cloud
lunch & learn

Marathon

Transforming regular ARM template skills into Azure Bicep

Sponsored by

Microsoft

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@ElYusubov

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ElYusubov

Elkhan is a principal cloud architect and 14 times MSFT MCT with experience in cloud solutions, enterprise healthcare systems and healthcare data, and API standards (HL7 FHIR, EDI X12).

He is an active MCT, a Microsoft Tech Community Contributor and Azure SME (Architecture, DevOps, Security).

He is a frequent speaker at tech meetups and has volunteered for Give Camps, Azure Data Fest, SQL Saturday and Global Azure events.

The Cloud Marathoner:
www.thecloudmarathoner.com

Company Snapshot: T- Rex Is…

- **An Innovative NGIT Provider:** a leading solutions provider of innovative and modernizing Next Generation IT capabilities and enabling skills to the federal government
- **A first to market in migrating large federal mission applications and data** into a citizen-facing public cloud, giving the Company the capabilities and past performance to bid and win future NGIT opportunities in adjacent federal agencies
- **A Prime Contractor** on **2020 Census,** one of the largest (scale) and most complex mission critical cloud/cyber/data analytics integration projects within the federal government

Concurrent Web Respondents (Peak) 600,000+

Mobile Census Enumerators 500,000+

Business Systems 52

Application Components 285+

- **Integrated 52 mission-critical systems comprised of 200+ applications** operating in a hybrid hyper-converged data center and Amazon Web Service ("AWS") public facing GovCloud protected by a world class active cyber defense (ACD) solution. Also includes a VDI-based Office 365 solution supporting 40k+ users and MS Azure AD managing 350k+ mobile users

Achievements & Partnerships

Silver Microsoft Partner

Silver Data Analytics
Silver Application Development
Silver Data Platform

aws partner network — Advanced Consulting Partner — Public Sector Partner

ISO 9001:2015 BUREAU VERITAS Certification

ISO 27001 BUREAU VERITAS Certification

CMMI DEV/3

CMMI SVC/3

#1 Bloomberg Government — Government Cloud Support Services PROVIDER 2016-20

Washington Technology 2020 Top 100 Government Contractors, Federal Market — T-REX #41

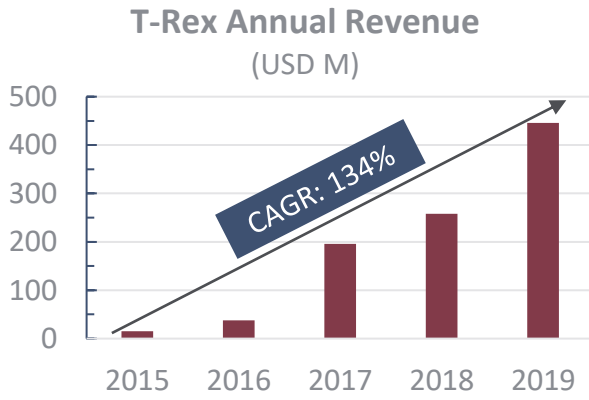
Company Info

- **Established:** 1999
- **Legal Structure:** LLC
- **Headquarters:** Greenbelt, MD
- **8(a)/HUBZone & SDVOSB Joint Ventures:** Ability to deliver services as a small business concern
- **Prime/**Sub (09/20): 98.5% Prime
- **Backlog** (09/20): $341.6MM

Prime Vehicles/BPAs:

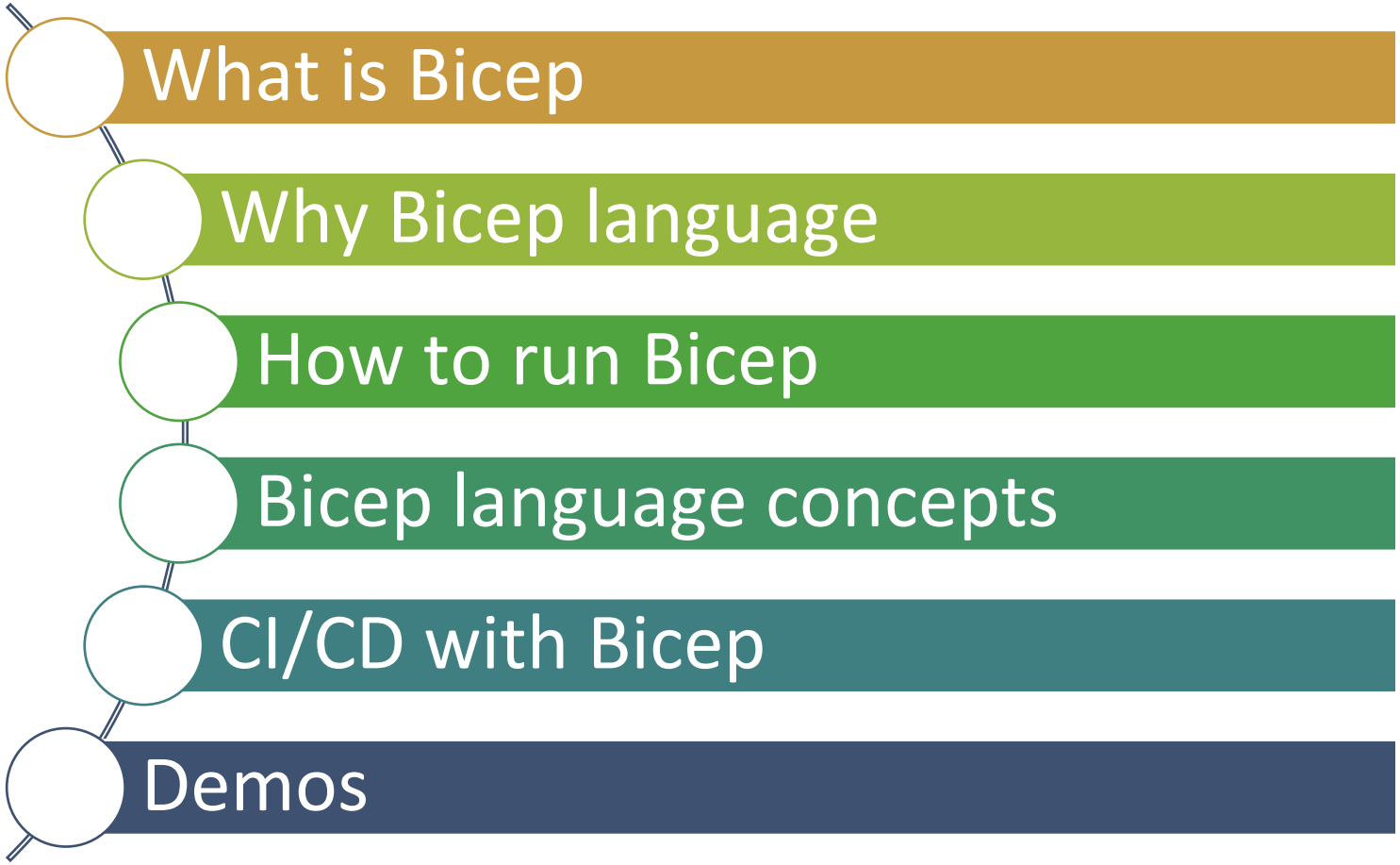
- GSA Schedule 70
- USDA Cloud COE BPA
- Dept of Commerce ESF

Financial Summary



TOP WORK PLACES 2020 The Washington Post

What we will cover



What is Bicep?

- DSL for deploying Azure resources
- Transpiler of code into ARM template
- Simple way to author Azure resources

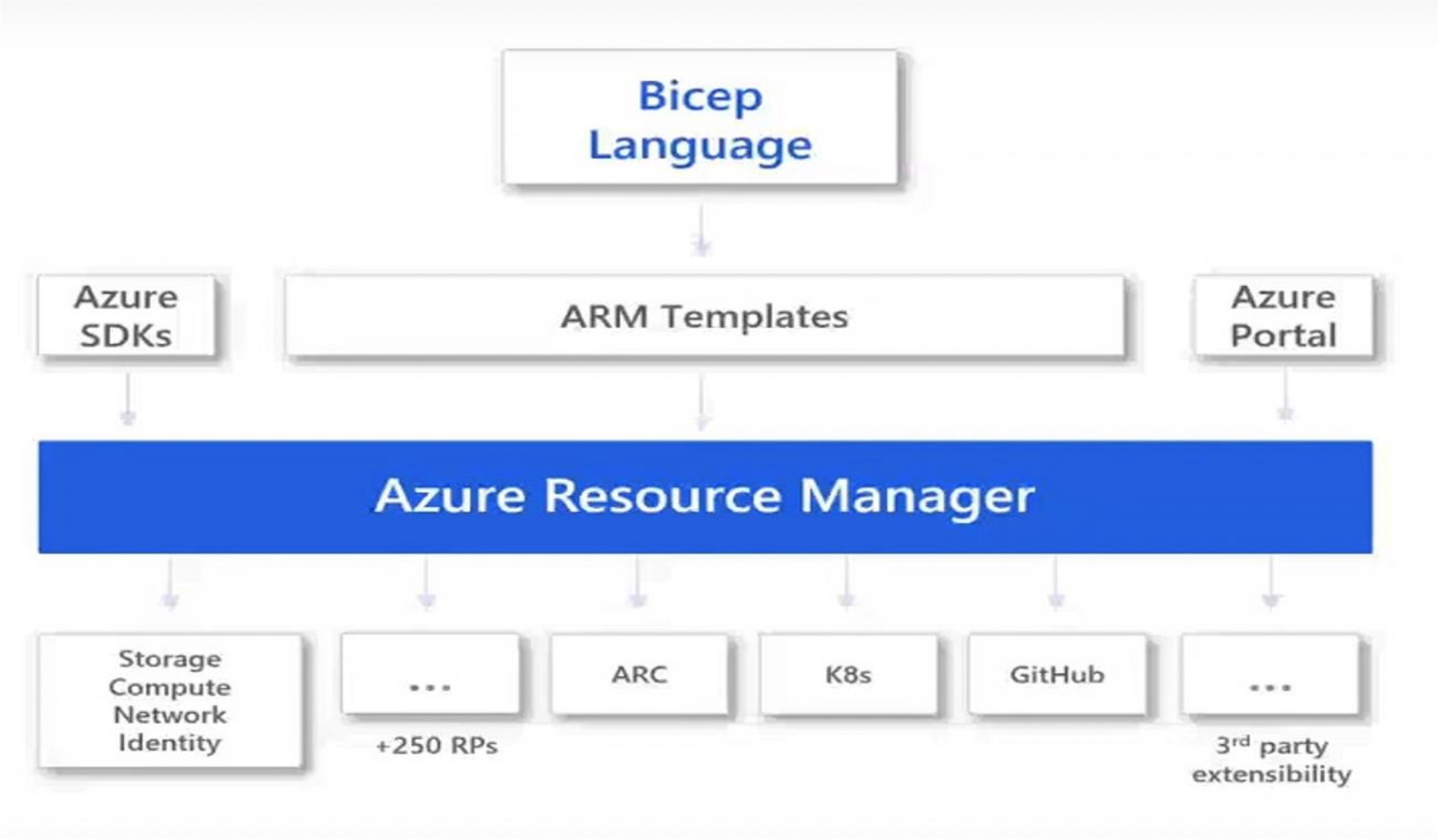
Why Bicep language?

- Easy to understand and maintain
- Day zero support
- Transparent abstraction
- Awesome tolling in VS Code
- Clean code syntax
- Code re-use and modularity
- Depp integration with Azure
- Preflight validation
- No state management
- Production support

```
param appName string = uniqueString(resourceGroup().id)
param accountName string = toLower('cosmos-${appName}')
param location string = resourceGroup().location
param databaseName string = toLower('db-${appName}')

resource cosmos 'Microsoft.DocumentDB/databaseAccounts@2020-04-01' = {
  name: accountName
  location: location
  properties: {
    enableFreeTier: true
    databaseAccountOfferType: 'Standard'
    consistencyPolicy: {
      defaultConsistencyLevel: 'Session'
    }
    locations: [
      {
        locationName: location
      }
    ]
  }
}

resource cosmosdb 'Microsoft.DocumentDB/databaseAccounts/sqlDatabases@2020-0
  name: '${cosmos.name}/${databaseName}'
  properties: {
    resource: {
      id: databaseName
    }
    options: {
      throughput: 400
    }
  }
}
```

```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploym
  "contentVersion": "1.0.0.0",
  "metadata": {
    "_generator": {
      "name": "bicep",
      "version": "0.3.255.40792",
      "templateHash": "17325859092750274113"
    }
  },
  "parameters": {
    "appName": {
      "type": "string",
      "defaultValue": "[uniqueString(resourceGroup().id)]"
    },
    "accountName": {
      "type": "string",
      "defaultValue": "[toLower(format('cosmos-{0}', parameters('appName')))
    },
    "location": {
      "type": "string",
      "defaultValue": "[resourceGroup().location]"
    },
    "databaseName": {
      "type": "string",
      "defaultValue": "[toLower(format('db-{0}', parameters('appName')))]"
    }
  },
  "functions": [],
  "resources": [
    {
      "type": "Microsoft.DocumentDB/databaseAccounts",
      "apiVersion": "2020-04-01",
      "name": "[parameters('accountName')]",
      "location": "[parameters('location')]",
      "properties": {
        "enableFreeTier": true,
        "databaseAccountOfferType": "Standard",
        "consistencyPolicy": {
          "defaultConsistencyLevel": "Session"
        },
        "locations": [
          {
```

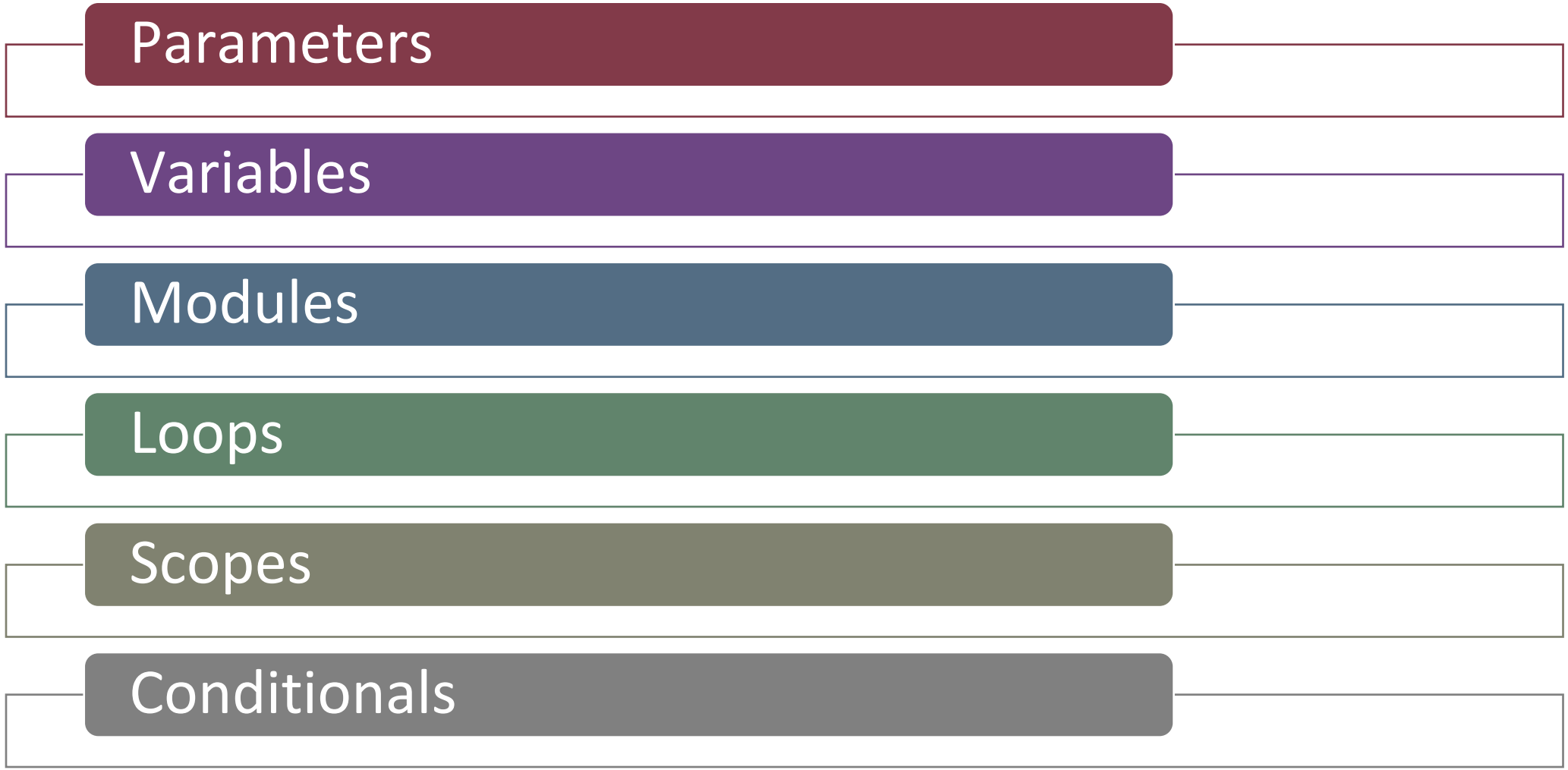
Relationship between Bicep and ARM templates



How to start with Bicep?

- Install Azure PowerShell
- Install Azure CLI on Windows
- Install Azure CLI on Linux
- Install Azure CLI on macOS

Bicep language concepts



Quick look into Bicep concepts

Parameters

samples > parameterized-storage.bicep > storageSKU

```bicep
// parameterized-storage.bicep
@minLength(3)
@maxLength(24)
param storageName string

@allowed([
  'Standard_LRS'
  'Standard_ZRS'
])
param storageSKU string = 'Standard_LRS'
```

Modules

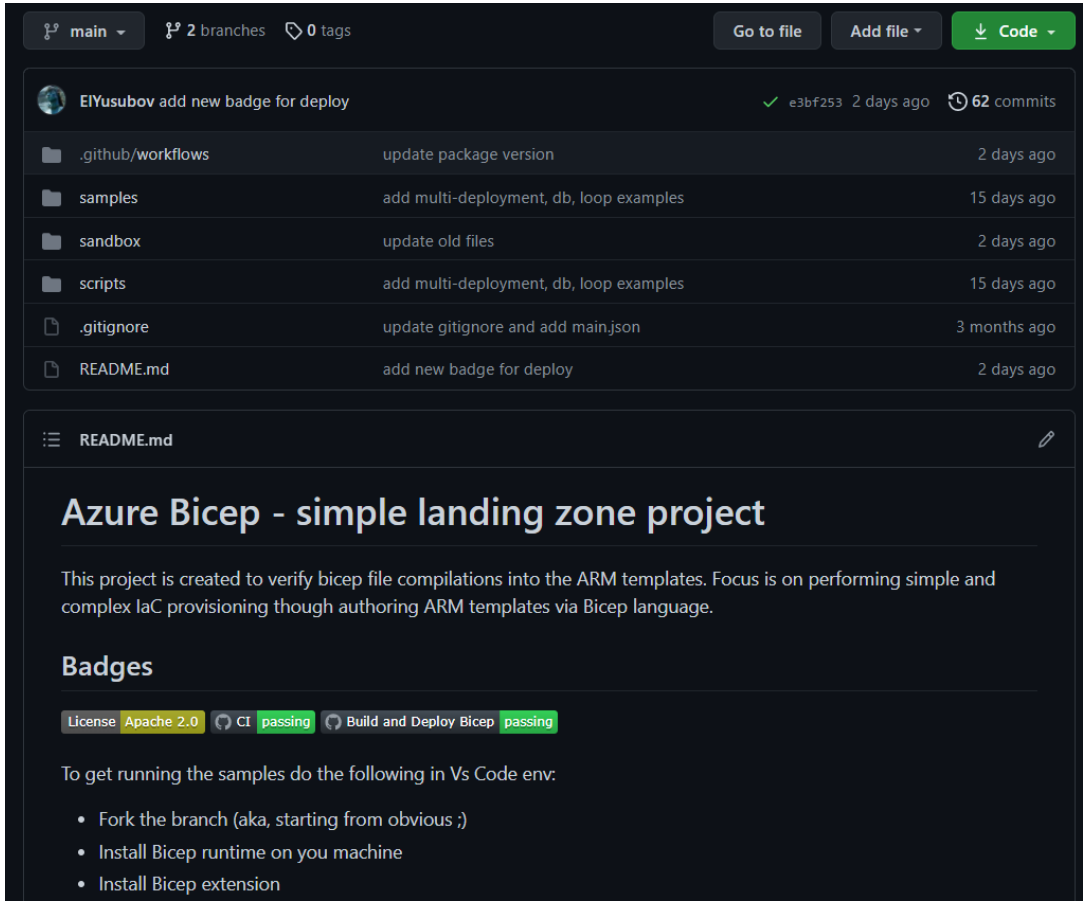
```bicep
resource computeRg 'Microsoft.Resources/resourceGroups@2020-06-01' = {
  name: concat('bicep-azglobal-compute-v1-', azureRegion)
  location: azureRegion
}

var computeDeployment = 'vmLinuxDeploy'
var uniqueComputeDeployment = '${computeDeployment}${uniqueString(computeRg.id)}'

module vmWinMod './linux-vm.bicep' = {
  name: uniqueComputeDeployment
  scope: resourceGroup(computeRg.name)
  params: {
    adminUsername: 'azureuser'
    vmSize: 'Standard_B2s'
    vmName: 'myLinuxVm'
  }
}

resource databaseRg 'Microsoft.Resources/resourceGroups@2020-06-01' = {
  name: concat('bicep-azglobal-database-v1-', azureRegion)
  location: azureRegion
```

Template function and Variables

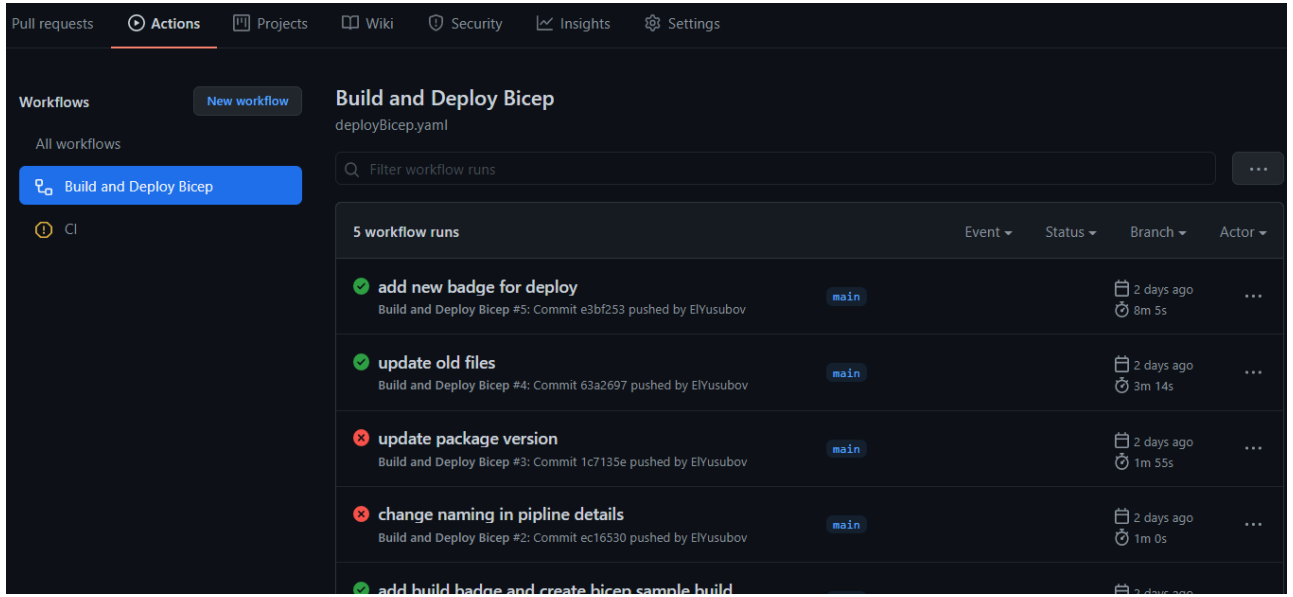
```bicep
param azureRegion string = resourceGroup().location

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

CI/CD with Bicep templates

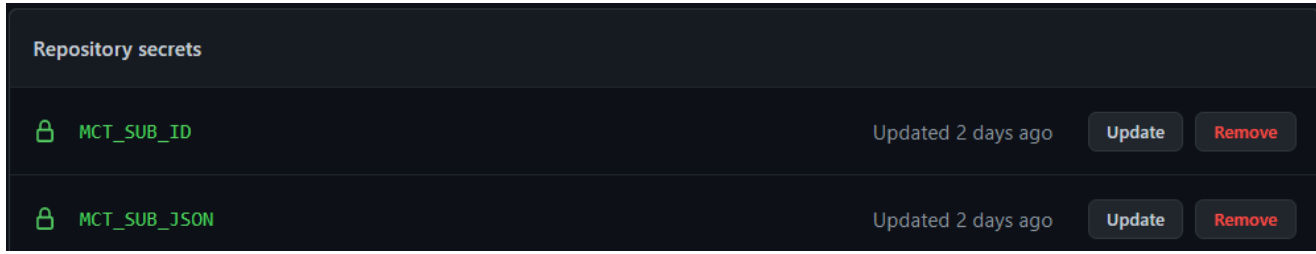
Bicep Test repo @ElYusubov



GitHub Workflows



Securing pipline with Secrets



Demo 1 – Getting started with Bicep on VS Code

Quick starter demo with storage account and parameterization

Demo 2 – Parametrized Bicep modules (re-use)

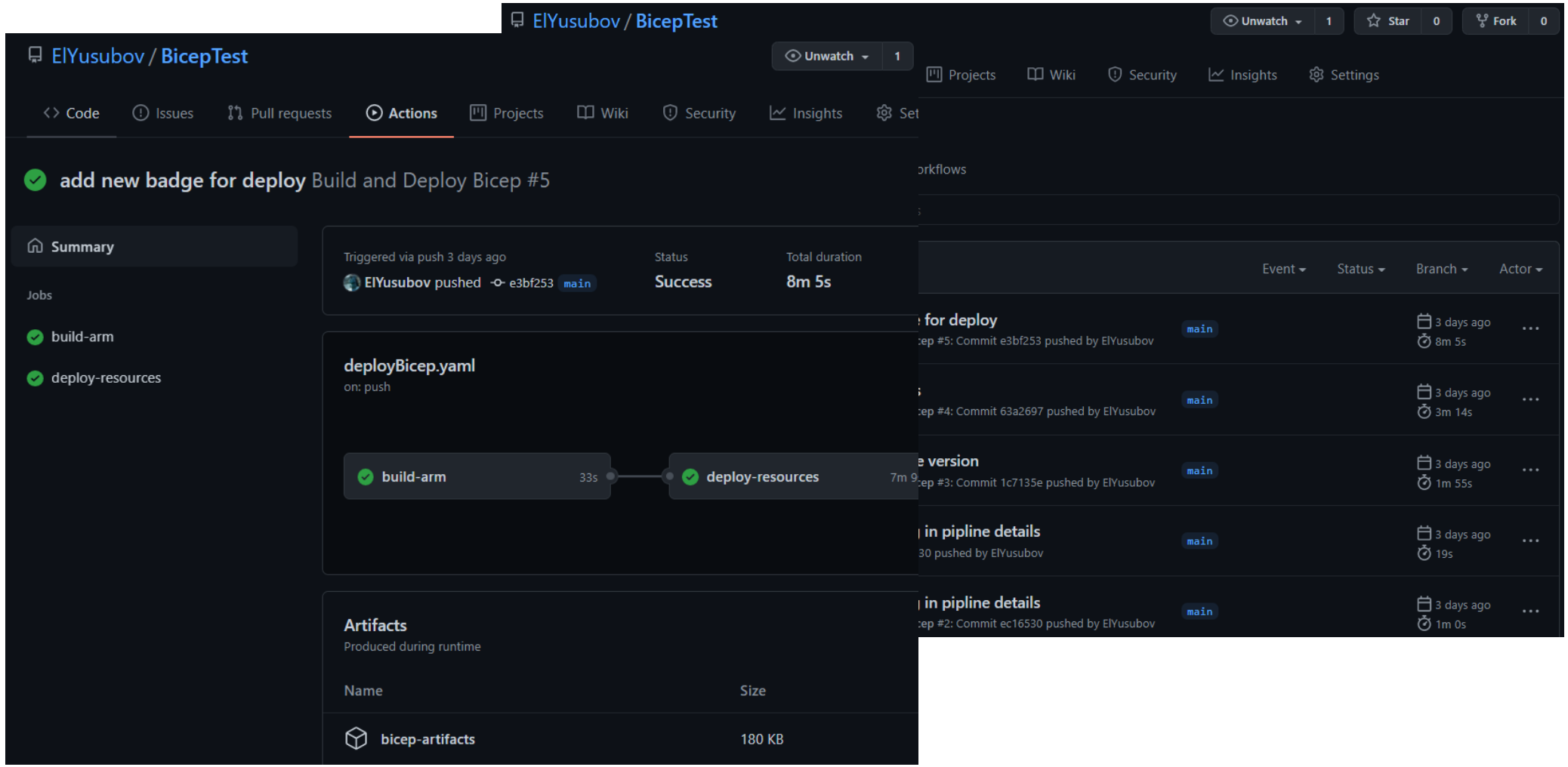
Look into parametrized deployment scenarios

Demo 3 – Deployments (security policies)

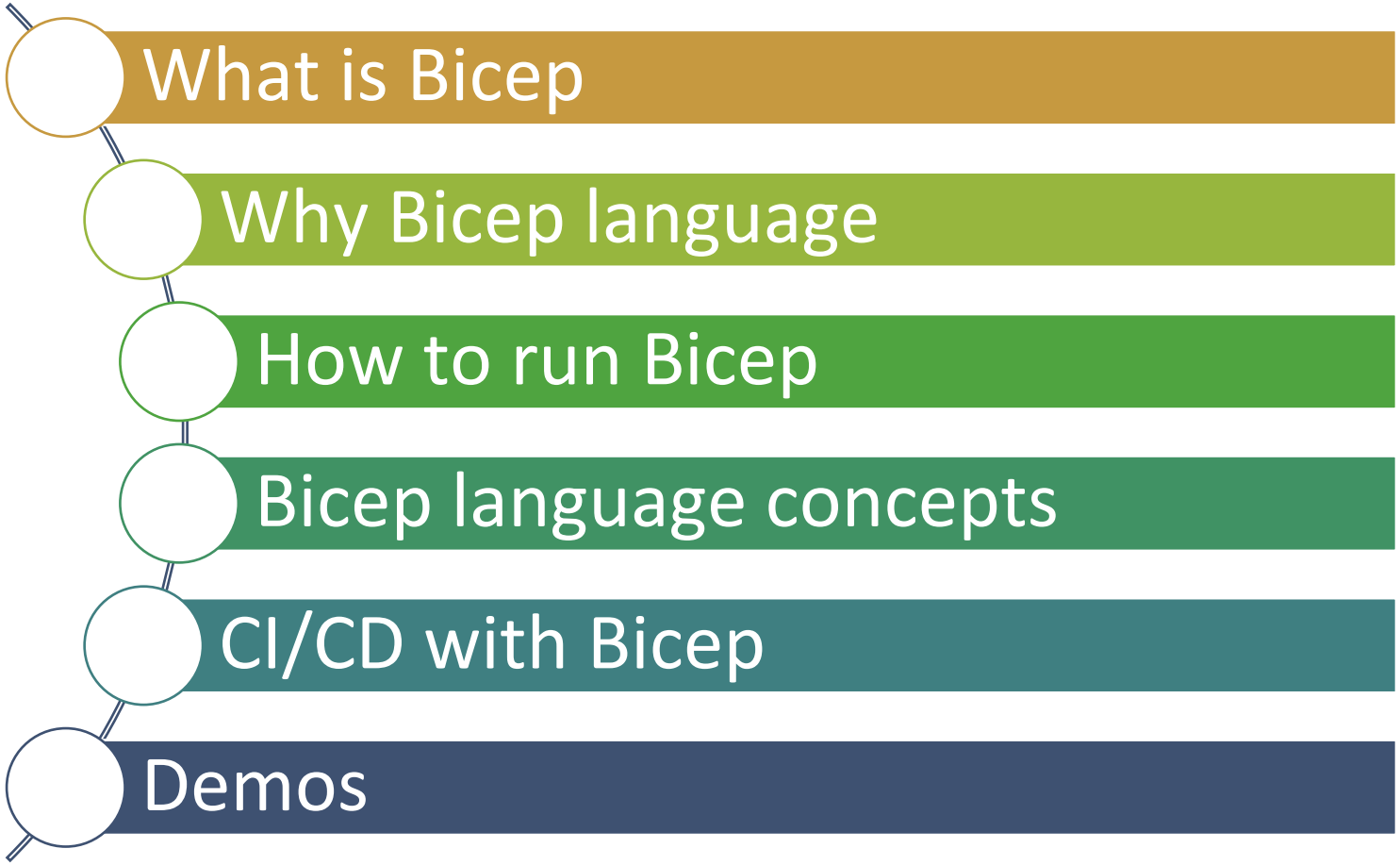
More modules and security policies for the deployment

```
TERMINAL  DEBUG CONSOLE  PROBLEMS  OUTPUT

PS C:\Work\Bicep-Starter> az deployment sub create --location eastus2 --template-file .\samples\custom-locations.bicep
The system cannot find the path specified.
Please provide string value for 'policyEffect' (? for help):
 [1] Audit
 [2] Deny
Please enter a choice [Default choice(1)]: 2
{
  "id": "/subscriptions/751fab54-447d-4b8f-8d44-12172466e856/providers/Microsoft.Resources/deployments/custom-locations",
  "location": "eastus2",
  "name": "custom-locations",
  "properties": {
    "correlationId": "df1bc4a1-f8d2-4320-8606-ec9a7d2135db",
    "debugSetting": null,
    "dependencies": [
      {
        "dependsOn": [
          {
            "id": "/subscriptions/751fab54-447d-4b8f-8d44-12172466e856/providers/Microsoft.Authorization/policyDefinitions/c
            "resourceName": "custom-allowed-location",
            "resourceType": "Microsoft.Authorization/policyDefinitions"
          }
        ],
        "id": "/subscriptions/751fab54-447d-4b8f-8d44-12172466e856/providers/Microsoft.Authorization/policyAssignments/Resou
        "resourceName": "Resource-location-restriction",
        "resourceType": "Microsoft.Authorization/policyAssignments"
      }
    ],
    "duration": "PT1.6436266S"
```

Demo 4 – CI/CD GitHub workflows



What we have covered



What is next?

Azure Bicep Demo GitHub

Let's Connect

Bicep project on GitHub

Tutorial on Azure Bicep

Project Bicep with DevOps

T-REX

Q & A

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