ArcGIS Server on the Amazon Cloud:

A Case Study for Student Use

Outline

Background/ Goals

Administration

Setting up the Servers

Monitoring and Managing

Hosting Applications?

Conclusions

Background

Internet Mapping Course

- Publishing services
- Designing applications

Background

The Old Way:

Background

Problems:

- Access from off-campus

Background

Problems:

- Access from off-campus
- Access to ‘my’ lab computer
- Hard to understand the different pieces of the system and their relationships
    - Server vs. Service
    - GIS Server vs. Web Server
    - ArcMap vs. GIS Server

Goals

- Work from off-campus
- Better understanding of the system
- Experience administering a GIS Server in the Cloud

Solution

- Student GIS Servers in the Cloud
- Amazon Grant

Application Form

Apply for an AWS Teaching Grant here:

First Name*	Greta
Last Name*	Bernatz
University*	Saint Mary's University
Country*	United States
State/Province*	Minnesota
Postal Code*	55987
Email (.edu or equivalent)*	gcbern07@smumn.edu
AWS user account email*	gcbern07@smumn.edu

Course #1

Course URL*	Internet Mapping Services
Number of Students*	35
Course Description (4000 character limit)*	This course introduces students to effective use of the Internet as a medium to publish map data. It examines the basic implementation details associated with serving spatial data over the Internet. Students are introduced to Internet mapping software as well as the particulars of designing and operating an effective map

* indicates required field

Submit

Administration

2 Options:

- Each student gets a share of credits (students have their own account)
- Credits are pooled (one account with sub-accounts)

Administration

All AWS Services

- Compute & Networking
- Storage & Content Delivery
- Database
- Analytics
- Deployment & Management
- App Services
- Applications
- Mobile Services

AppStream
CloudFormation
CloudFront
CloudSearch
CloudTrail
CloudWatch
Cognito
Data Pipeline
Direct Connect
Directory Service
DynamoDB
EC2

ElastiCache
Elastic Beanstalk
Elastic MapReduce
Elastic Transcoder

Identity and Access Management

IAM
Kinesis
Mobile Analytics
OpsWorks
RDS
Redshift

Route 53
S3
SES
SNS
Storage Gateway
SWF
Trusted Advisor
VPC
WorkSpaces
Zocalo

Administration

Identity and Access Management

	A	B	C	
1	Campus	User Name	Access Key Id	Secret Access Key
2	TC / Assist	jbrost	AKIAIV456EUE4FOTZSTA	hwX2kKQ1n+FaP6aQiPX
3	TC	asarms11	AKIAIEQ5PDMWJKEXD7MQ	07kYPQFuA235FZg+WqT
4	TC	cmfarr12	AKIAJX7QYGNGQOB2GPHA	k0B0+QRo8Nprk4RGvLjv
5	TC	aijibr13	AKIAJW73R2KZ6IWO6EIA	cN+Xxat/K3+a2eW5F9hY
6	TC	nxjohn12	AKIAJZEQSMVX2MQBYI5Q	aJ28vsmDIU5CHUvbIqh4
7	TC	alking12	AKIAJNNAUTERVLT4AGPA	n6Mq53j8vCgofUJs1ejd+
8	TC	ldknot12	AKIAJ3XEXCZKYSVL4BKA	I1UXMuil1SPSXhUJjBIqP
9	TC	jwkord12	AKIAJMLD3MAECZSA2I7Q	zH1y8JUsQL8N4C52Be5D
10	TC	avnixo12	AKIAJQHIJL2MTL2YZ4OA	epGnmGv4SD7XSLsHQQ8
11	TC	rlolso12	AKIAIFK3FUGPGXZUU5WQ	/kHikFIcB7N+jF3WJdVrU
12	TC	mawell12	AKIAIBJJP5CKAD7NTC6A	s2yho5hR3urfBdojp0o2h
13	WIN	slburn05	AKIAIXOUNO6VFK74RJZQ	Lw+g+svtw0a31ZBzoHae
14	WIN	dtcook13	AKIAI5WADL3B2UM46LMQ	QClQ+qolVqkBa9yweO5
15	WIN	amdavi13	AKIAJVQZEFVEFQ5YUZ2A	5erXh6kHrvrcPCNUkTPR
16	WIN	dlkenn13	AKIAJHBJ3K3U2DEUATPA	JqXBOifI6f6rnru0PtTTVg
17	WIN	mjrand13	AKIAJBUB3QPZXIZZ7MFQ	z7cLm0tLpk1zG4z2x1RA1
18	WIN	dtsail13	AKIAJL37C4XELCVC3JKQ	F1nc7PQ7i949jFZlHbhSe
19	WIN	sdwebi12	AKIAJOZYI553VDQE4N5Q	xoLY8DmDryOHnYCoIIM
20	WIN	rwziem12	AKIAIBW4RUOFGWOTB2XQ	A4lRg8Uc3bnsRAFg4TkuT
21	Me - Student	studentgreta	AKIAI666SJAMMZ5VELDA	476TUznN2uhREsSWvJTn
22	Me - Instructo	instructorgreta	AKIAIP7GYF7MWHLYJKSQ	TcQnsLzaczyHd+fAv8RiaU

Administration

Administration

Administration

Access to the ArcGIS Server Amazon Machine Image:

- Need Customer Number
- Need Server License Code
- Need Amazon Account Number
- Contact Esri Support

Administration

Creating the Servers

You Will Need:

- Cloud Builder install file (Normally obtained from the Esri Customer Care Portal)
- Your AWS access key and secret access key
- A provisioning file with licensing information

Creating the Servers

Install Cloud Builder Application:

Creating the Servers

Create a Site:

Creating the Servers

Create a Site:

Publishing to the Server

Server Computer Owned by
Amazon on East Coast
Amazon
GIS Server
Lab
Computer
GIS Server
Author in
ArcMap
Use in Web
Applications
School Lab Computer
Author in
ArcMap
Use in Web
Applications
Personal Computer

Managing and Monitoring

EC2 Dashboard
Events
Tags
INSTANCES
Instances
Spot Requests
Reserved Instances
IMAGES
AMIs
Bundle Tasks
ELASTIC BLOCK STORE
Volumes
Snapshots
NETWORK & SECURITY
Security Groups
Elastic IPs
Placement Groups
Load Balancers
Key Pairs
Network Interfaces
AUTO SCALING
Launch Configurations
Auto Scaling Groups

Launch Instance | Connect | Actions

Filter: All instances | All instance types

Name	Instance ID	Instance Type
[redacted]	[redacted]	m1.medium

Instance: [redacted] Elastic IP: [redacted]

Description | Status Checks | Monitoring

CloudWatch alarms: No alarms configured

No alarms created. You can create an alarm using the

CloudWatch metrics: Basic monitoring. Enable Deta

Below are your CloudWatch metrics for the selected re

CPU Utilization (Percent)

Disk Rea

Disk Write Operations (Operations)

Network

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ArcGIS Server Cloud Builder on Amazon Web Services

Sites | Templates | Help | About

Create Site

GretaWinona — Backups | Start | Update | Delete

Manager URL http://arcgis-GretaWinona-738675954.us-east-1.elb.amazonaws.com/arcgis/manager/
Description Greta's student site in Winona.
Configuration windows-shared-sqlexpress
Region US East (Virginia)
Availability zone No preference
ArcGIS Server instance type M1 Medium (m1.medium)
Minimum number of instances 1
Maximum number of instances 1
Key pair arcgis-GretaWinona

LeanneSite — Backups | Start | Update | Delete

MatthewSite — Backups | Start | Update | Delete

NiallAmazon2014 — Backups | Start | Update | Delete

RWZieman — Backups | Start | Update | Delete

RandersonSite — Backups | Start | Update | Delete

RhondaLOlsonSite — Backups | Start | Update | Delete

Refresh | Sign Out

http://michaelsync.net/2014/05/09/amazon-ec2-cloudwatch-new-relic-monitoring-alert-notifications

What about the web application?

Can I use Amazon to host that, too?

Yes, but...

- alter security settings
- open ftp and http ports
- create elastic IP address
- remote into server
- enable IIS on server

Conclusions

Objectives Met:

- Work from off-campus
- Better understanding of the system
- Experience administering a GIS Server in the Cloud

Conclusions

Ease of Use:

- Set-up
- Student interface
- Monitoring – yes and no
  - Watch out for storage volumes and load balancers
  - Continue monitoring billing after you think everything is deleted

Helpful Resources

Sterling Quinn from Penn State
https://www.e-education.psu.edu/cloudGIS/node/25

Top 10 AWS Identity and Access Management (IAM) Best Practices
http://www.youtube.com/watch?v=4AZX8COgnmU#t=2656

Building an ArcGIS Server site on Amazon Web Services
(discusses requirement of admin permissions on account)
http://resources.arcgis.com/en/help/main/10.2/index.html#/Building_an_ArcGIS_Server_site_on_Amazon_Web_Services/00rq0000004r000000/