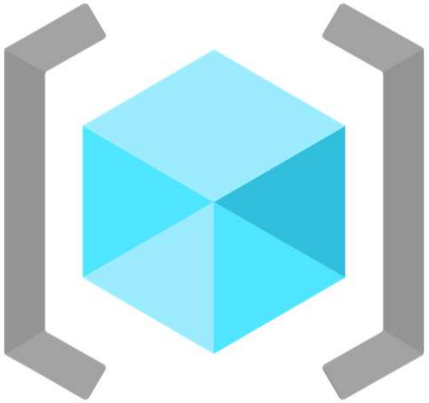
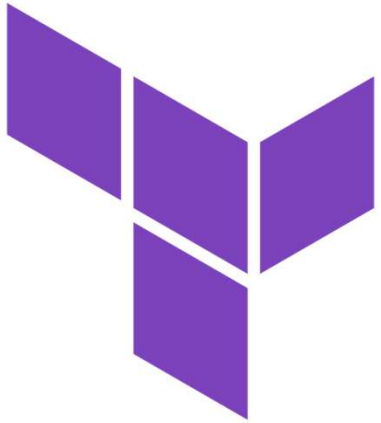
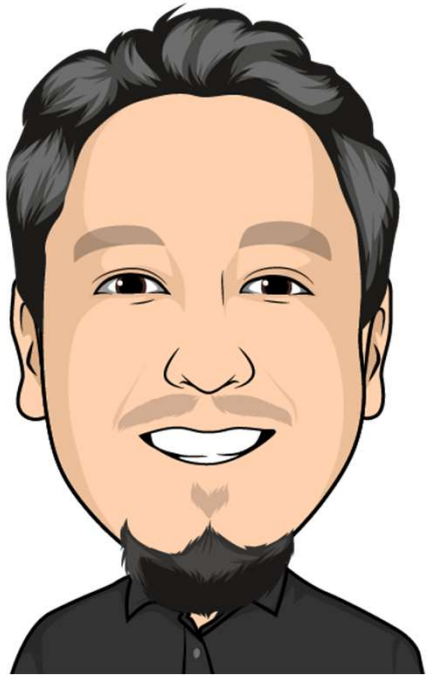




HashiCorp
Terraform

ARM, Bicep, knees and toes! Infrastructure as code for beginners.



Originally from Mexico.

Tech Lead at Geneca.

Spend time with family, movies, videogames, soccer.

@thesoccerdev

drkclw

samueljgomez

Agenda

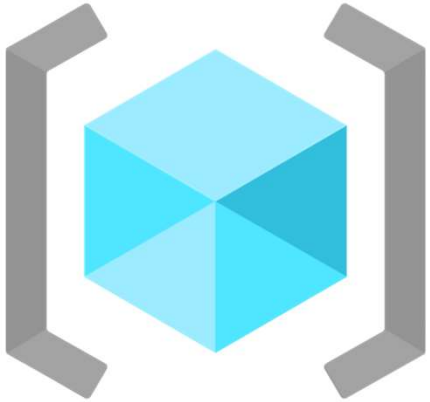
- Who is this talk for?
- Infrastructure as Code
- Azure Resource Manager
- Tool overview
  - ARM templates
  - Bicep
  - Terraform

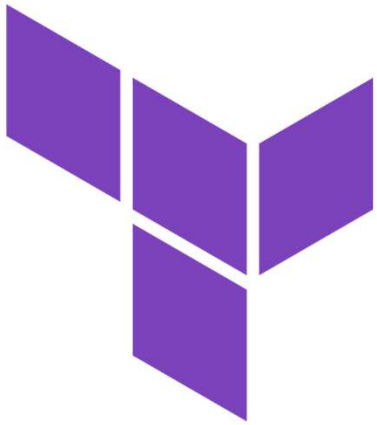
Who is this talk for?

- People completely new to IaC.
- Little experience with ARM templates.
- New to Bicep.
- New to Terraform.

Infrastructure as Code

- Deploy infrastructure in an automated, consistent and repeatable manner.





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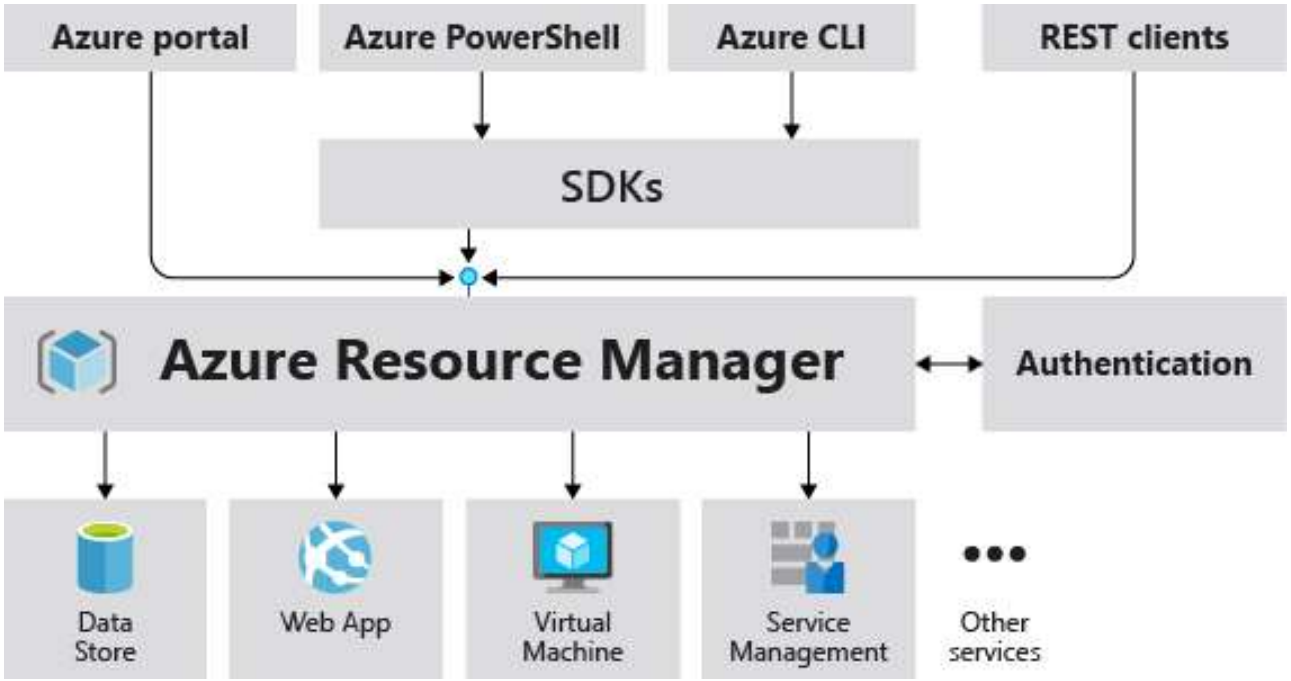
Azure Resource Manager

- API provisioning engine built into Azure.



Azure Resource Manager benefits

- Manage infrastructure through templates.
- Deploy resources in a consistent state.
- Define dependencies between resources.
- Apply tags to resources to organize them.
- Apply access control.

ARM templates

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ARM templates

- JSON format with declarative syntax.

- Defines infrastructure and configuration.

ARM Template format

JSON Copy

```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.jso
  "contentVersion": "",
  "apiProfile": "",
  "parameters": {  },
  "variables": {  },
  "functions": [  ],
  "resources": [  ],
  "outputs": {  }
}
```

```
{
    "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
    "contentVersion": "1.0.0.0",
    "metadata": {
        "_generator": {
            "name": "bicep",
            "version": "0.5.6.12127",
            "templateHash": "2173262573838896712"
        }
    },
    Select or create a parameter file...
    "parameters": {
        "configStoreName": {
            "type": "string",
            "defaultValue": "AppConfigDemoDevUp",
            "metadata": {
                "description": "Specifies the name of the App Configuration store."
            }
        },
        "location": {
            "type": "string",
            "defaultValue": "[resourceGroup().location]",
            "metadata": {
                "description": "Specifies the Azure location where the app configuration store should be created."
            }
        },
        "keyValueNames": {
            "type": "array",
            "defaultValue": [
                "FontColor$Development",
                "FontColor$Production",
                "Sentinel"
            ],
            "metadata": {
                "description": "Specifies the names of the key-value resources. The name is a combination of key and label with $ as c
            }
        },
```

ARM DEMO

> Let this code compile,
>
> In not an hour, but a little while.
>
> Allow this application to run with speed and zest,
>
> as this will keep users glued to my test.
>
> If my code blows up in my face,
>
> do it with style and grace.
>
> And last but not least, when all is said and run,
>
> let thy requirements have been correctly done.

https://www.rambli.com/2016/06/the-prayer-of-the-demo-gods/

Bicep

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Bicep

- Domain specific language that aims to drastically simplify authoring experience.

- Transparent abstraction over ARM templates.

Bicep format

Bicep

Copy

```
targetScope = '<scope>'

@<decorator>(<argument>)
param <parameter-name> <parameter-data-type> = <default-value>

var <variable-name> = <variable-value>

resource <resource-symbolic-name> '<resource-type>@<api-version>' = {
  <resource-properties>
}

module <module-symbolic-name> '<path-to-file>' = {
  name: '<linked-deployment-name>'
  params: {
    <parameter-names-and-values>
  }
}

output <output-name> <output-data-type> = <output-value>
```

Bicep example

Bicep Copy

```
@minLength(3)
@maxLength(11)
param storagePrefix string

param storageSKU string = 'Standard_LRS'
param location string = resourceGroup().location

var uniqueStorageName = '${storagePrefix}${uniqueString(resourceGroup().id)}'

resource stg 'Microsoft.Storage/storageAccounts@2019-04-01' = {
  name: uniqueStorageName
  location: location
  sku: {
    name: storageSKU
  }
  kind: 'StorageV2'
  properties: {
    supportsHttpsTrafficOnly: true
  }
}

module webModule './webApp.bicep' = {
  name: 'webDeploy'
  params: {
    skuName: 'S1'
    location: location
  }
}

output storageEndpoint object = stg.properties.primaryEndpoints
```

Modules

- Allow you to use reference other bicep AND ARM template files.

- Import modules from private or public registries.

Conditional (if)

- Allow you to deploy resources only when condition is met.

Bicep

Copy

```
param deployZone bool

resource dnsZone 'Microsoft.Network/dnszones@2018-05-01' = if (deployZone) {
  name: 'myZone'
  location: 'global'
}
```

Loops

- Define multiple copies of:
  - Resources
  - Modules
  - Variables
  - Properties
  - Outputs

Loop over index

Bicep

Copy

```
[for <index> in range(<startIndex>, <numberOfElements>): {
  ...
}]
```

Loop over items

Bicep

Copy

```
[for <item> in <collection>: {
  ...
}]
```

Loop over dictionary items

Bicep

Copy

```
[for <item> in items(<object>): {
  ...
}]
```

Loop over integer index and items

Bicep

Copy

```
[for (<item>, <index>) in <collection>: {
  ...
}]
```

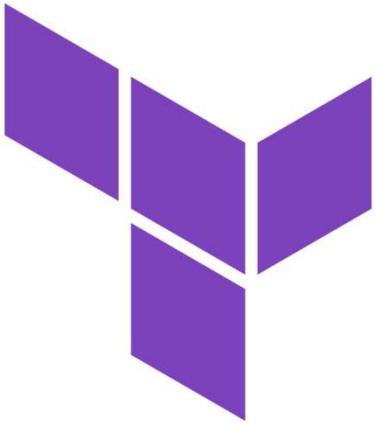
Loop over items with conditional

Bicep

Copy

```
[for <item> in <collection>: if(<condition>) {
  ...
}]
```

BICEP DEMO



HashiCorp
Terraform

Terraform

geneca

Terraform.

- Open source IaC tool for provisioning and managing infrastructure.
- HCL syntax.
- Can provision resources to multiple cloud providers.

Terraform providers.

- Plugins used to interact with cloud providers, SaaS providers and other APIs.
  - Azure
  - AWS
  - Google Cloud

Terraform syntax.

- Arguments.

```
image_id = "abc123"
```

Copy

- Blocks.

```
resource "aws_instance" "example" {
  ami = "abc123"

  network_interface {
    # ...
  }
}
```

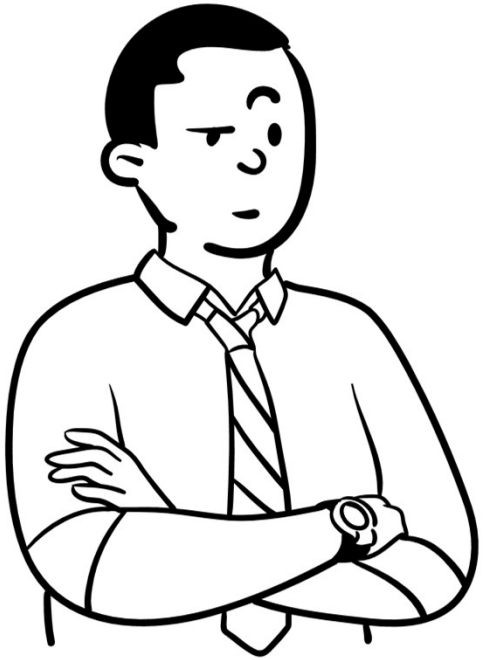
Copy

Terraform state.

- Terraform stores infrastructure state in a separate file.

TERRAFORM DEMO

Which one should I use?



Terraform.

- Resources not in Azure (including on-prem).
- Mix of cloud providers.
- More accessible for developers.

Bicep.

- Resources in Azure only.
- Share templates via registries.
- More accessible to developers.

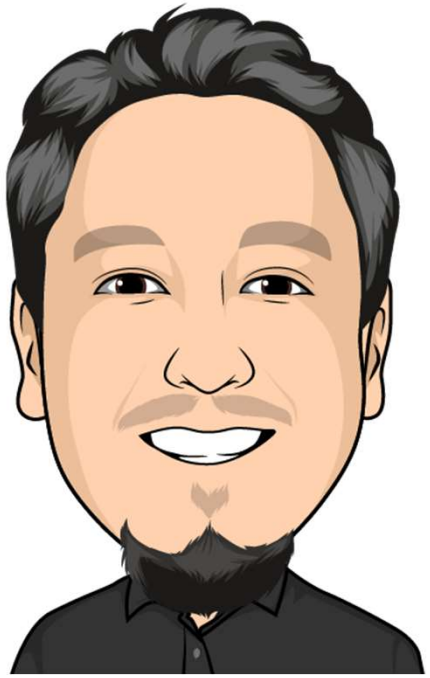
ARM.

- Resources in Azure only.
- Do not want to learn new language.
- Team has experience with ARM templates.


Questions?

Useful links.

- https://learn.microsoft.com/en-us/azure/templates/.
- https://github.com/Azure/azure-quickstart-templates
- https://github.com/Azure/bicep.
- https://github.com/hashicorp/terraform-provider-azurerm/tree/main/examples.



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