

# BEYOND CONNECTIVITY

———— FULL Life-Cycle ————  
Infrastructure Orchestration  
and Cost Engineering

TASTE



CARE



WELLBEING

















# Platform Engineering Team



# Code

- Java 
- Python 
- Kotlin Multi-Platform 
- C# 
- Node.js 
- BitBucket 
- CircleCI 
- Jenkins 
- ArgoCD 
- Spinnaker 
- SonarQube 
- ....

# Infra

- AWS 
- Azure 
- IBM 
- Google Cloud 
- Kubernetes 
- MongoDB 
- Postgres 
- Redis 
- Datadog 
- FireBase 
- Vault 
- Terraform 



# ANYTHING FROM THE LIST?

## DEVS

- Different tech stack
- Different tools
- Multi-cloud set up
- Outdated documentation
- Long waiting time
- Unclear process
- Restricted permissions

## SRE

- Toil
- DMs/tickets
- Context switching
- Low-valuable meetings
- No time for development

New message in #sre

New message in #sre

New message in #sre

Hi SRE team!  
could I ask to restart this prod deployment?

New message in #sre

Hi, I am getting error when trying to apply terraform changes. Looks like I do not have access to autogenerated secrets. Could you apply the service below to staging EU?

New message in #sre

Hi #sre Could you please work on this below ticket?  
//link/jira/infra-12345

New message in #sre

Hello SRE team, I'm trying to access Datadog, but when I try to login using SSO, it tells me to wait for an email. The problem is that this email never arrives. So I think that my account has no permission to use it. Is there anything I should do?

New message in #sre

We have startup errors in staging when deploying service with below error. Looks like process which copies the contents from vault and creates secret folder is missing. Could you check ?

New message in #sre

Hello #sre! We have a service called Care Advisor, which includes admin endpoints for R&D department to update the service's knowledge base. We need to provide them with API key values for all environments.

New message in #sre

Hi #sre Could you please work on this below ticket?  
//link/jira/infra-12335

New message in #sre

Hi SRE team!  
could I ask to restart this prod deployment?

New message in #sre

We have startup errors in staging when deploying service with below error. Looks like the process which copies the contents from vault and creates secret folder is missing. Could you check ?

Hi, I am getting error when trying to apply terraform changes. Looks like I do not have access to autogenerated secrets. Could you apply the service below to staging EU?

New message in #sre

New message in #sre

New message in #sre

Hi SRE team!  
We need your help again!  
Can somebody help u

New message in #sre

Hi SRE! I would need to add 3 new value to Vault on prod environment. Can somebody help me out with this?

New message in #sre

New message in #sre

New message in #sre

Hi SRE! I would need to add 3 new value to Vault on prod environment. Can somebody help me out with this?

New message in #sre

Hey! Just realised that I lost the access for Appliances plugin. Should I create another ticket?

New message in #sre

Hello #sre, there is one customer in Italy owning purifier bought on 27.03.2023. It is two days that it is OFFLINE in Google, while in the app it is online. Is there anything wrong in the system now?

New message in #sre

Hi #sre. I have a question: If a pod start failed, will it be automatically restarted after a time, or we can manually delete the POD in ArgoCD so system will scale it up again, and a new pod will be started?

New message in #sre

Hi SRE team!  
We need your help again!  
Can somebody help us with the following points please...

New message in #sre

Hello #sre. Can you help to create a IAM policy in ocp-staging?

New message in #sre

Hi #sre Could you please work on this below ticket?  
//link/jira/infra-12345

New message in #sre

Hi #sre Could you please work on this below ticket?  
//link/jira/infra-12335

New message in #sre

Hello SRE. I have a service running in OCP (ocp-scheduler) which requires to connect to MongoDB in ECP. Currently I am getting:

New message in #sre

or when trying to apply terraform I do not have access to secrets. Could you apply the service below to staging EU?

New message in #sre

Hello #sre. Can you help to create a IAM policy in ocp-staging?

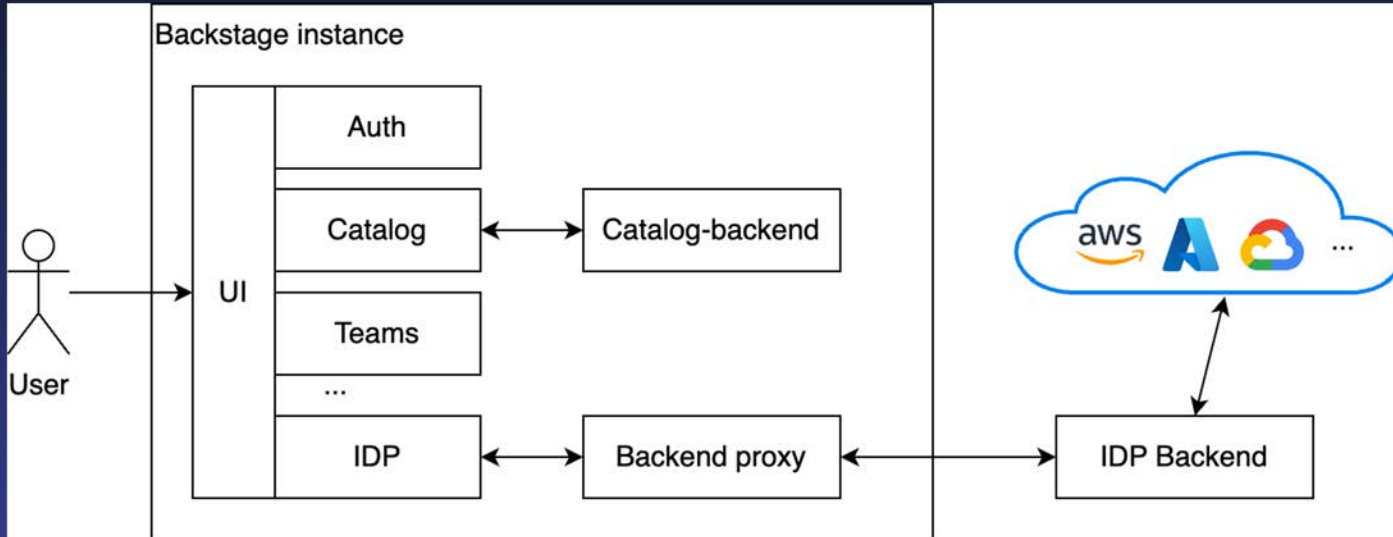
New message in #sre

Hi #sre. I am trying to publish to the kafka topic that was provisioned earlier today.





# Internal Developer Platform using Backstage



- Single entry for various platforms
- Unified UI
- Open for contributions from other teams

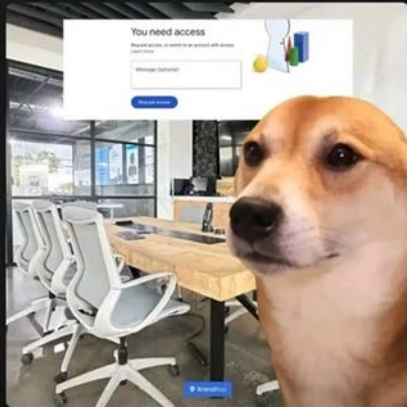
Ref: <https://backstage.io/docs/overview/architecture-overview>





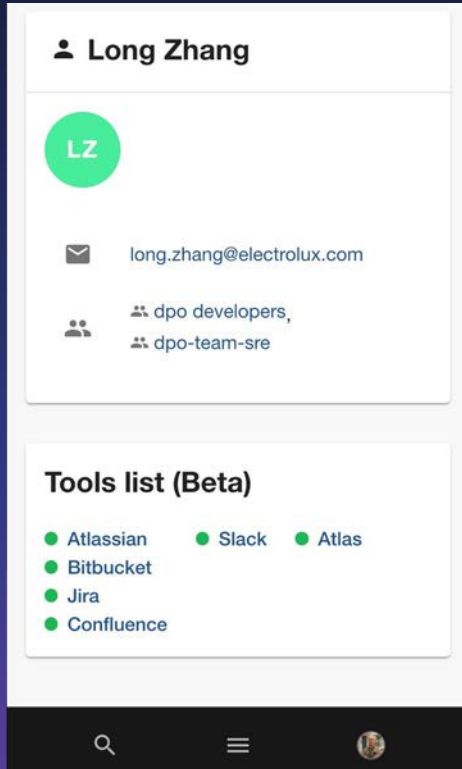
# User Onboarding

POV: you're finally  
starting the task you said  
you started a week ago  
and the document says  
"request access"





# User Onboarding



**Long Zhang**

**LZ**

long.zhang@electrolux.com

dpo developers,  
dpo-team-sre

**Tools list (Beta)**

- Atlassian
- Slack
- Atlas
- Bitbucket
- Jira
- Confluence

Navigation icons: search, menu, profile

- Pre-defined access policies based on the org structure
- One page for configuring access to all tools



# Two Different Kinds of Needs From Devs

**Cloud resources  
are all I need**

Reuse the modules that adopt best practices and provision infrastructure with several clicks

**Infrastructure  
customization**

Define my own modules that can be maintained via IDP



# EKS Provisioning as an Example

Electrolux Catalog

CREATE ? SUPPORT

Kind  
Component

Type  
all

PERSONAL  
Owned 0  
Starred 0

ELECTROLUX  
All 1105

OWNER  
[Dropdown]

LIFECYCLE  
[Dropdown]

TAGS  
[Dropdown]

All components (1105) Filter X

NAME	SYSTEM	OWNER	TYPE	LIFECYCLE	DESCRIPTION	TAGS	ACTIONS
aaec-api-postman-collections	aaec	APAC - API Economy	service	Autodiscovered		eks	[Check] [Edit] [Star]
aaec-asir-user-validation-api	aaec	APAC - API Economy	service	Autodiscovered		eks	[Check] [Edit] [Star]
aaec-autodose-api	aaec	APAC - API Economy	service	Autodiscovered		eks	[Check] [Edit] [Star]
aaec-care-advisor-orchestrator-service	aaec	APAC - API Economy	service	Autodiscovered		eks	[Check] [Edit] [Star]
aaec-drinks-chill-advisor-api	aaec	APAC - API Economy	service	Autodiscovered		eks	[Check] [Edit] [Star]
aaec-ip-to-location-api	aaec	APAC - API Economy	service	Autodiscovered		eks	[Check] [Edit] [Star]
aaec-lemongrass-cms	aaec	APAC - API Economy	service	Autodiscovered		eks	[Check] [Edit] [Star]
aaec-translation-service-api	aaec	APAC - API Economy	service	Autodiscovered		eks	[Check] [Edit] [Star]
aaec-weather-advisor-api	aaec	APAC - API Economy	service	Autodiscovered		eks	[Check] [Edit] [Star]

- Purely from UI
- Minimum input
- Follow standards



# Infrastructure Provisioning & Orchestration

fdn-infrastructure / terraform

Name

---

..

api-gateway

backends

dns

internal-custom-domain

kubernetes

rest-api



transit-gateway

COMPONENT — SERVICE

## fdn-infrastructure ☆

OVERVIEW REVISION LOG AUDIT


### About Service <sup>5</sup>

<>  

VIEW SOURCE DD LOGS


ORGANIZATION: DX  
PROJECT: Foundation (FDN)  
IDENTIFIER: fdn-infrastructure  
COMPONENT: Service  
DESCRIPTION: FDN terraform infrastructure scripts

TEAMS: dpo-team-sre  
ORG ADMIN TEAMS: dpo-team-sre

ORG ADMIN:  VS  
STATUS: Provisioned

RESOURCE TAGS: No Tags

MERGED TAGS: organization: dx project: fdn

REQUESTER:  AA  
LANGUAGE: terraform

ENVIRONMENTS: fdn-dev-eu-north-1-fdn-dev-eu-north-1-b80

Tree view (Beta)  Show subcomponents

#### Execute Terraform Code (Beta) ✕

- terraform/api-gateway
- terraform/backends
- terraform/dns
- terraform/internal-custom-domain
- terraform/kubernetes
- terraform/rest-api
- terraform/transit-gateway

CANCEL



# Infrastructure Provisioning & Orchestration

fdn-infrastructure / terraform

Name

..

1998 12:32:21

1999 12:32:21 Apply complete! Resources: 2 added, 4 changed, 2 destroyed.

2000 12:32:21 Update task is done

2001 12:32:21 Workspace /tmp/tmpnw4kf85b is cleaned up

2002

COMPONENT — SERVICE  
fdn-infrastructure ☆

OVERVIEW REVISION LOG AUDIT

About Service ⓘ

Tree view (Beta)

kubernetes

rest-api

transit-gateway

RESOURCE TAGS  
No Tags

MERGED TAGS  
organization: dx project: fdn

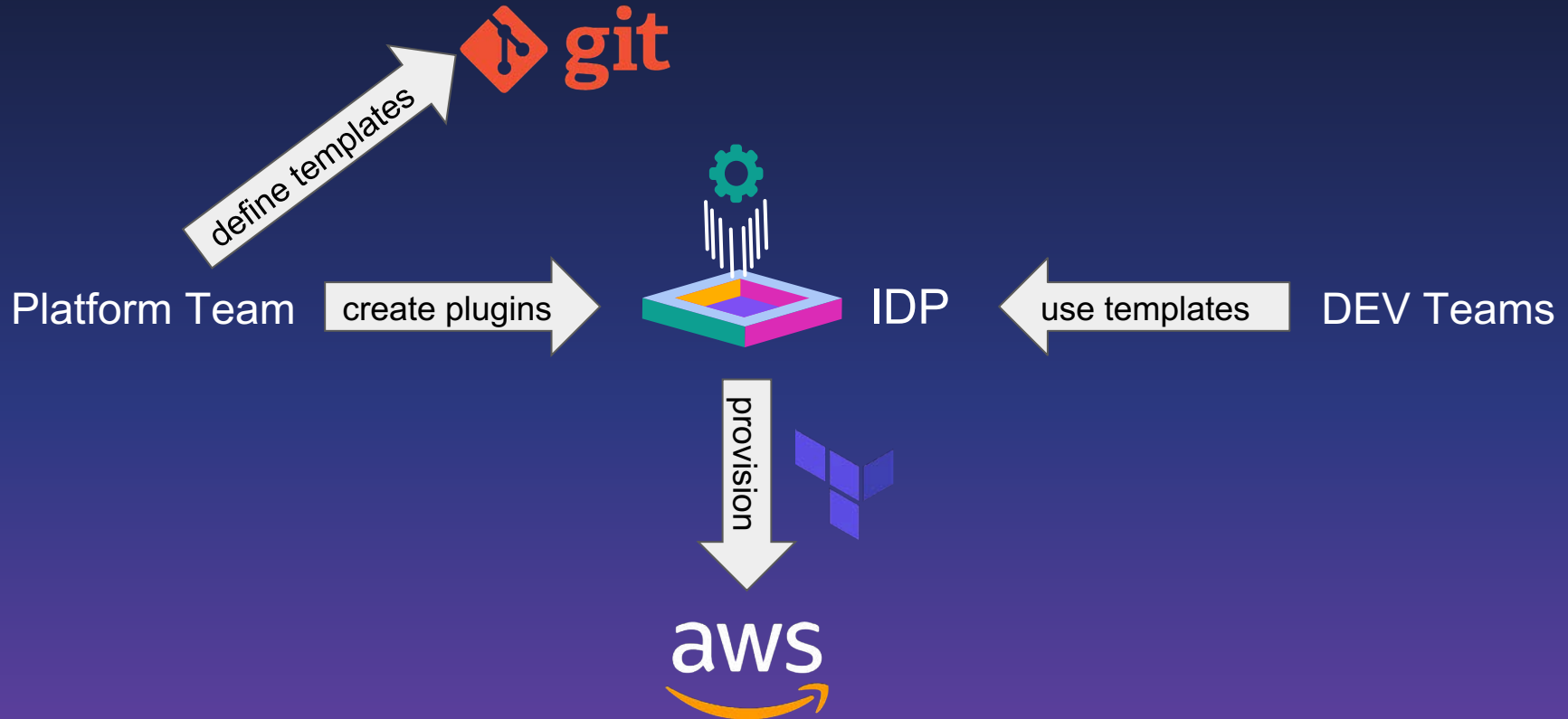
REQUESTER  
AA

LANGUAGE  
terraform

ENVIRONMENTS  
fdn-dev-eu-north-1-fdn-dev-eu-north-1-b80



# Infrastructure Management





# Use Cases for Service Onboarding

COMPONENT - SERVICE




fdn-auth ☆

Owner: Foundation Lifecycle: Provisioned

OVERVIEW CI/CD VAULT ECR REVISION LOG **KUBERNETES** AUDIT

## Kubernetes deployments

Cluster

	Updated	Actions
fdn-dev-eu-north-1-infra-kitchen-dev-85	24-01-28 13:16:56.896000	  

Labels


key	value
app.kubernetes.io/component	fdn-auth
app.kubernetes.io/instance	fdn
app.kubernetes.io/language	fdn
app.kubernetes.io/managed-by	CircleCI
app.kubernetes.io/name	fdn-auth
app.kubernetes.io/part-of	fdn
app.kubernetes.io/version	1.0.0-PR-4
git-revision	e862940b9b3ab7d897c3c00eb0527054a13dc8e6
helm.sh/chart	fdn-common-0.0.1
tags.datadoghq.com/env	dev

**Manual deployment to fdn-dev-eu-north-1-infra-kitchen-dev** ✕

Select service branch, image version, and values file

Branch	Image Version	Value File
master	1.0.8	values-dev.yaml

+

 This feature relies on a manual deploy workflow in the service's CircleCI pipeline. Check the instructions [here](#) if you have not configured it yet.

DEPLOY CANCEL





# Infrastructure Management

🌟 Cloud data synchronization

🌟 Version management and auditing

🌟 Cost observability

🌟 Approval flow

The screenshot displays the AWS CloudFormation console for an EKS cluster named 'fdn-dev-eu-north-1-demo-eks-ebd'. The navigation bar includes tabs for OVERVIEW, METADATA, METRICS, COST, REVISION, LOG, and AUDIT. A modal dialog titled 'Request approval' is open, asking 'Do you want to approve the request?' with 'APPROVE' and 'DECLINE' buttons. The background shows a table of components and a tree view of the stack.

IDENTIFIER	COMPONENT
demo-eks	EKS

Tree view (Beta)  
 Show subcomponents  
COLLAPSE ALL MARK AS BLUEPRINT

ORG ADMIN TEAMS  
AWS ACCOUNT: demo-account  
REGION: eu-north-1  
STATUS: Provisioning (Pending for approval)

🏠 Dashboard

▾ Catalog

🖼️ Components

🖼️ Integrations

🖼️ Tasks

🖼️ Configs

🖼️ Versions

▾ Resources

Aws Account

Aws Environment

Aws VPC

Aws Redis

Aws K8s

K8s namespace

+ Create




📄 Export

<input type="checkbox"/>	Identifier	Description	Component	Created at	Updated at
<input type="checkbox"/>	Aws Account		aws_account	27/08/2024	27/08/2024
<input type="checkbox"/>	Aws Environment		aws_environment	27/08/2024	27/08/2024
<input type="checkbox"/>	Aws VPC		aws_vpc	27/08/2024	27/08/2024
<input type="checkbox"/>	Aws Redis		aws_redis	28/08/2024	28/08/2024
<input type="checkbox"/>	Aws K8s		aws_k8s	28/08/2024	28/08/2024
<input type="checkbox"/>	K8s namespace		k8s_namespace	28/08/2024	28/08/2024

Rows per page: 10 ▾ 1-6 of 6

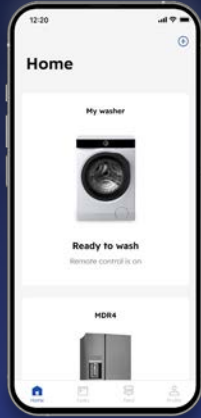


# Summary - Infrastructure Orchestration

-  To be dependency free from your infrastructure team
-  Modules are fundamental and the engine does the magic
-  Self-manageable infrastructure is much more efficient



# Infrastructure/Service Burns Money?



\$\$\$



\$\$\$





# Two Different Kinds of Needs for Costs

## From management

- What is the total cost of project X?
- What is the trend?
- How to optimize cloud costs?
- ...

## From developers

- How much does my service cost?
- What is the correlation between usage and cost?
- ...



# Two Different Kinds of Needs for Costs

## From management

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## From developers





# Two Different Kinds of Needs for Costs

## From management

- What is the total cost of project X?
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## From developers

- How much does my service cost?
- What is the correlation between usage and cost?
- ...



# Cost Engineering

## Multi-cloud cost aggregation

- Many third-party solutions in the market
- Might be overwhelmed by the features
- The subscription might not be cheap while you only need several key features



## Fine-grained cost breakdown

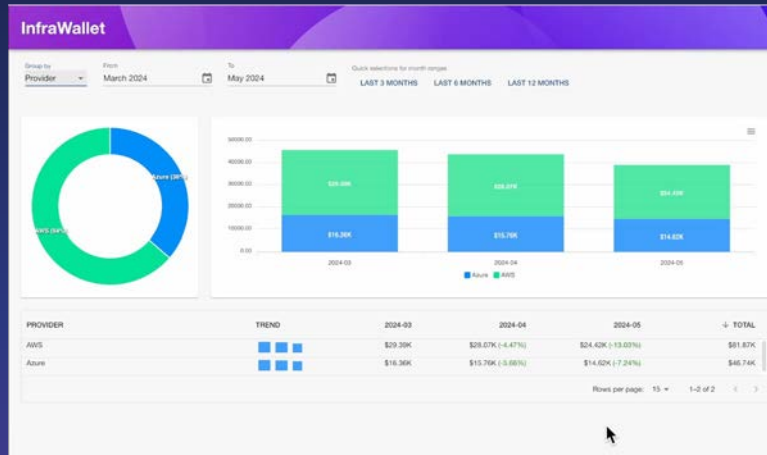
- Cloud providers usually provide nice tools
- One provider, several dashboards
- Users have to switch among dashboards when they have multi-cloud costs





# Cost Engineering

Multi-cloud cost aggregation

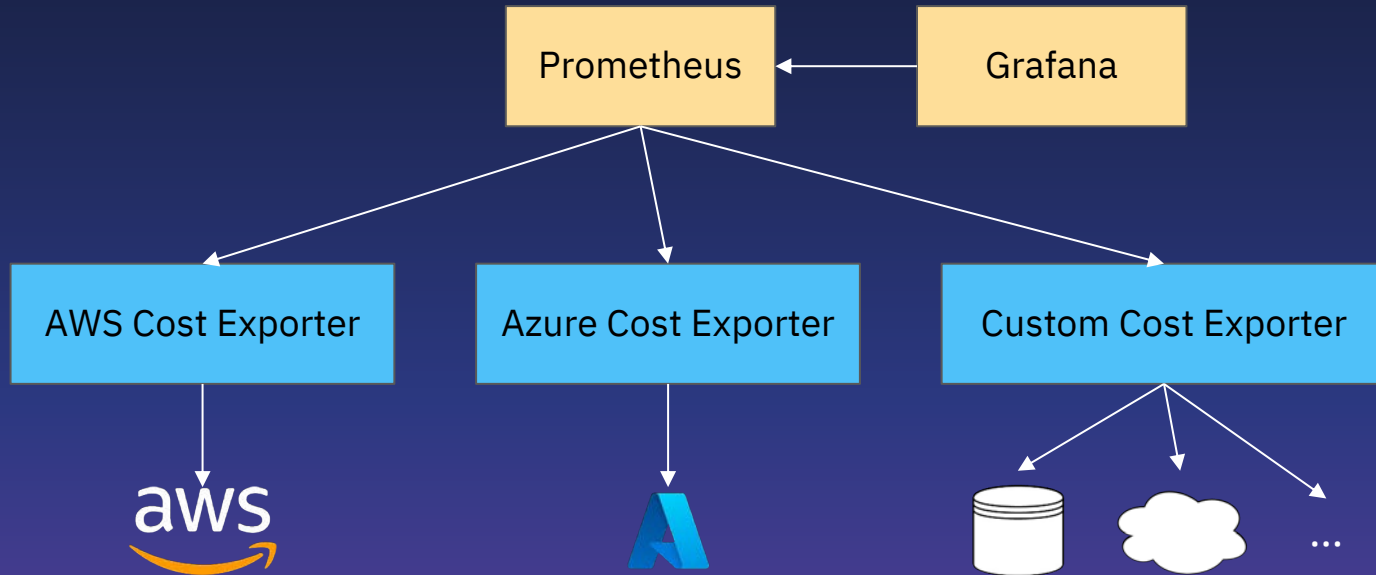


Fine-grained cost breakdown





# Cost Metric Exporters



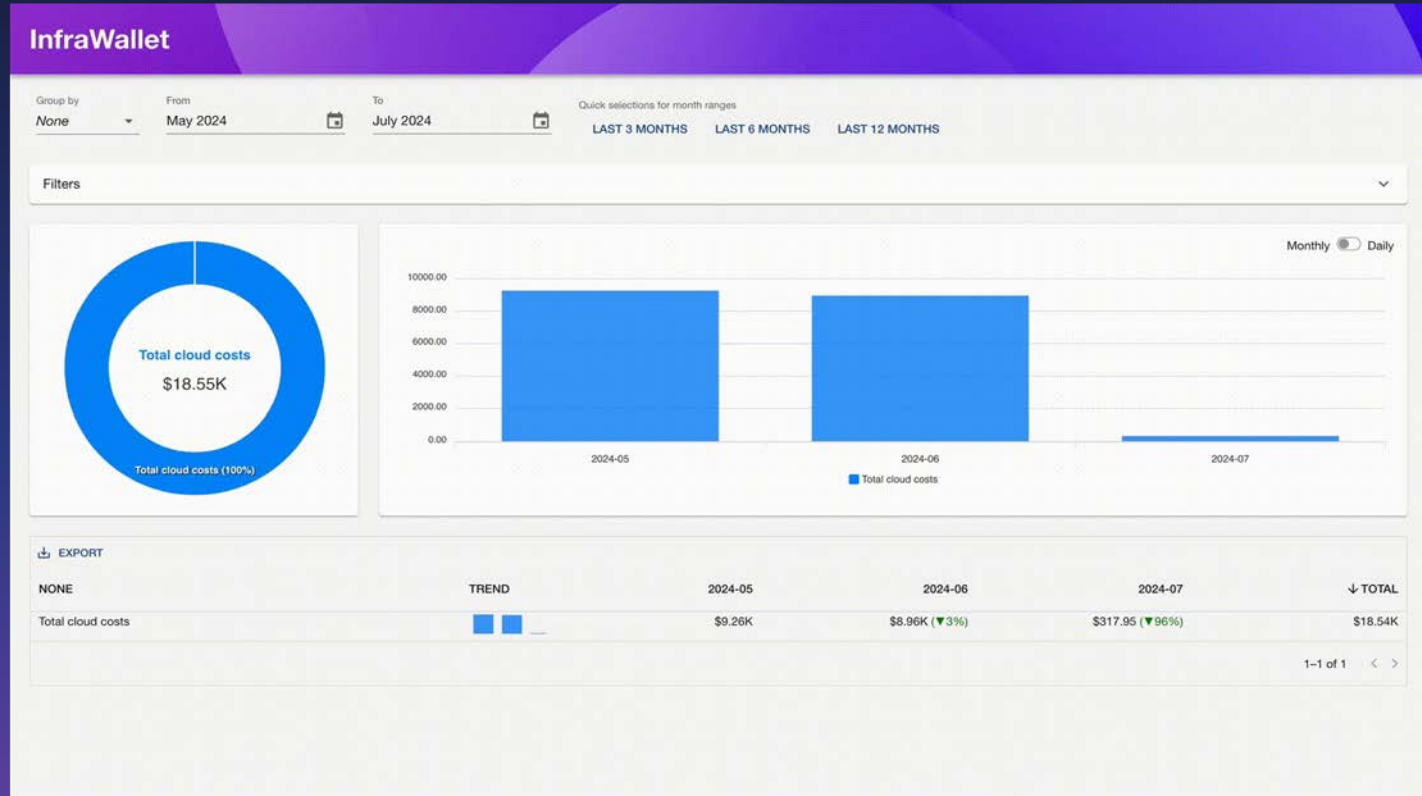
- Vendor-neutral
- Extensible
- Scalable

Ref: <https://prometheus.io/docs/instrumenting/exporters/#finops>



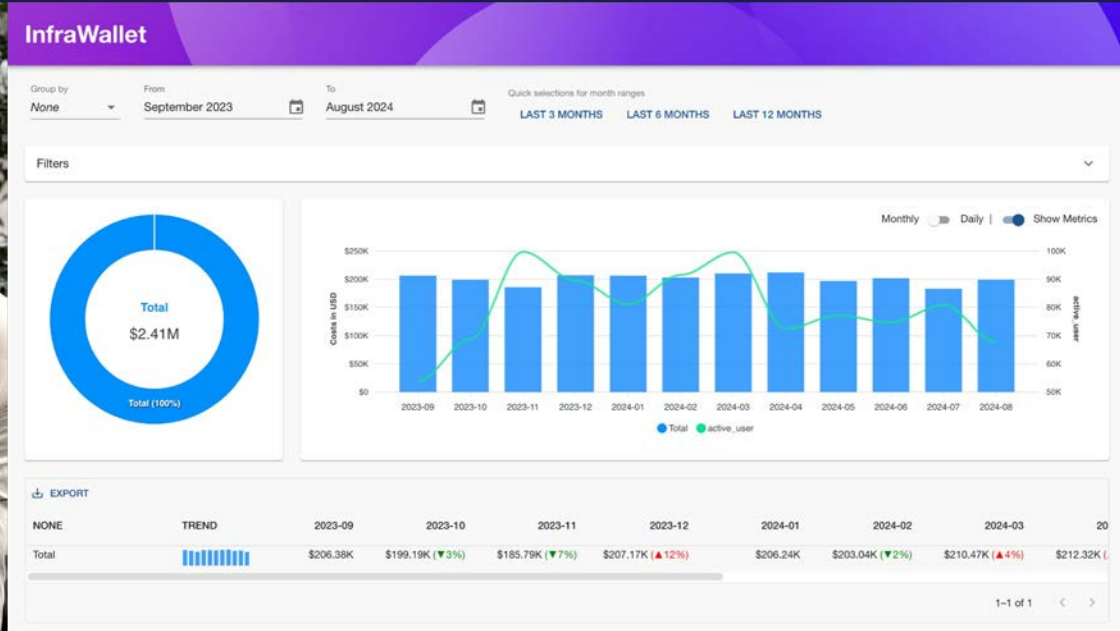
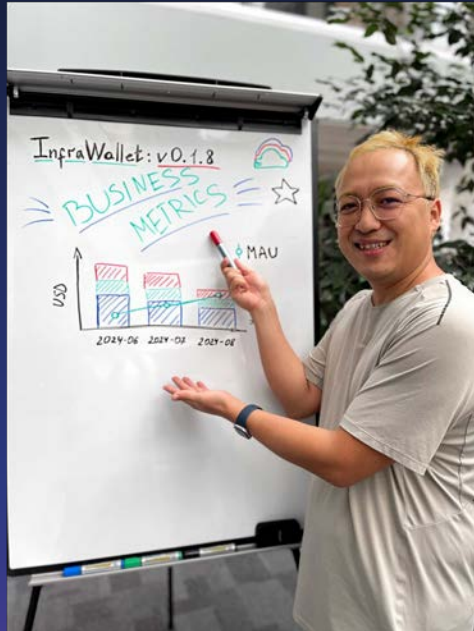
# Cost Engineering for Managers

```
backend:  
  infraWallet:  
    integrations:  
      azure:  
        - name: <unique_name_of_this_account>  
          subscriptionId: ...  
          tenantId: ...  
          clientId: ...  
          clientSecret: ...  
        - name: <unique_name_of_this_account>  
          subscriptionId: ...  
          tenantId: ...  
          clientId: ...  
          clientSecret: ...  
      aws:  
        - name: <unique_name_of_this_account>  
          accountId: '<12-digit_account_ID_as_string>  
          assumedRoleName: ...  
          accessKeyId: ...  
          accessKeySecret: ...  
        - name: <unique_name_of_this_account>  
          accountId: '<12-digit_account_ID_as_string>  
          assumedRoleName: ...  
          accessKeyId: ...  
          accessKeySecret: ...
```



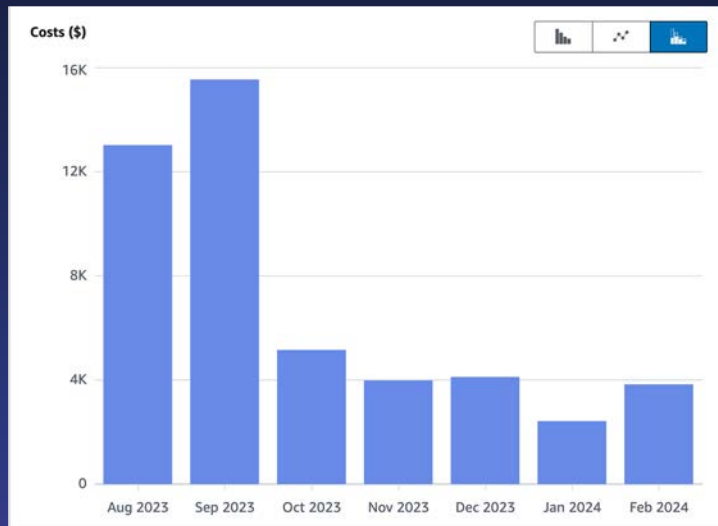
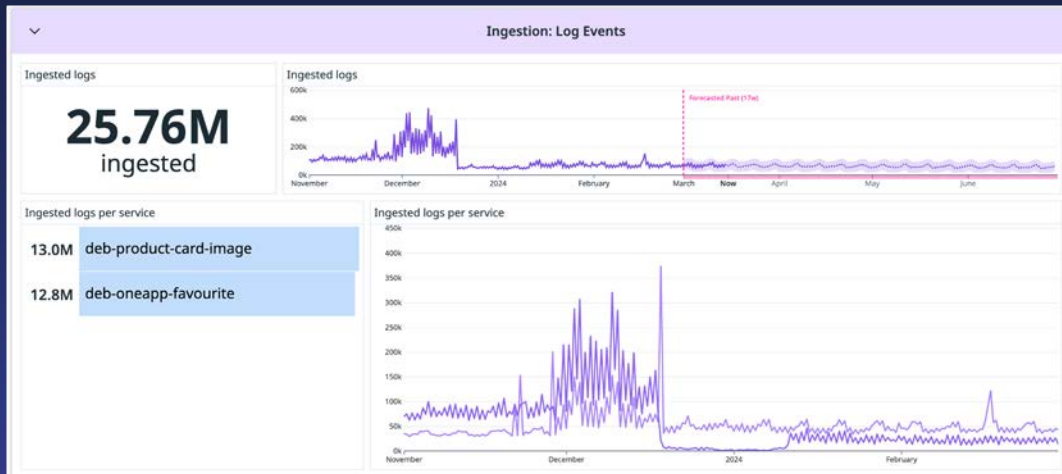


# Cost Engineering for Managers



- Unit economics: a crucial metric to understand the business efficiency
- Business metric examples: MAU, transactions, connected devices, etc.

# From Cost Observability to Cost Optimization





# CLOUD SAVINGS



DATABASE

STORAGE

MESSAGING

LOGS

APM

METRICS




CI/CD

TOTAL

\$32'101/month



# Summary - Cost Engineering

-  From cost awareness to cost efficiency
-  Follow FOCUS™ and make it vendor-neutral
-  Not only about techniques, but also about culture (e.g., a cost optimization program)

Ref: <https://focus.finops.org/#specification>

## ANYTHING FROM THE LIST?



### DEVS

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- Different tools
- Multi-cloud set up
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- Toil
- DMs/tickets
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## Infrastructure Management

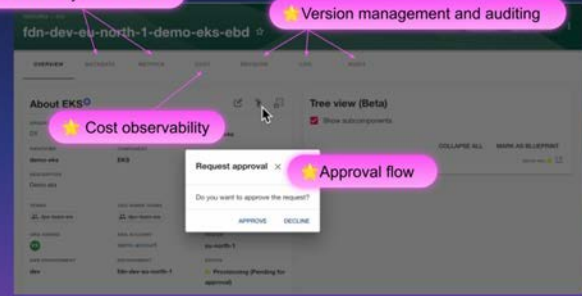


Cloud data synchronization

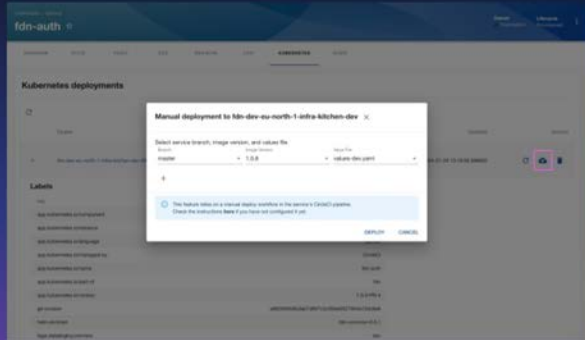
Version management and auditing

Cost observability

Approval flow



## Use Cases for Service Onboarding



## Cost Engineering



Multi-cloud cost aggregation



Fine-grained cost breakdown





# Opensource



<https://github.com/electrolux-oss>