

# Java and GraalVM Runtime for Microservices

Designed to radically simplify server-side  
development and deployment





# SOFTINSTIGATE

Software Design & Development Company, based in Milan, Italy

<https://softinstigate.com/en>

We develop **REST**Heart



<http://github.com/softinstigate/restheart>



# Our relationship with MongoDB

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SoftInstigate is  
[MongoDB ISV and Technical  
Partner](#)



Read our story on  
<https://www.mongodb.com/customers/softinstigate>



# Real case example

Project run by SoftInstigate

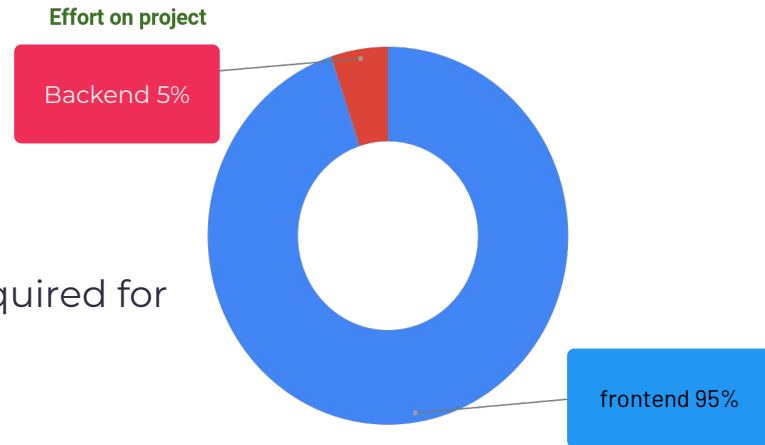
Complex B2B and C2B marketplace for used cars

- The project leverages RESTHeart+MongoDB and Angular
- Project start: mid September 2019
- In production: end of December 2019
- It took 215 man-days to go online



Thanks to RESTHeart, only 11 man-days were required for the development of the back-end

- Most of the team focused on UX/UI



# Motivation

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There are **fundamental features** every application always need to implement:

- Security
- Data Persistence
- Custom logic API

RESTHeart provides **out-of-the-box** data persistence on MongoDB , secure authentication and role-based authorization, and a Java and JavaScript framework to develop services.



# Main Features

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## Security

Authenticate clients via multiple schemes and enforce role-based authorization policies.

Security can be easily customized to integrate external providers or implement fine-grained security policies.

## Data API

RESTHeart leverages MongoDB to provide all data functionalities required by modern applications

Supports all the features of MongoDB including queries, aggregations, change streams and transactions.

## Development Framework

Develop Web Services in minutes or execute custom behaviours on different stages of the request / response life-cycle.

Deploy custom services by just copying plugins into a folder.

## Proxy

Use RESTHeart as the Ingress for your microservices and handle them under the same security context.

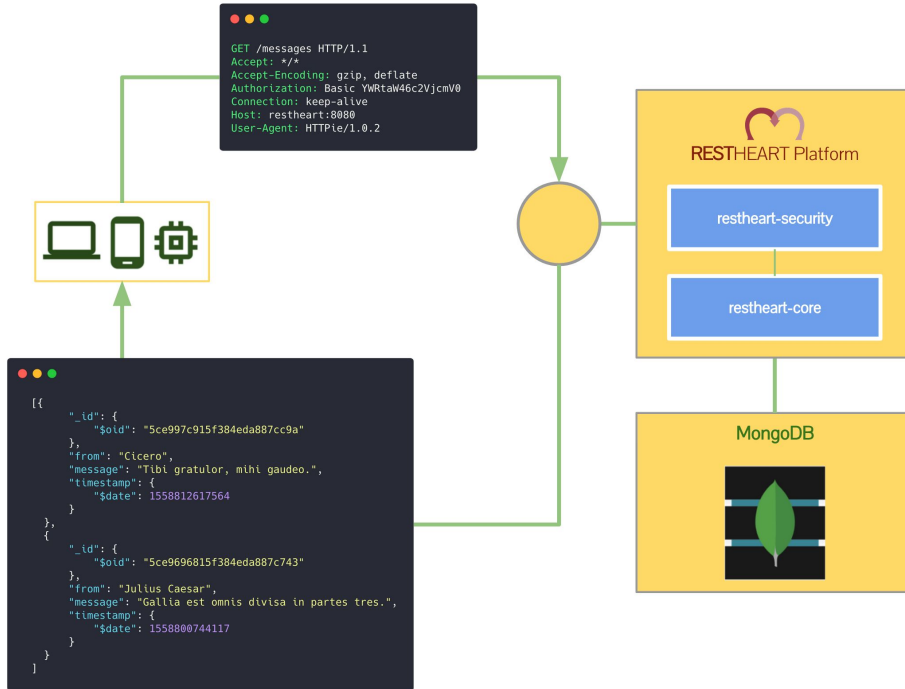
This makes possible to use external microservices, made with Node.js, Spring Boot, or AWS Lambda.

## Core Runtime

RESTHeart exposes a complete API that follows the REST paradigm and uses JSON as the representation format.



# RESTHeart simplifies client-server interaction



- Clients interact with RESTHeart using plain HTTP requests and JSON.
- REST + GraphQL make the API clean, self-describing and easy to use.
- Works seamlessly with SPA frameworks (React, Angular, Vue, ecc) .
- Clients (e.g. Mobile Apps) just require a HTTP client library.



# What's new in RESTHeart v6

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- **GraphQL** API for MongoDB
- **JavaScript** Development Framework
- Available as **native image** for instant startup and small memory footprint (fully supports GraalVM)
- Enhanced and Simpler **Security**

<https://restheart.org/docs/upgrade-to-v6>

[Discussion about v7](#)





# Technical Specifications

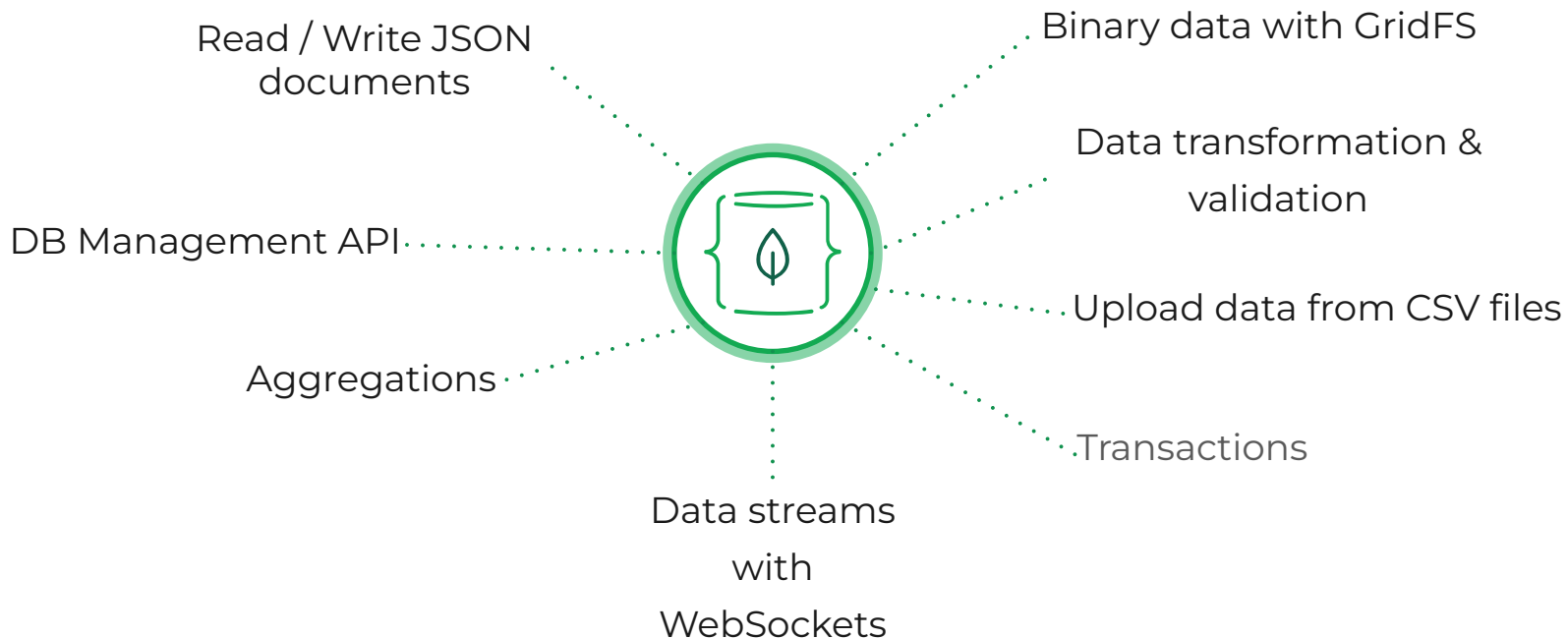
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- Runs on **Java** and **GraalVM** and as **native image**
- Uses **MongoDB** and compatible databases for data persistence
- **Super fast** (handles over 100k requests per seconds per instance)
- **Docker** images are available (~ 1 M download)
- **Kubernetes** friendly
- Can be easily deployed both on **Cloud** and **On Premises**.



# RESTHeart supports all MongoDB's features, and more

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# Supported databases

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RESTHeart is tested and supported with:

- MongoDB Community
- MongoDB Enterprise
- Percona Server for MongoDB
- Amazon DocumentDB (\*)
- Microsoft Azure Cosmos DB (\*)

(\*) Both databases are API-compatible with MongoDB v3, but with some specific limitations.



# Example: Query data with JavaScript

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```
const url =
  encodeURIComponent('https://demo.restheart.org/messages?filter=
{"from":"Bob"}&pagesize=1 ');

fetch(url)
  .then(response => response.json())
  .then(json => JSON.stringify(json, null, 2))
  .then(docs => console.log(docs))
```

[Run it](#)



```
HTTP/1.1 200 OK
...
[
  {
    "_id": {
      "$oid": "5db0067615f384eda89e5fab" },
    "message": "hi there!",
    "from": "Bob",
    "timestamp": { "$date": 1571817078280 }
  }
]
```



# Development Framework

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RESTHeart provides a modern Development Framework

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- Services are bound to an URI to handle HTTP requests
  - Interceptors can read or modify requests and responses on the fly
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Languages: **Java**, **Kotlin** and **JavaScript** (from v6)


See examples at <https://github.com/SoftInstigate/restheart-examples>



# Example: HelloWorld Web Service in Java

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```
@RegisterPlugin(name = "greetings", description = "just another Hello World")
public class GreeterService implements JsonService {
    @Override
    public void handle(JsonRequest req, JsonResponse res) {
        switch(req.getMethod()) {
            case GET -> res.setContent(object().put("message", "Hello World!"));
            case OPTIONS -> handleOptions(req);
            default -> res.setStatusCode(HttpStatus.SC_METHOD_NOT_ALLOWED);
        }
    }
}
```



```
$ curl 127.0.0.1:8080/greetings
HTTP/1.1 200 OK
{ "message": "Hello World" }
```



# JavaScript Example

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```
export const options = {
  name: "helloWorldService",
  description: "just another Hello World",
  uri: "/hello"
}

export function handle(req, res) {
  res.setContent(JSON.stringify({ msg: 'Hello World' }));
  res.setContentTypeAsJson();
}
```



```
$ curl 127.0.0.1:8080/hello
HTTP/1.1 200 OK
{ "message": "Hello World" }
```



# Services for the Enterprise

To run RESTHeart seriously in production





# On-premises

Buy **license keys** for running RESTHeart in production **without incurring in the limitations of the Open Source license**, including 12 months of first-class enterprise **support**.

<https://restheart.com/#onPremises>

## Options

### Commercial license

One license key per production instance, unlimited development instances

✓ [Contact Us](#) →

### Custom terms

When you need custom license and support terms

### OEM license

Embed RESTHeart in your product or service

## Features

- ✓ Perpetual Business friendly license
- ✓ Priority bug fixes
- ✓ One year of support, renewable
- ✓ Pay only for production instances
- ✓ OEM license option
- ✓ IP warranties



# Cloud

Fully managed **Cloud service** with all the out-of-the-box features of RESTHeart (including Authentication+Authorization and the Data API), where you can run your own plugins.

<https://restheart.com/cloud>

## Sizing

### Standard

The optimum size for most applications

### Plus

Higher throughput and more storage

### Custom

When you want a tailored installation

✔ [Contact Us](#) →

Transparent pricing, all costs of AWS and MongoDB Atlas are included

## Features

- ✔ Pay as you go
- ✔ High Available
- ✔ Available on all regions
- ✔ Secure
- ✔ Runs on AWS and MongoDB Atlas
- ✔ Deploy your plugins



# Support

## First-class support from the RESTHeart development team

You get Enterprise Support if you have an active RESTHeart Cloud account or if you own a RESTHeart commercial license, during the validity of the subscription period.

## All included

The support team is available for you via Jira. Whatever it is a discussion around a scalability problem, a feature request, an hint about the best approach to develop a custom plugin or how to use the API from a client application, or just a question, we are here to help.

## Service Level Agreement

	Enterprise	Community
<b>Visibility</b>	private	public
<b>Channel</b>	dedicated jira account	github issues
<b>Availability</b>	5x8: 8 hours per day Mon - Fri	not guaranteed
<b>Response time</b> - Application Down	2 business hours	not guaranteed
<b>Response time</b> - Application Degradation	4 business hours	not guaranteed
<b>Response time</b> - Low impact or Inquiry	2 business days	not guaranteed
<b>Support team</b>	restheart core development team	community members



# Contact us

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Contact us to request more information

<https://restheart.com/#contact>





Visit the web site → <https://restheart.org>

For any question → [ask@restheart.org](mailto:ask@restheart.org)

**RESTHeart** is a division of SoftInstigate

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