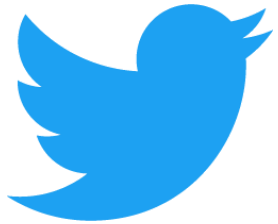

Architecture & Infrastructure As Code

About me

Christian Eder

35 years

Father of my 2 years daughter → just a little bit sleepy today ☺



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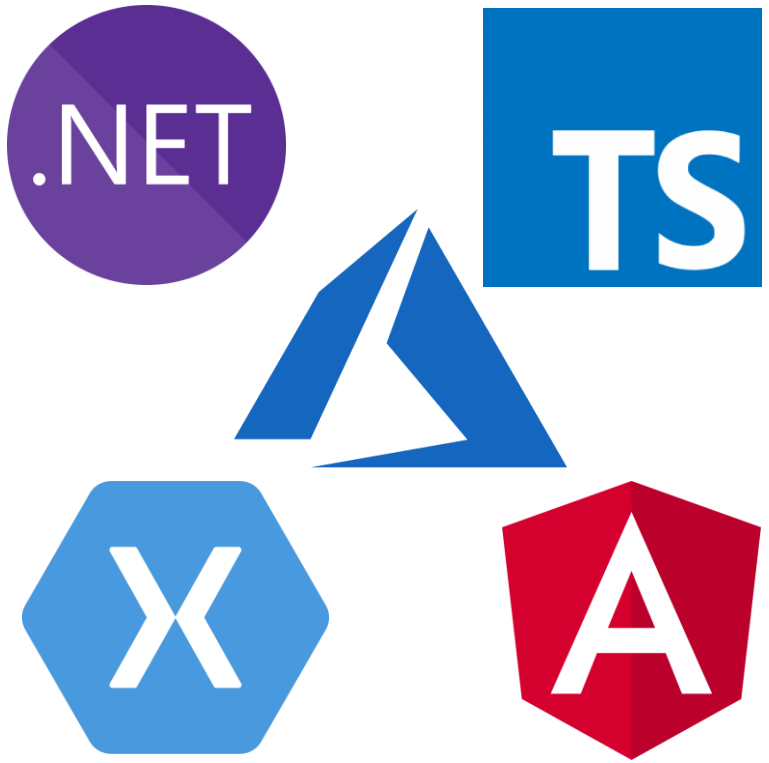
https://github.com/ChristianEder



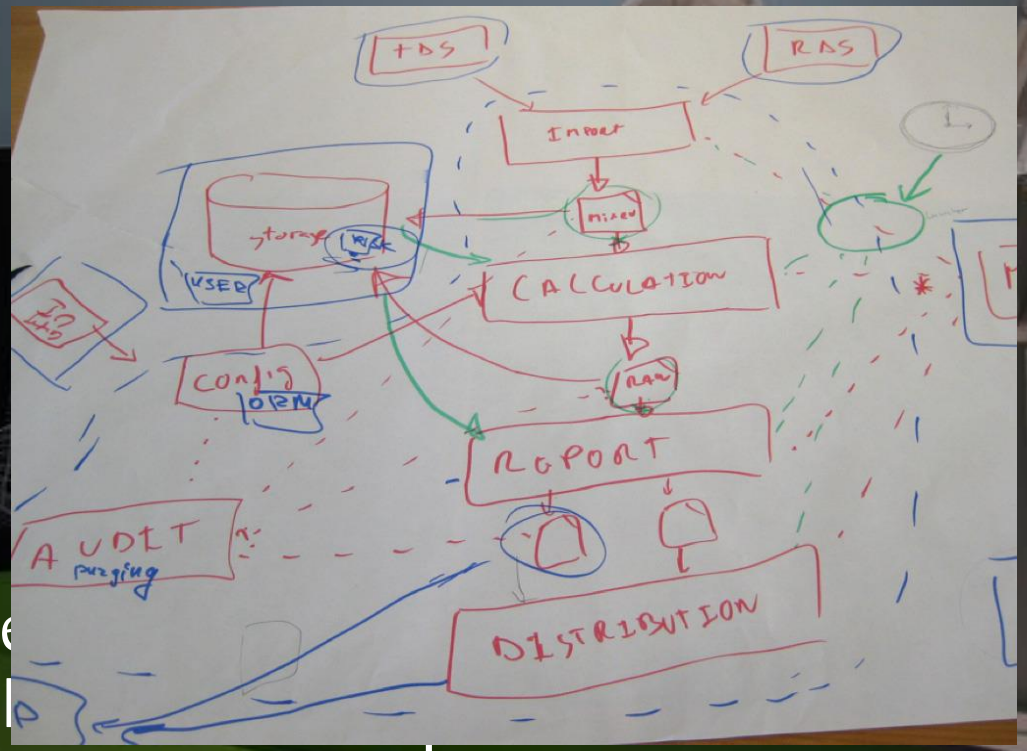
The model code gap

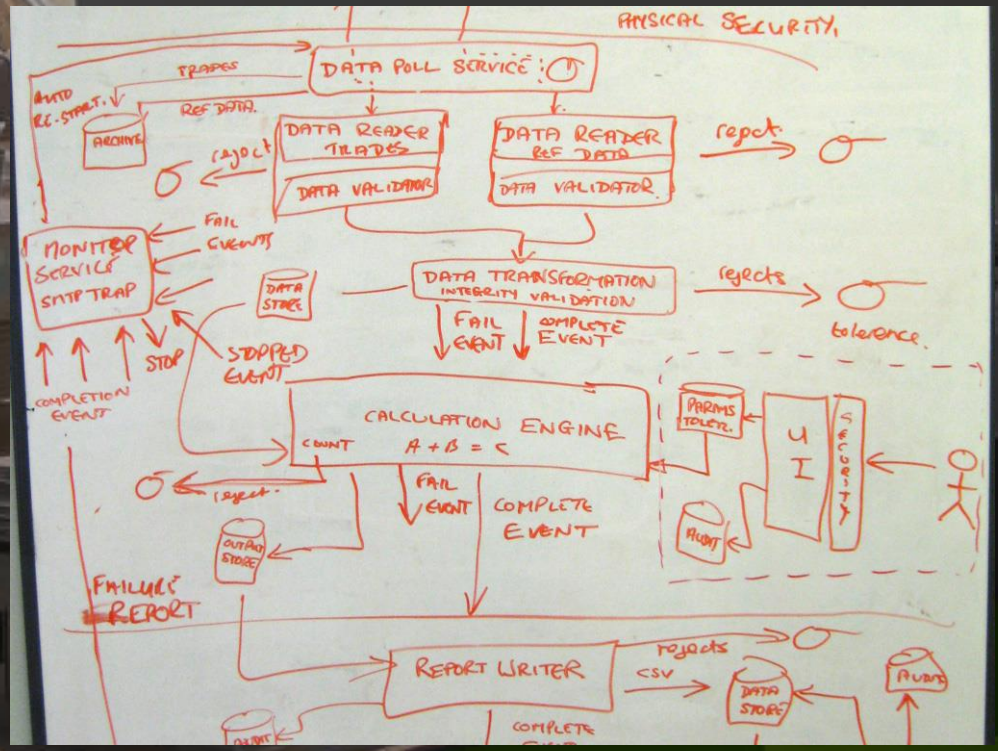
What does this model have in common with most software architecture models?

Most likely will never get updated when the actual thing is being built

Doesn't show a lot technical detail

But at least its beautiful ;-)

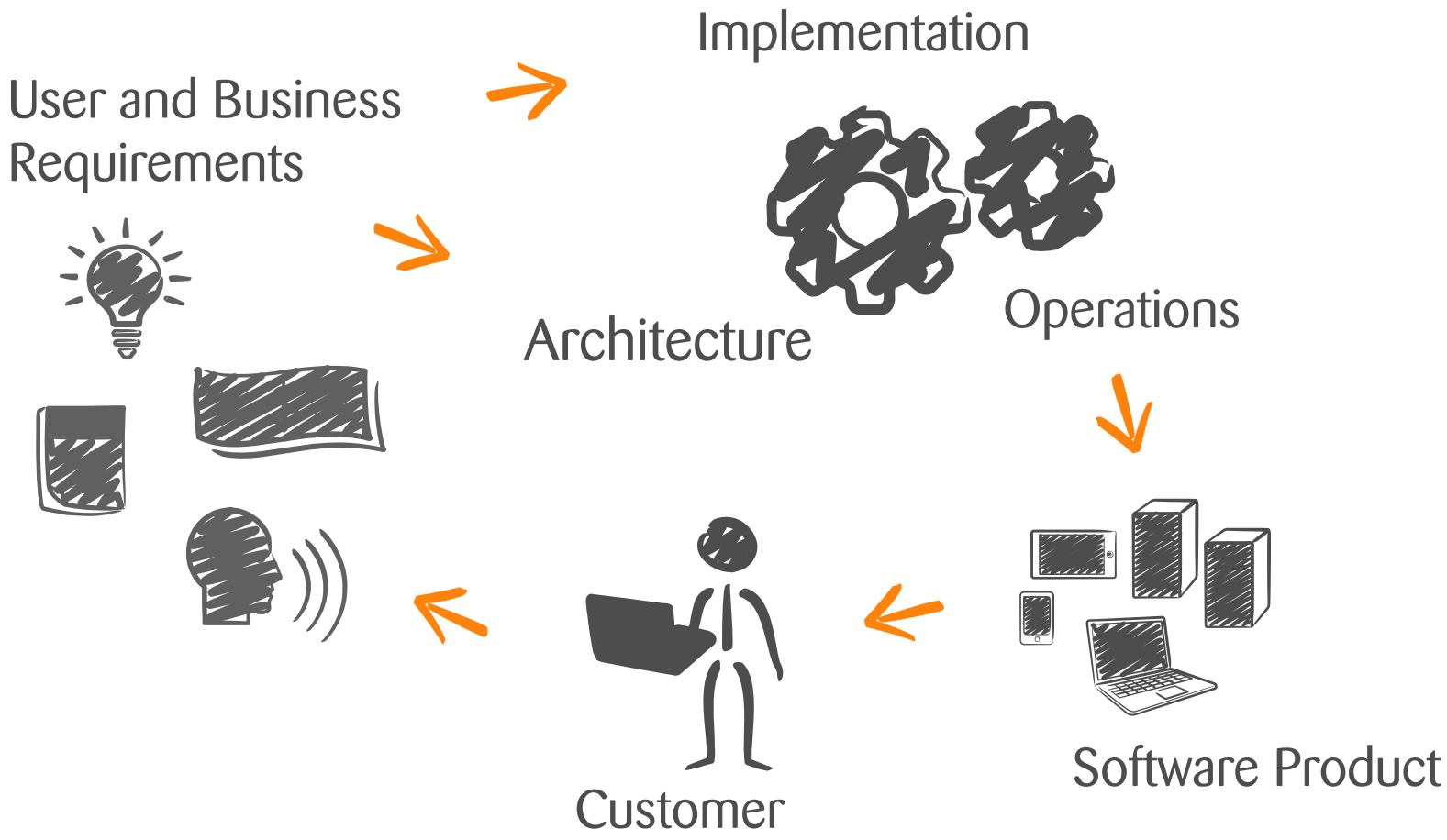




The
will
but not the same

The model code gap

Models are everywhere in software development



The model code gap

When models don't show the same things

Implementation

→ Code

Architecture

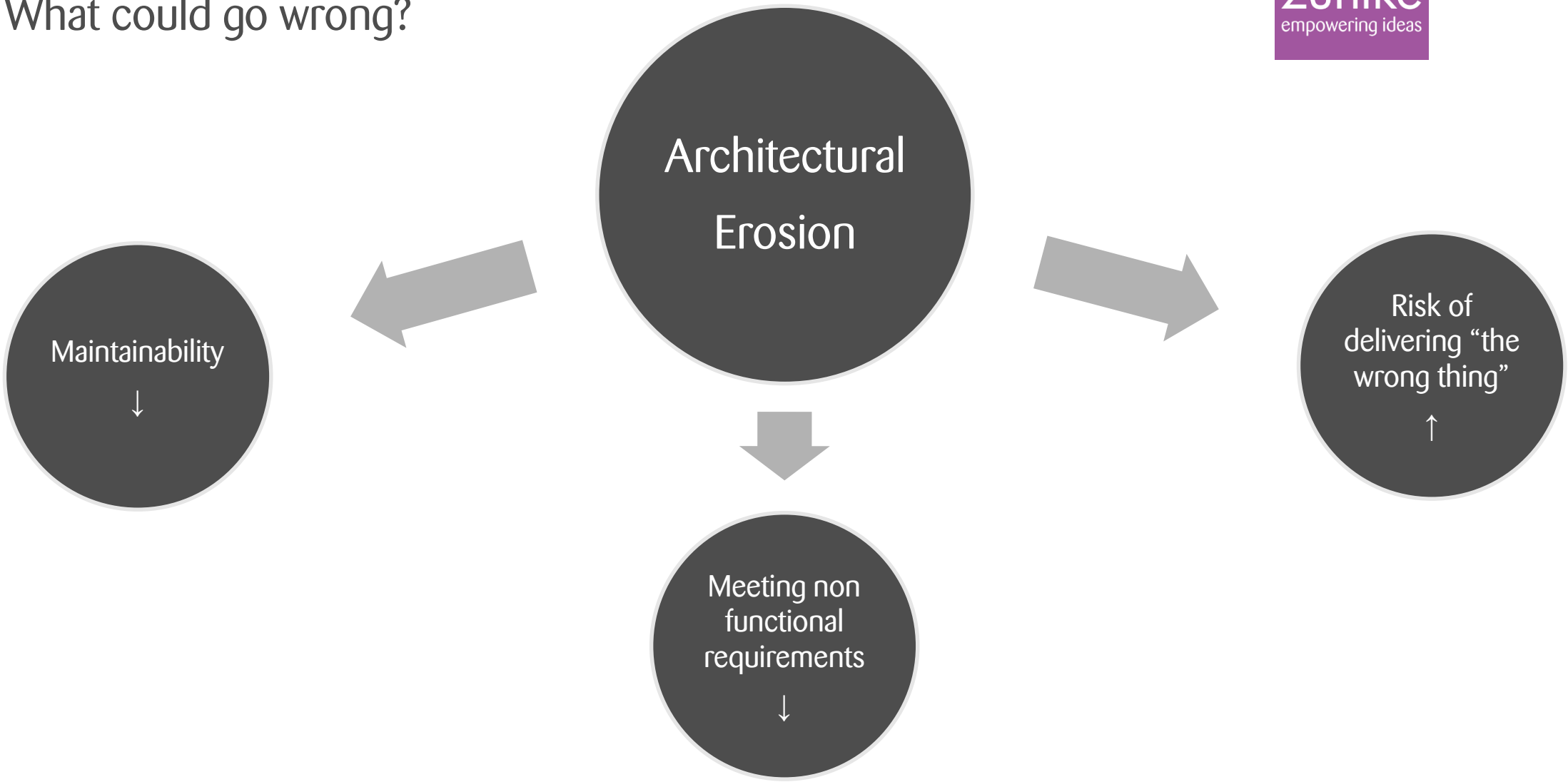
Operations

→ Diagrams & Documents

→ Infrastructure

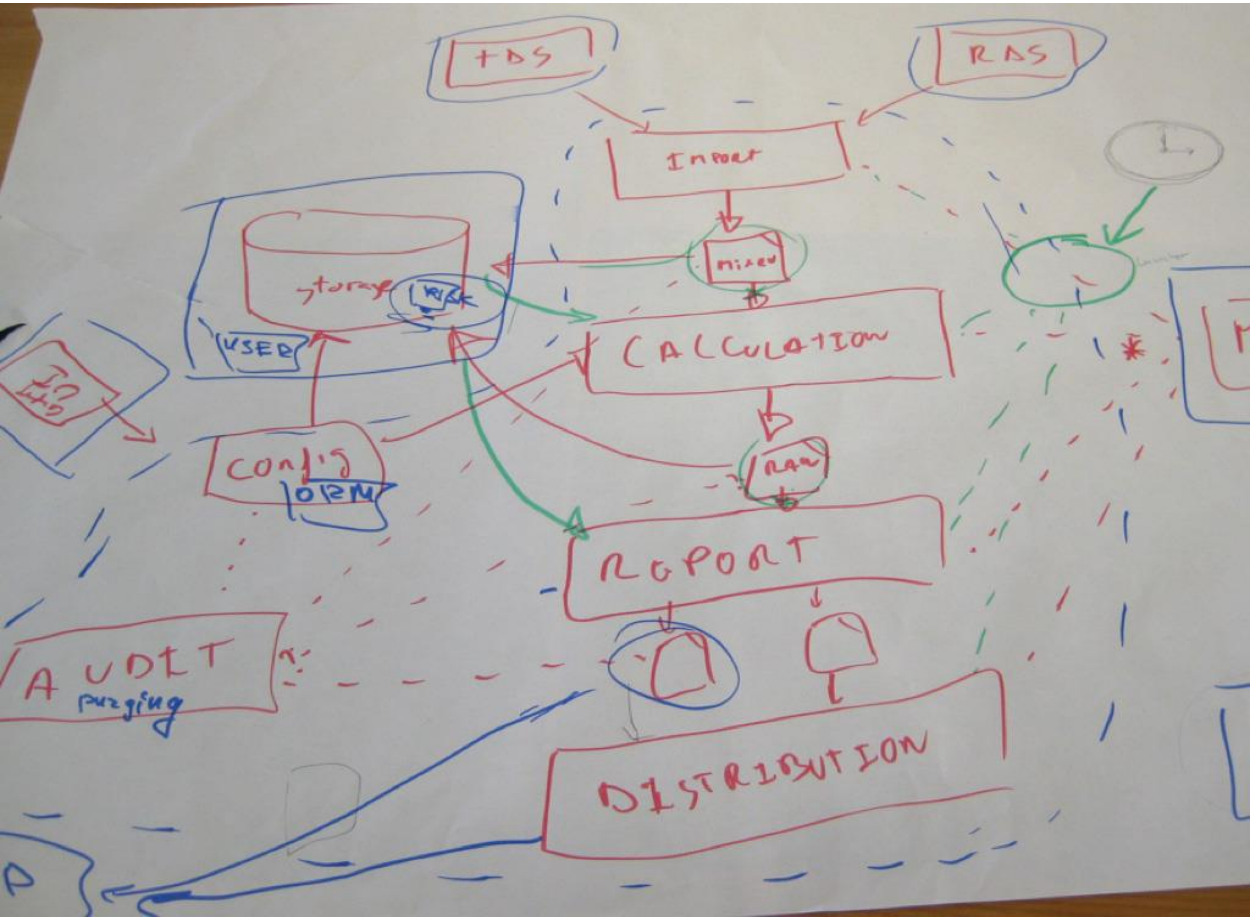
The model code gap - effects

What could go wrong?



Architecture Model

We all know & fear architecture models like these



Simon Browns C4 Architecture Model

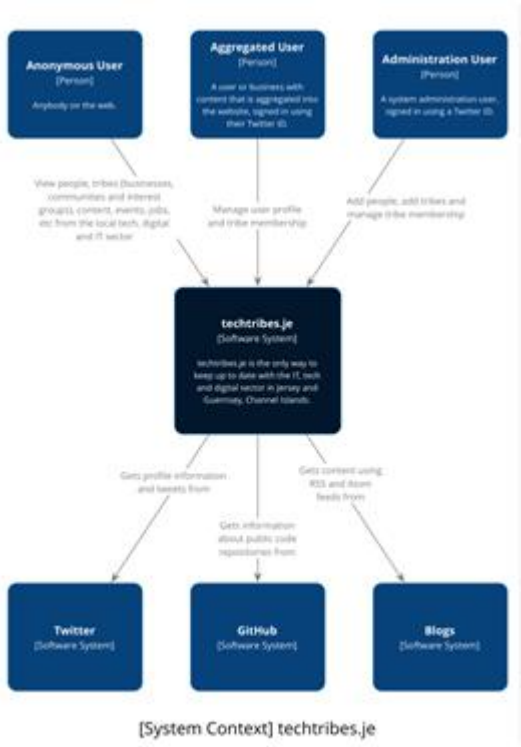
"Diagrams are maps"

System Context, Containers, Components, Classes

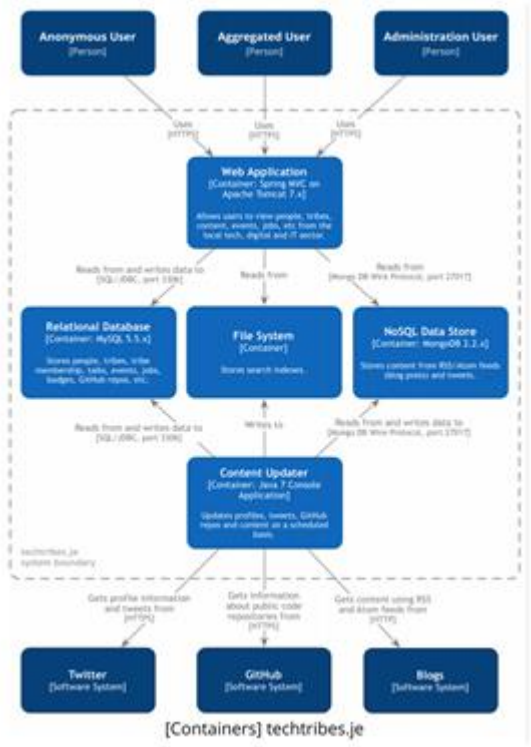
http://simonbrown.je
http://www.codingthearchitecture.com

Simon Browns C4 Architecture Model

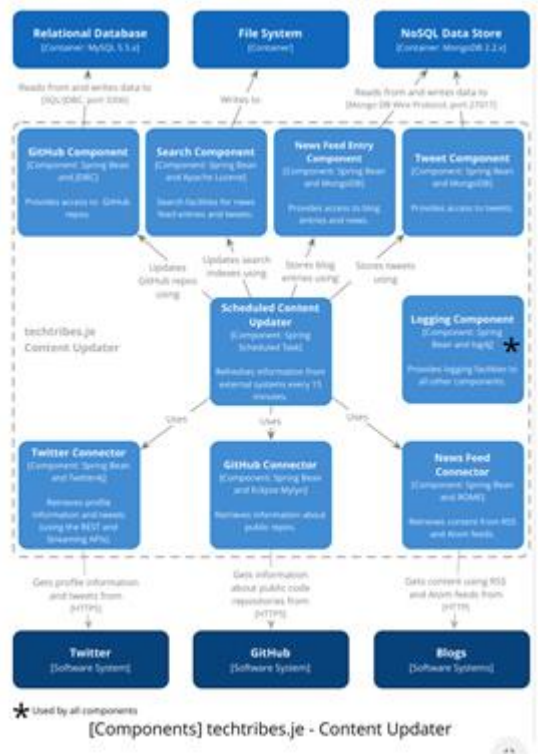
"Diagrams are maps that help you **navigating**"



[System Context] techtribes.je



[Containers] techtribes.je

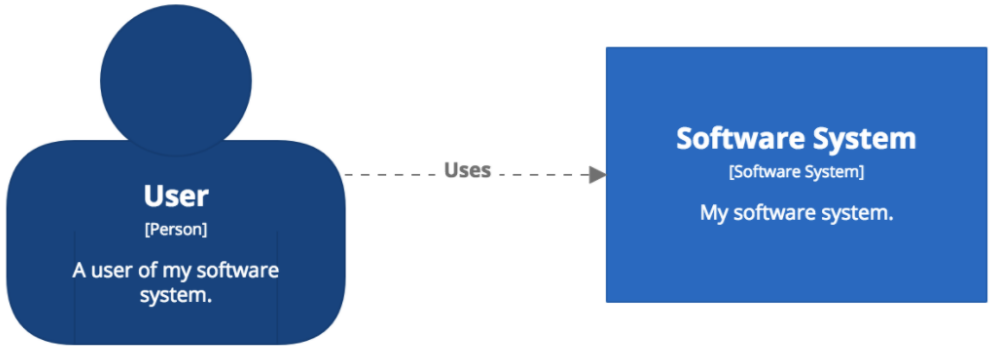


[Components] techtribes.je - Content Updater

Simon Browns Structurizr

Create software architecture models based upon the C4 model using code

```
Workspace workspace = new Workspace("Getting Started", "This is a model of my software system.");
Model model = workspace.getModel();

Person user = model.addPerson("User", "A user of my software system.");
SoftwareSystem softwareSystem = model.addSoftwareSystem("Software System", "My software system.");
user.uses(softwareSystem, "Uses");

ViewSet views = workspace.getViews();
SystemContextView contextView = views.createSystemContextView(softwareSystem, "SystemContext", "An example of a
contextView.addAllSoftwareSystems();
contextView.addAllPeople();
```

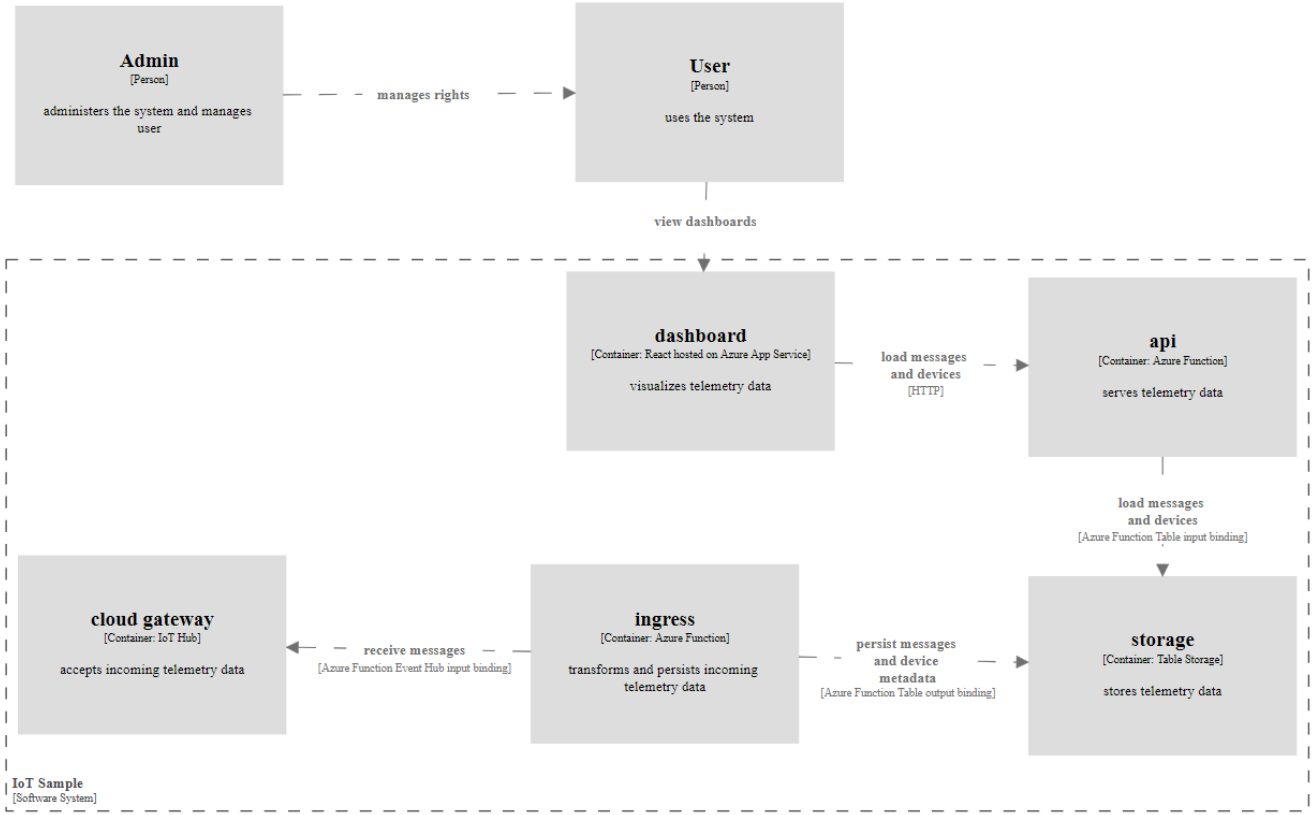


Architecture as *Code*

Using Structurizr – SDKs are available for Java, C# and TypeScript




```
stages:
- stage: Bu
  steps:
  - scrip
    displ
    worki
```



“Infrastructure” as code

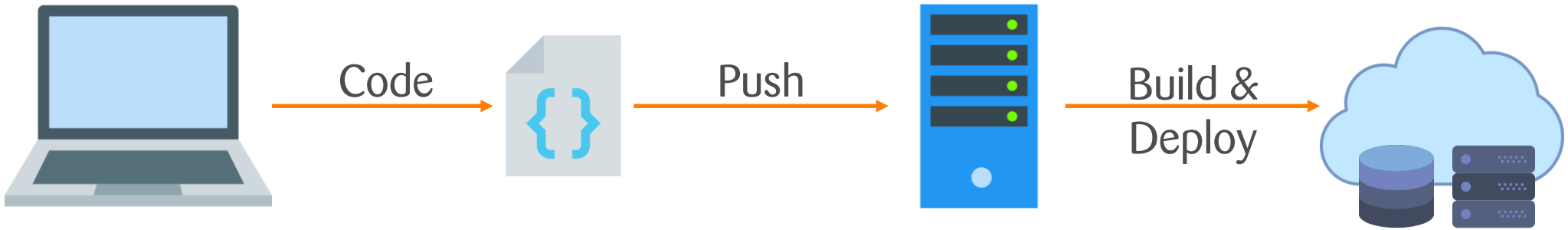
“Infrastructure” ≈ “Something that allows to run code or store data”

IAAS	PAAS	FAAS
Azure Virtual machines AWS EC2	Azure App Services AWS Elastic Beanstalk	Azure Functions AWS Lambda

Azure wording: “Resources”
AWS wording: “Services”
Wording for this talk: “Infrastructure”

Infrastructure as code

Applying software development principles to cloud infrastructure deployment



Infrastructure as code

There are a lot of tools to automate deploying cloud infrastructure

Tools provided by the cloud providers

- **Azure Resource Manager**: JSON files, PowerShell, az CLI
- **AWS Cloud Formation**: YAML files
- **Google Cloud Platform Deployment Manager**: YAML files

Cloud agnostic tools

- **Terraform**: custom DSL with cloud-specific providers
- **pulumi**: TypeScript, Golang, Python

Infrastructure as Code

There are a lot of tools to automate deploying cloud infrastructure

Azure Resource Manager

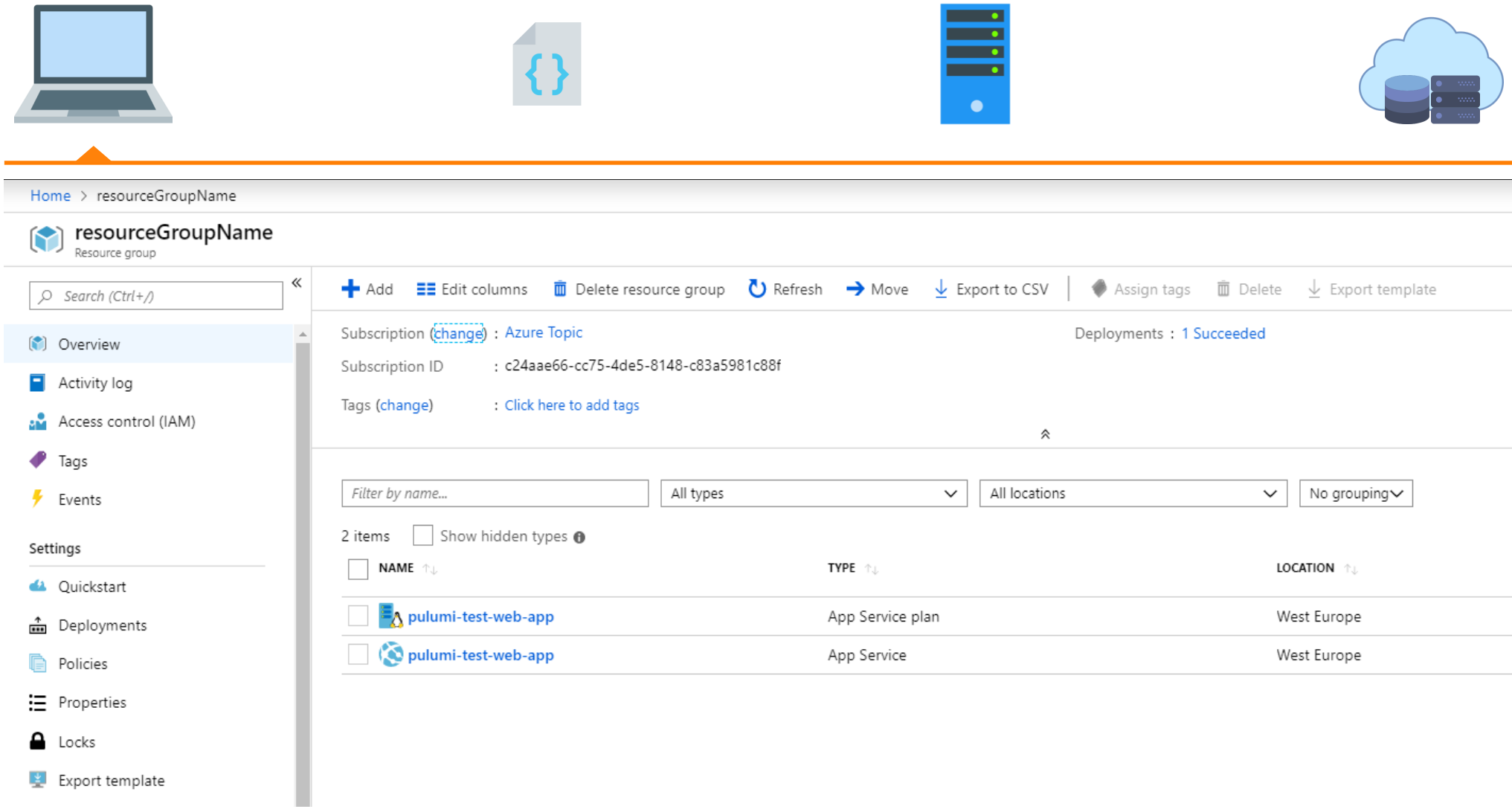
```
{
    "$schema": "http://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
    "contentVersion": "1.0.0.0",
    "parameters": {
        "sku": {
            "type": "string"
        },
        "skuCode": {
            "type": "string"
        }
    },
    "variables": {
        "name": "test-web-app"
    },
    "resources": [
        {
            "apiVersion": "2018-02-01",
            "name": "[variables('name')]",
            "type": "Microsoft.Web/sites",
            "location": "[resourceGroup().location]",
            "dependsOn": [
                "[concat('Microsoft.Web/serverfarms/', variables('name')]"
            ],
            "properties": {
                "name": "[variables('name')]",
                "serverFarmId": "[concat(resourceGroup().id, '/providers/Microsoft.Web/serverfarms/', variables('name'))]"
            }
        },
        {
            "apiVersion": "2018-02-01",
            "name": "[variables('name')]",
            "type": "Microsoft.Web/serverfarms",
            "location": "[resourceGroup().location]",
            "kind": "linux",
            "properties": {
                "name": "[variables('name')]",
                "workerSize": "0",
                "workerSizeId": "0",
                "numberOfWorkers": "1"
            },
            "sku": {
                "Tier": "[parameters('sku')]",
                "Name": "[parameters('skuCode')]"
            }
        }
    ]
}
```

Terraform

```
4 references
resource "azurerm_resource_group" "test" {
  name     = "example-resources"
  location = "West Europe"
}

1 references
resource "azurerm_app_service_plan" "test" {
  name                = "example-appserviceplan"
  location            = "${azurerm_resource_group.test.location}"
  resource_group_name = "${azurerm_resource_group.test.name}"

  sku {
    tier = "Standard"
    size = "S1"
  }
}

0 references
resource "azurerm_app_service" "test" {
  name                = "example-app-service"
  location            = "${azurerm_resource_group.test.location}"
  resource_group_name = "${azurerm_resource_group.test.name}"
  app_service_plan_id = "${azurerm_app_service_plan.test.id}"
}
```

Infrastructure as *Code*

Using pulumi



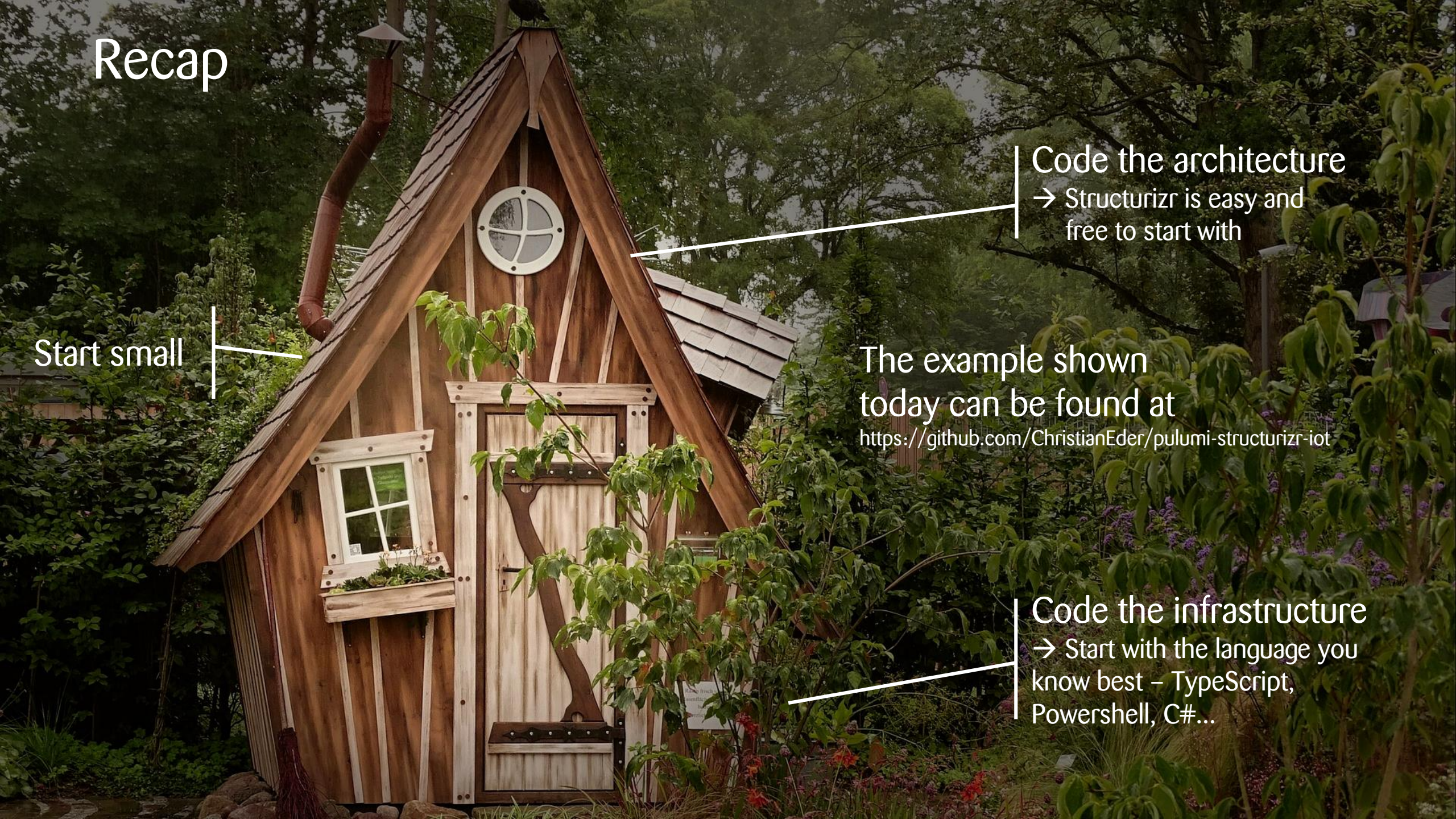
Infrastructure & architecture as *code*

Using pulumi & structurizr

https://github.com/ChristianEder/pulumi-structurizr-iot

https://github.com/ChristianEder/pulumi-structurizr-workshop/tree/master/examples/getting-started/pulumi-and-structurizr

Recap



Code the architecture

→ Structurizr is easy and free to start with

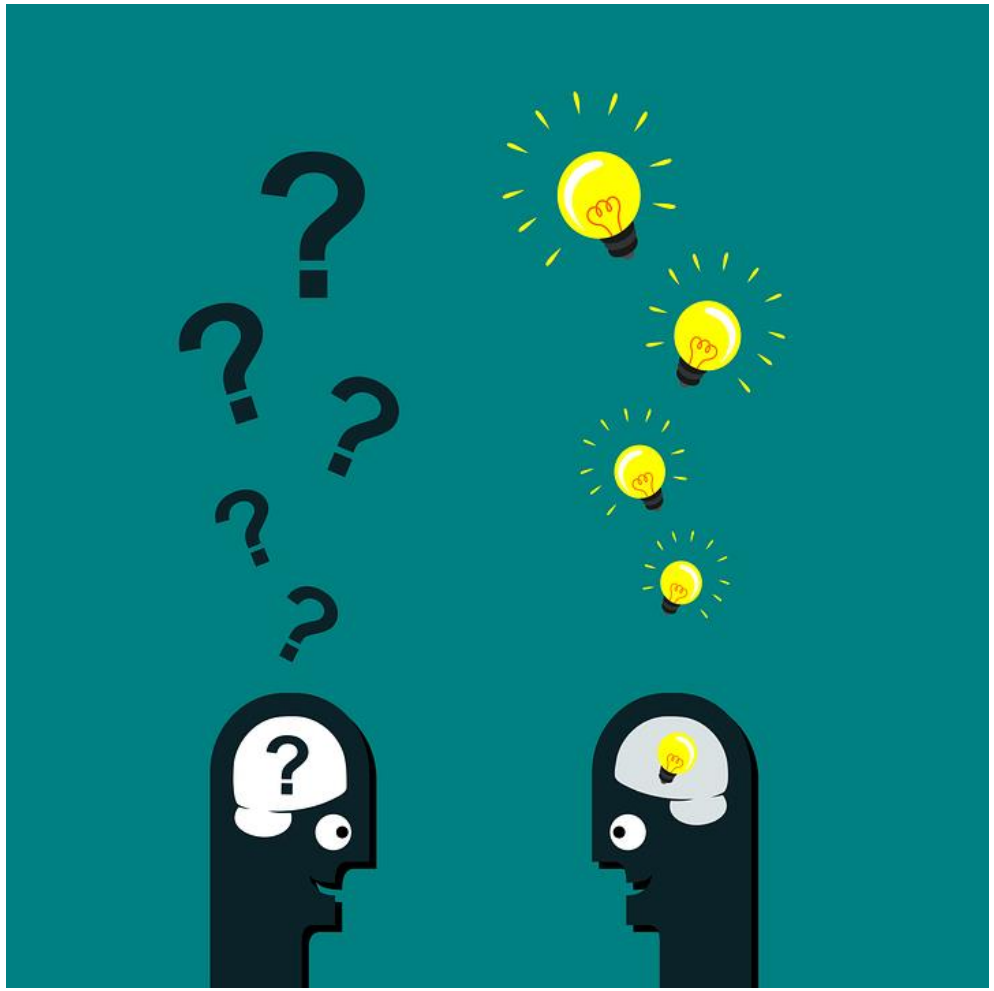
Start small

The example shown today can be found at

https://github.com/ChristianEder/pulumi-structurizr-iot

Code the infrastructure

→ Start with the language you know best – TypeScript, Powershell, C#...



zühlke
empowering ideas

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https://github.com/ChristianEder

Thank you for listening – any questions?

No? then lets get started with the workshop

Infrastructure & architecture as *code*

Now: Hands On!

https://github.com/ChristianEder/pulumi-structurizr-workshop

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Thank for your feedback