



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

SoftInstigate is
a [MongoDB Technical Partner](#)



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



Real case example

[Autoinrete.com](https://autoinrete.com)

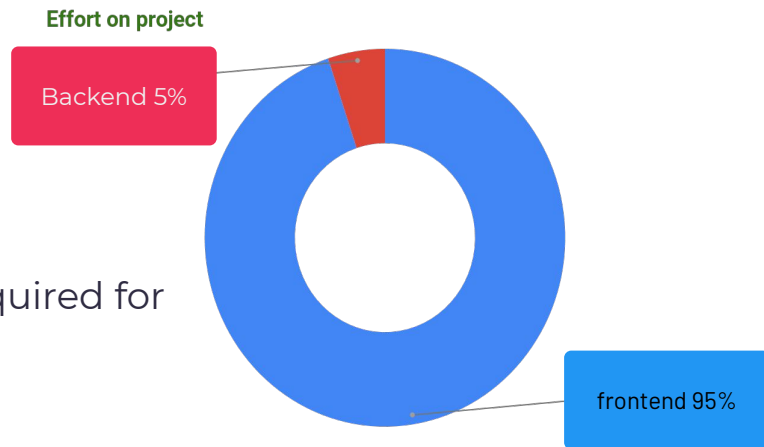
Complex B2B and C2B marketplace for used cars

- 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

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

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.

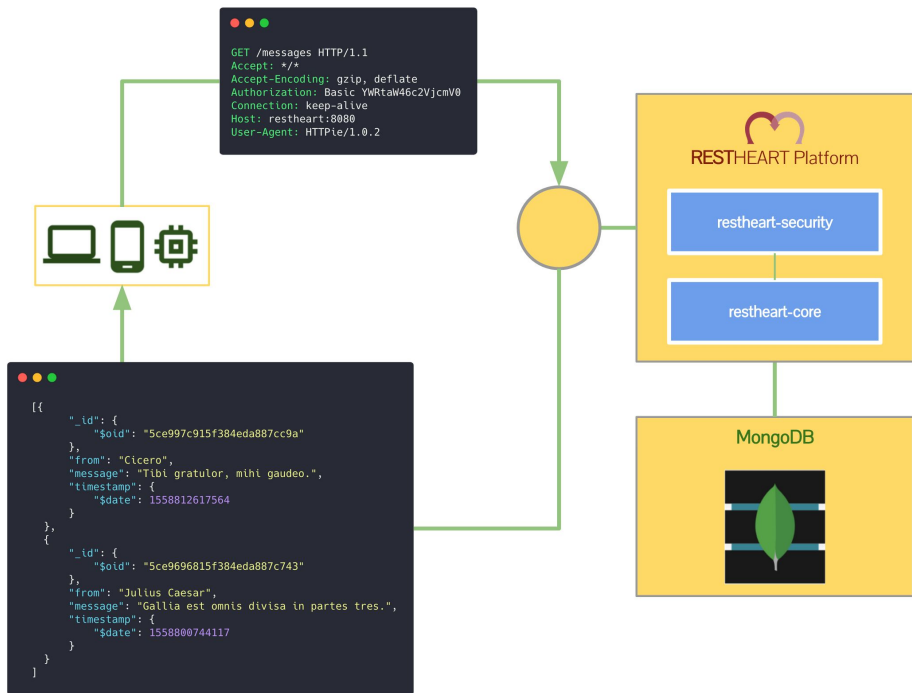
This makes possible to use external microservices, made with Node.js, Spring Boot, or AWS Lambda.

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

- **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>

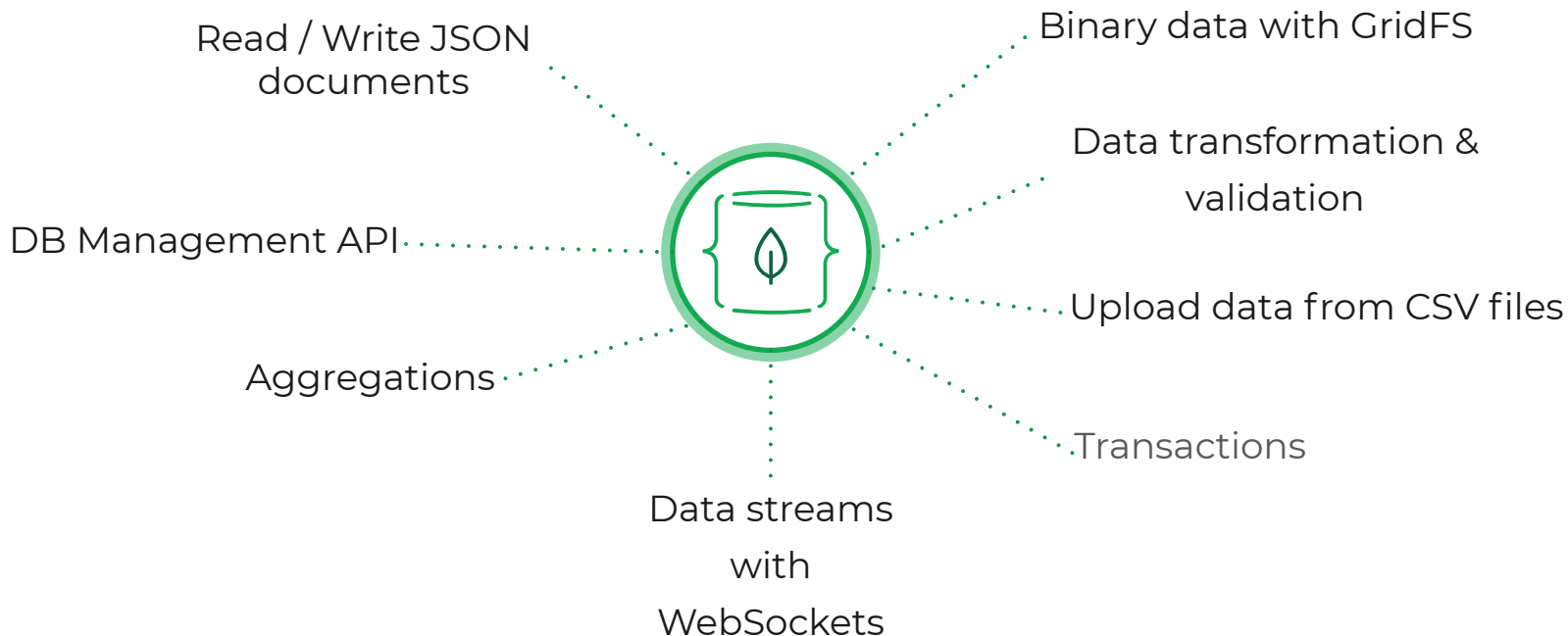


Technical Specifications

- 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



Supported databases

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

```
const url =  
encodeURIComponent('https://beta.mrest.io/demo/messages?filter={  
  "from": "Bob"}');  
  
fetch(url, { headers: {'key': 'demo'} })  
  .then(response => response.json())  
  .then(json => JSON.stringify(json, null, 2))  
  .then(data => console.log(data));
```

Run it



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



Development Framework

RESTHeart provides a modern Development Framework

- Services are bound to an URI to handle HTTP requests
 - Interceptors can read or modify requests and responses on the fly
-

Languages: **Java**, **Kotlin** and **JavaScript** (from v6)

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




Example: HelloWorld Web Service in Java

```
@RegisterPlugin(  
    name = "helloJava",  
    description = "just another Hello World",  
    defaultURI = "/helloJava")  
public class HelloService implements JsonService {  
    @Override  
    public void handle(JsonRequest request, JsonResponse response){  
        response.setStatusCode(200);  
        response.setContent(new JsonObject("message", "Hello World"));  
    }  
}
```



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





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

export function handle(request, response) {
  let body = {
    msg: 'Hello World'
  }

  response.setContent(JSON.stringify(body));
  response.setContentTypeAsJson();
}
```



```
$ curl 127.0.0.1:8080/helloJS
HTTP/1.1 200 OK

{ "message": "Hello World" }
```



Licenses and Support options



Licenses

RESTHeart is distributed through a **dual licensing** model:

1. **Open Source** - under the GNU AGPL v3.0 license.
2. **Enterprise** - under a business-friendly license.



RESTHeart Open source

If you are a student, individual developer or a small Web agency and comfortable with the AGPL v3 license, then using the product as open source is likely to be your best option.

- Source code: <https://github.com/softInstigate/restheart/>
- Community support is available on [Github](#) and [Stackoverflow](#).
- You can chat on [Gitter](#) or join our [Facebook community](#).



AGPL license - implications

The GNU Affero General Public License version 3 (AGPL v3) is a copyleft license nearly identical to the GPLv3 <https://www.gnu.org/licenses/agpl-3.0.html>.

Any derivative work using AGPL code (linked or otherwise, modified or not) must also be licensed and distributed under the same license.

- A Software that interacts with RESTHeart via its REST API **is not considered as a derivative work**, it just need to use any HTTP client library.
- The RESTHeart Development Framework (restheart-commons) is licensed under the **Apache 2.0 License**: custom plugins don't incur in the limitations of the AGPL and can be released with any license, either open or closed source.
- Any modification of RESTHeart's core source code **must be released as open source**, under the terms of the AGPLv3 license, regardless it is embedded or accessed via a network.



RESTHeart Subscription

When a company is not comfortable with the AGPL open source license or need technical support, then it could purchase a RESTHeart Subscription, which comes with:

- Perpetual, business-friendly **Enterprise license**.
- 12 months of **technical support**.
- 12 months of supported upgrades to any new release of the product.
- Training (optional).
- Professional Services (optional).

While the Enterprise license is perpetual, the subscription is annual and has to be explicitly renewed.



Enterprise license

The Enterprise license is **perpetual** and overcomes some limitations of the AGPL v3. Specifically, it grants the following rights:

- Use RESTHeart in closed source applications.
- Distribute RESTHeart embedded in closed source products.
- Get coverage against some legal risks, like third-parties IP claims.



How many subscriptions do I need to buy?

It's simple: **buy one RESTHeart subscription** for each **MongoDB production instance** you want to connect to.

So, with one annual subscription you get a license that allows to:

1. Run RESTHeart connected to one database **production** instance at a time.
2. Run unlimited RESTHeart instances, connected to any number of **non-production** database instances (dev, test, staging, ...).

Subscriptions containing multiple licenses for multiple database instances are available upon request.



Subscription renewals

At the end of the **standard 12 months subscription** you can either:

- Renew the subscription for another year (or more);
- Or let the subscription expire and keep running RESTHeart at the latest version released during the subscription period.

When the subscription expires (*) you are not supported anymore, but **you can keep running RESTHeart in production**, because the Enterprise license is perpetual.

(*) If you decide to renew later, the new subscription period will start retroactively from the date it expired.



Professional Services

Professional services are optional and are available on demand.

Example of activities:

- RESTHeart Development Framework
- Handling security, authentication and authorization
- Highly available deployments, on cloud and on premises
- Validation of architectural decisions
- Integration with other systems
- Performance tuning and monitoring

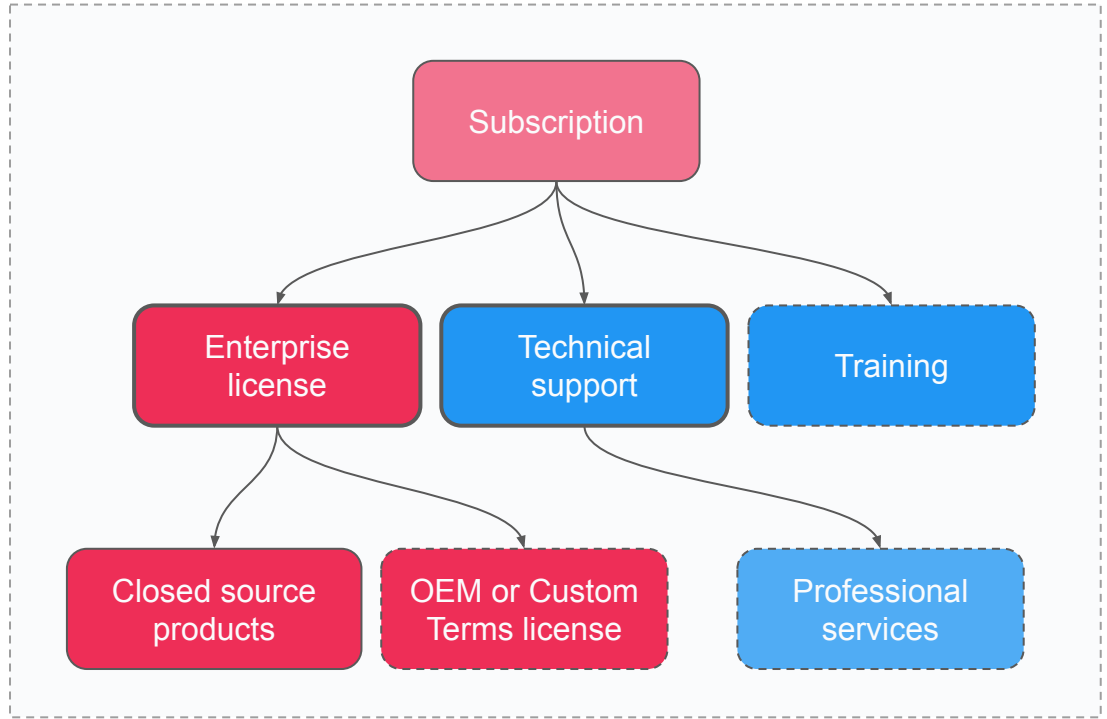
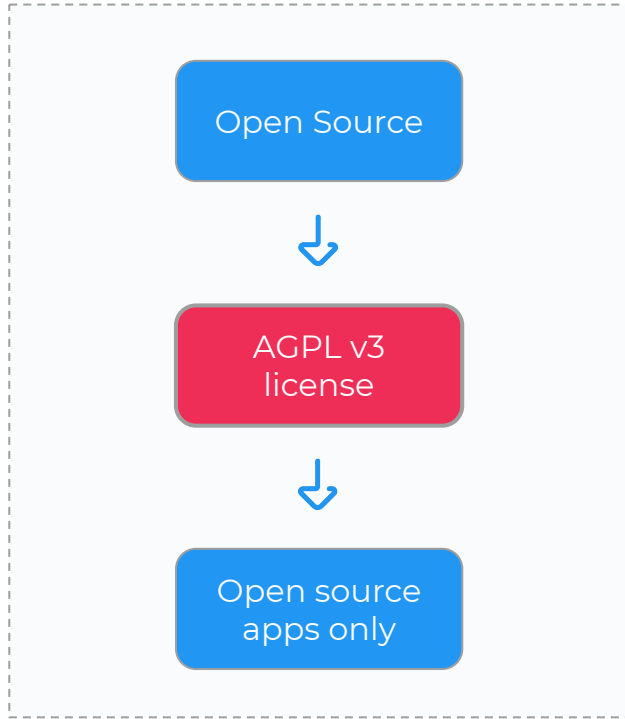


RESTHeart - recap of main differences

	Open source	Subscription
License type	AGPL v3	Enterprise
Technical support	⊗	✓
Supported HA clustering	⊗	✓
Closed source products	⊗	✓
Professional Services	✓	✓



Open Source vs Commercial Subscription



Companies using RESTHeart

UNISYS
imagine it. done.

**NORTHROP
GRUMMAN**

WALKER ART CENTER

CONQUEST
an  access company

 e-Spirit

authvia
simple billing

AUTO in RETE
partner **GRUPPO**
SERMETRA

GEOX
RESPIRA

OVS



VERSACE

SOCAN

music. people. **connected.**
musique. monde. **connectés.**



ACI Infomobility

radio traffic

 **openassembly**
ws

Crqqr



WRITESYSTEM

 **Synedrio**





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

For any question → ask@restheart.org

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