



# Get the message?

## Choosing a messaging framework for your .NET applications

**Roy Cornelissen**  
**Cloud Solution Architect**  
**Xebia**

**Level: Intermediate**

Visual Studio **LIVE!**  
EXPERT SOLUTIONS FOR ENTERPRISE DEVELOPERS

Data Platform **LIVE!**  
INSIGHTS FOR MANAGING YOUR DATA ECOSYSTEM

TECHMENTOR  
IN-DEPTH TRAINING FOR IT PROS

Artificial  
Intelligence **LIVE!**  
AI FOR DEVELOPERS AND DATA SCIENTISTS

Cloud &  
Containers **LIVE!**  
CLOUD-NATIVE, PaaS & SERVERLESS COMPUTING

Cybersecurity  
& Ransomware **LIVE!**  
DEFENDING AGAINST RANSOMWARE AND OTHER ATTACKS

# Why messaging? Why a framework? Comparison



# Agenda

# N-tier





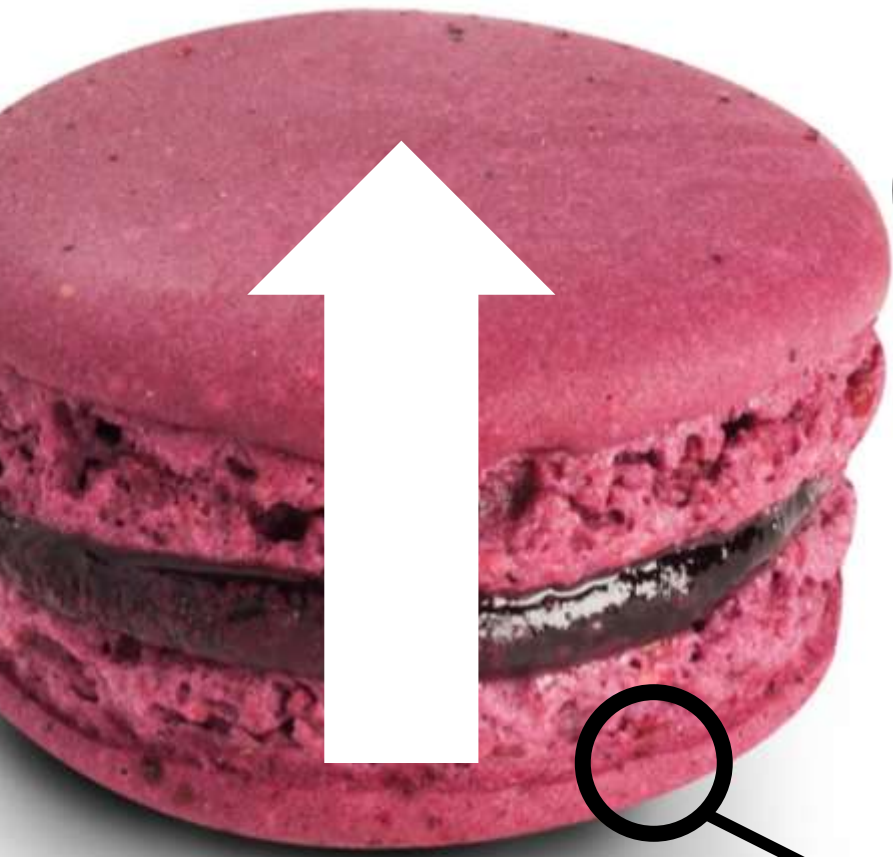
## **User interface**

Views, ViewModels,  
DTO's over HTTP

## **Business layer**

ORM, business rules,  
mapping to DTO

## **Database**



vertical  
**Coupling**  
It's normal

**Remove a field here**



Presentation  
Layer

Planning UI

Integration  
Layer

Integration Service

Service Layer

Common

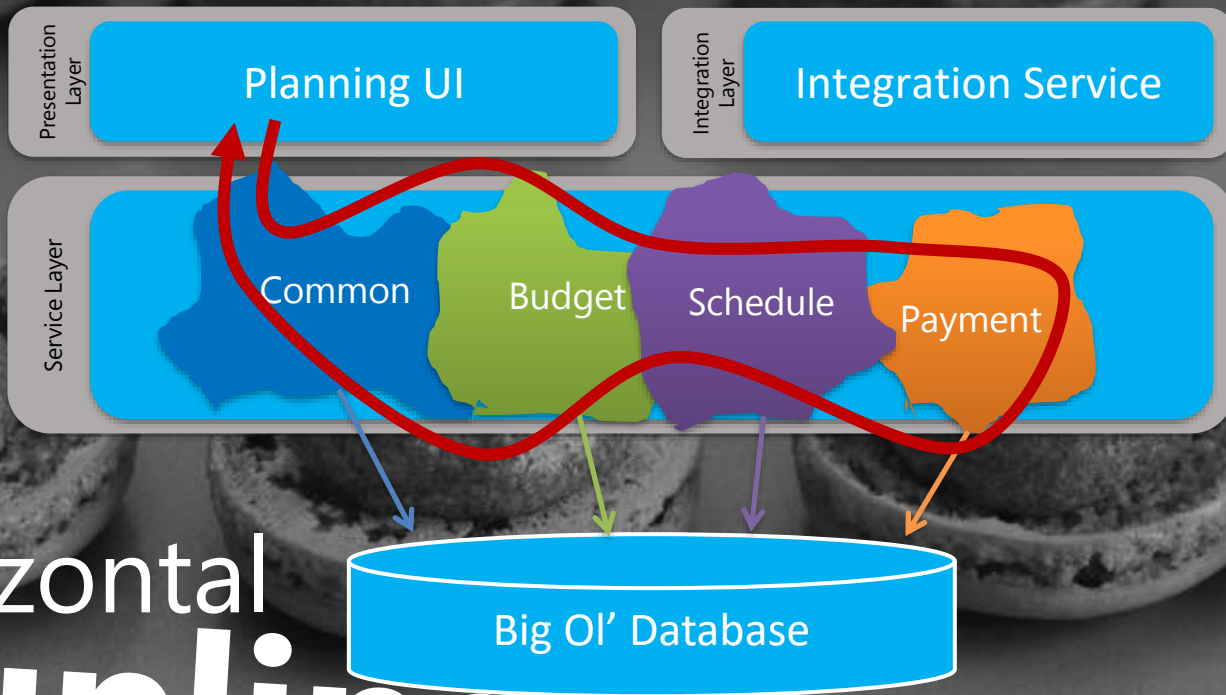
Budget

Schedule

Payment

Big Ol' Database

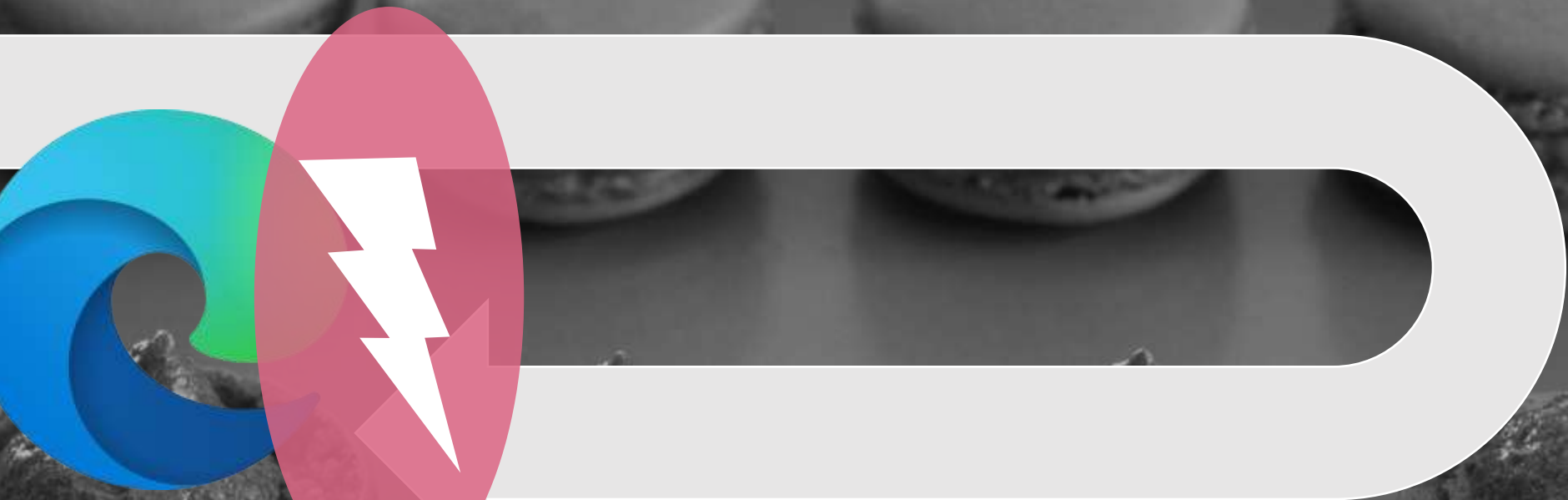
horizontal  
**Coupling**





temporal  
**Coupling**





temporal  
**Coupling**





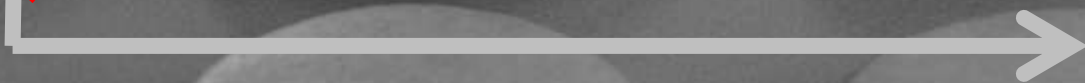
Reliability  
Scalability  
Stability

-ilities

# Throughput



RPC

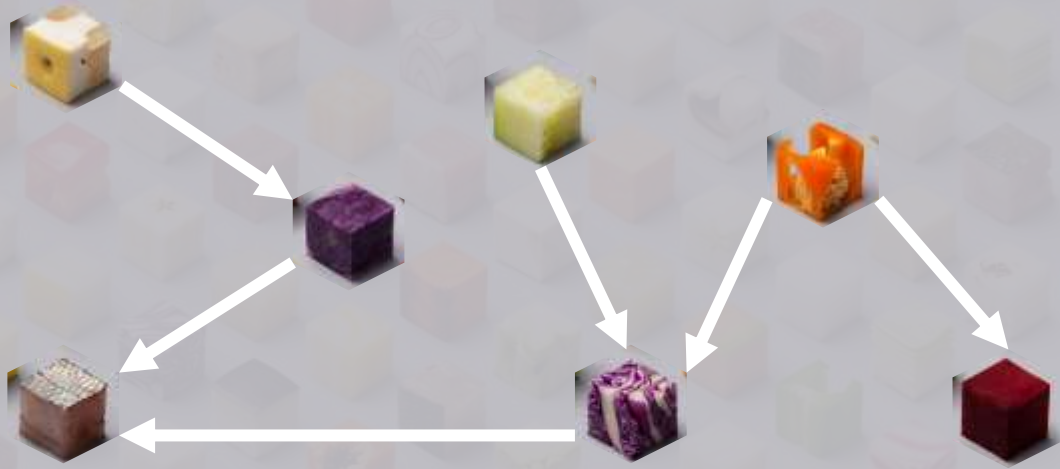


# Load

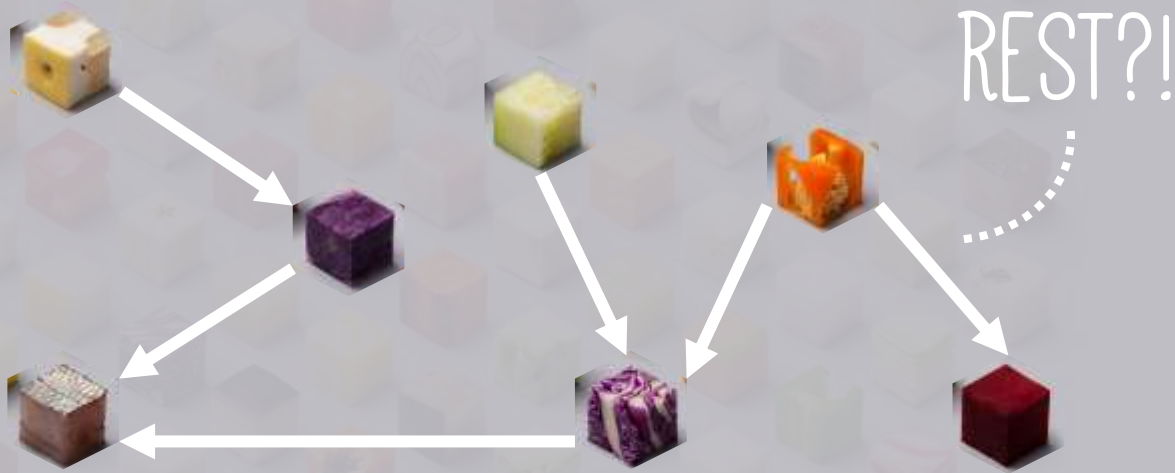


# Microservices

Services as a network of independent parts



# But how?





That is still  
**Coupling!**

# Event driven architecture

Services keep their *own state*

*Events* are used to notify changes

Each service will have *its own database*

Services use events to *replicate data*





# **Loose coupling**

**Temporal decoupling through  
queued messaging**

**Share contract and schema,  
not class (behavior)**

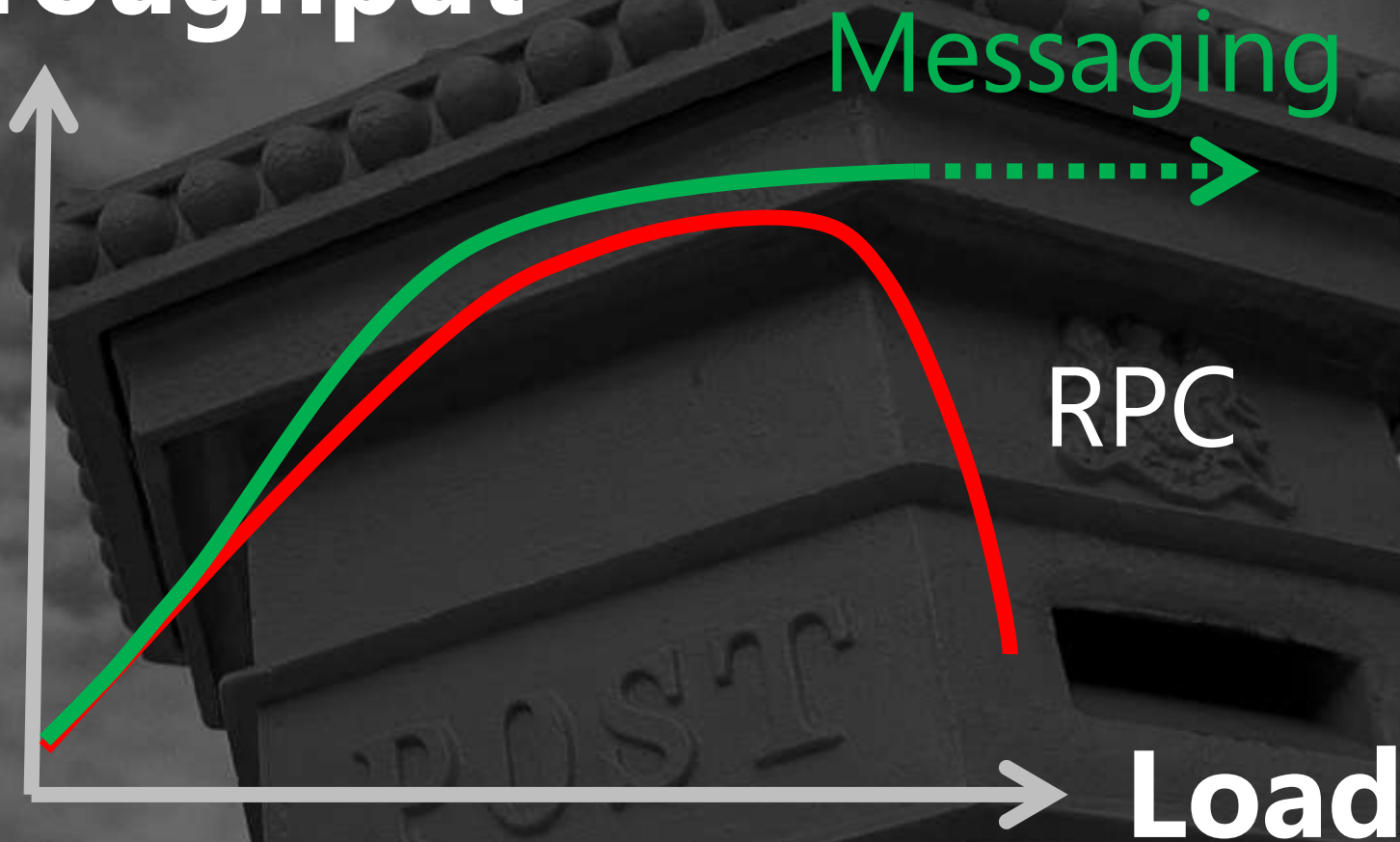
A low-angle shot of a red brick pillar against a blue sky with white clouds. The pillar has a decorative top with a row of red spheres. The word 'POST' is embossed in large, capital letters on the front face. A rectangular mail slot is visible on the right side of the pillar.

# (Reliable) **Messaging**



applying async  
**Messaging**

# Throughput



Messaging

RPC

Load

# Event driven architecture

## Costs

Latency in data changes and consistency

Challenge to reconcile in case of disaster

No central control of business logic

**Message Transport**





RabbitMQ



Azure Storage Queues



Azure Service Bus



Amazon SQS



SQL Server



PostgreSQL

...

Options

# Managed

vs

# Host it yourself



# Hosting

Stability/availability

Speed

Messaging topologies

(queues, topic/subscriptions)

Reliability

don't lose messages



NServiceBus



MassTransit



Wolverine

dapr



Started in 2006 by *Udi Dahan*

Open source

Commercial license - *Particular Software*

Also offers monitoring tools



<https://particular.net/nservicebus>

<https://github.com/Particular/NServiceBus>

# NServiceBus



# What is NServiceBus?

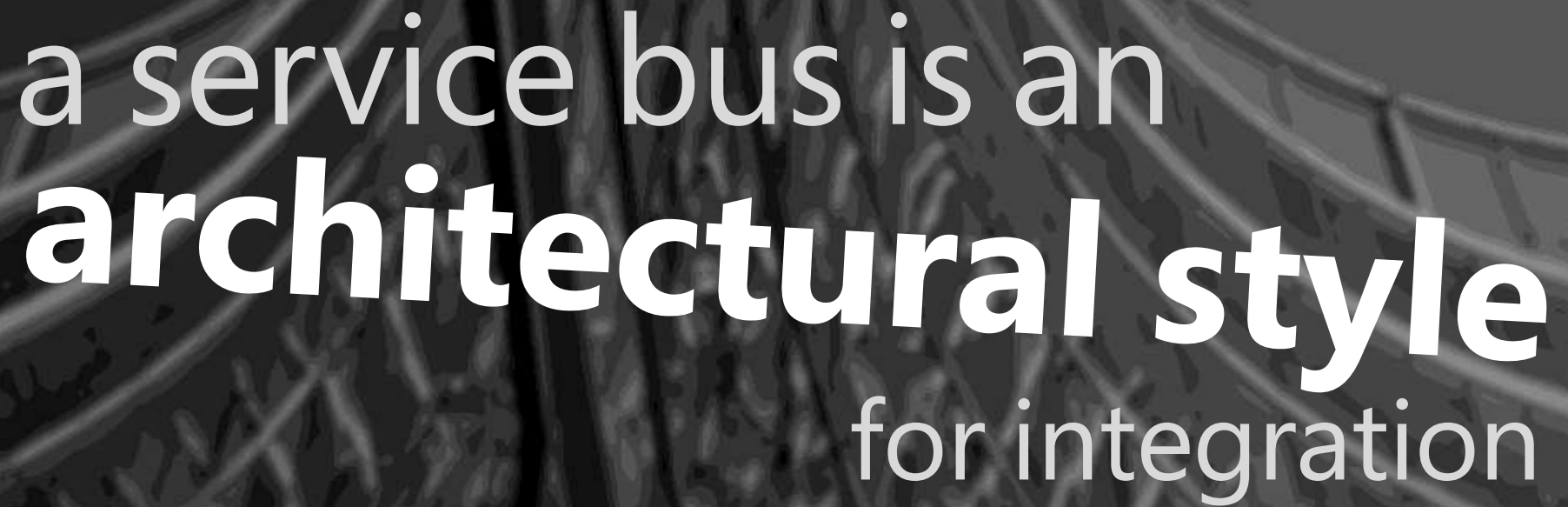
Abstracts away transport, threading,  
queues, transactions

# What is NServiceBus?

Focuses on implementing  
business logic

# What is NServiceBus?

Highly pluggable

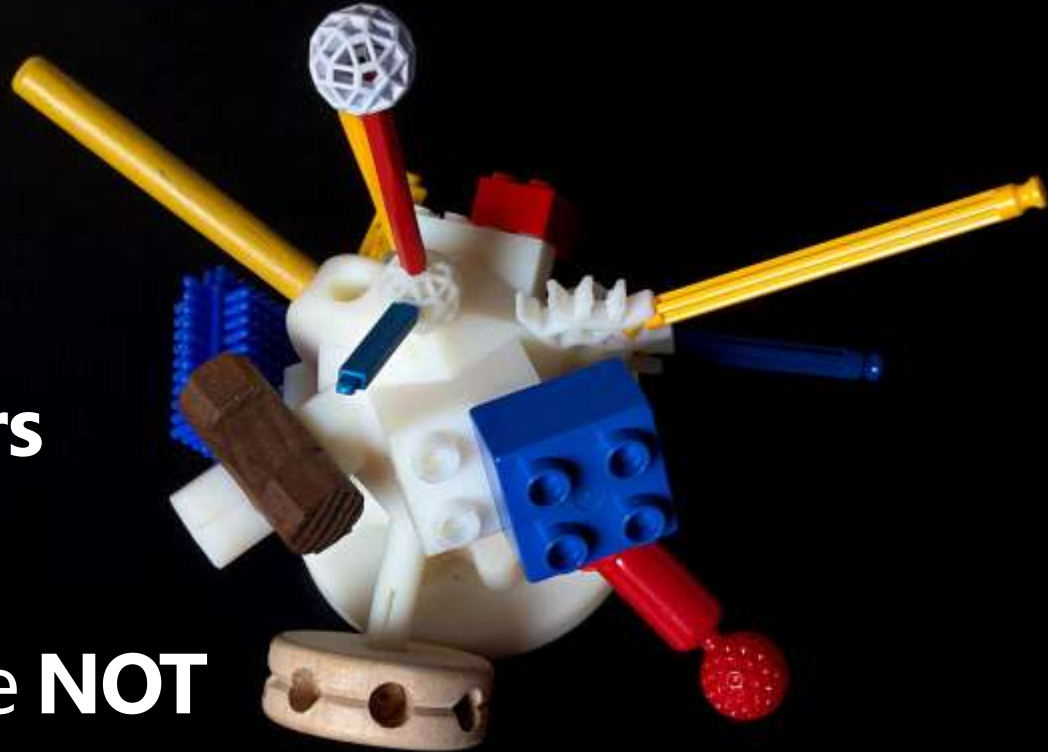


a service bus is an  
**architectural style**  
for integration

# What it's not...

Most products sold  
as a "service bus" are  
actually expensive,  
overly complex **brokers**

These 4 frameworks are **NOT**





**Where is the bus?**

Like Ethernet, it's  
everywhere!



# **NServiceBus** Concepts



# **NServiceBus** Concepts

**Messages are sent  
over a transport**



# **NServiceBus** Concepts

**Messages are handled  
by message handlers**



# **NServiceBus** Concepts

**Message handlers run  
inside an endpoint**



# **NServiceBus** Concepts

**Message handlers can  
be arranged in a  
sequential pipeline**



# **NServiceBus** Concepts

**An endpoint is a  
process with an  
input queue**

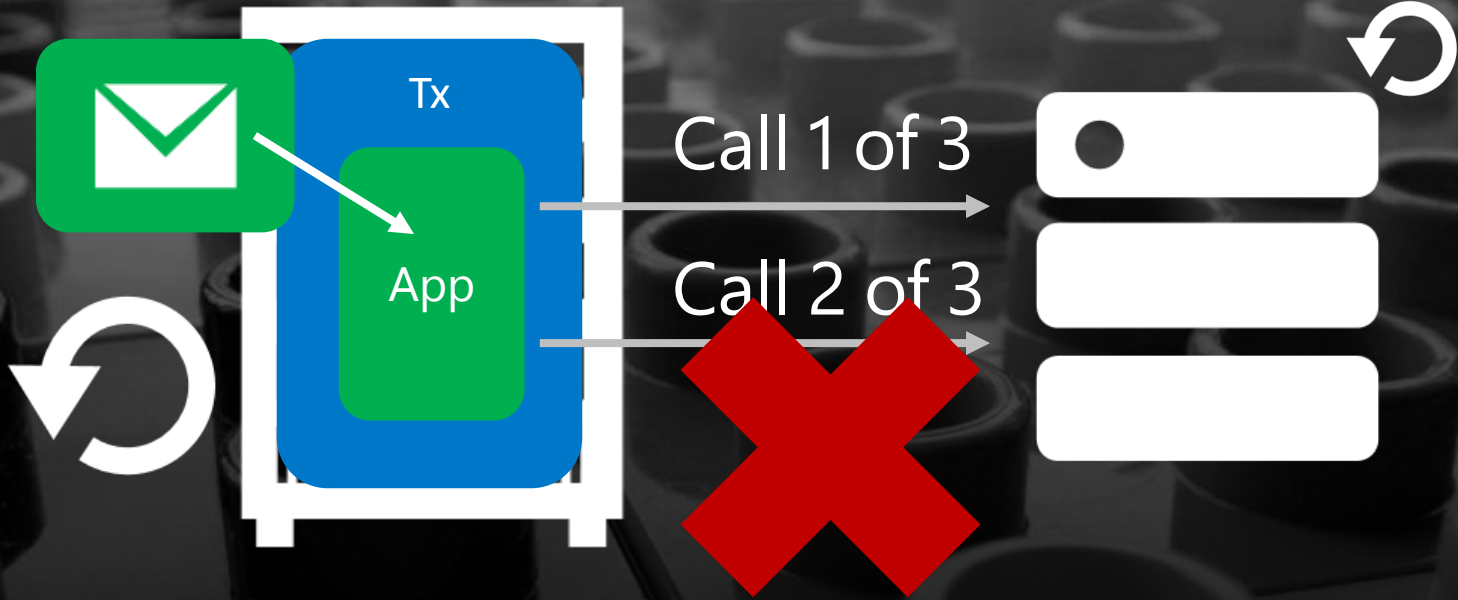


# NServiceBus Concepts

**Multiple endpoints can  
make up a service**

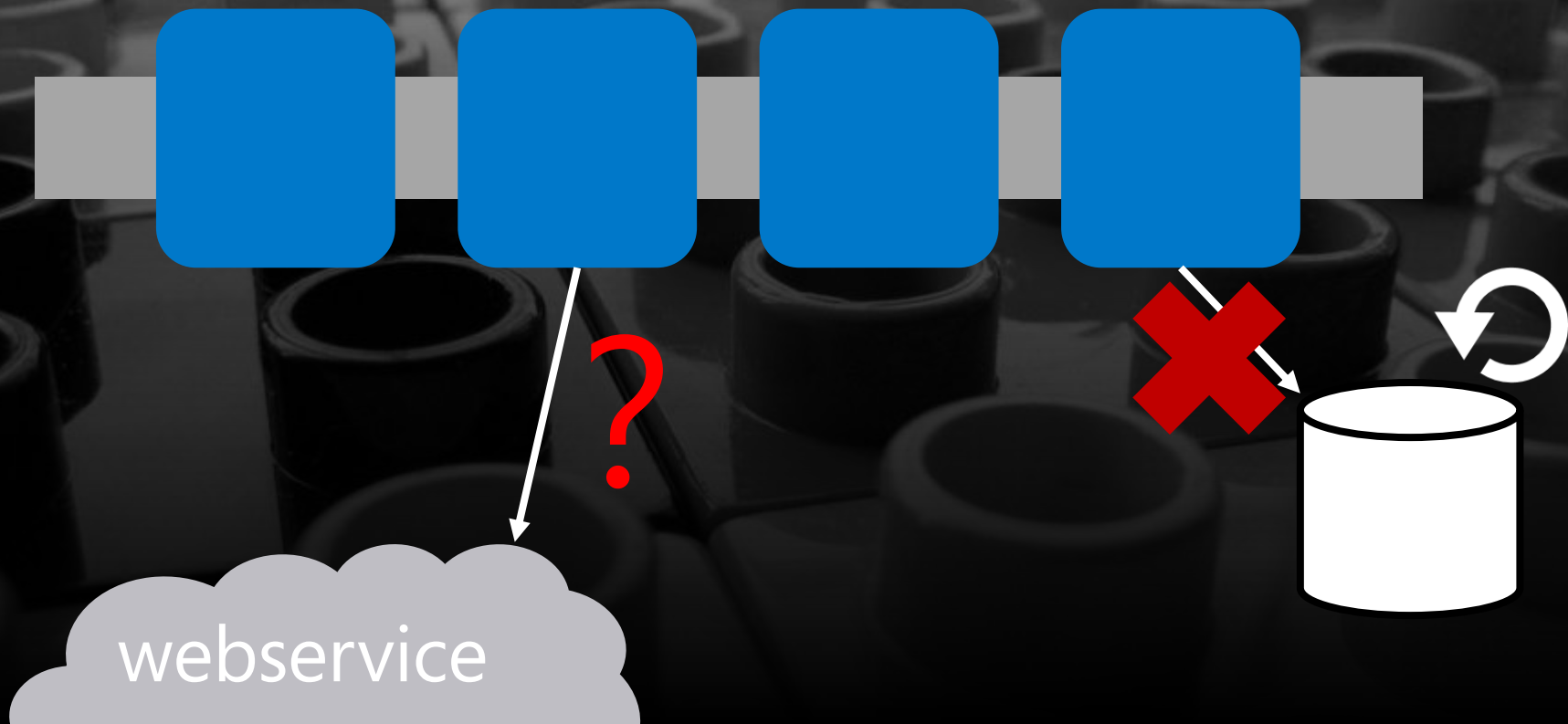
# Resilience

Order \$\$\$

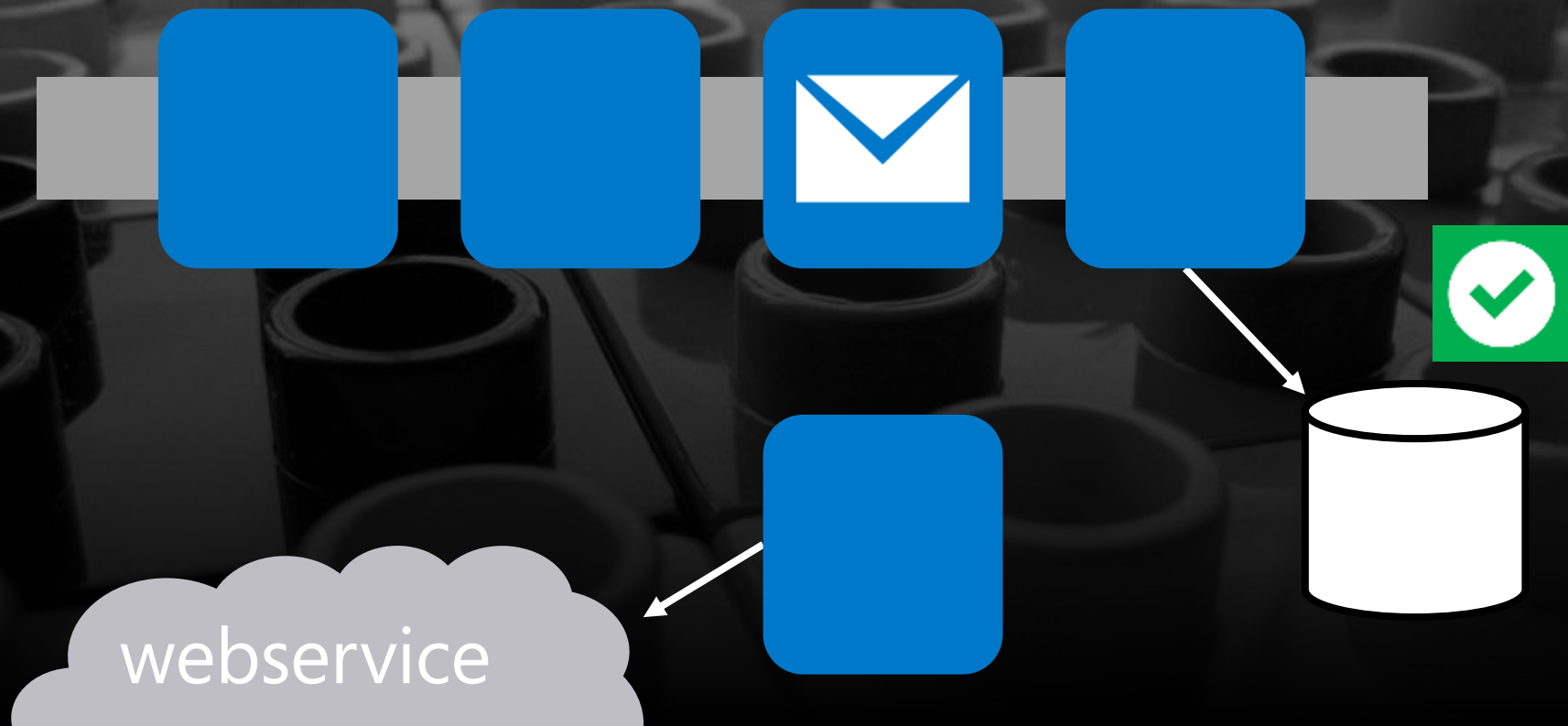


The order is back in the queue

# Webservices



# Webservices



Let's see it  
in action!



Started in 2007 by *Chris Patterson*  
Open source  
Free until MassTransit 8  
Commercial from v9 – *Massient Inc.*



<https://masstransit.io>

<https://github.com/MassTransit/MassTransit>

# MassTransit



# MassTransit Concepts

Uses many of the  
**same concepts**



# MassTransit Concepts

**Consumers consume  
messages**



**MassTransit**  
Concepts

**Sagas implemented as  
Automatonyous  
state machines**



Let's see it  
in action!



Started in 2015 by *Jeremy D. Miller*



History:

*FubuMVC + FubuTransportation* → *Jasper* → **Wolverine**

Part of the "Critter Stack" together with Marten  
(DocumentDB and Event Store)

Open source, free to use

Commercial support via *JasperFx*

<https://wolverinefx.net/>

<https://github.com/jasperfx/wolverine>

# Wolverine



**Wolverine**  
Concepts

**"Next generation  
.NET Mediator and  
Message Bus"**



# Wolverine Concepts

Based on **runtime  
code generation**,  
reducing your code



# Wolverine Concepts

Handlers can be written  
as **pure functions** for  
maximum **testability**



# Wolverine Concepts

Can even use

**WolverineFx.Http** to  
**replace** ASP.NET Core  
Endpoints



Let's see it  
in action!



Started in 2019 by *Microsoft*

Donated to *CNCF*

Platform and language agnostic



"APIs for building portable and reliable microservices  
**Leverage industry best practices** and focus on your  
application's logic."

<https://dapr.io/>

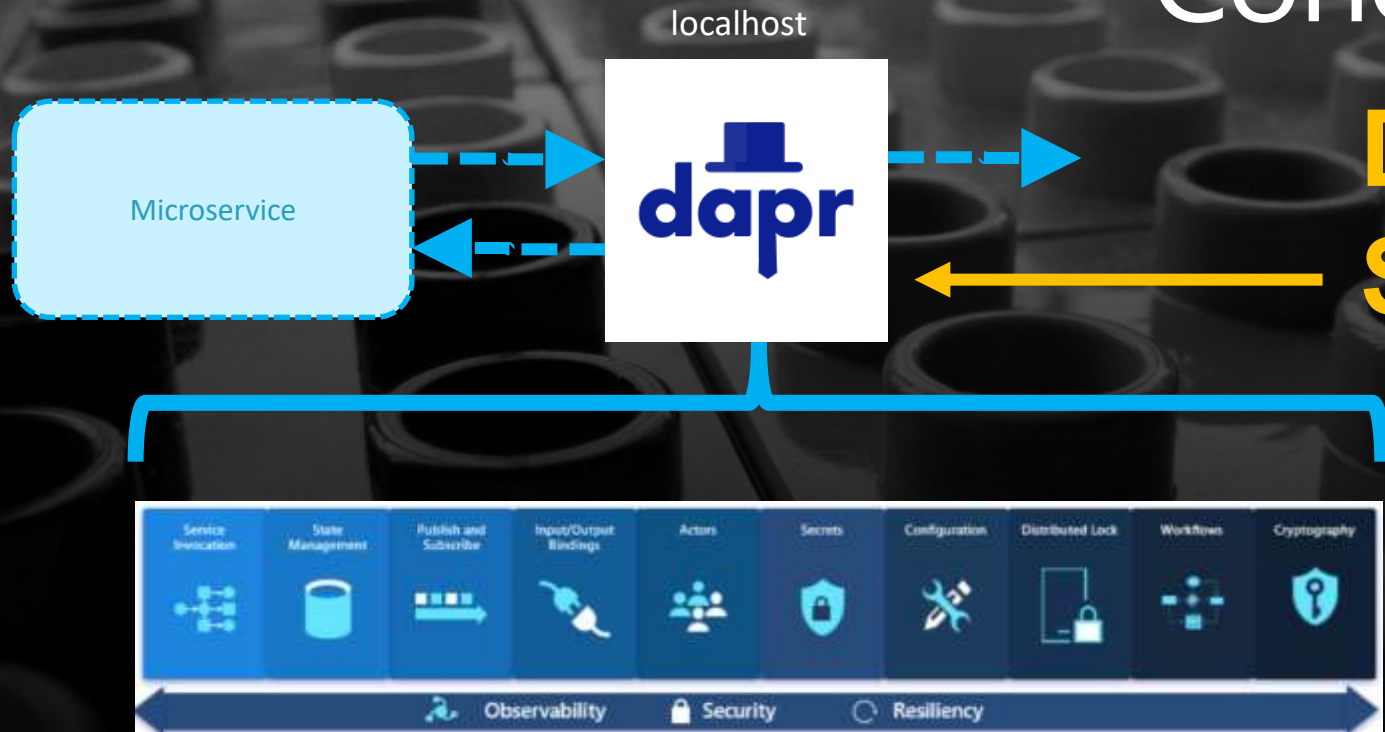
<https://github.com/dapr>

# Dapr



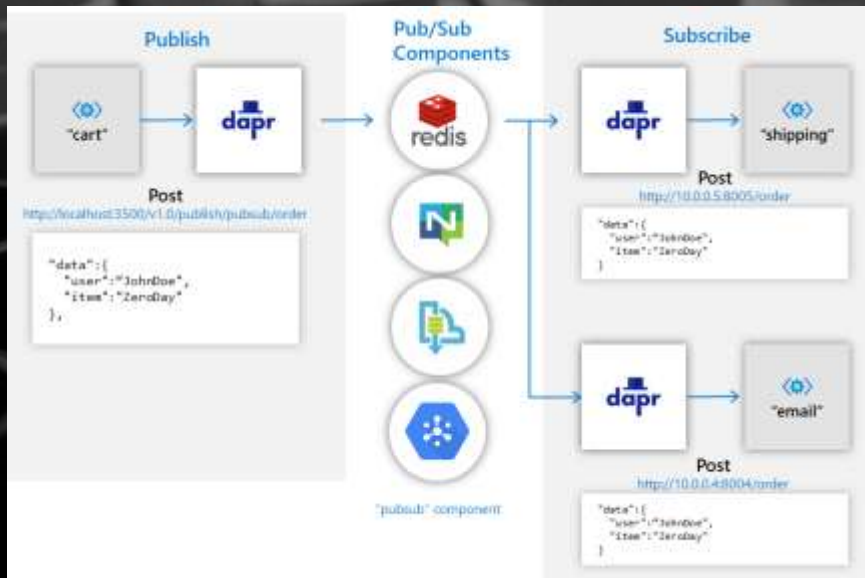
# Dapr Concepts

## Dapr Sidecar



# Dapr Concepts

## Publish Subscribe Building Block



<https://docs.dapr.io/reference/components-reference/supported-pubsub/>



**Dapr**  
Concepts

# Saga alternatives: Actors and/or Workflow





**Wrap Up**

**Which one is the best?**

**It depends...**

The background of the slide is a grayscale, high-contrast image of a computer keyboard. The keys are visible as a grid of raised, circular shapes. Overlaid on this background is white text. In the top right corner, the words "Wrap Up" are written in a large, bold, sans-serif font. On the left side, a list of five items is presented in a smaller, white, sans-serif font, stacked vertically.

**Wrap Up**

Level of support needed

Standards

Programming style

Supported transports

Monitoring

# Wrap Up

Other frameworks to look at

- Rebus
- Brighter (+ Darker)



# Thank you!

**Roy Cornelissen**

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Sample project:

[github.com/roycornelissen/get-the-message](https://github.com/roycornelissen/get-the-message)

# Session Survey

- Your feedback is very important to us
- Please take a moment to complete the session survey found in the mobile app
- Use the QR code or search for “Converge360 Events” in your app store
- Find this session on the Agenda tab
- Click “Session Evaluation”
- Thank you!

