How to accelerate Azure with Open-Source

Global Azure 2023

Chris McKelt

Chris McKelt

- Cloud explorer since ~ 2015
- Hope to connect!

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chrismckelt

GitHub Advanced Security
GitHub

GitHub Administration
GitHub

GitHub Actions
GitHub

Microsoft Certified: Power Platform Fundamentals
Microsoft

AZ-304: Microsoft Azure Architect Design
Microsoft

Microsoft Certified: Azure Solutions Architect Expert
Microsoft

AZ-303: Microsoft Azure Architect Technologies
Microsoft

Microsoft Certified: Azure Fundamentals
Microsoft

Todays Topic

Quick run through of GitHub projects that can help

Common Business Scenario

How can we help this business?

Review and Recommend

Current state assessment

Platform & Landing Zones

Reference architectures

Solution Accelerators

Fast track your cloud value

Pet Toyz R US

‘Click Ops’ Setup

- Web / VMs / Databases
- COTS /SAAS Products
- Security an afterthought
- No DevOps ☹

2019

2021

2023

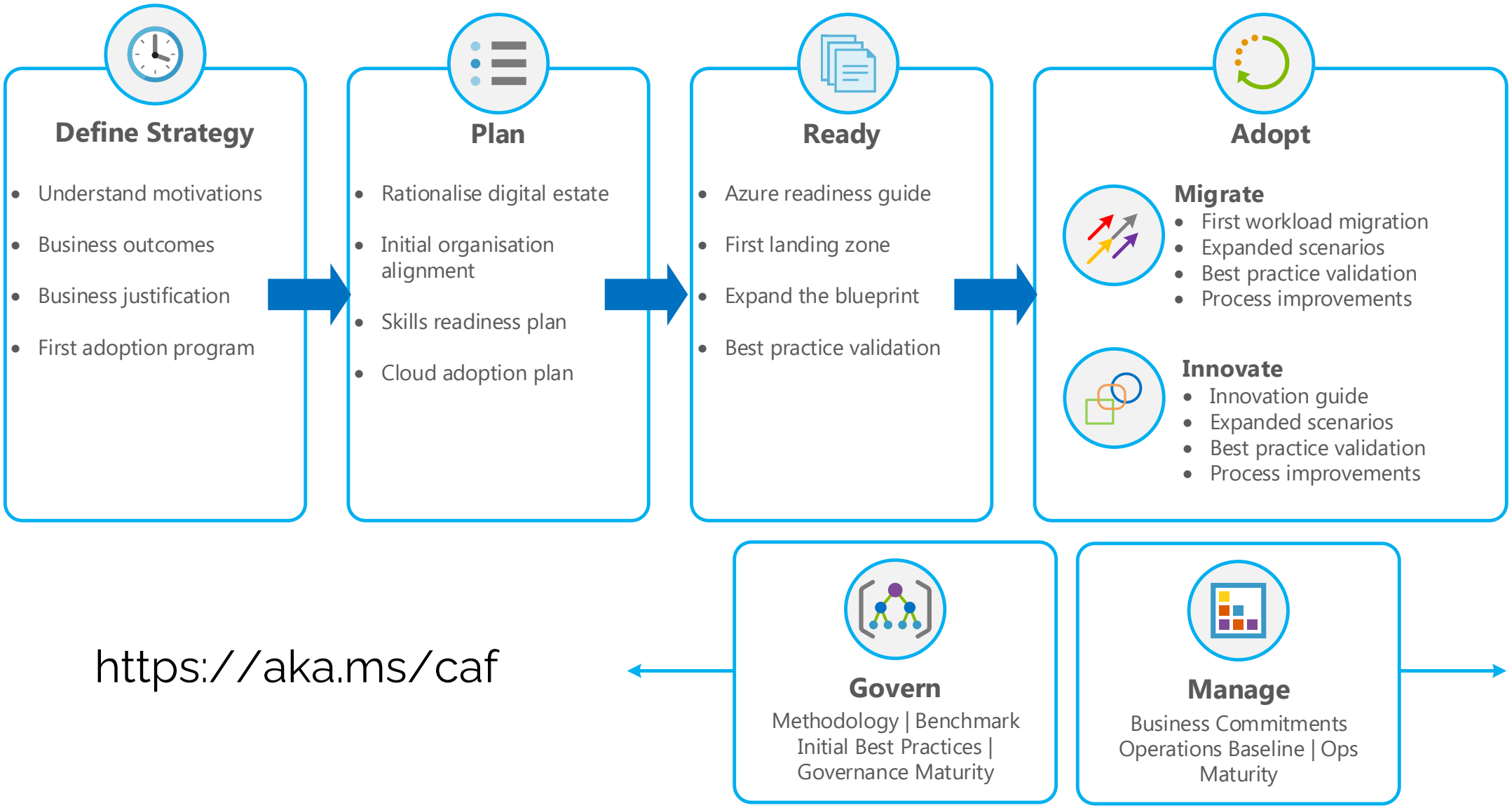
Company Founded

- Online E-Commerce Business
- Global distribution
- 3rd Party Integration (FedEx etc.)

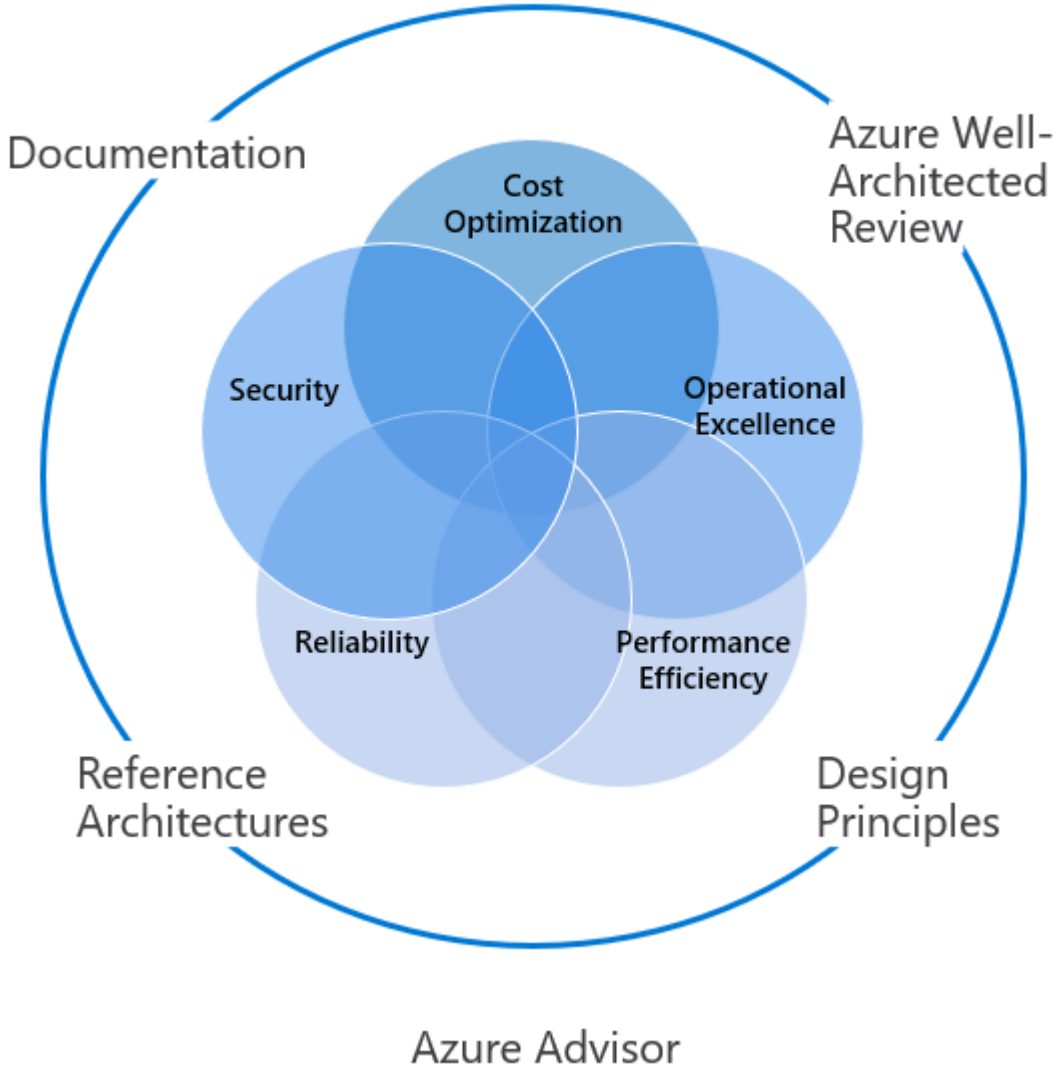
Help Needed

- Change is painful
- Data collected but not uses
- Sales dropping (dogs unhappy)

Needed: Cloud Adoption Framework



Needed: Well Architected Framework



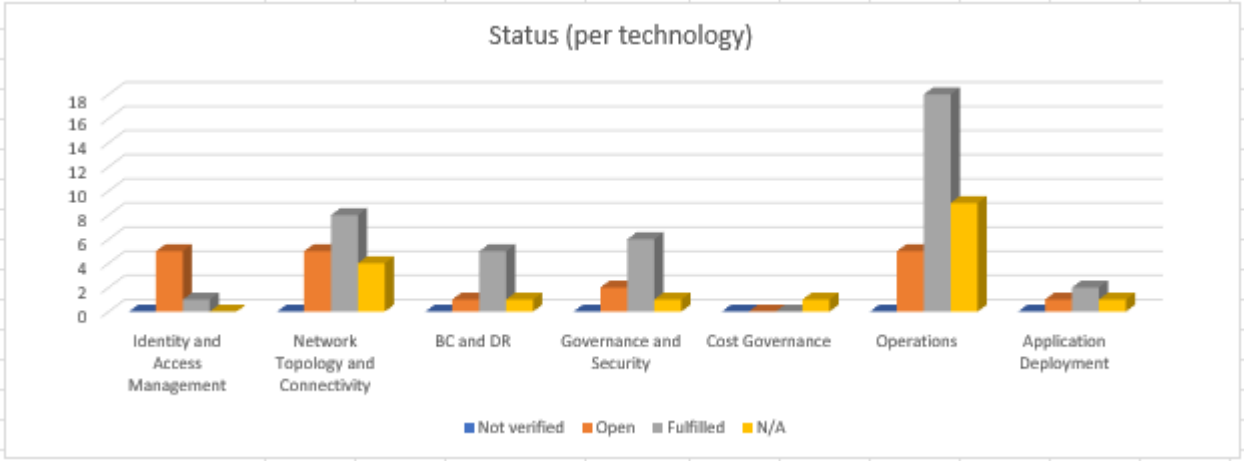
Hired!

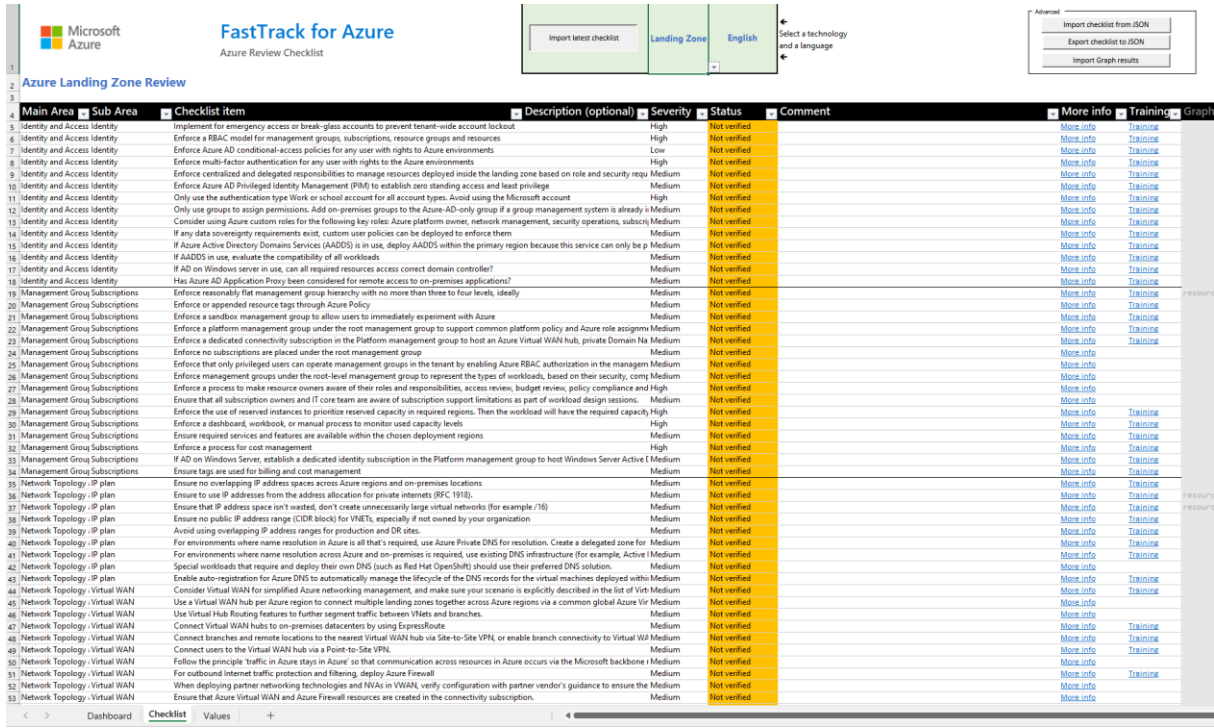
Current State Assessment

Azure Review Checklists

https://github.com/Azure/review-checklists

- Used by MSFT & Partners in reviews
- Excel Sheet imports JSON review tasks
- Cover 14 areas to review (plus yours)
- Visually displays dashboards
- https://aka.ms/ftaaas for a web frontend

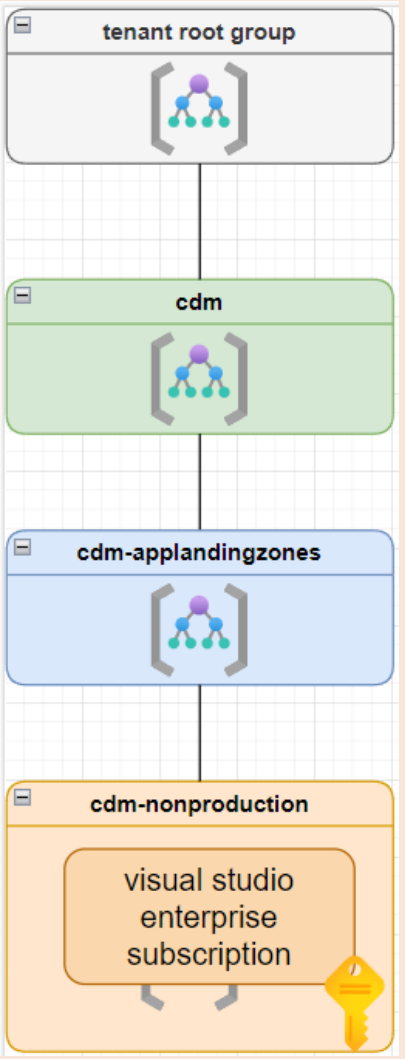




Azure Resource Inventory (ARI)

https://github.com/microsoft/ARI

- Single PowerShell file '*AzureResourceInventory.ps1*'
- Create Draw.io diagram of
  - Network topology
  - Organisation
  - subscriptions
- Creates an Excel Sheet covering resources and provide visual dashboards



Azure Resource Inventory (ARI)

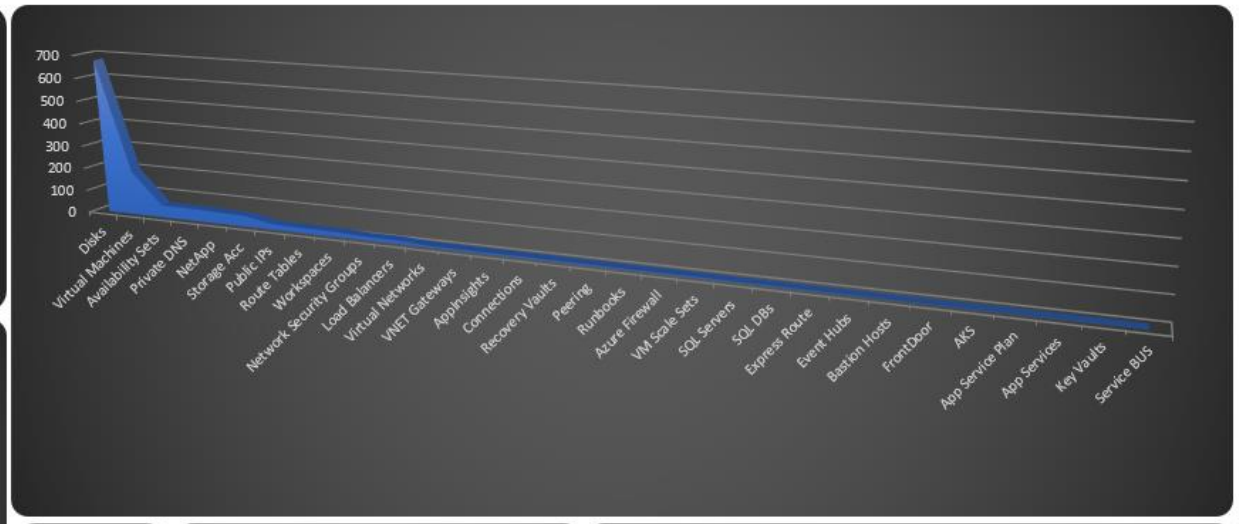
https://github.com/microsoft/ARI

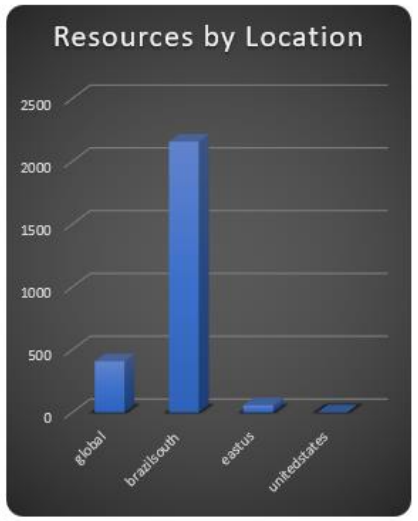
Reported Resources

Name	Size
Disks	677
Virtual Machines	192
Availability Sets	53
Private DNS	53
NetApp	50
Storage Acc	46
Public IPs	23
Route Tables	22
Workspaces	21
Network Security Groups	15
Load Balancers	15
Virtual Networks	7
VNET Gateways	6
AppInsights	6
Connections	6
Recovery Vaults	5
Peering	5
Runbooks	4
Azure Firewall	4
VM Scale Sets	4
SQL Servers	3
SQL DBs	3
Express Route	2
Event Hubs	2
Bastion Hosts	1
FrontDoor	1
AKS	1
App Service Plan	1
App Services	1
Key Vaults	1
Service BUS	1

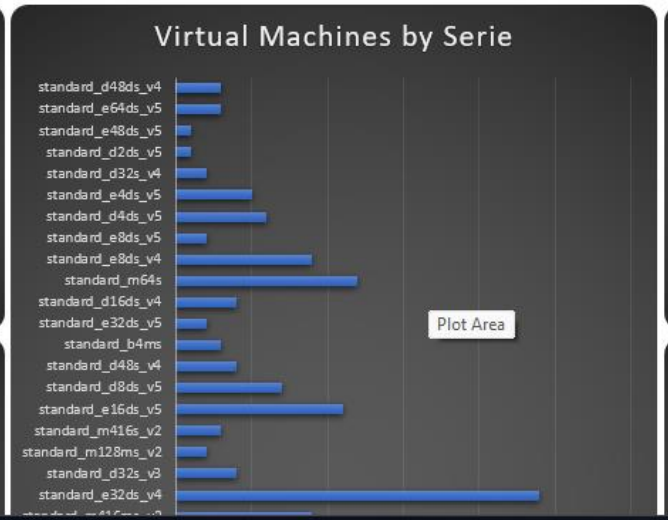
Azure Resource Inventory v3.0
https://github.com/microsoft/ARI

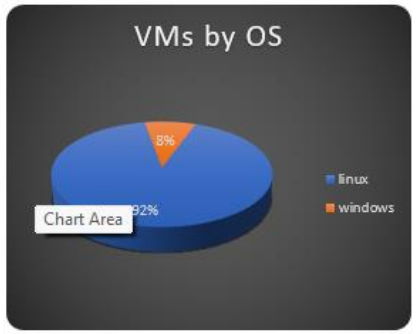
Report Date: 05/04/2023
Extraction Time: 7 Seconds
Reporting Time: 1.38 Minutes
User Session: clvieira@microsoft.com
Environment: PowerShell Desktop

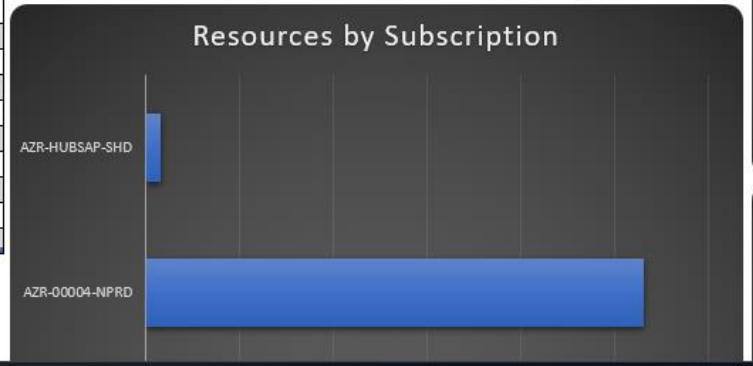


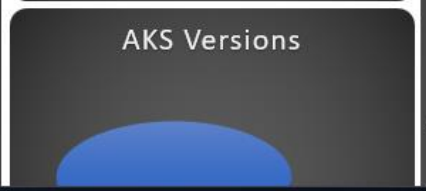


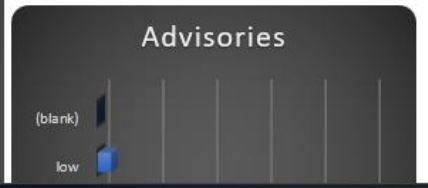
Total Resources
2621











Overview | Advisory | Disks | Route Tables | Virtual Machines | Private DNS | Availability Sets | Network Security Groups | Peering

1

AzGovViz → Azure Governance

https://github.com/microsoft/CloudAdoptionFramework/tree/master/govern/AzureGovernanceVisualizer

2

AzViz → Azure Visualizer (resource topology diagrams)

https://github.com/PrateekKumarSingh/AzViz

3

AzQr → Azure Quick Review (high level recommendations)

https://github.com/Azure/azqr

4

Azure Resource Map (by Graeme Foster)

https://github.com/graemefoster/AzureResourceMap

5

Azure Documenter $

https://docs.serverless360.com/docs/what-is-azure-documenter

Review Findings...

Naming/Tagging

- No naming standards
- No tagging
- Everything is in one resource group

Security

- RBAC issues (too many admins)
- No private networking

Cost Optmisation

- Unused resources costing $
- Not right sized

Disparate Environments

- No segregation production and nonproduction
- Resources deployed across regions

RECOMMENDATIONS & TOOLINGS

Platform & Guard Rails

Establish a scalable Azure cloud platform with best-practice networking and security foundations

Landing Zone Accelerators

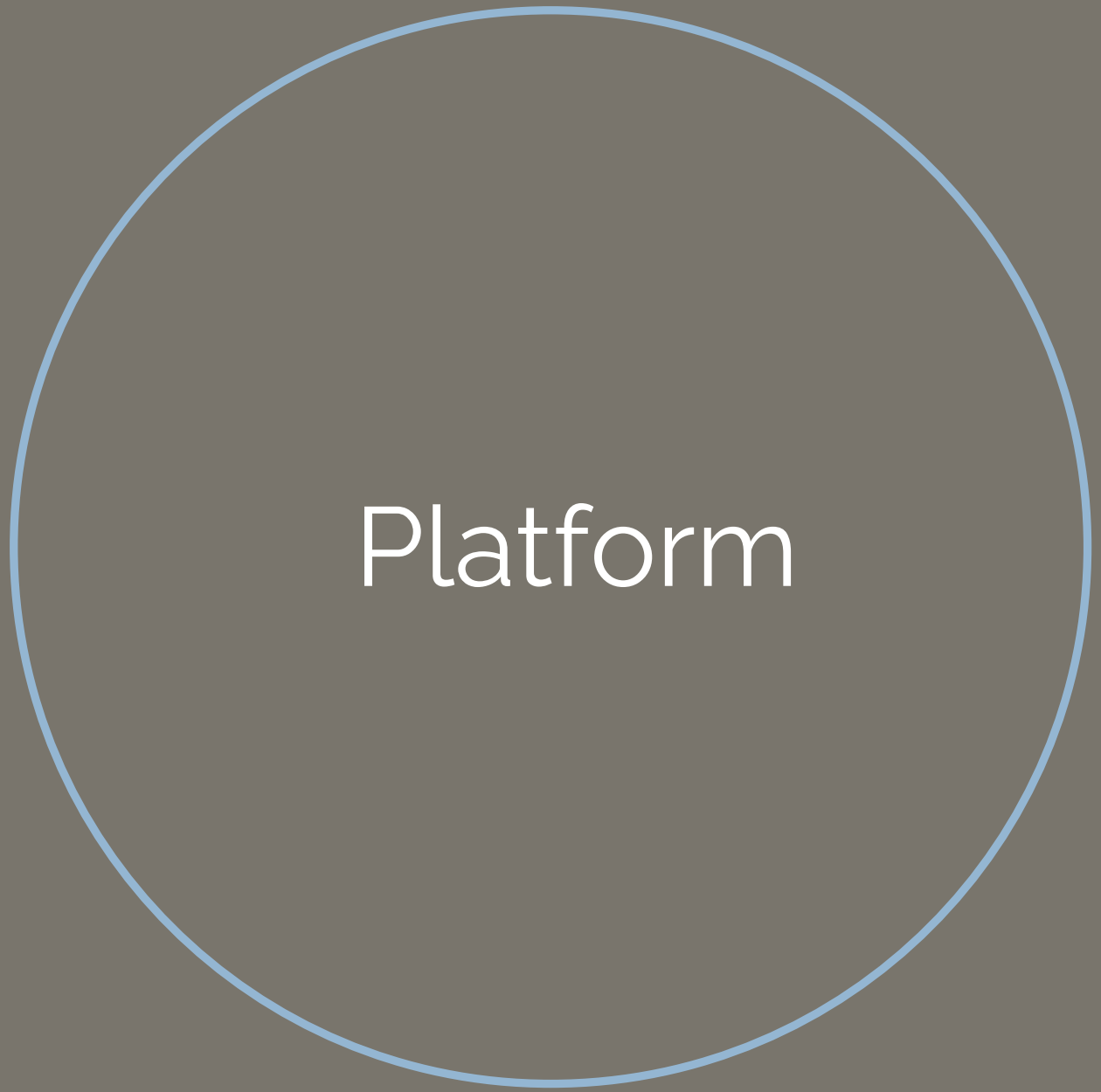
Reference implementations for application/APIs

Data Platform

Azure Data Services Go Fast

Solution Accelerators

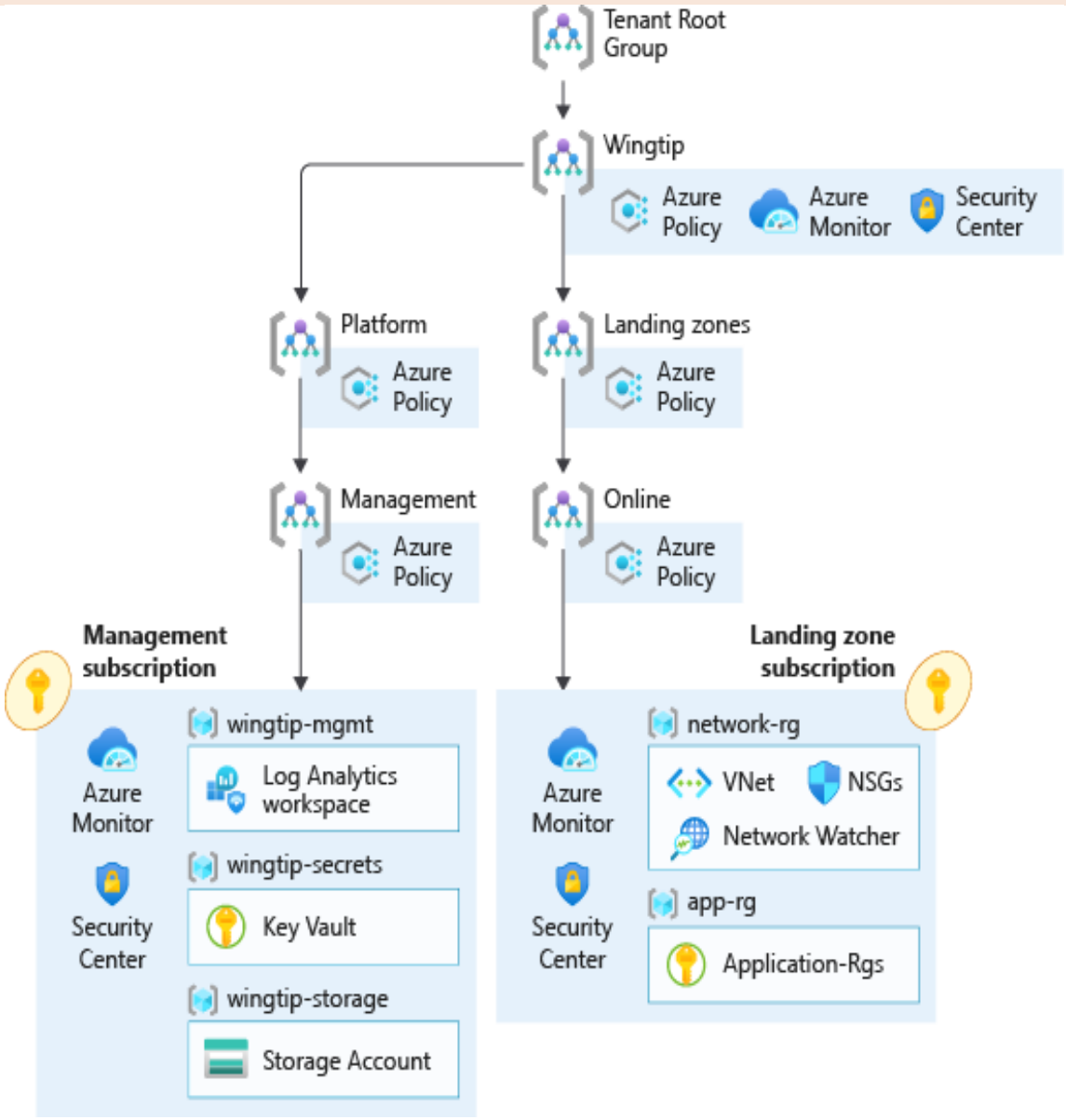
Open-source projects to fast track solution options


Platform

Enterprise-Scale

https://github.com/Azure/Enterprise-Scale

- Prescriptive guidance across WAF
  - Identity
  - Networking
  - Security
  - Governance
- Modular by design and a variety of flavours across
  - Hub and Spoke
  - Virtual WAN
  - Hybrid Connectivity
  - SAP/AKS/Government
- ARM, Bicep, Terraform



1

EPAC – Enterprise Policy as Code

https://github.com/Azure/enterprise-azure-policy-as-code

PowerShell module to deploy templates at all scope levels

2

Community Policy

https://github.com/Azure/Community-Policy

Custom policies built by the community

3

ALZ Monitor

https://github.com/Azure/alz-monitor

Alerts and Monitoring best practice setup

4

AZOps

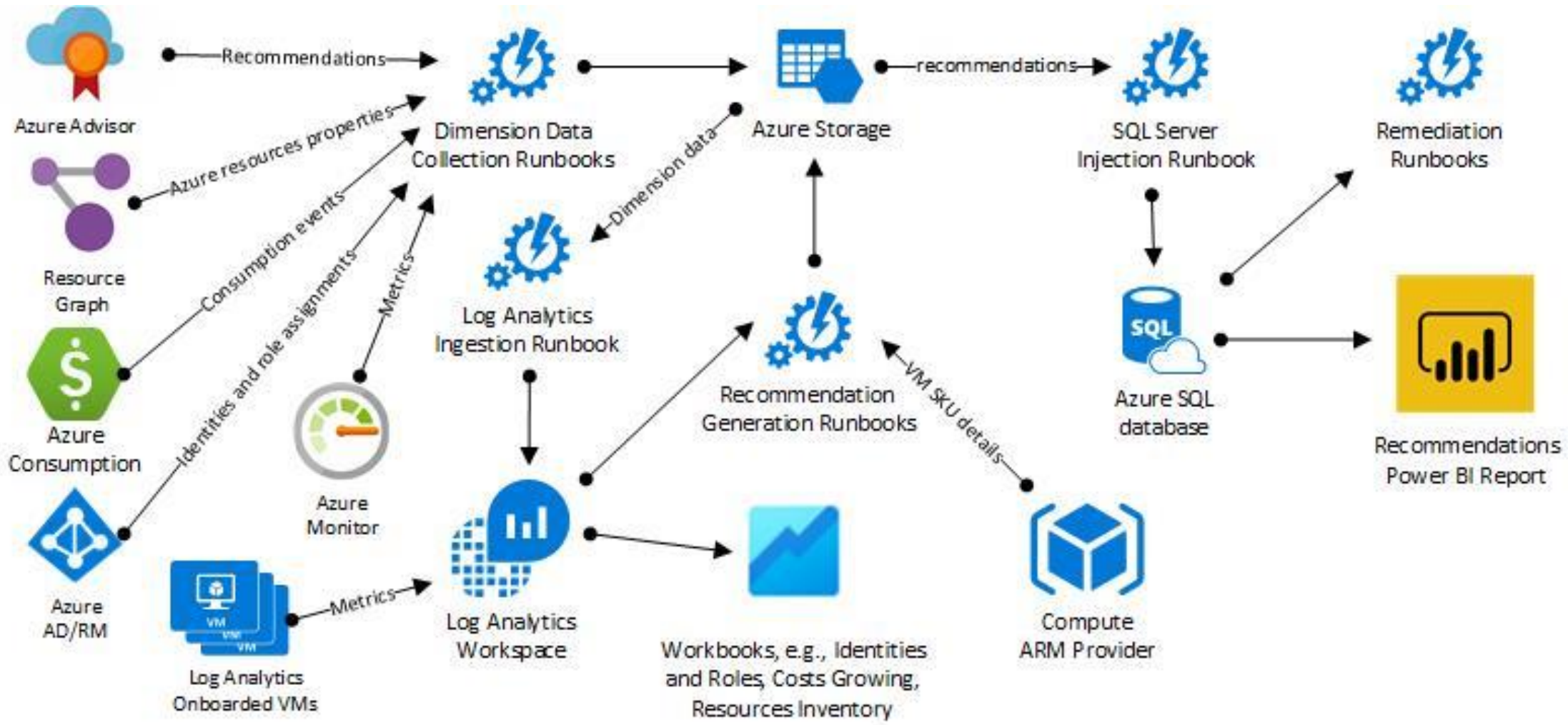
https://github.com/Azure/AzOps

PowerShell module to deploy resources at any scope

Cost Optimisation

Azure Cost Optimisation

https://github.com/helderpinto/AzureOptimizationEngine



Azure Cost Optimisation

https://github.com/helderpinto/AzureOptimizationEngine

Extensible solution designed to generate optimization recommendations across:

Azure Advisor Data

Cost

Security

High Availability

Performance

Custom Recommendations

Operational Excellence

Power BI/ Azure Workbook Dashboards

Azure Cost Optimisation

https://github.com/helderpinto/AzureOptimizationEngine

Latest Recommendations

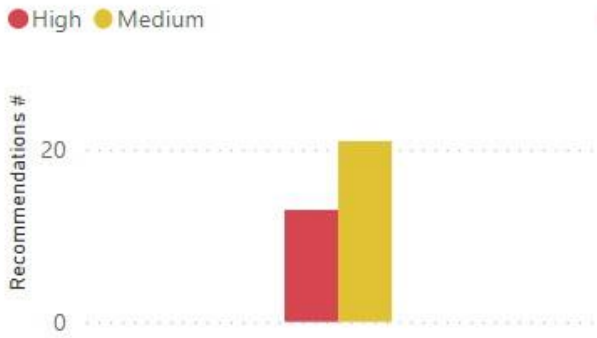
01-03-2021 00:08:00

34

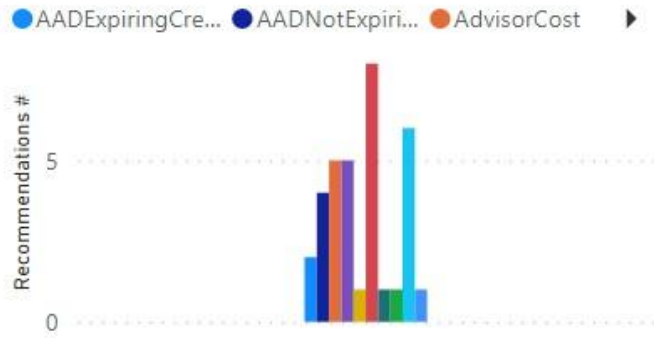
Total Recommendations

Recommendations # by Category

Recommendations # by Impact



Recommendations # by Sub-Type



Category	Impact	Sub-Type	Recommendation	Cloud	SubscriptionId	Environment
All	All	Multiple selections	All	All	All	All

Recommendation	Category	Impact	Cloud	SubscriptionGuid	ResourceGroup	Environment	Count
Virtual Machines should use Managed Disks for higher availability and manageab...	HighAvailability	High	AzureCloud	dfabc7a1-ca6f-4a...	onprem-tests-rg		6
Virtual Machines should be placed in an Availability Set together with other insta...	HighAvailability	Medium	AzureCloud	dfabc7a1-ca6f-4a...	onprem-tests-rg		5
Azure AD application with credentials expiration not set or too far in time	Security	Medium	AzureCloud	N/A	N/A		4
Virtual Machine has been deallocated for long with disks still incurring costs	Cost	Medium	AzureCloud	dfabc7a1-ca6f-4a...	onprem-tests-rg		4
Azure AD application with credentials expired or about to expire	OperationalExcellence	Medium	AzureCloud	N/A	N/A		2
Right-size or shutdown underutilized virtual machines	Cost	High	AzureCloud	dfabc7a1-ca6f-4a...	devops-rg	dev	2
Virtual Machines should use Managed Disks for higher availability and manageab...	HighAvailability	High	AzureCloud	dfabc7a1-ca6f-4a...	devops-rg		2

Azure Cost Optimisation

https://github.com/helderpinto/AzureOptimizationEngine

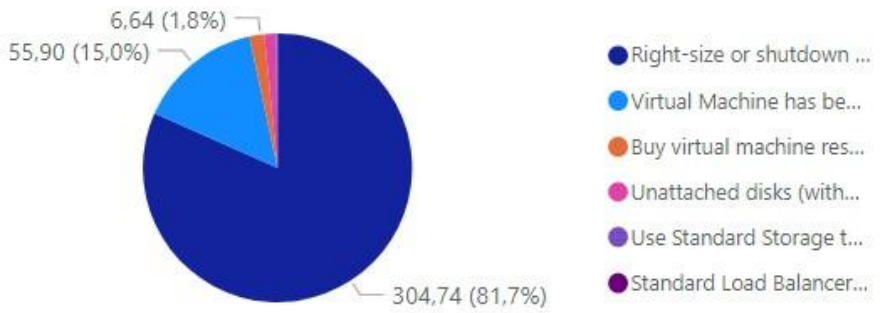
Cost Overview

Costs and estimated savings refer to 30 days

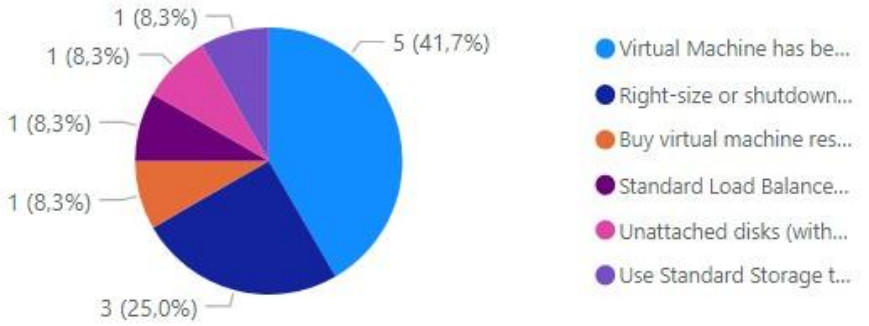
12
Recommendations

373
Savings

Savings by Recommendation



Recommendations Count

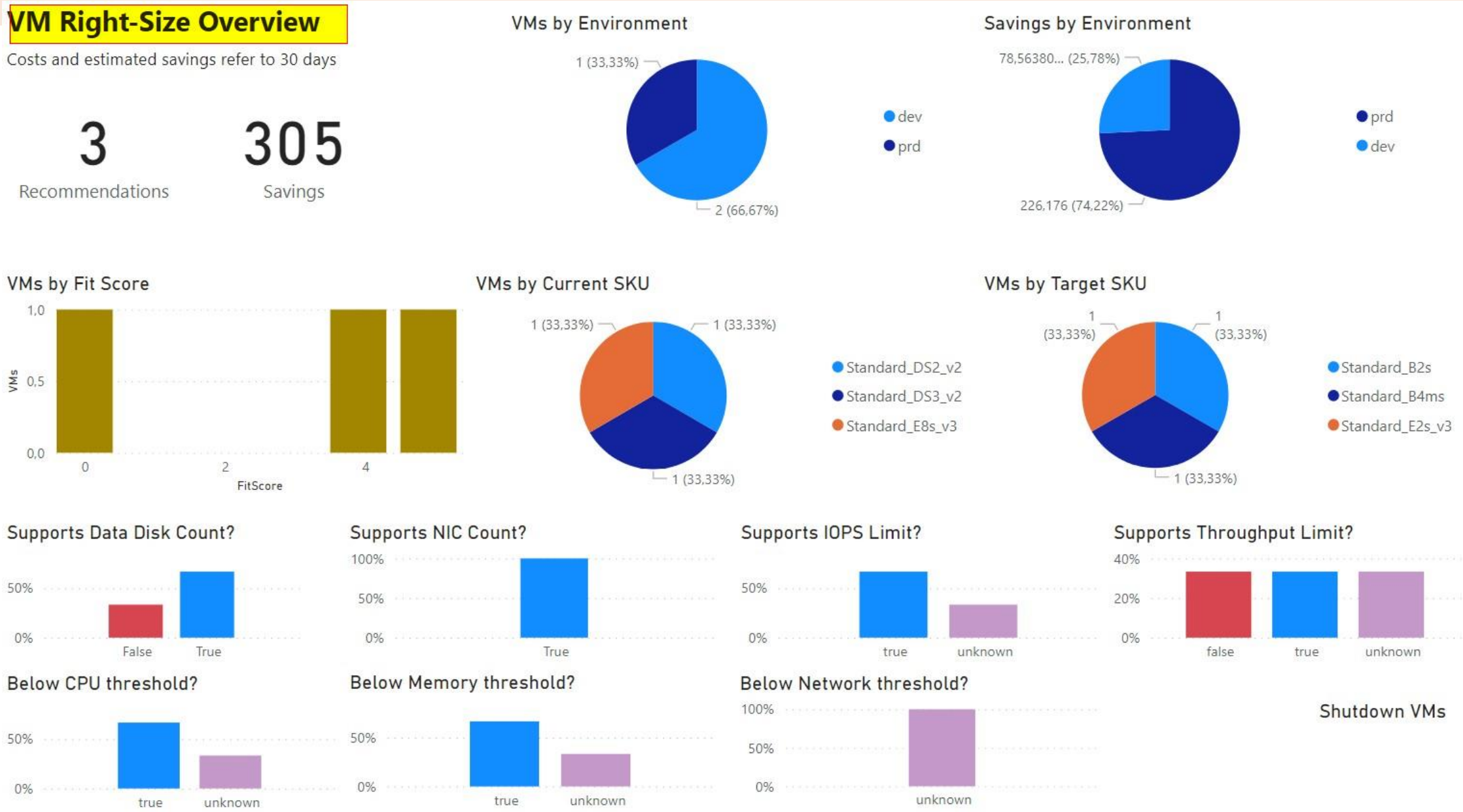


Impact	Sub-Type	Recommendation	Cloud	SubscriptionId	ResourceGroup	Environment
All	All	All	All	All	All	All

Recommendation	InstanceName	Cloud	SubscriptionGuid	ResourceGroup	Environment	Impact	Costs	Savings	FitScore	URL
Right-size or shutdown underutilized virtual machines	sql01	AzureCloud	dfabc7a1-ca6f-4a95-8a7...	prod-rg	prd	High	301,32	226,18	0,00	
Right-size or shutdown underutilized virtual machines	ubuntu1801	AzureCloud	dfabc7a1-ca6f-4a95-8a7...	devops-rg	dev	High	63,98	41,37	4,90	
Right-size or shutdown underutilized virtual machines	devops01	AzureCloud	dfabc7a1-ca6f-4a95-8a7...	devops-rg	dev	High	127,96	37,20	3,90	
Virtual Machine has been deallocated for long with disk...	onprem-mig02	AzureCloud	dfabc7a1-ca6f-4a95-8a7...	onprem-tests-rg		Medium	20,70	20,70	5,00	
Virtual Machine has been deallocated for long with disk...	devops01	AzureCloud	dfabc7a1-ca6f-4a95-8a7...	devops-rg		Medium	16,30	16,30	5,00	
Virtual Machine has been deallocated for long with disk...	onprem-mig04	AzureCloud	dfabc7a1-ca6f-4a95-8a7...	onprem-tests-rg		Medium	12,40	12,40	5,00	
Buy virtual machine reserved instances to save money o...	standard_d8a_v4 virt...	AzureCloud	dfabc7a1-ca6f-4a95-8a7...	notavailable		High	0,00	6,64	5,00	
Virtual Machine has been deallocated for long with disk...	onprem-srv01	AzureCloud	dfabc7a1-ca6f-4a95-8a7...	onprem-tests-rg		Medium	6,50	6,50	5,00	
Unattached disks (without owner VM) incur in unnecess...	physicaldrive0-onpr...	AzureCloud	dfabc7a1-ca6f-4a95-8a7...	adhoc-tests		Medium	5,27	5,27	5,00	

Azure Cost Optimisation

https://github.com/helderpinto/AzureOptimizationEngine



Landing Zones Accelerators

What is a Landing Zone Accelerator?

Open-Source on GitHub

Architecture guidance

Reference implementations

Infrastructure as Code templates

Follows Best Practices

Free to modify as needed

1

APIM Landing Zone Accelerator

https://aka.ms/EnterpriseScale-APIM

2

App Service Landing Zone

https://aka.ms/EnterpriseScale-AppService

3

Integration Services Landing Zone [WIP]

https://github.com/Azure/Integration-Services-Landing-Zone-Accelerator

4

Azure Virtual Desktop (AVD) Landing Zone

https://github.com/Azure/avdaccelerator

5

Azure Spring Apps

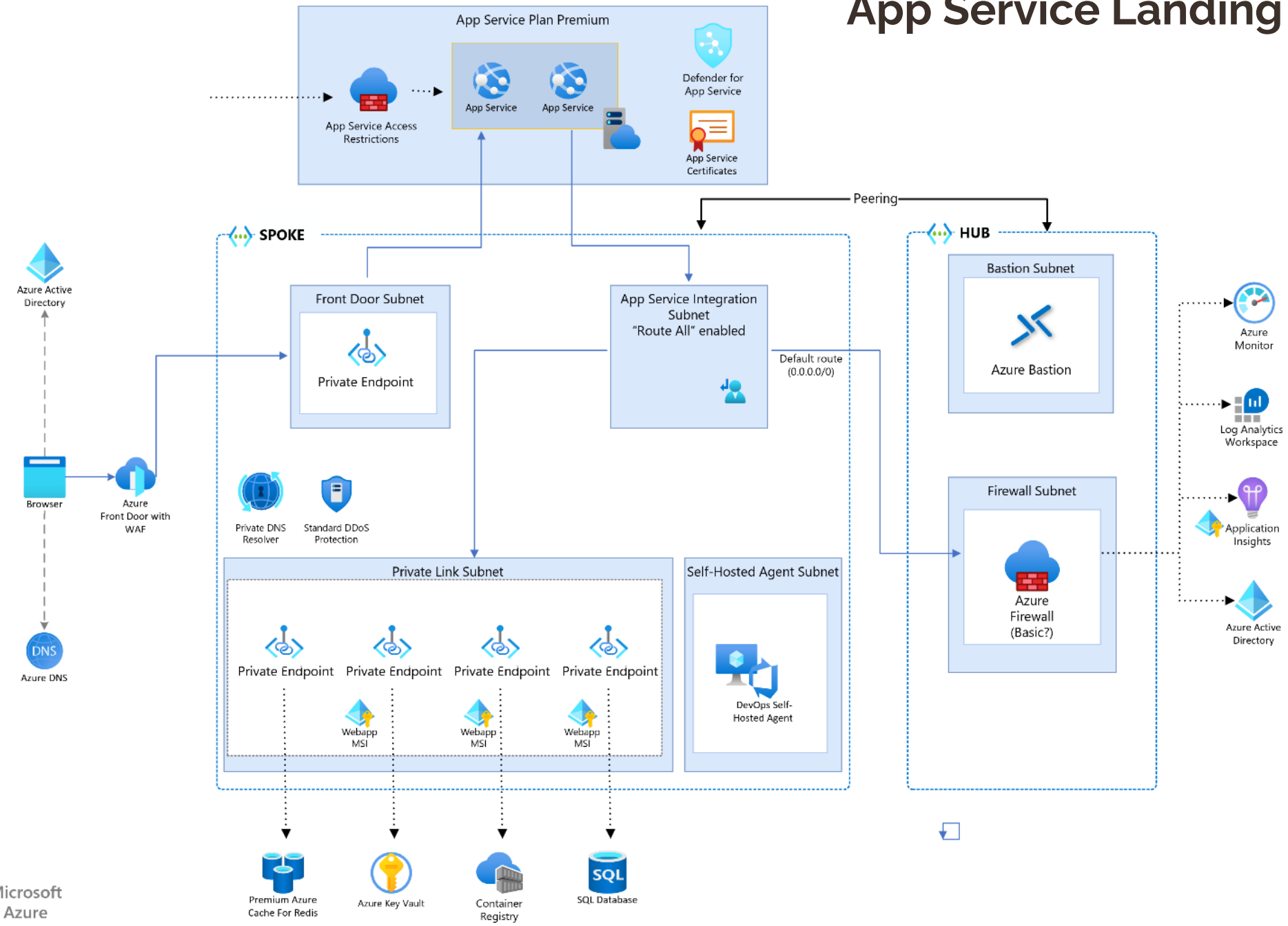
https://github.com/Azure/azure-spring-apps-landing-zone-accelerator

6

Azure Red Hat OpenShift

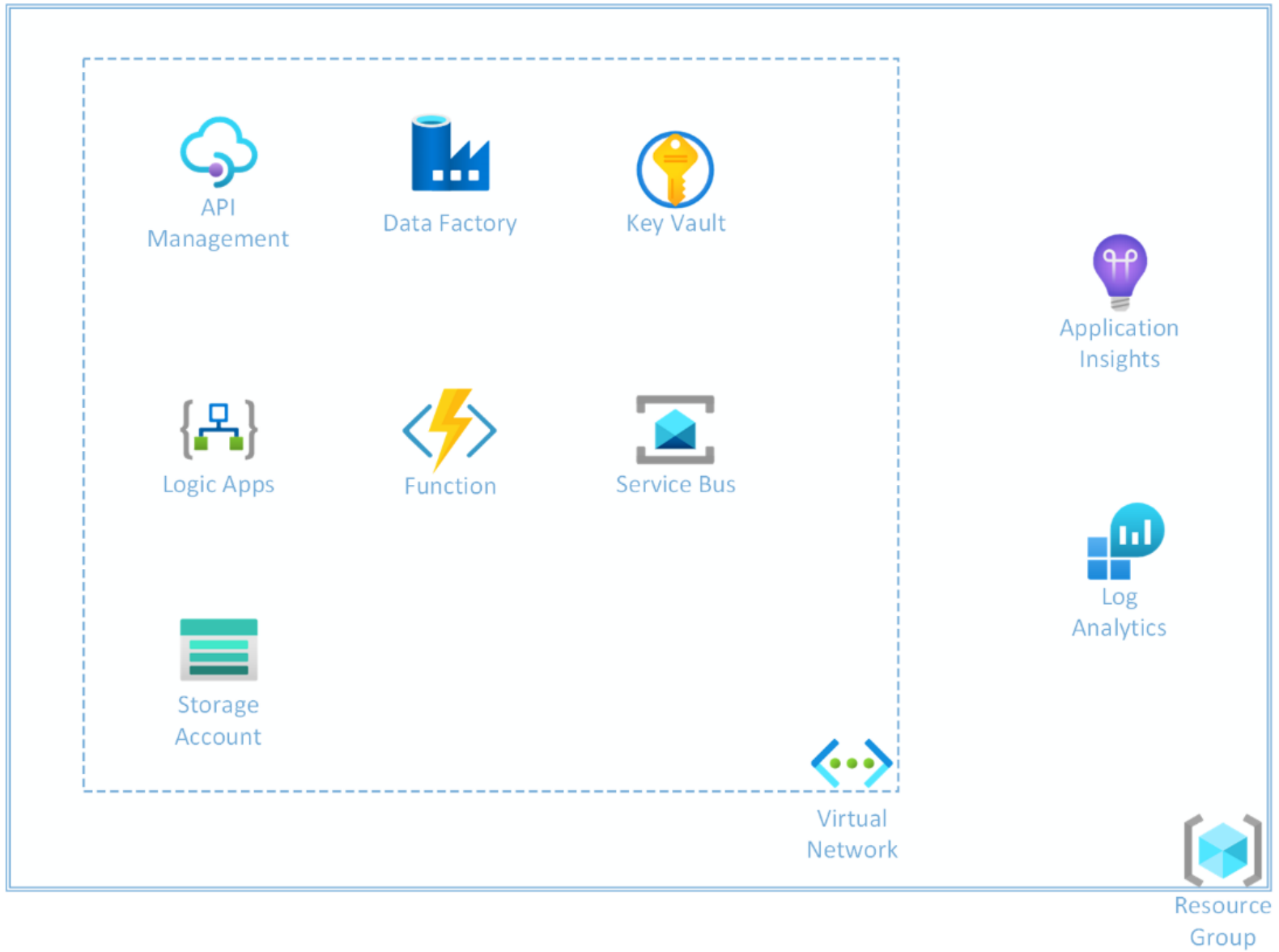
https://github.com/Azure/ARO-Landing-Zone-Accelerator

App Service Landing Zone Accelerator

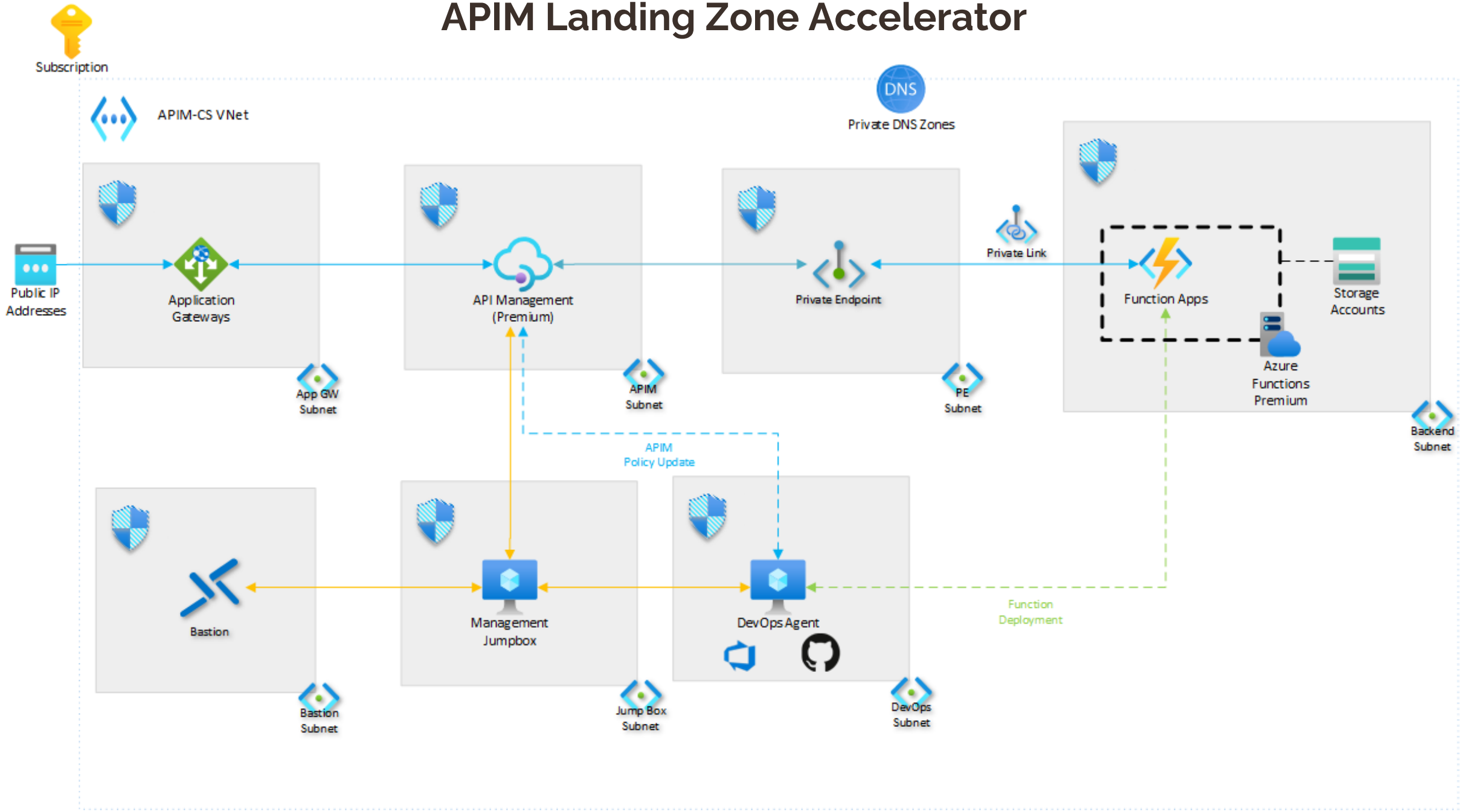


Microsoft Azure

AIS Landing Zone Accelerator



APIM Landing Zone Accelerator

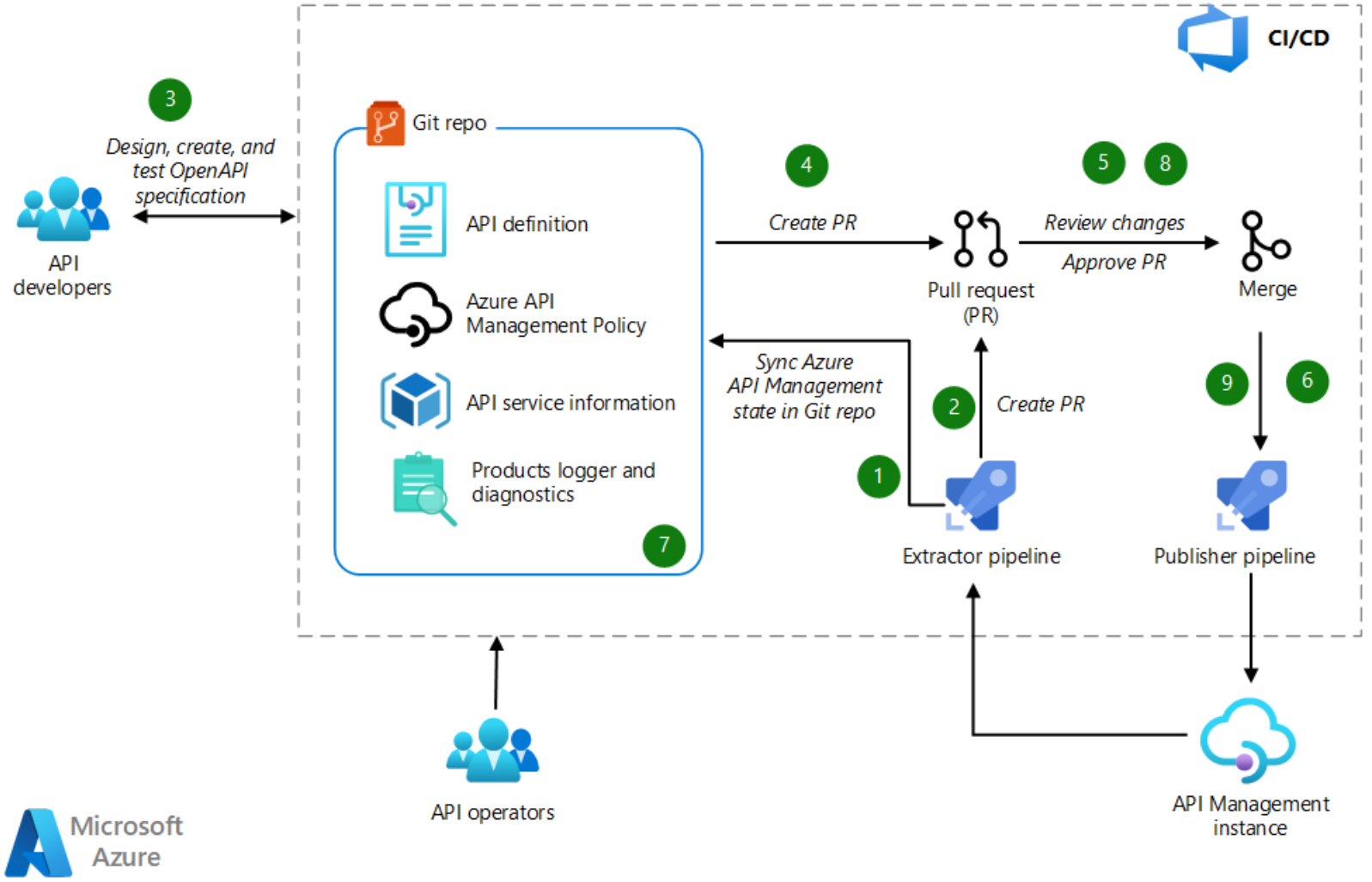


API Tooling

APIOps

https://github.com/Azure/apiops

- Applies concepts of DevOps to Azure API Management.
- Versions controls your API Management Solution
- Lifecycle of API design, development, and deployment with self-service and automated tools
- Automation tools to extract your current API and put rigour around changes



https://github.com/Azure/api-management-policy-snippets

APIM Policy Snippets

```
1
2   <policies>
3       <inbound>
4           <base/>
5       </inbound>
6       <backend>
7           <base/>
8       </backend>
9       <outbound>
10          sethea
11          <base/ set-header
12      </outbound>
13      <on-error>
14          <base/>
15      </on-error>
16  </policies>
```

Add a new header, change the value of an existing header or remove a header. Works for both response and request headers - policy can be applied in inbound or outbound sections at any scope. (User Snippet)

```
<set-header name="" exists-action="override">
    <value></value>
```

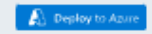
- Community repository for APIM Policies
- 50 commonly used policies

Data Platform / Cloud Scale Analytics

Cloud Scale Analytics

https://github.com/Azure/data-product-analytics

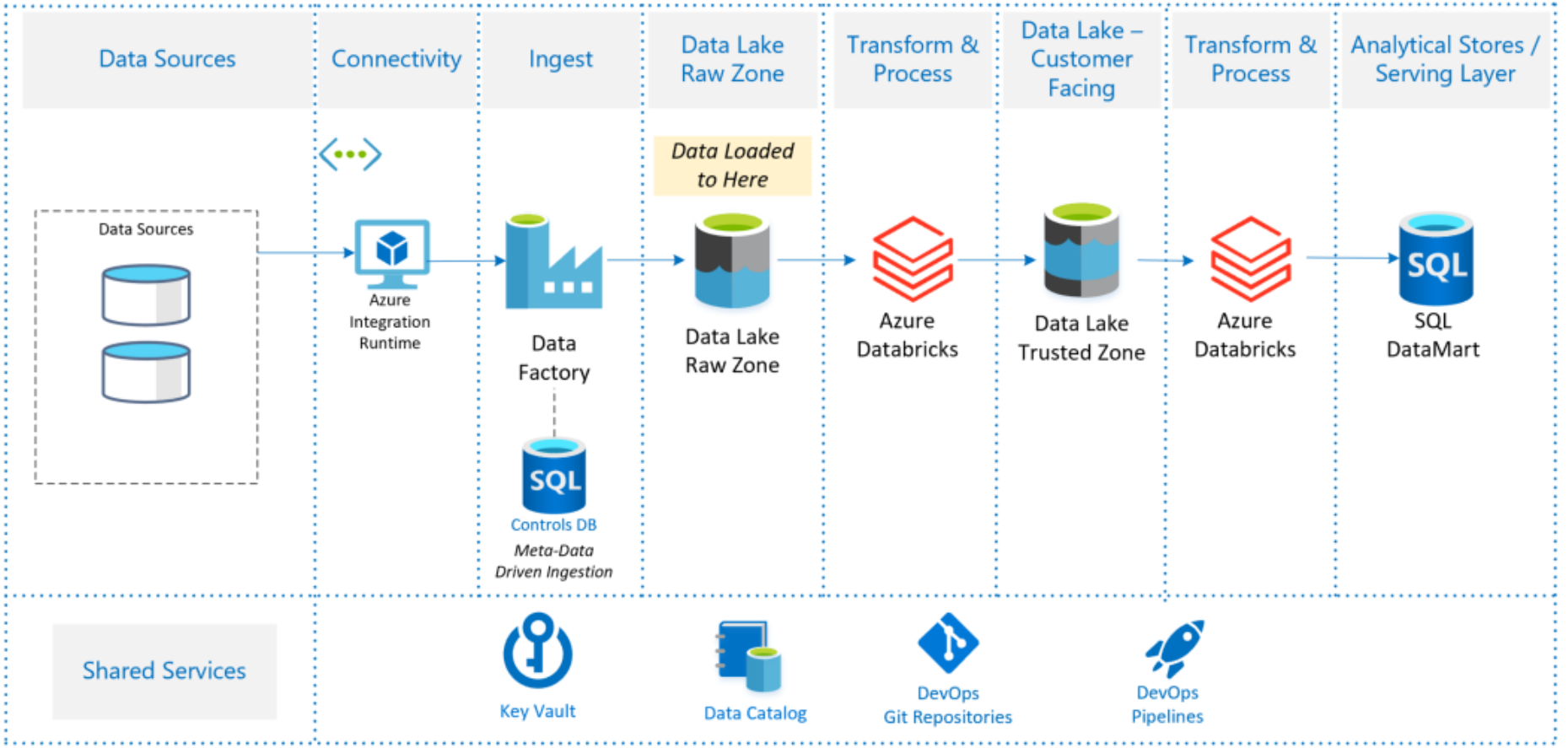
- 2 Core building blocks
  - Data Management Landing Zone
  - Data Landing Zone

Reference implementation	Description	Deploy to Azure	Link
Cloud-scale Analytics Scenario	Deploys a Data Management Landing Zone and one or multiple Data Landing Zones all at once. Provides less options than the the individual Data Management Landing Zone and Data Landing Zone deployment options. Helps you to quickly get started and make yourself familiar with the reference design. For more advanced scenarios, please deploy the artifacts individually.		
Data Management Landing Zone	Deploys a single Data Management Landing Zone to a subscription.		Repository
Data Landing Zone	Deploys a single Data Landing Zone to a subscription. Please deploy a Data Management Landing Zone first.		Repository
Data Product Batch	Deploys a Data Workload template for Data Batch Analysis to a resource group inside a Data Landing Zone. Please deploy a Data Management Landing Zone and Data Landing Zone first.		Repository
Data Product Streaming	Deploys a Data Workload template for Data Streaming Analysis to a resource group inside a Data Landing Zone. Please deploy a Data Management Landing Zone and Data Landing Zone first.		Repository
Data Product Analytics	Deploys a Data Workload template for Data Analytics and Data Science to a resource group inside a Data Landing Zone. Please deploy a Data Management Landing Zone and Data Landing Zone first.		Repository

Azure Data Services Go Fast

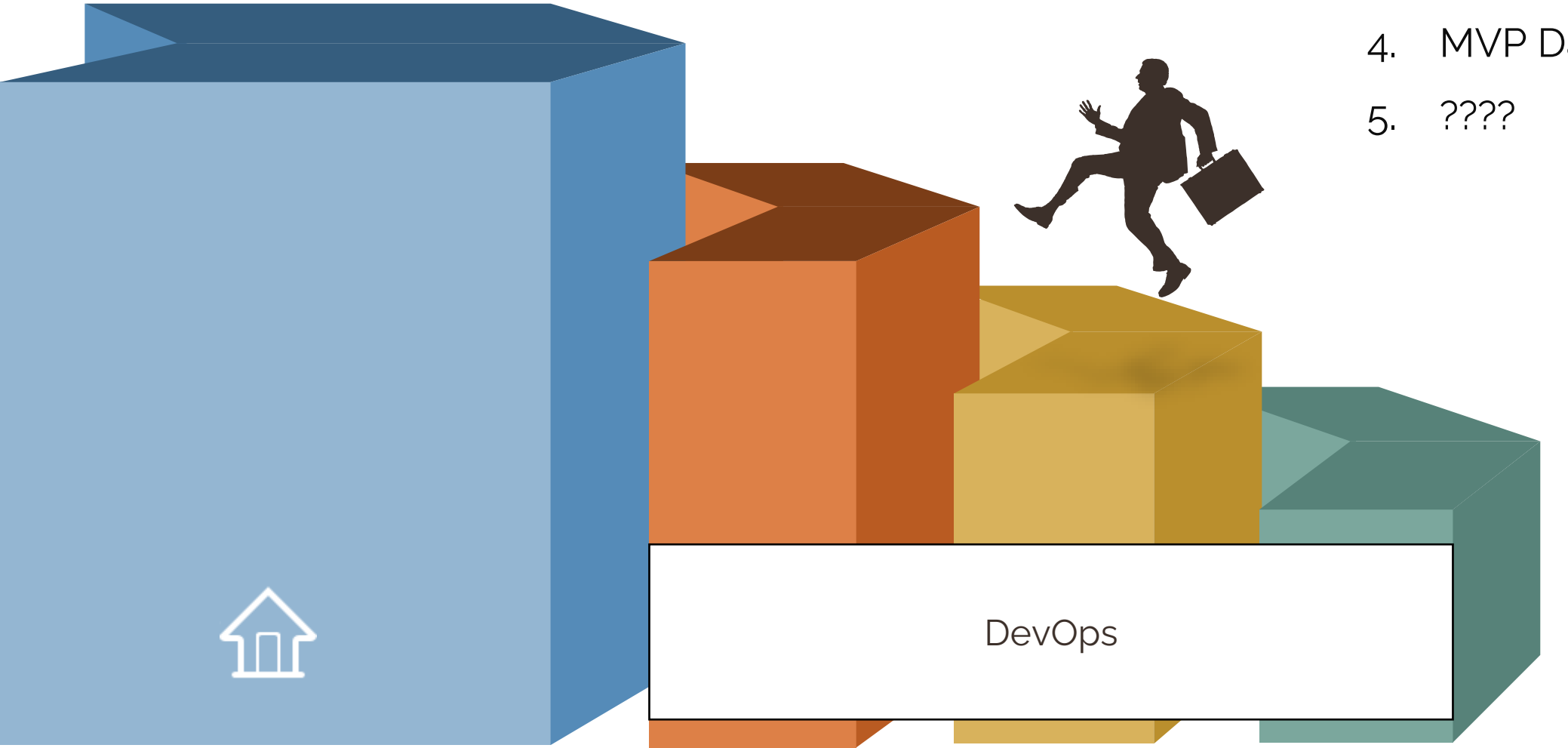
https://github.com/microsoft/azure-data-services-go-fast-codebase

- MVP Data Platform
- "Out of the box" CI/CD
- Enterprise grade security
- Codeless ingestion into Data Lake
- Web page for user interaction with dashboards



Where are we?

1. Platform Established
2. App Landing Zones
3. Applications Migrated
4. MVP Data Platform
5. ????



Solution Accelerators

Solution Accelerators

https://msusazureaccelerators.github.io/

What is it?

- Ready to deploy solution offerings
- Can be customised to your business

What does it include?

- Solution overview
- Reference architecture
- Deployment guides and code
- Training videos

Solution Accelerators

https://msusazureaccelerators.github.io/

Solution Accelerator	Technology Stack	Use Case	Link
Azure Synapse Customer Insights Customer 360	Azure Synapse, Customer Insights, ADLS, Power BI, Azure Machine Learning	Accelerate creation process of a unified customer 360 profile that can also segment at-risk customers	https://aka.ms/**Customer360SA**
Azure Retail Recommender	Azure Synapse, ADLS, Azure Machine Learning, AKS, Azure Cosmos DB, Power BI	Build a retail recommender solution based on current and historical user data on an ecommerce platform	https://aka.ms/**RetailRecommender**
Content Recommendations	Azure Synapse, ADLS, Power BI	Create personalized content recommendations based on user activity	https://aka.ms/**ContentRecommender**
Financial Analytics Customer Revenue Growth Factor	Azure Synapse, ADLS, Azure Machine Learning, ACI, Power BI	Bring together data from different systems to quickly identify top factors for customer revenue growth	https://aka.ms/**CustomerGrowthFactor**

Quick Reference Links

- https://aka.ms/AwesomeAzureArchitecture
- https://github.com/ddneves/awesome-azure-learning
- https://github.com/globalbao/awesome-azure-policy

Thanks