Deploying ArcGIS Enterprise in Microsoft Azure

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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

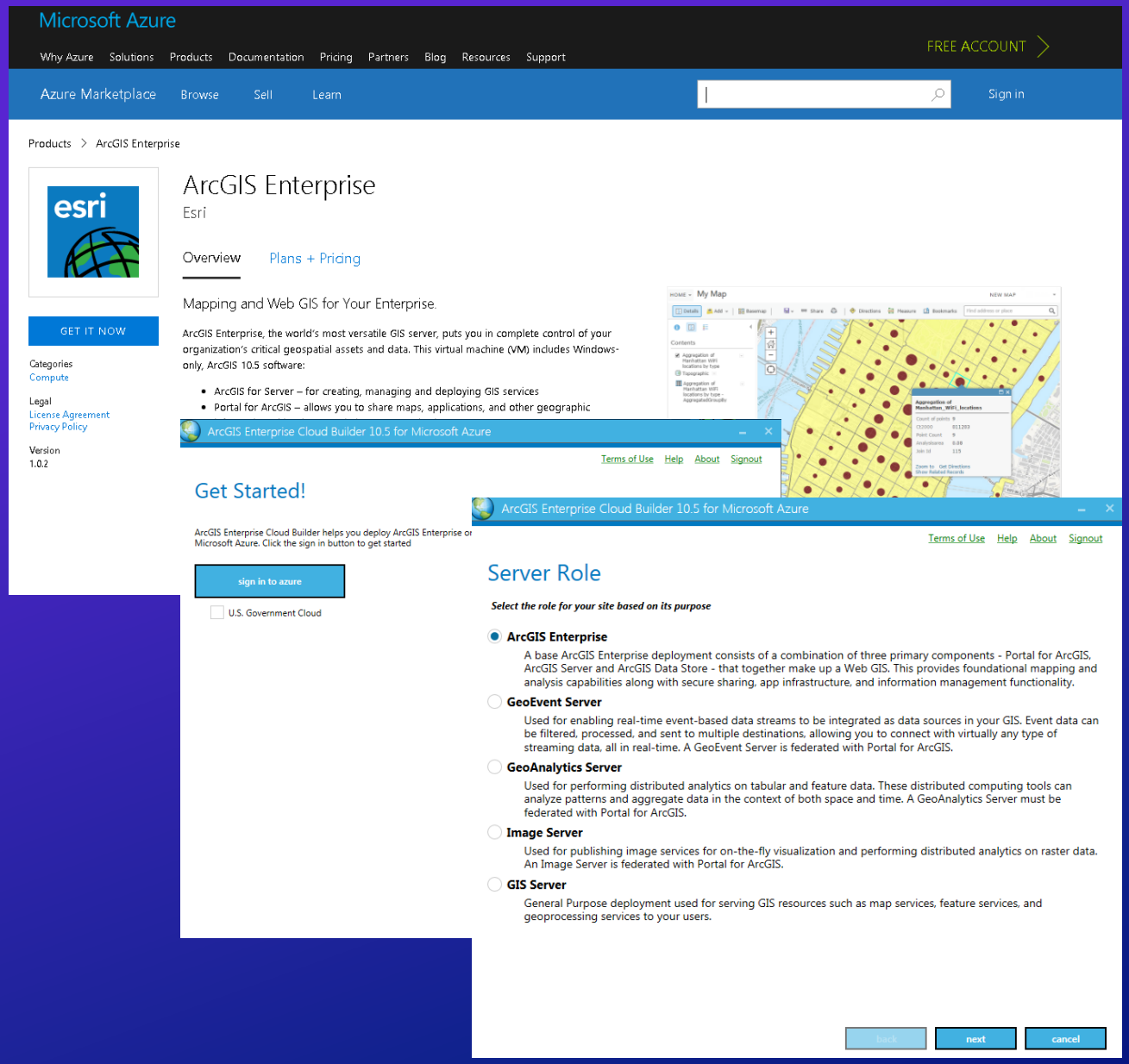
ArcGIS Enterprise on Microsoft Azure

“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

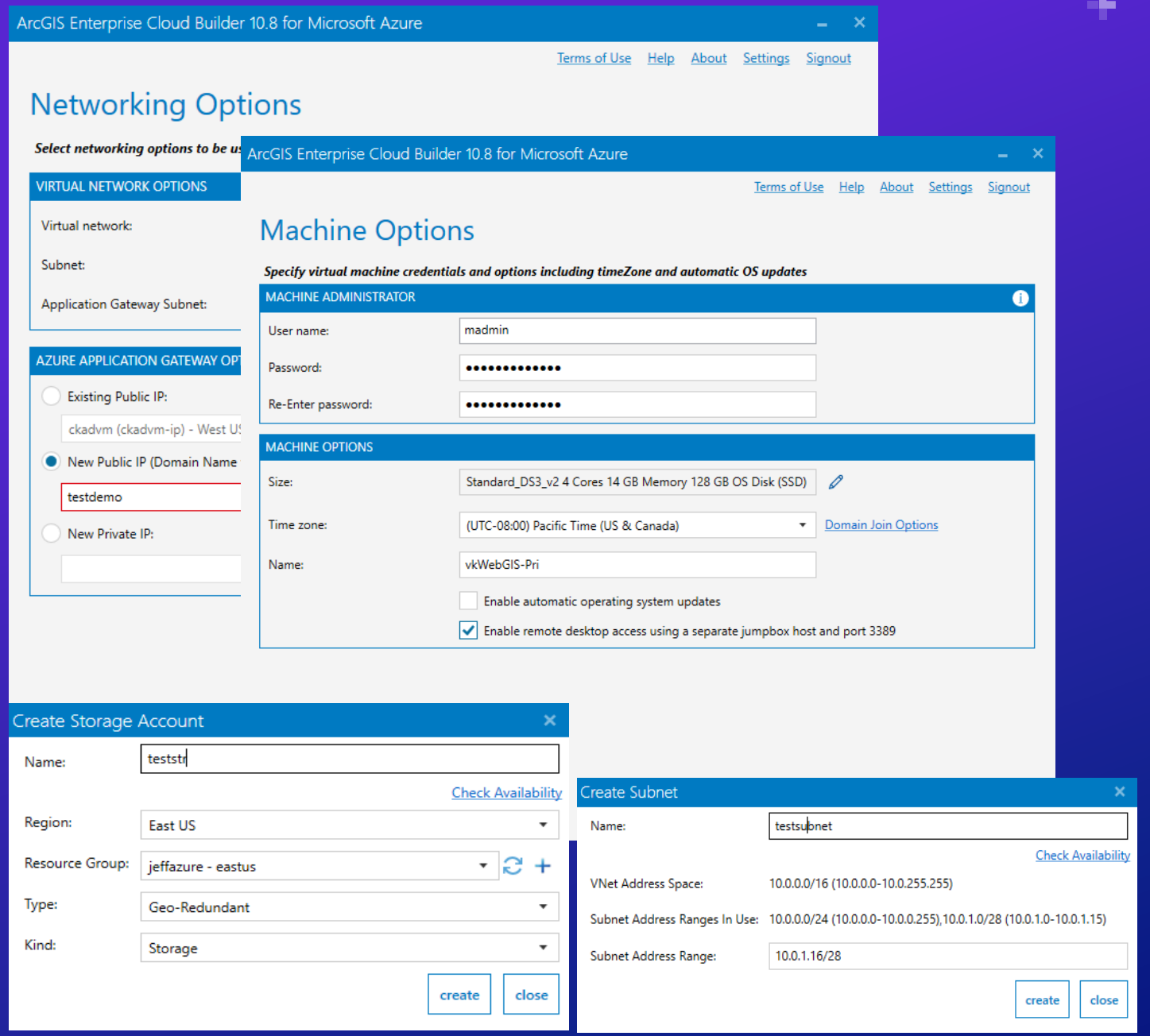


Why it is a big deal | Azure IaaS Concepts

- 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



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"
$BSTR = [System.Runtime.InteropServices.Marshal]::SecureStringToBSTR($sp.Secret)
$plainPassword = [System.Runtime.InteropServices.Marshal]::PtrToStringAuto($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

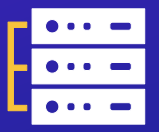
Server Sites

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

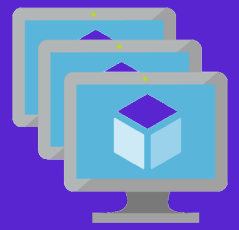
ArcGIS Spatiotemporal Big Data Store

Big Data File Share

Generic Data Store (Non-Esri)

Deployment Options

Single Machine



Multiple Machines

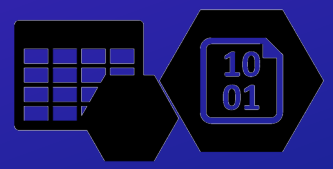
Single Tier
(All in One)

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

Multiple Tiers

Storage Options

File Share



Azure Blobs + Tables

Azure Files (SMB)

Deployment Patterns

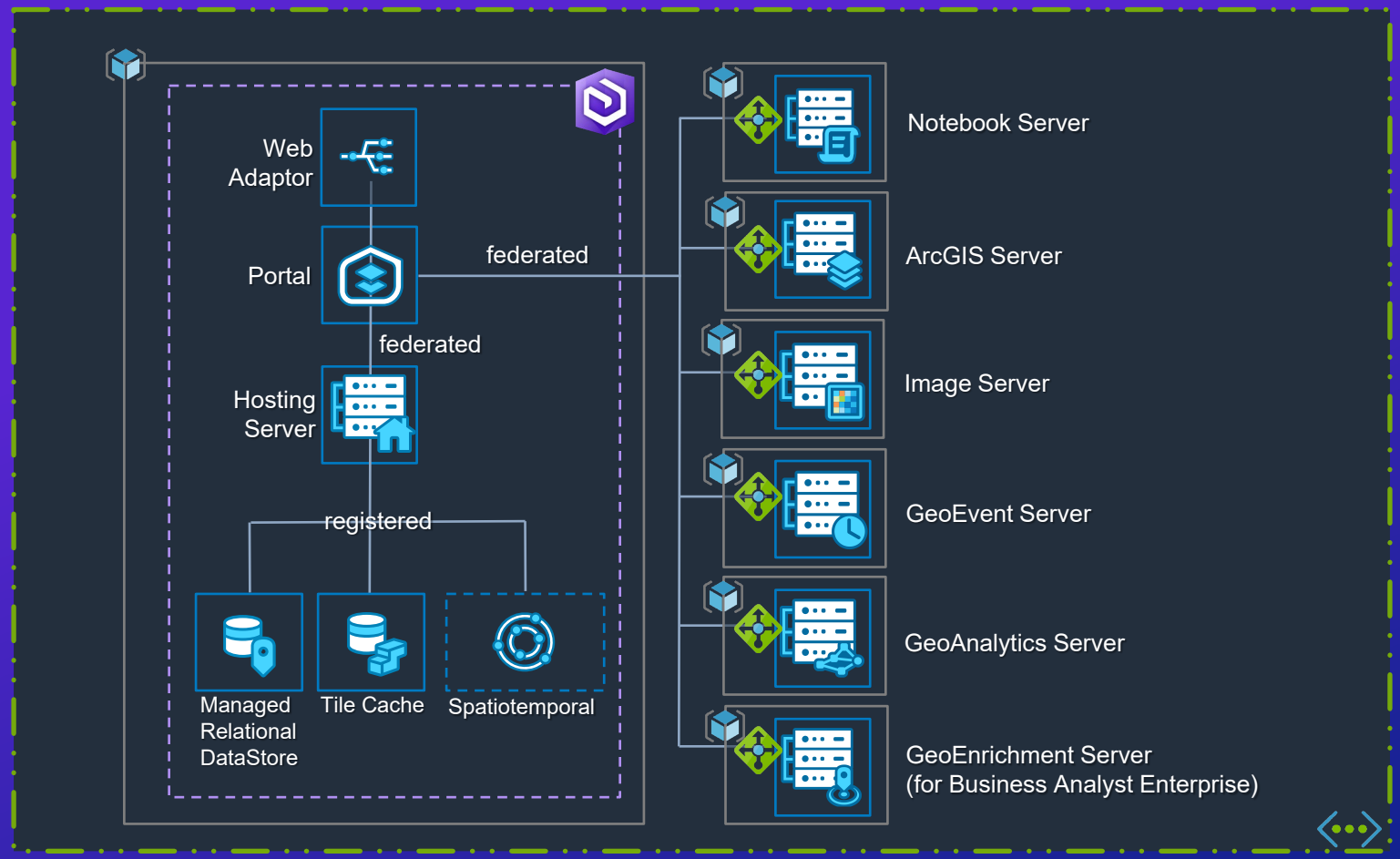
Comparing V1 and V2

Deployment Patterns

System Architecture

Deployment Concepts | Conceptual Software Architecture

V1

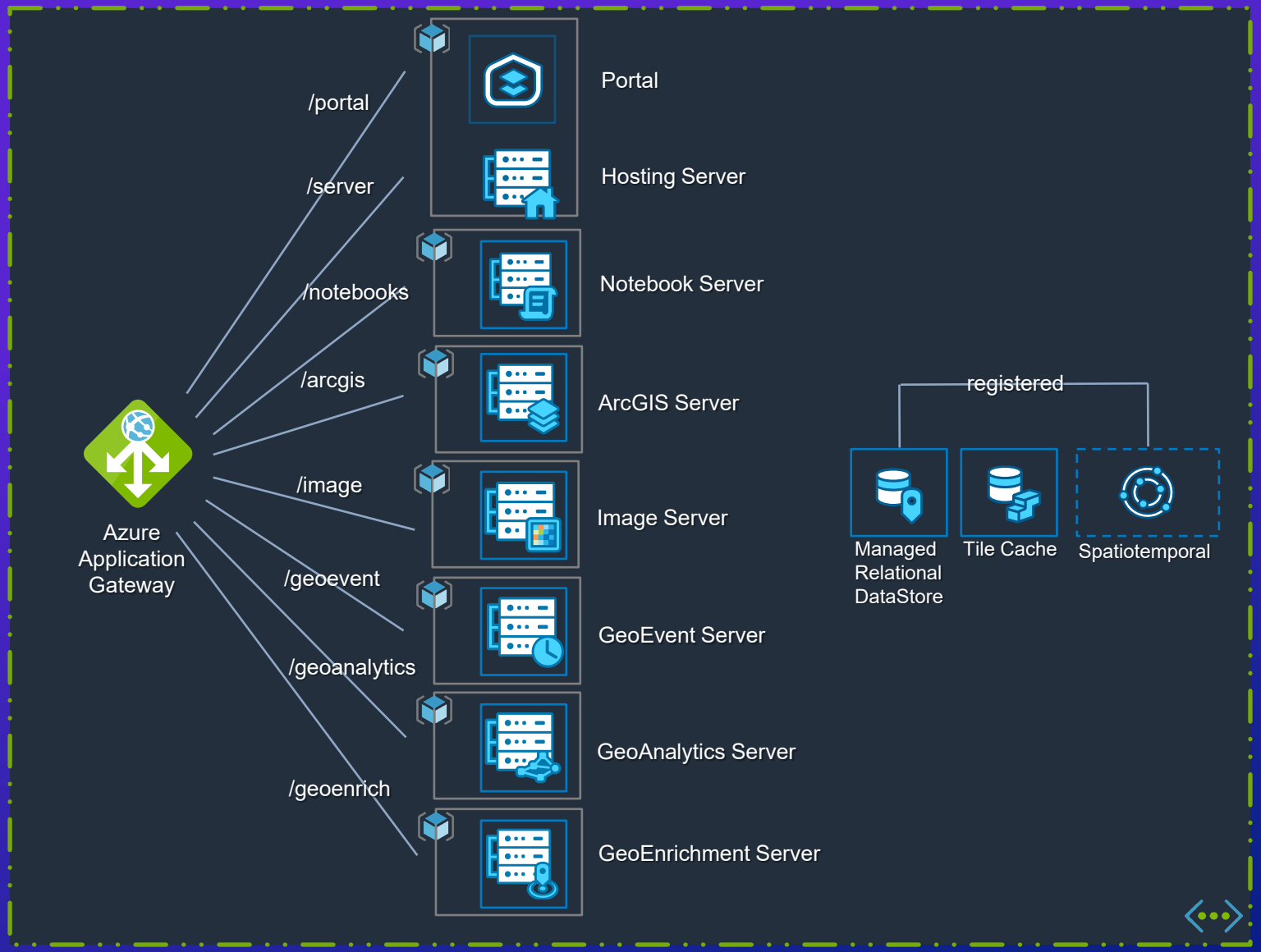


ALL federated ArcGIS Server Roles

- Fully qualified domain name (FQDN)

Deployment Concepts | Conceptual Software Architecture V2

ALL federated ArcGIS Server Roles
- Single (FQDN)

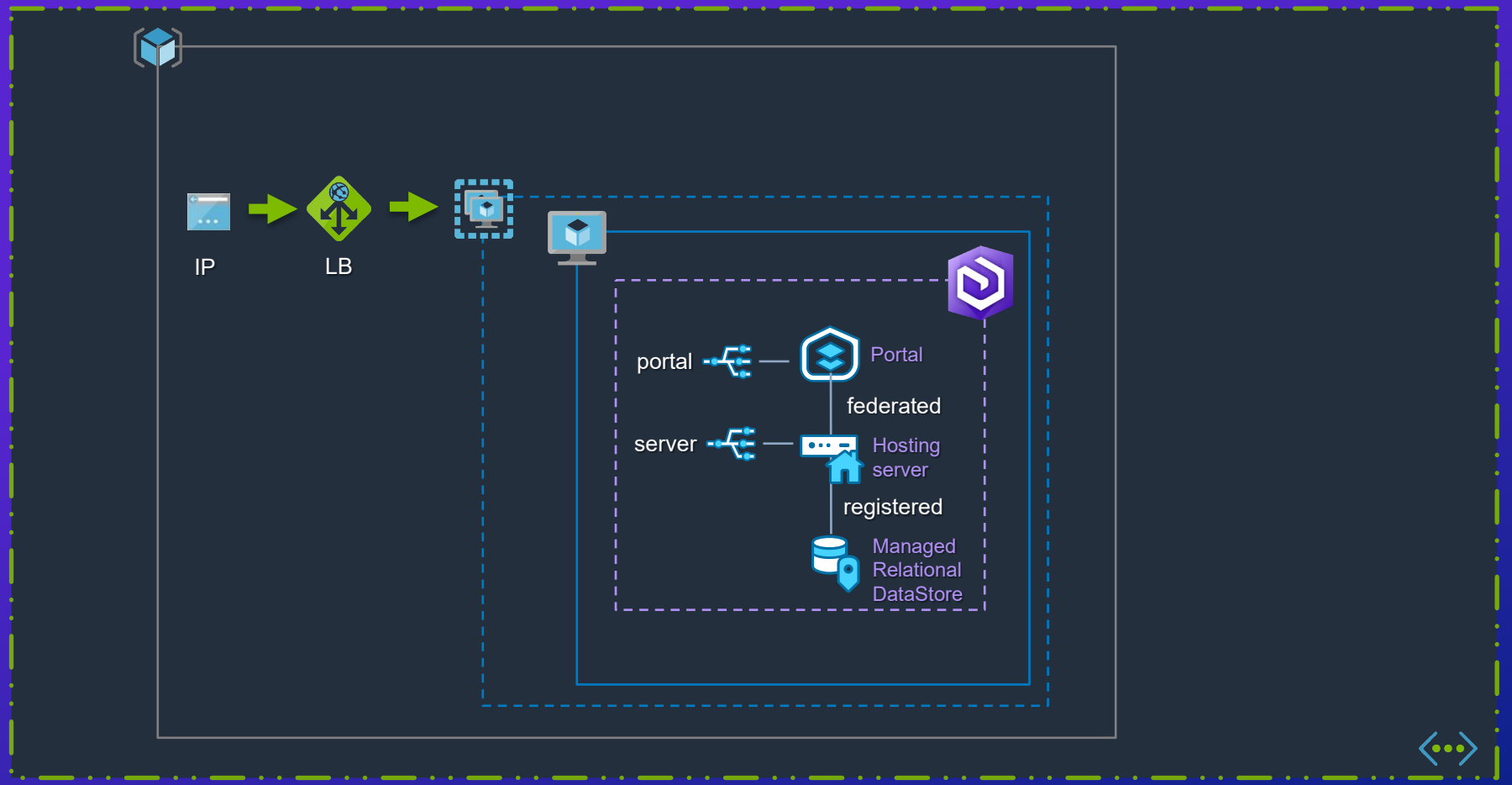


Deployment Patterns

Single Tier Base Deployment

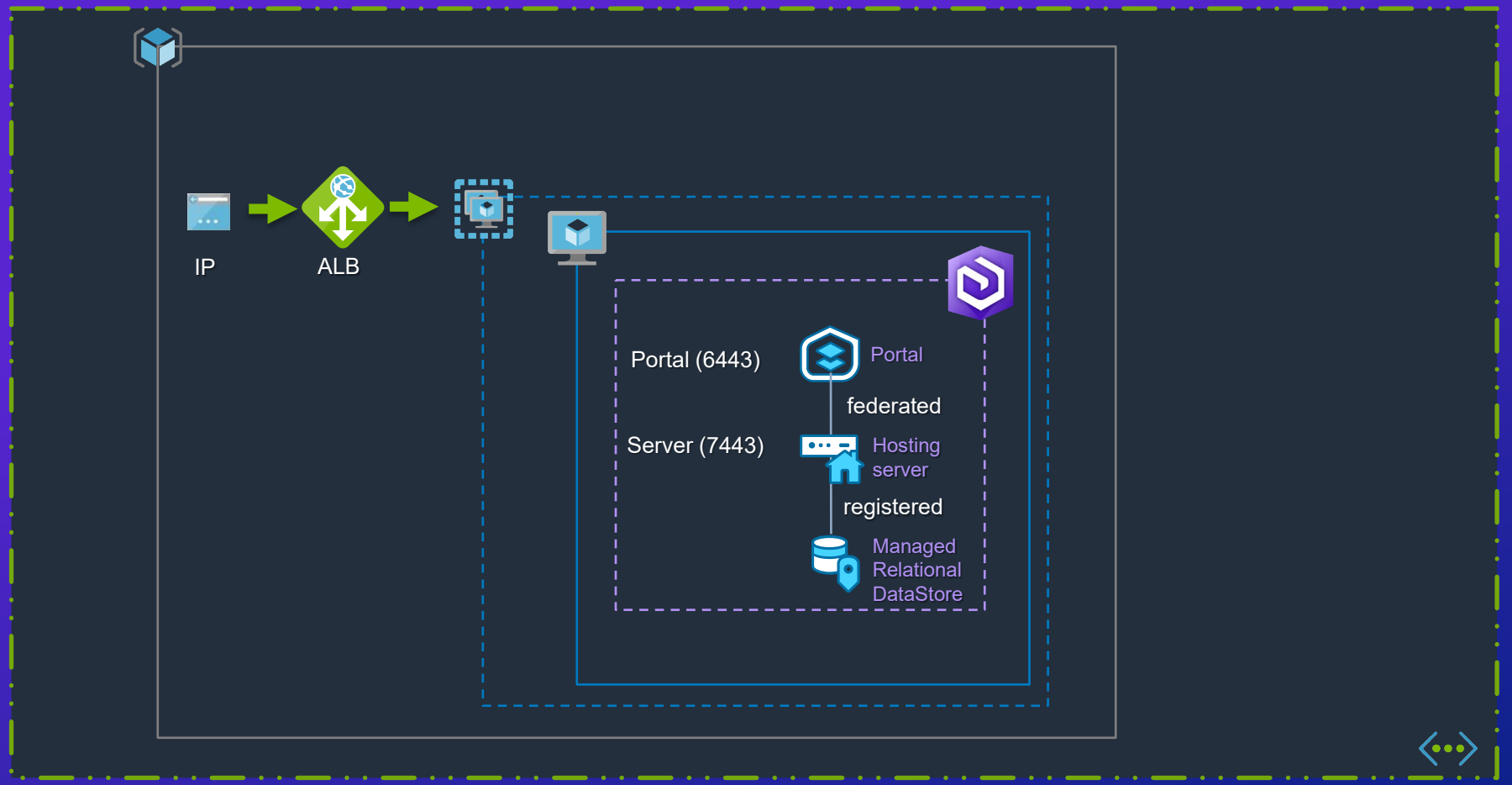
Deployment Concepts | ArcGIS Enterprise Single Tier Deployment

V1



Deployment Concepts | ArcGIS Enterprise Single Tier Deployment

V2

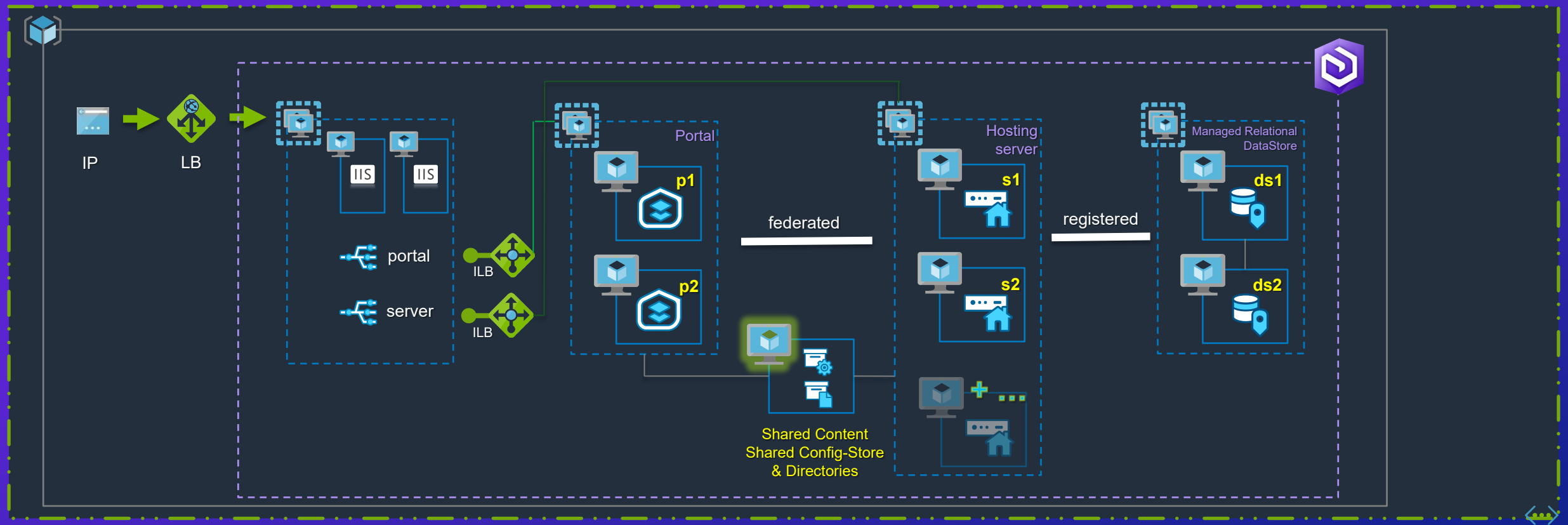


Deployment Patterns

Multi Tier Base Deployment

Deployment Concepts | ArcGIS Enterprise Multi-Tier Base Deployment

V1

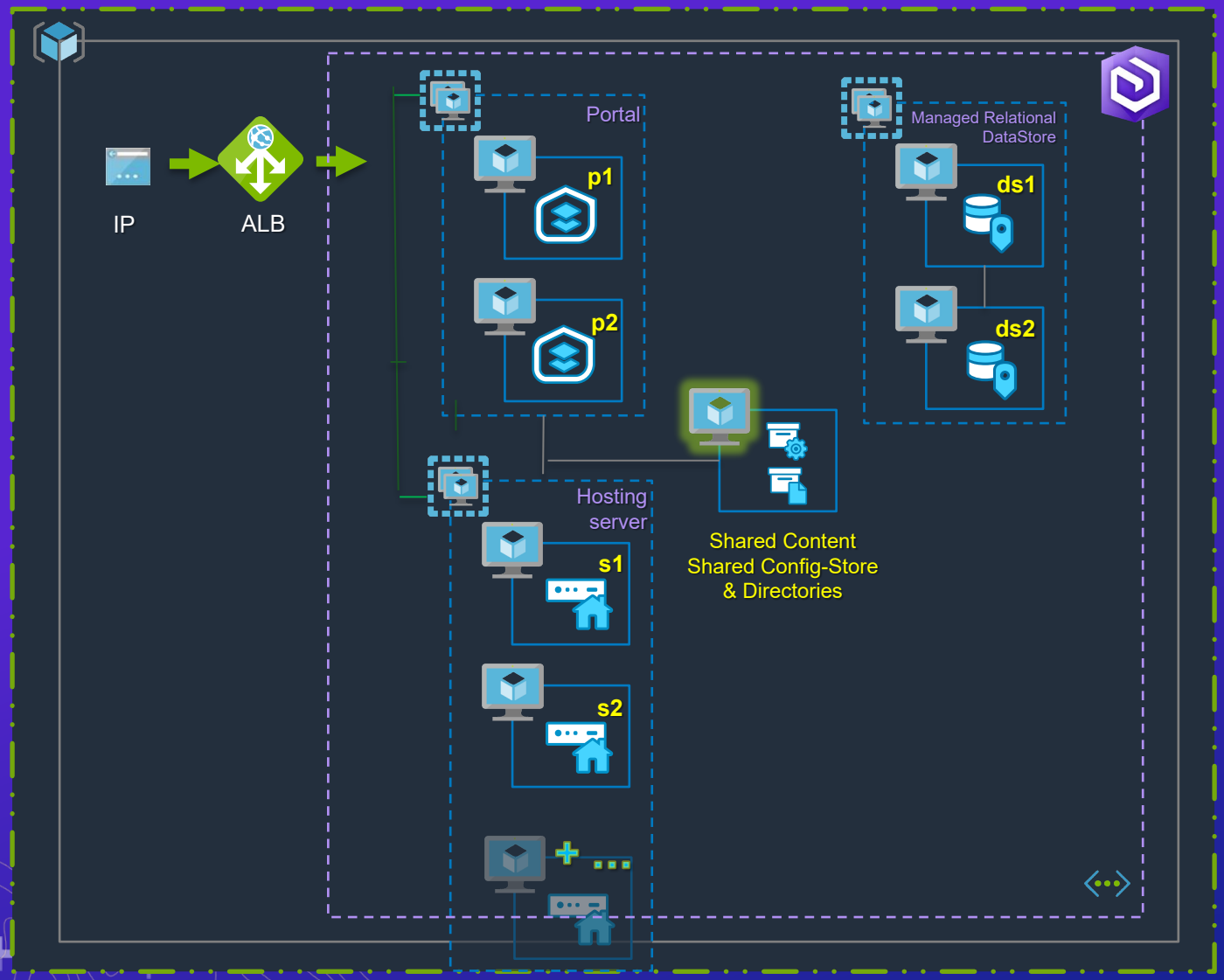


Storage Account
- Type:
  - Locally Redundant
  - Geo-Redundant
  - Read-Access Geo-Redundant
- Kind:
  - Storage
  - StorageV2
  - Blob Storage

Content Store
- File Server
- Azure Blobs and Tables

Deployment Concepts | ArcGIS Enterprise Multi-Tier Base Deployment

V2



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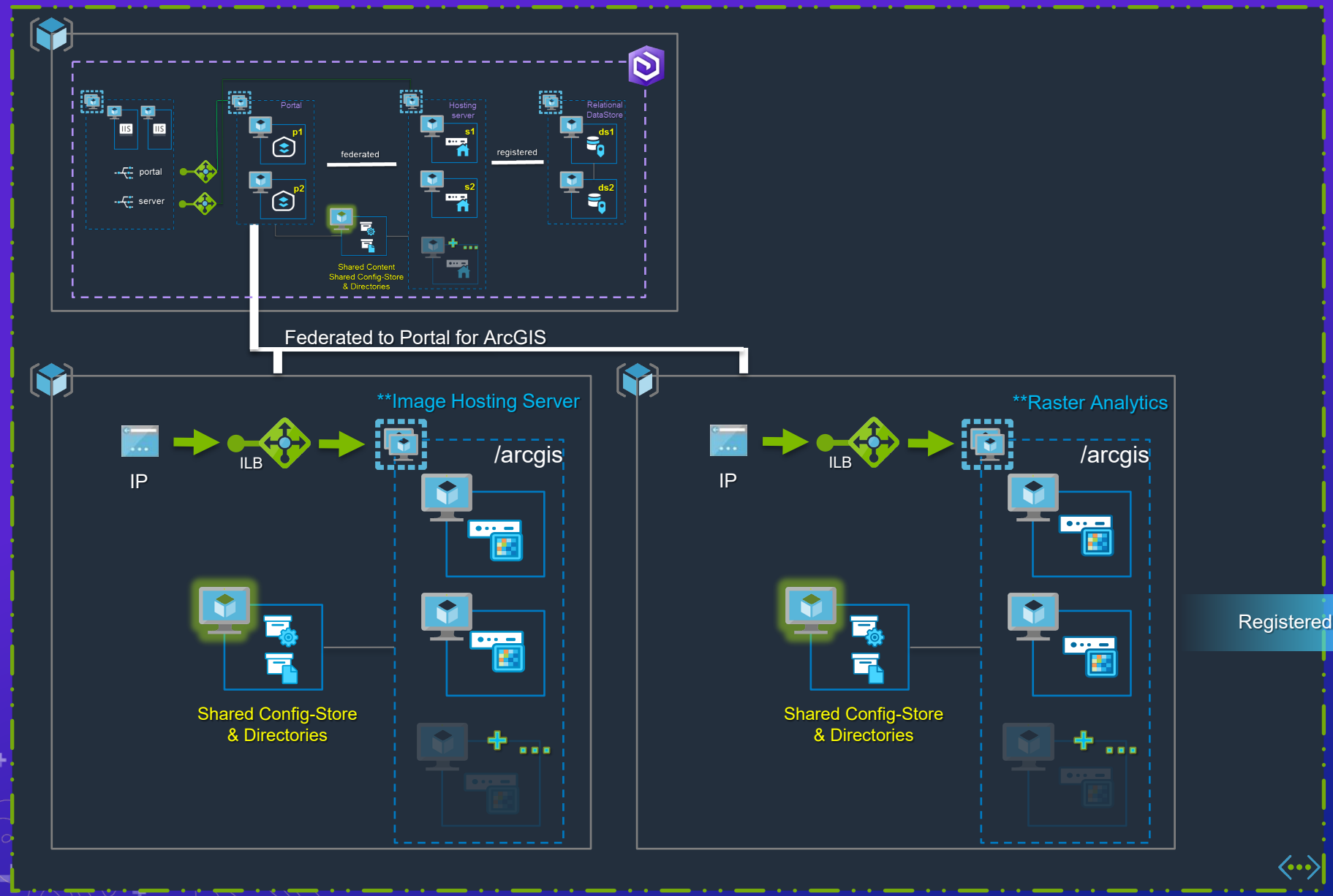
Deployment Patterns

Imagery

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

V1



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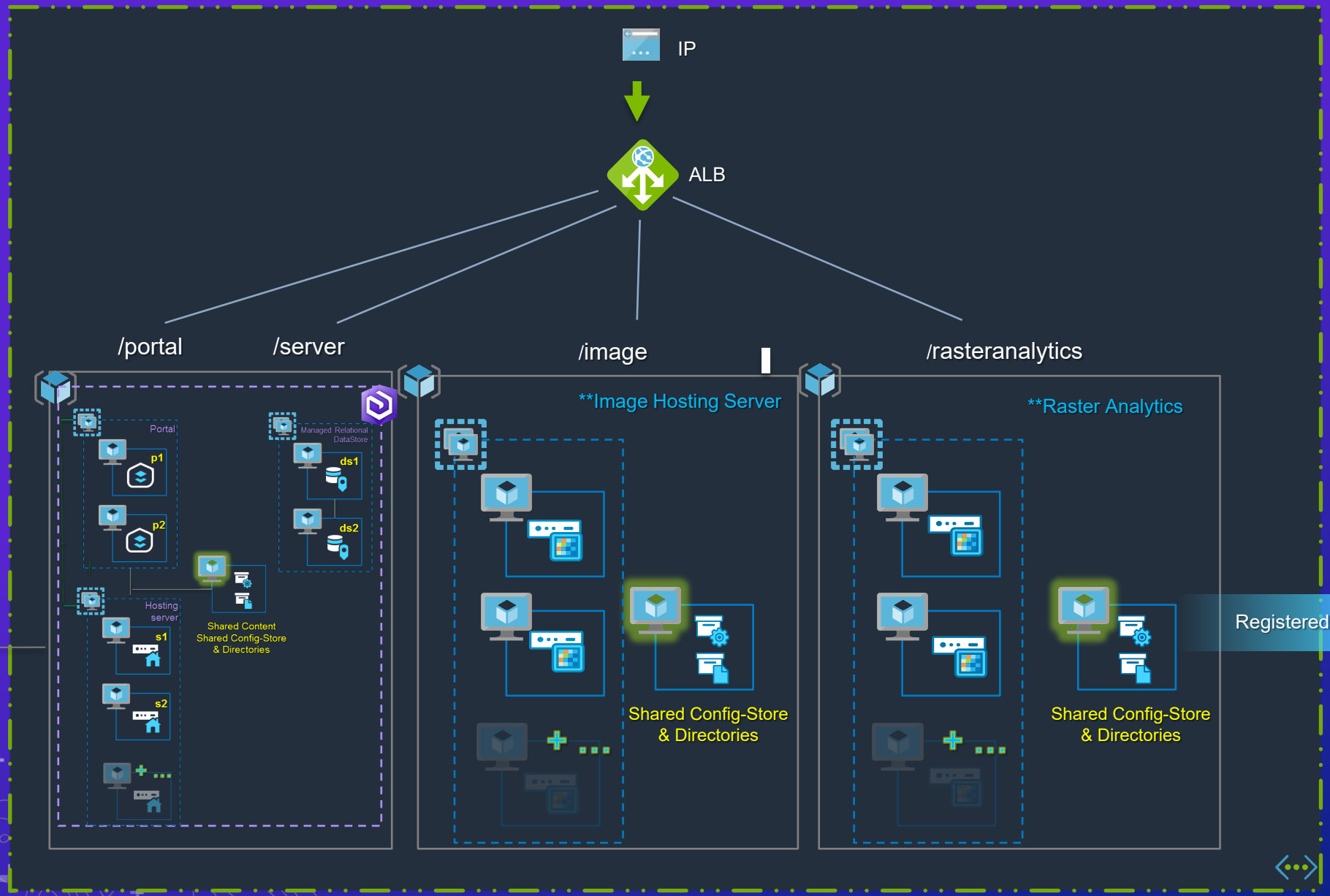
Database to be registered
- *Enterprise Geodatabase*

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

V2



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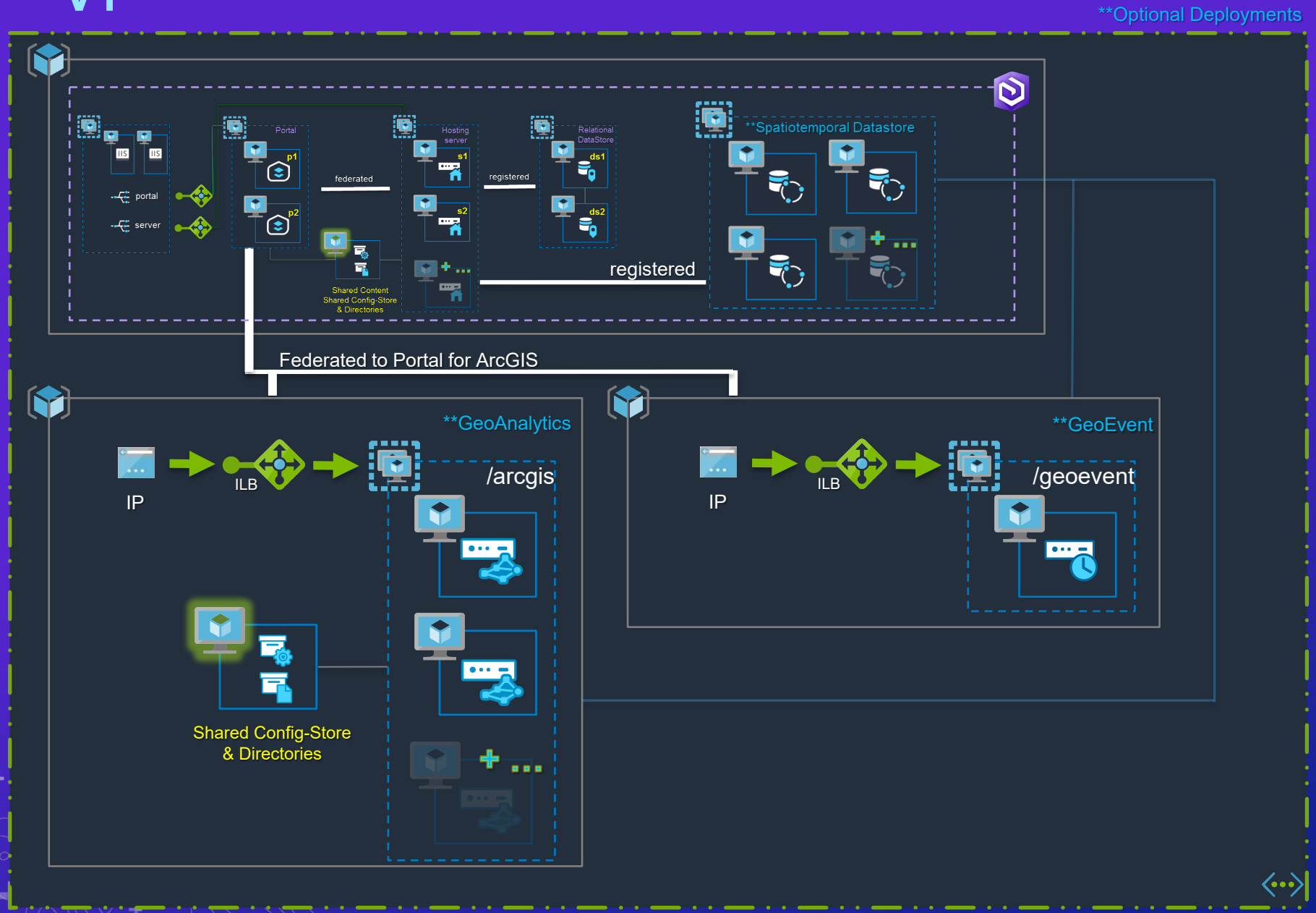
Deployment Patterns

Real time GIS (GeoEvent + GeoAnalytics)

Deployment Concepts | Multi-Tier Base Deployment (with GeoAnalytics & GeoEvent roles) V1



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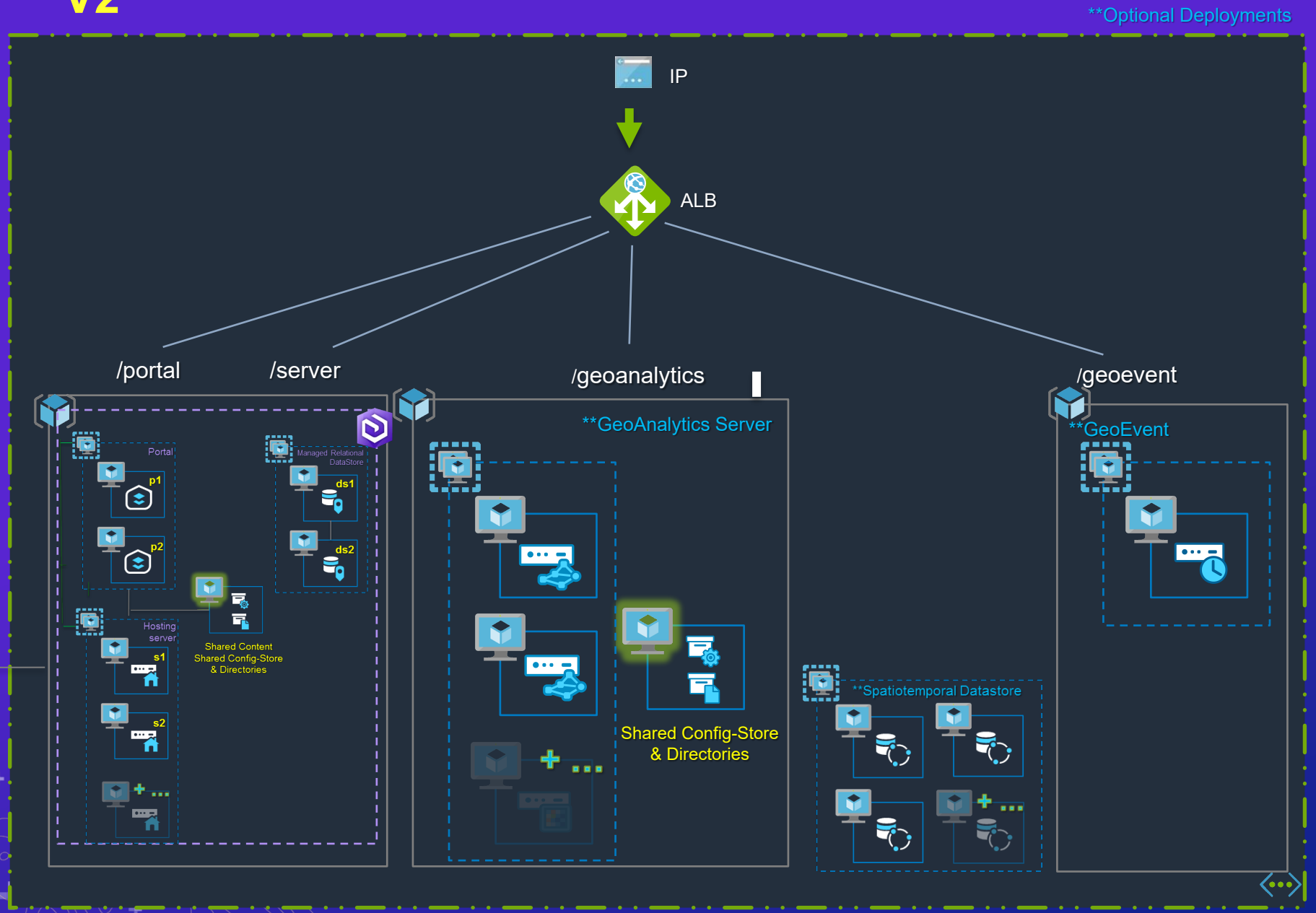
Deployment Concepts | Multi-Tier Base Deployment (with GeoAnalytics & GeoEvent) V2



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Content Store
- File Server
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Database to be registered
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Demo

Cloud Builder 10.8

Getting Started

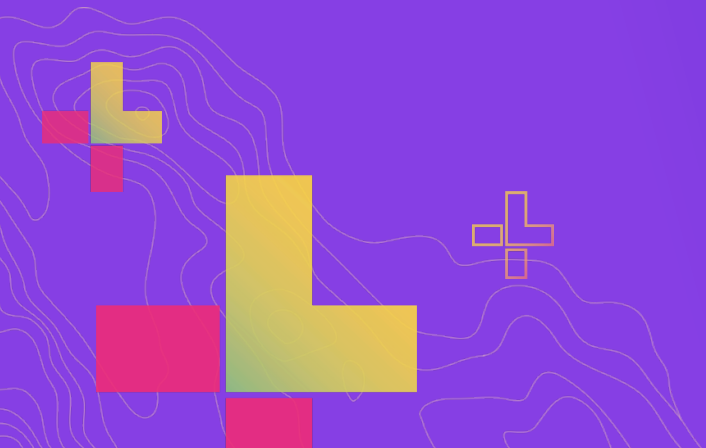
- Get Azure subscription
  - https://azure.com
- Get ArcGIS Enterprise software licenses
  - https://accounts.esri.com
- Get ArcGIS Enterprise Cloud Builder
  - http://bit.ly/cb108forazure

Cloud Builder

Demo

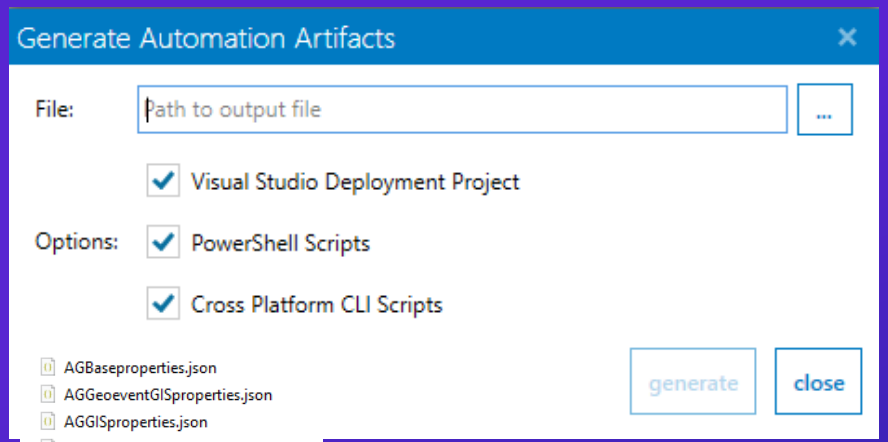
Automation

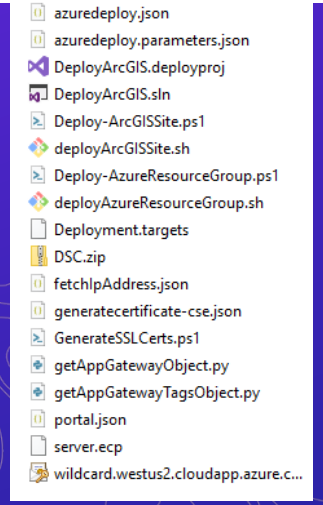
Concepts



Support for Automation | Since 10.6

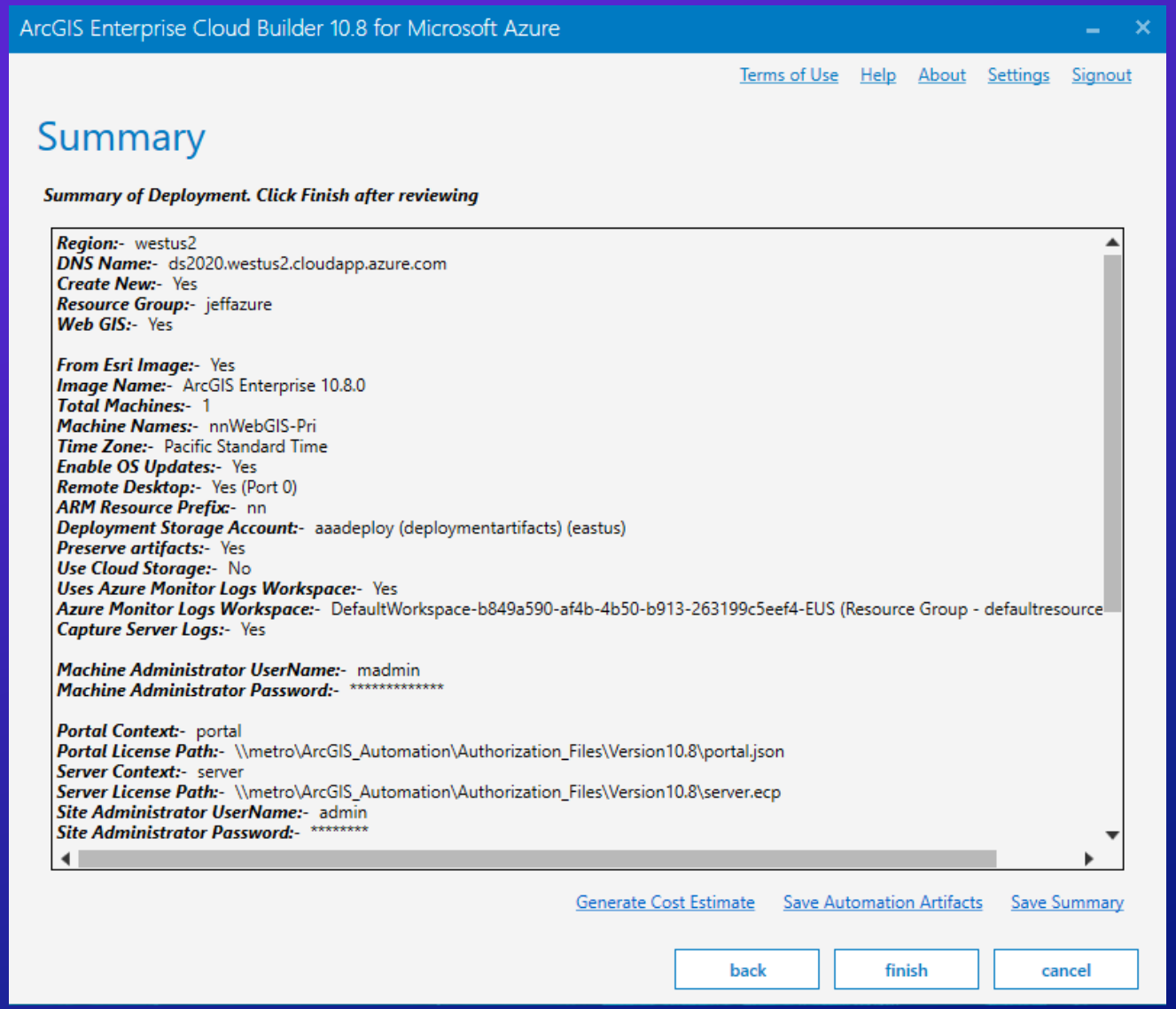
- Wizard driven deployment experience
- Designer to generate automation artifacts





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

Deployment Artifacts



Cloud Builder VS. Automation

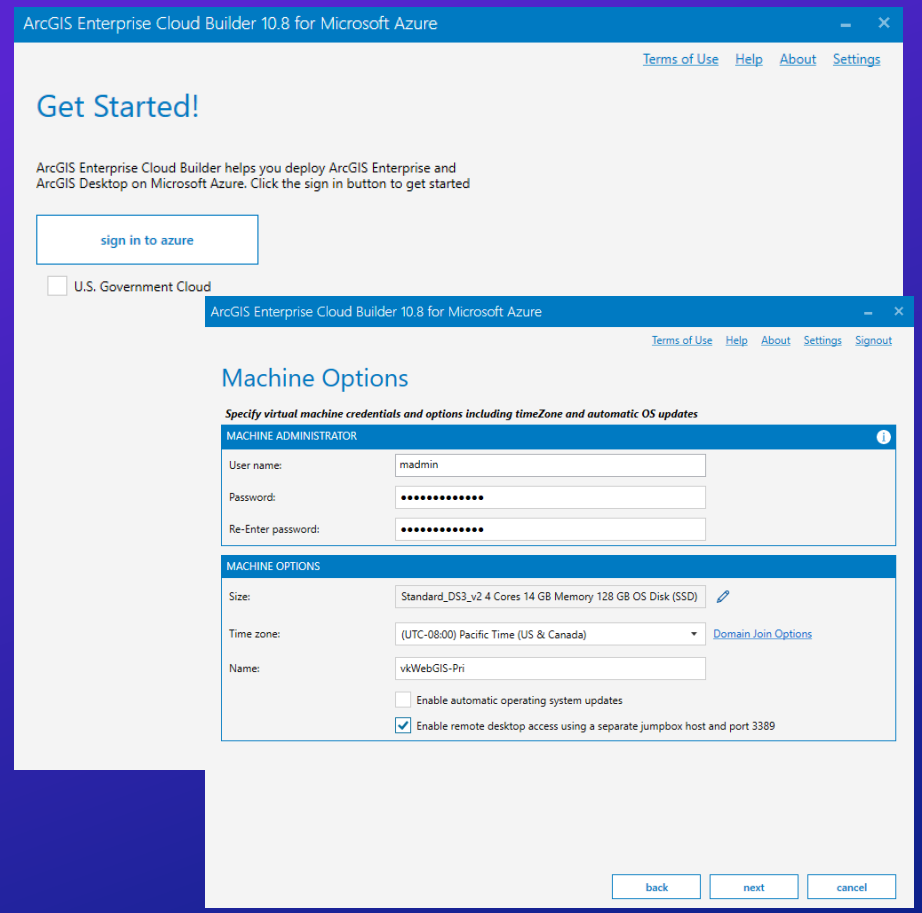
Visual Studio

BASH
THE BOURNE-AGAIN SHELL

PowerShell

Customize or Extend

Wizard Driven



Power ⟷ Simplicity

Typical Customizations and Extensibility

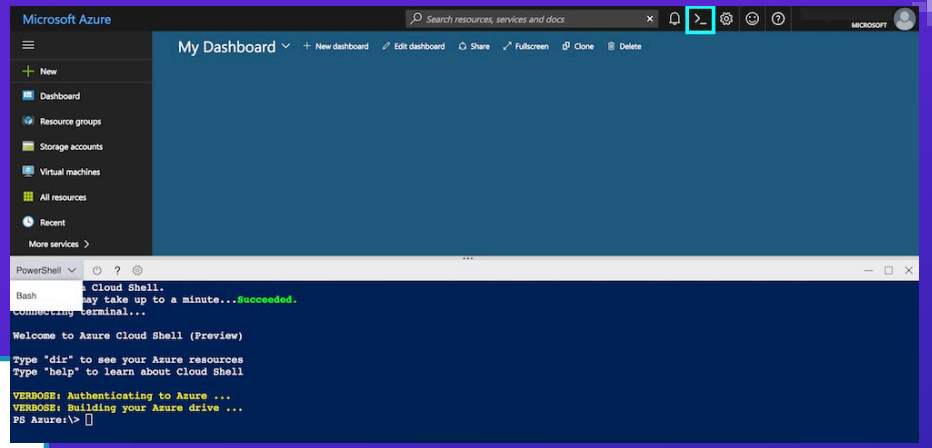
- Resource Naming Convention
  - Change the default names assigned by Cloud Builder (Load Balancers, Disks, NICs etc.)
- Place machines in separate subnets
  - Cloud Builder UI limits mapping NICs to single subnet
- Configure Network Security Groups (NSGs) as part of deployment
- Integrate with Azure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

…

Edits Outside Cloud Builder? … Training wheels are off!

Integrate with …

Azure Cloud Shell

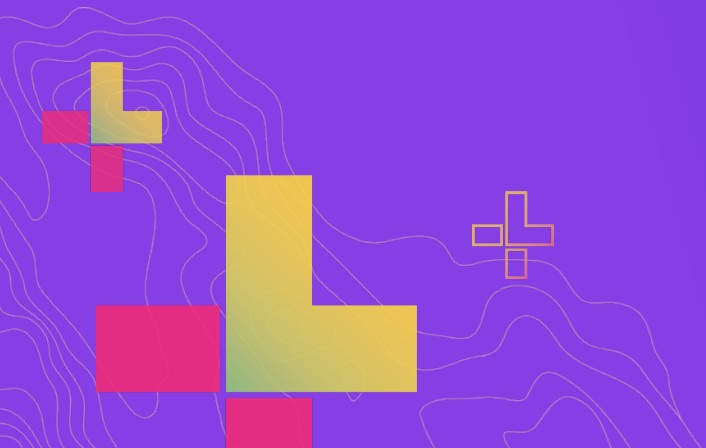


PowerShell DSC

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

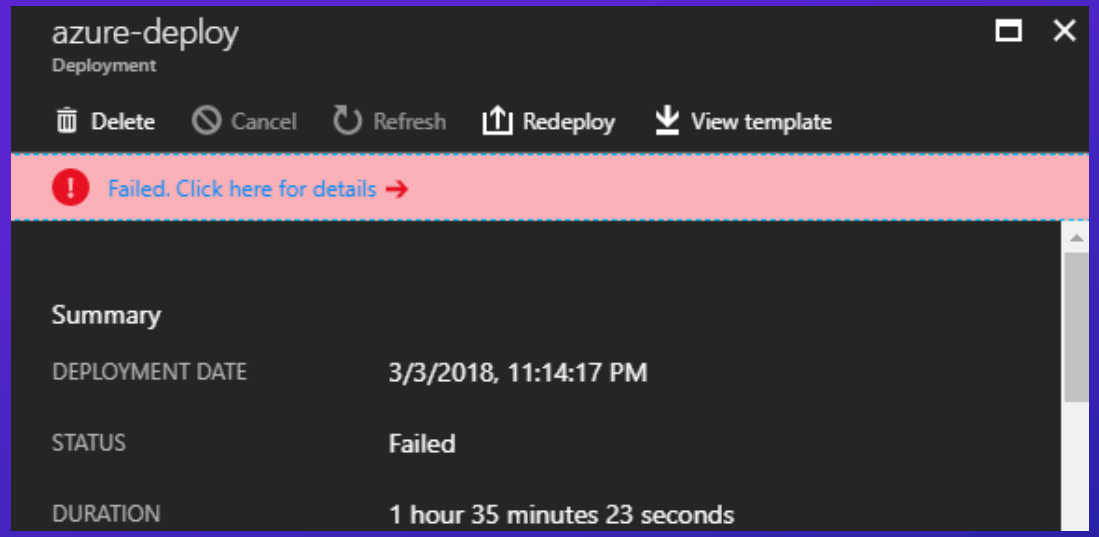
Storage Options | Help choosing

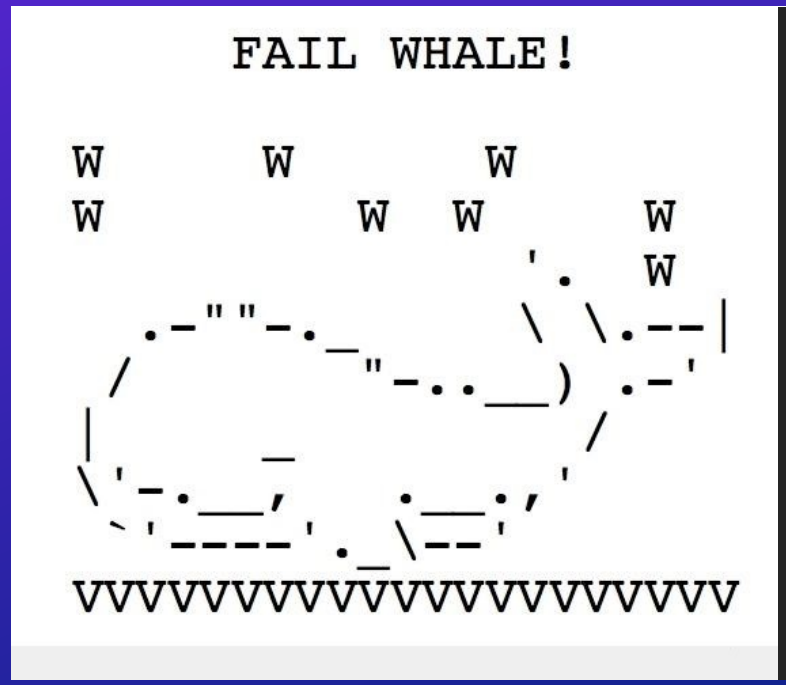
	File Share VM	Azure Blob + Table	Azure Files (SMB)
Latency	Best	Variable	Variable
Performance	Good	Good	OK
Scalability	Managed Disk IOPS	Good	Max 1000 IOPS
Config-Store Content-Store	Yes	Yes	Yes
Server Directories	Yes	No	Yes
High Availability	No	Yes	Yes

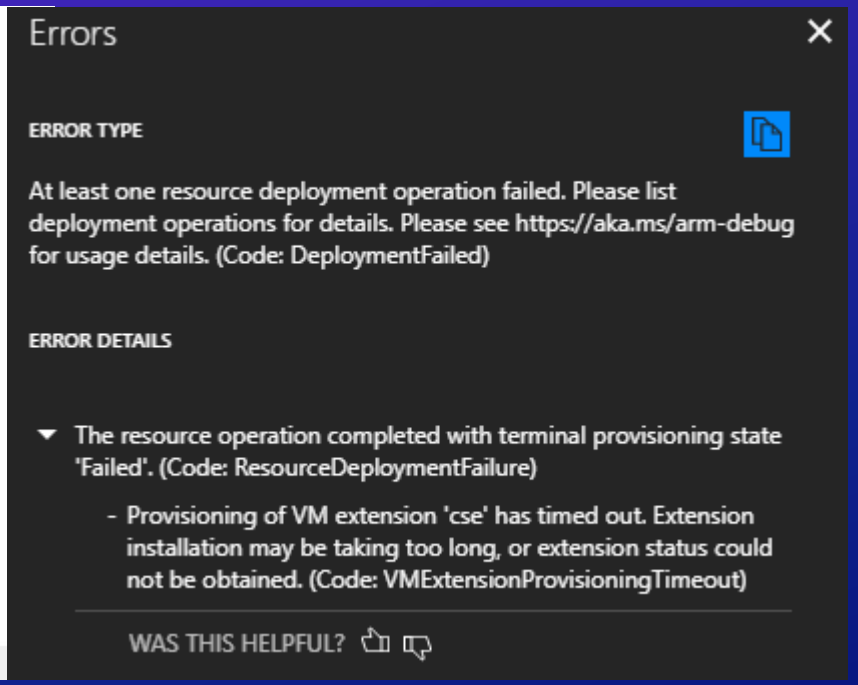
Single Machine VMs have 99.9 SLA + Scheduled Maintenance

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







Thank you

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