

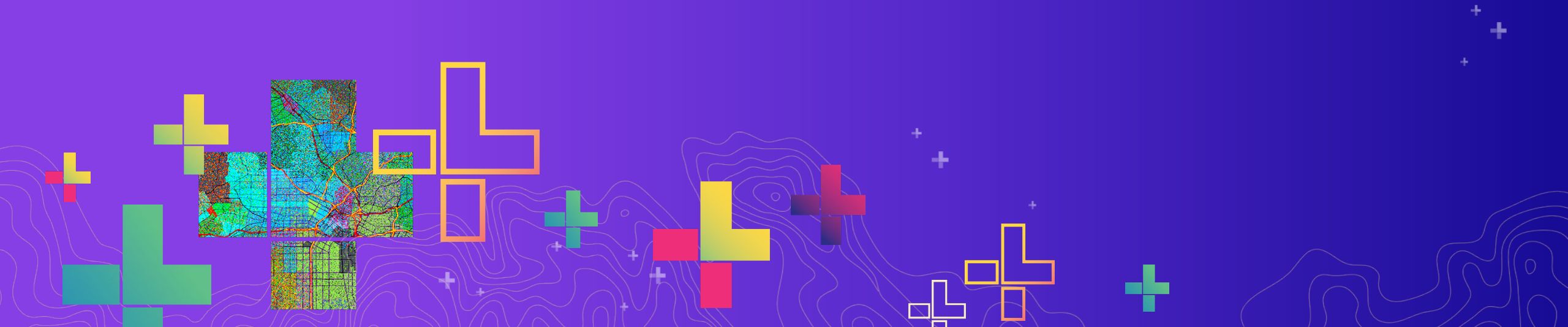


Deploying ArcGIS Enterprise in Microsoft Azure

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2020 ESRI DEVELOPER SUMMIT | Palm Springs, CA



Agenda

- Overview
 - ArcGIS Enterprise on Azure strategy
 - Deployment Options
- What's new
 - 10.7.1 and 10.8
 - Deployment Architecture Changes
- Demo
 - Cloud Builder
 - Automation
- Tips and Tricks





Overview

ArcGIS Enterprise on Microsoft Azure



“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 (54 Regions)
 - U.S. Government Cloud (Fairfax)
- Easy to deploy and manage
 - Deployment Tools
 - Cloud Builder
 - Automation

Microsoft Azure

Why Azure Solutions Products Documentation Pricing Partners Blog Resources Support

FREE ACCOUNT >

Azure Marketplace Browse Sell Learn

Products > ArcGIS Enterprise

esri

ArcGIS Enterprise

Esri

Overview Plans + Pricing

Mapping and Web GIS for Your Enterprise.

ArcGIS Enterprise, the world's most versatile GIS server, puts you in complete control of your organization's critical geospatial assets and data. This virtual machine (VM) includes Windows-only, ArcGIS 10.5 software:

- ArcGIS for Server – for creating, managing and deploying GIS services
- Portal for ArcGIS – allows you to share maps, applications, and other geographic

GET IT NOW

Categories
Compute

Legal
License Agreement
Privacy Policy

Version
1.0.2

Get Started!

ArcGIS Enterprise Cloud Builder helps you deploy ArcGIS Enterprise or Microsoft Azure. Click the sign in button to get started

sign in to azure

U.S. Government Cloud

Server Role

Select the role for your site based on its purpose

- ArcGIS Enterprise**
A base ArcGIS Enterprise deployment consists of a combination of three primary components - Portal for ArcGIS, ArcGIS Server and ArcGIS Data Store - that together make up a Web GIS. This provides foundational mapping and analysis capabilities along with secure sharing, app infrastructure, and information management functionality.
- GeoEvent Server**
Used for enabling real-time event-based data streams to be integrated as data sources in your GIS. Event data can be filtered, processed, and sent to multiple destinations, allowing you to connect with virtually any type of streaming data, all in real-time. A GeoEvent Server is federated with Portal for ArcGIS.
- GeoAnalytics Server**
Used for performing distributed analytics on tabular and feature data. These distributed computing tools can analyze patterns and aggregate data in the context of both space and time. A GeoAnalytics Server must be federated with Portal for ArcGIS.
- Image Server**
Used for publishing image services for on-the-fly visualization and performing distributed analytics on raster data. An Image Server is federated with Portal for ArcGIS.
- GIS Server**
General Purpose deployment used for serving GIS resources such as map services, feature services, and geoprocessing services to your users.

[back](#) [next](#) [cancel](#)

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 SQL Database
 - Azure Database for PostgreSQL
 - Azure SQL Managed Instance
 - Azure Key Vault
 - Azure Blob Storage
 - Azure Active Directory

The image displays four overlapping windows from the ArcGIS Enterprise Cloud Builder 10.8 for Microsoft Azure application. The top window is the 'Networking Options' screen, which includes sections for 'VIRTUAL NETWORK OPTIONS' and 'AZURE APPLICATION GATEWAY OPTIONS'. The 'AZURE APPLICATION GATEWAY OPTIONS' section shows 'New Public IP (Domain Name)' selected with the domain name 'testdemo'. The middle window is the 'Machine Options' screen, titled 'Specify virtual machine credentials and options including timeZone and automatic OS updates'. It contains a 'MACHINE ADMINISTRATOR' section with fields for 'User name' (madmin), 'Password', and 'Re-Enter password'. Below that is the 'MACHINE OPTIONS' section, which includes 'Size' (Standard_DS3_v2 4 Cores 14 GB Memory 128 GB OS Disk (SSD)), 'Time zone' (UTC-08:00 Pacific Time (US & Canada)), and 'Name' (vkWebGIS-Pri). There are checkboxes for 'Enable automatic operating system updates' (unchecked) and 'Enable remote desktop access using a separate jumpbox host and port 3389' (checked). The bottom-left window is the 'Create Storage Account' screen, with fields for 'Name' (testst), 'Region' (East US), 'Resource Group' (jeffazure - eastus), 'Type' (Geo-Redundant), and 'Kind' (Storage). The bottom-right window is the 'Create Subnet' screen, with fields for 'Name' (testsubnet), 'VNet Address Space' (10.0.0.0/16), 'Subnet Address Ranges In Use' (10.0.0.0/24, 10.0.1.0/28), and 'Subnet Address Range' (10.0.1.16/28).

What's New

10.7.1 and 10.8



Packer Templates on [github](#) | New at 10.7.1

- Build Custom Virtual Machine Images
- Industry Standard Packer (HashiCorp) technology

Follow these instructions to create a custom Microsoft Azure image to deploy ArcGIS Enterprise on Microsoft Azure.

Azure Image - Packer Build Scripts

1. **Create an Azure resource group** - During the build process, Packer creates temporary Azure resources as it builds the source virtual machine (VM). To capture that source VM for use as an image, you must define a resource group. The output from the Packer build process is stored in this resource group.

Create a resource group with `New-AzResourceGroup` Cmdlet found in Azure Az Powershell Module. The following example creates a resource group named `myResourceGroup` in the East US location:

```
New-AzResourceGroup -Name "mypackerGroup" -Location "East US"
```

To create the same resource group in the same location using Azure CLI, type the following:

```
az group create -l eastus -n "mypackerGroup"
```

For an example of creating a resource group using Azure Portal, see this [Juniper article](#).

2. **Create Azure credentials** - Packer authenticates with Azure using a service principal. An Azure service principal is a security identity that you can use with apps, services, and automation tools like Packer. You control and define the permissions as to what operations the service principal can perform in Azure. Create a service principal with `New-AzADServicePrincipal` and assign permissions for the service principal to create and manage resources with `New-AzRoleAssignment`. The value for `-DisplayName` needs to be unique; replace with your own value.

```
$sp = New-AzADServicePrincipal -DisplayName "PackerServicePrincipal"  
$BSTR = [System.Runtime.InteropServices]::SecureStringToBSTR($sp.Secret)  
$plainPassword = [System.Runtime.InteropServices]::PtrToStringAuto($BSTR)  
New-AzRoleAssignment -RoleDefinitionName Contributor -ServicePrincipalName $sp.ApplicationId
```

Deployment Architecture Change | New at 10.8

- Single hostname (endpoint) for Web GIS Deployments
 - Azure Application Gateway (Layer 7 Load Balancer)
 - Ability to use Web Application Firewall (WAF)
- Support for deployments accessible using a Private IP
- Able to deploy Tile Cache Data Store on separate tier of machines



Concepts

Site Deployments



ArcGIS Enterprise Sites

Portal for ArcGIS



Hosting Server
Site

Server Sites



ArcGIS
GIS
Server Site



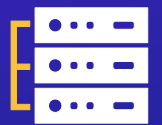
ArcGIS
Image
Server Site



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

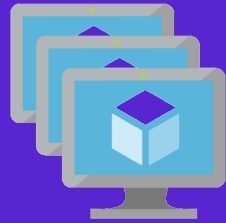


Generic Data Store
(Non-Esri)

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)

Deployment Patterns

Comparing V1 and V2



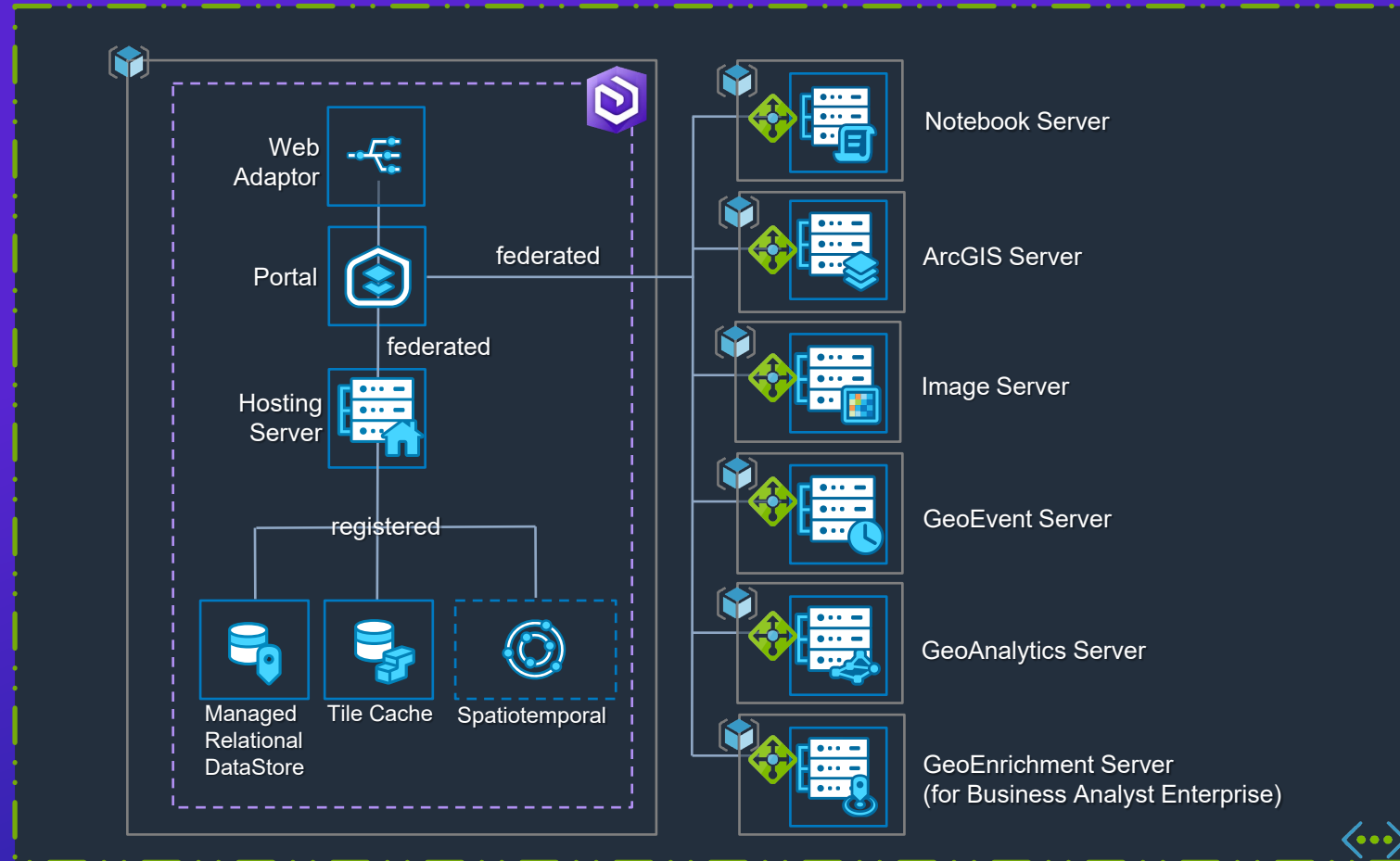
Deployment Patterns

System Architecture



Deployment Concepts | Conceptual Software Architecture

V1



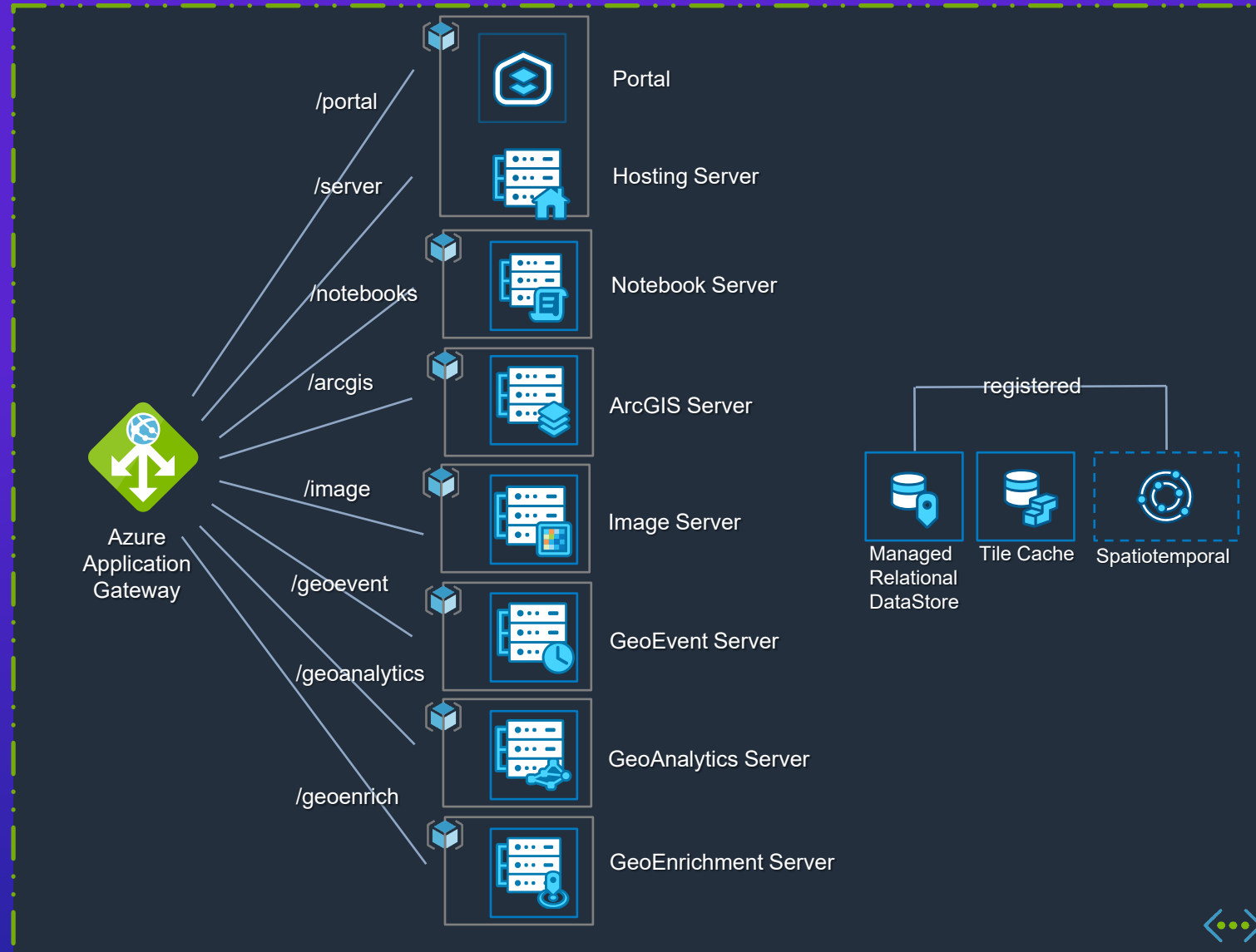
ALL federated ArcGIS Server Roles

- Fully qualified domain name (FQDN)

Deployment Concepts | Conceptual Software Architecture

V2

ALL federated ArcGIS Server Roles
- Single (FQDN)

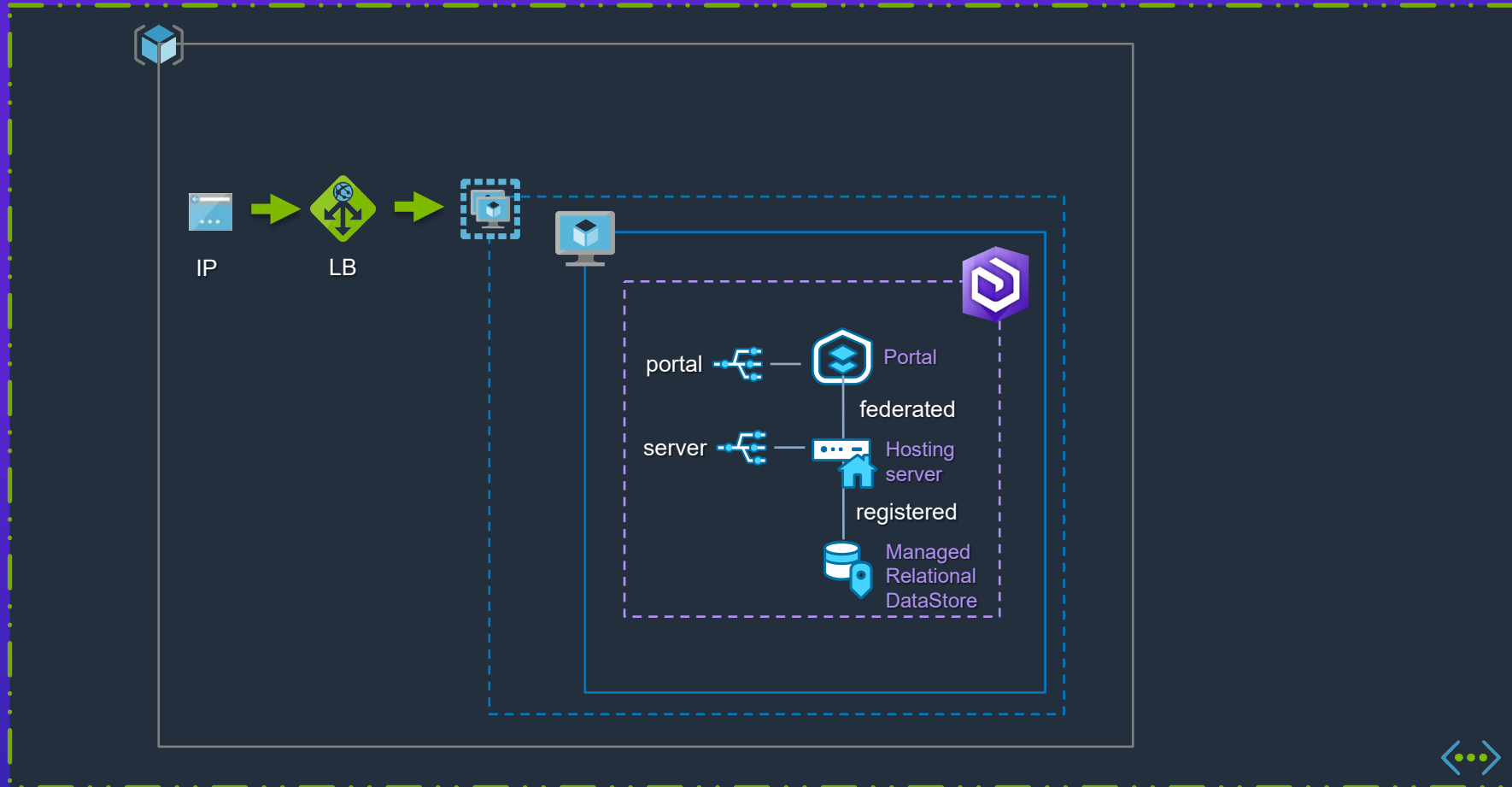


Deployment Patterns

Single Tier Base Deployment

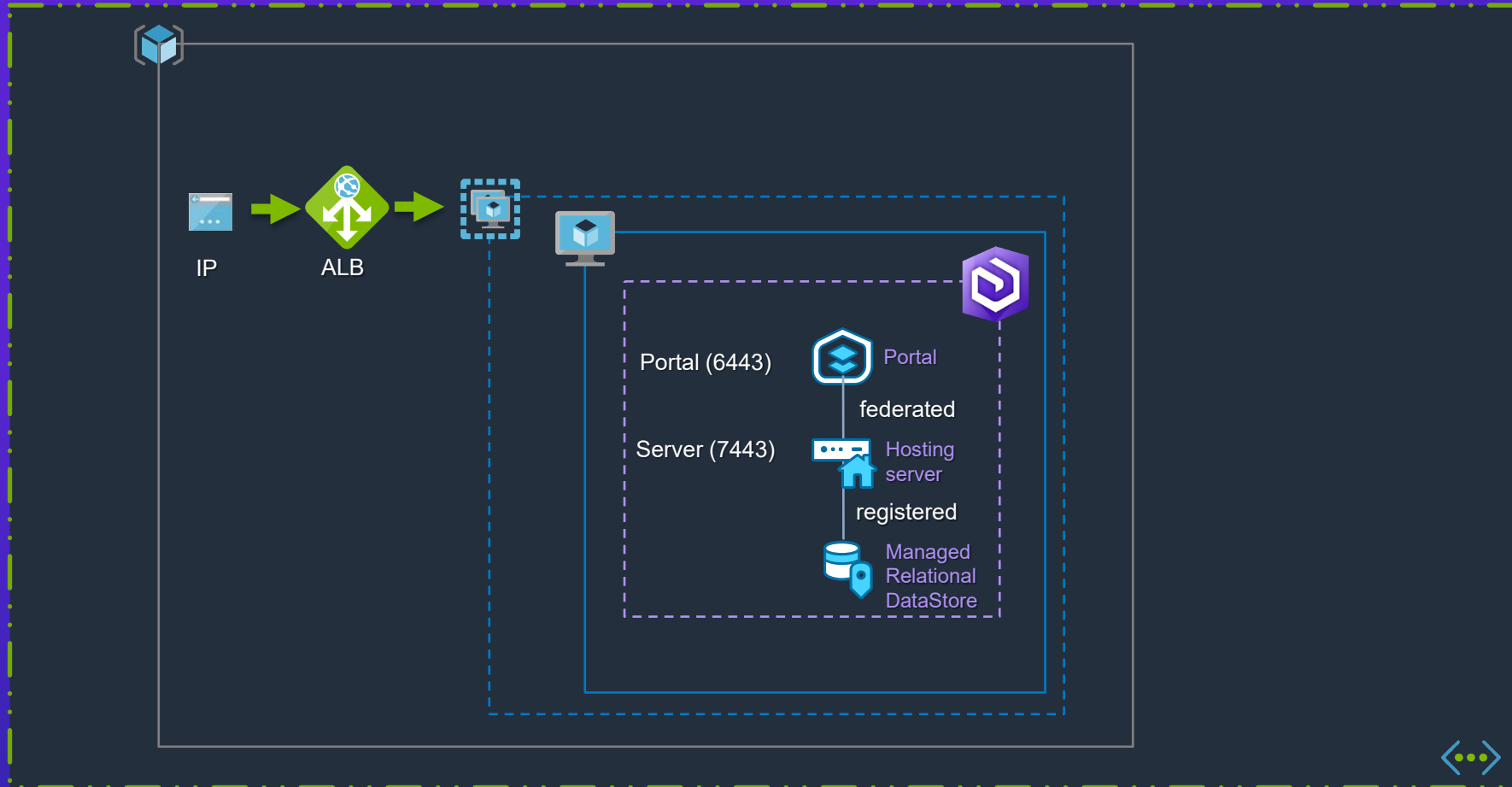


Deployment Concepts | ArcGIS Enterprise Single Tier Deployment V1



Deployment Concepts | ArcGIS Enterprise Single Tier Deployment

V2



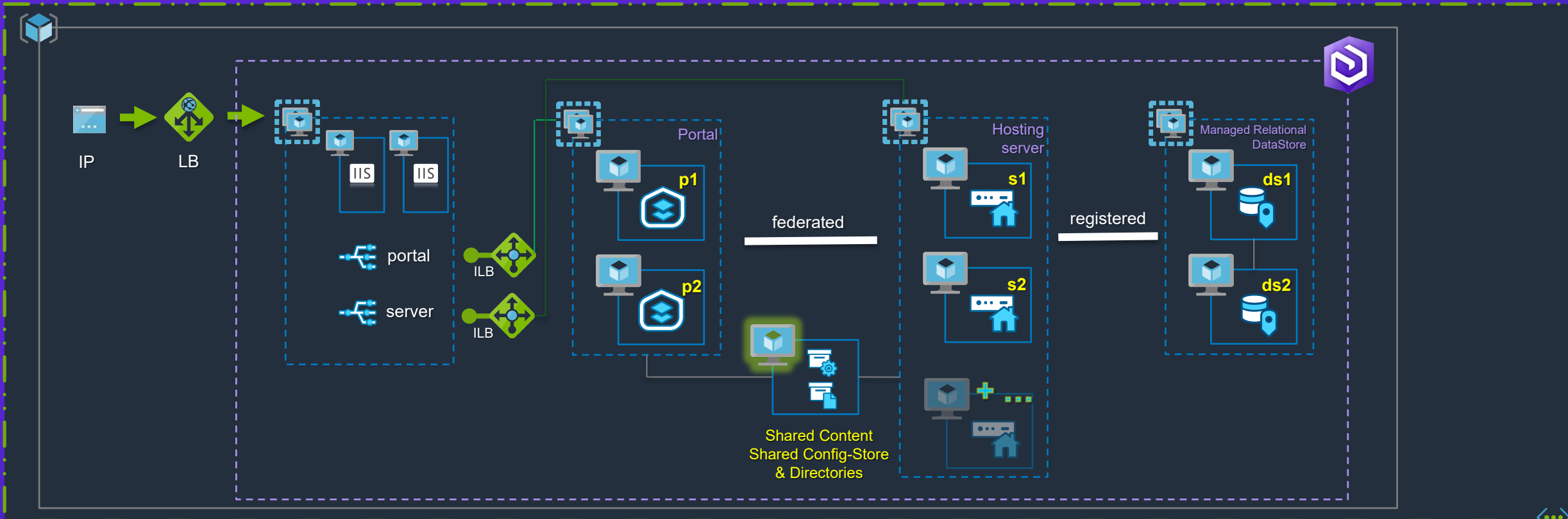
Deployment Patterns

Multi Tier Base Deployment



Deployment Concepts | ArcGIS Enterprise Multi-Tier Base Deployment

V1



Storage Account

- Type:
 - Locally Redundant
 - **Geo-Redundant**
 - Read-Access Geo-Redundant
- Kind:
 - Storage
 - **StorageV2**
 - Blob Storage

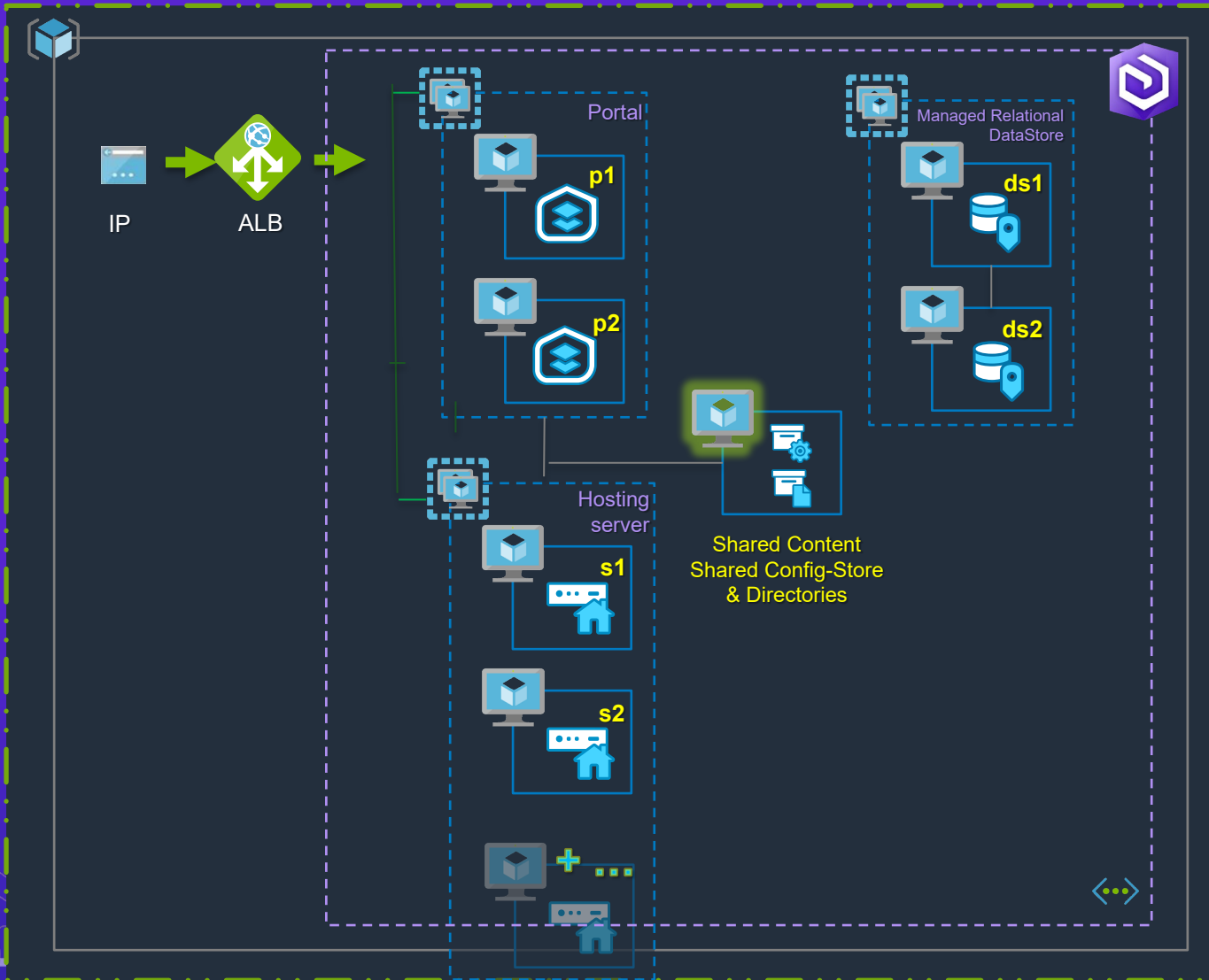


Content Store

- **File Server**
- Azure Blobs and Tables

Deployment Concepts | ArcGIS Enterprise Multi-Tier Base Deployment

V2



Storage Account

- Type:
 - Locally Redundant
 - **Geo-Redundant**
 - Read-Access Geo-Redundant
- Kind:
 - Storage
 - **StorageV2**
 - Blob Storage



Content Store

- **File Server**
- Azure Blobs and Tables

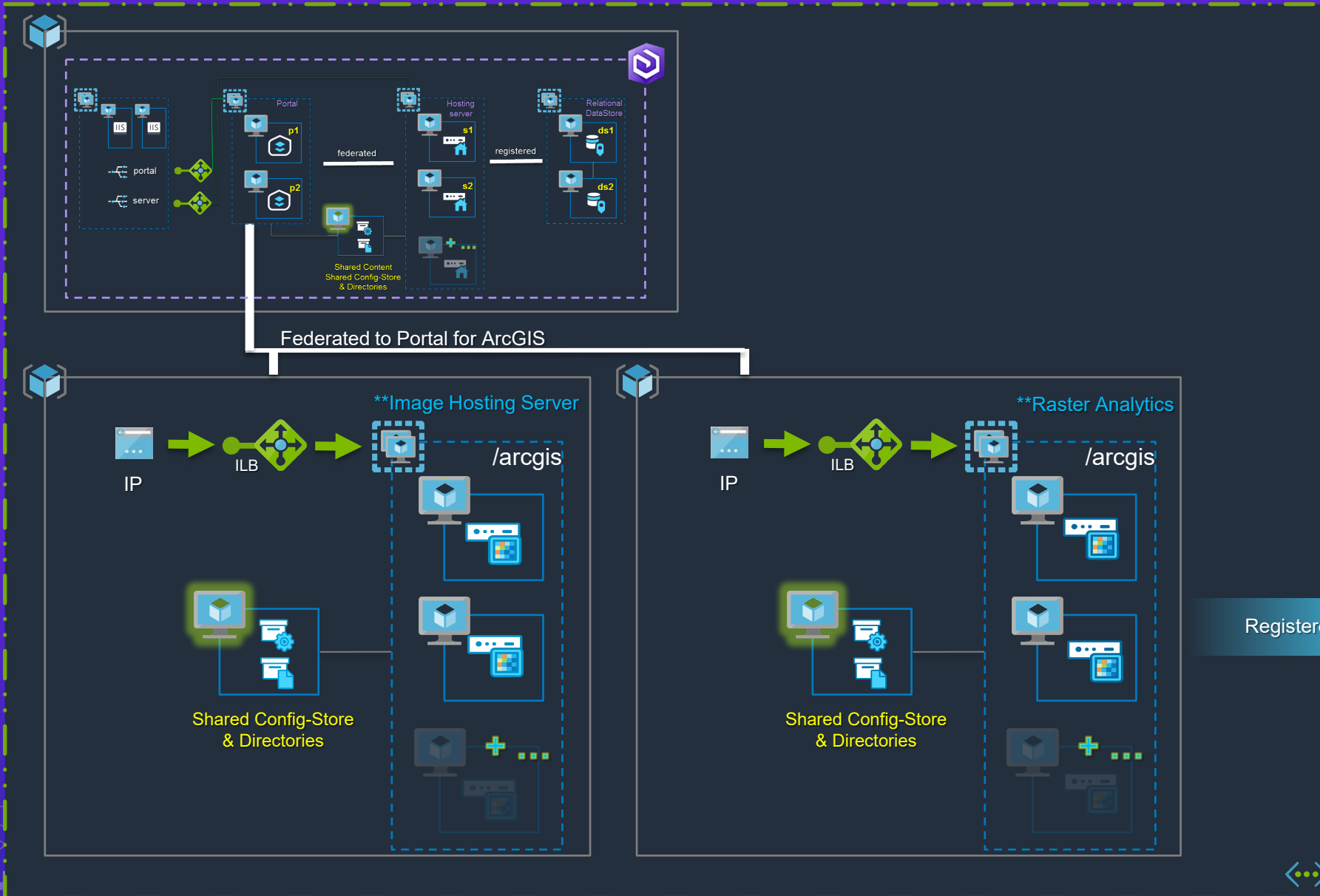
Deployment Patterns


Imagery





Deployment Concepts | Multi-Tier Base Deployment (with Image Hosting & RA roles)

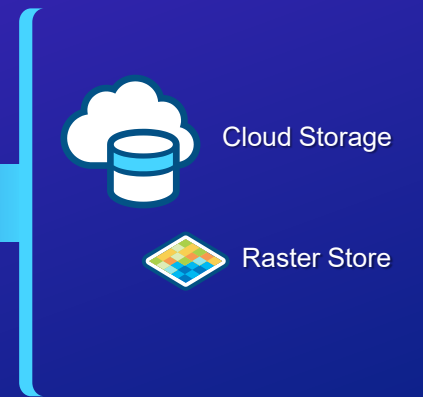
V1



-  Storage Account
 - Type:
 - Locally Redundant
 - **Geo-Redundant**
 - Read-Access Geo-Redundant
 - Kind:
 - Storage
 - **StorageV2**
 - Blob Storage

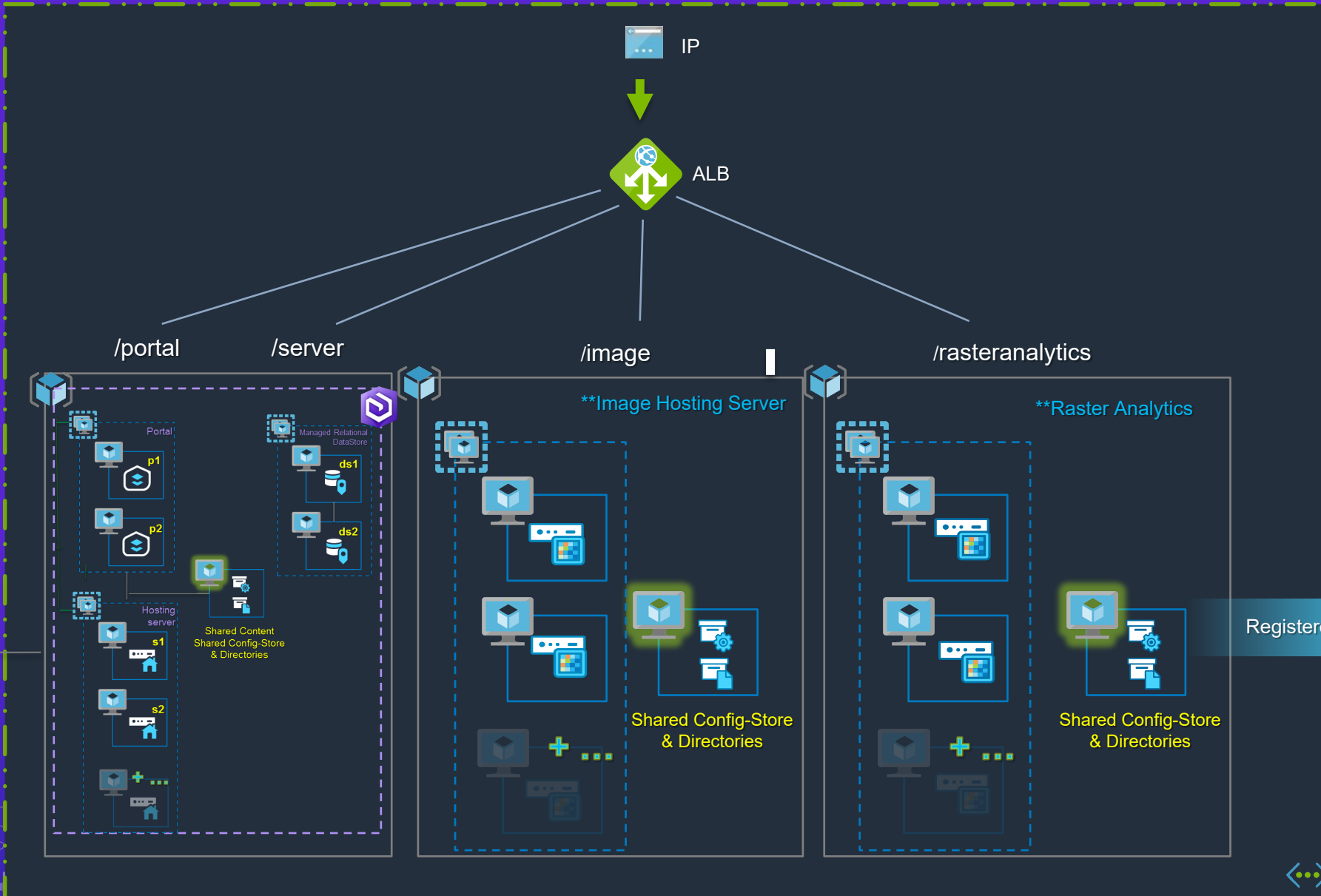
-  Content Store
 - **File Server**
 - Azure Blobs and Tables

-  Database to be registered
 - *Enterprise Geodatabase*

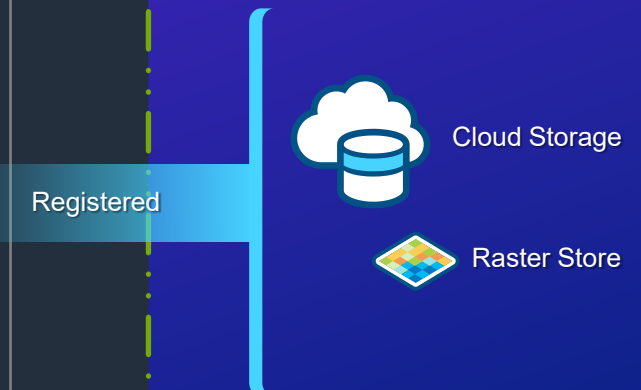


Deployment Concepts | Multi-Tier Base Deployment (with Image Hosting & RA roles)

V2



- Storage Account**
 - Type:
 - Locally Redundant
 - **Geo-Redundant**
 - Read-Access Geo-Redundant
 - Kind:
 - Storage
 - **StorageV2**
 - Blob Storage
- Content Store**
 - **File Server**
 - Azure Blobs and Tables
- Database to be registered**
 - *Enterprise Geodatabase*



Deployment Patterns

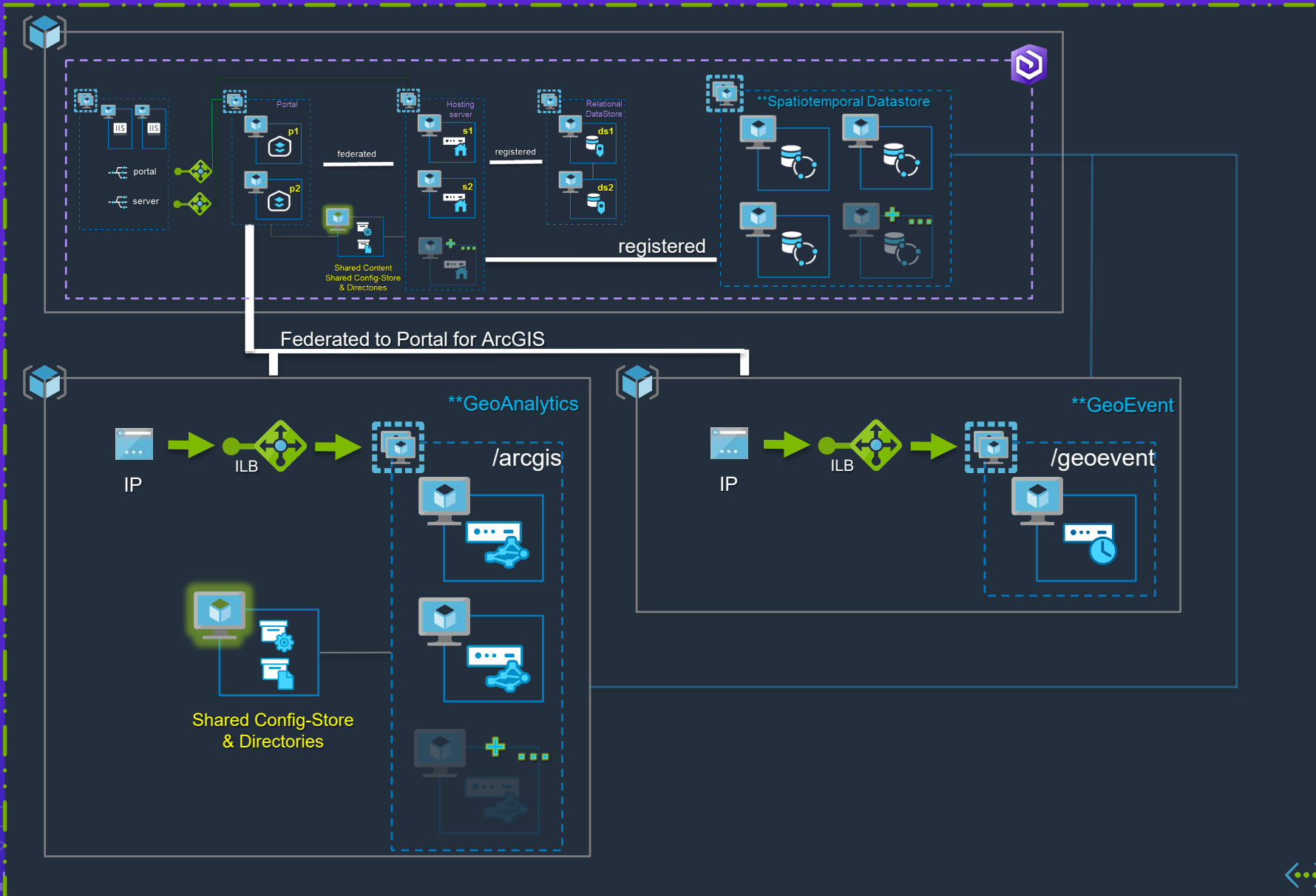
Real time GIS (GeoEvent + GeoAnalytics)






Deployment Concepts | Multi-Tier Base Deployment (with GeoAnalytics & GeoEvent roles)

V1

**Optional Deployments

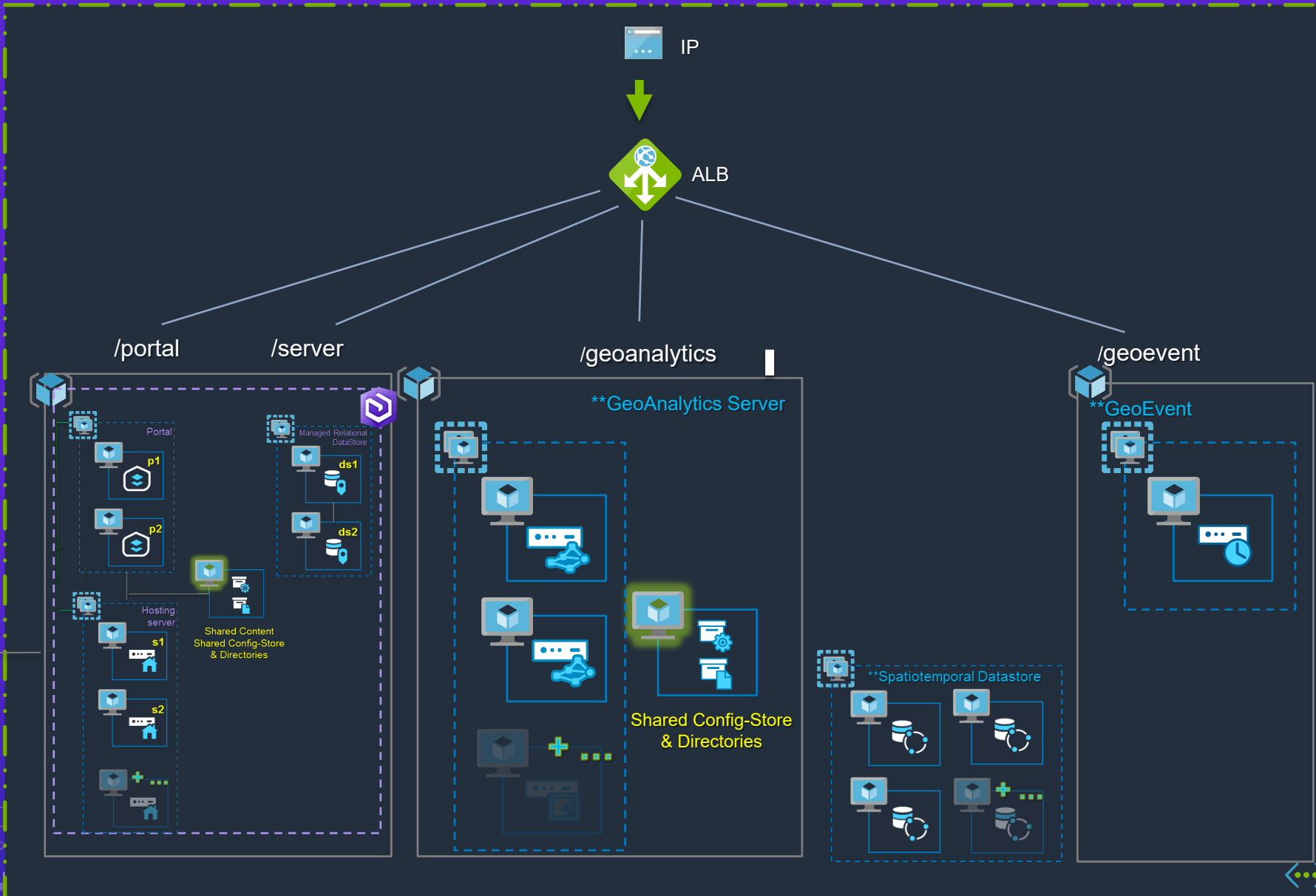


-  Storage Account
 - Type:
 - Locally Redundant
 - **Geo-Redundant**
 - Read-Access Geo-Redundant
 - Kind:
 - Storage
 - **StorageV2**
 - Blob Storage
-  Content Store
 - **File Server**
 - Azure Blobs and Tables
-  Database to be registered
 - *Enterprise Geodatabase*

Deployment Concepts | Multi-Tier Base Deployment (with GeoAnalytics & GeoEvent)

V2

**Optional Deployments



- Storage Account
 - Type:
 - Locally Redundant
 - **Geo-Redundant**
 - Read-Access Geo-Redundant
 - Kind:
 - Storage
 - **StorageV2**
 - Blob Storage

- Content Store
 - **File Server**
 - Azure Blobs and Tables

- Database to be registered
 - *Enterprise Geodatabase*

Demo

Cloud Builder 10.8



Getting Started

- Get Azure subscription
 - <https://azure.com>
- Get ArcGIS Enterprise software licenses
 - <https://accounts.esri.com>
- Get ArcGIS Enterprise Cloud Builder
 - <http://bit.ly/cb108forazure>



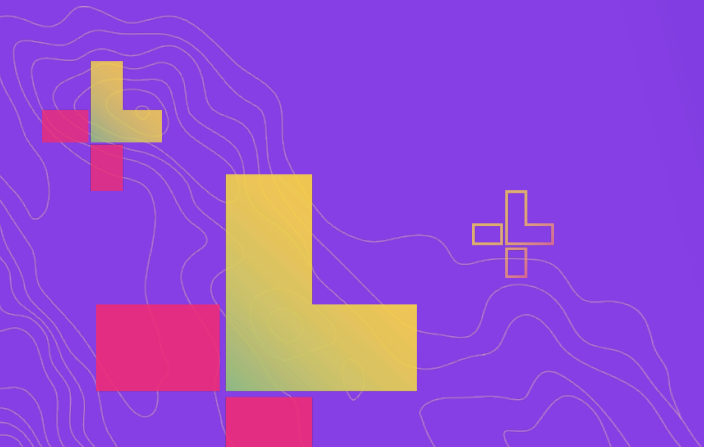
Cloud Builder

Demo



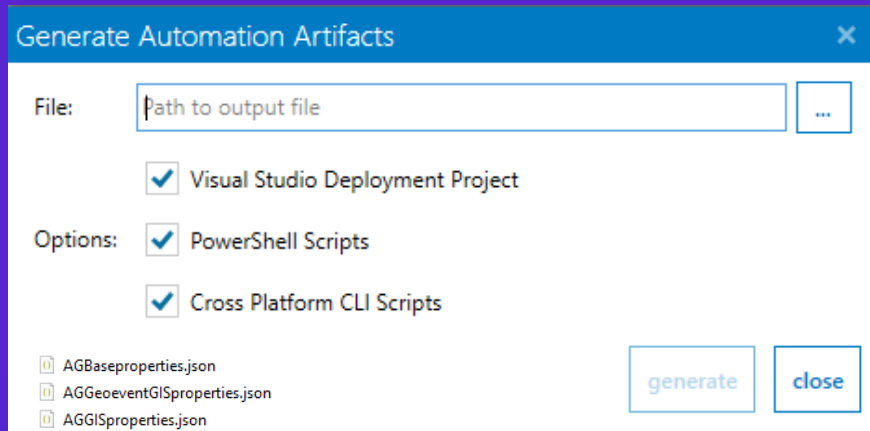
Automation

Concepts



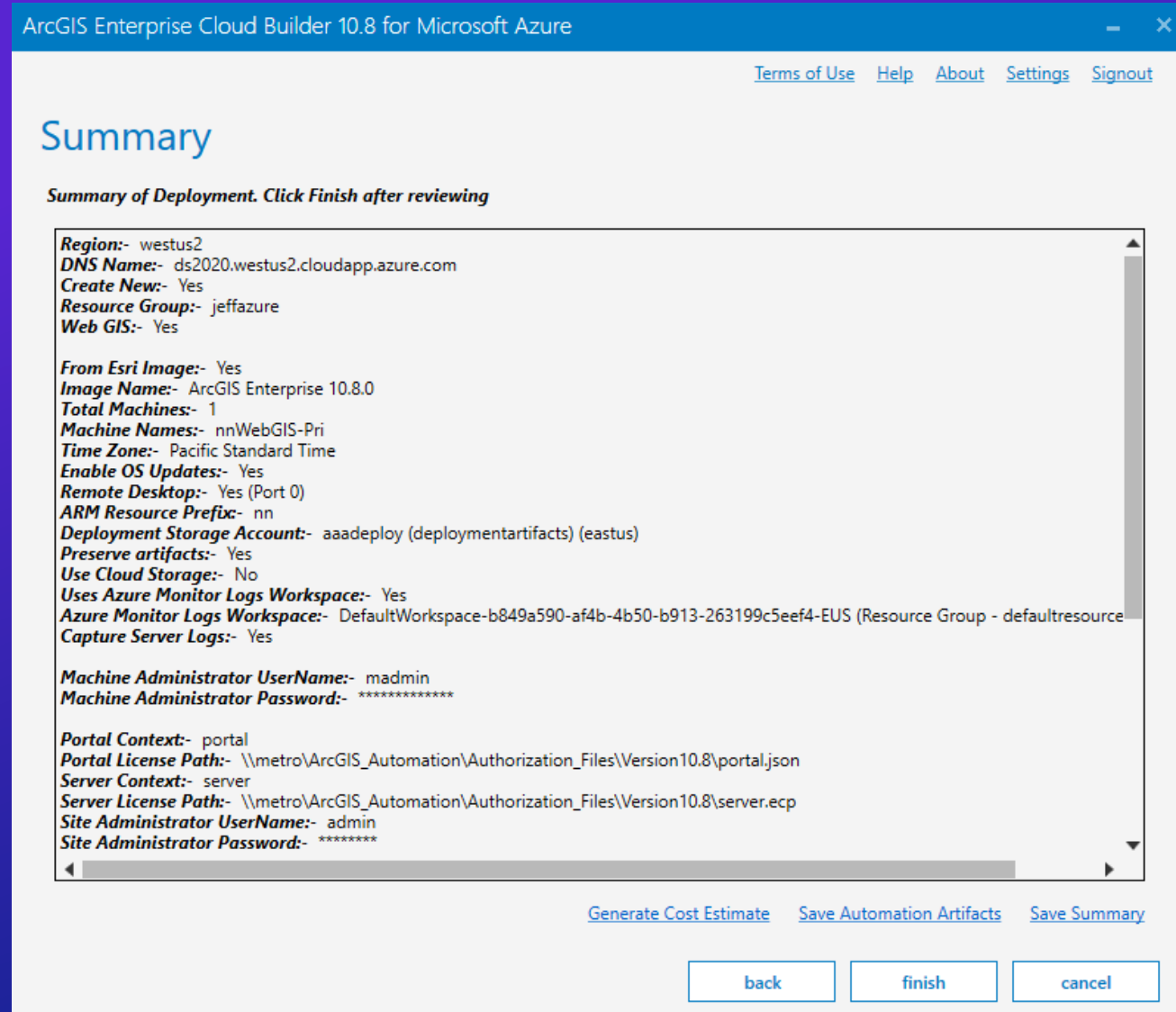
Support for Automation | Since 10.6

- Wizard driven deployment experience
- Designer to generate automation artifacts



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

Deployment Artifacts



Cloud Builder VS. Automation



Visual Studio



BASH
THE BOURNE-AGAIN SHELL

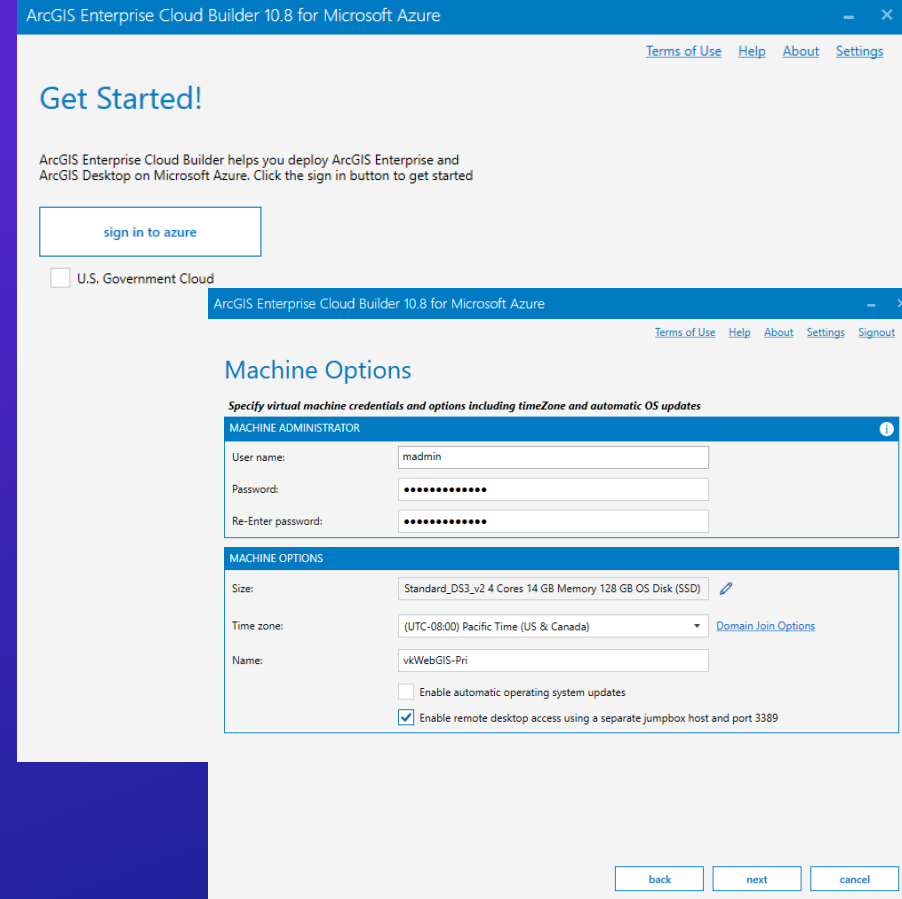
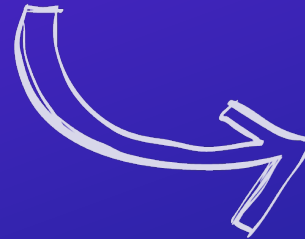


PowerShell

Customize or Extend



Wizard Driven



Power



Simplicity

Typical Customizations and Extensibility

- Resource Naming Convention
 - Change the default names assigned by Cloud Builder (Load Balancers, 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
 - Azure Alerts
- Configure VM backup Policy
- Scheduled Maintenance

...



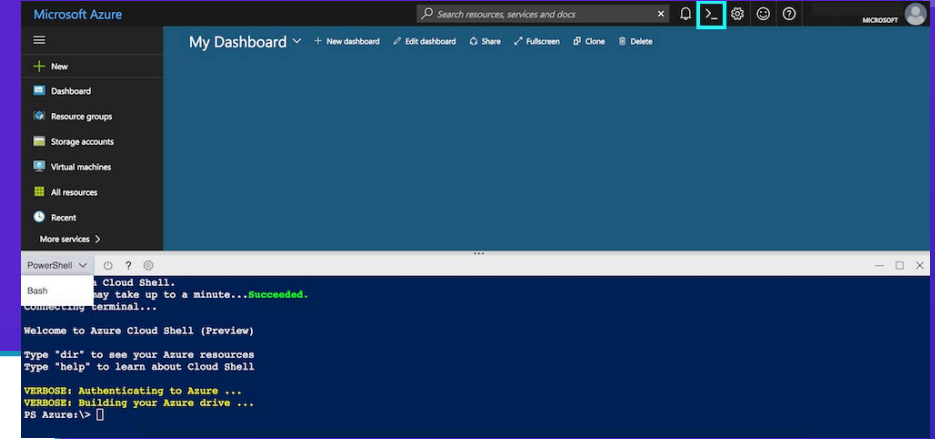
Edits Outside Cloud Builder? ... Training wheels are off!

Integrate with ...

 Launch Cloud Shell



Azure Cloud Shell



ANSIBLE



PowerShell DSC



Travis CI

Automation

Demo



Tips and Tricks

Troubleshooting



Tips and Tricks

- Not all regions have all VM Sizes
- Azure Quotas
 - VM Sizes
 - Regional Quotas
- Best Practice – Use separate Resource groups for each deployment
- Pre-Requisite Step
 - Enable programmatic deployment of ArcGIS Image Offer in the Marketplace



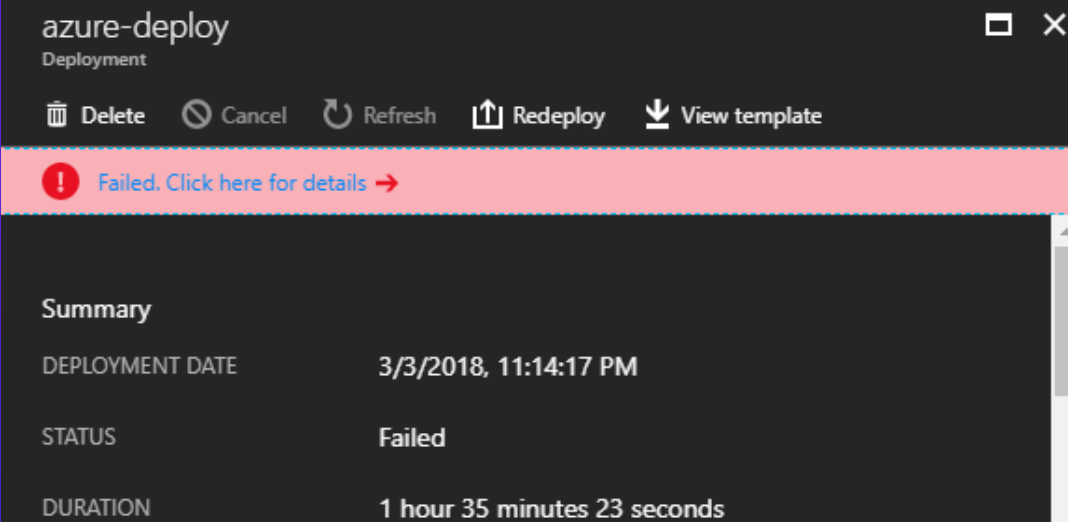
Storage Options | Help choosing

	File Share VM	Azure Blob + Table	Azure Files (SMB)
Latency	Best	Variable	Variable
Performance	Good	Good	OK
Scalability	Managed Disk IOPS	Good	Max 1000 IOPS
Config-Store Content-Store	Yes	Yes	Yes
Server Directories	Yes	No	Yes
High Availability	No	Yes	Yes

Single Machine VMs have 99.9 SLA + Scheduled Maintenance

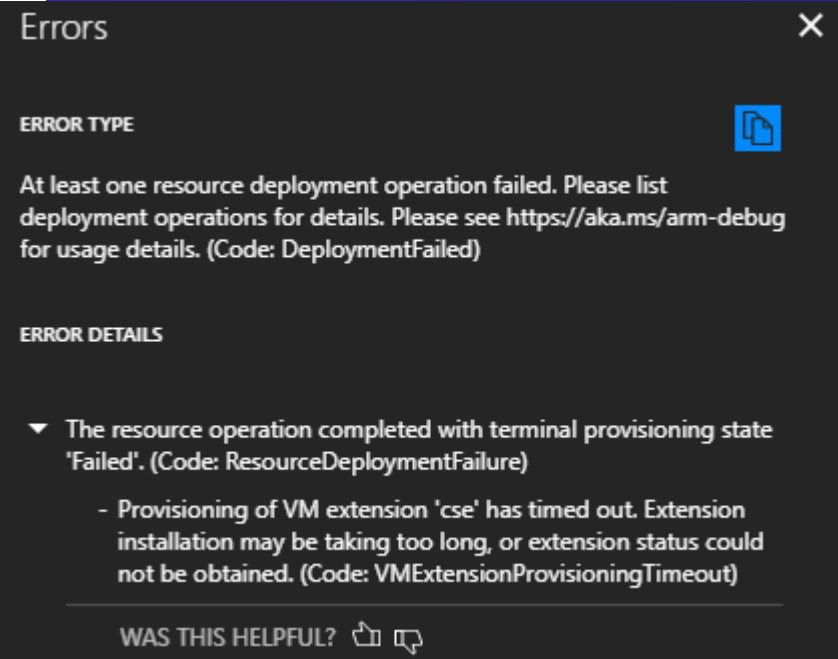
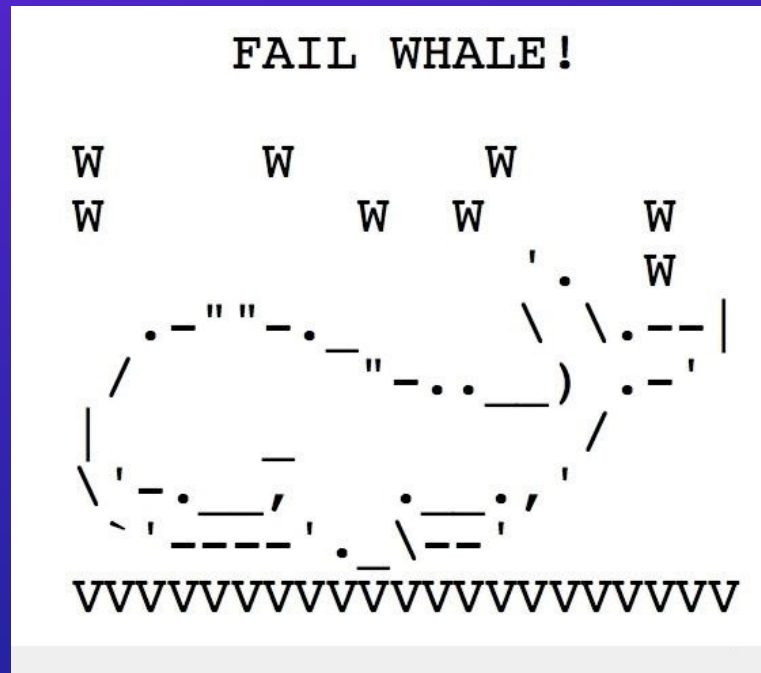
Troubleshooting deployment failures

- Examine Deployment in Azure Portal
- Examine log files for errors
 - Local Log, Remote Log
- Provide strong password for Windows Credentials
- Try the defaults
 - Start with small deployments
- Submit a support incident
 - Log Files
 - Deployment Summary



The screenshot shows the 'azure-deploy' window in the Azure Portal. At the top, there are navigation buttons: Delete, Cancel, Refresh, Redeploy, and View template. Below these is a red banner indicating a failure: 'Failed. Click here for details →'. The main content area is titled 'Summary' and contains the following information:

DEPLOYMENT DATE	3/3/2018, 11:14:17 PM
STATUS	Failed
DURATION	1 hour 35 minutes 23 seconds



The screenshot shows the 'Errors' section of the deployment summary. It contains the following information:

ERROR TYPE

At least one resource deployment operation failed. Please list deployment operations for details. Please see <https://aka.ms/arm-debug> for usage details. (Code: DeploymentFailed)

ERROR DETAILS

- ▼ The resource operation completed with terminal provisioning state 'Failed'. (Code: ResourceDeploymentFailure)
 - Provisioning of VM extension 'cse' has timed out. Extension installation may be taking too long, or extension status could not be obtained. (Code: VMExtensionProvisioningTimeout)

At the bottom of the errors section, there is a link 'WAS THIS HELPFUL?' followed by thumbs up and thumbs down icons.

Thank you

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