FINAL YEAR B.TECH SEMESTER INTERNSHIP REPORT

A Report Submitted in Partial Fulfilment of the Requirements for the Award of Degree of

BACHELOR OF TECHNOLOGY

in

ELECTRONICS AND COMMUNICATION ENGINEERING

by

MULKALLA SAIKUMAR

Enrollment Number: BT19ECE073

Internship Period: 6th June, 2022 - 6th December, 2022

Under the Supervision of

Vaibhav Tyagi, Head of MFS Product Development India

Sachindra Kumar Shukla, Product Development Leader

Ericsson Global India Pvt. Ltd.

Academic Mentor

Dr. Paritosh D. Peshwe, Assistant Professor

Department of Electronics and Communication Engineering

भारतीय सूचना प्रौद्योगिकी संस्थान, नागपुर

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY

NAGPUR

(An Institution of National Importance by Act of Parliament)

Survey No. 140,141/1,

Behind Br. Sheshrao Wankhade Shetkari Sahkari Soot Girni, Village - Waranga, PO - Dongargaon(Butibori), Tahsil - Nagpur (Rural), District Nagpur, Maharashtra - 441108

Contents

भारतीय सूचना प्रौद्योगिकी संस्थान, नागपुर
Indian Institute of Information Technology, Nagpur
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INTERNSHIP PERFORMANCE ASSESSMENT BY EMPLOYER

Is Internship completed on or before 30th November 2022: No

If No, please specify the amount of Internship work done (in percentage) till 30th November 2022: 95%

To,
The Reporting Manager / Program Coordinator (Internships)

We appreciate your contribution to the professional growth and development of students of IIIT Nagpur.
This internship is a mandatory part of B.Tech curriculum at IIIT Nagpur. This Assessment form is a part of INTERNSHIP EVALUATION of the student. Based on your assessment, the student will earn the credits for this internship.

Please handover this document duly filled and signed by the Supervisor/Reporting Manager to the student for submitting to the Institute.

Please note this form may be shared with the student; comments that will aid the student in career and related skill development are particularly encouraged.

STUDENT'S INFORMATION:

Student's Name: Mulkalla Saikumar

Student's Enrollment Number: BT19ECE073

Internship Start Date: 06/06/2022 **Internship End Date: 06/12/2022**

Work hours per week: 42.5

- **Internship Profile Name**:

_____

_____

- **Duties allotted to the student:**

_____

_____

INTERNSHIP EVALUATION SHEET

Please rate the internship performance of the student in the following areas on a scale of 1 to 5.

1=Poor	2=Acceptable	3=Good	4=Very good	5=Excellent

Sr No	Area	Rating (Out of 5)	Comments
1	Domain knowledge	3	Good, Has room for improvement
2	Ability to apply domain knowledge to tasks given	4	Has done well in his knowledge area.
3	Completion of Assignment/Project	5	Has completed the assignments given and kept good communication throughout
4	Ability to meet deadlines	4	
5	Ability to develop creative solutions to problems	3	Good. Has room for improvement
6	Ability to take initiative	4	Has taken few initiatives in picking up next tasks and activities. Can be improved upon .
7	Ability to work with others	5	Shown good collaboration with team
8	Presentation Skills	3	Presentation Skills are fine, but can be improved upon
9	Communications Skills	3	Communication Skills are fine, but can be improved upon
10	Punctuality	5	
	TOTAL SCORE (Out of 50)	39	

NARRATIVE ASSESSMENT (*Please state in narrative form your final assessment of the student's performance. Is the student better prepared for the industry? What are the specific strengths and weaknesses?*)

Overall good attitude and enthusiasm. Picks up skills quickly.

Improvement- Communication skills, presentation skills, needs to work more in project specific areas and improve knowledge.

RECOMMENDATIONS (*Do you have any recommendations to the program faculty on how to improve the program or the internship experience?*)

Can pursue front end tech knowledge like vue js .

DETAILS OF THE ORGANIZATION WHERE INTERNSHIP IS PURSUED

Name of the Organization/Institute where internship is pursued: EGI Ericsson India Global Services Pvt. Ltd. Gurgaon

Office Address: ASF Insigniay, Gadaipur - Mandi Road, Near Cake Emporium, Gwal Pahari, 122001

Date of Evaluation: **25-Nov-22**

Name of Supervisor/Reporting Manager: **Sachindra Kumar Shukla**

Signature of Supervisor/Reporting Manager: **Sachindra Kumar Shukla**

Contact No: 9811954446 **E-mail ID**: Sachindra.kumar.shukla@ericsson.com

Company Seal:

Declaration

I, Mulkalla Saikumar, final year undergraduate student of Department of Electronics and Communication Engineering at Indian Institute of Information Technology, Nagpur hereby declare that,

1. This Internship work as “IT - Software Developer Intern” is carried out by me at Ericsson Global India Pvt. Ltd., Gurgaon. Between 6th June, 2022 and 6th December, 2022.
2. The internship report submitted to the Indian Institute of Information Technology, Nagpur in partial fulfillment of the requirement for the award of the degree of B. Tech in the Electronics and Communication Engineering, is the work that has been done by me under the guidance of my supervisor(s).
3. The work has not been submitted to any other Institute for any degree or diploma.
4. I have followed the guidelines provided by the Institute for preparing the Internship report.
5. I have conformed to the Internship guidelines given by the Institute.
6. Wherever I have used materials (data, theoretical analysis, figures and text) from other sources, I have given due credit to them by citing them in the text of the report and giving their details in the references.

(Signature of Student)
Mulkalla Saikumar
BT19ECE073

Acknowledgement

I would like to extend my heartfelt obligation towards all the personages who have helped me in this endeavor. Without their active guidance, help, and cooperation, I would not have made headway in this six-month internship.

Internship Opportunity with Ericsson Global India Ltd. Gurgaon was a great learning opportunity for me. I would like to show my gratitude to Mr. Vaibhav Tyagi, Head of MFS Product Development India, Ericsson Global India Pvt. Ltd. for providing me with this Internship Opportunity

Special Mention to Mr. Akhtar Hussain, Mr. Mohit Sati, Mr. Yasharth Singh Tarkar, Mr. Sachin Kumar Chauhan for mentoring and constantly guiding me with patience, their invaluable advice, unwavering trust, and unconditional support helped immensely in the timely and successful completion of the internship. And I also express my gratitude to all the Team members that I worked with.

I thank the IIIT Nagpur Senate who has made a six-month internship compulsory part of the curriculum.

I express my gratitude to Dr. Paritosh D. Peshwe, Asst. Professor, Department of Electronic and Communication Engineering, Dr. Meera Jagdale, Training & Placement Officer and Training and Placement cell, IIIT Nagpur for helping me throughout the journey in every best way possible.

Also, I would like to thank all my friends and all other people who have directly or indirectly helped me in this internship.

Sincerely,

Mulkalla Saikumar

Organization and Company Profile

Telefonaktiebolaget LM Ericsson (lit. ”Telephone Stock Company of LM Ericsson”), commonly known as Ericsson, is a Swedish Multinational Networking and Telecommunications Company Headquartered in Stockholm. The company sells Infrastructure, Software, and Services in Information and Communications Technology for Telecommunications Service Providers and Enterprises, including, among others, 3G, 4G, and 5G equipment, and Internet Protocol (IP) and Optical Transport Systems.

The Company employs around 100,000 people and operates in more than 180 countries. Ericsson has over 57,000 granted patents. Ericsson has been a major contributor to the development of the Telecommunications Industry and is one of the leaders in 5G.

Ericsson’s business includes Technology Research and Development, Network Systems, Cloud Software and Services, Enterprise Wireless Solutions and Global Communication Platform. Ericsson has its Market Areas in North America, Europe, Latin America, Middle East, Africa, South East Asia, North East Asia, Oceania and India.

Ericsson’s Research and Development

Ericsson has structured its R&D in three levels depending on when products or technologies will be introduced to customers and users. Its research and development organization is part of ’Group Function Technology’ and addresses several facets of Network Architecture, Wireless Access Networks, Radio Access Technologies, Broadband Technologies, Packet Technologies, Multimedia Technologies, Software Services and Security.

Ericsson hosts a developer program called Ericsson Developer Connection designed to encourage development of Applications and Services. Ericsson also has an open innovation initiative for Beta Applications and Beta API’s & tools called Ericsson Labs. The company hosts several internal innovation competitions among its employees.

Ericsson Global India Pvt. Ltd

Ericsson has more employees in India than in any other country. With regional Headquarters in Gurgaon, Haryana, the Indian region has 19,971 employees working in Engineering and Research and Development in areas such as Revenue Management, Internet Protocol, Networking and Big Data. Ericsson Global India Services (EGI) is the largest and the fastest-growing Global Services Center (GSC) that delivers a wide array of Multi-Vendor and Multi-Technology ICT Services to leading Telecommunication Operators across the world.

The Research and Development (R&D) centre at Gurgaon, the unit provides core Networks, Operations Support Systems such as Network management and Analytics, and Business Support Systems such as Billing and Mediation. Within the Digital Services Unit, there is an M-Commerce offering, which focuses on service providers and facilitates their working with financial institutions and intermediaries.

Ericsson Mobile Financial Services (MFS)

Mobile financial services offer the possibility to bring millions into the formal economy, boosting individual livelihoods and transforming economies.

Mobile Financial Services Driving Forces

- Digital Transformation
- Cash to e-Money adoption
- Personalized Services
- Regulatory Challenges
- Technology evolution

The vision of Ericsson Mobile Financial Services (MFS) is

- A world where financial services are accessible to all and are interconnected with each other.
- Making a payment transaction is as easy and affordable as sending as SMS.
- And when any device is a commerce device.

Ericsson Mobile Financial Services (MFS) aim to drive greater financial and social inclusion. Financial services need to be accessible, affordable and convenient particularly if they are to benefit users in more rural or hard-to-reach areas. Ericsson Mobile Financial Services (MFS) platform features easy to use and secure next-generation mobile financial services. The main offerings of Ericsson MFS are Ericsson Wallet Platform, Products (3503) and Services (3502).

The M-Commerce ecosystem encompasses a large number and wide variety of stakeholders from several industries, each with diverse business goals. These players include agents, operators, banks, money transfer Organizations, different types of Service Provider, as well as internal actors from the operator. Agents provide cash-in/out points for the Consumer; and Operators and other service Providers deliver the M-Commerce ecosystem's functions.

The objective is to create a sustainable m-commerce ecosystem that gives the unbanked and under-banked access to a global payment network and financial services. Each stakeholder can provide key elements of the m-commerce ecosystem so that it is both accessible and widespread.

Ericsson Mobile Financial Services (MFS) collaborate to build mobile financial eco-systems which are a cornerstone in the infrastructure of many developing countries, enabling financial services such as peer to peer transfers, payments, disbursements, loans, savings and more, for hundreds of million persons, every day.

Internship Profile

Role: IT Software Developer Intern - R&D Unit

Duration: 6 Months

6th June, 2022 - 6th December, 2022

Team Name: M-Commerce-DT22

Team Members:

- Program Manager - Shantul Shukla
- Team Lead/Build Master - Mohit Sati
- Security Master/Build Master - Vishek Pratap Singh
- System Architect - Akhtar Hussain
- Architect - Yasharth Singh Tarkar
- Software Developer - Sachin Kumar Chauhan, Khushboo Kumari
- Graduate Engineer Trainee - Hunar Garg

Description:

I was offered a six-month internship after Technical rounds and interviews. The position was for a IT Software Developer Intern - R&D Unit. It was a good opportunity for me who is just growing in the IT Professional. The process was very standard for selection and onboarding. Over the complete duration of the internship, I was attached to a single team in Ericsson Mobile Financial Services (MFS) Ericsson Wallet Platform (EWP) Project.

My day to day responsibilities include Completion of task given by the Team Lead regarding BUCs and TRs in EWP Project. This involves knowledge of Java. I was focused primarily on development, maintenance, and testing tasks.

The working model for the whole duration of the Internship was Online. Working Hours every day were from 8 am to 5 pm. Every day a standup call was scheduled to discuss the updates and gain information on the progress within the teams. This involved query submission, resource planning and overview.

Technical Description of the Project

The project in which I was engaged was Ericsson Wallet Platform (EWP)

Ericsson Wallet Platform (EWP)

-A Platform For Mobile Financial Services

Ericsson Wallet Platform provides the technology, tools and regulatory supports to the service providers who are providing mobile financial services to their customers.With an open and published API first technology Ericsson Wallet Platform is the core of the mobile financial services echo-system.

Ericsson Wallet Platform combines the high performance telco level and high secure financial level capabilities into one platform.Ericsson Wallet Platform is feature rich, scalable, and highly secure platform that enables launch and delivery of Business to Consumer (B2C), Consumer to Business (C2B) and Consumer to Consumer (C2C) mobile financial services.Ericsson Wallet Platform allows users to store, transfer and withdraw money, paying merchants and utility providers as well as using financial services like saving and loan.

Ericsson's Wallet Platform is the first mobile money service in the world to earn the security standards certification, boosting its security credentials.With hundreds of mobile payment solutions on the market, you need a tried and tested platform. Building on years of experience, our mobile wallet platform ensures that you give your customers the digital experience they've come to expect: simple, functional, and relevant.

The Ericsson Wallet Platform is a mobile wallet solution that lets people conduct banking transactions with ease, directly from their mobile device. And with four times as many mobile subscribers as people with bank accounts, it's an opportunity to conveniently bring banking to billions across the globe.Ericsson provides full suite of services including technology, deployment and operational services with all needed expertise for the Ericsson Wallet Platform in an DevOps setup enabling fast and reliable solution.

Ericsson Wallet Platform also allows you to

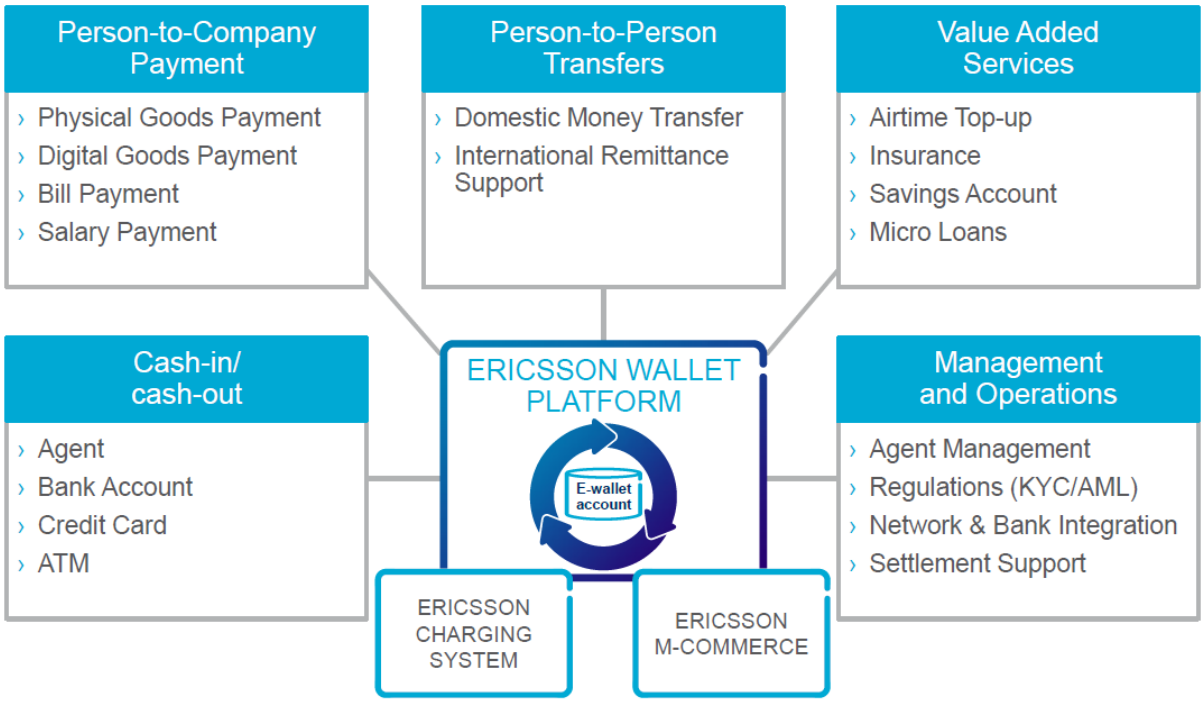
Discover new revenue streams. Generate revenue through interest float, transaction fees, subscription fees, account management, and currency exchange.

Attract new customers. Build your customer base with our secure and easy-to-use platform.

Expand your services. Launch related payment services while offering new services to merchants and financial institutions.

Build attractive user interfaces. Build interfaces via APIs that are not only engaging, but also popular.

Ericsson Wallet Platform (EWP) Features



Ericsson Wallet Platform features include:

Telco and Financial system: Combining high performance telco-grade and high secure financial grade capabilities into one platform.

Open platform: An open architecture providing wide range of APIs enabling customers to build an ecosystem together with their partners (agents, merchants, bill payment aggregators, financial service providers, utility providers, etc.).

Enhanced user experience: Enables users to access the system through multiple channels which can lead to more active wallets.

Easy integration: Provides integration with multiple front-end channels as well as back-end systems.

Complete security: Provides multiple levels of security enabling connecting securely to the ecosystem around you.

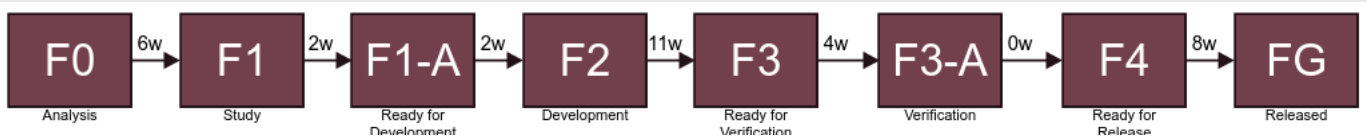
Regulatory Support: Built-in compliance and framework to adhere to the Anti-money laundry rules and regulations.

Theoretical Background of the Concepts Used

Business Use Case(BUC)

Business Use Case also known as a minimal marketable feature, a piece of end-to-end functionality that can be delivered in a release. As EWP is an Existing Project, BUC's are like new Features or Requirements that can be added to EWP which helps Customers and Business. The creation of the BUC starts by analysing the Requirements and Feature that came from Customer feedback or the exist Project Member(employee) by Access Module(AM) team, The AM Team gives the BUC Id to the important and good feature and this Feature or Requirement with the BUC Id is ready to be pick by Development Teams. Every BUC has a Product Owner(PO) who is the Point Of Contact for quires related to the respected BUC.

Flow of the BUC



Analysis phase[F0]: The BUC will be analyzed by AM team. AM team prepare a jira Ticket which contains all the necessary information about the BUC.

Study phase[F1]: After the analysis of AM team, the Team Lead of any Development Team study the BUC, if he is ok with BUC, he will get his team assigned with the BUC, the BUC start up meeting will be held within the team to go through the pros and cons of the BUC with help of Product Owner(PO). The Team Lead will assign a member of the team as the BUC Lead for the BUC, the responsibility of BUC Lead is to come up with Implementation Proposal(IP).

Ready for Development phase[F1-A]: In this phase the BUC Lead will propose the Implementation Proposal to all important teams in project. The Implementation Proposal should be approved by all the teams. After approval, the BUC Lead will make a list of the task for the development of BUC and assign the tasks to the team members.

Development phase[F2]: This phase is the development phase, all the team member will complete the assigned tasks of the BUC and get them reviewed by team members and other teams in the project.

Ready for Verification phase[F3]: After completion of all tasks of the BUC, the BUC lead will plan a Demo session of the development, involving all the important teams in the project. In the Demo session the BUC Lead will present the changes

made in the project to include BUC into the project. If any question are raised, the Development Team has to solve the raised questions, then after if everything is fine, the BUC is marked ready for the verification.

Verification phase[F3-A]: The verification team verifies the development done by the Development Team for the BUC, if everything works fine the BUC is forwarded to release.

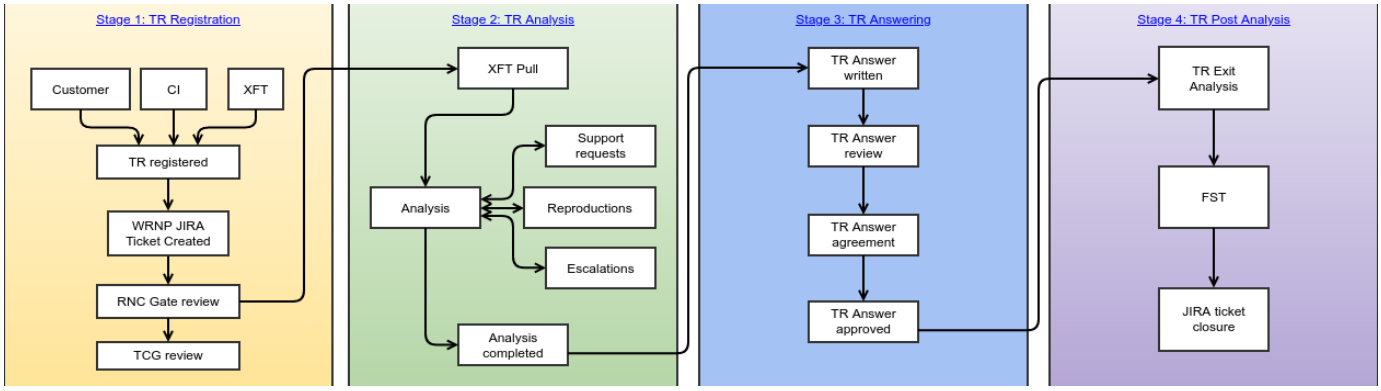
Ready to Release phase[F4]: After verification of Development Team changes the core team of the project checks the changes at customer environment and mark the BUC ready for release.

Release Phase[FG]: The BUC will be release to customers,they can access the new feature.

Trouble Report(TR)

Trouble Report is the function or feature miss functionality in the project. The purpose of TR is to, check items on faults found on project. TR is created by the fault identifier in the MHWeb platform and mirrored to Jira, the fault identifier has to mention necessary information of the fault in the MHWeb. Later TR is picked by the project teams to solve the fault. Ericsson has a promise to make the count of TRs low at MHWeb.

Flow of the TR



TR Registration[Stage1]: The TR will be Registered by the fault identifier on MHWeb and it will be Mirrored to Jira for tracking.

TR Analysis[Stage2]: The analysis of TR will be done, by any of the project member who was indented to pick that TR and he will replicate that issue at his end.

TR Answering[Stage3]: The project member assigned with the TR, will make the changes in project to solve the TR and he will propose the answer for the TR, after that the Answer has to be approved by the TR owner.

TR Post Analysis[Stage4]: The changes for the TR will be verified and the new version of project will be release.

Work done during the Internship

Over the span of 6 months, I have worked on various modules and technologies,below is the listed description of the accomplishments,

- **Going Through The On-Boarding Material -**

  Ericsson has a well set of on-boarding materials to let the new joining employees get knowledge about Overview of Ericsson Wallet Platform, Technologies, Tools used for the EWP. This Materials also give a clear picture of way of working on the Project and how to use the internal and external tools of Ericsson. This work helped me to get an idea of how EWP is created and working.

- **Setting Up the required Environment for the project -**

  Every project has the desired Environment in the IT field, for the EWP, the environment has to be made with the guidance of the senior employees, Ericsson also has a team chat where we can raise the queries about the Environment setup.

- **Ericsson MFS Web and Lwac Kata Exercises -**

  This Kata exercises of Ericsson, will make the new joining employees get the flow of front-end and back-end of the EWP. this series of exercise are compulsory when you join Ericsson in EWP project.

- **Updating the 3PP's used in Ericsson MFS EWP Project -**

  Ericsson Wallet Platform use many licensed Third Party Produts(3PPs), the 3PP has to be regularly checked for the latest version, In this work I have assigned with some 3PPs that needs update. From this work I have learnt how the 3PPs is handled in the project and steps to get the latest version of 3PP into project.

- **Writing the Unit Test(UT) cases for the BUC 18066 -**

  As specified early BUCs are the feature to add in EWP, The business objective of this BUC is to make additional data available in the RDS database for integrated third-party downstream systems like AML and fraud management systems. In this work I have assigned to write Unit Test to test the new implemented method for the code, From this work I have learnt how to write the Unit Test in java to test a functionality.

- **Writing the Basic Test(BT) cases for the BUC 18066 -**

  For the same BUC 18066, the functionality should be tested with the real time data with integrate it with Database for this purpose the basic test are written in java. From this work I have learnt how to fetch data from DB for the testing.

- **Working on the project repository pipelines in Jenkins -**

  A pipeline is a process that drives software development through a path of building, testing, and deploying code. Every time when a new version of software is release the pipelines must go green. In this work I am assigned with checking of pipelines and fixing them if they go red. This work made me to get a knowledge on how continuous integration and continuous deployment work and also got idea of Jenkins.

- **Testing the Implementation done BUC 18066 -**

  After the Implementation of the BUC, the changes are to be tested, so that the BUC can be made available for the customer. In this work I have asked to test all Implementation changes that are done by the team for the BUC. From this work I have learnt how to test a feature of a project and analysis the errors.

- **Involved in answering the TR HZ95086 -**

  This Trouble Report(TR) was raised due to the miss functioning of persistent log of the code, persistent log are the exception and build information files. In this work I have shared the analysis done by me with the TR Owner who raised this issue. From this work I have learnt how the logging is done for the project.

- **Involved in answering the TR HZ95663 -**

  The outdated version of 3PP SnakeYAML, didn't able to load the yaml file this issue is the root to this TR. In this work me and my team updated the version and solved the issue. From this work I have learnt how the 3PPs effect the project.

- **Worked on the BUC 21535 -**

  This BUC is prioritized because of a requirement from Orange where the external logs produced by the EWP will be imported to an analytics system. It is expected that the CPI pertaining to the audit logs gets generated automatically to avoid any discrepancy between the document and the actual audit logs. In this work I have assigned to list all the operations that the project uses and check the description for operations in CPI Document(it is document for the customers of EWP). From this work I have learnt how to write a document that is needed for the customer.

- **Involved in answering the TR IA13214 -**

  TR was raised because the logs for the errors which are getting in transaction failure because of irregular funds in the account is logged at the info level. The level of logs should not be info for this errors. In this work, I have changed logs level to debug and fixed the fault. From this work I have learnt how the error codes and exception are handled in EWP.

Description of the Technology Used

Light Weight Application Container(LWAC) -

LWAC is the deployment technology that implements transaction management, authentication, authorization, support for installation and upgrade, clustering support etc. LWAC hides much of the underlying platform to speed up and simplify development of customer critical requirements. LWAC manage the code of an application or its objects, but not create any additional dependencies. No complex deployment process needs to be started in order to place objects in the LWAC.

Third Party Product(3PP) -

Products that are sourced from suppliers and require a license (3PP License) for activation/use. Third Party Product means a product (whether hardware, software or services) supplied to you by a third party. Third Party Product software in object code form, database, service or content, including Documentation, updates and enhancements thereto if any, owned by an entity other than Us. Ericsson uses many 3PPs to make there project better for customer.

REST API -

REST(Representational State Transfer) API is an application programming technology (API or web API) that conforms to the constraints of REST architectural style and allows for interaction with web services. REST API Uses web services and is based on request and response. It is Highly adaptable and user-friendly. REST API has Strong protocol and is more secure.

Java -

Java is a programming language and a platform. Java is a high level, robust, object-oriented and secure programming language. Java has a Runtime Environment (JRE) and API. It is a general-purpose programming language intended to let programmers write once, run anywhere (WORA), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation. The Java Runtime provides dynamic capabilities (such as reflection and runtime code modification) that are typically not available in traditional compiled languages. Java is faster at runtime and easier to debug.

Container as a Service(CaaS) -

Containers as a service (CaaS) is a cloud service technology that allows software developers and IT departments to upload, organize, run, scale, manage and stop containers by using container-based virtualization. A CaaS provider will commonly provide a framework which allows users to make use of the service. Providers typically make use of application programming interface (API) calls or a web portal interface.

Kafka -

Kafka is high-throughput distributed messaging technology. Kafka has a modern cluster-centric design that offers strong durability and fault-tolerance guarantees. Kafka is designed to allow a single cluster to serve as the central data backbone for a large organization. It can be elastically and transparently expanded without downtime.

VueJs -

Vue.js (commonly referred to as Vue) is an open-source model–view–view model front end JavaScript technology for building user interfaces and single-page applications. Vue.js features an incrementally adaptable architecture that focuses on declarative rendering and component composition.Vue.js allows for extending HTML with HTML attributes called directives. The directives offer functionality to HTML applications, and come as either built-in or user defined directives.

Type-Script -

Type-Script adds additional syntax to JavaScript to support a tighter integration with your editor. Catch errors early in your editor. Type-Script code converts to JavaScript, which runs anywhere JavaScript runs: In a browser, on Node.js or Deno and in your apps. Type-Script understands JavaScript and uses type inference to give you great tooling without additional code.

Modules Used

- **Robot Framework -**
  - Robot Framework is open and extensible. Robot Framework can be integrated with virtually any other tool to create powerful and flexible automation solutions. Robot Framework is free to use without licensing costs.
  - Robot Framework has an easy syntax, utilizing human-readable keywords. Its capabilities can be extended by libraries implemented with Python, Java or many other programming languages.
  - Robot Framework provides good support for external libraries, tools that are open source and can be used for automation. The most popular library used with Robot Framework is Selenium Library used for web development & UI testing.
- **Free-Maker -**
  - Apache FreeMarker is a template engine: a Java module to generate text output (HTML web pages, e-mails, configuration files, source code, etc.) based on templates and changing data.
  - It can be used for Multipurpose and it is lightweight because it has zero dependencies and any output format can load templates from any place.
  - Free-Marker is designed to be practical for the generation of HTML Web pages, particularly by servlet-based applications following the MVC (Model View Controller) pattern.
- **Junit -**
  - JUnit is a unit testing framework for Java programming language. JUnit has been important in the development of test-driven development, and is one of a family of unit testing frameworks collectively known as xUnit, that originated with JUnit.
  - It increases the productivity of the programmer and the stability of program code, which in turn reduces the stress on the programmer and the time spent on debugging.
  - JUnit tests can be run automatically and they check their own results and provide immediate feedback. There's no need to manually comb through a report of test results.
- **AssertJ -**
  - AssertJ is a Java module that provides a rich set of assertions and truly helpful error messages, improves test code readability, and is designed to be super easy to use within your favorite IDE.
  - The idea is that disposal assertions should be specific to the type of the objects we are checking when writing unit tests.

- **Mockito -**
  - Mockito is a mocking framework that tastes really good. It lets you write beautiful tests with a clean & simple API. Mockito doesn't give you hangover because the tests are very readable and they produce clean verification errors.
  - Mockito is used to mock interfaces so that a dummy functionality can be added to a mock interface that can be used in unit testing.
  - Mockito has return value, exception, order check and annotation support.
- **PMD -**
  - PMD is a source code analyzer. It finds common programming flaws like unused variables, empty catch blocks, unnecessary object creation, and so forth. Additionally it includes CPD, the Copy-Paste-Detector.
  - PMD includes built-in rule sets and supports the ability to write custom rules. PMD does not report compilation errors, as it only can process well-formed source files
- **EJB -**
  - EJB is an acronym for Enterprise Java Bean. It is a specification provided to develop secured, robust and scalable distributed applications. It performs life cycle management, security and object pooling for a project.
  - In EJB, middleware services are provided by EJB Container automatically. EJB is a server-side component, it is required to be deployed on the server.
  - Application Server/EJB container provides most of the system level services like transaction handling, logging, load balancing, persistence mechanism, exception handling, and so on. Developer has to focus only on business logic of the application.
- **Test-containers -**
  - Test-containers for Java is a Java module that supports JUnit tests, providing lightweight, throwaway instances of common databases, Selenium web browsers, or anything else that can run in a Docker container.
  - Test-containers make Data access layer integration tests, Application integration tests and UI/Acceptance tests kinds of tests easier
  - Test-Containers also helps us to run module-specific Docker containers to simplify Integration Testing. Test-containers supports almost every Database from MySQL and Postgres to CockroachDB.

Industrial/Commercial Applications of Project

- Ericsson Wallet Platform Drives Financial Inclusion and Empowerment with F5 which is secure and efficient.
- Ericsson Wallet platform is currently handling around 50 million transactions every day making the transaction faster and easier for the customers it has across the world.
- Ericsson wallet platform support services related to both telecoms and finance.
- Ericsson Wallet Platform support specific financial requirements such as Know Your Customer (KYC) identity verification, Anti-Money Laundering and Counter Financing of Terrorism (AML/CTF), and sanctions screening.
- Ericsson Wallet Platform promote economic development in many of the countries.
- Ericsson Wallet Platform offers all the Application Programming Interfaces (APIs) you need to build attractive user interfaces.
- Ericsson Wallet Platform allows service providers to expand their product offerings and boost their customer base.
- Ericsson Wallet Platform will give rise to employment opportunities and bring us a step closer to support the growth of micro, small and medium sized enterprises (SMEs) through access to financial services.
- Ericsson Wallet Platform provide many services to it’s customer like loan, remittance etc.

Productivity Tools Used

Jenkins -

Jenkins an open source automation server which enables developers around the world to reliably build, test, and deploy their software. Jenkins provides hundreds of plugins to support building, deploying and automating any project. Jenkins is a self-contained Java-based program, ready to run out-of-the-box, with packages for Windows, Linux, macOS and other Unix-like operating systems. Jenkins can be easily set up and configured via its web interface. Jenkins is an open source continuous integration/continuous delivery and deployment (CI/CD) automation software DevOps tool written in the Java programming language. It is used to implement CI/CD workflows, called pipelines.

Kubernetes -

Kubernetes, also known as K8s, is an open-source system for automating deployment, scaling, and management of containerized applications. It groups containers that make up an application into logical units for easy management and discovery. Kubernetes defines a set of building blocks (”primitives”) that collectively provide mechanisms that deploy, maintain, and scale applications based on CPU, memory or custom metrics. Kubernetes is open source giving you the freedom to take advantage of on-premises, hybrid, or public cloud infrastructure, letting you effortlessly move workloads to where it matters to you. Kubernetes has deprecated the shim in favour of directly interfacing with the container through Containers or replacing Docker with a runtime that is compliant with the Container Runtime Interface.

Oracle -

An Oracle Database (aka Oracle RDBMS) is a collection of data organized by type with relationships being maintained between the different types. It is a database commonly used for running online transaction processing (OLTP), data warehousing (DW) and mixed (OLTP & DW) database workloads. Oracle

Autonomous Database is an all-in-one cloud database solution for data marts, data lakes, operational reporting, and batch data processing. Oracle uses machine learning to completely automate all routine database tasks—ensuring higher performance, reliability, security, and operational efficiency.

Helm -

Helm is the package manager for Kubernetes. It is used to build Helm charts, which are packages of Kubernetes resources that are used to deploy apps to a cluster. Those charts are kept in a repository served by chartmuseum. Helm is the best way to find and use software built for Kubernetes. Helm Charts help you define, install, and upgrade even the most complex Kubernetes application. Helm provides the same basic feature set as many of the package managers you may already be familiar with, such as Python's pip.

Use Helm to:

- Find and use popular software packaged as Helm Charts to run in Kubernetes.
- Share your own applications as Helm Charts.
- Create reproducible builds of your Kubernetes applications.
- Intelligently manage your Kubernetes manifest files

Jira -

Jira is a software application used for issue tracking and project management. The tool, developed by the Australian software company Atlassian, has become widely used by agile development teams to track bugs, stories, epics, and other tasks. Jira helps teams plan, assign, track, report, and manage work and brings teams together for everything from agile software development and customer support to start-ups and enterprises. Jira offers several products and deployment options that are purpose-built for Software, IT, Business, Ops teams, and more. More than just an issue tracker, Jira is an extensible platform that you can customize to match your business processes.

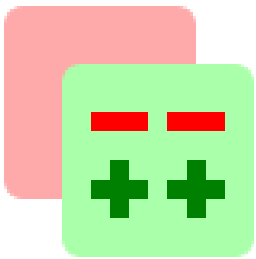
Citrix -

Citrix is an American multinational cloud computing and virtualization technology company that provides server, application and desktop virtualization, networking, software as a service (SaaS), and cloud computing technologies. Citrix Gateway service provides secure remote access solution with a diverse Identity and Access Management (IdAM) capabilities, delivering a unified experience into SaaS apps, heterogeneous Virtual apps and Desktops, and so forth. Citrix Remote Desktop Services allow Windows applications and computing resources to be centrally managed in a secure data center.

Microsoft Suite -

Microsoft Office is a family of client software, server software, and services developed by Microsoft. The office contains Microsoft Word, Microsoft Excel, Microsoft PowerPoint, OneNote and Outlooks etc. along with Microsoft Teams which is the official meeting and chatting app. Microsoft Office is a complete, intelligent solution to empower employees to be creative and work together, securely

Gerrit -



Gerrit is a free, web-based team code collaboration tool. Software developers in a team can review each other's modifications on their source code using a Web browser and approve or reject those changes. Gerrit makes reviews easier by showing changes in a side-by-side display, and allowing inline comments to be added by any reviewer. Gerrit simplifies Git based project maintainership by permitting any authorized user to submit changes to the master Git repository, rather than requiring all approved changes to be merged in by hand by the project maintainer.

GitLab -

GitLab is an open-core company that provides GitLab, a DevOps software package that combines the ability to develop, secure, and operate software in a single application. GitLab helps you automate the builds, integration, and verification of your code. With SAST, DAST, code quality analysis, plus pipelines that enable concurrent testing and parallel execution, your teams get quick insights about every commit so they can deliver higher quality code faster.

Advantages of GitLab -

- Allows for self-maintained version control for a closed source project.
- Integrates seamlessly with git.
- Allows for a detailed viewing and documentation of the project.

Gradle -

Gradle is an open-source build automation tool focused on flexibility and performance. Gradle is a build automation tool for multi-language software development. It controls the development process in the tasks of compilation and packaging to testing, deployment, and publishing. Supported languages include Java (as well as Kotlin, Groovy, Scala), C/C++, and JavaScript.[2] It also collects statistical data about the usage of software libraries around the globe. Gradle was designed for multi-project builds, which can grow to be large. It operates based on a series of build tasks that can run serially or in parallel. Gradle helps teams build, automate and deliver better software, faster.

Confluence -

Confluence

Confluence is a remote-friendly team workspace where knowledge and collaboration meet. It is used to build a knowledge base for documentation & product requirements. Confluence has evolved into part of an integrated collaboration platform and has been adapted to work in conjunction with Jira and other Atlassian software products, including Bamboo, Clover, Crowd, Crucible, and Fisheye. It is an open, connected structure allows information to flow freely among everyone at the organization.

Lens (*The Kubernetes IDE*) -

Lens is the only IDE you'll ever need to take control of your Kubernetes clusters, and any applications and services running on top. Lens IDE provides the full situational awareness for everything that runs in Kubernetes. Lens comes with a built-in Prometheus setup, With Prometheus, you get access to real-time graphs, resource utilization charts, and usage metrics such as CPU, memory, network, requests, etc., which are integrated into the Lens dashboard. These graphs and metrics are shown in the context of the particular cluster that is viewed at that moment, in real time. Kubernetes Lens also integrates with Helm, making it easy to install and manage Helm charts and releases in Kubernetes.

MHWeb -

MHWEB

MHWeb is a web system used by Design, Design Maintenance and Support organizations within Ericsson. MHWeb is used during development and maintenance, giving support for TR handling, Correction handling, Packaging, Analysis and Reporting. MHWeb is a global tool with one global database where all TRs for all Ericsson products are stored, and with extensive search and analysis capabilities. MHWeb also has a TR tracking component, to make the tracking process of TRs easier for projects. MHWeb is well-integrated with other global and local tools in Ericsson tool's landscape, with interfaces towards SAP SMS for CSR handling, GIT/Gerrit, Jira, Jenkins, PeM, Ericsson Global Search Tool and many others.

Challenges

- The Internship is carried out in the online mode which led to many challenges.
- Learning new technologies - When my internship started, within a week there was a lot of new technologies that was expected from me to be proficient at in a very short time span. To overcome this problem, I took help from my senior employees, friends and some of youtube lectures helped me a lot to get scope in the technologies, then as the task was assigned to me. I would assess the case and learn the new topic along with work.
- Fast paced development - This was one of the biggest challenges I faced during my internship. All things were moving very fast and it was difficult to keep up. It was resolved gradually as I started to pick up my pace and gradually got used to the pressure and speed.
- Error Debugging - when I encountered any error it was very difficult to find the solution for the error, because this error was complete internal to Ericsson product, Ericsson had a internal documentation which helped me to overcome this challenge.
- The complexity of Work - This internship is my first industrial exposure, The work assigned to me was completely different to the exams and projects I have done till now. To overcome it I tried to put in extra efforts to get the background knowledge of the work assigned.and also taking up the doubts in online forums for better solutions my team helped me to get better understanding of work every time I assigned a new work.
- Deadlines - Every Company has time - limited work and completing tasks before a deadline is always very challenging. There were some times when a minor spillover of tasks happened due to communication lag and many issues. To overcome this challenge, I have completed the minor task first and then moved to major works and if was struck on something I quickly went to the senior employee who is more proficient in the work than me.
- Multiple Works - My internship was going on with my final year project, placement exams, practice tests and interviews preparation for getting myself into a good position after my graduation. Managing all that with conflicts in time slots was a little tricky and sometimes I had exhausted .but it also helped me to get multitasking experience, which would surely help me in future.

Learning Aspects

1. Role offered to me in Internship was Software Developer, As Developer I have Learnt how software is released as a product. Industry - specific research internships are designed to provide individuals with hands-on experience and to know the changing technologies by research. I have gained the IT sector knowledge which will give a kick start to my professional career.

2. Working As Team - Team Work is always beneficial then individual work. I have learnt how to work in team to get the better result for the product. Ideas discussed in team meets helped me to know how the software requirement is analysed. Coordination is required among team members to execute a task successfully. I learnt that it is incredibly important to continuously interact with your team members and be an active part of the team building activities. This makes it easier for us to bond and coordinate while working together on a project for better results.

3. Improved Listening Skills - ”Listening is an art that requires attention over talent, spirit over ego, others over self” - Dean Jackson. When we are in the discussion of the project I used to be attentive to learn about the things and ask any queries, This Improved my listening skills.

4. This Internship taught me that Starting on work is more important then thinking on that work. Also taught to be Responsible and Accountable for decisions and actions that we make.

5. Time Management - ”Time is really the only capital that any human being has, and the only thing he can’t afford to lose.” – Thomas Edison. Managing time is very important to succeed in the life, that may be in Professional or Personal. By the Deadlines in the project tasks, I learned how to manage time and submit the required work in a timely.

6. I got knowledge about many New technologies that used in project and skill enhancement of the technologies that I already have learnt in my college. The connection between different platforms such as Java, Kubernetes and Jenkins.

7. Apart from the Technical Knowledge, I also acquired the Professional space Conduct of Conduct and work Ethics knowledge.

Outcomes

- Internship made me to get a clear level of understanding that I have on various technologies, so that I can improve in my weak aspects which will help in my future endeavours.
- Estimation of Resource is the technique of assessing the type and number of resources required for an upcoming project which is very important. Resources are the driving force behind the success of the project.
- Internship helped me develop work habits and attitudes necessary for job success. Develop communication, interpersonal and other critical skills in the job interview process. And to build a record of work experience.

Experience at Ericsson

I can say that I have got a great experience working with experienced and professional employees at Ericsson. In Ericsson there is no calling ”Sir” to any employee which makes the communication more easy and efficient. I was very lucky to work with the team that assigned to at Ericsson, who helped me in every aspect of the project and they are very friendly towards me. This experience changed my thinking about IT Professional Workspace.

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Go to Top↑