Data Migration & Architecture Transformation

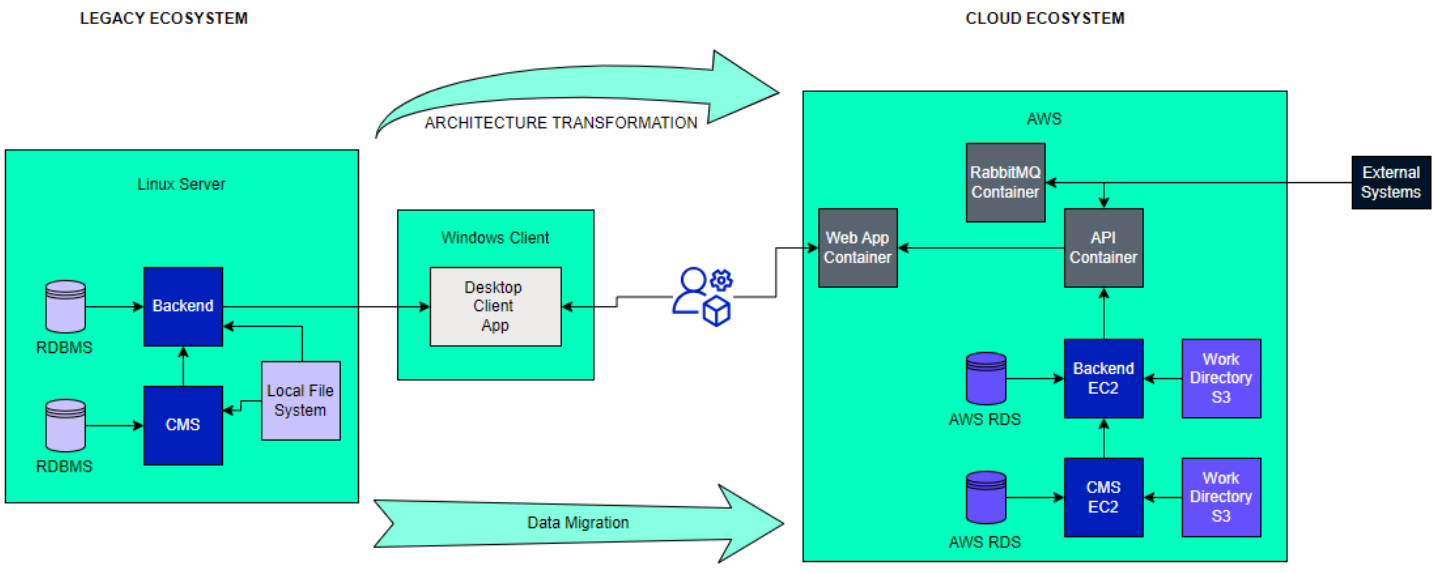
Case Study

Industry: Aerospace
Project Duration: July 2021 - October 2023
Team Size: 25+ Engineers
Main Tech Stack: Java/JVM, AWS, Kubernetes, Docker, Postgres, Linux, Windows

Project Overview

Our client, a leading technical content and maintenance workflow management company for the **aerospace industry**, needed to migrate two of their platforms from an on-premise Linux environment to AWS. The platforms, are instances of our client's proprietary framework, are critical to the operations of **two of the world's top three airlines**. The primary goals were to **adapt the framework's source code** for cloud compliance and establish a hybrid architecture that would support both on-premise and cloud environments as well as migrating the data from the legacy ecosystem to the new one.

The migration involved **transferring terabytes of data and metadata** while automating the analysis of discrepancies between the legacy and new cloud-based systems. Given the massive scale and sensitive nature of the data, the project presented unique technical challenges, including stringent **data integrity** requirements and ensuring **seamless user access** across thousands of accounts.



Key Challenges

1. **Large-Scale Data Migration:**
    - Migrated hundreds of billions of objects, including databases and file systems, from on-premise to AWS.
    - Ensured data integrity with customized validation mechanisms, verifying data consistency across platforms.
2. **Cloud Compliance & Source Code Adaptation:**
    - Adapted the framework's source code for AWS compatibility while maintaining on-premise support.
    - Ensured compliance with cloud architecture best practices and leveraged AWS services to enhance performance.
3. **User Migration & Permission Management:**
    - Migrated thousands of users to the new AWS-based platform.
    - Dynamically adapted the permission matrix to preserve user access levels and roles across environments.

Responsibilities and Solutions

Our team of over 25 engineers, spread across eight time zones, worked on the project for over 24 months. Key responsibilities included:

- **Solution Design & Architecture:**
  Developed a comprehensive migration plan and architectural design to ensure compatibility with AWS while maintaining legacy support.
- **Technical Coordination:**
  Organized and coordinated tasks across a distributed team of developers, DevOps engineers, and QA engineers to meet project goals within tight timelines.
- **Client Representation:**
  Acted as the client's technical representatives, interfacing directly with the airline clients and addressing technical inquiries related to the migration process.
- **Timeline Estimation:**
  Provided accurate time estimates for complex tasks, ensuring that project milestones were met on schedule.

Technology Stack

The project leveraged a diverse and robust tech stack, including:

- **Programming & Frameworks:** Java 8/11, Spring Boot, JPA, Hibernate
- **Cloud & Infrastructure:** AWS, Docker, Kubernetes, Terraform
- **Databases:** Postgres, Oracle, MS SQL Server
- **Servers & Automation:** Apache Tomcat, Linux shell scripting, Windows PowerShell

- **Search & Indexing:** Apache Solr
- **CI/CD & Version Control:** Jenkins, Git
- **Build & Dependency Management:** Maven
- Other proprietary software