



# *Infrastructure as Code with Bicep* *On tour!*

Esther Barthel  
Freek Berson

```
var privateIPAllocationMethod = 'Dynamic'

resource vnet 'Microsoft.Network/virtualNetworks'
  name: vnetName
  location: defaultLocation
  properties: {
    addressSpace: {
      addressPrefixes: [
        vnetConfig.vnetprefix
      ]
    }
  }
  subnets: [
```



# Esther Barthel

Solutions Architect and owner @ cognition IT  
[@virtuEs\\_IT](#)

- Loves workflows, DevOps, Bicep & scripting
- Women in Tech Mentorship advocate
- Microsoft MVP RDS/CDM/Azure since 2017

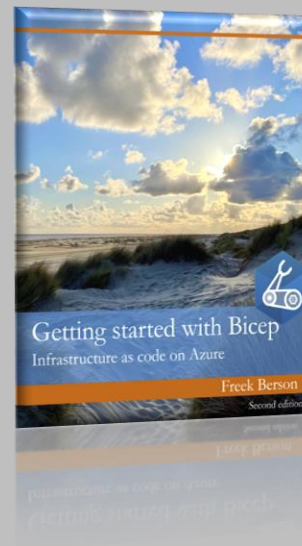


# Freek Berson

Principal Product Manager  
Parallels (Alludo)

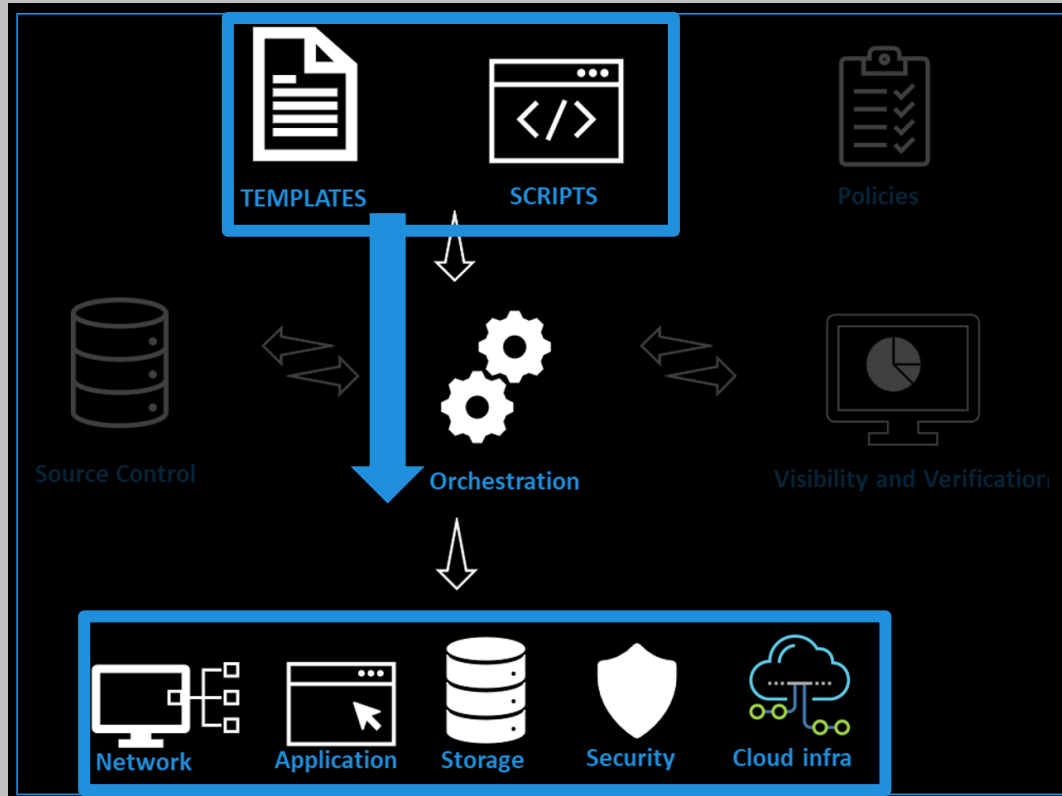
@fberson

- Using Project Bicep since its inception.
- Book author: 'Getting started with Bicep'
- Microsoft MVP on RDS/AVD since 2011 + Azure



# Infrastructure as Code (IaC)

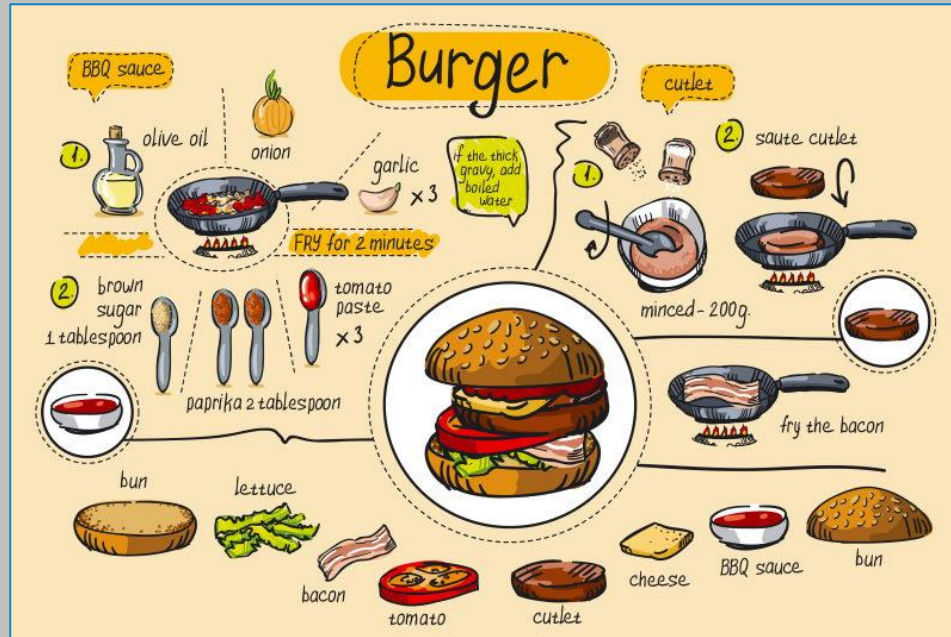
"..the process of **provisioning infrastructure resources** similar to how software is deployed."



# Imperative code

You **execute a sequence of commands**, in a specific order, to reach an end configuration.  
This process defines what the code should accomplish, and it defines how to accomplish the task.

Like a **step-by-step instruction** manual



# Imperative code

You **execute a sequence of commands**, in a specific order, to reach an end configuration.

Using **scripts**.

```
# Step 1: Create a new resource group in Azure
New-AzResourceGroup -Name "_rg-ctt-01" -Location "westeurope"

# Step 2: Create a new storage account in the resource group
New-AzStorageAccount -Name "sacttlab01" `
    -ResourceGroupName "_rg-ctt-01" `
    -SkuName Standard_LRS `
    -Kind StorageV2 `
    -AccessTier cool `
    -EnableHttpsTrafficOnly
```



# Declarative code

You **specify only the end configuration**. The code doesn't define how to accomplish the task.

Like **ordering from a menu**.



# Declarative code

You **specify only the end configuration**. The code doesn't define how to accomplish the task.

Using **templates**.

```

  ✓ resource stg 'Microsoft.Storage/storageAccounts@2021-06-01' = {
    name: 'saiac1ab01'
    location: 'westeurope'
    ✓ sku: {
      name: 'Standard_LRS'
    }
    kind: 'StorageV2'
    ✓ properties: {
      accessTier: 'Cool'
      supportsHttpsTrafficOnly: true
    }
    ✓ tags: {
      environment: 'iac-lab'
    }
  }

```






# ARM Template

## Template format

In its simplest structure, a template has the following elements:

JSON

 Copy

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

# ARM Template complexity



```
605     "hostPoolArmPath": "[resourceId('Microsoft.DesktopVirtualization/hostPools', format('{0}-REMOTEAPP', parameters('hostpoolName')))]"
606   },
607   "dependsOn": [
608     "[resourceId('Microsoft.DesktopVirtualization/hostPools', format('{0}-REMOTEAPP', parameters('hostpoolName')))]"
609   ]
610 },
611 {
612   "type": "Microsoft.DesktopVirtualization/workspaces",
613   "apiVersion": "2019-12-10-preview",
614   "name": "[parameters('workspaceName')]",
615   "location": "[parameters('AVDBackplaneLocation')]",
616   "properties": {
617     "friendlyName": "[parameters('workspaceNameFriendlyName')]",
618     "applicationGroupReferences": [
619       "[resourceId('Microsoft.DesktopVirtualization/applicationGroups', parameters('appgroupName'))]",
620       "[if(parameters('createRemoteAppHostpool'), resourceId('Microsoft.DesktopVirtualization/applicationGroups', format('{0}-REMOTEAPP', parameters('appgroupName'))), '')]"
621     ]
622   },
623   "dependsOn": [
624     "[resourceId('Microsoft.DesktopVirtualization/applicationGroups', parameters('appgroupName'))]",
625     "[resourceId('Microsoft.DesktopVirtualization/applicationGroups', format('{0}-REMOTEAPP', parameters('appgroupName')))]"
626   ]
627 }
628 ]
629 }
630 },
631 "dependsOn": [
632   "[subscriptionResourceId('Microsoft.Resources/resourceGroups', format('{0}BACKPLANE{1}', parameters('resourceGroupProdPrefix'), parameters('resourceGroupPostfix')))]"
633 ]
634 },
635 {
636   "type": "Microsoft.Resources/deployments",
637   "apiVersion": "2020-06-01",
```

# What is Bicep?



".. Bicep is a **Domain Specific Language** (DSL) for deploying Azure resources declaratively. It aims to **drastically simplify the authoring experience** with a cleaner syntax and better support for modularity and code re-use. Bicep is a transparent abstraction over ARM and ARM templates."

# What is Bicep?

## Intuitive

Easy to read and to author

## Transpiles to ARM Templates

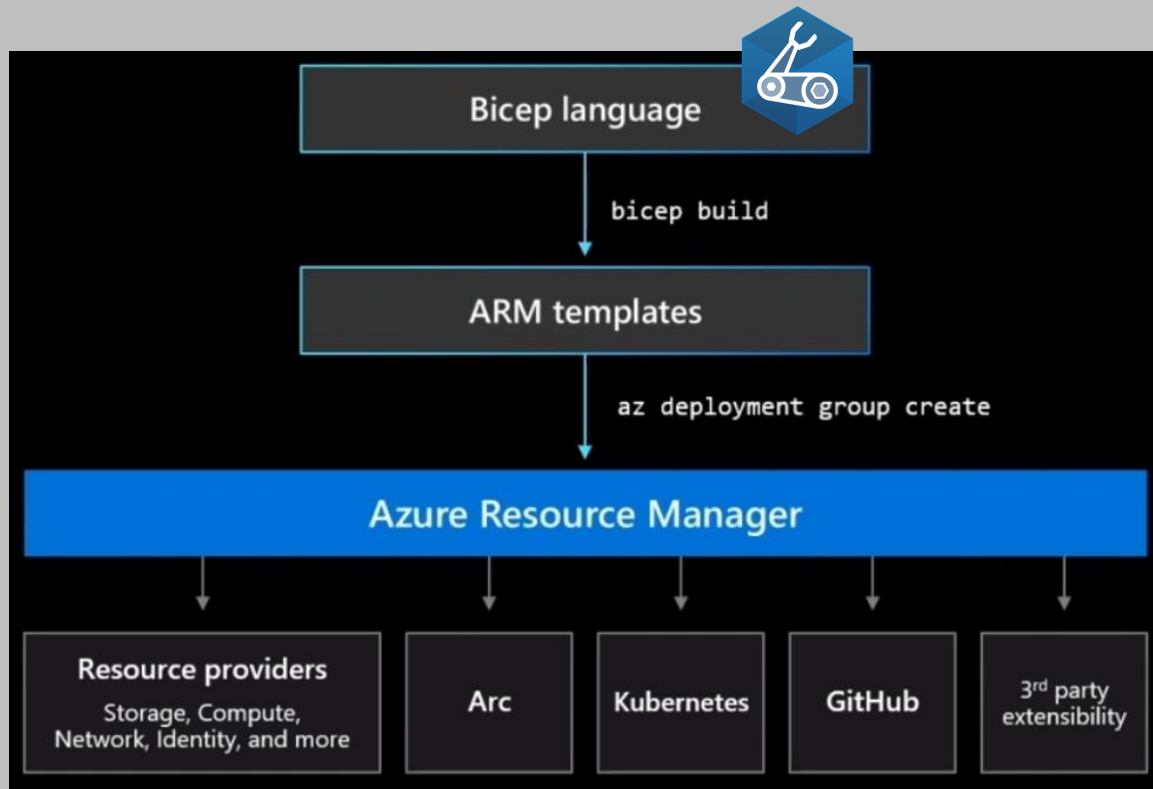
Leverage ARM template knowledge and investments

## Modular

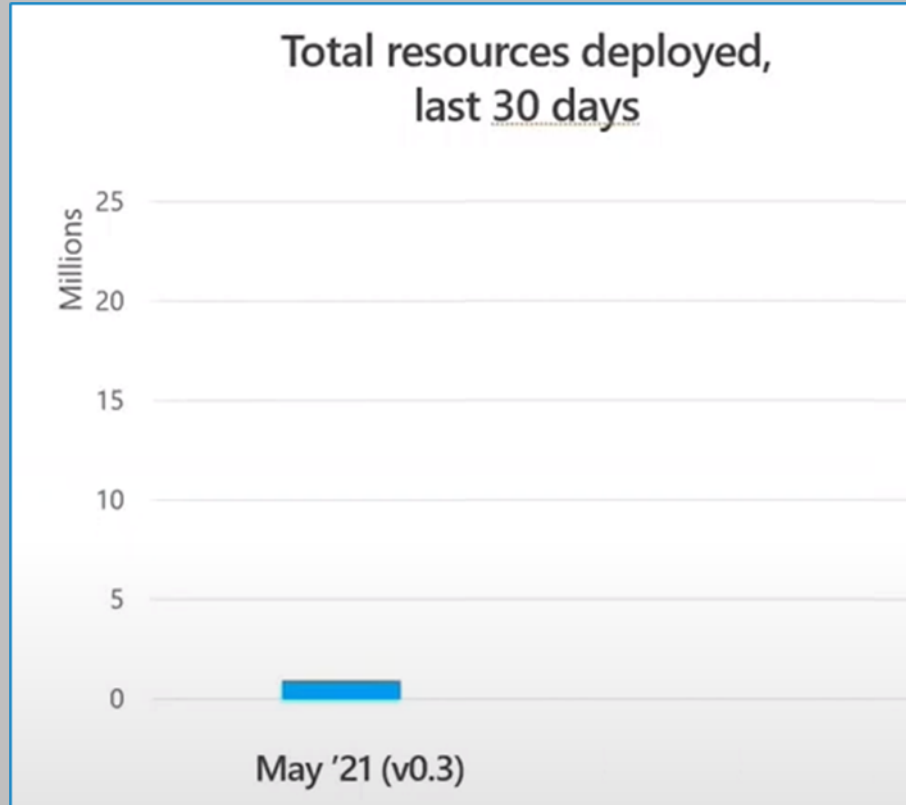
Abstract common blocks of code into reusable parts

## Open Source

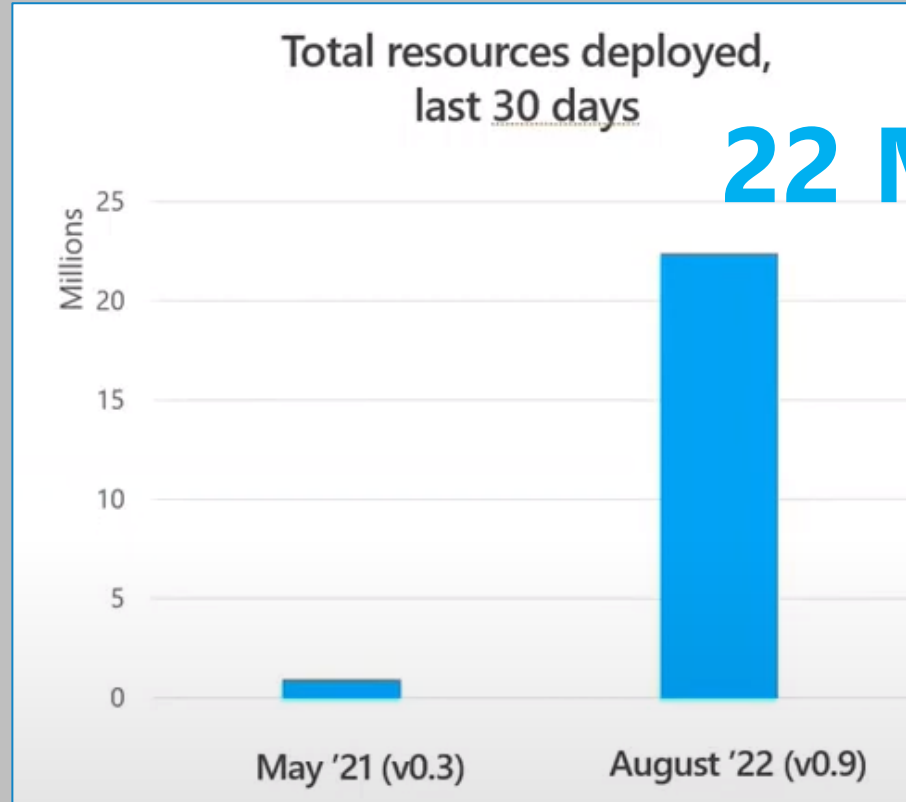
Transparency and community



# What is the Bicep usage?



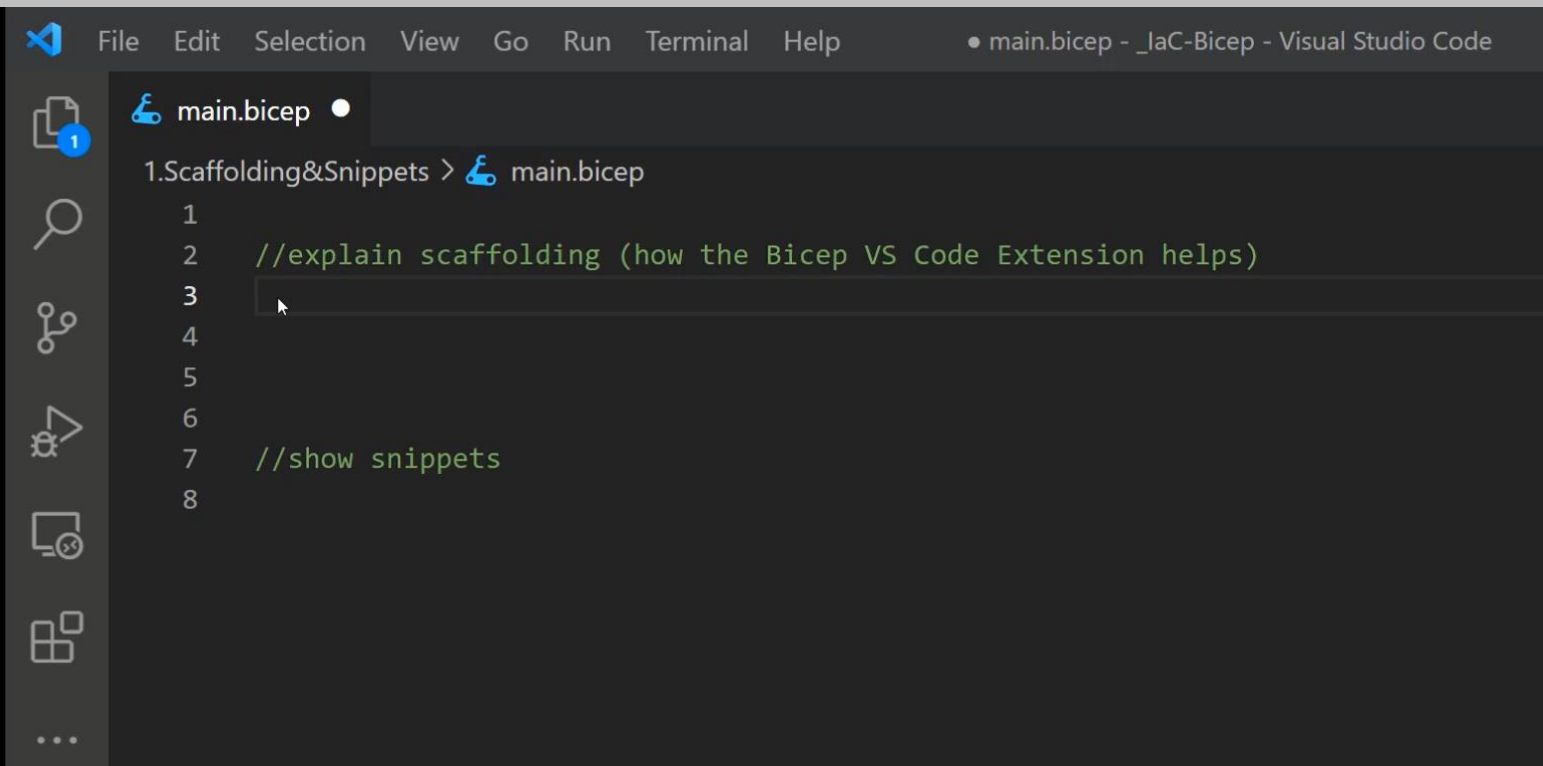
# What is the Bicep usage?



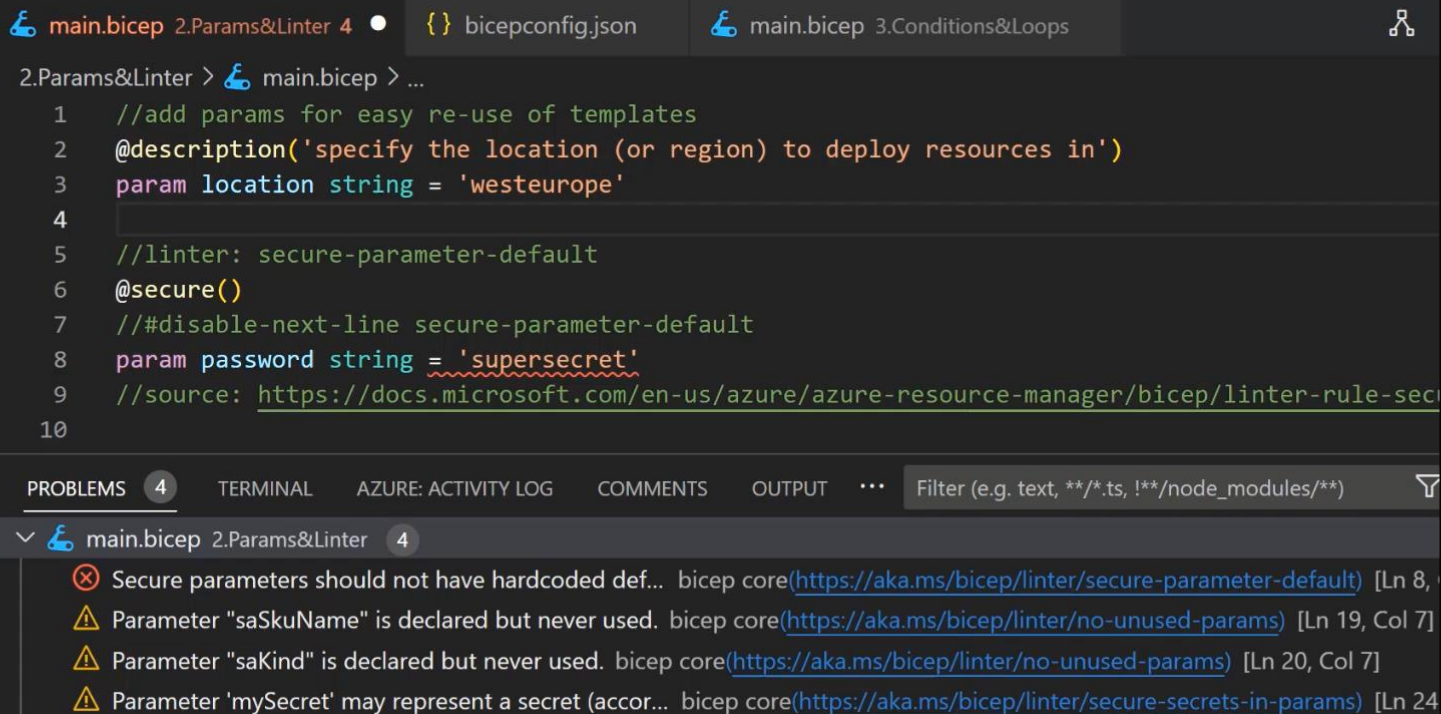
**22 Million!!!**

# Why we recommend VS Code

## (and the Bicep extension)



# Linters FTW!



The screenshot shows the Visual Studio Code editor with a Bicep file named `main.bicep`. The file content is as follows:

```
1 //add params for easy re-use of templates
2 @description('specify the location (or region) to deploy resources in')
3 param location string = 'westeurope'
4
5 //linter: secure-parameter-default
6 @secure()
7 //disable-next-line secure-parameter-default
8 param password string = 'supersecret'
9 //source: https://docs.microsoft.com/en-us/azure/azure-resource-manager/bicep/linter-rule-sec
10
```

Below the editor, the **PROBLEMS** panel shows 4 errors:

- ❌ Secure parameters should not have hardcoded def... bicep core(<https://aka.ms/bicep/linter/secure-parameter-default>) [Ln 8, ...]
- ⚠️ Parameter "saSkuName" is declared but never used. bicep core(<https://aka.ms/bicep/linter/no-unused-params>) [Ln 19, Col 7]
- ⚠️ Parameter "saKind" is declared but never used. bicep core(<https://aka.ms/bicep/linter/no-unused-params>) [Ln 20, Col 7]
- ⚠️ Parameter 'mySecret' may represent a secret (accor... bicep core(<https://aka.ms/bicep/linter/secure-secrets-in-params>) [Ln 24, ...]



DEMO!



# Secrets

```
param storageAccountName string
param containerName string
@secure()
param secretMetadata string

resource blob 'Microsoft.Storage/storageAccounts/blobServices/containers@2019-06-01' = {
  name: '${storageAccountName}/default/${containerName}'
  properties: {
    metadata: {
      secret: secretMetadata
    }
  }
}
```

tips & tricks

```
targetScope = 'subscription'|

param resourceGroupName string = 'my-rg'
param storageAccountName string
param containerName string
param keyVaultName string
param keyVaultSubscription string
param keyVaultResourceGroup string
param secretName string
param secretVersion string

resource rg 'Microsoft.Resources/resourceGroups@2021-01-01' = {
  name: resourceGroupName
  location: 'westeurope'
}

resource sa 'Microsoft.Storage/storageAccounts@2021-02-01' existing = {
  name: storageAccountName
  scope: rg
}

resource kv 'Microsoft.KeyVault/vaults@2019-09-01' existing = {
  name: keyVaultName
  scope: resourceGroup(keyVaultSubscription, keyVaultResourceGroup)
}

module co '20. container.bicep' = {
  scope: rg
  name: 'sa'
  params: {
    containerName: containerName
    storageAccountName: sa.name
    secretMetadata: kv.getSecret(secretName, secretVersion)
  }
}
```

# Template Specs

AVD-Template-Spec

Template spec

Search

Deploy Create new version Edit description Refresh Delete

Overview

Access control (IAM)

Tags

Versions

Settings

Properties

Locks

Automation

Tasks (preview)

Essentials

Resource group  
BICEP-DEMO

Location  
West Europe

Subscription ID  
6bee0596-7a91-4171-8e59-5c1

Subscription  
Microsoft Azure Sponsorship

Latest Version  
1.0

Tags (edit)  
Click here to add tags

Version: 1.0

Main template

Linked templates

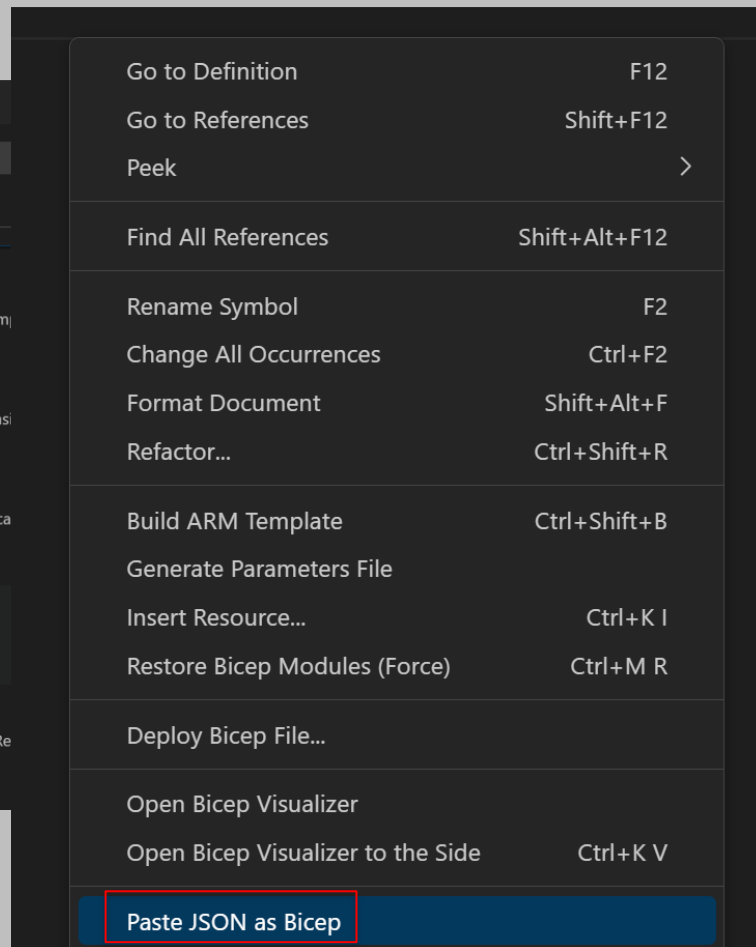
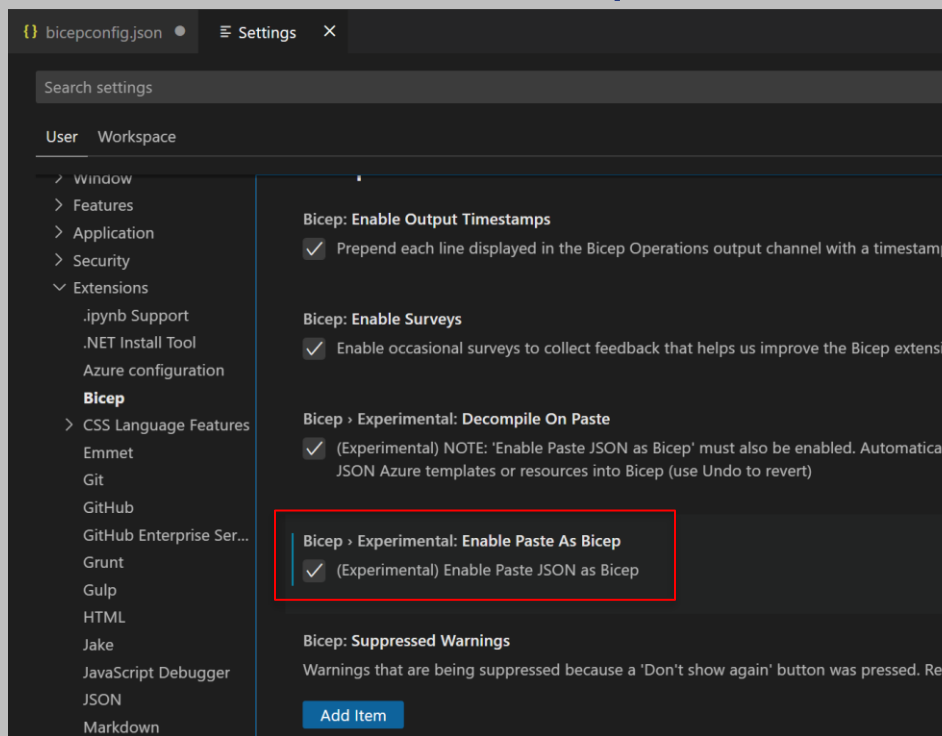
Relative path

No linked templates

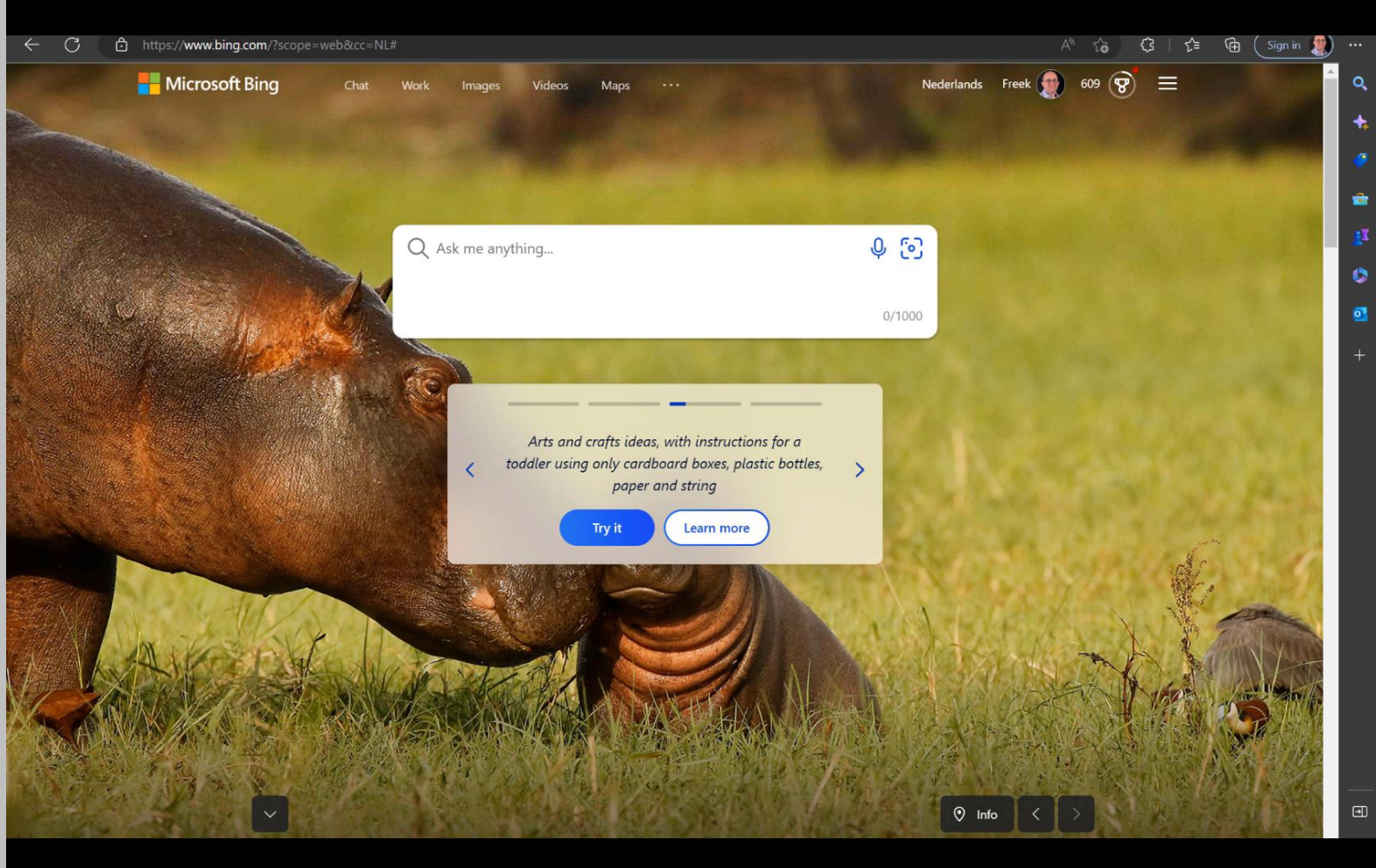
```
//Create AVD Prod backplane objects and configure Log Analytics Diagnostics Settings
module AVDbackplaneprod 'ts:6bee0596-7a91-4171-8e59-5c1af6dc65ed/BICEP-DEMO/AVD-Template-Spec:1.0' =
{
  name: '${AVDbackplane.hostpoolName}-deploy'
  scope: rgAVDp
  params: {
    hostpoolName: AVDbackplane.hostpoolName
    hostpoolFriendlyName: AVDbackplane.hostpoolFriendlyName
    appgroupName: AVDbackplane.appgroupName
    appgroupDesktopFriendlyName: AVDbackplane.appgroupDesktopFriendlyName
    appgroupRemoteAppFriendlyName: AVDbackplane.appgroupRemoteAppFriendlyName
    workspaceName: AVDbackplane.workspaceName
    workspaceNameFriendlyName: AVDbackplane.workspaceNameFriendlyName
    preferredAppGroupType: AVDbackplane.preferredAppGroupType
    AVDbackplanelocation: AVDbackplane.AVDbackplanelocation
    hostPoolType: AVDbackplane.HostPoolType
    enableValiationMode: AVDbackplane.enableValiationMode
    loadBalancerType: AVDbackplane.loadBalancerType
    createRemoteAppHostpool: AVDbackplane.createRemoteAppHostpool
  }
}
```

tips & tricks

# Paste as Bicep



tips & tricks



# Call to action!

- Bicep MS Docs:

[Aka.ms/bicep](https://aka.ms/bicep)

- Bicep Monthly Community call

[surveymonkey.com/r/ARMnews](https://surveymonkey.com/r/ARMnews)

- Bicep GitHub location

[github.com/Azure/bicep](https://github.com/Azure/bicep)

- Bicep Learning path

[docs.microsoft.com/en-us/azure/azure-resource-manager/bicep/learn-bicep](https://docs.microsoft.com/en-us/azure/azure-resource-manager/bicep/learn-bicep)



# Thank you!



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