

Observability In ArgoCD/Rollouts Using Streaming ML For Reducing MTTR



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Agenda

- 01 Objective and Problem
- 02 Demo - Argo CD / Rollouts Observability with AIOps
- 03 Numaproj - Streaming AIOps
- 04 Q&A

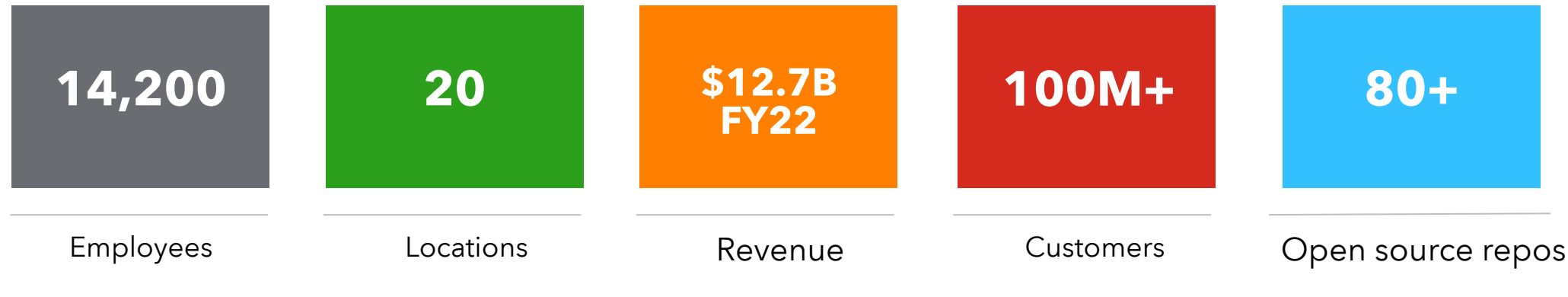


Leading US FinTech Company - 100M+ customers, \$12B Revenue

Our Mission - Powering prosperity around the world

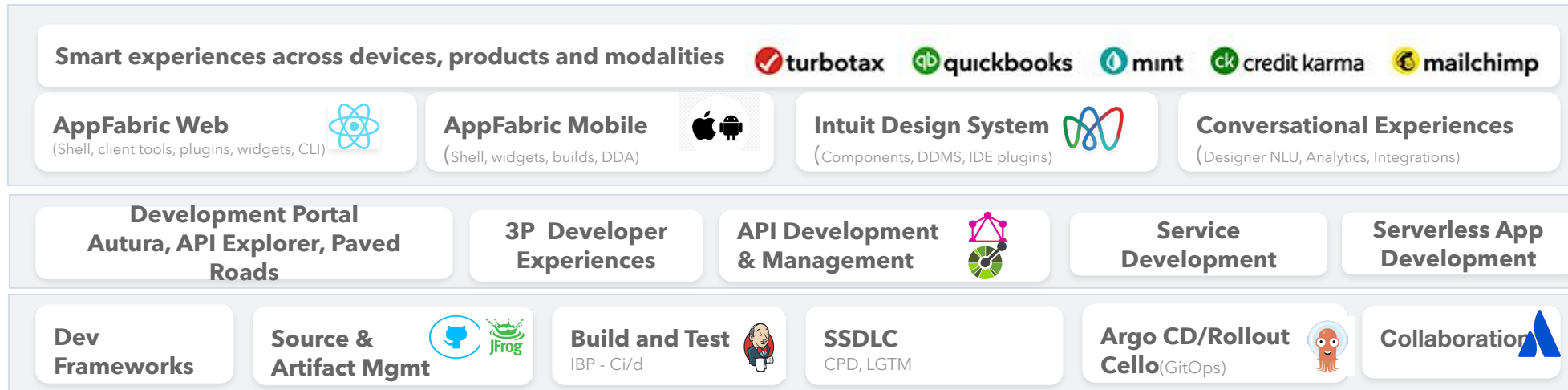
CNCF End user of the year 2019

CNCF open source project maintainer : Argo, Istio, Admiral, LitmusChaos, ...

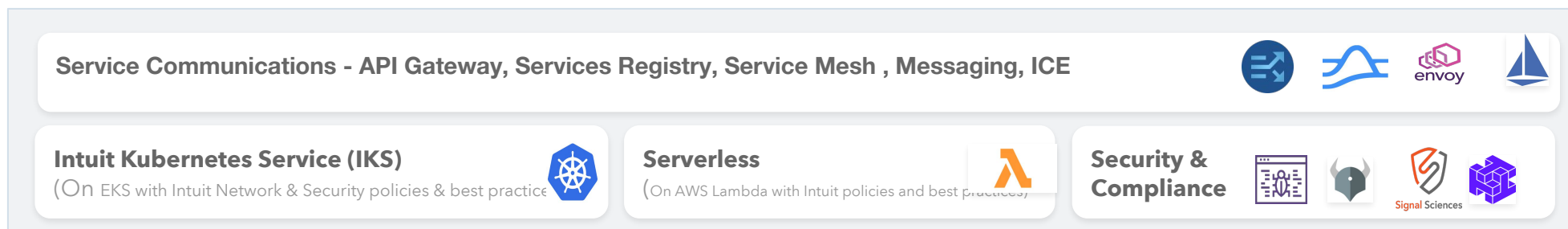


Modern SaaS Platform

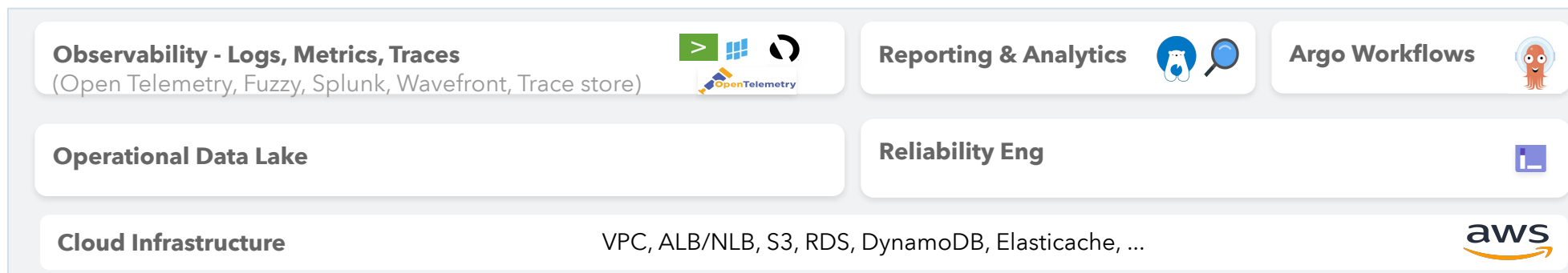
Experiences



Runtime



Operations



Started **Modern SaaS Platform** in 2018

- AI & Cloud-based technologies

Paved roads

- Containerized apps
- Serverless apps

Automate

- Development
- Build
- Deployment
- Scaling & mgmt

Automation at scale

- Higher productivity
- Increased velocity

Real-time operational data enables **AIOps**

Numaproj - Real-Time Analytics and AIOps on Kubernetes

Collection of Kubernetes-native, Opensource, Language agnostic, real-time data analytics tools



Numaflow

**Massively parallel, real-time data
and stream processing engine**

Numalogic

**ML models and libraries for real-time
operational AIOps**



Platform Scale

- 2500+ core services on Kubernetes (250+ K8s cluster)
- 2.5 Billion/per day real-time Events/metrics in ODL
- **Numaproj** powered AIOps. E.g. daily anomaly prediction
 - 490M messages processed
 - 135K models trained
 - 16M predictions



Innovate Fast

Intuit releases ~1000 software changes to production daily

Objective - **continuously deliver changes with quality**

Intuit created Argo CD / Rollouts

- **Argo CD**
GitOps continuous delivery for Kubernetes
- **Argo Rollouts**
Progressive delivery for Kubernetes
- Publicly referenced by 220+ companies
Adopted by many more

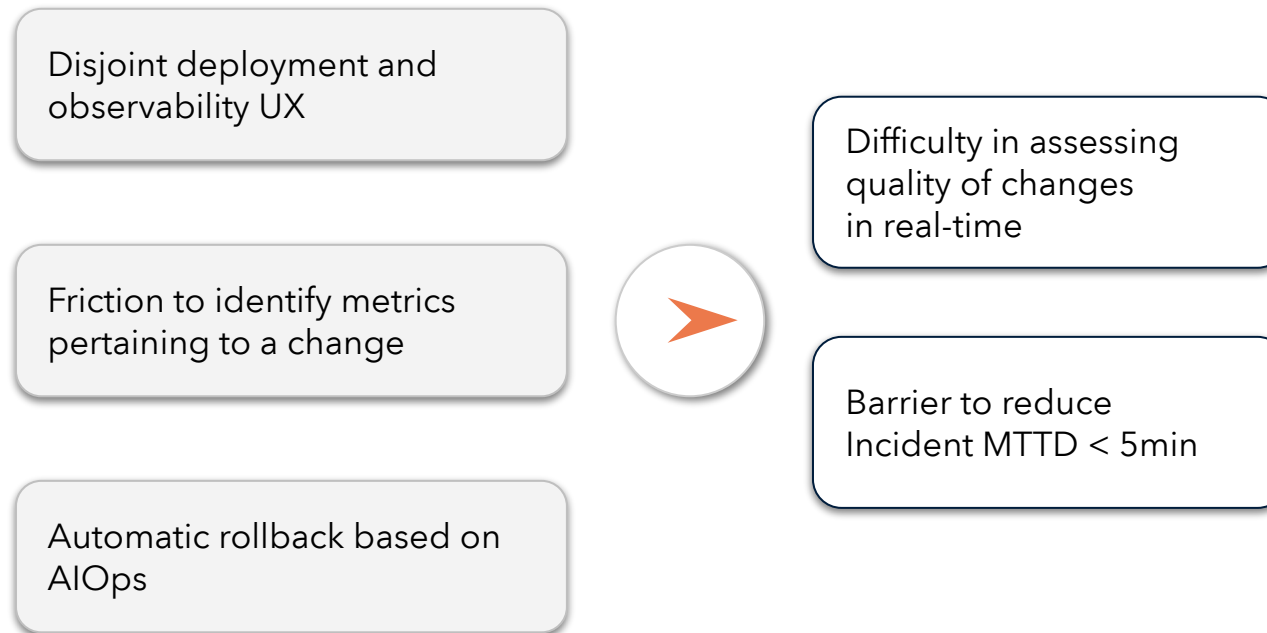


Problem



Problem

One third of P1/P2 incidents at Intuit are caused by simply rolling out changes



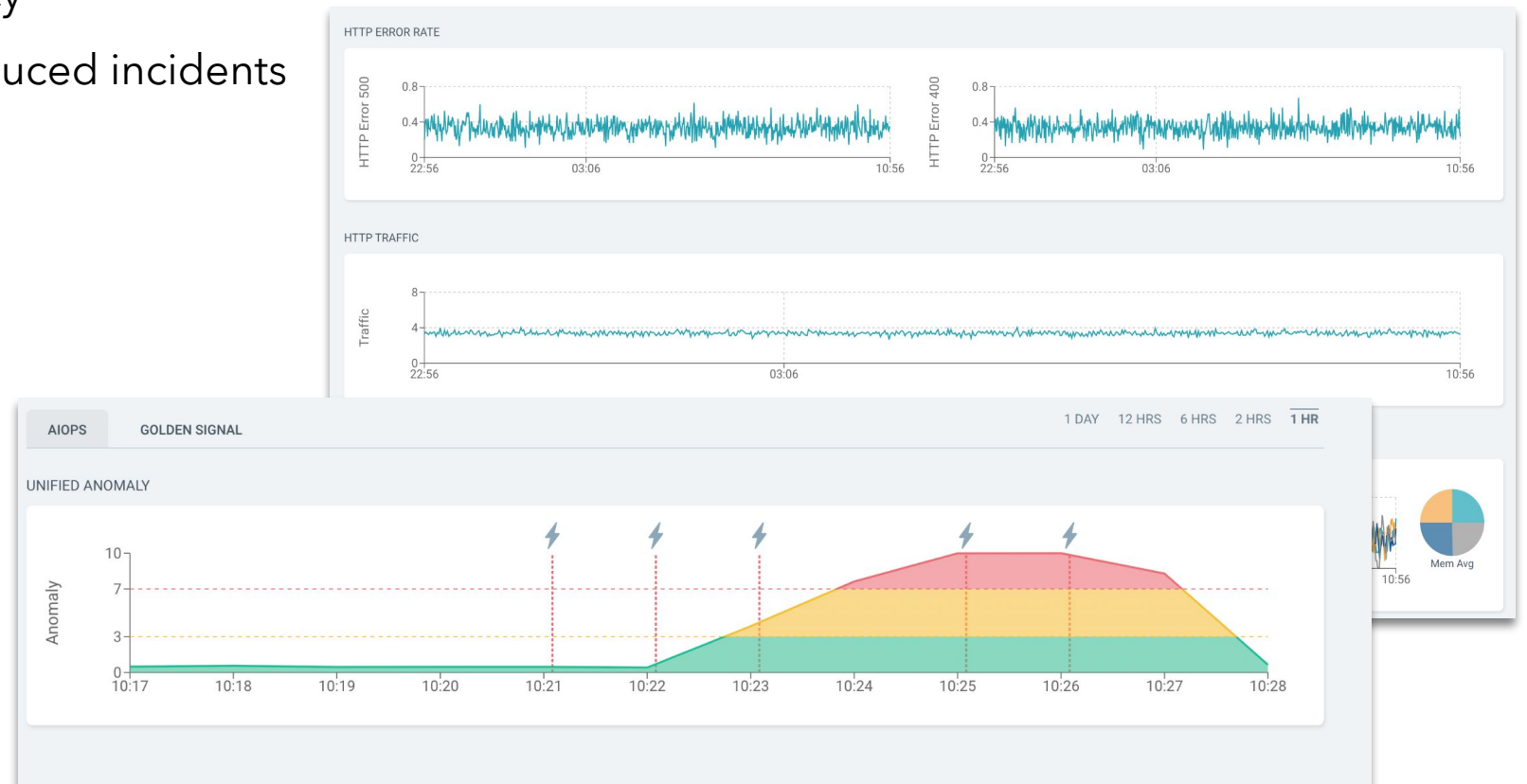
Solution

Bring Observability powered by Numaproj into Argo CD / Rollouts

- Increase developers' efficiency
- Reduce MTTD for change-induced incidents

New Capabilities

- Metrics view within Argo CD UI
- Numaproj powered AIOps in Argo CD/Rollouts
- Automated rollbacks using Anomaly Scores



Demo Plan

Persona - Service developer

Use case - Developer deploys a buggy change

Experience

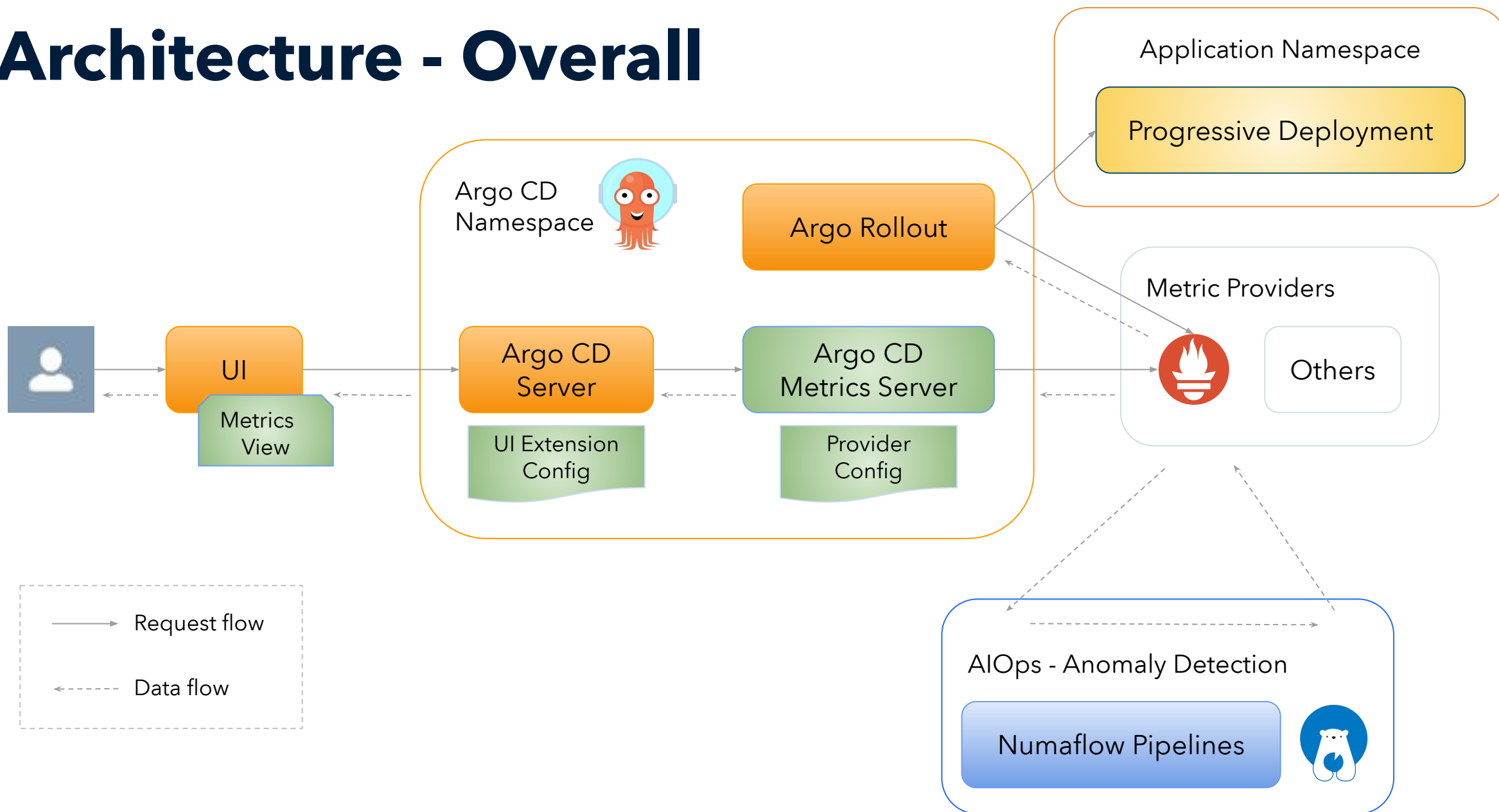
- Developer views customizable key **metrics** within Argo CD UI and can also detect change introduced incident fast using AI-powered **anomaly scores**.
- Argo Rollouts **automatically rollbacks** driven by Numaproj powered AIOps



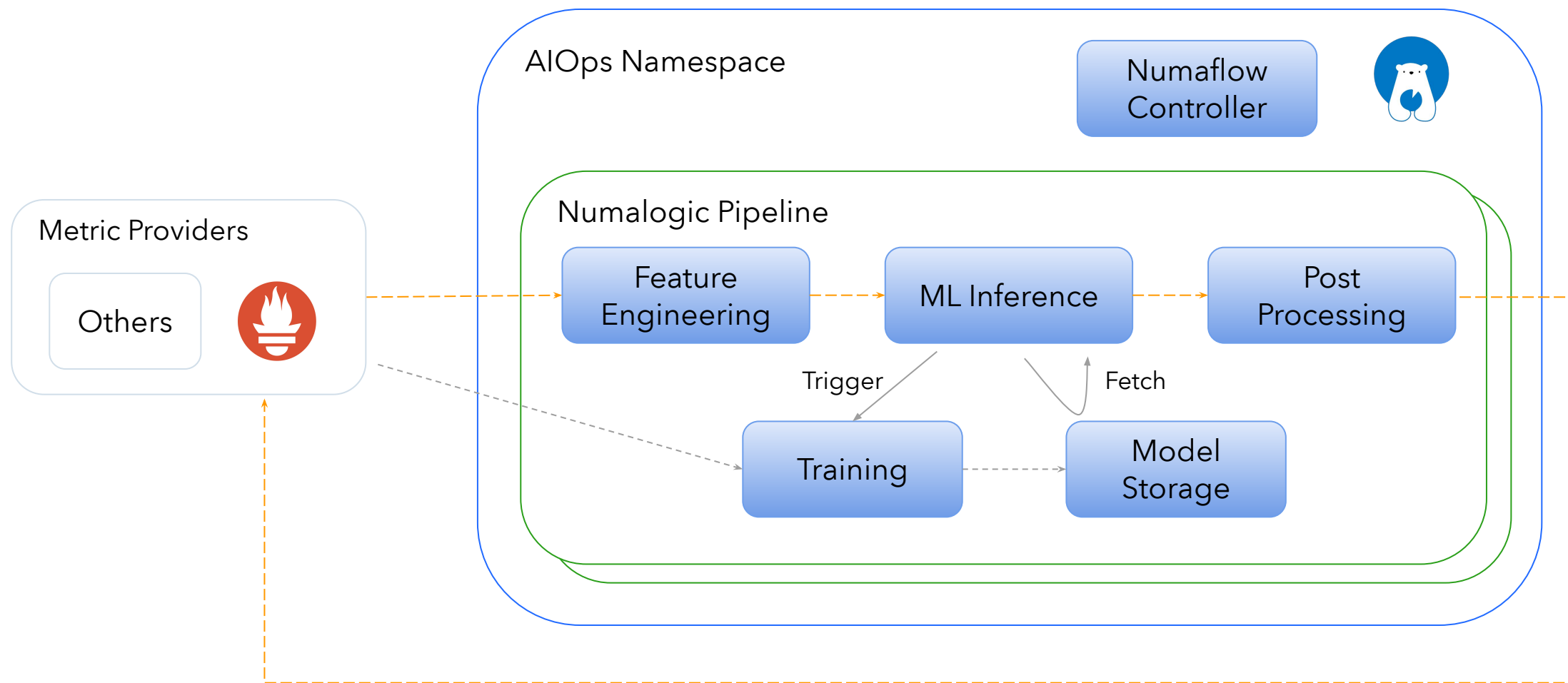
Demo



Architecture - Overall



Architecture - Real-time Streaming AI Ops



Challenges for Real-time Streaming AIOps

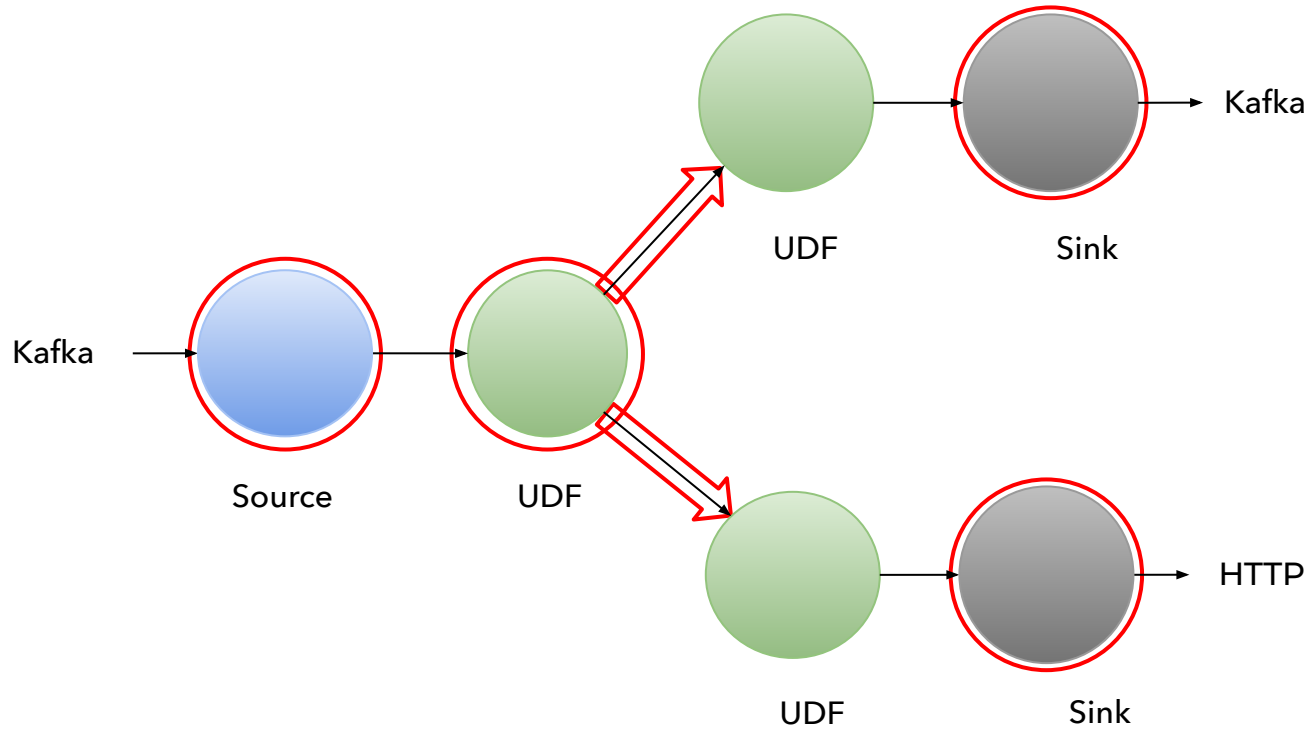
Lots of boilerplate code for streaming in every component

Ad-hoc code with poor reliability and maintainability

Inability to plug and play code for quick experimentation and extension

Data engineering frameworks are too complex and costly for AIOps

Numaflow - Streaming Platform



Read from Source

Tracks event-time, watermarks

Process via User Defined Functions

Every message is passed through UDF

Flat-map

0, 1 or more results after a transformation through a UDF

Conditional Forwarding

Edge can choose which path(s) the message should take

Persist to Sinks

Write result to Streaming, blob stores, etc.

Numaflow Features

Easy to use

Running in < 5 mins. **Language agnostic.**

Lightweight

Ability to run on edge. Native to K8s.

Cost efficient

Auto-scale even to 0, low resource footprint.

Separation of concerns

Decomposition of code. Functions as units. **Exactly-once** semantics.

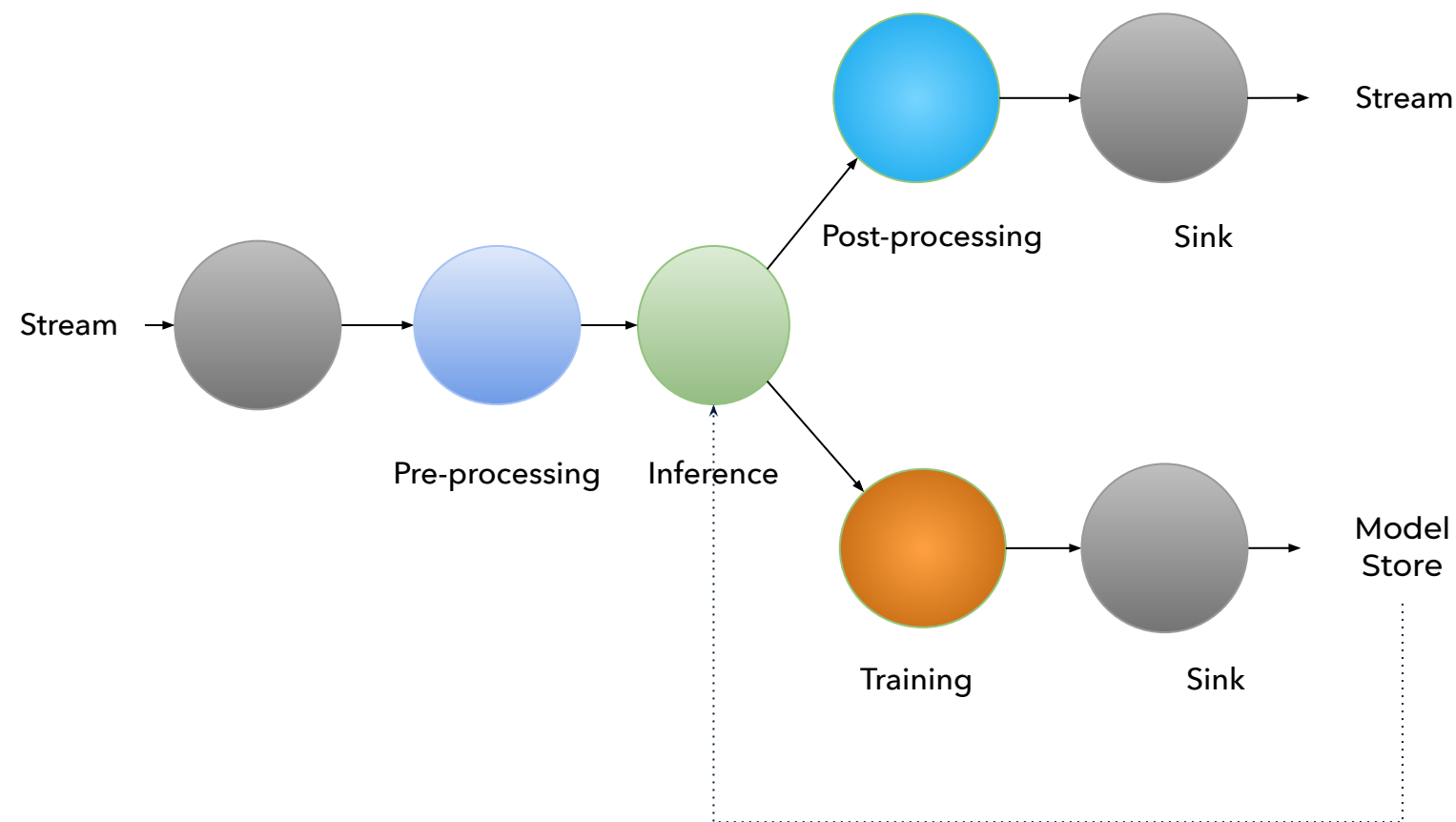
Standardized Streaming

Decouple source and sink. **Backpressure** handling. Watermarks.

Operational Excellence

Automated retries. OOB metrics. **Fire and forget.**

Numalogic - Real-Time Analytics and AI Ops at Scale



AI Ops model repository

Plug and play with out of the box ML models

Data processing

Stream transformer libraries suited for ML

Online training

On demand training, model discovery, with external registry support

A/B Experimentation

Evaluate multiple model performance concurrently

Better ML development velocity

Easy to integrate, Cookie-cutter deployment

The Road Ahead

Adoption at Intuit

Observability with AIOps for every Argo CD managed cluster

AIOps driven automated promotion and rollback



Upcoming Features in Numaproj

Windowing in **Numaflow** - Fixed and Sliding windows

Aggregation in **Numaflow** - GroupBy Keys

Forecasting models in **Numalogic**



Come Join Us

Contribute to Numaproj

- <https://github.com/numaproj>

Contribute to Argoproj

- <https://argoproj.github.io/>

We are hiring

- <https://www.intuit.com/careers>

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Thank You



NATS