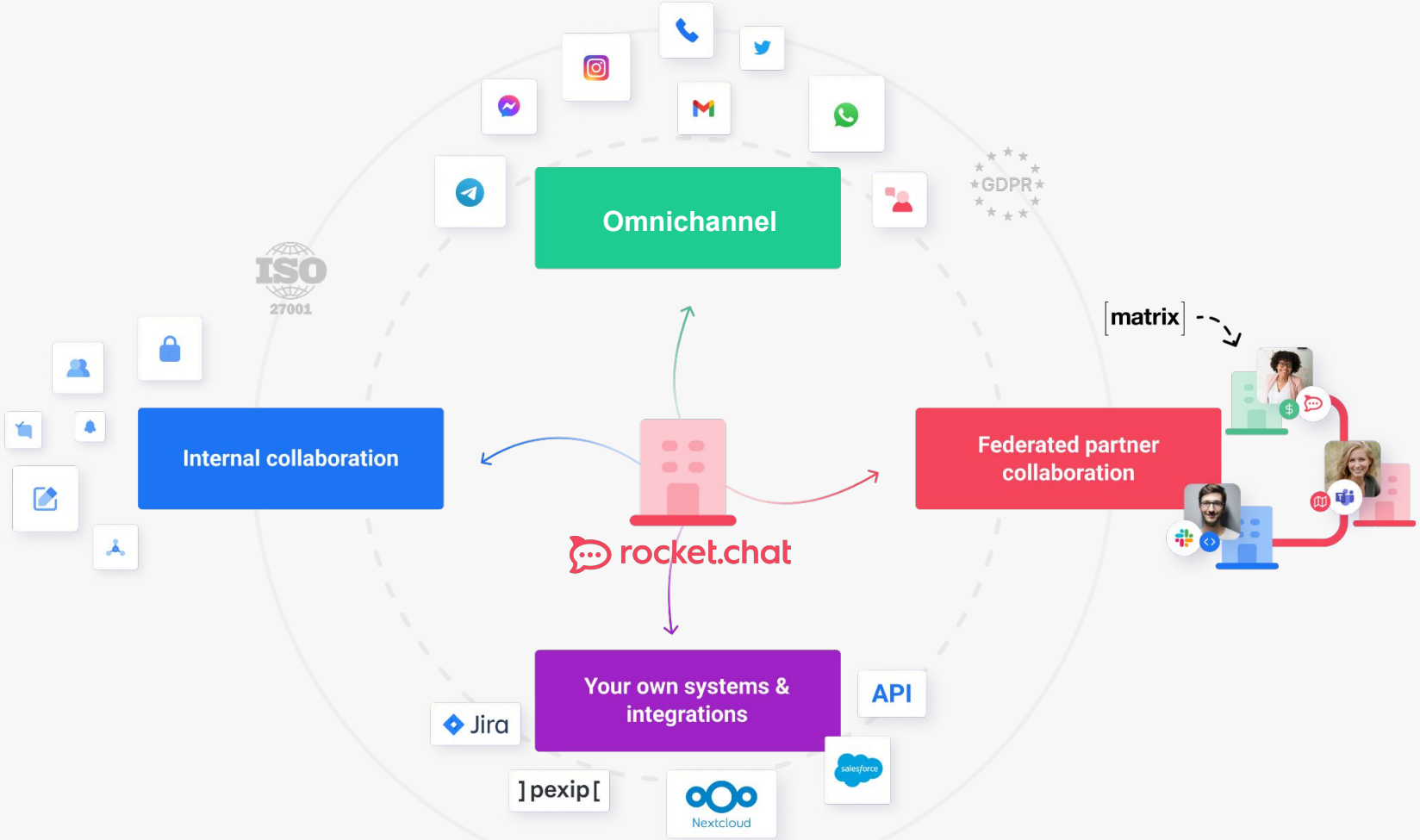
Scaling Open Source Real Time Messaging System for Millions

FOSDEM 2023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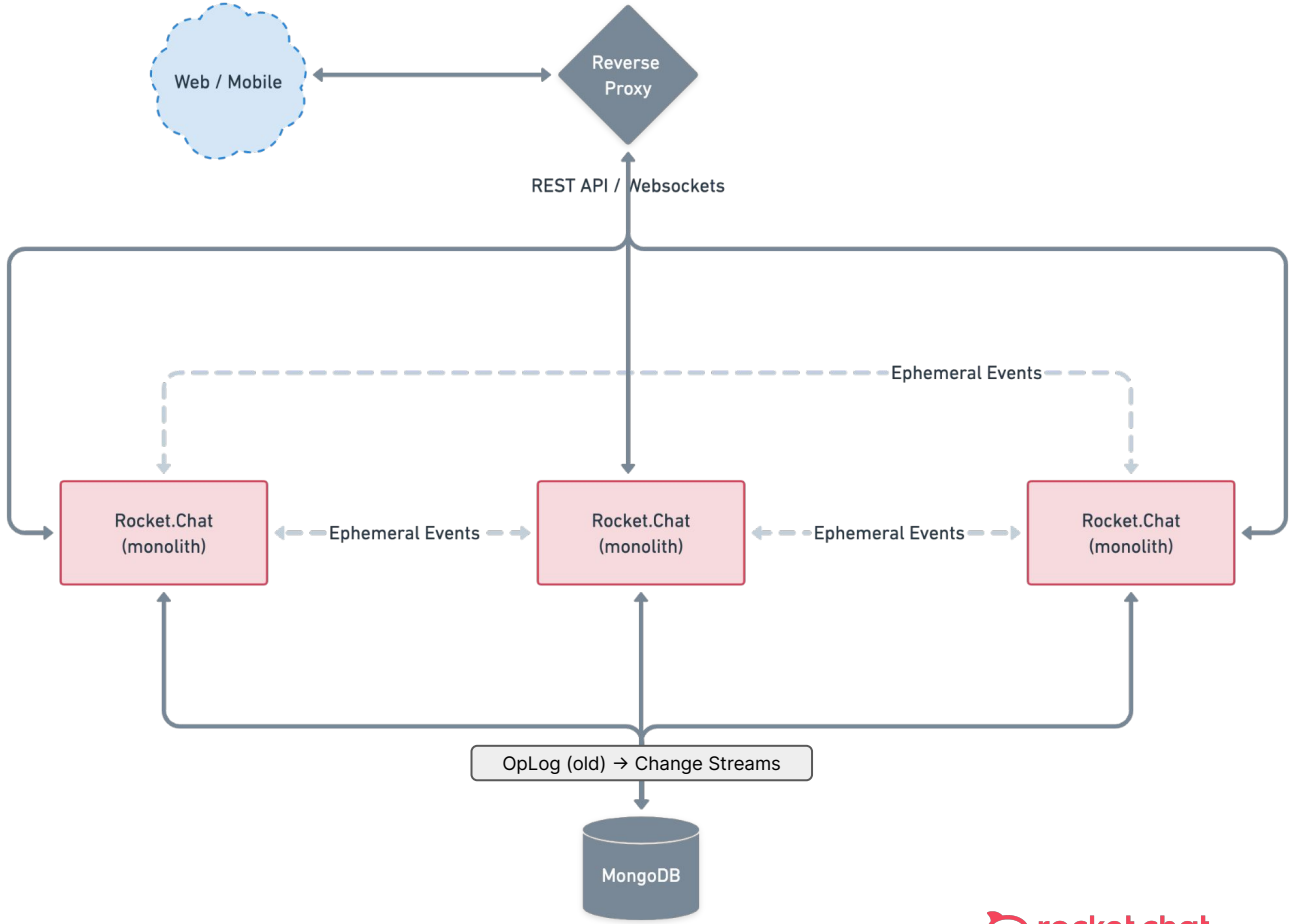
The Monolith

Scaled Monolith by adding dockerized instances

Every instance process all database events to filter the relevant ones increasing CPU and Memory consumption on every instance when scaling

Crossfire of messages between Instances led to scaling plateaux

(1000s of concurrent users)



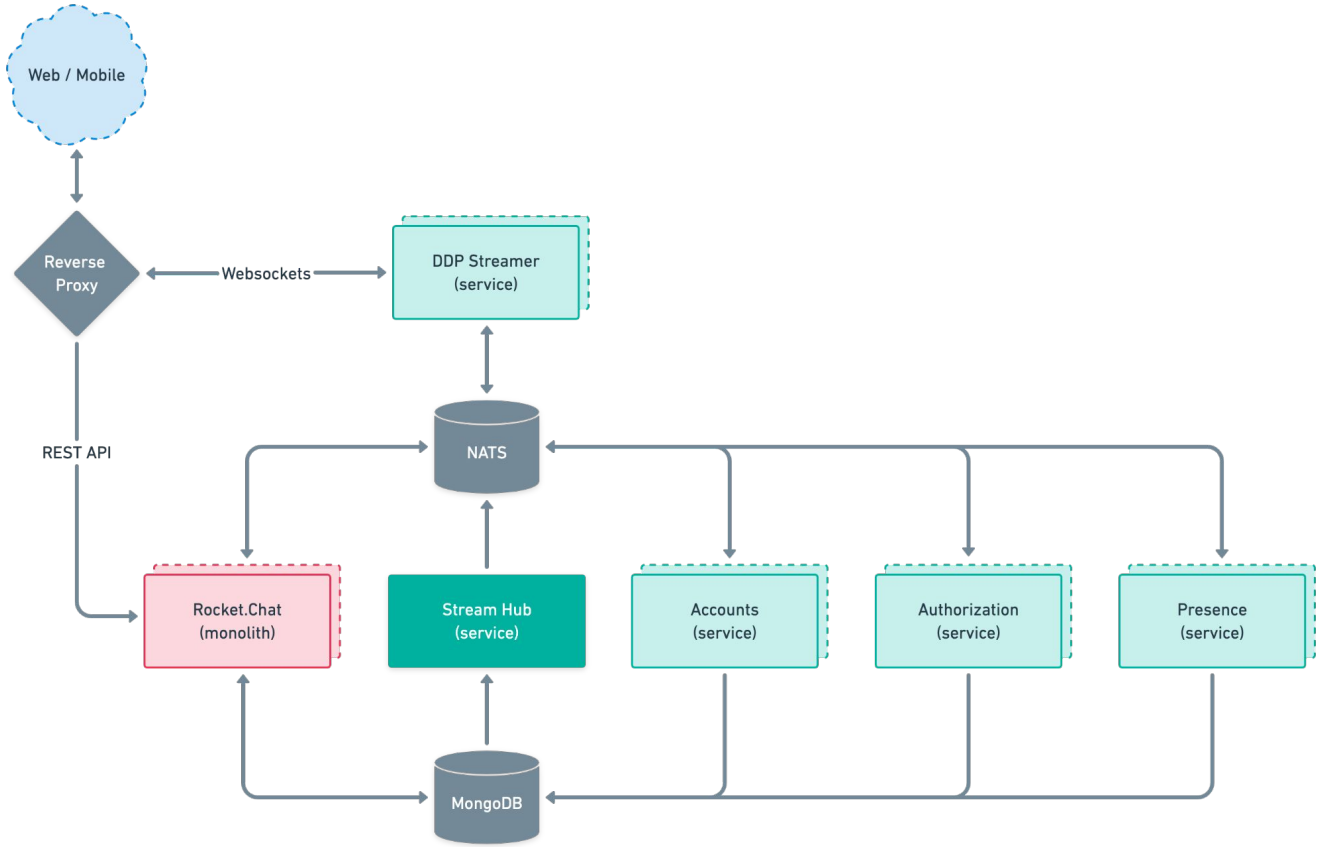
rocket.chat

Microservices V1

Scale services based on load. Websocket (DDP Streamer) is usually the heaviest

Keeps database events processing in a single instance (Stream Hub) which can send some events directly to the DDP Streamer allowing high scalability

Allow future code split as Apps Engine isolating possible performance issues on integrations from the main code



https://docs.rocket.chat/deploy/scaling-rocket.chat/microservices-setup

rocket.chat

Moleculer

Progressive microservices framework for Node.js

- MIT License
- Extensible
  - Good amount of extra modules
- Support for Prometheus metrics
- Many native transporters
  - NATS
  - MQTT
  - AMQP
  - Kafka
  - …
- Cache, DB Adapters, and many more great features
- Easy to use and understand
- Roadmap to a business model

```
const { ServiceBroker } = require("moleculer");

// Create broker
const broker = new ServiceBroker();

// Create service
broker.createService({
    name: "math",
    actions: {
        add(ctx) {
            return Number(ctx.params.a) + Number(ctx.params.b);
        }
    }
});

// Start broker
broker.start()
    // Call service
    .then(() => broker.call("math.add", { a: 5, b: 3 }))
    .then(res => console.log("5 + 3 =", res));
```

https://moleculer.services

rocket.chat

Moleculer

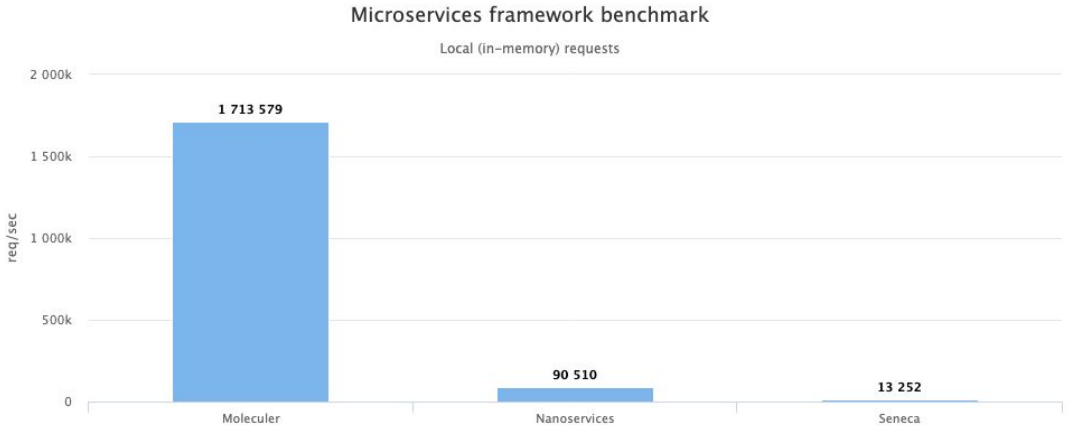
How fast?

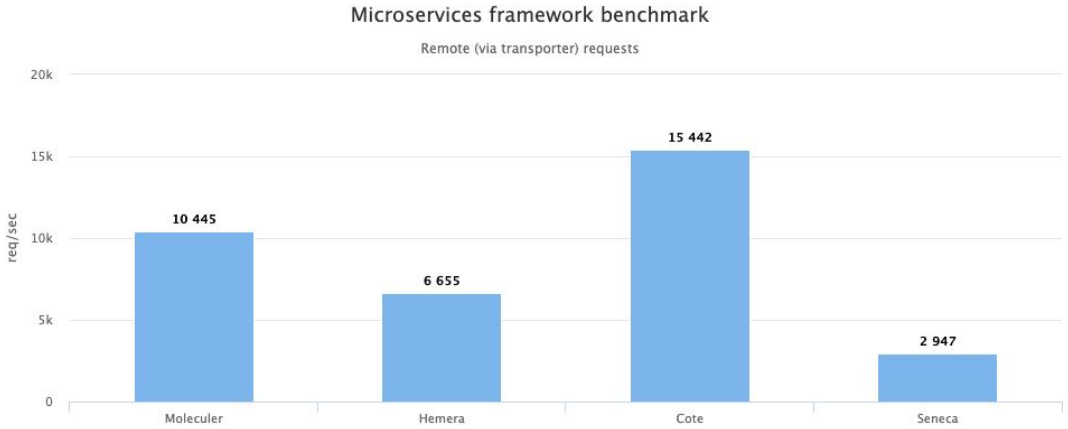
Call local actions

Moleculer	0%
Nanoservices	-94.72%
Seneca	-99.23%

Call remote actions

Cote	0%
Moleculer	-32.36%
Hemera	-56.9%
Seneca	-80.91%





https://moleculer.services

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NATS

Connective Technology for Adaptive Edge & Distributed Systems

- Open Source (Apache 2)
- Made in a modern and fast language (Go)
- Used by big companies as Paypal, Walmart, etc
- Simple to deploy
- Fast!

Downsides

- Do not support Queues

https://nats.io

Molecular & Typescript - Developer Experience

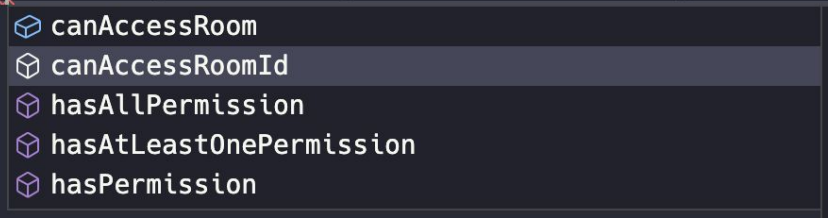
- Use JavaScript **Proxy** to create fake classes based on services' Interfaces
- The fake class converts the method calls to Moleculer service calls
- Allows import of a service class without dependencies
- Provides autocomplete of available methods
- Provides autocomplete of parameters and type-checks

```
export class Authorization extends ServiceClass implements IAuthorization {
    protected name = 'authorization';

    async canAccessRoomId(rid: IRoom['_id'], uid: IUser['_id']): Promise<boolean> {
```

```
export const Authorization = proxifyWithWait<IAuthorization>('authorization');

Authorization.      You, 1 second ago • Uncommitted changes
```




```
(method) canAccessRoomId(rid: string, uid?: str
ing | undefined): Promise<boolean>
```

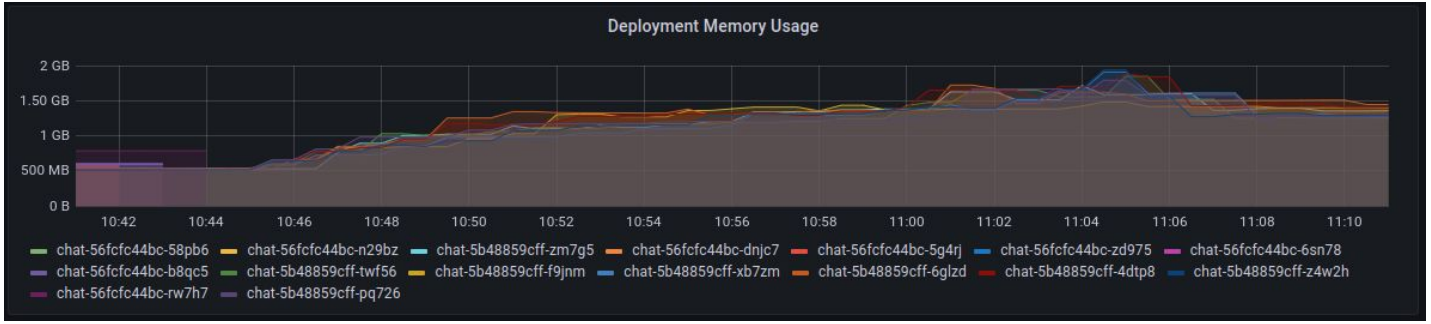
RESULTS

4k concurrent users, worker node m5a.2xlarge

8 monolith instances

~12GB of RAM

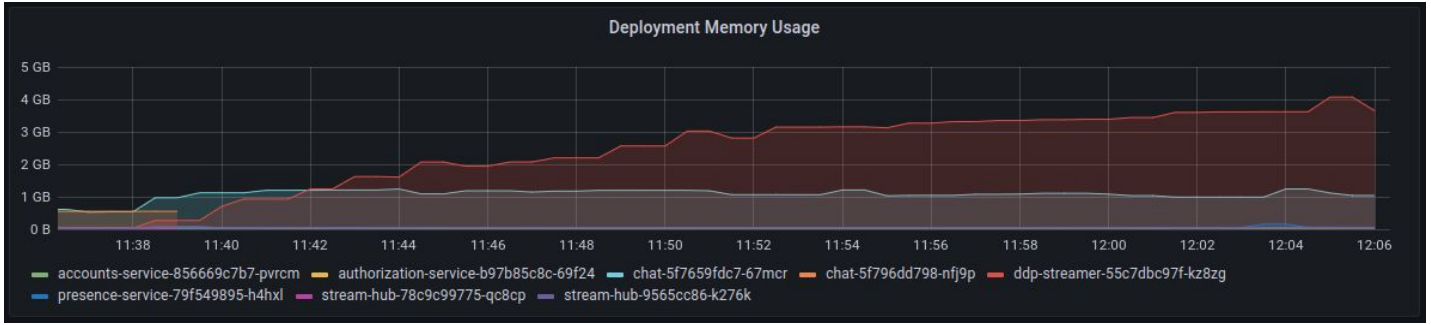
~15 CPUs



1 instance of each service

~5GB of RAM

~3 CPUs



Let's keep the conversation going!

Join the official channel on
open.rocket.chat

http://github.com/rocketchat/rocket.chat