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Kubernetes Trials & Tribulations: Cloud, Data Center, Edge

Live Webcast

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Today's Presenters

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SNIA - By the Numbers

Industry Leading Organizations

180

Active Contributing Members

2,500

IT End Users & Storage Pros Worldwide

50,000

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Topics

- ## Kubernetes Challenges:
  - Costs, data sovereignty, security
  - Data gravity, latency, and extending workloads to the edge
- ## Discussion:
  - How are trends converging?
  - Is cloud repatriation really a thing?
  - Are traditional hardware vendors reinventing themselves to compete?
  - Where does the data live?
  - How is the data accessed?
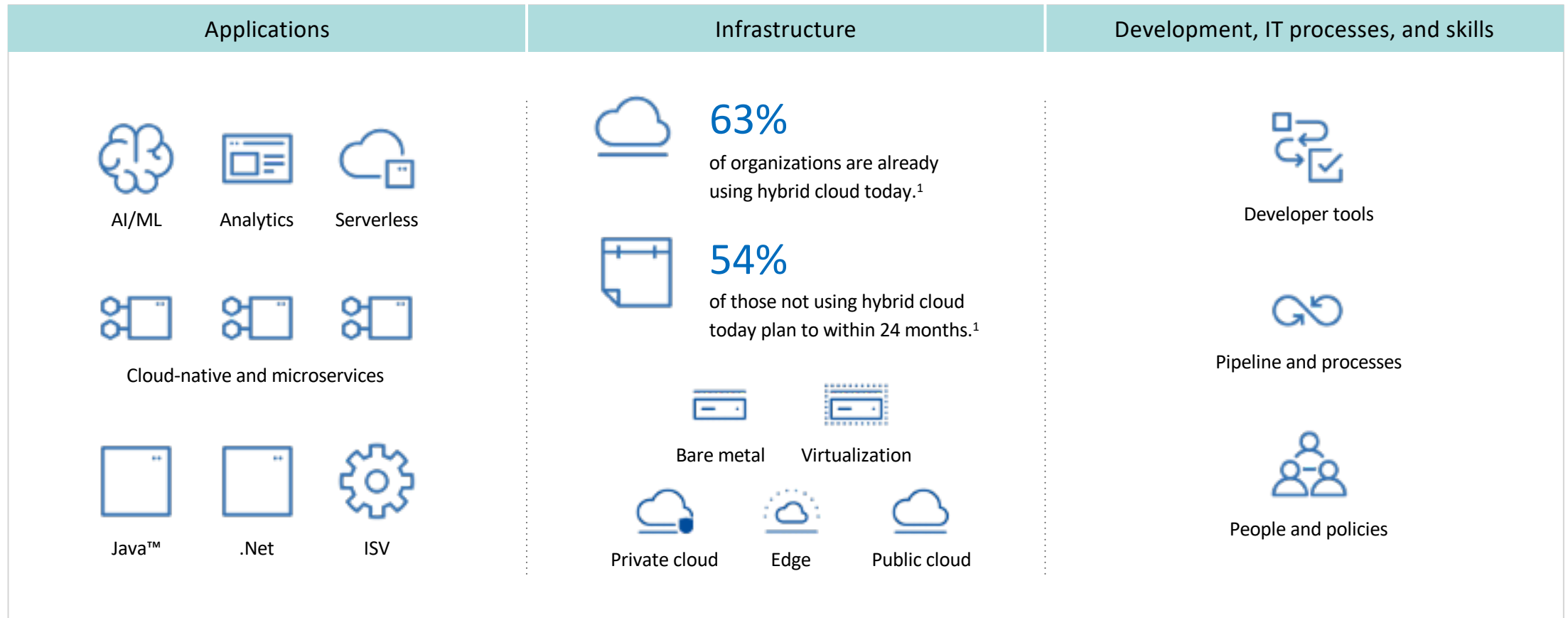 - What workloads are emerging?

Modernizing Application Development in the Hybrid Cloud

Michael St-Jean

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Reality of Enterprise IT Environments Today

Diverse app portfolios, mixed infrastructure environments, and limited automation

Applications	Infrastructure	Development, IT processes, and skills

Applications

AI/ML   Analytics   Serverless

Cloud-native and microservices

Java™   .Net   ISV

Infrastructure

63%
of organizations are already using hybrid cloud today.[1]

54%
of those not using hybrid cloud today plan to within 24 months.[1]

Bare metal   Virtualization

Private cloud   Edge   Public cloud

Development, IT processes, and skills

Developer tools

Pipeline and processes

People and policies

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Cloud native and Kubernetes lead to multicloud and multicluster…

29%

have more than 10 production Kubernetes clusters

74%

of customers have DevSecOps initiatives
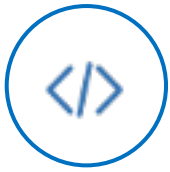
93%

Use multiple infrastructure clouds

81%

Use multiple public clouds and one or more private clouds

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…which leads to complexity, inconsistency and security risks

In a hybrid cloud world, it's hard to:

Ensure a consistent experience for developers

Scale Kubernetes to multiple clusters, clouds

Manage data across environments

Apply consistent security controls at scale

Shift security left into the development process

Verify configurations, policies, and compliance

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But multiple clusters and hybrid cloud are useful for many reasons

Application availability

Reduced latency

Address industry standards

Geopolitical data residency guidelines

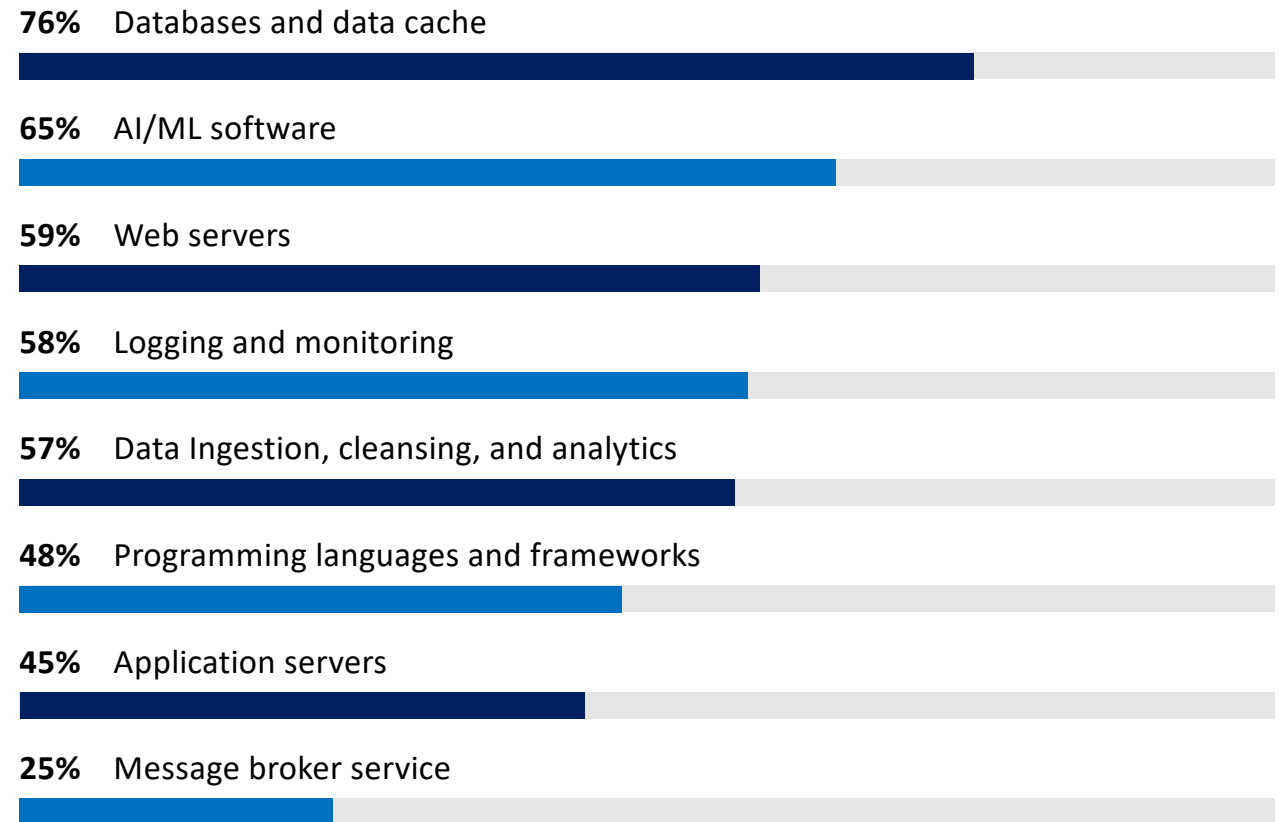Disaster recovery

Manage security and compliance

CapEx cost reduction

Avoid vendor lock-in

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Broad spectrum of workloads are being deployed in containers and Kubernetes[1]

76%   Databases and data cache

65%   AI/ML software

59%   Web servers

58%   Logging and monitoring

57%   Data Ingestion, cleansing, and analytics

48%   Programming languages and frameworks

45%   Application servers

25%   Message broker service

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What's in a modern application platform?

Unified platform for Dev, Sec and Ops

Transparent to developers

Extensible - works with what you have

Observability, management and monitoring
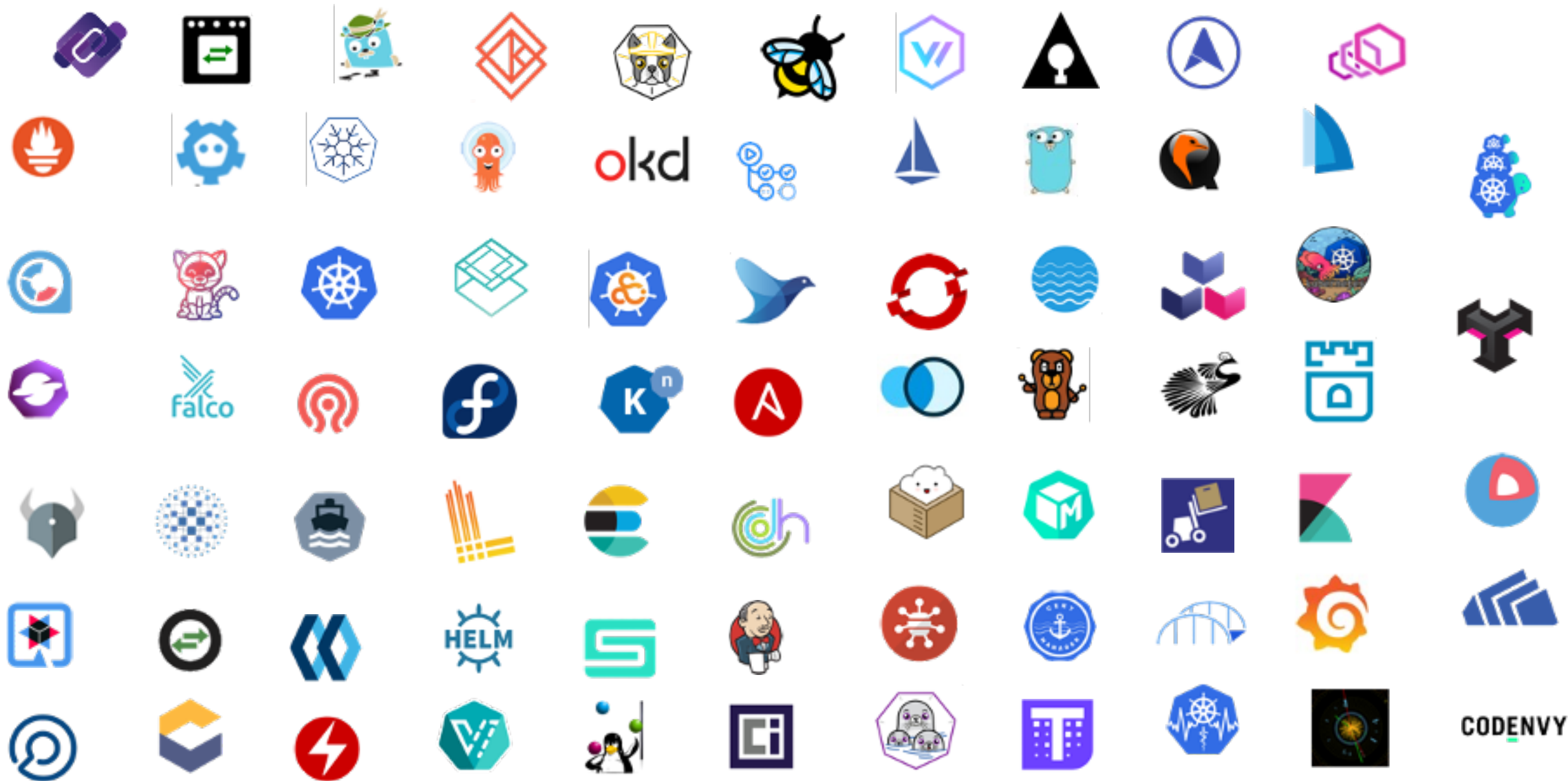
Runs on any infrastructure or cloud

Security configuration management and enforcement

Consistent data management

Vulnerability scanning and secure image management

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Accelerate application modernization with KubeVirt

Rehost
- Lift and shift traditional applications
- Easy and low friction
- Consolidate resources

Refactor
- Run traditional .NET framework apps on Windows Server Containers
- Extend benefits of containers to Windows
- Supports newer versions of Windows

Rearchitect
- Rearchitect traditional apps to cloud-native
- Full integration with emerging apps and services
- Schedule when it makes sense for the business

Rebuild
- Develop and test new applications to replace existing
- Take advantage of a robust community
- Integration with other apps and operationalized lifecycle

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"96% of customer-obsessed firms adopt new technologies before their competitors do"[1]

"800% increase in the number of apps deployed at the edge"[2]

1 Forrester: The Tools That Matter: Demystifying Emerging Technologies, May 2021
2 IDC: IDC FutureScape: Worldwide IT Industry 2020 Predictions, Doc # US45599219, October 2019

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The business drivers behind edge computing

Bringing new technologies and containerized applications to create differentiation

Fostering faster data-driven outcomes

- ‣ Deliver better products
- ‣ Make faster decisions
- ‣ Use resources more efficiently

Delivering better experiences, anywhere

- ‣ Use immersive apps
- ‣ Online streaming, gaming, etc.
- ‣ On a train, ship, oil rig, or even in space

Meet data residency/sovereignty requirements

- ‣ Storing or processing of personal data (subject to legal protections of a country) within a geographical area

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Edge computing comes with its own considerations

Scale

Infrastructure and application
scale-out to 100s to 1000s of
nodes and sites

Location

Variability in space, power
/cooling, hardware resources,
and network connectivity

People

As your architecture scales,
how will your teams scale?

Security

Reduced security when compute
is geographically dispersed

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Edge Tiers

Device or
Sensor

End-User Premises Edge

Edge
Endpoint

Edge
Gateway

Edge
Server

Provider Edge

Provider
Far
Edge

Provider
Access
Edge

Provider
Aggregation
Edge

Provider/Enterprise Core

Regional
Data Center

Core
Data Center

"last mile"

* Edge computing == Fog computing (there is no real difference other th

Distributed event-driven architectures

Configuration as code

Go beyond documentation using GitOps process to simplify deployment

Maintained over time

Each use case has a lifecycle to ensure they are kept up to date while they are being used

Highly reproducible

So that you can scale out your deployments with consistency

From POC to production

Ensure your teams are ready to operate at scale

Tested as a use case

Confidence the configuration continues to work

Open for collaboration

Anyone can suggest improvements and contribute

hybrid-cloud-patterns.io

IT Toolbox: How to Build Validated Patterns for Continuous AI Deployment at the Edge

Article

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Panel Discussion

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Discussion Points

- So how are all these trends coming together?

- Is cloud repatriation really a thing?

- How are traditional hardware vendors reinventing themselves to compete?

- Where does the data live and how is the data accessed?

- What workloads are emerging?

- How and why will Kubernetes succeed?

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Thank You!

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