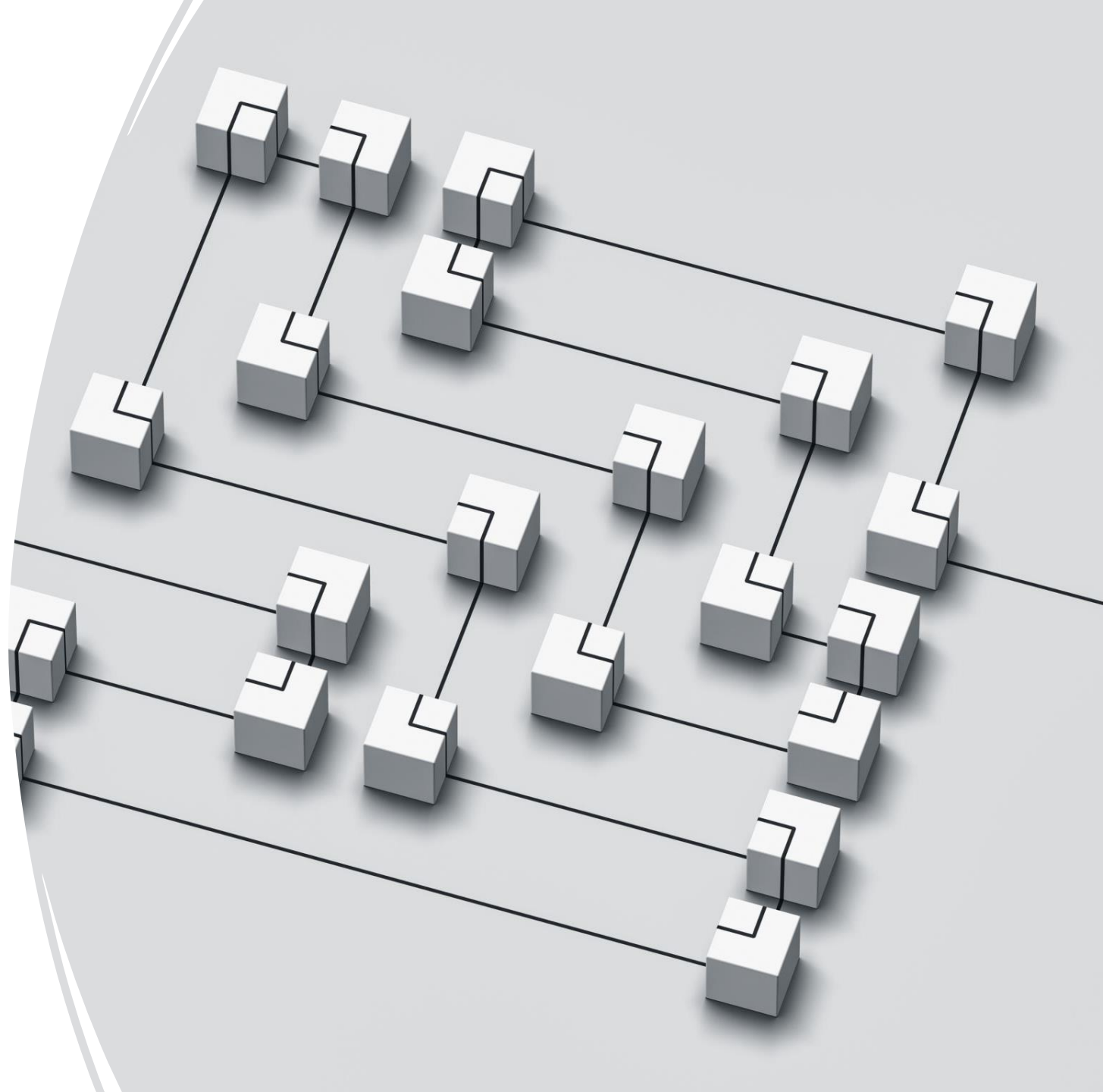


# Infrastructure Post-Merger:

---

Solving key technology  
challenges with Hashistack

David Lublink



# David Lublink

---

YouTube - DevOps Generation

Cloudli Communications - Director of  
Development Operations



# David Lublink

- He/Him/They
  - **Passionate** about **technology**
  - Coding since 10
  - **Trekkie**
  - **Home router** = Nomad Jobs
    - dhcp server
    - pihole
  - Replaced a computer in an electronic piano with a raspberry pi(synth) + arduino(key scan)
- 
- YouTube @DevOps Generation
  - Director, Developer Operations – Cloudli Communications



# Cloudli Communications - Company Profile

## Overview:

- Empowers businesses in the U.S. and Canada to communicate seamlessly with customers—anytime, anywhere.
- Provides **flexible, reliable, simple** solutions with a hands-on approach to support
- Main industries served:
  - Healthcare
  - Retail
  - Education
  - Government
- Legacy & Expertise:
  - Built on a strong history of innovation
  - Formed by uniting three companies to deliver best-in-class communication solutions

## Customer & Partner Network:

- Serves **customers** through a trusted network of:
  - Distributors
  - Agents
  - White-label resellers

## Solutions & Benefits:

- Offers a range of communication solutions, including:
  - Cloud communications
  - Digital fax technologies
  - Alert and notification solutions
  - Managed Services solutions
- Ensures **secure, efficient, and cost-effective** connectivity for businesses



Visit [www.cloudli.com](http://www.cloudli.com) to learn more!

# Infrastructure Post-Merger:

---

Solving key technology  
challenges with  
Hashistack



# HashiStack

---

Lightweight

---

Flexible

---

Scalable

---

Automation

---

Service discovery

---

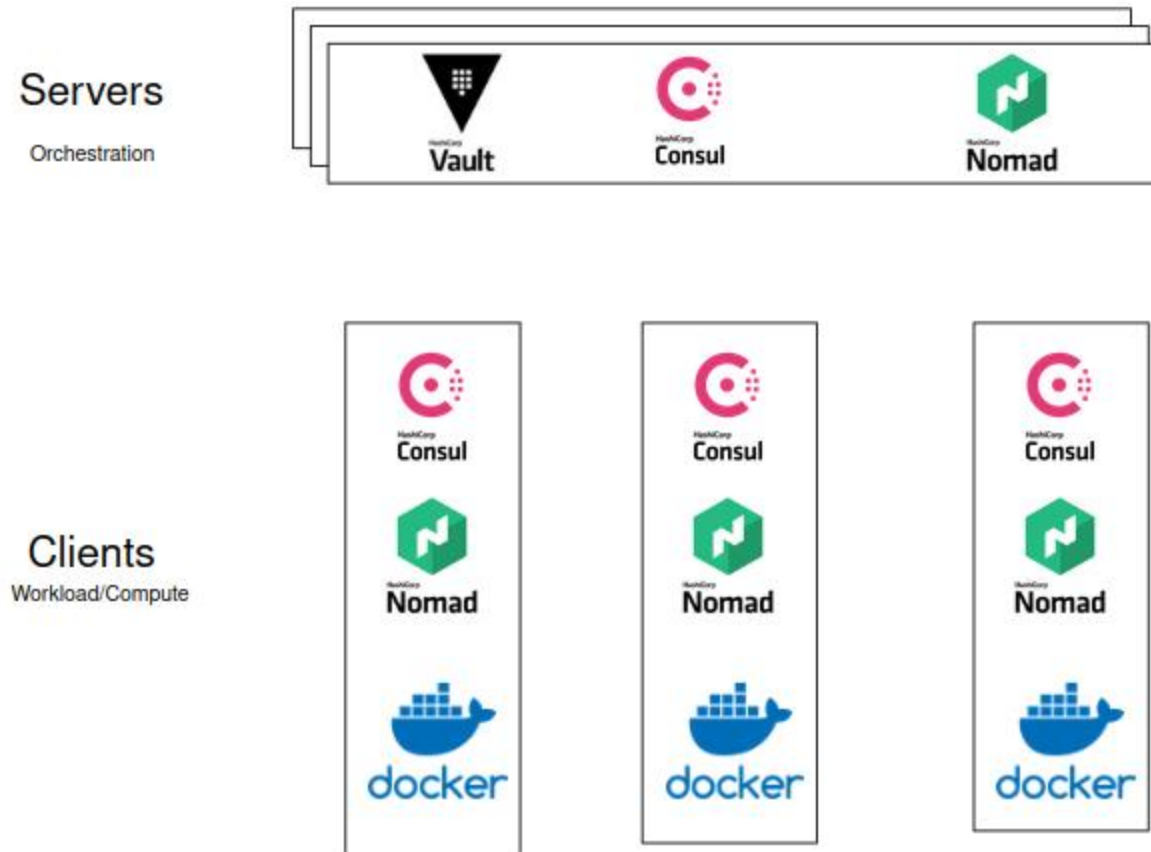
Orchestration

---

Security

---

# HashiStack



**Consul** – Service discovery & Monitoring

**Nomad** – Workload orchestrator

**Vault** – Secrets management

**Consul-template** - Write certificates from Vault to local file system + signals/restarts processes

**Docker** – Lightweight containerization

**Not featured in drawing:**

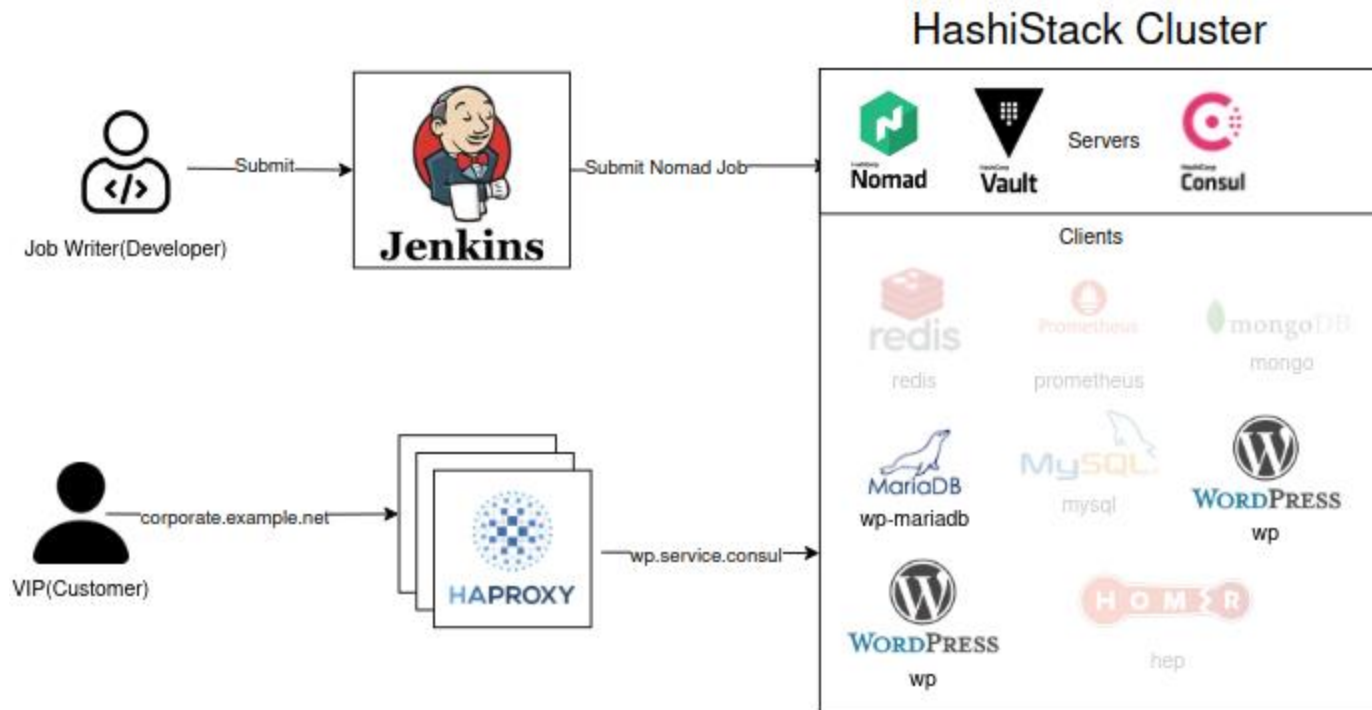
Jenkins – CI/CD

HAProxy – Ingress router

Consul-template



# HashiStack



**Jenkins** builds software, **builds** docker images, **publishes** images, generates Nomad job, and **submits** Nomad **job** to Nomad server.

**HAProxy** reverse proxies requests and exposes to the Internet only services you want exposed. HAProxy can **load balance** and route requests to different instances in the cluster. HAProxy can also load balance/failover on the frontend(VRRP, DNS, AWS LB, etc... )



# Job Writers

Nomad Jobs are not just for developers!

DevOps can deploy jobs

- HAProxy, nginx, Envoy, etc...
- Jenkins
- Prometheus
- Grafana
- Gitlab
- Kafka

Marketing can run jobs

- Wordpress
- URI redirection service

Customer success can run jobs

- Run SQL query X and send report to customer every Y days

NoC can run jobs

- Heplify, VoIPMonitor
- Smokeping, PingPlotter
- Netbox

# Redis Example

```
job "redis-cache" {  
  
  group "cache" {  
    count = 2  
  
    task "redis" {  
      driver = "docker"  
      config {  
        image = "redis:latest"  
        ports = ["db"]  
      }  
  
      service {  
        name  = "fun-redis"  
        port  = "db"  
        check {  
          type  = "tcp"  
          interval = "10s"  
          timeout = "2s"  
        }  
      }  
    }  
  }  
  
  network {  
    port "db" {  
      static = 6379  
    }  
  }  
}
```

DNS: fun-redis.service.consul

Jobs / Job redis-cache



Overview Definition Versions Deployments




### redis-cache



JOB DETAILS    Type service    Priority 50    Version 0    Name

Status: Healthy

**2/2 Allocations Running**

 [2 Running](#)     0 Pending     0 Failed

 0 Lost     0 Unplaced

## fun-redis

Registered via Nomad

Instances

Intentions

Routing

Tags

Search

Search Across

Health Status

Source

\_nomad-task-86459948-2ced-7dfe-79ca-eb7842dc2444-redis-fun-redis-db



All service checks passing



All node checks passing



ip-172-31-0-52



100.74.65.105:6379



cache, database

\_nomad-task-6f5ae71a-55ff-7606-0f33-d9ea9f5c6db3-redis-fun-redis-db



All service checks passing



All node checks passing



ip-172-31-5-82



100.72.247.68:6379



cache, database

# How HashiStack Improves Culture

---



Lower cost of  
deployment



Consistent and  
reliable releases



Faster developer  
velocity



Quick feedback  
with customers



Happier, motivated  
developers

# HashiStack v. Kubernetes

Originally:

- **Nomad's QEMU driver(Virtual machine support)**
- **Ease of management** of HashiStack
  - Nomad, Vault, and Consul\* are single binaries
  - Consul-template being counted apart

Nomad jobs are **whitespace-insensitive**

- copy-paste friendly
- nomad fmt command auto-formats

Overhead computing costs – Very low with HashiStack

Easy to start, simple to upgrade



# Merger Brief

3 companies

Communications platform

Similar markets

Similar customer bases

Uptime is a number one concern



# Axioms and Egos

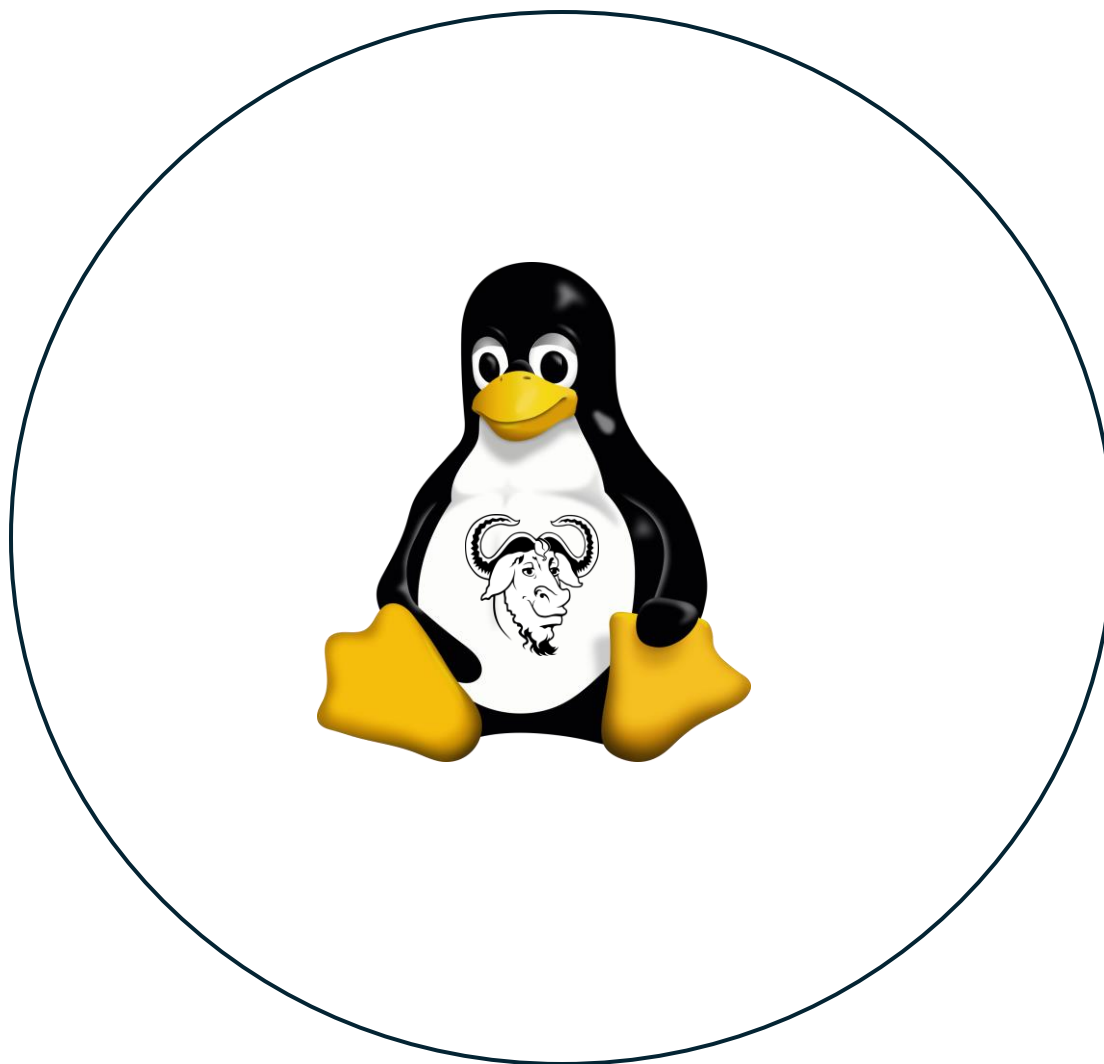


Unquestioned assumptions and personal pride



"All new servers  
should run Linux"

---



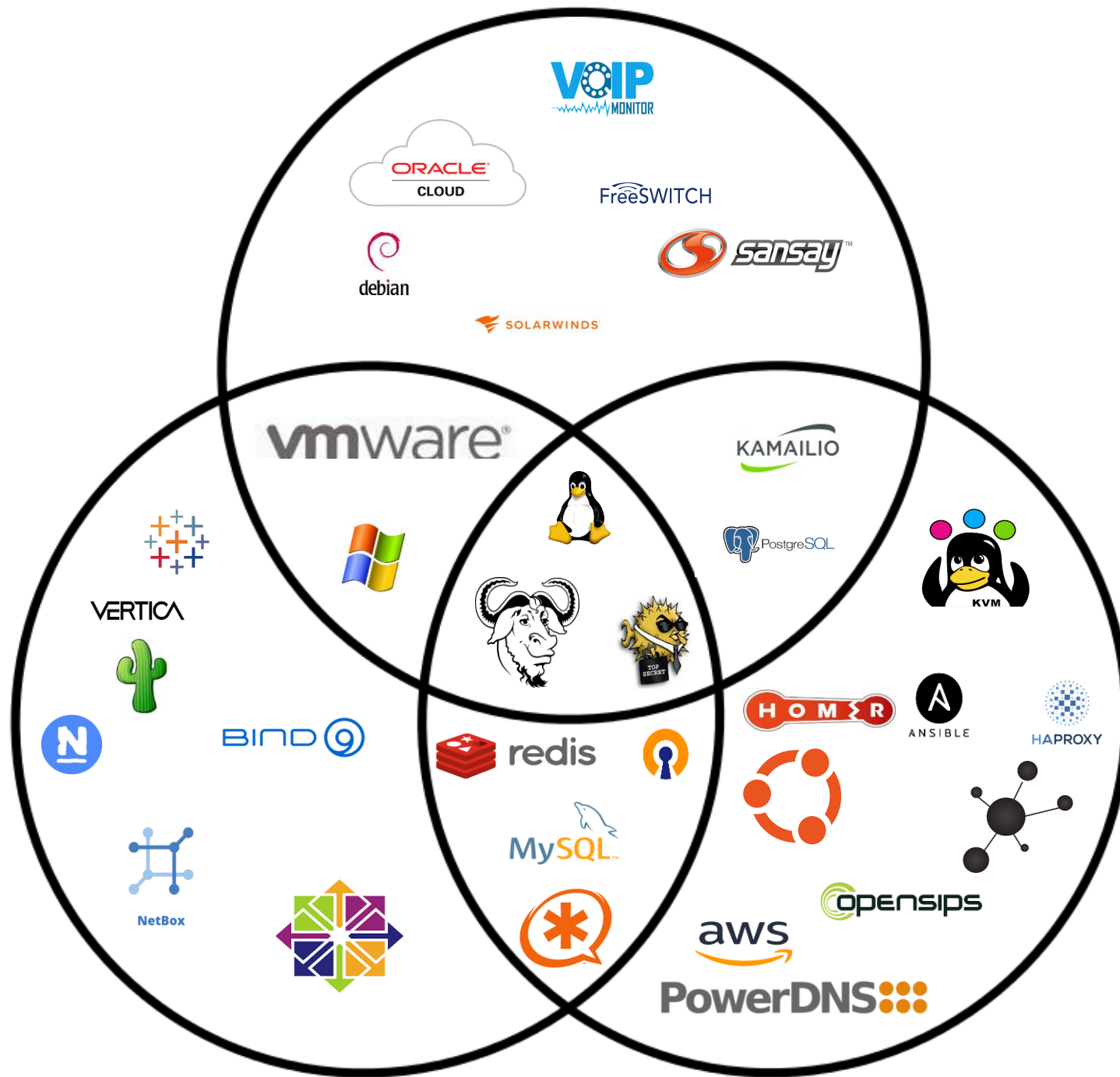


# Axioms

"Ubuntu is the right Linux for our needs"

"Debian is the right Linux for our needs"

"CentOs is the right Linux for our needs"





Ego

"It'll be faster if I write my own  
implementation of this software than to learn  
how it works"



Which inevitably becomes:



"It'll be faster if I write my own  
implementation of this software then to learn  
how it works"

# Re- inventing The Wheel

## Infrastructure & Deployment

- Custom deploy shell scripts
- Exotic failover plans
- Shell scripts to push updates to multiple servers
- Service health management system(similar to Consul)

## Security & Monitoring

- Watchdogs
- Firewalls



# Ego

---

"We've always done it this way and it's always worked; therefore we must continue to do it this way!"

---

"If my company's stock wins, it proves we were the superior company."

# Dramatic Representation

Tech turf war

Apologies to Ethel Merman and Doris Day

and to anyone with Spontaneous Song Aversion Syndrome

*"Any Linux you use, mine is much faster,  
Debian's king, and the rest are disasters!"*

*No, it's not!*

*Yes, it is!*

*No, it's not*

*Yes it is !*

Any stack you can build, I can build faster!  
I can scale better, with failover mastered!"

No, you can't!

Yes, I can!

No, you can't!

Yes, I can, yes I can!

I can deploy a VM, with a single bash script  
Fire up the firewall with no effort at all.

I



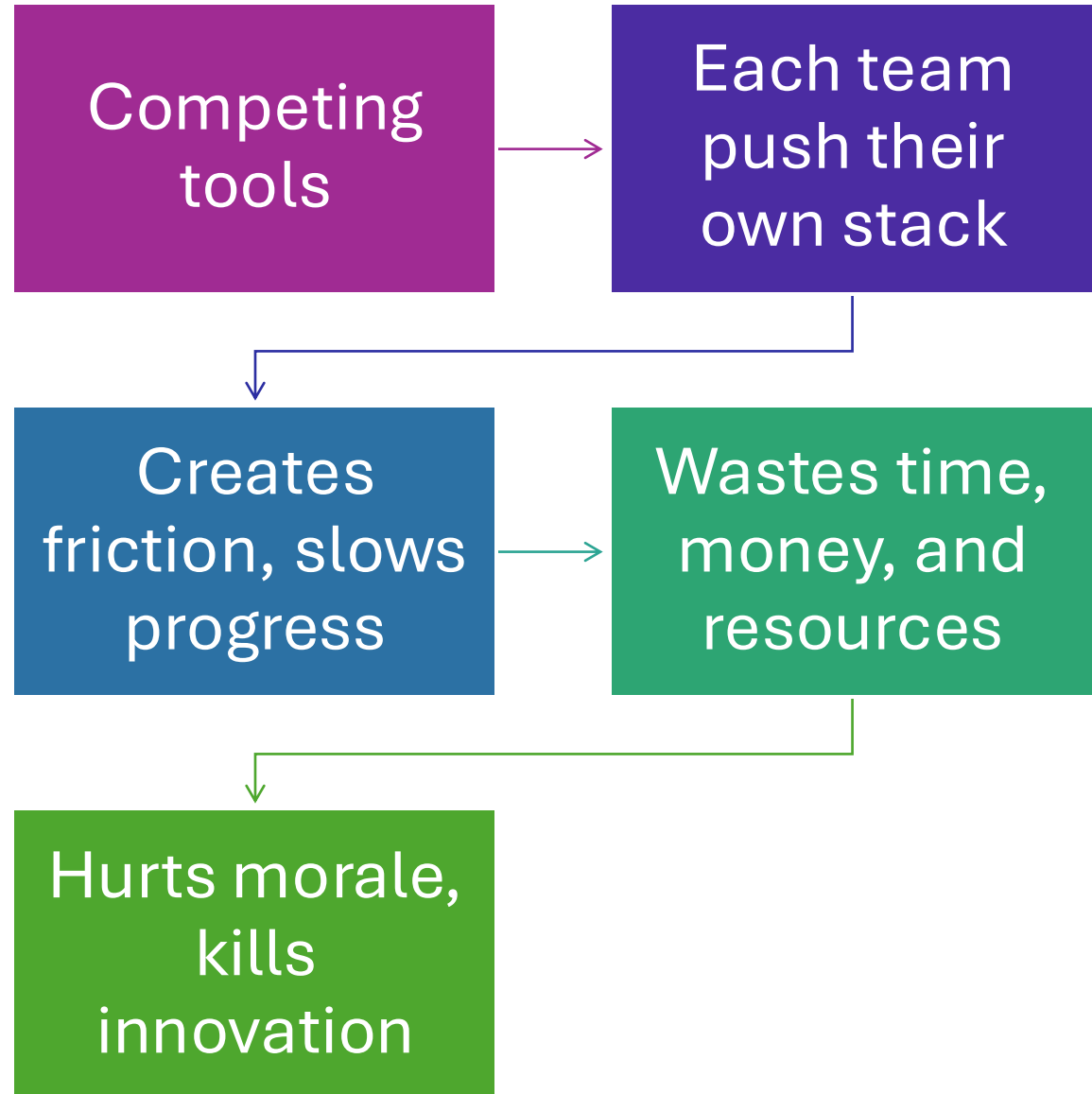


"And may the  
odds be ever  
in your favor"

---



# Tech Stack Turf War



# How does HashiStack solve these problems?

## **Nomad can run most software**

Run any software, support all 3 stacks easily in a unified approach

## **Docker dilutes OS debate**

Docker images based on different base images can all run side by side

## **Low cognitive load**

Nomad jobs are easy for developers to work with, easy to learn and well documented

## **HashiStack solves common problems**


Automated deployments. Watchdogs replaced. Monitoring unified by Consul. Vault protects secrets.

## **Powerful tooling diffuses tech stack war**


Provides powerful tooling to the developer enabling them instead of impeding them.

# Deployments and Redundancy

---

A large, solid orange circle is positioned on the left side of the slide, partially cut off by the edge.

"Let me just log into the server and I'll take care of it"

A blue dashed line is located in the bottom right corner of the slide, consisting of several short, curved segments.

# Deployments

---

- Manual deployments
  - Long and painful deploy cycles
  - Knowledge with single individuals, distributed
- Partial automation
  - Ansible
  - Salt
  - Shell script or two
- Inconsistent software versions
- Inconsistent configurations
- Inconsistent behaviours
  - Bug affects some servers, but not all

# Nomad – Better Deployments

Changes to job definitions can be tracked with version control

Nomad makes it easier to facilitate standardized work practices

Auditability, what is the expected state of this service?

Teams can work asynchronously





# Nomad: Clear Boundaries of Responsibility

---

# Nomad: Clear Boundaries of Responsibility

## **DevOps/Operations**

- Disks / Storage / Disk IO
- CPU
- Virtual Machines & Bare Metals
- Memory
- DNS ( recursive )
- Secrets management
- Backups
- IP Transit ( Internet )
- Disaster Recovery
- Layer 2 switching
- Layer 1 Connectivity
- Logging
- Metrics
- Firewalls

## **Developers**

- Write their code
- Build/Maintain Nomad Jobs
  - Think of a Nomad job definition like a software installer
- Submit Nomad Jobs to cluster

# The Gatekeepers of Production

---

# Gatekeepers of Production

## Tug of war between working groups

- Product owner
- Quality Assurance
- Developers
- Network operations
- Compliance
- Marketing
- Sales
- Support

And when they finally agree, does anyone remember the version tested by QA?

# HashiStack



Fully automated deployments -Deployment can be configured to be triggered by single button in CI/CD or other UI when the team agrees to release to production



Manual Triggers for Business processes - Manual triggers are only introduced out of business necessity, not because of technology requirements

Demo



# Spin-up Your Own HashiStack Cluster!

---

# Migrate to Nomad Strategy



## Start small

3 servers nodes – raft fault tolerance – 1 server  
2 client nodes(virtual, baremetals, can easily be changed later)



## Deploy the smallest/easiest service

Low impact services  
Small services



## Opportunistic migrations

Any time you are doing a migration or major change, make Nomad a part of the change  
Target unstable systems  
O/S updates, software updates, library updates? Migrate to Nomad!



As **expertise/confidence** in the system **grows**, take on **bigger** and bigger pieces



As the **workload** in your cluster **grows**, you can **add** new **Nomad Clients**

# Expand Your HashiStack



Yup! Vault, Consul, and Nomad are just the beginning

# Expanded HashiStack

---

---

**Terraform** - Use Terraform to deploy your Nomad Servers and Nomad Clients. You shouldn't be doing this by hand!

---

**Packer** - Use Packer to build your server images that are deployed with Terraform

---

**CI/CD software** - Use a CI/CD software such as Jenkins to automate image building+publishing and to submit jobs to Nomad

---

**Nomad Pack** - Use Nomad Pack to build templates for your Nomad jobs for when copy/paste and search/replace aren't enough

---

**Nomad Pack Registry** - Registry of Nomad packs, can be good to find more complex examples of Nomad jobs and deploy common services quickly



# Automate Everything with Hashistack

Connect the developers to the customers.

# Connect with me

Youtube DevopsGeneration



Find me on  
LinkedIn

