Not my problem!

Delegating respobisiblites to infrastrucutre

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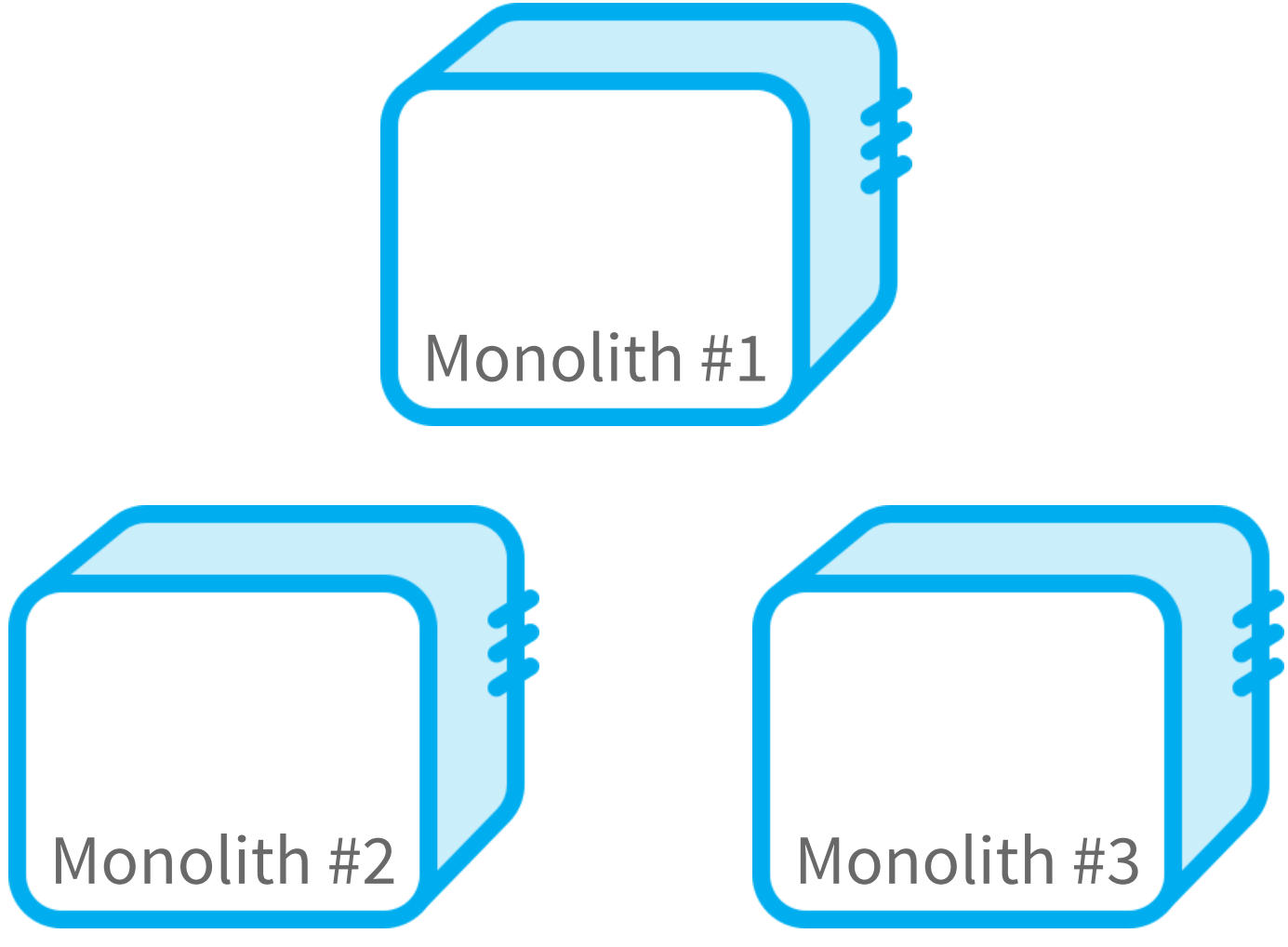
As a developer, I want to **focus on building features** that deliver **business value** .

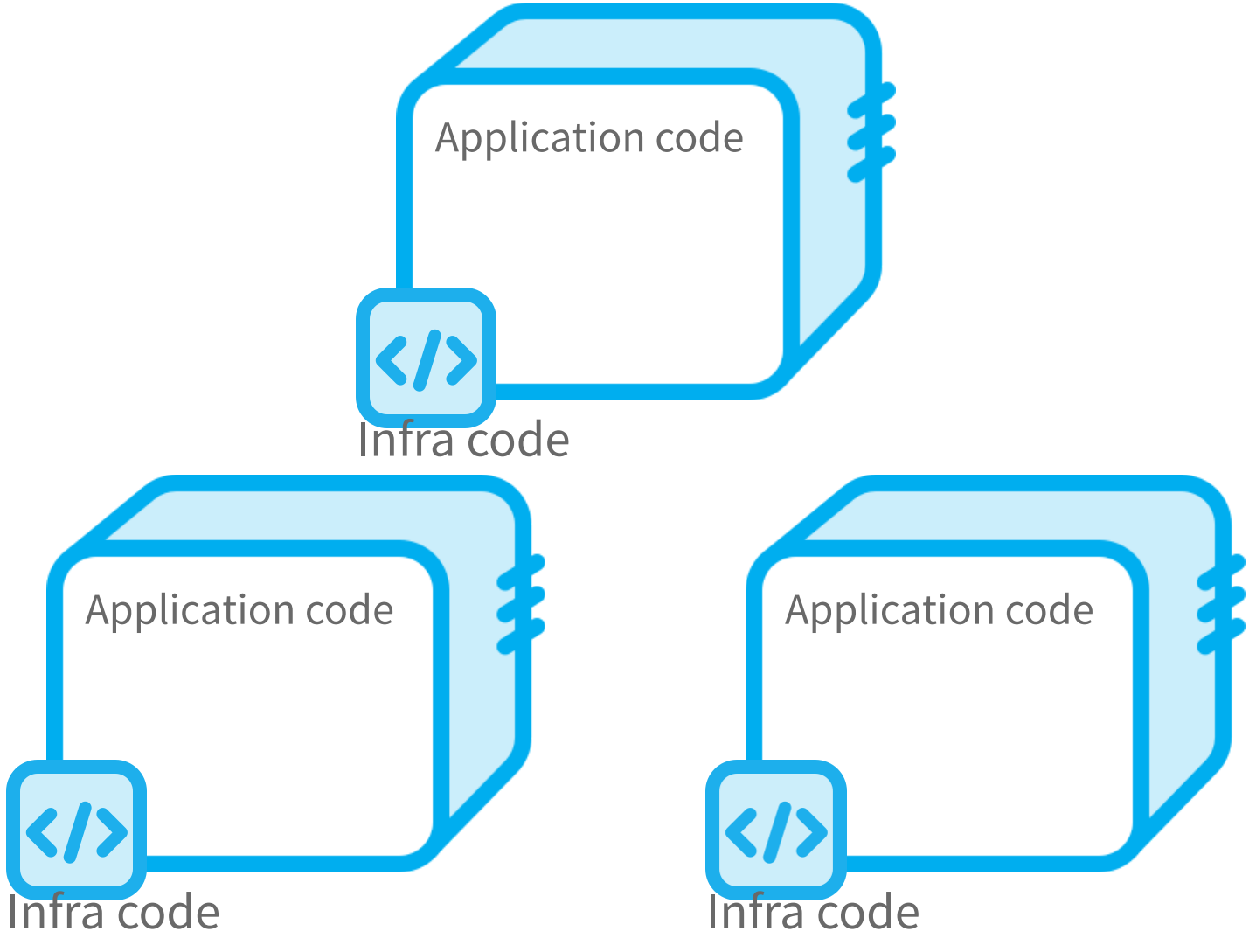
Infrastructure


Monolith
Microservices

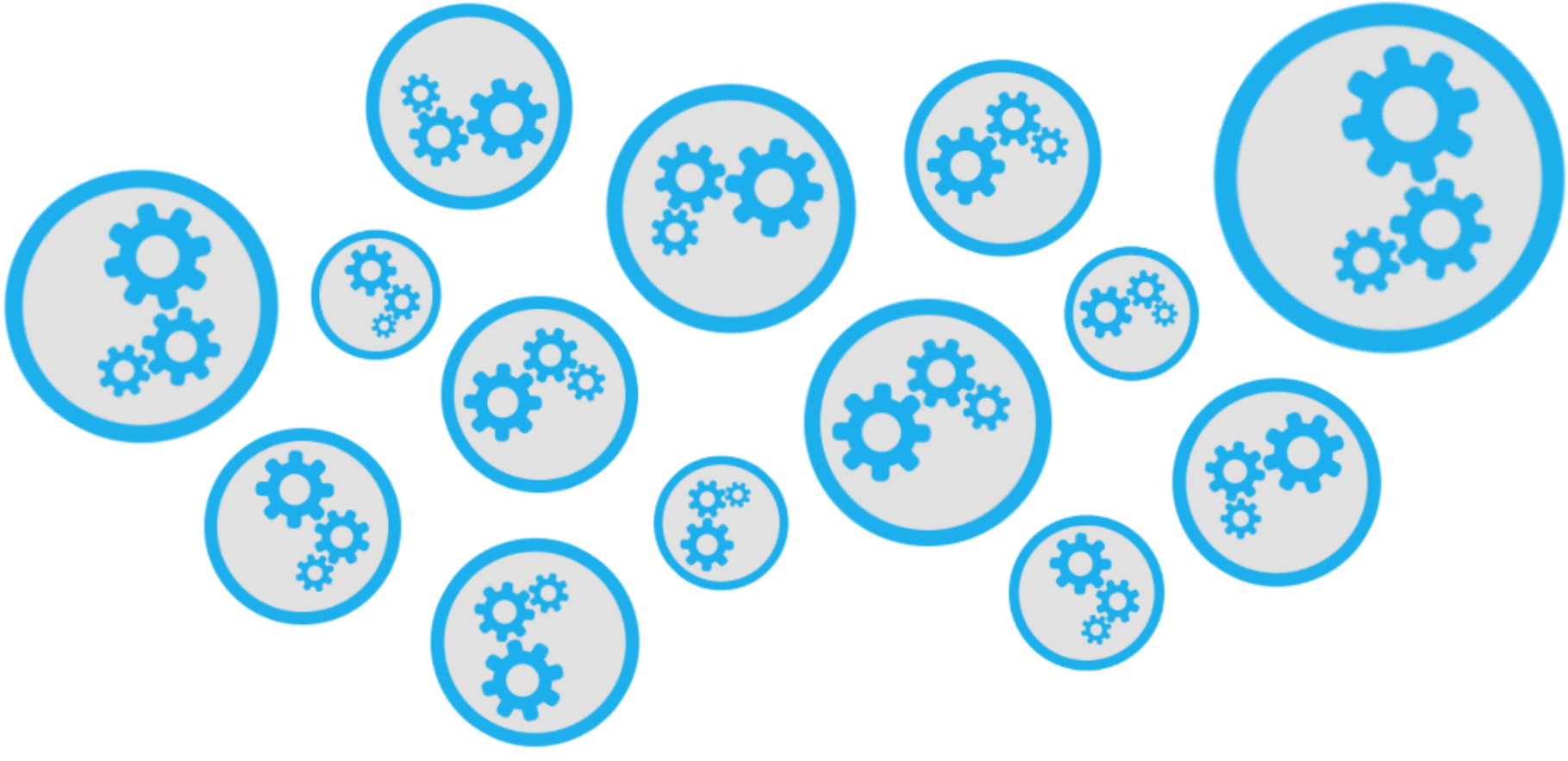
Few Monoliths



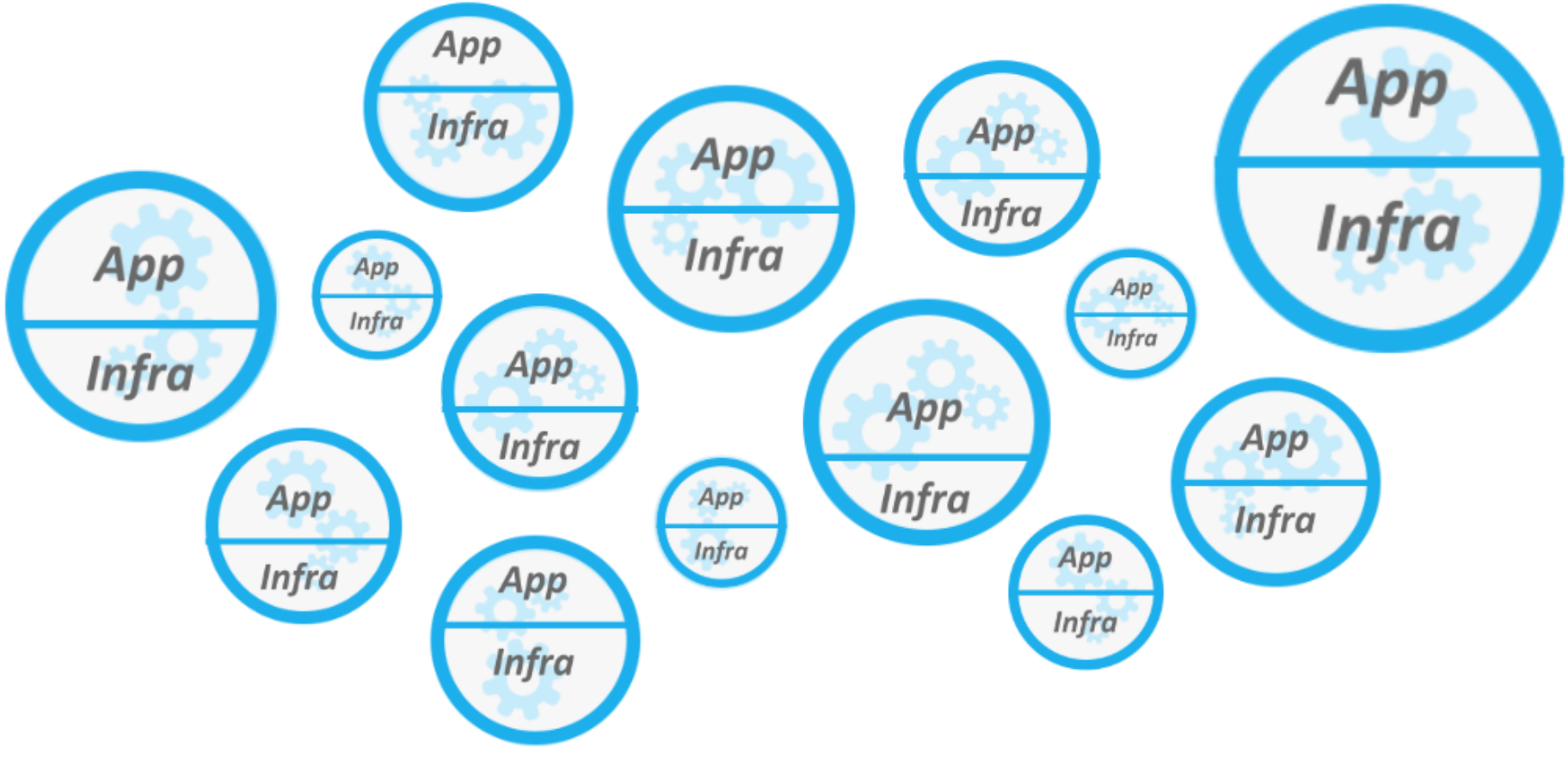
Few Monoliths



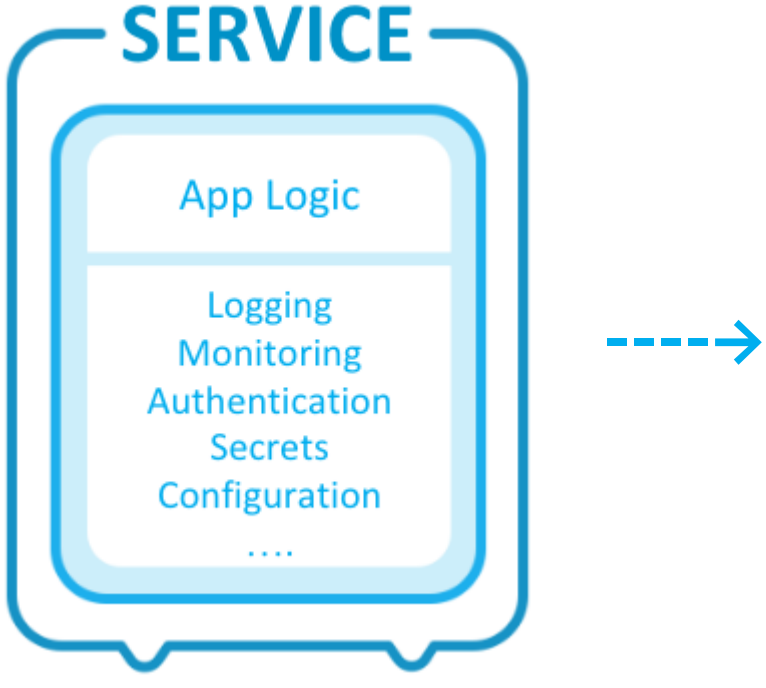
Monoliths -----→ Lots of Microservices



Monoliths -----→ Lots of Microservices

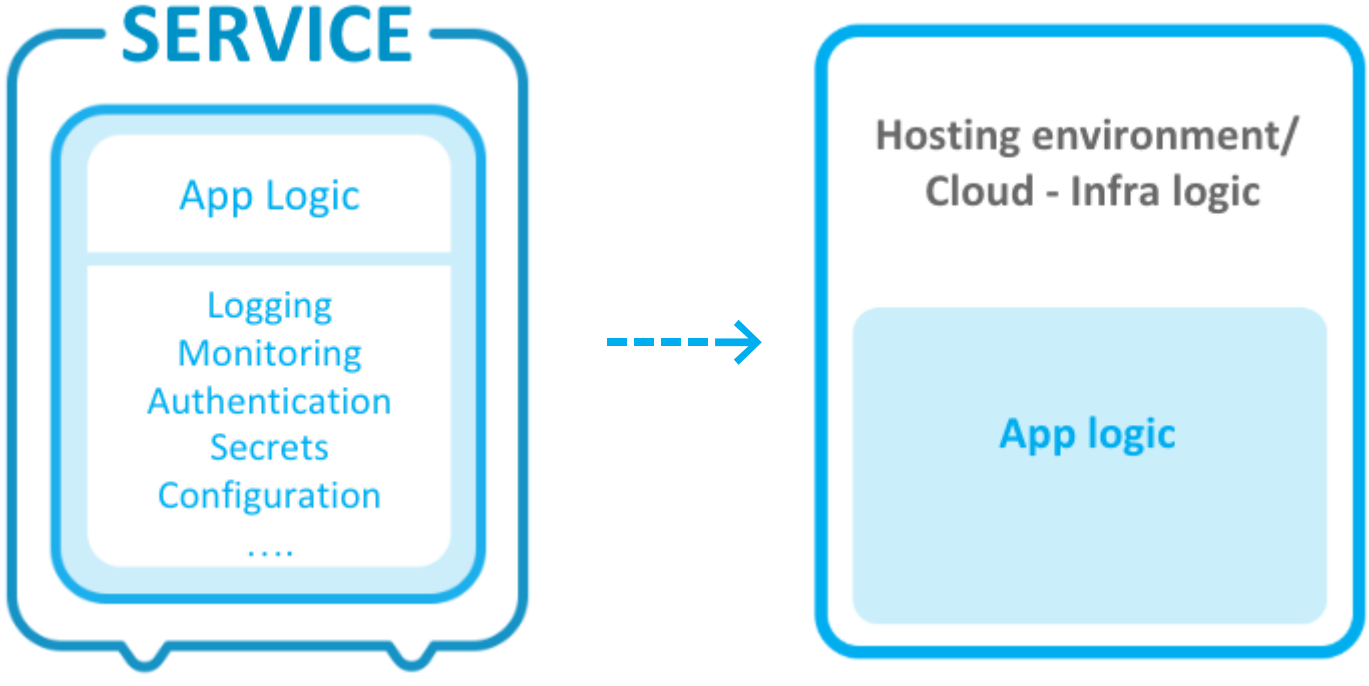


Service structure



Infra-code and business logic code live together with every microservice

Service structure



Can we write only our business code and let our hosting environment take care of the rest?

About me

- Tech lead @ Soluto
- Open source
- Cloud architecture
- Functional Programming
- Docker
- Code Quality

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About Soluto

- Based in Tel Aviv, acquired by Asurion at 2013
- Next generation of tech support
- 150M users worldwide
- We love open-source


MICROSERVICES
since
2014

Shifting to microservices

- ~5 services -> 100+ services
- Cultural change, new aspects of ownership
- CI/CD - Better tooling automation

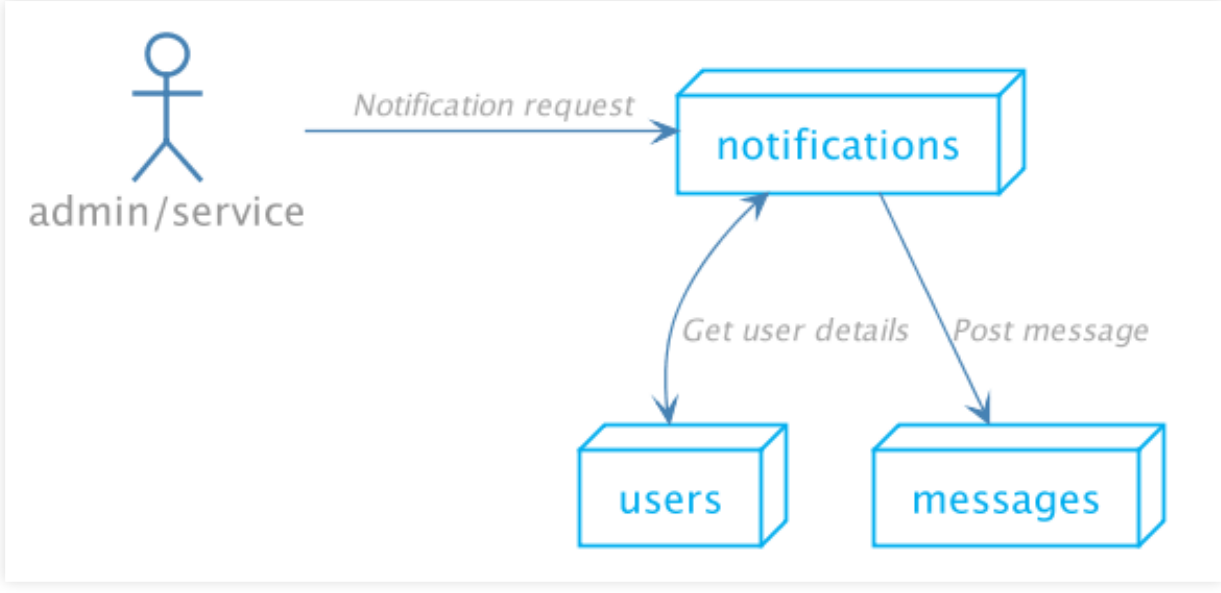
How does a service look like?

DEMO - Notifications service V1

Spec - Notifications service

- We want to send notifications to users
- Notifications will be based in templates
- Notifications will be personalized

Flow - Notification service



1. Get user identifier and notification type
2. Fetch user details from users micro-service
3. Format message using a template
4. Send a message

Let's write some code

Demo

What's missing?

- Visibility
- Security
- Resiliency

Logging

- We need to add a logger
- We send logs to a 3rd party provider
- Let's get a library + a provider

☑ Logging
☐ **Error policies**
☐ Authentication
☐ Monitoring

Error policies

- The network can fail
- We want to retry failed requests
- Let's add Polly

☑ Logging
☑ Error policies
☐ **Authentication**
☐ Monitoring

Authentication

- We'll use JWT token
- OIDC/OAuth2

☑ Logging
☑ Error policies
☑ Authentication
☐ **Monitoring**

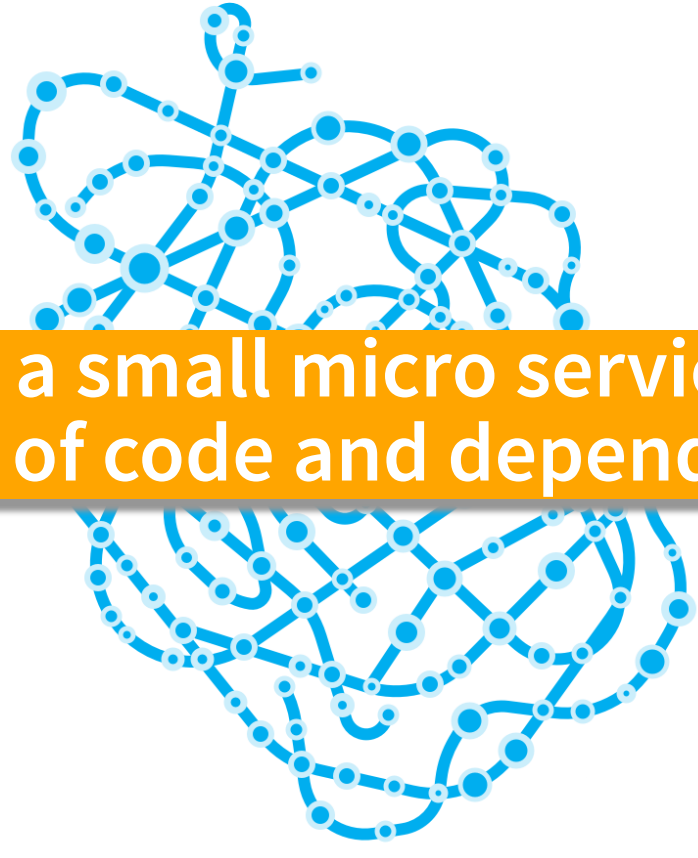
Monitoring

- Performance metrics, throughput, latency
- Statsd client

☑ Logging
☑ Error policies
☑ Authentication
☑ Monitoring

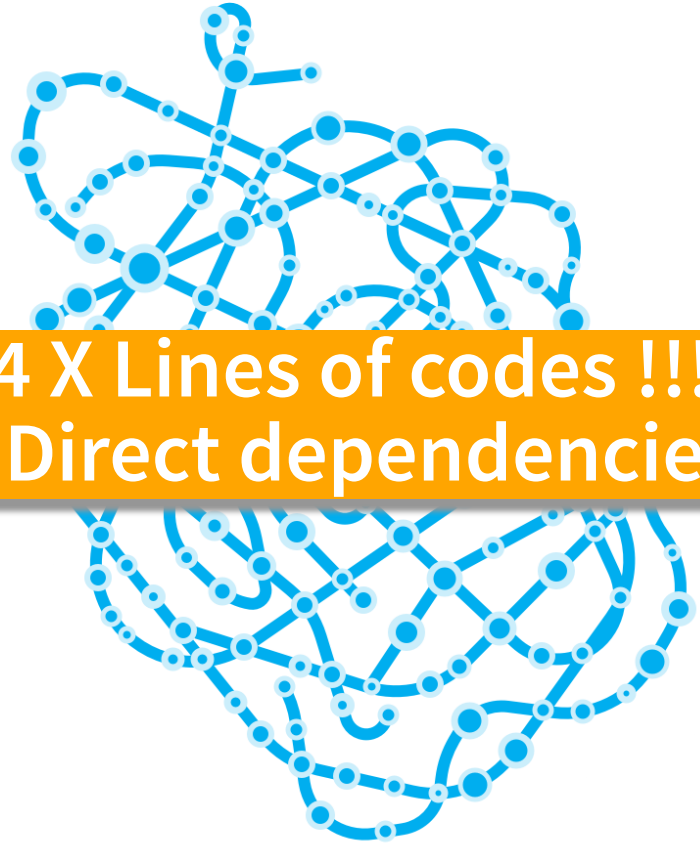
Demo

What just happend here?



We wanted a small micro service and got a bunch of code and dependencies

What just happend here?



4 X Lines of codes !!!
3 X Direct dependencies !!!

Soluto - microservices v1

- Shared template - dependencies and code blocks
- Used by teams as a boilerplate
- Shared “common” packages/frameworks
- Lots of DI magic
- Worked well until...

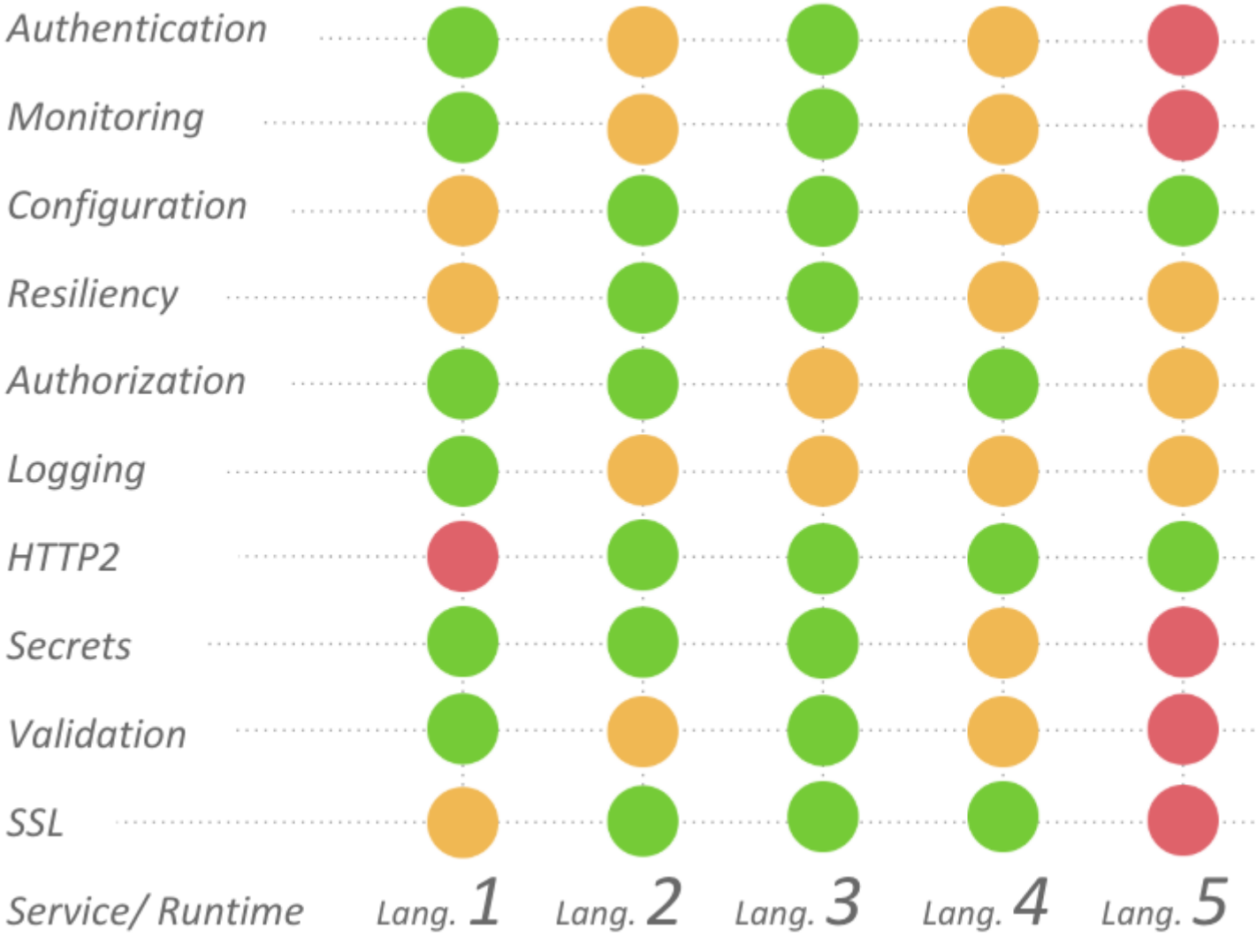
Problems

- Upgrades are **Hard**
- Dependencies can break
- Dependencies can conflict
- Dependencies requires re-build+re-deploy
- Extremely difficult to introduce global change

And that's not the worse...

We need to solve it for each and every programming language

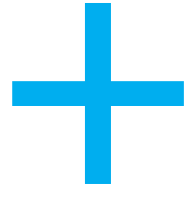
Not all languages are born equal



As a developer, I want to **focus on building features** that deliver **business value** .

Which of these concerns can be solved at **environment level** ?

Soluto - microservices v2

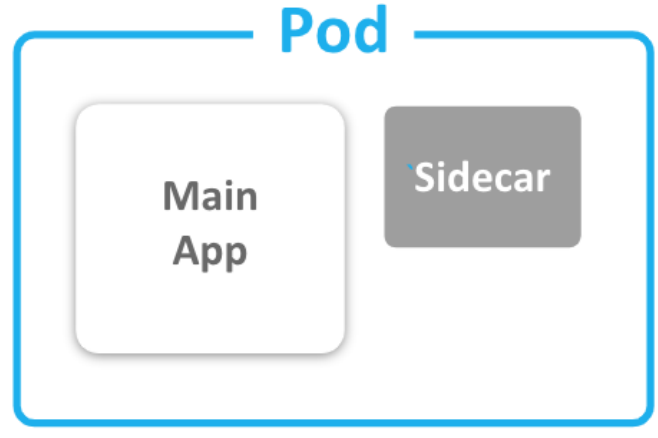


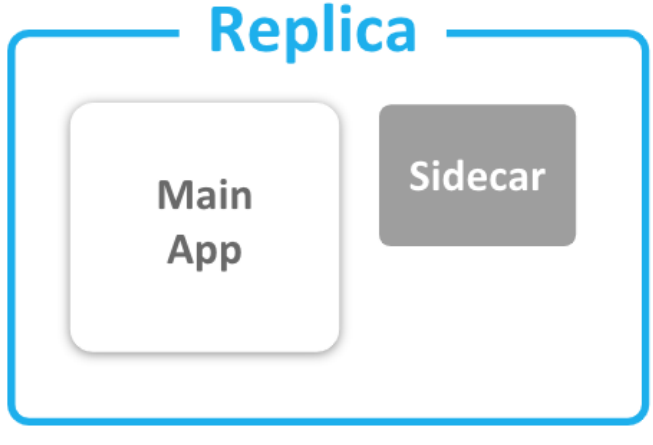
Kubernetes

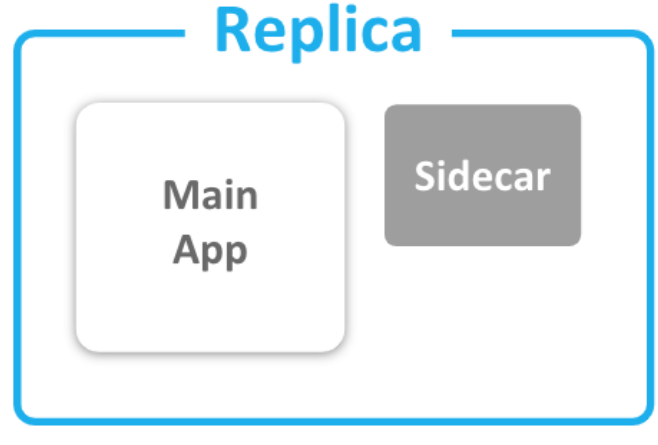
- Orchestrate our services
- Solves many cross cutting concerns

A Sidecar Container

- Additonal Container in a **pod**
- Provide **functionality** to support main app
- **Co-scheduled** together in replicas







Sidecars can help us solve infrastructure concerns externally to our app

Let's get rid of stuff

Logging Revisited

Logging

- Use log forwarder
- Scrape the logs from Docker

FluentD

- Run on every node (Daemonset)
- Declarative configuration to define log pipelines

Logging - extra benefits

- Different policies
- Info/Debug -> low retention
- Error/Fatal -> high retention
- Plugins -> anonymization

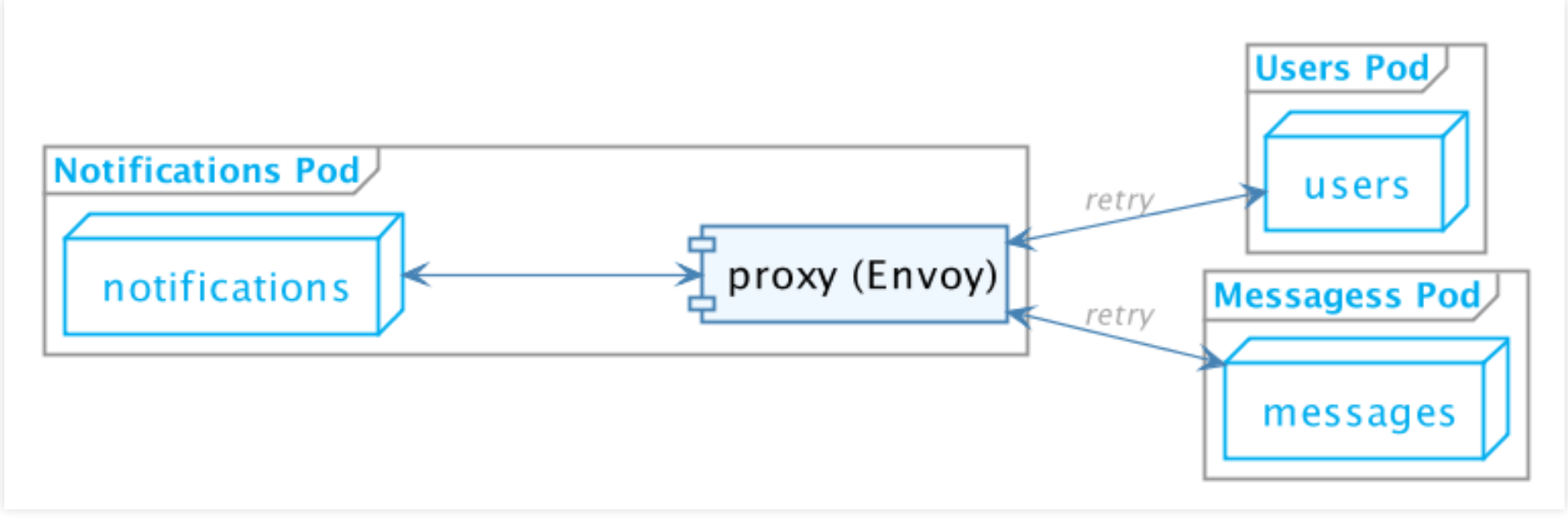
☑ ~~Logging~~
☑ Error policies
☑ Authentication
☑ Monitoring

Error policies Revisited

Error policies

- Service-mesh, THE buzzword for 2018
- Istio
- Injects proxy sidecar

Service mesh - Istio



Service mesh - Resiliency

- Configurable failure handling

Service mesh extra benefits

- Security
- Traffic management
- Tracing
- Too many to count...

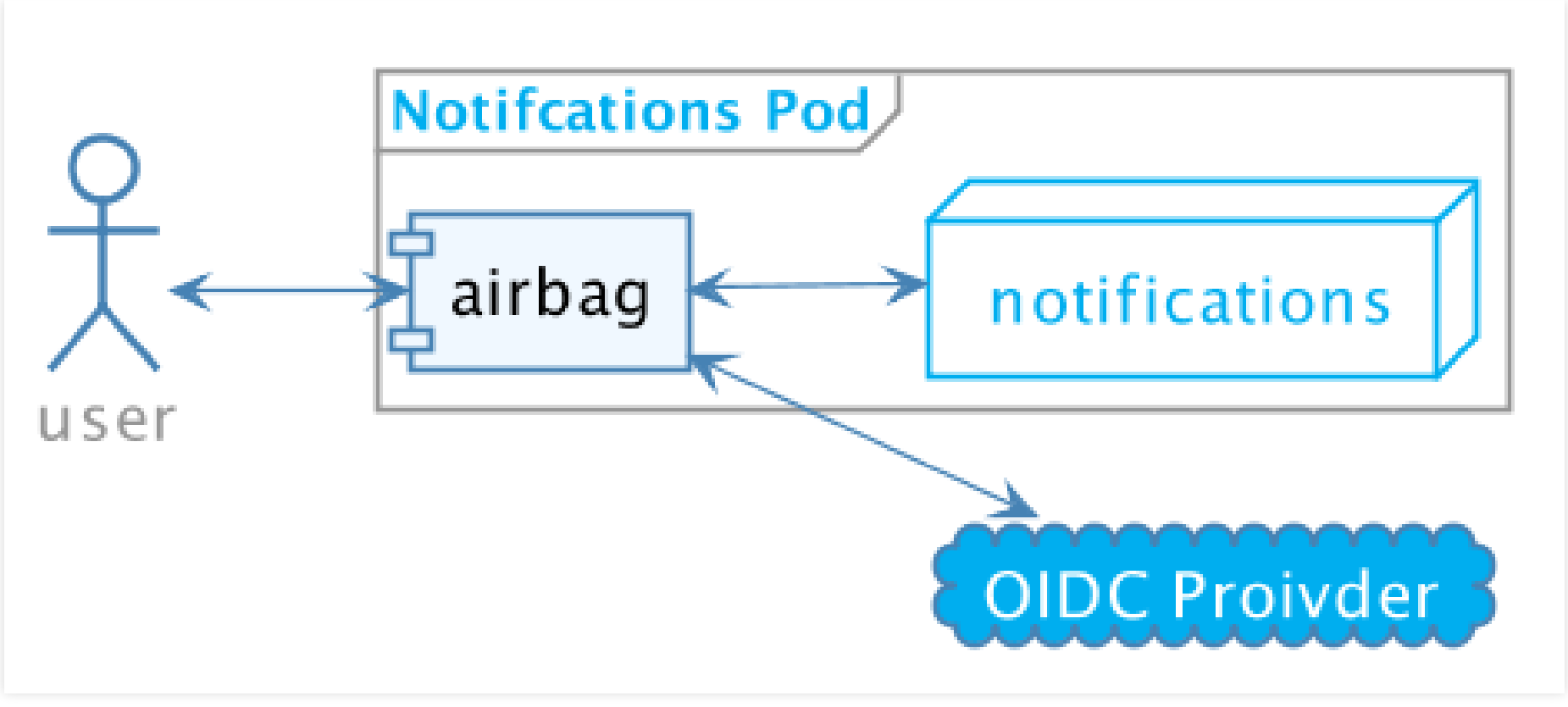
~~☑ Logging~~
~~☑ Error recovery~~
☑ Authentication
☑ Monitoring

Authentication Revisited

Authentication

- Let's use a sidecar
- Soluto/Airbag

Authentication - Airbag



Authentication - Airbag

- Configuration yaml example
- Open source
- Probably be superseded by Istio's origin authentication

~~☑ Logging~~
~~☑ Resiliency~~
~~☑ Authentication~~
☑ Monitoring

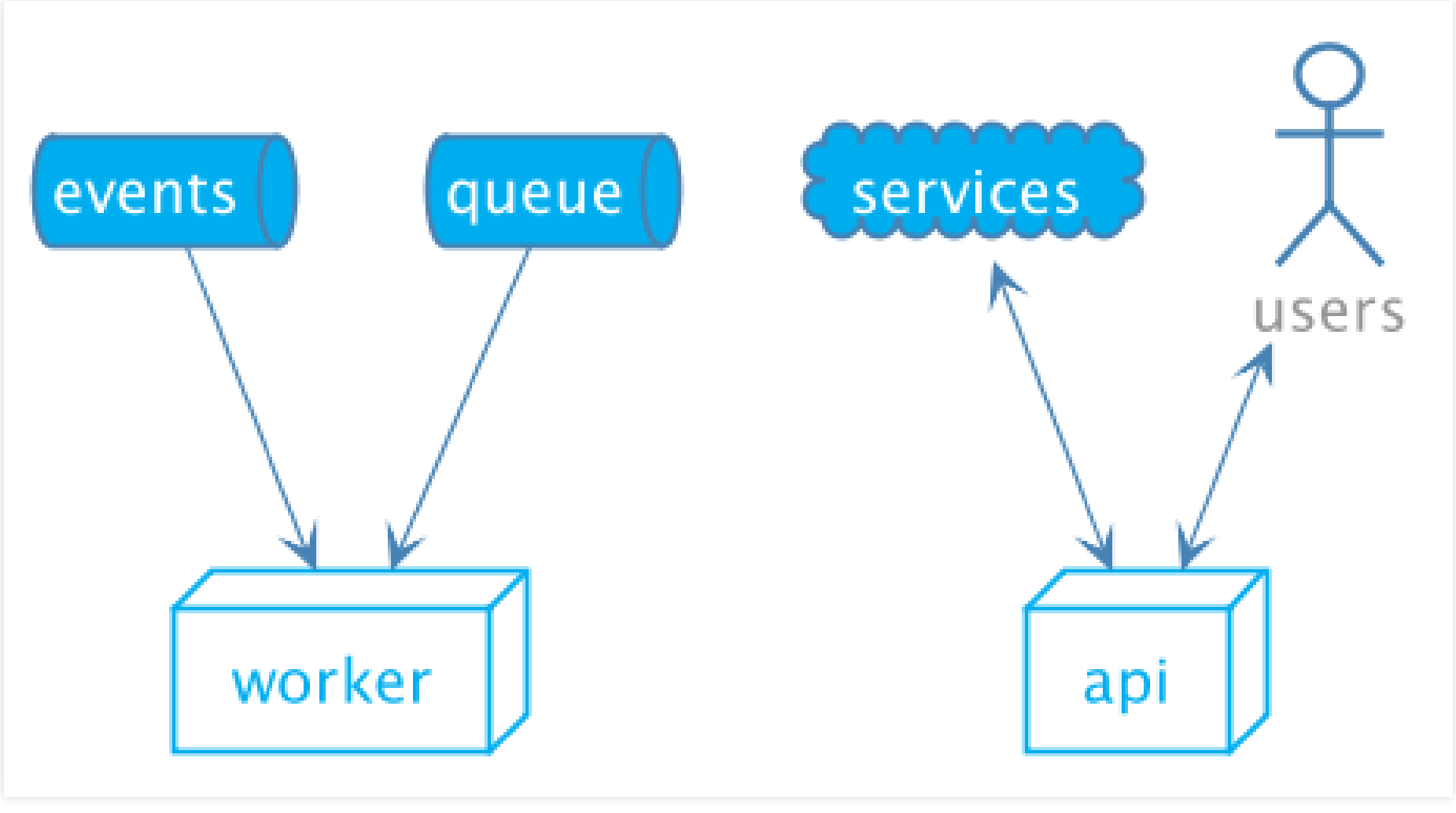
Monitoring

Monitoring

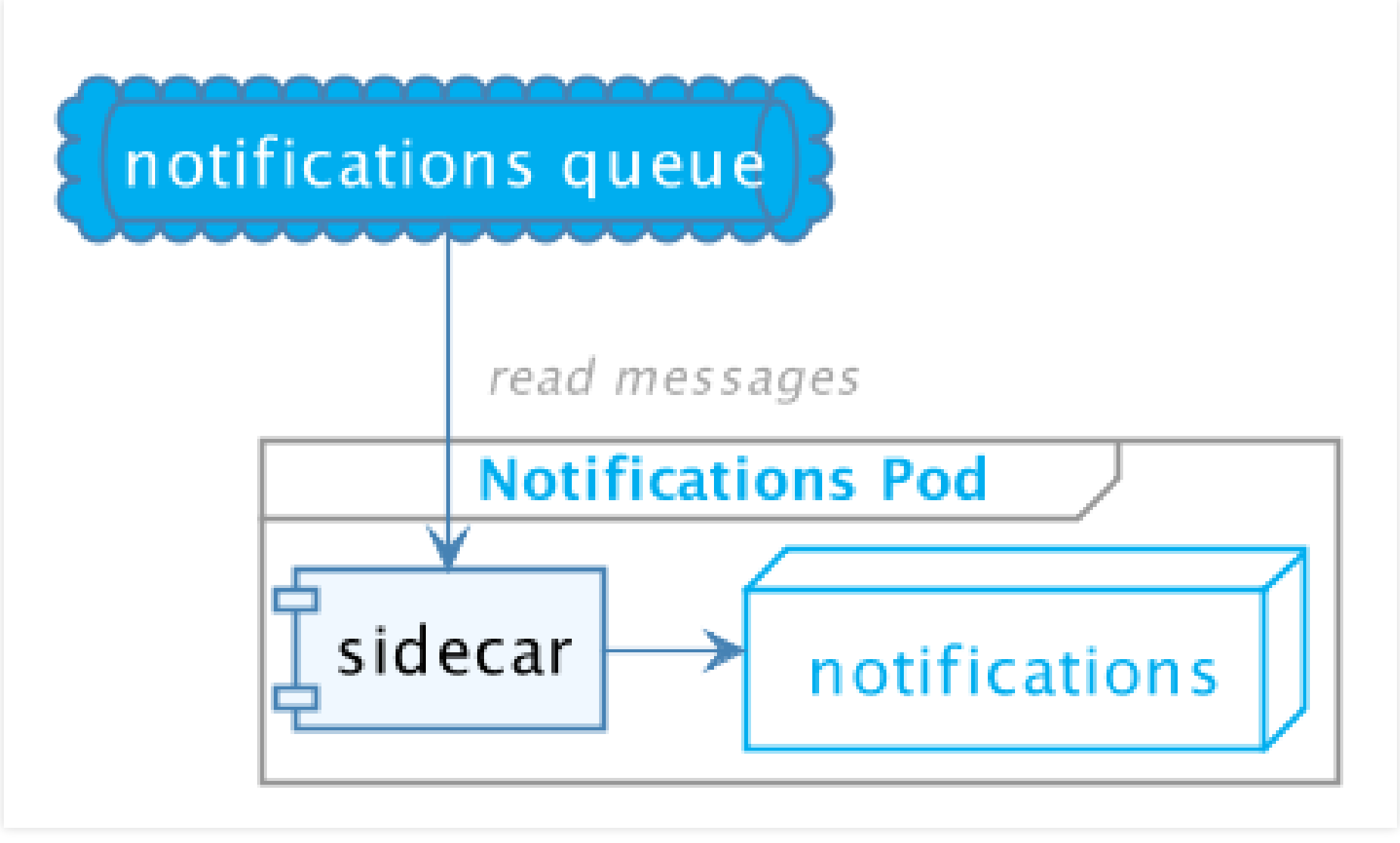
A new requirement

- Sending lots of messages
- Batch process

Previous solutions



Yet Another sidecar



Dequeue Daemon Sidecar

- Soluto/DQD
- Read items from queue, activate service
- Back-pressure support
- Expose consumption metrics

DQD - Demo

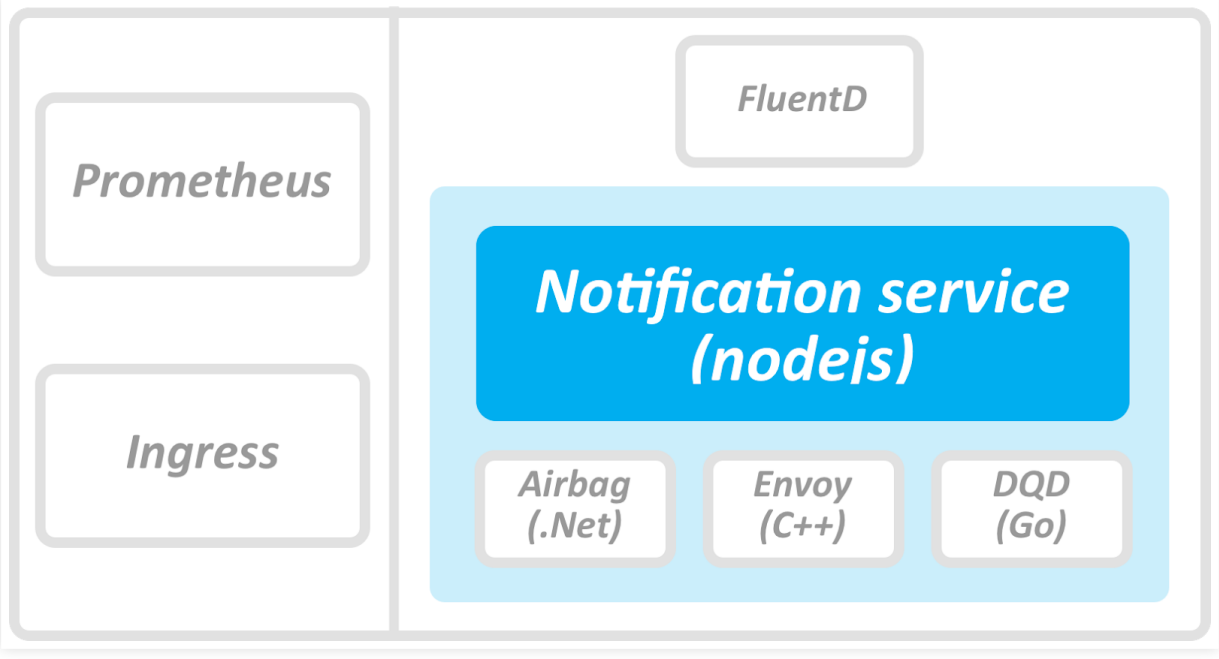
DQD - benefits

- Scaled with service
- Testing
- Agnostic

Second iteration

- Lots of code elimination
- Dependencies removal
- Leaner, more testable service
- Declarative approach
- Better visibility

Architecture



- External processes
- **Agents & Proxies**
- Co-scheduling

How far can we go?

- **Gateways** - routing, caching, validation, rate limiting, policies
- **Configuration** - secrets, cloud resource binding
- **Tools** - remote debugging/profiling Supporting services - analytics, feature flags, etc…
- **Probably more**… (https://landscape.cncf.io/)

How did it affect us?

- Cleaner, leaner services
- Testing got easier
- Faster adoptions of new languages and tools
- No more Soluto.Logging/Monitoring/Auth/... packages
- We're still learning...

As a developer, I want to **focus on building features** that deliver **business value** .

What can the infrastructure do for you?

Thank you

Questions

Additonal resources - tools

- AirBag - github.com/soluto/airbag
- DQD - github.com/soluto/dqd
- FluentD - https://www.fluentd.org/
- Prometheus - https://prometheus.io
- Istio - https://istio.io/
- Skaffold - github.com/GoogleContainerTools/skaffold
- Oidc-server-mock - github.com/Soluto/oidc-server-mock
- FluentD k8s level filter - github.com/Soluto/fluent-plugin-kubernetes-log-level

Additonal resources

- CNCF landscape - https://landscape.cncf.io/
- Design patterns for container-based distributed systems - https://static.googleusercontent.com/media/research.google.com/e
- Introduction to modern network load balancing and proxying - https://blog.envoyproxy.io/introduction-to-modern-network-load-b a57f6ff80236