



MC2MC

ClickOps to DevSecOps

ClickOps



DevSecOps



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Experience in both small and large scale solutions

Background in development, infra and automation

10+ years of experience

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Agenda



1 | Introduction(5 min)



2 | ClickOps & DevSecOps(15 min)



3 | Demo(25 min)



4 | Wrap-up(5 min)

Terminology





What is ClickOps ?

"ClickOps is the process of provisioning, configuring, and managing resources by clicking in portals, management consoles, and wizards"

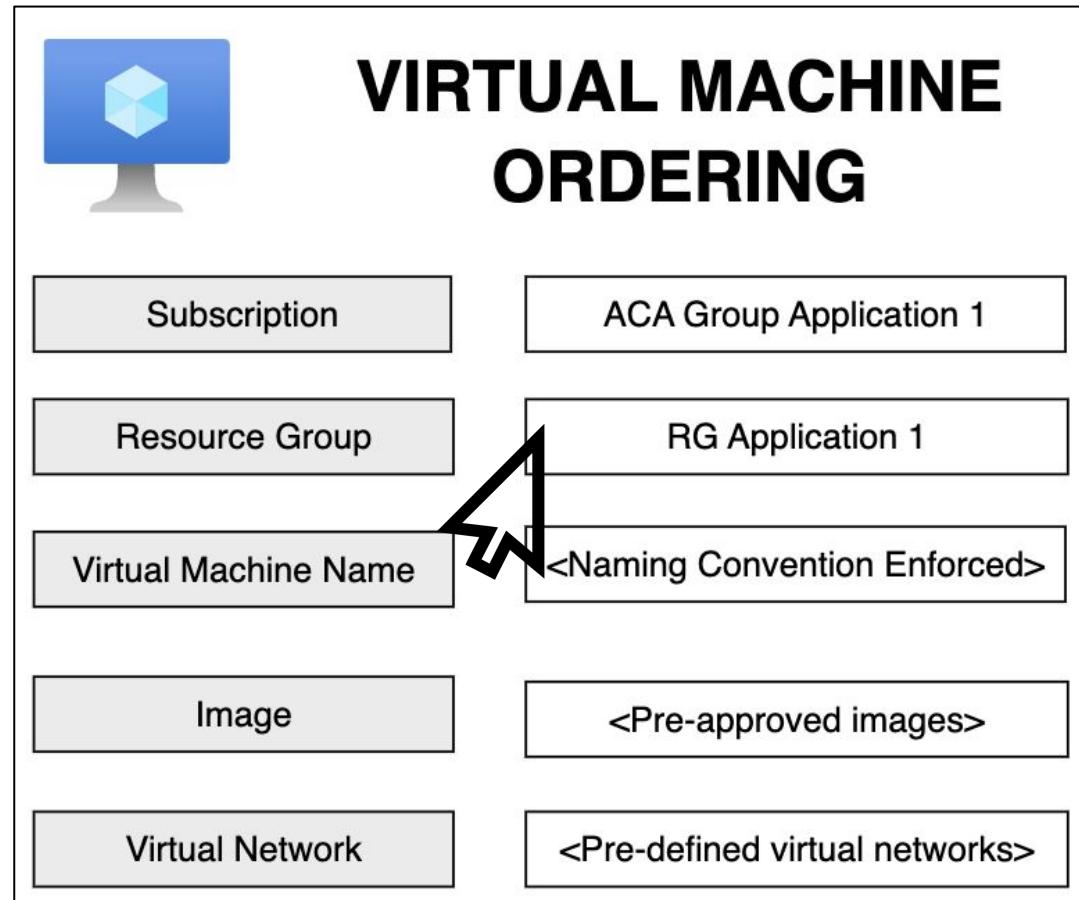
The screenshot shows the Microsoft Azure portal homepage. At the top, there's a search bar and a 'Copilot' button. Below the header, there's a section titled 'Azure services' with links to 'Create a resource', 'Storage accounts', 'All resources', 'Azure DevOps organizations', 'Azure Databricks', and 'Key vaults'. Underneath are links for 'Microsoft Entra ID', 'Managed Identities', 'Subscriptions', and 'More services'. To the right of these links is a large, stylized black cursor icon pointing towards the 'More services' link. Below this is a section titled 'Resources' with tabs for 'Recent' (which is selected) and 'Favorite'. A table lists recent resources: a Network security group named 'databricksnsgsmtvgxyme6ujw' (last viewed 21 hours ago), a Storage account named 'tfstatepatrik' (2 days ago), a Resource group named 'Malmo' (2 days ago), a Resource group named 'test-delete-databricks' (5 days ago), a Key vault named 'certificate-keyvault12' (a week ago), a Virtual network named 'example-network' (3 weeks ago), an App Service plan named 'ASP-testwebapp01f3group-8862' (4 weeks ago), a Subscription named 'Visual Studio Enterprise Subscription – Patri...' (3 months ago), and a Storage account named 'dbstoragekfqvt6fmnz6' (3 months ago).

| Name | Type | Last Viewed |
|--|------------------------|--------------|
| databricksnsgsmtvgxyme6ujw | Network security group | 21 hours ago |
| tfstatepatrik | Storage account | 2 days ago |
| Malmo | Resource group | 2 days ago |
| test-delete-databricks | Resource group | 5 days ago |
| certificate-keyvault12 | Key vault | a week ago |
| example-network | Virtual network | 3 weeks ago |
| ASP-testwebapp01f3group-8862 | App Service plan | 4 weeks ago |
| Visual Studio Enterprise Subscription – Patri... | Subscription | 3 months ago |
| dbstoragekfqvt6fmnz6 | Storage account | 3 months ago |



Different types of ClickOps

- ServiceNOW integration with Azure
- Customized portal tailored for a specific customer
- Example: A customer can order a virtual machine. It will adhere to the naming conventions of the company, and only pre-selected options are available.





What is DevSecOps ?

"DevSecOps, which stands for development, security, and operations, is a framework that integrates security into all phases of the software development lifecycle"

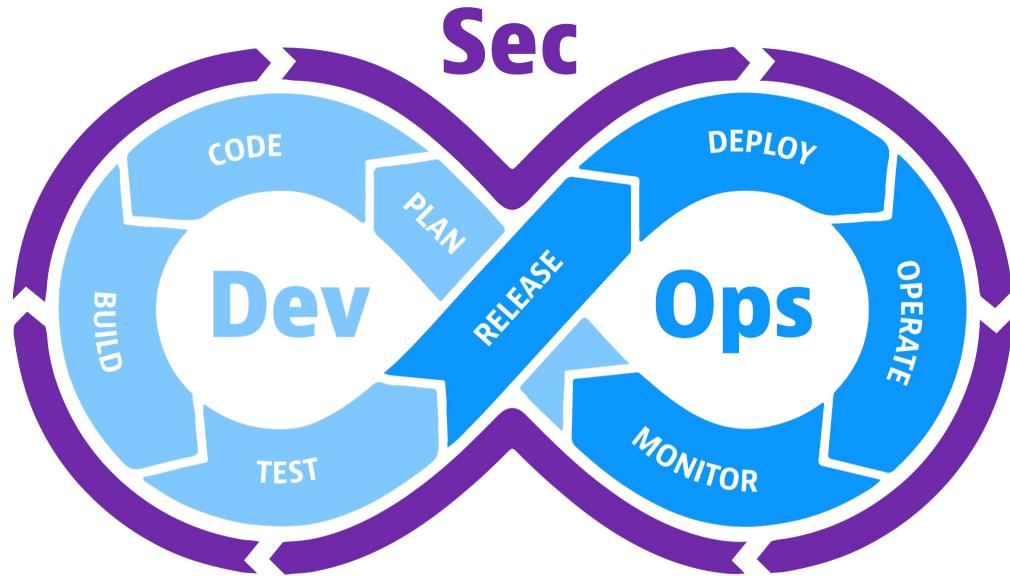


Image source: <https://www.dynatrace.com/news/blog/what-is-devsecops/>

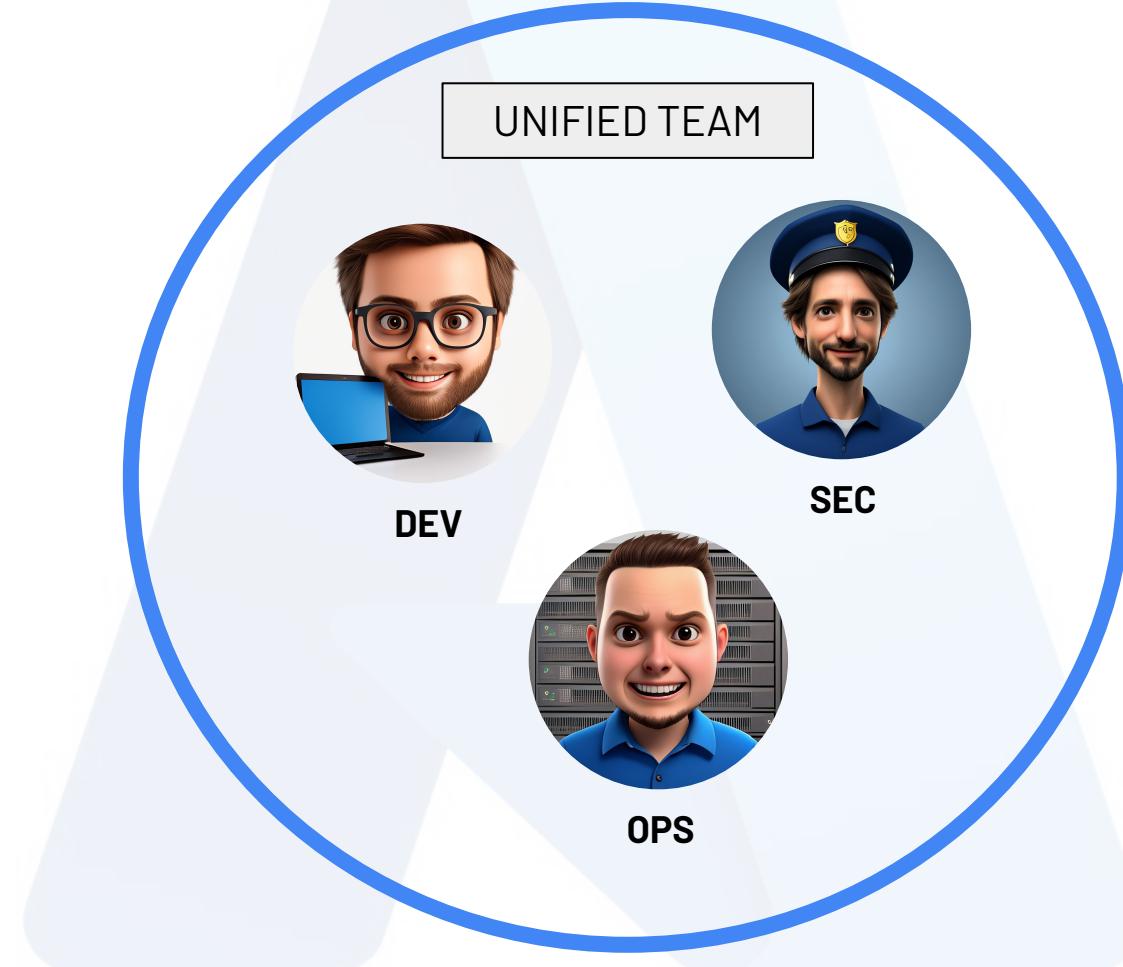


DevSecOps - One Team

DevSecOps removes the boundaries between the different teams:
Development, Security and Operations.

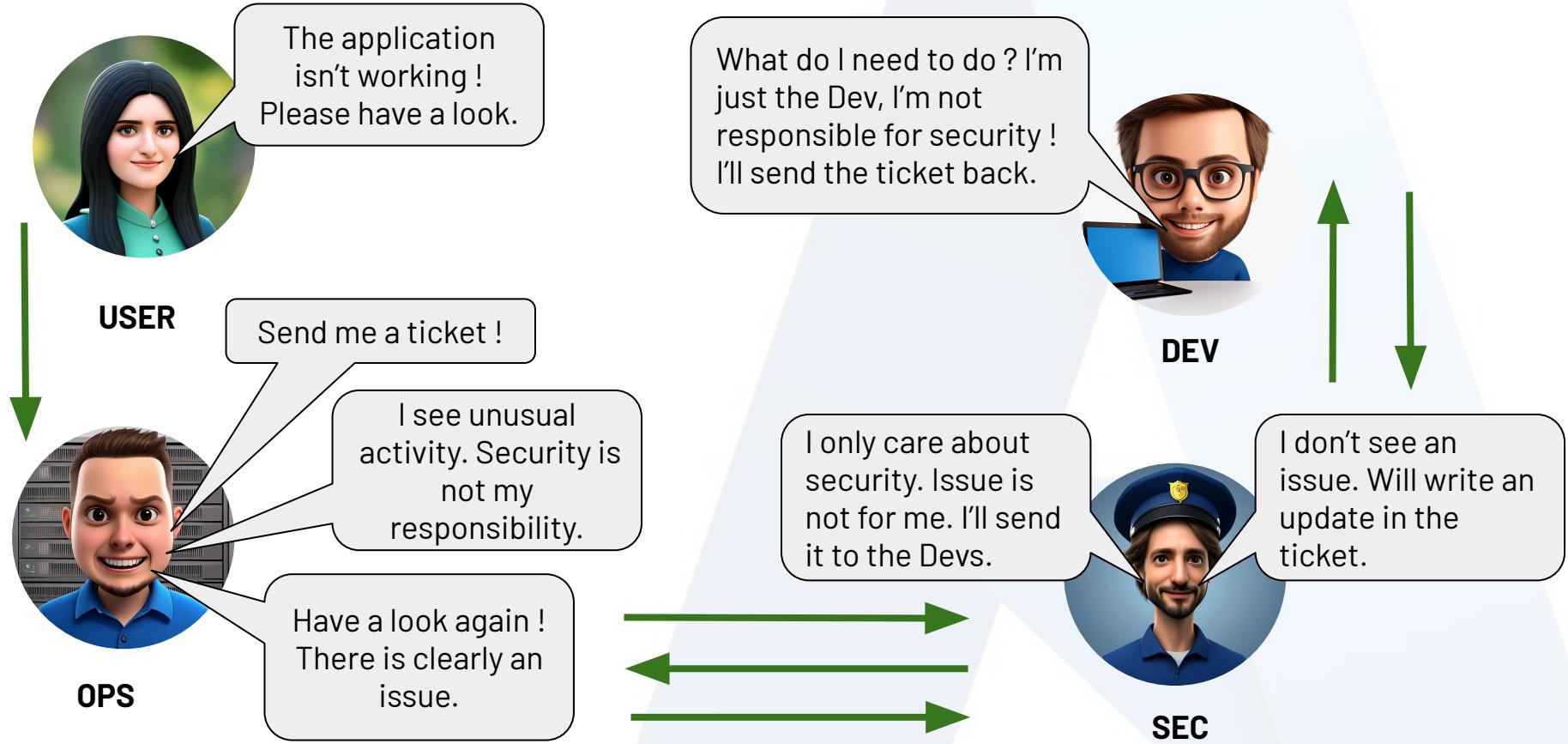
They act as one unified team !

"Security is everyone's responsibility"



Without DevSecOps





With DevSecOps





I'm investigating ! There is unusual activity. I wonder if we have a vulnerability



OPS



The application isn't working ! Please have a look.



SEC



I will fix it !



DEV



I found a vulnerability. It needs to be fixed !

USER



DEV

I'm writing a new feature
for the application !



SEC

I'm involved in the process ! I
will continuously validate
security and compliance.



OPS

Let me also have a look at the
code ! I will be supporting and
ensuring the application stays
available.

ClickOps Positivity !





POSITIVE ASPECTS OF CLICKOPS

1

EASE OF USE

- Quickly deploy resources
- Catalogue of items to pick

2

HELPS TROUBLESHOOTING

- Quickly update settings





POSITIVE ASPECTS OF CLICKOPS

3

BETTER RESOURCE VIEW

- Settings available in a GUI
- It "makes" more sense than code

The screenshot shows the Azure portal interface for managing network security rules. The top navigation bar includes 'databricksnsgsmtvgxyme6ujw' and 'Inbound security rules'. The left sidebar lists various settings like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, and Settings (which is expanded). Under Settings, 'Inbound security rules' is selected. The main content area displays a table of security rules:

| Priority | Name | Port | Protocol | Source | Destination |
|----------|-------------------------|------|----------|-------------------|----------------|
| 65000 | AllowVnetInBound | Any | Any | VirtualNetwork | VirtualNetwork |
| 65001 | AllowAzureLoadBalanc... | Any | Any | AzureLoadBalancer | Any |
| 65500 | DenyAllInBound | Any | Any | Any | Any |

Below the table, there are filters for Port, Protocol, Source, Destination, and Action, all set to 'all'. A note at the bottom states: 'Network security group security rules are evaluated by priority using the combination of source, source port, destination, destination port, and to allow or deny the traffic. A security rule can't have the same priority and direction as an existing rule. You can't delete default security rules, but you can override them with rules that have a higher priority.' A 'Learn more' link is provided.

```
terraform.tf > resource "azurerm_network_security_rule" "nsg2" > ┌ network_security_group_name
resource "azurerm_resource_group" "example" {
  name      = "example-resources"
  location  = "West Europe"
}

resource "azurerm_network_security_group" "nsg" {
  name          = "acceptancetestSecurityGroup1"
  location      = azurerm_resource_group.example.location
  resource_group_name = azurerm_resource_group.example.name
}

resource "azurerm_network_security_rule" "nsg1" {
  name      = "rule1"
  priority  = 1000
  direction = "Outbound"
  access    = "Allow"
  protocol  = "Tcp"
  source_port_range = "*"
  destination_port_range = "*"
  source_address_prefix = "*"
  destination_address_prefix = "*"
  resource_group_name = azurerm_resource_group.example.name
  network_security_group_name = azurerm_network_security_group.example.name
}

resource "azurerm_network_security_rule" "nsg2" {
  name      = "rules2"
  priority  = 2000
  direction = "Outbound"
  access    = "Allow"
  protocol  = "Tcp"
  source_port_range = "*"
  destination_port_range = "*"
  source_address_prefix = "*"
  destination_address_prefix = "*"
  resource_group_name = azurerm_resource_group.example.name
  network_security_group_name = azurerm_network_security_group.example.name
}
```



WHEN TO USE CLICKOPS

TINY ENVIRONMENTS

- Very small environments
- Sandbox



ClickOps Pitfalls !

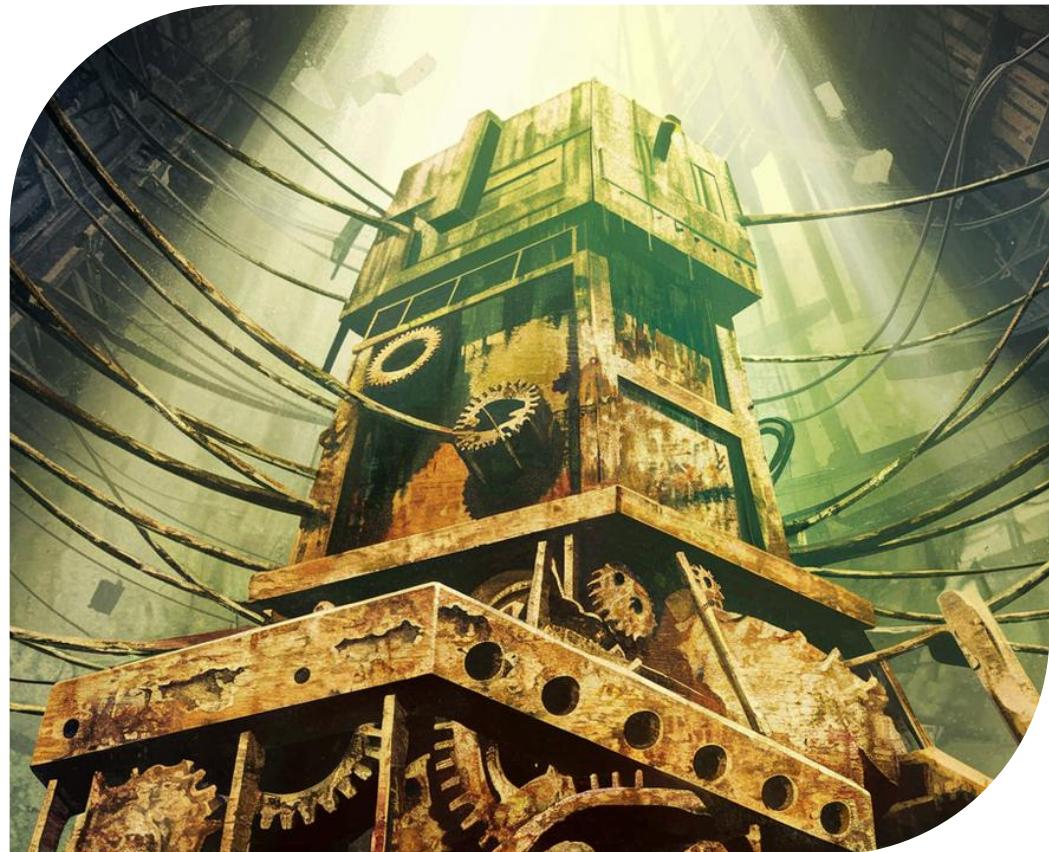




PITFALLS OF USING CLICKOPS

1 TECHNICAL DEBT

Each deployment through the portal makes it more difficult to switch over to IaC





PITFALLS OF USING CLICKOPS

2

ERROR PRONE

- Using the Azure portal is error prone. Manually, entering all the information is susceptible to mistakes
- Virtual machine creation:
 - 7 tabs to enter information
 - Several fields in each tab

Microsoft Azure

Home > Create a resource > Create a virtual machine

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * Resource group * [Create new](#)

Instance details

Virtual machine name *

Region *

Availability options Availability zone Self-selected zone Choose up to 3 availability zones, one VM per zone Azure-selected zone (Preview) Let Azure assign the best zone for your needs Using an Azure-selected zone is not supported in region 'East US'.

Zone options Self-selected zone Choose up to 3 availability zones, one VM per zone Azure-selected zone (Preview) Let Azure assign the best zone for your needs Using an Azure-selected zone is not supported in region 'East US'.

Availability zone * You can now select multiple zones. Selecting multiple zones will create one VM per zone. [Learn more](#)

Security type [Configure security features](#)

Trusted launch virtual machine is required when using 1P Gallery images.

< Previous Next : Disks > Review + create



PITFALLS OF USING CLICKOPS

3 DIFFERENT ENVIRONMENTS

Difficult to maintain different environments such as: Dev / Test / Prod.





PITFALLS OF USING CLICKOPS

4 BACKUP & DISASTER

Difficult and time consuming to recreate your environment in another region.



IaC Positivity



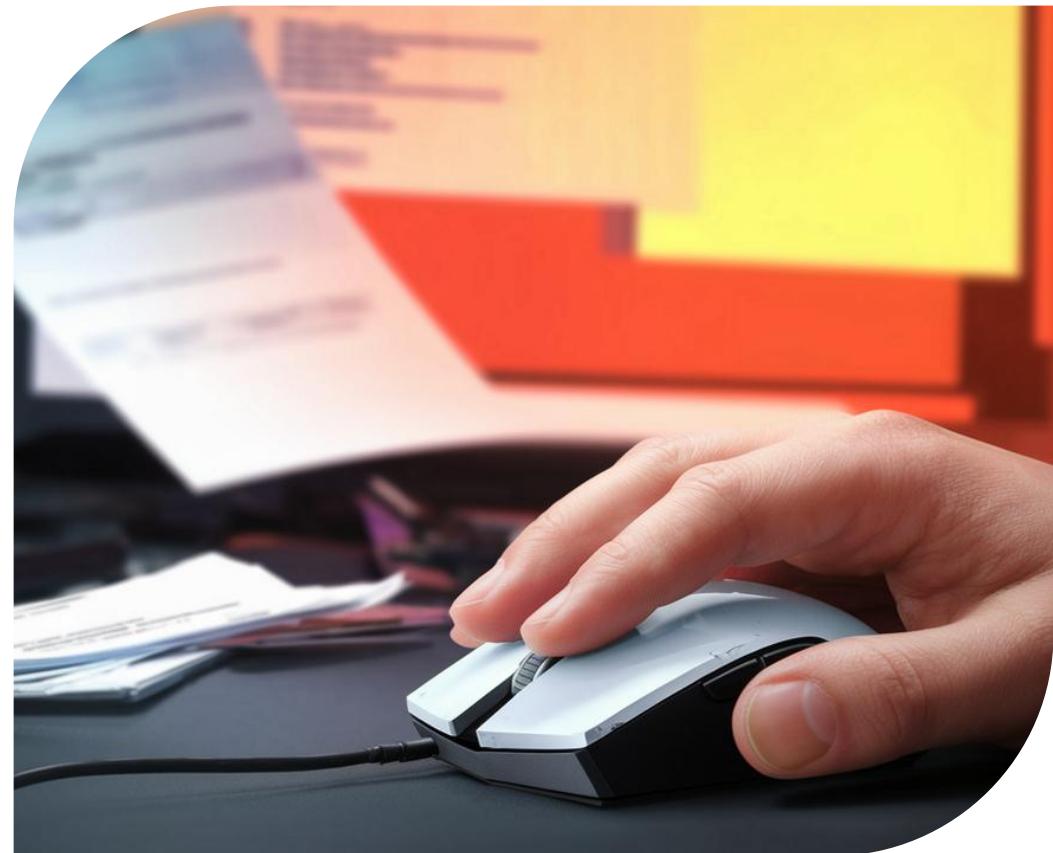


POSITIVE ASPECTS OF IAC

1

STANDARDIZED DEPLOYMENTS

IaC templates and modules, ensures that the same setup is deployed every time.





POSITIVE ASPECTS OF IAC

2

DIFFERENT ENVIRONMENTS

IaC makes it easy to create and maintain different environments.

Prod/Dev/Test are mostly the same with different parameters.

Easy to create and break down these environment.





POSITIVE ASPECTS OF IAC

3 DISASTER RECOVERY

IaC is an important part of a Disaster Recovery plan.

Resources can “easily” be recreated in another region.





POSITIVE ASPECTS OF IAC

4

COLLABORATION & VERSION CONTROL

Version control and IaC





POSITIVE ASPECTS OF IAC

5

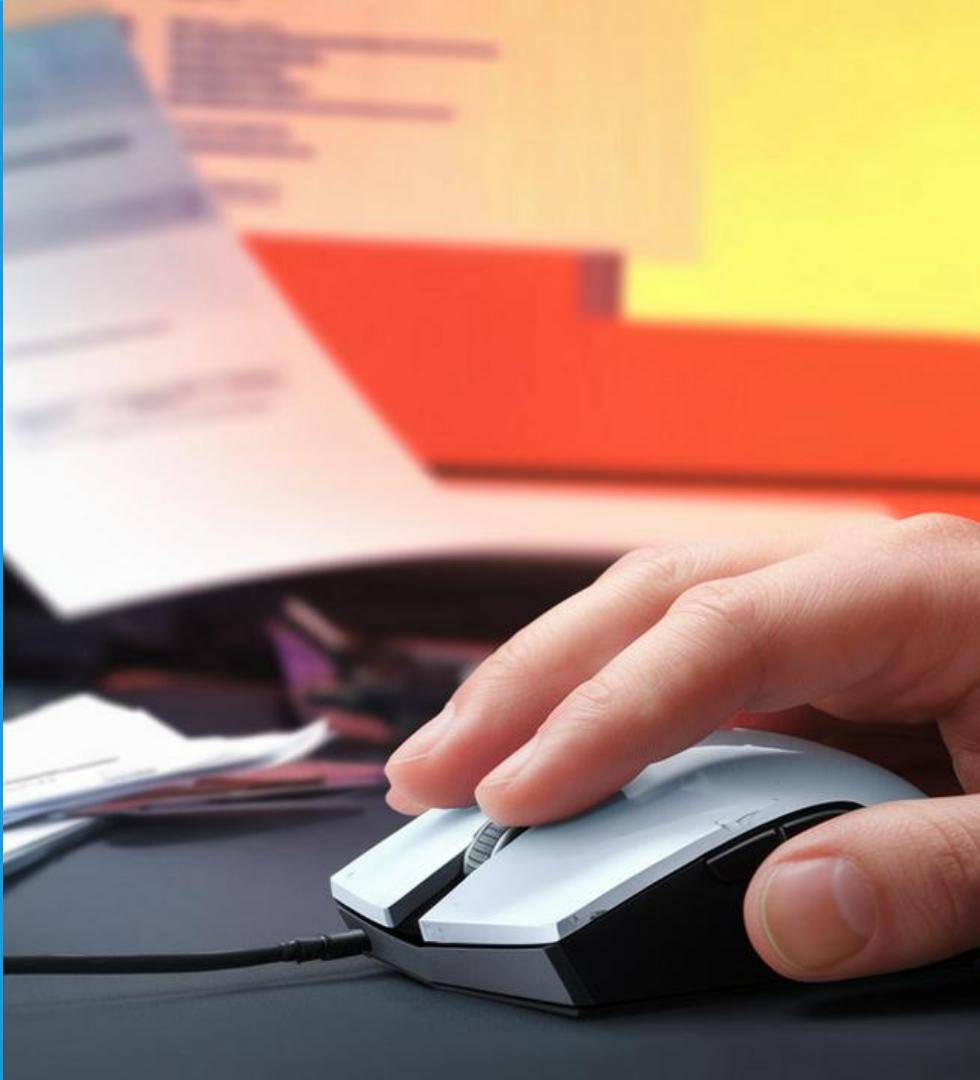
COMPLIANCE BEFORE CREATION

The Terraform code is checked for compliance before applied in the environment.

Toolsets such as: Checkov, tfscan and terrascan can be used.



IaC Pitfalls !





PITFALLS OF IAC

1

REQUIRES A DIFFERENT PROFILE

Not everyone can work with Infrastructure as Code. Cloud Engineers with experience are required to reap the benefits.





PITFALLS OF IAC

2

ONE TIME TASKS DIFFICULT

Easy and quick configuration of single resources can take longer using Infrastructure as Code.

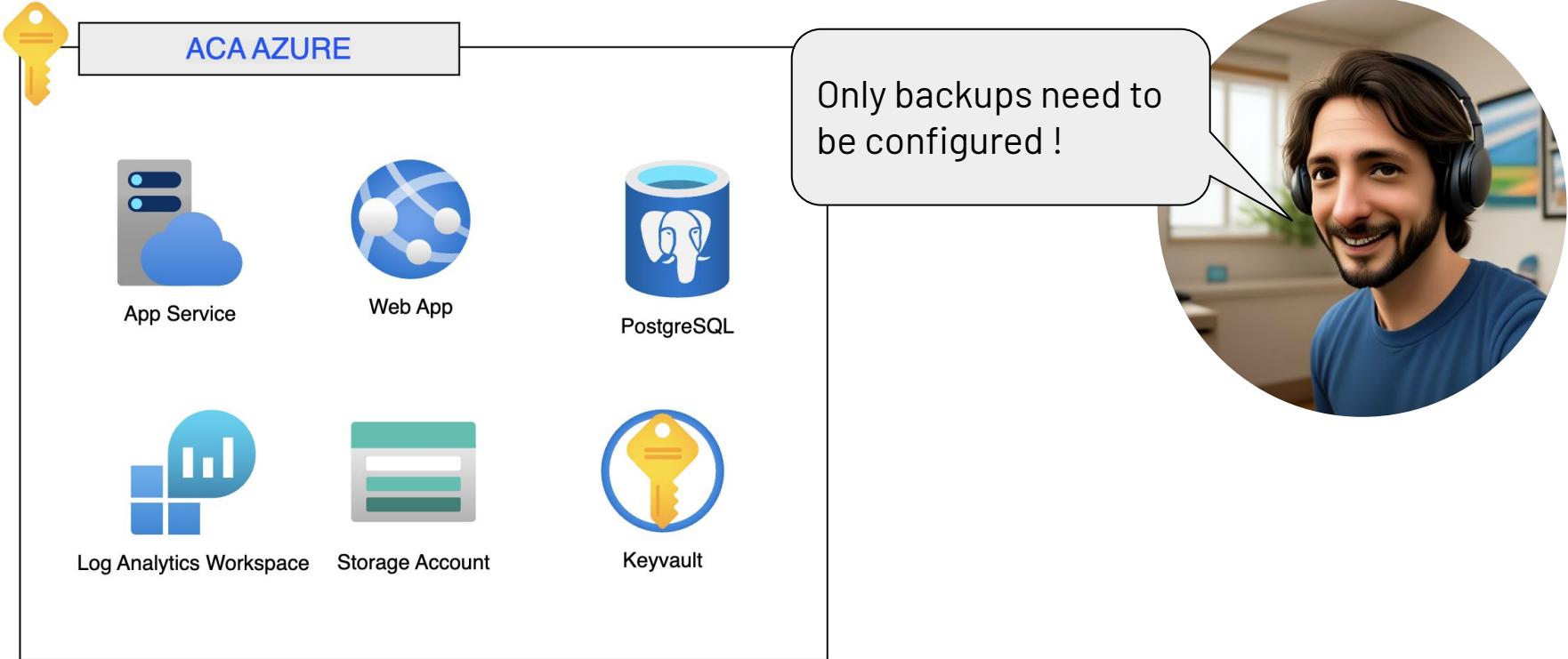


Scenario: Backups IaC

TIME CHECK!



SCENARIO: IAC BACKUPS



SCENARIO: IAC BACKUPS



Hey Johan ! Can you
configure the backups in
Terraform ?



Is it ready ?



Sure Patrik ! Let me start
working on it right away...



I'm still busy ...

SCENARIO: IAC BACKUPS



The code and everything
is ready !



Why did it take so long ?

PROBLEM

Only 5 resources had to have their backup configured.

Why did it take three hours to write this in Terraform ?

```
6   resource "azurerm_network_security_group" "nsg" {
7     name                = "acceptanceTestSecurityGroup1"
8     location            = azurerm_resource_group.example.location
9     resource_group_name = azurerm_resource_group.example.name
10    }
11
12  resource "azurerm_network_security_rule" "nsg1" {
13    name                = "nsg1-1"
14    direction           = "Outbound"
15    access              = "Allow"
16    protocol            = "Tcp"
17    source_port_range   = "*"
18    destination_port_range = "*"
19    source_address_prefix = "*"
20    destination_address_prefix = "*"
21    resource_group_name = azurerm_resource_group.example.name
22    network_security_group_name = azurerm_network_security_group.example.name
23  }
24
25  resource "azurerm_network_security_rule" "nsg2" {
26    name                = "nsg2-1"
27    priority            = 2000
28    direction           = "Inbound"
29    access              = "Allow"
30    protocol            = "Tcp"
31    source_port_range   = "*"
32    destination_port_range = "*"
33    source_address_prefix = "*"
34    destination_address_prefix = "*"
35    resource_group_name = azurerm_resource_group.example.name
36    network_security_group_name = azurerm_network_security_group.example.name
37  }
```

1

More options available in Terraform

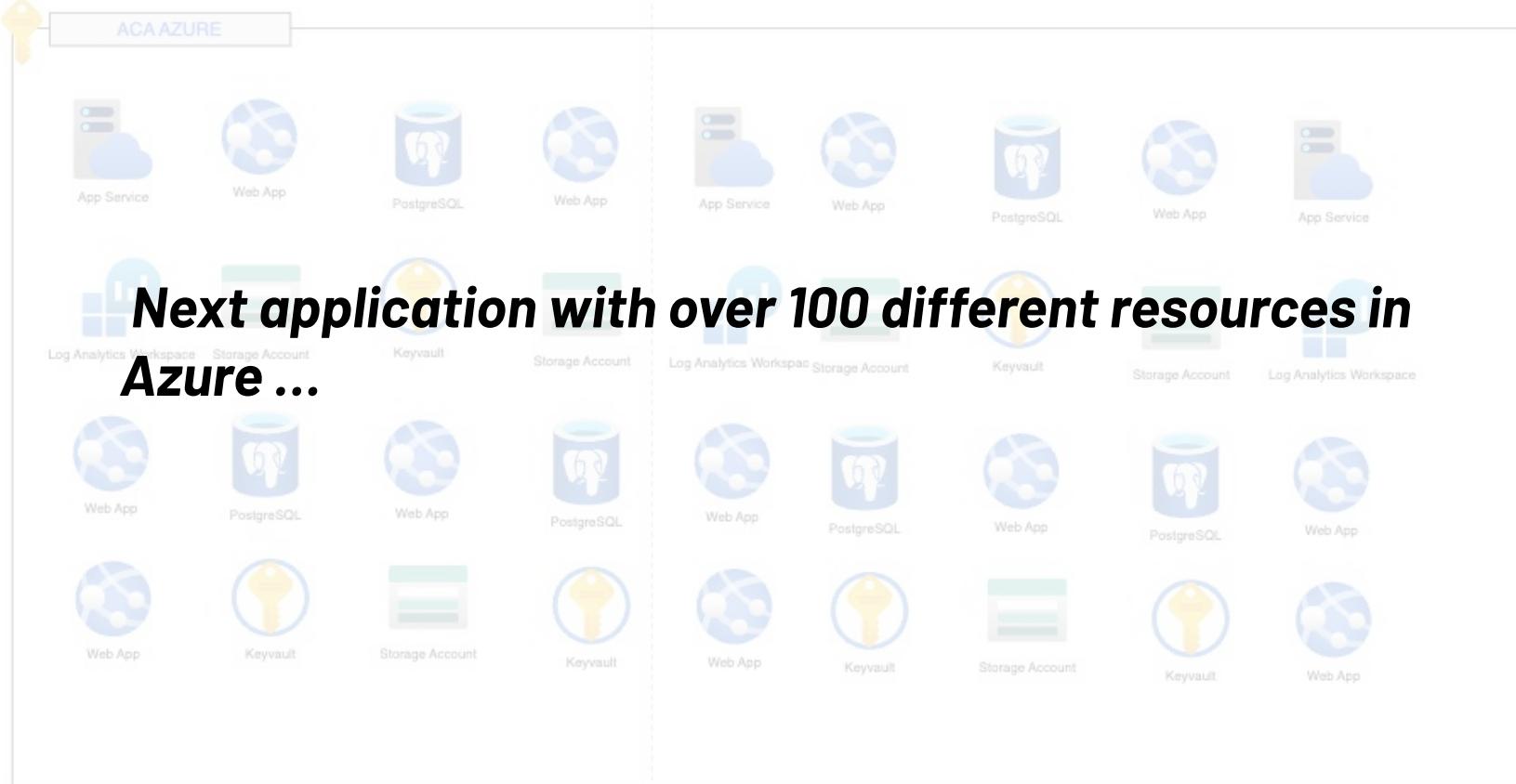
2

Johan wrote a reusable module for the landing zone

3

Additional application backups will be configured quickly, regardless of amount

SCENARIO: IAC BACKUPS



SCENARIO: IAC BACKUPS



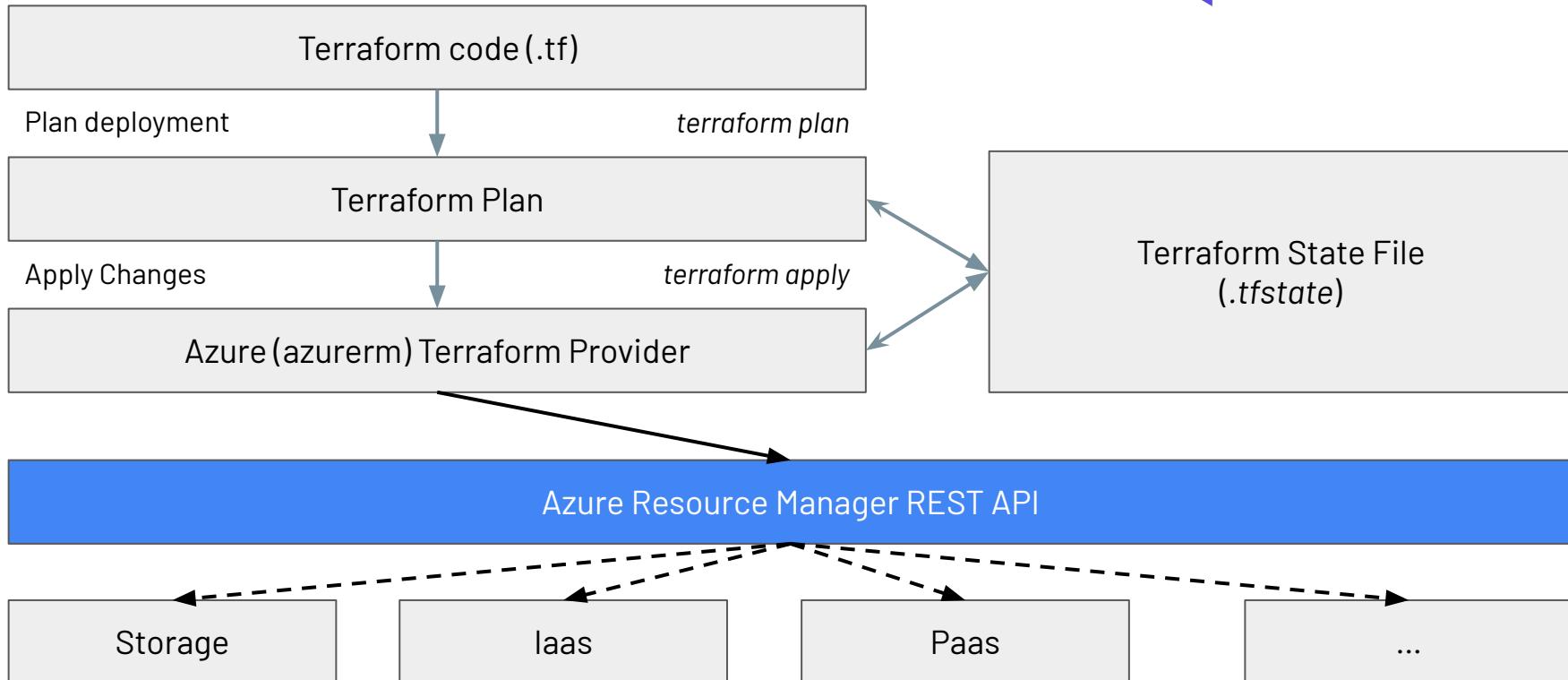
BENEFITS

New deployments have backups quickly configured, regardless of the environment size.

Technical Demo

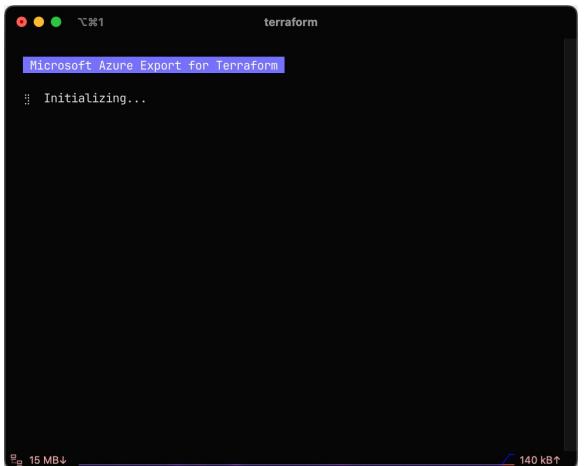


TERRAFORM RECAP



AZTFEXPORT

- <https://github.com/Azure/aztfexport>
- Microsoft recommended
- Active development



Azure / aztfexport Public

Code Issues 33 Pull requests Actions Projects Security Insights

main 19 Branches 28 Tags Go to file Code

magodo Dep: Update aztf to correct the populated resource id of `azurerm...` 215fca6 · last month 464 Commits

.devcontainer Adding a devcontainer (#73) 3 years ago

.github/workflows update gossec (#561) 5 months ago

doc Single resource mode supports resource population and ... 3 years ago

internal Batch mode error out if no resource being listed (#597) last month

pkg Query mode: Supports --arg-table and '--arg-authorization' 5 months ago

scripts/package Avoid using 3rd-party Docker images: Build Linux packag... 2 years ago

.gitignore feature: add support for exporting to azapi provider (#462) 2 years ago

.goreleaser.yml manual versioning for binary app 4 years ago

CODE_OF_CONDUCT.md Adding CoC file (#528) 9 months ago

LICENSE Include in license file a copyright notice from the Hashico... 3 years ago

Makefile Refactor: remove dependency on the v1.1.0-alpha terrafor... 3 years ago

README.md Update readme to mention that both azurerm and azapi a... 2 years ago

SECURITY.md Microsoft mandatory file (#98) 3 years ago

auth_oidc.go Support full set of authentication configuration flags (#54... 7 months ago

azure-pipelines-ci.yml Cred scan v3 (#543) 7 months ago

command_before_func.go Query mode: Supports --arg-table and '--arg-authorization' 5 months ago

command_before_func_test.go aztfexport res supports multiple resources (#552) 6 months ago

cred.go Support full set of authentication configuration flags (#54... 7 months ago

STEPS

- 1 Generate code for the existing resources (aztfexport)**
- 2 Cleanup generated code**
- 3 Import resources into the terraform state**
- 4 Adjust code to match the state file**

STEPS

5

Extract variables

6

Add tagging

7

Convert to a module

8

Create an second instance

Wrap-up



“Today, data shows that 89% of organizations claim they’ve adopted Infrastructure as Code (IaC), according to Firefly’s 2025 “State of Infrastructure as Code” report.”

How many % have achieved full cloud IAC?



We would love to hear your feedback!

Session feedback
available in home feed
of the app after the session



Thank You!

