

IMPROVING AGILITY BY MANAGING SHARED LIBRARIES IN MICROSERVICES



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MANY COMPANIES ARE USING MICROSERVICES

- **Architectural style** that is being widely adopted
 - It organizes the application into **services** around business capabilities
 - Good for **continuous delivery**
 - loosely coupled
 - highly testable and maintainable
 - independently deployable and scalable
 - One team, one service (or a few of them)

MICROSERVICES AND AGILE ARCHITECTURE

- **Agile architecture** is another topic of interest
 - Microservices are being considered a way of having it
 - Many microservices success histories
 - E.g. “Mastering Chaos” by Josh Evans (Netflix, 2016)
 - Many other companies in several other events
 - Discussing how Microservices allowed them to be agile

HOWEVER...

- Microservices may become more complex than monoliths
 - Multiple services
 - Multiple Containers
 - Complex Load balancing
 - Network/Latency issues
 - Etc.
- We may have costly **Architectural Technical Debt**

MICROSERVICES AND AGILE ARCHITECTURE

- There are **many things** hindering agility while using microservices
- **Shared libraries**
 - A small problem pointed out by many practitioners
 - Taibi and Lenarduzzi (2018) classify them as one of many possible bad smells in microservices

SHARED LIBRARIES



What they are

- Piece of software
- Developed in-house
- Containing a collection of resources used by several components



What they are not

- External dependencies
 - Frameworks
 - Drivers
 - Other libraries

SHARED LIBRARIES



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What they are not



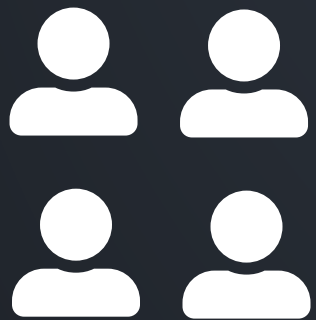
RESEARCH QUESTIONS

- **RQ1:** Which practical issues when using shared libraries in microservices hinder agility in organizations?
- **RQ2:** Which solutions do developers apply into to solve such issues?

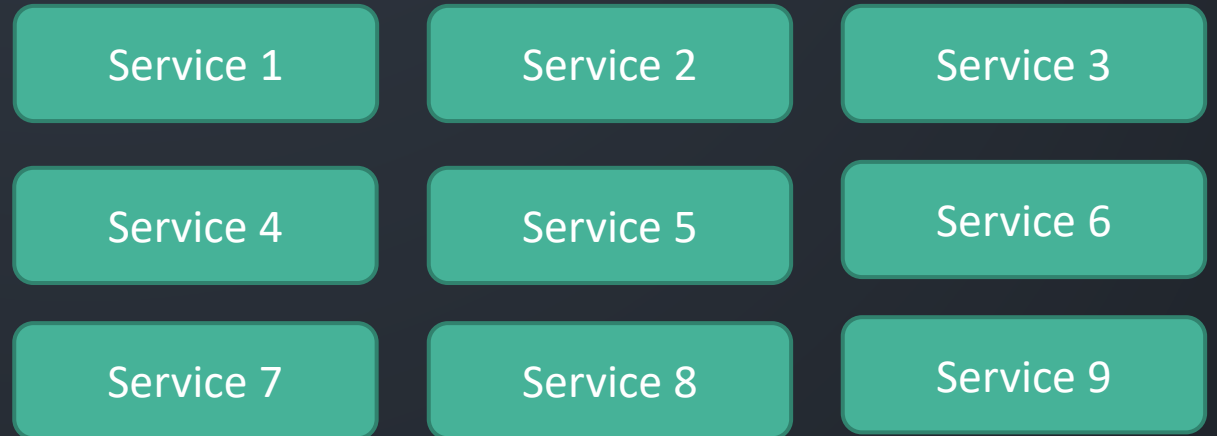
METHODOLOGY

- Multiple case study
 - Four large international companies (more than 1000 employees)
 - Six interviews

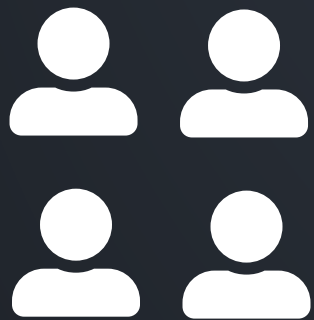
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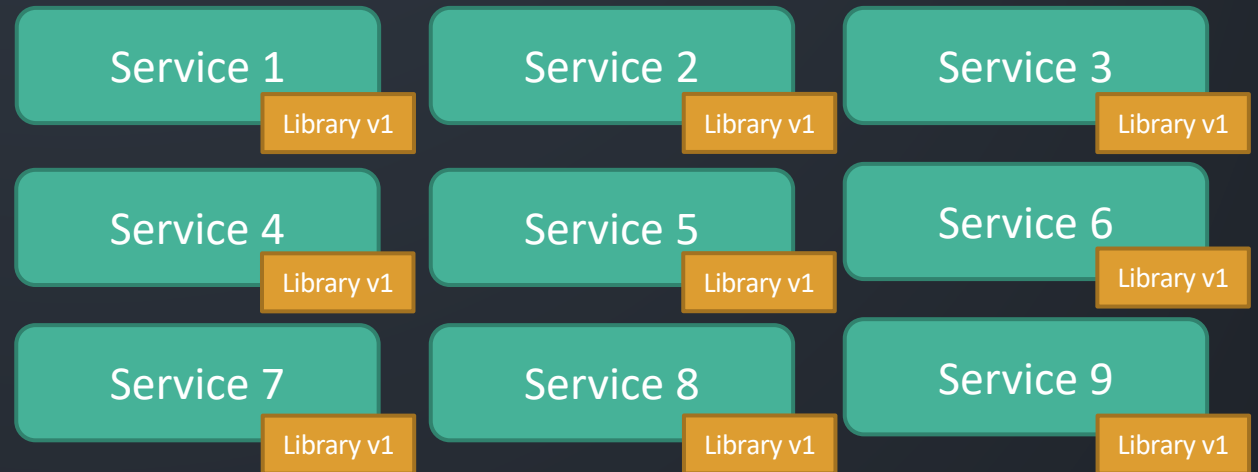
Library v1



DESCRIBING THE CONTEXT



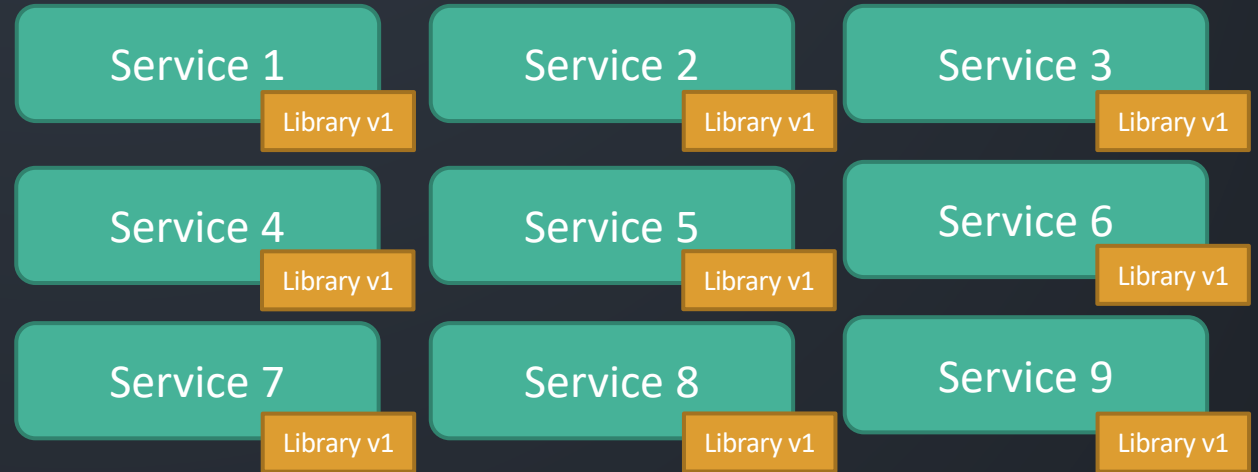
Library v1



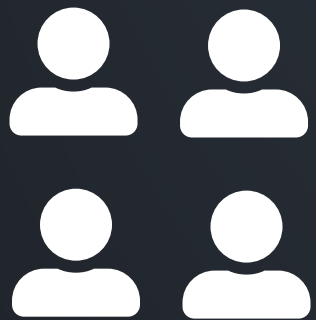
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Library v1



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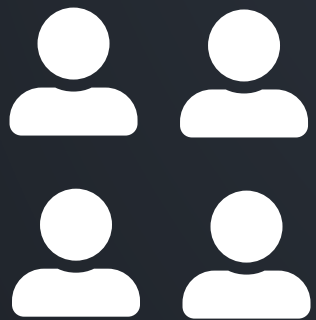


Library v1
(deprecated)

Library v2

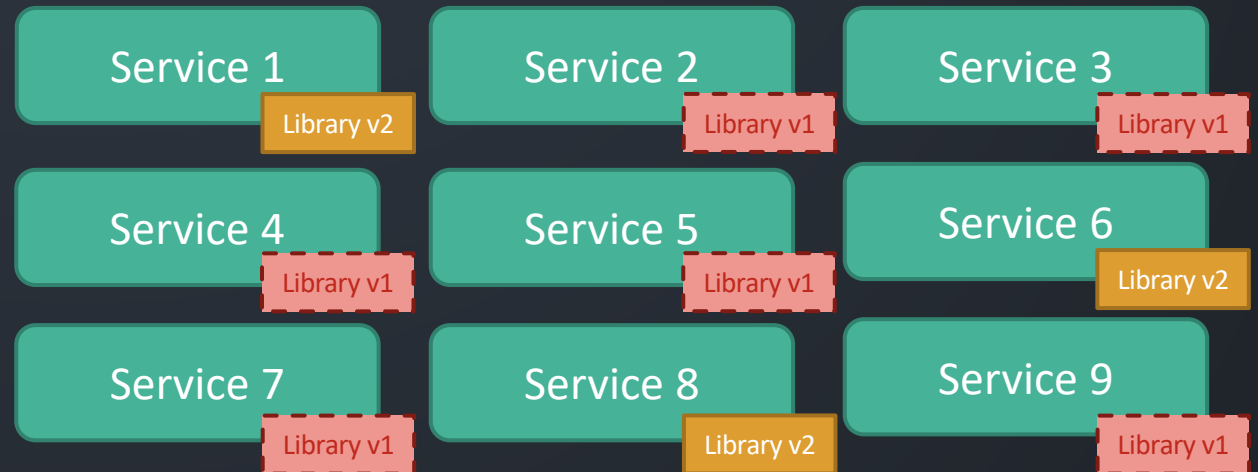


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Library v1
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Library v2

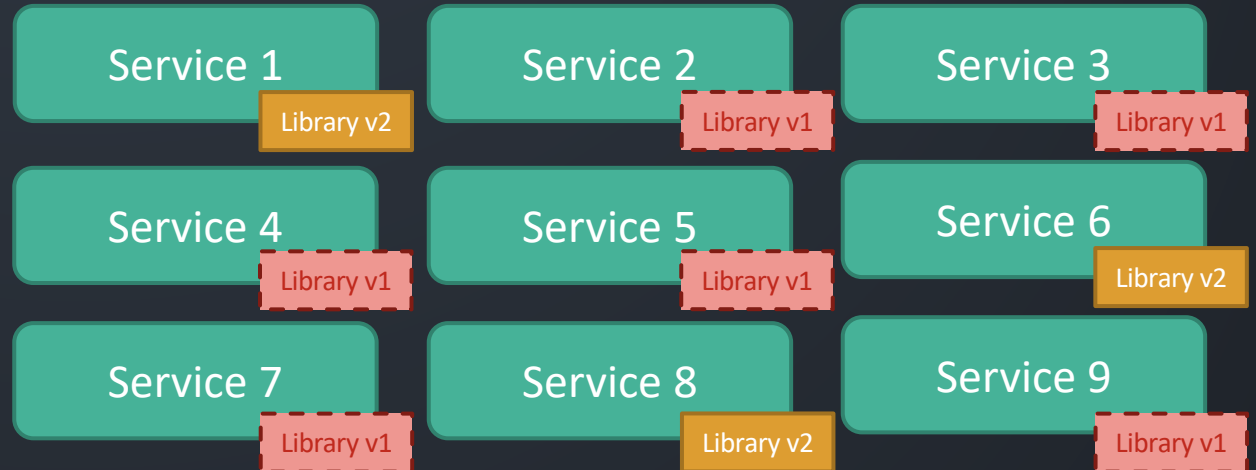


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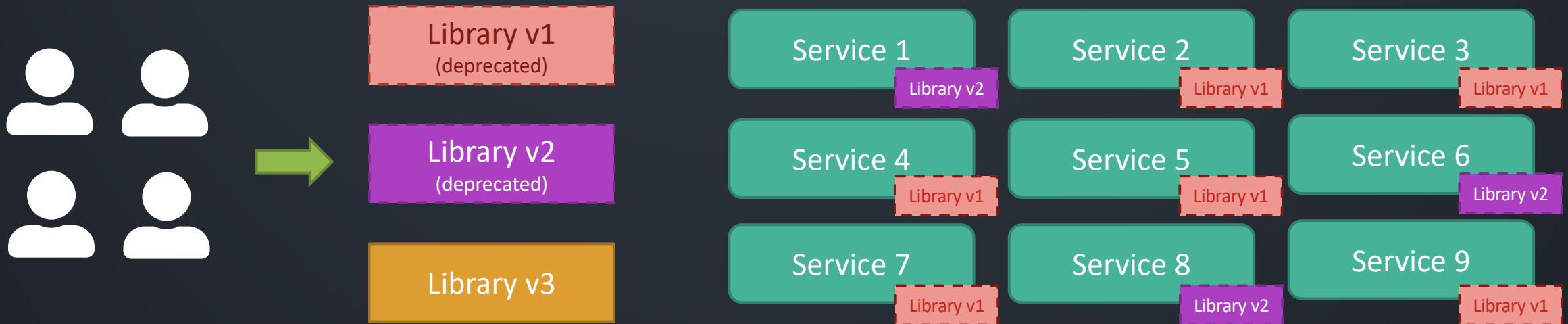


Library v1
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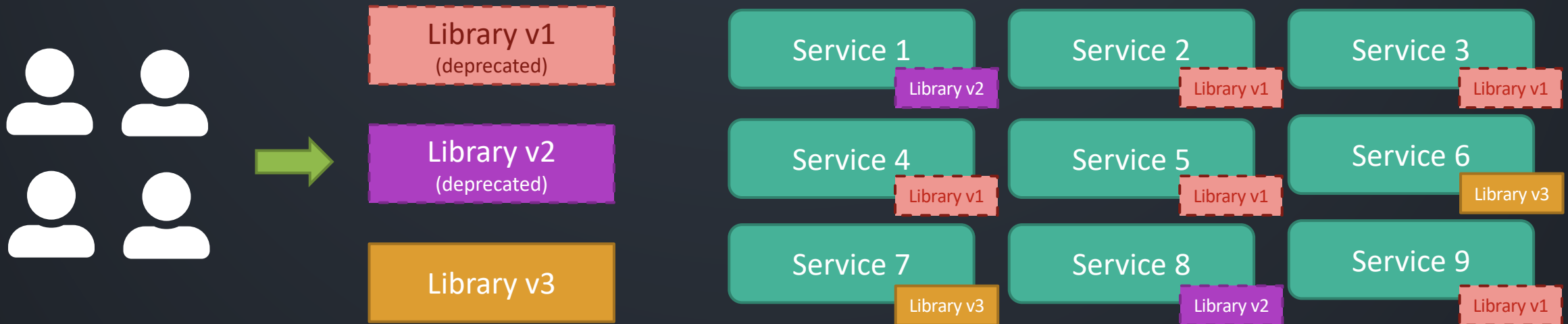
Library v2



DESCRIBING THE CONTEXT



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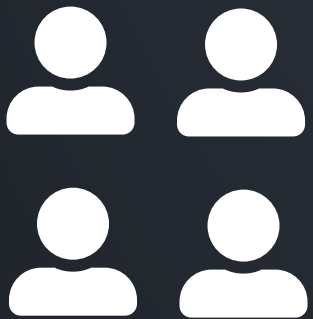


RESULTS

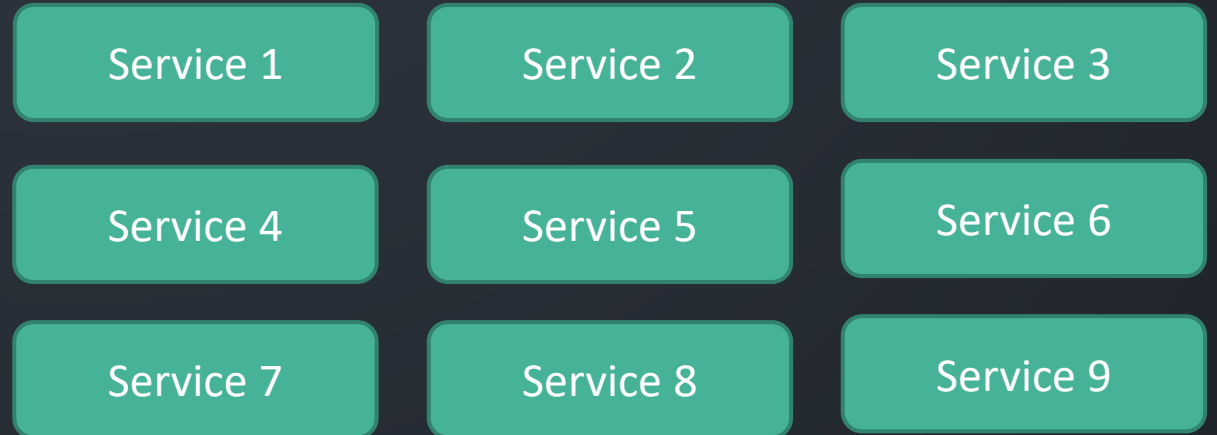
ID	Issue	Company			
		A	B	C	D
1	Impossibility to update library in service due to priorities	X		X	
2	Need to maintain too many versions of the library	X		X	
3	Impossibility to update library in service due to breaking changes			X	
4	Delays while waiting for fixes		X	X	X
5	Early adopters refusing to migrate	X			
6	Failures due to unknown use cases		X	X	
7	Failures after library upgrades		X	X	
8	Overhead to library maintainers		X	X	X
9	Dependent agile teams	X	X	X	X

A SOLUTION TO THE PROBLEM

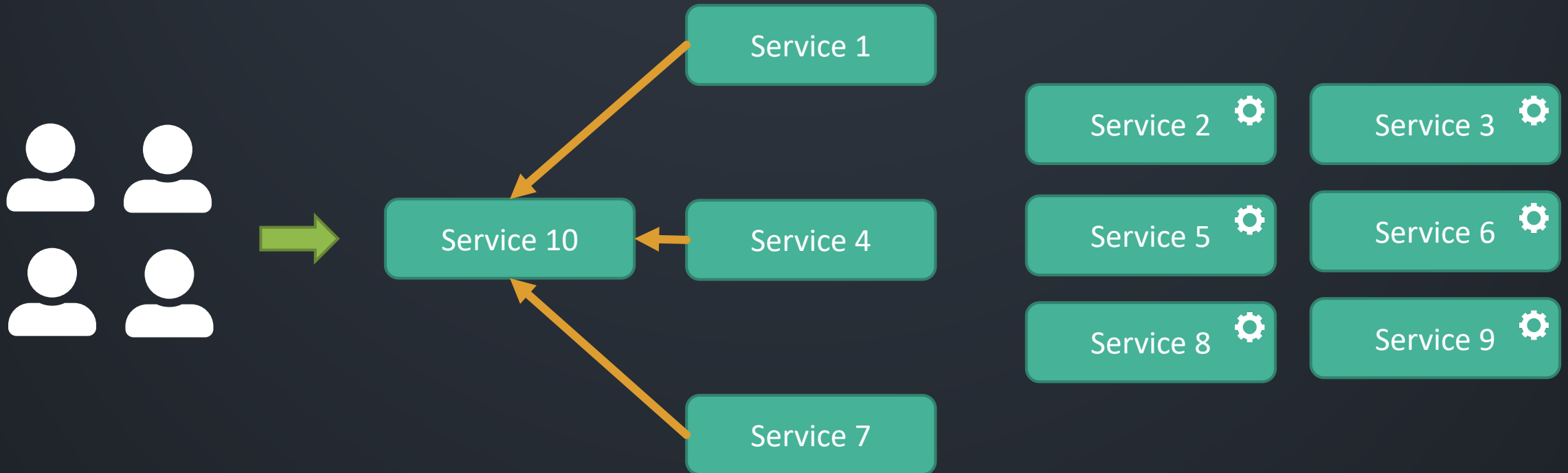
A SOLUTION TO THE PROBLEM



Service 10



A SOLUTION TO THE PROBLEM



WE ARE NOT ALONE...

- Taibi and Lenarduzzi (2018) also reported those solutions
- Hasselbring et al. (2017) suggests to not share code
- Balalaie et al. (2016) converts a library into a service in his report

DISCUSSION AND CONCLUSIONS

- Companies should **consider** the proposed solutions **very carefully**
 - Are shared libraries **becoming** a problem in my company?
 - Can I visualize the problem growing?
 - Are we **considering the drawbacks**?
 - Network issues, latency etc.
 - Are there **other alternatives**?
 - Better quality assurance, for example

FUTURE WORK

- Further investigate the problem
- Investigate why external dependencies are usually not reported as a problem
 - Some are libraries developed by external partners
 - What are the most important factors? Code stability? Quality assurance? Other?

QUESTIONS?

- Let's discuss them!
- We can also have a chat later
 - Do you see this problem in your company?
 - What are **your** microservice project **needs**?
 - We are looking for **practical case studies**
 - We will run a **survey** later to validate our findings and work on our next steps
- Contact me at:
 - **saulos@ifi.uio.no**
 - Or fill in this form: **<https://bit.ly/sl-contact-info>**