The simplest way to build resilient applications

Giselle van Dongen

restate

Drop your questions in the Wova Session Q&A!

Let’s start with a simple example…

```
public class User {

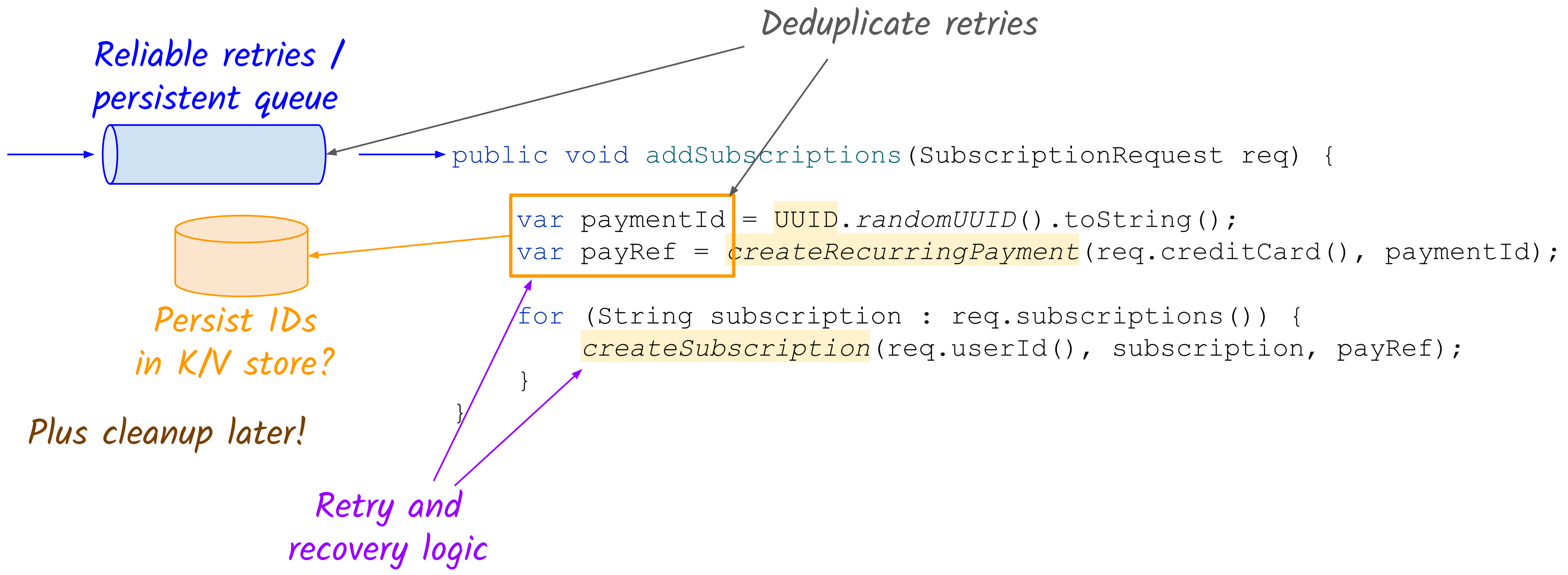
    public void addSubscriptions(SubscriptionRequest req) {

        var paymentId = UUID.randomUUID().toString();
        var payRef = createRecurringPayment(req.creditCard(), paymentId);

        for (String subscription : req.subscriptions()) {
            createSubscription(req.userId(), subscription, payRef);
        }
    }

}
```

→ *How can we make this really reliable?*



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Writing resilient systems is hard…

Race conditions

Zombie processes

Half-executed orchestration

Corrupted state

Timeouts

Network partitions

Duplicate requests

Concurrency

Distributed transactions

Scalability

Rf. the IT crowd

Duct-taping it all together

Session K/V stores
for app state

Message queues
for async events

Workflow orchestrators
for execution progress

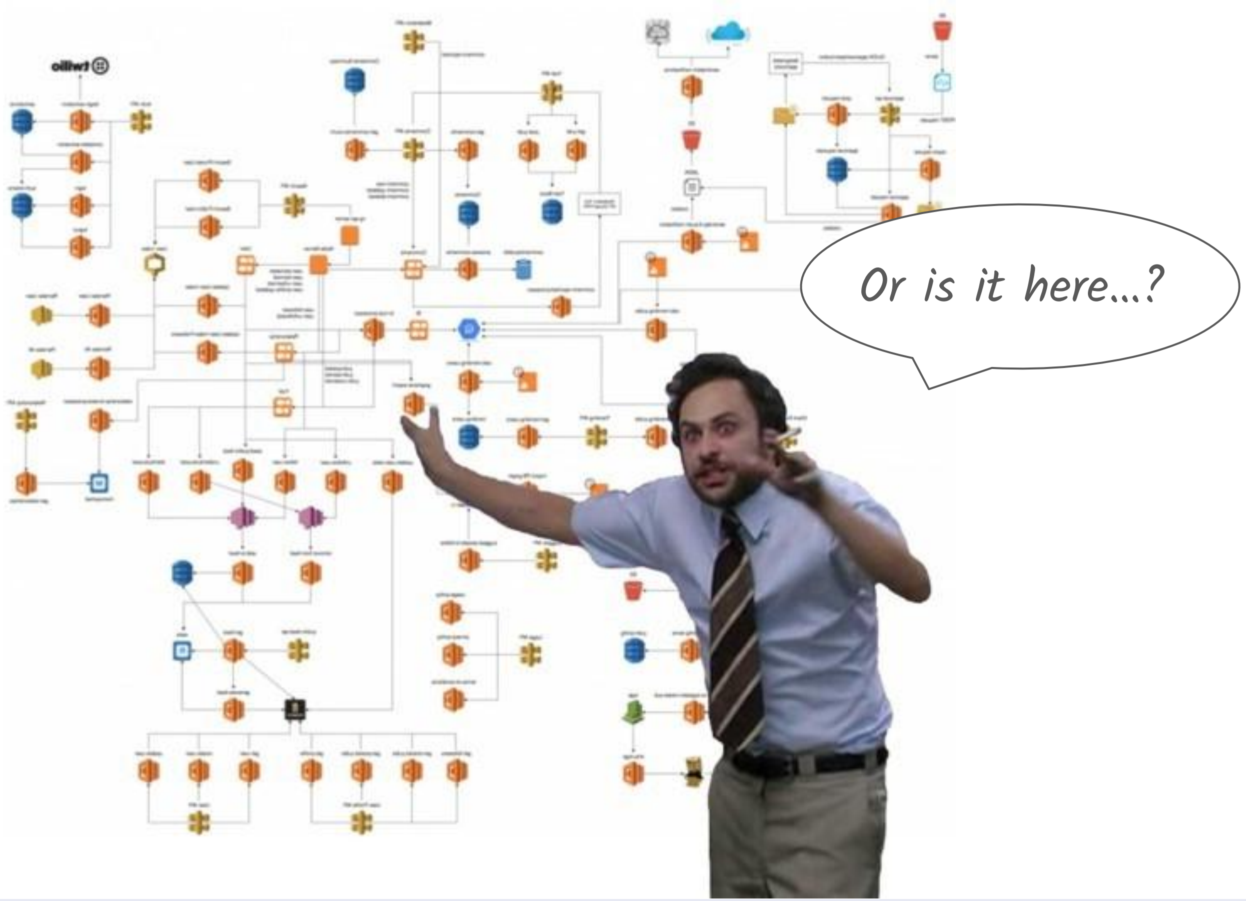
Schedulers
for timers

Manual retry & recovery logic

Don't solve it!

The end...

The end...



Duct-taping it all together

Session K/V stores
for app state

amazon DynamoDB redis

Message queues
for async events

kafka SQS

Workflow orchestrators
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AWS StepFunctions CAMUNDA

Schedulers
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QUARTZ + PostgreSQL CRONJOBS

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QUARTZ
+
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CRONJO

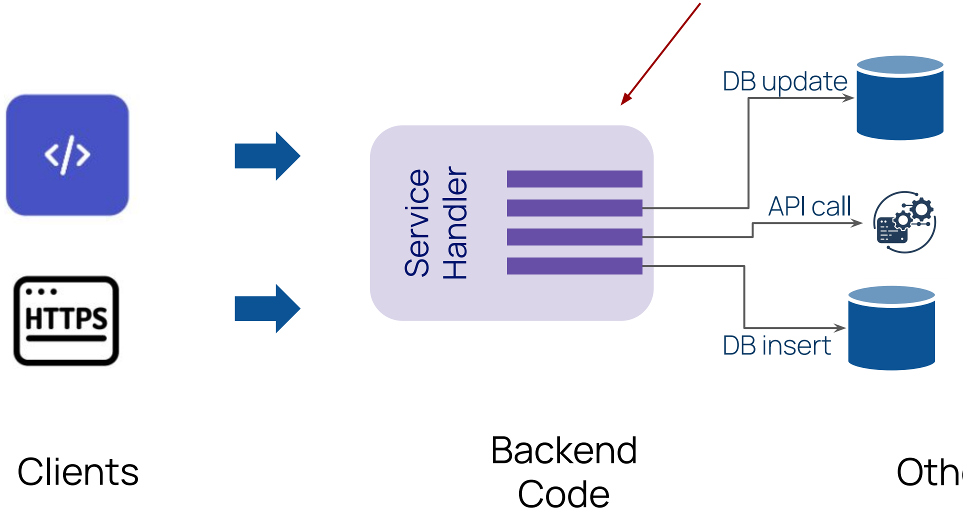
Manual retry &

Don't solve it!

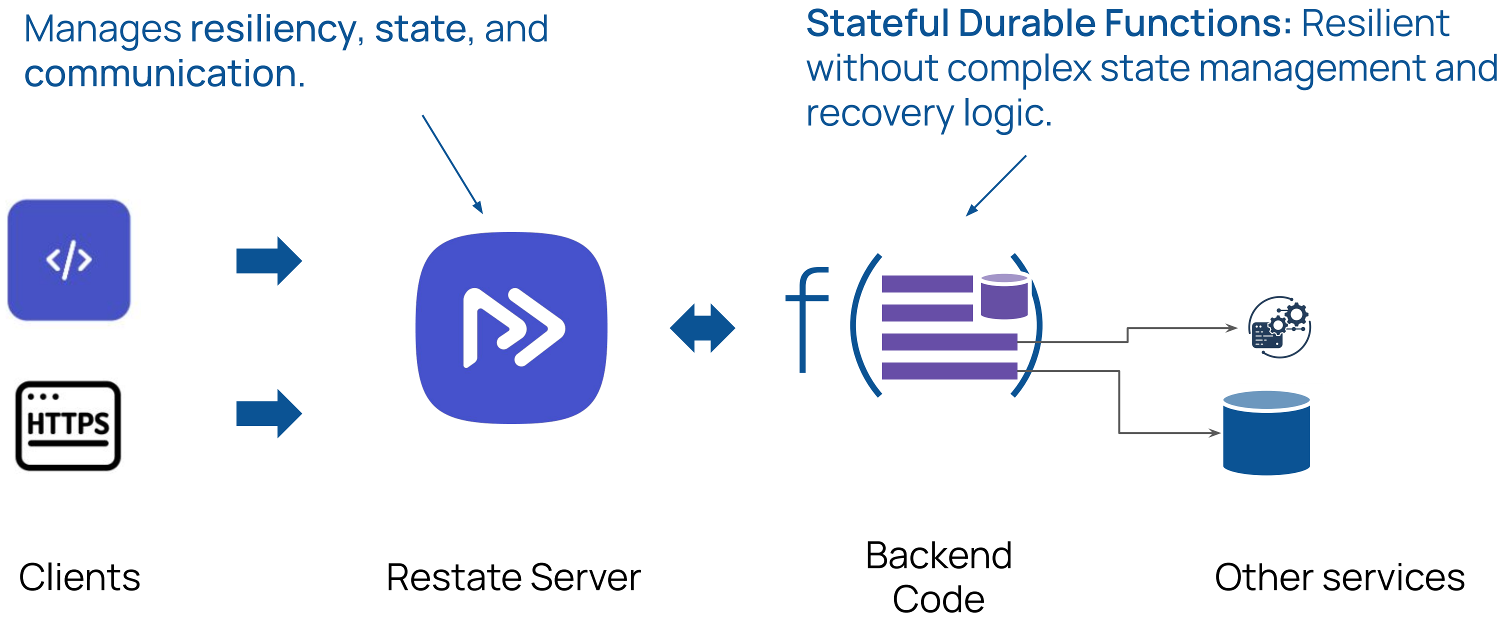
Observability tooling

https://landscape.cncf.io/

On failure, lose state, partial progress.
Resilience is up to the developer.



Restate makes applications innately resilient


Manages **resiliency, state,** and **communication.**
Stateful Durable Functions: Resilient without complex state management and recovery logic.
HTTPS
Clients
Restate Server
Backend Code
Other services

A hybrid between a workflow orchestrator and a message broker

Workflows
and sagas

Concurrent
async tasks

State machines,
agents, actors

Kafka event
processing

Durable Execution

💡 Built-in retries and recovery of progress

```
@Service
public class User {

    @Handler
    public void addSubscriptions(Context ctx, SubscriptionRequest req) {

        var paymentId = ctx.run(() -> UUID.randomUUID().toString());
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        for (String subscription : req.subscriptions()) {
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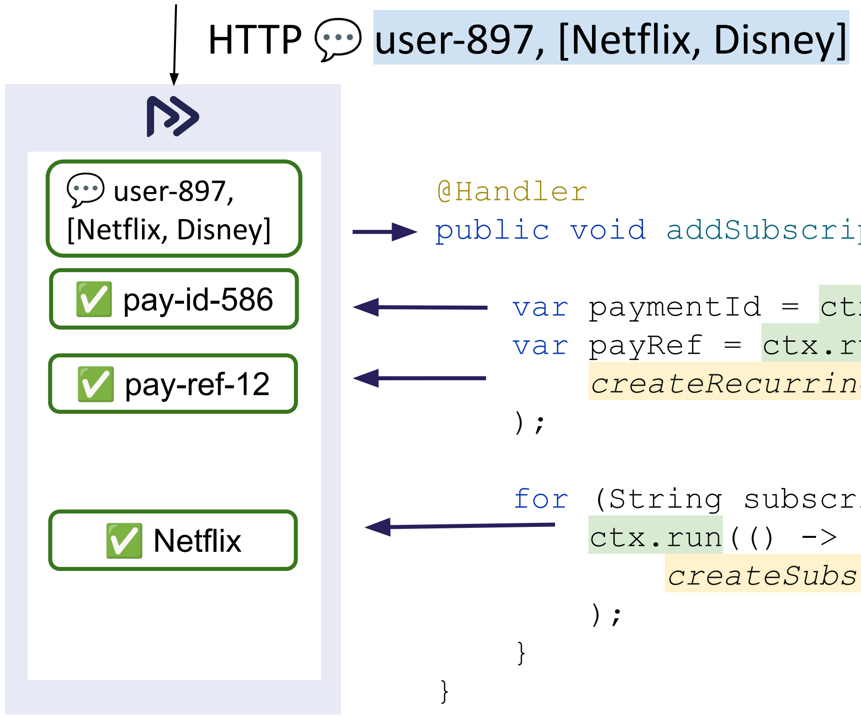
HTTP 💬 user-897, [Netflix, Disney]
💬 user-897, [Netflix, Disney]
✅ pay-id-586
✅ pay-ref-12
✅ Netflix

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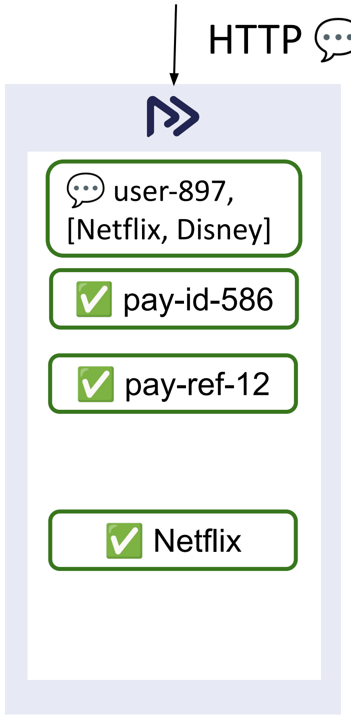

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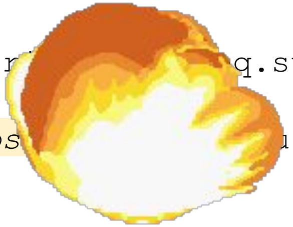

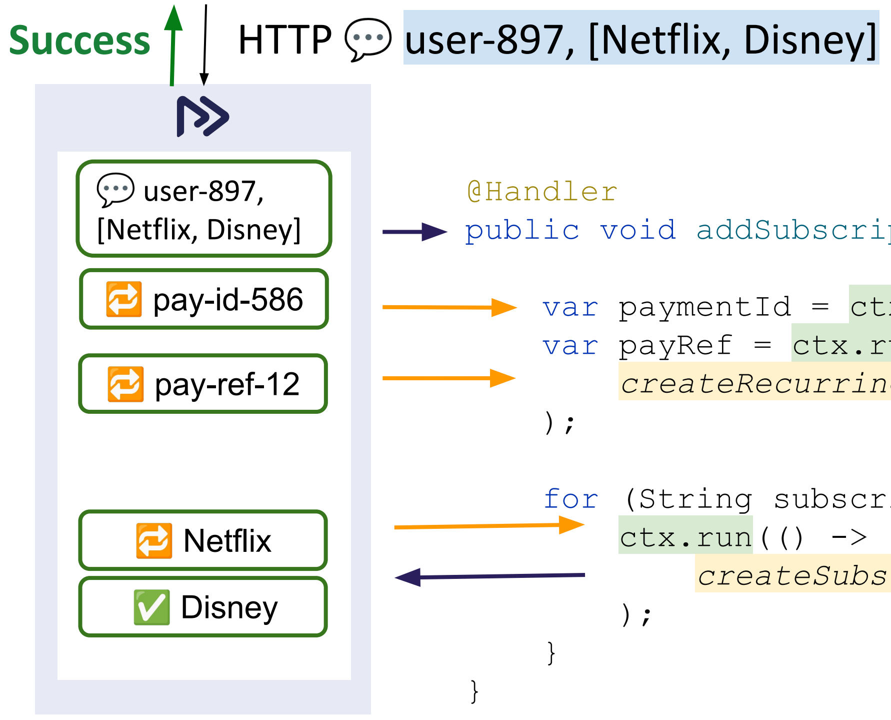
Success
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DEMO

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Scalability

restate

Rf. the IT crowd

Writing resilient systems is a lot easier…

~~Race conditions~~

~~Zombie processes~~

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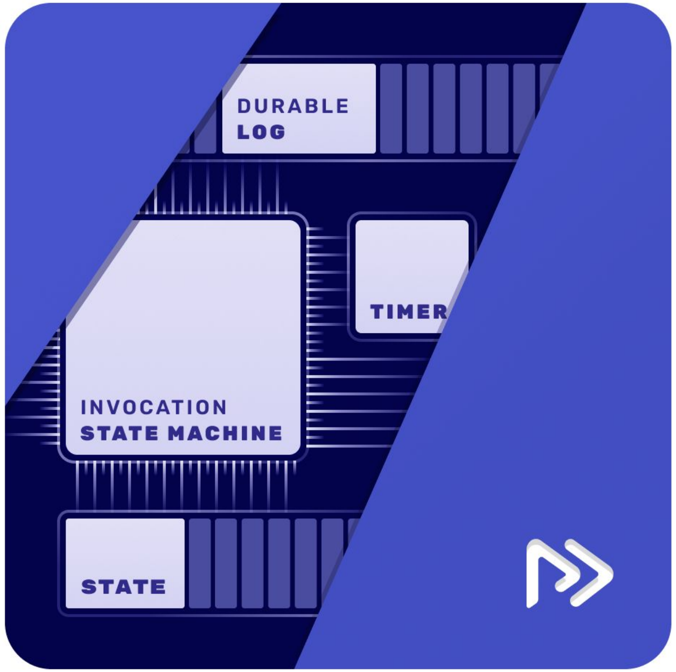
~~Concurrency~~

~~Distributed transactions~~

~~Scalability~~

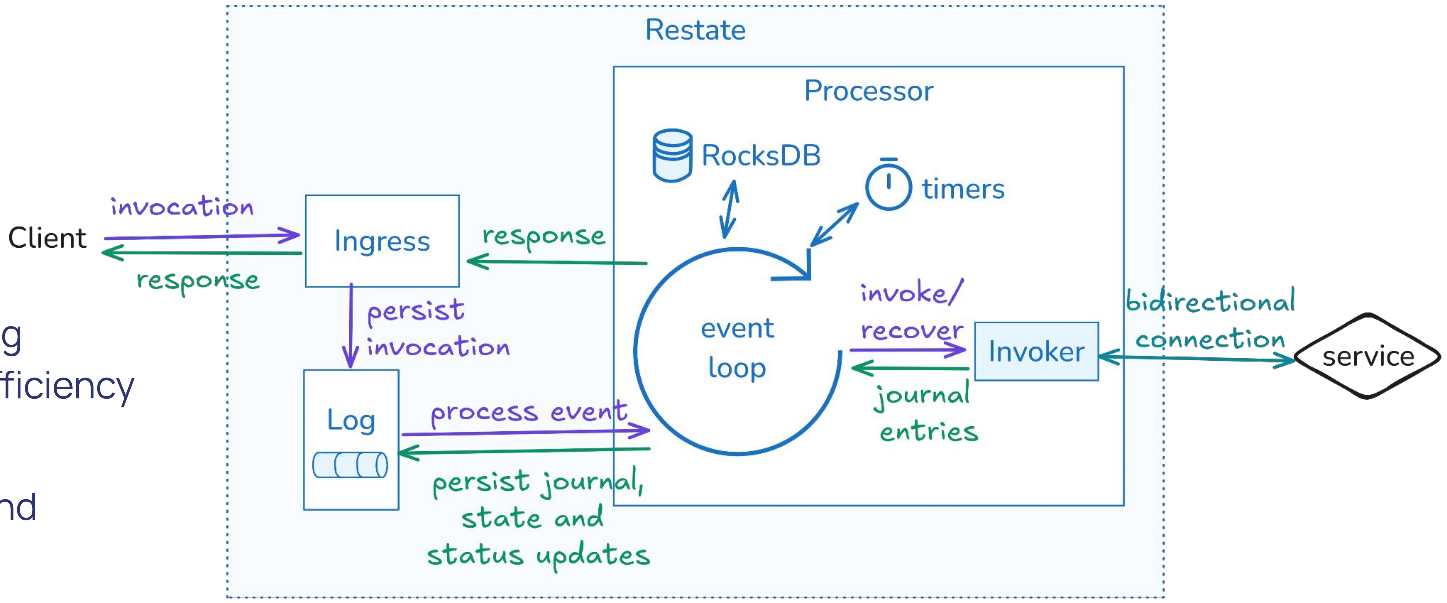
Rf. the IT crowd

- Single binary, written in Rust
- No need for database, queues, ...
- Distributed setup with snapshots to S3
- Cloud-native failover support
- Open Source



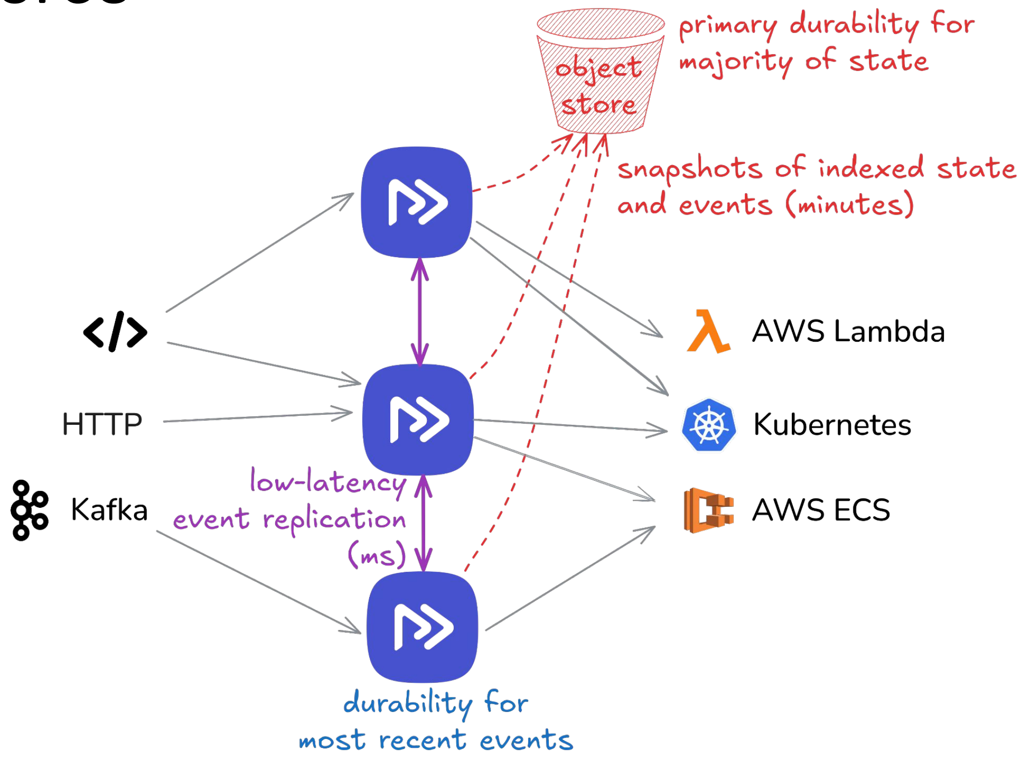
A transactional stateful stream processing engine

- Stream-processing architecture for efficiency and low latency
- Co-located logs and processors



Replication + object stores

- Restate clusters replicate events between nodes for low latency
- The majority of the data is stored on object store


object store
primary durability for majority of state
snapshots of indexed state and events (minutes)
</>
HTTP
Kafka
low-latency event replication (ms)
durability for most recent events
AWS Lambda
Kubernetes
AWS ECS

Currently Supported Languages

TypeScript / JavaScript

Java

Kotlin

Python

Go

Rust

What our community builds with Restate

Workflows/ SAGAs	AI inference	Event-driven Services	Ledgers
Service Orchestration	Payment Processing	Workflow interpreters	AI Agents
Webhook ingestion	Distributed Transactions	Control Planes	Stateful Event Processing

A computer lets you make more mistakes faster than any invention in human history, with the possible exceptions of handguns and tequila.
- Mitch Ratcliffe -

https://restate.dev

@restatedev

@restatedev.bsky.social

/restatedev

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