Desafio Back-end

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1 Escopo:

Microserviços distribudos no intuito de mostrar o fluxo e comunicação entre as Api´s.

Os microserviços comunican-se via mensageria, Kafka, possuindo persistência com Mongo Db, Postgres e Cache com Redis.

Tecnologias Utilizadas

- **Java 17**
- **Spring Boot**
- **Spring Cache** (para caching de dados)
- **Spring Scheduler** (para execução periódica da tarefa)
- **Spring Data JPA** (para persistência de dados)
- **MapStruct** (para mapeamento de DTOs)
- **Lombok** (para redução de boilerplate no código)
- **Banco de Dados**: PostgreSQL e MongoDB
- **Apache Kafka** (para comunicação assíncrona entre microserviços)
- **Spring Cloud OpenFeign** (para comunicação entre serviços REST)

Arquitetura

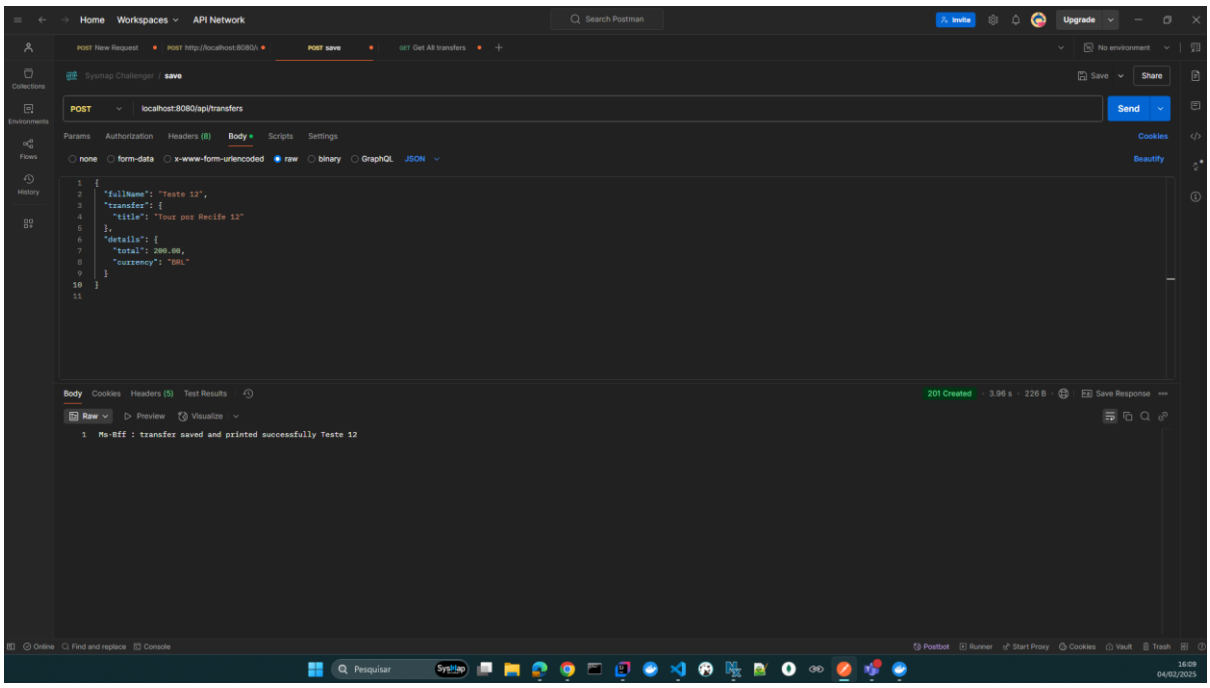
O fluxo de dados ocorre da seguinte forma:

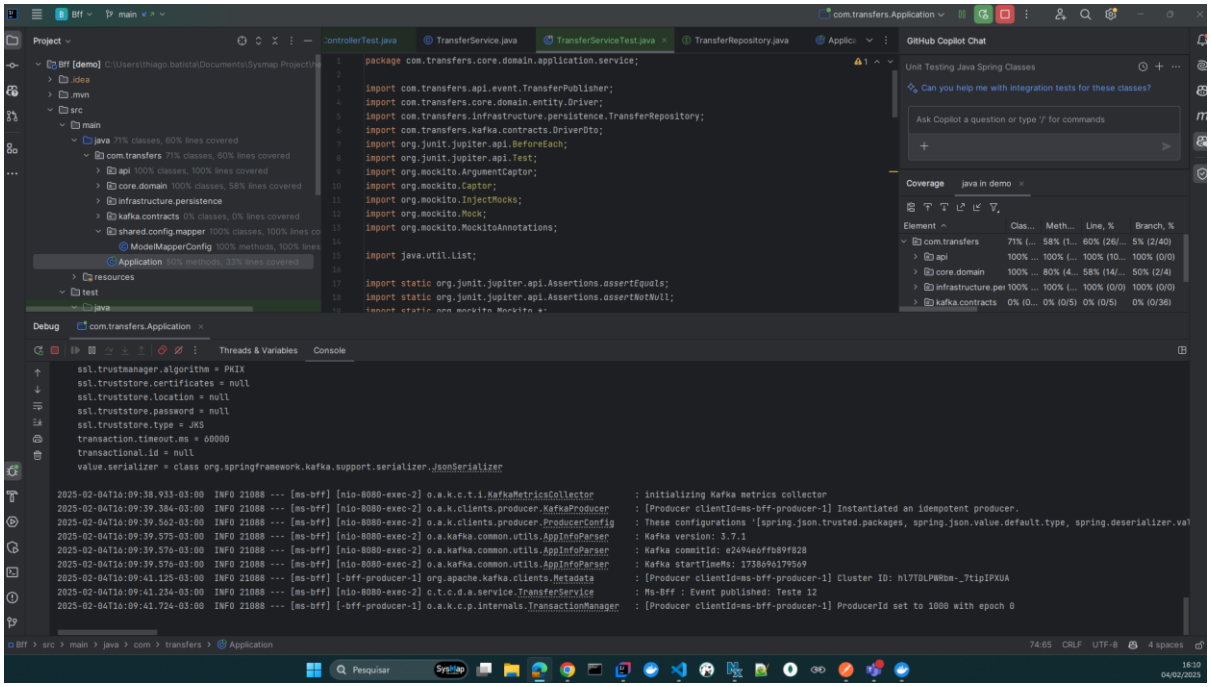
1. O microserviço **BFF** recebe um objeto e o salva no MongoDB.
2. Em seguida, ele envia o dado via **Kafka** para o microserviço **MongoDB**.
3. O microserviço **MongoDB** salva o dado no banco MongoDB e expõe um endpoint REST.
4. O microserviço **Postgres** consome esse dado via **OpenFeign**, processa e armazena no PostgreSQL.
5. O dado salvo no PostgreSQL é armazenado em cache para otimizar futuras consultas.

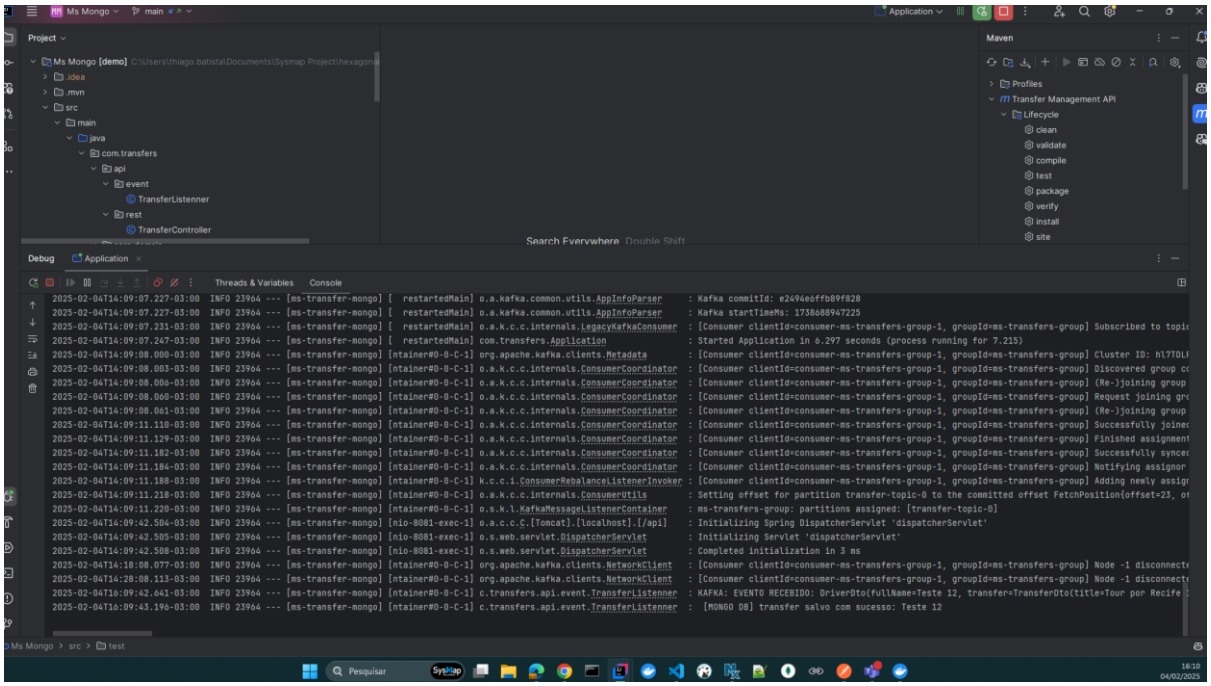
Considerações Finais

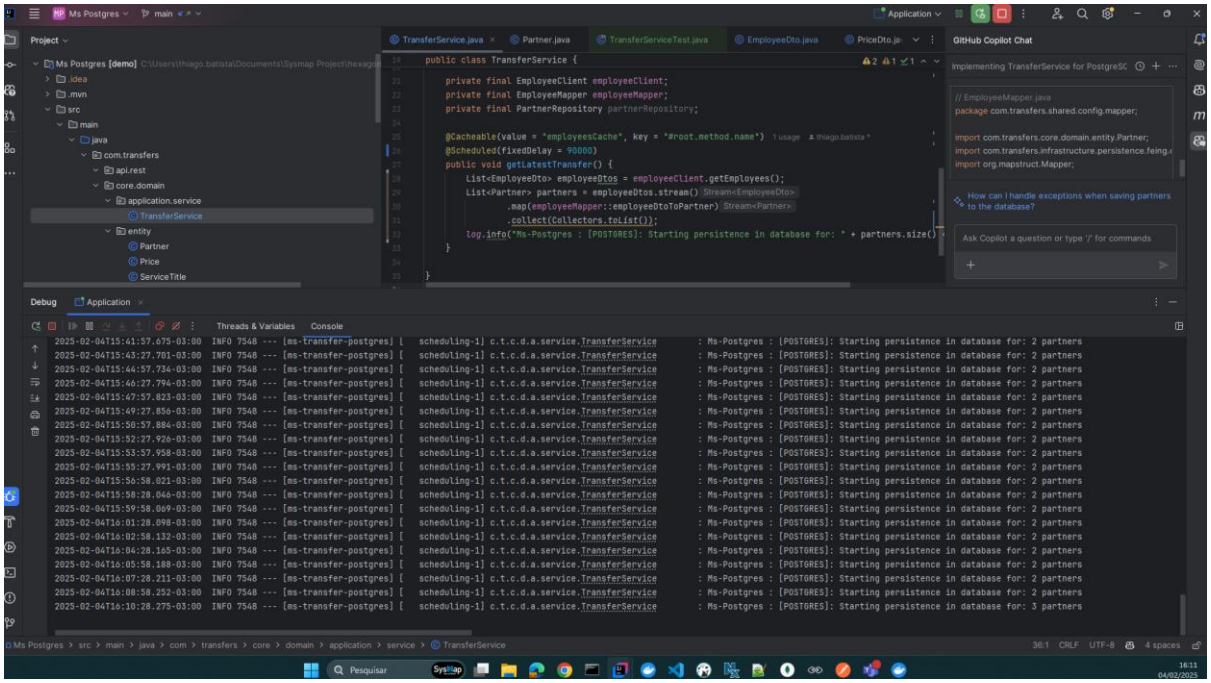
- O cache impede requisições desnecessárias e melhora a performance.
- O agendamento (a cada 30 segundos) garante que o banco de dados esteja sempre atualizado.
- A comunicação assíncrona via Kafka melhora a escalabilidade e desacoplamento entre microserviços.
- O uso de logs permite acompanhar o processamento e detectar possíveis erros rapidamente.

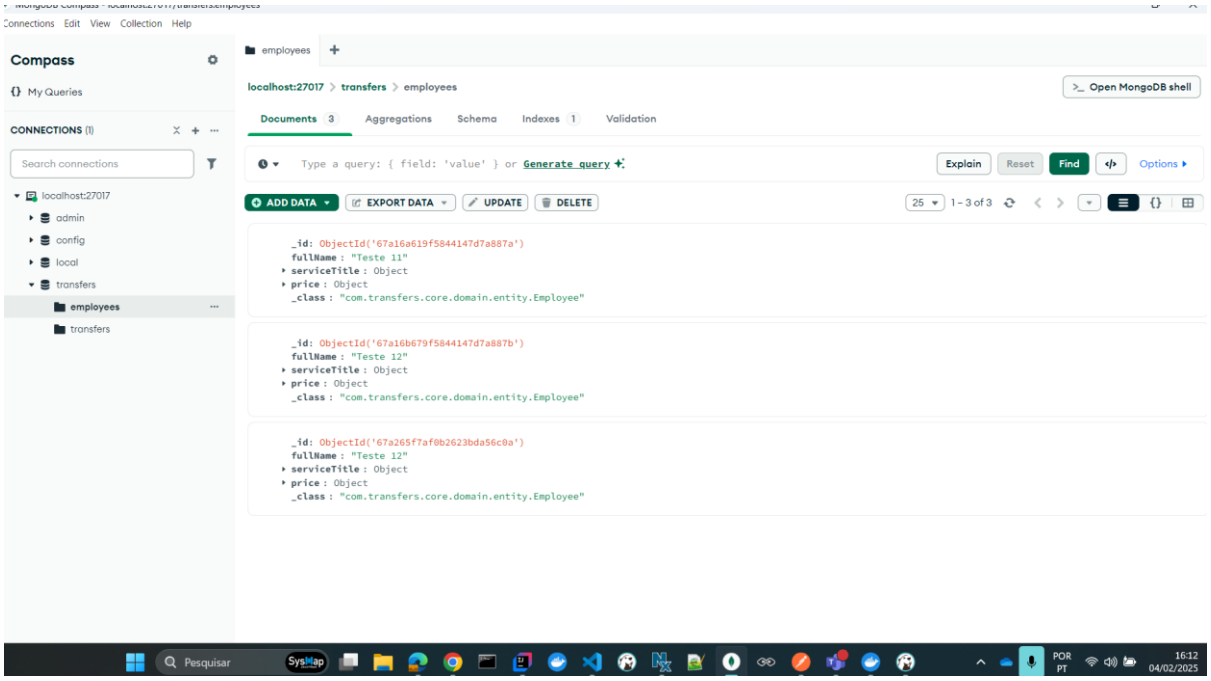
Evidências:

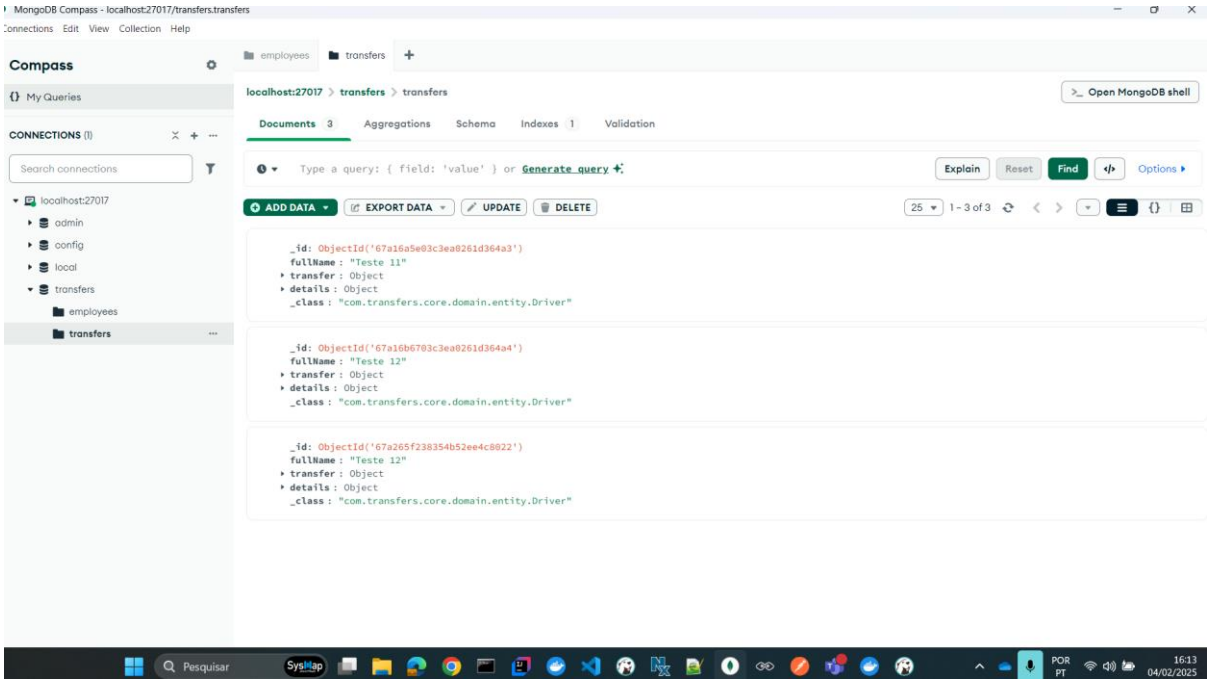


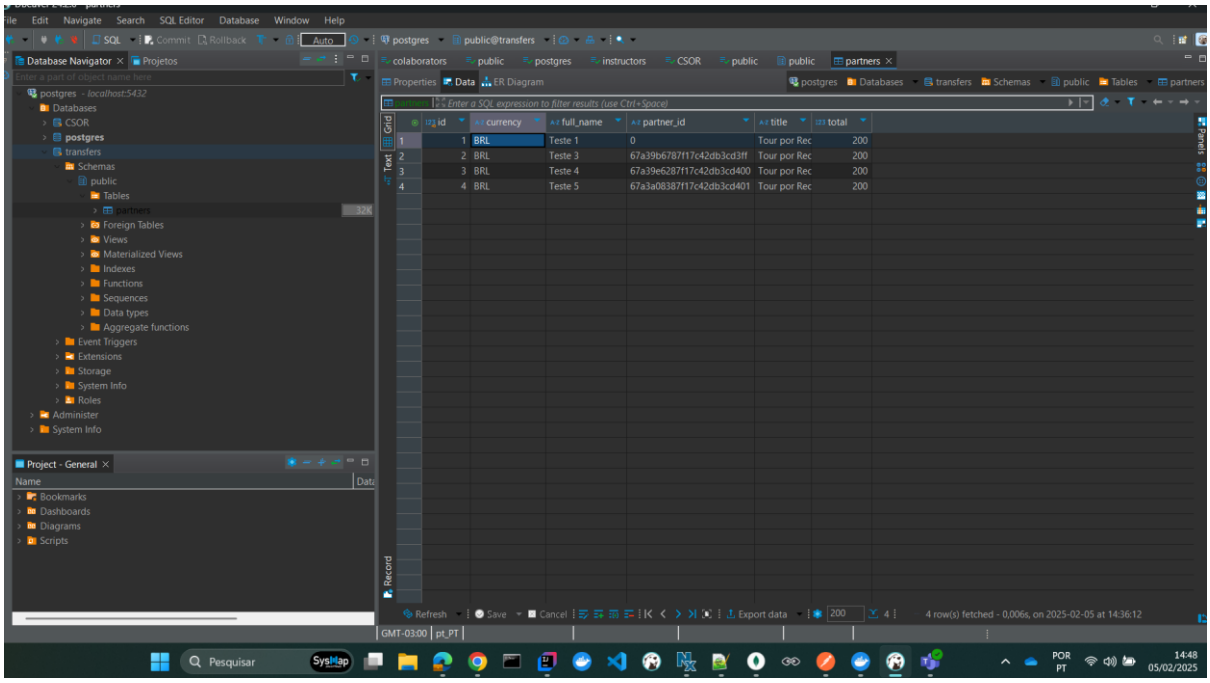

package com.transfers.core.domain.application.service;
import com.transfers.api.event.TransferPublisher;
import com.transfers.core.domain.entity.Driver;
import com.transfers.infrastructure.persistence.TransferRepository;
import com.transfers.kafka.contracts.DriverDto;
import org.junit.jupiter.api.BeforeEach;
import org.junit.jupiter.api.Test;
import org.mockito.ArgumentCaptor;
import org.mockito.Captor;
import org.mockito.InjectMocks;
import org.mockito.Mock;
import org.mockito.MockitoAnnotations;
import java.util.List;
import static org.junit.jupiter.api.Assertions.assertEquals;
import static org.junit.jupiter.api.Assertions.assertNotNull;
ssl.truststore.certificates = null
ssl.truststore.location = null
ssl.truststore.password = null
ssl.truststore.type = JKS
transaction.timeout.ms = 60000
transactional.id = null
value.serializer = class org.springframework.kafka.support.serializer.JsonSerializer
2025-02-04T16:09:38.933-03:00 INFO 21088 --- [ms-bff] [nio-8080-exec-2] o.a.k.c.t.i.KafkaMetricsCollector : initializing Kafka metrics collector
2025-02-04T16:09:39.384-03:00 INFO 21088 --- [ms-bff] [nio-8080-exec-2] o.a.k.clients.producer.KafkaProducer : [Producer clientId=ms-bff-producer-1] Instantiated an idempotent producer.
2025-02-04T16:09:39.562-03:00 INFO 21088 --- [ms-bff] [nio-8080-exec-2] o.a.k.clients.producer.ProducerConfig : These configurations '[spring.json.trusted.packages, spring.json.value.default.type, spring.deserializer.val
2025-02-04T16:09:39.575-03:00 INFO 21088 --- [ms-bff] [nio-8080-exec-2] o.a.kafka.common.utils.AppInfoParser : Kafka version: 3.7.1
2025-02-04T16:09:39.576-03:00 INFO 21088 --- [ms-bff] [nio-8080-exec-2] o.a.kafka.common.utils.AppInfoParser : Kafka commitId: e2494e6ffb89f828
2025-02-04T16:09:39.576-03:00 INFO 21088 --- [ms-bff] [nio-8080-exec-2] o.a.kafka.common.utils.AppInfoParser : Kafka startTimeMs: 1738696179569
2025-02-04T16:09:41.125-03:00 INFO 21088 --- [ms-bff] [-bff-producer-1] org.apache.kafka.clients.Metadata : [Producer clientId=ms-bff-producer-1] Cluster ID: hl7TDLPWRbm-_7tipIPXUA
2025-02-04T16:09:41.234-03:00 INFO 21088 --- [ms-bff] [nio-8080-exec-2] c.t.c.d.a.service.TransferService : Ms-Bff : Event published: Teste 12
2025-02-04T16:09:41.724-03:00 INFO 21088 --- [ms-bff] [-bff-producer-1] o.a.k.c.p.internals.TransactionManager : [Producer clientId=ms-bff-producer-1] ProducerId set to 1008 with epoch 0


2025-02-04T14:09:07.227-03:00 INFO 23964 --- [ms-transfer-mongo] [restartedMain] o.a.kafka.common.utils.AppInfoParser : Kafka commitId: e2494e6ffb89f828
2025-02-04T14:09:07.227-03:00 INFO 23964 --- [ms-transfer-mongo] [restartedMain] o.a.kafka.common.utils.AppInfoParser : Kafka startTimeMs: 1738688947225
2025-02-04T14:09:07.231-03:00 INFO 23964 --- [ms-transfer-mongo] [restartedMain] o.a.k.c.c.internals.LegacyKafkaConsumer : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Subscribed to topic
2025-02-04T14:09:07.247-03:00 INFO 23964 --- [ms-transfer-mongo] [restartedMain] com.transfers.Application : Started Application in 6.297 seconds (process running for 7.215)
2025-02-04T14:09:08.000-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] org.apache.kafka.clients.Metadata : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Cluster ID: hl7TDLP
2025-02-04T14:09:08.003-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Discovered group co
2025-02-04T14:09:08.006-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] (Re-)joining group
2025-02-04T14:09:08.060-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Request joining gro
2025-02-04T14:09:08.061-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] (Re-)joining group
2025-02-04T14:09:11.110-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Successfully joinec
2025-02-04T14:09:11.129-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Finished assignment
2025-02-04T14:09:11.182-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Successfully synce
2025-02-04T14:09:11.184-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Notifying assignor
2025-02-04T14:09:11.188-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] k.c.c.i.ConsumerRebalanceListenerInvoker : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Adding newly assign
2025-02-04T14:09:11.218-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerUtils : Setting offset for partition transfer-topic-0 to the committed offset FetchPosition{offset=23, of
2025-02-04T14:09:11.220-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] o.s.k.l.KafkaMessageListenerContainer : ms-transfers-group: partitions assigned: [transfer-topic-0]
2025-02-04T14:09:42.504-03:00 INFO 23964 --- [ms-transfer-mongo] [nio-8081-exec-1] o.a.c.c.C.[Tomcat].[localhost].[/api] : Initializing Spring DispatcherServlet 'dispatcherServlet'
2025-02-04T14:09:42.505-03:00 INFO 23964 --- [ms-transfer-mongo] [nio-8081-exec-1] o.s.web.servlet.DispatcherServlet : Initializing Servlet 'dispatcherServlet'
2025-02-04T14:09:42.508-03:00 INFO 23964 --- [ms-transfer-mongo] [nio-8081-exec-1] o.s.web.servlet.DispatcherServlet : Completed initialization in 3 ms
2025-02-04T14:18:08.077-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] org.apache.kafka.clients.NetworkClient : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Node -1 disconnecte
2025-02-04T14:28:08.113-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] org.apache.kafka.clients.NetworkClient : [Consumer clientId=consumer-ms-transfers-group-1, groupId=ms-transfers-group] Node -1 disconnecte
2025-02-04T14:09:42.641-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] c.transfers.api.event.TransferListenner : KAFKA: EVENTO RECEBIDO: DriverDto(fullName=Teste 12, transfer=TransferDto(title=Tour por Recife
2025-02-04T16:09:43.196-03:00 INFO 23964 --- [ms-transfer-mongo] [ntainer#0-0-C-1] c.transfers.api.event.TransferListenner : [MONGO DB] transfer salvo com sucesso: Teste 12


Ms Postgres
main
Application
Project
TransferService.java
Partner.java
TransferServiceTest.java
EmployeeDto.java
PriceDto.ja
GitHub Copilot Chat
Ms Postgres [demo]
.idea
.mvn
src
main
java
com.transfers
api.rest
core.domain
application.service
TransferService
entity
Partner
Price
ServiceTitle
public class TransferService {
private final EmployeeClient employeeClient;
private final EmployeeMapper employeeMapper;
private final PartnerRepository partnerRepository;
@Cacheable(value = "employeesCache", key = "#root.method.name")
@Scheduled(fixedDelay = 90000)
public void getLatestTransfer() {
List<EmployeeDto> employeeDtos = employeeClient.getEmployees();
List<Partner> partners = employeeDtos.stream()
.map(employeeMapper::employeeDtoToPartner)
.collect(Collectors.toList());
log.info("Ms-Postgres : [POSTGRES]: Starting persistence in database for: " + partners.size());
}
}
Debug
Application
Threads & Variables
Console
2025-02-04T15:41:57.675-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:43:27.701-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:44:57.734-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:46:27.794-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:47:57.823-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:49:27.856-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:50:57.884-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:52:27.926-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:53:57.958-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:55:27.991-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:56:58.021-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:58:28.046-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T15:59:58.069-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T16:01:28.098-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T16:02:58.132-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T16:04:28.165-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T16:05:58.188-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T16:07:28.211-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T16:08:58.252-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 2 partners
2025-02-04T16:10:28.275-03:00 INFO 7548 --- [ms-transfer-postgres] [scheduling-1] c.t.c.d.a.service.TransferService : Ms-Postgres : [POSTGRES]: Starting persistence in database for: 3 partners
Pesquisar
04/02/2025


Connections
Edit
View
Collection
Help
Compass
My Queries
CONNECTIONS (1)
Search connections
localhost:27017
admin
config
local
transfers
employees
transfers
employees
localhost:27017 > transfers > employees
Open MongoDB shell
Documents 3
Aggregations
Schema
Indexes 1
Validation
Type a query: { field: 'value' } or Generate query
Explain
Reset
Find
Options
ADD DATA
EXPORT DATA
UPDATE
DELETE
25
1 - 3 of 3
_id: ObjectId('67a16a619f5844147d7a887a')
fullName : "Teste 11"
serviceTitle : Object
price : Object
_class : "com.transfers.core.domain.entity.Employee"
_id: ObjectId('67a16b679f5844147d7a887b')
fullName : "Teste 12"
serviceTitle : Object
price : Object
_class : "com.transfers.core.domain.entity.Employee"
_id: ObjectId('67a265f7af0b2623bda56c0a')
fullName : "Teste 12"
serviceTitle : Object
price : Object
_class : "com.transfers.core.domain.entity.Employee"
Pesquisar
POR
PT
16:12
04/02/2025


MongoDB Compass - localhost:27017/transfers.transfers
Connections Edit View Collection Help
Compass
My Queries
CONNECTIONS (1)
Search connections
localhost:27017
admin
config
local
transfers
employees
transfers
employees
transfers
localhost:27017 > transfers > transfers
Open MongoDB shell
Documents 3
Aggregations
Schema
Indexes 1
Validation
Type a query: { field: 'value' } or Generate query
Explain
Reset
Find
Options
ADD DATA
EXPORT DATA
UPDATE
DELETE
25
1 - 3 of 3
_id: ObjectId('67a16a5e03c3ea0261d364a3')
fullName : "Teste 11"
transfer : Object
details : Object
_class : "com.transfers.core.domain.entity.Driver"
_id: ObjectId('67a16b6703c3ea0261d364a4')
fullName : "Teste 12"
transfer : Object
details : Object
_class : "com.transfers.core.domain.entity.Driver"
_id: ObjectId('67a265f238354b52ee4c8022')
fullName : "Teste 12"
transfer : Object
details : Object
_class : "com.transfers.core.domain.entity.Driver"
Pesquisar
POR PT
16:13
04/02/2025


File Edit Navigate Search SQL Editor Database Window Help
Database Navigator
Projetos
postgres - localhost:5432
Databases
CSOR
postgres
transfers
Schemas
public
Tables
partners
Foreign Tables
Views
Materialized Views
Indexes
Functions
Sequences
Data types
Aggregate functions
Event Triggers
Extensions
Storage
System Info
Roles
Administer
System Info
Project - General
Bookmarks
Dashboards
Diagrams
Scripts
colaborators
public
postgres
instructors
CSOR
public
public
partners
Properties
Data
ER Diagram
id
currency
full_name
partner_id
title
total
1 BRL Teste 1 0 Tour por Rec 200
2 BRL Teste 3 67a39b6787f17c42db3cd3ff Tour por Rec 200
3 BRL Teste 4 67a39e6287f17c42db3cd400 Tour por Rec 200
4 BRL Teste 5 67a3a08387f17c42db3cd401 Tour por Rec 200
Refresh
Save
Cancel
Export data
4 row(s) fetched - 0,006s, on 2025-02-05 at 14:36:12
GMT-03:00
pt_PT
Pesquisar
POR PT
14:48
05/02/2025