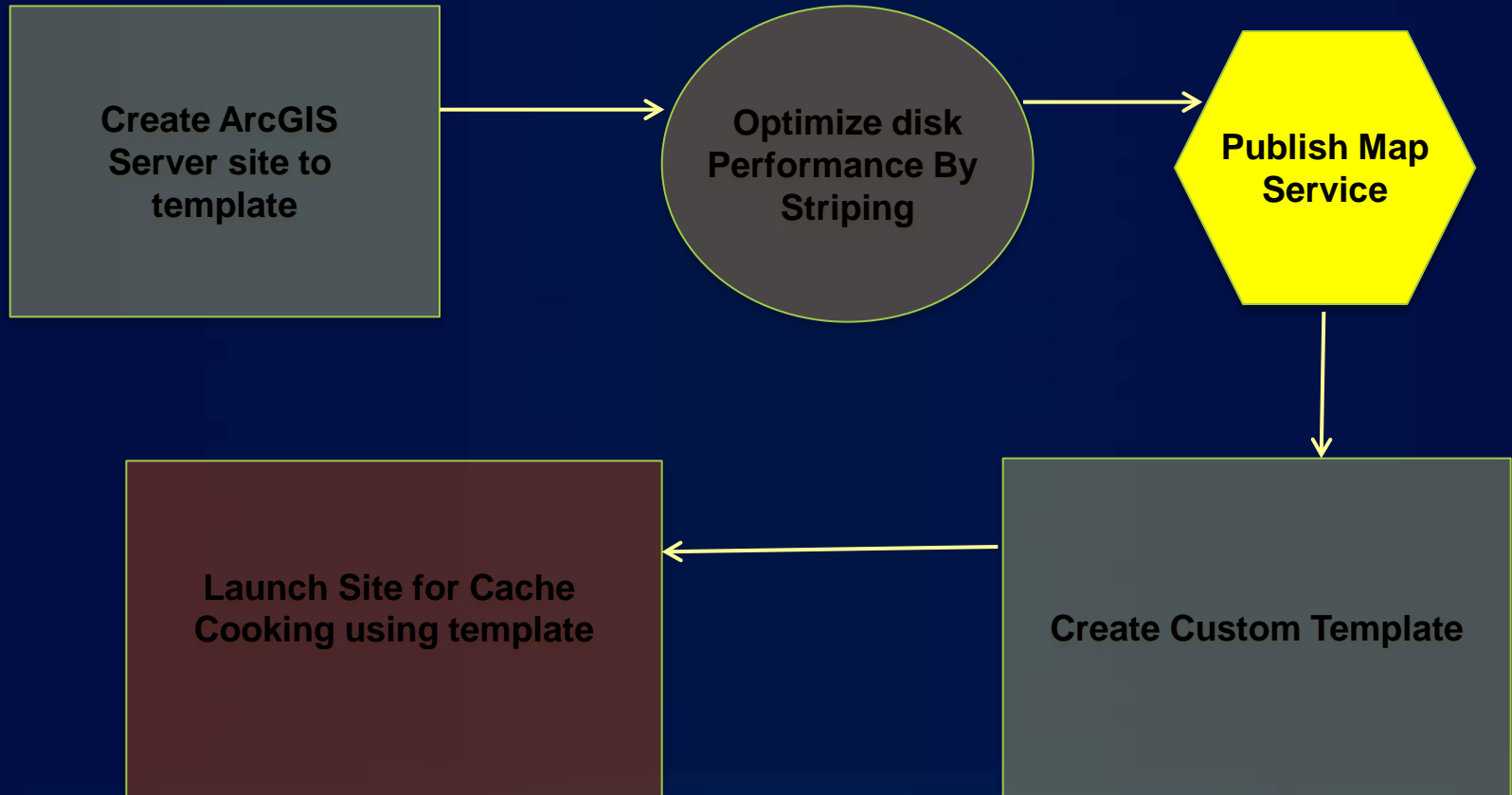
Demo Steps



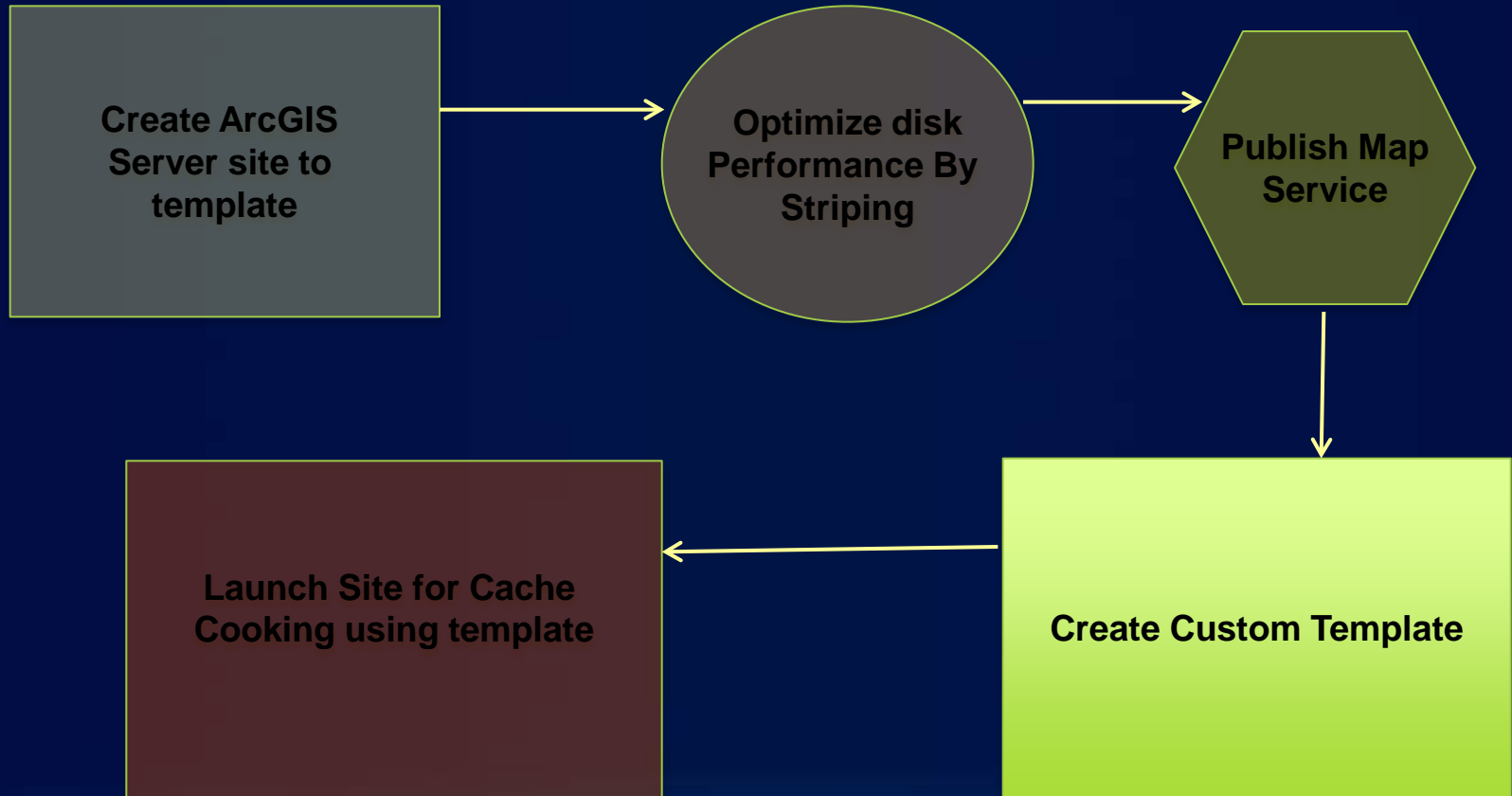
Demo Steps



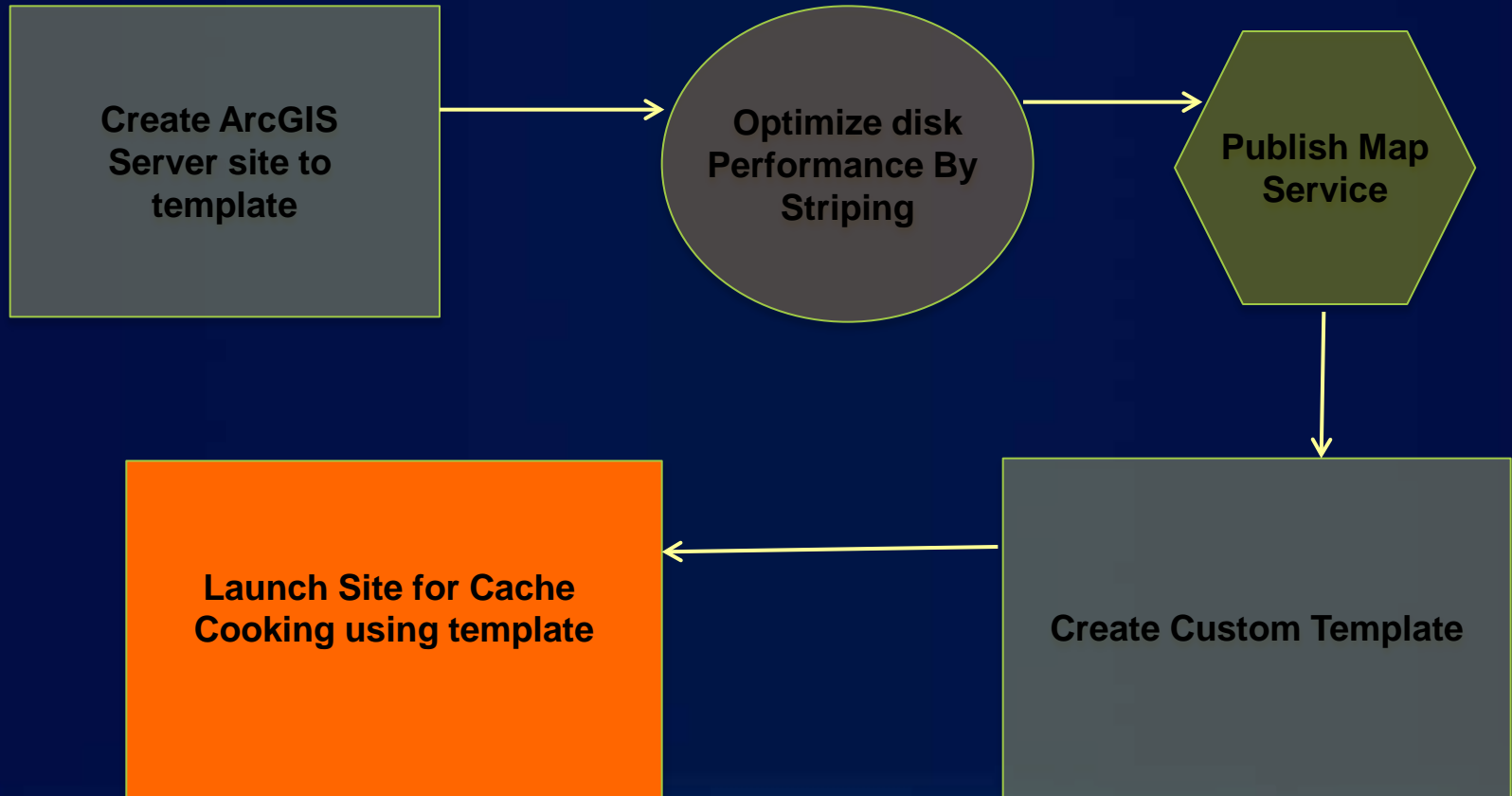
Demo Steps



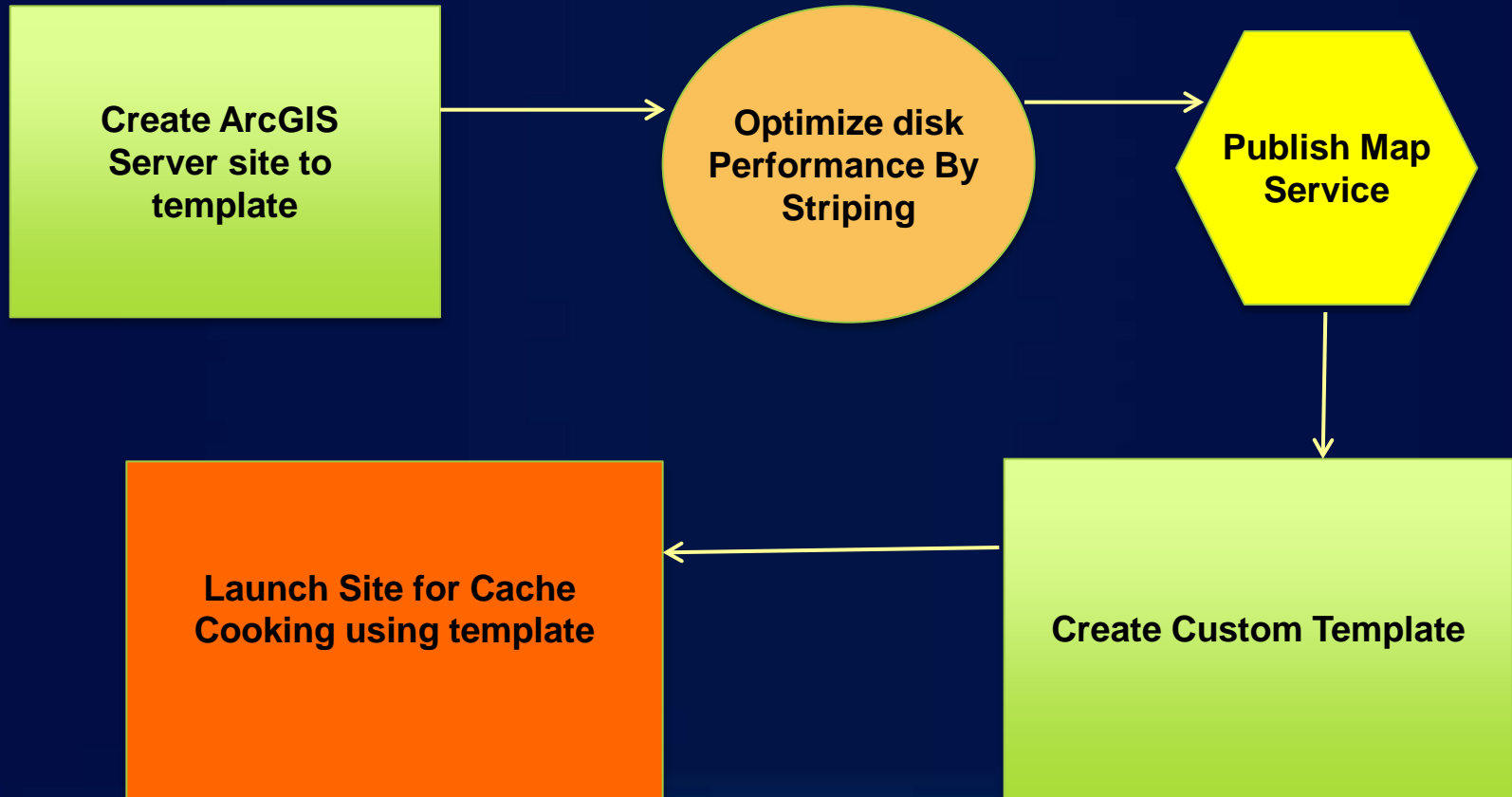
Demo Steps



Demo Steps



Demo Steps



Demo

```
esri.symbol.SimpleLineSymbol({
  color: [0, 0, 255],
  width: 2
});
feature.setSymbol(new dojo.Color([0, 0, 255], 2));
feature.setSymbol(new esri.symbol.SimpleLineSymbol({
  color: [0, 0, 255],
  width: 2
}));
```

Instance types & hourly rates

Standard Type

Standard On-Demand Instances	Linux Usage	Windows Usage
Large	\$0.32 per hour	\$0.46 per hour
Extra Large	\$0.64 per hour	\$0.92 per hour

Reserved Utilization	Reserved Instances Size	1 yr Term	Linux Hourly	Windows hourly
Light	Large	\$276	\$0.156	\$0.235
Medium	Large	\$640	\$0.096	\$0.175
High	Large	\$780	\$0.064	\$0.145

Instance Costs

Cost breakdown for one instance

- Hourly rate
- Elastic Block Storage
 - \$0.10 per GB-month of provisioned storage
 - \$0.10 per 1 million I/O requests
- Data Transfer In/ Out

Data Transfer In	US & EU Regions
All Data Transfer In	\$0.00

Data Transfer Out	US & EU Regions
First 1 GB per Month	\$0.00 per GB
Up to 10 TB per Month	\$0.12 per GB

Amazon Report

Usage Report

The screenshot displays the Amazon Usage Reports page. On the left is a navigation sidebar with two main sections: 'Account' and 'DevPay'. The 'Account' section includes links for Account Activity, Usage Reports (highlighted), Security Credentials, Personal Information, Payment Method, Consolidated Billing, AWS Identity and Access Management, and AWS Management Console. The 'DevPay' section includes links for DevPay Activity, DevPay Transaction History, Account Withdrawal, DevPay Customer Reports, and Register a DevPay Product. The main content area is titled 'Usage Reports' and includes a 'Download Usage Report' section. This section contains a form with the following fields: 'Service' (set to Amazon Elastic Compute Cloud), 'Usage Types' (set to All Usage Types), 'Operation' (set to All Operations), 'Time Period' (set to Current billing period), and 'Report Granularity' (set to Hours). Below the form are two buttons: 'Download report (XML)' and 'Download report (CSV)'. A note at the bottom states: 'Note: The CSV file you download can be opened in Excel or another spreadsheet application.' The top right corner of the page shows 'Welcome Marwa PSDEV | Sign Out'.

Account

- Account Activity
- Usage Reports**
- Security Credentials
- Personal Information
- Payment Method
- Consolidated Billing
- AWS Identity and Access Management
- AWS Management Console

DevPay

- DevPay Activity
- DevPay Transaction History
- Account Withdrawal
- DevPay Customer Reports
- Register a DevPay Product

Usage Reports

Welcome Marwa PSDEV | Sign Out

Download Usage Report

Using the form below, you may create and download a report of your usage for the service you select:

Service: Amazon Elastic Compute Cloud

Usage Types: All Usage Types

Operation: All Operations

Time Period: Current billing period

Report Granularity: Hours

[Download report \(XML\)](#) [Download report \(CSV\)](#)

Note: The CSV file you download can be opened in Excel or another spreadsheet application.

Amazon Bill

Complete Cost

Billing Statement: June 1, 2010

The billing cycle for this report is May 1 - May 31, 2010.

Expand All Services Collapse All Services		Printer Friendly Version
		Totals
+ Amazon Elastic Compute Cloud	View/Edit Service	
	Download Usage Report	1,158.43
+ Amazon Simple Storage Service	View/Edit Service	
	Download Usage Report	0.00
Amazon Virtual Private Cloud	View/Edit Service	
	Download Usage Report	0.00
+ AWS Data Transfer (excluding Amazon CloudFront)	View/Edit Service	
		0.63
Taxes		0.00
Total Charges due on June 1, 2010		\$1,159.06

Amazon Bill

Cost Breakdown

Amazon Elastic Compute Cloud		
View/Edit Service		
US East (Northern Virginia) Region		
Amazon EC2 running Windows		
\$0.48 per Large Windows Instance (m1.large) instance-hour (or partial hour)	2,098 Hrs	1,007.04
Amazon EC2 EBS		
\$0.10 per GB-month of provisioned storage	1,047.867 GB-Mo	104.79
\$0.10 per 1 million I/O requests	11,394,333 IOs	1.14
\$0.15 per GB-Month of snapshot data stored	8.767 GB-Mo	1.32
\$0.01 per 10,000 gets (when loading a snapshot)	103,623 Requests	0.10
\$0.01 per 1,000 puts (when saving a snapshot)	2,488 Requests	0.02
Elastic Load Balancing		
\$0.008 per GB Data Processed by the LoadBalancer	4.048 GB	0.03
\$0.025 per LoadBalancer-hour (or partial hour)	1,057 Hrs	26.43
Amazon CloudWatch		
\$0.015 per monitored instance-hour (or partial hour)	1,171 Hrs	17.57
Download Usage Report		1,158.43

CloudWatch Utilization Report



- Always make sure to only keep the resources in need

Best practices

- **Plan costs**
 - <http://www.esri.com/library/whitepapers/pdfs/estimating-cost-gis-cloud.pdf>
- **Create Custom AMI**
- **Plan Security**
- **Plan Data Management**
- **Take advantage of Elasticity**
- **Use Reporting**

Q&A

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esri