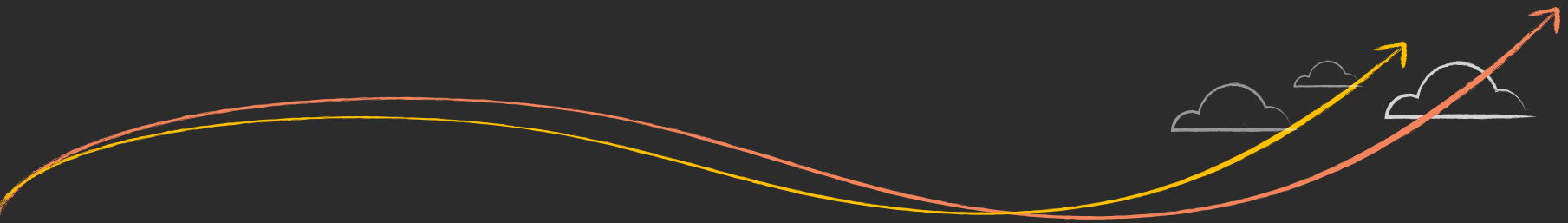
Kubernetes The Database

Jonathan Owens and Maryum Styles



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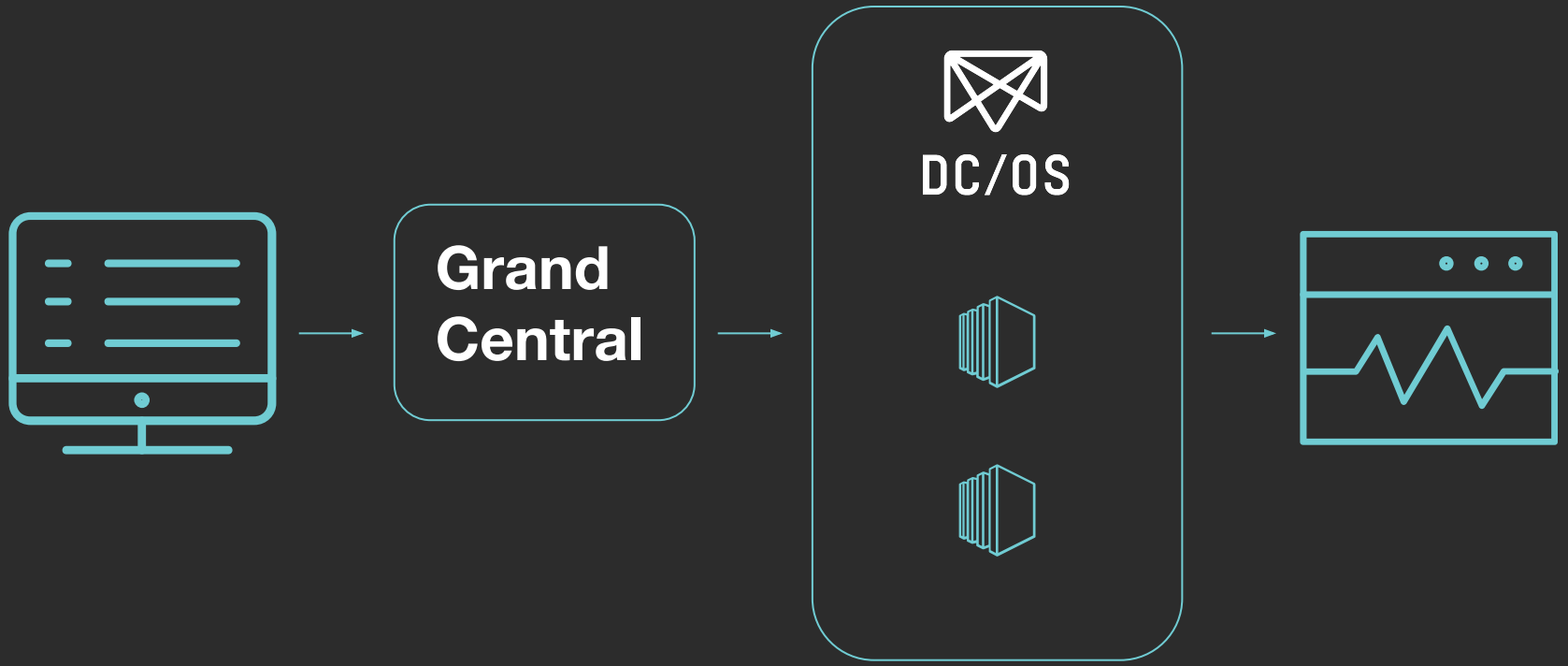
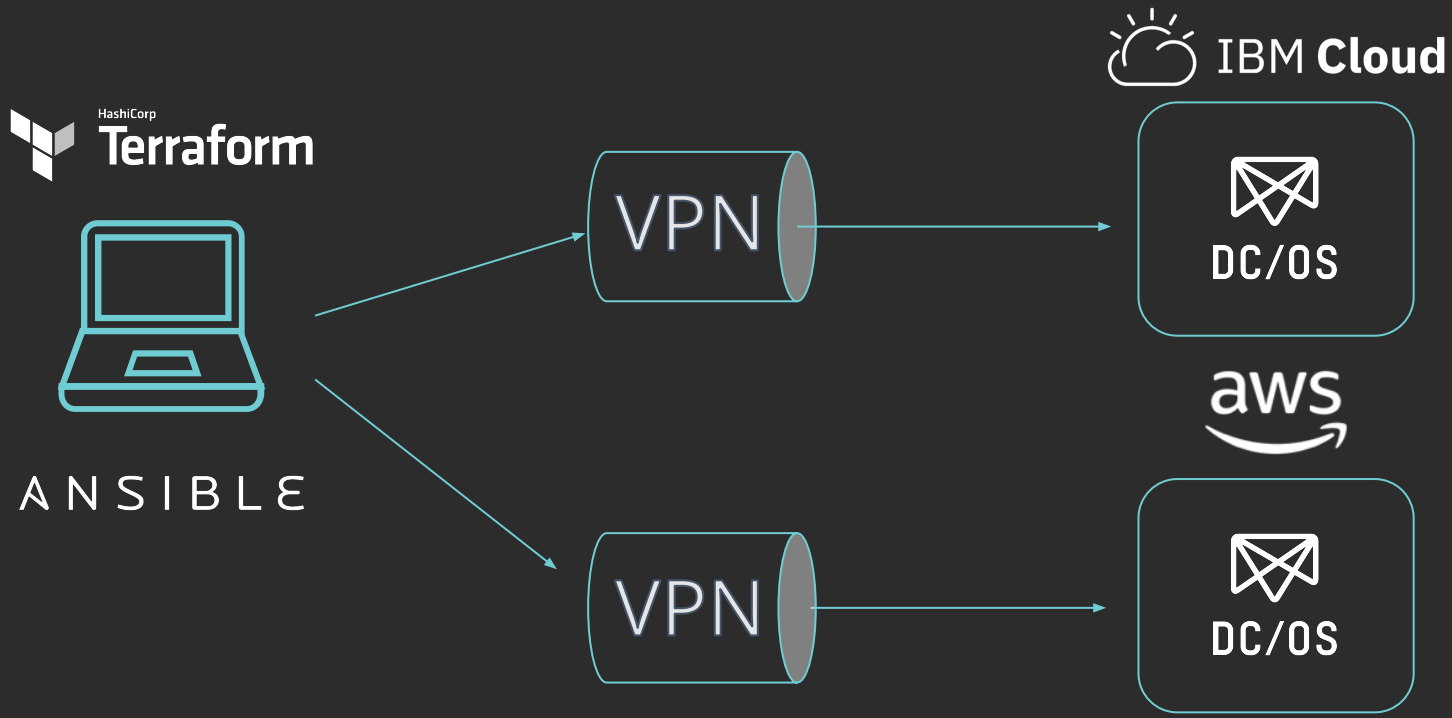
Container Fabric at New Relic

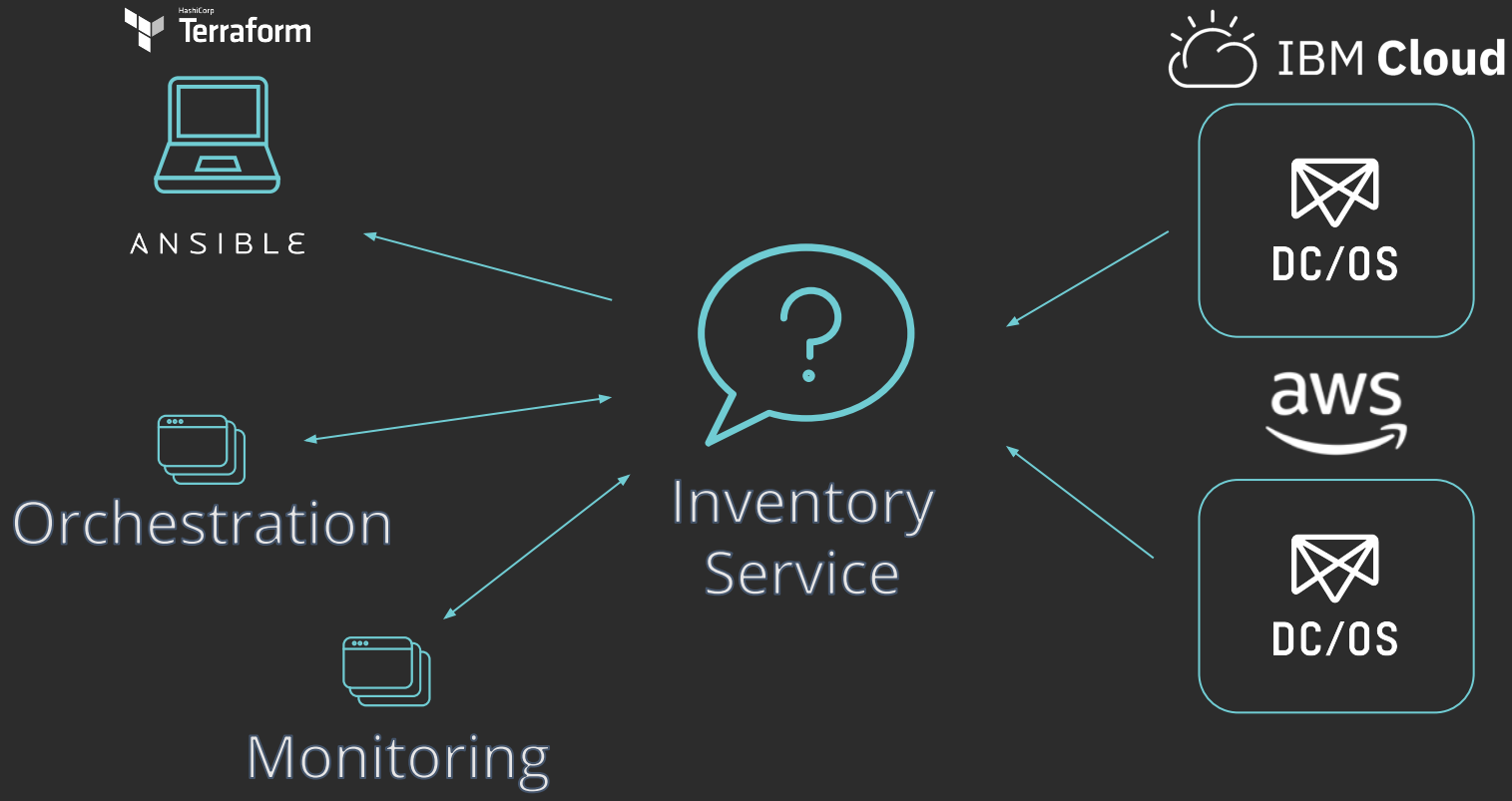


Container Fabric Management Architecture

Container Fabric Regional Architecture



Multi-Cloud Inventory



What could we use?

Terraform state?

- Not distributed
- Not dynamic
- No partial updates

Device42?

- Not available

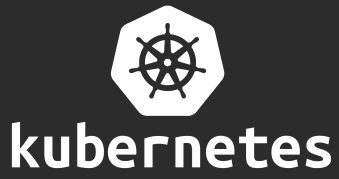
What turned out to matter

- Single source of information
- Live worldwide updates
- Ansible dynamic inventory compatible CLI
- Production quality
- Locally meaningful annotations

How might we do it?

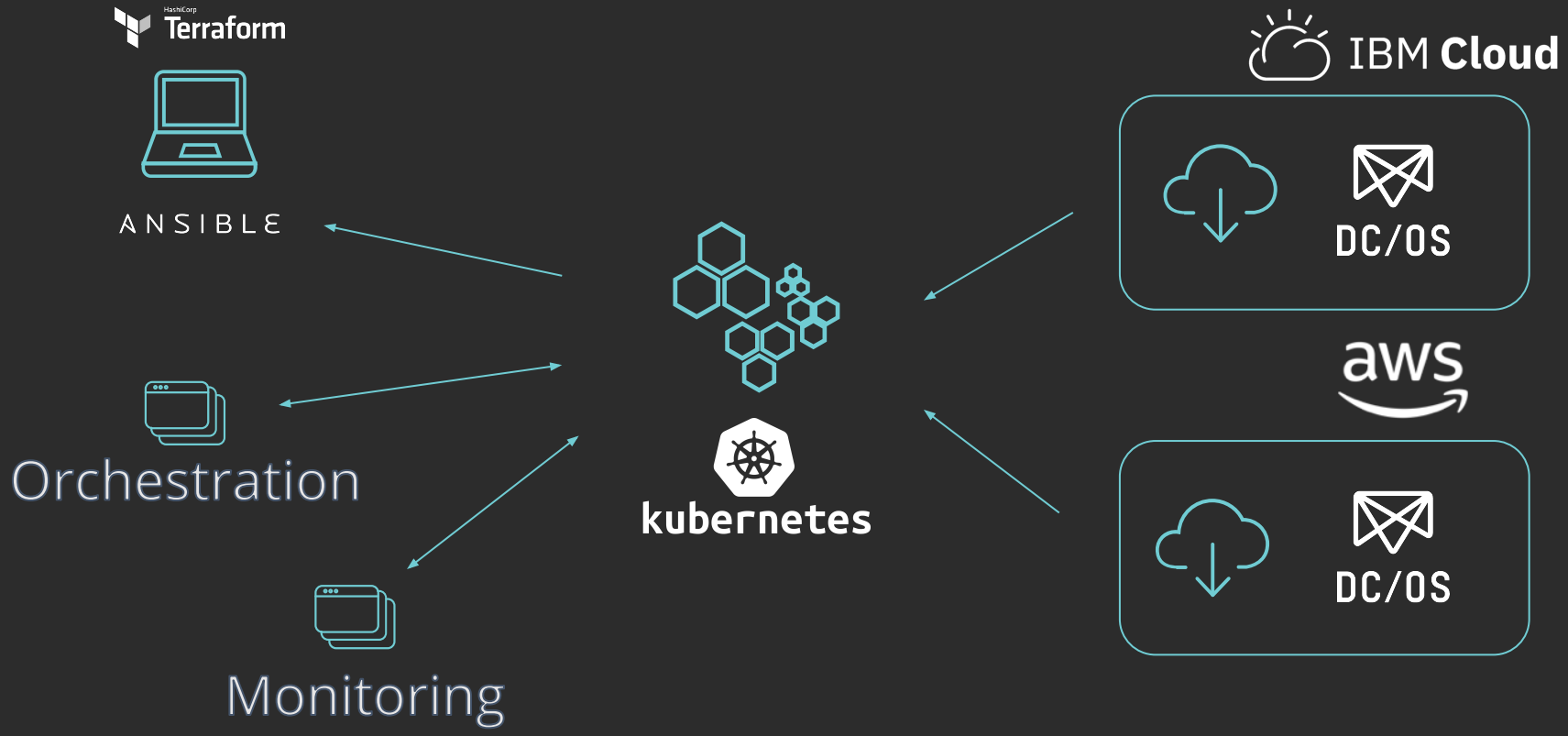
- etcd backend
- Go language service
- Customizable API endpoints
- HTTP+JSON API

What if we just...



- Use the Kubernetes API server
- Use Custom Resource Definitions
- Profit?

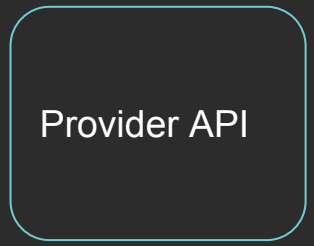
Kubernetes API Inventory



Implementation

Maryum Styles

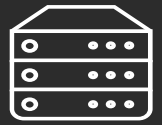
Fetcher Flow



Provider APIs

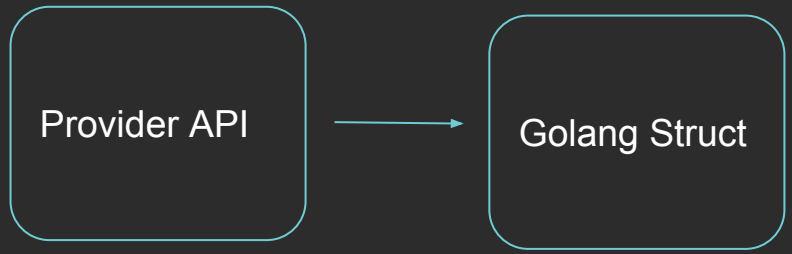
aws

IBM Cloud



Datacenter

Fetcher Flow



Golang Struct

Json responses from Provider APIS are stored as structs specific to each provider

Fetcher Flow

Creating a Custom Object

- create CRDs
- create struct fields
- update register
- code generation
- apply CRDs

Host Object

Host Labels

hardware type

region

cluster name

...

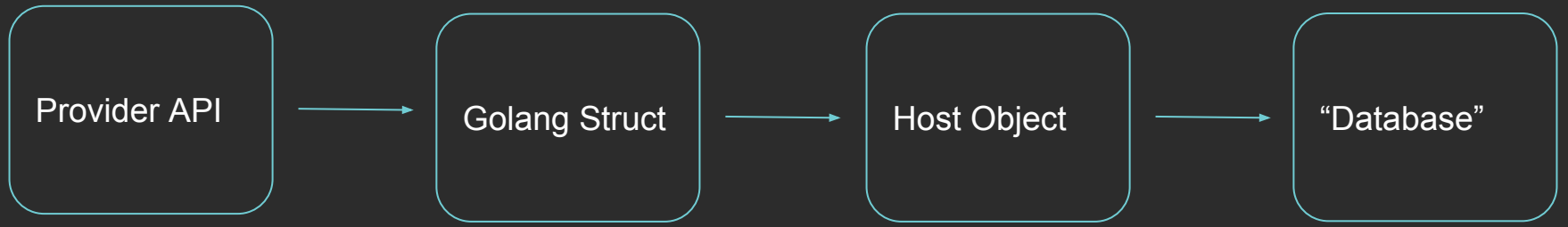
Host Annotations

ansible variables

provider groups

ansible visibility

Fetcher Flow



“Database”

The kubernetes host objects stored via an update or create call to the Kube API

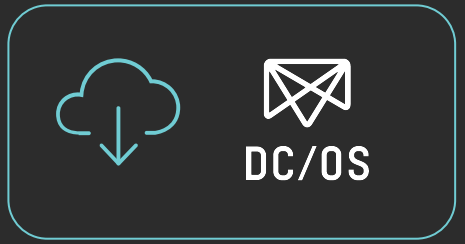
The Deploy Story

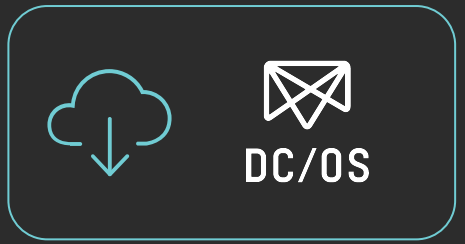
Create CoreOS EC2 instance and ec2 ELB

ANSIBLE

Add Certs
Install Kube API
Install Controller-Manager

kubernetes





Using the “database”

KUBE API FORMAT

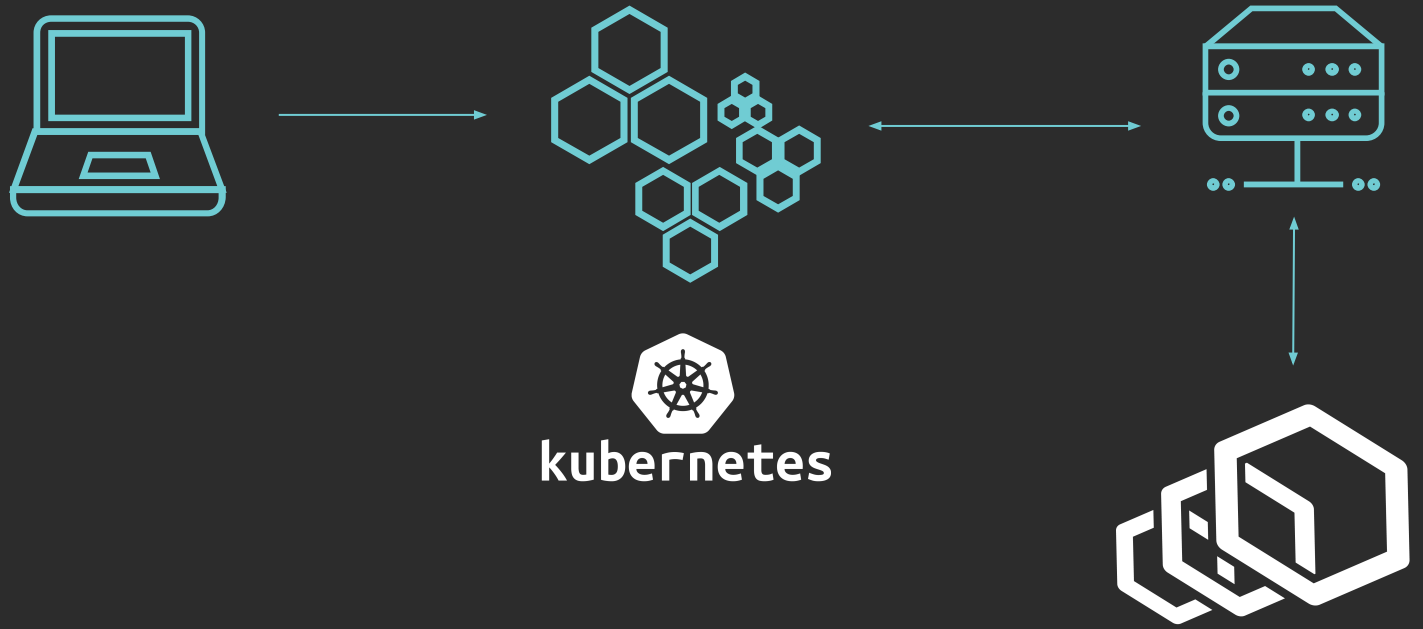
```
apiVersion: alpha.nr-ops.net/v1
kind: Host
  labels:
    availabilityZone: bcr01.fra02
    clusterName: fra1a
    env: eu-production
    os: coreos
    provider: softlayer
    region: eu
    role: log
    sla: high_priority
    …
name: fra-sl-943337
```

Using the “database”

ANSIBLE FORMAT

```
"nr_role=log": {
    "hosts":
["cf-log-943337-fra1a.r112.eu.nr-ops.net"],
    "vars": {"nr_role": "log"}
 },
 "nr_cluster_name=fra1a": {
    "hosts":
["cf-log-943337-fra1a.r112.eu.nr-ops.net"],
    "vars": {"nr_cluster_name": "fra1a"}
  },
```

Envoy Configuration Server



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