Building a container platform on Azure at ING

IT DevOps Platforms

Sudesh Jethoe, Chapterlead & Platform Engineer

Amsterdam • 22nd October 2019

@sudeshjethoe

https://www.linkedin.com/in/sudeshjethoe/

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Overview

- Introduction
- Design
- Architecture
- CI/CD
- Observability
- Lessons Learned / Future Work

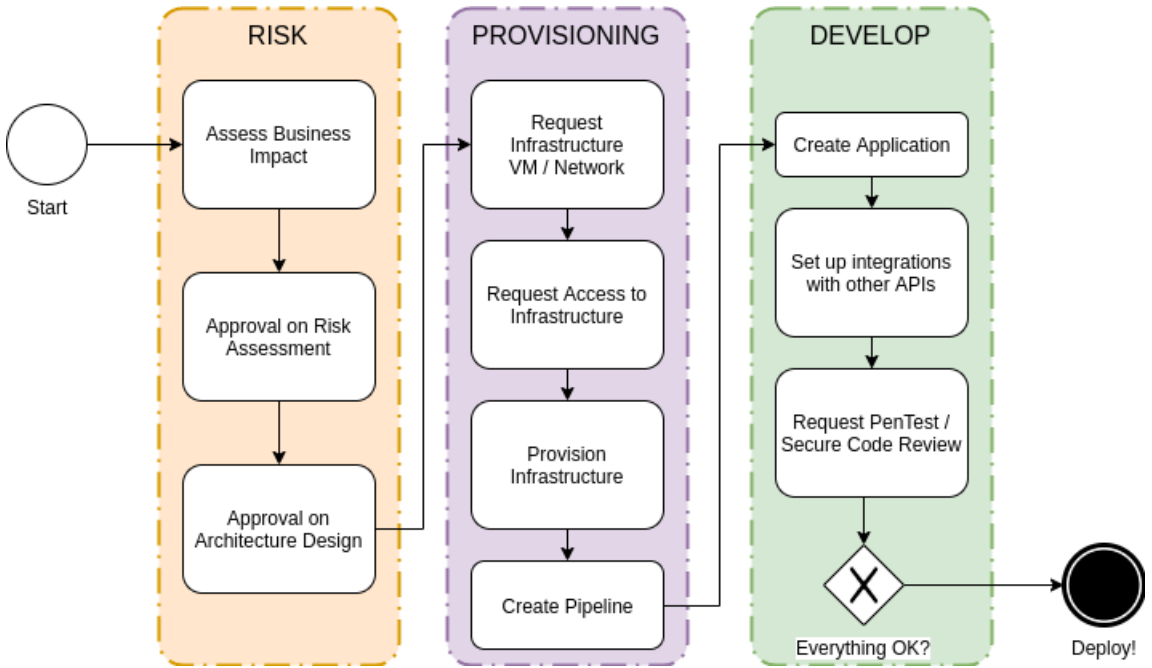
Introduction

Introduction

- How long does it take you to get a new application to production?
  - Hours?
  - Days?
  - Months?
  - Years?

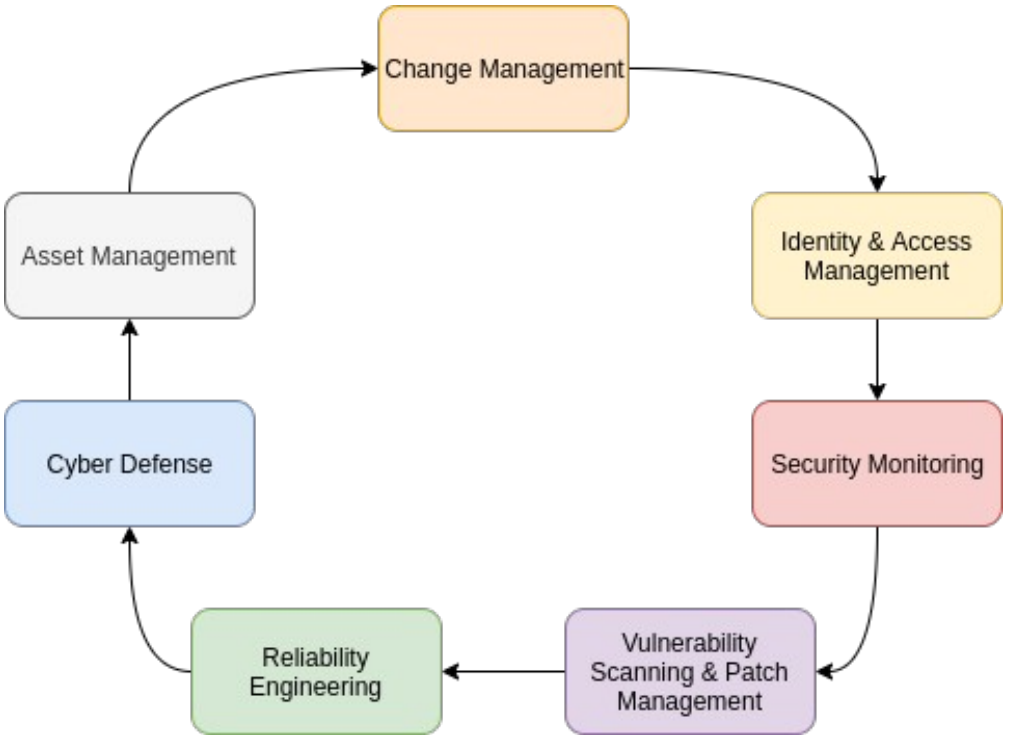
Introduction

- Going to production at ING



Introduction

- Day2 operations



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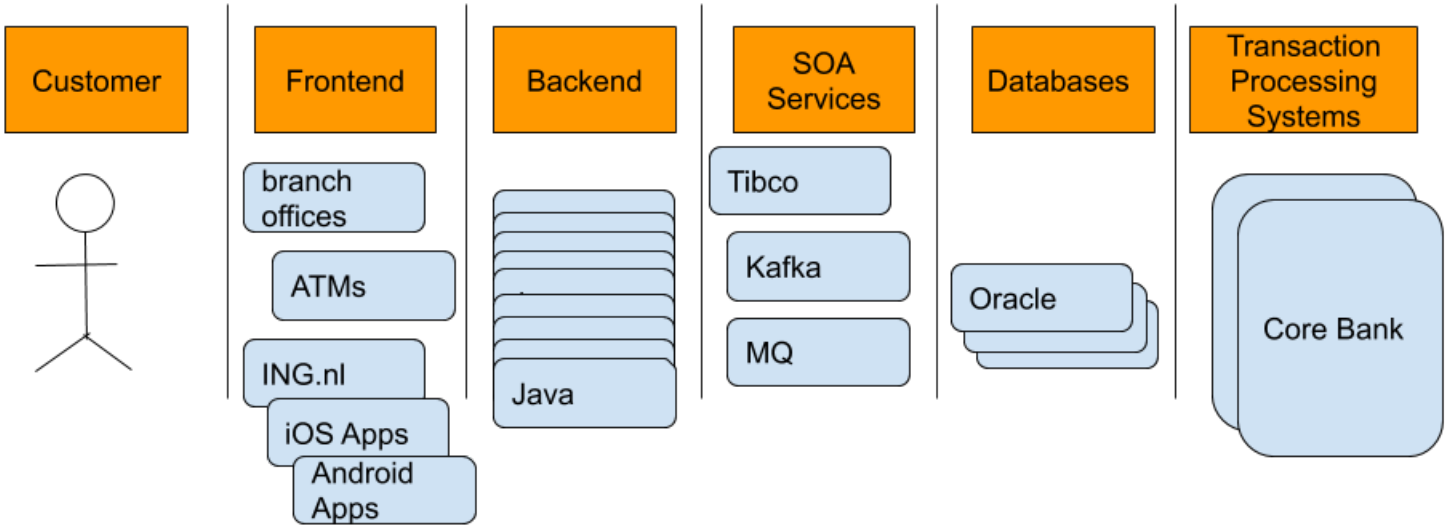
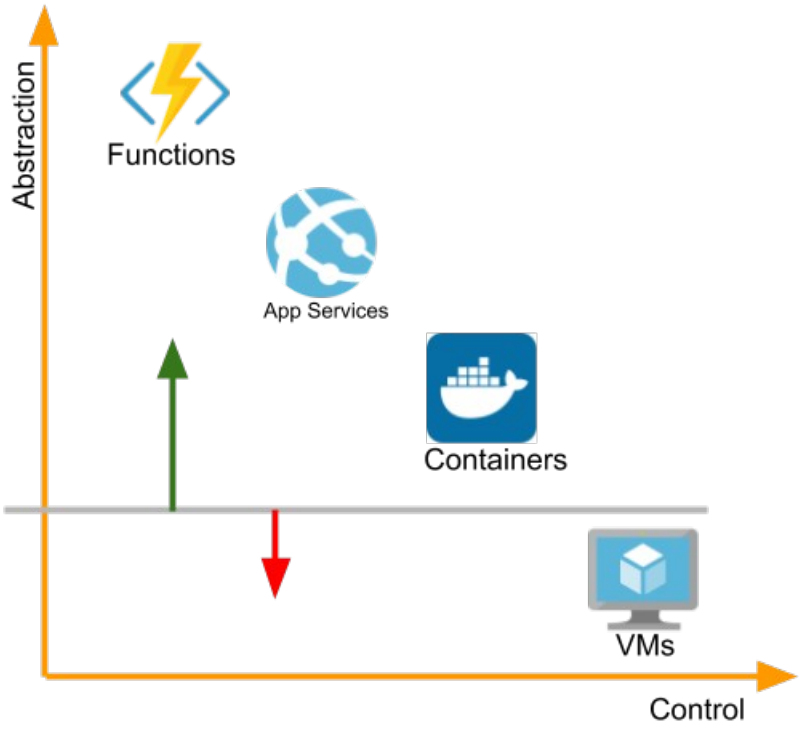
Where to start?

ING Landscape

+300 DevOps teams working on 1000’s of services ...



Deciding on an initial target platform



Finding the right balance between abstraction and control

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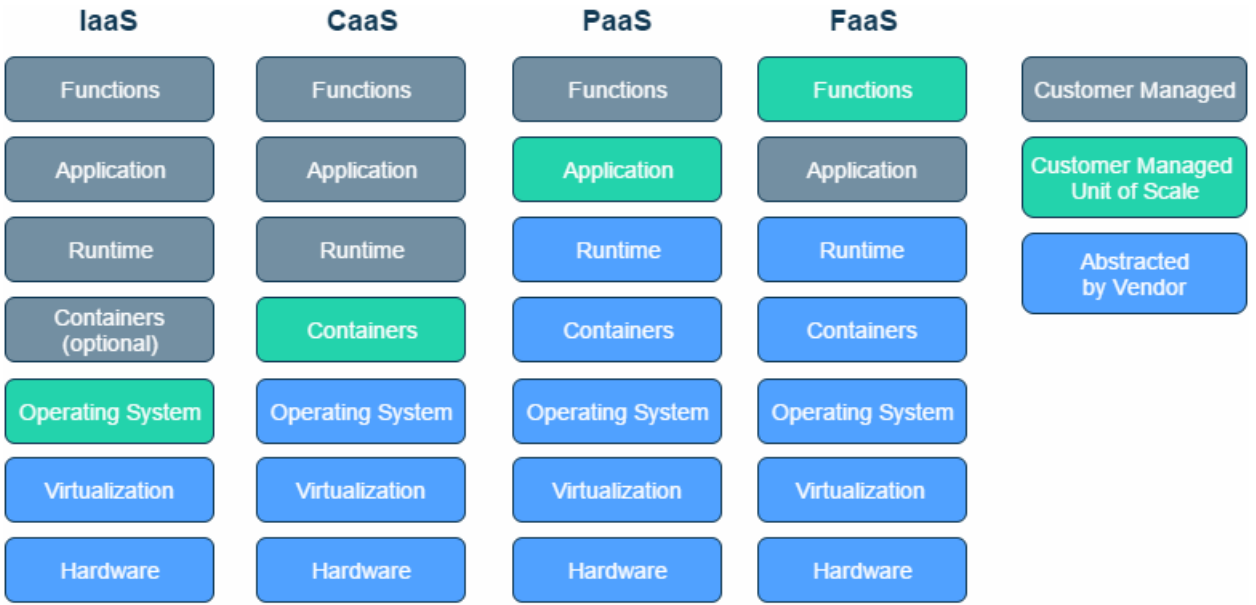
Tradeoffs



https://serverless.zone/abstracting-the-back-end-with-faas-e5e80e837362

- Migration path
- Easy of use
- Compliance
- Security
- Observability

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Architecture

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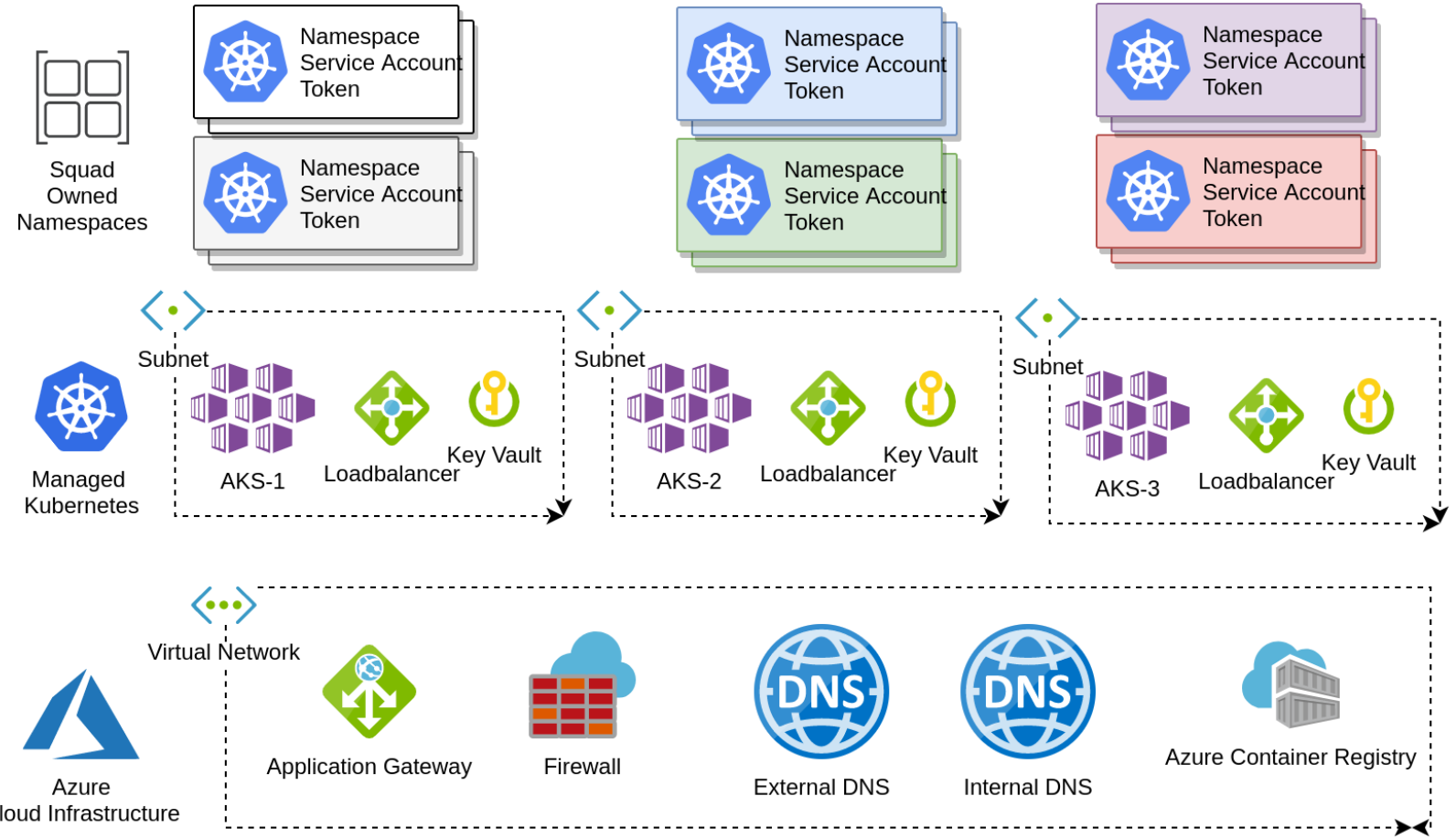
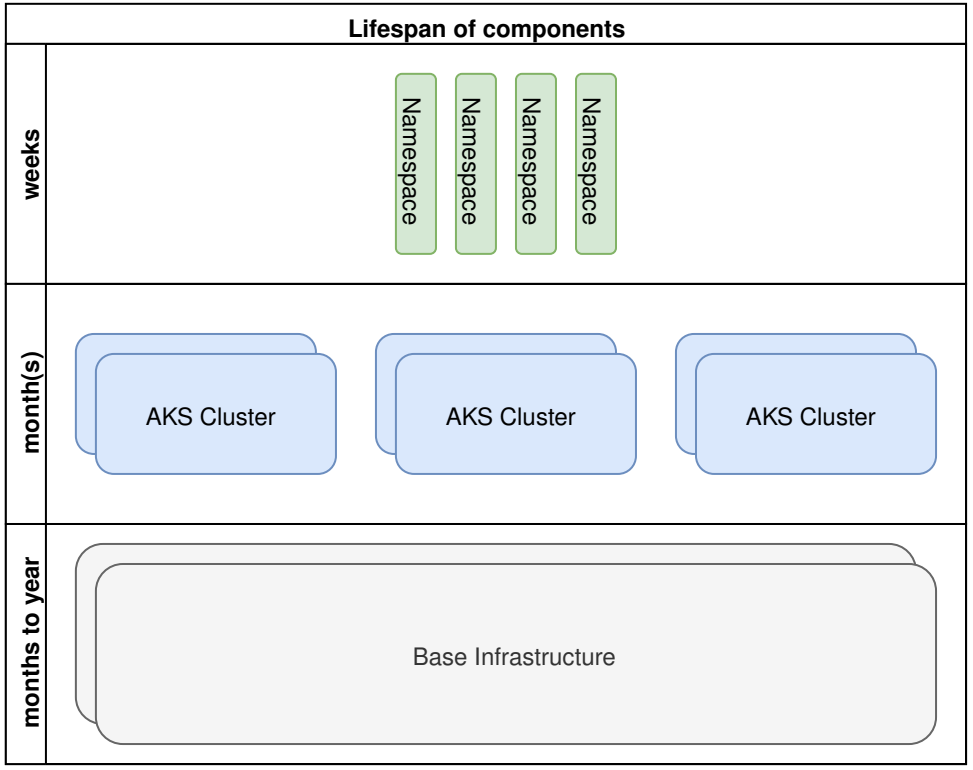
Architecture



Composable Architecture

- Lifecycle management of systems
- Separation of failure domains
- Separation of concerns
- Separation of business processes



How to achieve composability?

- Infrastructure as Code
- ARM vs Terraform

```
{
      "name": "[variables('networkInterfaceName')]",
      "type": "Microsoft.Network/networkInterfaces",
      "apiVersion": "2016-09-01",
      "location": "[parameters('location')]",
      "dependsOn": [
        "[concat('Microsoft.Network/virtualNetworks/', variables('virtualNetworkName'))]",
        "[concat('Microsoft.Network/publicIpAddresses/', variables('publicIpAddressName'))]",
        "[concat('Microsoft.Network/networkSecurityGroups/', variables('networkSecurityGroupName'))]"
      ],
     "properties": {
        "ipConfigurations": [
          {
            "name": "ipconfig1",
            "properties": {
              "subnet": {
                "id": "[variables('subnetRef')]"
              },
              "privateIPAllocationMethod": "Dynamic",
              "publicIpAddress": {
                "id": "[resourceId(resourceGroup().name,'Microsoft.Network/publicIpAddresses', variables('pu
              }
            }
          }
        ],
        "networkSecurityGroup": {
          "id": "[resourceId(resourceGroup().name, 'Microsoft.Network/networkSecurityGroups', variables('net
        }
}
```

ARM

```
resource "azurerm_network_interface" "basicvm" {
  name                = "${local.networkInterfaceName}"
  location            = "${var.resource_group_location}"
  resource_group_name = "${azurerm_resource_group.basicvm.name}"

  ip_configuration {
    name                          = "ipconfig"
    subnet_id                     = "${azurerm_subnet.basicvm.id}"
    private_ip_address_allocation = "dynamic"
    public_ip_address_id          = "${azurerm_public_ip.basicvm.id}"
  }
}
```

Terraform

https://blogs.msdn.microsoft.com/cloud_solution_architect/2018/06/27/terraform-for-the-arm-template-developer/

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CI/CD || Pipeline

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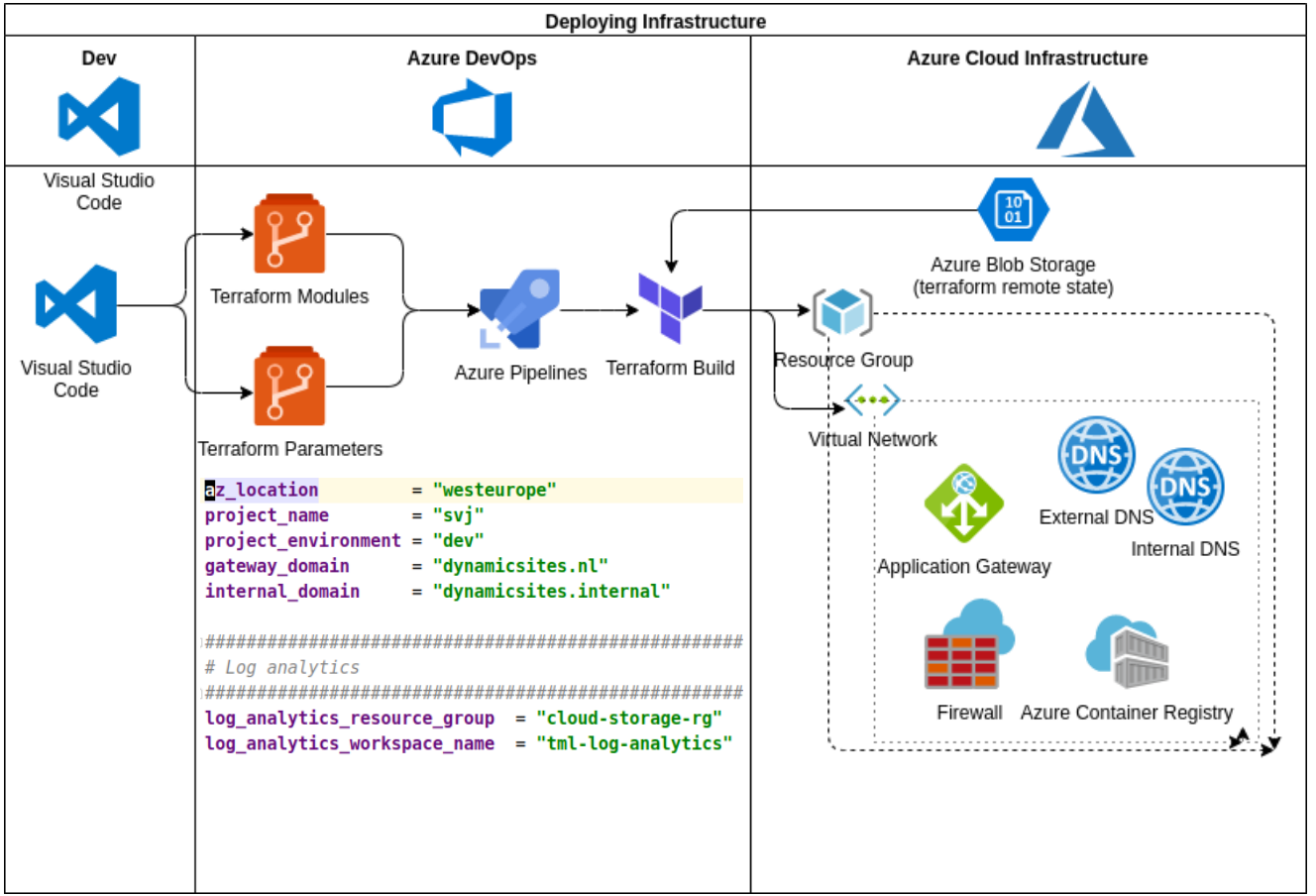
Pipeline for infrastructure

Minimum set of parameters

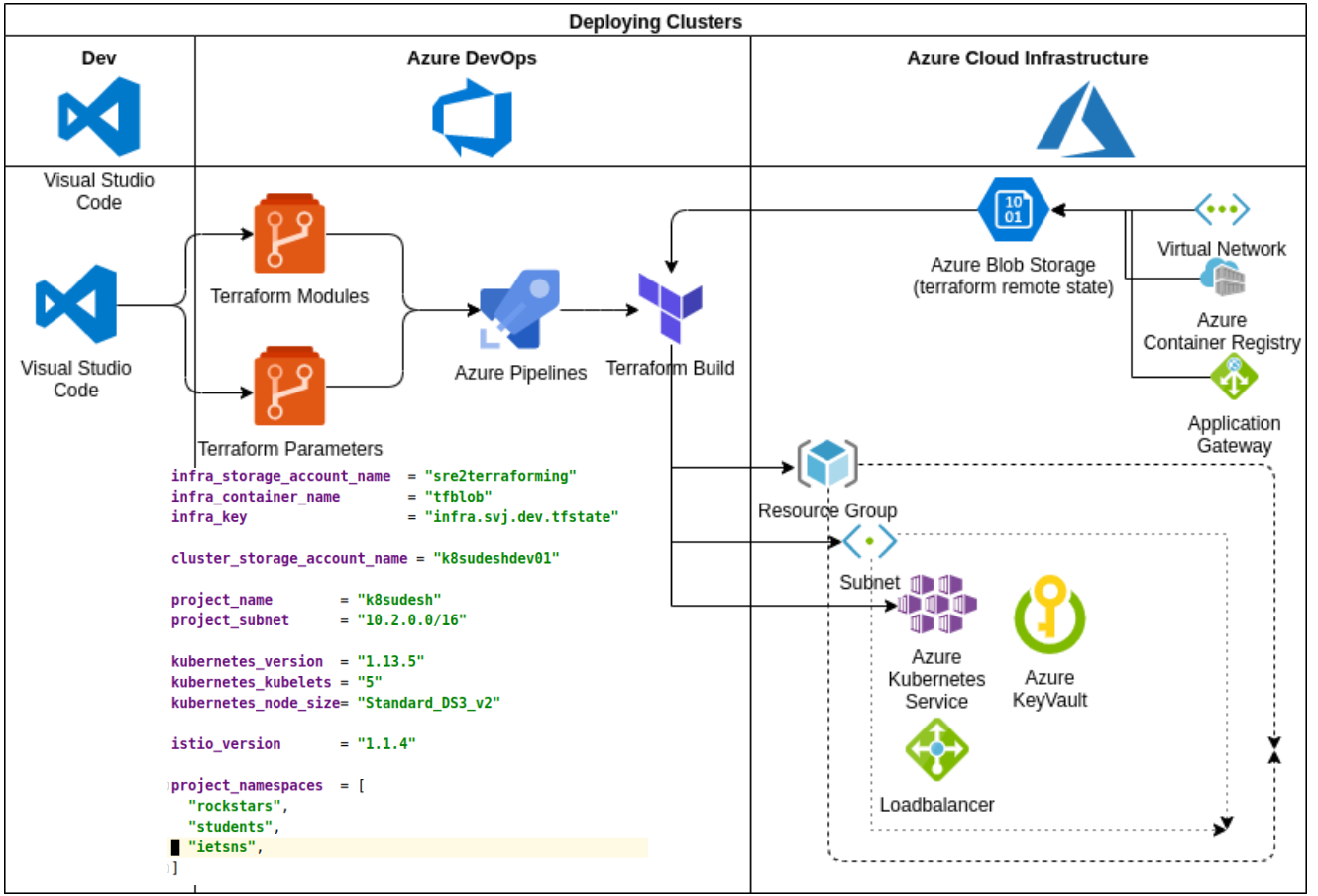
- Region
- Domain
- Project name
- Project environment
- Network size



Pipeline for clusters

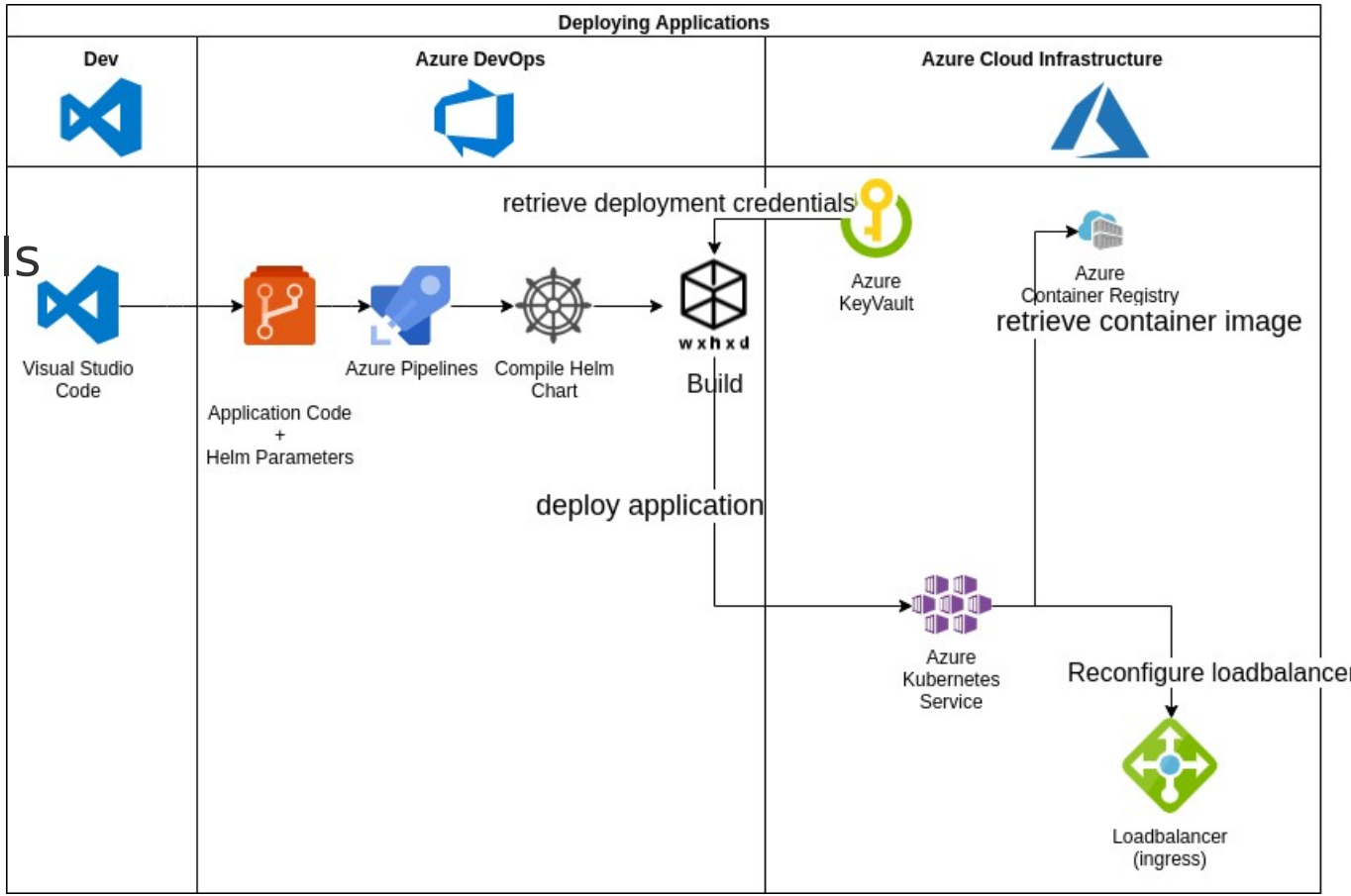
Minimum set of parameters

- Terraform state
- Project name
- Project environment
- Networking info
- Kubernetes version
- Istio version
- # Nodes
- Namespaces



Pipeline for application developers

- Build application
- Compile chart
- Retrieve credentails
- Deploy!



Minimum set of parameters

```yaml
--- deployment, service
image:
  repository: acrinfrasvjdev.azurecr.io/tml-istio
  repositoryProject: hellosudesh
  tag: latest

replicaCount: 2
resources:
  requests:
    memory: 256Mi
  limits:
    memory: 512Mi

service:
  name: helloing
  version: v0.1
  namespace: rockstars
  externalport: 80
  containerPort: 8080
  prometheusPort: 9090
```

```yaml
--- virtualservice
virtualService:
  ingressName: ing-gateway.istio-system
  hostName: k8sudesh.dynamicsites.nl
  endpoints:
    - uri: hellosudesh
      destinationService: hellosudesh-service
      destinationNamespace: rockstars
      destinationPort: 8080
```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Observability

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Lessons Learned

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Future work

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Persoonlijk maken..

Beginnen met vraag

Voorbeeldvraag

Server aanvragen duurt lang // Grote vis (Jaws)

Introduction

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  - Hours?
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  - Years?

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* Automation Engineer (IBM)

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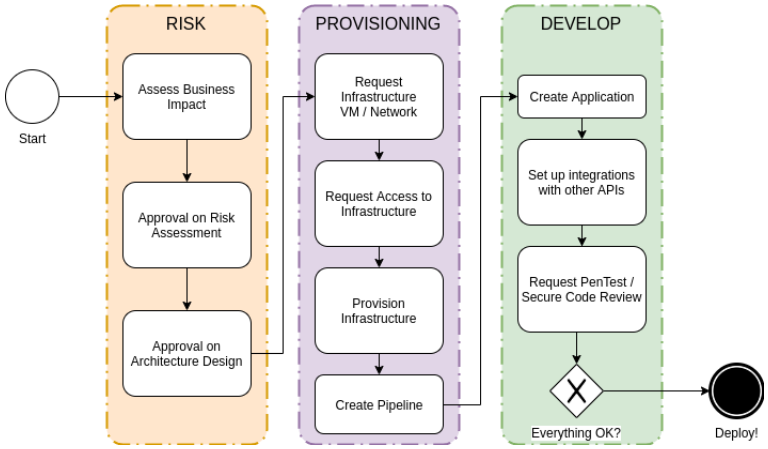
- Going to production at ING



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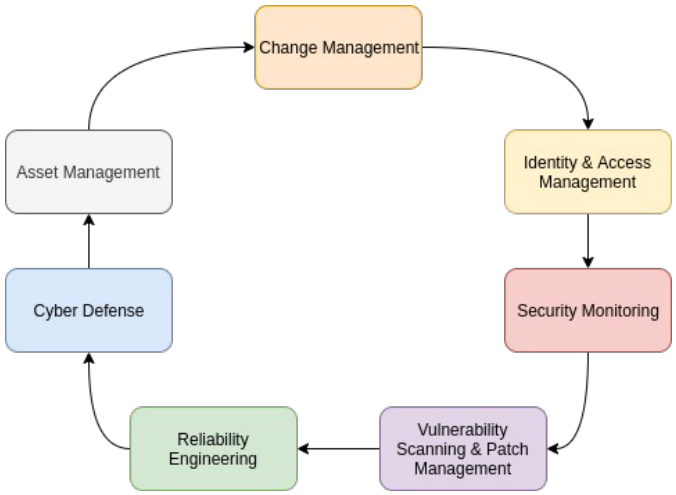

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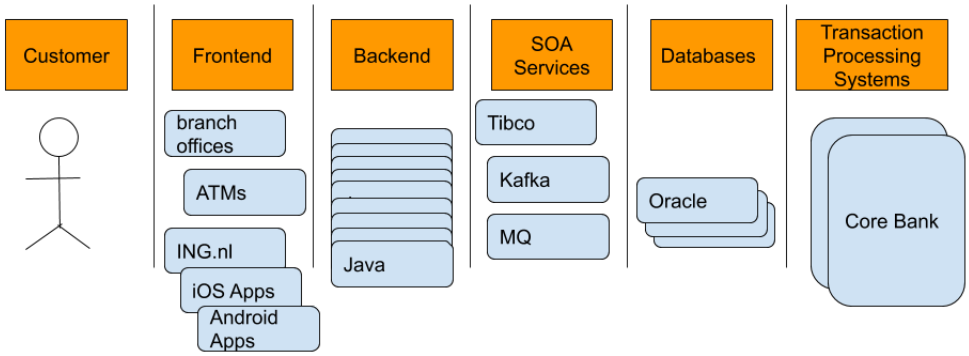

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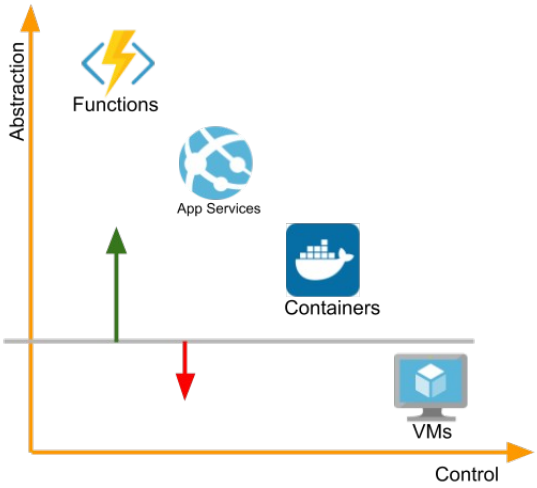
Add mobile at frontend

Transaction Processing is not mainframe (anymore) → core banking systems / systems of record

Deciding on an initial target platform



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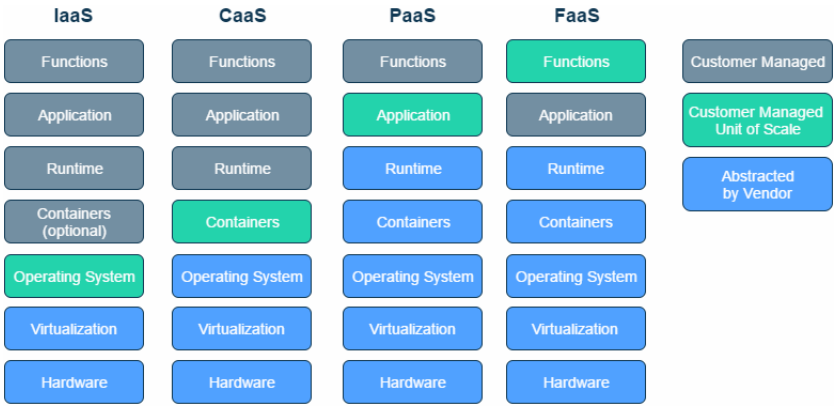

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- Migration path
- Easy of use
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Architecture

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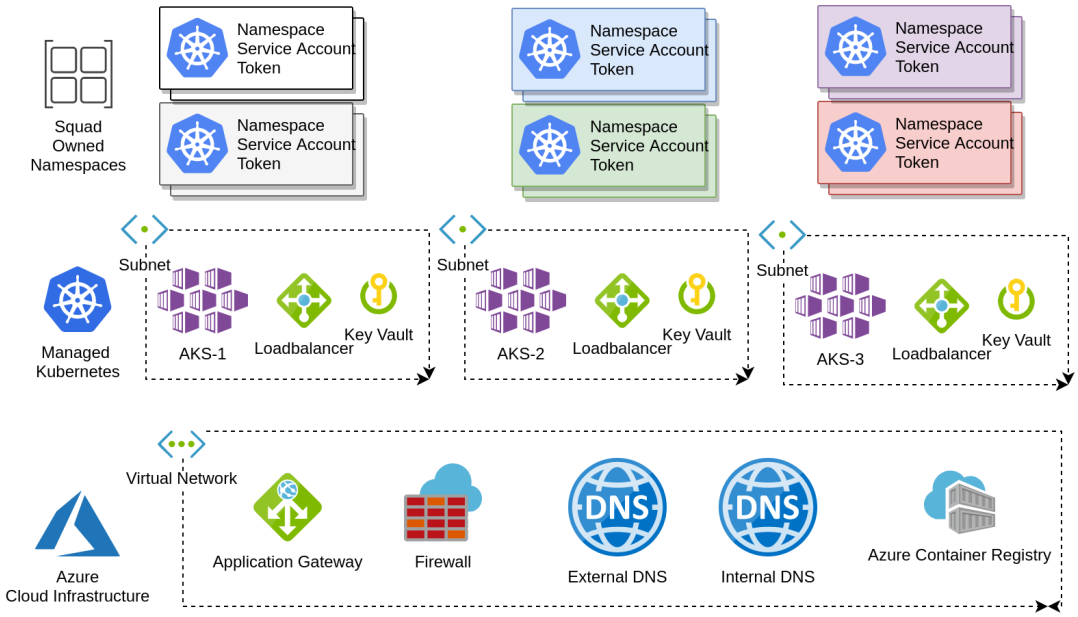
Stukje stack en gebruikte componenten

– application
– orchestration
– runtime
– provisioning

– compliance

Architecture



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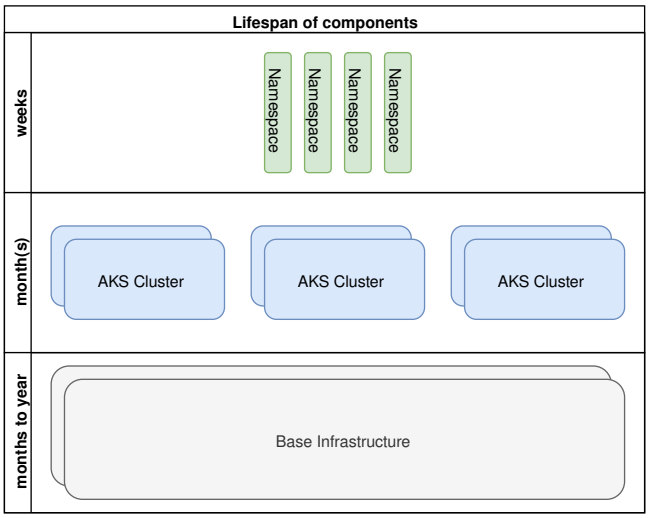

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Hoe we onze stack releasen

Hoe we onze apps releasen

How to achieve composability?

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     "name": "[variables('networkInterfaceName')]",
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     "location": "[parameters('location')]",
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    "properties": {
       "ipConfigurations": [
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           "properties": {
             "subnet": {
               "id": "[variables('subnetRef')]"
             },
             "privateIPAllocationMethod": "Dynamic",
             "publicIpAddress": {
               "id": "[resourceId(resourceGroup().name,'Microsoft.Network/publicIpAddresses', variables('pu
             }
           }
         }
       ],
       "networkSecurityGroup": {
         "id": "[resourceId(resourceGroup().name, 'Microsoft.Network/networkSecurityGroups', variables('net
       }
}
```

ARM

```
resource "azurerm_network_interface" "basicvm" {
  name                = "${local.networkInterfaceName}"
  location            = "${var.resource_group_location}"
  resource_group_name = "${azurerm_resource_group.basicvm.name}"

  ip_configuration {
    name                          = "ipconfig"
    subnet_id                     = "${azurerm_subnet.basicvm.id}"
    private_ip_address_allocation = "dynamic"
    public_ip_address_id          = "${azurerm_public_ip.basicvm.id}"
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Terraform

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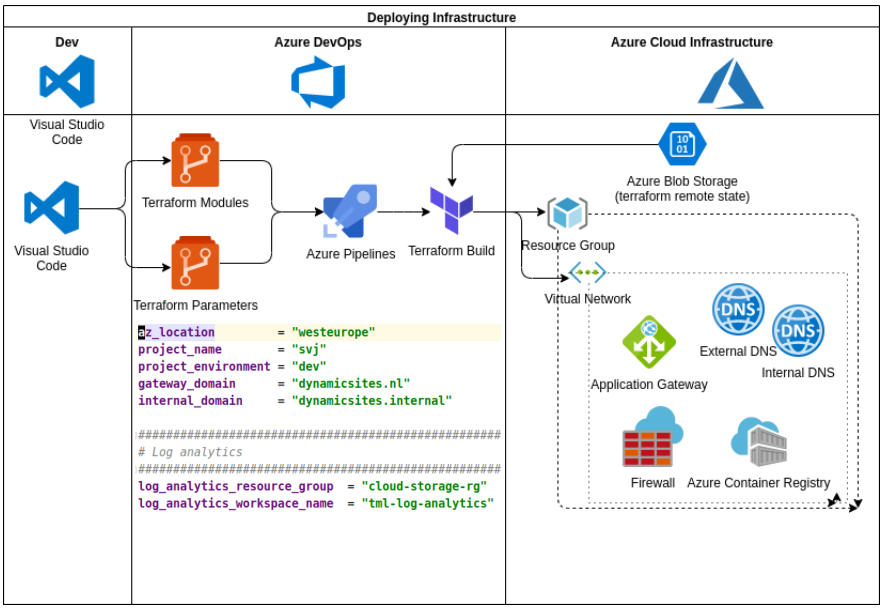

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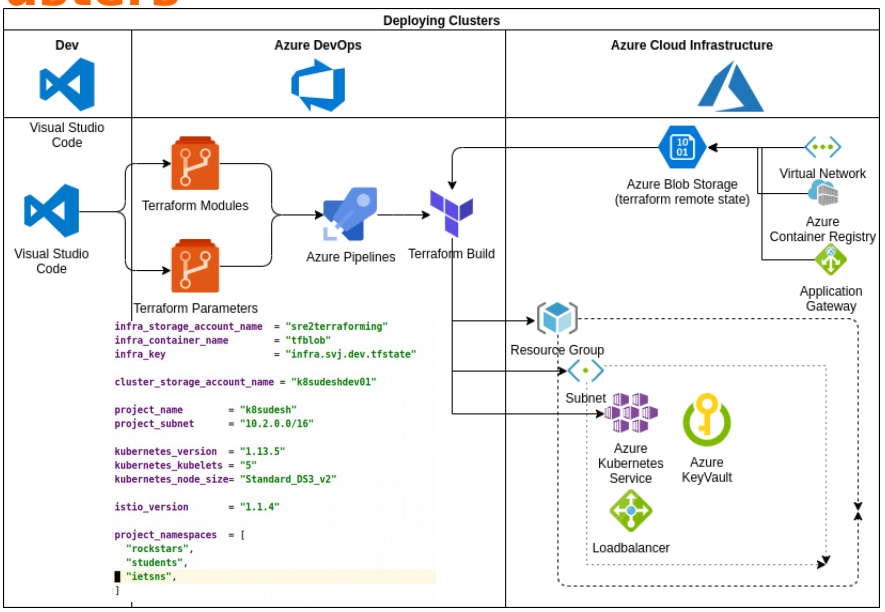

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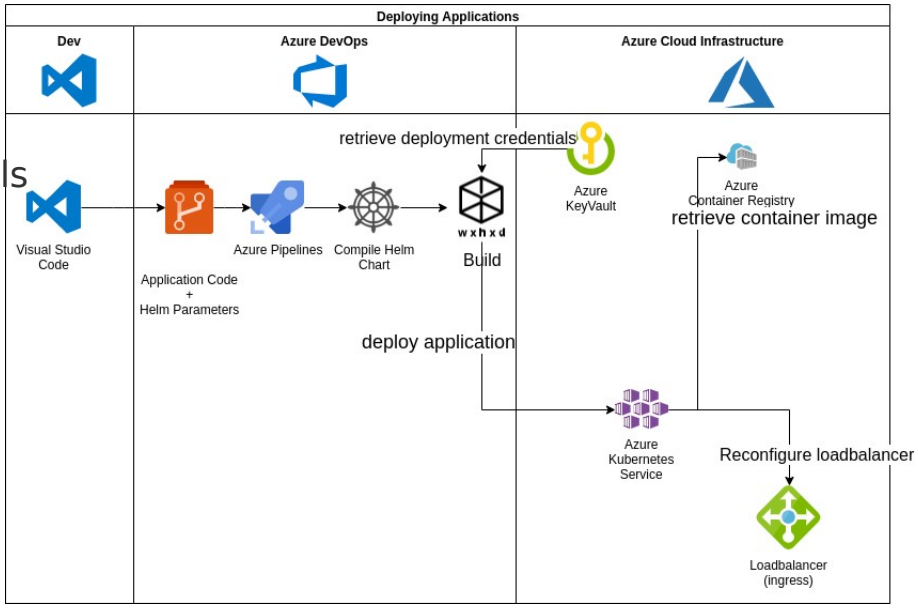

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  requests:
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  limits:
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service:
  name: helloing
  version: v0.1
  namespace: rockstars
  externalport: 80
  containerPort: 8080
  prometheusPort: 9090
```

```yaml
--- virtualservice
virtualService:
  ingressName: ing-gateway.istio-system
  hostName: k8sudesh.dynamicsites.nl
  endpoints:
    - uri: hellosudesh
      destinationService: hellosudesh-service
      destinationNamespace: rockstars
      destinationPort: 8080
```


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Hoe we onze stack releasen

Hoe we onze apps releasen

Observability

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Lessons Learned

Future work