COMPSCI 497S

Scalable Web Systems

03 Micro-Services Fundamentals

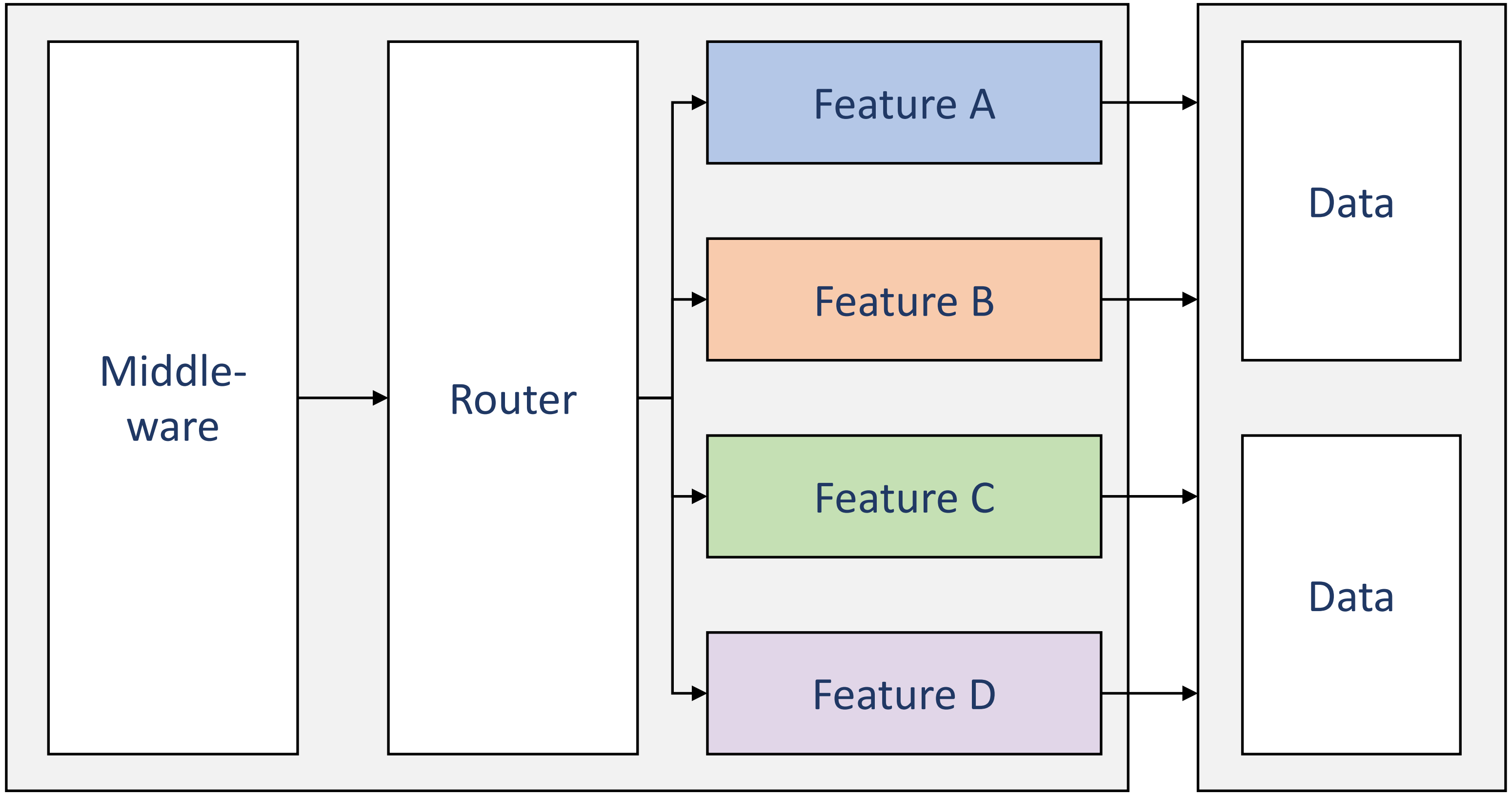
Today

- Micro-Service Architecture
- Data Management Between Services
- Database Per Service

What is a micro-service?

Monolithic Architecture

Again, here is what a monolithic architecture.

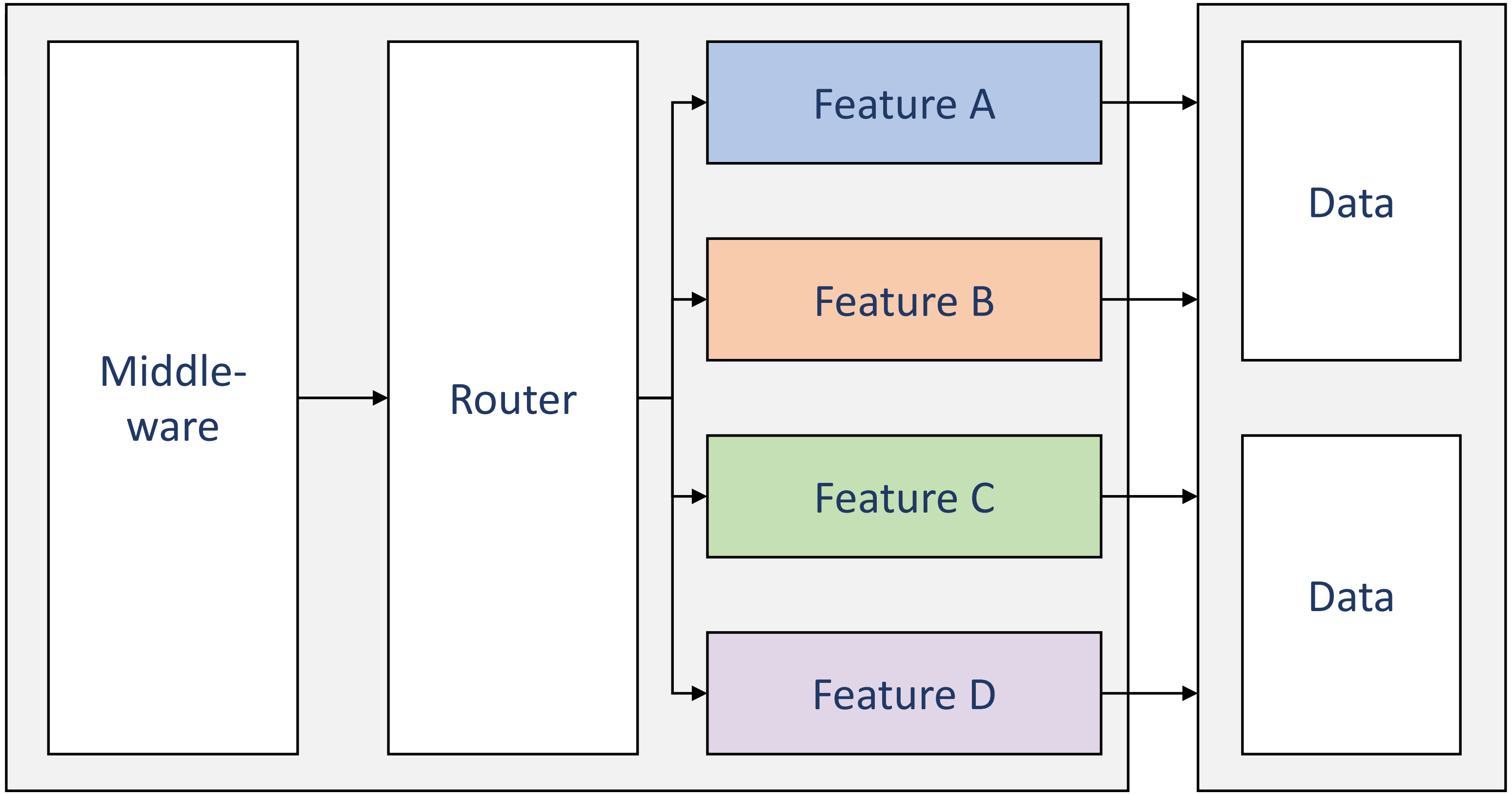


Monolithic Architecture

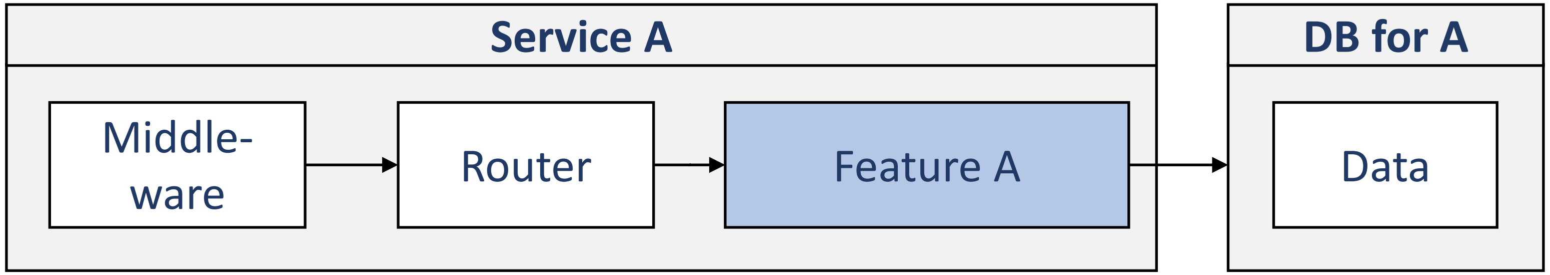
A **monolith** contains:

- Routing
- Middlewares
- Business Logic
- Database Access

For **all** features.



Micro-Service Architecture



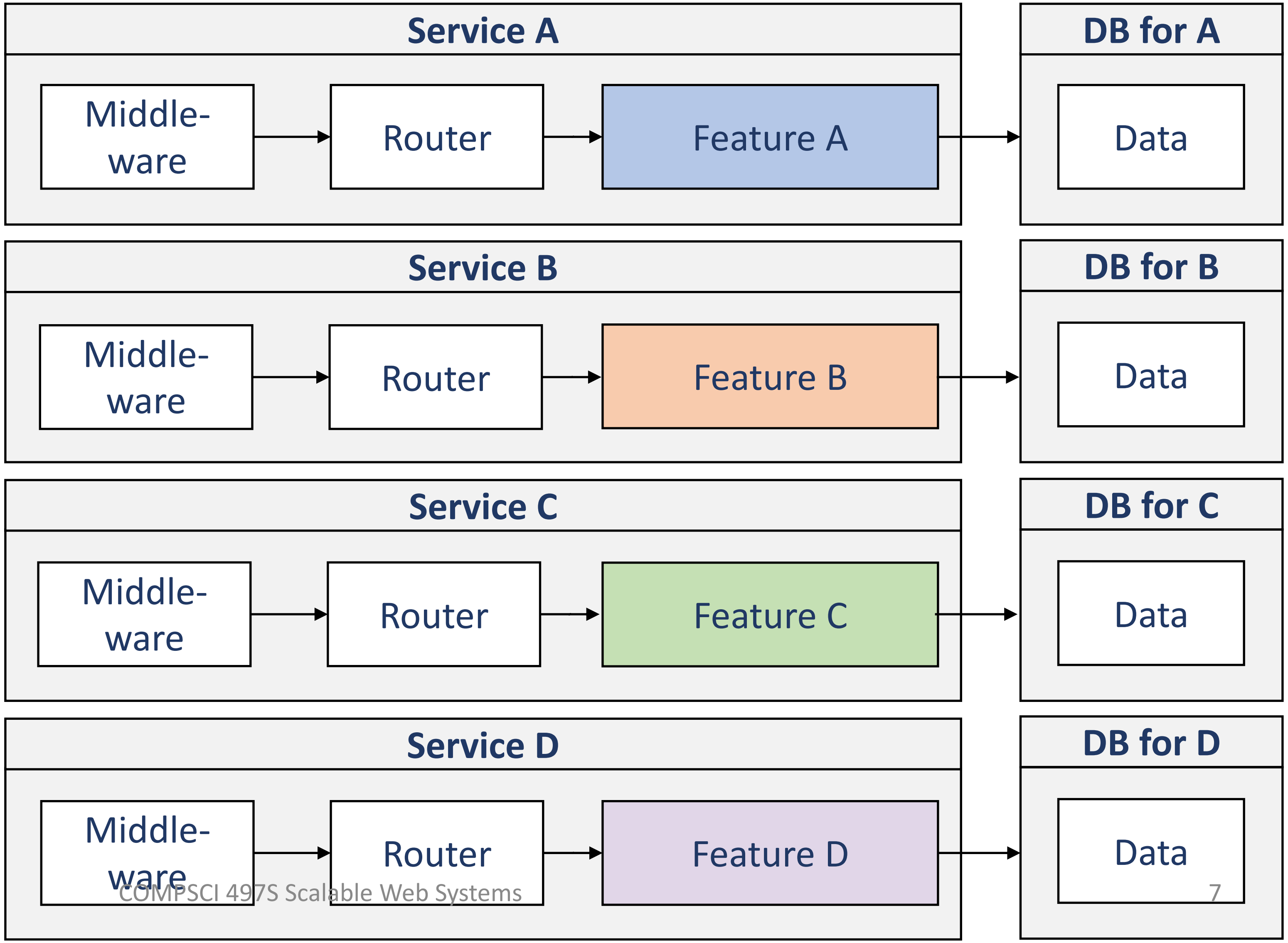
A **micro-service** contains:

- Routing
- Middlewares
- Business Logic
- Database Access

For a **single** feature!

Micro-Service Architecture

A **micro-service architecture** is composed of many micro-services.



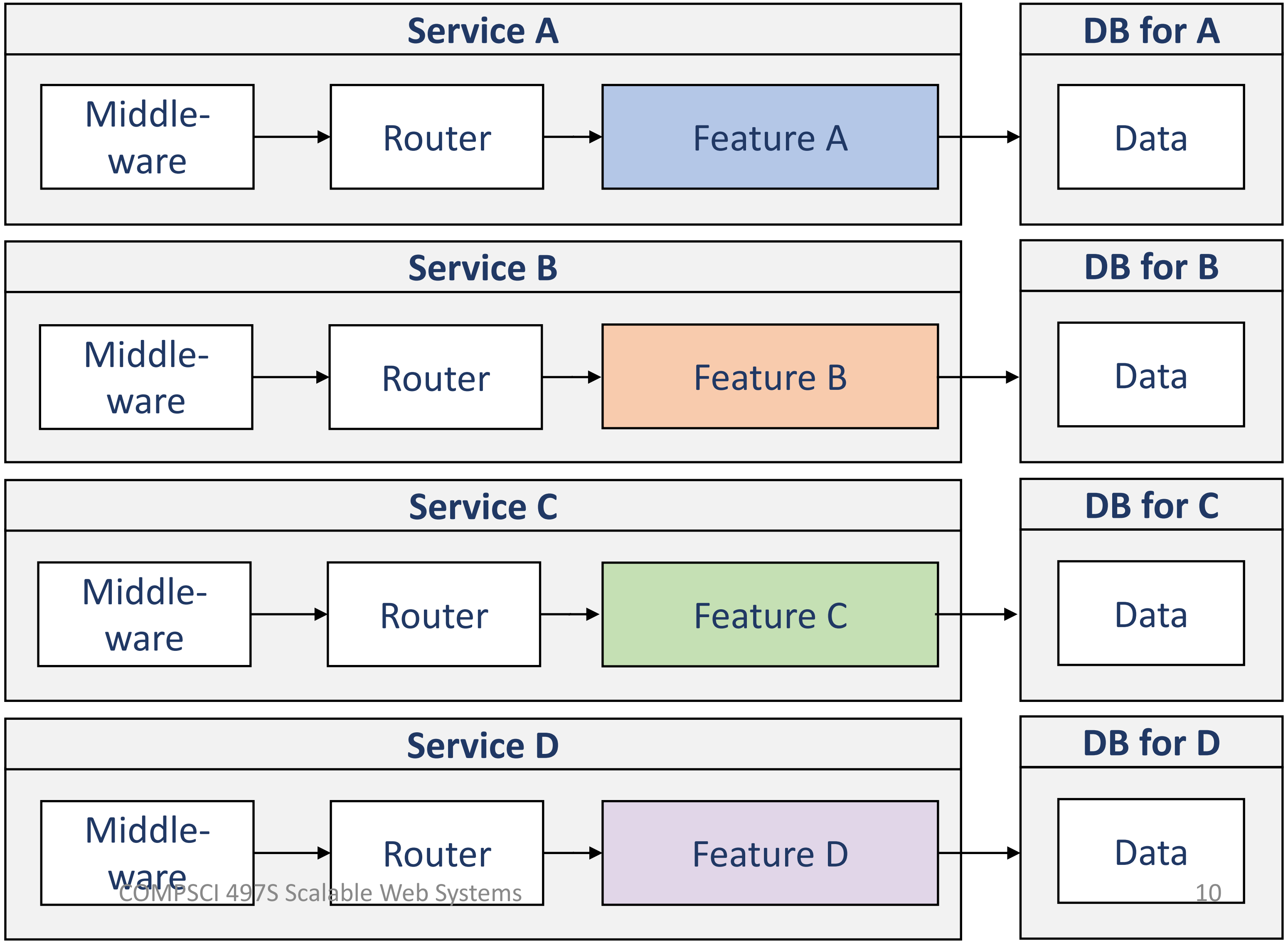
What is the biggest challenge with micro-services?

Data management between services.

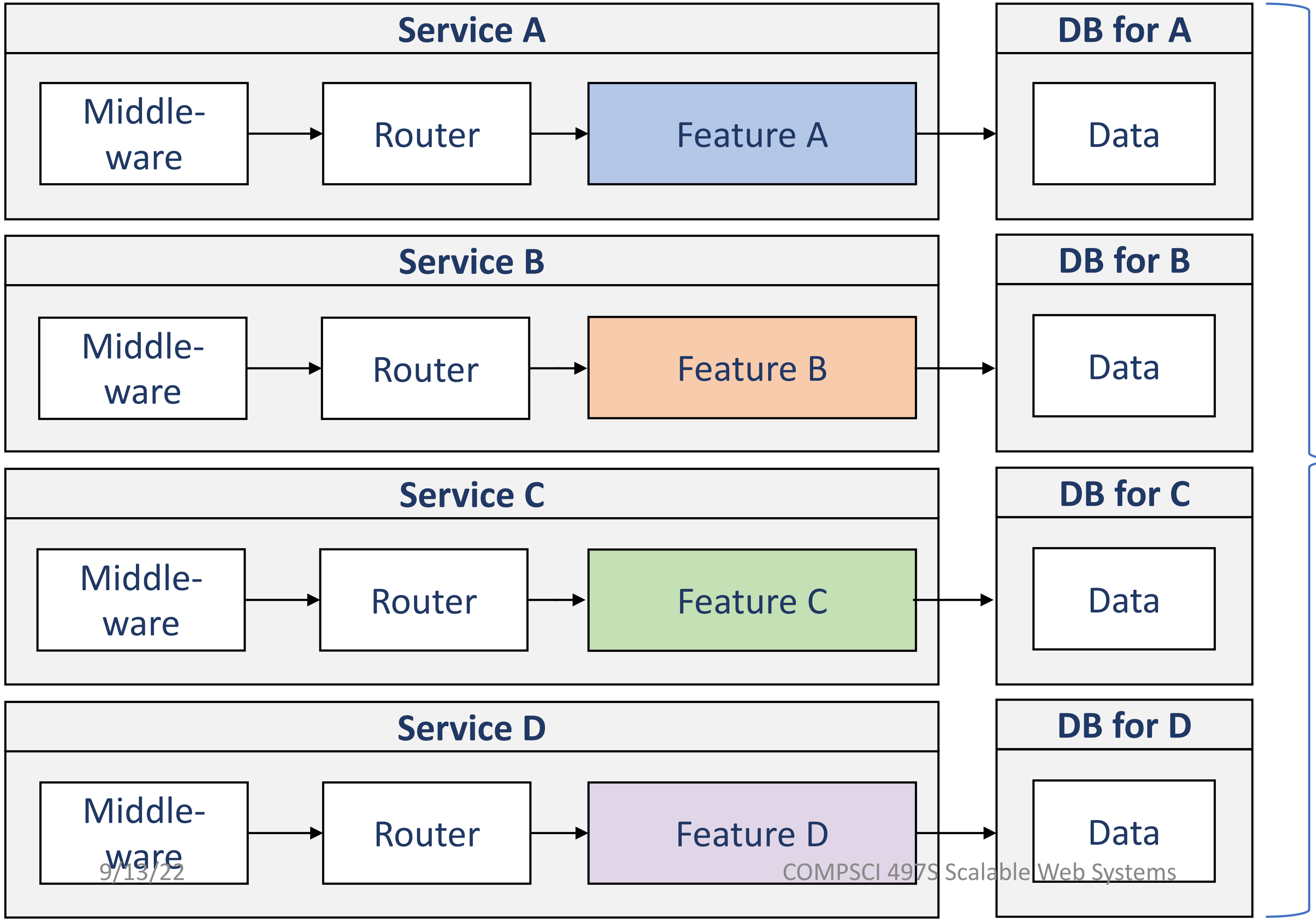
Micro-Service Architecture

A **micro-service architecture** works with data that is fundamentally different than a monolith.

- **How it is stored**
- **How it is accessed**

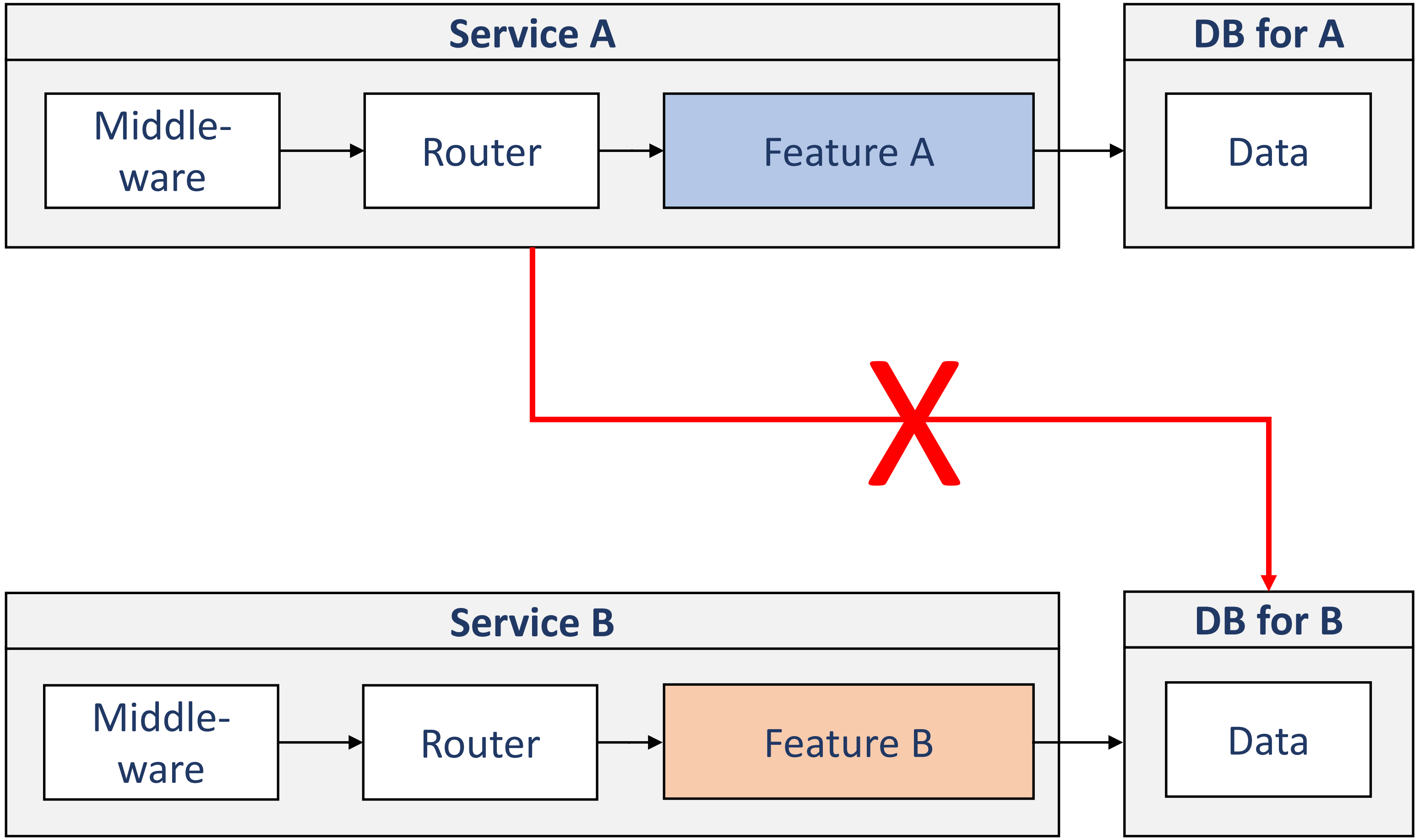


Micro-Service Architecture



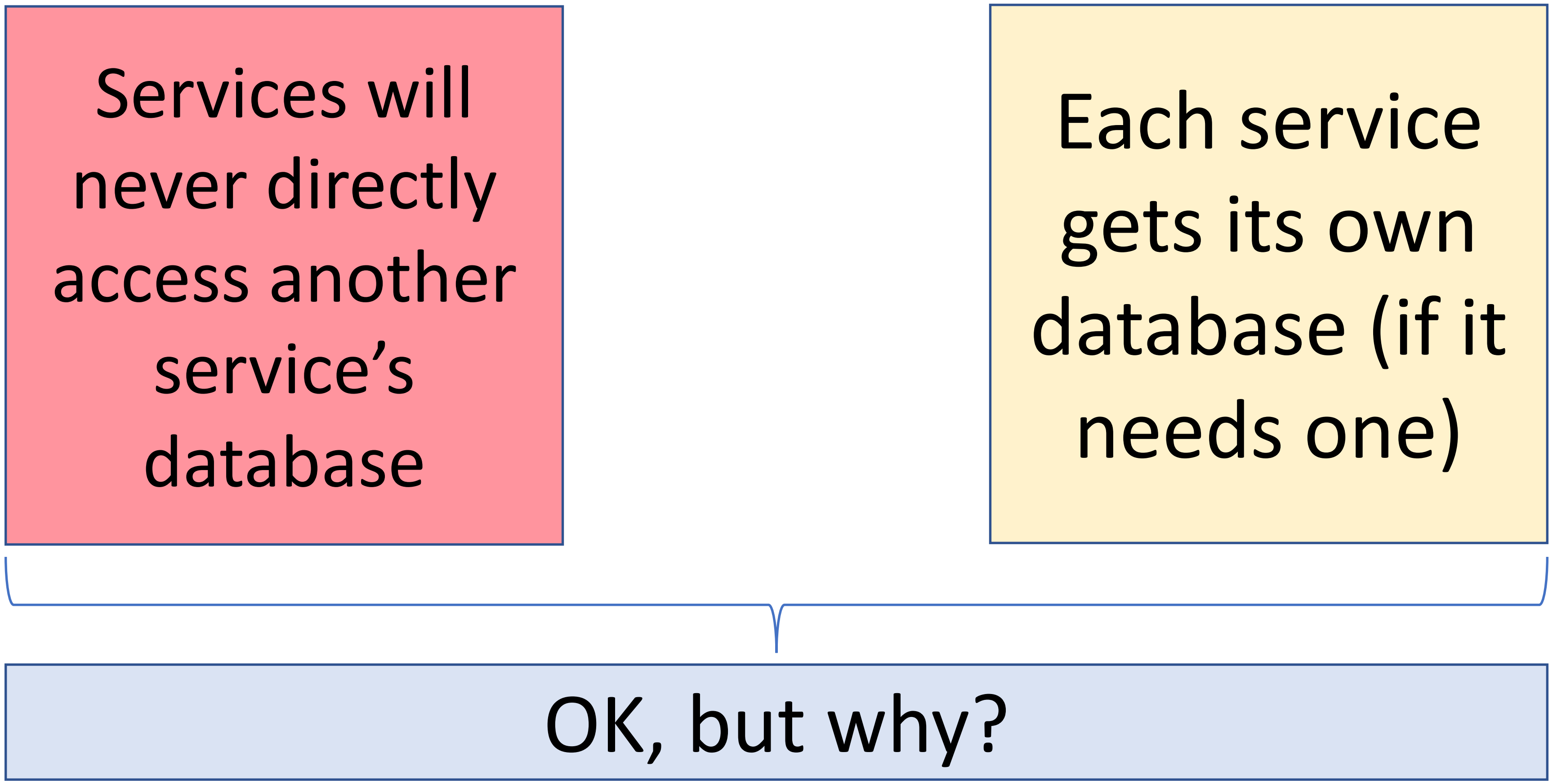
Each service gets its own database (if it needs one)

Micro-Service Architecture



Services will never directly access another service’s database

Micro-Service Architecture



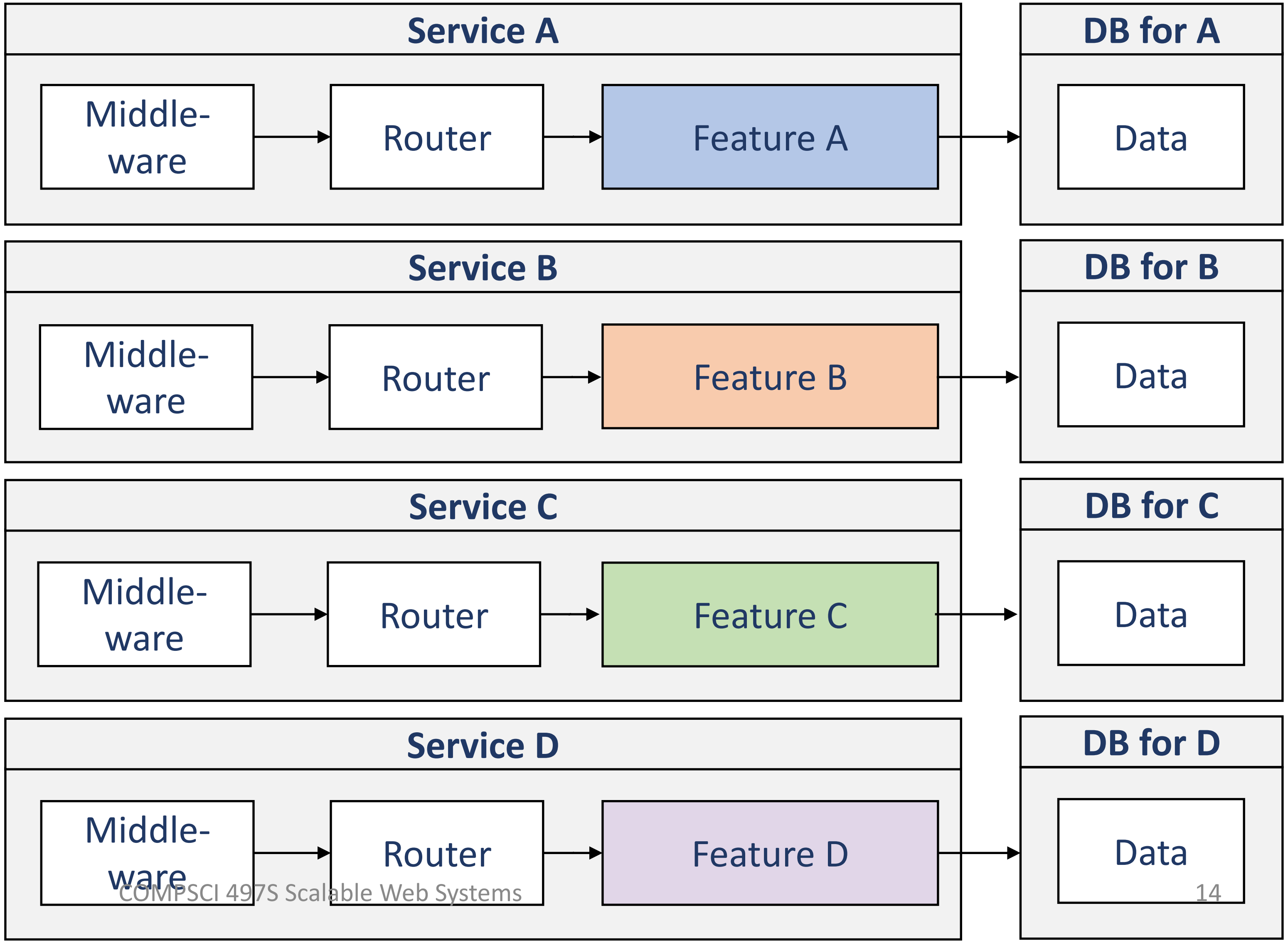
Services will never directly access another service's database

Each service gets its own database (if it needs one)

OK, but why?

Micro-Service Architecture

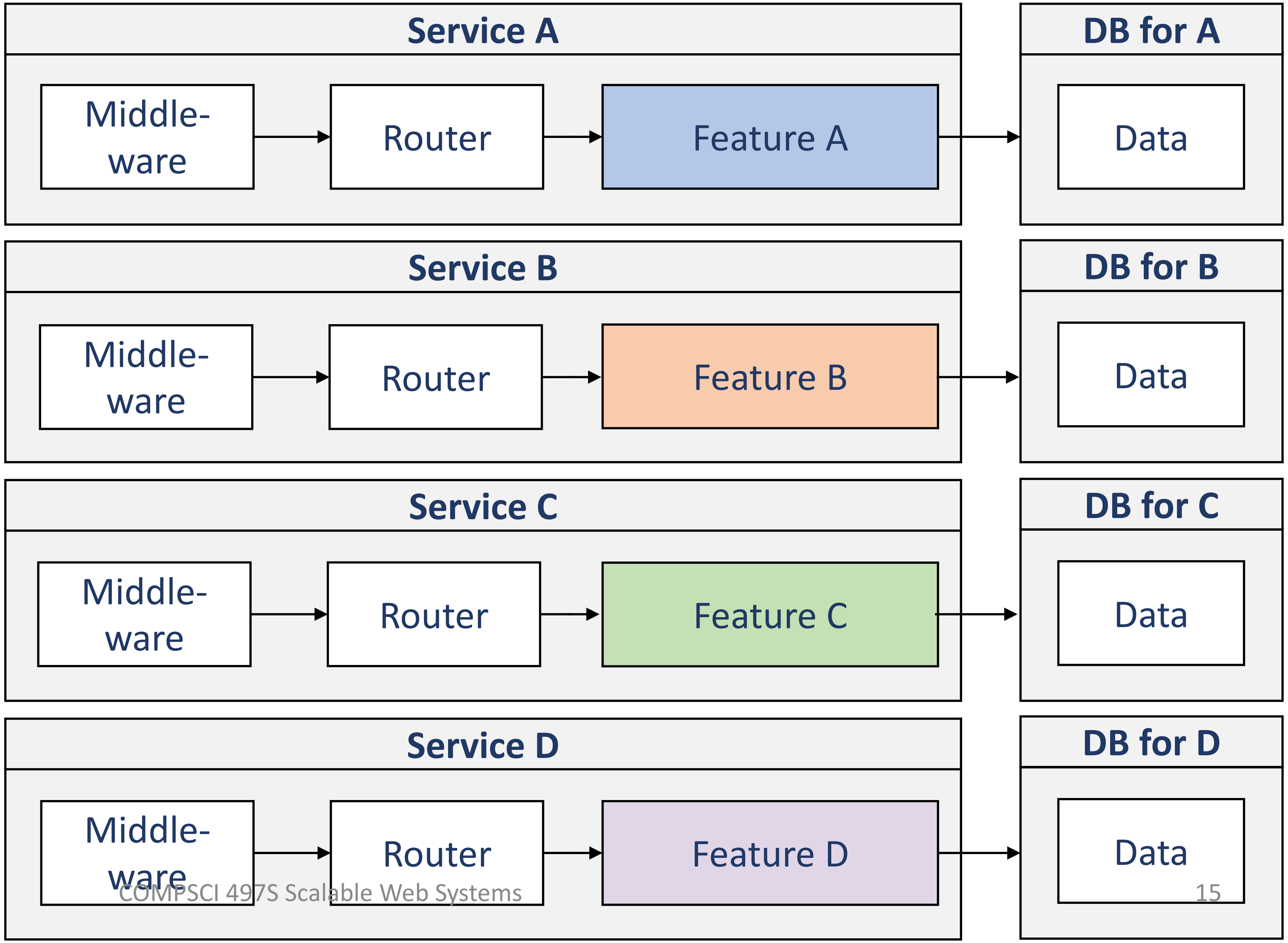
Why a database per service?



Micro-Service Architecture

Why a database per service?

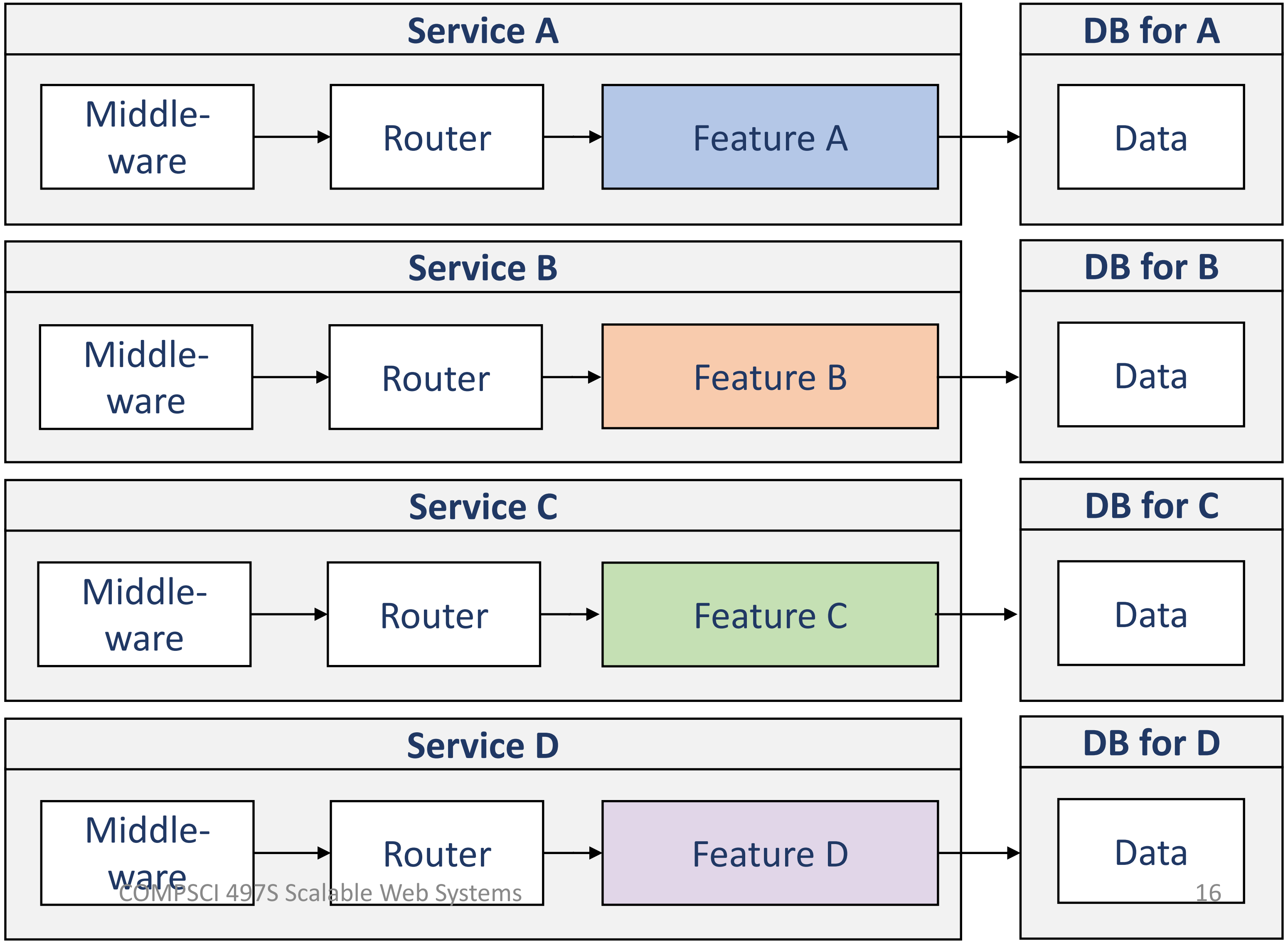
We want each service to run independently of other services.



Micro-Service Architecture

Why a database per service?

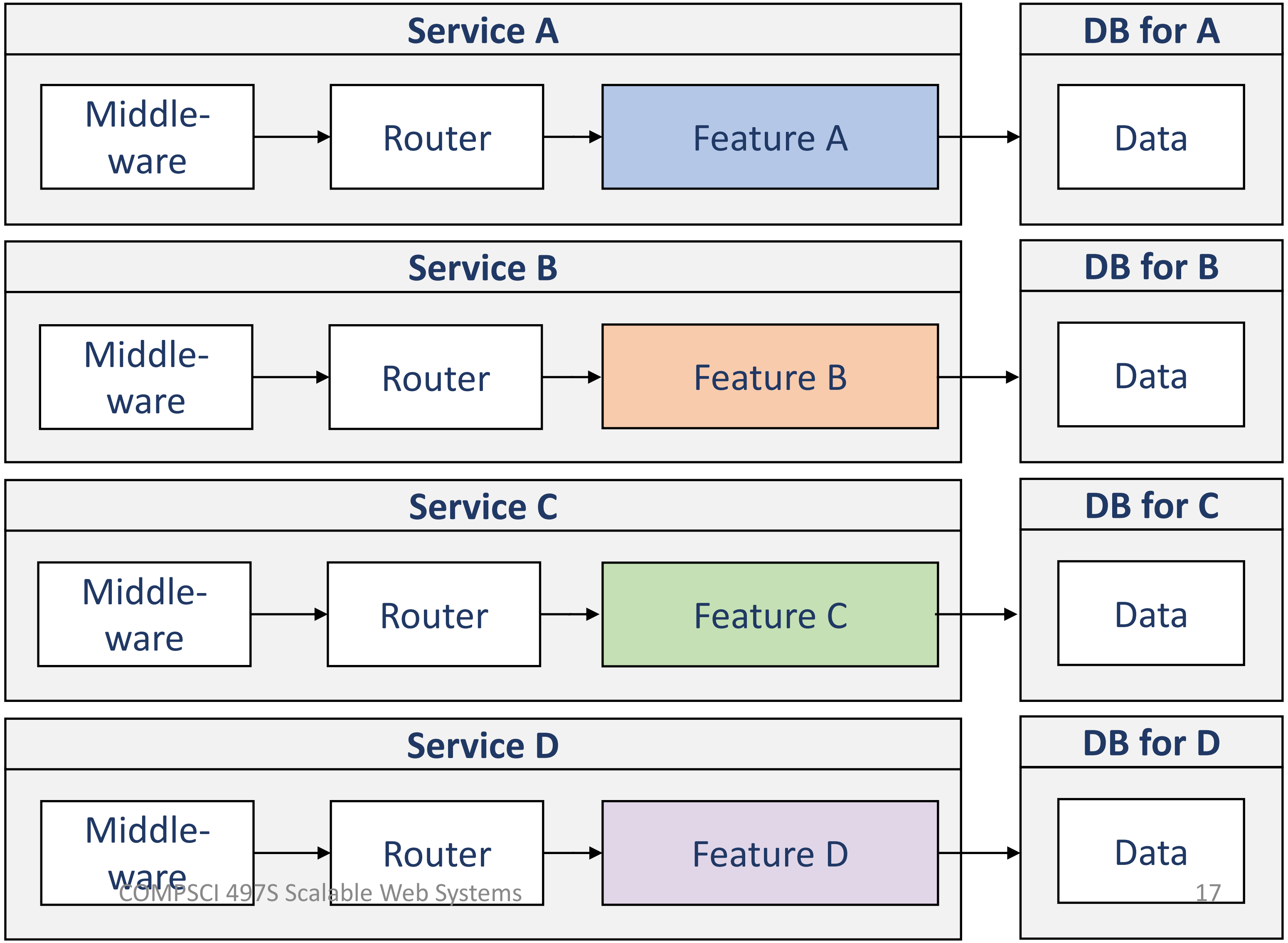
Database schema/structure might change unexpectedly.



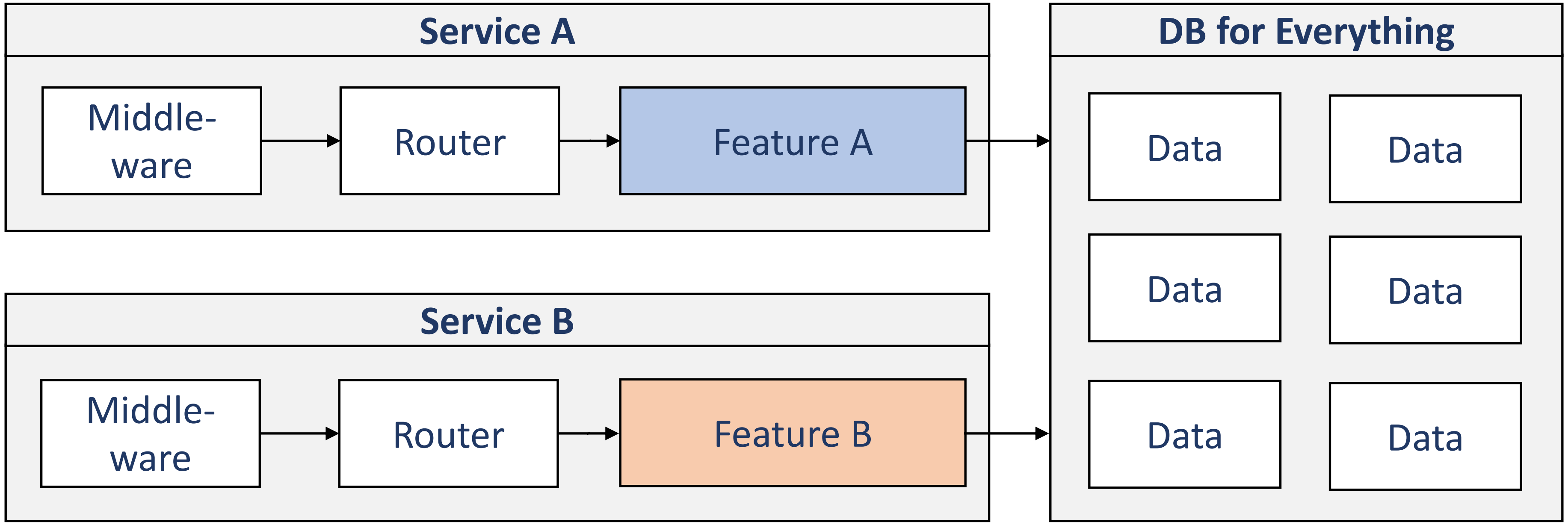
Micro-Service Architecture

Why a database per service?

Some services might function more efficiently with different types of DB's (sql vs nosql)

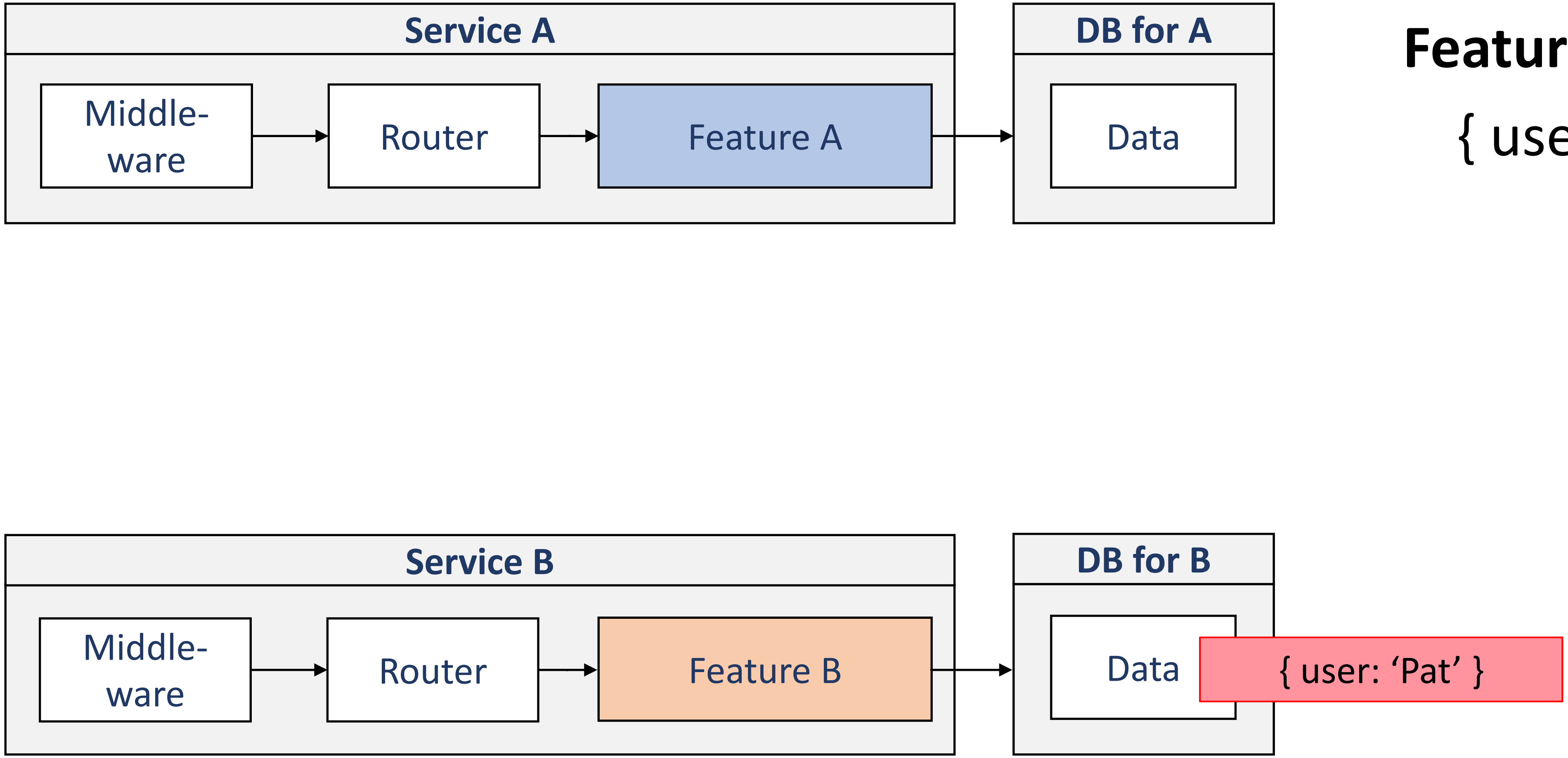


Micro-Service Architecture



What could go wrong with this architecture?

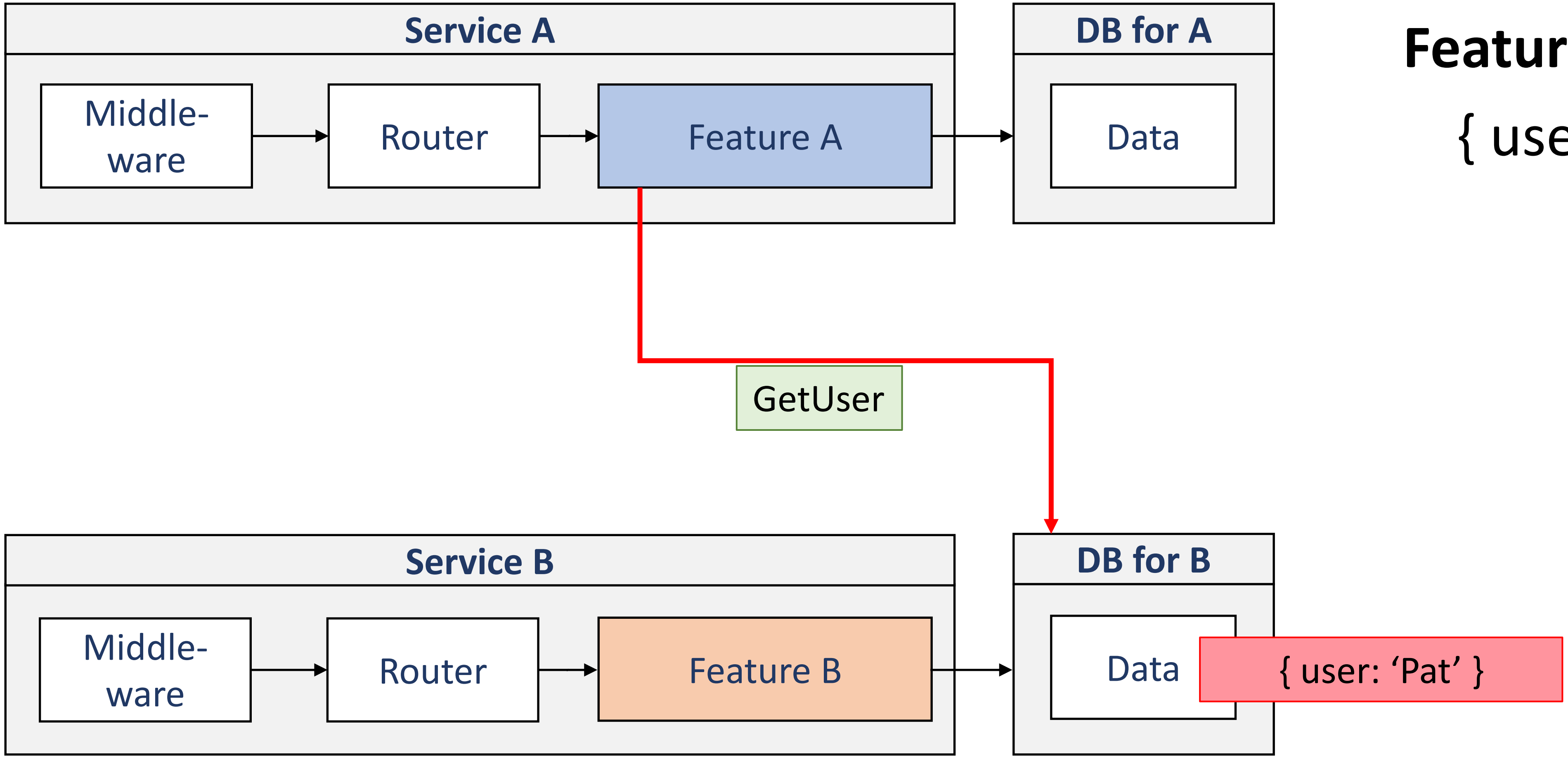
Micro-Service Architecture



Feature A expects

{ user: *string* }

Micro-Service Architecture



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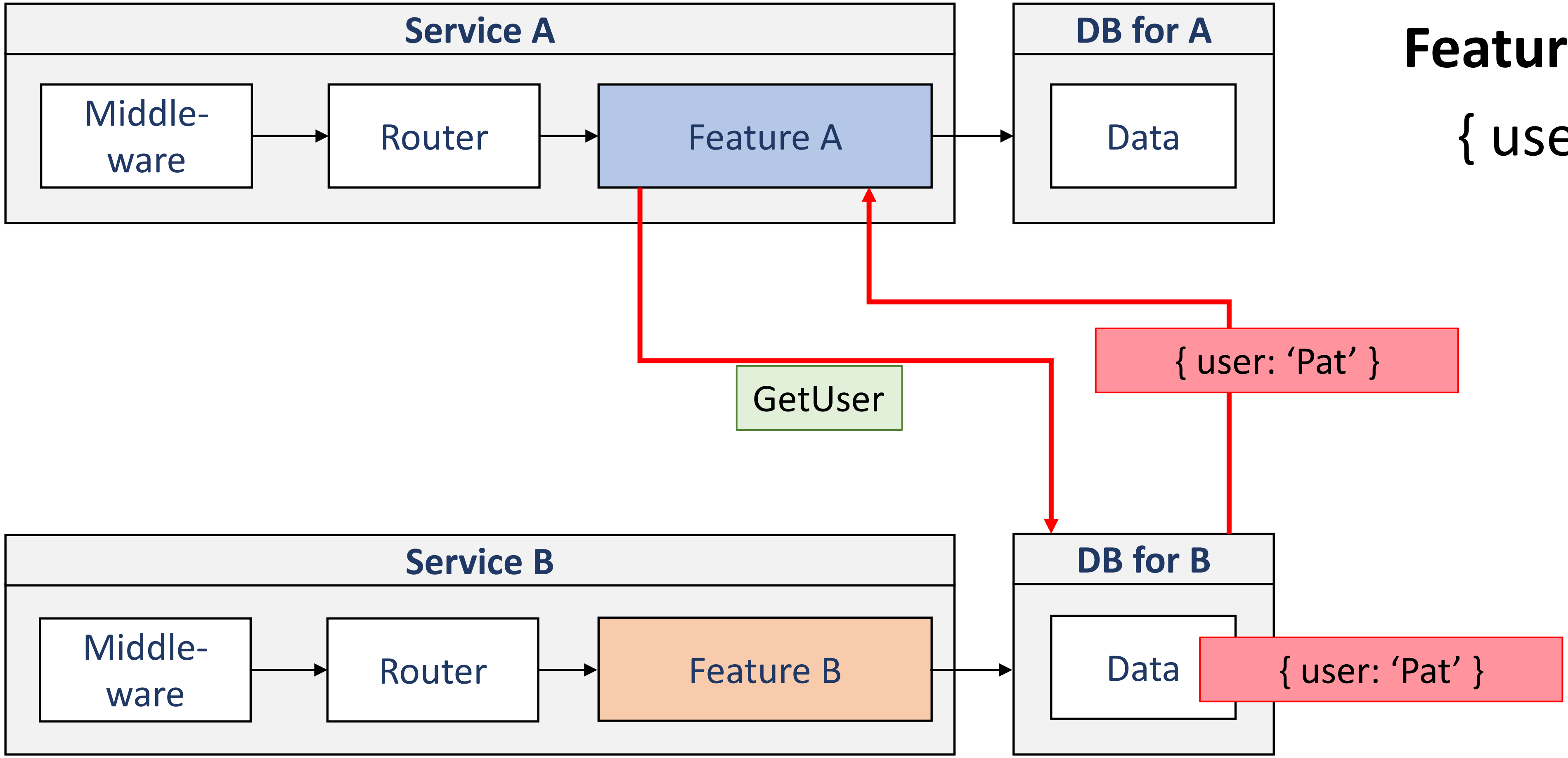
Micro-Service Architecture



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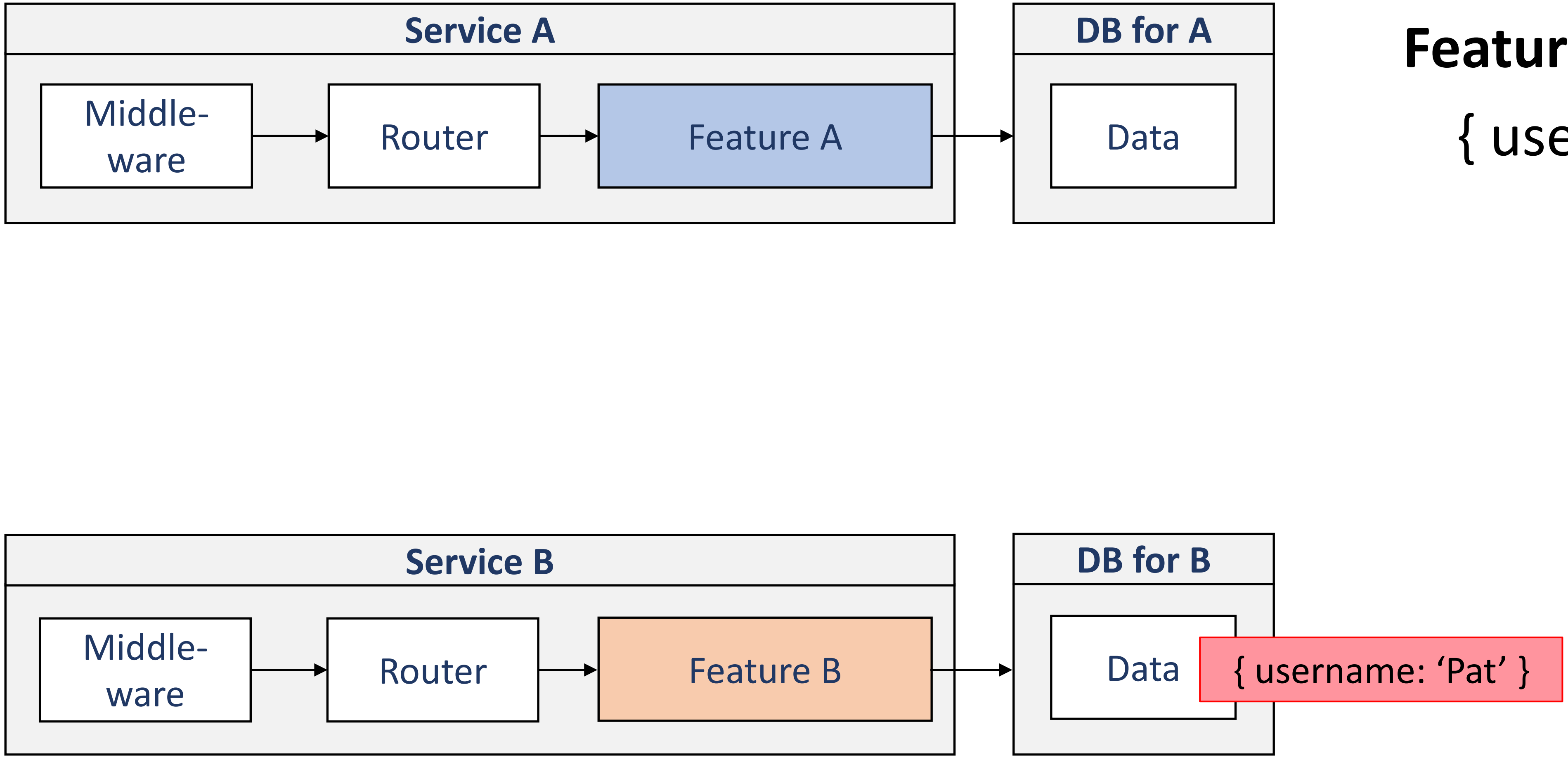
Micro-Service Architecture



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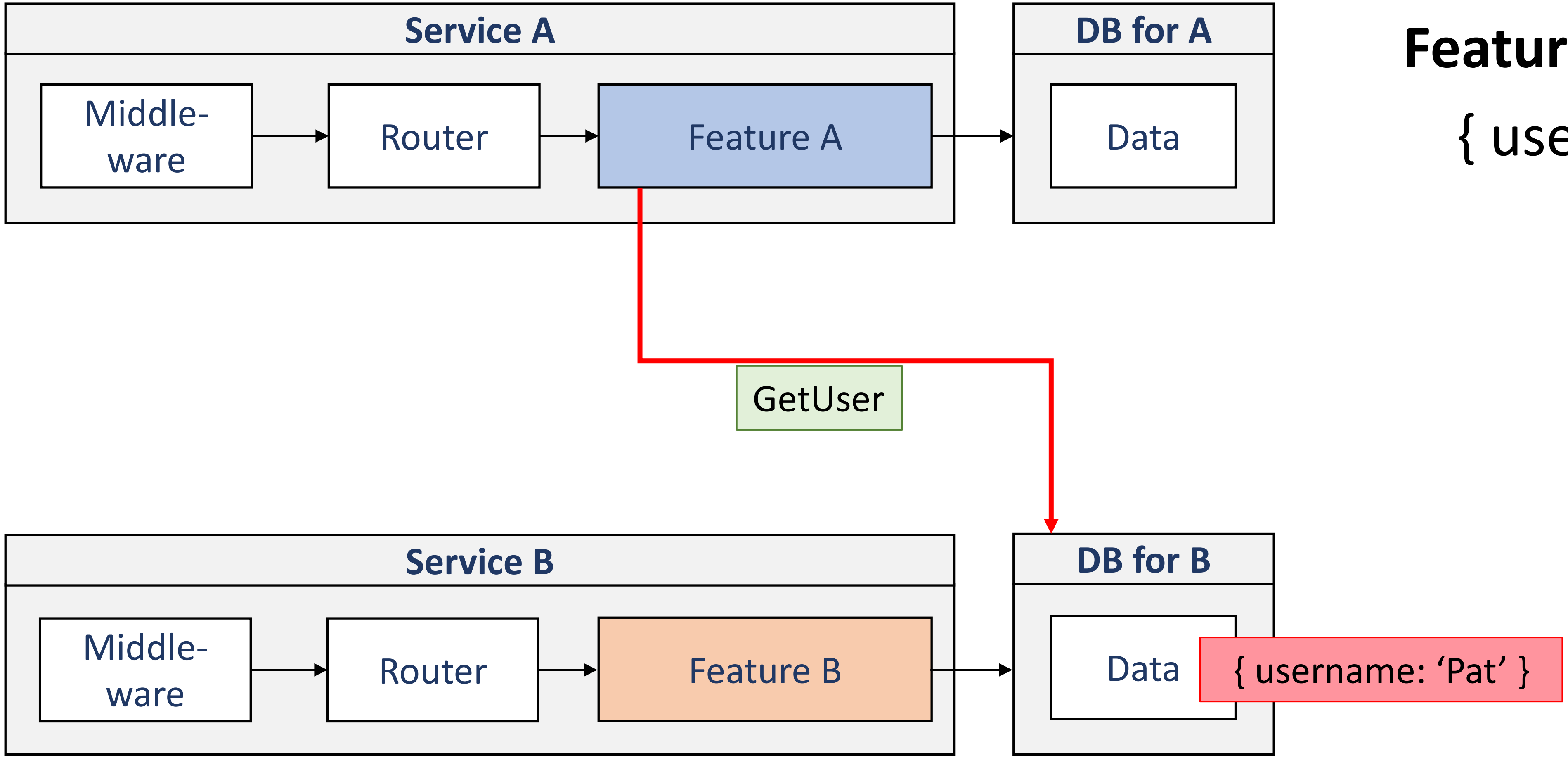
Micro-Service Architecture



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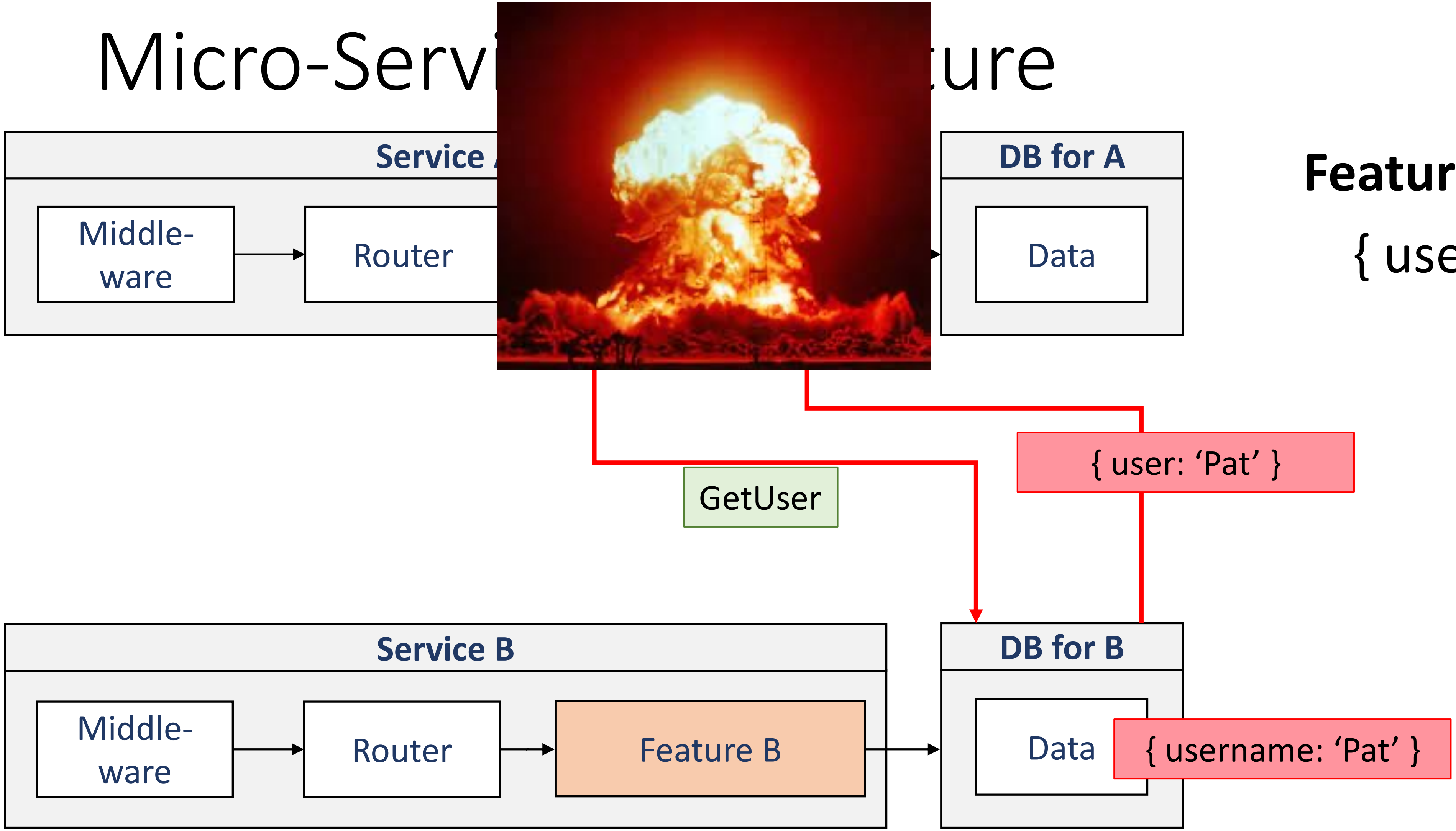
Micro-Servi ture



Feature A expects

{ user: *string* }

So…… What is the biggest challenge with micro-services?

Data management between services.

And, as we will see, makes communication significantly more complex.

Basic e-commerce Application

Now that we have all of that covered, let us look at a design of an example application.

For that, let us switch over into a tool that is great for diagramming.

Group-Based Exercise

- See GROUP.md in course material.