

**Enabling developers
while sustaining growth
with Backstage**

LUNAR[®]



AGENDA AGENDA AGENDA AGENDA

Set the stage

Find the audience

Perform

Next steps

LUNAR[®]

Bjørn Hald Sørensen

Platform engineer

Everything developer experience

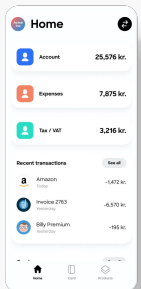
Co creator of the Lunar development platform
since 2017

Contributor to CNCF projects Backstage and
Linkerd



LUNAR[®]

Set the stage



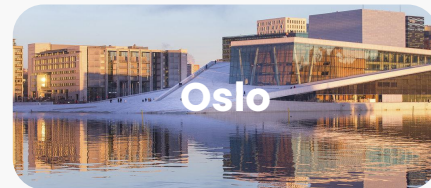
490

Employees



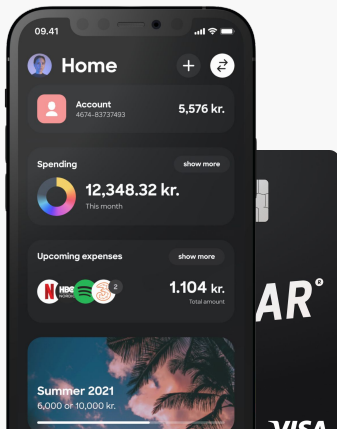
European Banking License issued in Denmark

We have offices in these locations



10,000

Total number of Business Customers



410,000+

Customers in total



Company founded in 2015

€345m

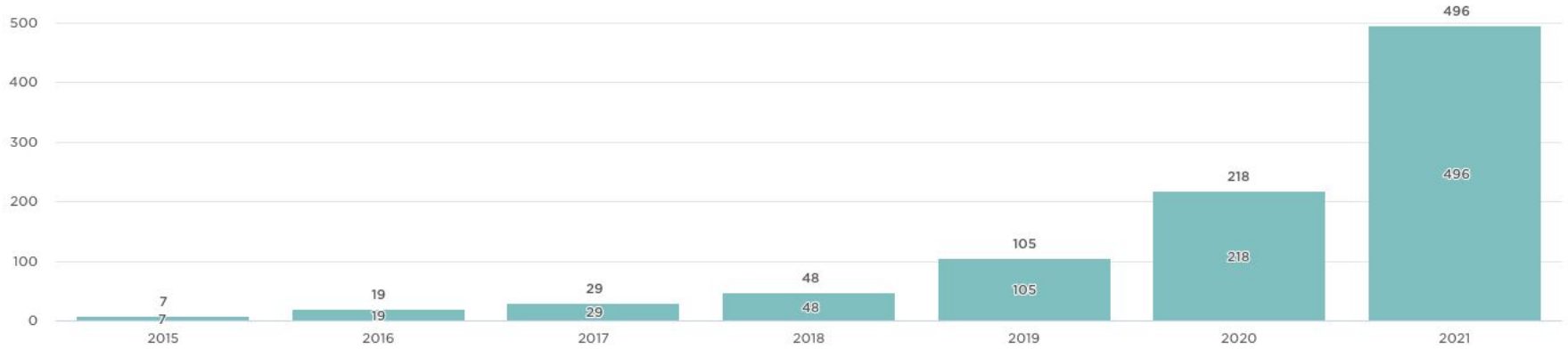
Total amount raised

Series D



Recently closed our Series D of €210m

HEAD COUNT



2 x year by year



Meet Mae



Meet Mae

Let's go



Meet Mae

**Sure,
legacy
stuff**

GitHub



Meet Mae

I guess
that's
required

GitHub



Meet Mae

Uhh

GitHub



Meet Mae

Really?

GitHub



RabbitMQ



GraphQL



Grafana



Really?



Meet Mae

Now come on!

GitHub



Grafana



Meet Mae

You're kidding me

GitHub



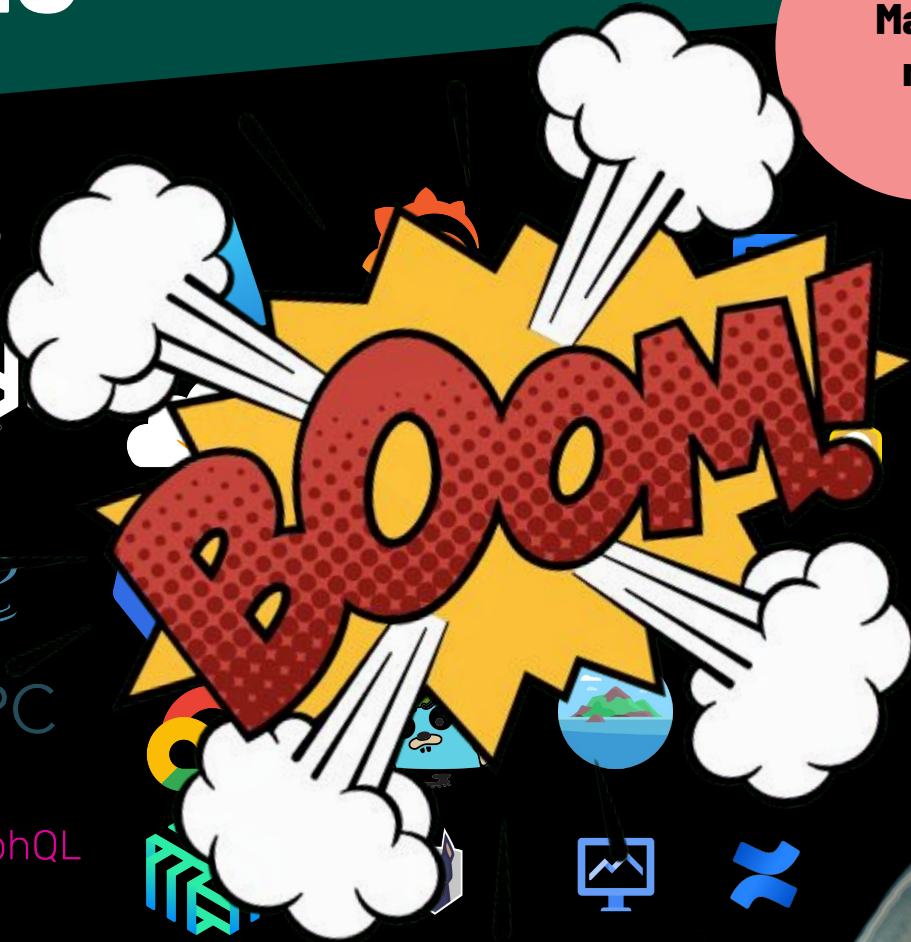
Grafana



Meet Mae

Maybe
not

GitHub



LUNAR[®]

Find the audience

The What's

- What things **do we have**?
- **Who owns** this thing?
- What **talks** to what?
- What **can I do** with this thing?
- How do I **do it**?

Collect developers'
pains continually
to stay ahead



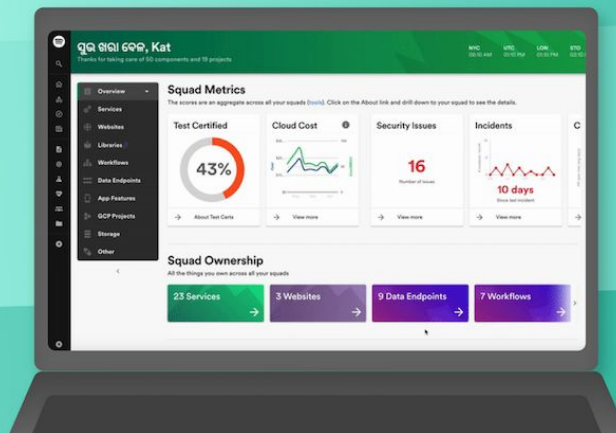
The Who's

- App developers
- Backend developers
- Architects
- Auditors
- ...



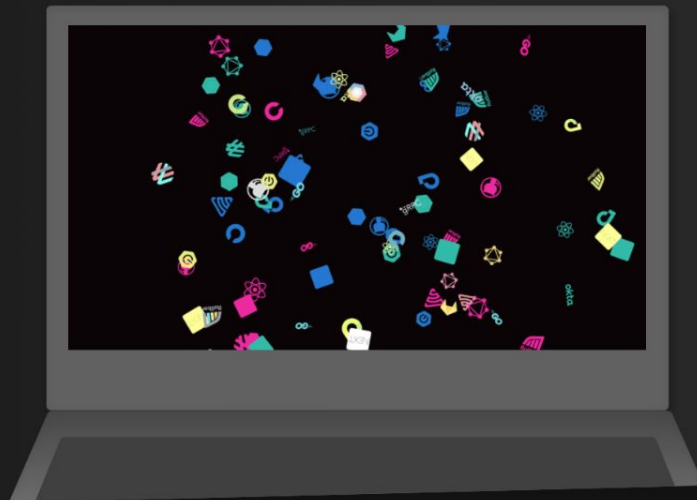


Backstage



An open platform for building developer portals

Powered by a centralized software catalog, Backstage restores order to your infrastructure and enables your product teams to ship high-quality code quickly — without compromising autonomy.

[GITHUB](#)

The Speed Paradox

At Spotify, we've always believed in the speed and ingenuity that comes from having autonomous development teams. But as we learned firsthand, the faster you grow, the more fragmented and complex your



The Standards Paradox

By centralizing services and standardizing your tooling, Backstage streamlines your development environment from end to end. Instead of restricting autonomy, standardization frees your engineers from infrastructure



Backstage Software Catalog *(alpha)*

Build an ecosystem, not a wilderness

Manage all your software, all in one place

Backstage makes it easy for one team to manage 10 services — and makes it possible for your company to manage thousands of them

Metadata on tap

All that information can be shared with plugins inside Backstage to enable other management features, like resource monitoring and testing

A uniform overview

Every team can see all the services they own and related resources (deployments, data pipelines, pull request status, etc.)

Not just services

Libraries, websites, ML models — you name it, Backstage knows all about it, including who owns it, dependencies, and more

The screenshot shows the 'Owned (32)' view in Backstage. It features a table with columns for NAME, SYSTEM, OWNER, LIFECYCLE, STATUS, DESCRIPTION, TAGS, and ACTIONS. The table lists several services like 'podcast-app', 'artist-backend', 'searcher', 'playback-order', 'shuffle-app', and 'spotify-privacy'. A filter overlay is open, showing counts for 'PERSONAL' (Owned: 32, Starred: 2) and 'SPOTIFY' (All: 824).

NAME	SYSTEM	OWNER	LIFECYCLE	STATUS	DESCRIPTION	TAGS	ACTIONS
podcast-app	podcast	Tools	Production	Up and running	Graphing backend for Playlist	Webhooks	🔍 ⚙️ ☆
artist-backend	artist	Tools	Production	Up and running	Graphing backend for Playlist	Webhooks	🔍 ⚙️ ☆
searcher	search	Tools	Production	Up and running	Graphing backend for Playlist	Python	🔍 ⚙️ ☆
playback-order	playback	Tools	Production	Up and running	Graphing backend for Playlist	Data	🔍 ⚙️ ☆
shuffle-app	playback	Tools	Production	Increased failure rates	Graphing backend for Playlist	Data	🔍 ⚙️ ☆
spotify-privacy	playback	Tools	Production	Up and running	Graphing backend for Playlist	Webhooks	🔍 ⚙️ ☆
			Production	Deployment failed	Graphing backend for Playlist	Dev	🔍 ⚙️ ☆
			Production	Up and running	Graphing backend for Playlist	Dev	🔍 ⚙️ ☆
			Production	Up and running	Graphing backend for Playlist	Webhooks	🔍 ⚙️ ☆

Discoverability & accountability

No more orphan software hiding in the dark corners of your tech stack



Backstage TechDocs *(beta)*

Docs like code

Free documentation

Whenever you use a Backstage Software Template, your project automatically gets a TechDocs site, for free

Easy to write

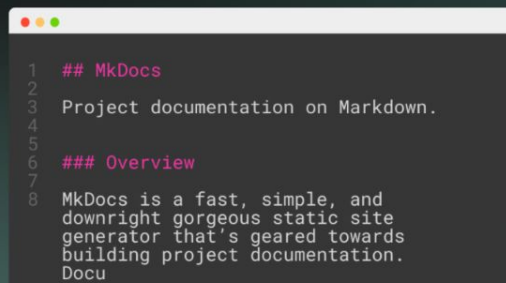
With our docs-like-code approach, engineers write their documentation in Markdown files right alongside their code

Easy to maintain

Updating code? Update your documentation while you're there — with docs and code in the same place, it becomes a natural part of your workflow

Easy to find and use

Since all your documentation is in Backstage, finding any TechDoc is just a search query away





Backstage Software Templates *(beta)*

Standards can set you free

Like automated getting started guides

Using templates, engineers can spin up a new microservice with your organization's best practices built-in, right from the start

Push-button deployment

Click a button to create a Spring Boot project with your repo automatically configured on GitHub and your CI already running the first build

Built to your standards

Go instead of Java? CircleCI instead of Jenkins? Serverless instead of Kubernetes? GCP instead of AWS? Customize your recipes with your best practices baked-in

Golden Paths pave the way

When the right way is also the easiest way, engineers get up and running faster — and more safely

website

Create React App Template

Experimental React CRA

Create a new CRA website project

service

Spring Boot GRPC Service

Recommended Java

Create a simple microservice using gRPC and Spring Boot Java

CHOOSE

website

React SSR Template

Recommended React

Create a website powered with Next.js

service

Golang Microservice

Experimental Go

Create a Golang repo with this template built by members of the Go community

**MOCK
IT UP**



OVERVIEW SERVICES CODE TEST BUILD RELEASE OPERATE MONITOR SECURITY

Overview

SUPPORT

Success Rate

This should be above 99.9%



High CVE's

This should be above 99.9%



HTTP 5xx

This should be above 99.9%



level=error

This should be above 99.9%



Alerts

This should be above 99.9%



Open PRs

ID	TITLE	REPOSITORY	AUTHOR	LAST UPDATED
#12	Upgrade Humio to 1.15.1	lunar-way-humio	kaspennissen	5 minutes ago
#1	Initial commit	service-mesh	Crevil	1 hour ago
#43	Awesome new feature	release-manager	JacobValdemar	2 hours ago

Pulse

TIME	ACTIVITY
10 seconds ago	Service authentication is in CrashLoopBackOff in prod
2 minute ago	Service authentication 3/3 Pods are Running
3 minute ago	Service authentication was released to prod by Bjørn Sørensen
5 minutes ago	Build Successful for service authentication with 0 high vulnerabilities 🍌
7 minutes ago	JacobValdemar approved PR: "Enable Istio Service Mesh"
9 minutes ago	Crevil created PR: "Enable Istio Service Mesh"
1 hour ago	Great job! You have 10 High CVE's less than yesterday 🥳

Overview

SUPPORT

Success Rate

This should be above 99.9%



High CVE's

This should be above 99.9%



HTTP 5xx

This should be above 99.9%



level=error

This should be above 99.9%



Last master build

Status ● Completed

Build Github LunarWay » lunar-way-subscription-service » master #162

Uri [See more on Jenkins](#)

About

VIEW
TECHDOCS

VIEW
SOURCE

CONTACT
OWNER

DESCRIPTION

This line is the description for the data endpoint. Validated aggregated stream activity fact table, used for metrics.

OWNER

Tools

TYPE

Library

LIFECYCLE

Production

TAGS

 web
 mobile

● UPDATED 2 MIN AGO

Release drift

dev

1 commit (1 hour) behind master

staging

3 commits (5 days) behind master

prod

7 commits (13 days) behind master

lunarway/lunar-way-subscription-service

OPEN

CLOSED

ALL

Search

X

ID	TITLE	CREATOR	CREATED	LAST UPDATED
#126	Add Backstage Component and API	JacobValdemar	3 days ago	2 days ago
#95	Feature/prepare swedish rollout	Muggel	2 months ago	9 days ago


5 rows |< < 0-0 of 0 > >|

Deployments

Search X

SERVICE	RUNNING	STATUS	CPU (%)	MEMORY (%)	SLACK
authentication	3/3	●			20%
subscription	2/3	●			5%
user	1/1	●			1%
product	1/3	●			67%

Runtime Overview



All pods running succesfull

Runtime events

TIME	ACTIVITY
10 seconds ago	Pod authentication-77884cbcc9-c7lp4 was OOMKilled 🚫
5 minute ago	Deployment: authentication 3/3 pods are Running
1 hour ago	Deployment: subscription 3/3 pods are Running
3 hours ago	Pod user-7c854f5444-gkcxm is in state: CrashLoopBackOff 🚫 (inspect logs)
5 hours ago	Pod product-58965b55f8-wbxlm is in state: CreateContainerConfigError missing secret product-db 🚫
6 hours ago	Deployment: prometheus 2/2 pods are Running

**COLLECT
FEEDBACK**



ADMIT IT

No one gets hyped about your new
“thing” that solves a rare edge case
for almost no developers



Bjørn Hald Sørensen 3:00 PM

Vi er ved at groom en MVP på Backstage i Lunar. Nogen har tidligere set præsentation til et guild (den kan findes her: https://docs.google.com/presentation/d/1P1-iICCFy9F--NhMVax2YtxgmDxwvyqD4ZPsyAw17J0/edit#slide=id.g5f3b75bbff_2_13)

Vi har shortlisted de features vi vurderer vi kan lykkes med short term og vil gerne have jeres input til hvad der ville skabe mest værdi for jer 🚀. Hvis det er helt i hegnet, så smid en kommentar på hvad det skal være i stedet.

Smid et tal som reaktion på denne ud fra denne list og hjælp os med at lave det rigtige først 🙏

- 1 Automatisk service generation:** Indtast navn, vælg features og tryk Go. Vi sørger for Git repository, pipelines, deployments, quay images osv.
- 2 Squad overview:** Dagligt overview med nøgle metrikker, åbne PRs i squadet, release drift på services osv.
- 3 Database access requests:** Indtast navn, reason og database og du får adgang (erstatning for PR flowet i postgresql-access)
- 4 Release status:** Overblik over hvor og hvad der er released. "Git sha 'abc' i env prod", "released til dev, men ikke prod endnu" osv.
- 5 Service catalog:** Docs, API specification (swagger, GraphQL mv.), CI osv.

4 2 1 4 5 11 2 2 3 3 😊+

MAKE IT FIT

Align with the product

How does this idea fit into the product?

Mae doesn't want **yet another thing**.

Instead we should **reduce** the "things"
and make it **seamless**.



Experience matters

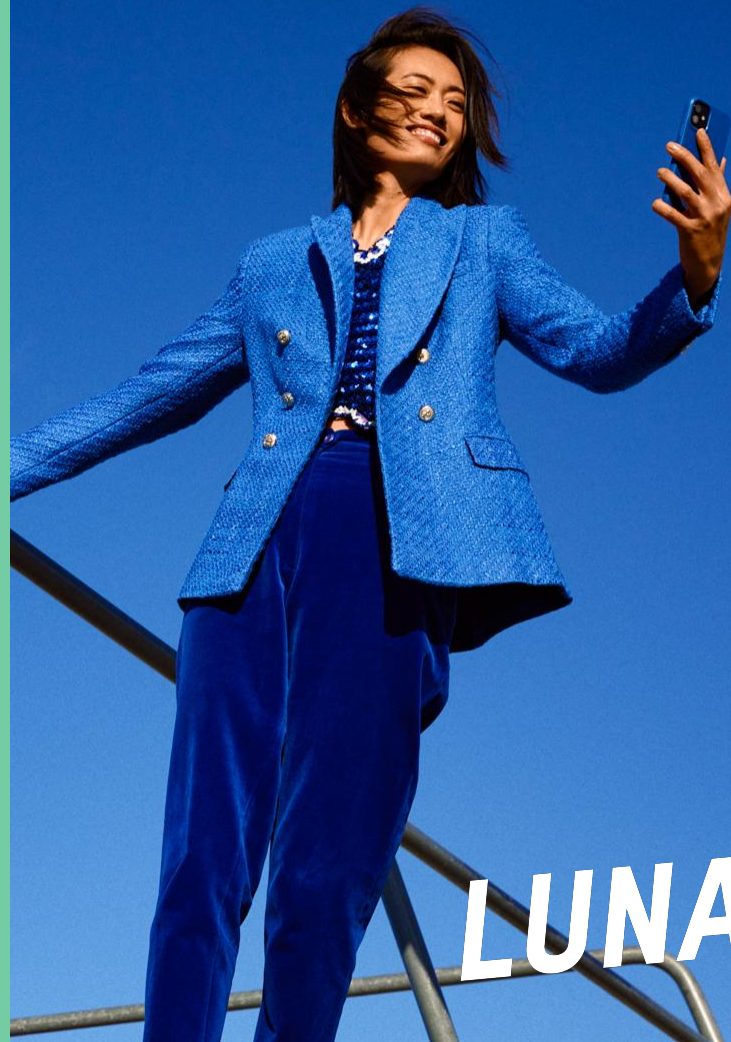


**“You can’t have good
DevX without good UX”**

- Daniel Bryant
Ambassador Labs



shuttle



LUNAR[®]

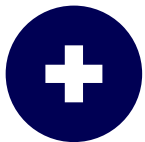


shuttle.yaml

```
1  plan: git://git@github.com:lunarway/lw-shuttle-go-plan.git
2
3  vars:
4    service: dead-letter
5    squad: nasa
6
7    docker:
8      | builder-image: golang:1.17.3
9
10   db: true
11
12   ingress: true
13
14   rabbitmq:
```



**NOT
ANOTHER
THING**



Import source of truth

Processors and entity providers



Solve the needs

Implement the things developers need but don't require them to use it



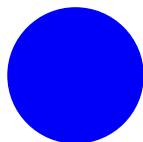
Enable DIY

Showcase how developers can create their own plugins



IMPORT ALL THE THINGS

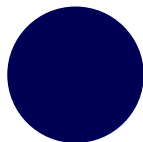
Community based discovery for every need



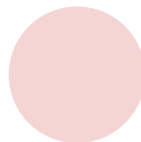
AWS



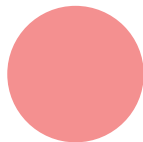
File reader



Azure DevOps



GitLab



BitBucket



GitHub

LUNAR[®]

Perform



FEEL THE CROWD



BE YOURSELF



CATALOG

Components

TYPE

All

PERSONAL

Owned 149

Starred 3

LUNAR

All 530

OWNER

LIFECYCLE

TAGS

Owned (149)

Filter

X

NAME	DESCRIPTION	OWNER	ACTIONS
alertmanager	Kubernetes configuration for Prometheus alertmanager	squad-nasa	🔗 ✎ ☆
analytics-requests		squad-nasa	🔗 ✎ ☆
app-services-proxy	Configuration for proxying request from fra k8s cluster to service running in...	squad-nasa	🔗 ✎ ☆
atlantis	Kubernetes configuration for Atlantis	squad-nasa	🔗 ✎ ☆
avro-schema-registry		squad-nasa	🔗 ✎ ☆
aws-load-balancer-controller	Kubernetes configuration for the aws-load-balancer-controller	squad-nasa	🔗 ✎ ☆
backbone-gateway	Enable network traffic to and from the edges of the Lunar backbone	squad-nasa	🔗 ✎ ☆
backbone-gateway-probe	A probe service that continuously checks if the backbone is connected	squad-nasa	🔗 ✎ ☆
backstage	Developer portal for Lunar tech	squad-nasa	🔗 ✎ ☆
backstage-grpc-api-docs	Simple tool to generate backstage api specifications from proto files	squad-nasa	🔗 ✎ ☆
best-practices	Documentation of Lunar's developer best practices	squad-nasa	🔗 ✎ ☆
buoyant-cloud	Repository containing configuration for running buoyant.cloud agents	squad-nasa	🔗 ✎ ☆
cert-checker	TLS certificate configuration for kubernetes clusters	squad-nasa	🔗 ✎ ☆
cert-manager	Repository for cert-manager	squad-nasa	🔗 ✎ ☆
cloudwatch-exporter	Kubernetes configuration for AWS CloudWatch Prometheus exporter	squad-nasa	🔗 ✎ ☆
cluster-autoscaler	Repository for the Kubernetes cluster-autoscaler	squad-nasa	🔗 ✎ ☆
cluster-identity-controller	Kubernetes controller that managed cluster identity	squad-nasa	🔗 ✎ ☆
cluster-lifecycle	Disaster Recovery and Failover processes and tooling	squad-nasa	🔗 ✎ ☆
cluster-routing-controller	A k8s operator to manage external DNS routing	squad-nasa	🔗 ✎ ☆
cluster-routing-controller-resources	Resource repository with custom resources owned by a cluster-routing-controller	squad-nasa	🔗 ✎ ☆

20 rows |< < 1-20 of 149 > >|

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API Docs

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Dead Letter

Reconstitution

Create...

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Components

TYPE

All	149
Service	3
Library	
Documentation	
Web	
All	530

OWNER

LIFECYCLE

TAGS

Owned (149)

Filter

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alertmanager	Kubernetes configuration for Prometheus alertmanager	squad-nasa	🔗 ✎ ☆
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avro-schema-registry		squad-nasa	🔗 ✎ ☆
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cluster-routing-controller-resources	Resource repository with custom resources owned by a cluster-routing-controller	squad-nasa	🔗 ✎ ☆

20 rows |< < 1-20 of 149 > >|

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TODOS

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DEAD LETTER

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Create...

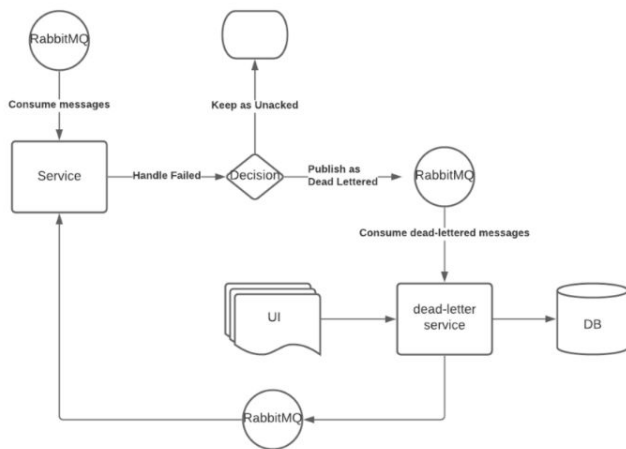
Settings

Read me

DeadLetter service

This service implements a deadletter queue used together with messaging in Lunar.

Below is a drawing of how the flow looks



About

VIEW
SOURCEVIEW
TECHDOCS

DESCRIPTION

An AMQP dead letter manager for storing, replaying and inspecting dead lettered messages.

OWNER

squad-nasa

SYSTEM

No System

TYPE

service

LIFECYCLE

unknown

TAGS

golang

Languages

Go - 100.00%

Contributors



People →

Relations

groupsquad-nasa

ownerOf / ownedBy

component:dead-letter

Search

OVERVIEW

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APIS

CI/CD

PULL REQUESTS

TODOS

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Pull requests plugin

SUPPORT

lunarway/dead-letter

OPEN

CLOSED

ALL

Filter

X

ID	TITLE	CREATOR	CREATED	LAST UPDATED
#176	Fix bug in mutatingBatchSearch	Crevil	8 days ago	8 days ago
#175	Optimize heap allocations in repository	Crevil	8 days ago	8 days ago
#174	Add tracing to search	Crevil	8 days ago	8 days ago
#170	Feature/mutating batch search	mahlunar	9 days ago	8 days ago
#169	Add seed command	Crevil	9 days ago	9 days ago

5 rows

|<

<

1-5 of 120

>

>|

**TECH
DOCS**

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Create...

Settings

SUPPORT

PERSONAL	
Owned	28
Starred	4

LUNAR	
All	35

OWNER	

TAGS	

Starred (4)

Filter X

DOCUMENT	OWNER	TYPE	ACTIONS
developer-onboarding Everything you need for getting onboarded to the Lunar development platform	squad-nasa	documentation	< ★
platform-docs Platform documentation hosted in backstage	squad-nasa	documentation	< ★
service-lifecycle How to go from thought to production and back again	squad-nasa	documentation	< ★
tech-guides Repository containing guides and faqs for Lunar Tech	squad-nasa	documentation	< ★

Search

Catalog

Tech Docs

API Docs

On Call

Dead Letter

Reconstitution

Create...

Dead Letter

Dead-Letter service

Load test 2021-09-02

Search dead-letter docs

Load test 2021-09-02

Duration: 10:00 - 14:00

Attendees: BSO and MAH

Why?

We are getting close to launching dead-letter service for Lunar and would like to ensure that a worst case scenario in production is safe. The scenario we choose is card clearing at the end of the month where we in ultimo aug 2021 saw around 1300 msg/s during peak.

Setup

Producer tool publishes sequentially in a busy `for` loop without publisher confirmation. See <https://github.com/lunarway/lunar-way-rabbitmq-tester> for more details.

Dead letter uses quorum queues on 5 nodes. (not equal to prod) but the last test with 2000 msg/s were rerun with a quorum of 3.

The authentication service was released with a load test consumer used to push integration events against. See <https://github.com/lunarway/dead-letter-load-test> service/commit/5335 for more details.

The consumer can handle two actions: `error` that returns an error and `noop` (empty string) that just acknowledges messages.

Spec

Each run is setup like below.

```
1 go run cmd/main.go produce \
2   --uri "amqp://lunarway:<pw>@localhost:5672/" \
3   --publish-spacing "<spacing>" \
4   --count <count>
```

Spacing is calculated as $1/\text{rate}=\text{spacing}$ and count is $\text{rate}*\text{testDuration}=\text{count}$.

Queries

Below Humio queries are run in <https://humio.com/search>.

A Grafana dashboard has also been used to track library metrics: <https://grafana.com/dashboards/1234567890> dead-letter-load-test?orgid=1&from=now-6h&to=now&refresh=30s

Throughput auth

```
1 #app=authentication system=grpc "Event handled" deadletter_loadtest | timechart(span="1s")
```

Latency auth

```
1 #app=authentication system=grpc "Event handled" deadletter_loadtest | kvParse() | percentile("responseTime", percentiles=[50, 95, 99])
```

Throughput deadletter

```
1 #app=dead-letter "Event handled" DeadLetter | timechart(span="1s")
```

Deadletter HTTP squad overview

```
1 #app=dead-letter req.method=* req.path="/dead-letters/squad-overview" | percentile("responseTime", percentiles=[50, 95, 99])
```

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Why?

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Throughput auth

Latency auth

Throughput deadletter

Deadletter HTTP squad overview

Deadletter HTTP messages

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Dead letter

Backstage

RabbitMQ

Previous

Dead-Letter service

Settings

Certificate manager

cert-manager

[Runbooks for cert-manager](#)

Runbooks for cert-manager



Manually renew certificates

This guide describes how to renew certificates manually if cert-manager is unable to do so.

Tip

You can see this status of the certificates in prod with the certificate dashboard: <https://grafana.com/dashboards/10000> `certificates` (change `prod` in another environment)

Prerequisites

- You must have the admin role for the cluster the certificates is stored in. Typically, only members of nasa and ranger will have this role.
- Krew should be installed: `brew install krew`

Step 1: Install cert-manager kubectrl plugin through Krew

```
1 kubectl krew install cert-manager
```

Tip

Run `wk get cert,certificaterequest,order -n <namespace>` in another terminal window to get an overview.

Step 2: Delete failed certificate requests

If the cert-manager has unsuccessfully tried to renew the cert, it might have created a `certificaterequest` with `status = errored`. If this is the case you will have to delete this `certificaterequest`.

```
1 kubectl delete certificaterequest --namespace <namespace> <certificaterequest>
```

Step 3: Initial renewal of the certificate

When a certificate is renewed a new `certificaterequest` and `order` resource will be created. The order resource will have `status=pending` until LetsEncrypt checks the created Route53 record. It will take around a minute or two to be validated, and then the new certificate will be issued.

```
1 k cert-manager renew -n <namespace> <cert>
```

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Manually renew certificates

Prerequisites

Step 1: Install cert-manager kubectrl plugin through Krew

Step 2: Delete failed certificate requests

Step 3: Initial renewal of the certificate

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Docker

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Node.js

VPN

Finished

Developer onboarding

 **First of all, welcome onboard!** 🎉

This article will hopefully help you get started quickly. Before we dive into the different tools and accesses you need in order to start contributing, we would like to introduce you to three high-level tools that we use internally at Lunar.

This is just a highlight. Each tool is explained and setup during this guide.

These tools are;

- **lw-zsh**: Plugin for [zsh](#) with common tooling for accessing AWS, kubernetes, databases, along with the tools needed to interact with runtime environments
- **shuttle**: Tool for managing a service. This includes centralized sane defaults, scripts, etc. for building and testing a service
- **hamctl**: Tool for releasing services into environments

In the following we will point you to guides for configuring the niddy gritty details. Don't worry, if you run into any problems, don't hesitate to ask in the Slack channel: [#squad-nasa](#)

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LUNAR

All 180

OWNER

LIFECYCLE

Owned (2)

Filter

NAME	TYPE	DESCRIPTION	OWNER	ACTIONS
dead-letter-http	openapi	API for managing dead lettered AMQP messages	squad-nasa	🔗 ✎ ☆
product-http	openapi	API for product-service.	squad-nasa	🔗 ✎ ☆

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OpenAPI Row

Lunar Dead Letter API 0.1.0

API for managing dead lettered AMQP messages

Authorize

default

GET	/swagger	
GET	/dead-letters	
DELETE	/dead-letters	
POST	/dead-letters/redeliver	
GET	/dead-letters/service-overview	
GET	/dead-letters/squad-overview	

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DeadLetteredMessage

ServiceOverview

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★ Starred 0

LUNAR

All 4


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library
Go lib ☆

DESCRIPTION
Create a new Go lib

OWNER
squad-nasa

TAGS


 [CHOOSE](#)

service
Go Service with fx-baseservice ☆

DESCRIPTION
Create a new Go service using fx-baseservice for components

OWNER
squad-gemini

TAGS


 [CHOOSE](#)

service
Go Service with vostok ☆

DESCRIPTION
Create a new Go service using Vostok for components

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service
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Create a new infrastructure service

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Go Service with vostok

1 Fill in the needed information to create the service

Name *

cloud-native-aarhus

Unique name of the service.

Description *

We should have a service, right?

What is the responsibility of the service?

Owner *

squad-nasa

The squad that will own the service. eg. 'squad-nasa'

Kubernetes namespace

The kubernetes namespace, eg. 'bank'. Leave empty to default to workload namespaces, ie. 'dev', 'staging' and 'prod'.

Setup auto release policy for

 dev staging prod platform azure-uat azure-prod

BACK

NEXT STEP

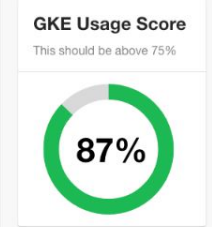
MAKE IT YOU



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Cost Efficiency

SUPPORT



Additional Information

Rightsize GKE deployment

Services are considered underutilized in GKE when the average usage of requested cores is less than 80%.

What can I do?

Review requested core and limit settings. Check HPA target scaling settings in `hpa.yaml`. The recommended value for `targetCPUUtilizationPercentage` is 80.

For single pods, there is of course no HPA. But it can also be useful to think about a single pod out of a larger deployment, then modify based on HPA requirements. Within a pod, each container has its own CPU and memory requests and limits.

Definitions

A request is a minimum reserved value; a container will never have less than this amount allocated to it, even if it doesn't actually use it. Requests are used for determining what nodes to schedule pods on (bin-packing). The tension here is between not allocating resources we don't need, and having easy-enough access to enough resources to be able to function.

Contact [#cost-awareness](#) for information and support.

[Learn more about GKE](#) →

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squad-mercury	10652
squad-artermis	359
squad-orion	206
squad-apollo	202
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SERVICE	COUNT
notification	43695
term-deposit	117
card-management	40
braze-sync	8
transaction-core	5
project-blue	2
accounts-view	2
account-payments-front	1

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Dead letters

<input type="checkbox"/>	TIMESTAMP	QUEUE	ROUTINGKEY	MESSAGE ID	CORRELATION ID	ERROR	HUMIO
<input type="checkbox"/>	2021-11-12 11:07:01.348365 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	185b036f-a0d4-490f-8448-7857d8ef563c	6fe8fdff-7544-4e6d-9c6b-c801f90c8d45	ctx handler: insufficient_funds: insufficient funds	
<input type="checkbox"/>	2021-11-10 07:01:01.765746 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	7d988bf9-5819-4cf5-9c12-123919410e45	9e9f9838-e71c-4796-a0c0-3b4e18a25ca5	ctx handler: insufficient_funds: insufficient funds	
<input type="checkbox"/>	2021-11-11 12:48:13.022495 +0000 UTC	dev-k8s-bankaccount_term-deposit	bankaccount.CreateAccountResponse	b2056e3d-9e6a-4fbl-be0f-95dafa0c19d84	78d17cb8-dcfd-4bb3-9ed4-345ae29fb5fe	ctx handler: record not found	
<input type="checkbox"/>	2021-12-01 05:00:02.390483 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	7e5de595-7215-424e-91bb-338e0971bbd1	4bd496af-f380-446f-affe-e72be0511582	ctx handler: domain error: failureCode = FailureCode_InvalidStateChange, failureMessage = invalid state change empty -> CreatingBankAccount for savings account (code: CommandFailureCode_DomainError)	
<input type="checkbox"/>	2021-11-11 05:00:02.193498 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	ee962091-5e93-4d97-84a5-143d8034399b	e97b65b6-f261-456a-8fad-8fe96cb5a0c1	ctx handler: insufficient_funds: insufficient funds	
<input type="checkbox"/>	2021-11-12 13:02:19.84315 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedV1	b4e5ald9-4245-4601-9383-a6e23c5cd758	17fd82b1-4dbc-43a5-86f3-2695280d7c23	ctx handler: record not found	
<input type="checkbox"/>	2021-11-25 13:47:20.517806 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	a8c21b3d-1ca8-412f-ac64-c991b5995fe	344056d6-c493-4d00-a430-aaaa248933	ctx handler: insufficient_funds: insufficient funds	
<input type="checkbox"/>	2021-11-12 13:43:11.641519 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedV1	807604cf-54fe-48f0-b84c-548ffe2b8a2f	2a7c4e3c-e798-47bl-01ba-ld25dab47899	ctx handler: record not found	
<input type="checkbox"/>	2021-11-12 13:22:20.741417 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedV1	09554d24-9c86-4a2d-9256-888d43904362	e27d9e05-5bee-4be3-90f5-86ecf687fe8c	ctx handler: record not found	
<input type="checkbox"/>	2021-11-12 13:34:42.326436 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedV1	4ef06fff-7419-4e1b-9fa4-d6d2e55100dd	488f8f9d-cld0-425a-9c35-704bf2a28ccb	ctx handler: record not found	
<input type="checkbox"/>	2021-12-02 05:00:01.858426 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	cba6c4f9-7ae9-4c54-b5d4-9f24af581a8c	81aef30-63e2-4883-888f-a9abb85d0729	ctx handler: domain error: failureCode = FailureCode_InvalidStateChange, failureMessage = invalid state change empty -> CreatingBankAccount for savings account (code: CommandFailureCode_DomainError)	
<input type="checkbox"/>	2021-11-12 13:02:20.278717 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedV1	10959af5-0d22-4b92-bfe8-191c10df69b7	4a2eca78-c06c-4c5a-9268-fbb895b7be3e	ctx handler: record not found	
<input type="checkbox"/>	2021-11-25 13:27:38.747815 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	fa46ce41-e5ab-4e93-baed-7da1bfbcba06	174c01d9-95b6-4ce9-8568-2522f1c5a3561	ctx handler: insufficient_funds: insufficient funds	
<input type="checkbox"/>	2021-11-12 13:22:21.386352 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedV1	736140e1-f6dd-4705-b9d4-e8f436649a6c	f154c598-cdcf-4dc2-908d-fd71d7a239f8	ctx handler: record not found	
<input type="checkbox"/>	2021-11-30 11:09:48.14573 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	468ab3b9-757d-4203-aed-ef2ffe45273	82fd5de9-edic-5-4414-8871-7b2def73e8c2	ctx handler: domain error: failureCode = FailureCode_InvalidStateChange, failureMessage = invalid state change empty -> CreatingBankAccount for savings account (code: CommandFailureCode_DomainError)	

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2 row(s) selected

	TIMESTAMP	QUEUE	ROUTINGKEY	MESSAGE ID	CORRELATION ID	ERROR	HUMAN
<input checked="" type="checkbox"/>	2021-11-12 11:07:01.348365 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	185b036f-a0d4-490f-8448-7857d8ef563c	8fe8dff-7544-4e64-9c4b-c901f90c9d45	ctx handler: insufficient_funds: insufficient funds	
<input checked="" type="checkbox"/>	2021-11-10 07:01:01.765746 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	7d988bf9-5819-4cf5-9cf2-123919410e45	9e9f9838-e71c-4796-a0c0-3b4e18a25ca5	ctx handler: insufficient_funds: insufficient funds	
<input type="checkbox"/>	2021-11-11 12:48:13.022495 +0000 UTC	dev-k8s-bankaccount_term-deposit	bankaccount.CreateAc...			ctx handler: record not found	
<input type="checkbox"/>	2021-12-01 05:00:02.990483 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.F...			ctx handler: domain error: failureCode = FailureCode_InvalidStateChange, failureMessage = invalid state change empty -> CreatingBankAccount for savings account (code: CommandFailureCode_DomainError)	
<input type="checkbox"/>	2021-11-11 05:00:02.193498 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.F...			ctx handler: insufficient_funds: insufficient funds	
<input type="checkbox"/>	2021-11-12 13:02:19.84315 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedv1	9383-a6e23c5cd758	86f3-2695280d7c23	ctx handler: record not found	
<input type="checkbox"/>	2021-11-25 13:47:20.517806 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	a8c21b3a-1ca8-412f-ac64-c91b55995fe	3d4056d9-c493-4d00-a430-aaaac248933	ctx handler: insufficient_funds: insufficient funds	
<input type="checkbox"/>	2021-11-12 13:43:11.641519 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedv1	807604cf-5cfe-48f0-b84c-546ffe2b8a2f	2a7c4e3c-e788-47b1-01ba-1d28db47899	ctx handler: record not found	
<input type="checkbox"/>	2021-11-12 13:22:20.741417 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedv1	09554d24-9c86-4a2d-9256-888da3904362	e27d9e05-5bee-4be3-90f5-86cef68768c	ctx handler: record not found	
<input type="checkbox"/>	2021-11-12 13:34:42.328436 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedv1	4ef06fff-7d19-4eb-9fa4-6e32e59100dd	48989f9d-cld0-425a-9c35-704b7a289ccb	ctx handler: record not found	
<input type="checkbox"/>	2021-12-02 05:00:01.858426 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	cba9cf49-7ae9-4c54-b5d4-9b4af581a9fc	81ae0a30-63e2-4883-888f-a9abb85d0729	ctx handler: domain error: failureCode = FailureCode_InvalidStateChange, failureMessage = invalid state change empty -> CreatingBankAccount for savings account (code: CommandFailureCode_DomainError)	
<input type="checkbox"/>	2021-11-12 13:02:20.278717 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedv1	10959af5-0d22-4b92-bf68-191c0df69b7	4a2eca78-c06c-4c5a-9268-fbb895b7be3e	ctx handler: record not found	
<input type="checkbox"/>	2021-11-25 13:27:38.747815 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	fa45ce41-e5ab-4e93-baed-7da1bfcbca06	174c01d9-95b6-4ce9-8568-2522fca3561	ctx handler: insufficient_funds: insufficient funds	
<input type="checkbox"/>	2021-11-12 13:22:21.386352 +0000 UTC	dev-k8s-eventstreams_bankaccount_bankacco..._term-deposit	bankaccount.bankaccounting.v1.UserToUse...rAccountingTransferCompletedv1	736140e1-f6dd-4705-b9d4-e8f436649a6c	f154c598-cdcf-4dc2-908d-fa7d1742398	ctx handler: record not found	
<input type="checkbox"/>	2021-11-30 11:09:48.14573 +0000 UTC	dev-k8s-commandstreams_bankaccount_accoun..._term-deposit	bankaccount.account.ReserveFundsRespon...seV1	466ab3b9-757d-4203-aead-ef21fe45273	82fd5de9-edc5-4414-8871-7b2def73e8c2	ctx handler: domain error: failureCode = FailureCode_InvalidStateChange, failureMessage = invalid state change empty -> CreatingBankAccount for savings account (code: CommandFailureCode_DomainError)	

Confirm deletion

The action is destructive and cannot be undone.

Please make sure that you do in fact want to delete 2 messages.

CONFIRM DELETE

CANCEL

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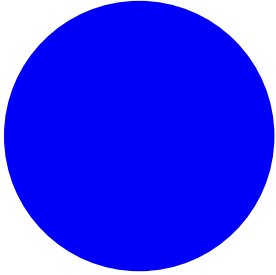
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Next steps

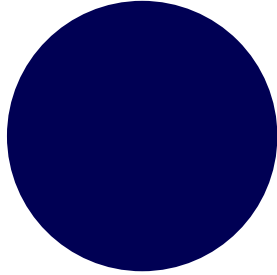


LET MORE JOIN THE BAND



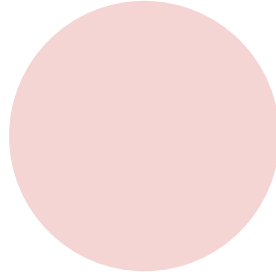
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Staging deployments,
performance analytics



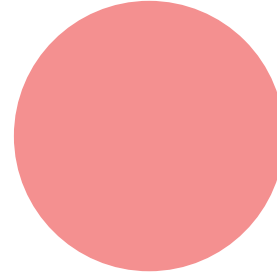
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AI models, data
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training data



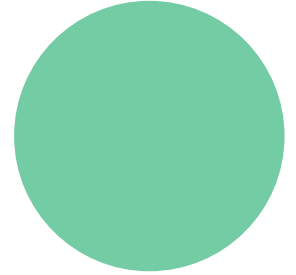
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overviews



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usage statistics

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group:squad-nasa

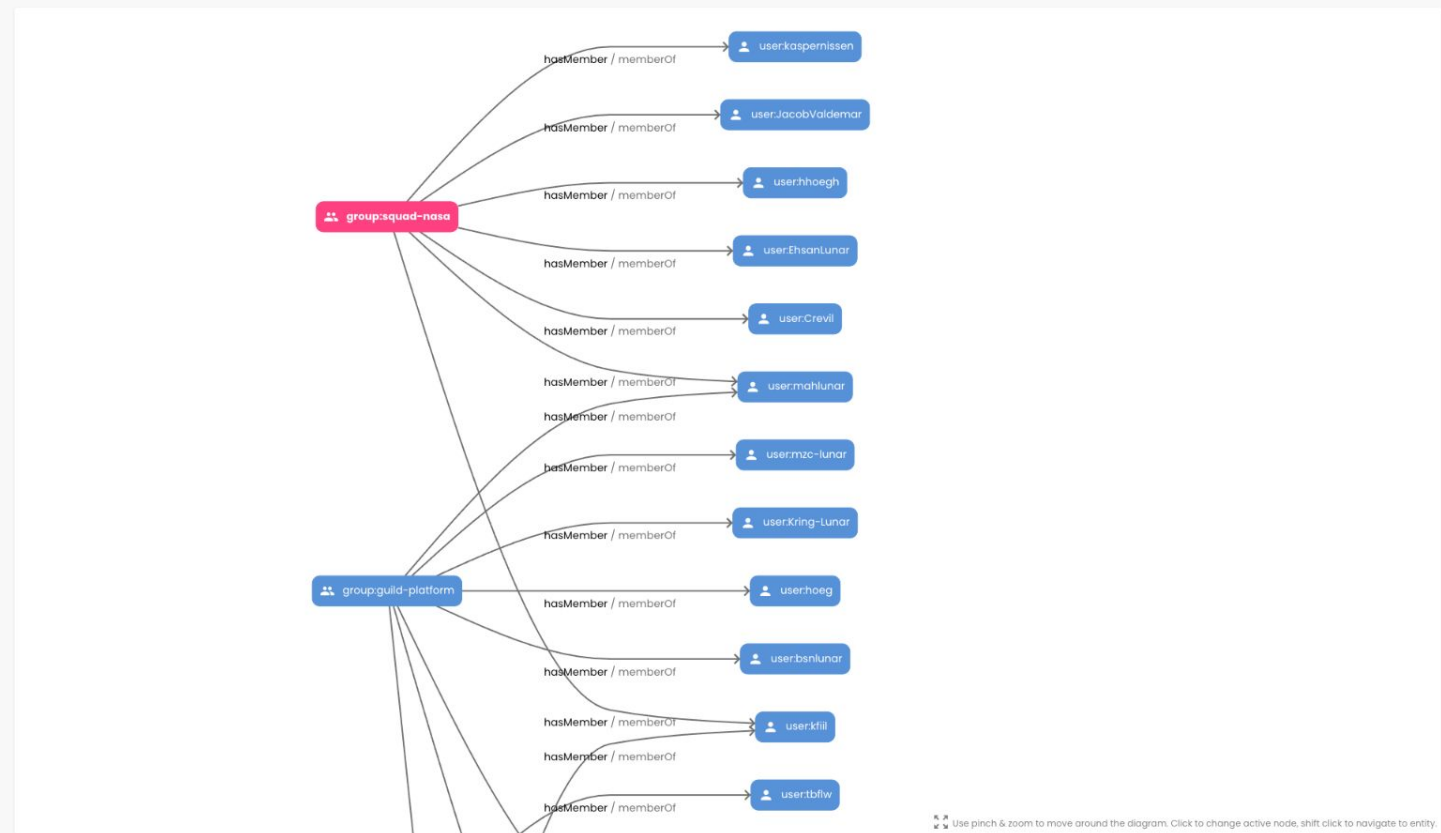
MAX DEPTH
∞ Infinite

KINDS
User Group

RELATIONS
ownerOf ownedBy consumesApi apiConsumedBy +10

DIRECTION
Left to right

Simplified
 Merge Relations





message.proto ×



message.proto > ...

```
1  import "google/protobuf/descriptor.proto";
2
3  extend google.protobuf.FieldOptions {
4  |   optional bool gdpr_sensitive = 50000;
5  | }
6
7  message UserCreated {
8  |   string social_security_number = 1 [(gdpr_sensitive) = true];
9  | }
10
```




**Did it
work?**



**Thank you for
listening.**

Questions?

 @Bjorn_Sorensen

 bso@lunar.app

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