



WE MAKE **DIGITAL**
DREAMS COME TRUE

Image: Malin Isaksson and Jonas Back

Infrastructure as Code, with a splash of Citrix

BeLux Citrix User Group Community

Adam Clark (adam.clark@xenit.se), 2023-05-23

Adam Clark

Solutions Architect and Managed Services Portfolio Manager, **Xenit AB**

Citrix Technology Professional, CTP

Citrix Partner Advocate, CPA

molnet.io



@_adamclark



adam.clark@xenit.se



+46 (0)10 - 707 35 13



Advanced Specialisation: Server Migration
Advanced Specialisation: Azure Virtual Desktop
Advanced Specialisation: Kubernetes



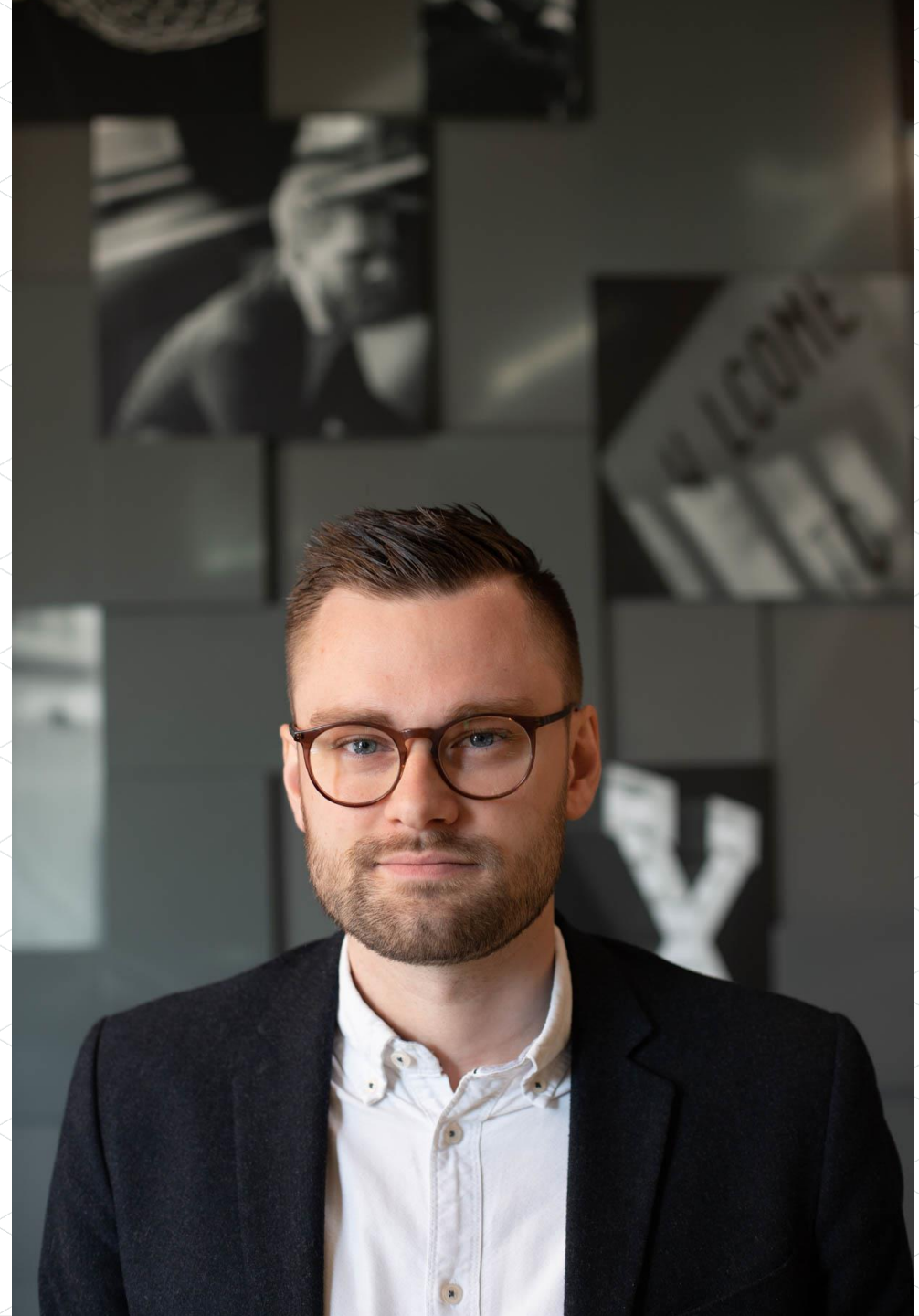
Partner
Platinum
Solution Advisor
Specialist

Citrix Virtualization Specialist Practicum

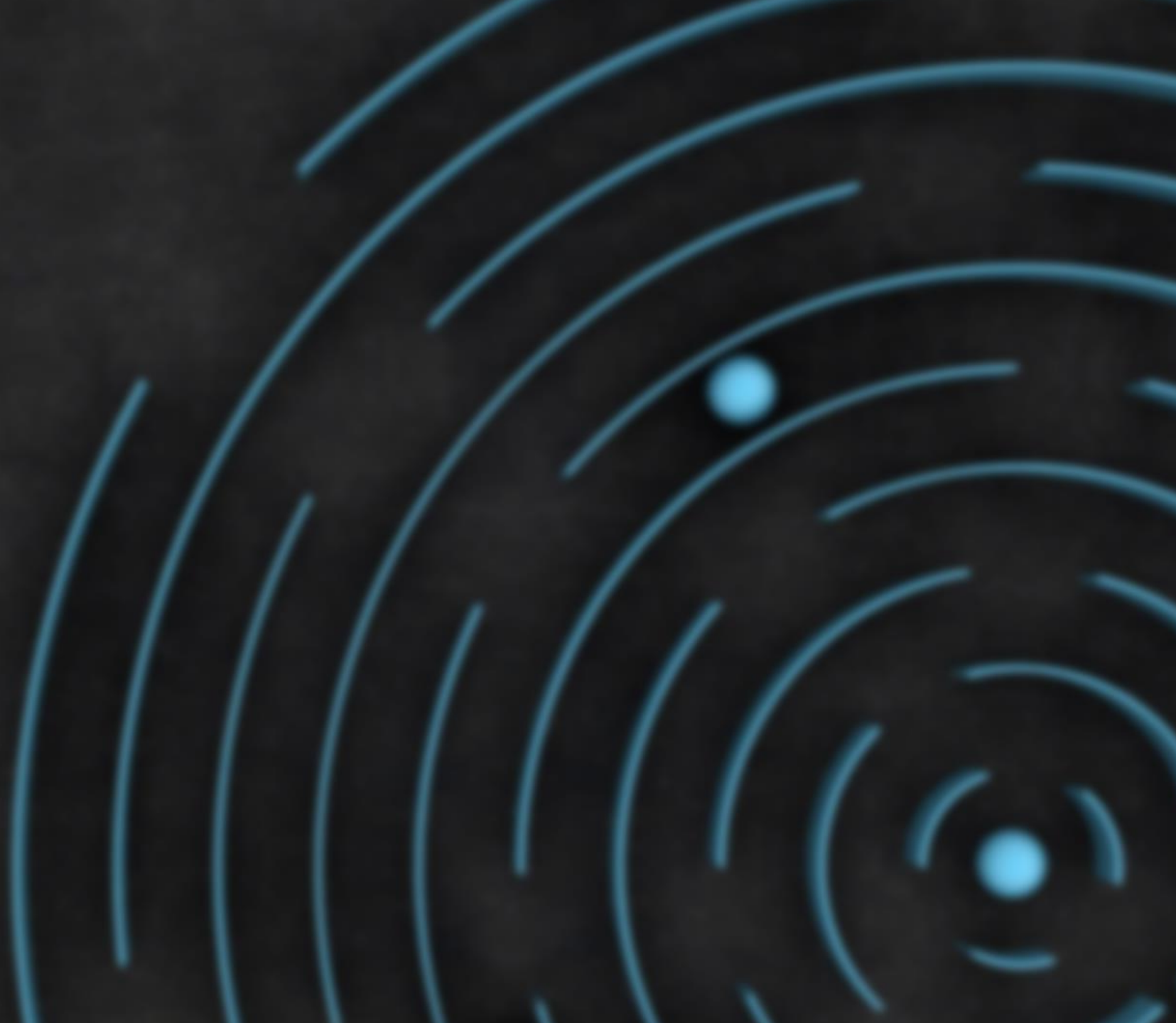


Citrix
Technology
Professional

CTP



The Challenge



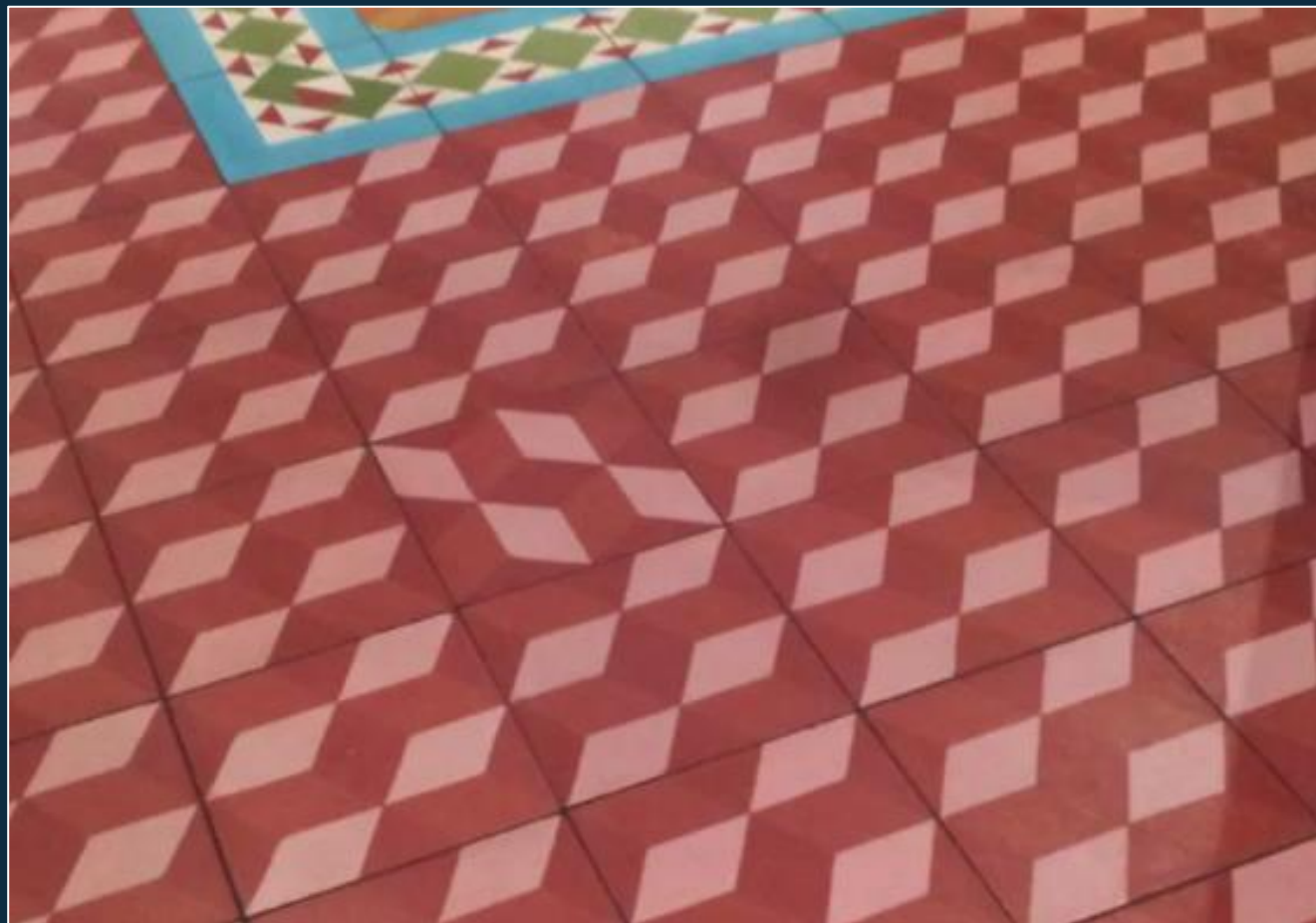




Snowflakes

- ✓ Unique
- ✓ Fragile
- ✓ Impossible to reproduce

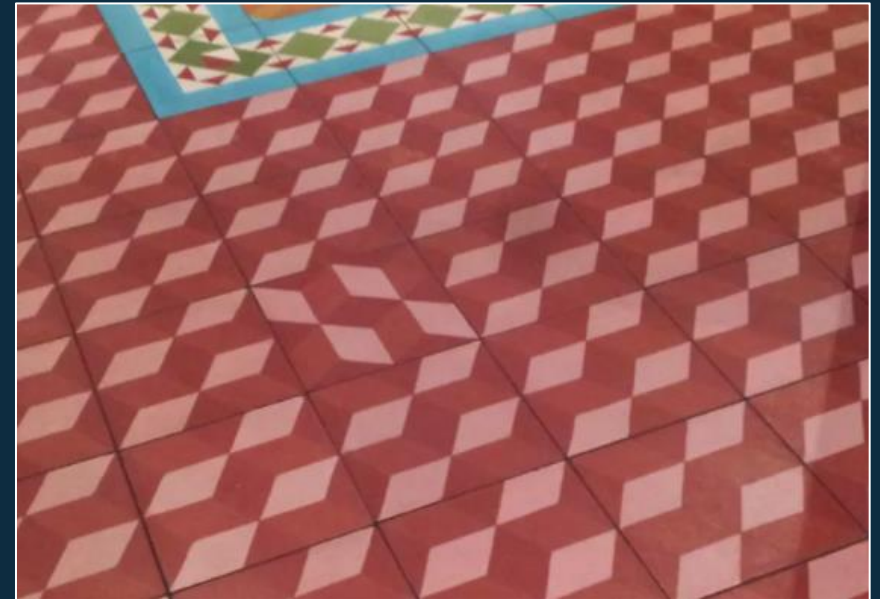






Human Errors

- ✓ We get tired
- ✓ We forget things
- ✓ Mistakes happen







Configuration Drift

- ✓ Minor drift can become a headache
- ✓ Major drift can require a new implementation
- ✓ Imperative implementation is not safe over time





Fast. Simple. Flexible. Secure.



“Through 2025, 99% of cloud security failures will be the customer’s fault.”

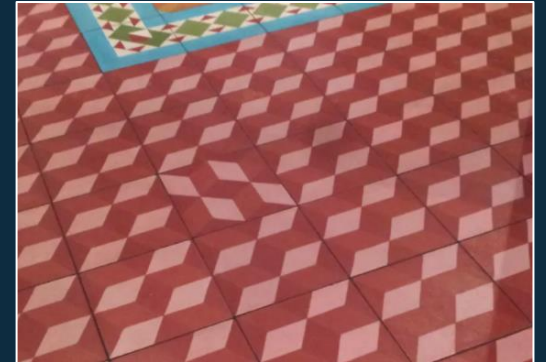
- Gartner



Challenges.

There are indeed some challenges and risks that we wish we could mitigate in some way. Especially when working with complex IT solutions, for example CC CVAD + Azure + AWS.

What can we do?



What do we need?





In other words...

we need Infrastructure as Code!

which is the...

“Management of digital infrastructure, i.e., network, virtual machines, load balancers etc., in a descriptive format that together with version management take back the control of digital infrastructure assets.”



Pulumi



ANSIBLE



CHEF



HashiCorp
Packer



Microsoft Azure
Resource Manager

Azure Resource Manager (ARM) Templates

Domain Specific Language (DSL)



Native Azure IaC solution

Builds on JSON Templates

Idempotent

Dependencies to the different templates

Linking needed in bigger implementations



HashiCorp

Terraform

Some assistance in writing templates (VM extensions and VSCode)

Difficult (see **Confusing**) to manage at a larger scale

Single Hyperscaler



HashiCorp

Packer

Most common way of configuring templates is to "reverse engineer"



Microsoft Azure
Resource Manager



HashiCorp

Terraform



HashiCorp

Packer

```
"resources": [  
  {  
    "apiVersion": "2017-05-10",  
    "name": "linkedTemplate",  
    "type": "Microsoft.Resources/deployments",  
    "properties": {  
      "mode": "incremental",  
      "templateLink": {  
        "uri": "https://.../myTemplate.json",  
        "contentVersion": "1.0.0.0"  
      },  
      "parametersLink": {  
        "uri": "https://.../myParameters.json",  
        "contentVersion": "1.0.0.0"  
      }  
    }  
  }  
]
```




Microsoft Bicep

Domain Specific Language (DSL)

Abstraction of native ARM templates

Much simpler syntax

Easier to read and author for a human

Transpile the syntax to JSON ARM templates


Better authoring experience compared to native JSON ARM

New features coming up (AAD, parameters, 0.8)



```
param location string = resourceGroup().location
param storageAccountName string = 'toylaunch${uniqueString(resourceGroup().id)}'

resource storageAccount 'Microsoft.Storage/storageAccounts@2021-06-01' = {
  name: storageAccountName
  location: location
  sku: {
    name: 'Standard_LRS'
  }
  kind: 'StorageV2'
  properties: {
    accessTier: 'Hot'
  }
}
```

app >  main.bicep

1
2
3
4
5



HashiCorp Terraform

Hashicorp Configuration Language (HCL) (i.e., not DSL)

Still idempotent

Manages Transistent Errors automatically

Manage dependencies to different hyperscalers

State files

Fantastic eco system

Built on Golang (CURD REST)

A lot of providers (GCP, AWS, Az, but also on-prem servers etc)



```
# Describe providers and required version
terraform {
  required_providers {
    azurerm = {
      source  = "hashicorp/azurerm"
      version = "=2.46.0"
    }
  }
}

# Configure each provider
provider "azurerm" {
  features {}
}

# Create an Azure Resource Group
resource "azurerm_resource_group" "example" {
  name       = "belux-cugc-a-very-cool-resource-group-name"
  location   = "Sweden Central"

  tags = {
    environment = "SuperPROD"
    project     = "SuperSecretProject"
    owner       = "Adam Clark"
    demo        = "demo1"
  }
}
```



HashiCorp Packer

Hashicorp Configuration Language (HCL) (i.e., not DSL)

In many ways an extension to previous DSL/HCL
"Image as Code"

Creates a runner and follows a runbook, i.e., the code
External and internal features
Possibility to create nightly golden images for CVAD

Natural expansion of your IaC career



```
"builders": [  
  {  
    "type": "azure-arm",  
    "client_id": "{{user `azure-client-id`}}",  
    "client_secret": "{{user `azure-client-secret`}}",  
    "tenant_id": "{{user `azure-tenant-id`}}",  
    "subscription_id": "{{user `azure-subscription-id`}}",  
    "managed_image_resource_group_name": "{{user `azure-resource-group`}}",  
    "managed_image_name": "WindowsServer2019-Packer",  
    "os_type": "Windows",  
    "image_publisher": "MicrosoftWindowsServer",  
    "image_offer": "WindowsServer",  
    "image_sku": "2019-Datacenter",  
    "communicator": "winrm",  
    "winrm_use_ssl": true,  
    "winrm_insecure": true,  
    "winrm_timeout": "5m",  
    "winrm_username": "packer",  
    "location": "{{user `azure-region`}}",  
    "vm_size": "{{user `vm-size`}}"  
  }  
]
```



```
"provisioners": [  
  {  
    "type": "shell-local",  
    "inline": [  
      "echo ##### STARTING #####"  
    ]  
  },  
  {  
    "type": "shell-local",  
    "inline": [  
      "echo ##### INSTALLING GOOGLE CHROME #####"  
    ]  
  },  
  {  
    "type": "powershell",  
    "script": "scripts/apps/Install-GoogleChrome.ps1"  
  },  
  {  
    "type": "shell-local",  
    "inline": [  
      "echo ##### DISABLE IE ESC #####"  
    ]  
  },  
  {  
    "type": "powershell",  
    "script": "./scripts/osconfiguration/Disable-IEESC.ps1"  
  }  
]
```



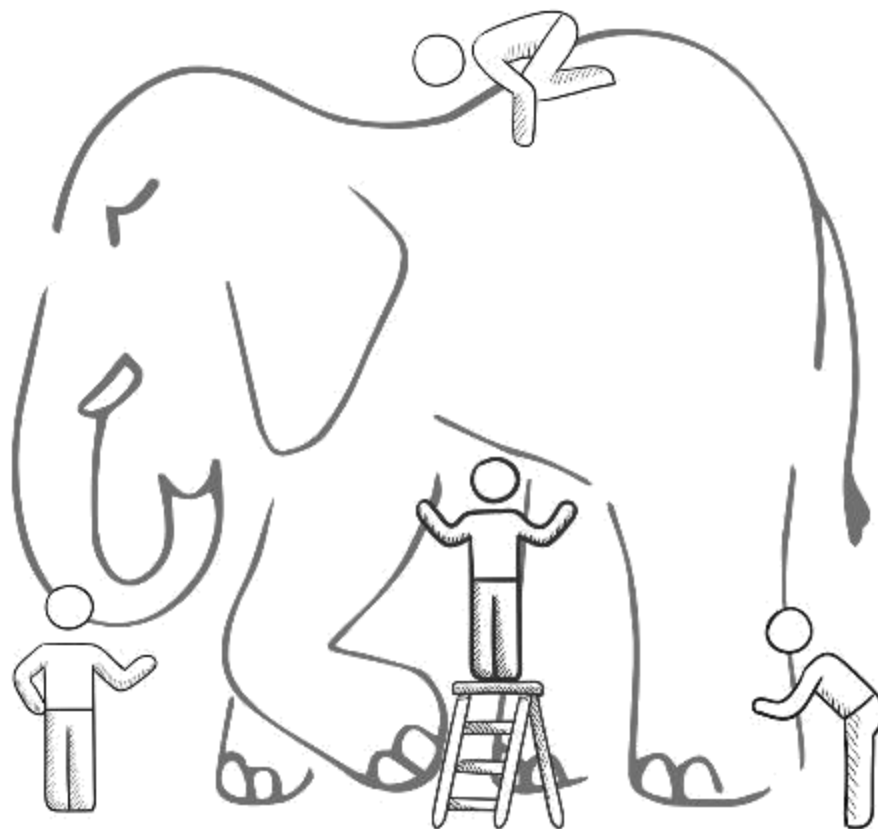
Why codify?

- Better change management
- Define security
- No more snowflakes
- No more configuration drift
- Minimize the human factor
- Deploy same infrastructure several times



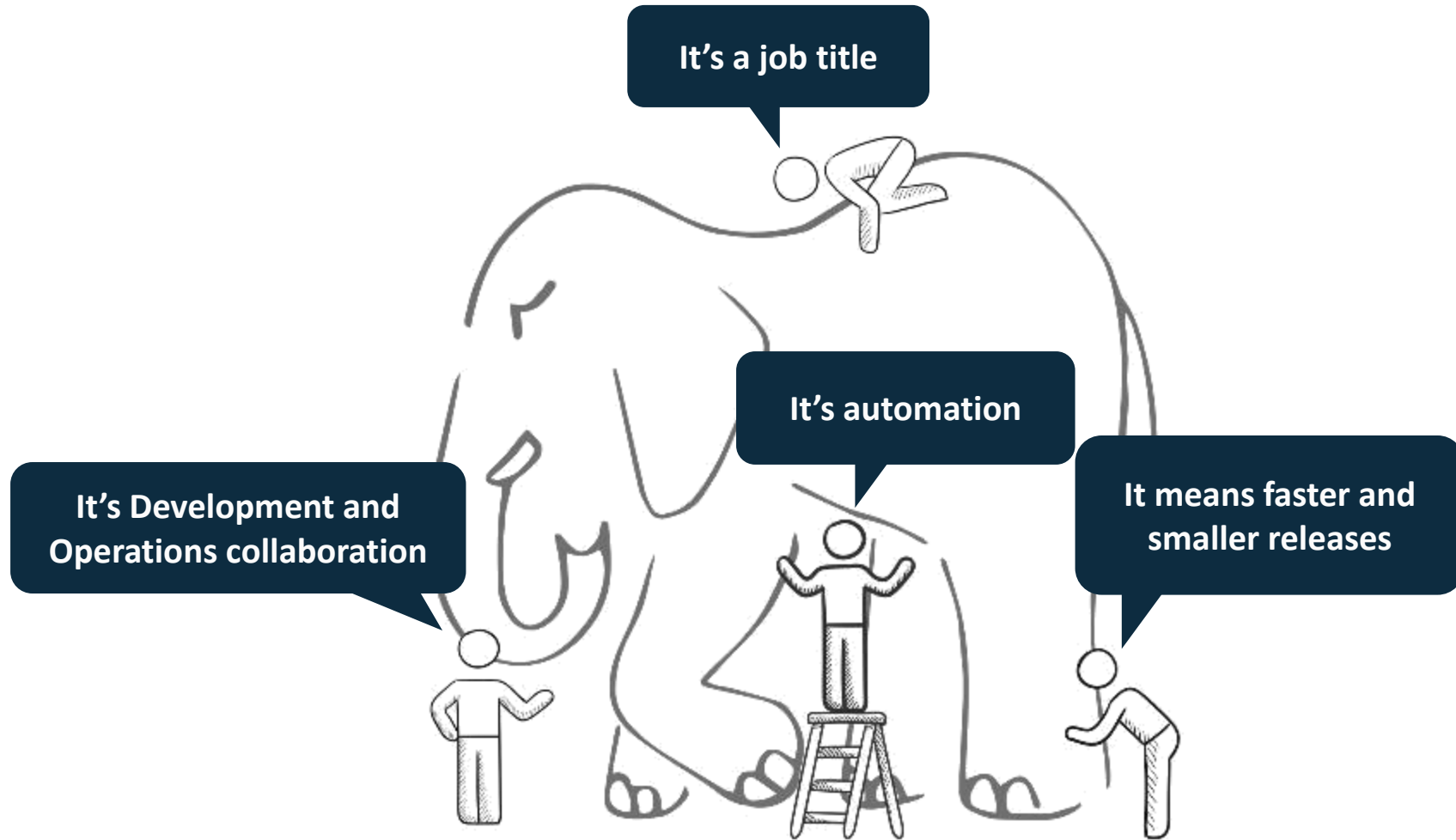


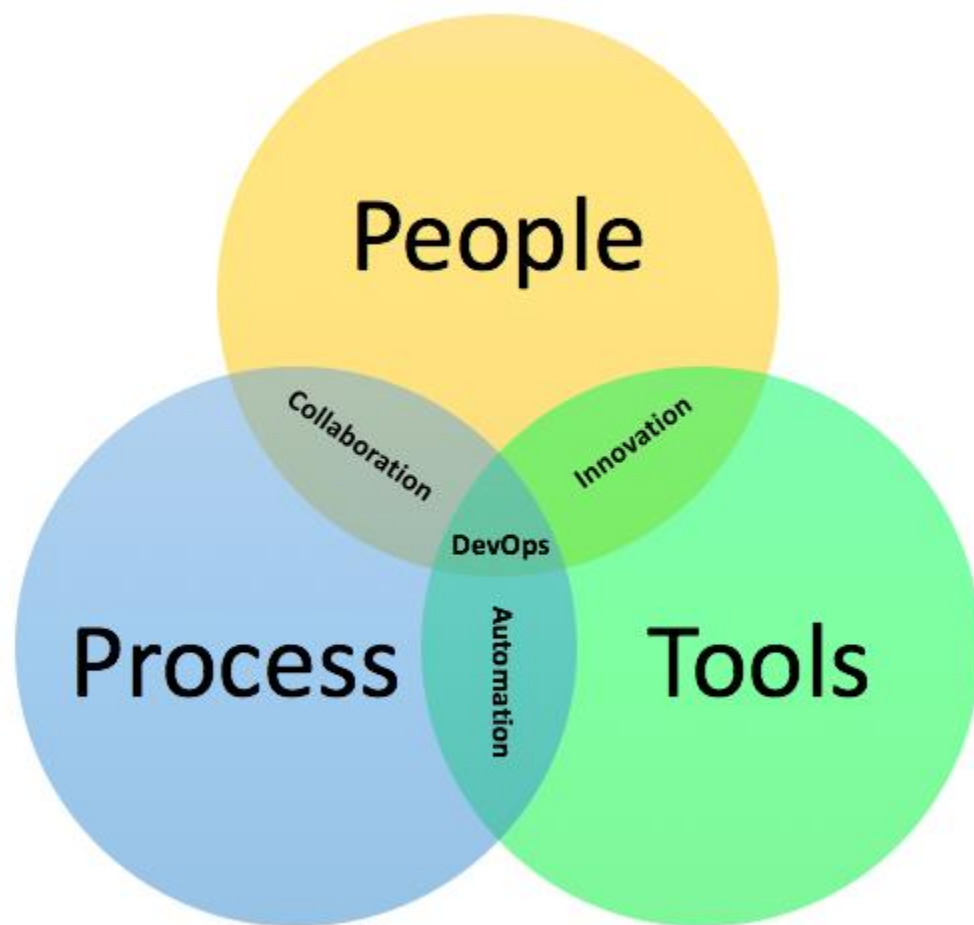
The Elephant in the Room



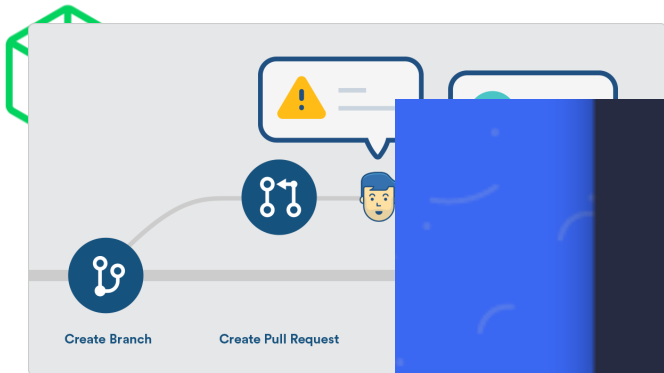


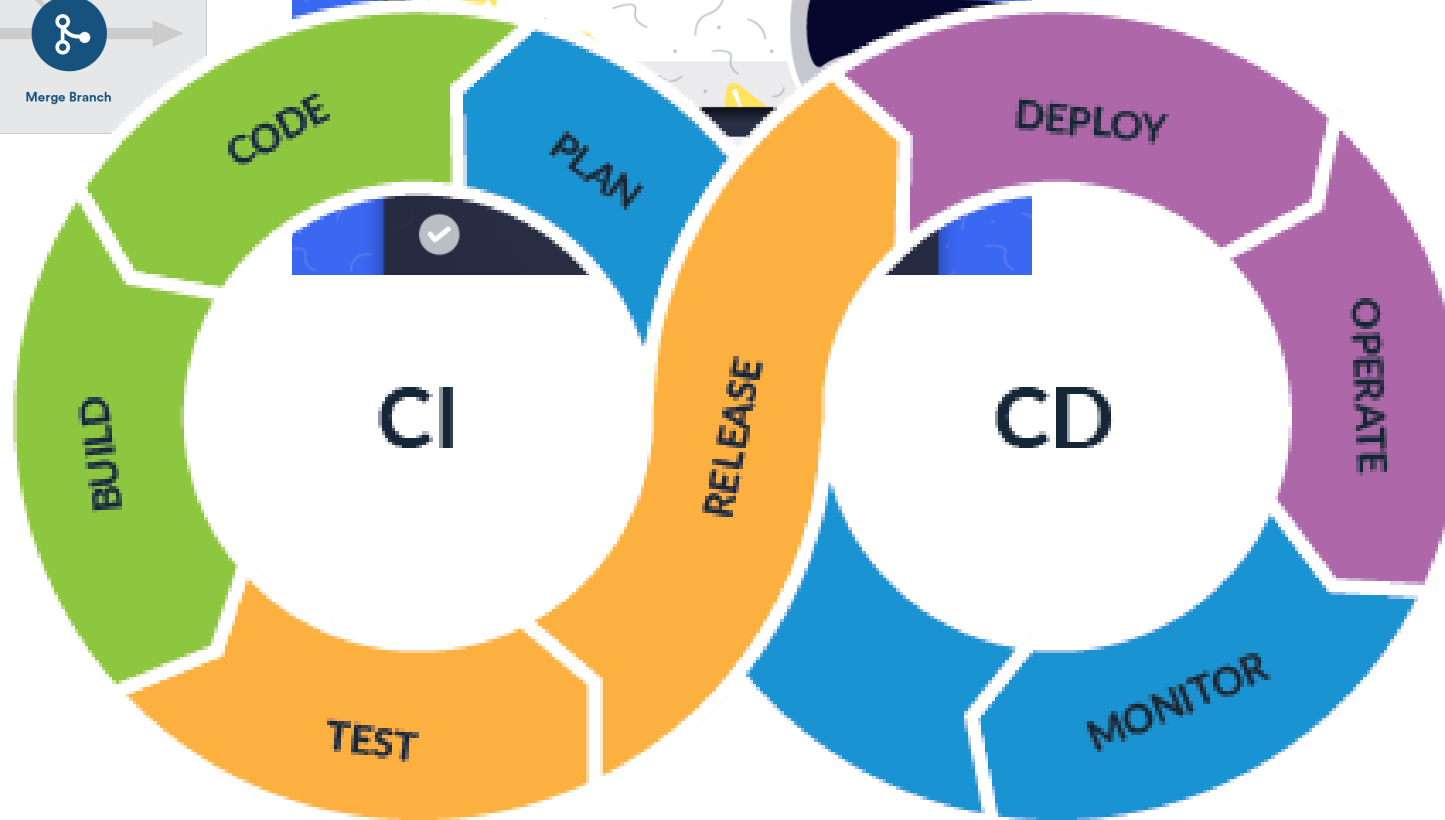
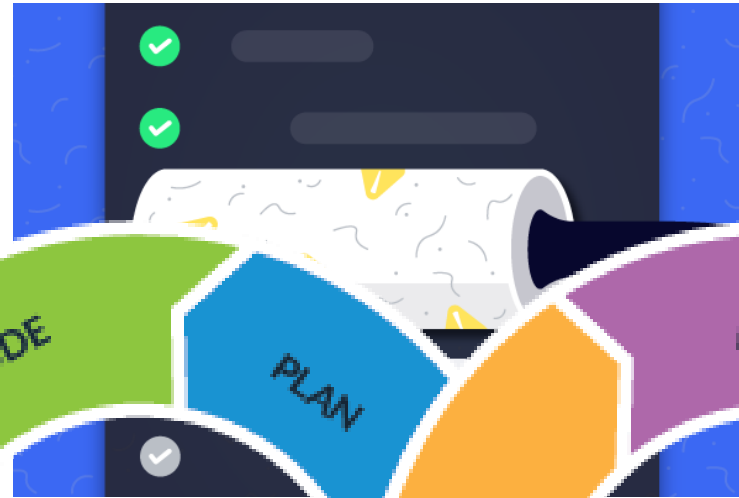
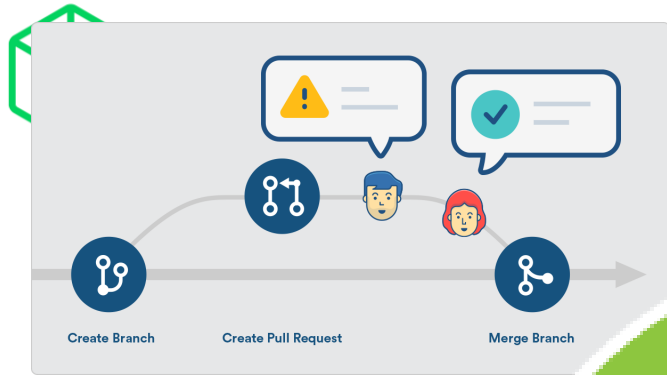
What is DevOps...?

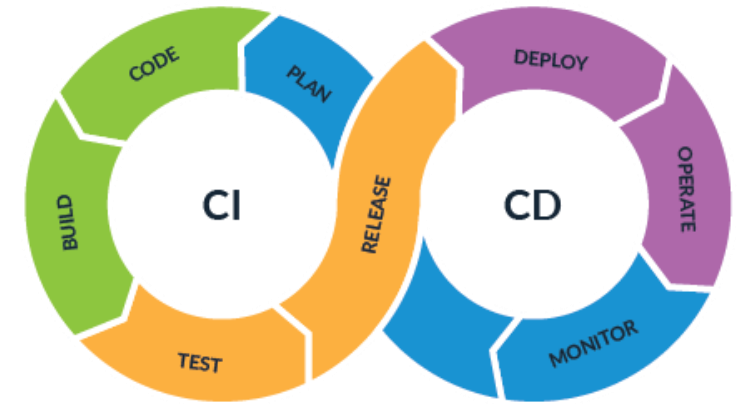
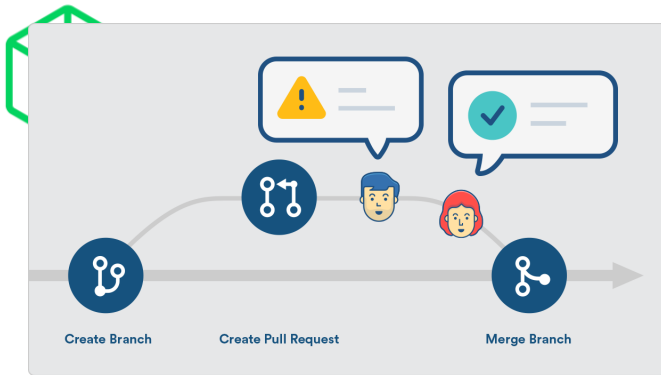




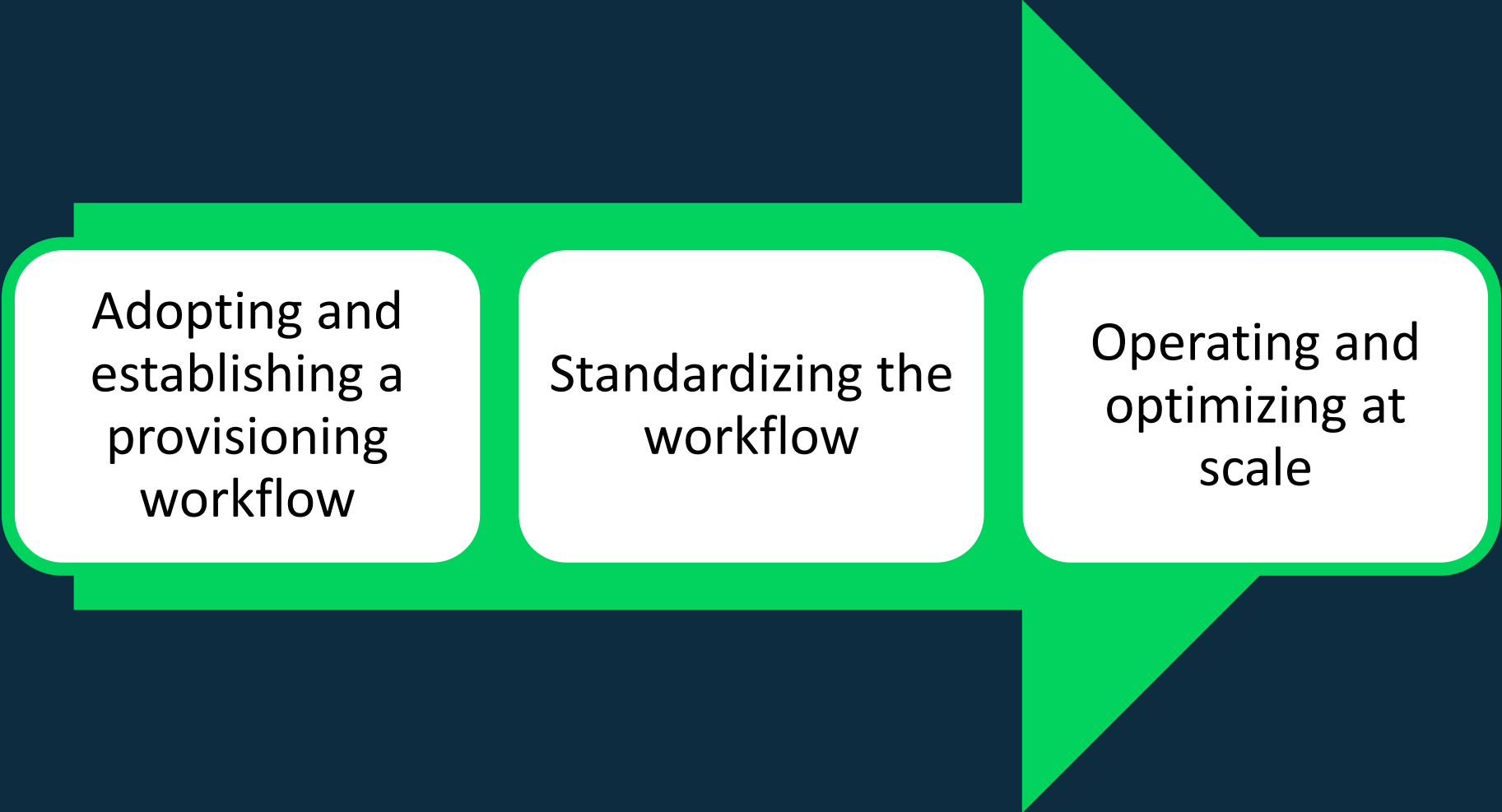








“DevOps is the union of people, process, and tools/or products to enable continuous delivery of value to our end users.”



Adopting and
establishing a
provisioning
workflow

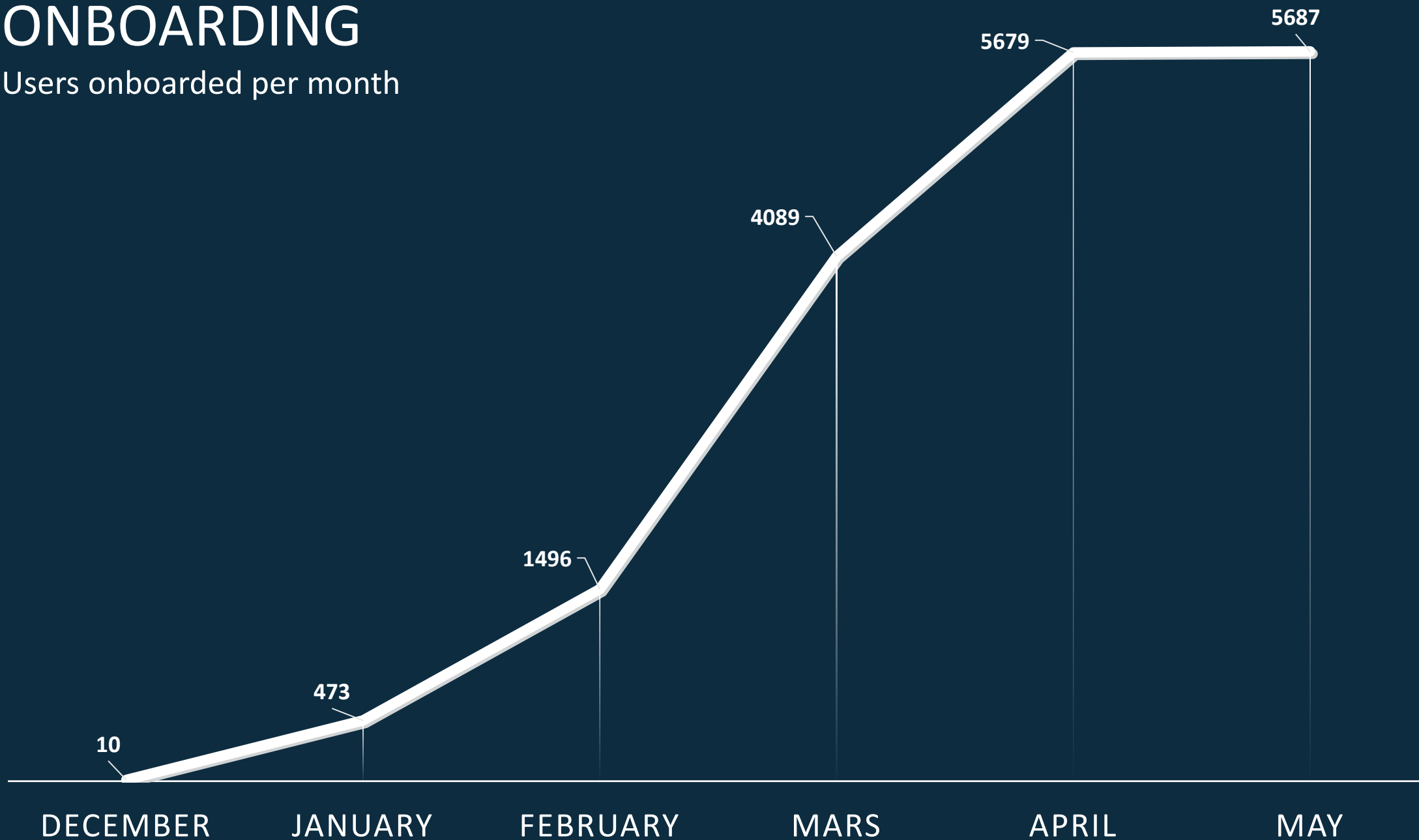
Standardizing the
workflow

Operating and
optimizing at
scale



ONBOARDING

Users onboarded per month





DEMO!





?



XENIT

Xenit AB | Adress: Kungstorget 7, 411 17 Göteborg | Telefon: +46 (0) 10 707 35 00

Orgnr: 556762-2120 | E-post: info@xenit.se | Web: www.xenit.se