Codify Your Data Infrastructure Using Terraform

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Note: These slides have been modified from their original versions which were dedicated for a live audience.

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BizStream

ATOMIC OBJECT

THE C2 GROUP

KL&A
KUNZ, LEIGH AND ASSOCIATES

{M} MICHIGAN SOFTWARE LABS

WEST MICHIGAN TECH TALENT

TEKTON®

KFORCE℠

Leading EDJE

Mutually human

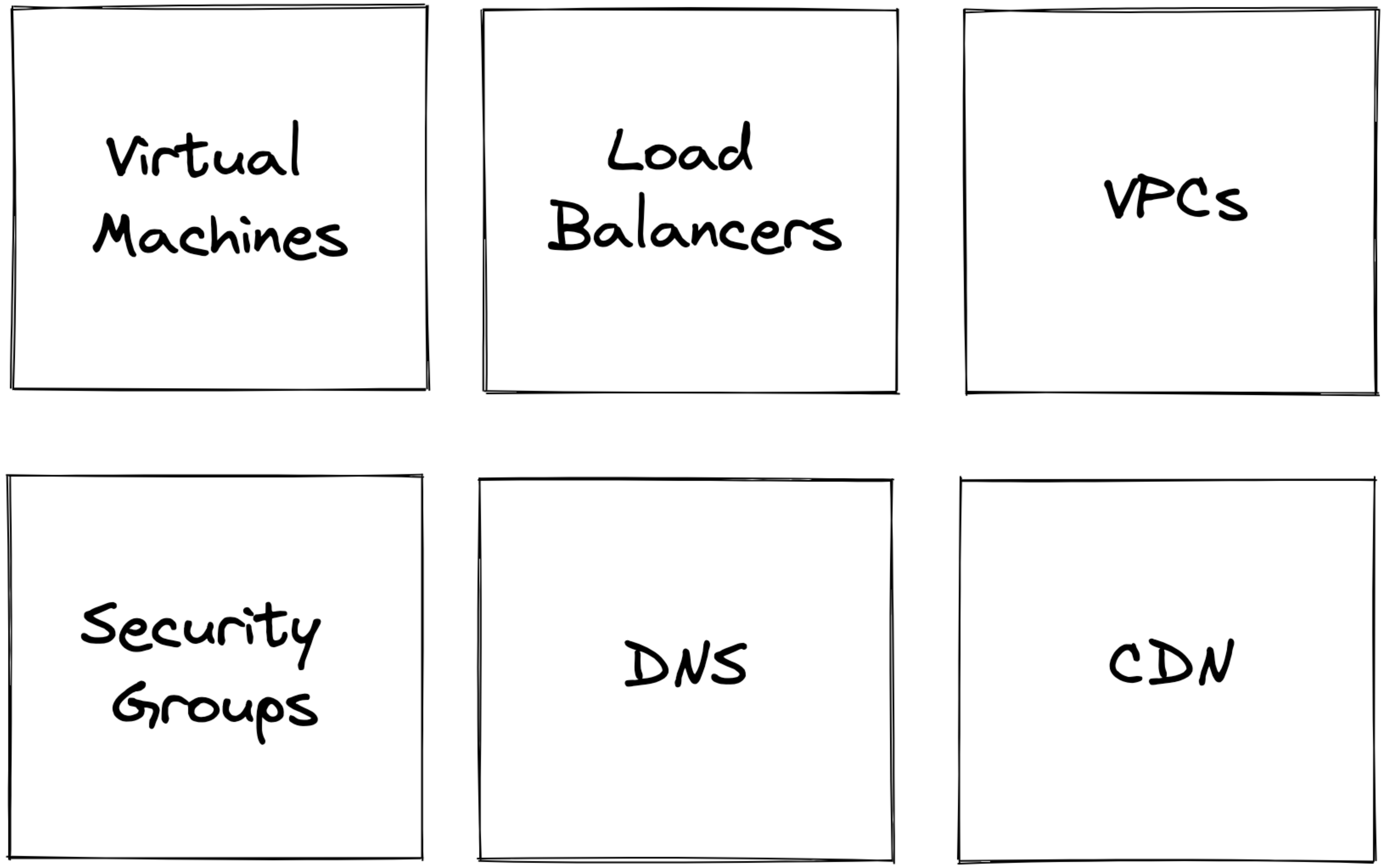
Scout APM

Sweetwater®
Music Instruments & Pro Audio

Hi, I'm Dewan

- Senior Developer Advocate, Aiven
- New Brunswick, Canada
- Focus on app/data infrastructure
- Pro bono career coach

Application Infrastructure



Virtual Machines

Load Balancers

VPCs

Security Groups

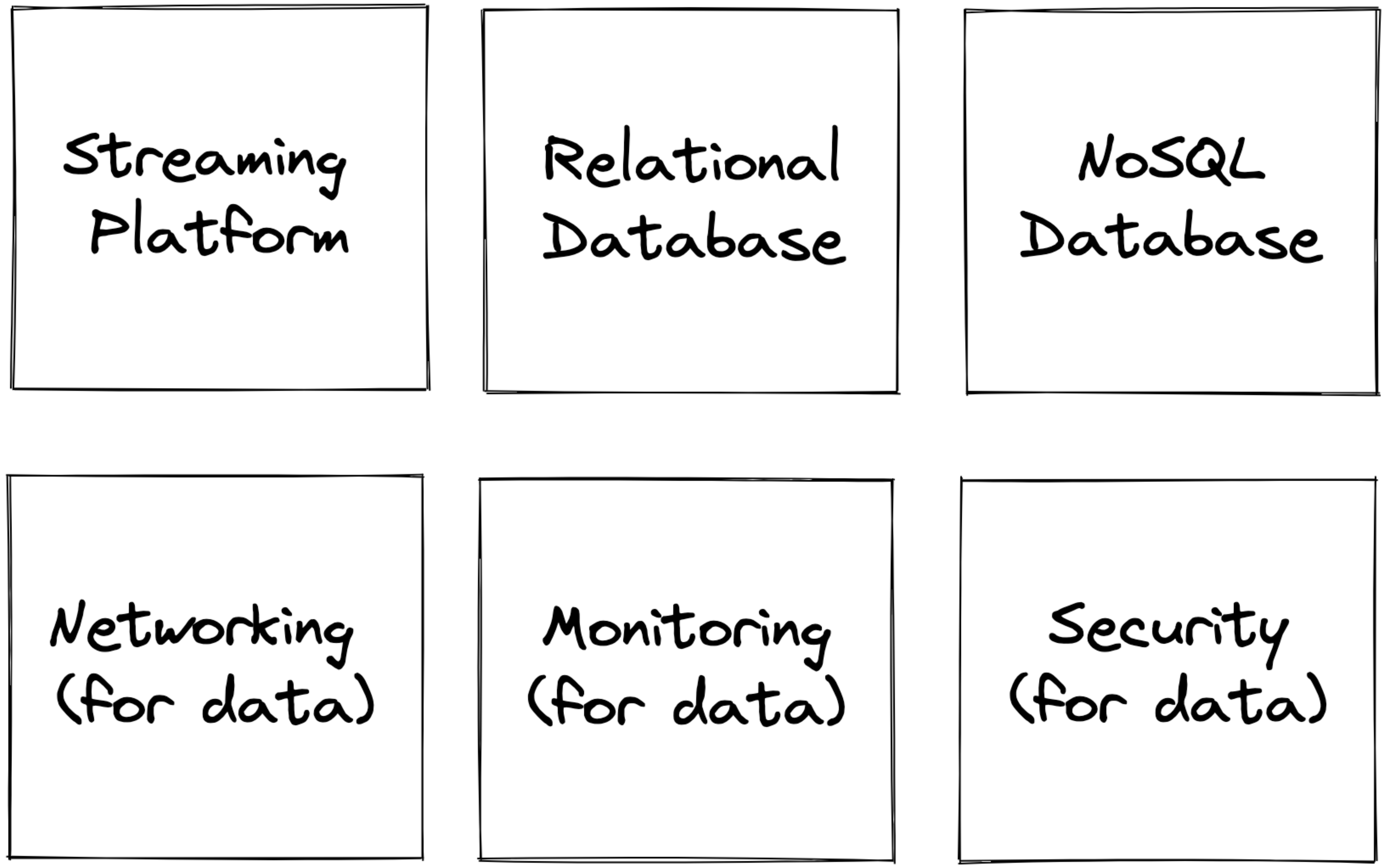
DNS

CDN

Why do we build applications?

To move **data**

Data Infrastructure



Streaming Platform

Relational Database

NoSQL Database

Networking (for data)

Monitoring (for data)

Security (for data)

Infrastructure-as-Code Principles

- Reproducibility
- Repeatability
- Disposability
- Consistency
- Ability to incorporate design changes

More in the book:
Infrastructure as Code (Kief Morris)

Infrastructure-as-Code Challenges

- Resistance to learning
- Configuration drift
- Duplicate work
- Security issues*
- Handling unicorns

*Source: https://bridgecrew.io/blog/state-of-open-source-terraform-security-report-2020

Handling Unicorns - Databases

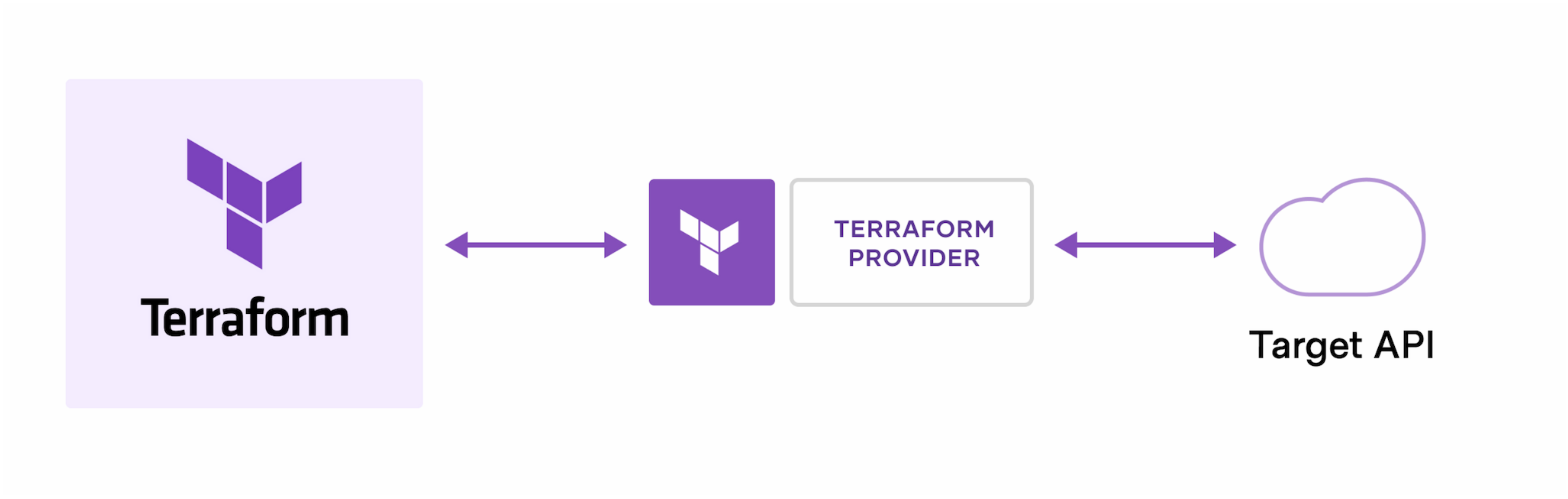
How to IaC without downtime

- Perform version upgrade
- Prevent version upgrade
- Change configurations

HashiCorp Terraform

- Open-source Infrastructure as Code tool
- Policy compliance and management
- Target cloud or on-prem resources
- Version-control
- Declarative

Aiven Terraform Provider

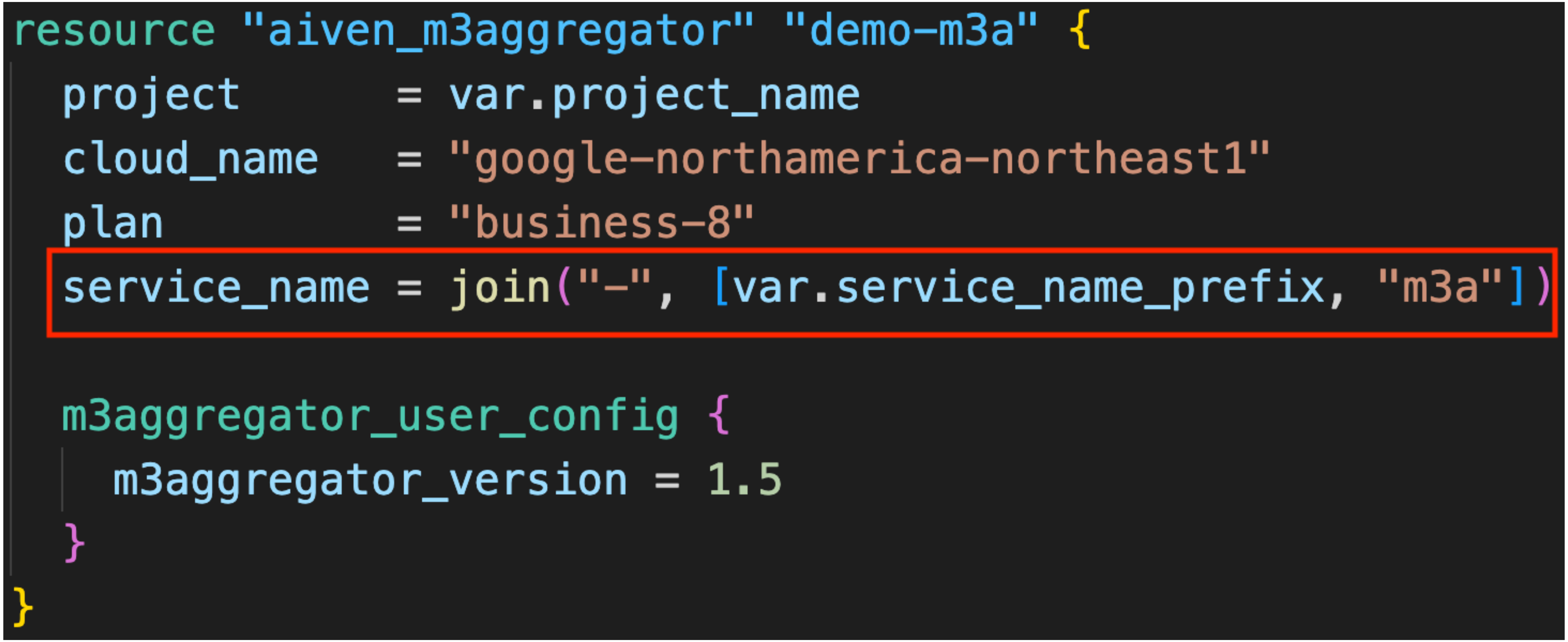


Source: https://www.terraform.io/intro

There was a demo in this slide.

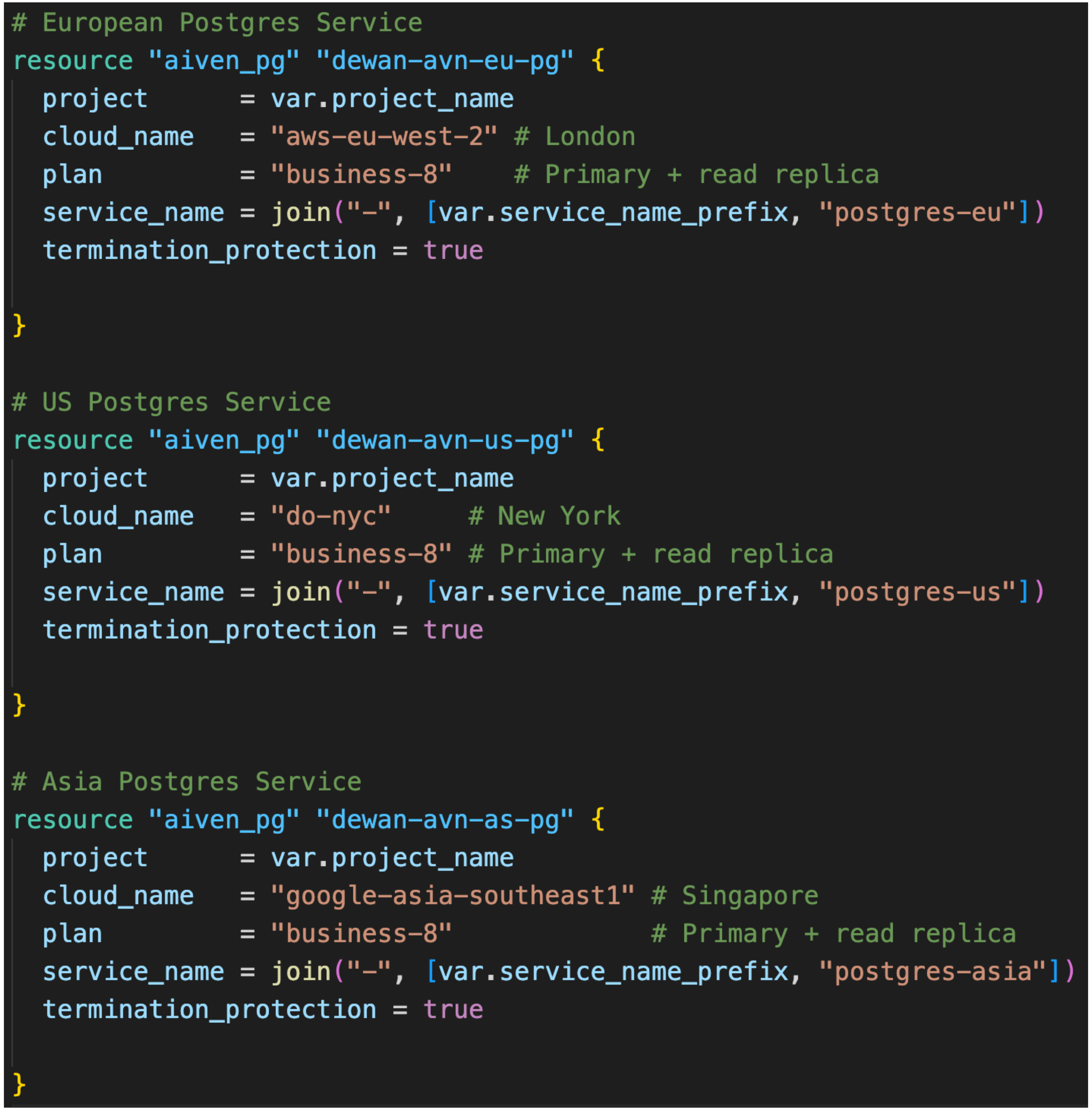
https://developer.aiven.io/docs/tools/terraform/get-started.html to follow the demo

Reproducibility



```
resource "aiven_m3aggregator" "demo-m3a" {
  project      = var.project_name
  cloud_name   = "google-northamerica-northeast1"
  plan         = "business-8"
  service_name = join("-", [var.service_name_prefix, "m3a"])

  m3aggregator_user_config {
    m3aggregator_version = 1.5
  }
}
```



```
# European Postgres Service
resource "aiven_pg" "dewan-avn-eu-pg" {
  project      = var.project_name
  cloud_name   = "aws-eu-west-2" # London
  plan         = "business-8"    # Primary + read replica
  service_name = join("-", [var.service_name_prefix, "postgres-eu"])
  termination_protection = true

}

# US Postgres Service
resource "aiven_pg" "dewan-avn-us-pg" {
  project      = var.project_name
  cloud_name   = "do-nyc"      # New York
  plan         = "business-8" # Primary + read replica
  service_name = join("-", [var.service_name_prefix, "postgres-us"])
  termination_protection = true

}

# Asia Postgres Service
resource "aiven_pg" "dewan-avn-as-pg" {
  project      = var.project_name
  cloud_name   = "google-asia-southeast1" # Singapore
  plan         = "business-8"             # Primary + read replica
  service_name = join("-", [var.service_name_prefix, "postgres-asia"])
  termination_protection = true

}
```

Repeatability

Consistency

@aiven_io

in/diahmed | @DewanAhmed

Apache Kafka® and Apache Kafka® MirrorMaker 2

Data Center 1
topic-a
Apache Kafka® Source
Apache Kafka®
MirrorMaker 2
Replication Flow
Data Center 2
topic-b
dc1.topic-a
Apache Kafka® Target

There was a demo in this slide.

https://developer.aiven.io/docs/tools/terraform/reference/cookbook/kafka-mirrormaker-recipe.html to follow the demo

But… How do I start?

- Research - is this right for us?
- Awareness - are we ready for this?
- Principles - Do you know the fundamentals?
- Pilot - Let’s get something working
- ~~All-in~~ Strategy - Roll-out where it makes sense

Recap

- Infrastructure-as-Code (IaC) principles
- Challenges and concerns - IaC with data infrastructure
- How to get started in your IaC journey?

References:

- Aiven Terraform Provider: https://developer.aiven.io/docs/tools/terraform.html

- Demo: https://developer.aiven.io/docs/tools/terraform/reference/cookbook/kafka-mirrormaker-recipe.html

- IaC Blog: https://www.dewanahmed.com/iac-principles-patterns

Questions?

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