References GEM System a.s. for the middleware part of Red Hat and open source technologies

GEM SYSTEM

Our IT solutions will excite you!

Raiffeisen Bank

INTEGRATION & DEVELOPMENT

GEM System uses OpenShift Container Platform as its development and testing environment for container technology projects. At the same time, we provide the following references and experiences on OpenShift, Red Hat technologies or other K8s clusters, which can be applied in general on any K8s cluster.

PROJECT: THE RAIFFEISENBANK BANK – MIGRATION OF CASHLOANS

CLIENT: RAIFFEISENBANK A.S.

OCTOBER 2022 – JULY 2023

FINANCIAL COSTS: APPROX. CZK 15 MILLION

Raiffeisenbank (RB) acquired the now former Equa bank in the first half of 2021. In autumn 2022, RB completed the integration of clients and their services into its systems. With one exception, namely the short-term lending system, which was only connected to RB's central systems but continued to operate on Equa bank's infrastructure.

Therefore, from the summer of 2022, RB was looking for a partner who was able to migrate the entire short-term lending solution to RB systems so that it could completely leave the Equa bank infrastructure and thus save tens of millions of crowns per year on parallel operation of data centres, related licenses and services, etc. GEM System prepared an analysis and project plan within 7 weeks, which confirmed to RB that the project could be completed within the required 9 month timeframe.

THE PROJECT MIGRATED THE SELECTED CASHLOAN – MINUTE LOAN SOLUTION (EQUA BANK'S SUCCESSFUL LENDING SYSTEM) WITH THE FOLLOWING OBJECTIVES:

- The project migrated the selected Cashloan - Minute Loan solution (Equa bank's successful lending system) with the following objectives:
- Coordinate the creation of new infrastructure on technology and according to RB standards.
- Rewrite business logic of Equa bank integration solution from Oracle SOA Suite integration platform to RB OpenShift MicroServicesTransform SOAP interface to REST.
- Design Database structure in RB environment and coordinate data migration from Equa bank.
- Implement Cashloan deployment to 4 environments including production by end of July 2023.
- Coordinate creation of network infrastructure to run critical application in active/active mode of two datacenters.

These objectives had a number of consequences and sub-phases:

- ✅ Prepare and coordinate a complete release including service downtime outside the official release schedule.

- ✅ Oracle SOA Suite integration services contained complex business logic that could not be implemented due to the RB standard in OpenShift IMS - so we separated this business logic into a separate application also on OpenShift. More than 50 services had to be reprogrammed.

- ✅ To design the target architecture and migrate approximately 15 more applications originally running on the K8s cluster Rancher or on dedicated servers.

  - It was essential to analyze the dependencies of individual applications and define namespaces and implement CI/CD processes in the new environment accordingly.

  - For practically all systems it was necessary to ensure integration with infrastructure services of the new environment, typically Identity Management, Certification Authority, Load Balancing of individual services, etc.).

  - During the migration, we had to take into account the client's requirement for a significantly higher load on the CashLoan solution (a substantial increase in the number of requests/month), so it was necessary to design a completely new sizing.

- ✅ Application namespaces transformation from Rancher to multiple namespaces on OpenShift.

  - Applications were divided into namespaces according to the view through business logic, according to how individual applications form functional units.

- ✅ Complete reimplementation of CI/CD processes.

  - It was necessary to transfer the source codes of individual applications from the EQ repositories to RB, which required secured network communication according to RB security standards.

  - The applications in EQ were not originally intended as a high availability solution, so here we were faced with the challenge of configuring CI/CD processes and changes at the level of the applications themselves to ensure high availability according to RB standards

  - All of this of course took place across all DEV - TEST - PrePROD - PROD environments.

- ✅ The migration also included systems for specific operations that are not part of the K8s, but run on traditional virtual machines running MS Windows Server and RHEL. These systems were newly installed and integrated into the RB environment.

- ✅ Migrate a set of Oracle databases from the Exadata Database Machine to the new Linux x86 infrastructure including performance tuning.

- ✅ Complete network layer transformations including load balancer transformations.

  - It was necessary to analyze the existing network communication and according to the security standards of network communication in RB to create a completely new communication matrix, according to which the rules of network communication in RB were subsequently defined. It was essential to distinguish where communication would be established 1:1 and where it would require transformation to a new environment.

  - In the area of load balancing, an F5 Big IP analysis was performed, where it was again necessary to correctly select the relevant rules and subsequently transform these to the new environment. It was essential to correctly identify the services provided in the bank's internal environment and those provided externally. Furthermore, it was necessary to correctly define the load balancing methods, which differed in each service area.
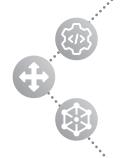
- An integral part of the delivery was also complete documentation, which included a communication matrix separately for all environments, a description of load balancing including a description of the methods used, several diagrams graphically representing the resulting infrastructure in different views and details (e.g. complete graphical representation of the communications of individual systems, graphical representation of the resulting actual state of load balancing). These materials are an important aid for the operational management of systems.

✅ **Non-trivial adaptation of migrated applications to new RB standards.**

- Especially in the area of development security standards, it was necessary to reflect RB's requirements for code purity and Sonar coverage.

- It was also necessary to coordinate the creation of records and processes for HW and SW according to RB international standards.

- It was necessary to connect all applications to a different standard for service monitoring (Zabbix) and logging (Elasticsearch-Kibana).

The entire solution is already successfully in operation and further development and evolution of new services for customers is underway, which was previously blocked due to dependence on Equa bank infrastructure. The actual switchover from Equa bank infrastructure to RB infrastructure and migration of hundreds of GB of data took place in June 2023 with minimal downtime of less than 18 hours and zero impact on revenue from that product in that month.

TECHNOLOGIES AND SOLUTIONS USED:

Oracle SOA Suite, Oracle DB, F5 Big IP, OpenShift Container Platform, Apache Camel, Apache Kafka, Spring Framework, WSO2 APIM, Kong, Camunda, Elasticsearch – Kibana, GIT, Jenkins, Zabbix