/RavenDB

Exploration of NoSQL database - BDNR@M.EIC
June 7th, 2022

> Ana Cruz | up201806460@up.pt
> António Bezerra | up201806854@up.pt
> Mariana Truta | up201806543@up.pt

/TABLE OF CONTENTS

/01

/RAVENDB

Technology overview and history.

Quick overview

- **Open-source** database with free and commercial licenses.
- Version 1.0 launched in **2010**.
- **Document-based** database.
- Provides **ACID transactions across documents and clusters**.
- Available as **DBaaS** - RavenDB Cloud.

Technical aspects

- Source-code written in **C#**.
- Data is stored as **JSON** documents.
- Supports **storing large files** through attachments.
- Extensive support for **Clustering**.
- Queries written in **own query language, RQL**.

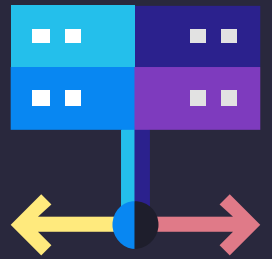
/02

/SETUP&DATA

Installation and data model.

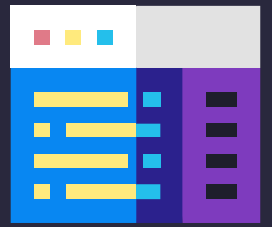
Installation

- Can be **installed** or used in a **docker-container**.
- Official docker image: *ravendb*.
- **Configurable** through the Studio, API, environment variables or files.
- ***Safe by-default*** - HTTPS enabled.



Data model

- **JSON** document format.
- Extensions:
  - **Counters** (distributed)
  - **Time-series** (streams of data)
  - **Attachments** (large data)
- **Revisions** with version vectors.



Data operations

- CRUD operations performed in the context of a **session/transaction**.
- **Extensions** have **specific operands** (increment/decrement counters).
- **Advanced features**:
  - ETL from external sources
  - Subscriptions
  - Backups

/03

/FEATURES&API

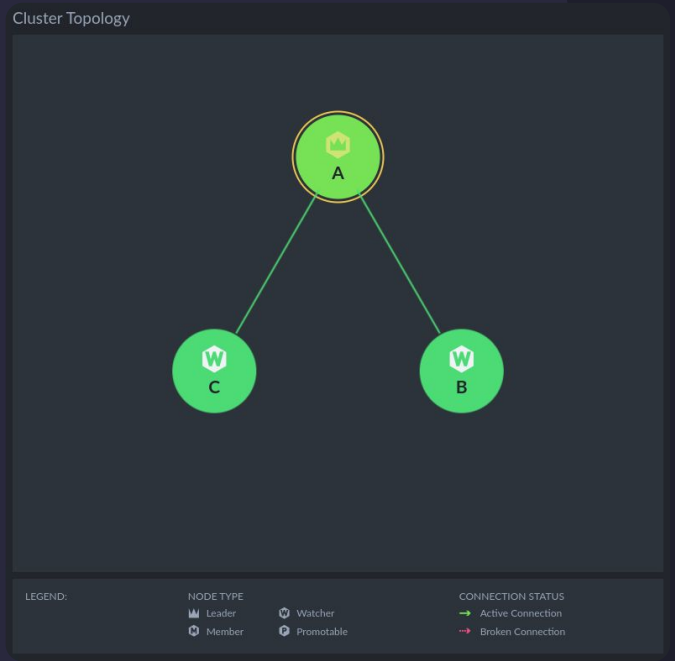
Main use cases and relevant features.

Consistency

// All operations on a document or attachment using its ID are always consistent and run in an ACID transaction

Replication

- RavenDB supports replication through **clustering**.
- Clusters are **3+ nodes** working together.
- Databases may be replicated on **all nodes or a subset**.
- **ACID** properties ensured **cluster wide**.
- **Partition** may lead to conflicts.
- Conflict resolution is **customizable**.



Querying

/Raven Query Language

RQL allows to execute all available types of queries.

/Full-Text Search

Advanced full-text search operations over one or more fields.

/Spatial

RQL itself and our Client API contain built-in methods to help find the documents with the search areas.

/Facets

Perform calculations such as counts, and sums, on aggregated data and split it into defined ranges.

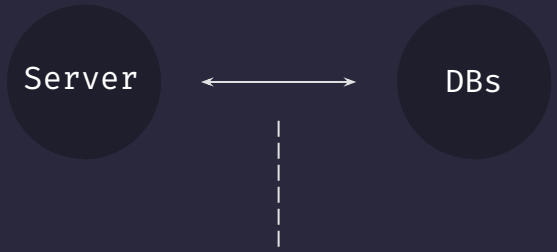
/MoreLikeThis

Built-in method to retrieve similar documents.

/Patching

Update documents directly on the server-side using our integrated JavaScript-based patching API, a part of RQL syntax.

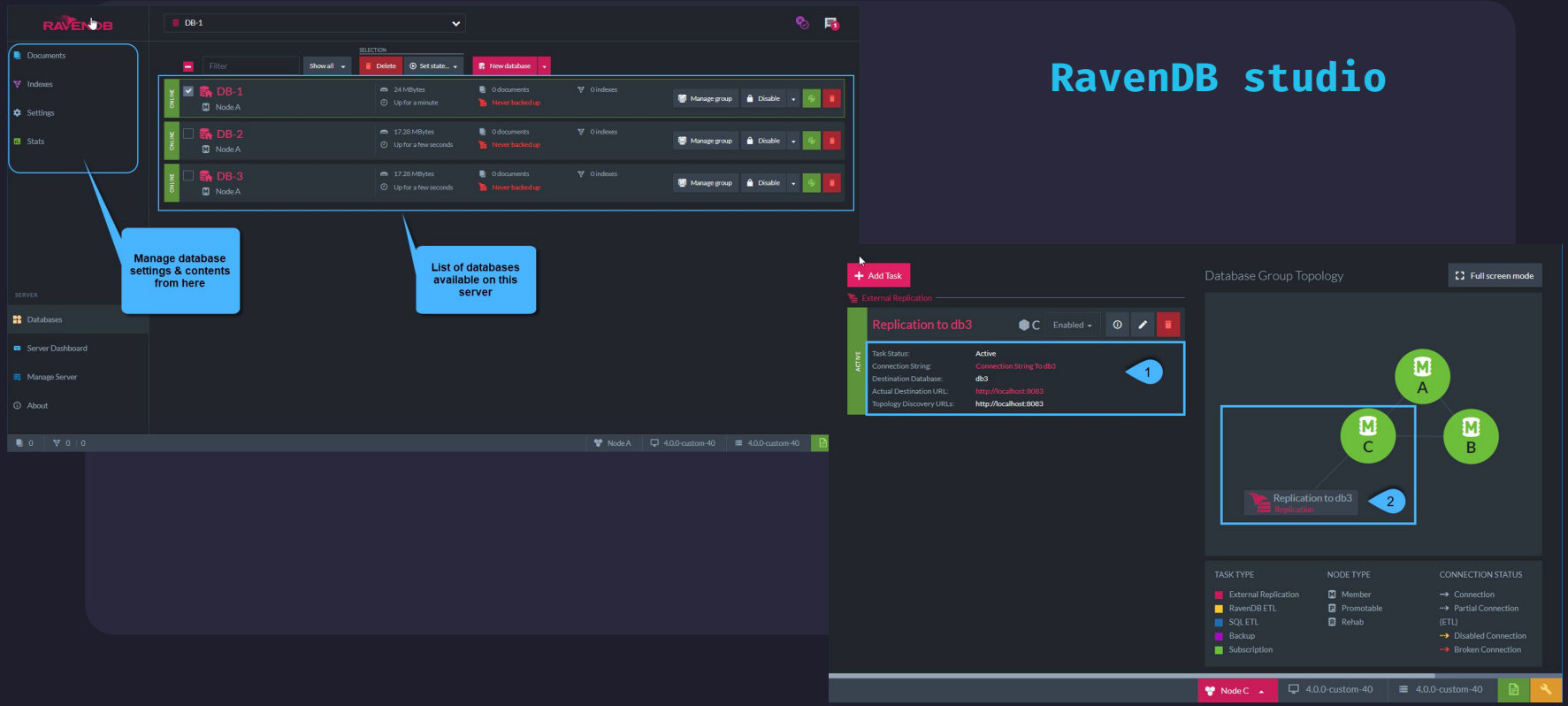
API and client libraries



REST client API

Client libraries for:

API and client libraries



/03

/LIVE_DEMO

RavenDB in action.

Prototype overview

Database

RavenDB instance running in docker container.

Backend

Simple node.js backend using Express.

Frontend

React web application.

Data

- **Ecommerce** use scenario
- Data sourced from various product datasets
- **Clean-up and additional generation** using Python
- **6** conceptual **classes**
- **3** database **collections**

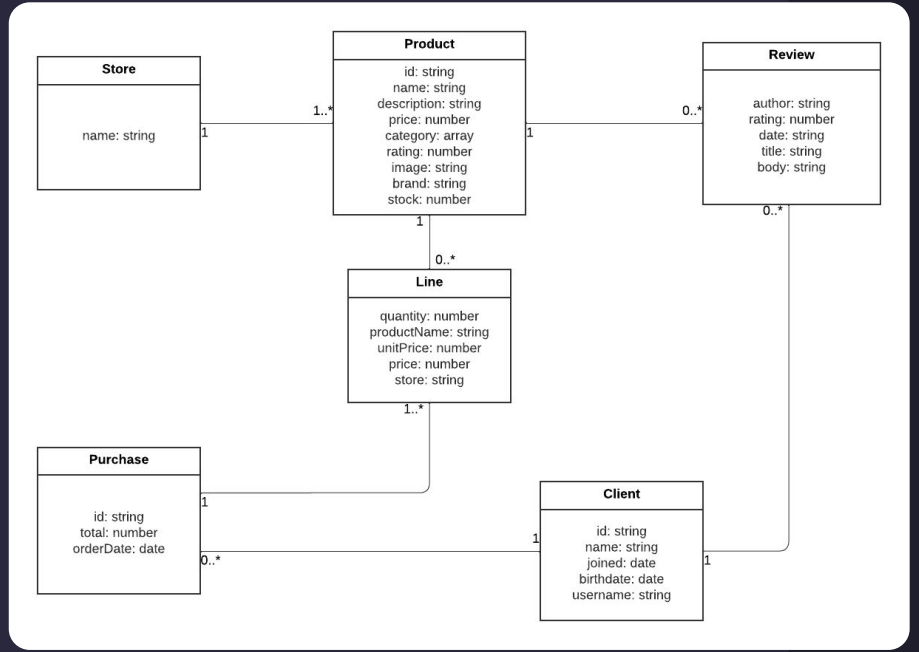


Fig.1 : Conceptual Data Model

<DEMO>

> Demonstrate Prototype and Studio. <

Conclusions

Negative

- Documentation lacking and sometimes confusing;
- Lack of documentation for all languages.

Positive

- Website and Studio intuitive and appealing;
- Versatility of features;
- High performance.

/THANKS!

Any Questions?

> Ana Cruz | up201806460@up.pt
> António Bezerra | up201806854@up.pt
> Mariana Truta | up201806543@up.pt