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CloudNativeCon

North America 2023

# Building, Scaling, and Growing Internal Developer Platform for Companies Inside Companies

Giri Kuncoro & Joshua Bezaleel

goto financial

# intro



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X @girikuncoro



X @joshuabezaleel

# intro

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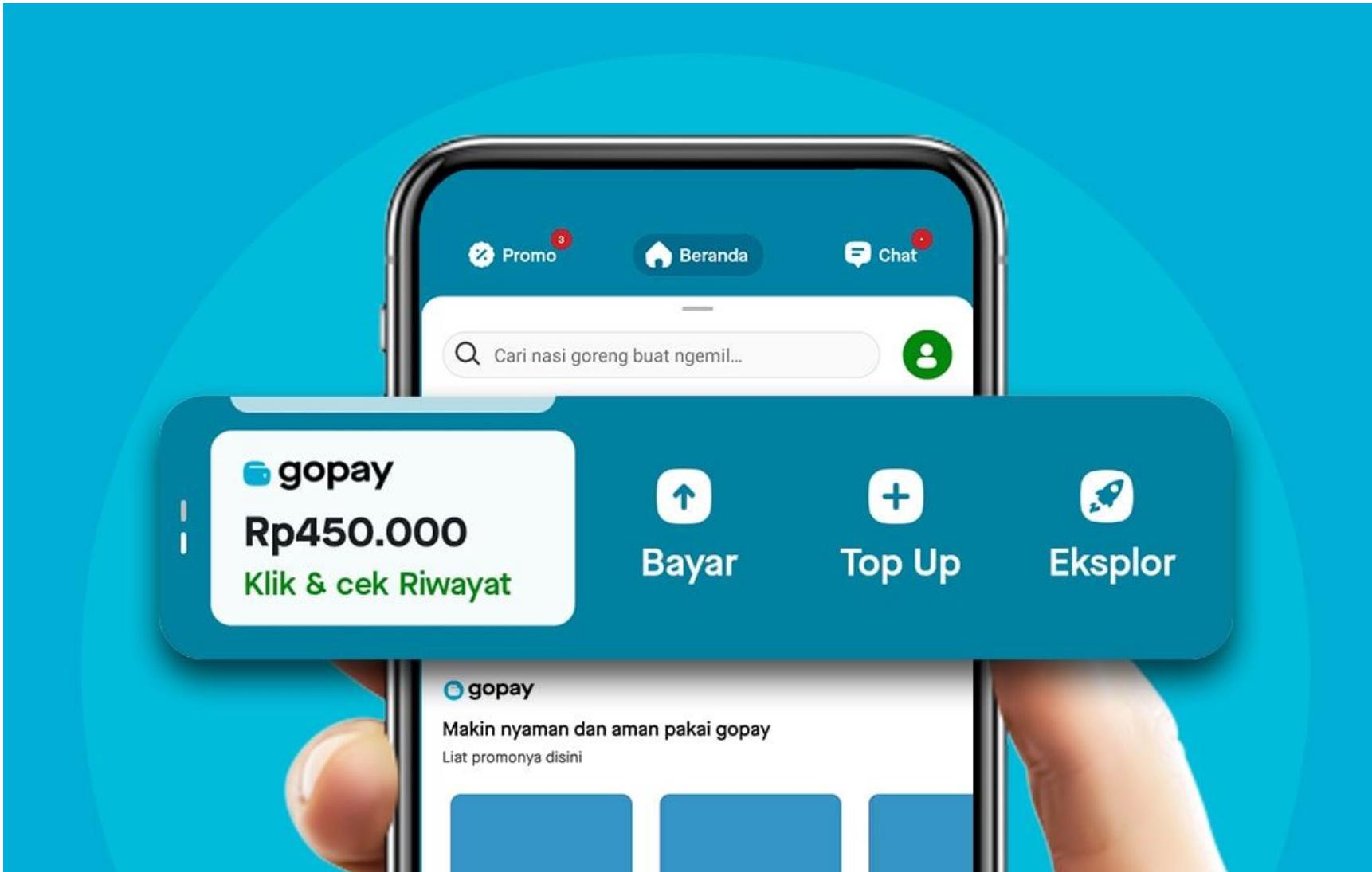
Part of **goto** group,  
the leading Indonesia's  
digital ecosystem



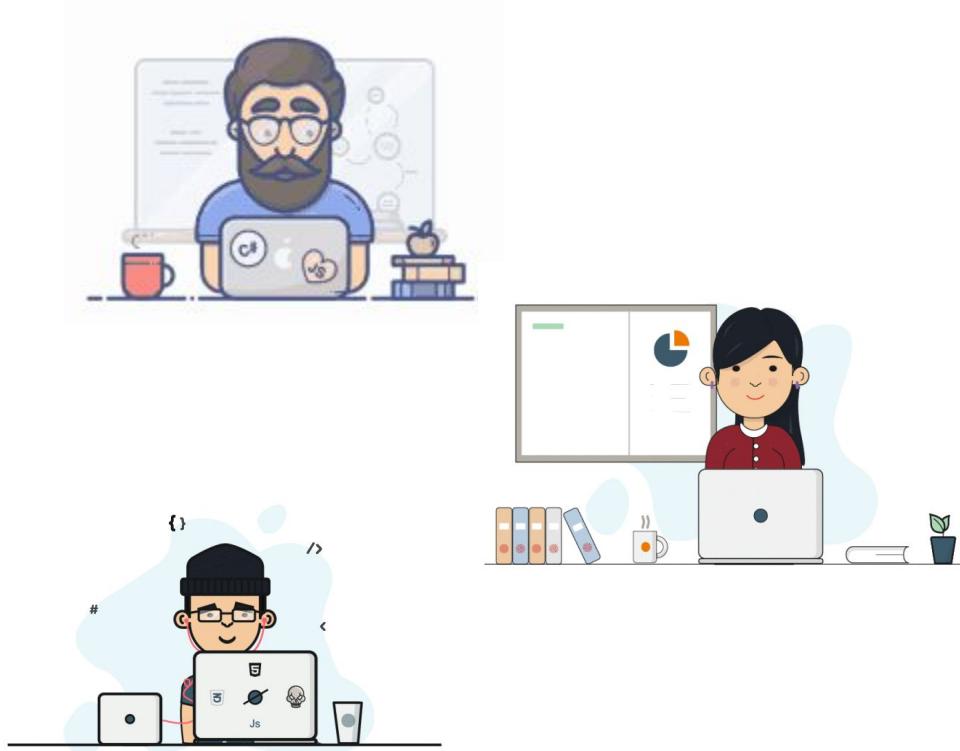
# GoTo Financial Case Study



# start: gopay (digital payment)



- 230+ developers
- 30+ teams
- 30 Kubernetes clusters



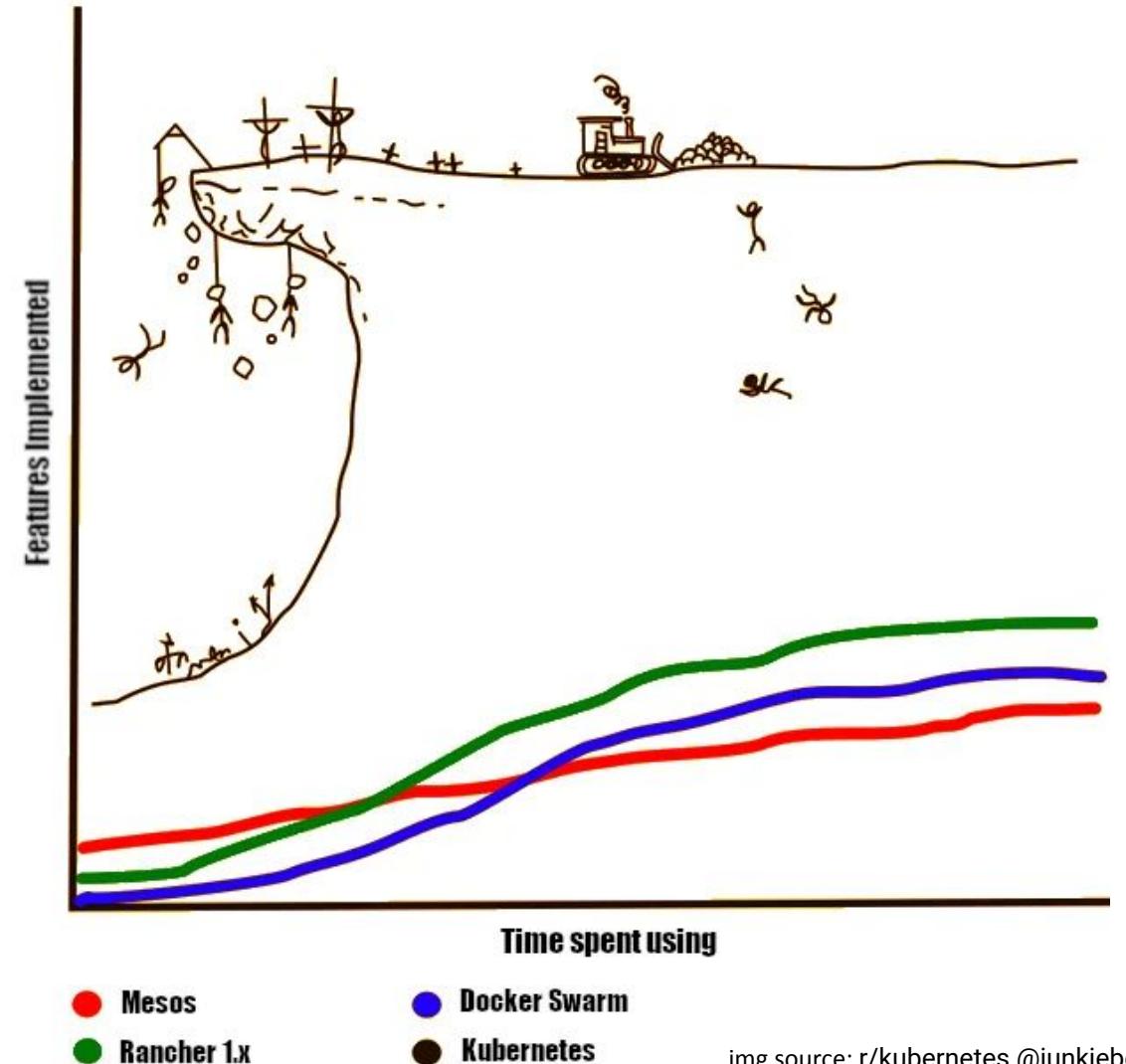
- complex infrastructure
- developers suffer



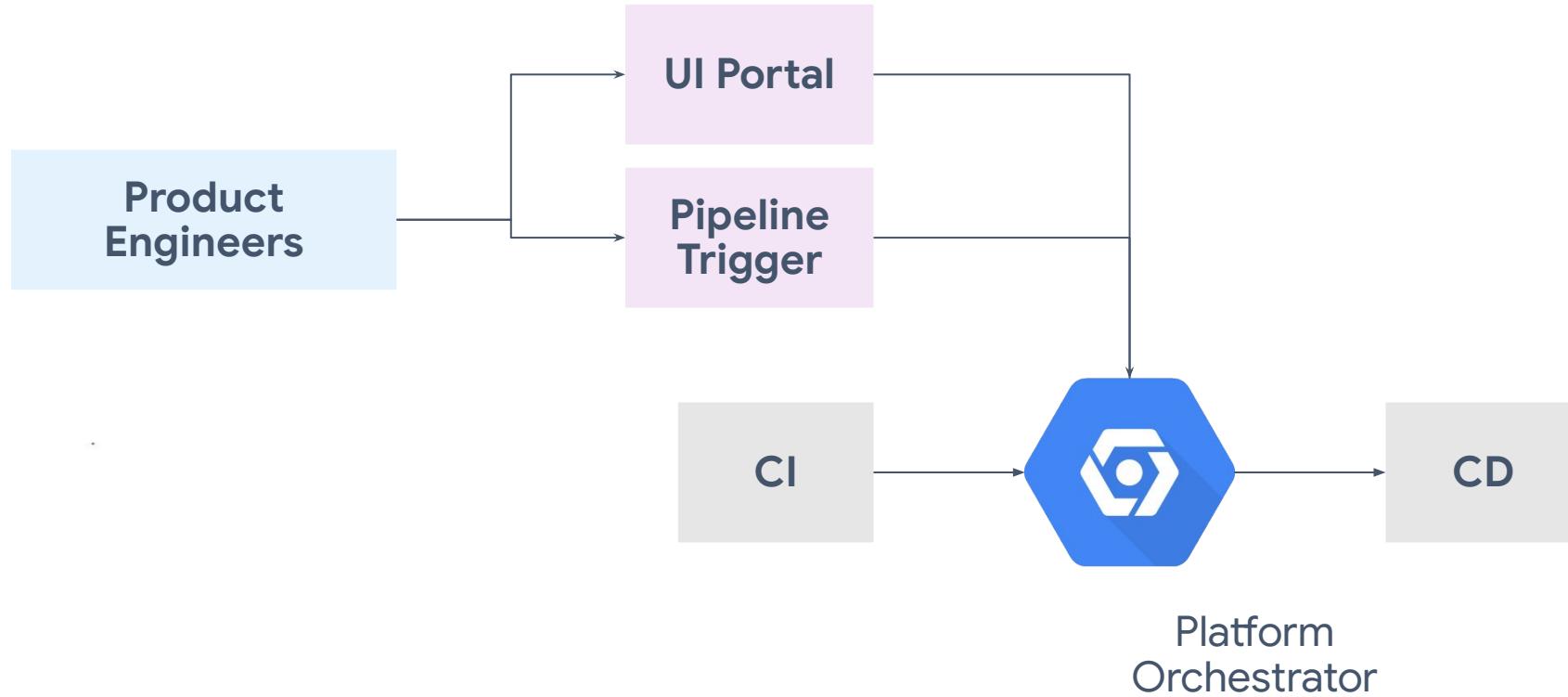
# platform abstraction

- shield developers from learning curve of kubernetes
- infra team **maintains** and **governs** infrastructure **easily**

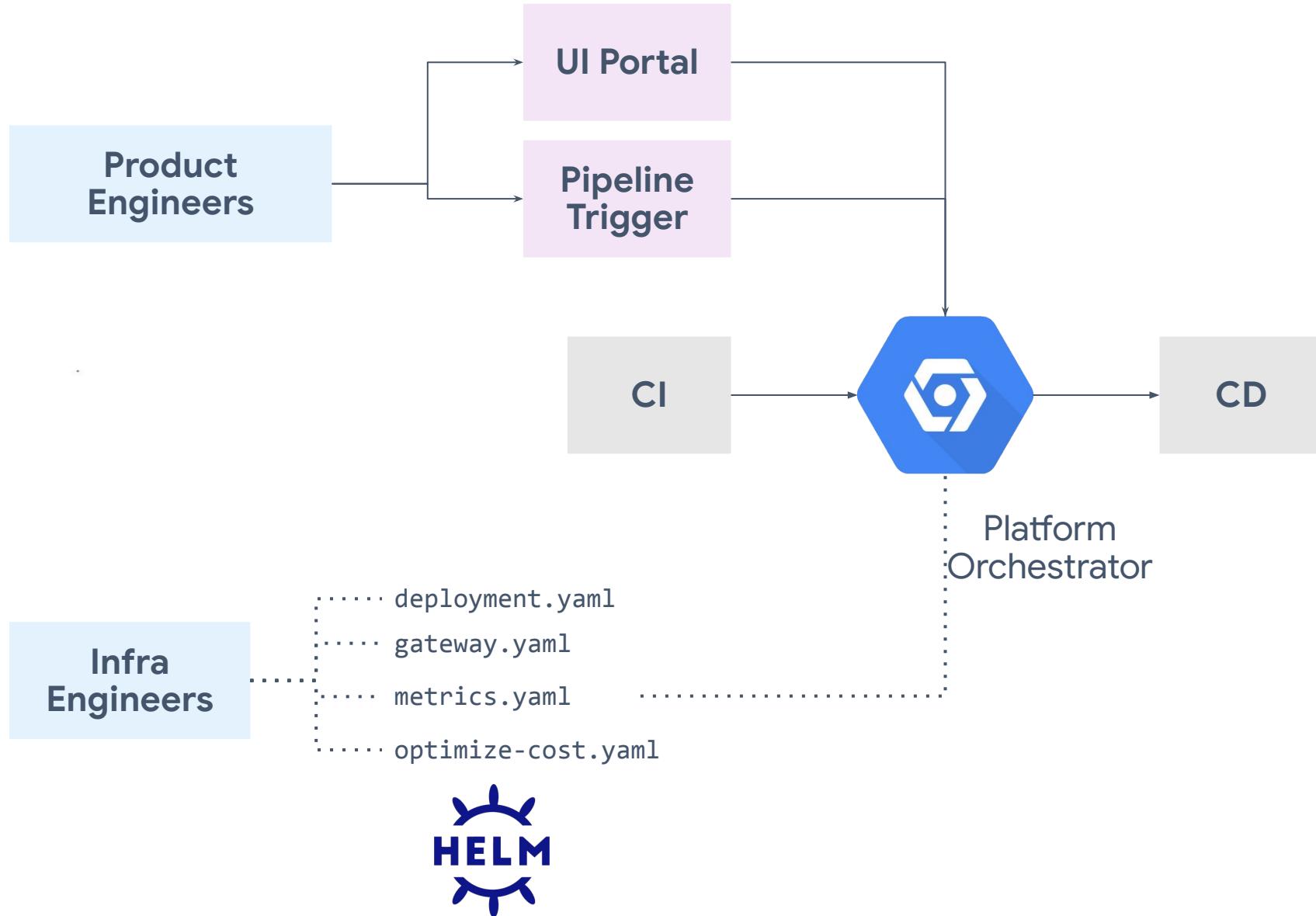
Learning curves of some Container Orchestration Engines



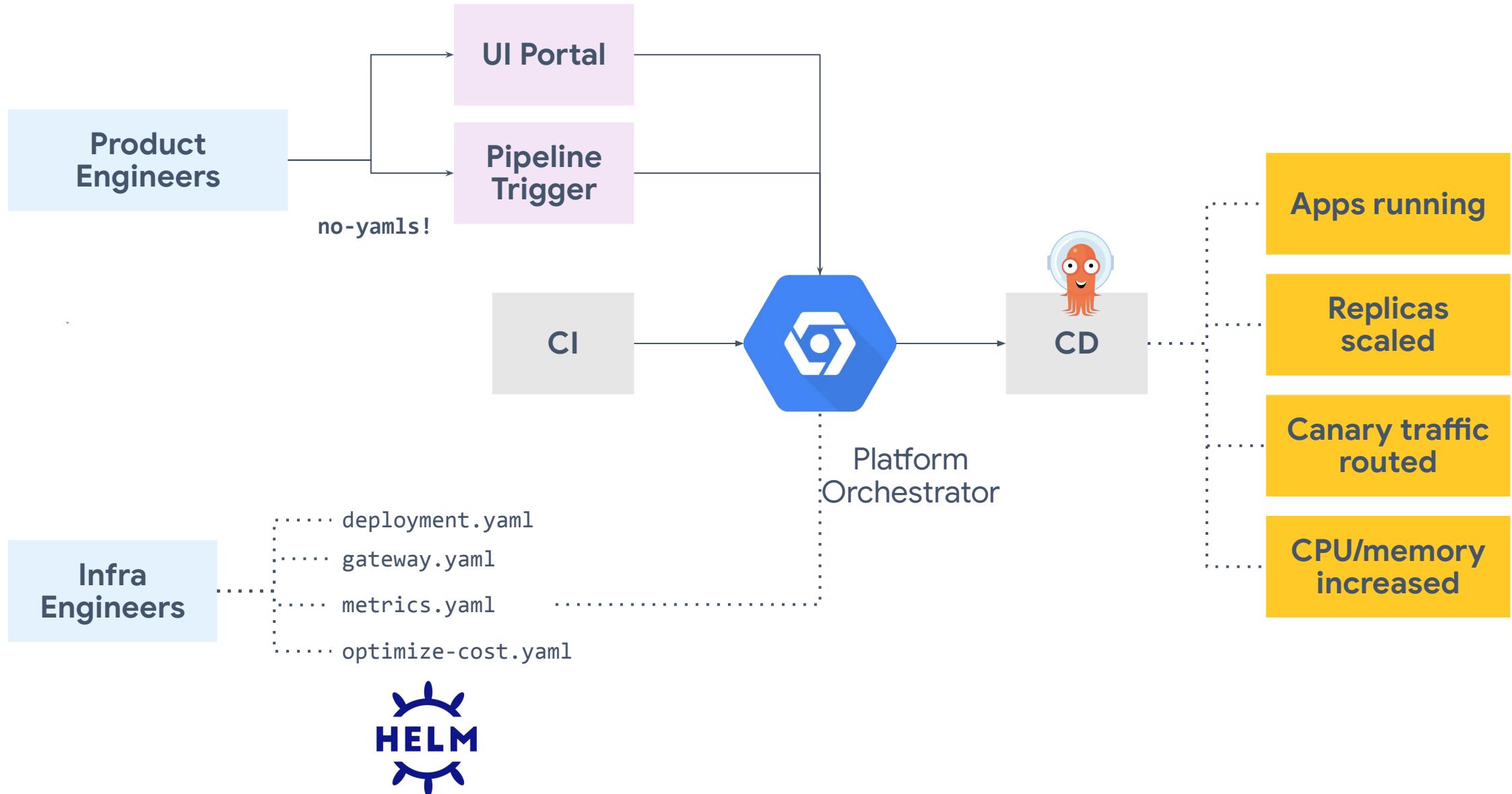
# platform abstraction



# platform abstraction



# platform abstraction



# impact of abstraction

- **rolled out istio 100% within 1 year**
- removed **deprecated** Kubernetes APIs
- scheduled workload to **spot instances**
- improved **utilization** of our clusters

# Gopay.sh Developer Platform

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**Developer  
Control  
Plane**

UI Portal

App Config

Components

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**Integration  
& Delivery  
Plane**

CI Pipeline

Image Registry



ArgoCD  


# Gopay.sh Developer Platform

**Developer  
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**Integration  
& Delivery  
Plane**

CI Pipeline

Image Registry



CD Pipeline

GitLab CI  
Runner

GitHub Action  
Runner



**Monitoring  
& Logging  
Plane**



ELK Log  
Infra



VictoriaMetrics



Prometheus  
AlertManager



Cost Insight

# Gopay.sh Developer Platform

## Developer Control Plane

UI Portal

App Config

Components

## Integration & Delivery Plane

CI Pipeline

Image Registry



CD Pipeline

GitLab CI Runner

GitHub Action Runner



## Monitoring & Logging Plane



ELK Log Infra



VictoriaMetrics



Prometheus AlertManager



Cost Insight

## Security Plane



Teleport Access

App Secret

# Gopay.sh Developer Platform

ref: [mckinsey, dev platform ref architecture](#)

## Developer Control Plane

UI Portal

App Config

Components

## Integration & Delivery Plane

CI Pipeline

Image Registry



CD Pipeline

GitLab CI Runner

GitHub Action Runner



## Monitoring & Logging Plane



ELK Log Infra



VictoriaMetrics



Prometheus AlertManager



Cost Insight

## Security Plane



Teleport Access

App Secret

## Resource Plane



Google Kubernetes Engine



Elastic Kubernetes Service



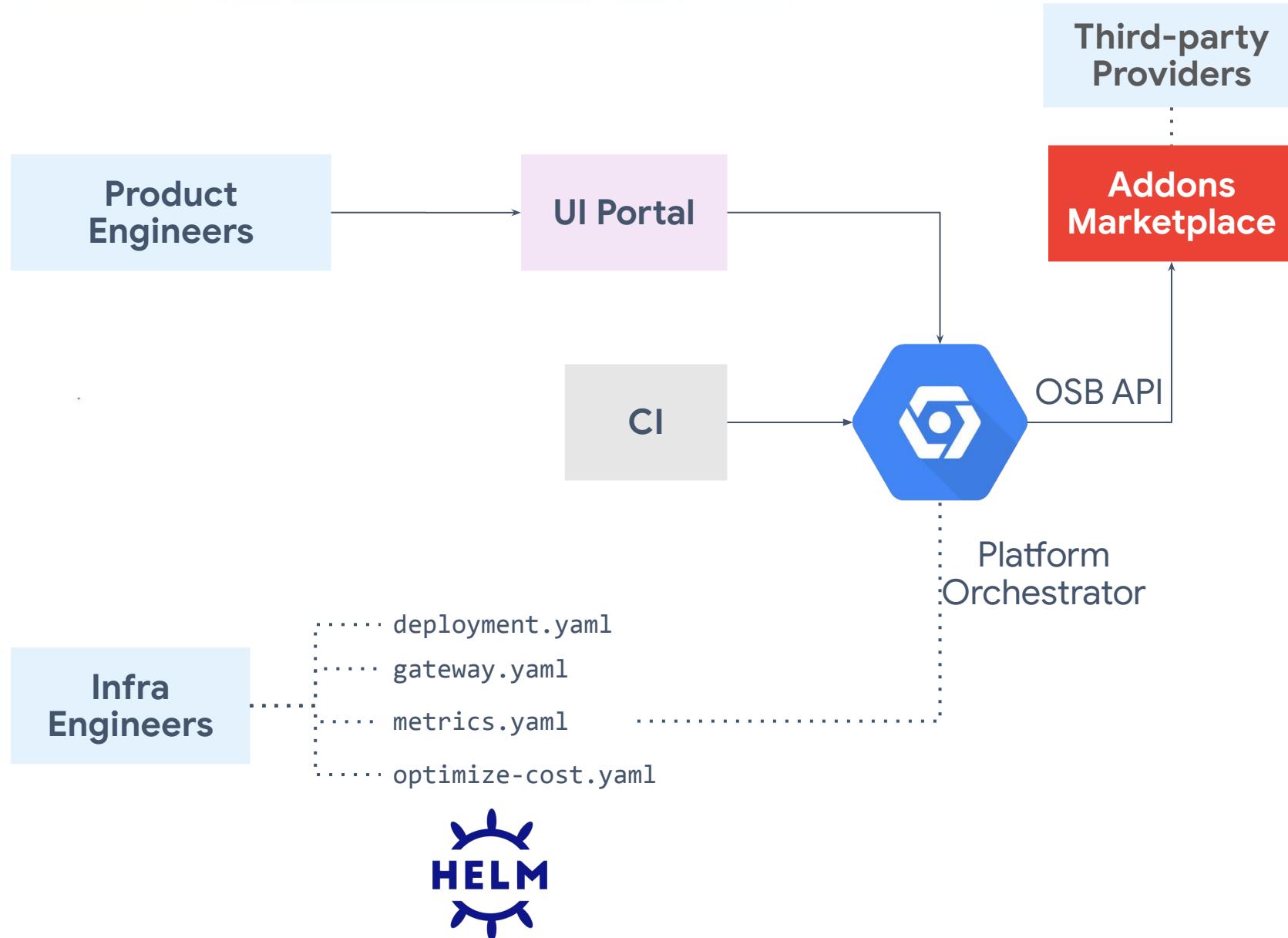
Istio Service Mesh

Postgres & Redis

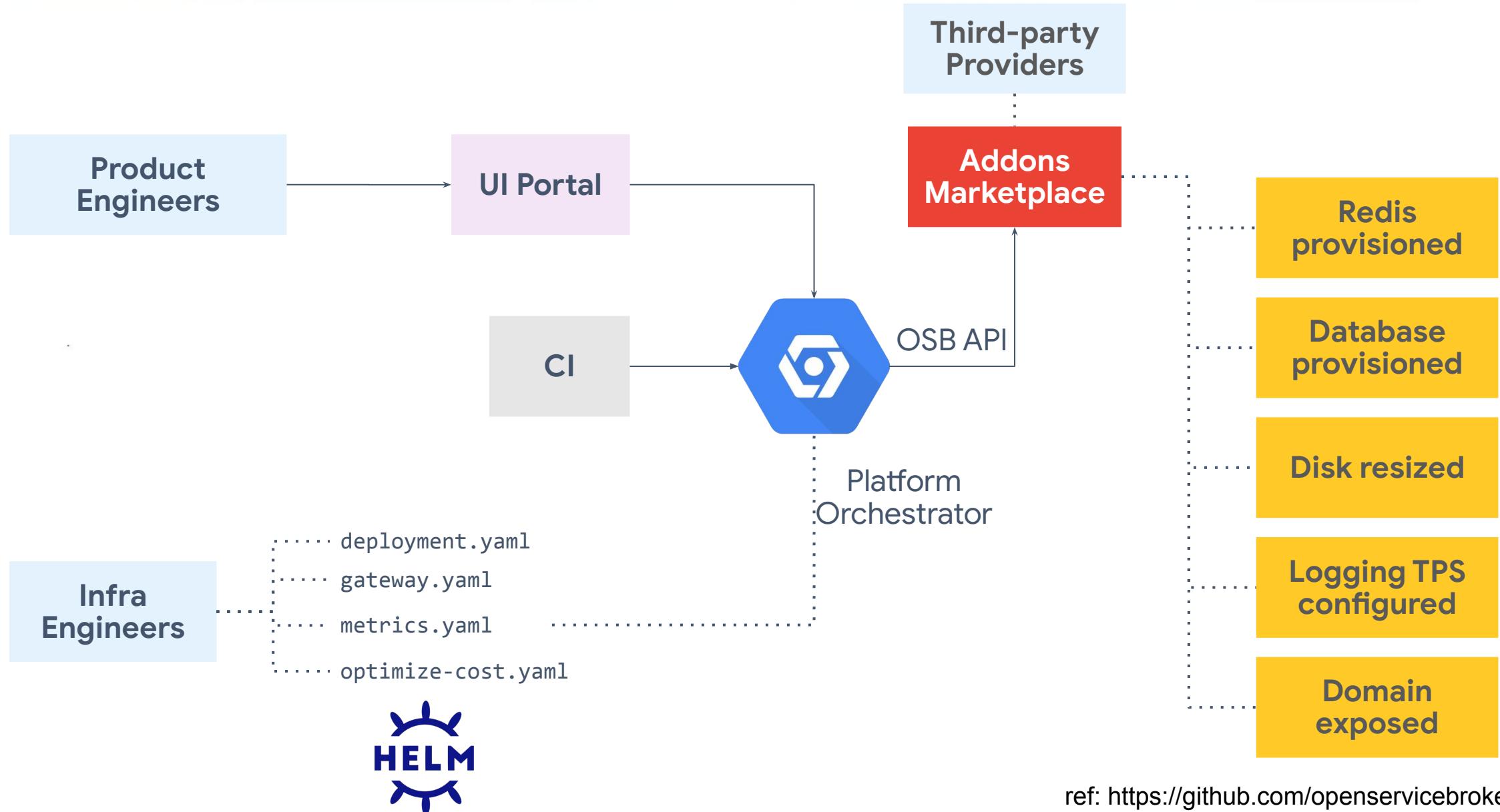
...

Kafka Cluster

# extensible platform through OSB



# extensible platform through OSB



# acquired multiple companies



A screenshot of an e-commerce website's payment method selection screen. The top navigation bar shows "Cart > ... > Choose courier > Payment method". The main title is "Payment Method". Below it are four sections: "Credit/Debit cards" (VISA, Mastercard, JCB, American Express), "ATM/Bank Transfer" (BCA, Mandiri, ATM Bersama, Mandiri Prima), "E-Wallets" (DANA, gopay), and a "See all 24 payment methods" dropdown. A "Continue" button is at the bottom. To the right is a shopping cart summary:

Singo Mantra Watch	IDR 1.304.000
Way Kambas Watch	IDR 1.130.500
Way Kambas Watch	IDR 1.130.500
Discount	<input checked="" type="checkbox"/>
Subtotal	IDR 3.565.000
Shipping	IDR 34.000
Total	IDR 3.599.000

Acquired an Online Payment Gateway Company

# acquired multiple companies

moka



Acquired a Point-of-Sales System Company

# acquired multiple companies



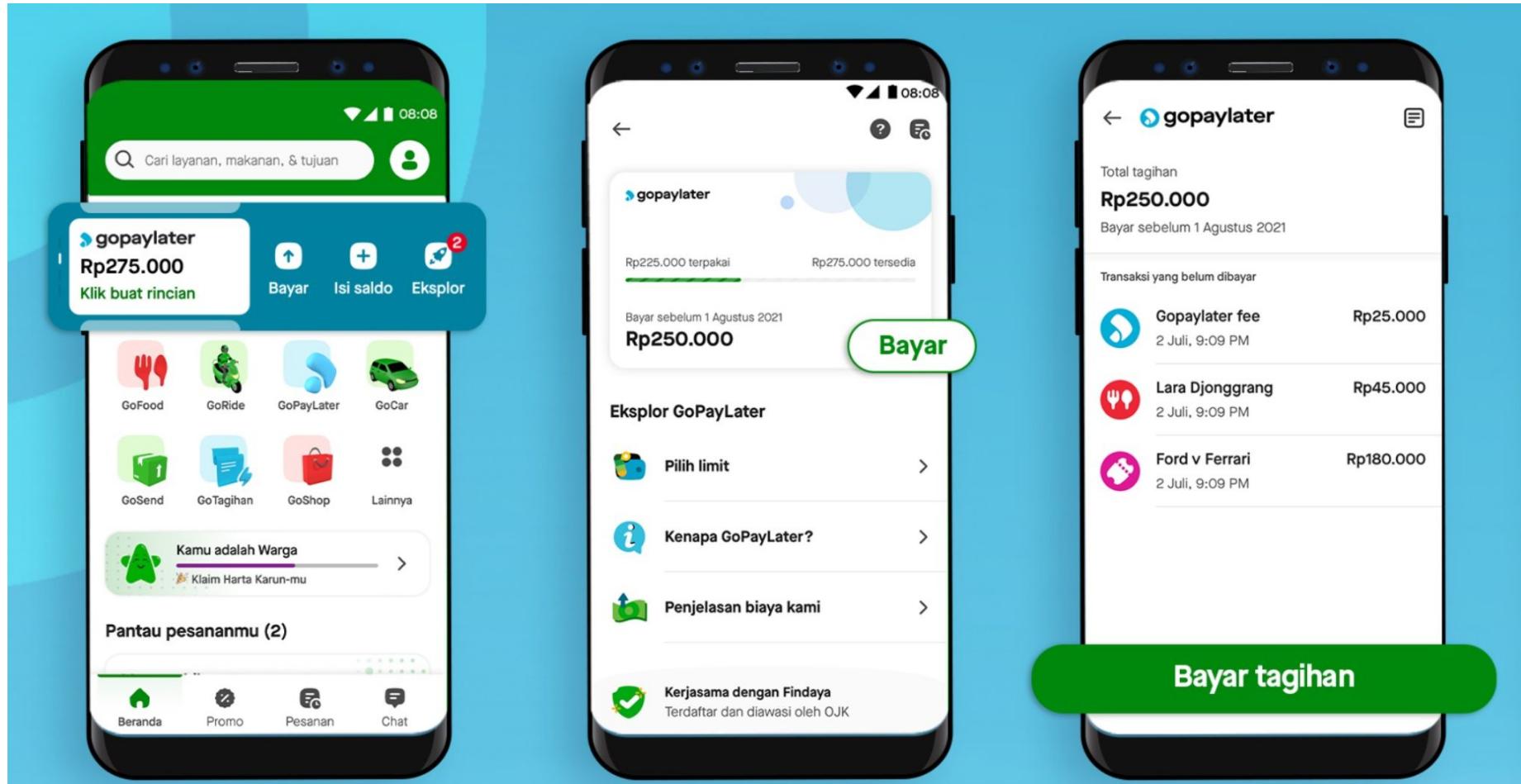
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 gopay later



## Acquired Lending Companies

# goto financial family

## For Consumers



**gopay later**

**gopay pinjam**

**gopay tabungan** by Jago

Access to a safe, responsible, and easy-to-use financial services for all.

## For Business



Payment gateway solution  
for businesses to accept  
and make payout easily



Cloud-based Point of  
Sales (POS) to manage  
business operations



**gomodal**

Access to financing for MSMEs

# each has independent infra team



Product Engineers

Infrastructure Team



Product Engineers

Infrastructure Team



**gopay later**

Product Engineers

Infrastructure Team



Product Engineers

Infrastructure Team

# problems with independent infra team

- **High variance** of infra stack and tooling
- **Collaboration frictions** across engineering orgs
- **Redundant infra teams** achieving the same thing
- **Cost savings** opportunities

# consolidated infra team



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Product Engineers



Product Engineers



Product Engineers



Product Engineers

**goto financial** Infrastructure Team

Do more with less! A small, stylized rocket ship emoji with a red base and a white body.

# challenges with consolidation

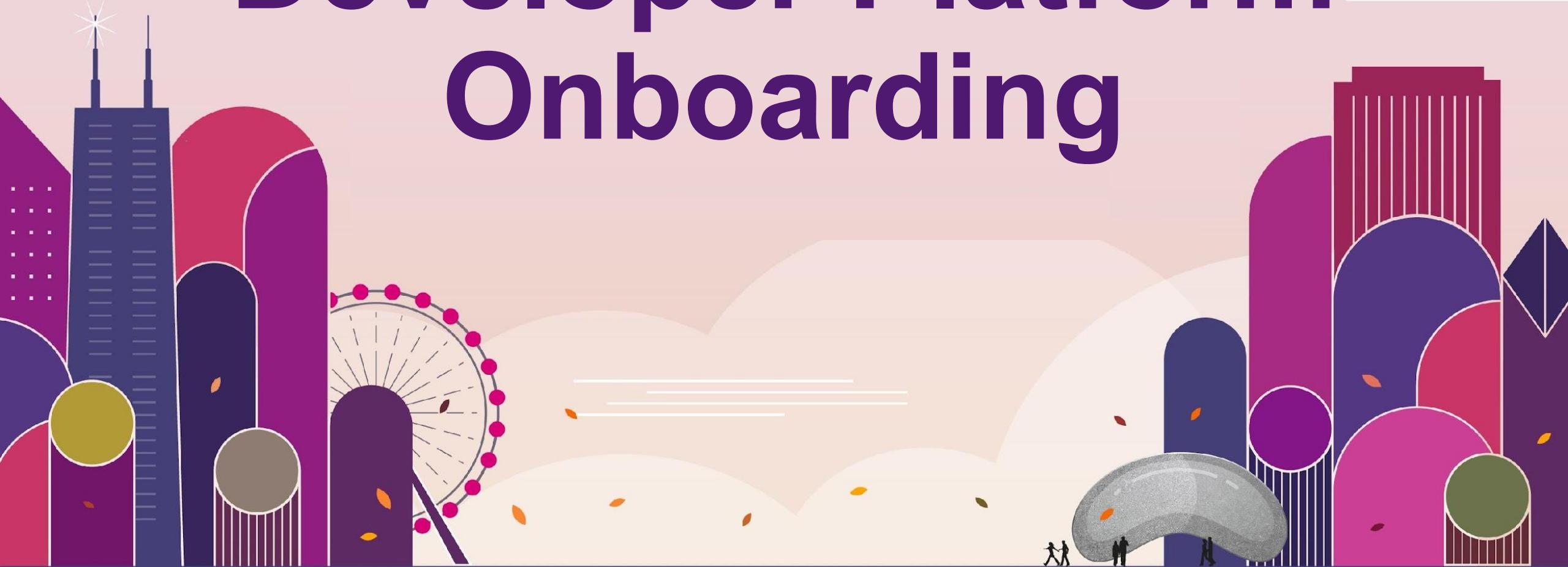
- Adding support, or **deprecate** existing tools
- Each company **must comply** to different regulations
  - Central Bank (Bank of Indonesia)
  - Financial Services Authority (OJK)
  - PCI-DSS

# where we got lucky

- All companies are already on **Kubernetes** across **GCP, AWS, and Private Datacenter**



# Developer Platform Onboarding



# Cluster Standardization

- Cluster runtime components



- Gopay.sh managed namespace
- Deprecate unmaintained clusters

# Team Onboarding

- Google group
- Namespace creation
- RBAC & access management

# Deployments



	gopay	moka	midtrans	gopay later	Other variance
CD	 		 Edith (in-house)	 	Albatross (in-house)
App config		StatefulSet	init Container Custom port probe File Mount	Custom port probe	 File mount
Secret management				SOPS	 BCS (in-house)

- Adopt to our flow as default while accommodating the needs of their workloads

# Monitoring & Alert

	 gopay	 moka	 midtrans	 gopay later	Other variance	
Monitoring	 	 		 	Managed Service 	  
Alerting	  P	  P	  P			Managed Service   

- Custom metrics
  - Push (statsd) <> pull (prometheus scrape)
- Deprecate
- Compliance -> data locality

# Logging

	 gopay	 moka	 midtrans	 gopay later	Other variance
Logging					

- Write log to files -> deprecate
  - Favor stdout as per 12 factor app standards
- Parse logs to have the same format as existing

# Support or deprecate

- Best practices
  - 12-factor app
- Compliance
- Minimum changes
- Cost-efficient

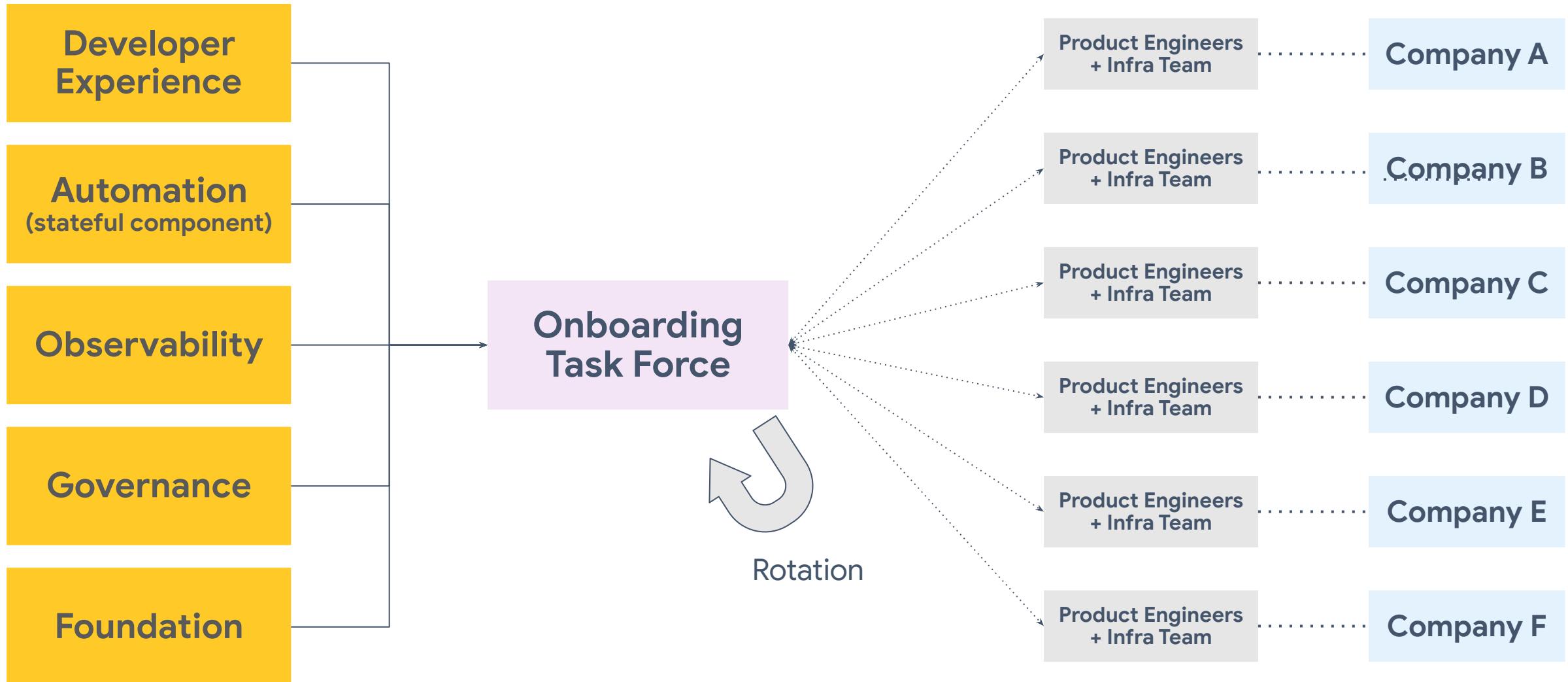
Disclaimer:

This is not a testament to the quality of the products itself but highly-contextual to each of the current condition of the team, including ours.

# Execution

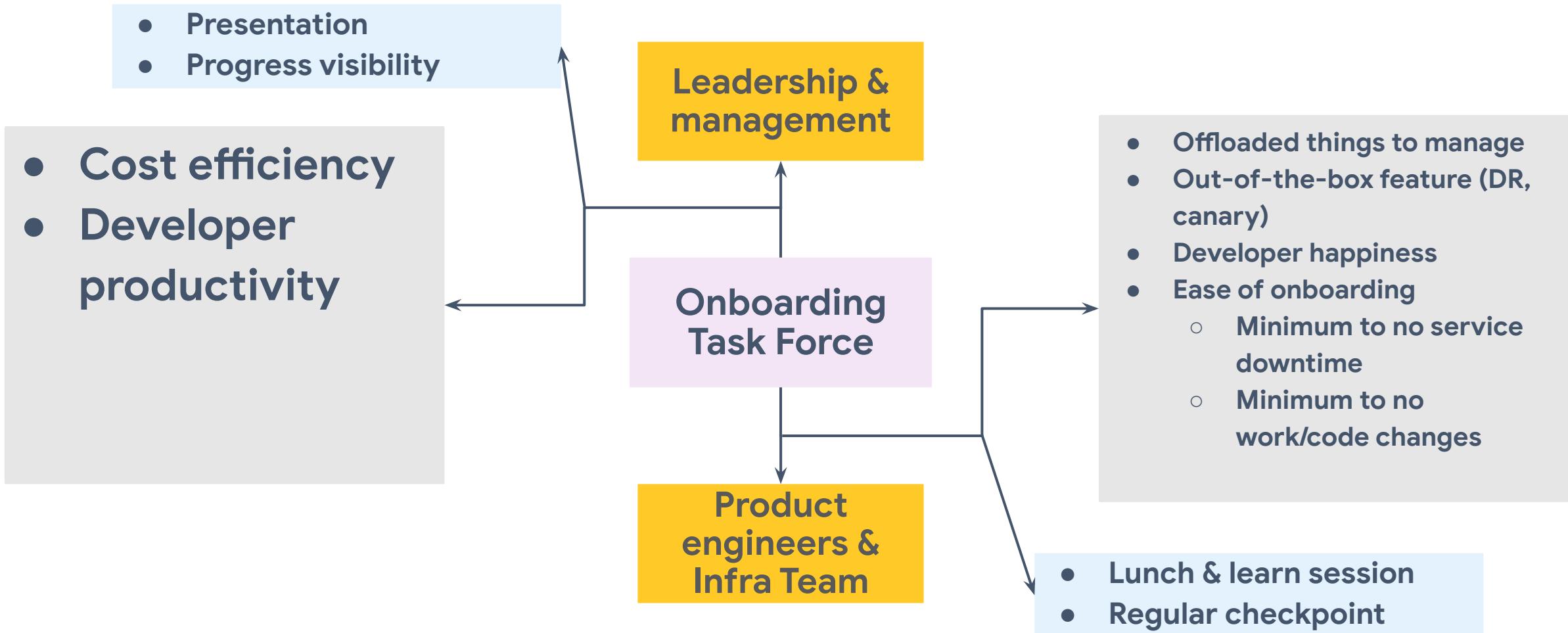


# Task Force

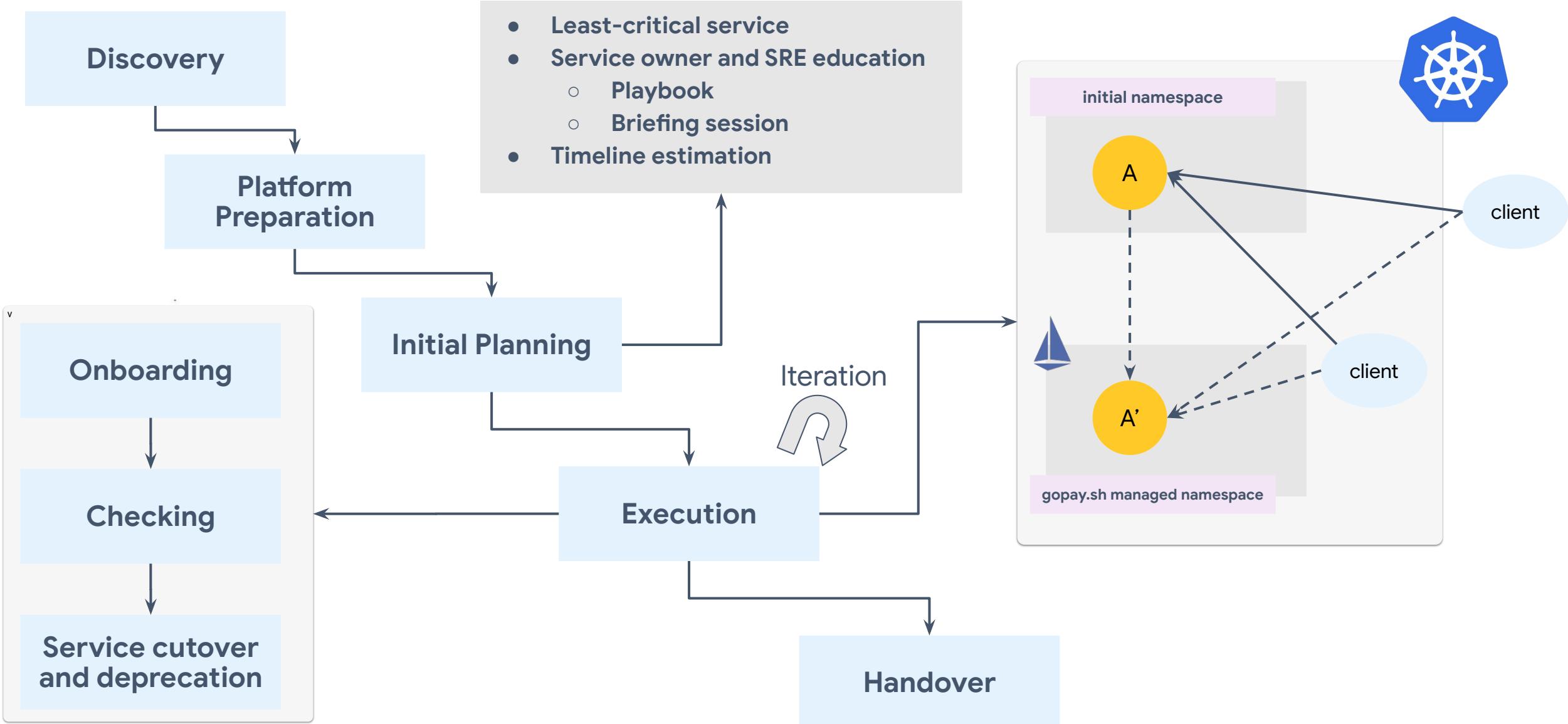


# Buy-in

- Buy-in: Leadership sponsor **AND** developers support



# Execution



# Execution



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```
→ ~ kubectl get pods -n this-is-prod-test | grep kubecon
I1106 20:31:52.709089    7792 versioner.go:58] Get "https://teleport-proxy.ap
kubeconna23-cc5d4dcf5-q5kdb                         1/1     Running
→ ~
```

```
→ ~ kubectl get pods -n infrastructure-engineering | grep new-app
I1106 20:38:36.620689    7904 versioner.go:58] Get "https://teleport-p
new-app-gsh-stable-679dd575f7-6k8rh                   2/2
new-app-gsh-stable-679dd575f7-7cfkw                   2/2
→ ~
```

The screenshot shows the ArgoCD UI for creating a new release. On the left, there's a sidebar with 'Cluster' and 'Existing Kubernetes Namespace' dropdowns, and sections for 'Release Type' (set to 'HTTP Service') and 'Kubernetes Object Name' (set to 'kubeconna23'). On the right, the main form has fields for 'Release Type' (set to 'Service'), 'Type' (set to 'HTTP Service'), 'Name' (set to 'kubeconna23-app-gsh'), 'Port' (set to '80'), and 'Liveness Healthcheck Endpoint' (set to '/'). At the bottom, there's a 'Yggdrasil (optional)' section with a note about adding application configuration paths, and a 'Review' button.

## DEVELOPMENT

### RELEASE DEPLOYMENT

Please make sure this config exists in your `.gitlab-ci.yml` file stage.

```
kubeconna23-app-gsh:go-gp-02:development:deploy:
  image: asia.gcr.io/gopay-systems/gopaysh:staging
  stage: <CHANGE_WITH_YOUR_DEPLOYMENT_STAGE>
  script:
    - gopaysh deployment create kubeconna23-app-gsh
      --cluster go-gp-02
      --env development
      --image ${GOPAYSH_IMAGE}
    only:
      - master
    tags:
      - s-go-sy-docker
```

- None of the companies are using it
- How?
  - POC
  - Pairing
  - Data-backed argument



- Features:
  - Leaner code
  - Canary
  - Service graph (Kiali + Jaeger)
  - Generated metrics

# How did we do?



# In Migration



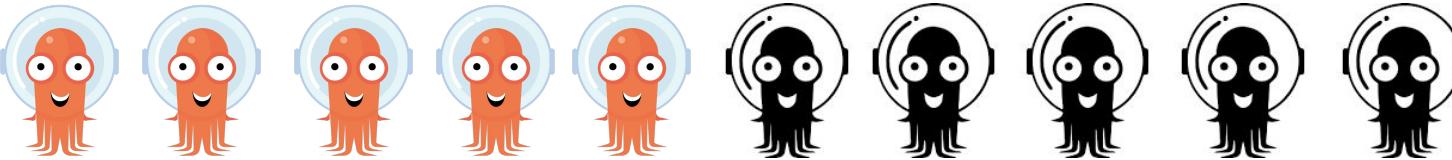
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700+ services



1,500

11 clusters



36

8 teams



20

# Since mid 2023

- **10 tools deprecated** and 50+ more coming
- **20+ helm charts deprecated**, 100+ charts already deprecated  
(since 2021)
- **30+ developers freed up**
- Reduction in **license spend**

# kubectl describe cluster

Distributed across Singapore and Indonesia region

- **~50 Kubernetes clusters**  
in AWS, GCP, and Private Datacenter
- **700+** compute nodes
- **30,000+** pods



# kubectl describe argocd

Tuned performance of our centralized argocd

- **11,000+** applications
- **6,000+** repositories
- ~**60** projects
- **380,000+** total objects



Wednesday, November 8 • 11:00am - 11:35am

[GoTo Financial's Story: Towards 10k ArgoCD Apps to Support Billions of \\$ Transactions - Yudi Andrean Phanama & Giri Kuncoro, GoTo Financial](#)

# Takeaways

- Consolidating tools bring **cost benefits, recover productivity, and improve collaboration**
- **Finding allies** across companies to address gaps and advocating for adoption
- Favor consolidation by **movements**, but ask **leadership mandates** to speed up alignment

# References

- [Expedia, Building Support for Cloud Native Journey](#)
- [Elastic, Tool Consolidation](#)
- [JFrog, DevOps & Security Tool Consolidation](#)
- [Google, SRE Engagement Model](#)



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**Please scan the QR Code above  
to leave feedback on this session**

X @girikuncoro

X @joshuabezaleel

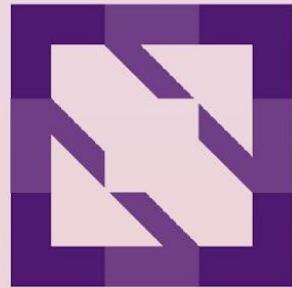


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