Kubernetes in hybrid environments

WHAT IS MULTI-CLOUD?

What is Multi-Cloud?
A combination of 2 or more public cloud, private cloud or SaaS environments

Public Cloud

**Private Cloud On-Prem
or in Colocation**

SaaS

3

They all have their individual benefits..

Public Cloud

**Private Cloud On-Prem
or in Colocation**

SaaS

- On demand scalability
- Business agility
- OpEx consumption model
- Innovative services
- Greater reliability

- Enhanced security
- Flexibility and customization of resources
- Single tenant
- L2-L3 networking control

- Reduced time to benefit
- OpEx and lower/predictable costs
- Reduced management and operations burden

Multi-cloud is here, and it's everywhere…

Do customers really know where their applications will end up?

85%

1.8

2.3
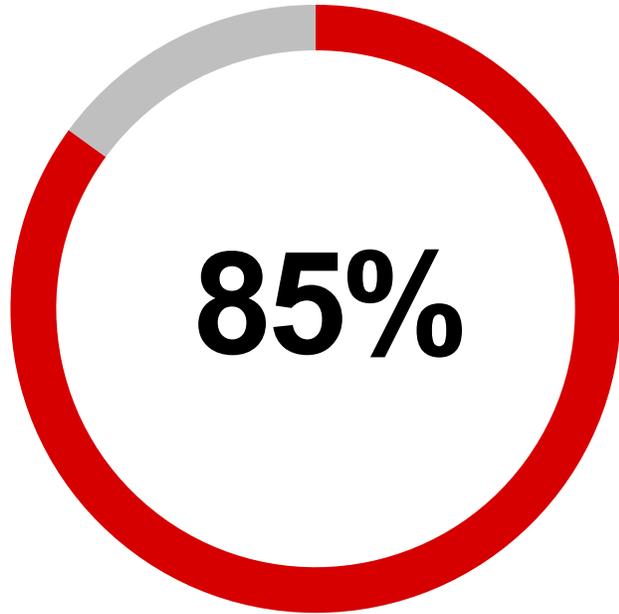
85% of companies have a multi-cloud strategy…

…leveraging an average of **1.8** public clouds…

…and 2.3 private clouds.

Source: RightScale State of the Cloud Report 2017,

What About Containers?
What's all the fuss about?
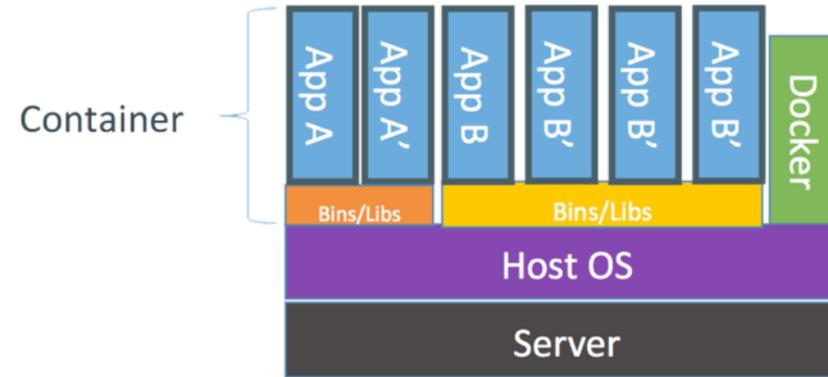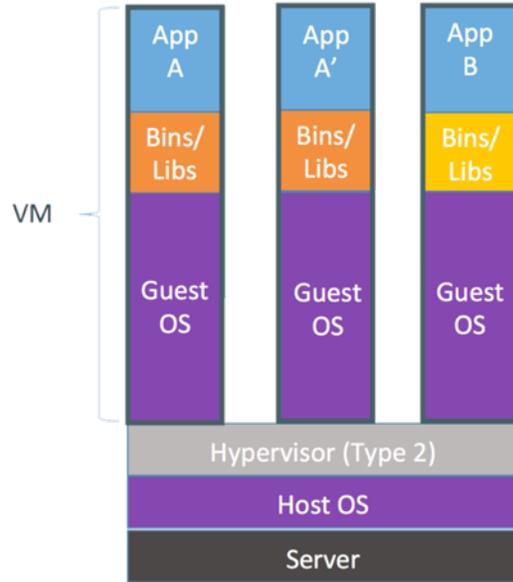
"**Containers consist of an entire runtime environment; an application plus all of its dependencies, libraries, binaries and config files needed to run it. Abstracting away and negating differences in OS.**"

Benefits of Containers
- Platform independence
- Resource efficiency
- Enhanced agility and scaling
- Operational efficiency
- Portability - containers run in both public and private cloud environments

Container Platforms & Orchestration Tools

Containers

- **OpenSource app development environments**
- **Enhanced agility and scaling**
- **Platform independence & portability - containers can be transferred between public and private cloud environments**

Platform-as-a-Service (PaaS)
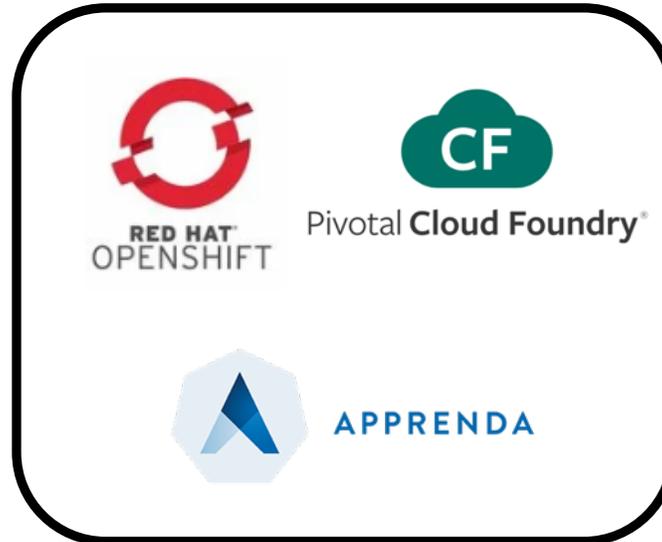
- **Platform automatically packages software into containers and provides compute resources**
- **Allows developers to focus on writing code for greater agility**

Container-as-a-Service (CaaS)

- **Provide container engines, orchestration tools and compute resources**
- **Requires the developer to package software into containers**

MULTI-CLOUD DRIVERS

What's Driving Multi-Cloud Adoption?
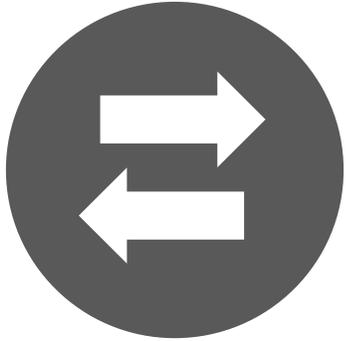
Increased Availability or Disaster Recovery	Economics & Buyer Leverage	Different teams using different clouds	Prevention of Vendor Lock-in

What is the main driver for multi-cloud adoption?

Multi-Cloud Adoption Drivers
Its a multitude of factors...

Company Size

- 10,000 or more
- 1,000-9,999
- 100-999
- Under 100

0%   20%   40%   60%   80%   100%

Legend:
- Different departments using different providers
- Ensure buyer leverage
- Concerns around vendor lock-in
- Economics
- Optimizing SLA's
- Specialized features in specific clouds
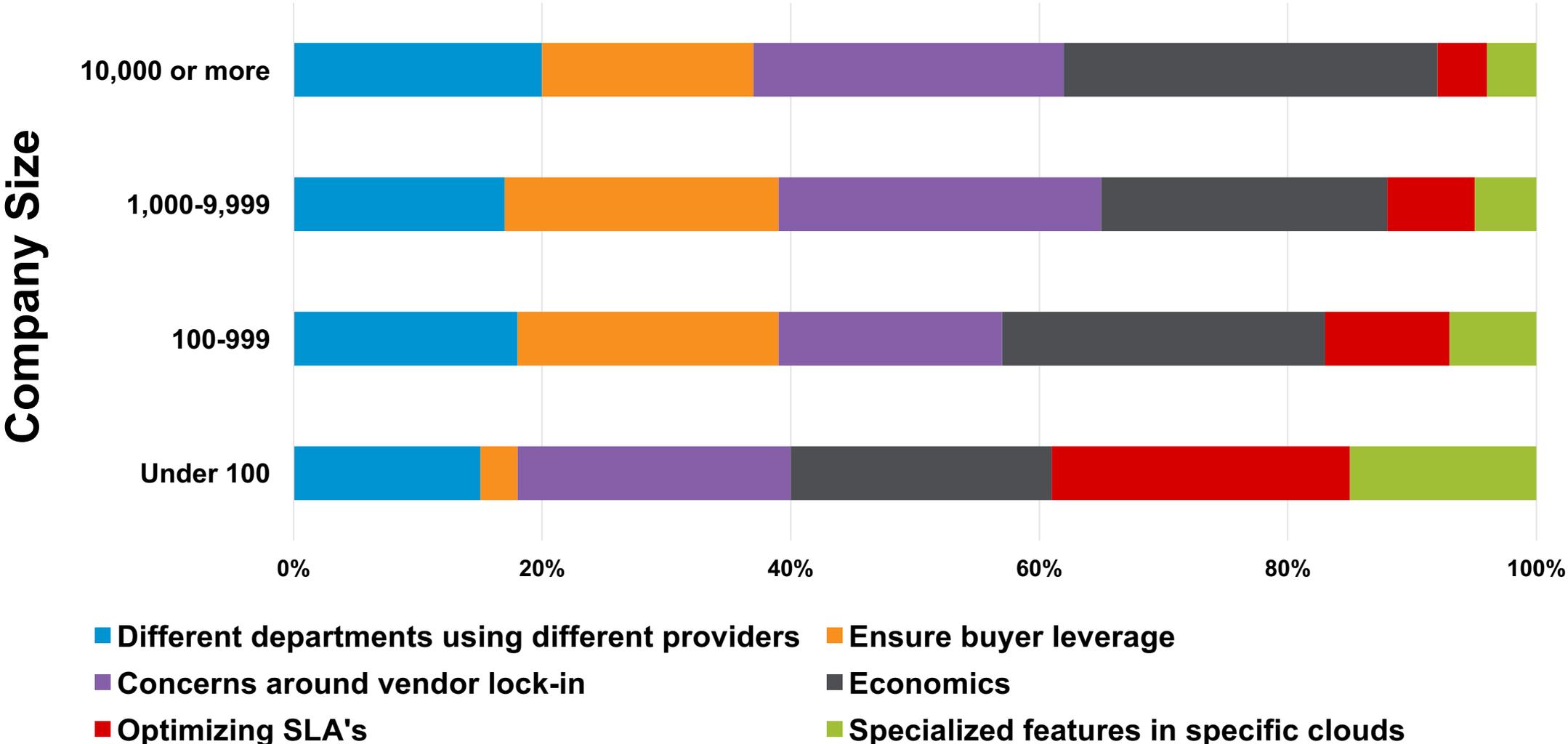
MULTI-CLOUD CHALLENGES

A Few Multi-Cloud Challenges by Persona
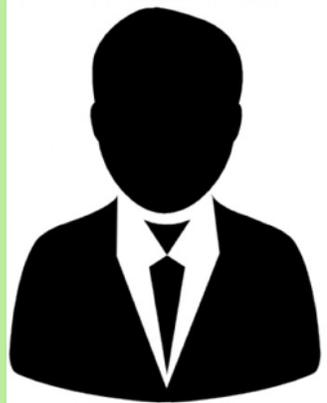
Cloud Architect

- DevOps & app owners bypass traditional IT - don't consider long term strategic impacts.

- Required to leverage automation tools to meet speed and scale requirements

NetOps

- Struggles to keep pace with massive changes in IT and has difficulties providing their expertise in cloud environments

- Aware that automation is key to long term success, but struggle to know where to start
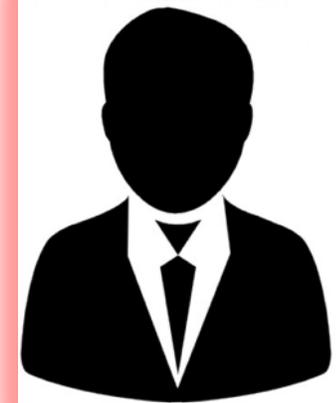
SecOps

- Inconsistent services and features creates security vulnerabilities

- Controlling who has administrative access to these multi-cloud applications

Challenges of Developing Multi-Cloud Architectures
Basic, inconsistent application services across multi-cloud environments

Siloed services drive non-portable investments

Inconsistent policies across environments create security vulnerabilities

Data Center/Colocation Facility

BIG-IP Platform   F5 Virtual Edition   F5 VIPRION

Administrator
- Numerous disparate toolsets & interfaces
- Inconsistent features and terminology
- No centralized point of control
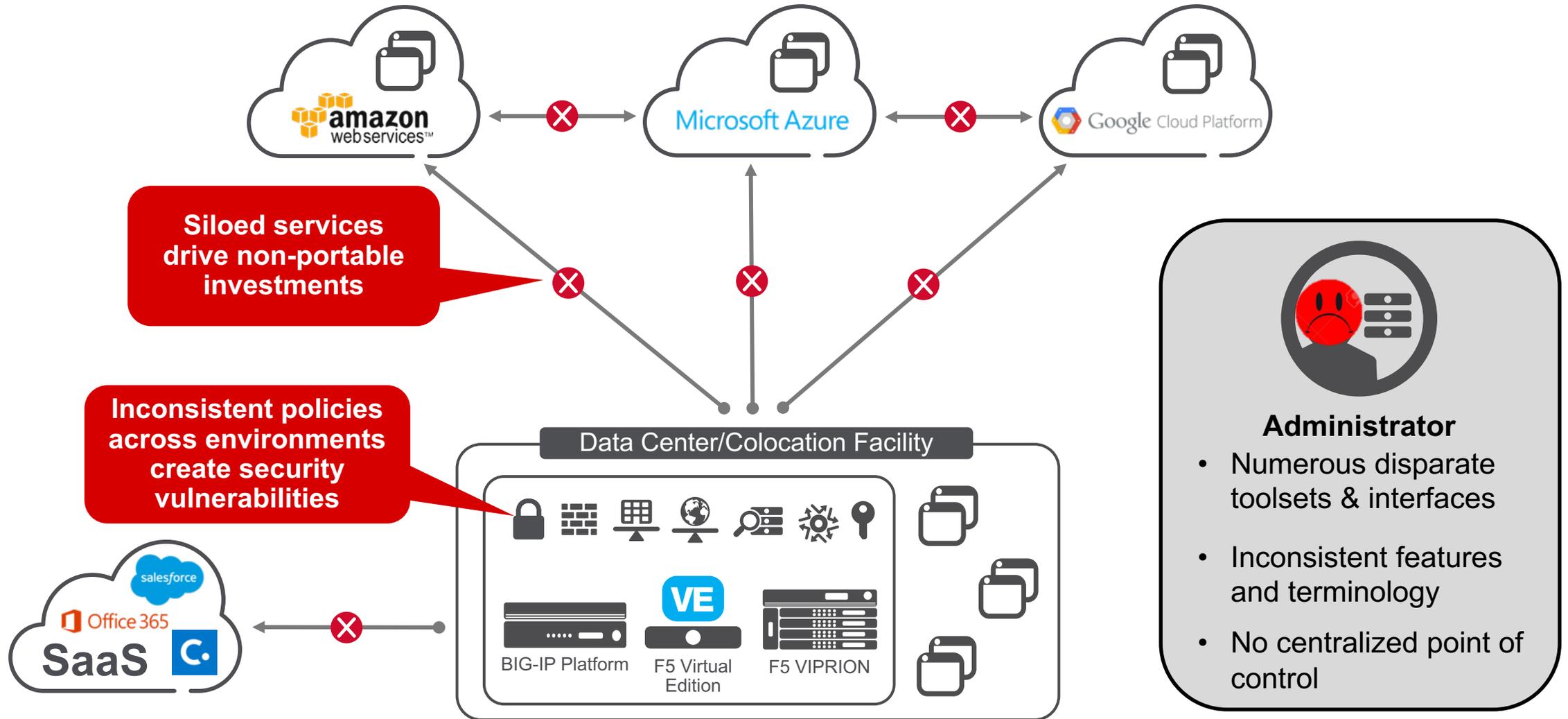
Don't limit growth by creating an unsustainable operating model

F5 Simplifies Complex, Multi-Cloud Architectures
With F5, disparate cloud environments don't have to be…

Advanced app services offer feature parity across all environments

Replication of app services across environments allows for highly portable workloads

Consistent policies across platforms reduces security vulnerabilities

Data Center/Colocation Facility

BIG-IP Platform   F5 Virtual Edition   F5 VIPRION

Administrator
- Standardized app services for consistent features
- 1 solution means 1 interface and 1 set of terminology
- All of which can be centrally managed

Ensure flexibility and control by future-proofing investments
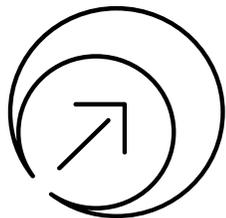
FASTER DEPLOYMENTS

Scale deployments with increased agility

Turnkey solutions validated and tested in multiple clouds

Library of automation and DevOps toolsets

Enable NetOps with SuperNetOps training
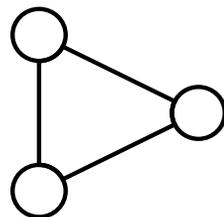
EFFICIENT OPERATIONS

Reduce complexity across multiple clouds

Service abstraction

Cloud independence with portable multi-cloud app services

Integration with application ecosystem
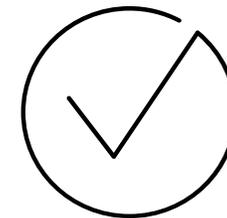
CONSISTENT SECURITY

Reduced risk while maintaining compliance and control

Consistent security policies

Simplified policy deployment and compliance

Advanced app protection

Centralized visibility for control

F5 transforms app services delivering consistency and security to Multi-Cloud deployments

App Services For Container Environments
Frictionless And Automated App Services Insertion

Integrate F5 into container orchestration and management solutions systems, while also providing lightweight load balancing within container environments
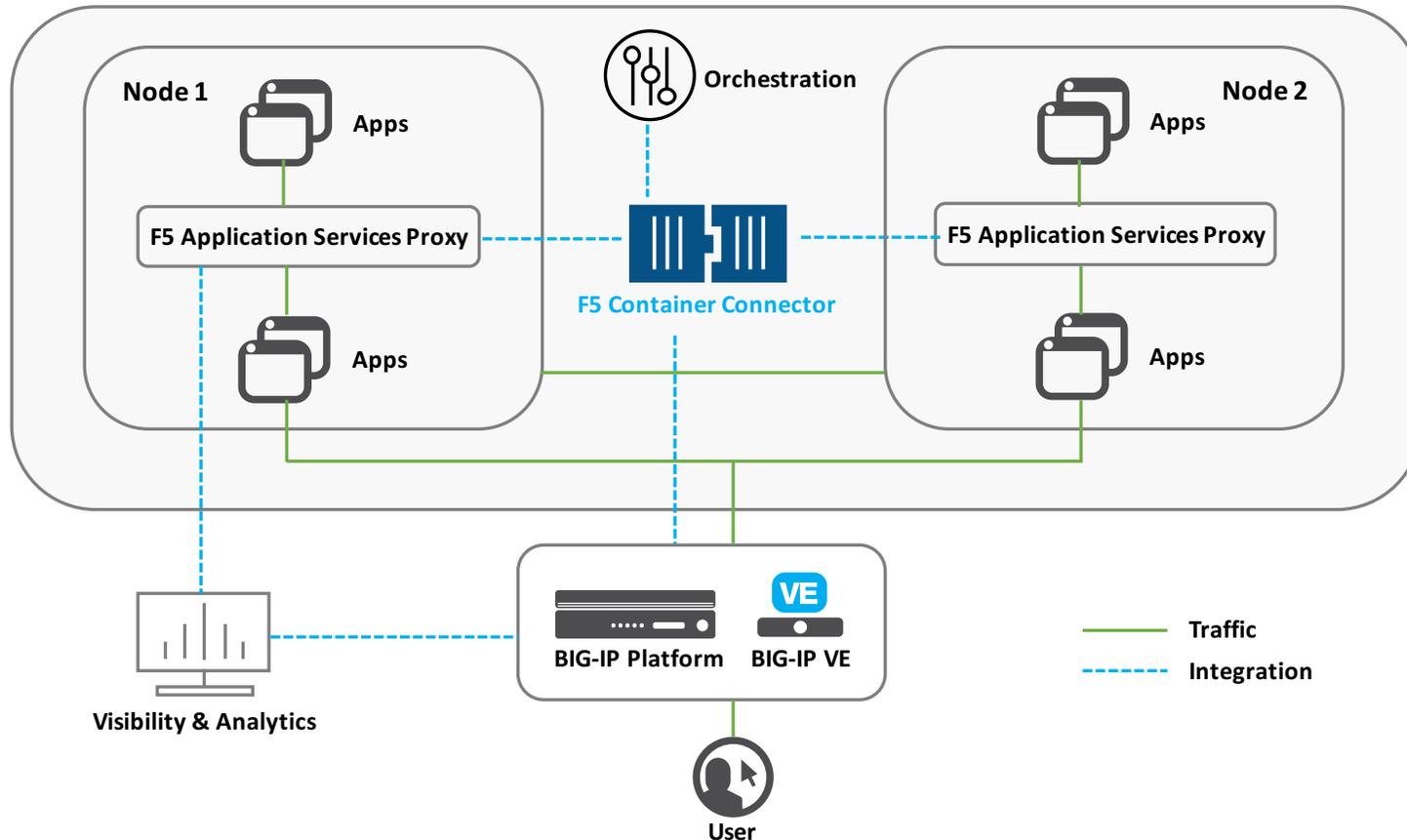
Problem: Constant manual changes with services causes lack of agility and increases friction.

Solutions:
- **F5 BIG-IP**
- **F5 Container Connector**
- **F5 Application Services Proxy**

Benefits:
- **Frictionless app services for containers**
- **Enable self-service for DevOps**
- **Automated discovery and services insertion Elastic app services**
- **Elastic app services**
- **Faster deployment and greater visibility**

Service Mesh
Kubernetes-Native Advanced L7 Policy
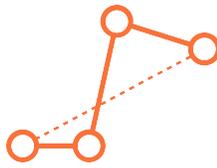
Flexibility and power from the core of Istio plus everything you need to run in production

User's Kubernetes Cluster

A — Envoy
C — Envoy
B — Envoy
Mixer — Agent
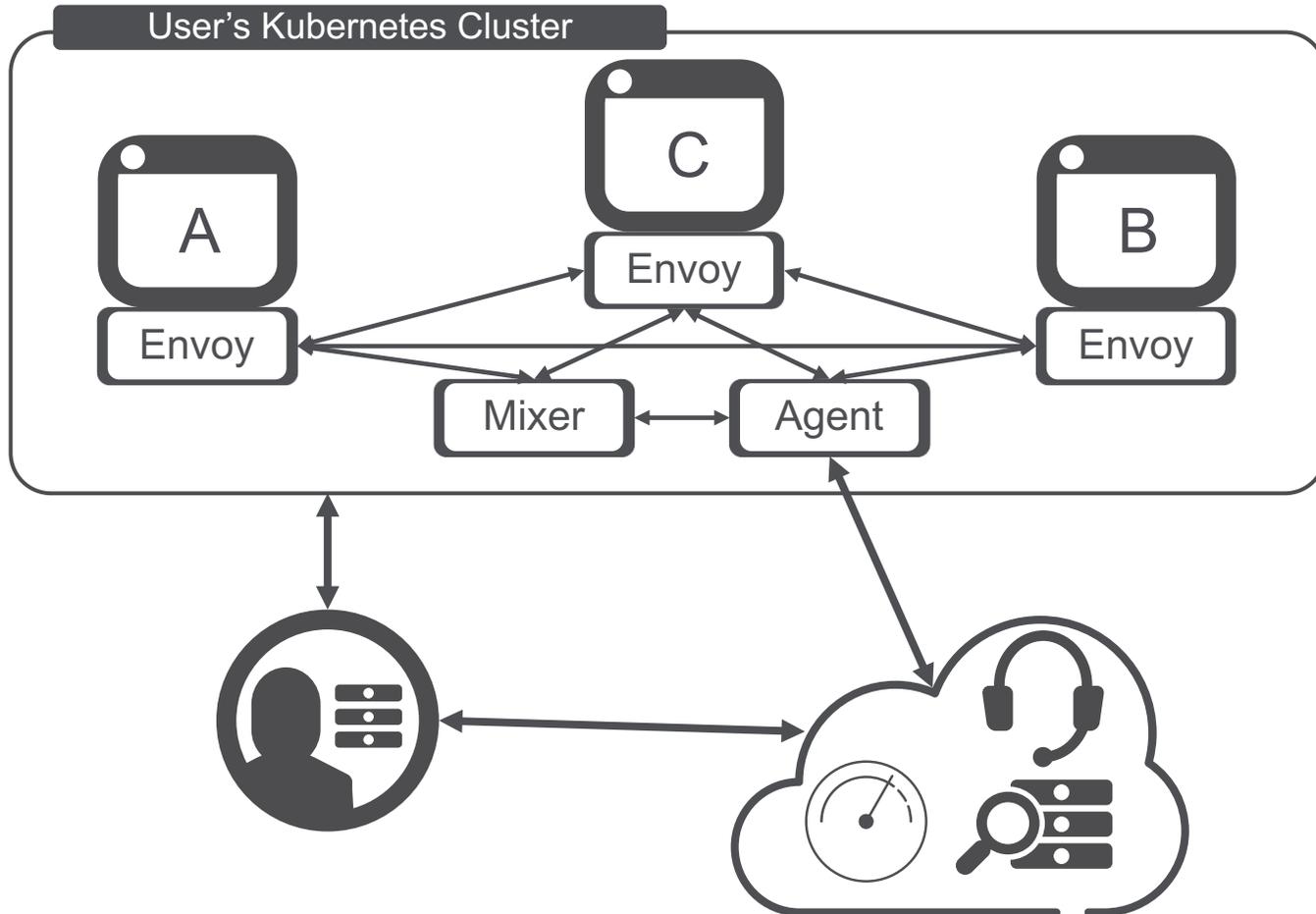
Problem: Container-to-container communication should be frictionless from dev to prod.

Solutions:
- **Aspen Mesh**

Benefits:
- **Istio at its core**
- **Hosted Grafana, Jaeger**
- **Istio vet for basic problems**
  - **mTLS and liveness probes**
  - **Version mismatches**
  - **Init failures**
- **Istio vet in the cloud can do even more**
  - **Predictive analytics**
  - **Alerting/history**

Cloud Interconnect for Accelerated Cloud Adoption

Flexibility and scale of the public cloud while managing security, traffic, and policy programs in a physical environment

Challenges

- Lack of control over applications and devices

- Lack of operational flexibility and risk of cloud provider lock-in

- Gap in IT resource skillsets in public cloud

Recommended app delivery services

- Advanced local/global traffic management

- SSL offload and intercept

- App security – DDoS, WAF and IAM

Key Benefits

- Maintain central point of control and visibility

- Enable flexibility and portability among clouds

- Reduce security risks with consistent policies

- Achieve user performance expectations
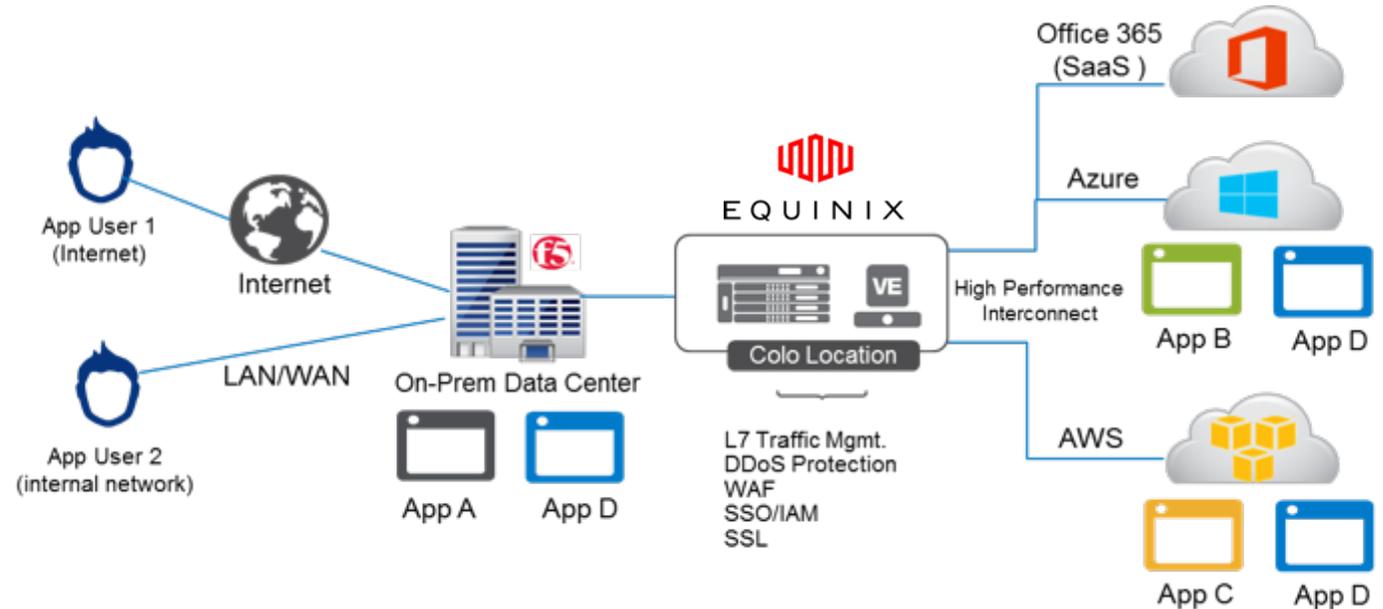
Thank You

WE MAKE APPS

GO→

FASTER. SMARTER. SAFER.

Questions?

Useful Links

https://f5.com/about-us/blog/articles/speed-and-scale-f5-big-ip-as-ingress-control-for-kubernetes-28620

https://devcentral.f5.com/articles/deploy-an-app-into-kubernetes-using-advanced-application-services-27233