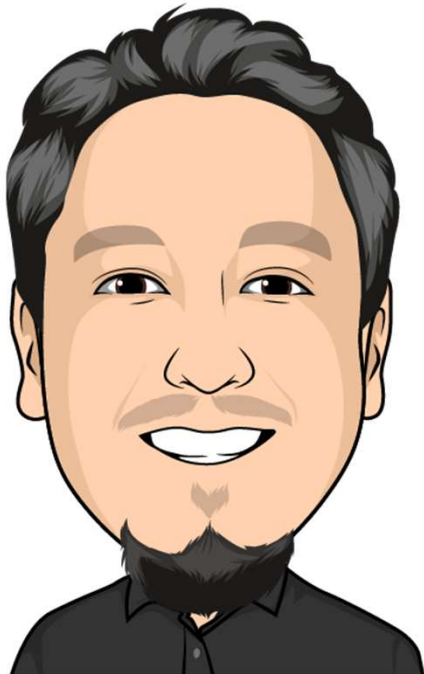


HashiCorp

**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



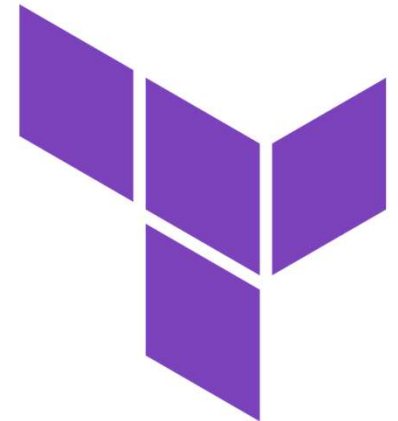
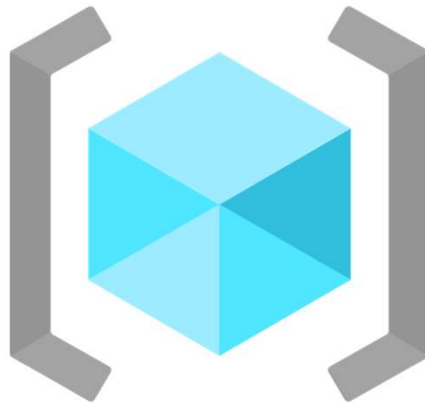
# Who is this talk for?

- 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.

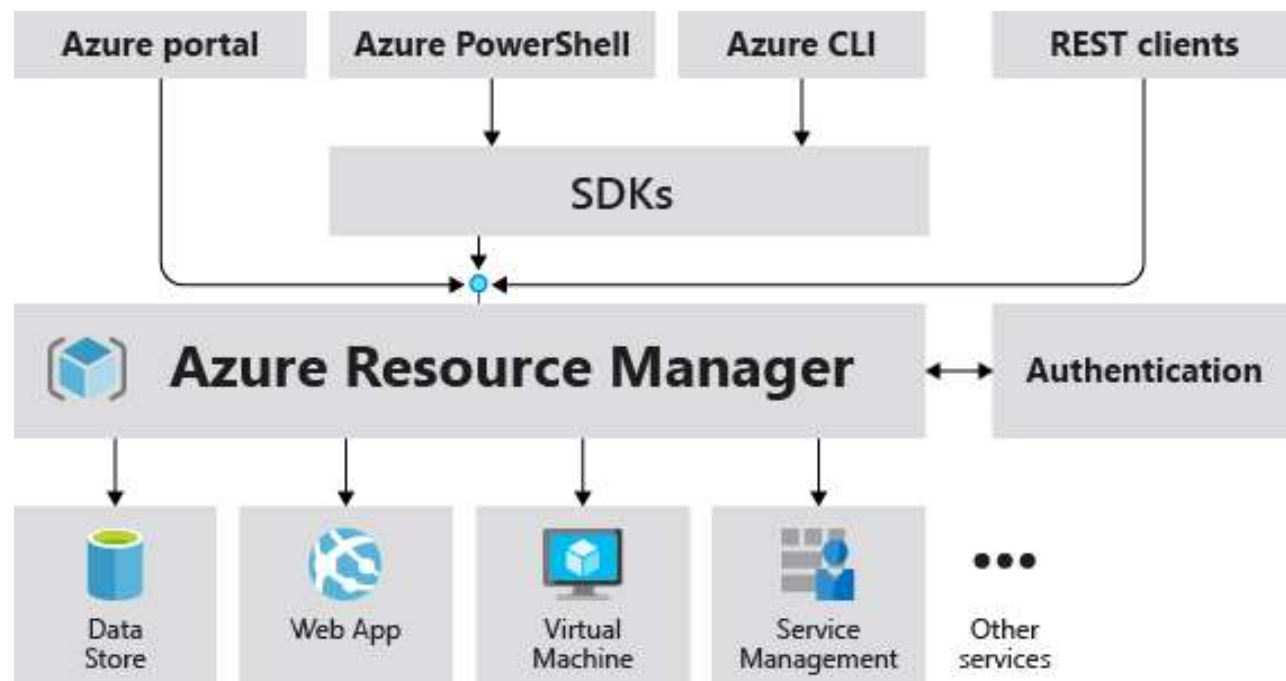


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**Terraform**



# 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



# 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.json",  
  "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 a separator."
    }
  }
}
```





# 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

# 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

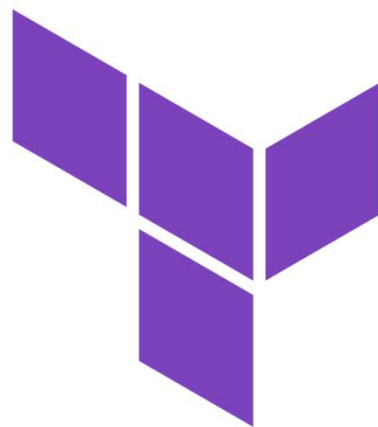
 Copy

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





# BICEP DEMO



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**Terraform**

**Terraform**

# Terraform.


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



# Terraform syntax.

- Arguments.

```
image_id = "abc123"
```

Copy 

- Blocks.

```
resource "aws_instance" "example" {  
  ami = "abc123"  
  
  network_interface {  
    # ...  
  }  
}
```

Copy 



# Terraform state.

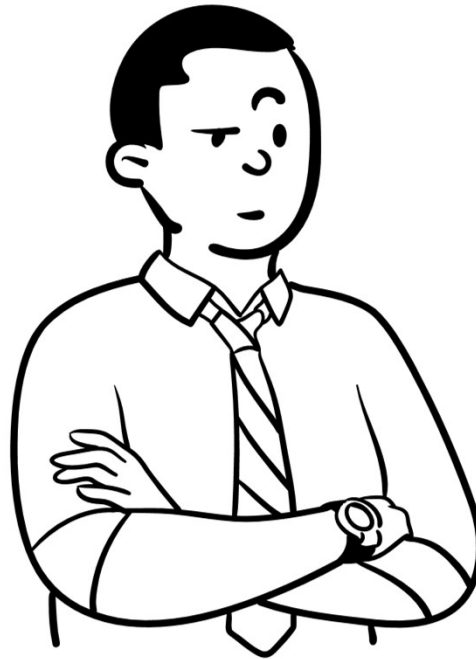
- Terraform stores infrastructure state in a separate file.





# TERRAFORM DEMO

# Which one should I use?







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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