ArcGIS Enterprise: In the cloud

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ESRI EUROPEAN DEVELOPER SUMMIT

esri

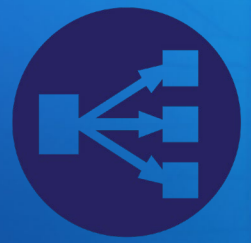
ArcGIS Enterprise

Challenges

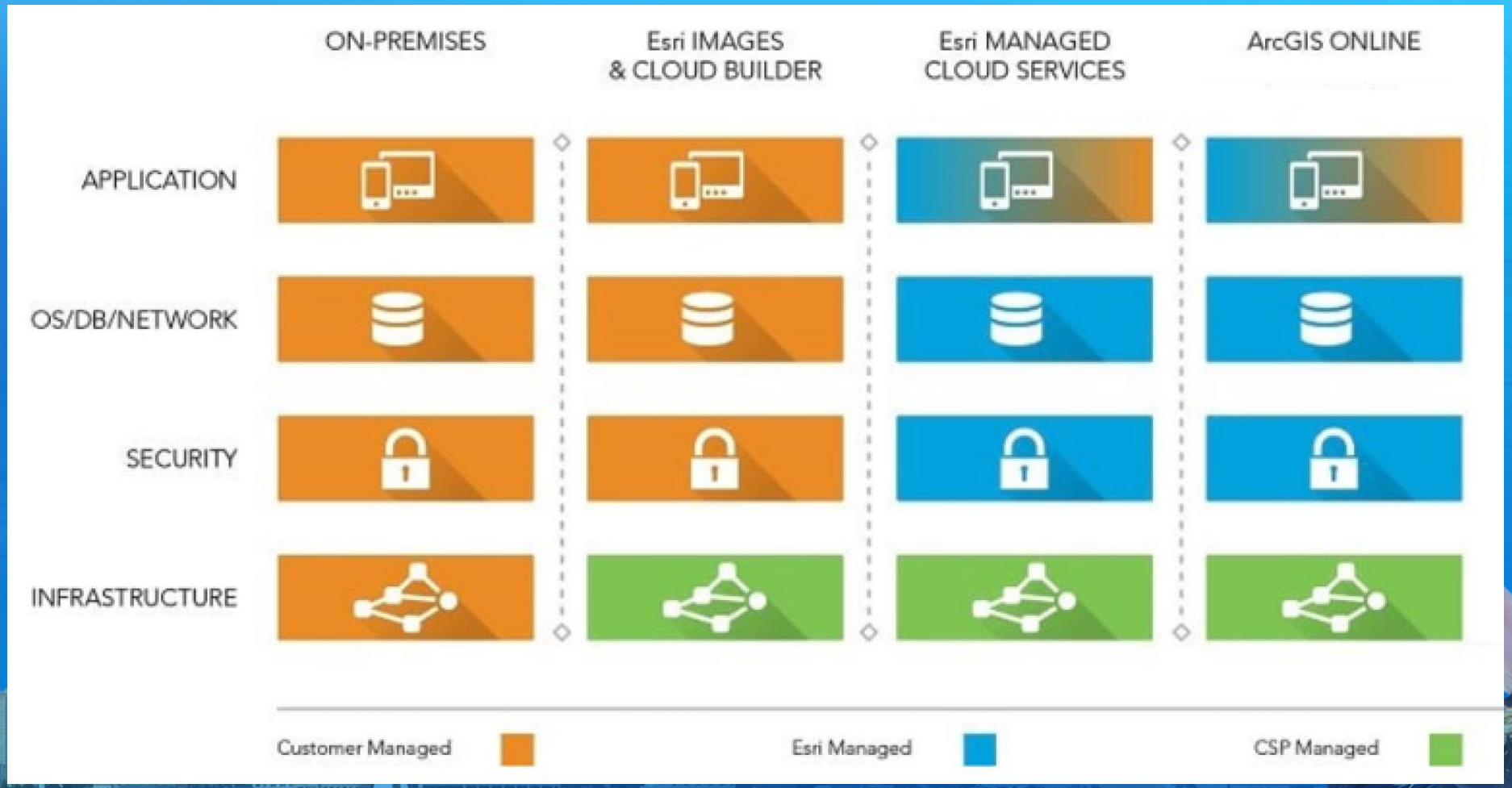
- Shrinking Budgets
- Specialist Network and Infrastructure Staff Required
- Long Lead Times to Set up New Infrastructure
- Flexibility
- Resilience
- Keeping Software up to Date

Infrastructure as a Service – (IaaS)

- Outsourced computing infrastructure



Shared Responsibility Model



Which Cloud Provider to use?

ESRI Specialized tooling available

- Why is this important?
  - Enables consistent repeatable deployments
  - Creates a record of deployed configuration

ESRI Specialized tooling available

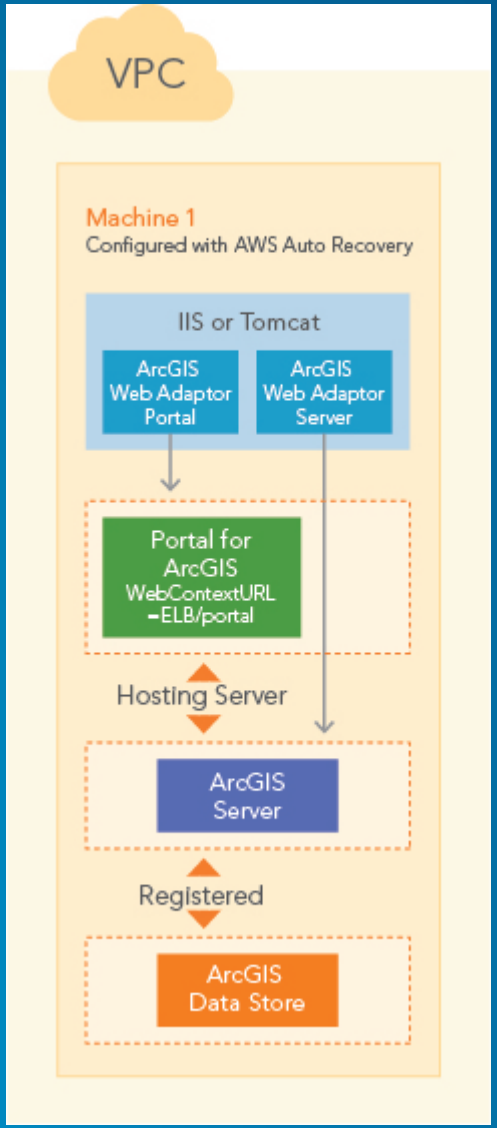
- AWS CloudFormation

- ArcGIS Enterprise Cloud Builder for Amazon Web Services

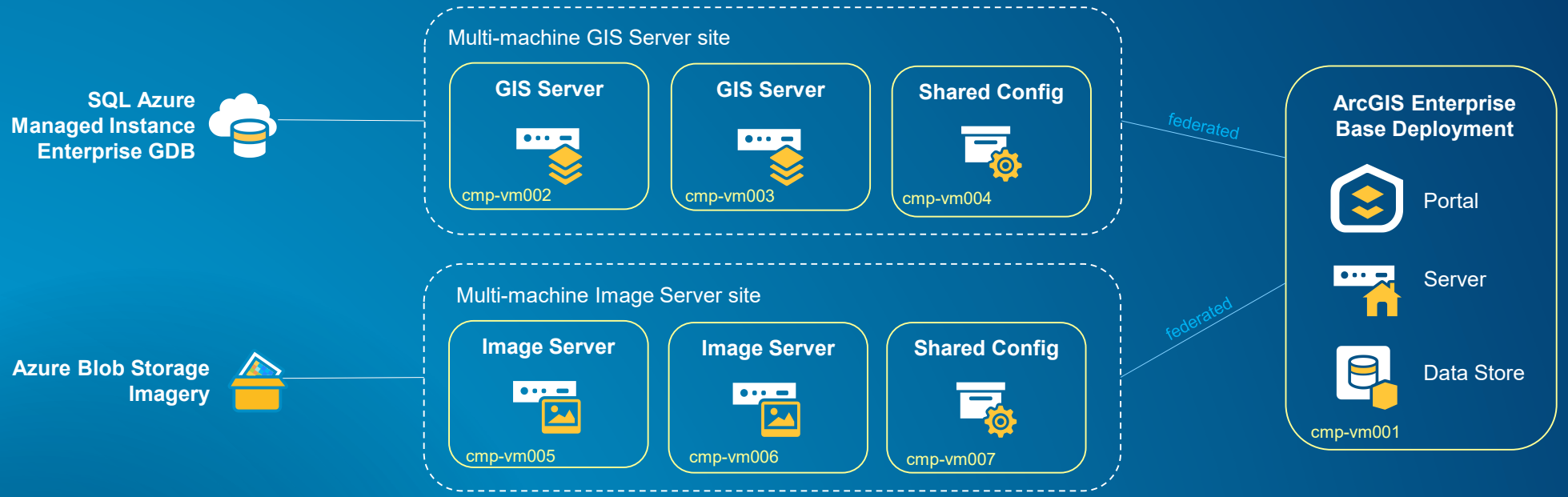
- ArcGIS Enterprise Cloud Builder for Microsoft Azure

Cloud Architectures

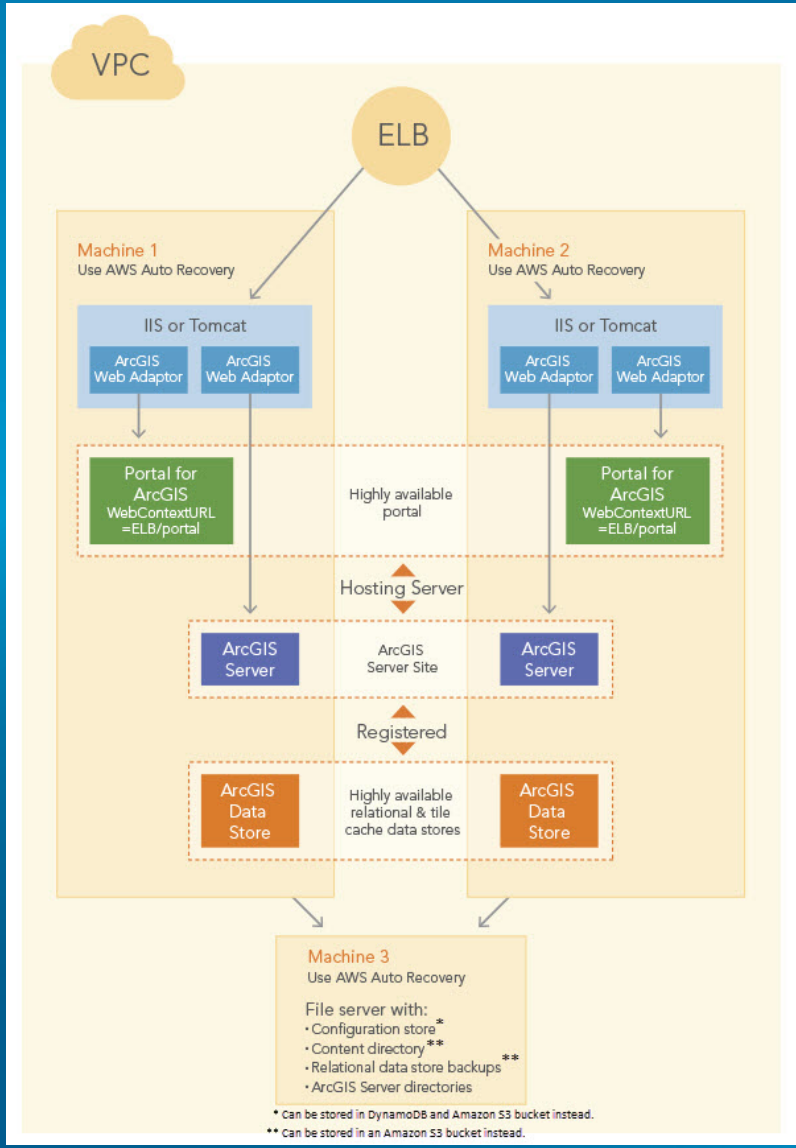
Cloud Architectures – Single-machine deployment

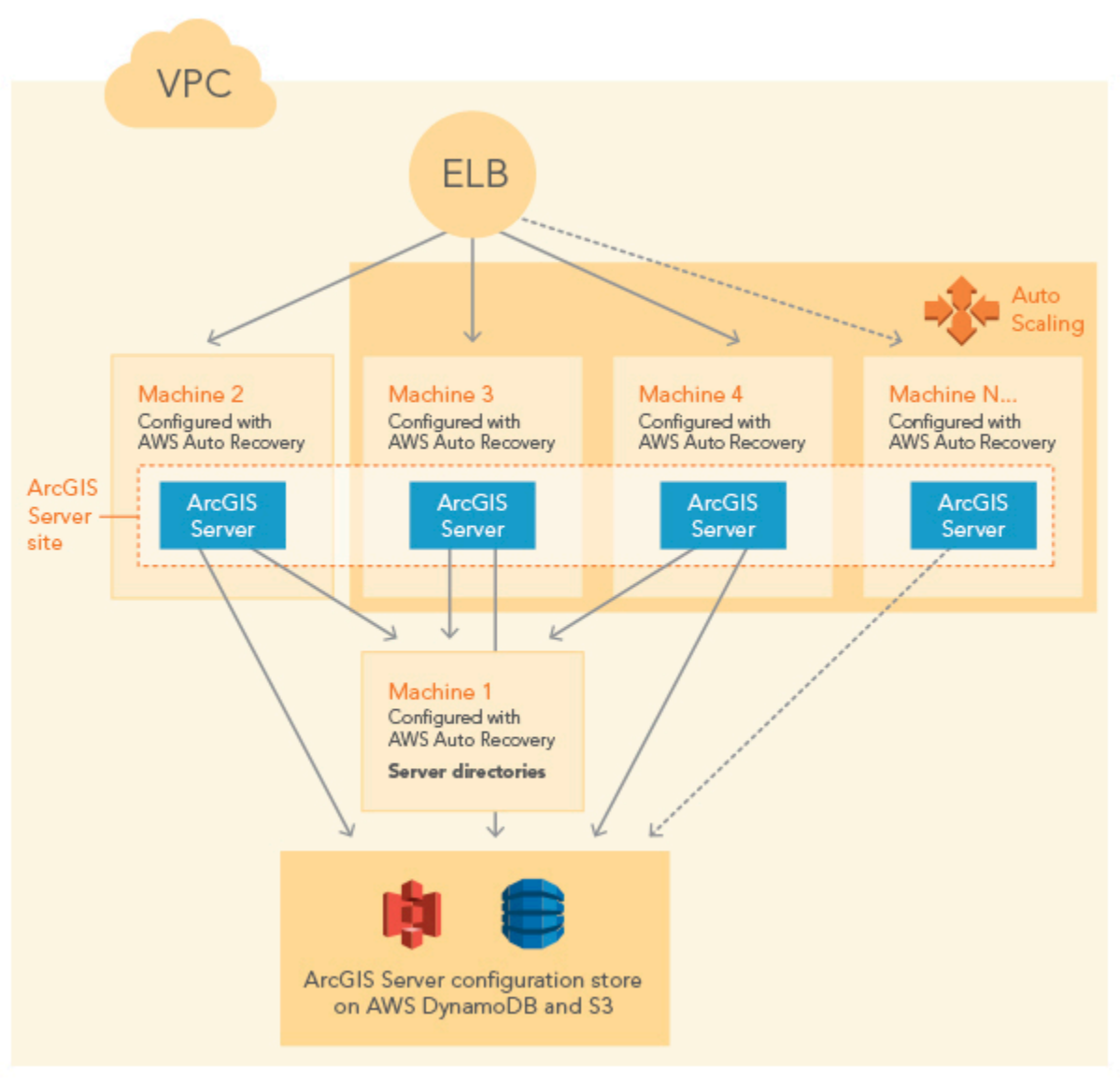


Cloud Architectures – Extended Single server ArcGIS Enterprise



Cloud Architectures – Highly Available deployment



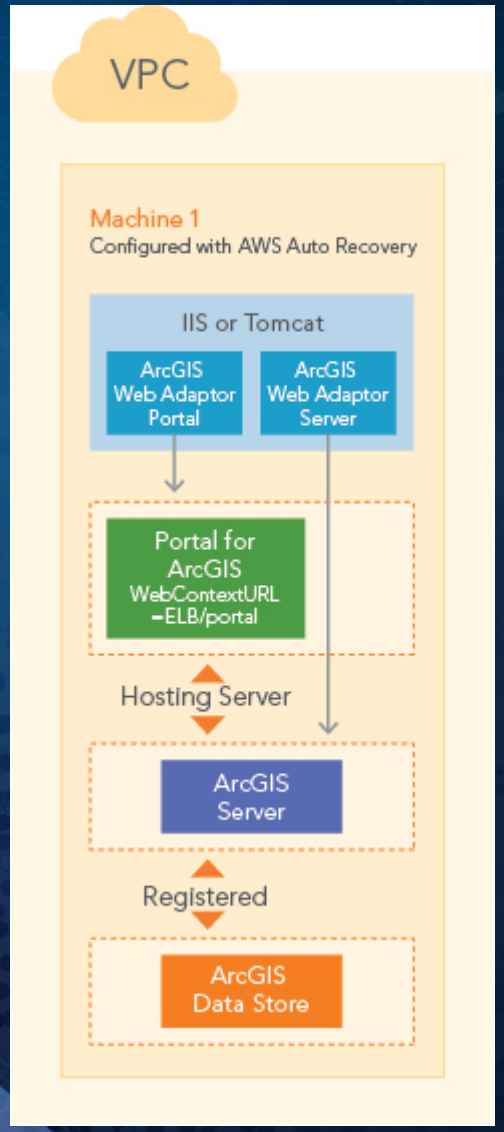


Resilience & Disaster Recovery

Use Cloud Capabilities to provide resilience, i.e.:

- Multi-region hosting and backups
- Auto-Scaling & Healing
- AWS Route 53 & Azure Traffic Manager
- Multi-region Managed Databases (i.e. RDS)
- Proven Templates & APIs

- Infrastructure as code



Understanding cost

- **AWS Simple Monthly Calculator**
  - https://calculator.s3.amazonaws.com/index.html
- **Azure Pricing Calculator**
  - https://azure.microsoft.com/en-gb/pricing/calculator/

Setting up the Networking

CloudFormation - ESRI release their own Enterprise templates

- https://arcgisstore1071.s3.amazonaws.com/11595/docs/index.html

VPC for ArcGIS Enterprise

Create an AWS VPC to deploy ArcGIS Enterprise

This template will deploy an AWS VPC that you can setup your ArcGIS Enterprise deployments in it. It will create a VPC with two public subnets.

To deploy this template, follow these steps:

- Run the template.
  Click **Launch Stack** for this template. There are a number of properties in the Parameters object that you can set:
  - AZs:Select two availability zones that you want the VPC subnets to be in. The VPC subnet will be created in these zones.
  - CIDR: For VPC CIDR. The default is 10.0.0.0/16.
  - Subnet1CIDR: CIDR block of VPC subnet 1. The default is 10.0.0.0/24.
  - Subnet2CIDR: CIDR block of VPC subnet 2. The default is 10.0.0.0/24.
- Output of the stack creation.
  After the stack is created successfully, in the **Output** stab, you'll get: **"VPCId", "Subnet1", and "Subnet2"**. These output values can be used as input in other templates for VPC information.

Template Name	Description	View	Launch
Create an Amazon VPC	Create an Amazon VPC with two subnets that ArcGIS Enterprise can be deployed in. ReadMe	View	LAUNCH STACK

VPC parameters

Template Name	Description	View	Launch
Create an Amazon VPC	Create an Amazon VPC with two subnets that ArcGIS Enterprise can be deployed in. ReadMe	View	LAUNCH STACK

Stack name
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Stack name can in

Parameters
Parameters are de

AZs
Select two availab
eu-west-1a

CIDR
VPC CIDR
10.0.0.0/16

Subnet1CIDR
CIDR block of VPC subnet 1
10.0.0.0/24

Subnet2CIDR
CIDR block of VPC subnet 2
10.0.1.0/24

Tags
You can specify ta
resource
Add tag

Permissions
Choose an IAM rol
based on your use
IAM role - optio
Choose the IAM ro
IAM role name

Advanced options
You can set additional options

Stack policy
Defines the resources that y
Stack policy - optional
A stack policy is a JSON docume
No stack policy

Rollback configura
Specify alarms for CloudFor
more.
Monitoring time - optional
Number of minutes after the op
10 Minutes
CloudWatch alarm - optio
Amazon Resource Name (ARN) c
arn:aws:cloudwatch:us-ea
Add CloudWatch alarm

Notification options
SNS topic ARN - opt
Specify an SNS To
Create new SNS

Stack creatic
Rollback on failure
Specifies whether the s
Enabled
Disabled
Timeout
The number of minutes
Minutes
Termination protect
Prevents the stack fro
Disabled
Enabled

Review E
Step 1: Specify
Template
Template URL
https://s3.ama
Stack descriptic
ArcGIS CloudFo
you create a sta
Estimate cost

Step 2: Specify
Parameters
Search pa
Key
AZs
CIDR
Subnet1CIDR
Subnet2CIDR

Step 3: Configure stack options
Tags (1)
Search tags
Key
resource

Permissions

Stack policy

Rollback configuration
Monitoring time
-
CloudWatch alarm ARN
-

Notification options
No notification options
There are no notification options defined

Stack creation options
Rollback on failure
Enabled
Timeout
-
Termination protection
Disabled

Quick-create link

Cancel | Previous | Create change set | Create stack

Setting up ArcGIS Enterprise

CloudFormation

Deploy base ArcGIS Enterprise

A base ArcGIS Enterprise deployment includes Portal for ArcGIS, a GIS Server to be used as the portal's hosting server, and a relational and a tile cache data store created through ArcGIS Data Store and registered with the portal's hosting server.

These templates create a base ArcGIS Enterprise deployment You also have the option to include a spatiotemporal big data store with your base deployment when you use the following templates.

Template Name	Description	Platform	View	Launch
Single-machine deployment	Create a base ArcGIS Enterprise deployment on a single machine. This is the minimal all-in-one configuration, where all the components are installed on a single instance. ReadMe	**Windows** 2019	View	LAUNCH STACK
		Ubuntu LTS 18.04	View	LAUNCH STACK

- **Cloud Builder**

ArcGIS Enterprise
Cloud Builder for AWS

amazon web services

ArcGIS Enterprise

Microsoft Azure

Single-machine deployment parameters

Template Na

Single-mach
deployment

Specify ten
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Amazon S

Amazon S3 UR
https://s3.an
Amazon S3 temp

S3 URL: https

Amazon EC2 Configuration

InstanceType
The EC2 instance type
m5.xlarge

BDSInstanceType
Spatio-temporal Big Data Store EC2 instance type
r5.xlarge

BDSInstances
Number of spatio-temporal Big Data Store EC2 instances
0

DriveSizeRoot
The size of the C: Drive in GB.
100

KeyName
The EC2 KeyPair to allow remote access to the instances
ESRIDevSummitTest

ArcGIS Enterprise Configuration

DeploymentBucket
S3 bucket for license files and SSL certificates
MyBucket1

ServerLicenseFile
ArcGIS Server authorization fi (must be uploaded to DeploymentBucket)
Server.prvc

PortalLicenseFile
Portal for ArcGIS authorization file (must be uploaded to DeploymentBucket)
portal.json

StoreType
ArcGIS Server config store and Portal for ArcGIS content store type
FileSystem

latform

Support Ireland

No notification options
here are no notification options defined

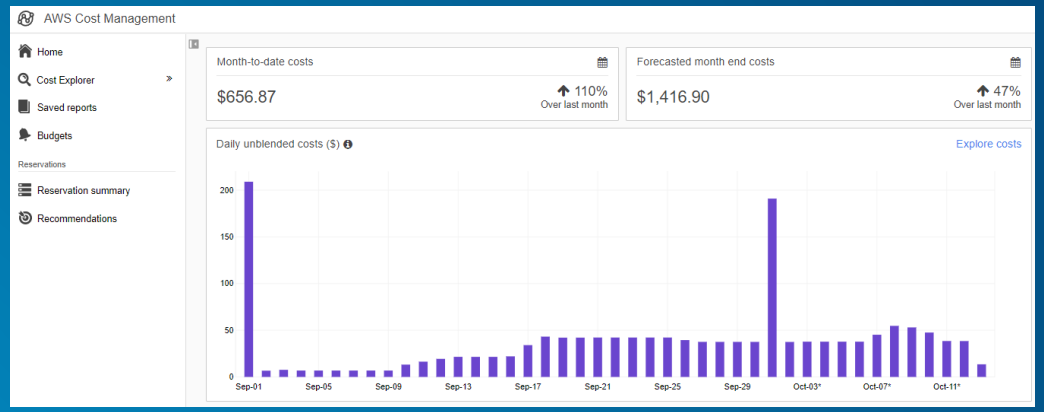
IAM::Role]
t (IAM) resources that might provide entities access to make changes to your AWS account.
nd that they have the minimum required permissions. Learn more.
reate IAM resources.

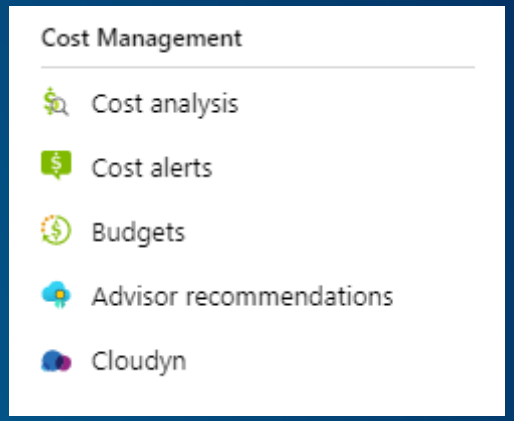
Cancel Previous Create change set Create stack

ancel Previous Next

Managing Cost in the cloud

- AWS Cost Explorer
- Azure Cost Management





- Scheduled stop/start
  - Scripted scheduled tasks
  - 3rd Party Tools

CloudRanger

skeddly

- Regular backups / rotate daily keep 7 etc

- Reserved Instances (can save upto 75%)
  - Save upto 75% compared to EC2 OnDemand hourly rates
  - Price calculated on 3 factors:
    - Instance Attributes, Term – 1 year / 3 year, Payment Options

Upgrade at 10.7: Automated

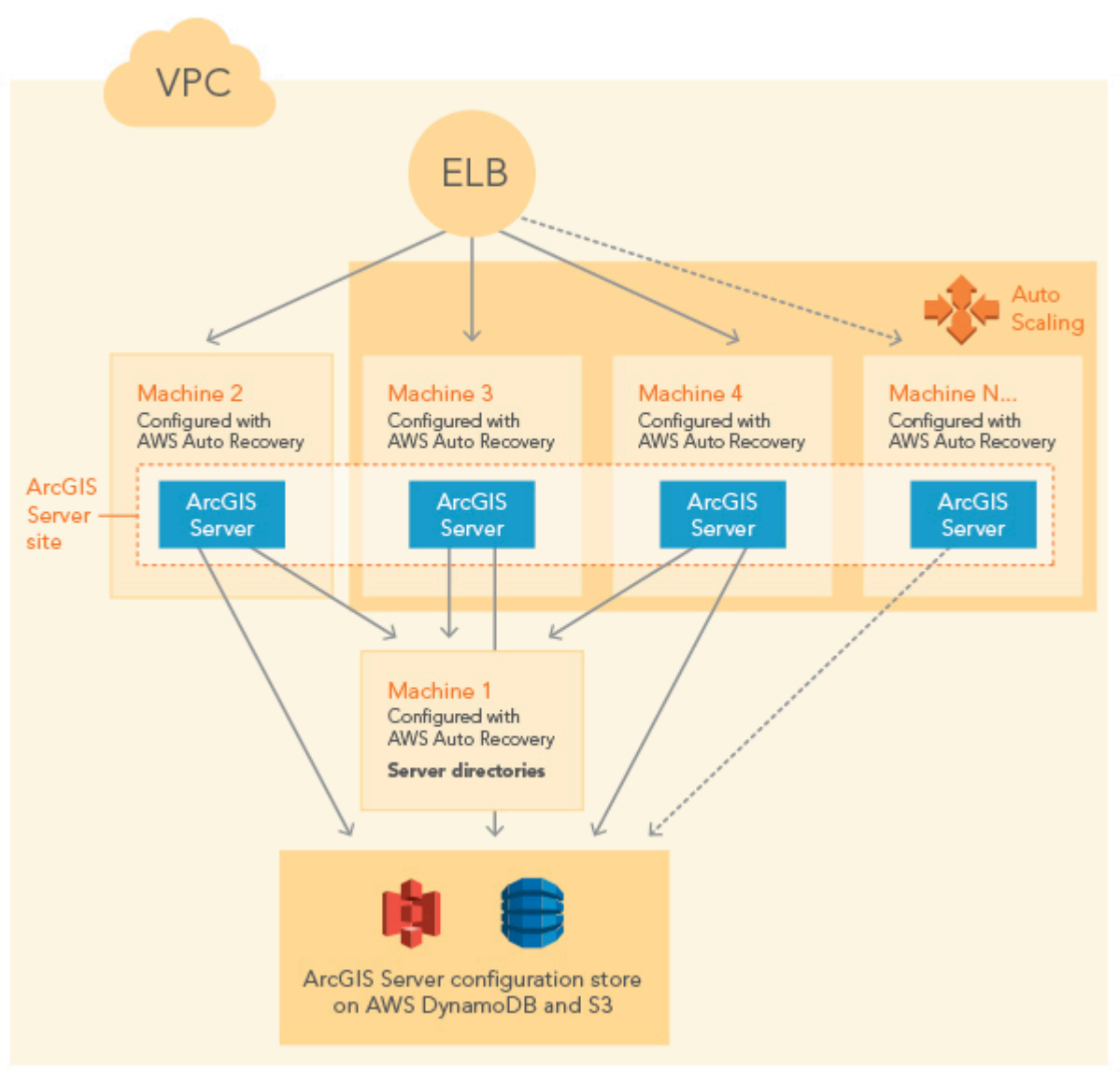
- AWS Cloud Formation update stack by providing
  - Portal license (.json)
  - Server 10.7 license
- Run update cloudformation with the template provided by Esri

Security Best Practices

- KMS Keys (Key Management Service)
  - Volume Encryption
- IAM (Identity and Access Management)
  - Enforce the principle of least privilege
- Security Group rules
  - Port restrictions
  - IP whitelists
- Penetration testing
  - ArcGIS portalScan & serverScan – python scripts
  - Fix any issues and build into a standard pattern

Scaling and Performance Optimization Options

- Add More Resources (storage)
- Change Instance Types i.e. Memory Optimised Instances (Higher RAM)
- Use paging files
- Use Auto-Scale to spread server load

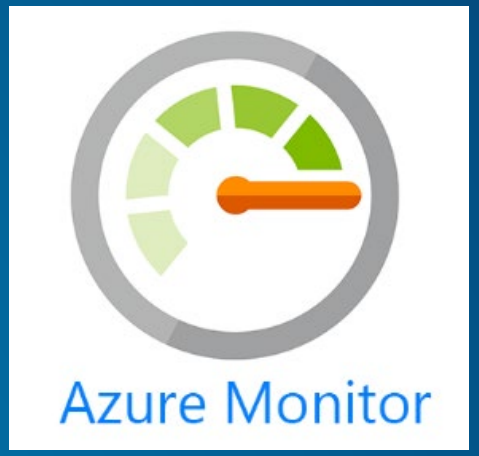


Monitoring

- Why monitor ?
  - Spot performance issues
  - View trends
  - Act rather than React !

- Levels of Monitoring
  - Endpoint
  - Infrastructure – CPU / Memory / Disk
  - Application – AGS Enterprise / AGS Server / Database

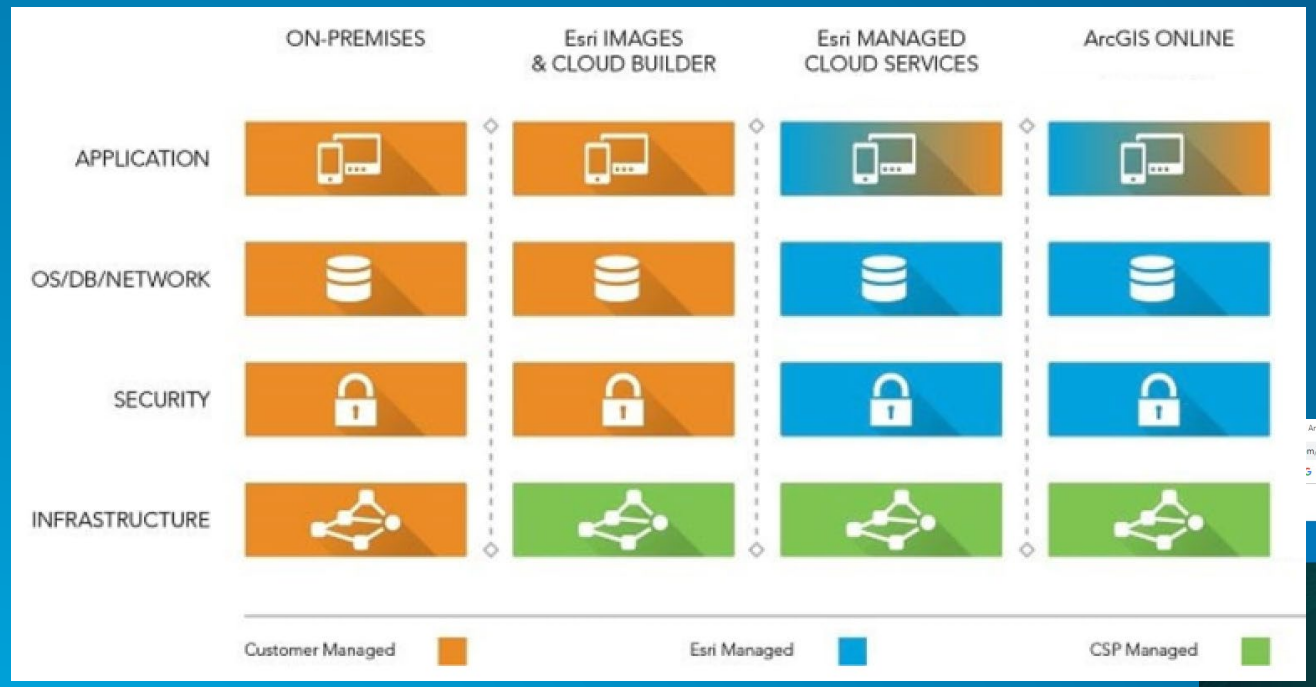
Monitoring Tools

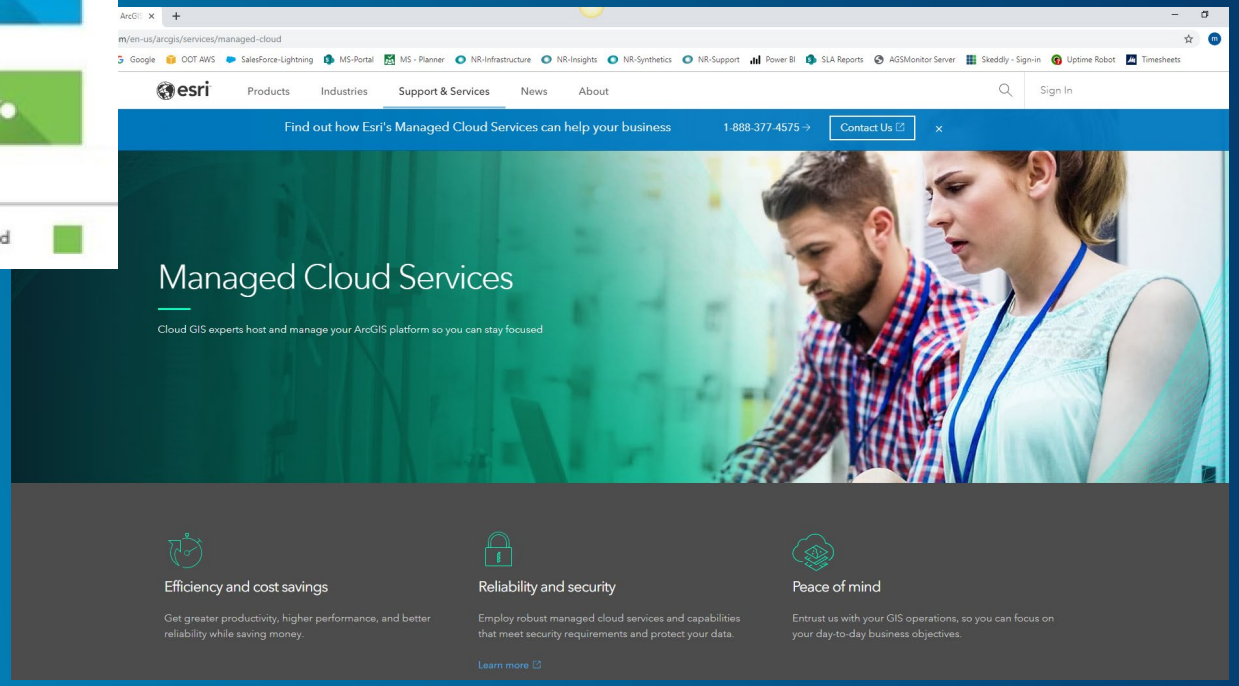


How happy is Juliet?

- Do more with her limited budget
- Limit need for specialist infrastructure and network skills
- Flexibility to scale up (or down) and try new things
- Cost effective resilience
- Easily support her ArcGIS Enterprise users.

Esri Distributors and Partners can offer Managed Cloud Services

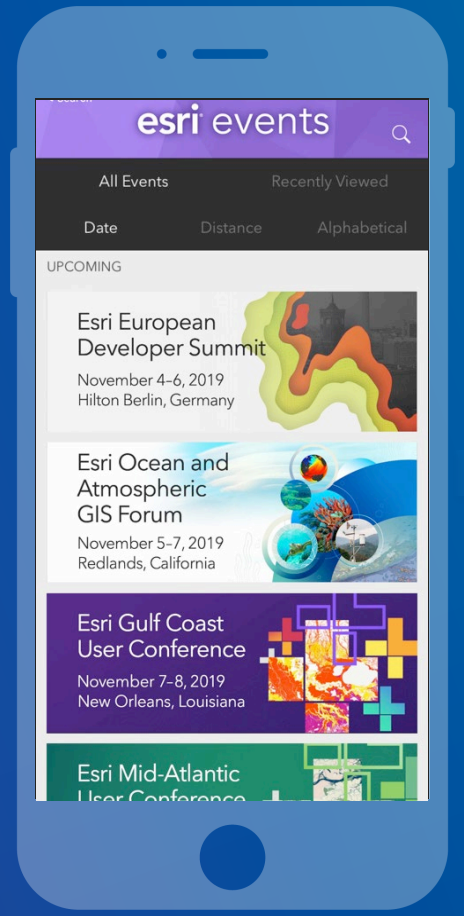




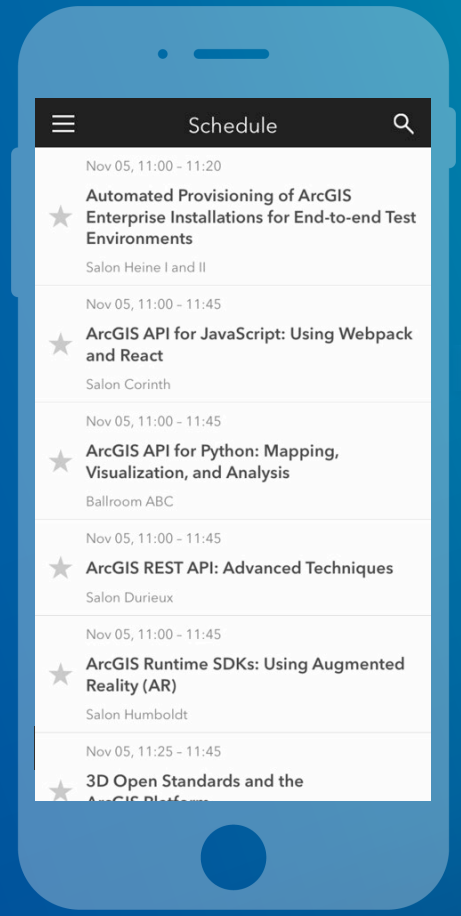
Any Questions

Please Take Our Survey on the App

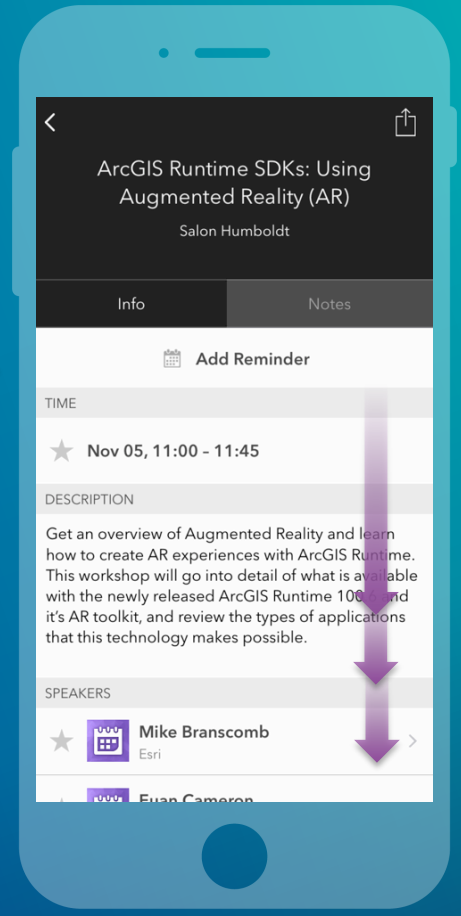
Download the Esri Events app and find your event



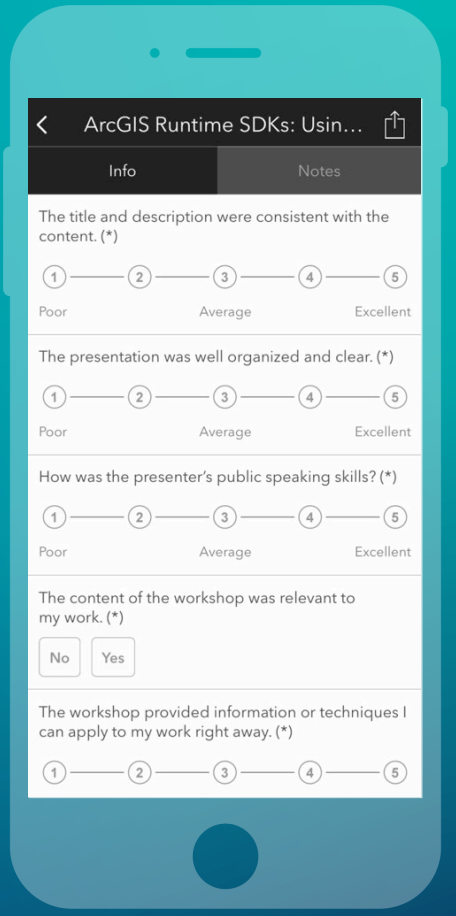
Select the session you attended



Scroll down to find the feedback section



Complete answers and select "Submit"



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Additional slide 1 – useful links

- ESRI CloudFormation Templates 10.7.1
- https://arcgisstore1071.s3.amazonaws.com/11595/docs/index.html

- ArcGIS Enterprise Cloud Builder for Amazon Web Services
- https://enterprise.arcgis.com/en/server/latest/cloud/amazon/arcgis-enterprise-cloud-builder-for-aws.htm

- ArcGIS Enterprise Cloud Builder for Microsoft Azure
- https://enterprise.arcgis.com/en/server/latest/cloud/azure/what-is-arcgis-server-cloud-builder-for-microsoft-azure.htm

- Amazon AWS
- https://aws.amazon.com/
- https://aws.amazon.com/ec2/instance-types/

- Microsoft Azure
- https://azure.microsoft.com/en-gb/

Additional slide 2 – useful links

- **AWS to Azure Services Comparison**
- https://docs.microsoft.com/en-us/azure/architecture/aws-professional/services
- **AWS Simple Monthly Calculator**
- https://calculator.s3.amazonaws.com/index.html
- **Azure Pricing Calculator**
- https://azure.microsoft.com/en-gb/pricing/calculator/
- **portalScan.py**
- https://enterprise.arcgis.com/en/portal/latest/administer/windows/scan-your-portal-for-security-best-practices.htm
- **serverScan.py**
- https://enterprise.arcgis.com/en/server/latest/administer/windows/scan-arcgis-server-for-security-best-practices.htm

Additional slide 3 – useful links

- **ArcGIS Enterprise: Cloud Operations using Amazon Web Services – Palm Springs DevSummit (March 2019)**
- https://www.esri.com/videos/watch?videoid=Wd0ah5wK2Rc&title=arcgis-enterprise-cloud-operations-using-amazon-web-services

- **Cloud Operations using Microsoft Azure – Palm Springs DevSummit (March 2019)**
- https://www.esri.com/videos/watch?videoid=iAge4J0toG4&title=arcgis-enterprise-cloud-operations-using-microsoft-azure

- **Managed Cloud Services**
- https://www.esri.com/en-us/arcgis/services/managed-cloud