



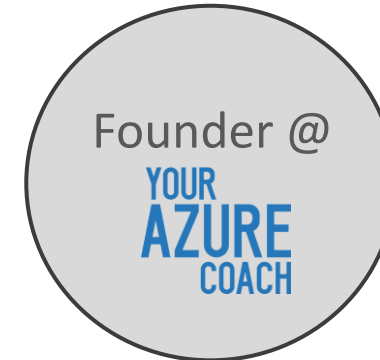
AUTOMATE YOUR AZURE INFRASTRUCTURE WITH BICEP AND AZURE DEVOPS

Toon Vanhoutte



Who am I ?

Toon Vanhoutte



Infrastructure as Code in Azure

Technology	Supplier
<input type="checkbox"/> ARM Templates	Microsoft
<input type="checkbox"/> Bicep	Microsoft
<input type="checkbox"/> Terraform	HashiCorp
<input type="checkbox"/> Pulumi	Pulumi
<input type="checkbox"/> Azure CLI	Microsoft
<input type="checkbox"/> Azure PowerShell	Microsoft

Two approaches

Declarative:

- Functional
- Describes the *What*
- You describe the desired state
The system executes the steps to achieve it

Imperative:

- Procedural
- Describes the *How*
- You describe an order of commands
The system executes them

Infrastructure as Code in Azure

Technology	Supplier	Declarative?
<input type="checkbox"/> ARM Templates	Microsoft	Yes
<input type="checkbox"/> Bicep	Microsoft	Yes
<input type="checkbox"/> Terraform	HashiCorp	Yes
<input type="checkbox"/> Pulumi	Pulumi	Yes
<input type="checkbox"/> Azure CLI	Microsoft	No
<input type="checkbox"/> Azure PowerShell	Microsoft	No

Infrastructure as Code in Azure

Technology	Supplier	Declarative?	Idempotent?
<input type="checkbox"/> ARM Templates	Microsoft	Yes	Yes
<input type="checkbox"/> Bicep	Microsoft	Yes	Yes
<input type="checkbox"/> Terraform	HashiCorp	Yes	Yes
<input type="checkbox"/> Pulumi	Pulumi	Yes	Yes
<input type="checkbox"/> Azure CLI	Microsoft	No	Yes / No
<input type="checkbox"/> Azure PowerShell	Microsoft	No	No

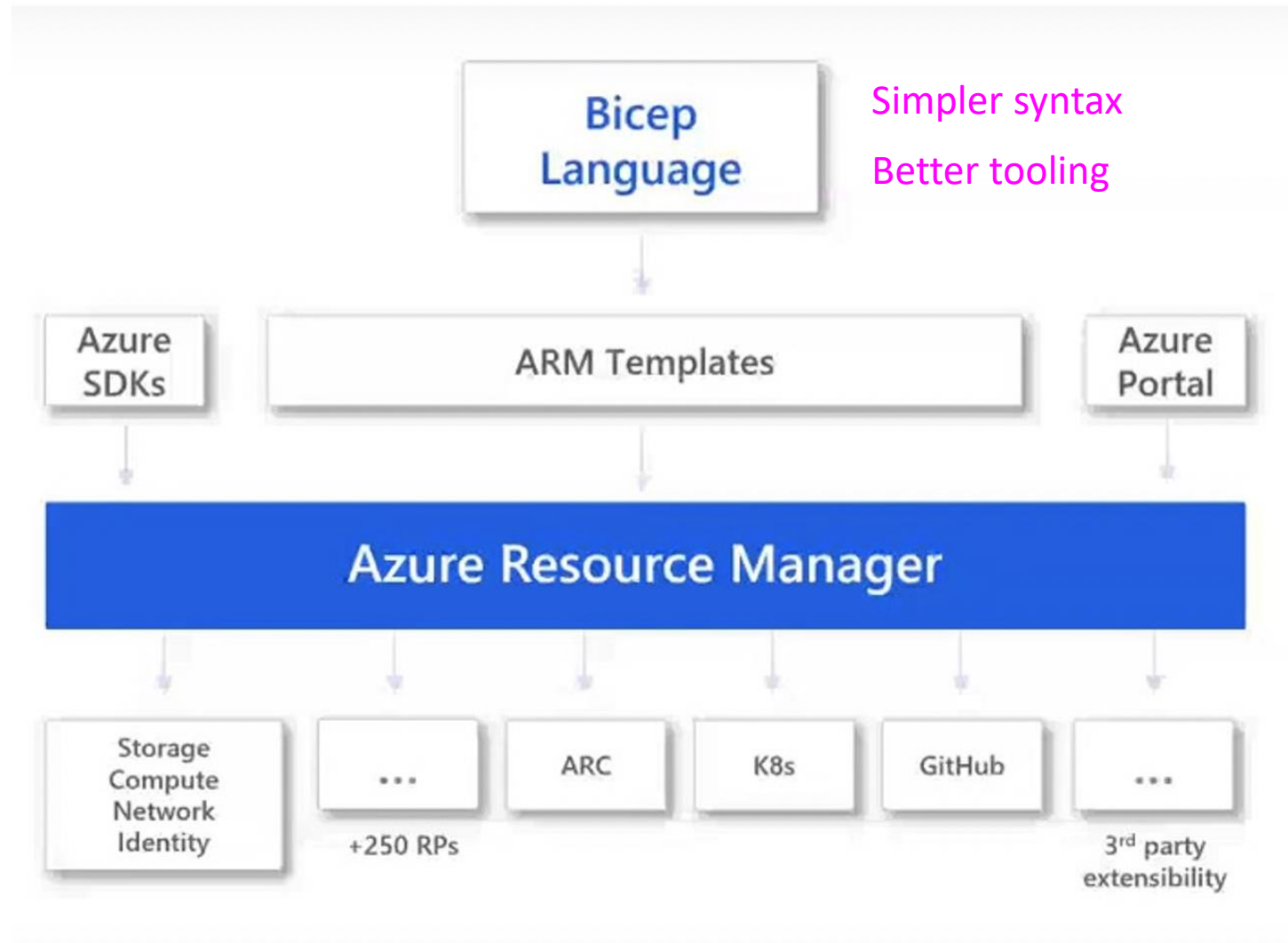
Infrastructure as Code in Azure

Technology	Supplier	Declarative?	Idempotent?	Up to date?
<input type="checkbox"/> ARM Templates	Microsoft	Yes	Yes	Yes
<input type="checkbox"/> Bicep	Microsoft	Yes	Yes	Yes
<input type="checkbox"/> Terraform	HashiCorp	Yes	Yes	No
<input type="checkbox"/> Pulumi	Pulumi	Yes	Yes	Yes
<input type="checkbox"/> Azure CLI	Microsoft	No	Yes / No	No
<input type="checkbox"/> Azure PowerShell	Microsoft	No	No	No

Infrastructure as Code in Azure

Technology	Supplier	Declarative?	Idempotent?	Up to date?	Multi-cloud?
<input type="checkbox"/> ARM Templates	Microsoft	Yes	Yes	Yes	No
<input type="checkbox"/> Bicep	Microsoft	Yes	Yes	Yes	No
<input type="checkbox"/> Terraform	HashiCorp	Yes	Yes	No	Yes
<input type="checkbox"/> Pulumi	Pulumi	Yes	Yes	Yes	Yes
<input type="checkbox"/> Azure CLI	Microsoft	No	Yes / No	No	No
<input type="checkbox"/> Azure PowerShell	Microsoft	No	No	No	No

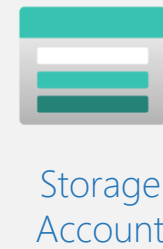
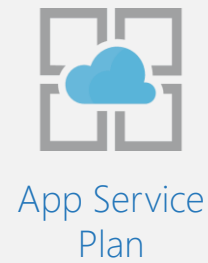
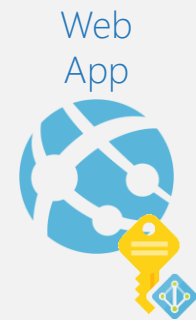
Bicep





Demo #1

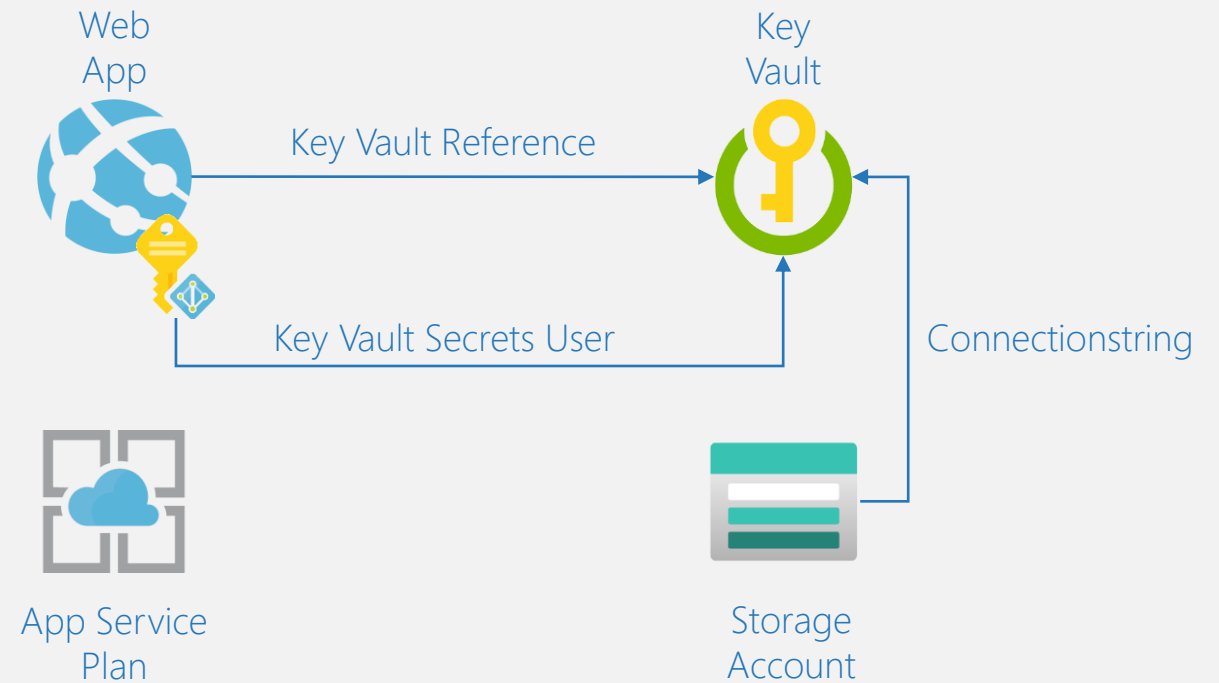
Create resources





Demo #2

Handle connection string

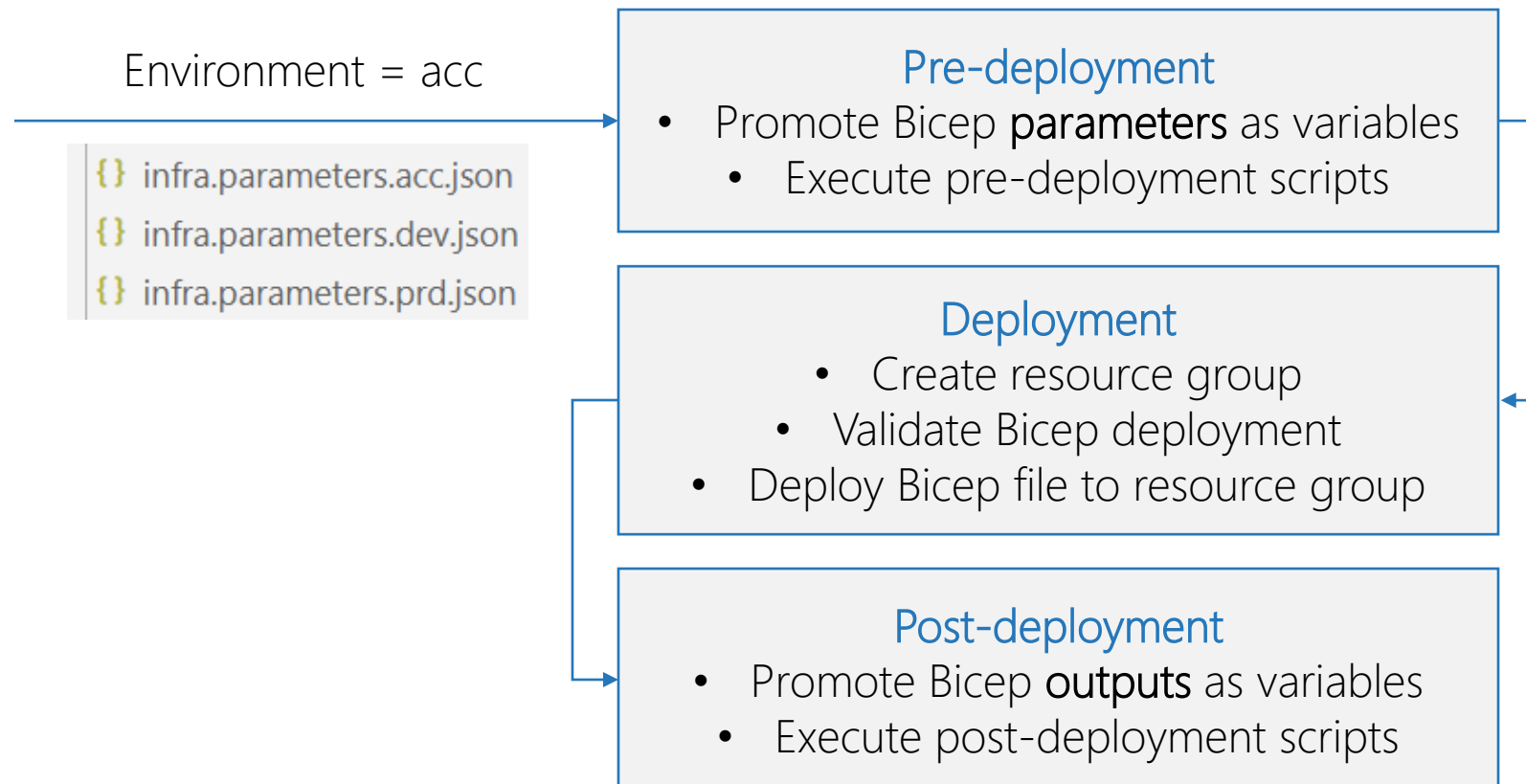


#20210909.27 Update azure-pipelines.yml for Azure Pipelines Individual CI for main 633256e3		Yesterday 10s
#20210909.26 Update azure-pipelines.yml for Azure Pipelines Manually triggered for main 34036652		Yesterday 12s
#20210909.25 Update azure-pipelines.yml for Azure Pipelines Individual CI for main 34036652		Yesterday 8s
#20210909.24 Update azure-pipelines.yml for Azure Pipelines Manually triggered for main 9e206037		Yesterday 25s
#20210909.23 Update azure-pipelines.yml for Azure Pipelines Individual CI for main 9e206037		Yesterday 42s
#20210909.22 Update azure-pipelines.yml for Azure Pipelines Manually triggered for main 078c8318		Yesterday 10s
#20210909.21 Update azure-pipelines.yml for Azure Pipelines Individual CI for main 078c8318		Yesterday 23s
#20210909.20 Update azure-pipelines.yml for Azure Pipelines Manually triggered for main 52036291		Yesterday 24s
#20210909.19 Update azure-pipelines.yml for Azure Pipelines Individual CI for main 52036291		Yesterday 44s
#20210909.18 Update azure-pipelines.yml for Azure Pipelines Manually triggered for main 6711e7f6		Yesterday 22s
#20210909.17 Update azure-pipelines.yml for Azure Pipelines Individual CI for main 6711e7f6		Yesterday 22s
#20210909.16 Update azure-pipelines.yml for Azure Pipelines Manually triggered for main ce59f896		Yesterday 9s
#20210909.15 Update azure-pipelines.yml for Azure Pipelines Individual CI for main ce59f896		Yesterday 20s



Align local and cloud deployment

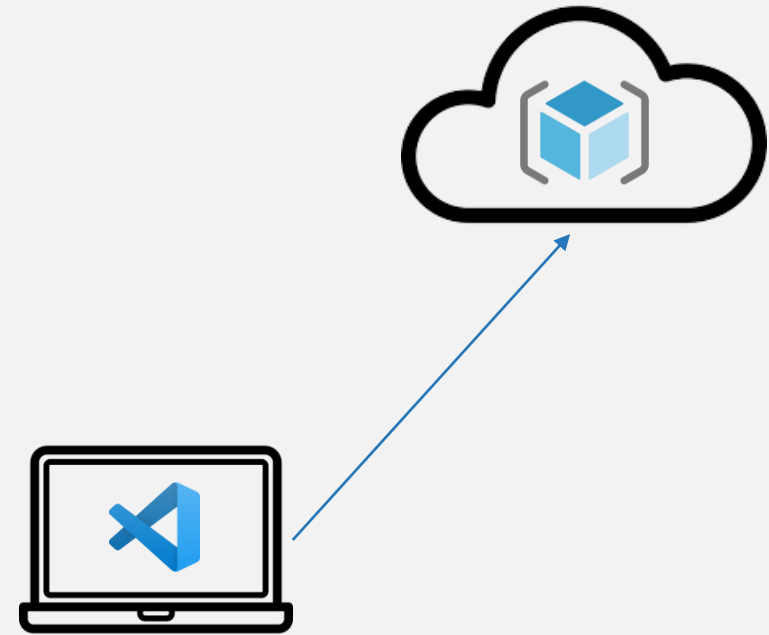
|| PowerShell Script





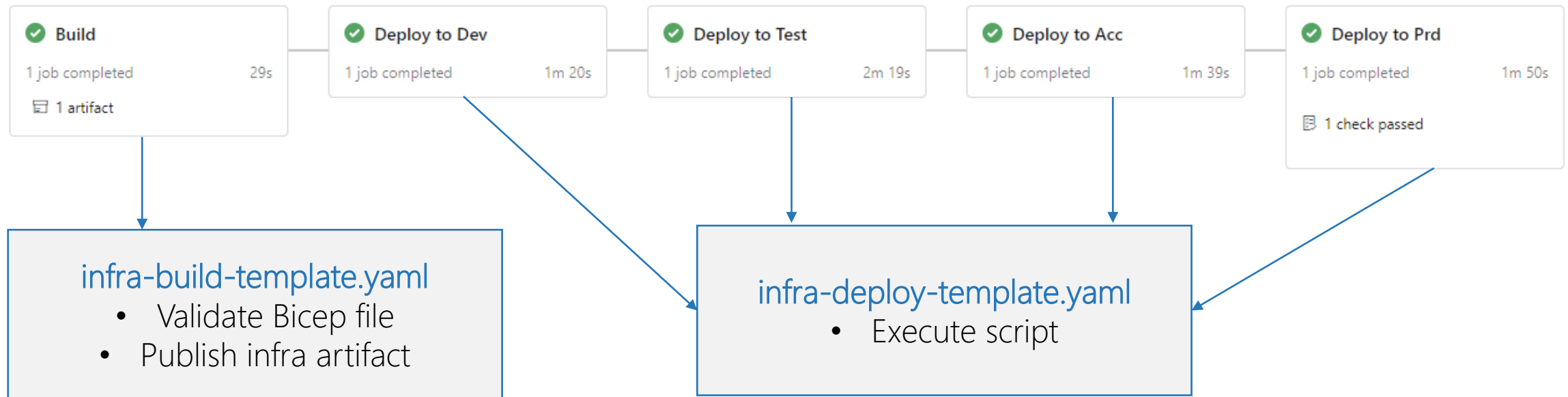
Demo #3

Local deploy



Multi-stage pipeline

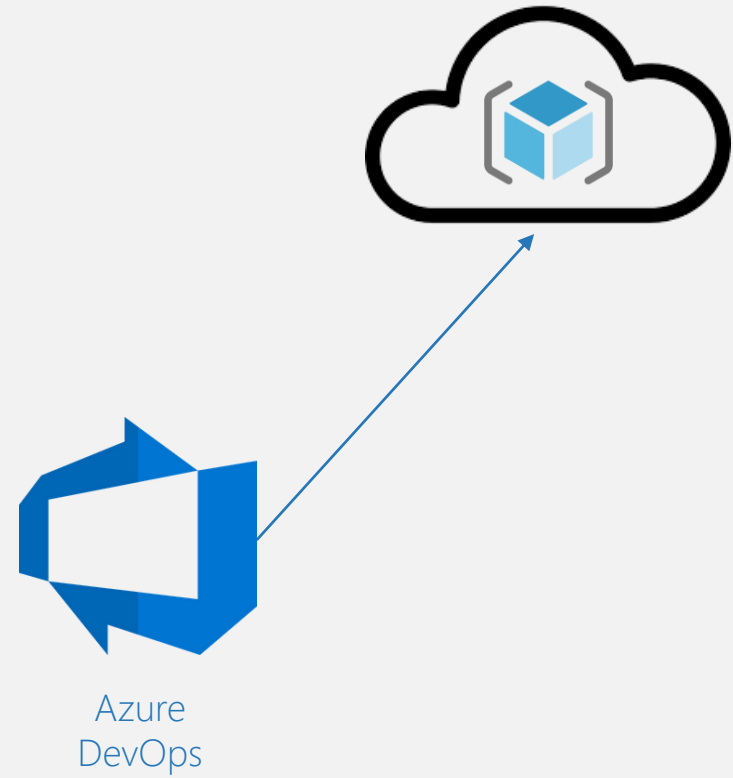
azure-pipelines.yml





Demo #4

Azure DevOps release



Lessons learned along the way

- || All environment abbreviations must have the same length
 - || Example: dev – acc – **prod**



Lessons learned along the way

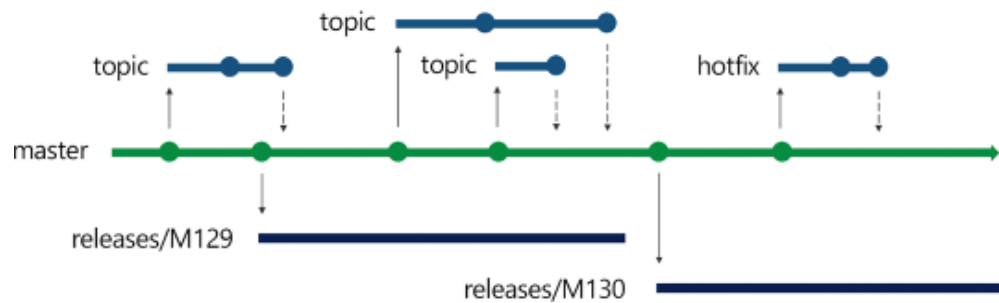
II Adjust stage conditions, based on branching strategy
([more info](#))













```
- stage: 'Dev'
  displayName: 'Deploy to Dev'
  dependsOn: Build
  condition: |
    and
    (
      succeeded(),
      eq(variables['Build.SourceBranchName'], variables['developBranchName']),
      ne(variables['Build.Reason'], 'PullRequest')
    )
```

Lessons learned along the way

II Adjust stage conditions, based on branching strategy
([more info](#))

II Example: *Release Flow*



Pipeline flow		
Feature branch	Release branch	Pull Requests
 Build	 Build	 Build
 Release to Test	 Release to Test	 Release to Test
 Release to Acceptance	 Release to Acceptance	 Release to Acceptance
 Release to Production	 Release to Production	 Release to Production

No possibility to manually trigger stages in YAML pipelines

Lessons learned along the way

- II Use rendered logging commands in Azure DevOps scripts ([more info](#))

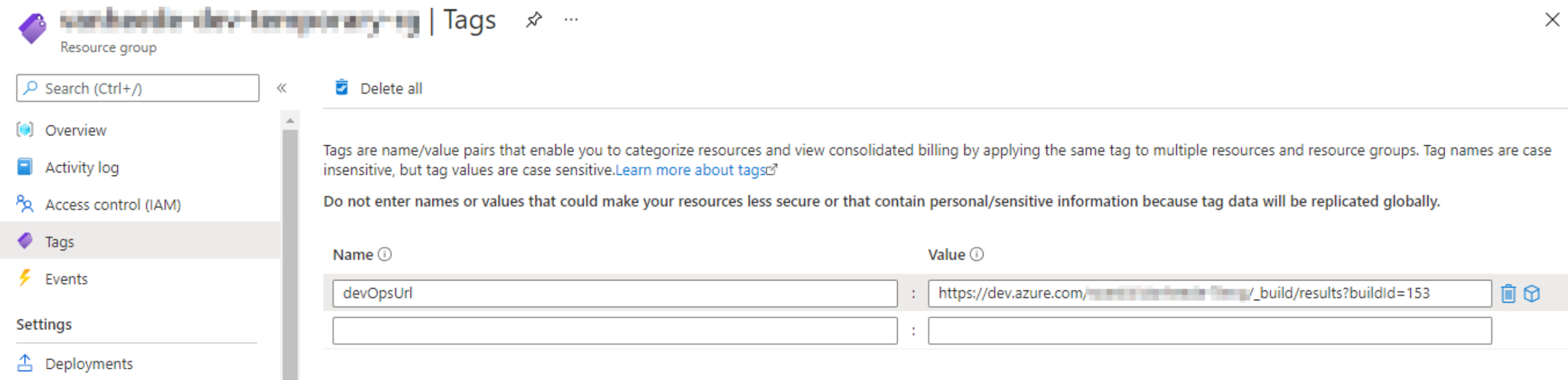
```
##[group]Beginning of a group  
##[warning]Warning message  
##[error]Error message  
##[section]Start of a section  
##[debug]Debug text  
##[command]Command-line being run  
##[endgroup]
```



```
▼ Beginning of a group  
  ##[warning]Warning message  
  ##[error]Error message  
  Start of a section  
  ##[debug]Debug text  
  Command-line being run  
  Finishing: CmdLine
```

Lessons learned along the way

II Foresee end-to-end traceability between Azure <> Azure DevOps
([more info](#))



The screenshot shows the 'Tags' page in the Azure portal for a resource group. The left sidebar contains navigation links: Overview, Activity log, Access control (IAM), Tags (selected), Events, Settings, and Deployments. The main content area has a search bar, a 'Delete all' button, and a description of tags. Below the description is a table with two columns: 'Name' and 'Value'. The first row shows a tag named 'devOpsUrl' with a value pointing to an Azure DevOps build results page. The second row is empty.

Resource group | Tags ✕ ...

Search (Ctrl+/) << Delete all

Overview
Activity log
Access control (IAM)
Tags
Events
Settings
Deployments

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. Tag names are case insensitive, but tag values are case sensitive. [Learn more about tags](#)

Do not enter names or values that could make your resources less secure or that contain personal/sensitive information because tag data will be replicated globally.

Name ⓘ	Value ⓘ
devOpsUrl	https://dev.azure.com/[redacted]/_build/results?buildId=153

Lessons learned along the way

- || Avoid accidental deployments with Approvals and Branch Control
 - || On environments
 - || On service connections (!)

Branch control ×

Display name *

Branch control

Allowed branches * ⓘ

refs/heads/master, refs/heads/releases/*

☒ Verify branch protection * ⓘ

☐ Ignore unknown protection status * ⓘ

Control options ∨

Lessons learned along the way

- || Give your modules a unique / meaningful name
 - || This name is the deployment name in Azure!

```
//Describe Resource Group
module rg 'modules/resource-group.bicep' = {
  name: '${appName}-resourceGroup-${buildId}'
  params: {
```

THANK YOU !!!

— TOON VANHOUTTE —

