amanox

Success Story:

Comprehensive cloud migration at the Swiss Federal Railways SBB

The cloud migration of applications that play a key role in the ongoing operations of Swiss Federal Railways requires the most careful planning and prudence. Thanks to the expertise of Axians Amanox, the change-over was seamless and did not affect train traffic.

SBB CFF FFS

Industry
Transportation

Challenge
- Hardware maintenance expiration
- Standardized infrastructure service needed
- AWS expertise with swift operational support
- Complex DR due to hardware dependency

Solution
- Seamless transition to AWS
- Reduced human error via operations as code
- Enhanced disaster readiness with automated application setup

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Challenge and solution approach

Precision, efficiency and safety are of the utmost importance in rail operations. Every maneuver, every decision hinges on accurate data and streamlined processes.

SBB's Train Driver Electronic Assistant (LEA[1]) is a technical assistant for train drivers in Switzerland, used in freight and passenger transport as well as by several private railroads. The critical information provided by the app enables train drivers to carry out their work easily. The application providing this critical information had been running on **hardware whose maintenance was due to expire**.

Maintenance was a major problem and the inevitable obsolescence of the hardware threatened operational continuity. Dependence on the hardware therefore entailed considerable disadvantages. Hence, the **"operations as code[2]"** approach was chosen to reduce the time to operate and maintain the infrastructure for LEA's messaging subsystem. The time required to set up the application from scratch was also drastically reduced thanks to IaC[3].

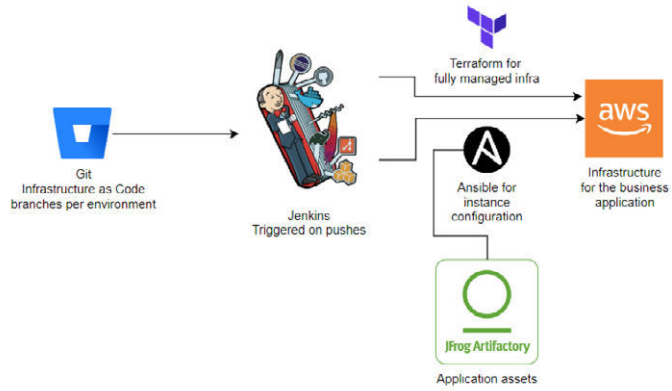

Fig. 1:
Tools used for the operations as code approach

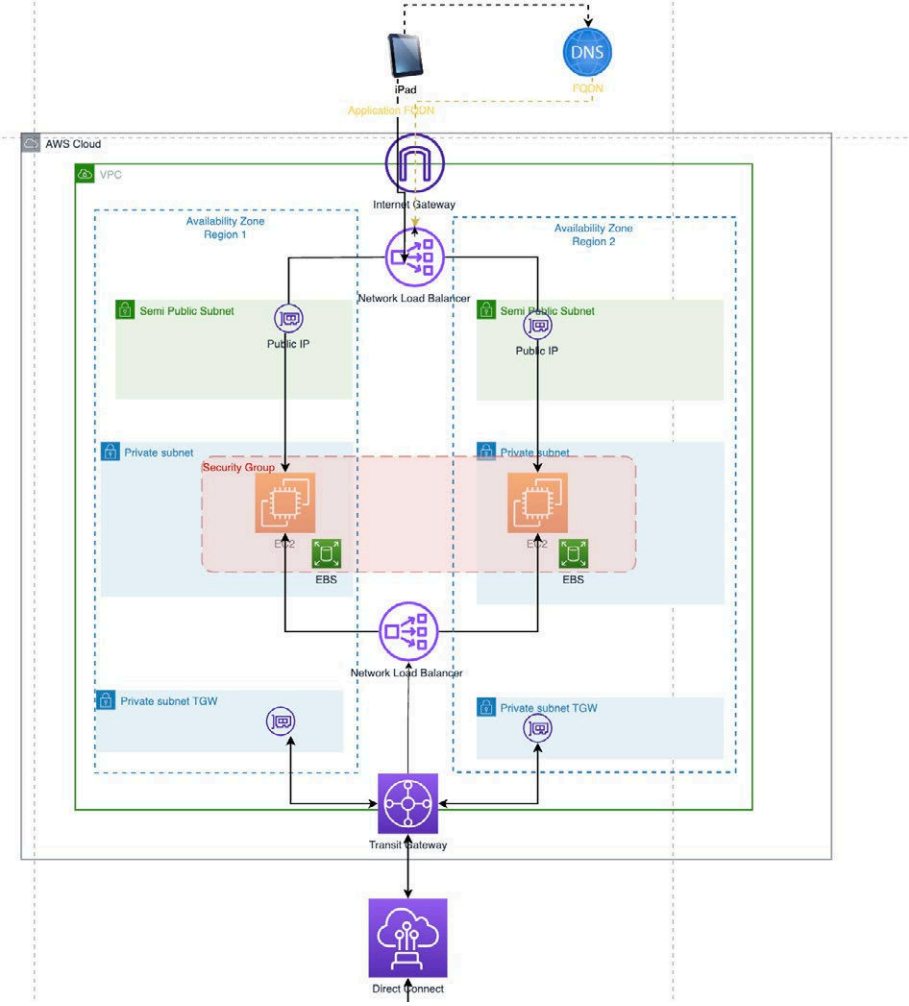

Fig. 2:
An architectural diagram of the environments in AWS

Solution

Careful planning:
Axians Amanox carefully crafted a **plan to ensure migration without disruption** to ongoing operations, moving the application to the cloud - specifically utilizing Amazon Web Services (AWS).

During the smooth transition, hardware dependencies were eliminated, paving the way for improved scalability and resilience.

Capacity and scalability:
During the initial phase of the migration, EC2[4] instances were spun up to test the network capacity. This permitted the adoption of **EC2 instances with higher network allowances**[5] to handle a high number of client requests from the production.

Automation of operations:
In addition, **automating the application configuration** allowed the operations team to set up the application from scratch for disaster recovery reasons. By adopting an Infrastructure as Code (IaC) approach, operations in the test, development and production environments were optimized and manual installation and configuration processes were eliminated.

Better Collaboration:
Furthermore, the **control and management of the application version** and **certificates** is now managed with Ansible (automation platform). This not only facilitated seamless collaboration within the operations team, but also enabled them to flexibly manage their infrastructure. Maintaining separate **Git branches per environment minimized the impact radius**, while committing changes only to the Bitbucket repository for AWS resources enabled effective change tracking and auditing.

Sustainability and efficiency:
We opted for this shared responsibility model instead of developing everything ourselves to make the solution sustainable.

Working with SBB‘s product owner, development team and AWS experts ensured alignment with objectives, adherence to SBB infrastructure standards and seamless execution throughout the project lifecycle. By complying with SBB infrastructure standards, we were able to **reuse the services already provided by the internal teams**, such as Unified OS or Jenkins, to avoid unnecessary duplication of effort.

Fine-tuning:
Using a proactive approach, Axians Amanox closely **monitored the environment** post-migration to ensure optimal performance and **quickly resolved any issues**. With CloudWatch Metrics, it is possible to observe advanced ENA metrics[6] to check if the network allowances allowed for the EC2 instances are being exceeded and to scale the EC2 instances if necessary.

Tools and Technologies

Following our ambition to implement the **transformation in the best possible way**, we used a whole arsenal of cutting-edge tools:

Terraform, Ansible, Jenkins and Artifactory:
IaC formed the backbone of our migration strategy, enabling automation and CD (continuous deployment) pipelines.

AWS Services:
From AWS EC2 instances, Network Load Balancers (NLB) to CloudWatch, we harnessed the power of AWS to deliver a robust, scalable, and cost-efficient infrastructure.

Conclusion

Axians Amanox's partnership with SBB has ushered in a new era of efficiency, scalability, and innovation. By migrating the application to AWS, we have **liberated SBB from the shackles of hardware dependency and paved the way for seamless operations and agility**.

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About SBB – Swiss Federal Railways AG

The company Swiss Federal Railways SBB is a joint stock company under special law with its registered office in Bern. Its public services include passenger services and rail infrastructure. It transports over 1,160,000 people and 185,000 tonnes of freight to their destinations every day. 33,500 employees are passionately committed to ensuring that their customers arrive safely, on time and in an environmentally friendly manner.

Also check out other success stories with SBB:
https://www.amanox.ch/en/case-study-sbb-connectivity-problem/

[1] https://de.wikipedia.org/wiki/Lokpersonal_Electronic_Assistant#:~:text=Lokpersonal%20Electronic%20Assistant%2C%20kurz%20LEA,im%2Dienst%20stets%20mitgef%C3%BChrt%20werden

[2] Operational excellence https://docs.aws.amazon.com/wellarchitected/latest/operational-excellence-pillar/operational-excellence.html

[3] https://en.wikipedia.org/wiki/Infrastructure_as_code

[4] https://en.wikipedia.org/wiki/Amazon_Elastic_Compute_Cloud

[5] https://aws.amazon.com/blogs/networking-and-content-delivery/amazon-ec2-instance-level-network-performance-metrics-uncover-new-insights/

[6] https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/monitoring-network-performance-ena.html