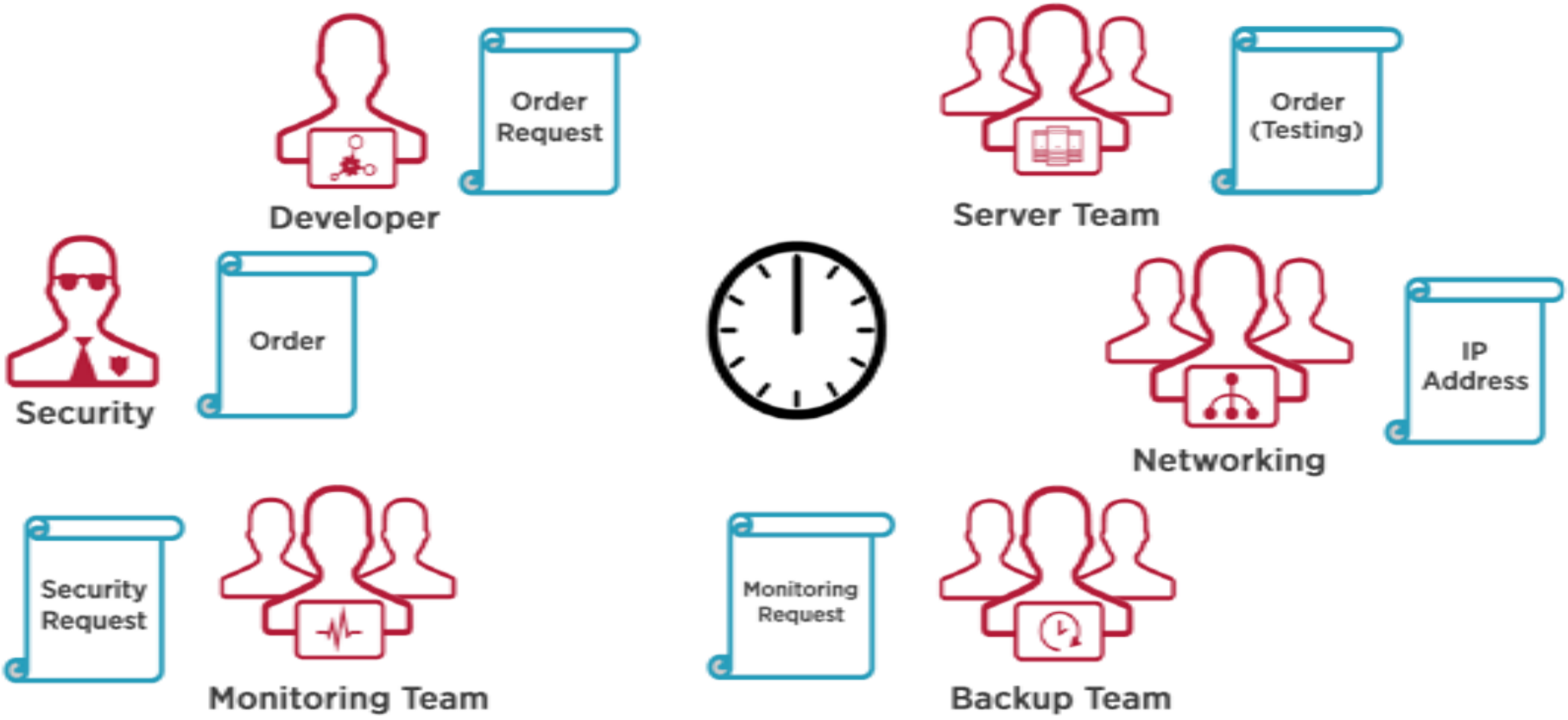
TERRAFORM

QUALITY THOUGHT
INFOSYSTEMS (INDIA) PVT. LTD.

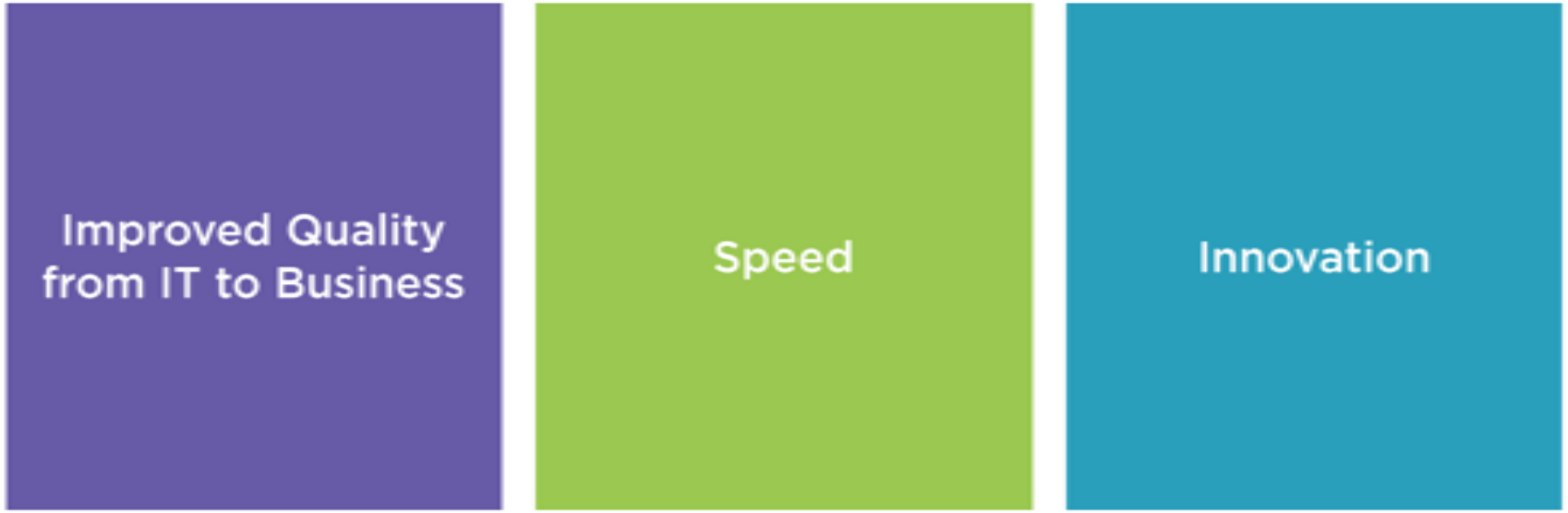
THE OLD WAY TO GET AN IT SERVICE



The Infrastructure as Code (IaC) Way

```
1   provider "aws" {
2     access_key = "
3     secret_key = "
4     region     = "us-east-1"
5   }
6
7   resource "aws_instance" "pluralsightExample" {
8     ami           = "ami-ee7805f9"
9     instance_type = "t2.micro"
10    key_name = "AWS EC2 - SEP 2016"
11  }
```

Benefits of IaC



Terraform and Configuration Management

CHEF

SALTSTACK

- OS Configuration
- Application Installation
- Declarative
- Limited Infrastructure Automation

- Infrastructure Automation
- VM and Cloud Provisioning
- Declarative like Configuration Management Tools
- Limited OS Configuration Management

Declarative vs Procedural

Procedural

Connect to VMware vCenter

Create VM

Install Windows Operating System

Configure NIC Settings

Install Software Package A

Install Software Package B

Declarative

Give me a Virtual Machine with the following configuration:

CPUs: 2

Memory: 2GB

OS: Windows Server 2012

1 NIC with IP 10.0.0.101/24

Puppet Role: SQL Server

Automating Infrastructure Deployment

Provisioning Resources

Planning Updates

Using Source Control

Reusing Templates

Terraform Components

Terraform Executable

Terraform File

```
variable "aws_access_key" {}

variable "aws_secret_key" {}


provider "aws" {

  access_key = "access_key"
  secret_key = "secret_key"
  region = "us-east-1"

}
```

- Variables
- Provider

```
resource "aws_instance" "ex"{

  ami = "ami-c58c1dd3"
  instance_type = "t2.micro"

}

output "aws_public_ip" {

  value =
  "${aws_instance.ex.public_dns}"

}
```

- Resource
- Output

Some of the resources deployed in AWS may cost **money**. You've been warned.

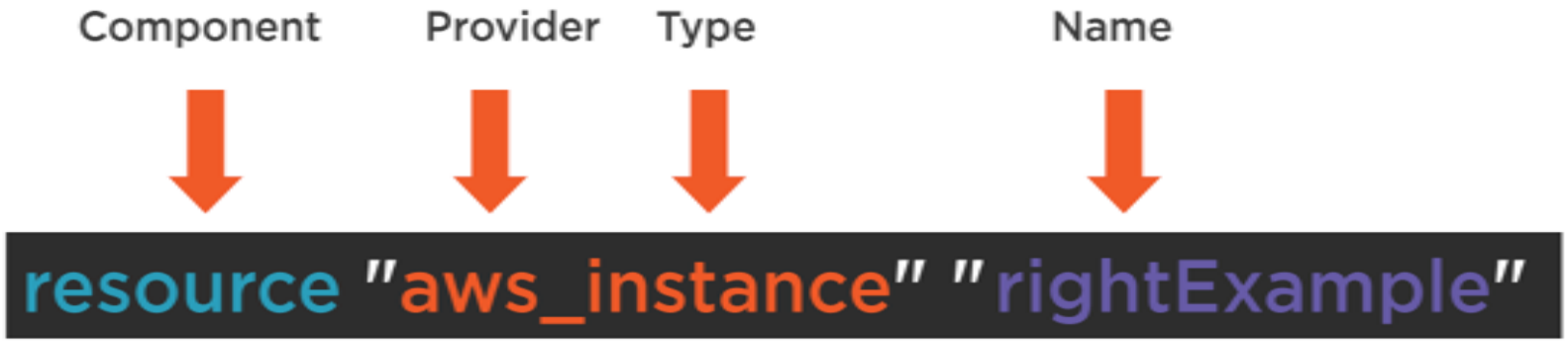
Terraform Constructs

Terraform Constructs

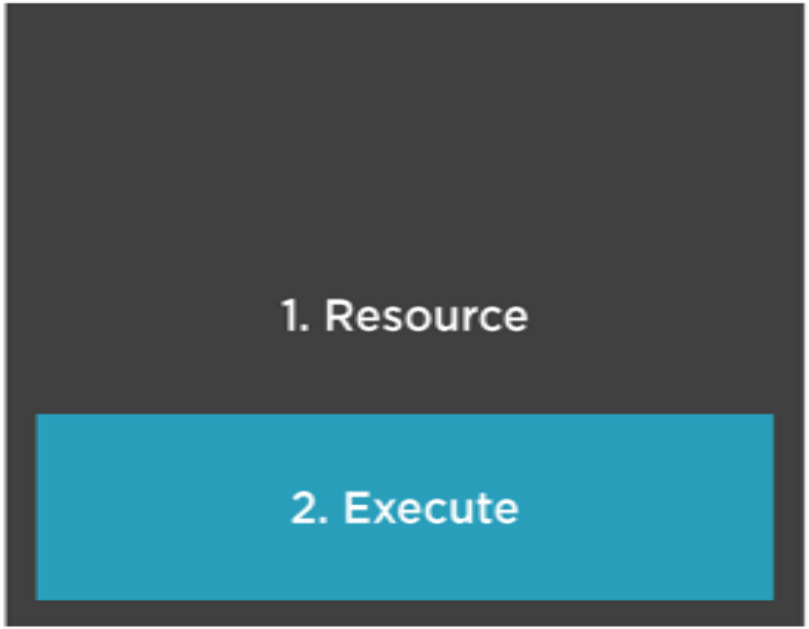
Providers

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

Resources



Provisioners



"When a resource is initially created, provisioners can be executed to initialize that resource"

Terraform Execution

Plan	terraform plan
Execute	terraform apply
Destroy	terraform destroy

Terraform State

JSON format (Do not touch!)

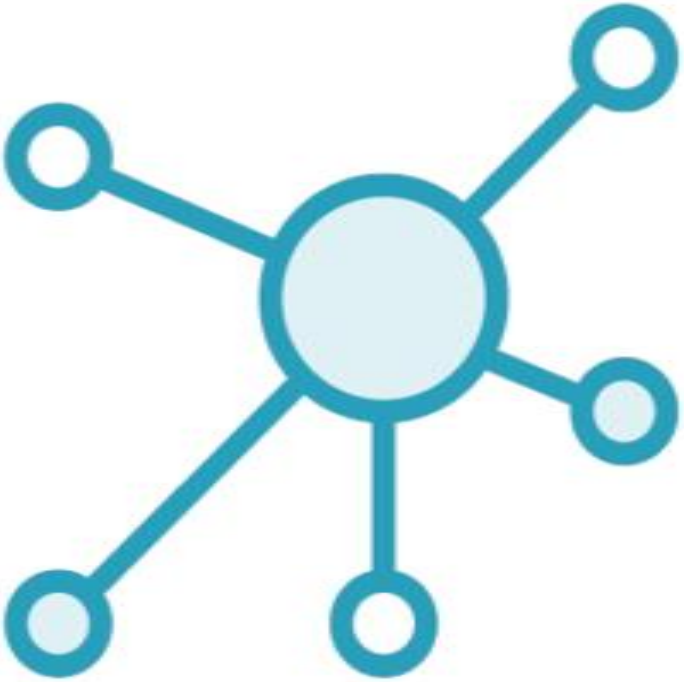
Resources mappings and metadata

Locking

Local / remote

Environments

Terraform Planning



Inspect state

Dependency graph

Additions and deletions

Walk the line

Terraform Syntax

```
#Create a variable
variable var_name {
 key = value #type, default, description
}
#Use a variable
${var.name} #get string
${var.map[“key”]} #get map element
${var.list[idx]} #get list element
```

Terraform Syntax

```
#Create provider

provider provider_name {

 key = value #depends on resource, use alias as needed

}

#Create data object

data data_type data_name {}

#Use data object

${data_type.data_name.attribute(args)}
```

Terraform Syntax

```
#Create resource

resource resource_type resource_name {

 key = value #depends on resource

}

#Reference resource

${resource_type.resource_name.attribute(args)}
```

Terraform Modules

Code reuse

Remote or local source

Terraform evaluation

Mini-Terraform configuration

Multiple instances (no count)

Module Components

Variables

Resources

Outputs

Terraform Module

```
variable “name” {}

resource “aws_s3_bucket” “bucket”{
  name = “${var.name}”
  […]
}

output “bucket_id” {
  value = “${aws_s3_bucket.bucket.id}”
}
```

Terraform Module

```
#Create module bucket
module “bucket” {
  name = “MahBucket”
  source = “.\\Modules\\s3”
}

#Use MahBucket
resource “aws_s3_bucket_object” {
  bucket = “${module.bucket.bucket_id}”
  key = “/walrus/bucket.txt”
  source = “./mahbucket.txt”
}
```

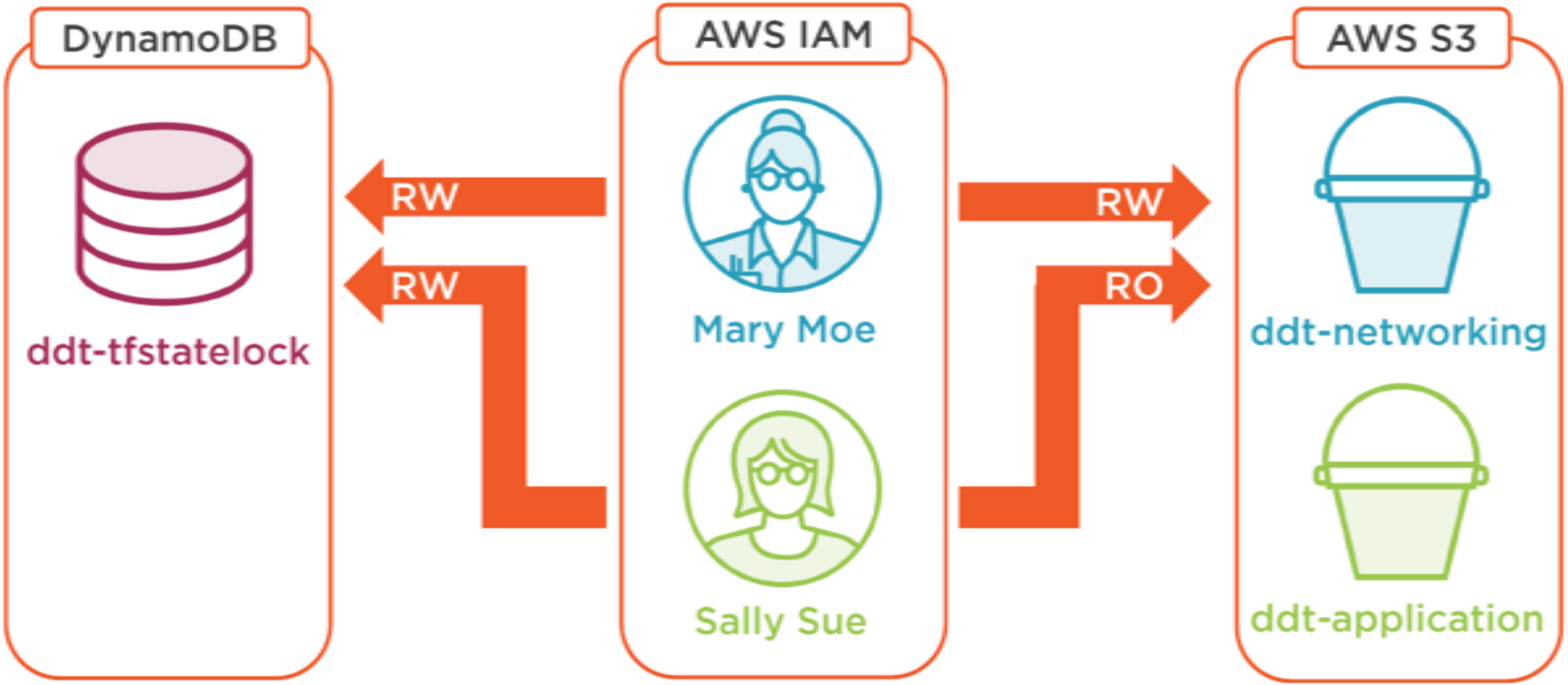
Working as part of a larger team

Configuring infrastructure for another team

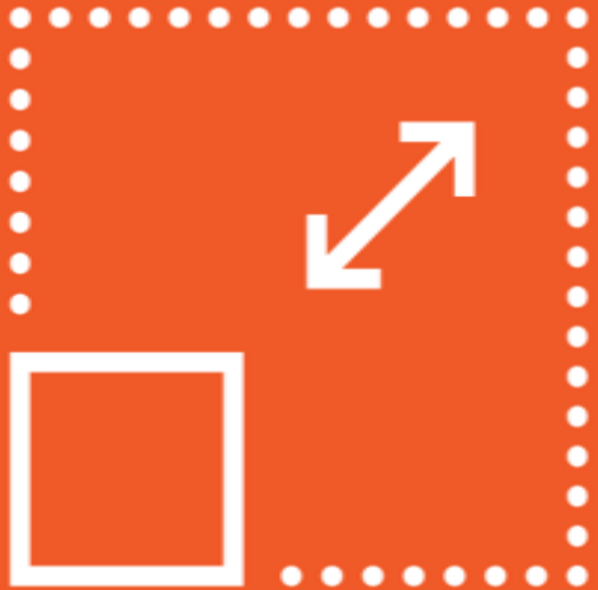
Remote state enables collaboration

Need to restrict access for other teams

Remote State Setup



BACKEND



Remote state is stored in a backend

Backends must be initialized using init

Partial configurations recommended

Backends do not support interpolation

```
# Basic Backend

terraform {
      backend "type" {
            # backend configurations
            # partial configurations allowed
            # no interpolations
      }
}

# Backend Types S3, Consul, AzureRM
```

Configuring a Backend

WORKSPACES

Workspaces replace the environment command

Separate state file per workspace

Use a single configuration for multiple deployments

Supported by select backends

Configuring a Workspace

 # Workspace Commands

`show` – show current workspace
`list` – list all workspaces
`select` – select which workspace to use
`new` – create a new workspace
`delete` – remove a new workspace

 # Examples

```
terraform workspace new development
terraform workspace select development
```

 # Using in a Configuration

```
${terraform.workspace}
```