CITRIX

CLOUD NATIVE COMPUTING FOUNDATION

8x8

Migrating Real-Time Communication Applications to Kubernetes at Scale: Learnings from 8×8's Experience

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Microservices-Based Applications for Business Continuity

Read “A Pandemic Plan for Application Architecture” at https://tinyurl.com/**K8sApp**

Modular App Architecture

Break application in small services, which can be developed, deployed and auto-scaled **independently**

Faster Releases

Very frequent application updates (even many times a day)

Continuous delivery to automate deployment

Portability

Self-contained runtime

Application portability across clouds

Diverse Stakeholders Have Unique Needs

DevOps

Faster release & deployment cycles
CI/CD & automation
Canary & progressive rollout

Developers

User experience
Troubleshooting
Microservice discovery & routing

Platform Team

Platform governance
Operational efficiency
Developer agility

SRE

Application availability
Observability
Incident response
Postmortems

NetOps

Network policy & compliance
Manage, control & monitor network
Resources & capacity planning (visibility)

DevSecOps

Application & infrastructure security
Container security & API gateways
Automation

Microservices App Delivery Solution Principles

Read “7 Key Considerations for Microservices-Based Application Delivery” at https://tinyurl.com/**7Consideration**

Architecture Flexibility

Move at speed of your IT skill set
Balance benefits & complexity

Integrated With Your Platform & Tools

Get apps to production fast with vast K8s platform & opensource tools support

Performance & Scale

Support large clusters & very dynamic microservices

Consistent App & API Security

Break the silos of monoliths & microservices

Complete Observability Stack

Gain visibility & troubleshoot problems faster, Break the silos

Production-Grade Solution at the Speed of Business


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Communications.
Transformed.
DevOps “Three Body Problem”

8x8 Introductions

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BASH
CHEF STYLE
DEVOPS
KUNG FU
I Voted
CHEF
WHIPPING UP AWESOME
HyperL
docker
HELM
amazon web services
8x8
GitLab
CODE CAN DEPLOY
Code
CHEF
CHEF.IO
$ helm yeah
HAWAII
FEST 2015
INSPEC
aws
OCEAN ORIGIN
CHEF CONF
2014


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All-in-One
Communications
A single platform that combines cloud phone, video collaboration, team chat, contact center and analytics.

8x8 At a Glance

NYSE: EGHT

1,600+ Employees in 8 Countries

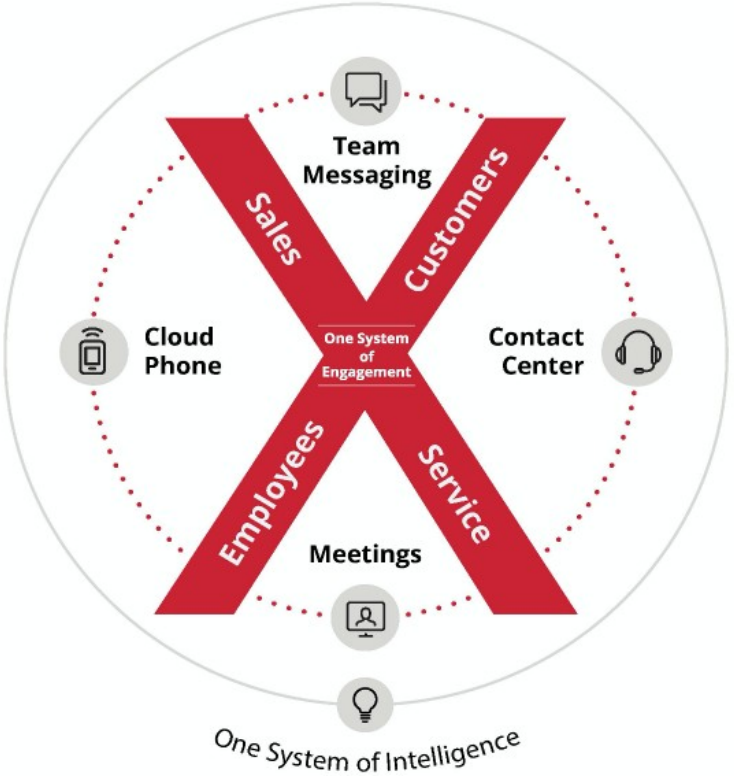
1+ million business users in 150+ countries

Guaranteed call reliability, quality

Leading security and compliance

Global capabilities

Proven, trusted partner



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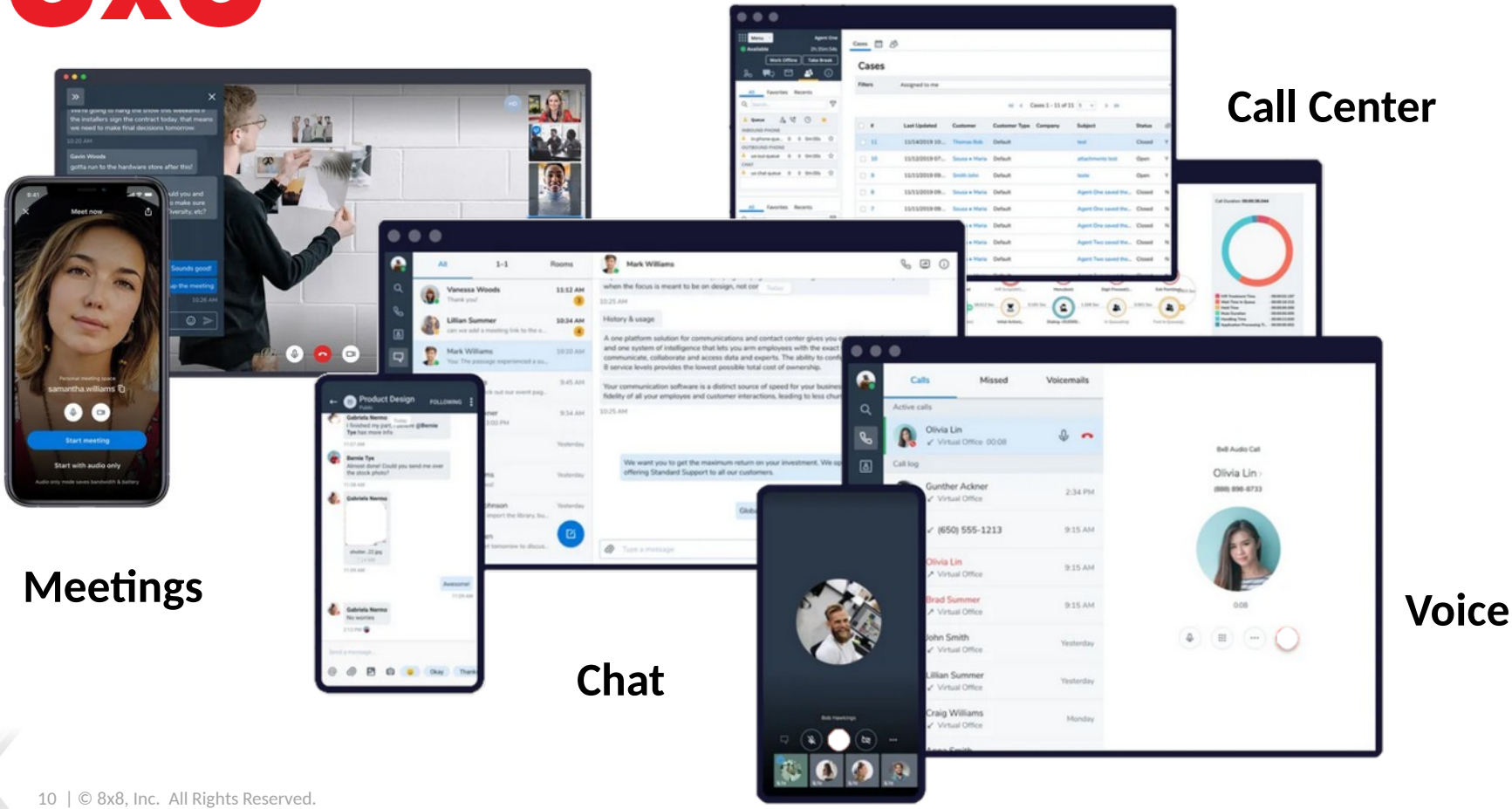
8x8 Unified Communications



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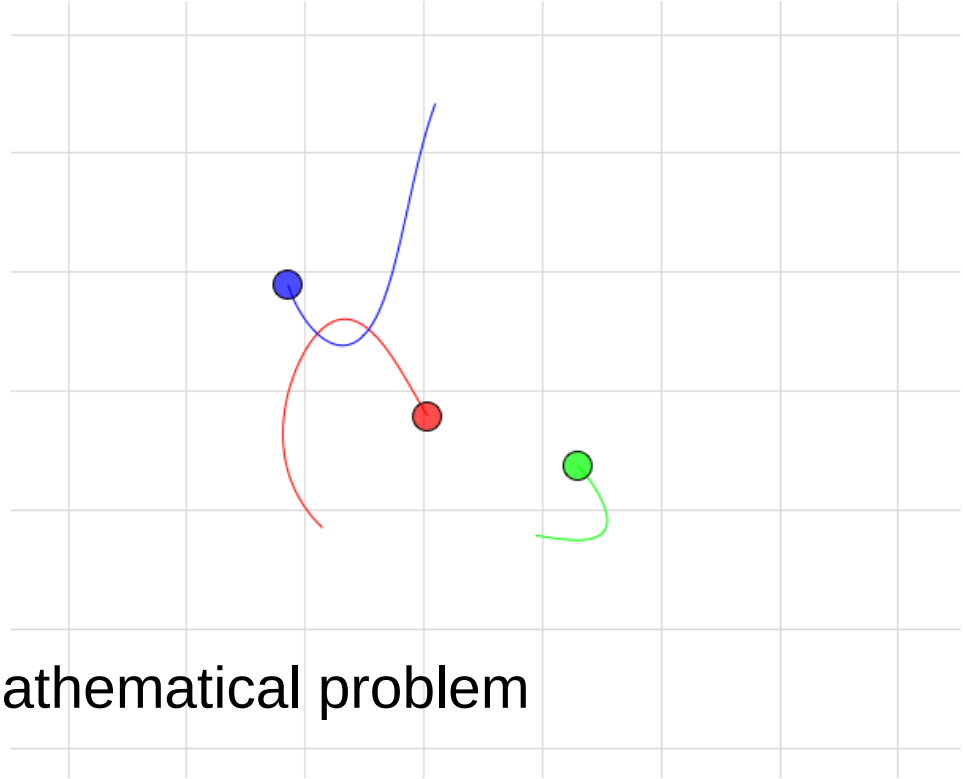
The Three Body Problem



Unsolvable mathematical problem

DevOps Three Body Problem

Deployments

- Ssh
- Jenkins Pipelines
- HyperLoop
- Ansible
- Chef
- Terraform
- Cloudformation

Customers

- DNS
- LTM
- GTM
- Route53
- Geo
- Proxy
  - CloudFlare
  - Ambassador/Envoy

Dependencies

- Data Centers
- Clouds
- Files
- Databases
- Random VPC
- Public
- Private

How did 8x8 approach the problem?

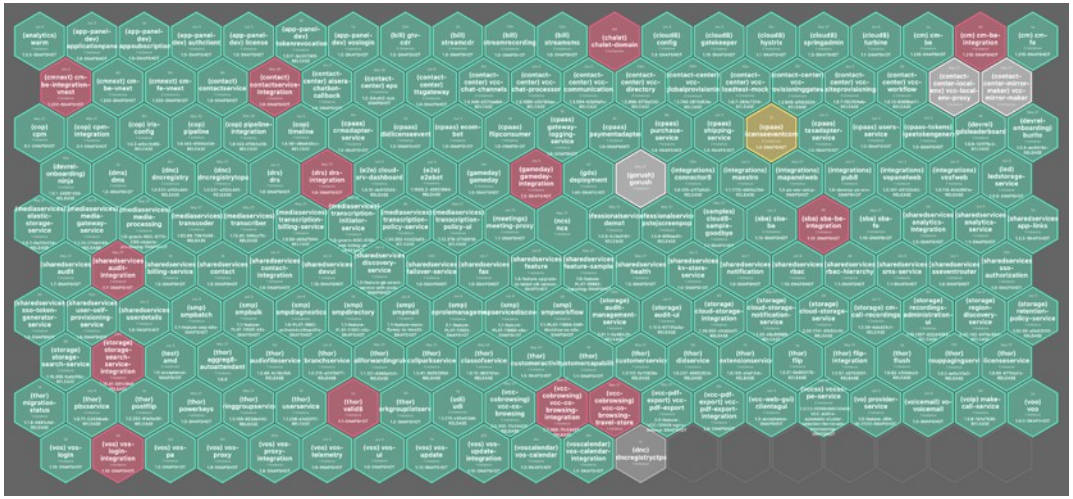

GANGNAM STYLE

8x8 DevOps Fundamentals

- **Safety**
  - Provide a way for changes to be validated and tested.
- **Automation**
  - Deliver the changes the same way for any environment
- **Knowledge Sharing**
  - Learn from each other with open collaboration
- **Autonomy**
  - Immediate visibility that changes deployed are safe
  - Continuously verified for every change

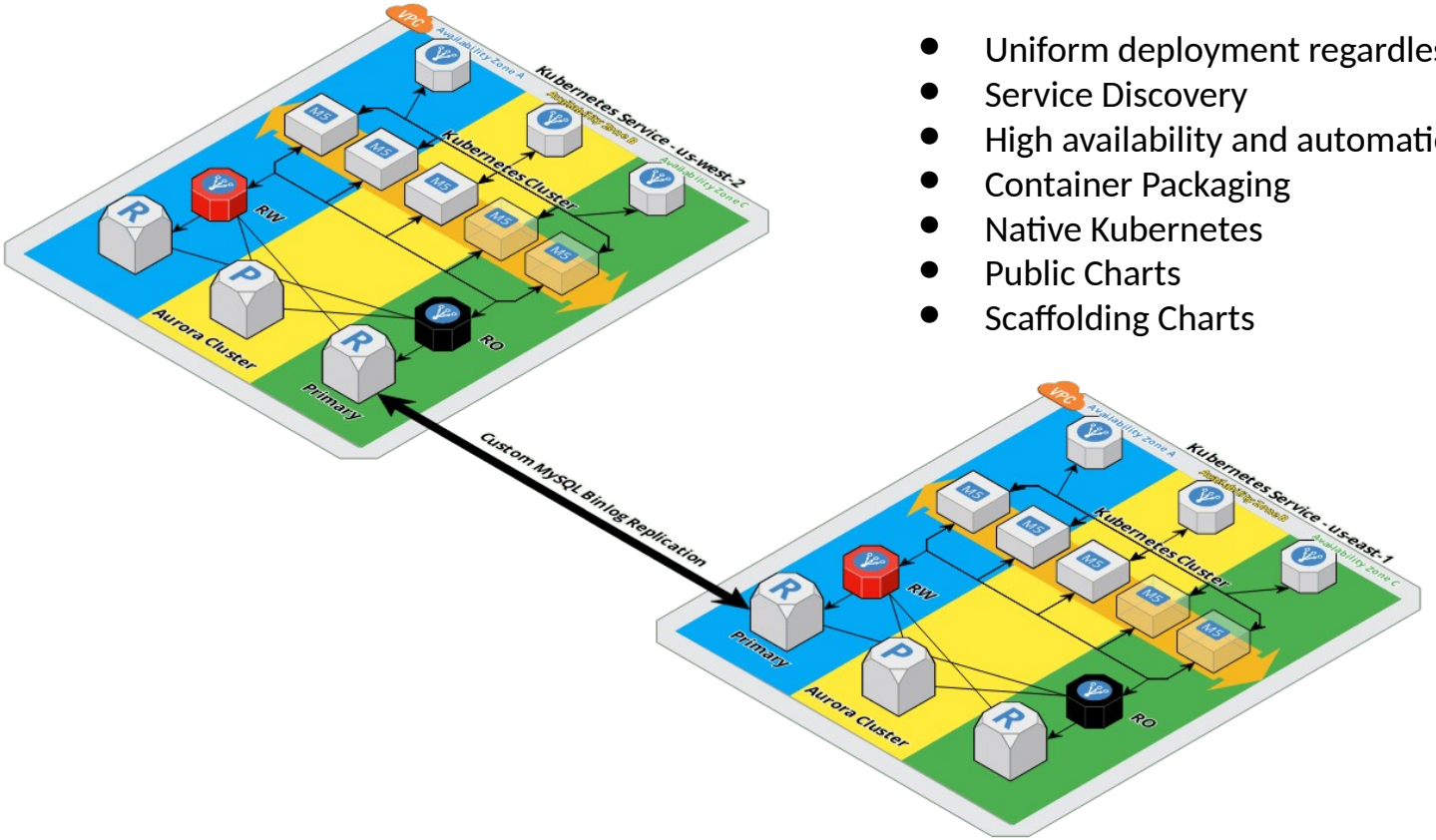
8x8 Adoption of Microservices: 100s of Them!

- Why
  - Divide and conquer
  - Technology refresh
  - Team Autonomy



- Which
  - Foundational Framework services (Cloud8)
  - Shared Services
  - Stateless Application Services

8x8 Design Goals



- Uniform deployment regardless of environments
- Service Discovery
- High availability and automatic recovery
- Container Packaging
- Native Kubernetes
- Public Charts
- Scaffolding Charts

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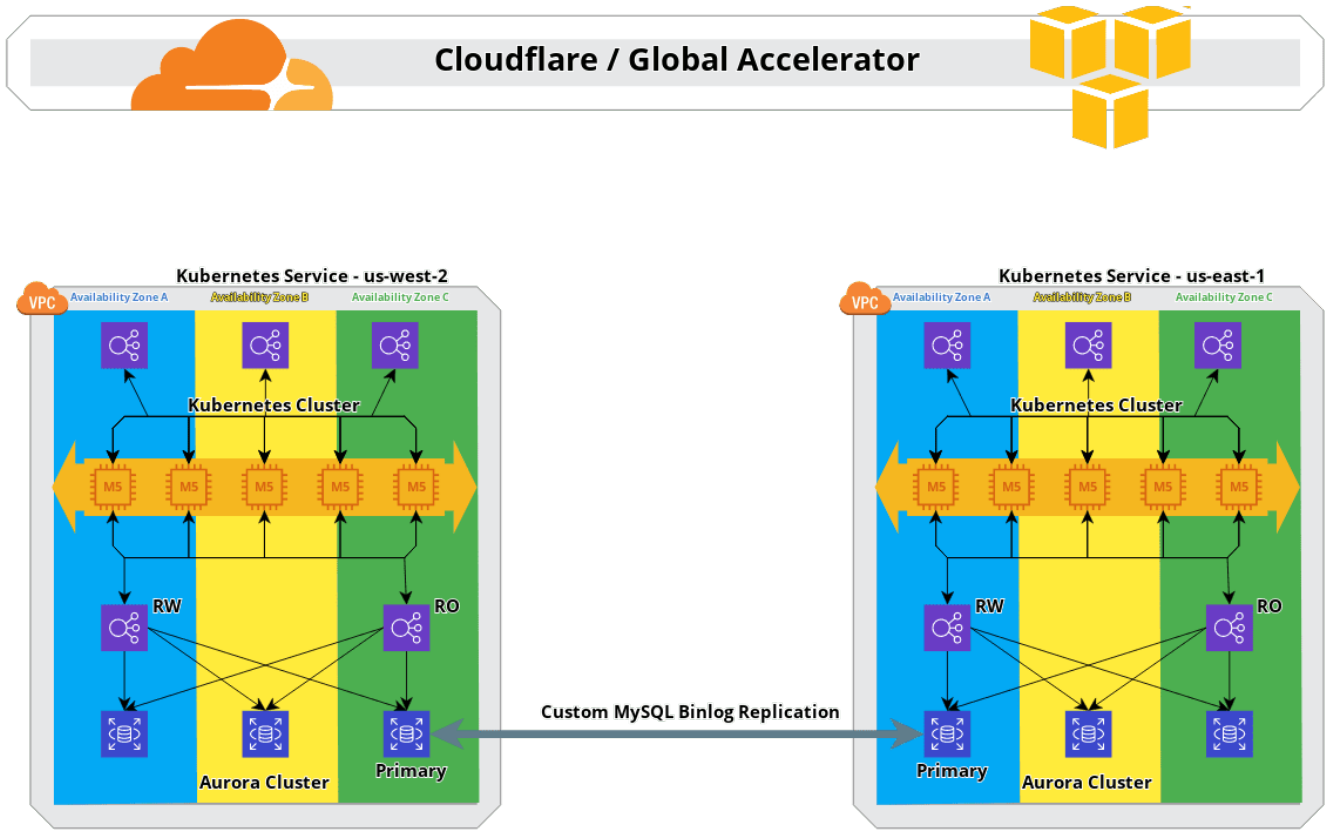
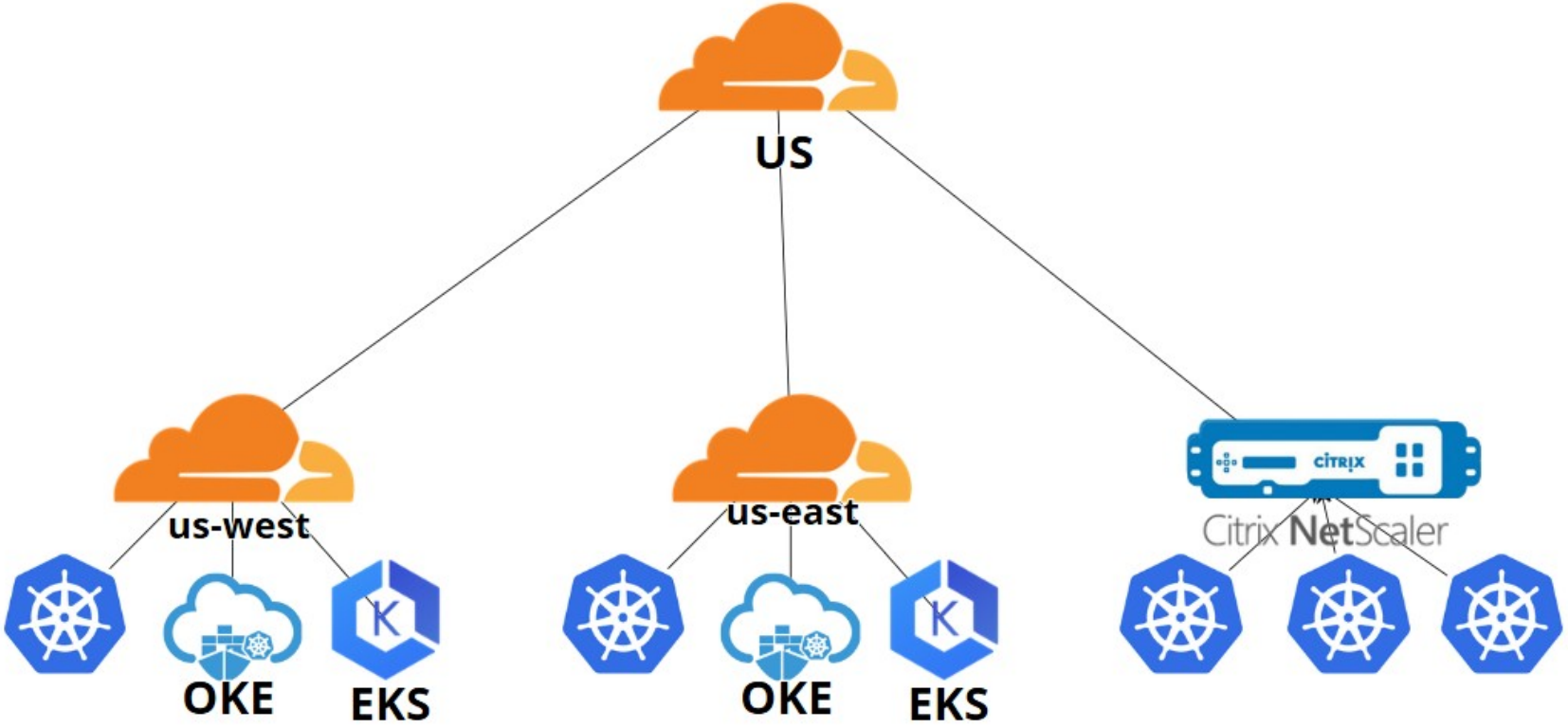
8x8 Deployment Environments - Cloud



8x8 Deployment Environments - Hybrid



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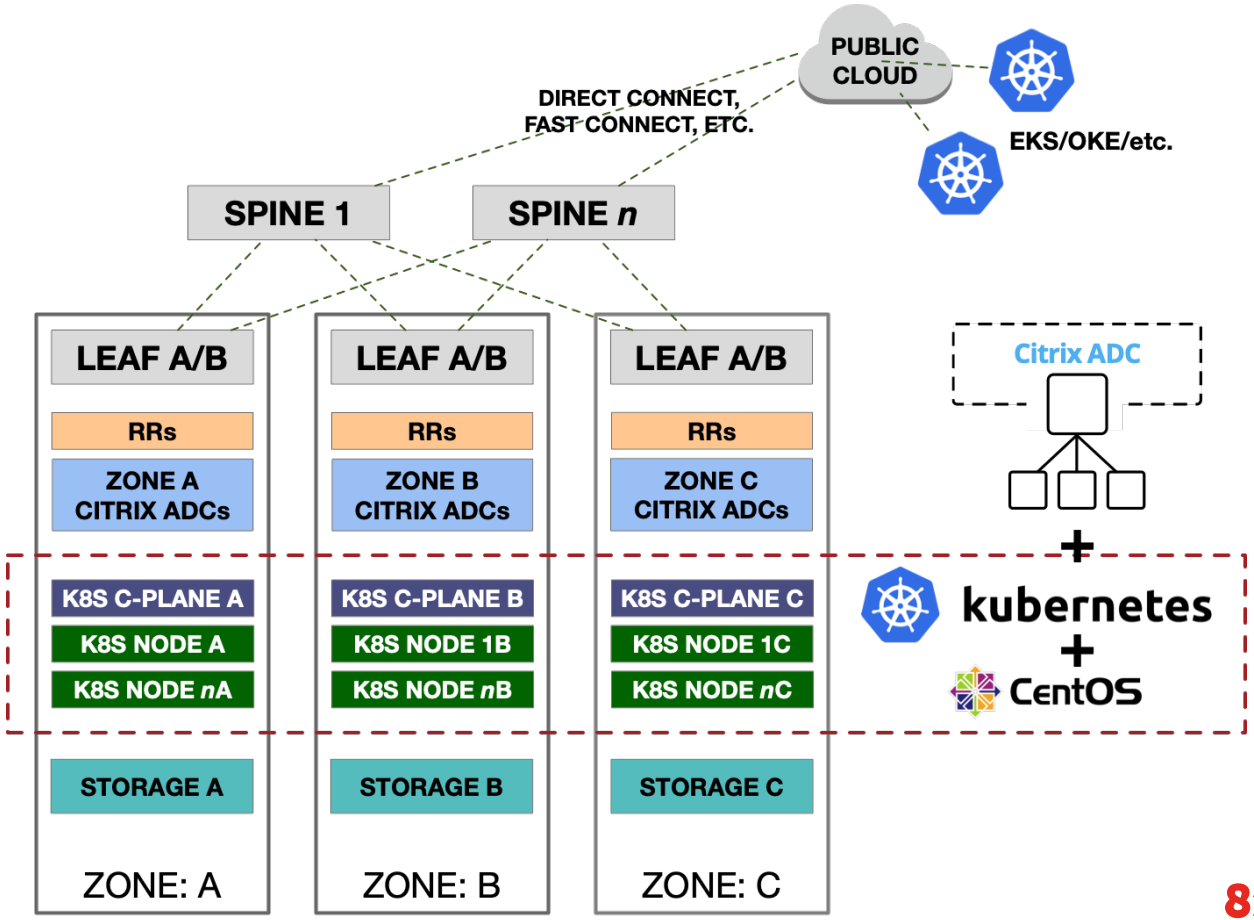
8x8 Deployment Environment - On Premise

* Mainline K8s (1.17+)
* L3 Leaf-Spine
* 3 Zones/DC
* Zone Storage
  (& CSI Topology)
* BGP (Calico + Bird)
  - Citrix ADC
  - Route Reflectors
  - BGP to Host



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8x8 Deployment Environment - Anatomy of a Zone

Requirements:

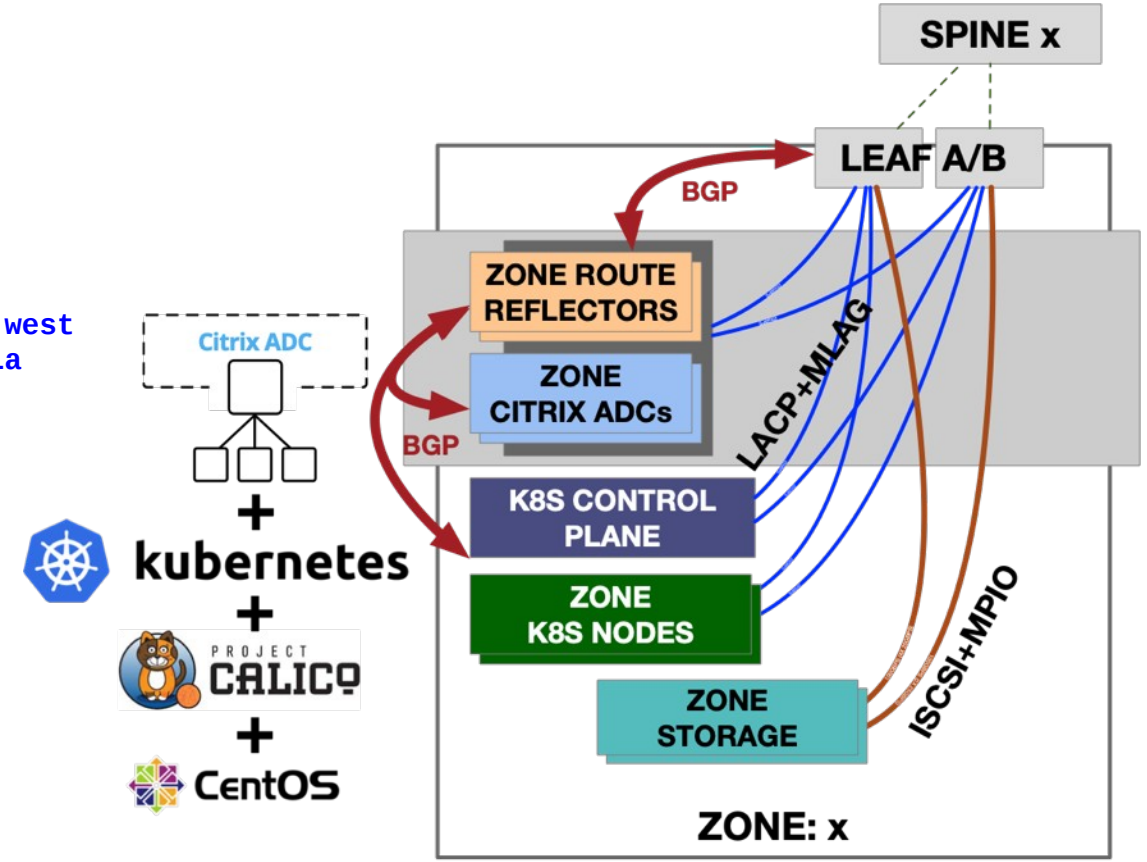
* Horizontal Scale

* Zone isolation
  `topology.kubernetes.io/region=us-west`
  `topology.kubernetes.io/zone=sjc01a`

* Specialized network
  Use-cases (DSR, ECMP, Anycast)

* Service IPs (VIPs) via BGP

* K8s-native APIs/resources
  `kind: Service`
  `type: LoadBalancer`



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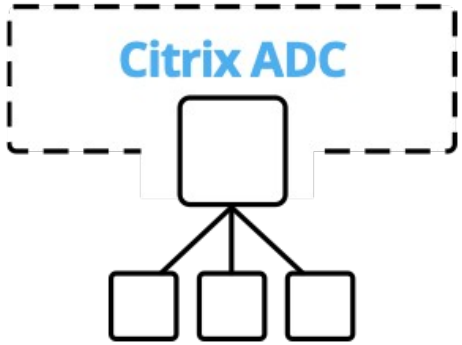
8x8 Load Balancing Tier - Citrix ADC

Key Decision Factors:



- Supports Kubernetes Services and Ingresses (and Ingress Classes)
- Supports Complex, Zone-Aware Infrastructures
- Full-Feature BGP Support (e.g. Route Reflectors, Auth, RHI, ECMP)
- Horizontal/Linear Scale (using VPX in VMware)
- Rich Feature Support via CRD/Annotation (Cert Mgmt, Rules, Policy, IPAM, etc.)
- Simple, Hands-Off, Reliable Deployment and Configuration
- Flexible Licensing Options & Editions (MPX, VPX, CPX, etc.)

8x8 Recommendations

01	Choose your battles	• Only stateless microservices initially • New framework from the ground up
02	Alignment	• Strong collaboration between operations and development • Shared goals between teams
03	Self Service	• Both engineering and operations could react independently
04	Cloud First	• Started in the cloud for a uniform experience • 100% of the resources were automatable
05	Reserve System Resources	• System level, guarantee the OS a percentage • Namespace LimitResource defaults • Right size your workers

8x8 Recommendations

06	Embrace A Service Mesh	• Telemetry • Better Security • Connect desperate clusters
07	Security	• Limit kubectl usage • Helm safer • Cluster Role for a power user
08	Ingress vs Services	• Use an ingress strategy • Saves money • Provides Telemetry
09	Common Logging Format	• Simply it for the teams, send to standard out • Build into your framework or endorse a specific format
10	Centralize Metrics and Logs	• Prometheus has vast library of existing dashboards • Collect and ship using Daemonsets • Newrelic with Pagerduty