University of Stuttgart
Institute of Software Engineering (ISTE)
Software Quality and Architecture Group (SQA)

MiSArch - A Modern Microservice Reference Architecture

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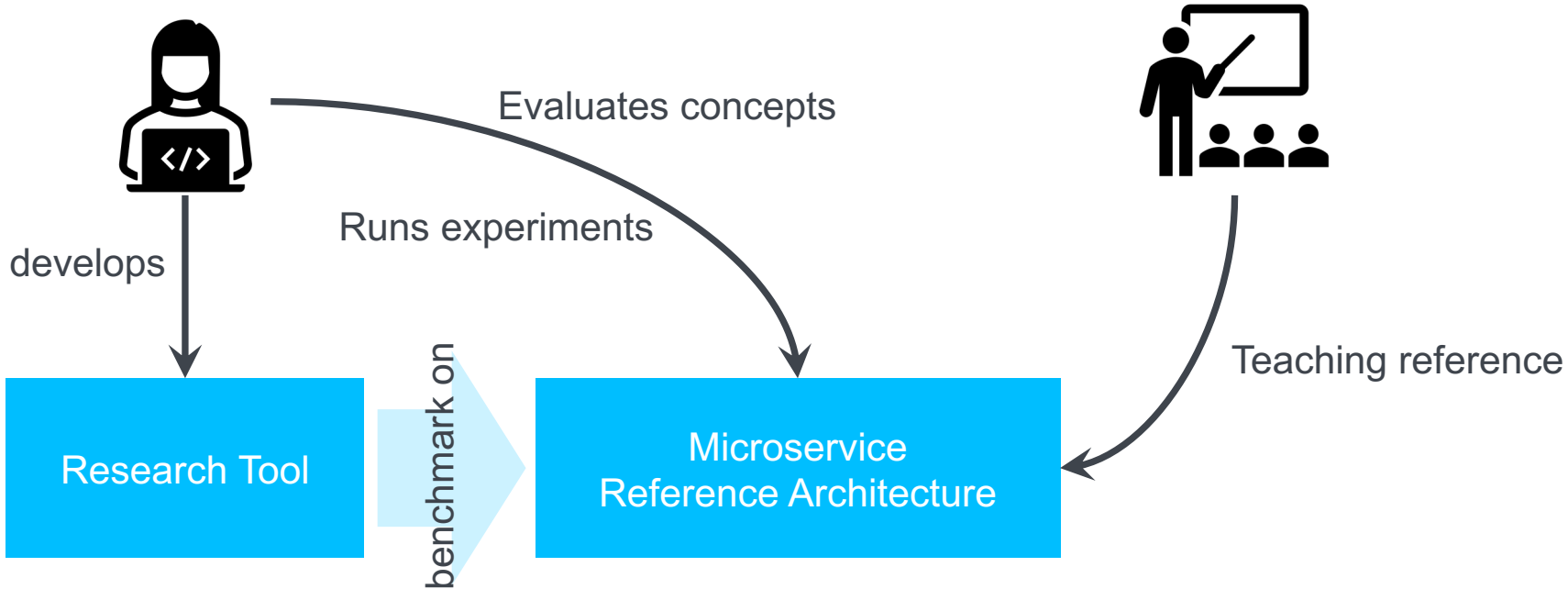
AK MSDO History

Microservice Reference Architecture

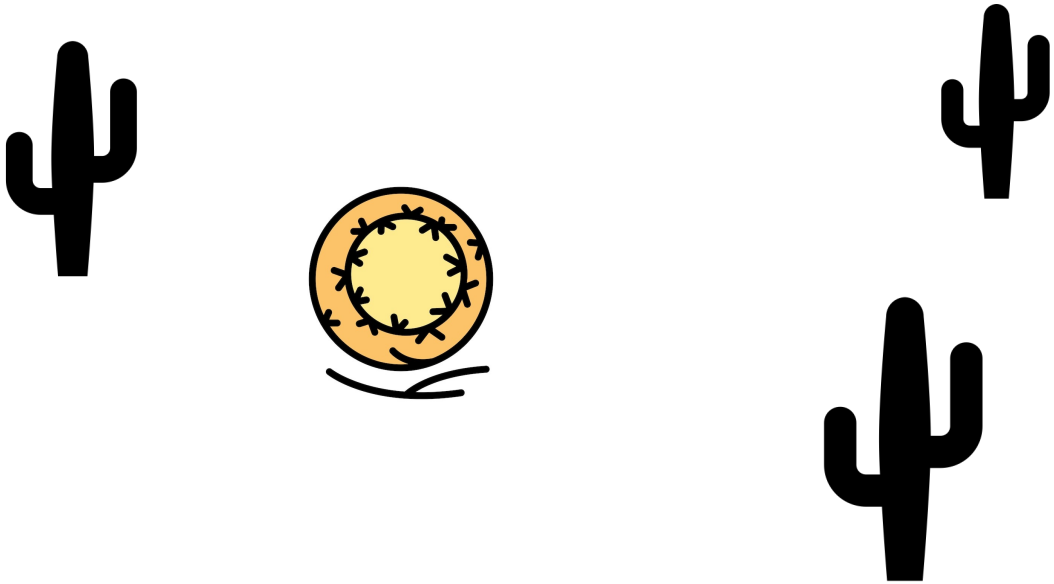
Monolith vs. Microservice Guidelines

Motivation



Existing Microservice Reference Architectures are not representative

Industrial Microservice Reference Architecture



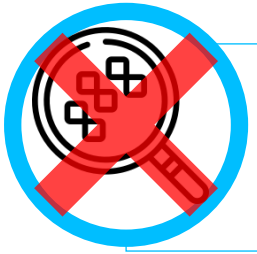
Problems with Existing Reference Architectures*

* Except for the T2-Project
(doi: 10.1109/ICSA-C54293.2022.00029)

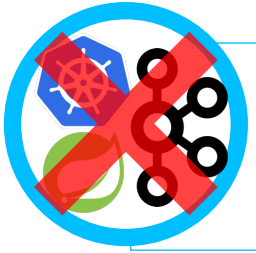
Do not use lightweight and asynchronous communication

Have no out-of-the-box self-adaptation

Provide no defined service-level objectives and load profiles

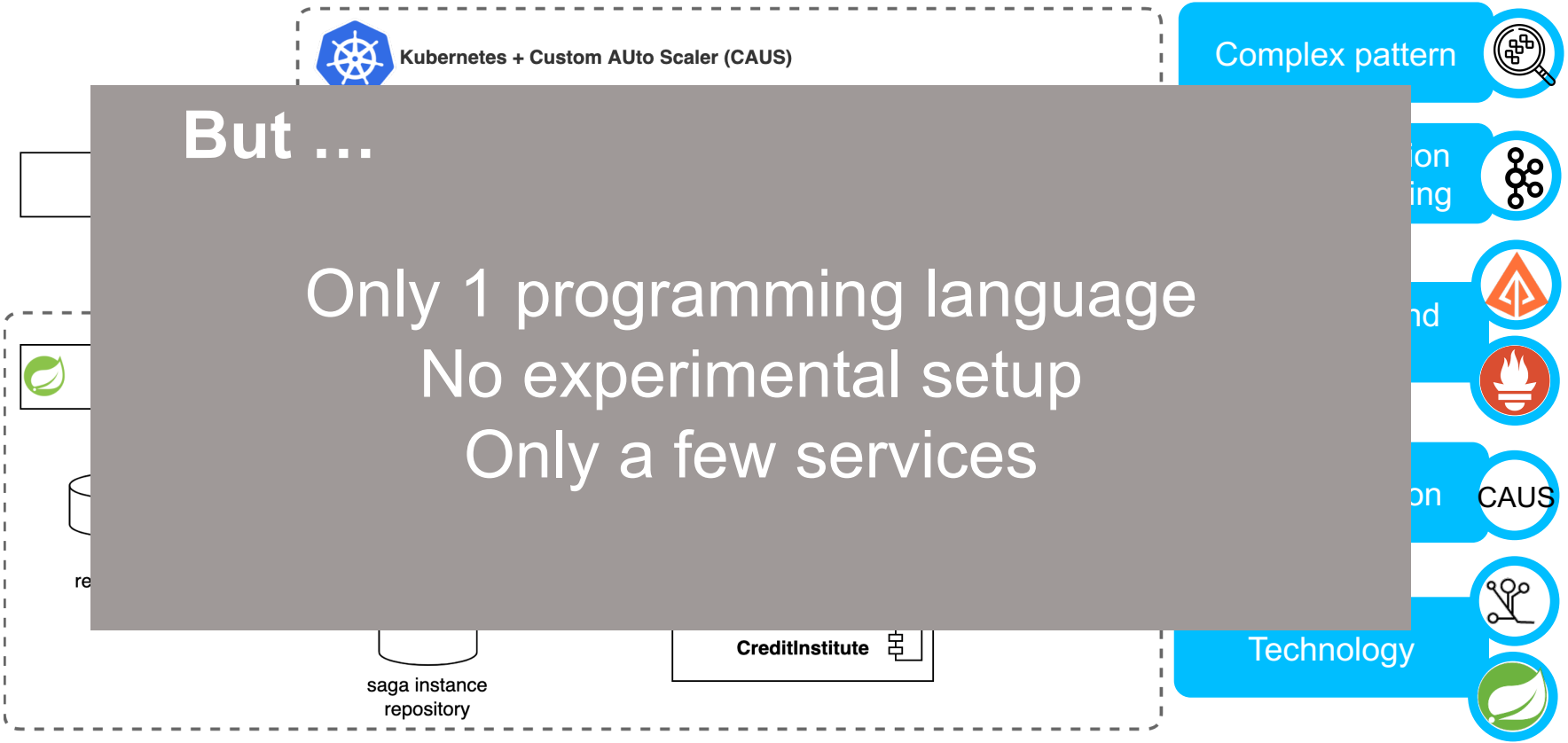


Do not consider microservice patterns



Not build on state-of-the-art technologies

Excursion: T2-Project



But …

Only 1 programming language
No experimental setup
Only a few services

Requirements

Interviews with Developers and Researchers

9 Interviewees

63 functional and non-functional “meta-level” requirements

→ T2-Project also does **NOT** fulfill many requiements

MiSArch – Meta-requirements

https://misarch.github.io/

Synchronous and lightweight asynchronous communication

Self-adaptation

Saga pattern, database per service pattern, etc.

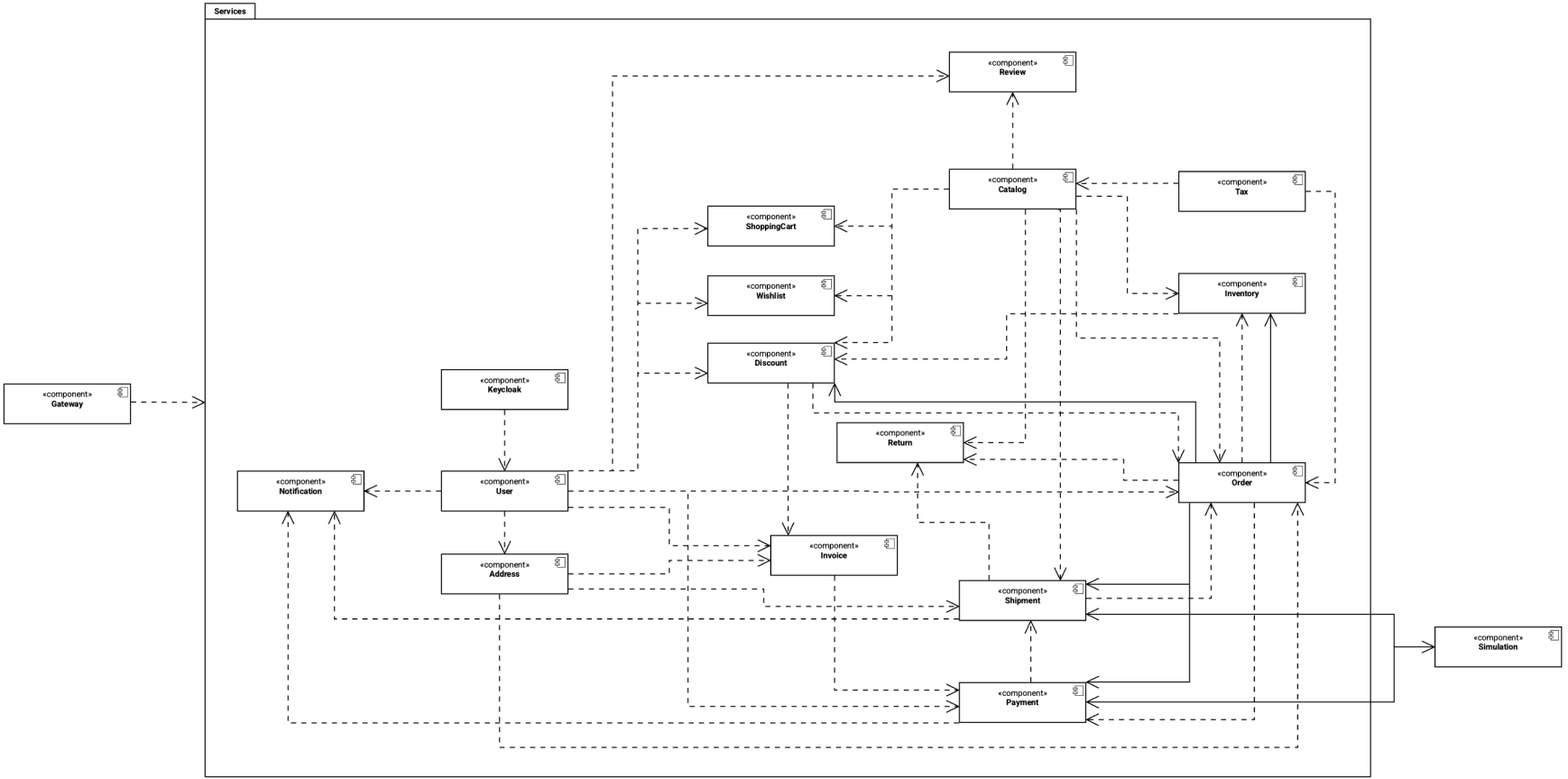
Pre-defined service-level objectives for defined ressources

SOTA technology and multiple programming languages

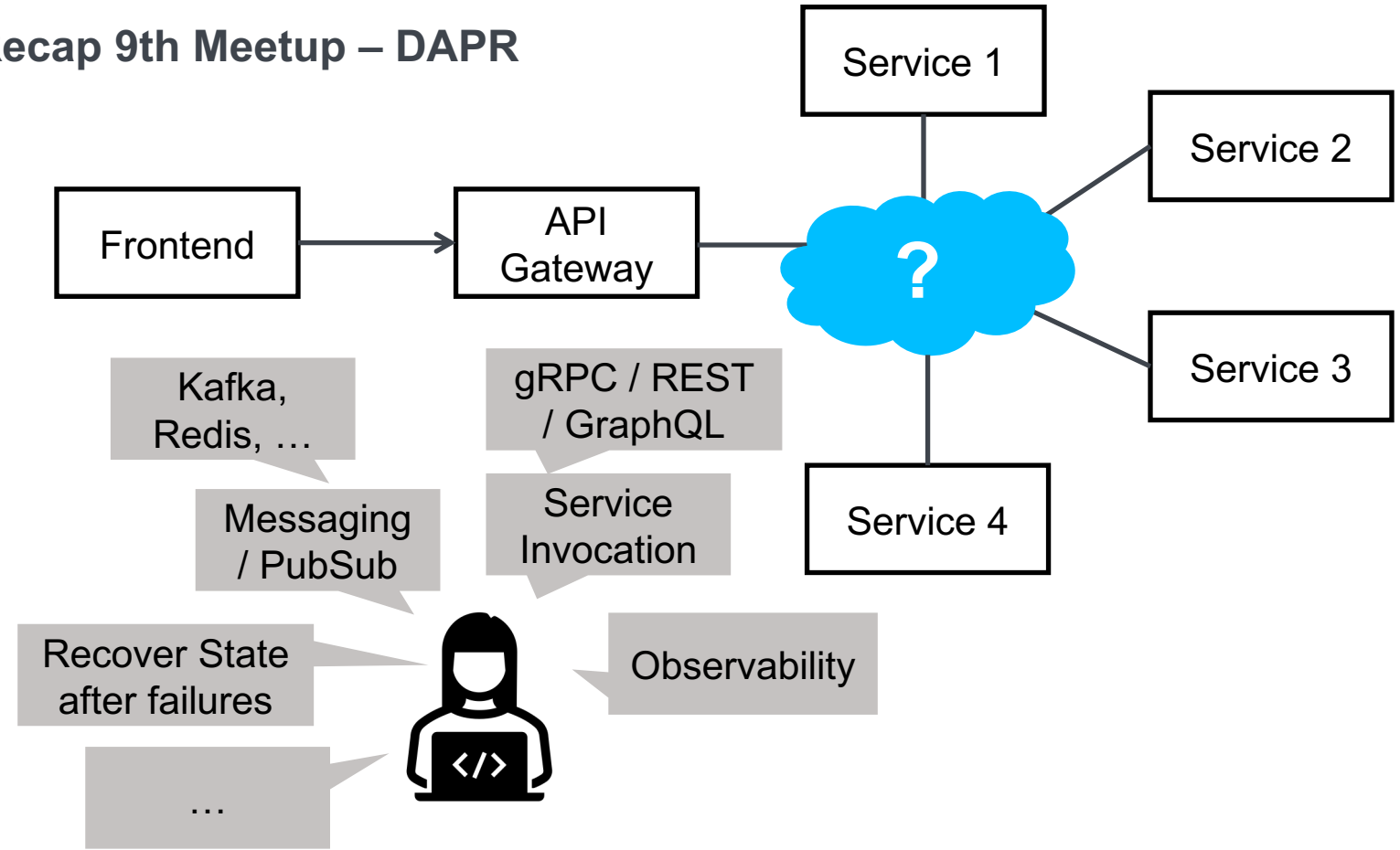
Easy experimentation

...

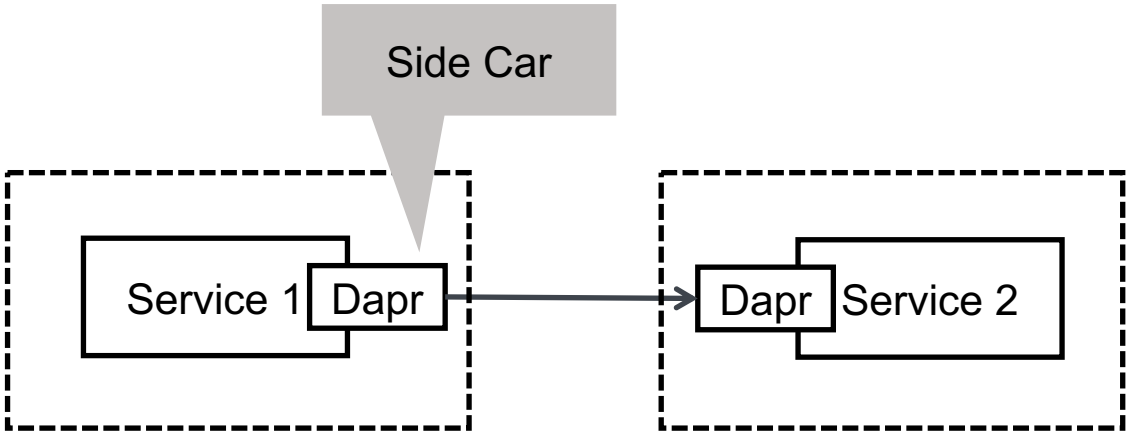
Architecture



Recap 9th Meetup – DAPR



Recap 9th Meetup – DAPR Side Car



Recap 9th Meetup – Is Dapr ready?

Yes!

… if you are Microsoft or work esp. on .Net

And otherwise?

Maybe wait 1-2 more years if you do not want a hard learning curve

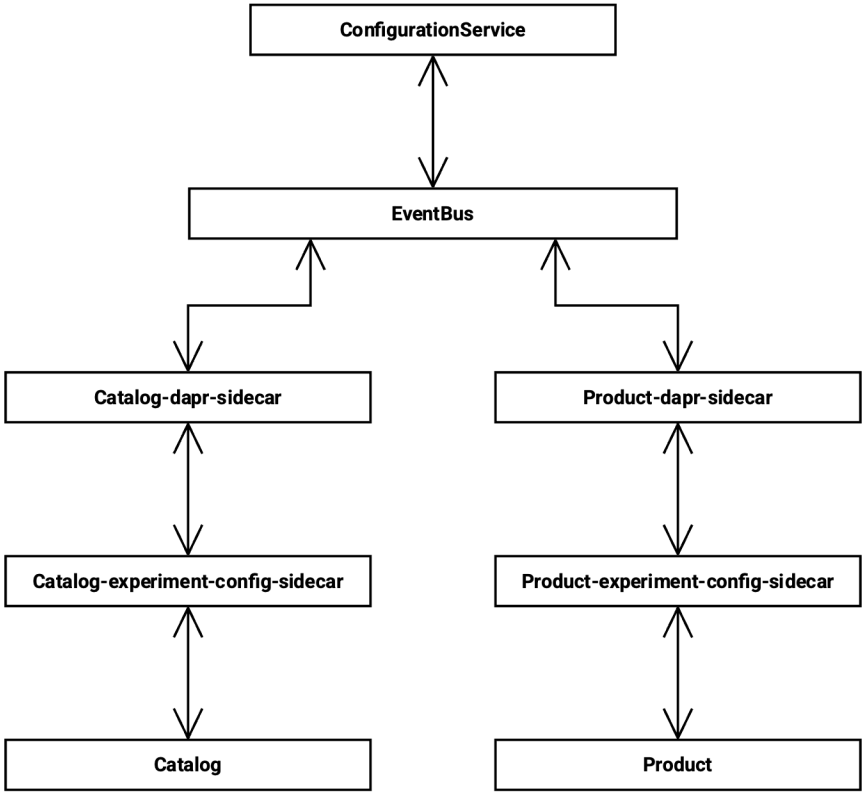
Experiment Config

Service definition, i.e., unique name, # instances, etc.

Experiment config, e.g., retries for service, artificial memory overhead, etc.

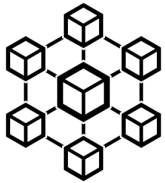
REST API to change config

Experimenting as Sidecar



Summary and Future Work

https://misarch.github.io/



Larger, loosly coupled Architecture

Experiments

SOTA technologies + Multiple languages

Experiments, Load Profiles and SLOs, fulfil further requirements

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Thank you!

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