



# Get the message?

## Choosing a messaging framework for your .NET applications

Roy Cornelissen  
Cloud Solution Architect  
**Xebia**

Level: Intermediate



# 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

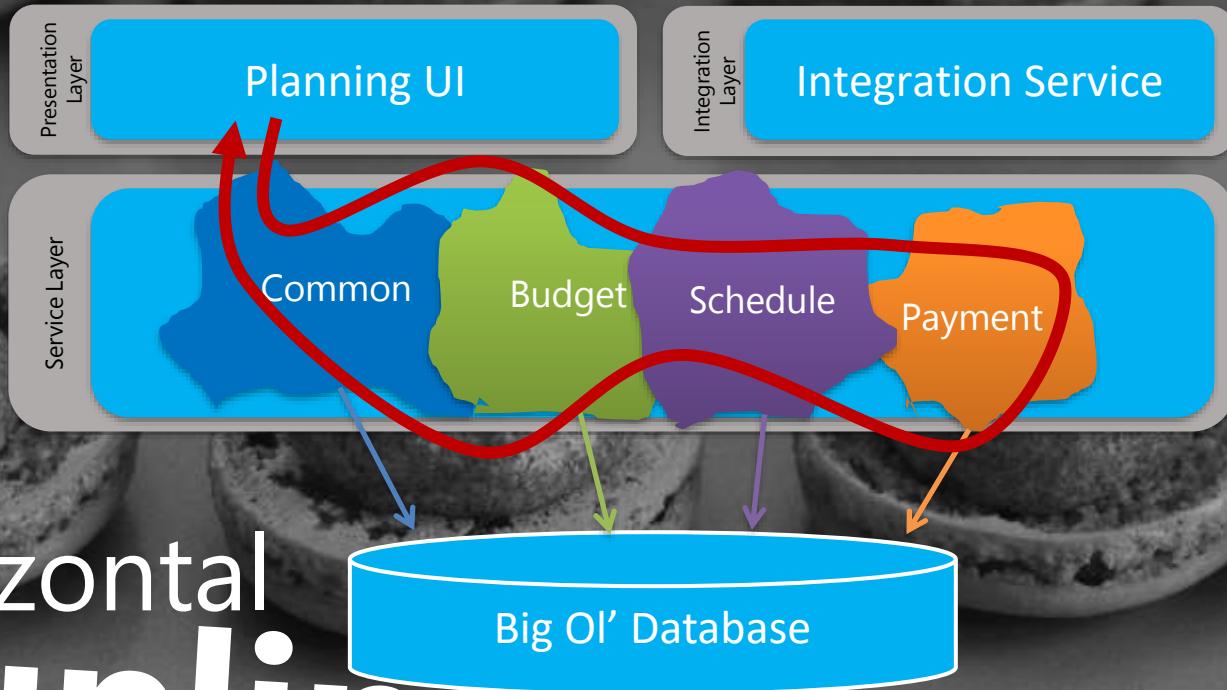
## Database



vertical  
Coupling  
It's normal

Remove a field here

# horizontal Coupling



# temporal Coupling

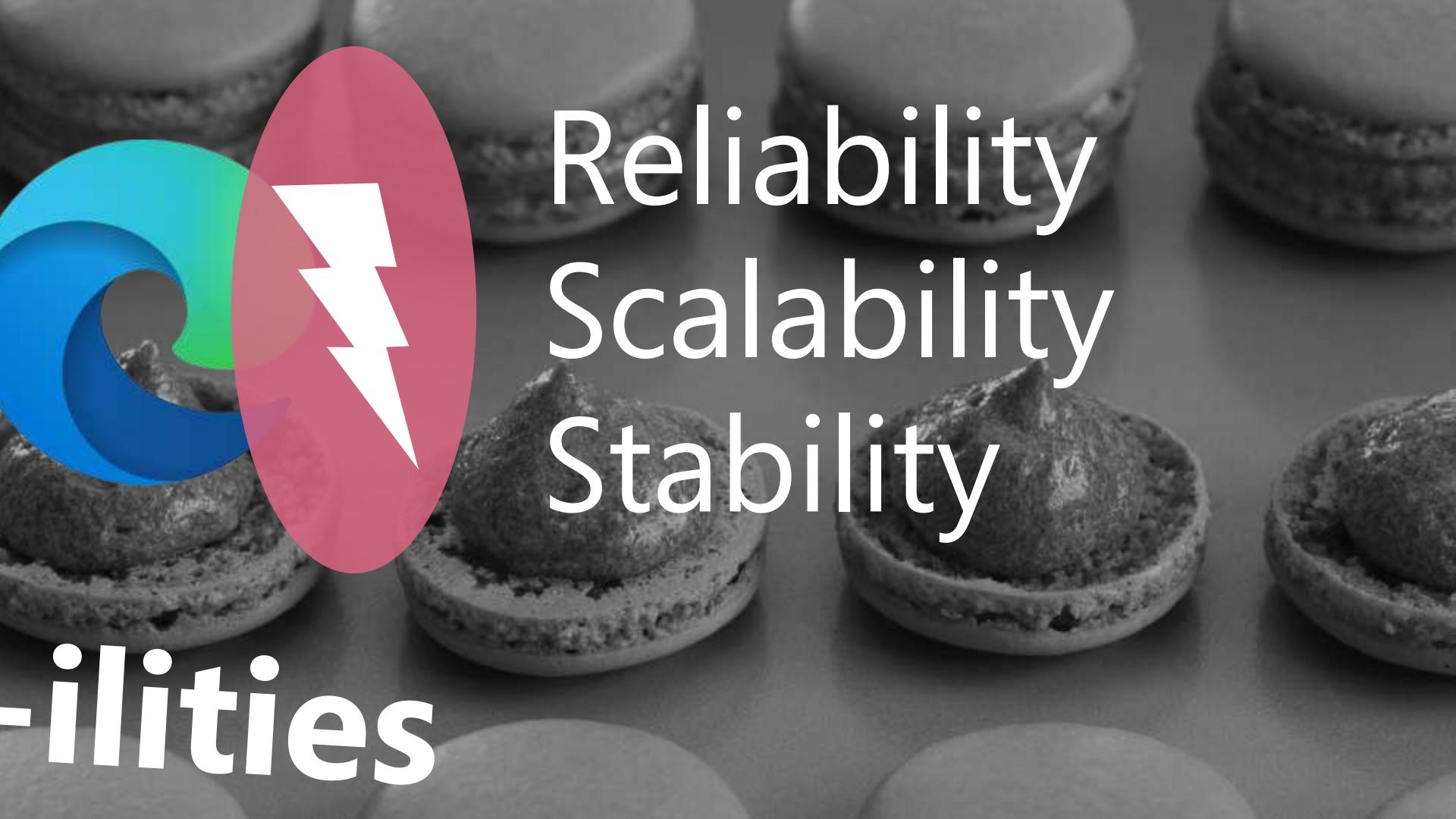
response





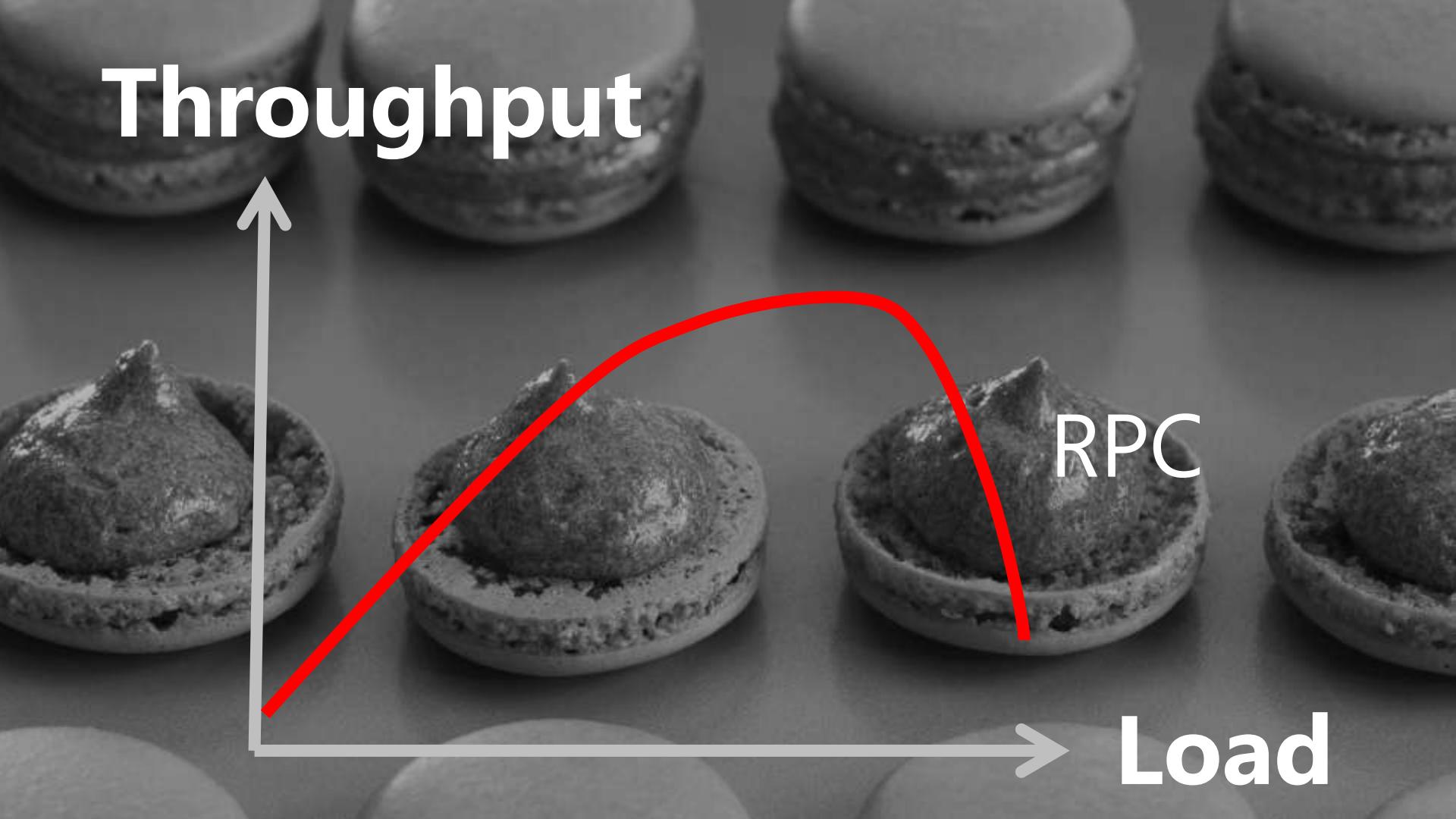
# temporal Coupling



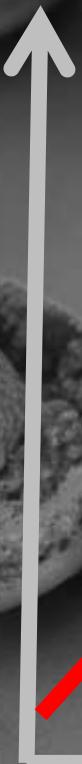
A stack of grey coins is visible in the background, partially obscured by the text. In the foreground, there is a graphic element consisting of two overlapping circles: a blue one on the left and a red one on the right. Inside the red circle is a white lightning bolt symbol.

Reliability  
Scalability  
Stability

-ilities



# Throughput



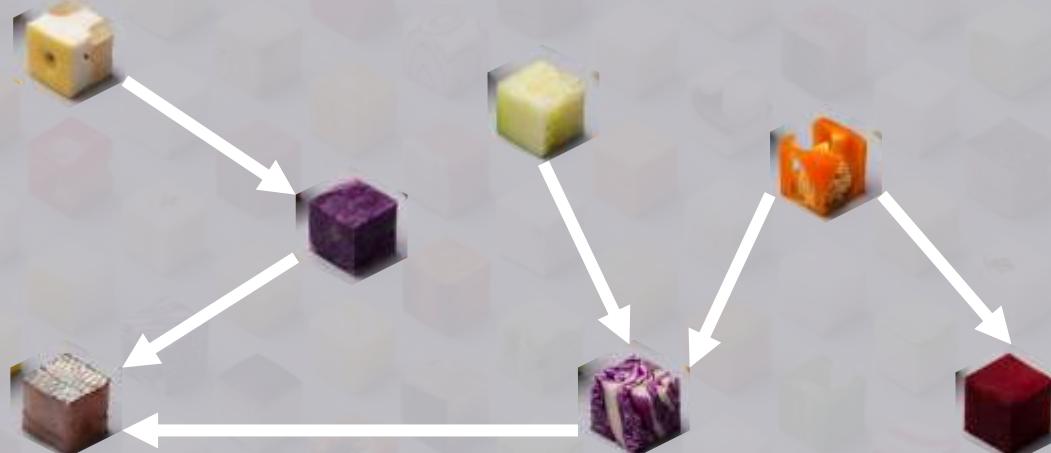
RPC

Load

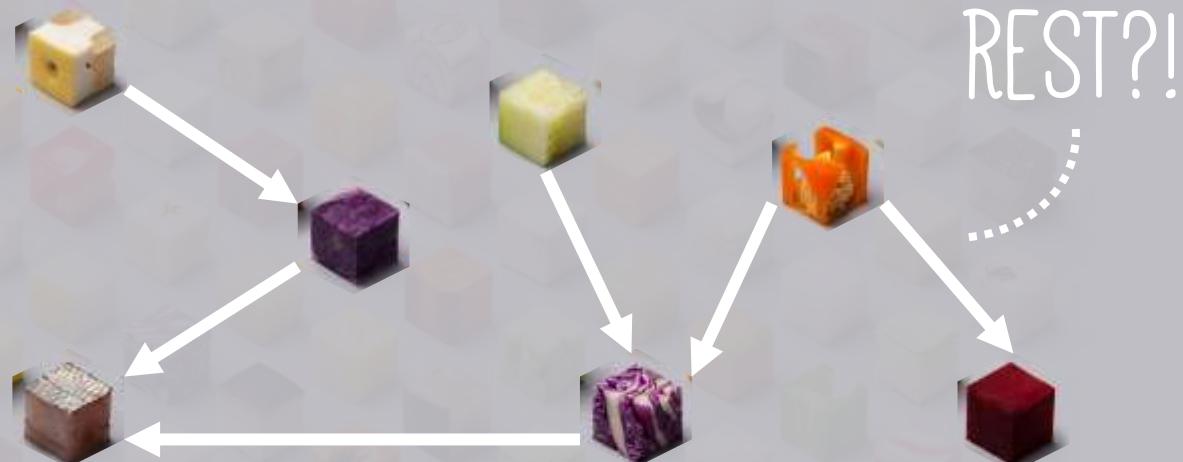


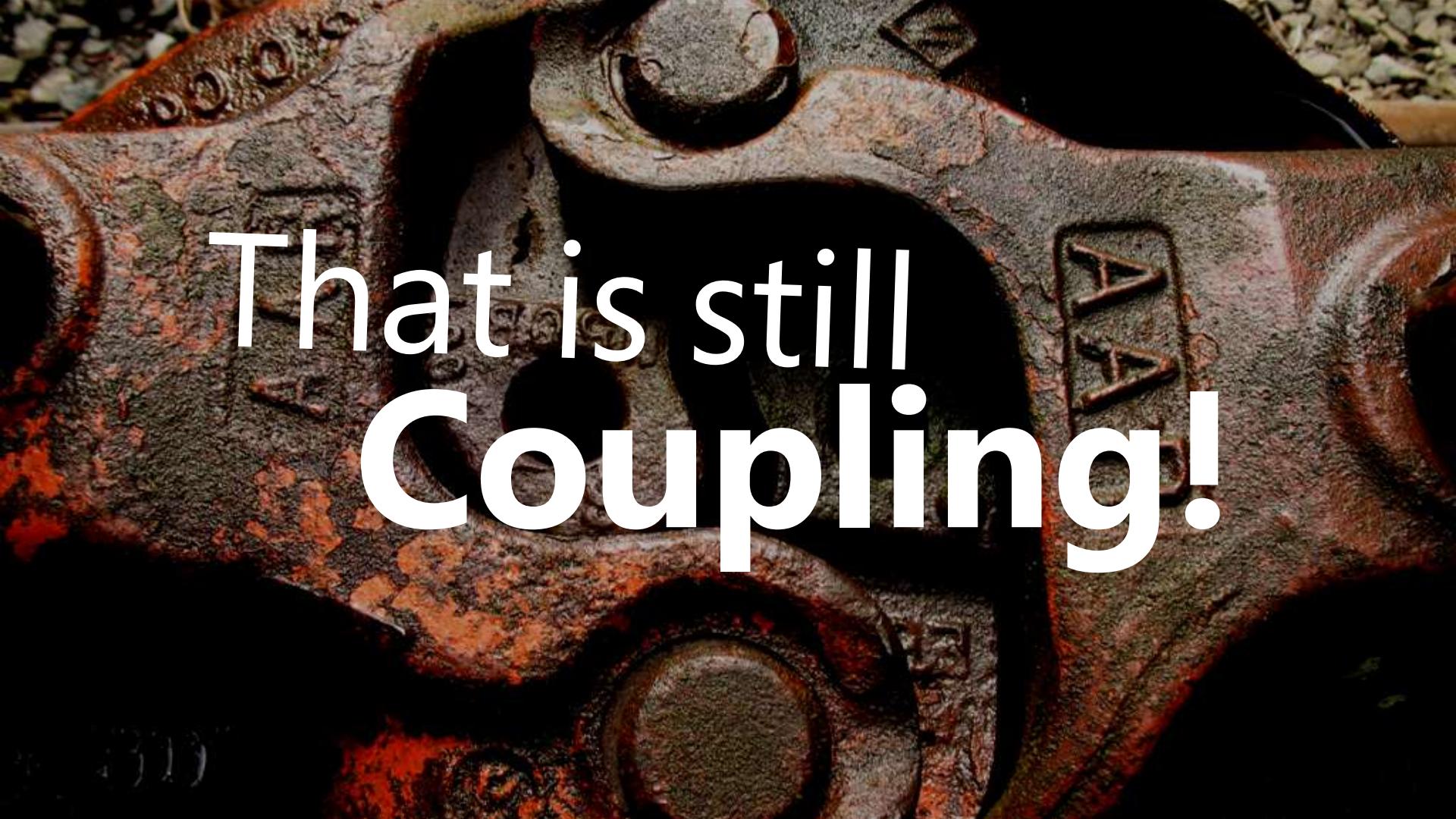
# Microservices

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*



PlaceOrder

Sales



OrderAccepted

OrderAccepted

OrderShipped



Billing

PaymentReceived

Shipping





# Loose coupling

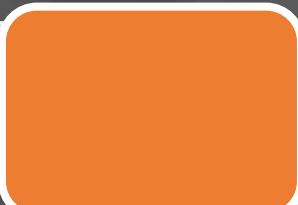
Temporal decoupling through  
queued messaging

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

A close-up photograph of a traditional red wooden post box. The box is made of dark wood with a smooth finish. It features a decorative curved roof with a series of circular ornaments along the edge. On the front face, the word "POST" is carved in large, raised letters. To the right of the main body, there is a rectangular slot for inserting letters. The background is a bright blue sky with scattered white clouds.

# (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

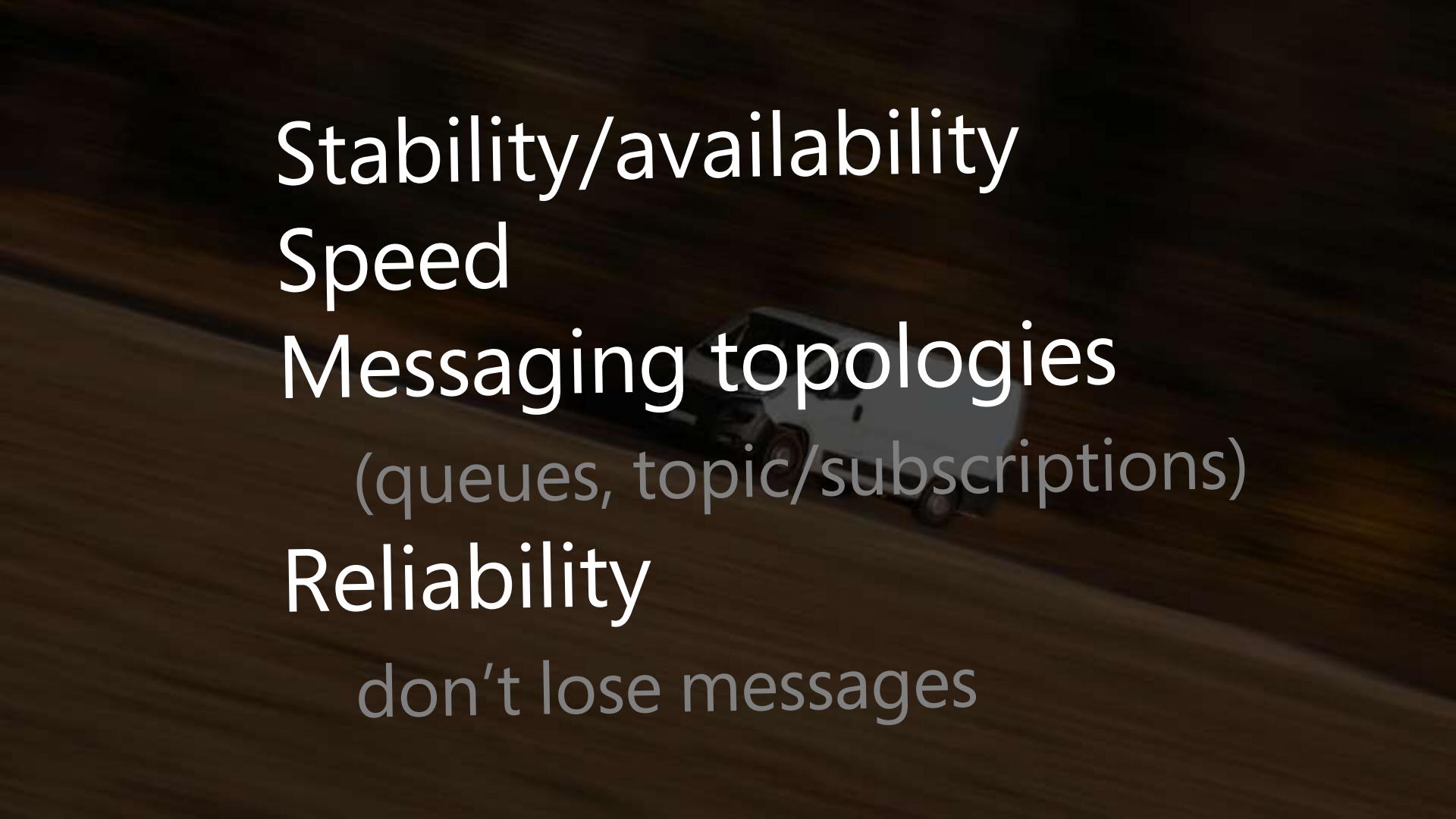
...

Options

# Managed vs Host it yourself



Hosting



Stability/availability

Speed

Messaging topologies

(queues, topic/subscriptions)

Reliability

don't lose messages



NServiceBus

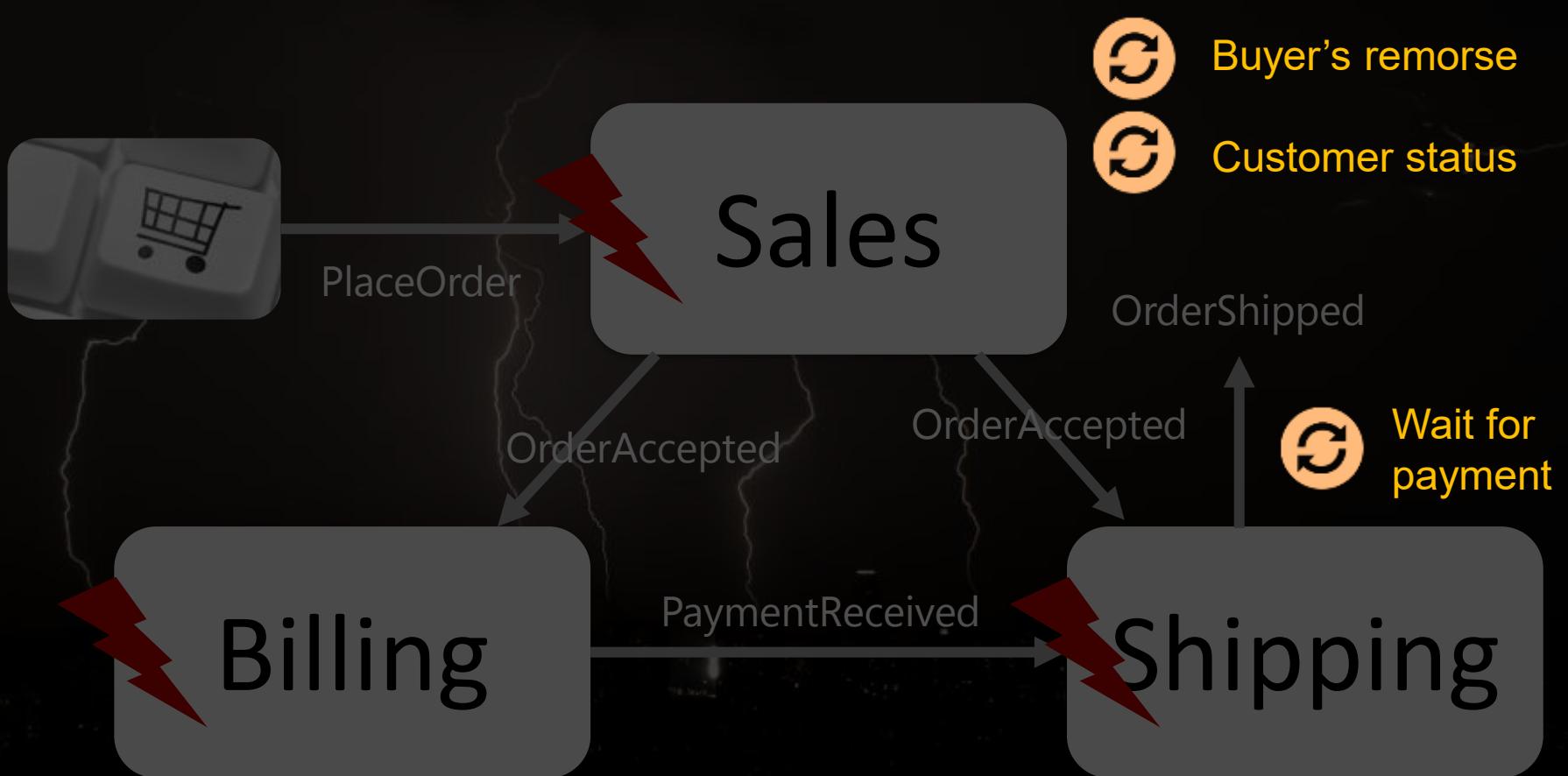


MassTransit



Wolverine





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

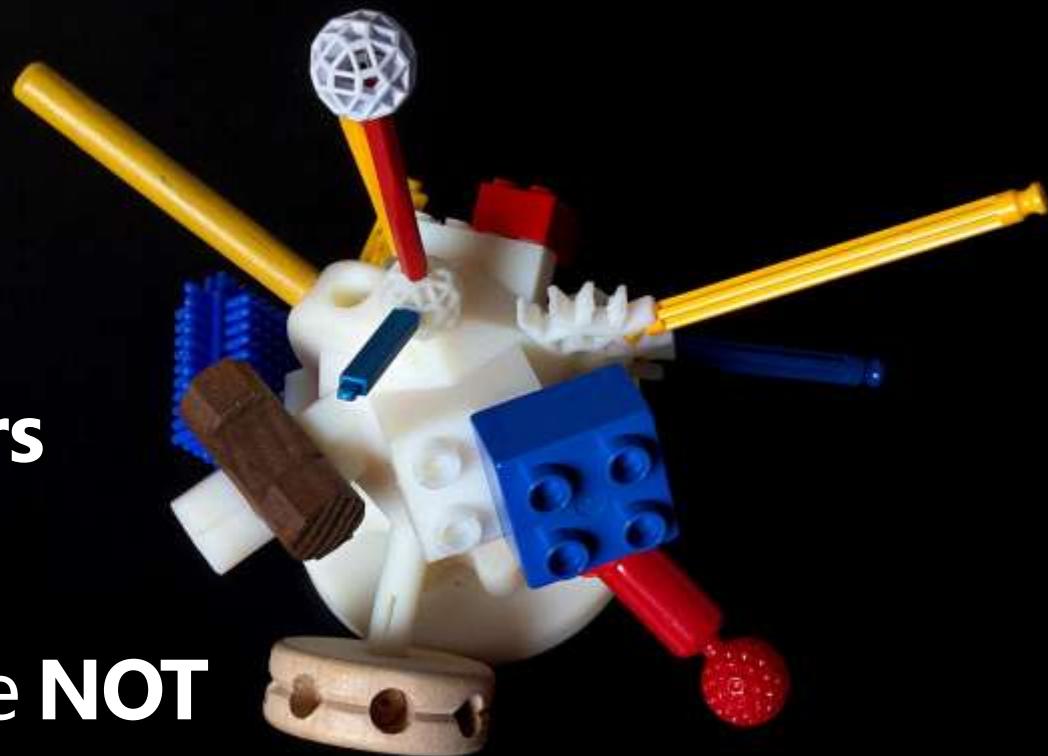


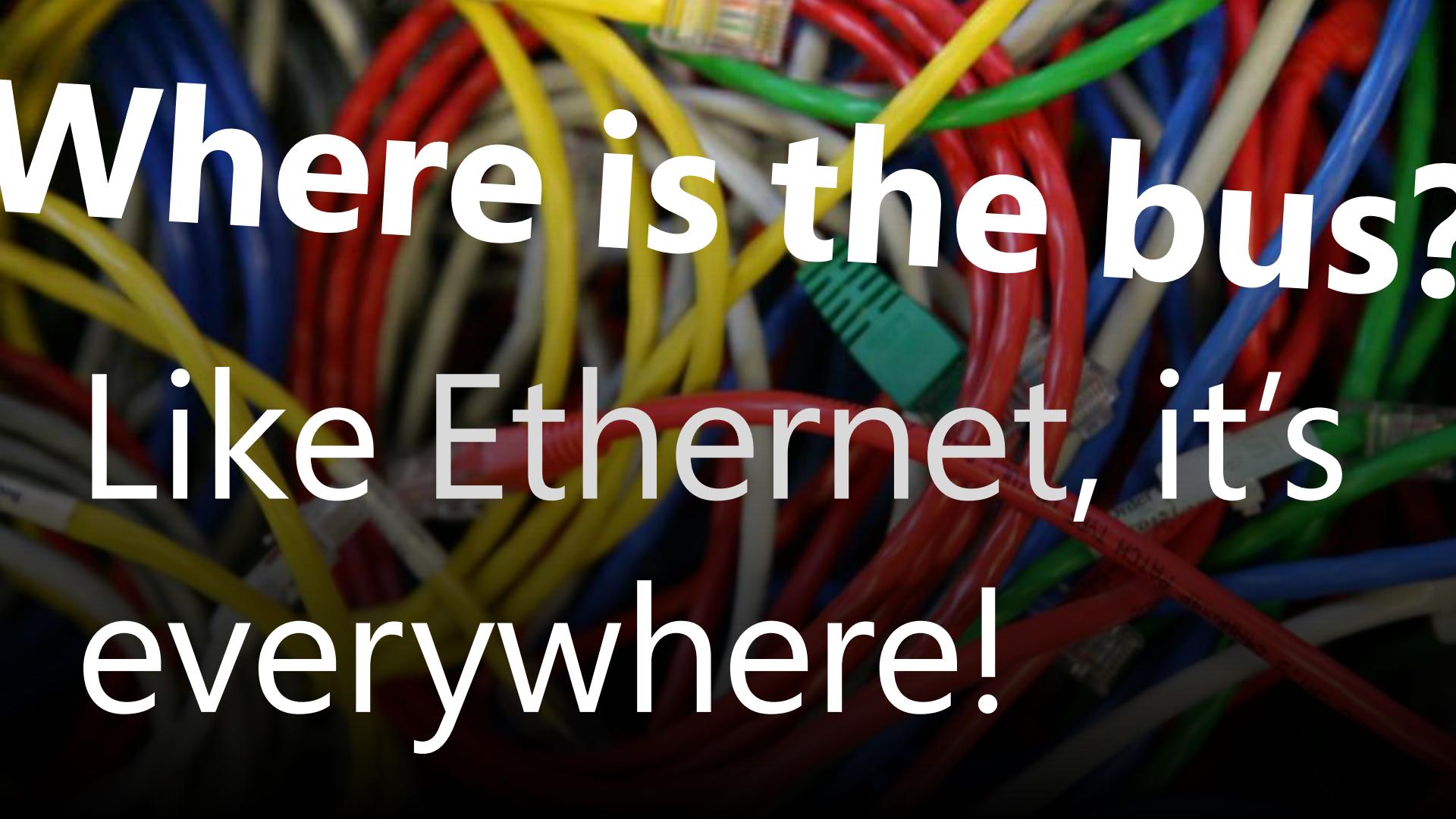
a service bus is an  
**architectural style**  
for integration

# 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

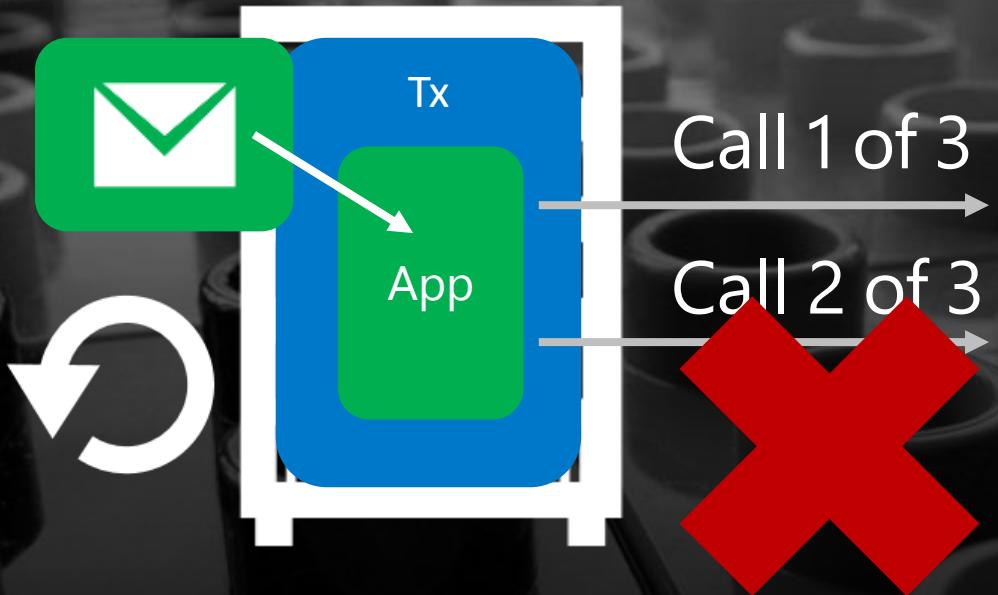
An endpoint is a  
process with an  
input queue

# NServiceBus Concepts

Multiple endpoints can  
make up a service

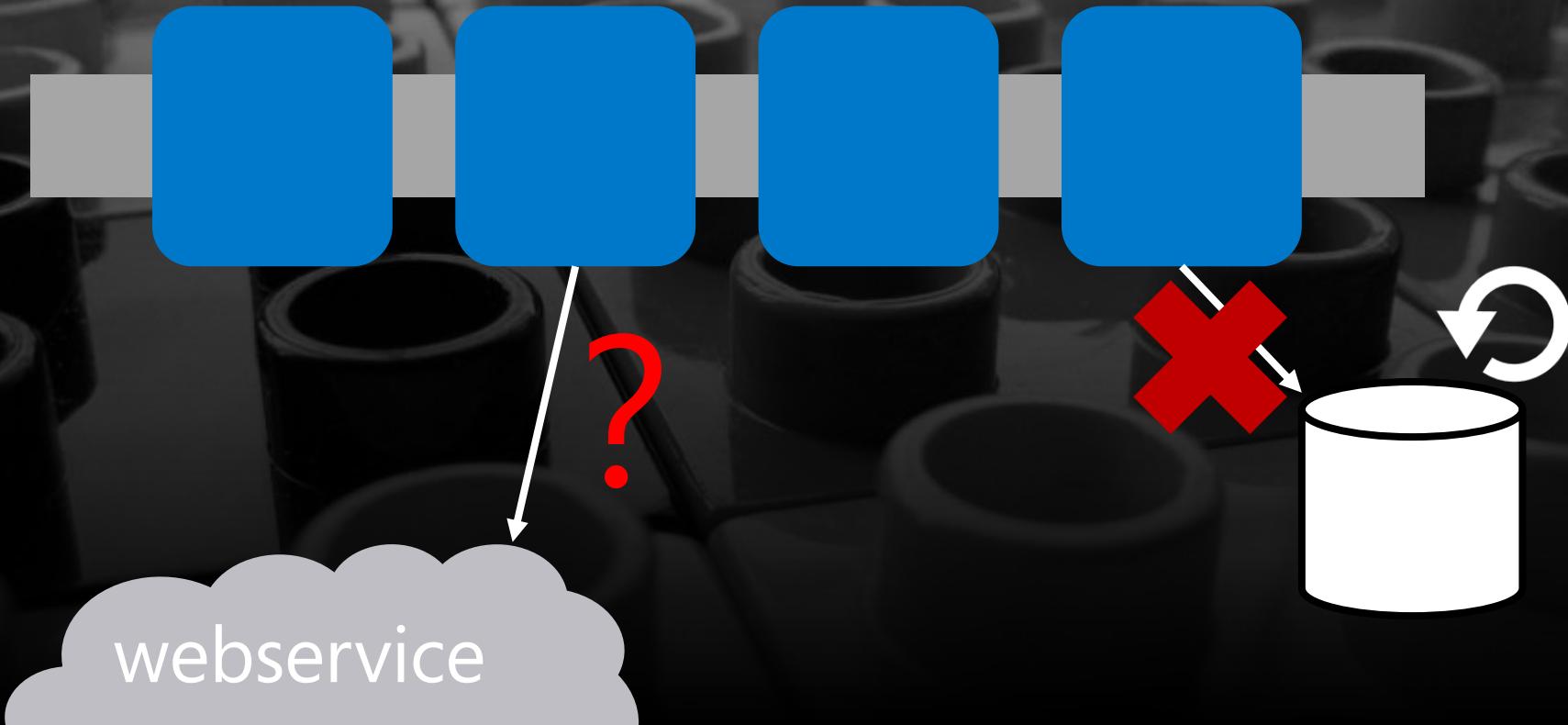
# Resilience

Order \$\$\$

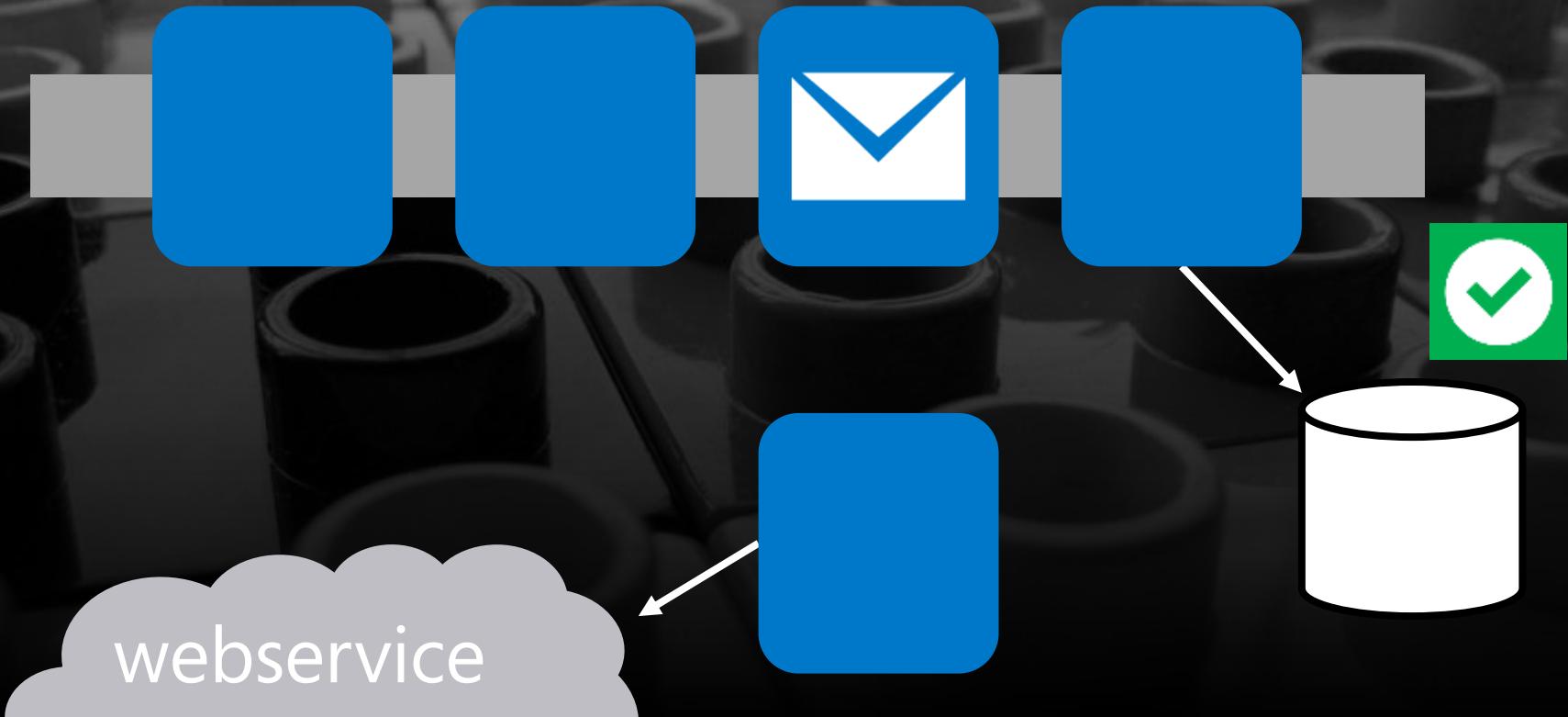


The order is back in the queue

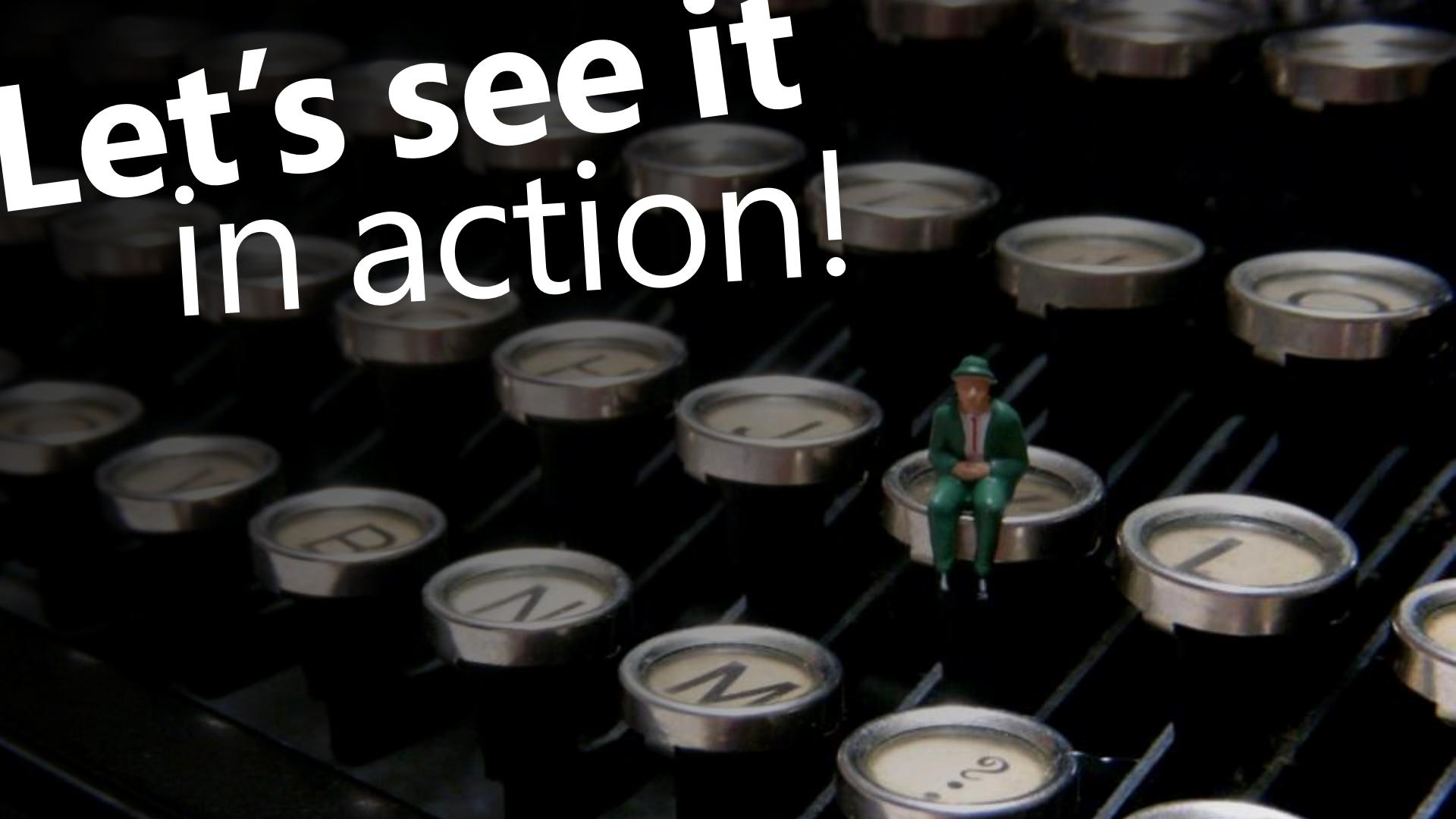
# Webservices



# 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

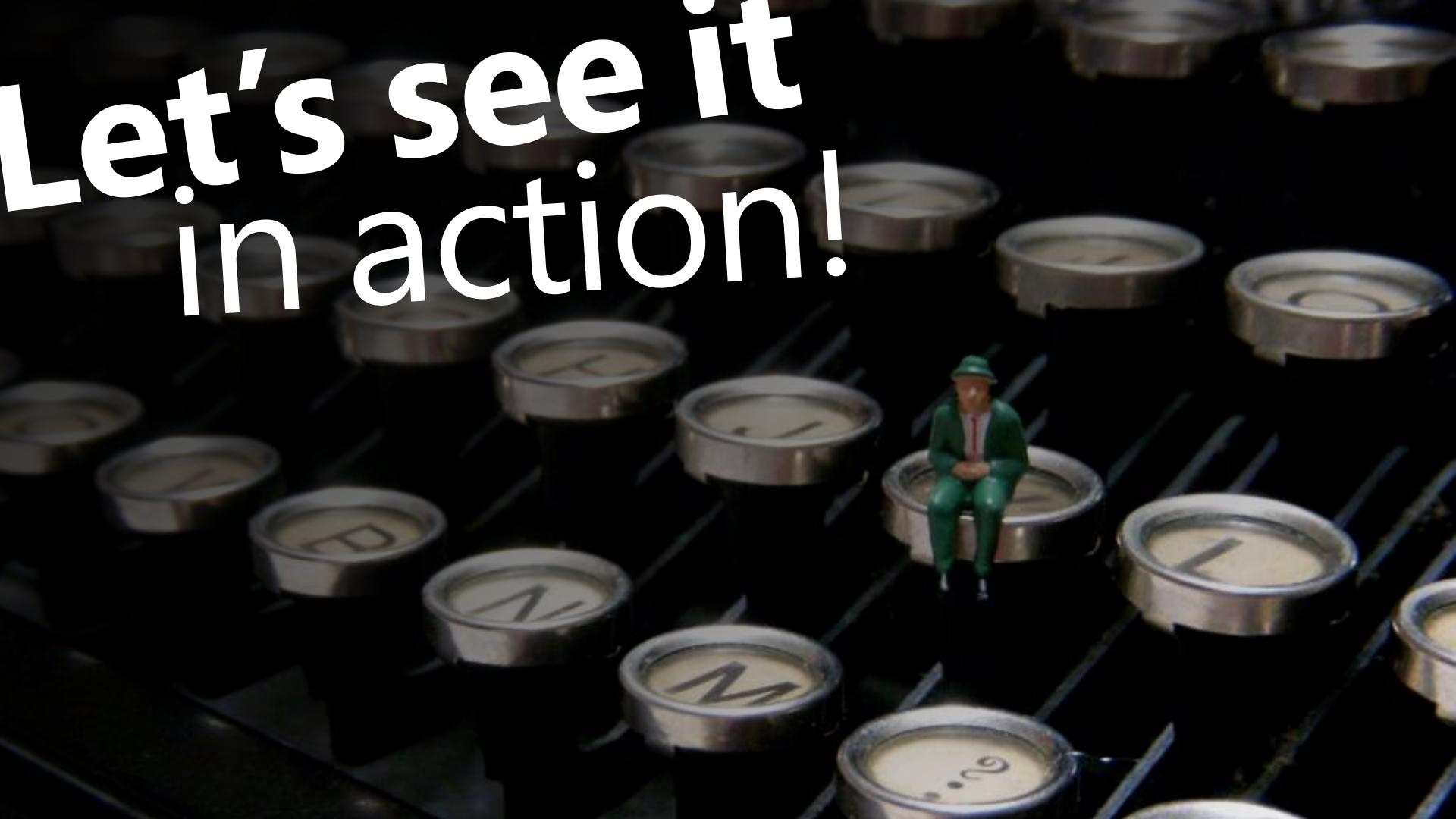


MassTransit  
Concepts

Sagas implemented as  
Automatonous  
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



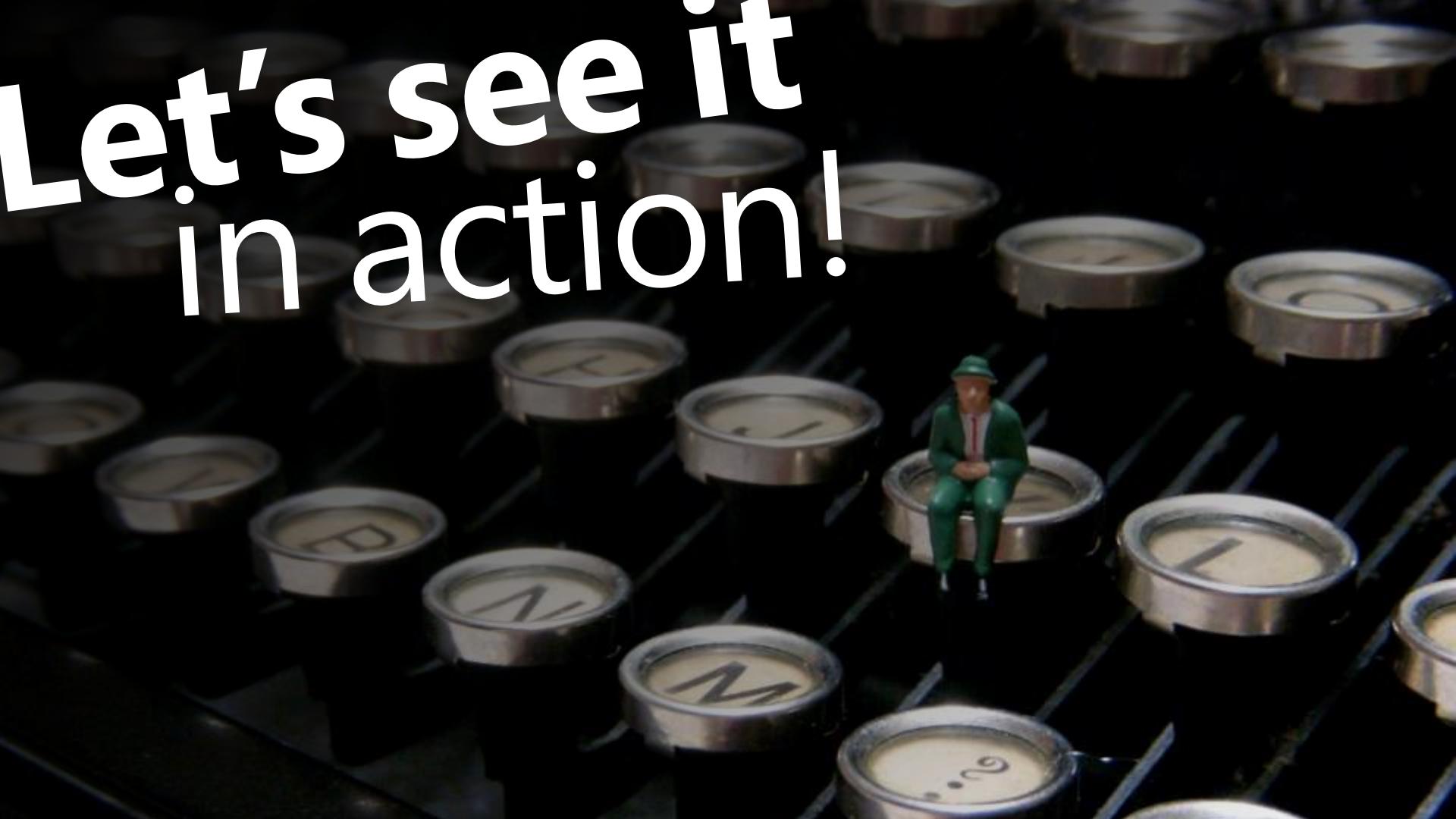
Wolverine  
Concepts

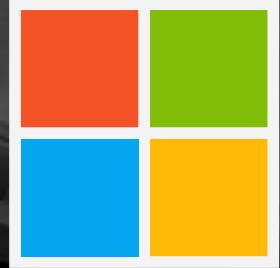
Can even use

**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

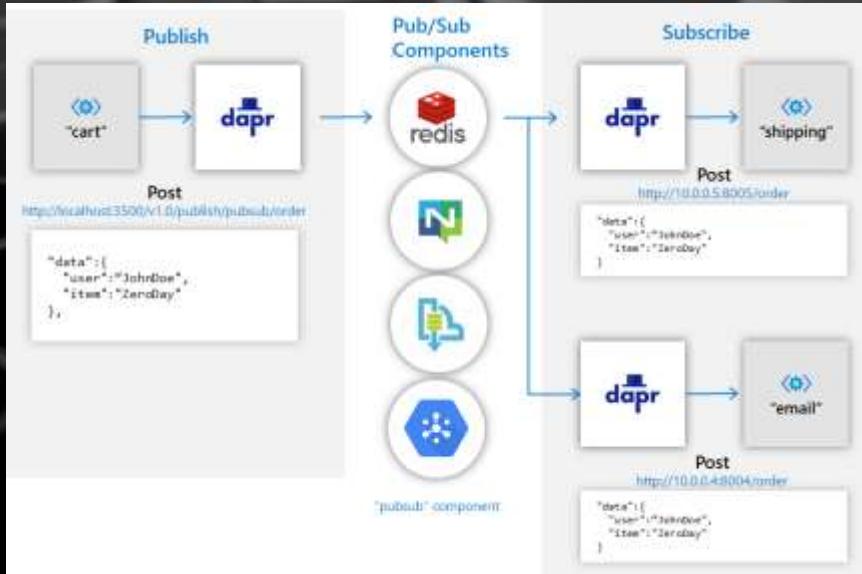
The Dapr logo, featuring the word "dapr" in a bold, lowercase, sans-serif font. Above the letter "d", there is a small icon resembling a blue hat or a stack of books.

# Dapr Concepts



# 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...

# 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  
@roycornelissen  
[roy.cornelissen@xebia.com](mailto:roy.cornelissen@xebia.com)

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



[www.usps.com](http://www.usps.com)

FHSC

# 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!

