Introduction to Infrastructure as Code (IaC) with AWS and Terraform

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Who am I?

12 years' experience

- Programmer
- Business Analyst
- Architect

AWS Certified Solutions Architect – Professional

Agenda


AMAZON
DEPLOYMENT
INFRASTRUCTUREASCODE
DEVOPS
IAC
AWS
TERRAFORM
NETWORK
CLOUD
INSTANCE
VPC


What is
Infrastructure
as Code?

The idea behind
Infrastructure as Code (IaC)
is that you write and execute code to define, deploy, and update your infrastructure.

Because it's a code, you can

Version it as code in a repository

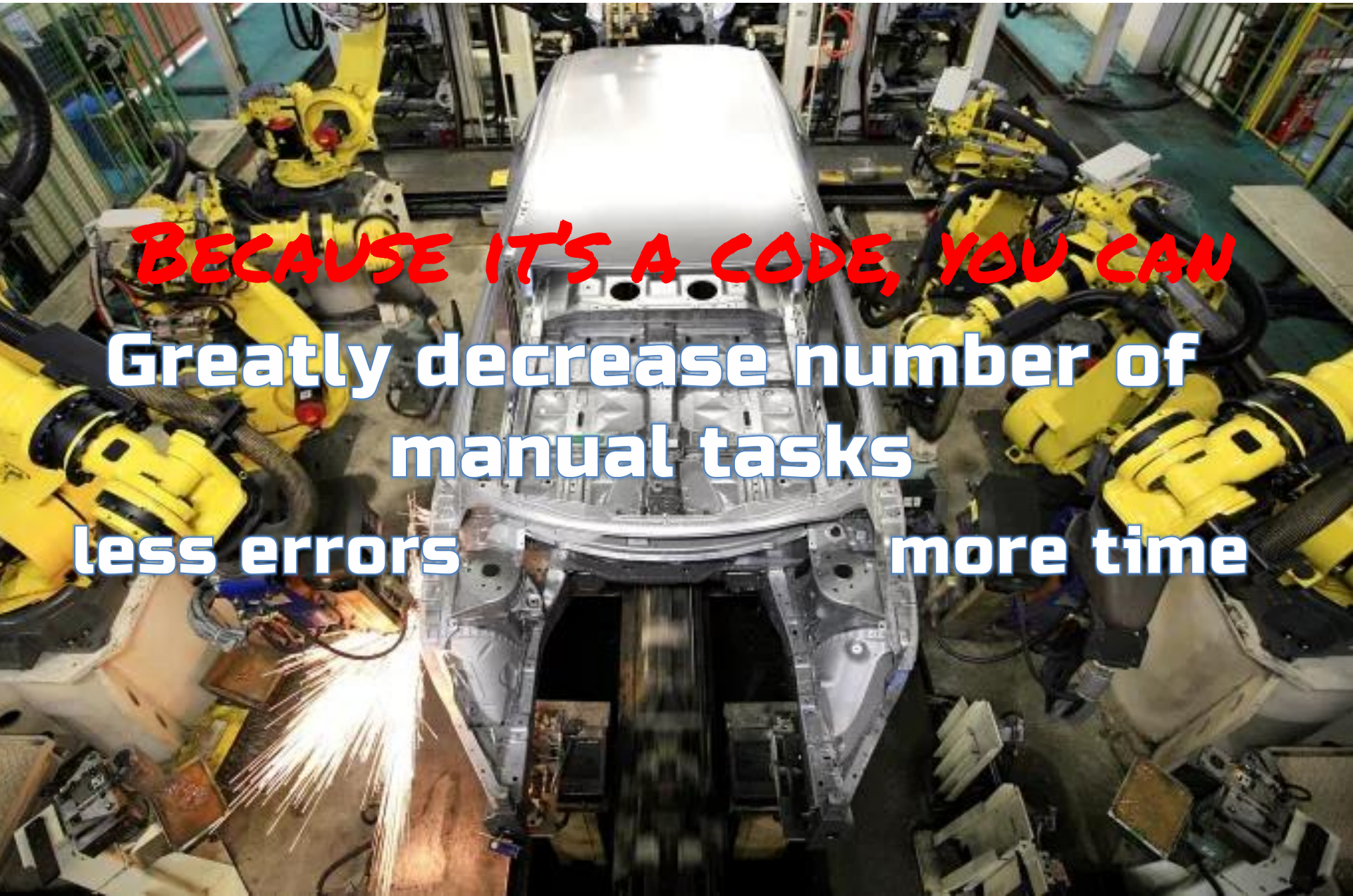
Because it's a code, you can

Expect it to be repeatable

Because it's a code

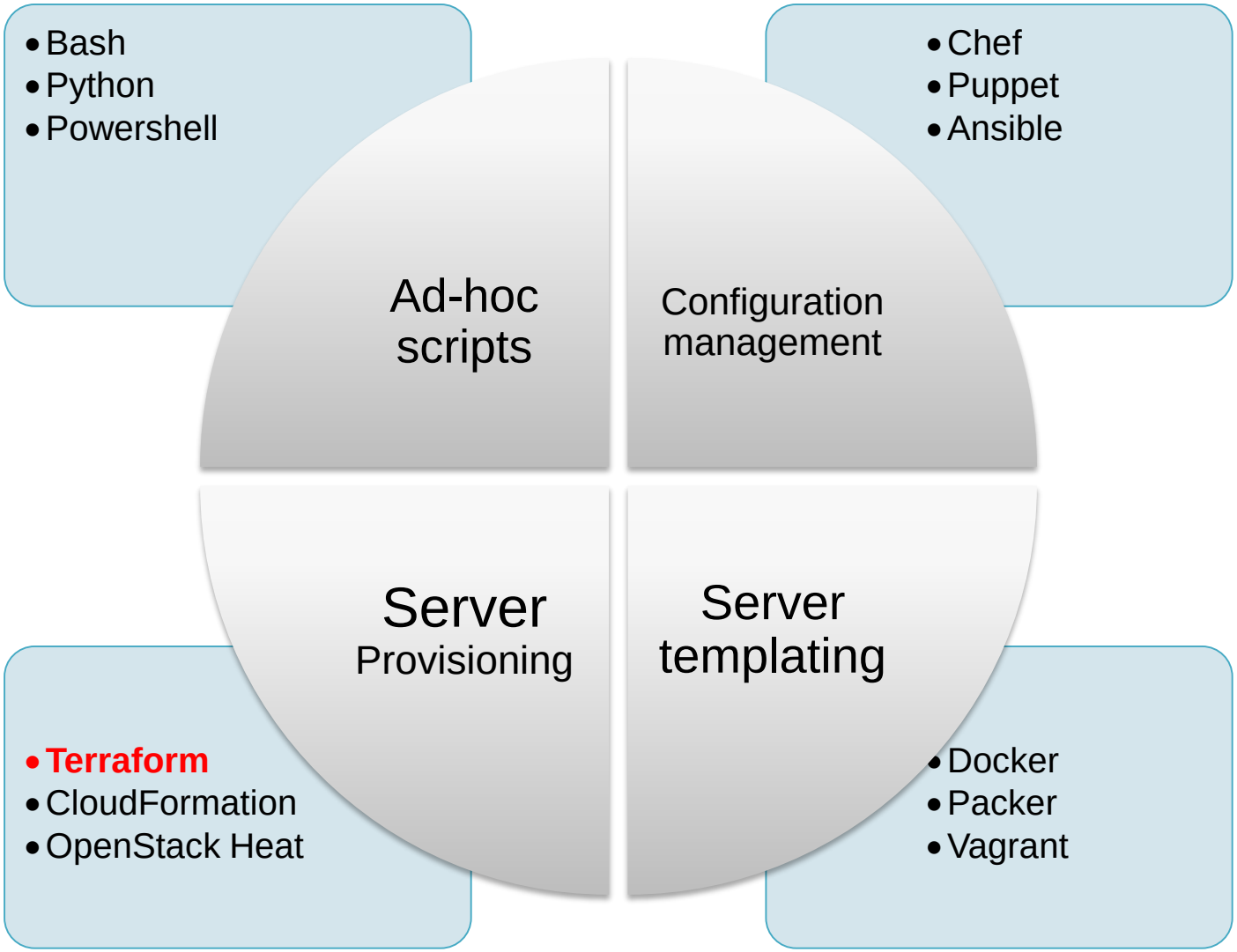

Because it's a code, you can
Tailor infrastructure to your needs at any time


Because it's a code, you can
Test easier
(provision as many TEST envs as you need)


Because it's a code, you can
Greatly decrease number of manual tasks
less errors
more time

This aligns well with DevOps

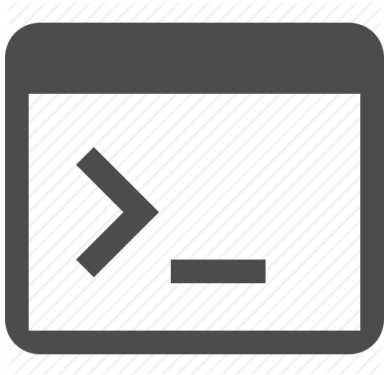
IaC tool categories



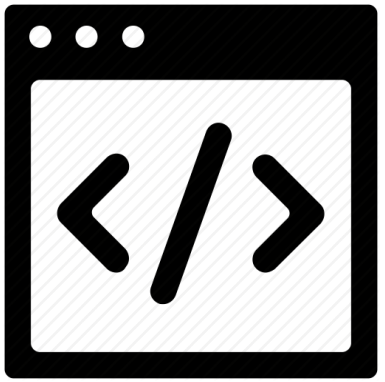
What is Terraform?

Terraform is a tool for building, changing, and versioning infrastructure safely and efficiently.

open source



command line tool



Infrastructure is described using a high-level **configuration syntax**

HashiCorp Configuration Language HCL syntax:

```
1 reference
resource "aws_instance" "myserver" {
  ami           = "ami-40d28157"
  instance_type = "t2.micro"
}

0 references
resource "dnsimple_record" "mydns" {
  domain = "example.com"
  name   = "test"
  value  = "${aws_instance.myserver.public_ip}"
  type   = "A"
}

0 references
provider "aws" {
  region  = "eu-west-3"
  profile = "terraform"
}
```

Terraform is used to provision and manage infrastructure resources via **Providers**.

A provider is responsible for understanding API interactions and exposing resources.

Providers generally are:

- **IaaS** (e.g. AWS, GCP, Azure, OpenStack, Alibaba),
- **PaaS** (e.g. Heroku), or
- **SaaS** (e.g. DataDog, Fastly, DNSimple, CloudFlare)

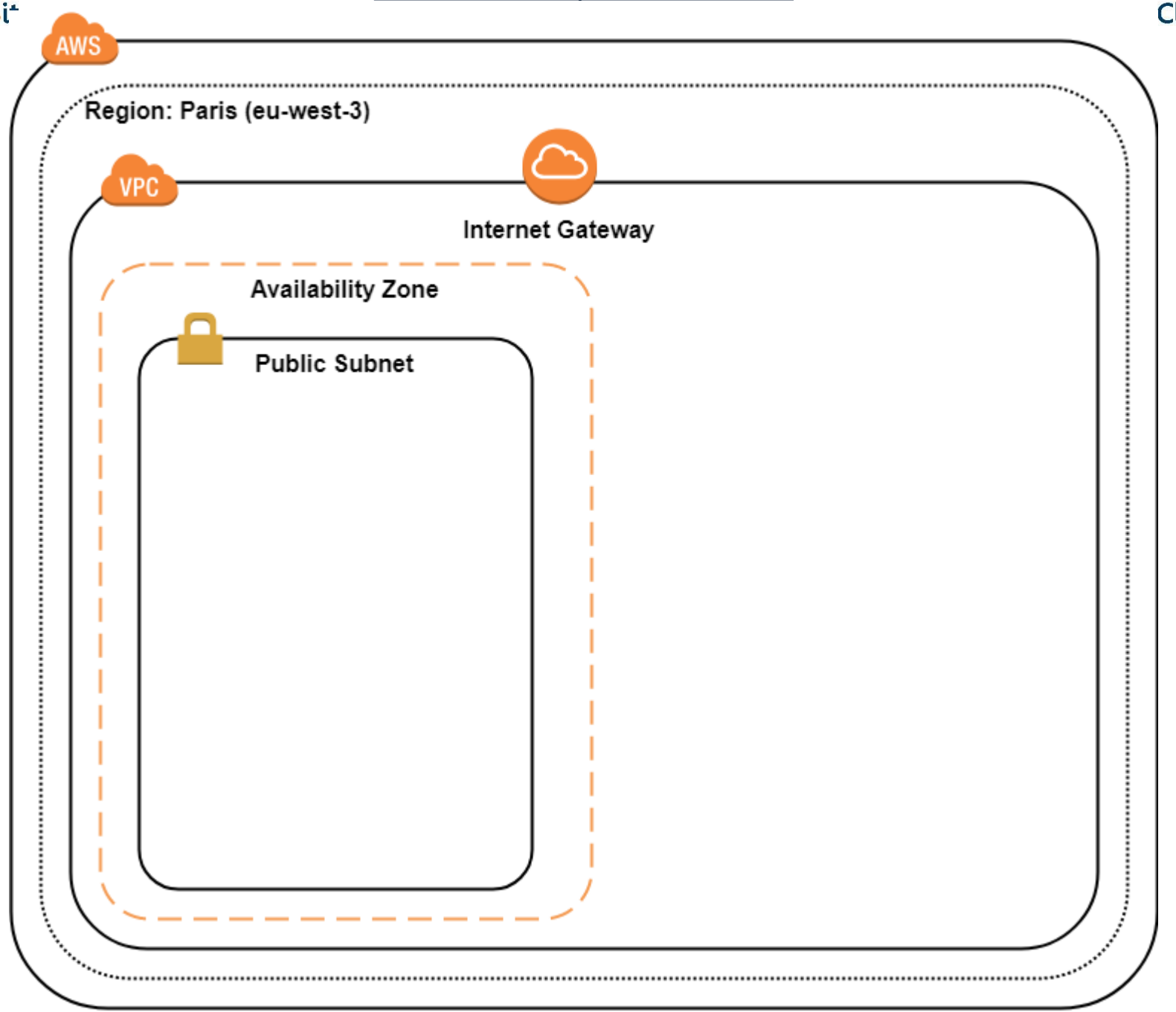
Providers

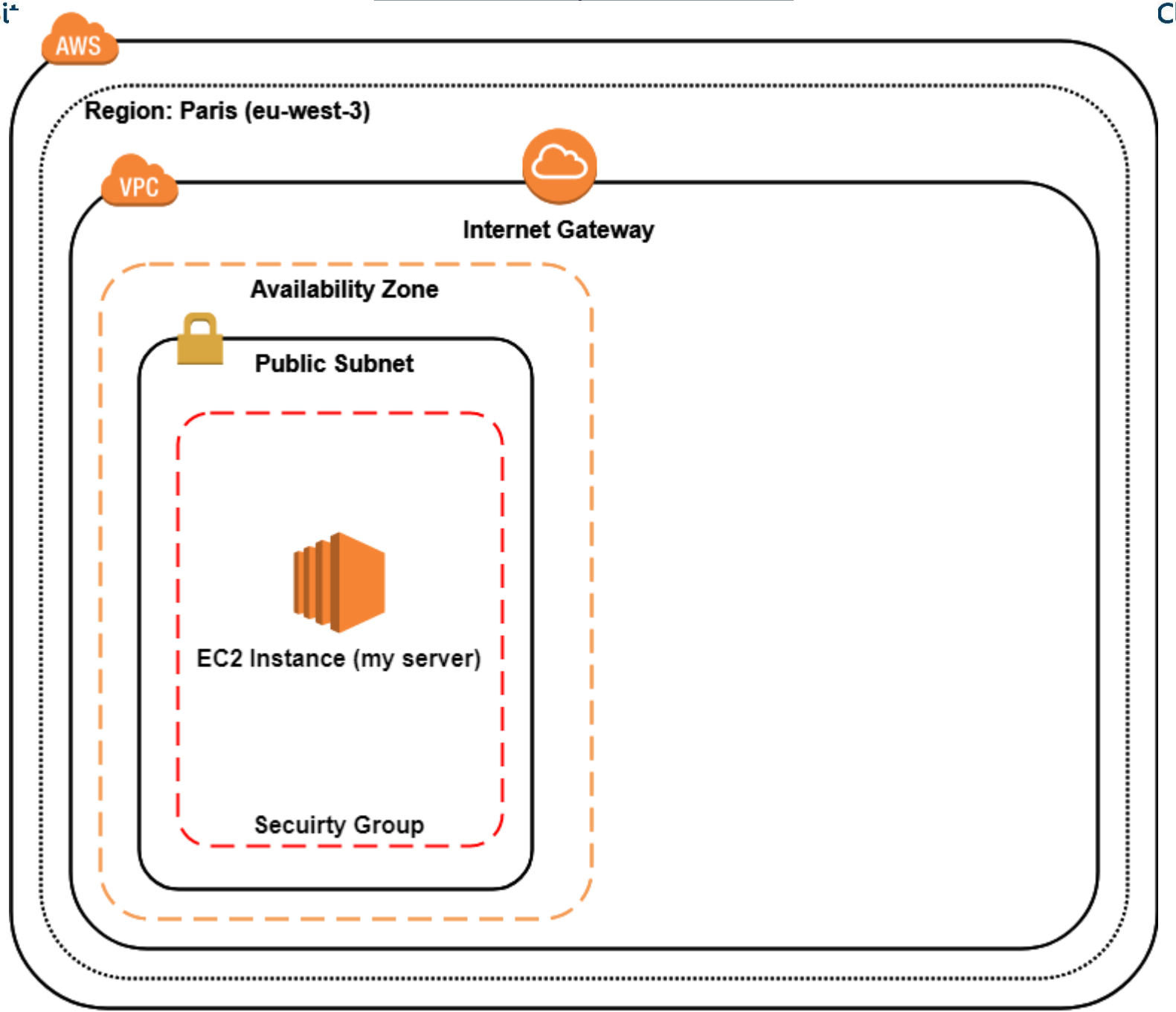
AWS employees are curating Terraform AWS provider.

Alicloud	Archive	AWS
Azure	Bitbucket	CenturyLinkCloud
Chef	Circonus	Cloudflare
CloudScale.ch	CloudStack	Cobbler
Consul	Datadog	DigitalOcean
DNS	DNSMadeEasy	DNSimple
Docker	Dyn	External
Fastly	FlexibleEngine	GitHub
Gitlab	Google Cloud	Grafana
Heroku	Hetzner Cloud	HTTP
Icinga2	Ignition	InfluxDB
Kubernetes	Librato	Local
Logentries	LogicMonitor	Mailgun
MySQL	New Relic	Nomad
NS1	Null	1&1
OpenStack	OpenTelekomCloud	OpsGenie
Oracle Public Cloud	Oracle Cloud Platform	OVH
Packet	PagerDuty	Palo Alto Networks
PostgreSQL	PowerDNS	ProfitBricks
RabbitMQ	Rancher	Random
Rundeck	Scaleway	SoftLayer
StatusCake	Spotinst	Template
Terraform	Terraform Enterprise	TLS
Triton	UltraDNS	Vault
VMware vCloud Director	VMware NSX-T	VMware vSphere

Source: https://www.youtube.com/watch?v=6bSOAl1i8bw

Cloud4it Group #1 - Wrocław




AWS
Region: Paris (eu-west-3)
VPC
Internet Gateway
Availability Zone
Public Subnet
EC2 Instance (my server)
Secuirty Group

AWS networking resources

- **VPC** - Virtual Private Cloud is a virtual network dedicated to your AWS account.
- An **internet gateway** is a horizontally scaled, redundant, and highly available VPC component that allows communication between instances in your VPC and the internet.
- **Subnet** – logical part of VPC allocated to exactly one Availability Zones
- **Availability Zone** – isolated datacenter within a Region. Usually 3 or more AZs per region.

Talk is cheap show me the code.

Linus Torvalds

Demo #1

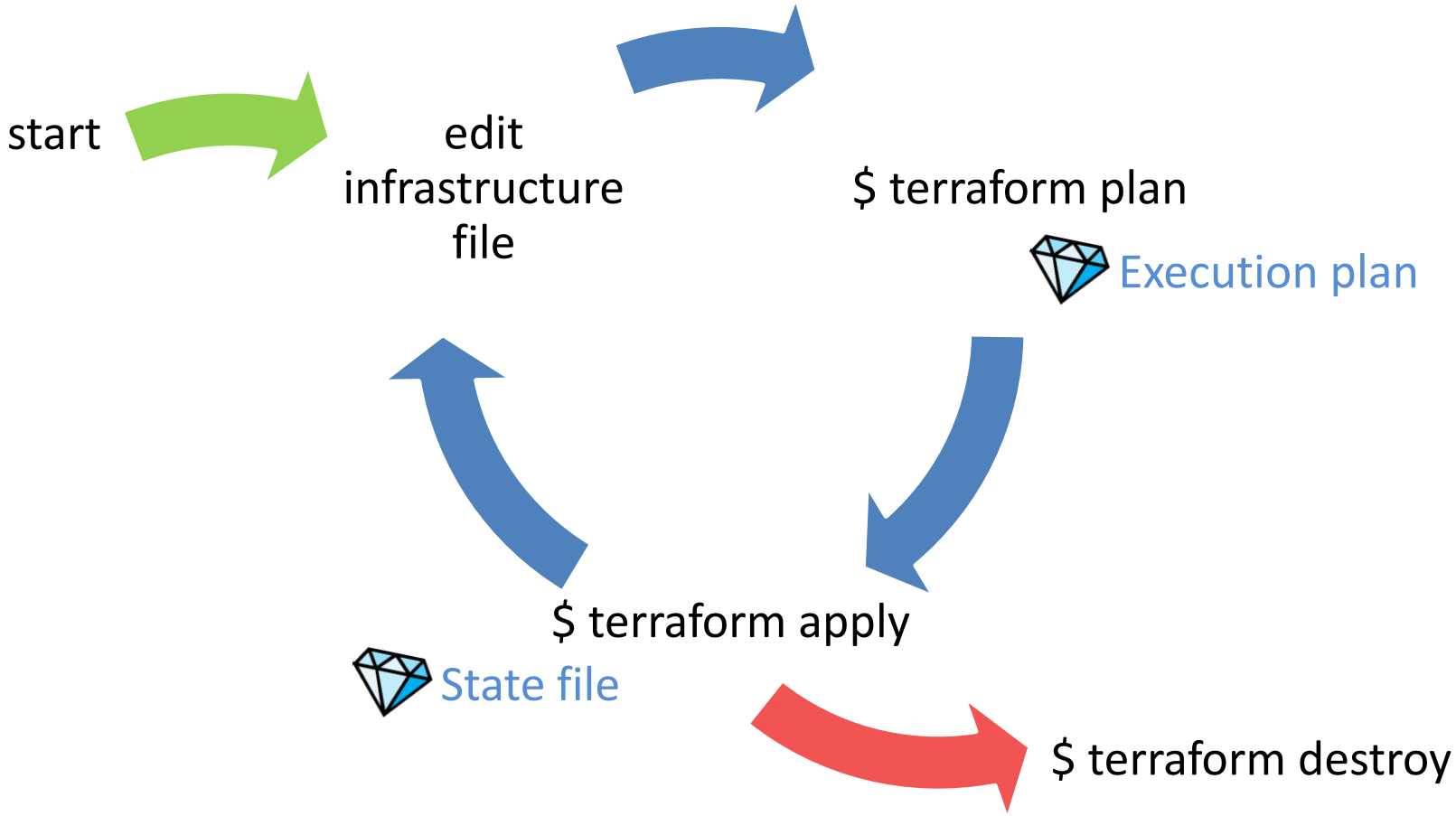
Demo #1

What you need

- AWS account (access key + secret access key)
- Terraform in your path
- Some infrastructure / configuration file
- Private key (pem file) for SSH

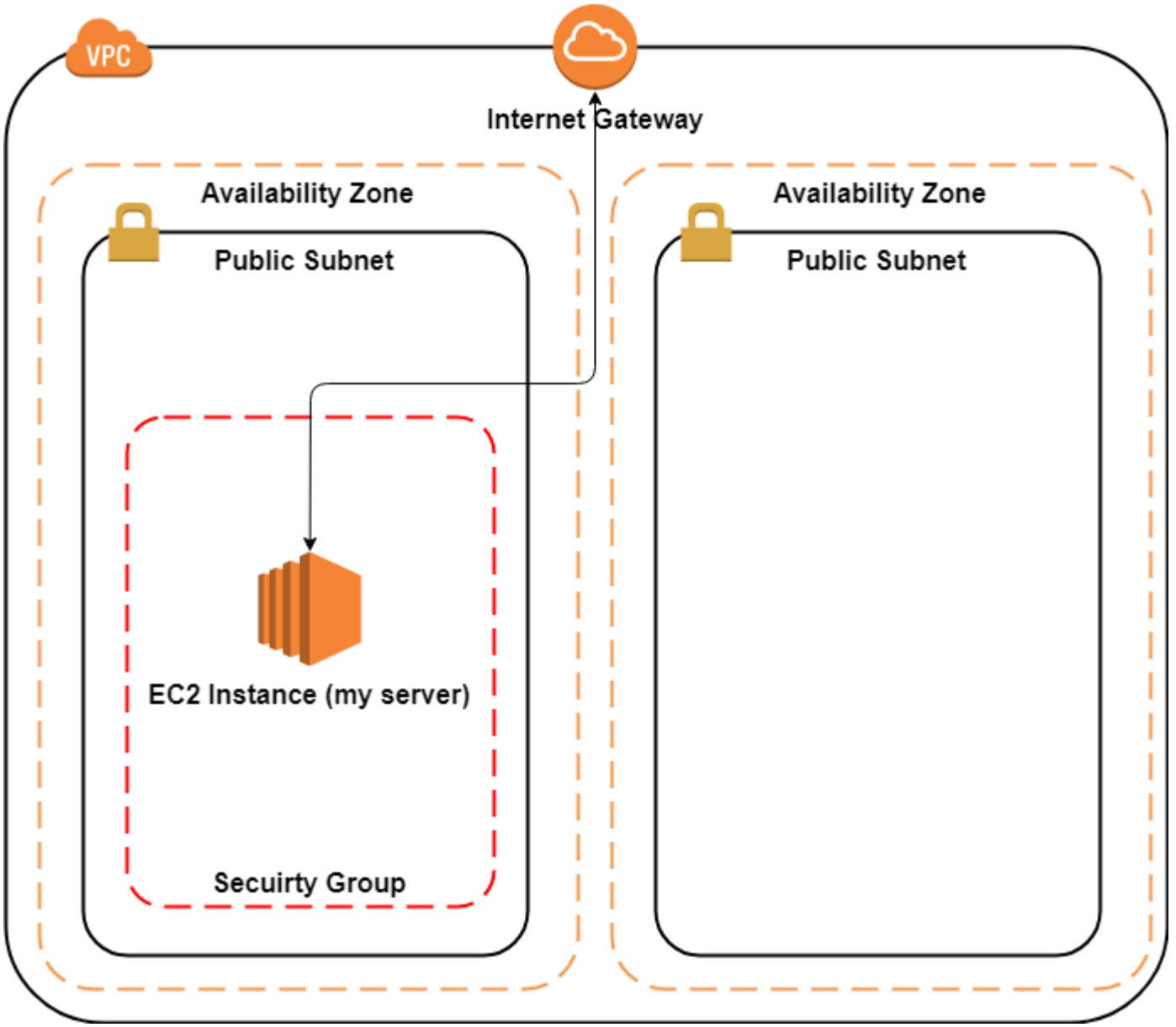
Demo #1

Terraform workflow



Demo #2

Demo 2


VPC
Internet Gateway
Availability Zone
Public Subnet
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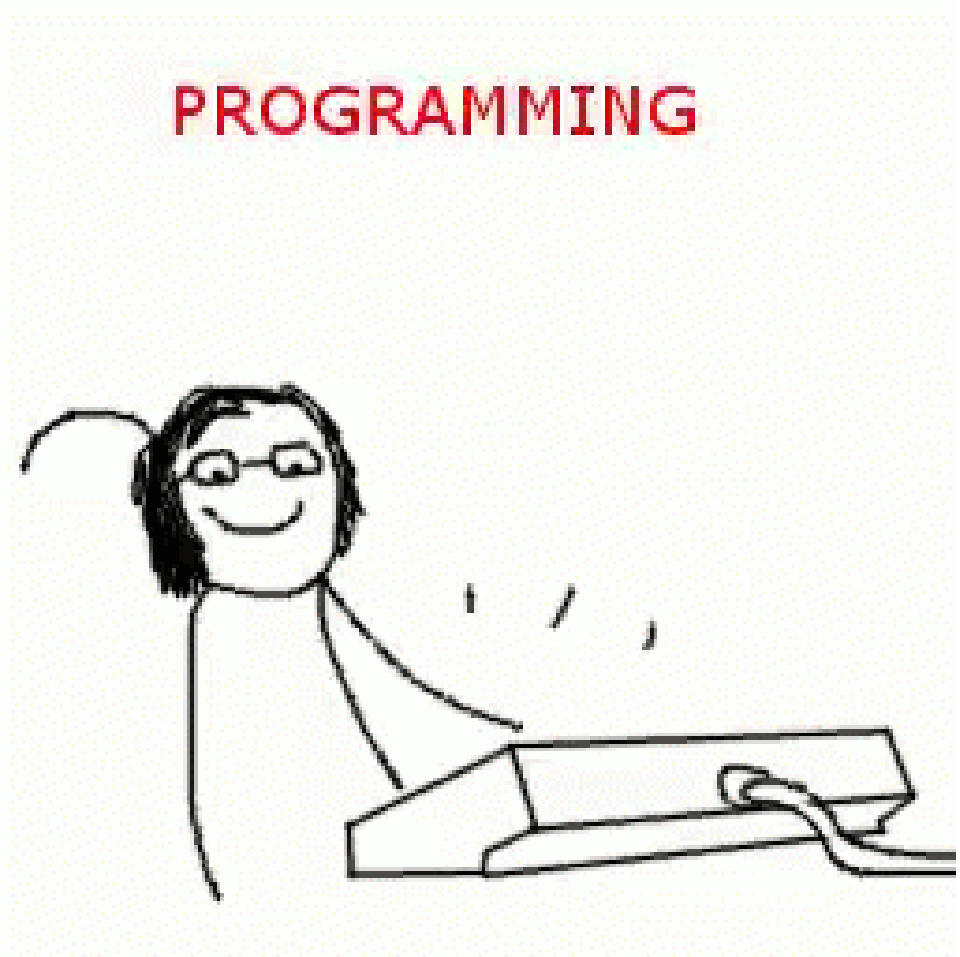
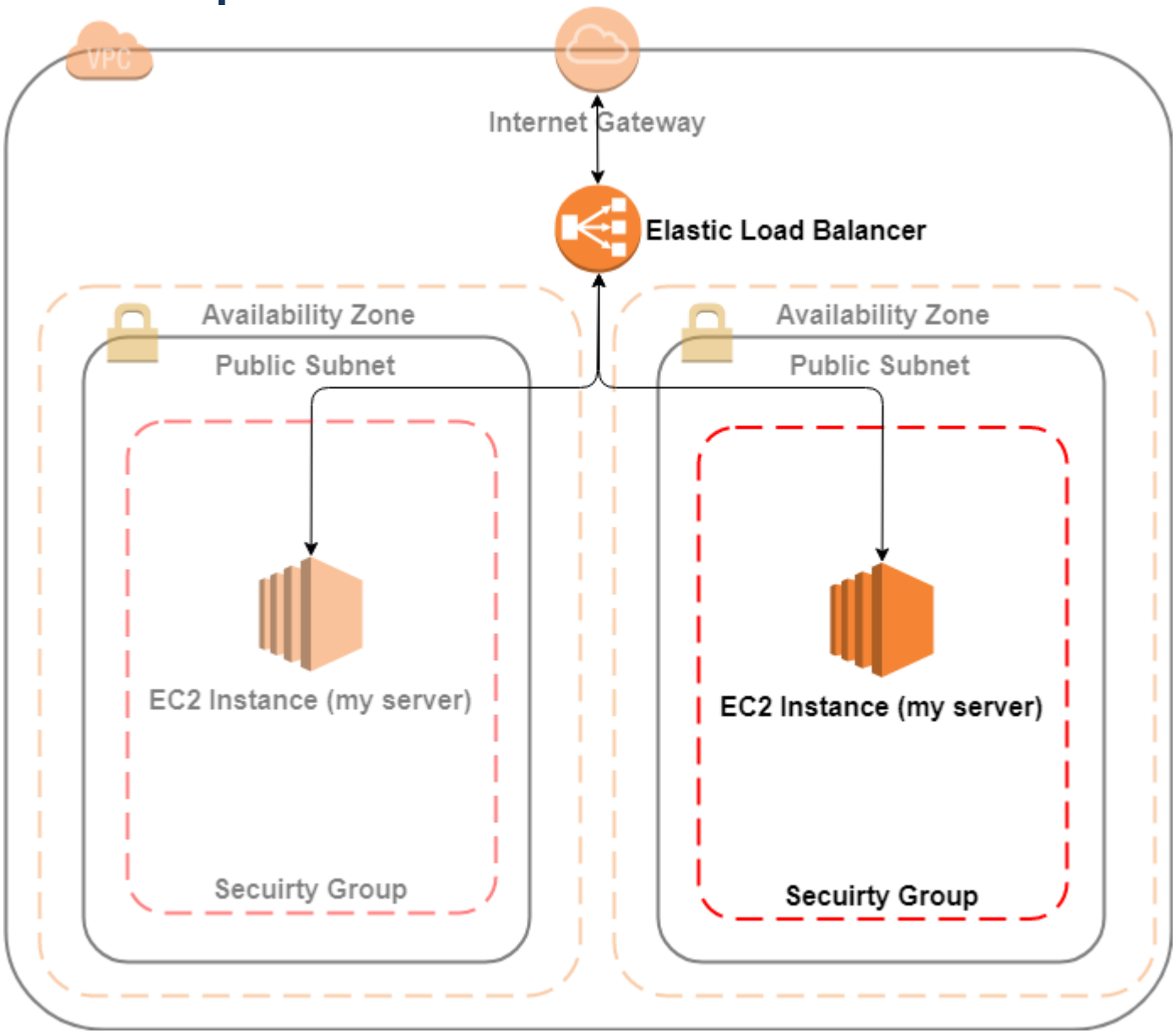
Demo time



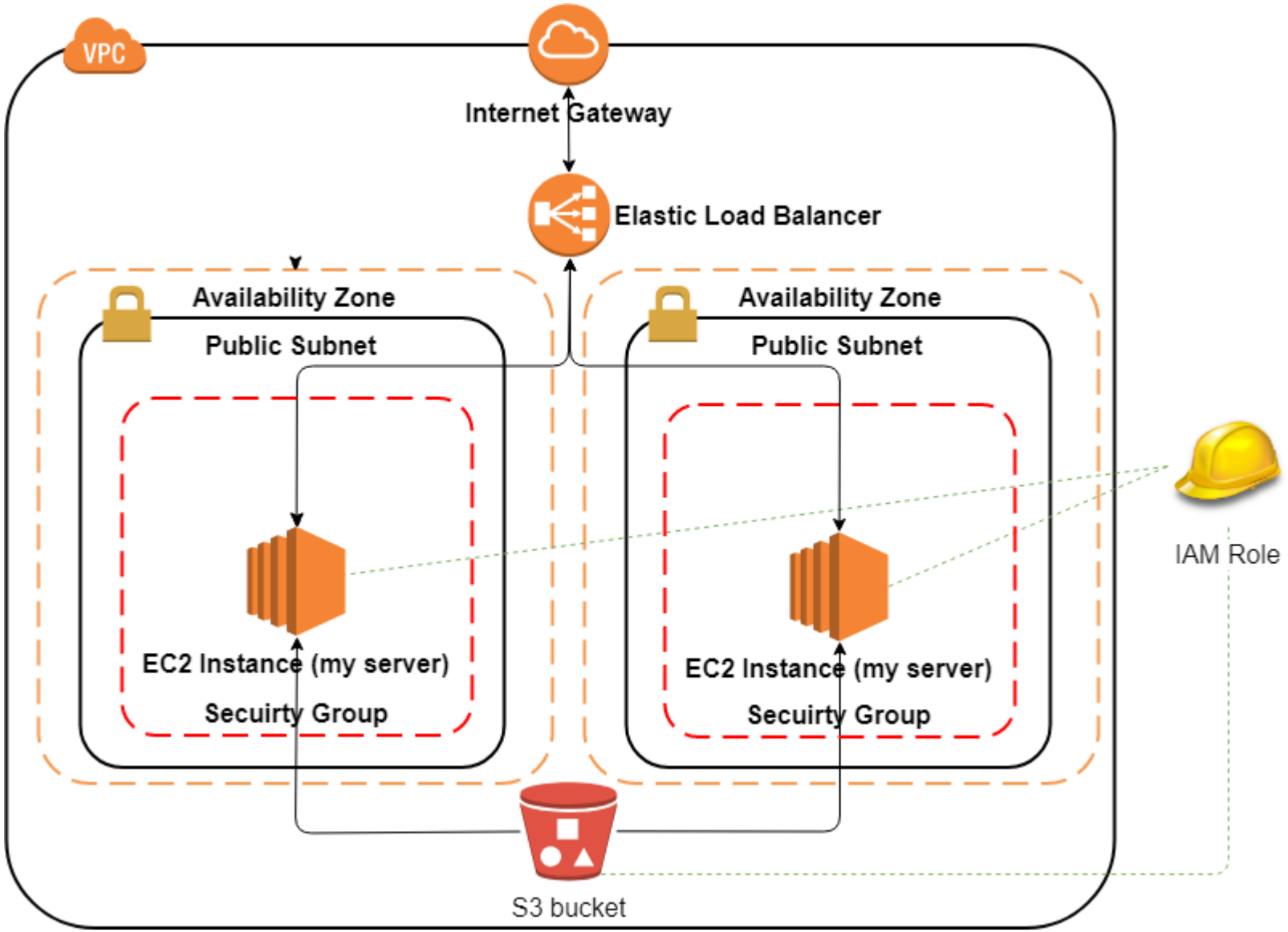
Demo #2 -update



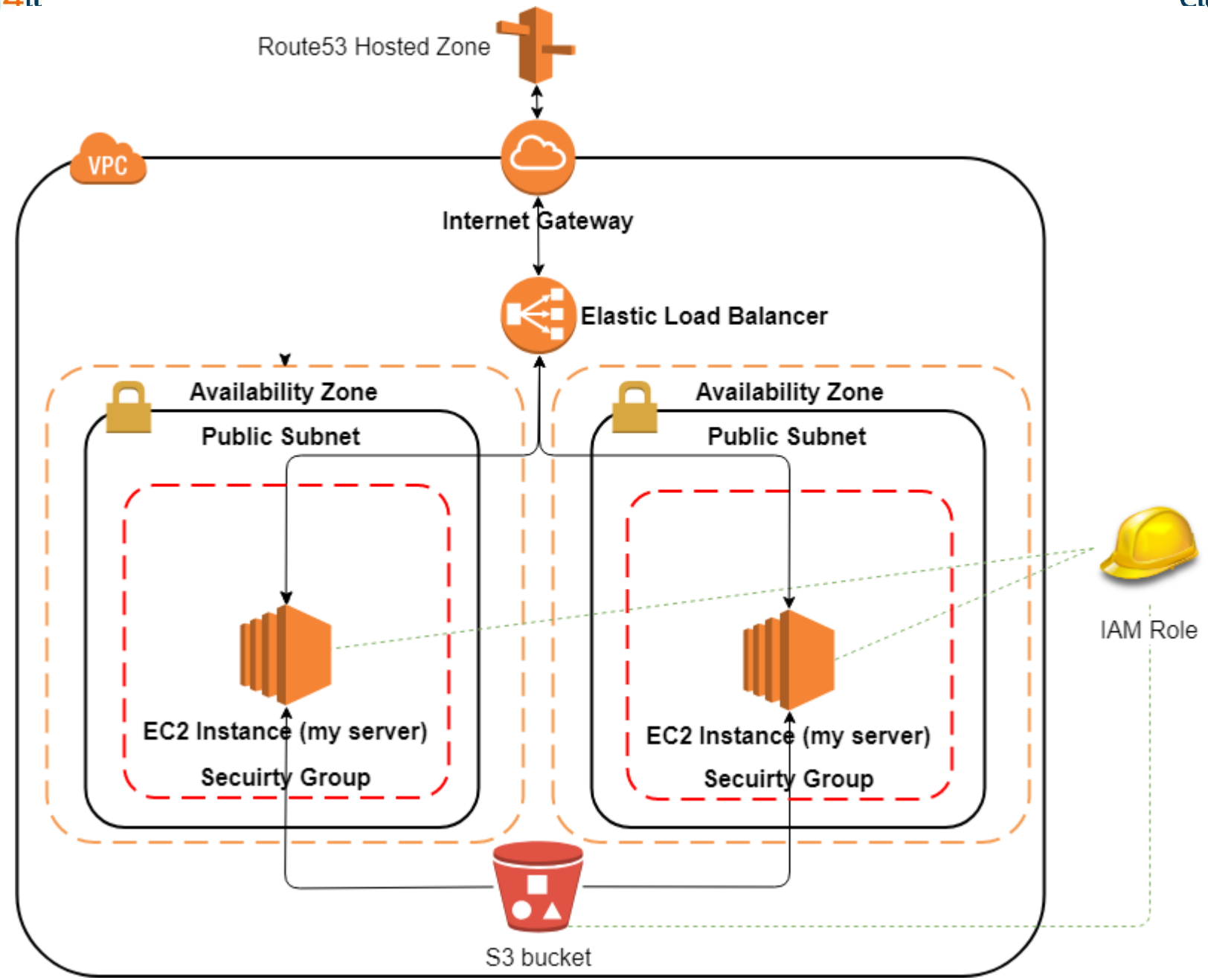
Configuration syntax

- **Variables** - parameters
- **Resources** - component of your infrastructure. It might be some virtual machine, DNS record, or DB provider
- **Data Sources** - allow data to be fetched or computed for use elsewhere in Terraform configuration
- **Outputs** - define values that will be highlighted to the user when Terraform applies
- **Providers** – adapters for actual pro
- Functions & conditionals

Demo #3


VPC
Internet Gateway
Elastic Load Balancer
Availability Zone
Public Subnet
Availability Zone
Public Subnet
EC2 Instance (my server)
Secuirty Group
EC2 Instance (my server)
Secuirty Group
IAM Role
S3 bucket

Cloud4it Group #1 - Wrocław



Production System:
AWS Reference Architecture for hosting WordPress

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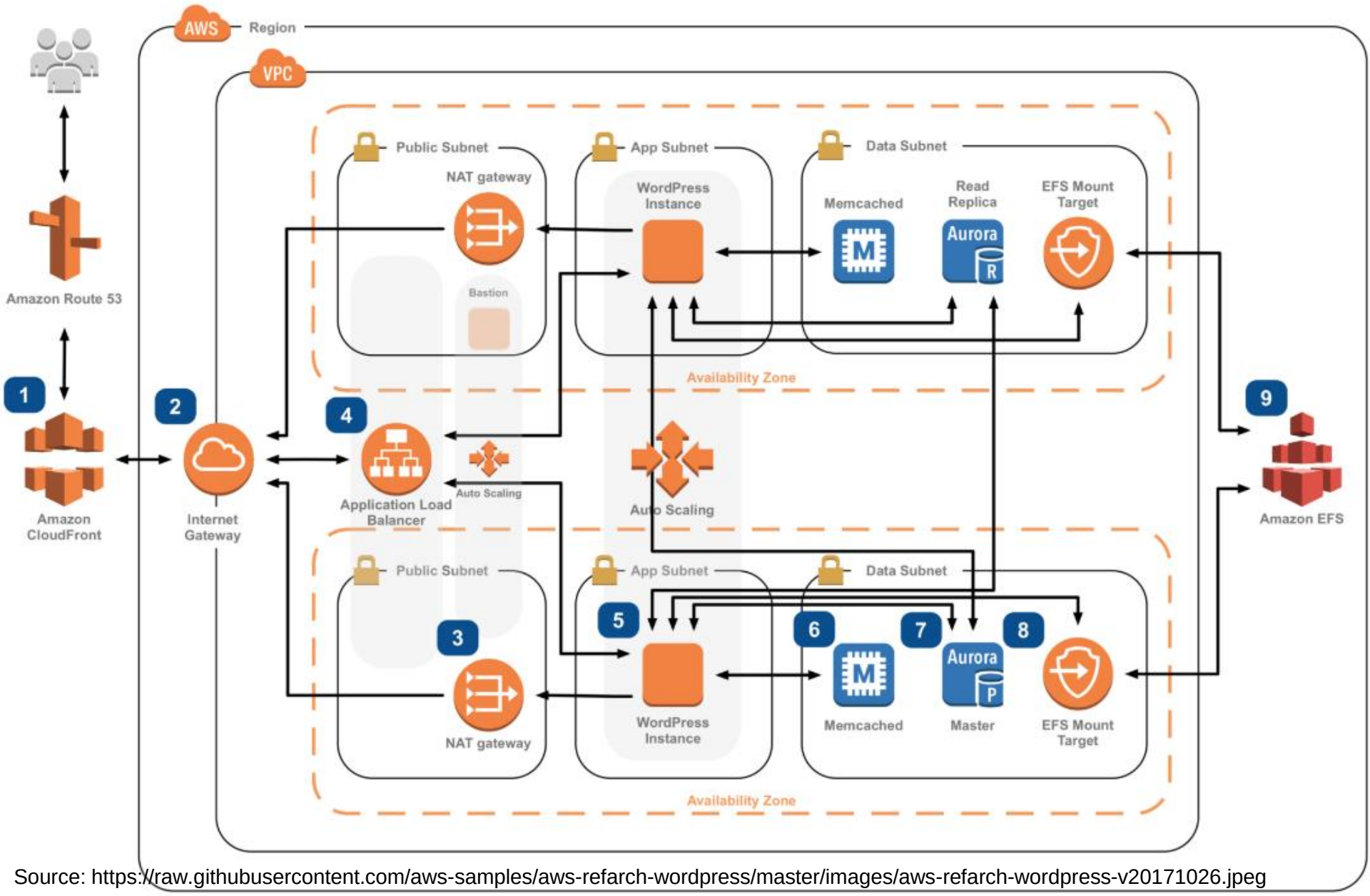
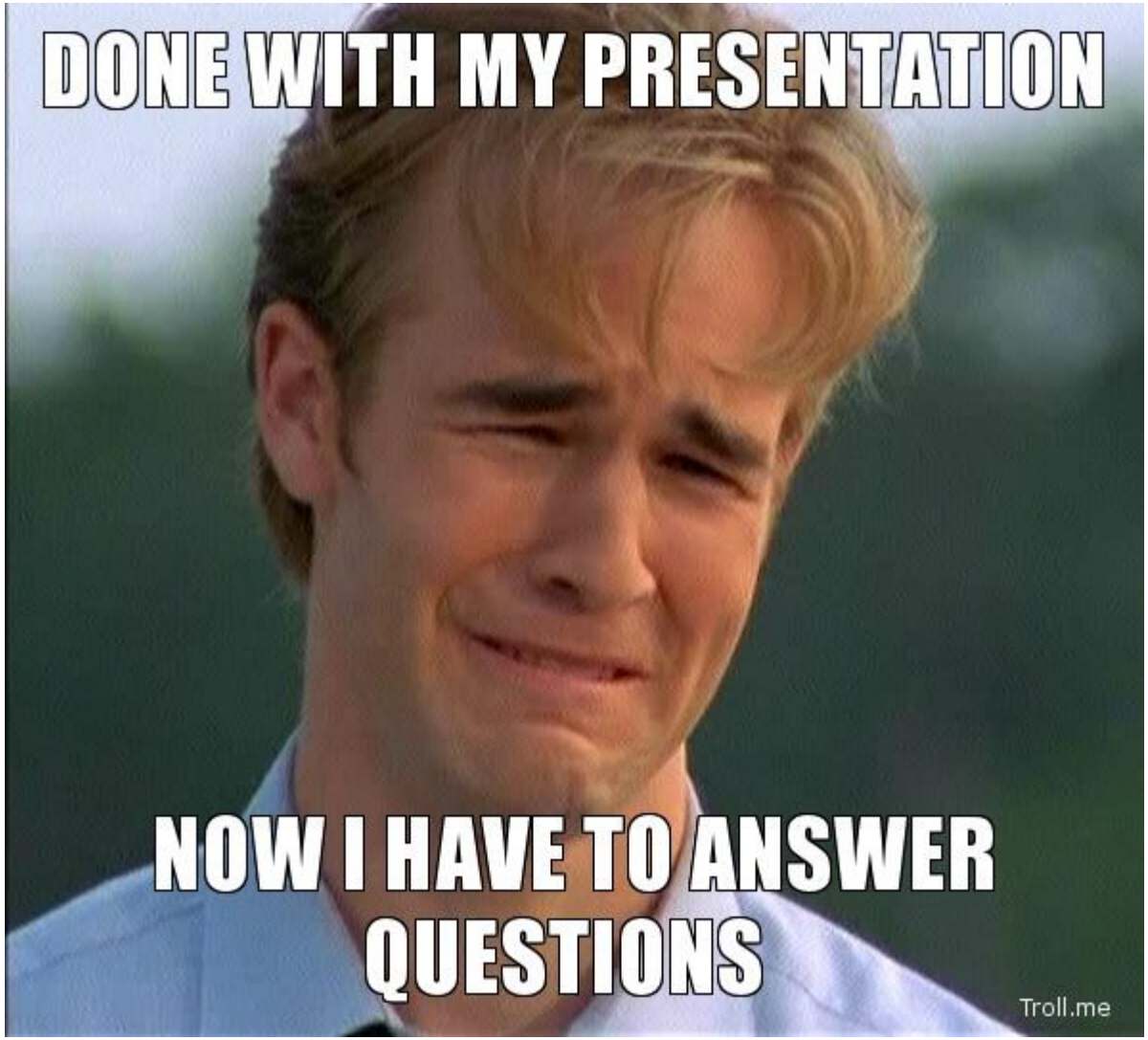


Source: https://raw.githubusercontent.com/aws-samples/aws-refarch-wordpress/master/images/aws-refarch-wordpress-v20171026.jpeg


DONE WITH MY PRESENTATION
NOW I HAVE TO ANSWER QUESTIONS
Troll.me