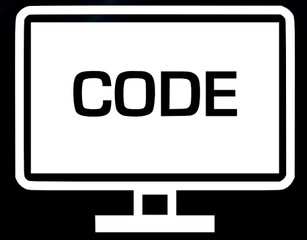
Virtual Azure Community Day

Infrastructure as Code using Terraform on Azure: Implement Managed Identities in Azure Functions

by Jonah Andersson



Hi, I'm Jonah Andersson

Inspire Tech to others!

< Fullstack Developer />

< Cloud Infrastructure & DevOps Engineer />

< Book Author />

< Community Leader />

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Microsoft Azure Mentor

Infrastructure as Code (IaC)

Managed Identities

Azure Functions

Terraform on Azure

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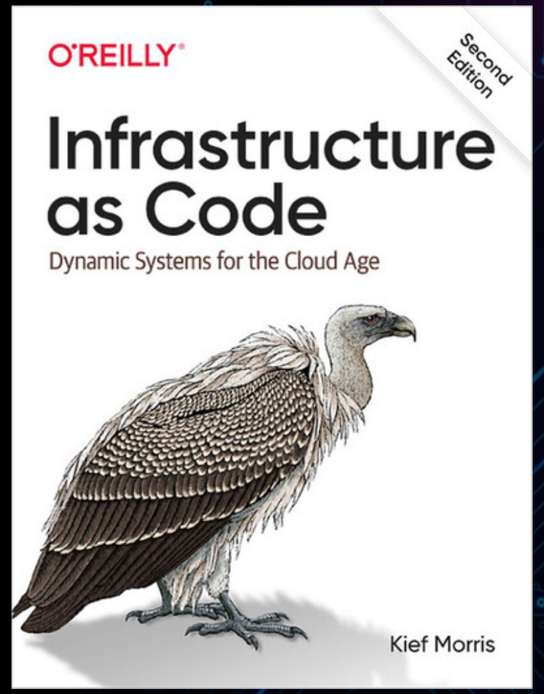
Iron Age vs. Cloud Age

Iron Age	Cloud Age
Cost of change is high	Cost of change is low
Changes represent failure (changes must be “managed,” “controlled”)	Changes represent learning and improvement
Reduce opportunities to fail	Maximize speed of improvement
Deliver in large batches, test at the end	Deliver small changes, test continuously
Long release cycles	Short release cycles
Monolithic architectures (fewer, larger moving parts)	Microservices architectures (more, smaller parts)
GUI-driven or physical configuration	Configuration as Code



Credit: Infrastructure as Code: Dynamic Systems for the Cloud Age by Kief Morris (O'Reilly Media)

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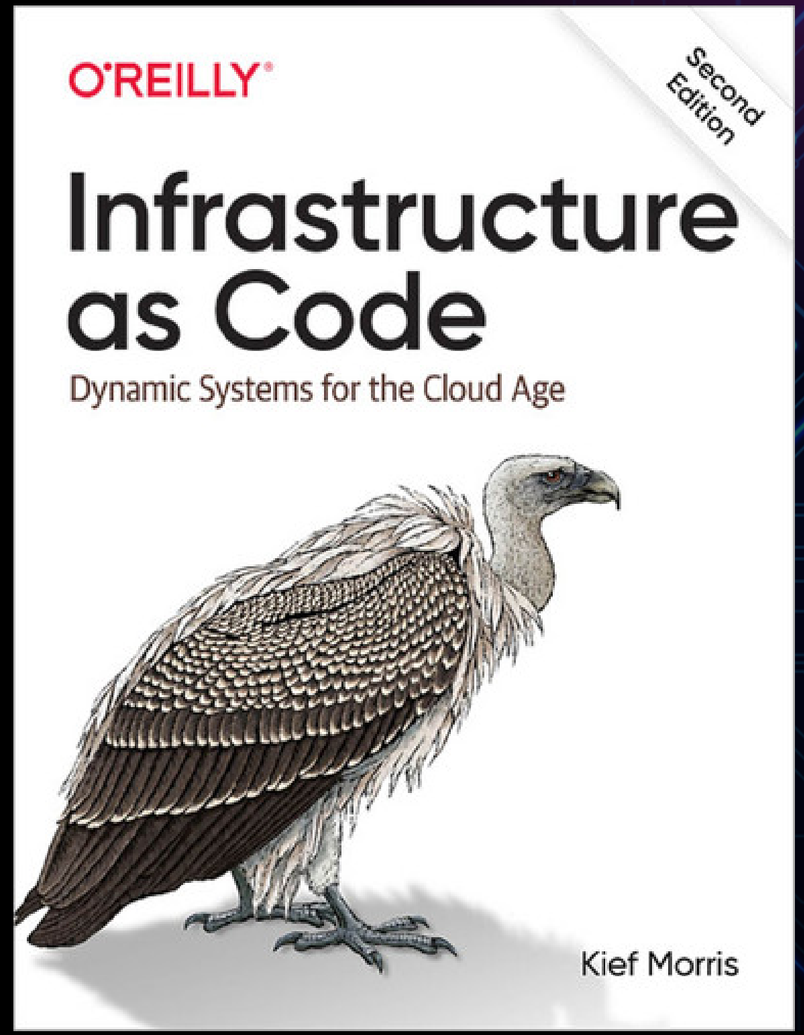
Infrastructure as Code is a Cloud Age approach to managing systems that embraces continuous change for high reliability and quality.



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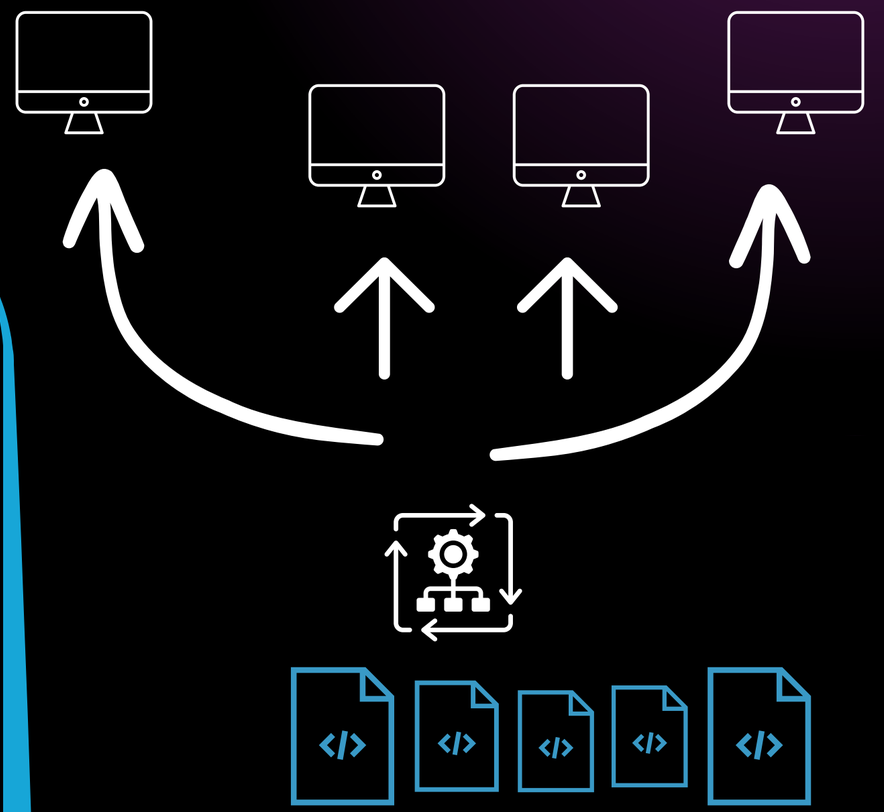
IaC - The Definition

Infrastructure as code (IaC) tools allow you to **manage infrastructure** with configuration files rather than through a graphical user interface.

IaC allows you **to build, change, and manage your infrastructure in a safe, consistent, and repeatable way** by defining resource configurations that you can version, reuse, and share"

Terraform (Hashicorp)



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Benefits of Infrastructure as Code (IaC)

- Process automation
- Declarative Paradigm
- Repeatable Deployments
- Easier to scale out/in, configure and change when needed
- Enforce compliance best practices
- Collaboration between teams (DevOps, Dev, etc)
- Help solve the rising complexity of cloud and architecture

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Infrastructure as Code Tools

Azure Resouce Manager (ARM)
Bicep

Google Cloud
Deployment Manager

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Infrastructure as Code (IaC)

Azure Functions

Managed Identities

Terraform on Azure

Terraform (Hashicorp)

- An open-source IaC (Infrastructure-as-Code) tool
- Used for cloud infrastructure provisioning, automation and management
- Codifies infrastructure in configuration files that describe the desired state for your topology.
- Multicloud support - public, private clouds, and even SaaS services using Terraform providers.

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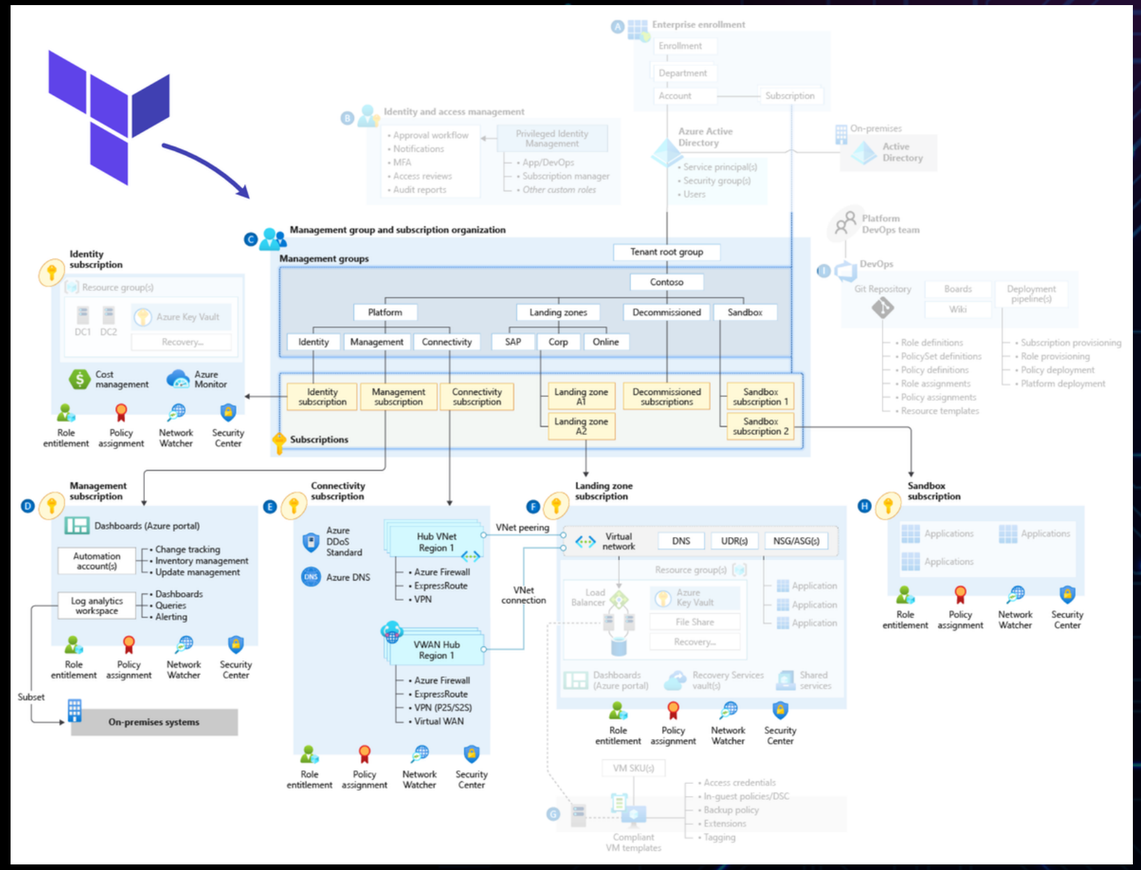
Terraform on Azure

- Automate infrastructure management
- Provision core Azure platform capabilities (ex. CAF on Terraform)
- Provision Azure DevOps pipelines to automate regular infrastructure and application deployments.
- Provision Azure resources



https://github.com/Azure/terraform-azurerm-caf-enterprise-scale

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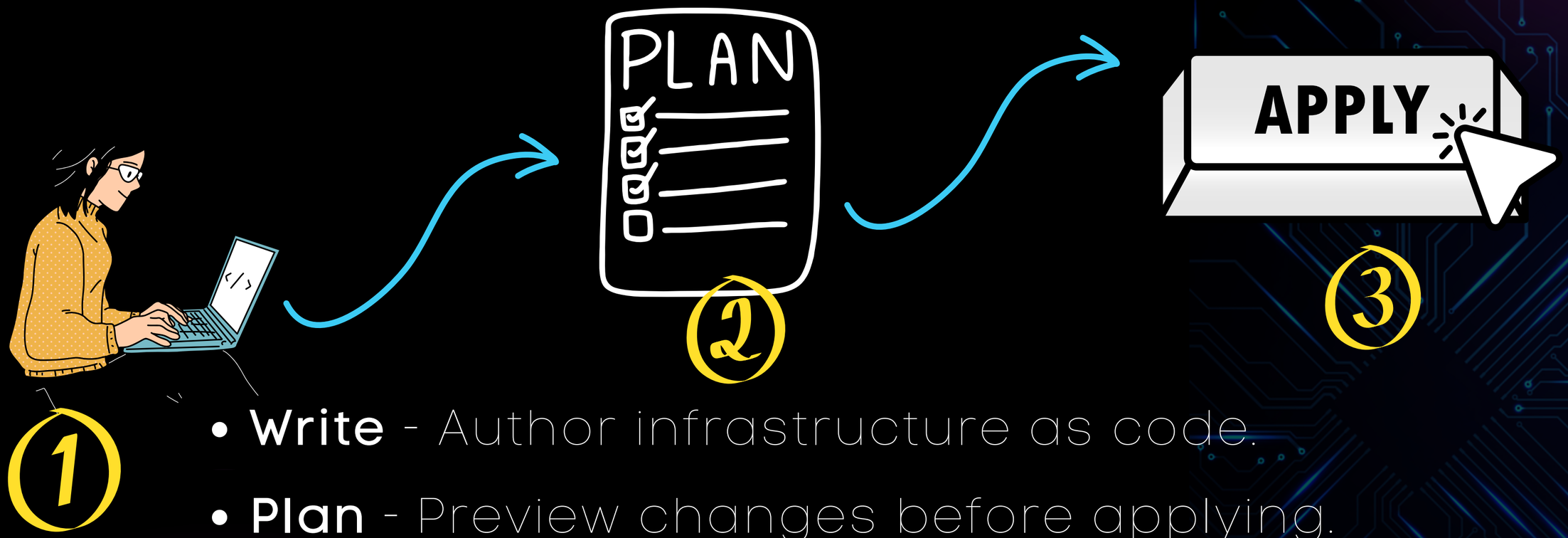
Terraform Workflow



- **Write** - Author infrastructure as code.
- **Plan** - Preview changes before applying.
- **Apply** - Provision reproducible infrastructure.

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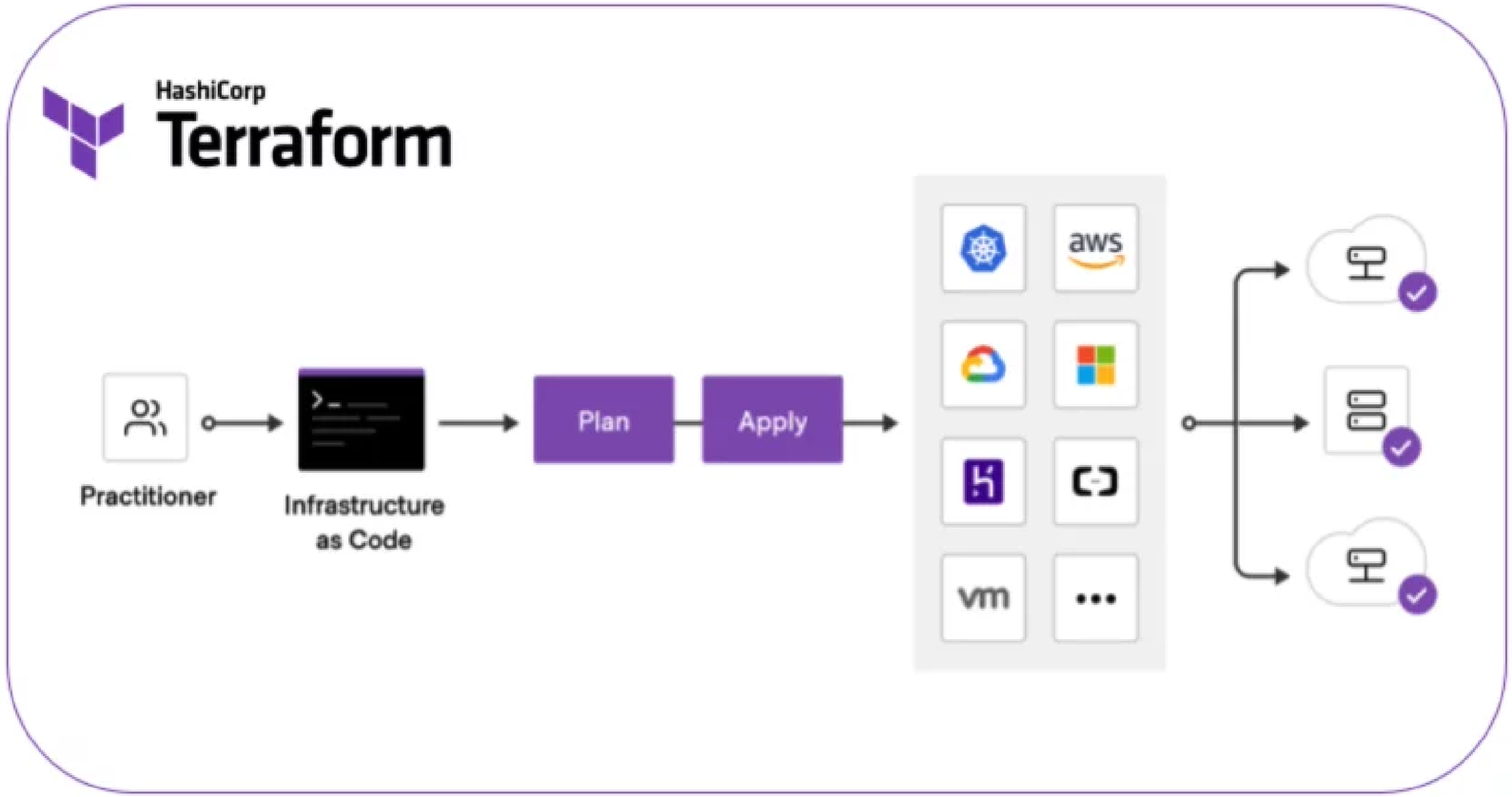
Iac on Terraform's Perspective - Workflow



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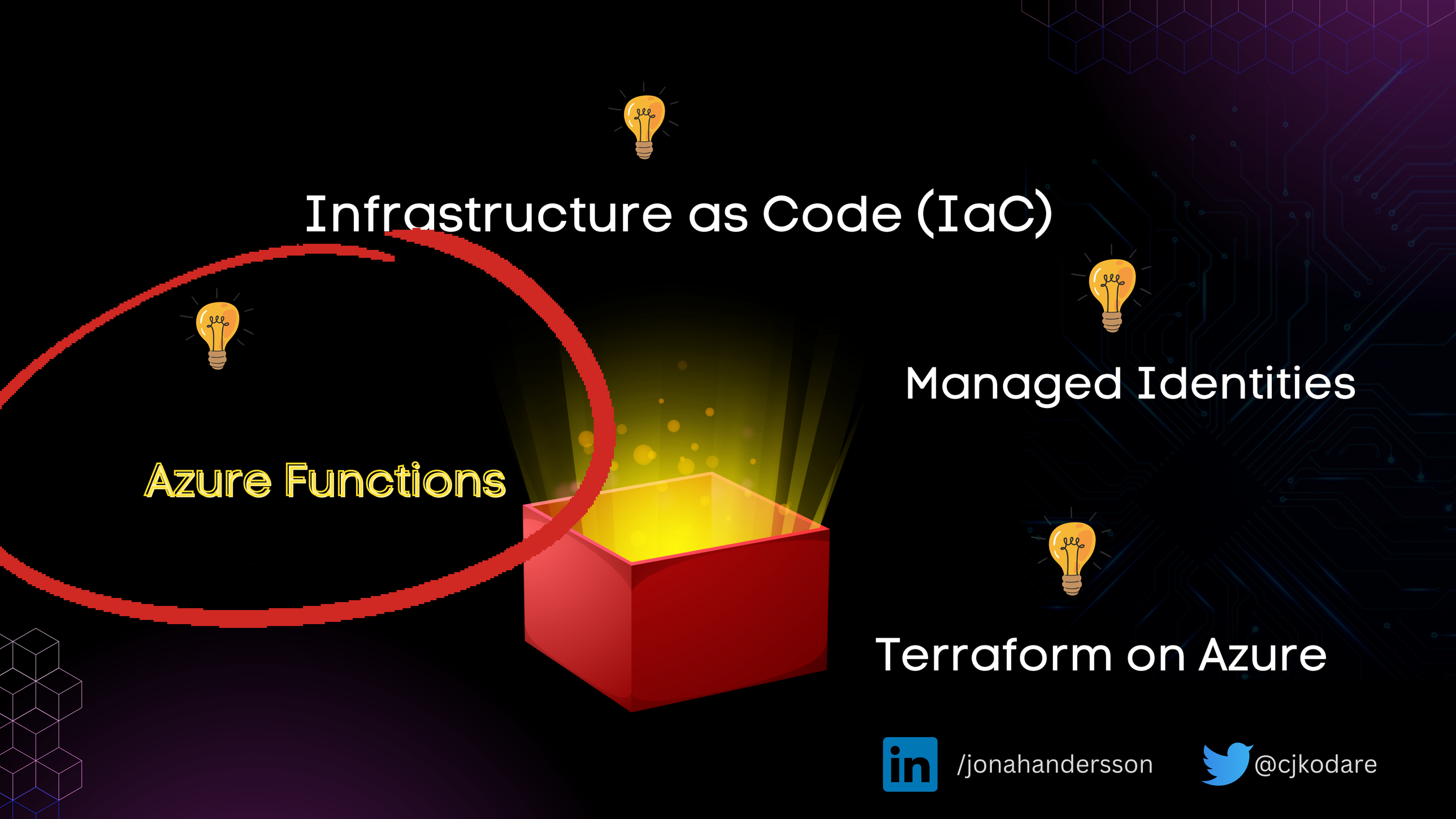
Infrastructure as Code (IaC)
Managed Identities
Azure Functions
Terraform on Azure
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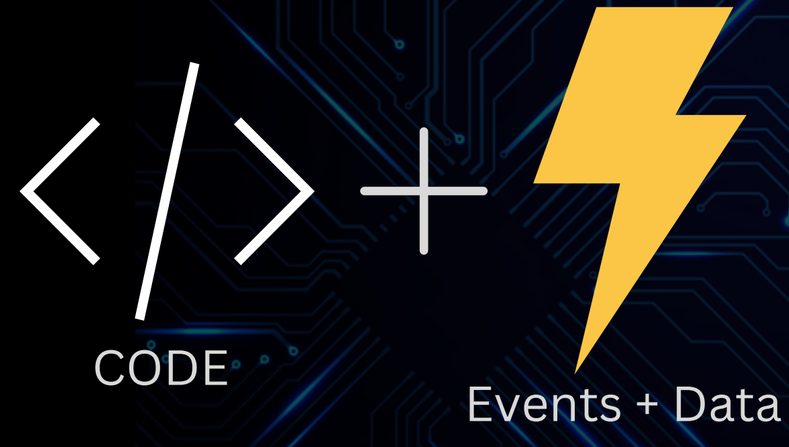
Azure Functions

- Service Compute Solution in Azure
- Allows write less code and be effective
- Maintain less infrastructure
- Event-driven apps and architecture
- Extension: Azure Durable Functions - Code Stateful Workflows/Orchestration of events by code



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Infrastructure as Code (IaC)

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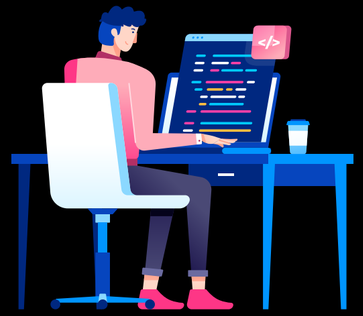
A Few Common Problems & Scenarios #1



Developers using their own PAT / tokens and credentials to access, develop or manage resources in Azure

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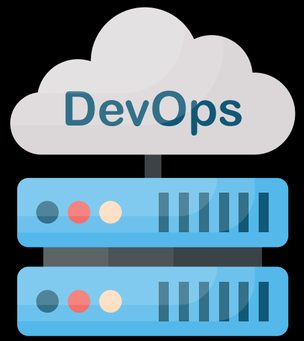
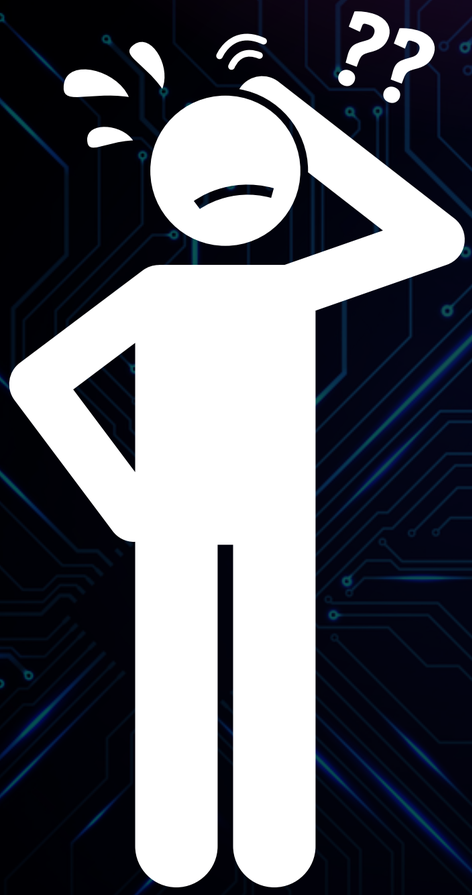
A Few Common Problems & Scenarios #2



DevOps Pipelines need to use Service Principals (Azure AD) for Service Connections which is usually using client tokens/secrets that expires



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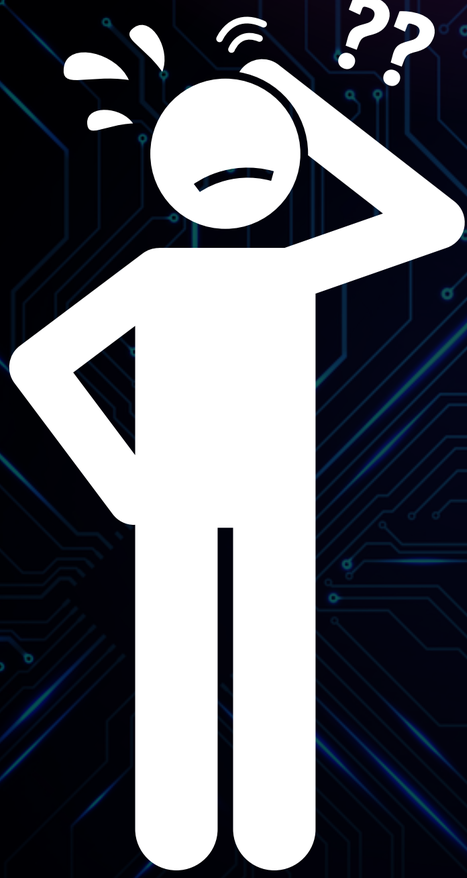
A Few Common Problems & Scenarios #3



Azure resources and Azure DevOps needs to be integrated with other services, 3rd-party apps, APIs, etc.

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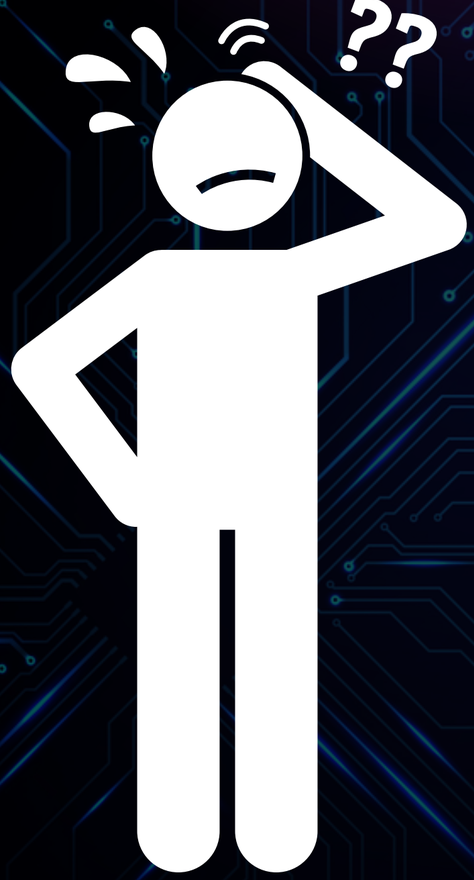
A Few Common Problems & Scenarios #4



Extra hassle of manually adding, updating, deleting secrets in Azure Key Vault

Note: Azure Key Vault is best solution for storing secrets than putting it hard-coded in your code

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Azure AD Identity Objects & Permissions

Types

- Azure AD Users
- Azure Groups
- Enterprise Apps / Applications

Permissions

- RBAC
- Pre-defined roles, etc.
- Management Groups, etc.

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Azure - Service Principals

Why Needed?

Serves as Identity Objects for applications for any apps or entity that is not an Azure AD user or groups

Typical Uses

- Service Connections for Azure DevOps Pipelines
- Integration with Azure resources
- Infrastructure as Code (non Azure) eg. Terraform

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Azure -Managed Identities (prev. MSI)

Managed identities provide an automatically managed identity in Azure Active Directory for applications to use when connecting to resources that support Azure AD authentication.

Applications can use managed identities to obtain Azure AD tokens without having to manage any credentials.

Quote from Microsoft Docs

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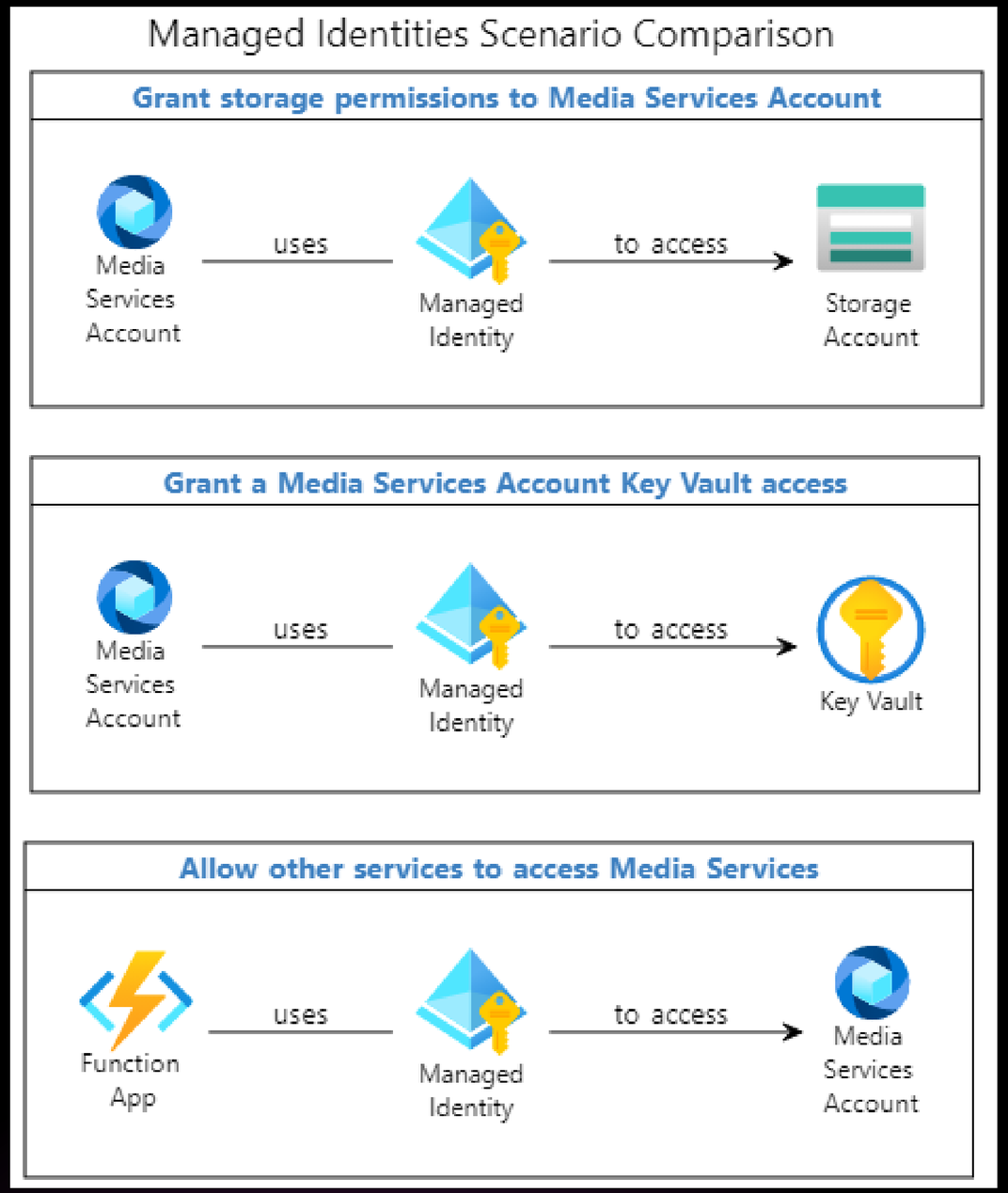
Managed Identities Scenario Comparison



Source: Microsoft Learn Docs

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Managed Identities - Types

System-Assigned

Associated with an Azure Resouce
e.g. Azure VM, App Service, etc.

User-Assigned

An object itself and it can be configured to access multiple Azure Resouces

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Managed Identity - User Assigned

MI1

Azure VM 1

MI1

Azure VM 2

MI1

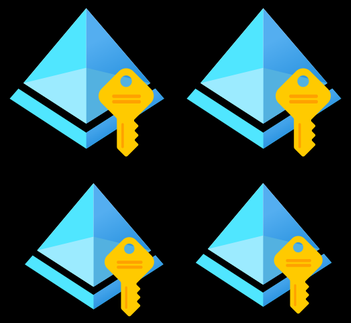
Azure VM 3

MI1

Azure VM 4

MI1

Same Identity per Azure VM



Managed Identities - System Assigned

MIS1 MIS2

MIS3 MIS4

Azure VM 1

MIS1

Azure VM 2

MIS2

Azure VM 3

MIS3

Azure VM 4

MIS4

One Identity per Azure VM or resource

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Managed Identities for Azure resources

It provides an automatically managed identity in Azure Active Directory.

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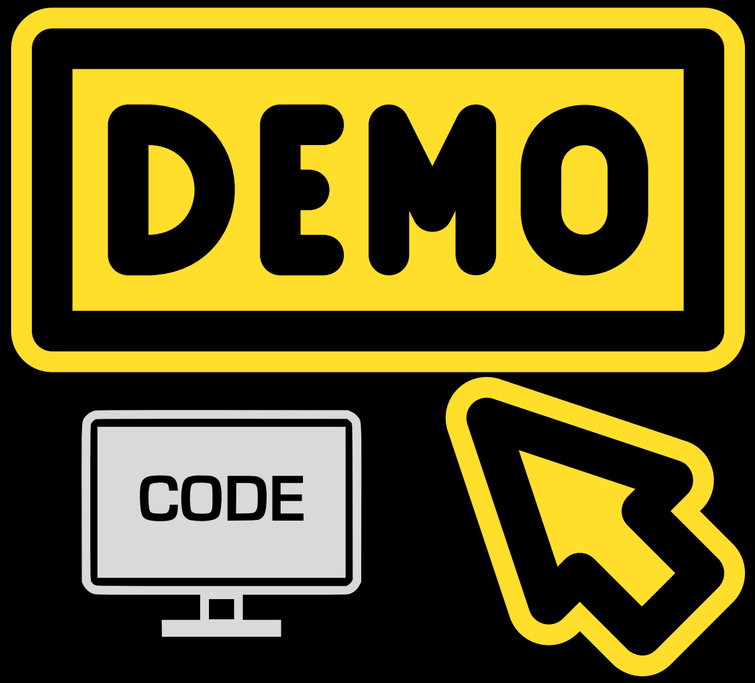

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Terraform on Azure

Bicep on Azure

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Learning by doing!

Azure Functions and Serverless
Microsoft Learn Path

Identity with Azure AD
Microsoft Learn Path

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CONNECT

THANK YOU VERY MUCH!

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