

Realization Overview

INTERNSHIP TELENET

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Bachelor of Applied Computer Science

Option: Application Development

A

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Contents

Terminology	2
Introduction	3
What?	3
Who?	6
Where?	7
When?	8
Why?	9
How?	11
Conclusion.....	12

Terminology

NC: Netcracker Technology Corporation. An American-based multinational telecommunications technology company. The company specializes in software products and professional services for communications service providers.

OSS: Computer systems used by telecommunication service providers to manage their networks.

BSS: The components that a telecommunication service provider uses to run its business operations towards customers.

AWS: A subsidiary of Amazon that provides on-demand cloud computing platforms to individuals, companies and governments on a metered pay-as-you-go basis.

Number Porting: The process of transferring a phone number from one operator to another.

FNP: Fixed Number Porting. Number porting for fixed phone numbers.

MNP: Mobile Number Porting. Number porting for mobile phone numbers.

TOF: Technical Order Fulfillment tribe. Currently responsible for the Number Porting project at Telenet.

Introduction

During my internship at Telenet, I had the opportunity to contribute to a significant modernization project within the TOF Squad, a team within the Number Porting Tribe. This project aimed to replace the outdated number porting system for both mobile and fixed lines with a more robust and scalable solution leveraging Amazon Web Services (AWS).

The project involved extensive collaboration among developers, testers, analysts, and a product owner, operating within an Agile framework

The opportunity to learn from the talented individuals who work at Telenet and witness their unique problem-solving approaches was an honor. I worked very hard to enhance my technical abilities, critical thinking skills and improving my communication.

This thesis outlines the purpose, participants, process, and outcomes of my internship, structured around the key questions of what, who, where, when, why, and how.

Further supporting documentation and evidence can be found in the Realization-automatization and Realization-development documents.

What?

Number porting is the process of transferring a phone number from one telecom operator to another without altering the number itself. The original system for number porting at Telenet was outdated, prone to failures, and difficult to maintain. To address these issues, the TOF Squad embarked on a project to rebuild the system from scratch using modern technologies, with AWS as the backbone for scalability and reliability.

The project involved two distinct phases:

1. **Mobile Number Porting:** This phase focused on creating a system for transferring mobile numbers. By the time I joined, this phase was nearing completion.
2. **Fixed Number Porting:** This phase aimed to revamp the process for transferring fixed-line numbers. I was actively involved in this phase, contributing to back-end and front-end development as well as automation testing.

My tasks included analyzing existing code, writing automated tests, solving bugs, and developing new features. I also worked on improving code quality by addressing technical debt and creating tools like message transformers for converting data formats.

The following images can help visualize the number porting process.

Telenet Mobile

CRDC

Build date: 03/12/2024 12:29:19

Home Page

Molo Functions

Molo Views

Molo Reports

Logout

Telenet Mobile

Telenet Mobile

TELENET

BASE Company

Confirm

View As Donor

View As Recipient

View as Participant

Participant	System	Link	Participant	System	Link
BASE Company			Orange Light		
Belgian Telecom			ORANGE MOBILE		
BICS - Fixed Carrier Services			OVN		
BT			Premium Routing		
Carrier 2 Network Services			Prosimus fix		
CTT - CWave			Prosimus mobile		
COLT TELECOM			SCARLET Belgium NV		
CRDC			SEWAN Belgium		
Destiny			SONA Fixed		
Destiny GIS			TechIT		
Dialoga			Telavox		
DIDWW			Telavox FIX		
DIGI Fix			TELENET		
DIGI Mobile			Telenet Mobile		
EDFnet			TeliaIP		
FERD Fixed			Telnyx Ireland		
FERD Telecom			TelSmart		
Hoptone			Tismi Fixed		
Intellinet			Tismi Mobile		
IP Netia Fixed			Trustteam		
Lancelot Fix			United Telecom		
Lancelot Mobile			Victone		
Lycamobile sprl			Verizon		
Medafon Carrier Services			VOIPED Telecom		
Minovip			VOD SA		
NLI OM Telecom			VOD SA fix		
NLI ONDB Primary (by PKS)			Vodafone		
NLI ONDB Secondary (by PKS)			Vodafone Mobile		
NLI RingRong			Vapepee		
NPA			X2Com		
Onoffapp					
Orange Business Belgium					

Jose Jaicy

Replace

Console

Bootcamp

Build

Browse

Telenet Mobile

CRDC

Build date: 03/12/2024 12:29:19

Home Page

Molo Functions

Molo Views

Molo Reports

Logout

NP Number Location Report (Historical)

Usage: Enter a phone number to determine the number's location history

Phone Number

0465221187

Search

Clear

Drag a column header here to group by that column

Operator	Start Date	End/Discontinuation Date
Lycamobile sprl	04/02/2015 14:36:40	

Telenet Mobile

CRDC

Hello jaicy.jose@telenetgroup.be you were logged in as Telenet Mobile as Operator

- Build date: 03/12/2024 12:29:19

Home PageMolo FunctionsMolo ViewsMolo ReportsLogout

NP Number Location Report

Jsage: Enter a phone number to determine t

Phone Number0465221187

SearchClear

Drag a column header here to group by that co

Operator	Start Date	End
Lycamobile sprl	04/02/2015 14:36:40	

Scheduled Reports Archive

NP Activated Deactivated Ports

Consolidated Database Storage Report

NP Database Storage Statistics Report

NP Number Block Allocation Report

NP Number Location Report Current

NP Number Location Report Historic

NP Routing Number Report

MNP Cancels Statistics Report

MNP Downtime Statistics Report

MNP NP Exec Volume Statistics Report

MNP NPR Volume Stats

MNP Porting Process History Report

MNP Rejects And Cancels Statistics Reports

MNP Synchronization Report

MNP Timers Expired Report

Telenet Mobile

CRDC

Hello jaicy.jose@telenetgroup.be you were logged in as Telenet Mobile as Operator

- Build date: 03/12/2024 12:29:19

Home PageMolo FunctionsMolo ViewsMolo ReportsLogout

MNP Porting Process History.

Start date and time05/12/20240000

End date and time12/12/20242359

Start Phone Number0488652527

Stop Phone Number

MessageAll

View ReportSubscribe Report

1 of 1Find | Next

MNP Porting Process History Report

Requestor	Generation Timestamp	MSISDN From	MSISDN To
Telenet Mobile	12/12/2024 11:48:27	0488652527	

NPR Number	NP Message	Version	Sender	Role	CRDC Date/Time	Donor	Recipient	MSISDN	Routing Info	Reject Code	Reject String
BASE202024121211435801	npbroadcast	01.00	BASE	Recipient	12/12/2024 11:47:22	MOBM	BASE	0488652527	C4800		

BASE Company

CRDC

Hello jaicy.jose@telenetgroup.be you were logged in as BASE Company as Operator

- Build date: 03/12/2024 12:29:19

Home PageMolo FunctionsMolo ViewsMolo ReportsLogout

MNP Porting Process History.

Start date and time05/12/20240000

End date and time12/12/20242359

Start Phone Number0488652527

Stop Phone Number

MessageAll

View ReportSubscribe Report

1 of 1Find | Next

MNP Porting Process History Report

Requestor	Generation Timestamp	MSISDN From	MSISDN To
BASE Company	12/12/2024 11:49:05	0488652527	

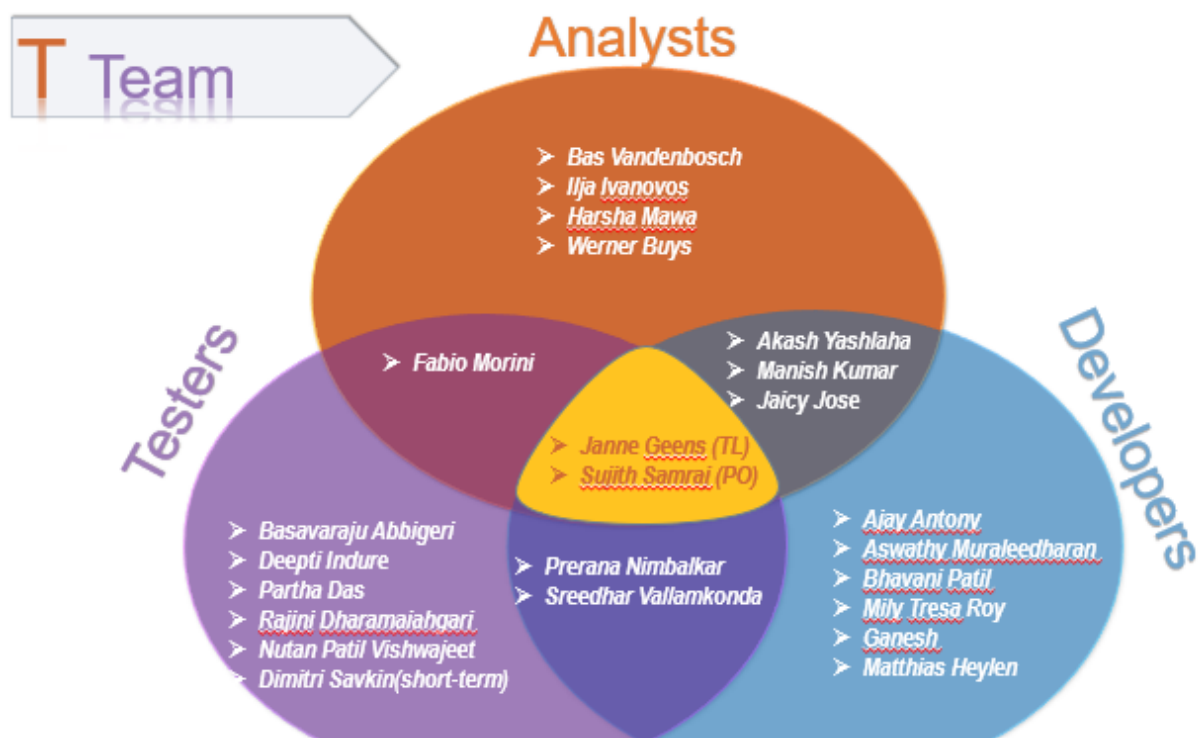
NPR Number	NP Message	Version	Sender	Role	CRDC Date/Time	Donor	Recipient	MSISDN	Routing Info	Reject Code	Reject String
BASE202024121211435801	nprequest	01.00	BASE	Recipient	12/12/2024 11:44:02	MOBM	BASE	0488652527			
BASE202024121211435801	npaccept	01.00	MOBM	Donor	12/12/2024 11:44:12	MOBM	BASE	0488652527			
BASE202024121211435801	npexec	01.00	BASE	Recipient	12/12/2024 11:44:24	MOBM	BASE	0488652527			
BASE202024121211435801	npready	01.00	MOBM	Donor	12/12/2024 11:47:07	MOBM	BASE	0488652527			
BASE202024121211435801	npbroadcast	01.00	BASE	Recipient	12/12/2024 11:47:22	MOBM	BASE	0488652527	C4800		
BASE202024121211435801	npdone	01.00	MOBM	Donor	12/12/2024 11:47:41	MOBM	BASE	0488652527			

Who?

The TOF Squad comprised a diverse and collaborative team:

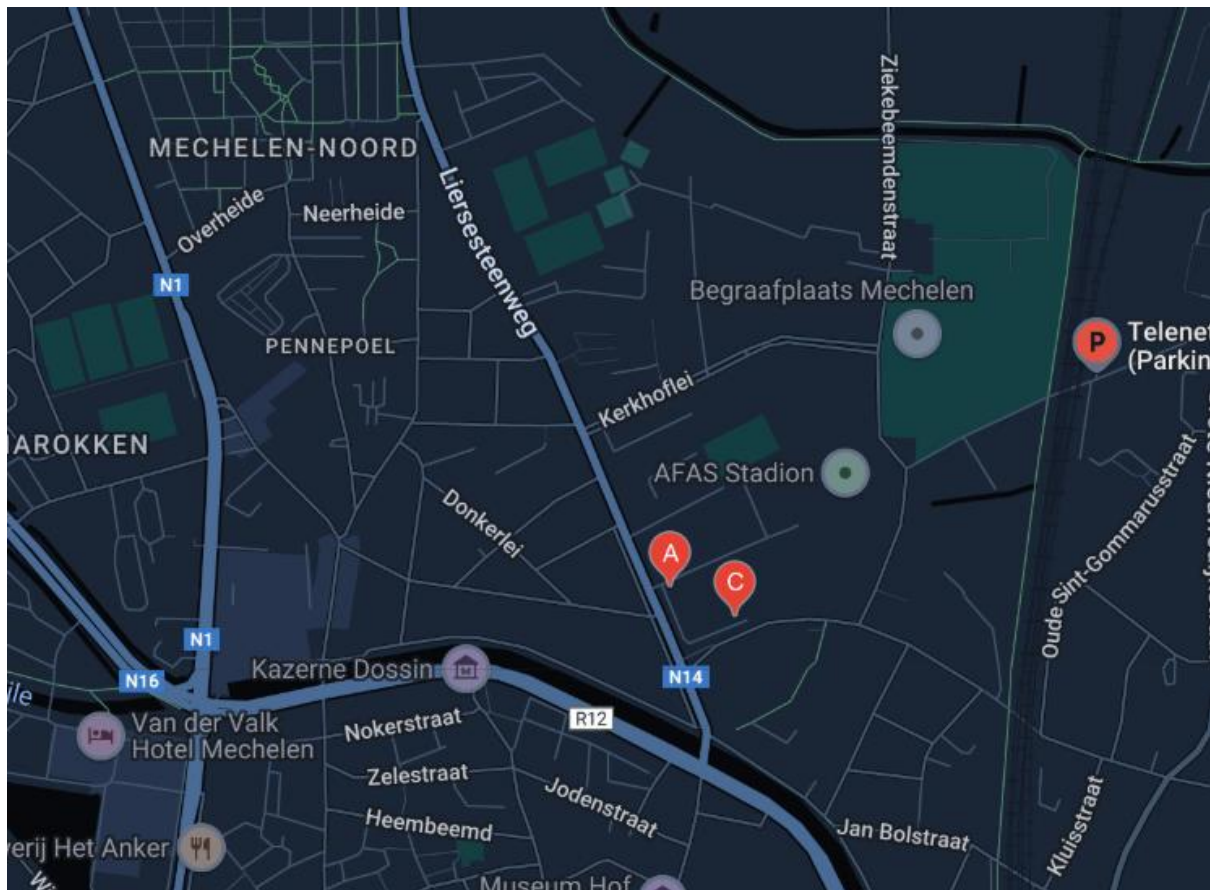
- **Product Owner:** Responsible for setting priorities, defining requirements, and ensuring alignment with business goals.
- **Developers:** Focused on coding, system architecture, and technical implementation. I was part of this group.
- **Testers:** Ensured the quality and reliability of the system through rigorous testing.
- **Analysts:** Worked on translating business requirements into technical specifications and supported the team with domain knowledge.

This cross-functional team operated in an Agile environment, with daily stand-ups, sprint planning, code reviews, and retrospectives fostering collaboration and continuous improvement.



Where?

The internship was based at Telenet's headquarters in Mechelen, Belgium. This location served as the central hub for the Number Porting Tribe, where team members could collaborate closely. While some tasks were performed remotely, much of the work involved face-to-face meetings, brainstorming sessions, and technical workshops in Mechelen.



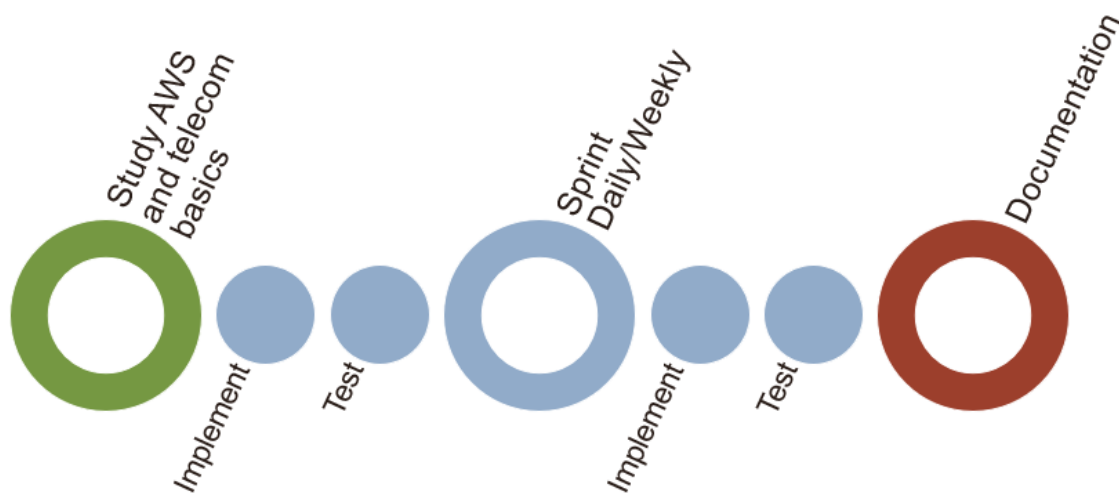
When?

My internship took place during the final stages of the mobile number porting project and the early-to-mid stages of the fixed number porting project. These efforts were part of a broader modernization initiative that had been ongoing for over a year and a half prior to my arrival. Agile sprints structured the workflow, with two-week cycles focusing on delivering incremental improvements.

Regular sprint reviews and retrospectives ensured that progress aligned with project goals and that any challenges were promptly addressed.

This internship is unique in the sense that you are not individually working on a 13 week long project like most other internships, but are rather a part of that team.

Development was an iterative process.



Why?

The decision to modernize the number porting system stemmed from several critical issues with the legacy system:

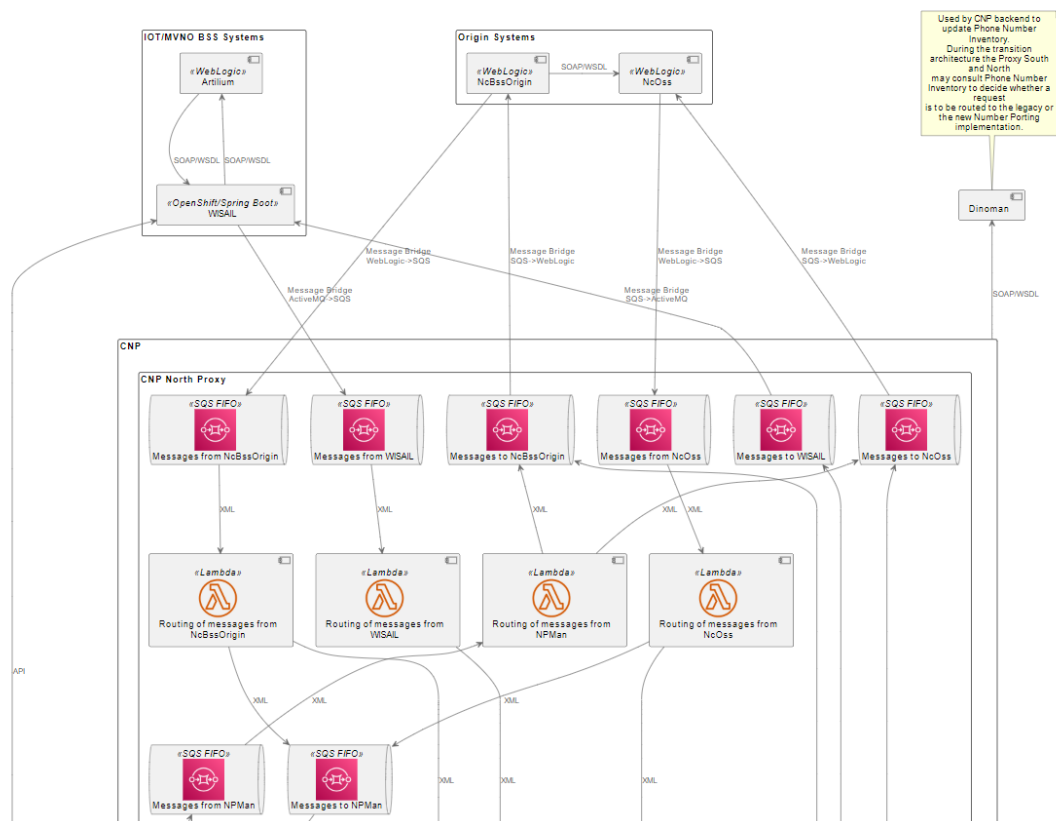
1. **Reliability:** The old system experienced frequent failures, leading to operational disruptions and customer dissatisfaction.
2. **Maintainability:** Legacy code was difficult to update and debug, hindering the ability to introduce new features or adapt to changing requirements.
3. **Scalability:** As Telenet's customer base grew, the system struggled to handle the increasing load.

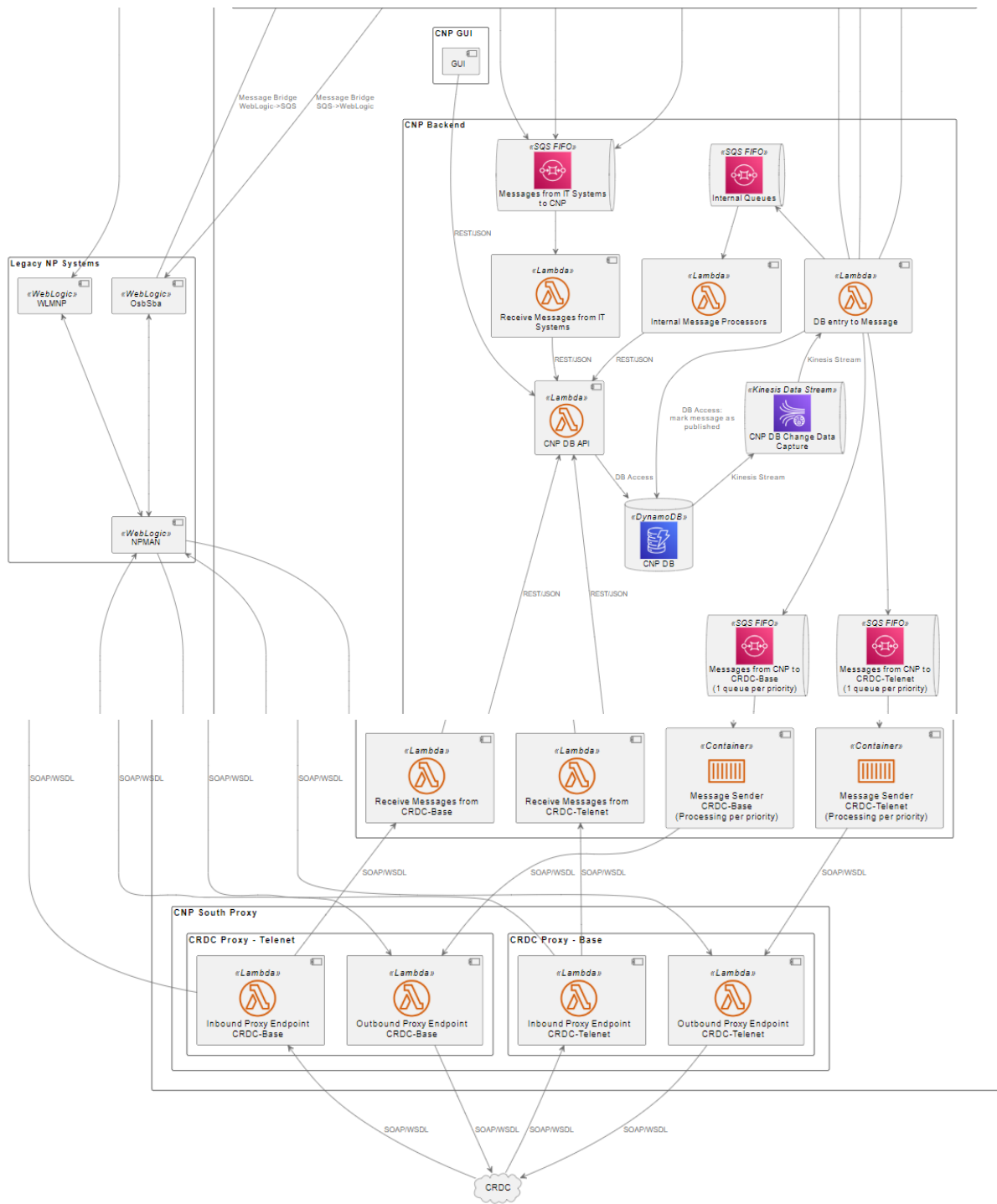
By transitioning to AWS, the new system aimed to:

- Enhance reliability with cloud-based infrastructure.
- Improve scalability to accommodate future growth.
- Streamline maintenance through modern coding practices and better documentation.

The following images display the current architecture of the project.

Application Architecture

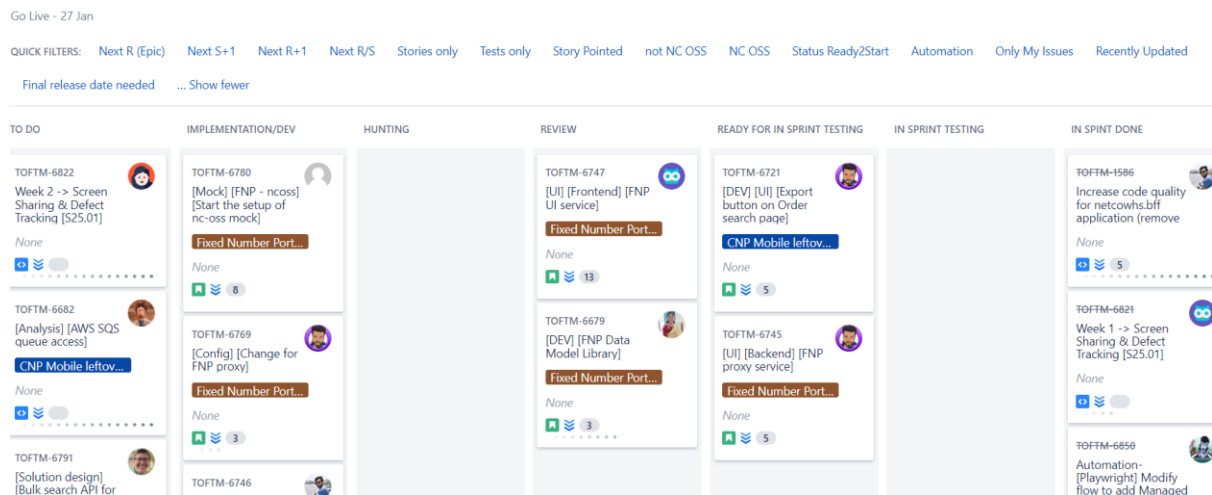




How?

The project followed an Agile methodology, emphasizing iterative development and collaboration. Key aspects of the workflow included:

1. **Sprints:** Two-week cycles focused on delivering specific features or resolving high-priority issues.
2. **Code Reviews:** Peer reviews ensured high-quality code, shared knowledge among team members, and adherence to best practices.
3. **Automation Testing:** I contributed by writing JUnit and Selenium tests to ensure system reliability and identify bugs early in the development process.
4. **AWS Integration:** Serverless technologies like AWS Lambda were employed for tasks such as message transformation and data processing. I worked on developing XSL files and deploying them using Terraform.
5. **Front-End Development:** I implemented new features, such as a button for exporting orders to CSV format, using frameworks like Vue.js and React.
6. **Collaboration Tools:** Daily stand-ups and tools like Jira facilitated effective communication and task management within the team.



Conclusion

My internship at Telenet provided a comprehensive learning experience, combining technical development with teamwork and problem-solving. By participating in the modernization of the number porting system, I gained hands-on experience in:

- Cloud computing with AWS, including serverless technologies and deployment using Terraform.
- Automation testing, which strengthened my understanding of software quality assurance.
- Agile development practices, including sprints, code reviews, and cross-functional collaboration.

The project's success underscored the importance of updating legacy systems to meet modern standards of reliability, scalability, and maintainability. Working within the TOF Squad allowed me to contribute meaningfully while developing skills that will undoubtedly benefit my future career as a software developer. This experience highlighted the value of teamwork, effective communication, and adaptability in achieving shared goals in a professional setting.