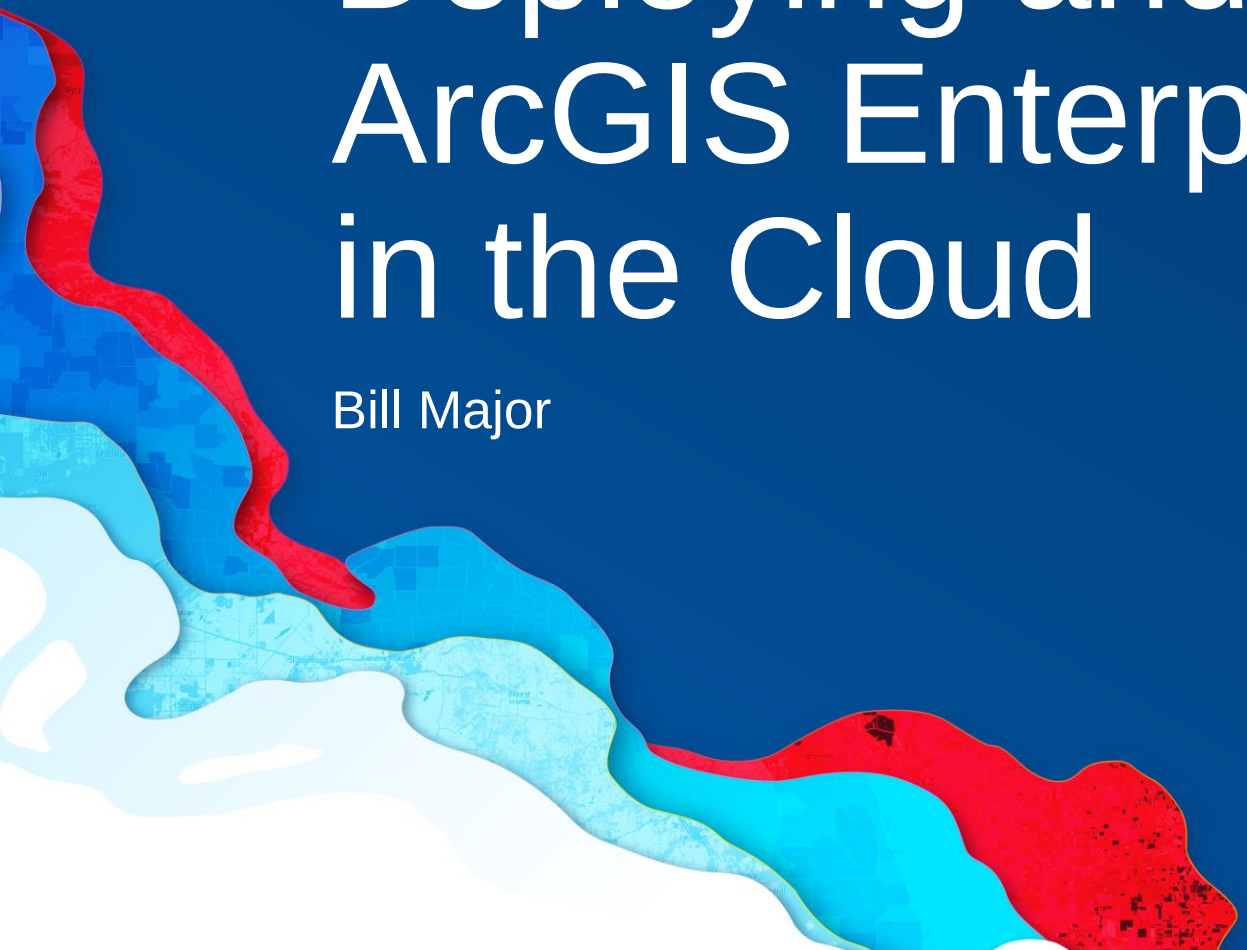
Deploying and Using ArcGIS Enterprise in the Cloud

Bill Major



Quick Survey

- Your role in your organization
  - Developer?
  - Cloud Admin?
- Already a cloud user
- Running Esri deployment on AWS
- Running Esri deployment on Azure

Agenda

- AWS Offerings
- Azure Offerings

ArcGIS Enterprise Support for Cloud Providers

aws

rackspace
the open cloud company

HUAWEI

阿里云计算
Alibaba Cloud Computing

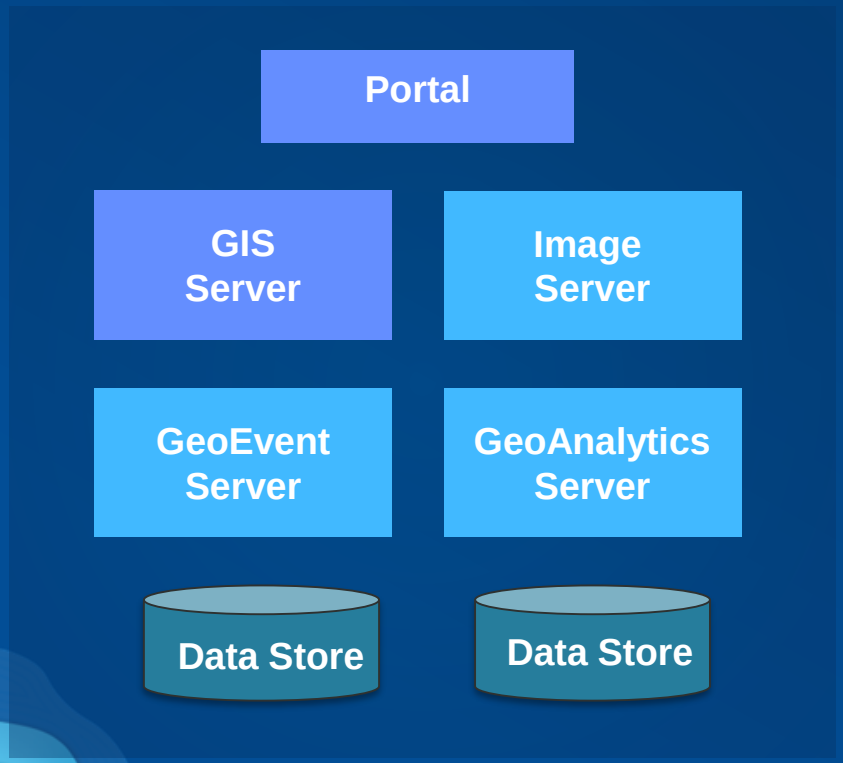
ArcGIS Enterprise Special Tooling

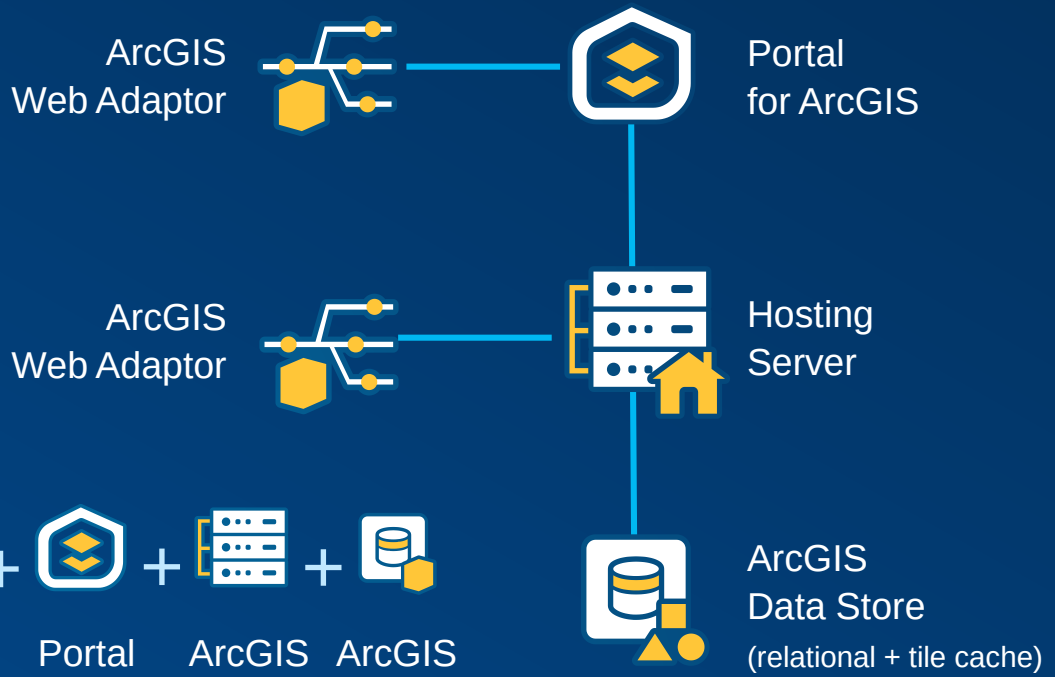
Cloud deployments

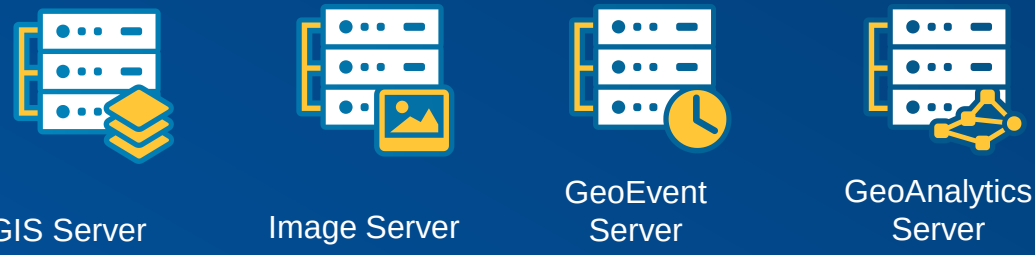
Amazon Web Services

Microsoft Azure

ArcGIS Enterprise







ArcGIS Spatiotemporal Big Data Store

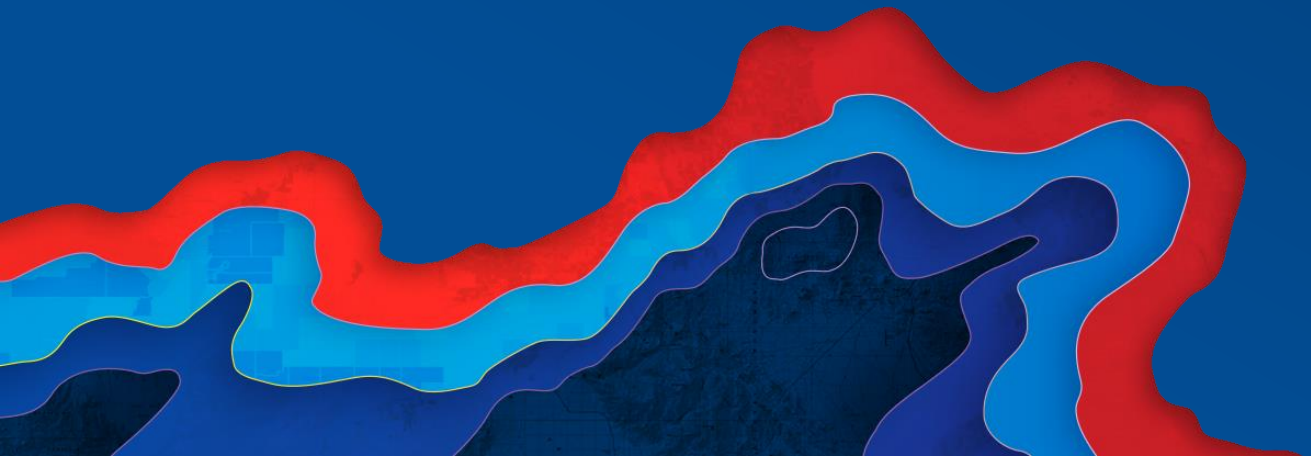
Before Starting a Deployment

On-premise	AWS / Azure
Esri authorization files Domain_name for your application SSL Certificate for your domain Esri software setups Infrastructure - Machines/VMs/Networks - Web Servers and/or Load Balancer - File Server - Data storage/Database - ……	Esri authorization files Domain_name for your application SSL Certificate for your domain Azure/AWS Account and privileges

Start Deployment

On-premise	AWS / Azure
Some knowledge about your infrastructure Manually run setups/configurations on all machines, or Deployment automation	Some knowledge about Azure/AWS AWS • Esri CloudFormation template • One deployment for different patterns • Scripting tools, python or powershell • Esri ArcGIS Cloud Builder CLI for AWS (10.6) • Customization with AMIs/CF Templates Azure • ArcGIS Enterprise Cloud Builder for Azure • ARM Templates • DSC Automation

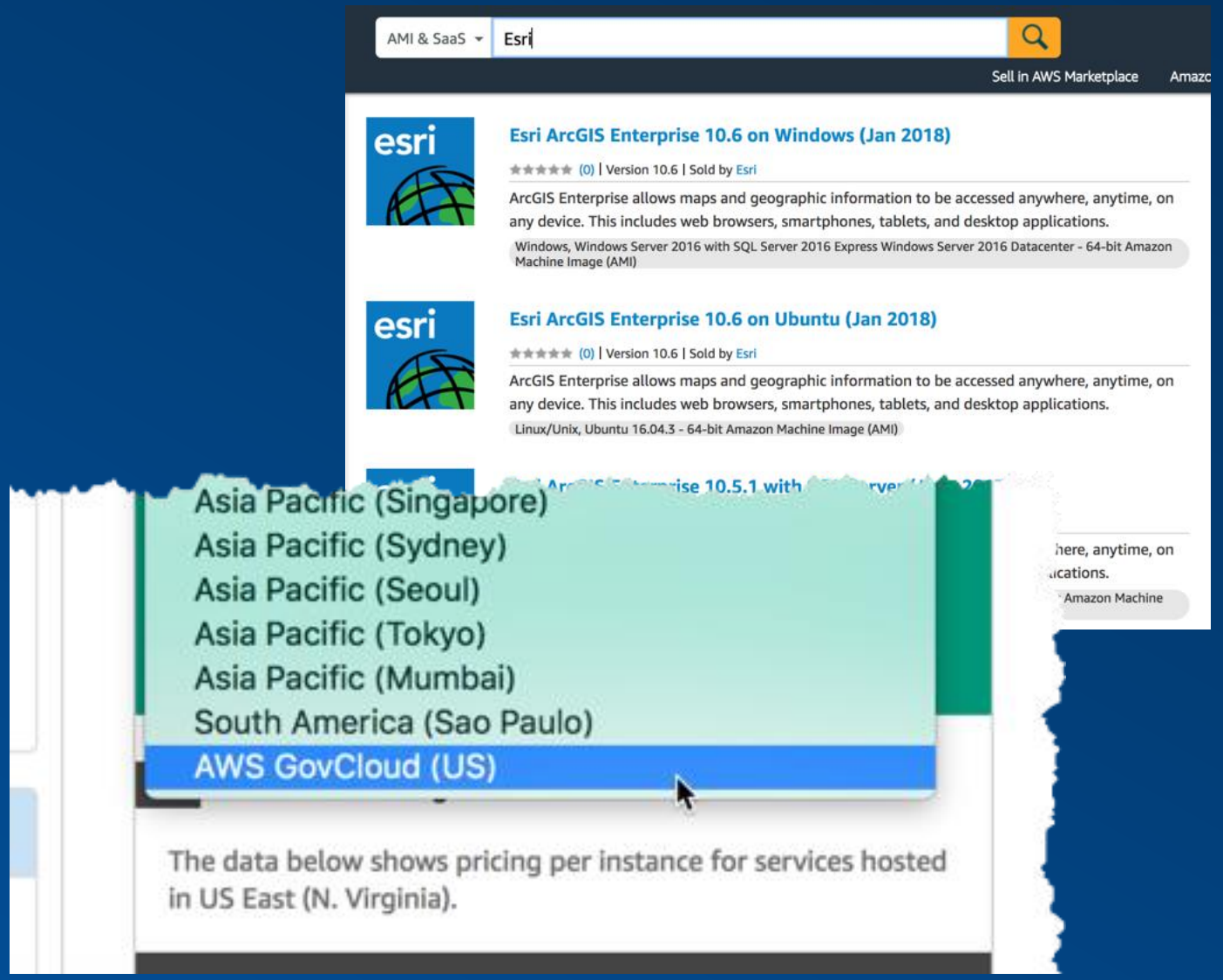
AWS ArcGIS Enterprise Offerings



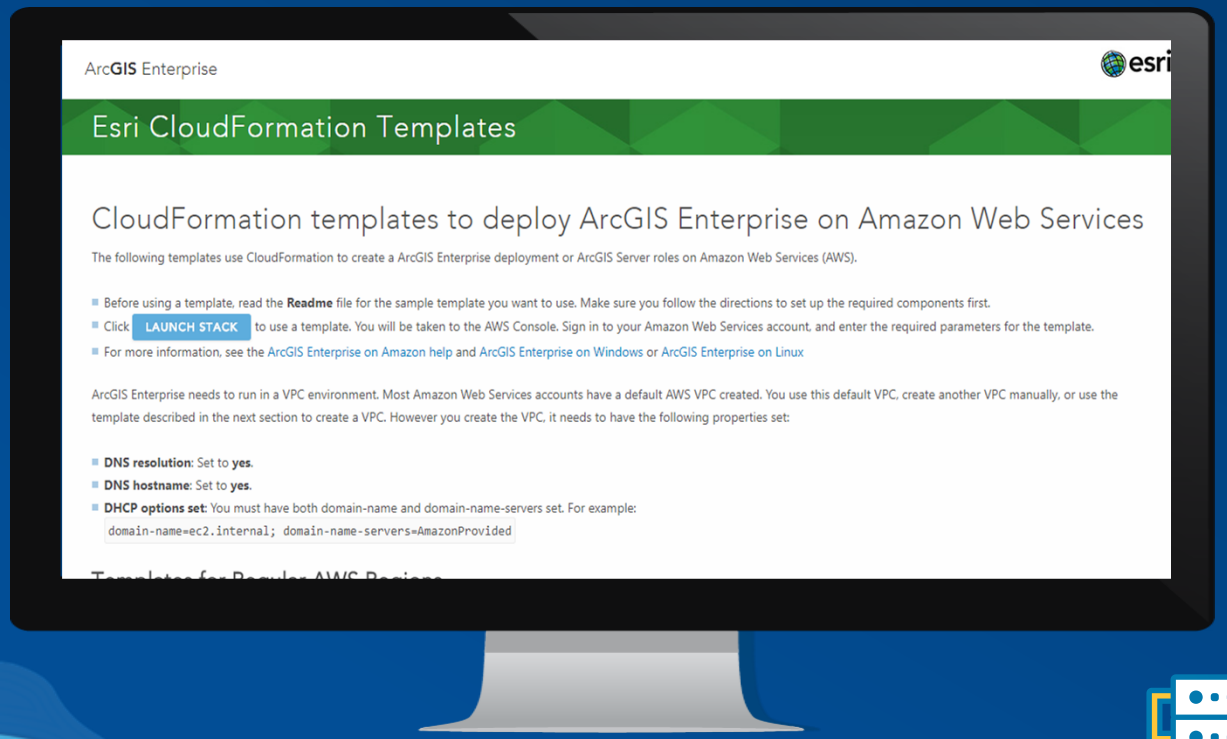
AMIs

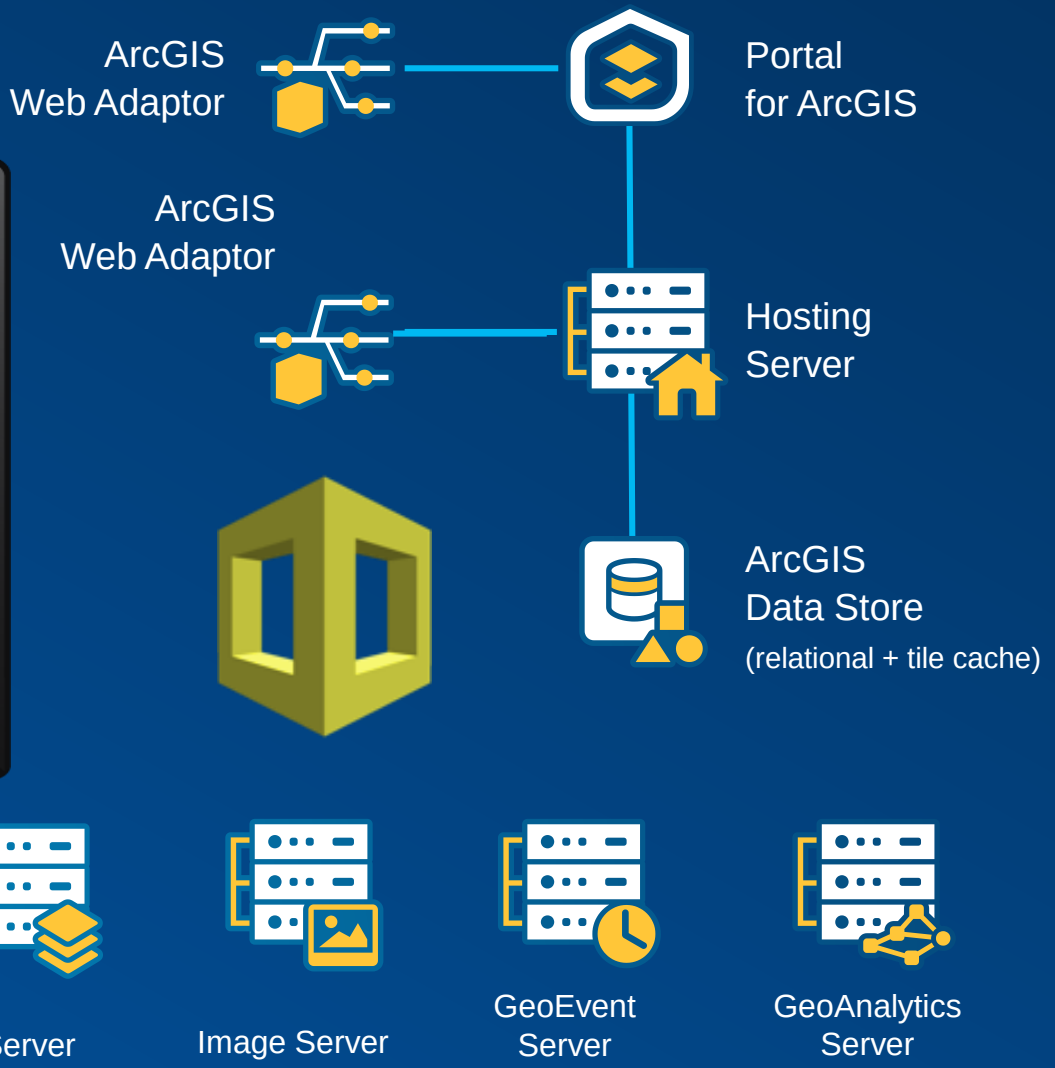
- Windows with SQL Server Express
- Ubuntu with Postgresql

- Available in GovCloud Region

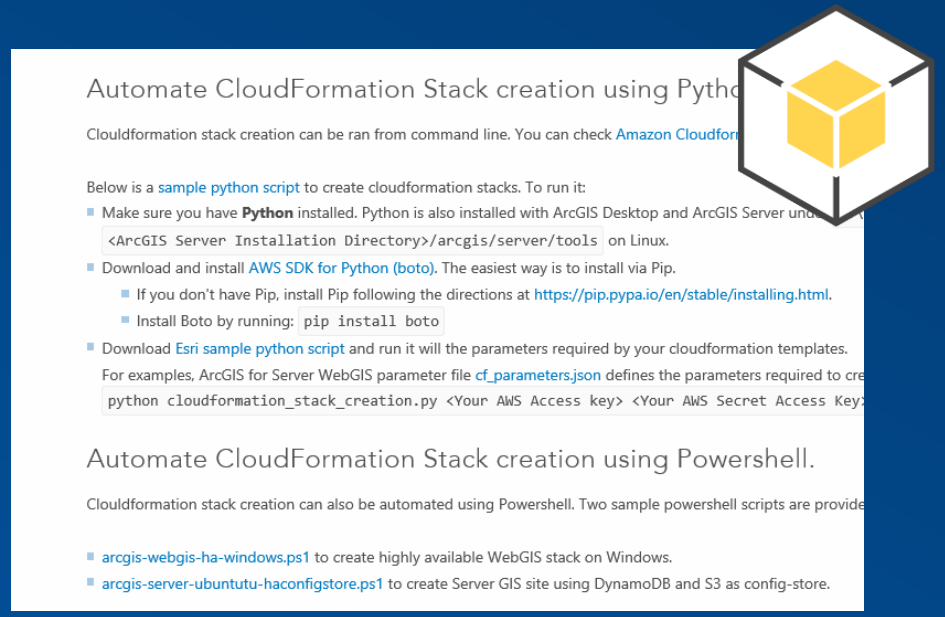


Esri Cloud Formation Templates

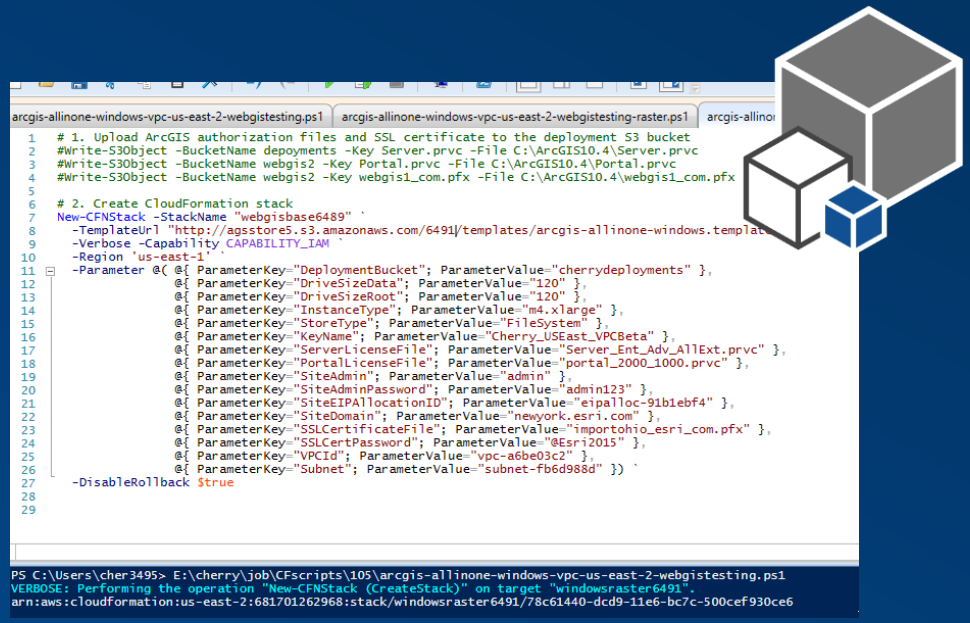




Native to AWS Tools



Esri-provided sample scripts



Android

iOS

Java

JavaScript

.NET

Node.js

PHP

Python (boto)

Ruby

Xamarin

AWS CLI

AWS Toolkit for Eclipse

AWS Toolkit for Visual Studio

AWS Tools for Windows PowerShell

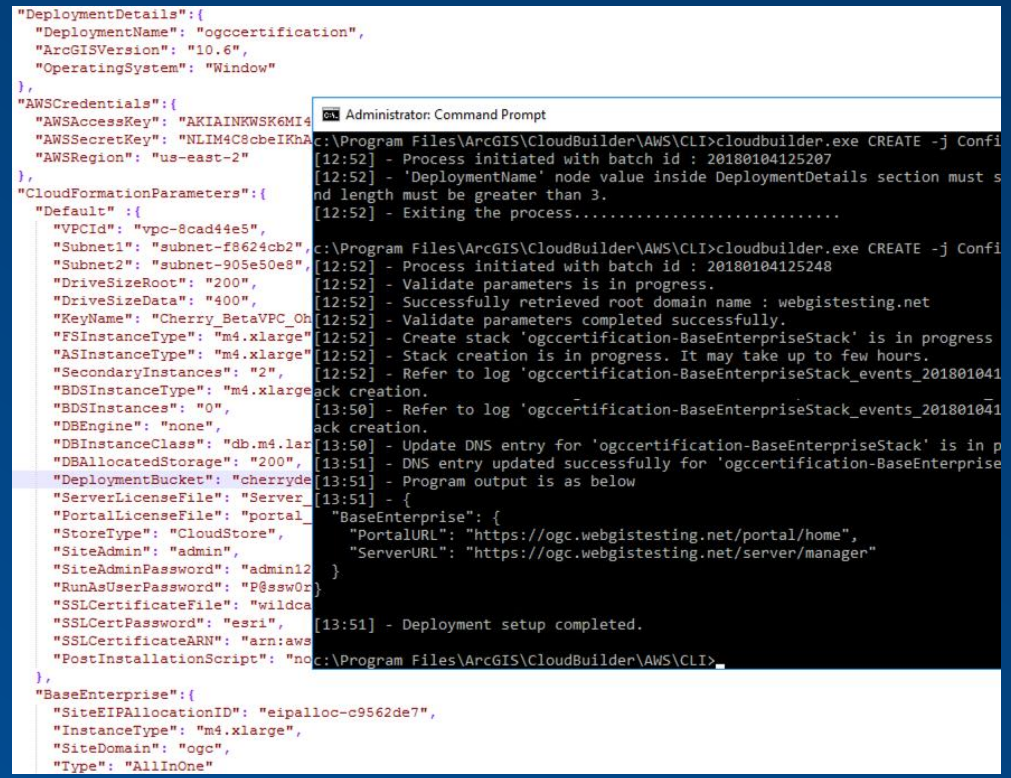
Provided by Esri CF templates

- Esri ArcGIS Server Docker through AWS ECS
  - New at 10.5.1
- Stop/Start the whole stack (Lambda function)
- Remotely Applying Esri patches – through AWS “Run command” tool
  - Windows starting at 10.5.1
  - Ubuntu starting at 10.6

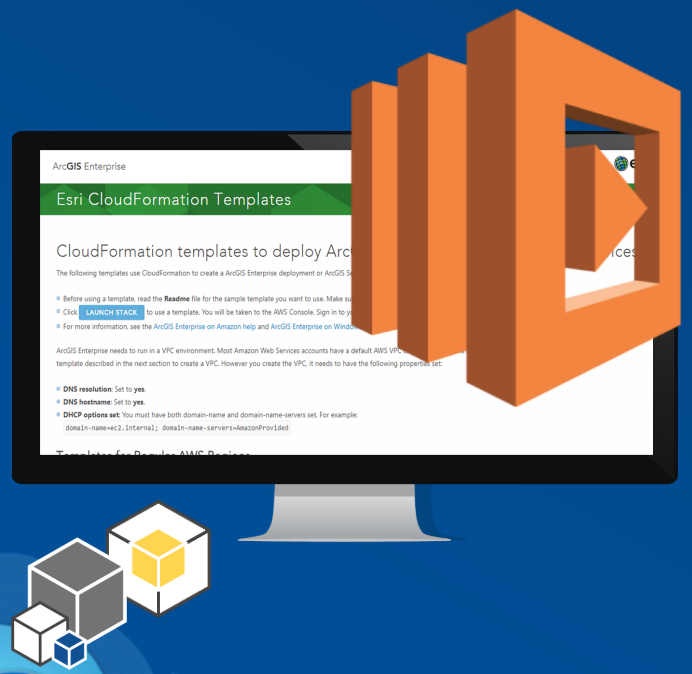
Function name	Description	Ru
ogccertification-BaseEnterpriseS-StopStackFunction-1THY6SCW9NUCH	Stops all EC2 instances of the CloudFormation stack	Pyt
ogccertification-BaseEnterprise-StartStackFunction-1MJ90NP9MR32	Starts all EC2 instances of the CloudFormation stack	Pyt
ogccertification-BaseEnte-ServerConfigStoreFunctio-		Pyt

Deployment Tools - Cloud Builder Command Line Interface for AWS

- New at 10.6
- One Run to Deploy ArcGIS Enterprise
  - Base + Federated Servers
  - Define in a json file
- Prepare your deployment

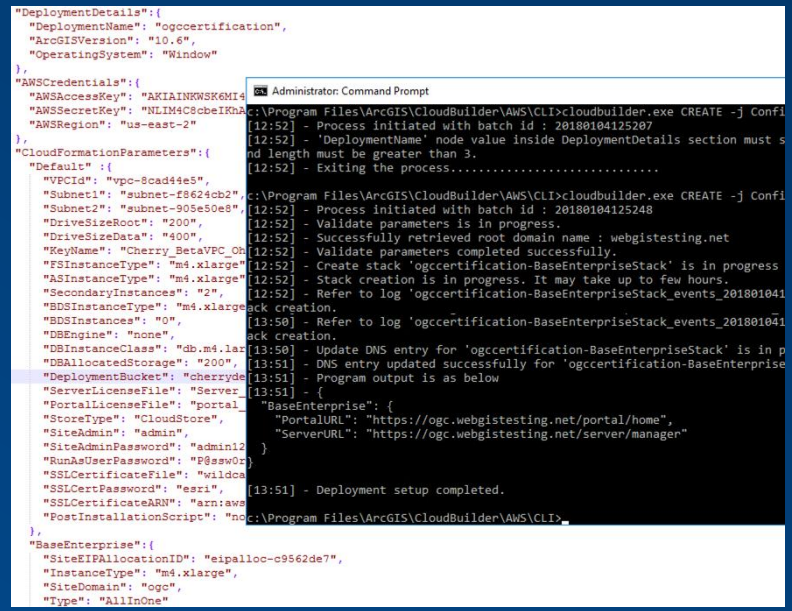


Cloud Formation Templates VS. Cloud Builder CLI



Highly Customizable

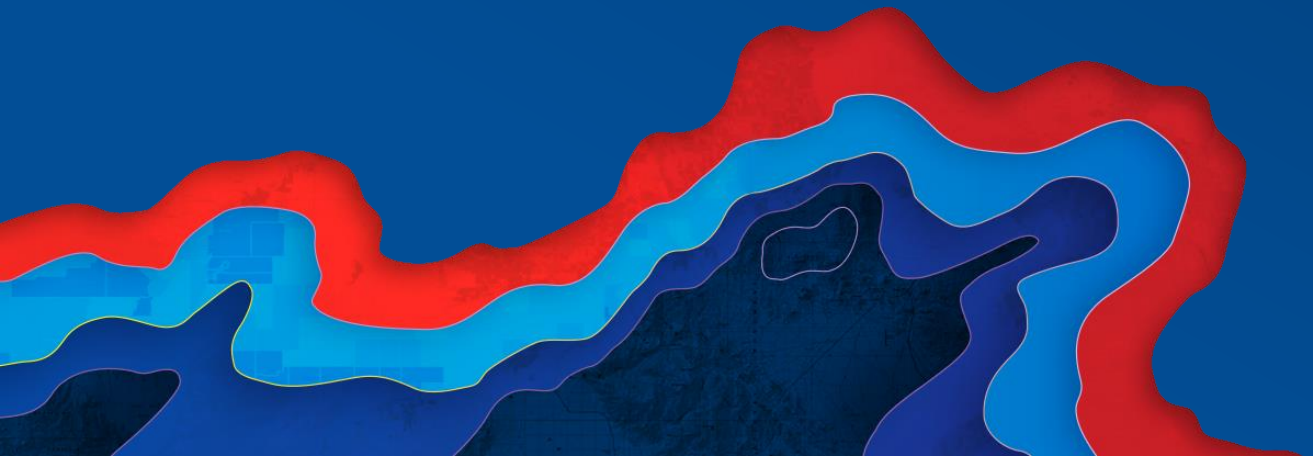
One Run Deployment



Power ⟷ Simplicity

Demo

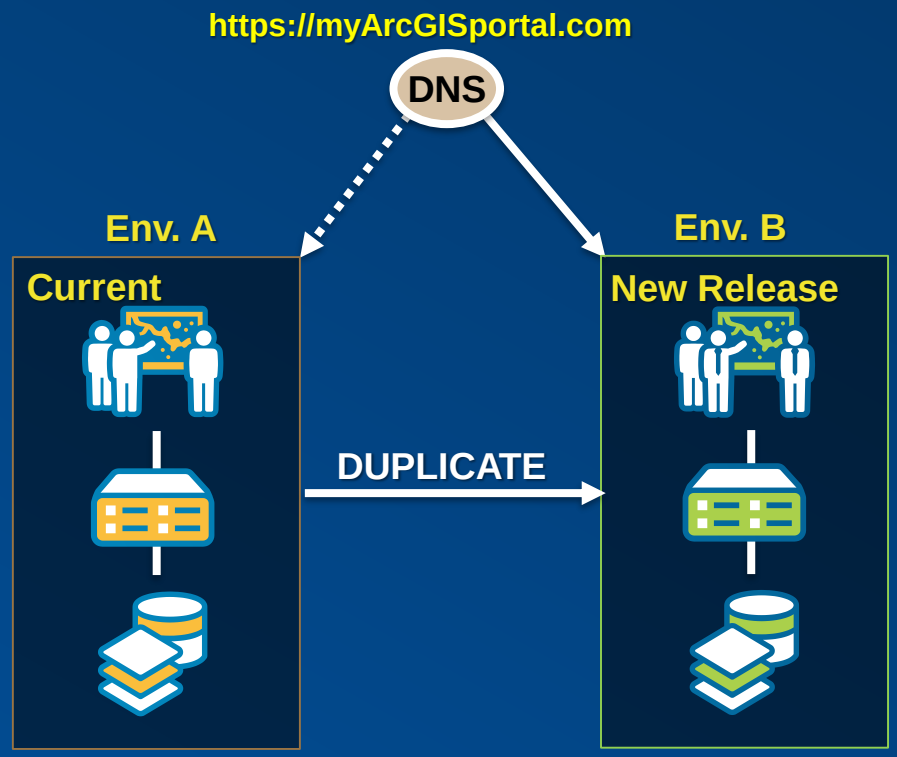
Cloud Formation Templates Review
Review ArcGIS Enterprise Command Line Interface for AWS



Cloud Storage Support

- ArcGIS Server config-store: DynamoDB & S3
- Portal content store: S3
- Cloud Storage in Server Manager: S3
- Caching: S3
  - Consumption: 10.5.1
  - Generation: 10.6
- ArcGIS Spatial Temporal DataStore backups: S3. New at 10.6
- Webgisdr backups: to S3
- GeoAnalytics Data Input : S3
- All Regions at 10.6
- User-defined S3 compatible storage

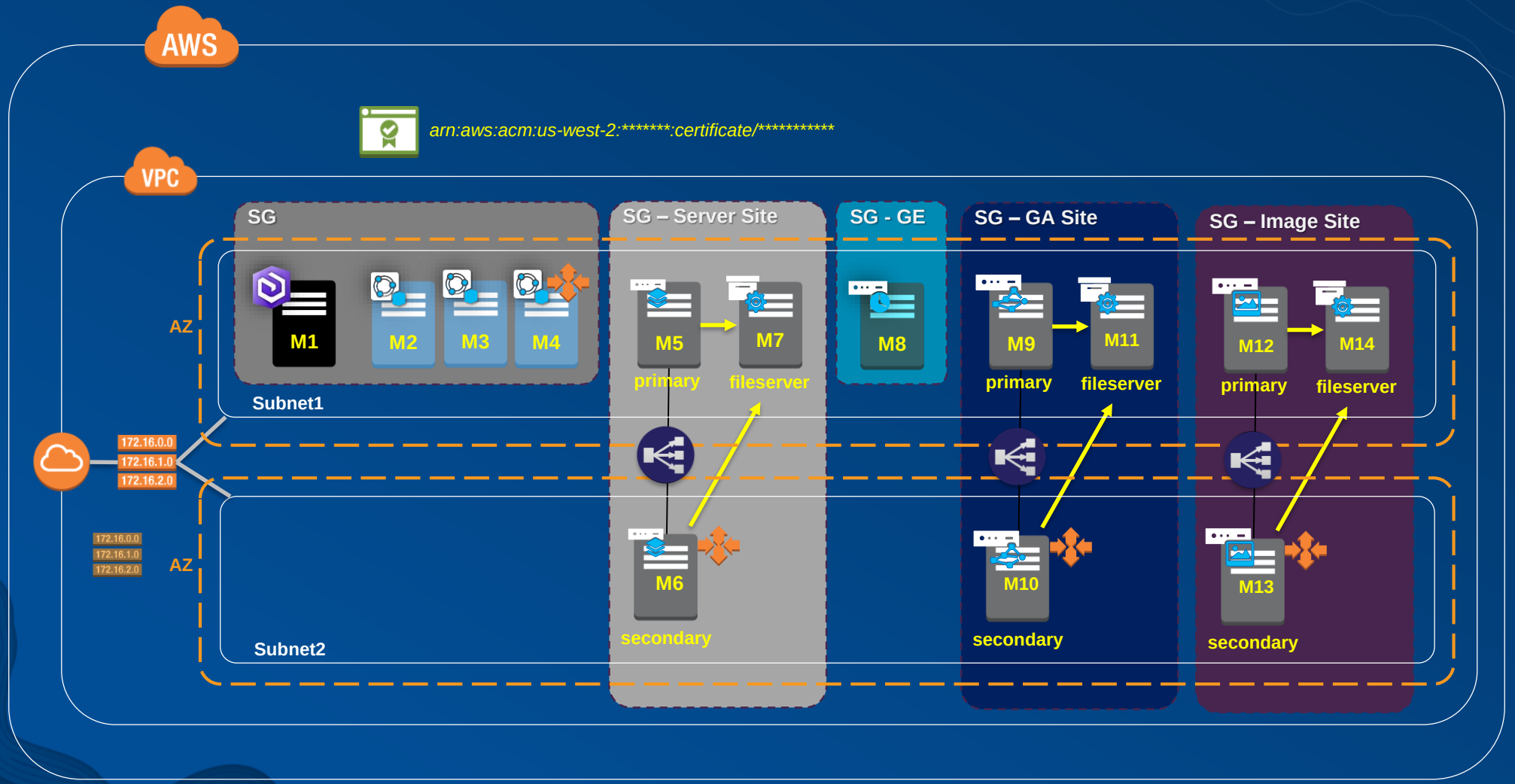
Operational Practices | Upgrades



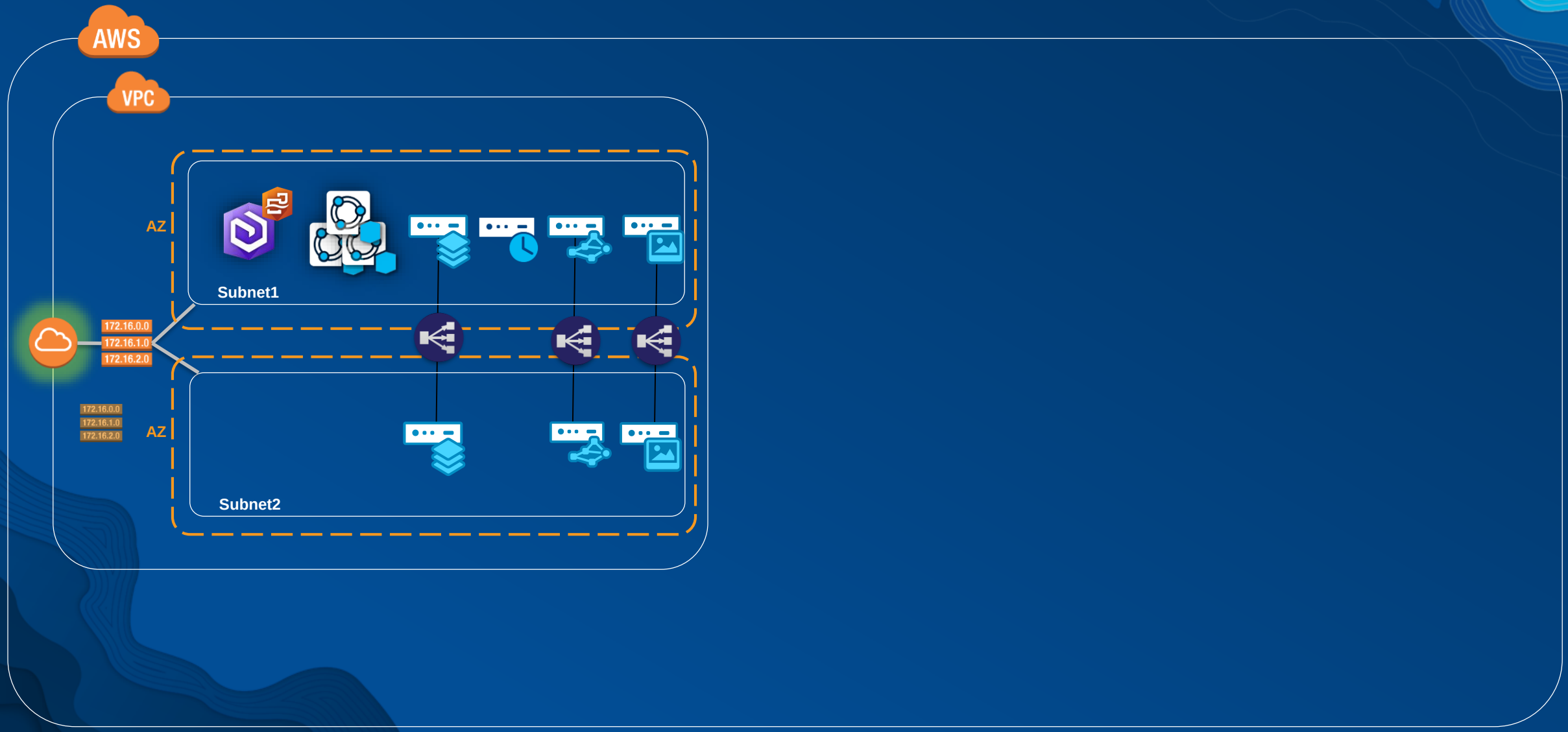
Seamless

The url for the end user never changes.

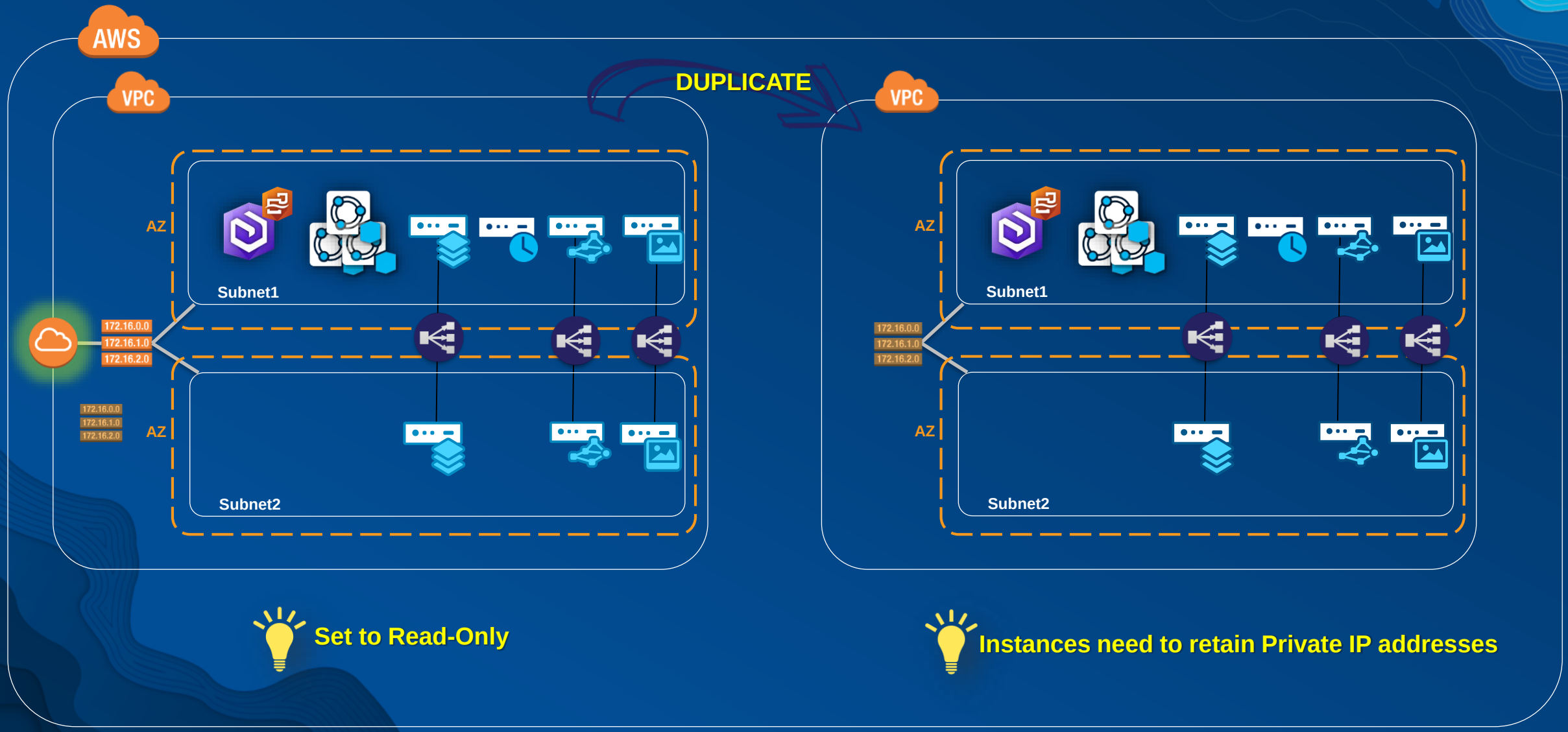
Operational Practices | Upgrades



Operational Practices | Upgrades



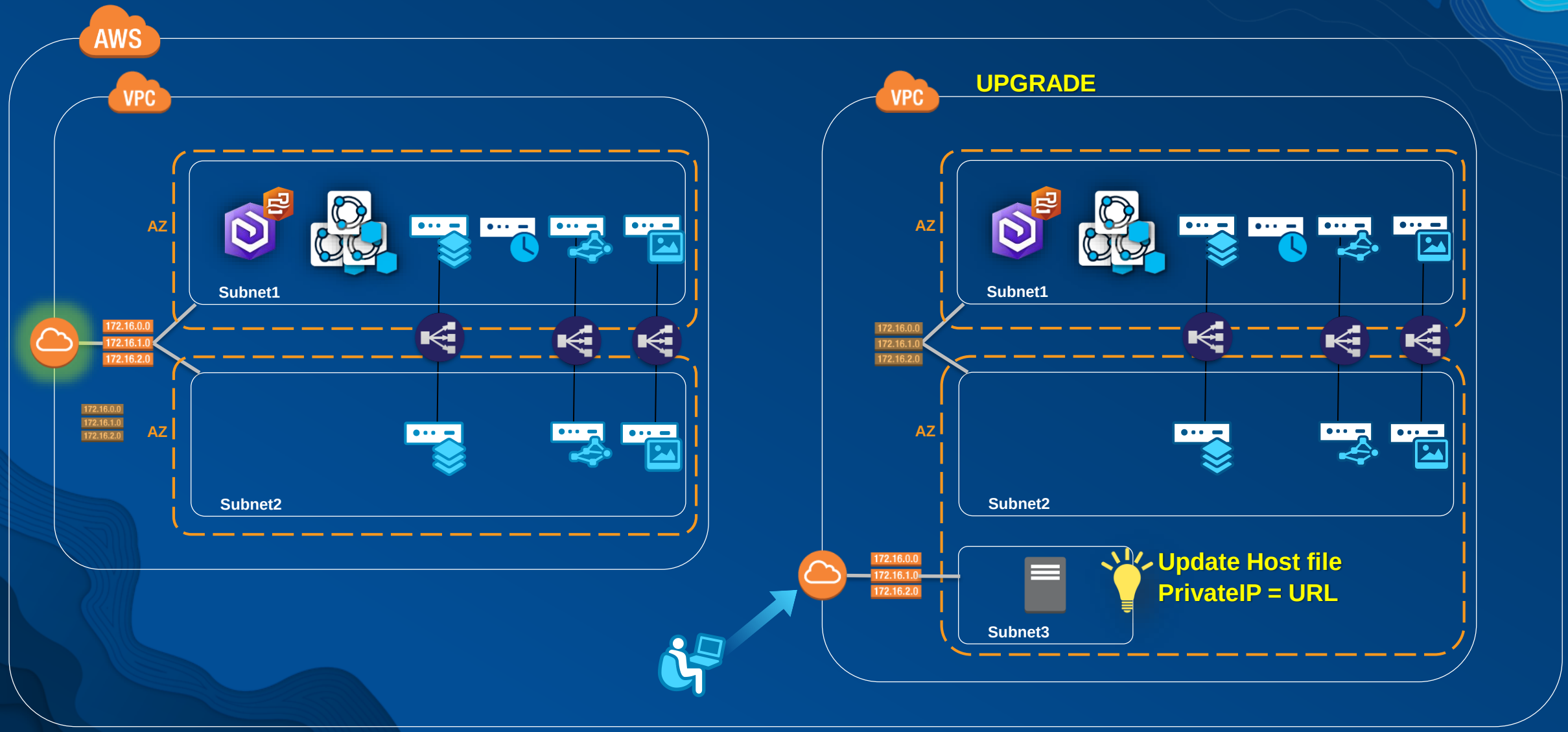
Operational Practices | Upgrades



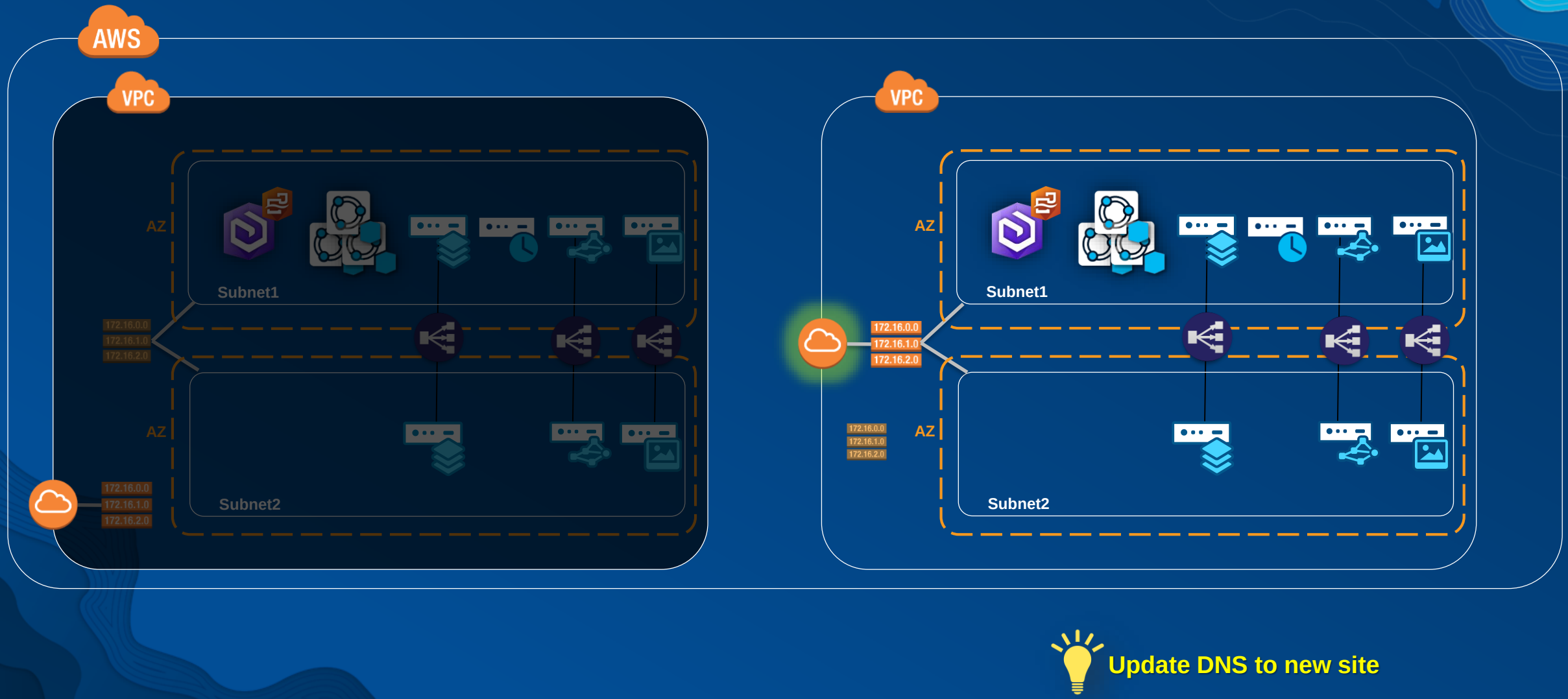
Set to Read-Only

Instances need to retain Private IP addresses

Operational Practices | Upgrades



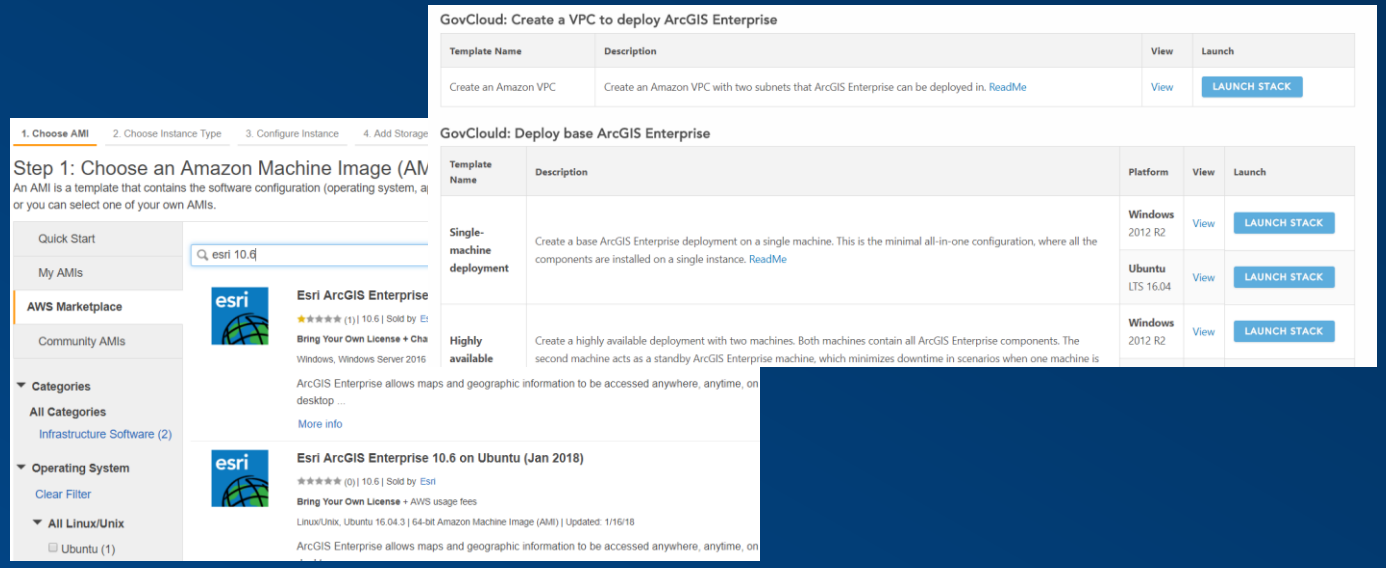
Operational Practices | Upgrades



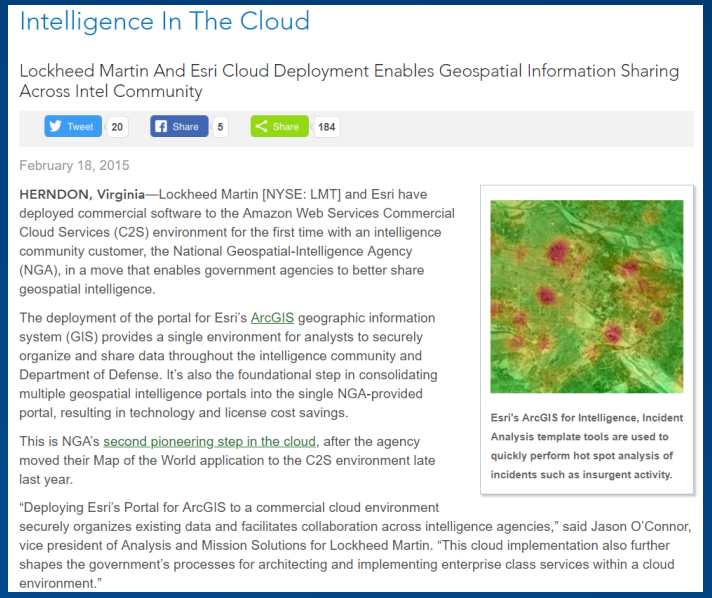
Update DNS to new site

AWS GovCloud / C2S

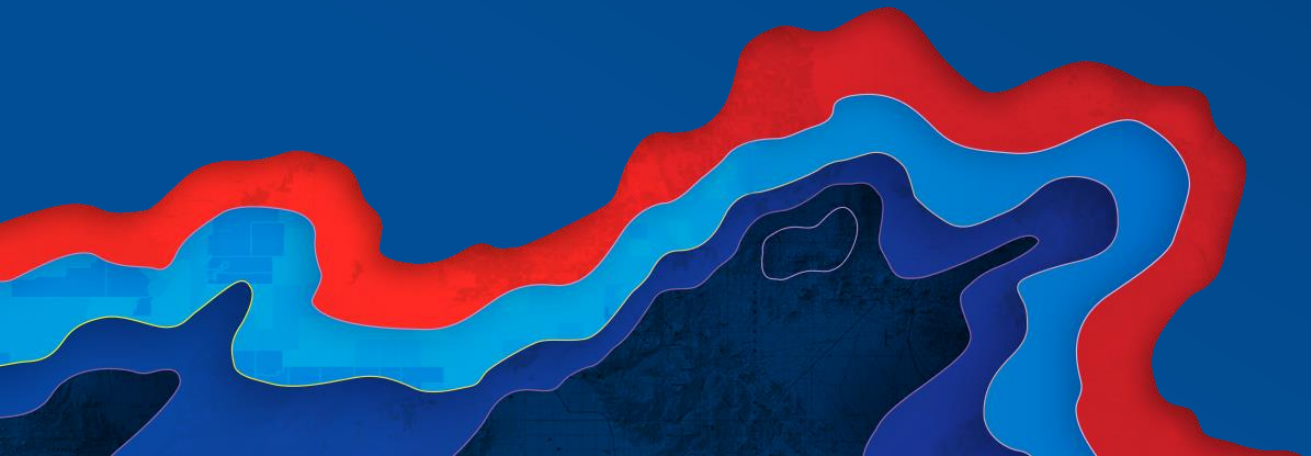
- AWS GovCloud
  - Esri AMIs in Marketplace
  - CF Templates for GovCloud



- C2S
  - Support most deployment patterns in commercial AWS
  - No official Esri AMIs exist; security dictates baseline images
  - ArcGIS Enterprise was first COTS production deployment in C2S
    - Visit NGA Booth to learn more about the IC GIS Portal



Azure ArcGIS Enterprise Offerings

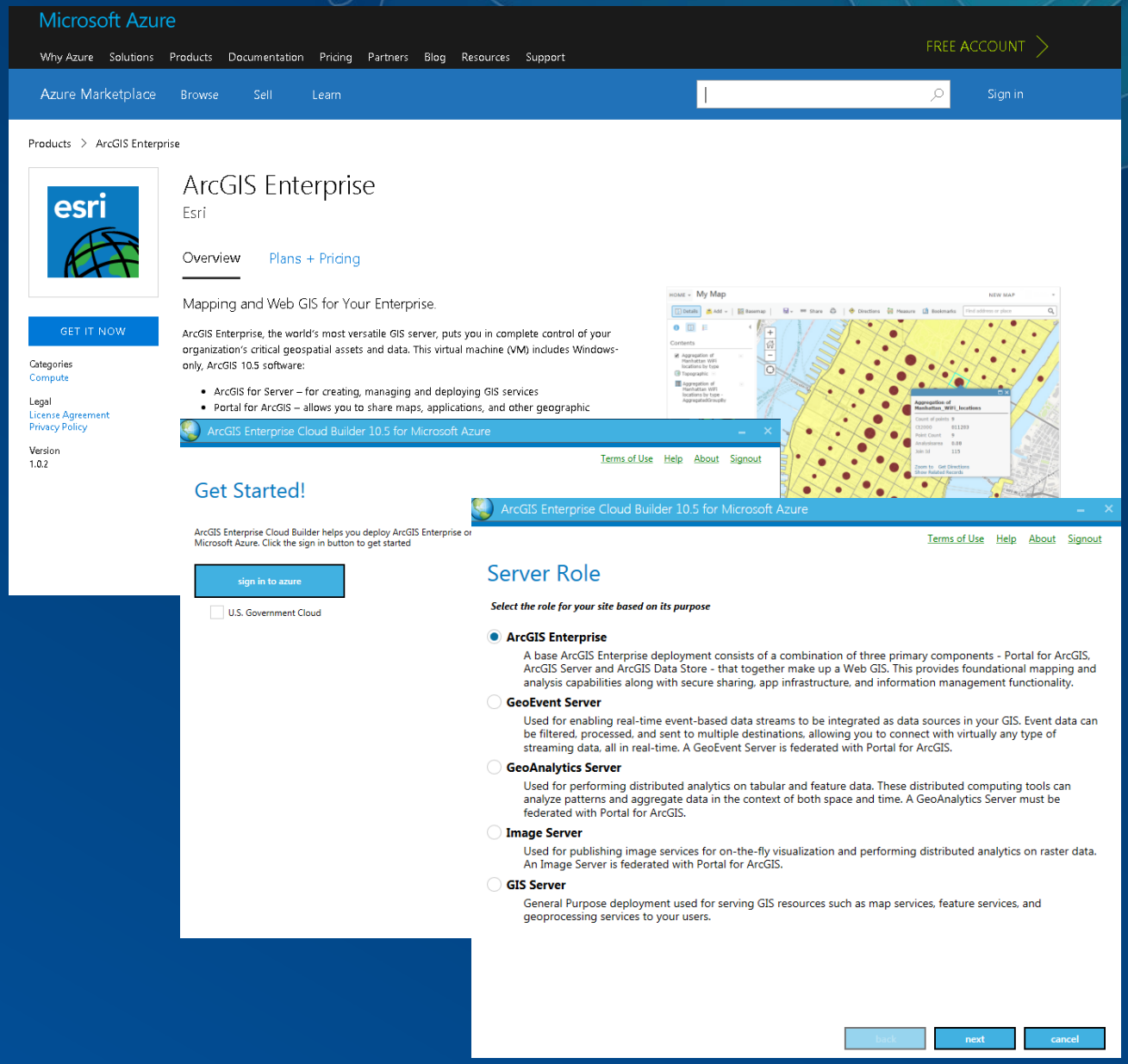


“Our mission is make deploying and managing ArcGIS Enterprise on Microsoft Azure as seamless as possible.”

- ArcGIS Enterprise Team

How do we achieve that?

- Ready to use Virtual Machine Images
  - Public Azure (36 + 6 Regions)
  - U.S. Government Cloud
- Easy to deploy and manage
  - Deployment Tools
    - Cloud Builder
    - Automation

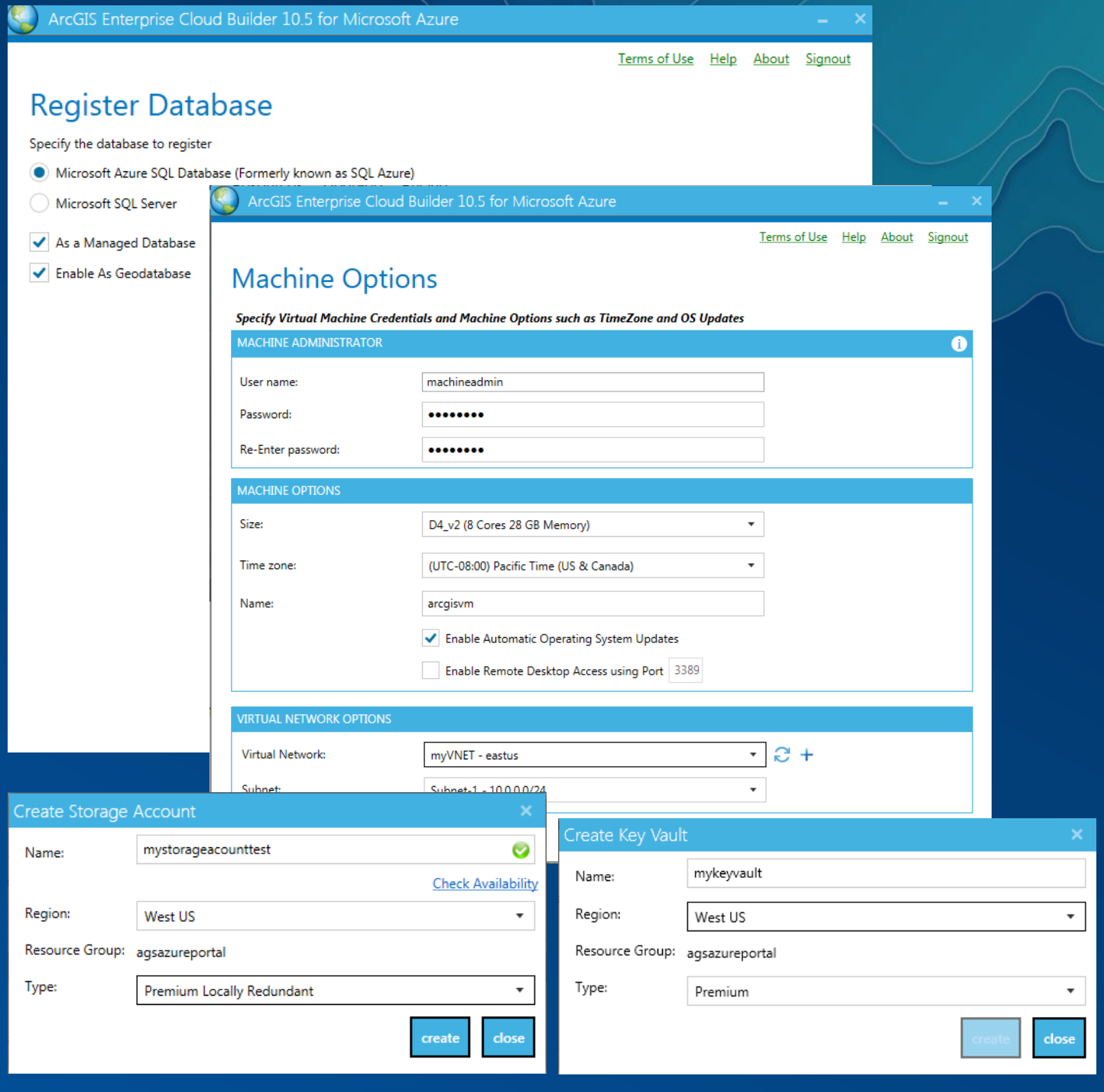


Why it is a big deal | Azure IaaS Concepts

- Resource Groups
- Load Balancers
  - Layer 7 vs Layer 4
- Traffic Rules
  - NAT (Network Address Translation) Rules
  - Load Balancer Rules, Health Probes
- Virtual Networks
  - Subnets, CIDR, Network Interfaces (NICs)
  - Network Security Groups
- Windows Firewall Configuration
- Web Server SSL Certificates
- Availability Sets/ VM Scale Sets
- Azure Key Vault
- Azure Active Directory

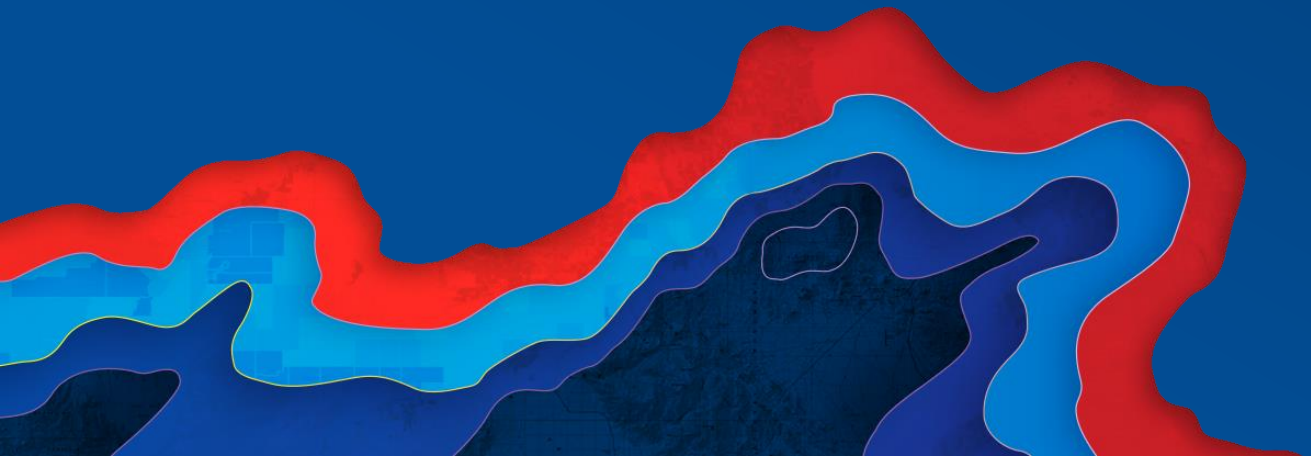
Cloud Builder

- Desktop application for Windows
- Wizard Driven Experience
  - Deployment
  - Post Deployment
- Configure Azure native features
  - Azure Managed Databases
  - Azure Key Vault
  - Azure Blob Storage
  - Azure Active Directory (10.6.1)
  - Azure Data Lake Store (10.7)



Concepts

Site Deployments



ArcGIS Enterprise Sites

Portal for ArcGIS

Hosting Server Site

Server Sites

ArcGIS GIS Server Site

ArcGIS Image Server Site

ArcGIS GeoEvent Server Site

ArcGIS GeoAnalytics Server Site

Generic Server Site

Data Stores

ArcGIS Relational Data Store

ArcGIS Tile Cache Data Store

ArcGIS Spatiotemporal Big Data Store

Big Data File Share

Generic Data Store (Non-Esri)

Deployment Options

Single Machine

Multiple Machines

Single Tier
(All in One)

Portal for ArcGIS | Hosting Server | Reverse Proxy | ArcGIS Data Store

Multiple Tiers

Storage Options

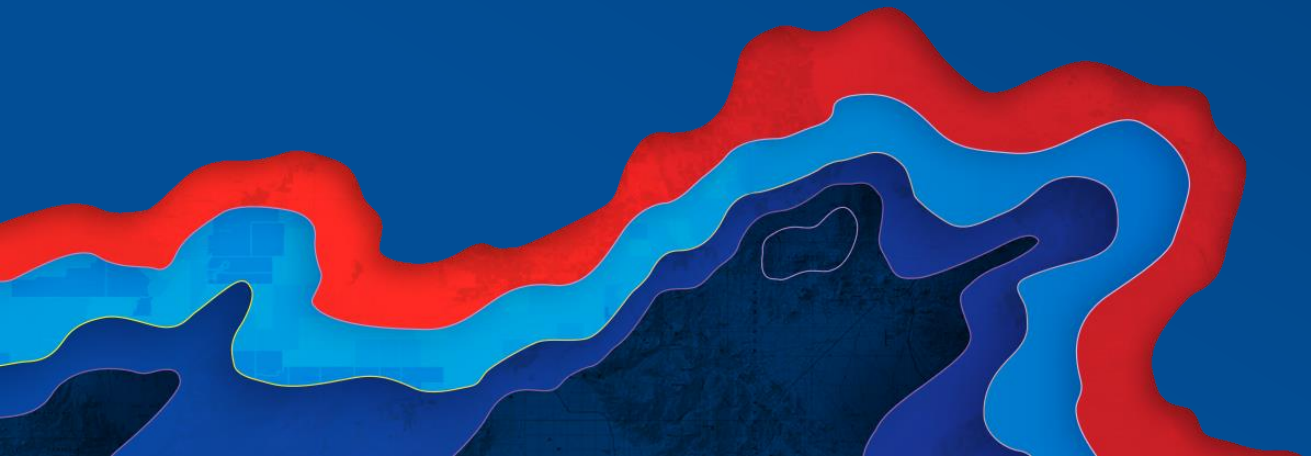
File Share

Azure Blobs + Tables

Azure Files (SMB)

Getting Started

How



Getting Started

- Get Azure subscription
  - https://azure.com
- Get ArcGIS Enterprise software license
  - https://accounts.esri.com
- Get ArcGIS Enterprise Cloud Builder (one-click application)
  - http://links.esri.com/azure/azure-cb-download

Cloud Builder

Demo

What’s New

10.5.1 and 10.6

What's New | 10.5.1

- Windows Server 2016
- Azure Blob Storage
  - Portal Content
  - GeoAnalytics Big Data File Share
- Azure Native Features
  - Azure Key Vault
  - Managed Disks
- Virtual Machine Size Picker
- Manage machines in a Site
  - Add/Remove machines from a site
  - Start/Stop/Delete
  - Manage Virtual Machine Size

Azure Storage

Azure Key Vault

Azure Managed Disks

What's New | 10.6

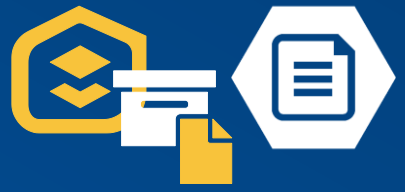
- Automation Options
  - Visual Studio
  - PowerShell
  - Azure CLI
- Deploy VMs for ArcGIS Desktop
- Support for Domain Joining Virtual Machines
- Support for Azure Files (Managed SMB service)
- Non default context (server/portal)

Visual Studio

PowerShell

Command Line

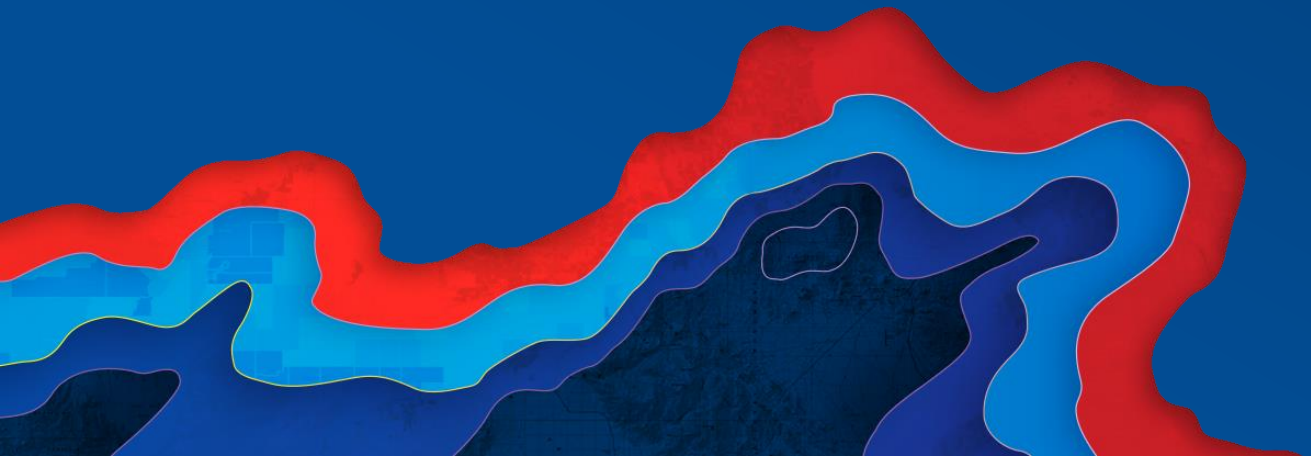
Active Directory Domain



Azure Files

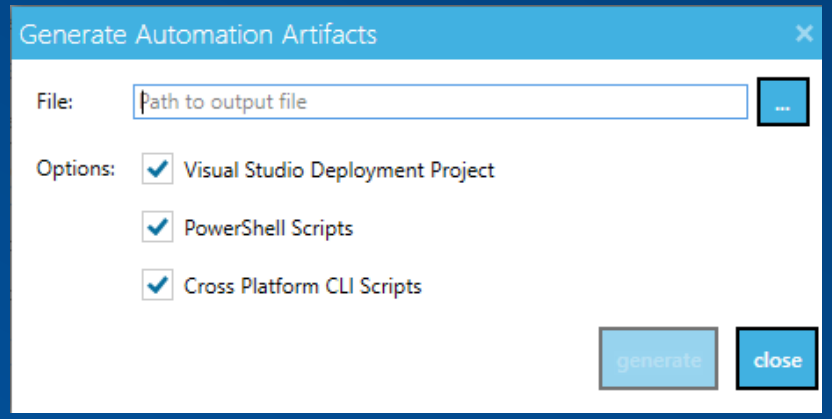
Automation

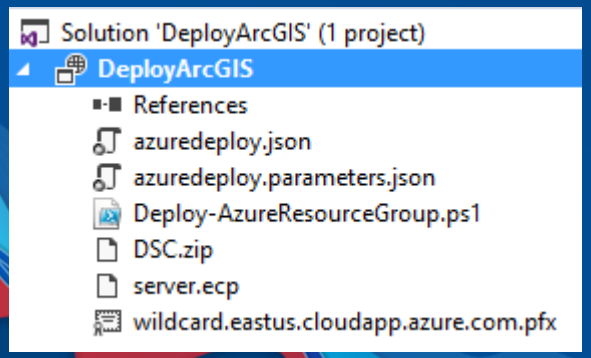
New at 10.6



Cloud Builder Overview

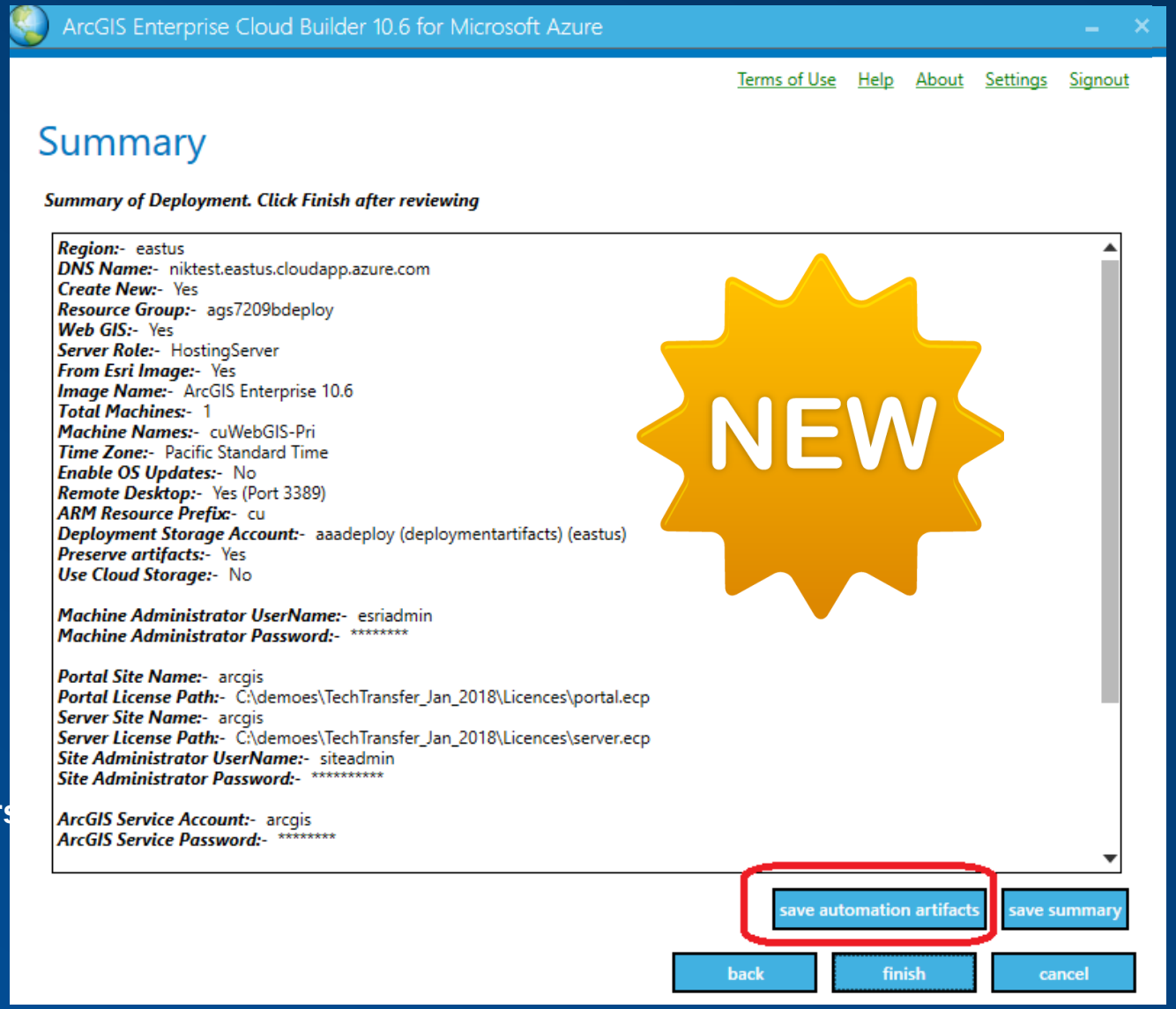
- Wizard driven deployment experience
- New at 10.6
  - Designer to generate automation artifacts





Deployment Artifacts

- **ARM Template**
- **Template Parameters**
- **Automation**
- **Licenses**
- **SSL Certificate**



Cloud Builder VS. Automation

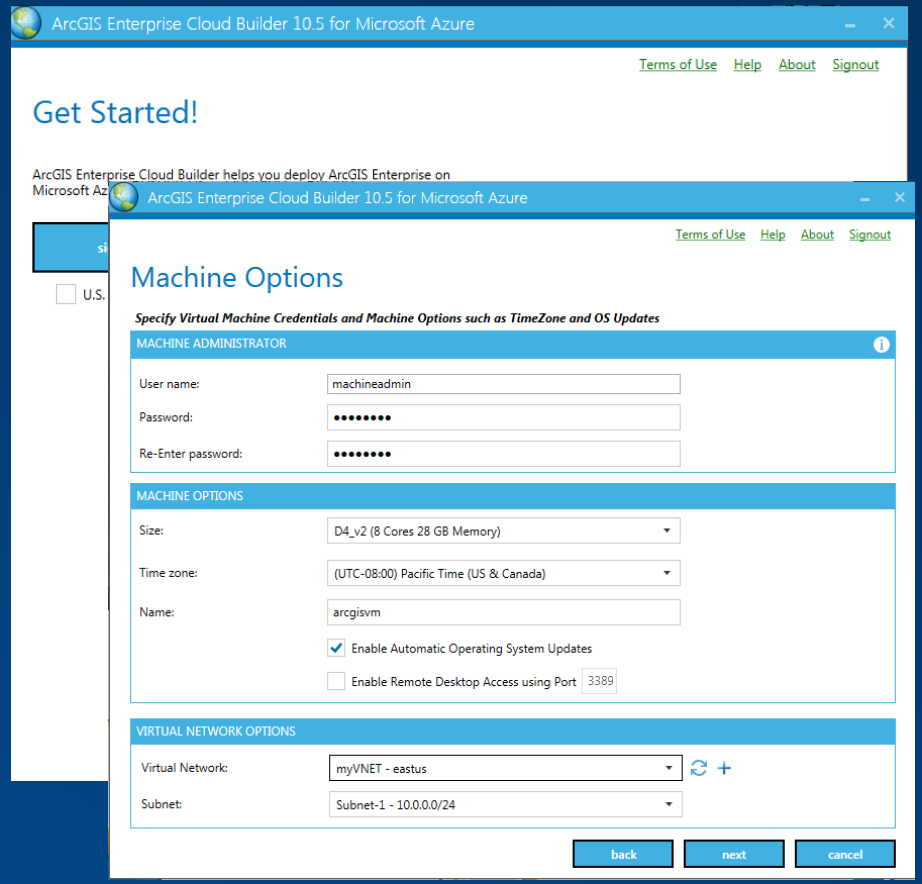
Visual Studio

BASH
THE BOURNE-AGAIN SHELL

PowerShell

Customize or Extend

Wizard Driven



Power ⟷ Simplicity

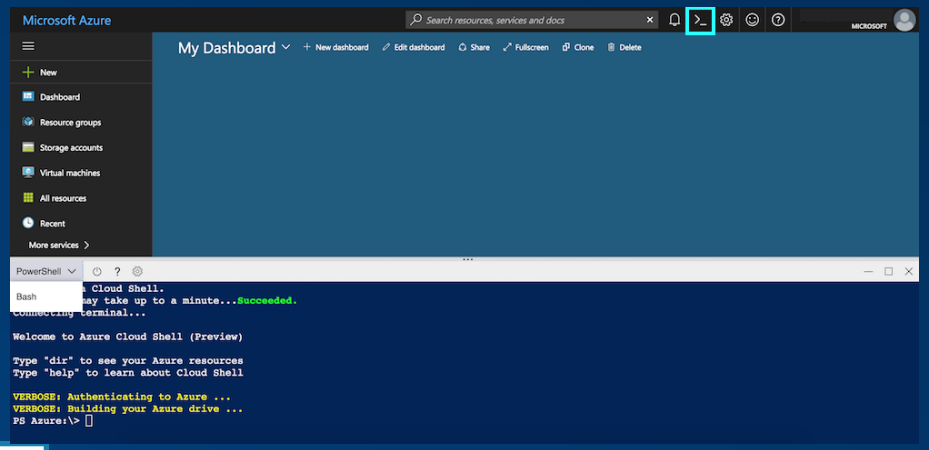
Typical Customizations and Extensibility

- Resource Naming Convention
  - Change the default names assigned by Cloud Builder (LBs, Disks, NICs etc.)
- Place machines in separate subnets
  - Cloud Builder UI limits mapping NICs to single subnet
- Configure Network Security Groups (NSGs) as part of deployment
- Integrate with Azure Monitoring
  - OMS Monitoring Extension
  - Azure Alerts
- Configure VM backup Policy
- Scheduled Maintenance
- …

Edits Outside Cloud Builder? … Training wheels are off!

Integrate with …

Azure Cloud Shell



PowerShell DSC

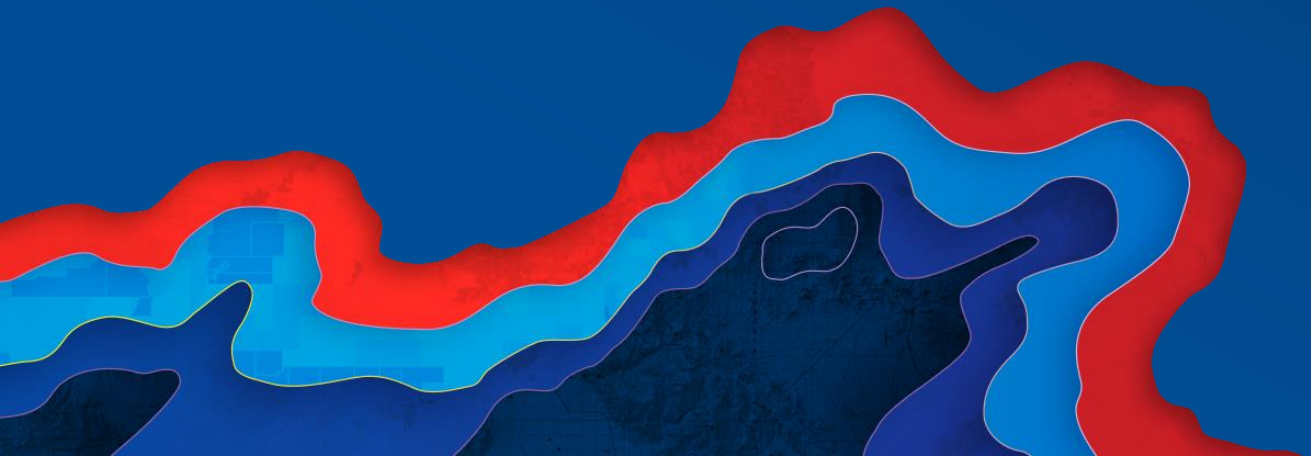
Travis CI

Automation

Demo

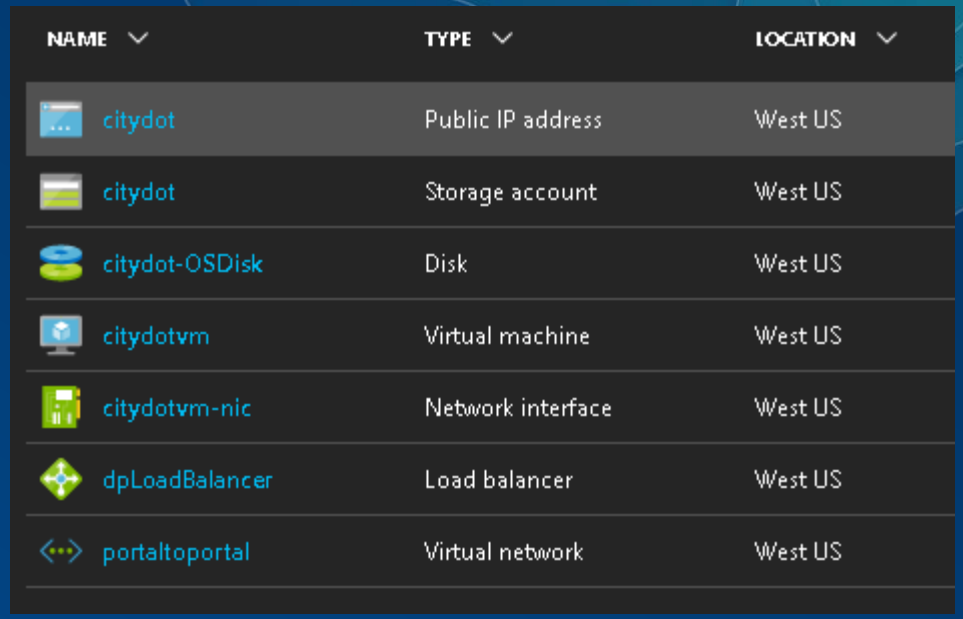
Under the hood

How Cloud Builder Works



Two Responsibilities

- Provision Infrastructure Resources
  - Azure Resource Manager (ARM) API
  - Imperative (10.5.1) /Declarative (10.6)



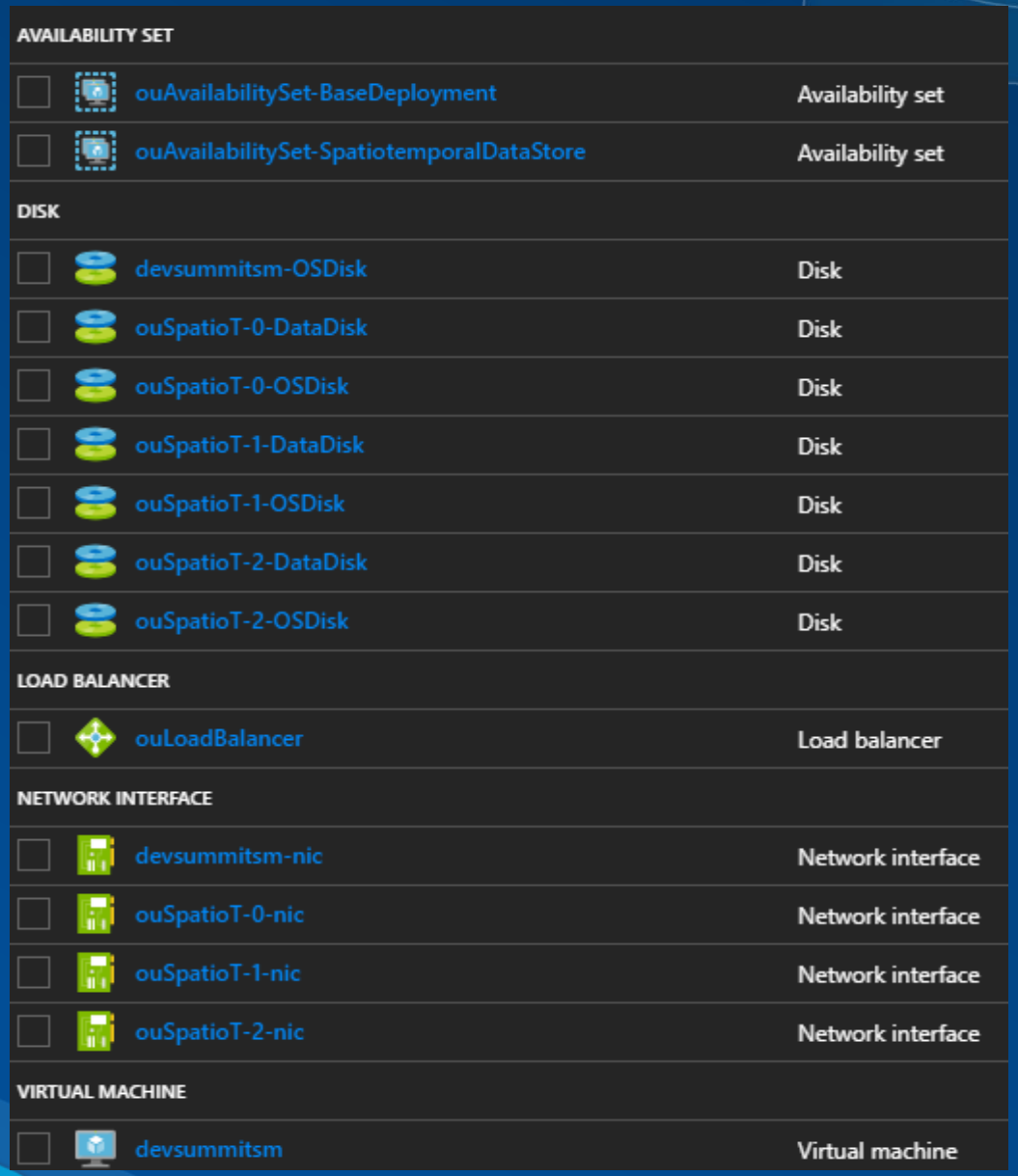
NAME	TYPE	LOCATION
citydot	Public IP address	West US
citydot	Storage account	West US
citydot-OSDisk	Disk	West US
citydotvm	Virtual machine	West US
citydotvm-nic	Network interface	West US
dpLoadBalancer	Load balancer	West US
portaltoportal	Virtual network	West US

- Trigger In-VM Configuration of ArcGIS Components
  - Automation using PowerShell Desired State Configuration (DSC)
  - Azure Custom Script Extension (10.5.1) or DSC Extension (10.6)

1 Provision Azure Infrastructure Resources

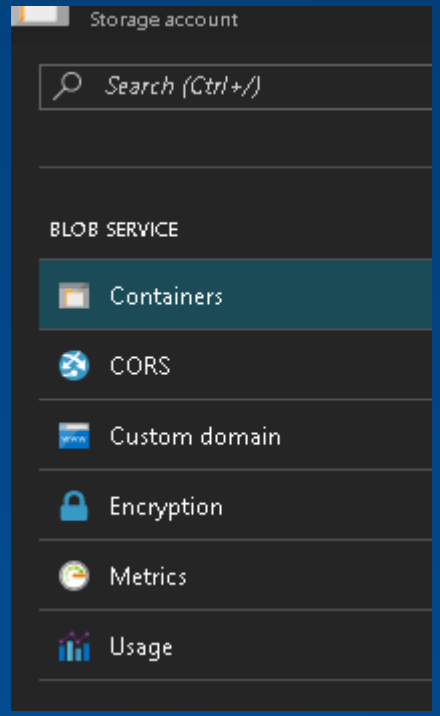
- Virtual Machines
  - Network Interfaces
  - Disks
- Availability Sets
- Load Balancers
- Virtual Networks

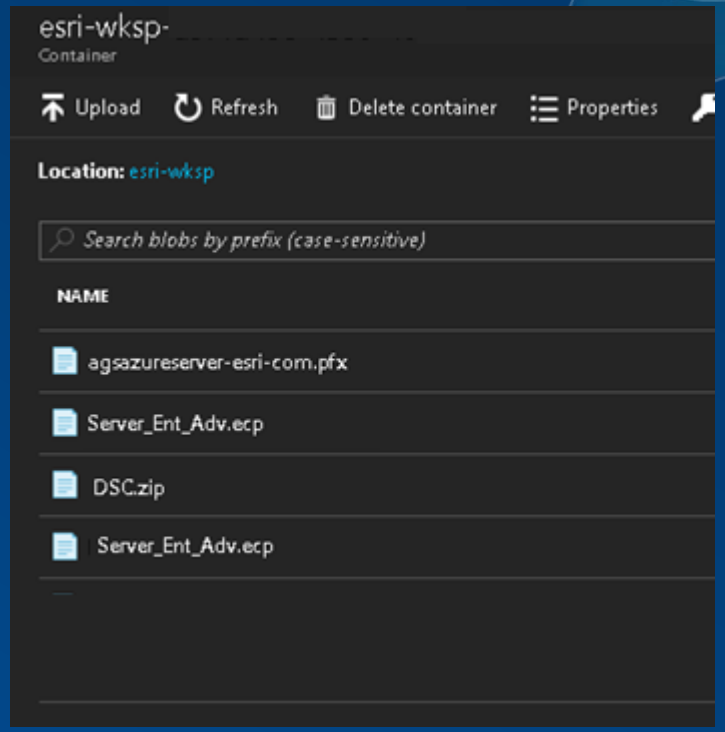
- etc



2 Stage Deployment Artifacts

- SSL Certificate
  - Certificate.pfx
- Automation Code
  - DSC.zip
- License
  - License.prvc

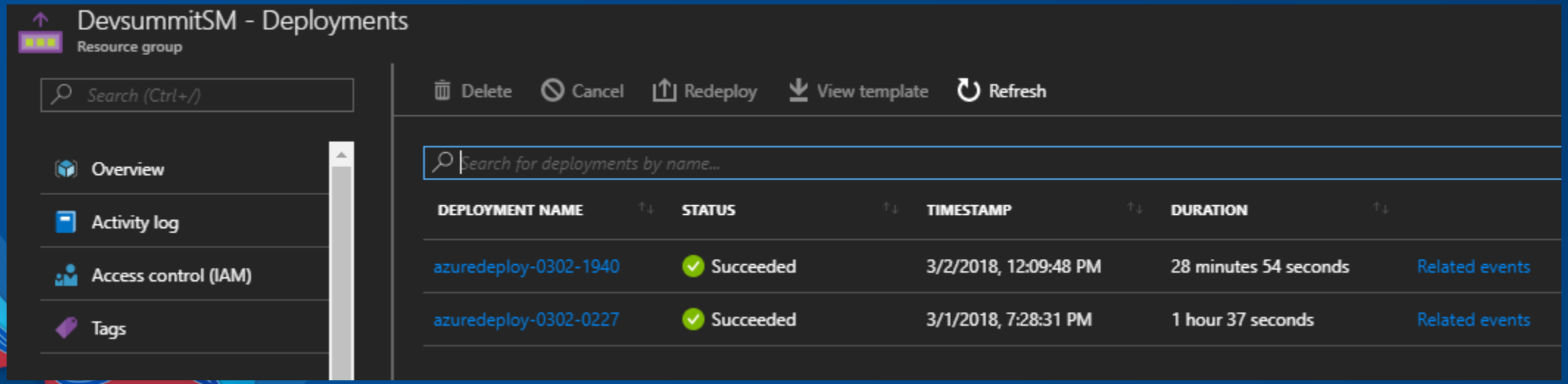




3 Trigger Deployment using ARM Template

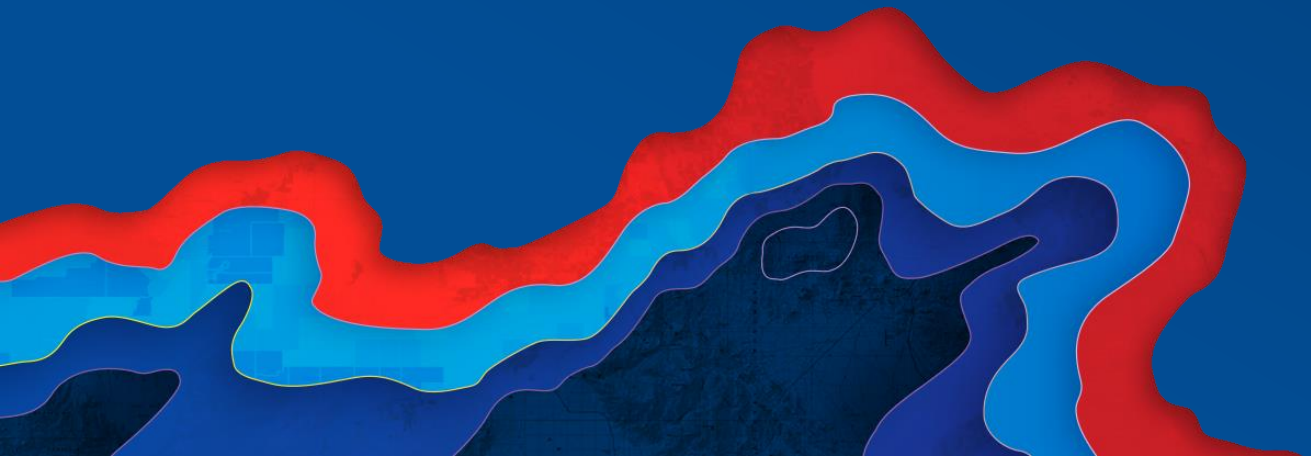
az group deployment create --name $deploymentName --resource-group $resourceGroupName --template-file 'azuredeploy.json' --parameters $paramsFile

New-AzureRmResourceGroupDeployment –Name $deploymentName -ResourceGroupName $ResourceGroupName -TemplateFile $TemplateFile -TemplateParameterFile $TemplateParametersFile



What’s Next

Planned Features for 10.6.1 and 10.7



Planned Features | 10.6.1

- Upgrades
  - Standalone GIS Servers
  - Base Deployment + Federated Servers

- Azure Database for PostgreSQL

- Enterprise Logins using Azure Active Directory

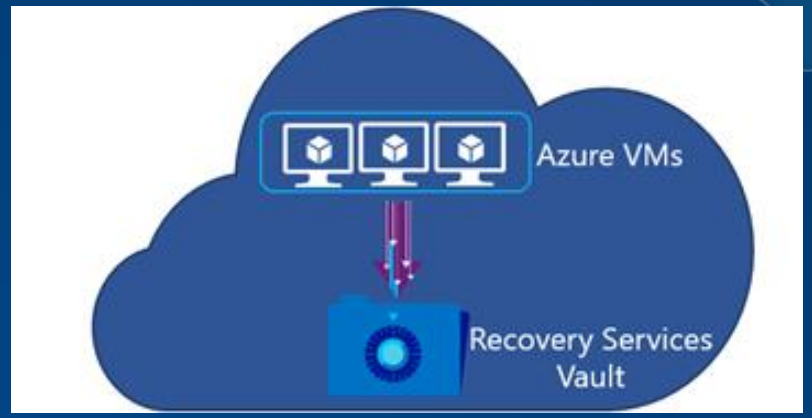
Disclaimer Subject to Change!

Planned Features | 10.7

- VM Level Backup/Restore
  - Azure Recovery Services Vault
  - In place backup/restore

- Solution Templates

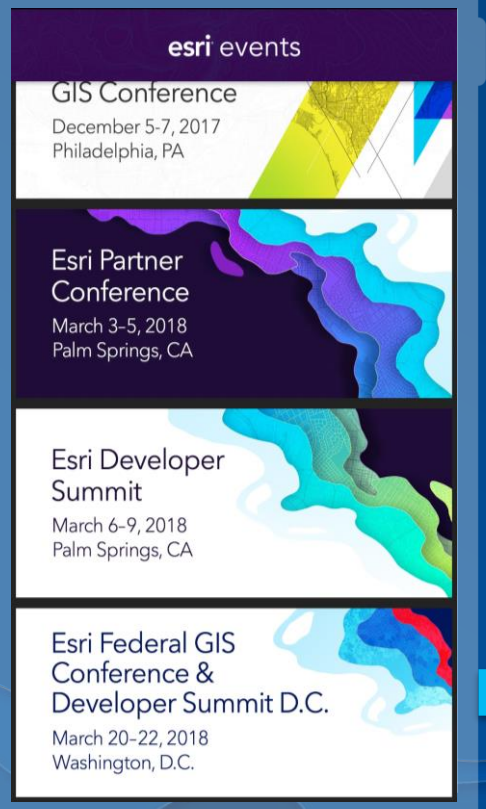
- ARM Templates on Github



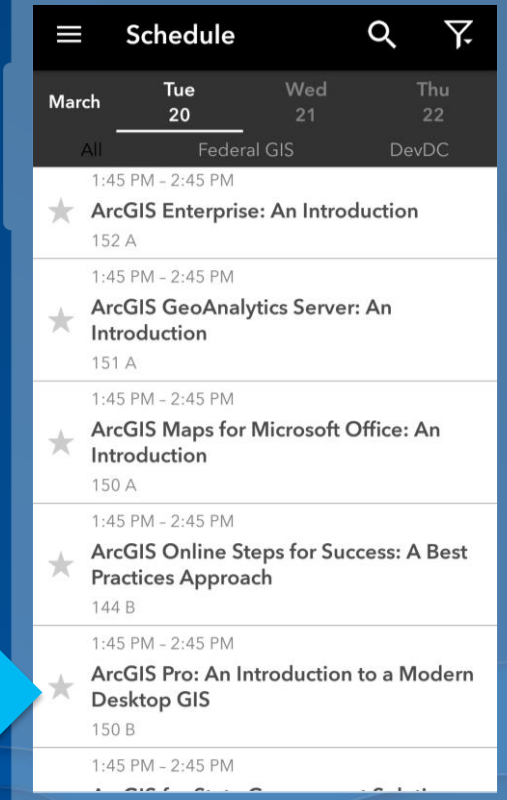
Disclaimer Subject to Change!

Please Take Our Survey in the Esri Events App

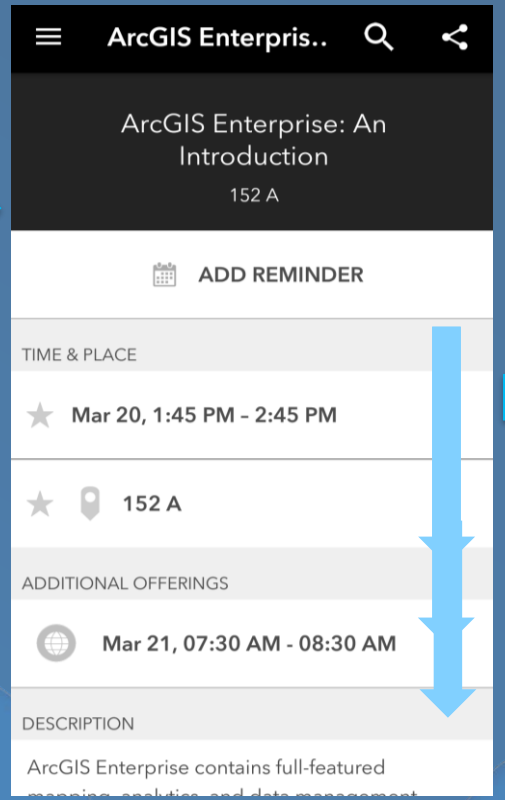
Download the Esri Events app and find your event



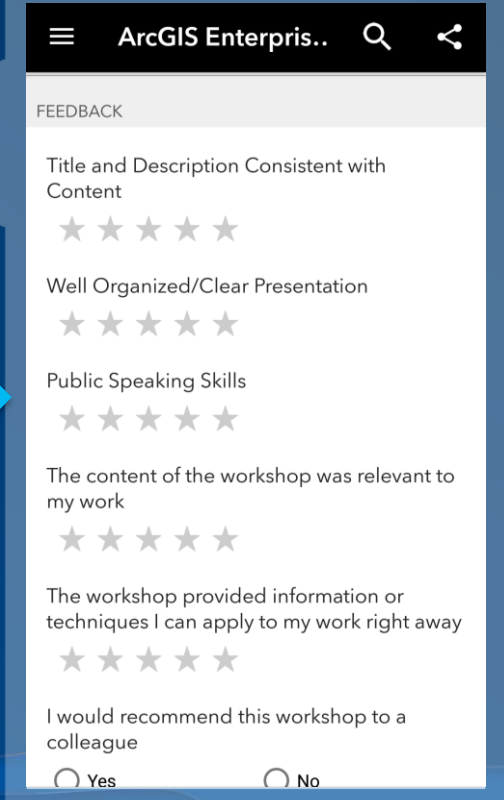
Select the session you attended



Scroll down to find the feedback section



Complete answers and select "Submit"



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