Terraform at Adobe

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Introduction

Systems Engineer @ Adobe Audience Manager (AAM)
Been with Adobe for 18 months

AAM was acquired by Adobe in 2011, and is 100% in AWS

Twitter- @zxjinn

HashiCorp

VAGRANT

SERF

PACKER

CONSUL

VAULT

TERRAFORM

Raise your hands

- Who knows what Terraform is?
- Who uses Terraform?
- … in production?

Terraform

- Infrastructure as code
- Supports many providers
  - AWS
  - Azure
  - Digital Ocean
  - Google Cloud
  - Heroku
  - OpenStack
  - VMware vSphere/vCloud Director
  - others…

Why Terraform?

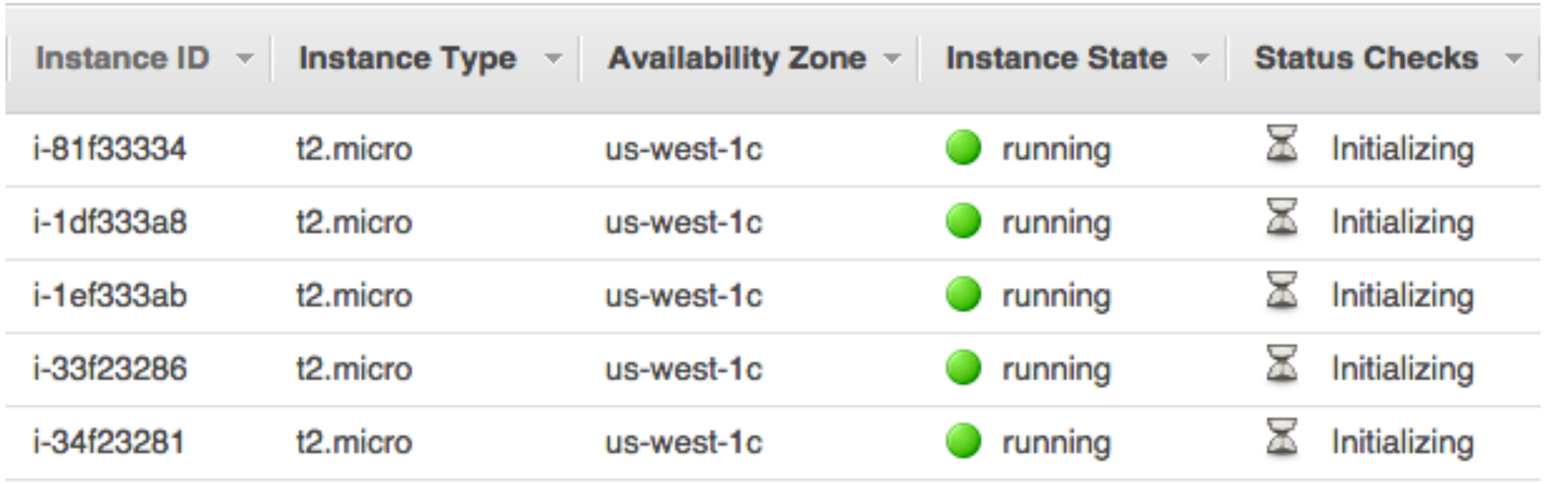
- Fun to write
- Easy to extend with modules
- Shows the execution plan (no-op)
- State stored in a committable file

Basic Terraform Example

Basic Terraform Example

```
$ cat main.tf
resource "aws_instance" "app" {
  ami           = "ami-d1f482b1"
  count         = 5
  instance_type = "t2.micro"
}
$ terraform plan
+ aws_instance.app.0...
+ aws_instance.app.1...
$ terraform apply
aws_instance.app.0: Creating...
Apply complete! Resources: 5 added, 0 changed, 0
destroyed.
$
```

It worked! Parallel, takes ~1 min



Instance ID	Instance Type	Availability Zone	Instance State	Status Checks
i-81f33334	t2.micro	us-west-1c	● running	⌛ Initializing
i-1df333a8	t2.micro	us-west-1c	● running	⌛ Initializing
i-1ef333ab	t2.micro	us-west-1c	● running	⌛ Initializing
i-33f23286	t2.micro	us-west-1c	● running	⌛ Initializing
i-34f23281	t2.micro	us-west-1c	● running	⌛ Initializing

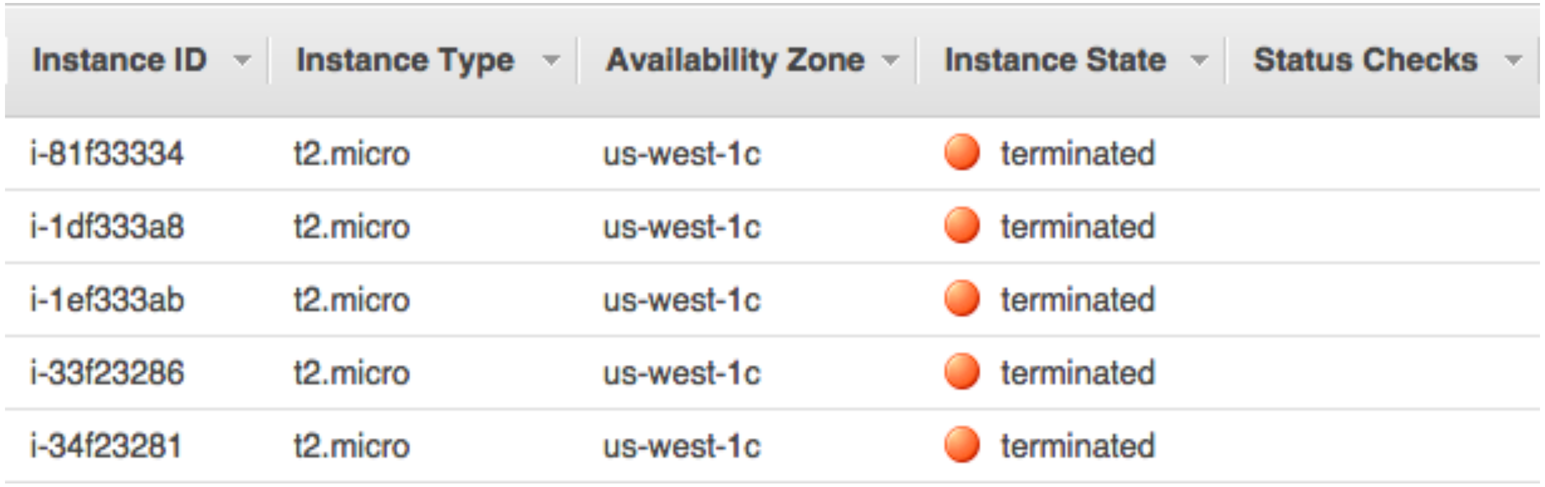
Basic Terraform Destroy

```
$ terraform destroy
Do you really want to destroy?
  Terraform will delete all your managed infrastructure.
  There is no undo. Only 'yes' will be accepted to
confirm.
  Enter a value:yes

aws_instance.app.0: Destroying...

Apply complete! Resources: 0 added, 0 changed, 5 destroyed.
$
```

It worked! Parallel, takes ~1 min



Instance ID	Instance Type	Availability Zone	Instance State	Status Checks
i-81f33334	t2.micro	us-west-1c	● terminated	
i-1df333a8	t2.micro	us-west-1c	● terminated	
i-1ef333ab	t2.micro	us-west-1c	● terminated	
i-33f23286	t2.micro	us-west-1c	● terminated	
i-34f23281	t2.micro	us-west-1c	● terminated	

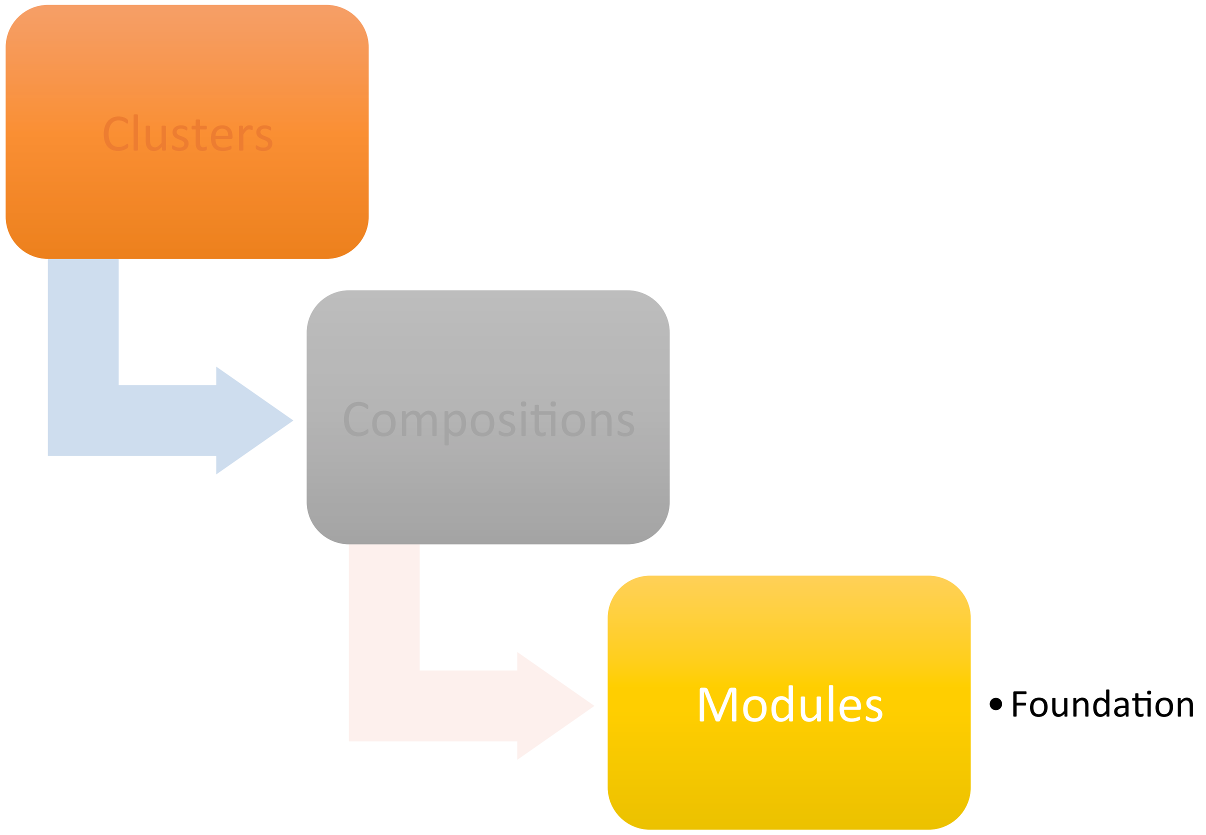
More than just EC2 instances

- S3- Simple Storage Service
- CloudFormation
- VPC- Virtual Private Cloud
- SQS- Simple Queue Service
- Route53- Hosted DNS
- RDS- Relational Database Service
- IAM- Identity and Access Management
- ECS- EC2 Container Service
- others…

Modules, Compositions, and Clusters

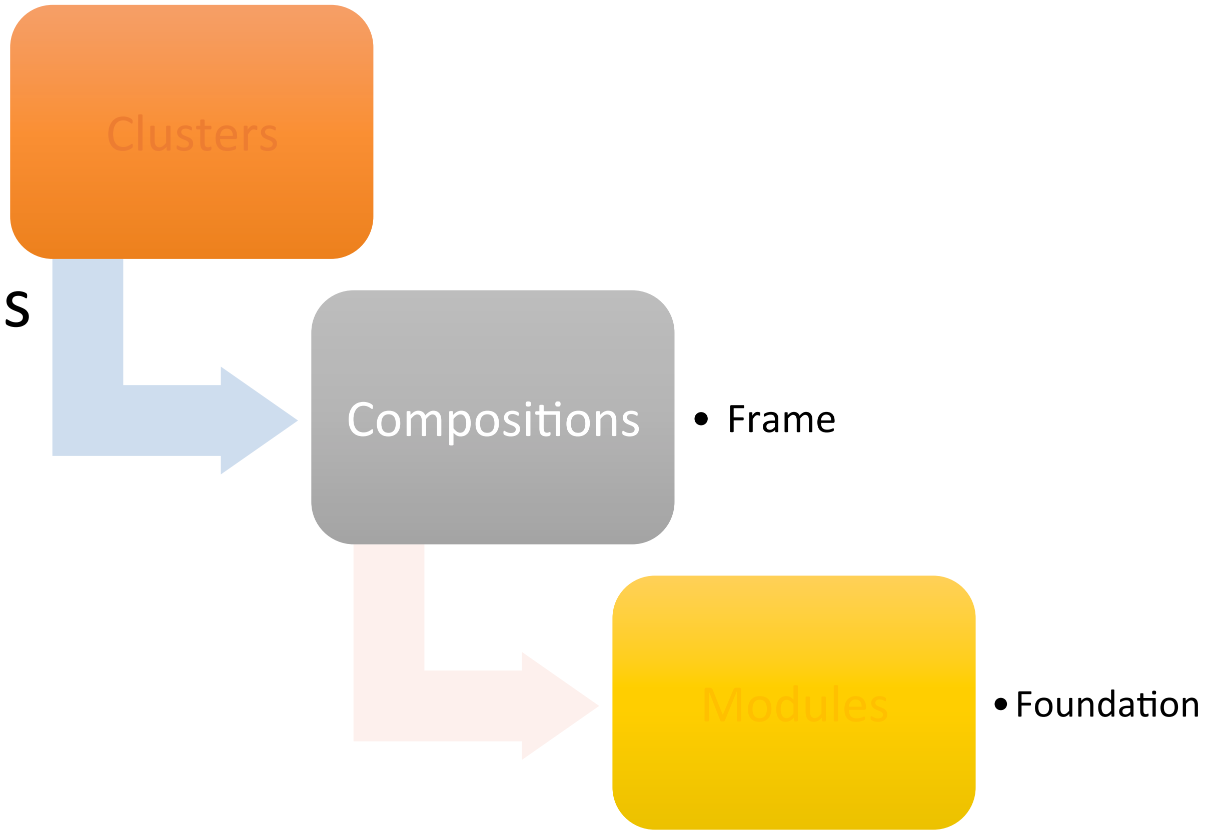
Modules

- Self-contained reusable code
- Behavior changes based on inputs
- Terraform code



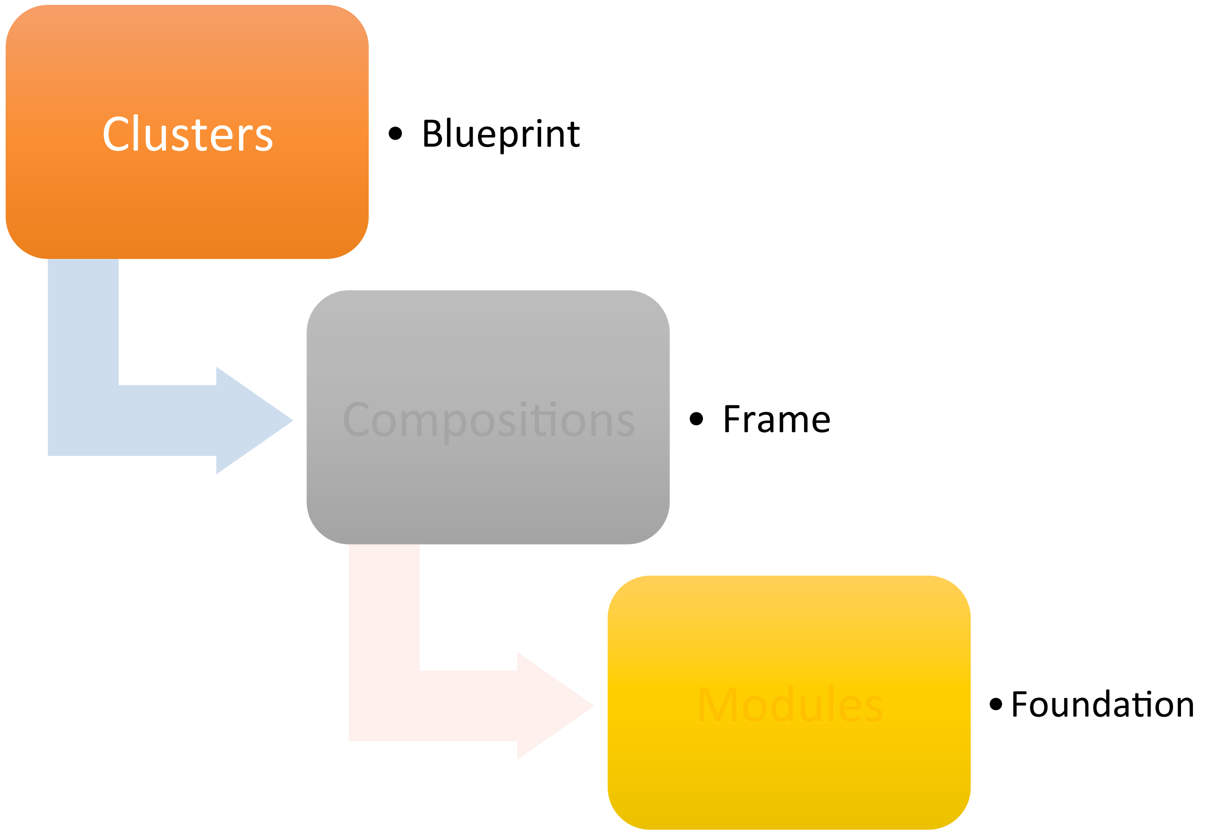
Compositions

- Pre-defined collections of modules
- Passes parameters to many modules
- Terraform + Jinja



Clusters

- Passes params to one composition
- Ultimate source of truth
- YAML



For example

- Module
  - VPC module- NAT and Bastion instances, security groups, etc
  - App1 module- App1 Instances, SQS queues, S3 buckets, subnets
  - DB1 module- RDS instances, security groups
  - Admin module- Instances- config management, monitoring, etc
- Composition
  - Edge composition- VPC, App1, DB1, Admin
  - DataProcessing composition- VPC, App2, DB2, Admin
  - Delivery composition- VPC, App3, Admin

Analogous to modern Puppet design

- Terraform Modules = Puppet Modules
- Compositions = Roles and Profiles
- Clusters = ENC and Hiera

Ops wrapper

- Reads cluster YAML variables
- Reads composition (.tf.jijna2), writes Terraform (.tf) files with cluster variables injected

Demo!

The Future

- Jenkins runs Terraform and commits statefile
- Web interface to generate cluster YAML files for self service
- Pending discussion: ops wrapper generates Terraform JSON instead of parsing jinja

Lessons Learned, Best Practices

- A springboard for Terraform (ops wrapper for us) is invaluable
- Terraform HCL + Jinja templates are easier to write and read than Terraform JSON
- Make 1 cluster = 1 vpc = 1 environment = 1 purpose
    - Reproducible environments
    - Separated Terraform statefiles per cluster
- Version user data in a map variable
- Symlink shared Terraform files in modules
- Separate "common" infrastructure like- S3 buckets, SQS, IAM to its own cluster

Don’t

- Get impatient with Terraform
- Go in guns blazing and use it in production on day 1
- Skip reading the Terraform docs

Woohoooo!

- 85% of our production infrastructure is managed with Terraform!

Questions?

Adobe