A project report on

ORDER ENGINEERING CENTER

Submitted in partial fulfilment of the requirement
For the award of the degree

MASTER OF COMPUTER APPLICATIONS

Of

Visvesvaraya Technological University
Belgaum, Karnataka
By

NAZIM BASHA

1CR18MCA79

CMR INSTITUTE OF TECHNOLOGY
132, IT Park Road, Kundalahalli, Banglore-560037
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Under the guidance of

Internal Guide

DR. Helen Josephine V L

Associate Professor

Department of MCA

CMR IT, Bangalore.

External Guide

Mr. Ameen Khan

Technical Lead,

Grayhats,

Bangalore.

CMR INSTITUTE OF TECHNOLOGY

132, IT Park Road, Kundalahalli, Bangalore-560037

2019-2020

CMR INSTITUTE OF TECHNOLOGY

Department of Master of Computer Applications

Bangalore - 560 037

CERTIFICATE

This is to certify that the project work entitled

ORDER ENGINEERING CENTER

Submitted in partial fulfilment of the requirement
for the award of the degree of
Master of Computer Applications of the Visvesvaraya
Technological University, Belgaum, Karnataka
bonafide work carried out by

NAZIM BASHA

1CR18MCA79

during the academic year 2019-20120.

Signature of the Guide	**Signature of the HOD**	**Signature of the Principal**
DR. Helen Josephine VL	**Mrs. Gomathi T**	**DR. Sanjay Jain**
Associate Professor, MCA	HOD, MCA	Principal, CMRIT

Name of the Examiners	External Viva	Signature with Date
1.		
2.		

Grayhats

CERTIFICATION OF PROJECT/INTERNSHIP COMPLETION

DATE: **19-05-2020**

This is to certify that **Mr. Nazim Basha**, student of **CMR Institute of Technology, Bangalore** pursuing MCA has done his project/internship work entitled "**Order Engineering Center**" during the period from **16-12-2019** to **22-05-2020** in our company. All necessary details were provided from our side for the establishment of the project. During his tenure, we found that **Mr. Nazim Basha** to be hard working, conscientious and a responsible intern. The feedback of her participation in all the activities of the company has always been positive, and we wish him all the best in the future

Sincerely,
Ameen Khan,
Grayhats IoT Pvt Ltd

www.grayhats.in
No. 484, Level 2 17th Cross, 27th Main Rd, 2nd Sector, HSR Layout, Bengaluru, Karnataka 560102

1CR18MCA79_Nazim

ORIGINALITY REPORT

2%	0%	0%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Laureate Education Inc. Student Paper	1%
2	Submitted to BITS, Pilani-Dubai Student Paper	<1%
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DECLARATION

I, **Nazim Basha**, student of 6th Semester MCA, CMR Institute of technology, bearing the USN **1CR18MCA79** hereby declare that the project entitled **"Order Engineering Center"** has been carried out by me under the supervision of External guide **Mr. Ameen Khan, Technical Lead, Grayhats,** and Internal guide **Dr. Helen Josephine V L, Associate Professor, MCA Department,** and submitted in partial fulfilment of the requirements for the award of the Degree **Master of Computer Applications** by the **Visvesvaraya Technological University** during the Academic year 2019-2020.This report has not been submitted to any other University for any award of degree or certificate.

Name : Nazim Basha

Signature:

ACKNOWLEDGEMENT

The satisfaction and joy of the successful completion of any task would be incomplete without the mention of the people who made it possible.

The consistent direction of these individuals and consolation game by them delegated my endeavours with achievement and eminence. I consider it as a benefit to express my gratitude to everyone who drove and guided me over the span of completion of this project.

I would like to thank to all those who are involved in this endeavour for their kind cooperation for its successful completion. At the outset, I wish to express my sincere gratitude to all those people who have helped me to complete this project in an efficient manner.

I offer my special thanks to my external project guide **Mr. Ameen Khan**, **the Technical Lead**, **Grayhats IoT Pvt Ltd**, **Bangalore**, and to my Internal Project guide **Dr. Helen Josephine V L**, **Associate Professor**, **Department of MCA**, **CMRIT**, **Bangalore** without whose help and support throughout this Internship would not have been this success.

I am thankful to **Dr. SANJAY JAIN**, **Principal**, **CMRIT**, **Bangalore** for his kind support in all respect during my study. I would like to thank **Mr. Ameen Khan**, **the Technical Lead**, **Grayhats IoT Pvt Ltd**, **Bangalore** who gave opportunity to do this Internship at an extreme organization Most of all and more than ever, I would like to thanks my family members for their warmness, support, encouragement, kindness and patience. I am thankful to all my friends who always advised and motivated me throughout the course.

Nazim Basha
1CR18MCA79.

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1. INTRODUCTION

The Order Engineering Center is an Enhanced Ordering Application used by order Engineers of Grayhats for creating and pricing orders related to all telecom services and internet services. It is specifically designed to support more products like Ethernet Private Lines, CPE etc which was not supported by the other ordering applications-Orion etc. It is more flexible when compared to Orion that it interacts with various systems very effectively and it allows supplements on orders, change orders on the top of already bill-activated services etc.

In Short, it is convenient, cost-effective and self-analyzing java/j2ee web -based tool which is built to allow order engineers to configure orders, create new services, create new VOIP sites, validate and price the order and submit the order to provisioning.

Once the order is submitted, the order reaches mainly two systems i.e., provisioning and billing systems. The provisioning system is responsible for the provisioning of the element and the billing system is responsible for the billing of the components which the Enterprise customer has purchased. The OEC application interacts with other applications through web service calls for fetching the data regarding the product configuration and the service configuration.

1.1 PROJECT DESCRIPTION

“Order Engineering Center” is a java or j2ee based app used by order Engineers of Grayhats for creating and pricing orders related to all telecom services and internet services. The Order Engineers need to enter the customer information in the Order info tab which consists of customer name, address and contacts details. Once the Order info tab is configured the customer navigates to the location tab where the customer’s location is validated, during this phase ordering calls other application such as ESL and GLM to validate the service address of the customer. Once the location tab is configured the user moves to the service

tab where the service configuration is configured based on the users need and the requirement. Grayhats can offer the bandwidth services with various speeds and can provide the TN's (Telephone Numbers) to the customer. Once the service tab is configured the user navigates to the pricing tab where the pricing is configured for the components and discounts is applied to attract the customer. All this activity is performed by OEC application where the Engineers used to do it through Excel around 15 years ago. SDP flow starts from Qcentral, orders are created by users through Qcentral which contains so many small applications, for example one for opportunity, one for cpe, one for quote etc. Orders can also be created via Direct Ordering. In Qcentral we can view the created order by using the links Selling->Project Manager. Order is then submitted to OEC by clicking submit to back office button in Qcentral. But for the CPE order, it's a different flow, they never flow to OEC. They are standalone orders which are directly flown to CPE application and then to Oracle Apps and Oracle E-business Suite. And the data related to them also flows to OES, Eflow, LIMS etc. CPE orders also have provisioning like other SDP orders and their data is also stored in SALEFA DB. They have a separate DB called CPE DB also.

Once the provisioning is completed, the data will be imported from EFLOW to Oracle E-business suite. It is not mandatory that a CPE component should be there in a IQ order. But the CPE is the main component in Packages and VOIPs. If we want to use a CPE component in an IQ order, we just need to refer the CPE Quote (select the worksheet) that we created in Qcentral because we already configured it in Qcentral. For other SDP orders, after orders submitted to back office, the flow starts from QC Ordering. When an order is submitted to back office, the order mode will change from OA_MODE to OEC_MODE, OA_MODE being Qcentral mode. QCO mainly interacts with SALEFA DB, CSIP. Data in order summary page is stored and fetched from SALEFA DB. QCO comes to picture when we navigate to location manager or import locations etc. Depending upon the customer the user may create location/locations. For each location a service instance is created and if we click on service instance, we can navigate to end point configuration page where we will have the technical details for the products purchased/configured by the customer.

After location is submitted, it will be sent to SAV (service address validation) which is a third-party application. It will take care of the service address validation. If there are

multiple matches of the service address, it will show all the options so that we can select the most matching one. If we get any SAV issue, we can contact the access staging group, also we are not supposed to bypass any SAV validation. If the user demands the same, we cam inform him to do the same. In EPC after user clicks 'Validate and price', the request goes to Quoting application which calls CCSS and IPS for pricing. IPS will give the rate of ports, they have a product builder which contains the pricing of each billing component, and IPS is maintained by LATIS pricing team. If the user wants to change the pricing, QCQ provides an editable box in pricing details page so that user can enter the new value and update it. QCQ also takes care of the pricing. When clicking on "Validate and price" button, QCC will validate the order configuration. It also interacts with IPS by sending the configuration to IPS. At the time of configuring LL in EPC, QCC sends XMLs to CCSS. QCC also interacts with RQ, which is more like a product builder which contains all the rules build, i.e., there is a rule set. QCC interacts with RQ to clarify the rules. Every time we configure in EPC, QCC interacts with RQ, based on that QCC will create BTL objects. QCO also interacts with CSIP (Customer Service Inventory Portal) mainly at the time of inventory pull. Qrules have a separate rule engine, they interact with system like QCO, QCC, etc. During inventory pull, they also interact with CSIP, PROD, etc. They know how to read OA XML etc. At the time of inventory pull and submission of order, both Qrules and QCO interact will happens. Then Qrules and OES plays a very important role during the submission of the order. They are responsible for the conversion of XML which the downstream application.

1.2 COMPANY PROFILE

GRAYHATS

- **CEO:** Ameen Khan (1st Sep 2012 – Present)
- **Founded:** 1st Sep 2012
- **Headquarters:** Bangalore, India

Grayhats is an Information technology startup company. We are primarily focused on building IoT applications, platforms and tools to create a world where technology is connected, fun and easy to use. Ameen Kham is the Director of the company. It contains two groups the product development team and Product Marketing and Management team. it was started in the month September 2018. The Company Consists of 25 employees. It has a group of UI Developers, Mechanical Engineer's, Backend Developers and content specialists, together they form one of the leading IT software companies in Bangalore for IoT software development infrastructure and outsourcing. It gives software and management services to customers across multiple IT companies. It understands the Task that its customers face within and across these company.

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM AND PROPOSED SYSTEM

2.1.1 EXISTING SYSTEM

The system doesn't allow changing of the location address on the MACD orders because of this the Engineers are facing issues and a Manual approach is required to make updates in the data base. The orders that are being sent from salesforce are failing on OEC application because of the keying issues from the user and there is no user defined error message where they can make the corrections by themselves and then launch the order from salesforce. The existing system has latency issues when the Engineers key orders for large number of BTL's for adding cugs.

2.1.1.1 DISADVANTAGES OF EXISTING SYSTEM

- Latency issues with the application while keying large orders for adding CUG's.
- The orders failing to launch from salesforce has generic error message which is not user friendly.
- The system doesn't allow changing the location address on MACD order

2.1.2 PROPOSED SYSTEM

The latency issue while adding the CUG's to large orders is resolved. This is achieved by calling the LIMS application directly by the CUG name instead of enterprise ID. Automation for BRC (Billing Record change) is introduced where the users have to only enter the customer account ID and the pricing component that needs to be changed and the system will automatically create and submit that order to provisioning. The system is enhanced with an auto commitment date functionality which calculated the commit date automatically instead users entering the date manually. The OEC system is interacting with new Aprilia system where the provisioning is done quickly. The size of the ordering servers has been increased to scale up as in when the need occurs during the on-shore hours.

2.1.2.1 ADVANTAGES OF PROPOSED SYSTEM

- Automatic commitment date calculator functionality is implemented.
- The BRC order keying process is automated.
- The orders which are categorized as large are restricted with an pop up message telling the users to key it during off shore hours.
- The location address changed is allowed MACD orders.

2.2 FEASIBILITY STUDY

2.2.1 PRACTICAL FEASIBILITY

Project is based on ordering telecom and internet service for Enterprise customers which is required for Keying the orders. This information should be provided by the sales or accounts team to the order Engineers. The application also enabled the user to create MACD orders after install if the customer wants to perform changes to their services. The application requires quotation from the sales team to key the order which will improve the revenue of the company.

2.2.2 OPERATIONAL FEASIBILITY

It estimates problem that will be solved by proposed system. System that is proposed should be able to meet the requirement of the order Engineers and should be adaptable for ordering new products that enter the telecom industry.

2.2.3 FINANCIAL FEASIBILITY

Financial feasibility describes how the project is cost effective and beneficial to the company. The financial feasibility is to ascertain the project development cost and cost of manpower thereby re-factoring with the benefits that the project is going to make which should be higher that budget that is allocated to project each financial year.

2.2.4 TECHNICIAL FEASIBILITY

Technical feasibility includes determining whether the order Engineers has well suited system to run the application. It also determines whether the technical resources in the company can be utilized up to their potential. The project is in tune will all the tools that will be used in the development process and whether the Order Engineers are technically sound to understand the working and use of app.

2.3 TOOLS AND TECHNOLOGIES USED

2.3.1 TOOLS

Toad

The Toad is a database management tool for data administrators, data analysts and data base developers. It manages relational and non-relational data bases using SQL. We are using toad for oracle database. We use toad for managing database connection. Toad serves different purposes in different environment. In production environment we use toad to connect to the production database and perform DML operations for fixing the production issues that are occurring very frequently. In Development environment we used toad to connect to the testing database for creating and configuring the data into the tables. We can sql query builder to build the scripts very efficiently. Toad also provides a functionality where we can build data models for visual representations.

Eclipse

It is an IDE for writing computer code. It is used for developing us Java programming language applications and other programming languages i.e., Perl, Ruby application. Eclipse is developed using java programming language it is primarily used for developing Java applications. Eclipse also provides an option to install plug ins for perform various task or working with other smaller executable programs. Eclipse uses the concept of workspace to store the project that we are working on. It is like a folder which consists of all the files related to a project.

CVS

The CVS (Concurrent Version System) is a tool used for Maintaining the source code. It is widely used by developer for Legacy applications. The source code of the application and date what we upload is called CVS repository. It also provides version control for the application and allows the developers to fetch the source based on the releases.

2.3.2 TECHNOLOGIES

JAVA and JAVA EE

The OEC application is developed based on Java and Java EE. It is an legacy application which was earlier developed using only Java and J2EE frameworks. The application still used JDBC for performing various complex task in the application. The Java class invokes the procedure from the database to manipulate the data and for performing various operation. As the requirements kept evolving the concept of web services was introduced where OEC application can interact with other applications via web service calls.

SQL and PL/SQL

The OEC application uses Oracle SQL database for storing Enterprise ordering data. The SQL is used for writing queries for performing Data retrieval and Data manipulation. The PL/SQL is used to perform one or more activities together in a procedure. Once the

procedure is invoked from the application it executes the DML and DDL queries after taking the necessary input parameters that is passed from the application and returns the response as successful is the procedure is invoked successfully. There are constraints defined which ensures that there is no ambiguity in the data which is stored for placing the orders for telecom and internet services.

JavaScript, JQuery and AngularJS

OEC application uses the UI technologies such as HTML, CSS, JavaScript, JQuery and AngularJS. The UI technologies is used along with JAVA and JAVA EE for designing the user interface. The core functionalities of the application are written in Java because there is a need to establish the connection to the database for retrieving and storing the data in the ordering database. The UI technologies using the framework engine enables the developers to add customer field validation eliminating the need to write a Java for performing validation of the controls. Angular was later integrated with the project because of dealing with the web service call to different application.

2.4 HARDWARE AND SOFTWARE REQUIREMENTS

HARDWARE REQUIREMENTS

Developing Environment

- Keyboard and mouse Required
- Ram 8GB
- Hard disk(space) 80GB for developer
- Processor Intel Core i5 or above

Client Environment

- Processor Intel Core i5 or above
- Hard disk(space) 40GB
- Ram 4GB
- Internet Connection Required

SOFTWARE REQUIREMENTS

Developing Environment

- Operating system — Windows 7
- Coding Language — Java, Java EE, SQL, PL/SQL, JavaScript
- Tools — Eclipse, Toad, CVS, Putty

Client Environment

- Internet — Required with min speed of 5Mbps
- Browser — Internet Explorer, Chrome, Firefox

3. SOFTWARE REQUIREMENTS SPECIFICATION

3.1 USERS

Admin

The OEC application has two access levels i.e., Wholesale access and retail access. The admin will be able see the list of all the orders that is been keyed for the wholesale and retail access. The admin has the privilege to provide access to the OEC application based on their role and the type of access that is needed. The Admin has direct access to OEC application however the users can access the OEC only through salesforce after submitting the order to back office.

Order Engineers

The Order Engineers use the OEC application for keying the Enterprise orders for telecom and internet services. The Order Engineers are categorized into two types retail and wholesale users. The Order Engineers cannot directly access OEC application but only via salesforce. They will be able to see the orders of themselves and their peers in the team and no other orders that is keyed by other Order Engineers who belong to a different team. The order Engineers cannot troubleshoot the problems pertaining to the application, if they are facing issue with the application then they need send an email to the Admin team for fixing the issue where Admin team interacts with various other team to resolve the issue.

3.2 FUNCTIONAL REQUIREMENTS

Circuit import process

Use Case Name	Circuit import process
Trigger	Selective and input

Precondition	Authentication required
Process	The circuit import process is performed by order Engineer. The user will perform the circuit import process only on the MACD orders. The MACD orders are keyed when the Enterprise customer's wanting to perform changes to the service configuration which they opted for previously. The components are mapped to the circuit when the order Engineers import the circuit, the billing elements are imported from the billing system and provisioning elements are imported from the provisioning system. The circuit imports bring the technical configuration details which will be modified on the MACD Order
Post-condition	Circuit is imported successfully from Inventory

Validate and price configuration process

Use Case Name	Validate and price configuration process
Trigger	Selective, Input and Button click
Precondition	Authentication required
Process	The Validate and price process is performed in the service configuration page. The OEC application interacts with RQ system which is the rule specifier. The configuration that is displayed in the service page are defined by the RQ system. The product that is build based on the brand ID is defined by the RQ rule engine. When the validate and price button is clicked the QCC validates the configs to verify if all the details enter by the users and correctly and checks with other if they are returning the success response. If the configuration is correct and the web service have returned the success response, it validates the service configuration

	and goes to the pricing page for pricing of the billing components. The user will be able to make changes to this service config even after is validated and priced.
Post-condition	The service config is validated successfully

Location validation Process

Use Case Name	Location validation Process
Trigger	Selective, Input and Button click
Precondition	Authentication required
Process	The location validation process is performed by the order Engineer. The location validation happens in location tab. The location tab consists of the Enterprise customer's service address where the service will be installed. The Order Engineer will have to enter the customer service address and click on validate and price button. When the validate and price button is clicked the OEC application calls the ESL application by providing the location address to verify if the location service address is valid and exists. The ESL interacts with GLM where the address is created for USA. If the location exists in GLM, the ESL will give a success response to OEC and the OEC will mark the service address is valid. The location service address will also consist of SWC (Single Wire Channel) based on which the network installation will be step up for the Enterprise customers.
Post-condition	The service location is validated successfully

Order Submission Process

Use Case Name	Order Submission Process
Trigger	Selective

Precondition	Authentication required
Process	The order submission is performed by the order Engineer. The order Engineers must submit the order to provisioning so that the order reaches the provisioning and billing system for the provisioning and billing of the provisioning elements and the billing components. The provisioning element will have an unique id called sls order and each sls order will have eng order (Engineering Order). The provisioning elements will be mapped to eng orders that will have the job steps assigned against them. The provisioner will close the job step once the provisioning task is completed and service is installed at the customer premise. During the submission process the Ordering will generate the OA XML that the details entered into the application are converted and into XML and sent to Qrules which converts that into COD XML and sends to the provisioning and billing applications.
Post-condition	The order is submitted to provisioning successfully.

3.3NON-FUNCTIONAL REQUIREMENTS

Performance

The OEC tool is developed using Java programming language which is Portable and Robust It is platform independent. The Java programming is class based and object oriented hence it is very powerful

User Friendly

OEC application is simple and easy to use. All the functions and activities are designed in the single page through a tab structure which is easy to understand and navigate through out the application.

Security

The application is secured and only the Engineers those who have access can use the application with login credentials. The passwords are changed every three months.

Reliable

The OEC application can be accessed from any geographical location provided there is an internet connection with a minimum speed of 2 Mbps and the application is up and running 24/7.

Scalability

The new products can be integrated to the OEC application and the network traffic can be increased in the server very efficiently.

4. SYSTEM DESIGN

4.1 SYSTEM PRESPECTIVE

It defines the system as a whole where smaller and individual components or modules are grouped together to form a complete system. The system perspective describes the sub-component that are grouped collectively to form an complete functional system. The Architectural diagram shows the workflow of components of the system.

ARCHITECTURAL DIAGRAM

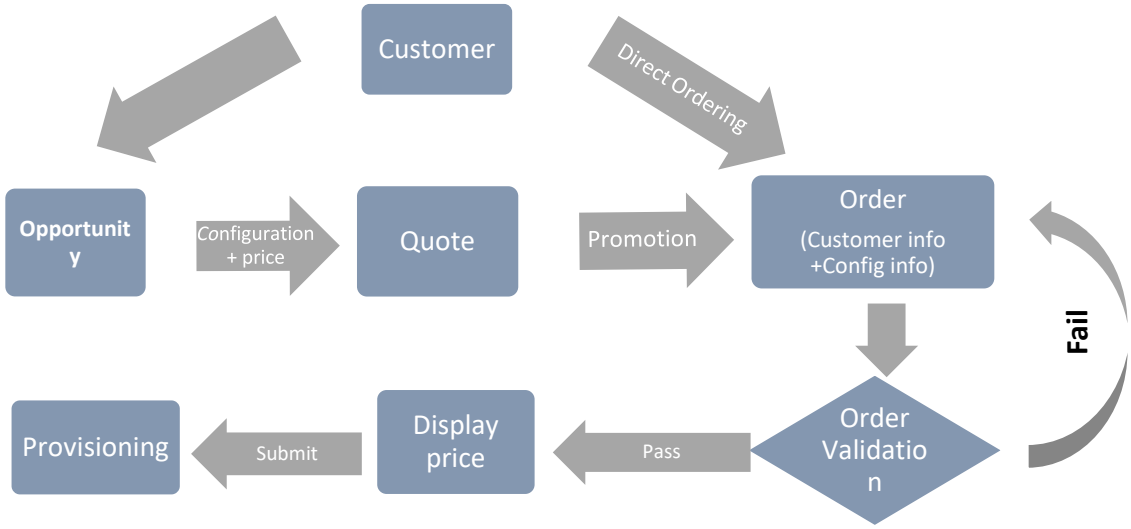


Fig 4.1.1 Architectural Diagram

It depicts architecture and workflow of the OEC app. All the objects of system are showing precisely and communication among the component is visible precisely through architecture diagram. The users or order Engineers can place the orders directly via Qcentral or salesforce. If they are placing the orders via salesforce, the sales or accounts team will provide the quote that includes the service configuration and pricing for the telecom and internet services that the customer is opting for. The order Engineer used this knowledge to key the orders. The user will fill all the details and click on 'Validate and Price' button which validates the service configuration. The 'Validate and Price' checks the various objectives of the system and gives back success response, if all objectives are configured correctly. The system passes validate and price objective and goes to pricing page that displays price for components which Enterprise customer is opting for. If the pricing is displayed correctly, the user goes ahead and submits the order. If 'Validate and Price' functionality returns the failure response, the user defined error messages are thrown which are resolved and corrected by the Engineers and then again attempts the 'Validate and Price' functionality which check for the success response and then navigates to the pricing page displaying the pricing for the components.

4.2 CONTEXT DIAGRAM

It depicts the architecture and workflow of OEC application. All the components of the system are shown precisely and the communication between the component is visible clearly through the diagram.

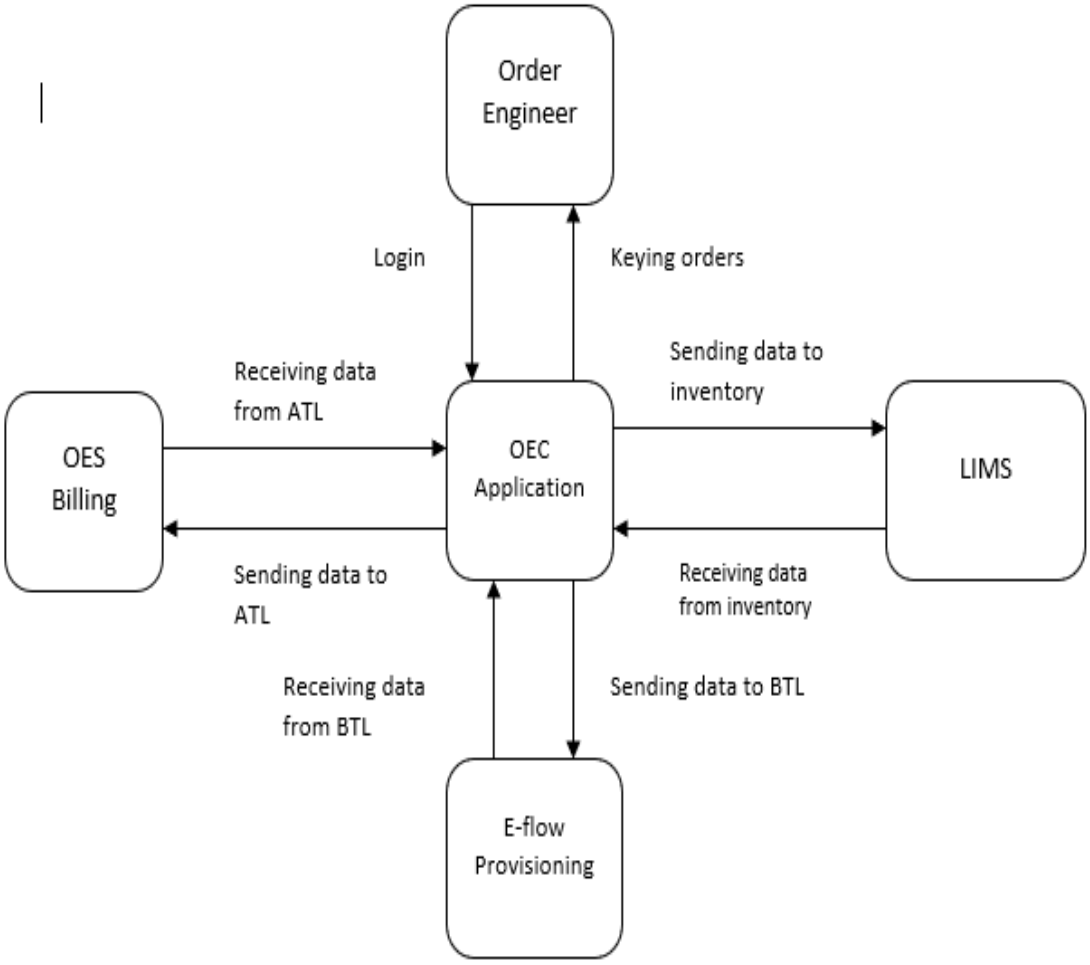


Fig 4.2.1 Context diagram

The Order Engineer will log in to the OEC application using the credentials provided for the log in and navigates to order info, location, service configuration and pricing and the perform the global validations and submits the order.

4.3 DATA FLOW DIAGRAM FOR ADMIN

The Data Flow Diagram Depicts the flow of data for the admin in the OEC application. The data flow diagram provides information about each entity in the project. The DFD also provides an overview regarding the flow of data in the system

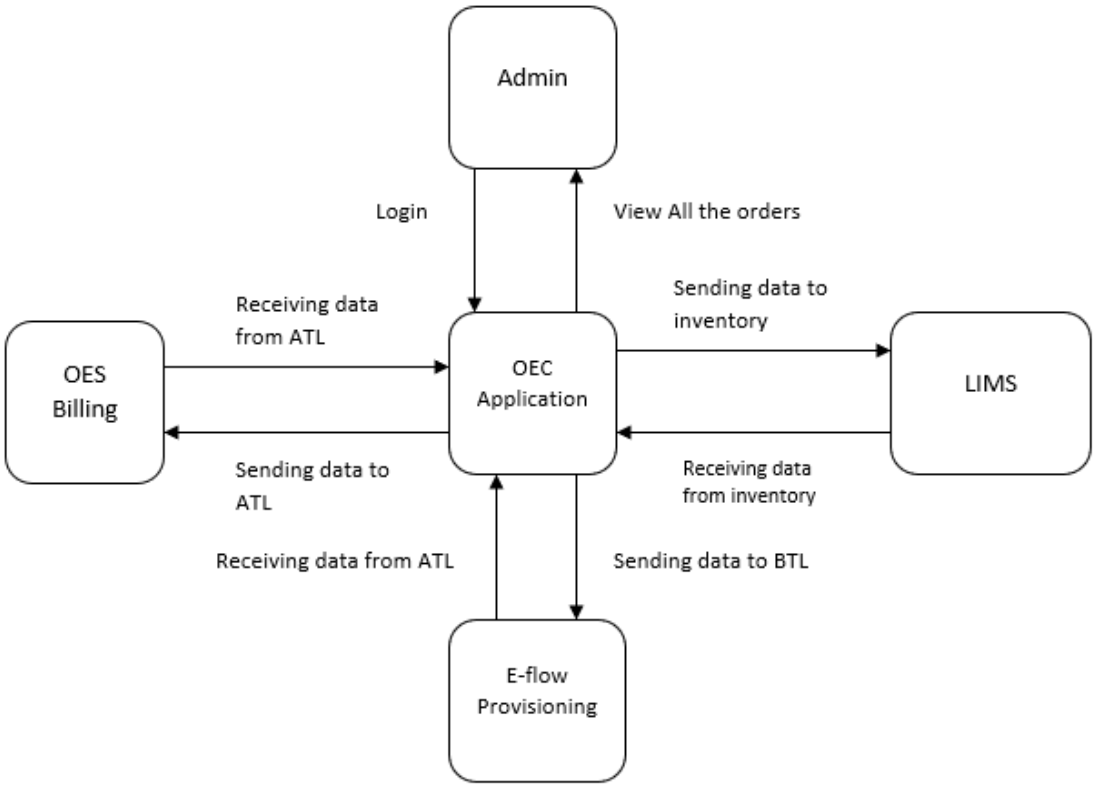


Fig 4.3.1 Data flow diagram for Admin

4.4 DATA FLOW DIAGRAM FOR USER

It Depicts the movement of data for the admin in OEC application. The data flow diagram provides information about each entity in the project. The DFD also provides an overview regarding the movement of data in system.

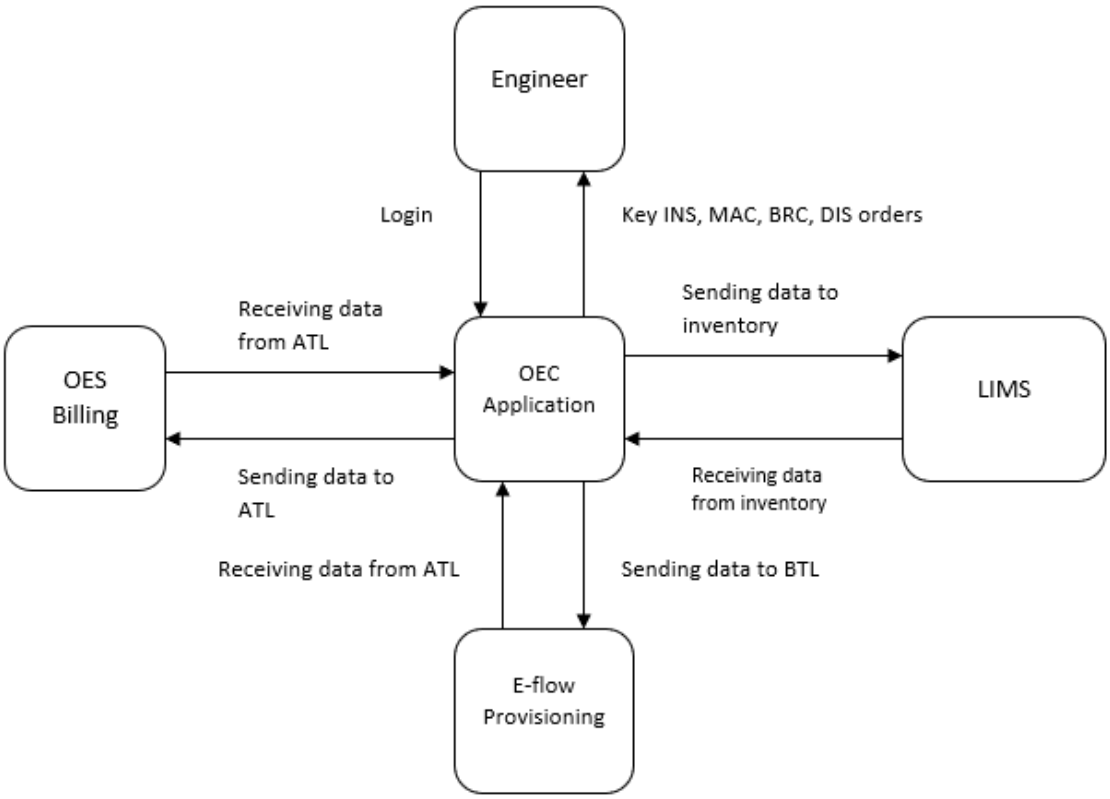


Fig 4.4.1 Data flow diagram for User

5. DETAILED DESIGN

5.1 USE CASE FIGURE

It is used to impersonate the interaction of OEC system with the user. It is used to represent interaction among the user's and the use cases associated with the system. It is used in Organizing, Mentioning and Identifying the system requirements.

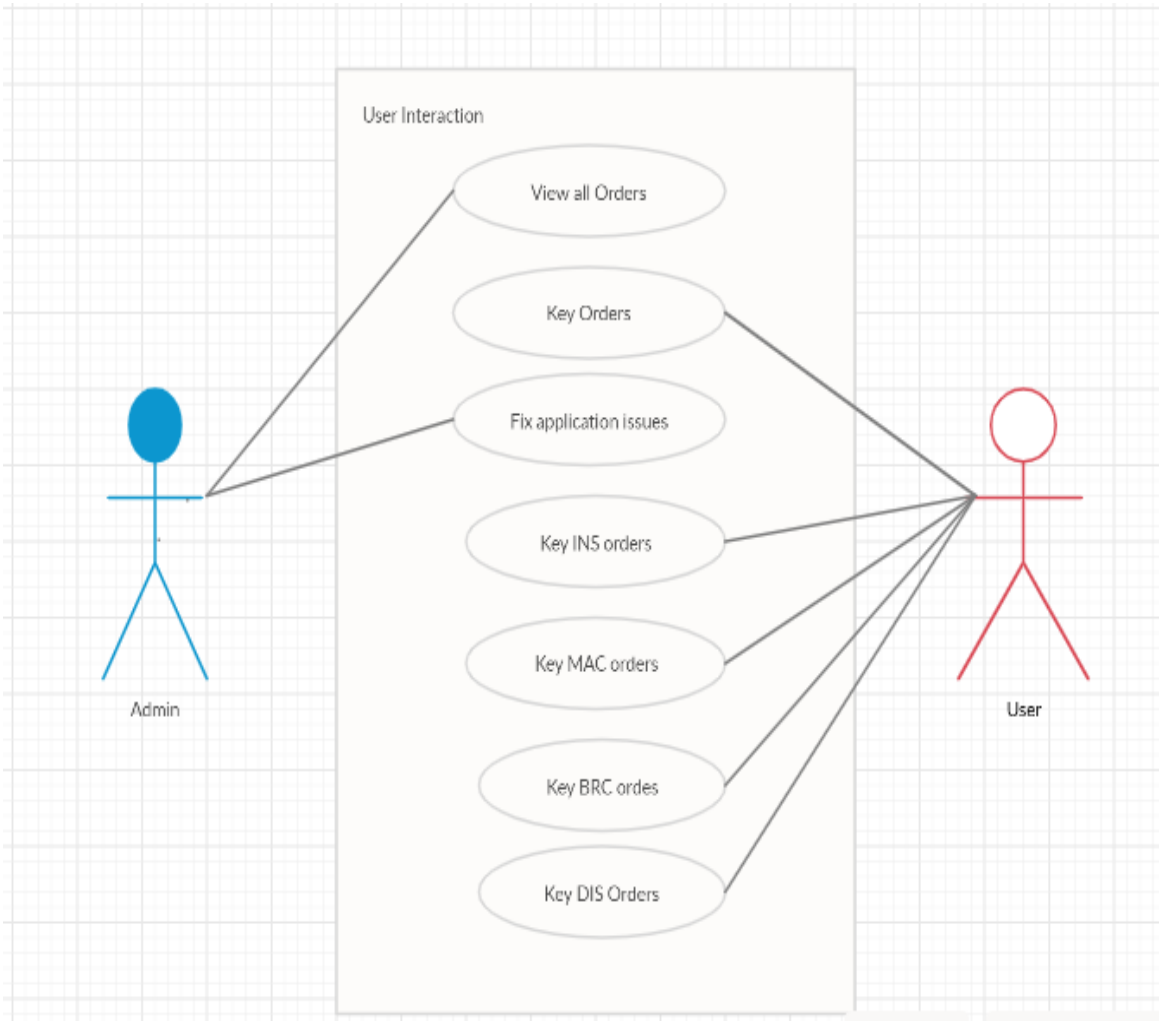


Figure 5.1.1 use case figure

5.2 SEQUENCE DIAGRAM

It refers to an interaction figure which depict flow of interaction between business objects. It gives a graphical visualization of how the objects communicate with each other in the OEC application.

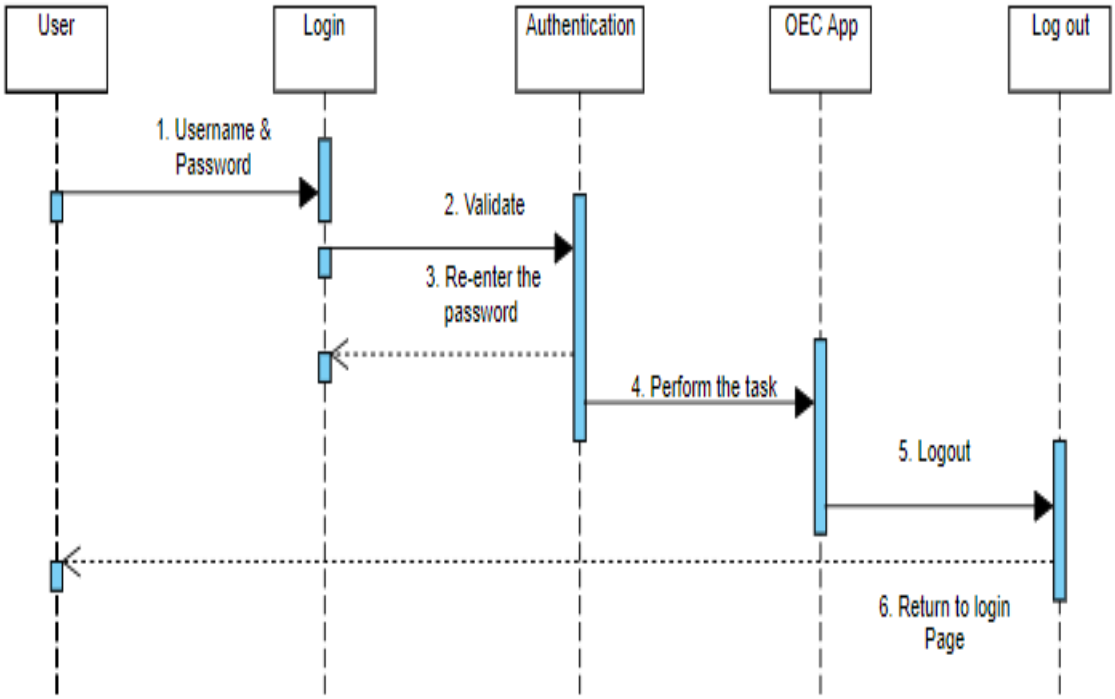


Fig 5.2.1 Sequence Diagram

5.3 COLLABORATION DIAGRAM

It represents the flow of complete project and its reciprocity between object that the system has. It also highlights the message sent for conveying information among the system components.

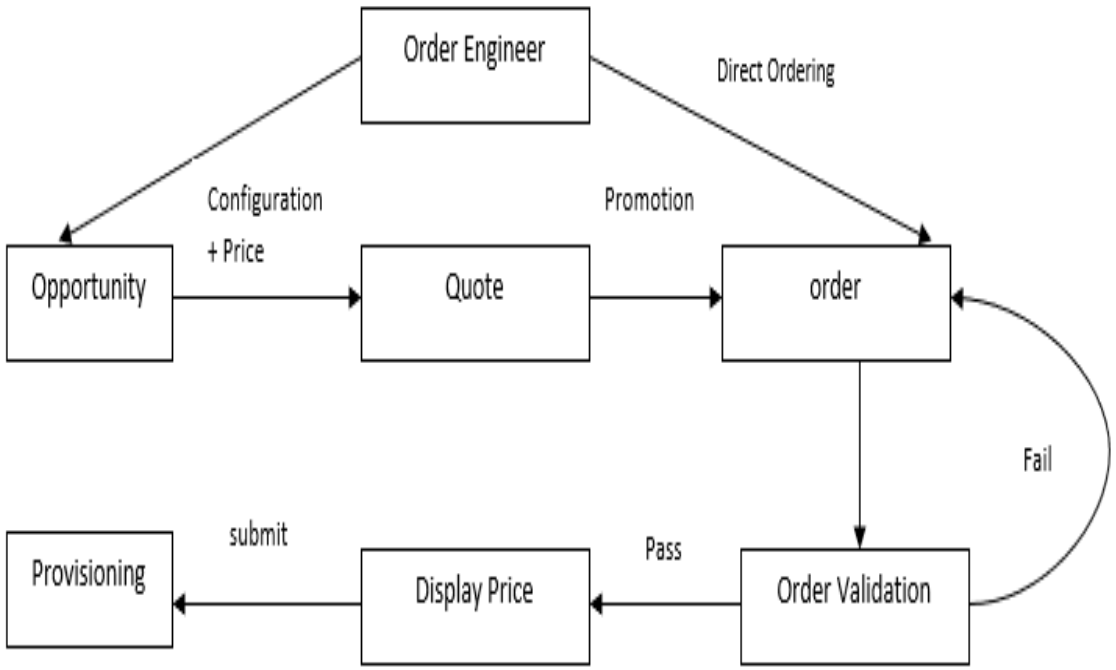


Figure 5.3.1 Collaboration Figure

5.4 ACTIVITY DIAGRAM

It is one of the most predominant diagrams in the UML that illustrates the system flow. It is a flowchart that depicts the flow activities within the system. The activities are nothing but the system functionalities. The flow of control is transferred among the activities after the previous activity is completed. It represents a sequential flow with conditions, iterations and looping within the system.

5.4.1 ACTIVITY FIGURE FOR ADMIN

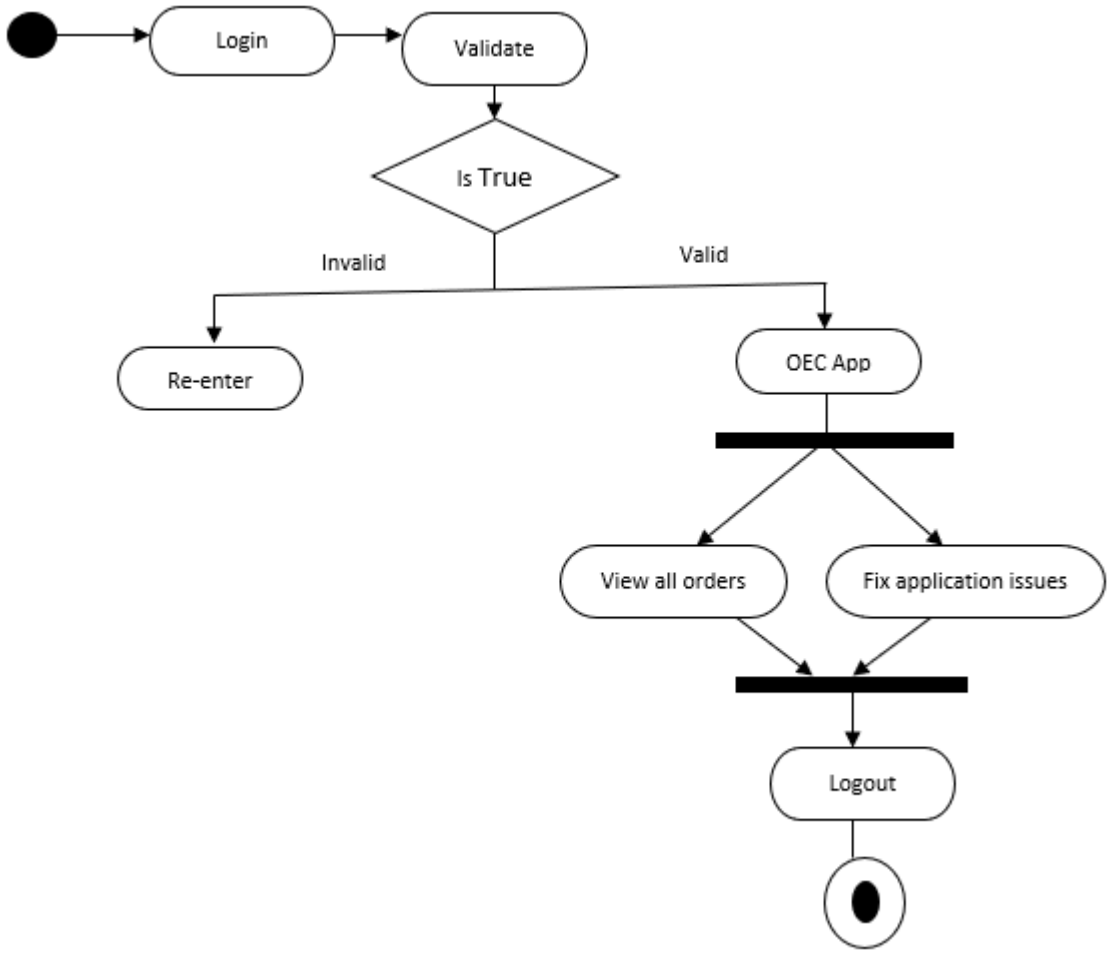


Figure 5.4.1 Activity figure for Admin

5.4.2 ACTIVITY FIGURE FOR ORDER ENGINEER

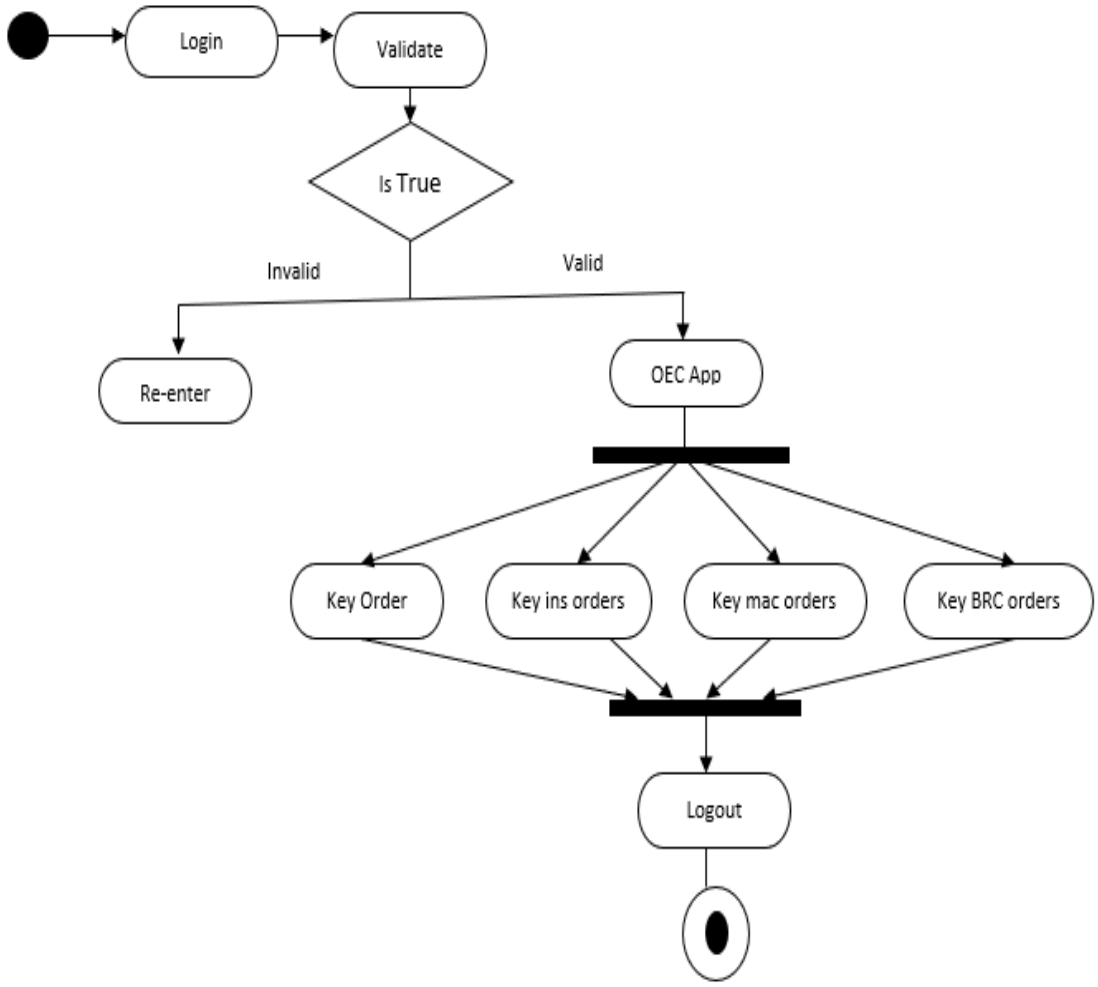
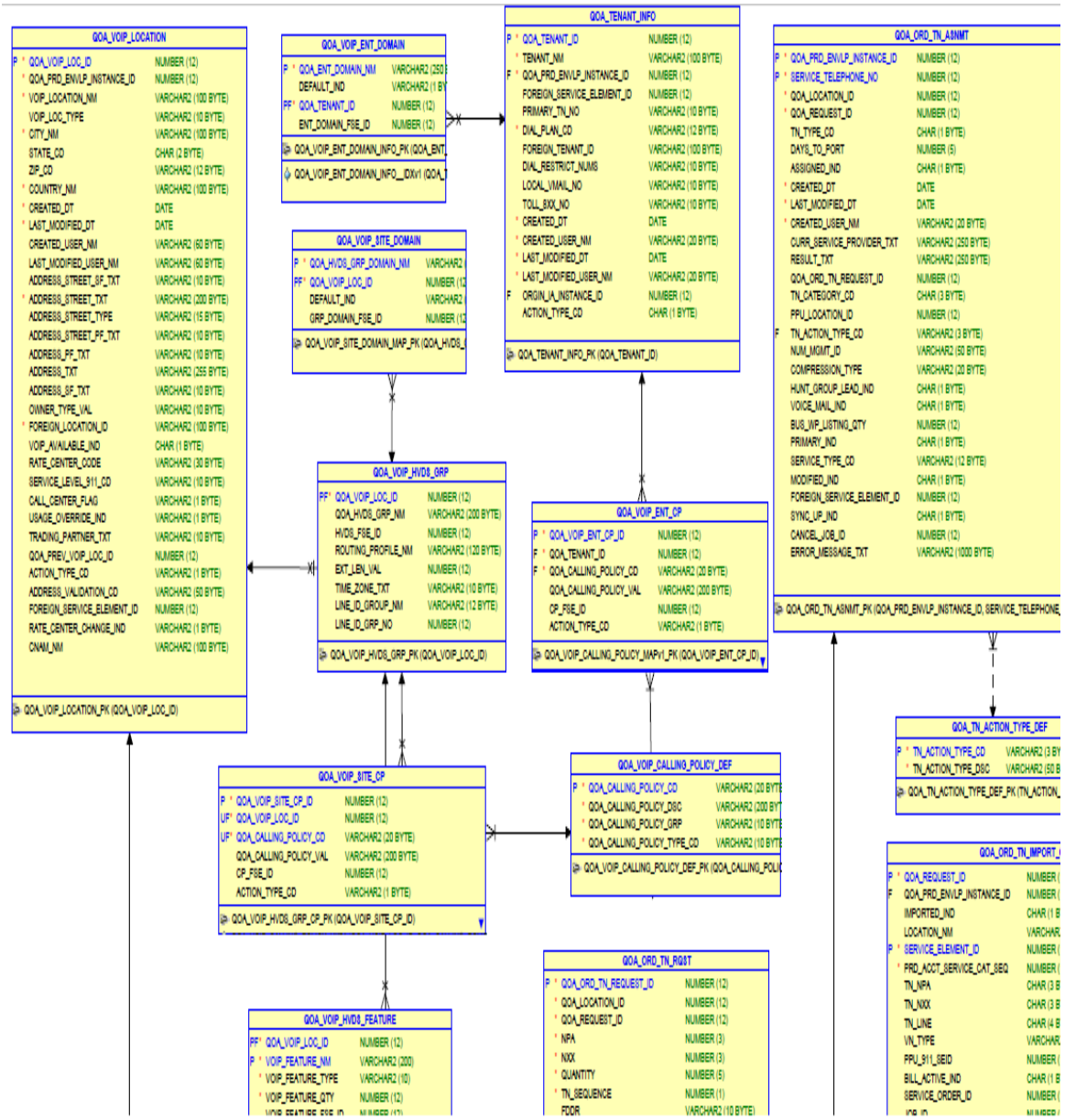


Figure 5.4.2 Activity figure for Order Engineer

5.5 E-R DIAGRAM

The Entity relationship diagram describes the database design in the structural figure. It depicts entities and their types in system. It also describes various types of entities that is used in the system and their relationship. An ER diagram typically represents the data base model of an application. An entity consists of attributes which defines the characteristics of an entity.



5.5.1 E-R Figure

6.IMPLEMENTATION

6.1 SCREENSHOTS

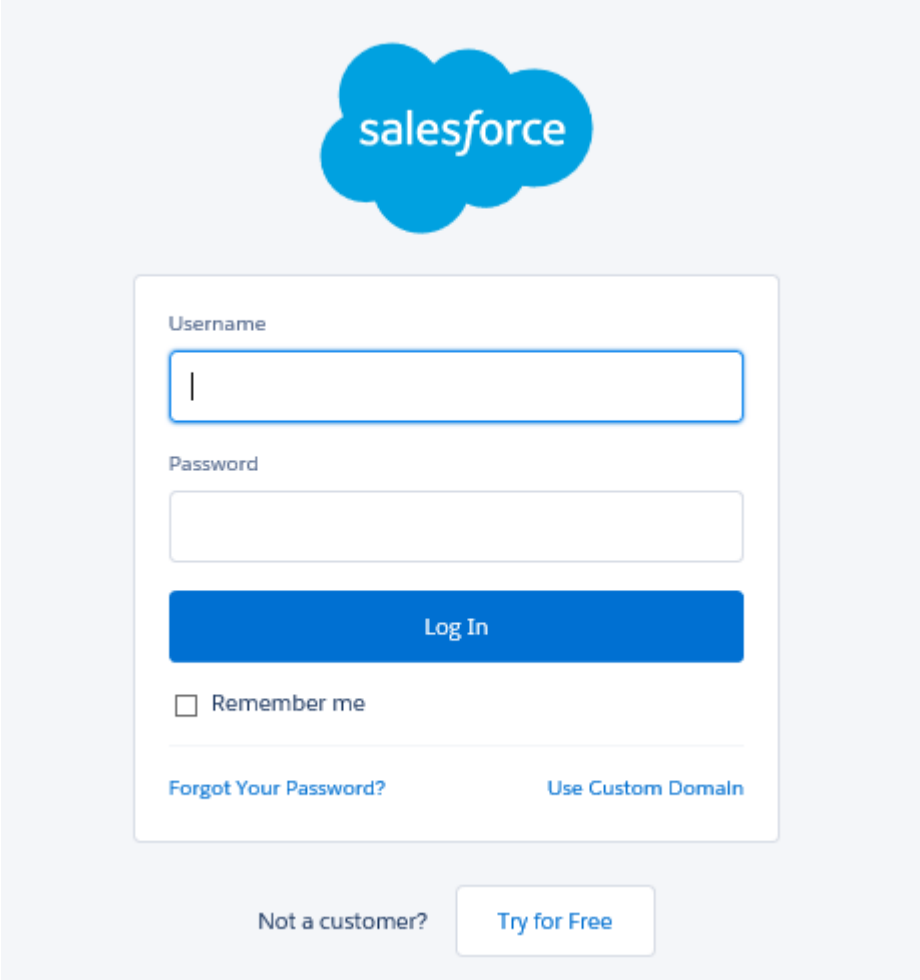


Figure 6.1.1 Login Page

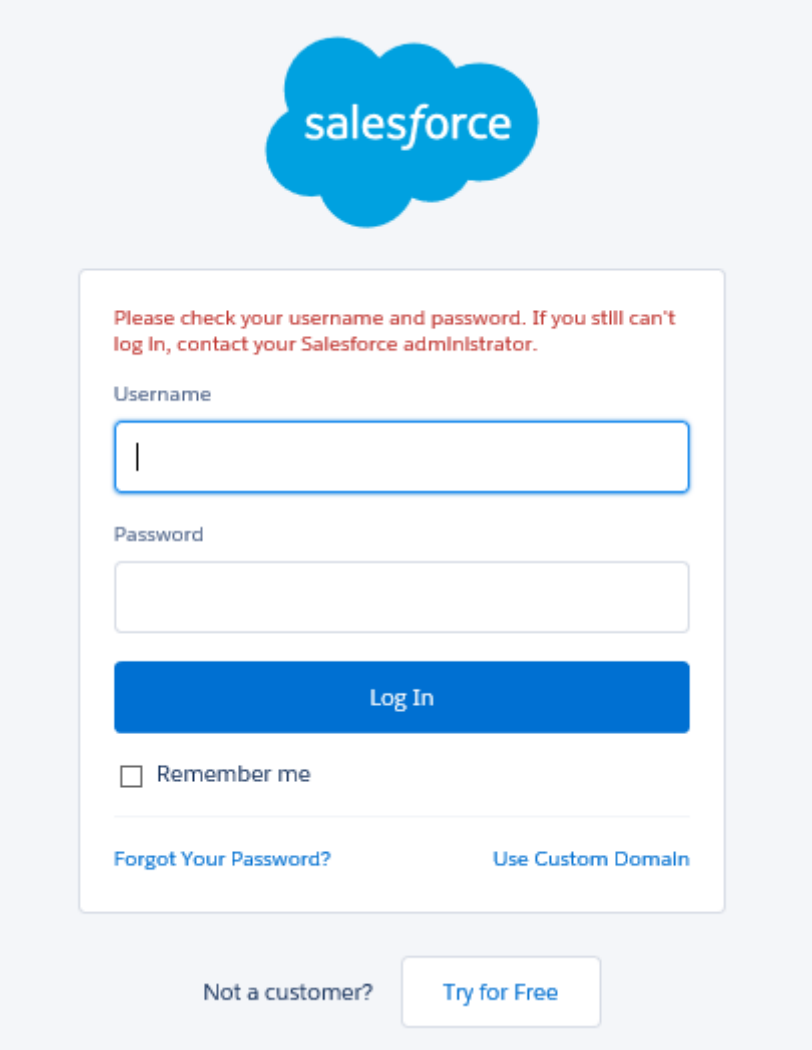


Figure 6.1.2 Log in failed due to invalid log in credentials

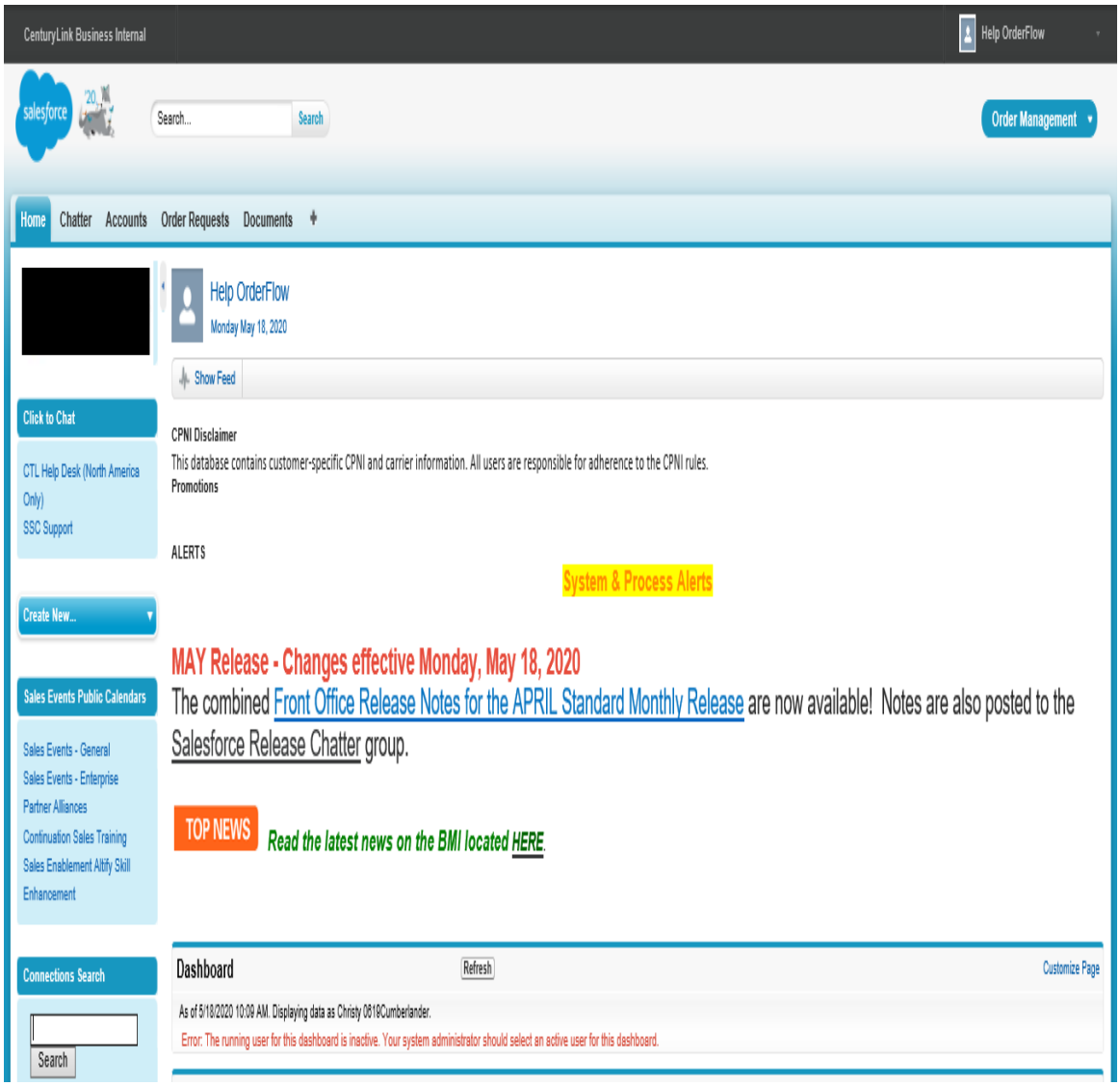


Figure 6.1.3 Home Page

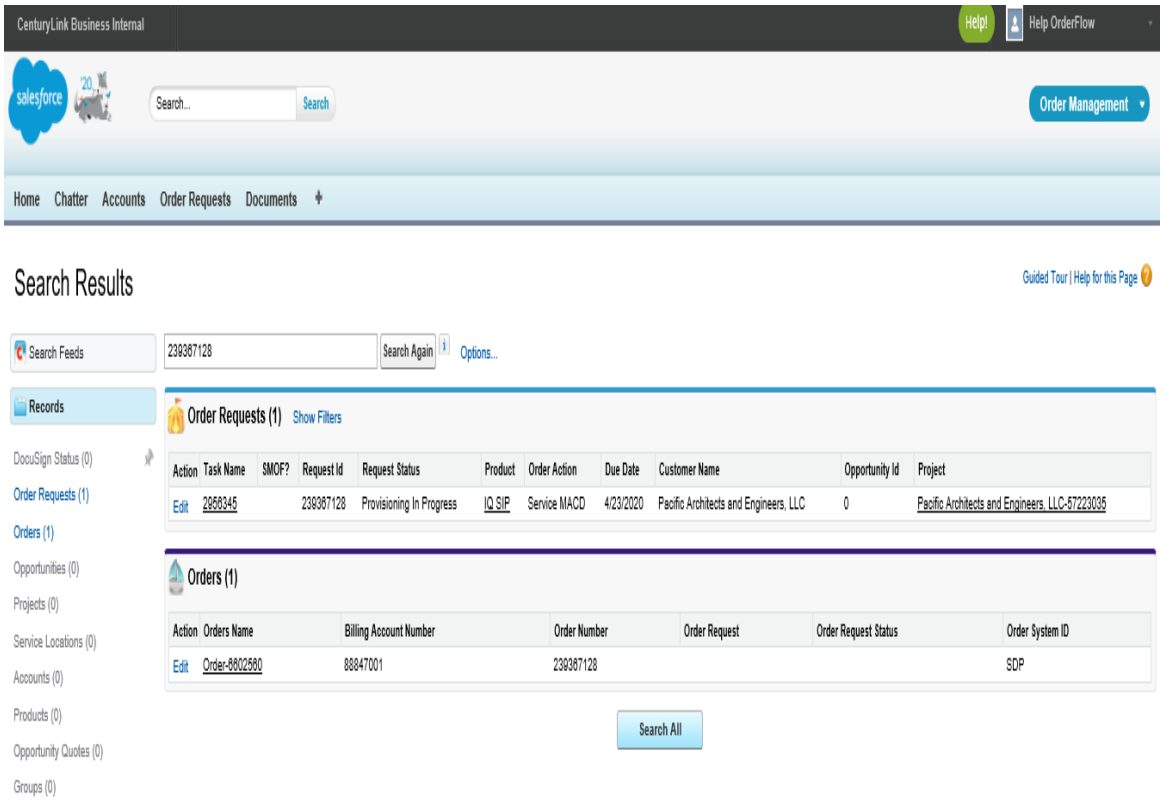


Figure 6.1.4 Order Request Search

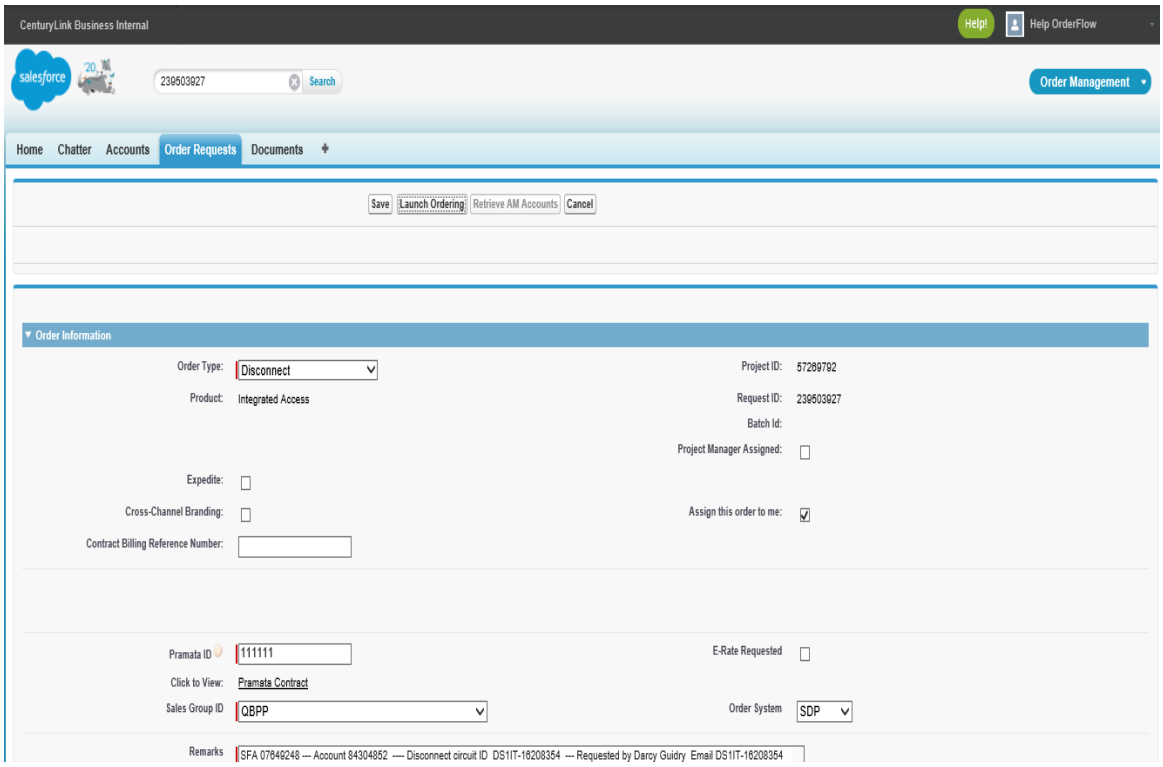


Figure 6.1.5 Launch Order Page

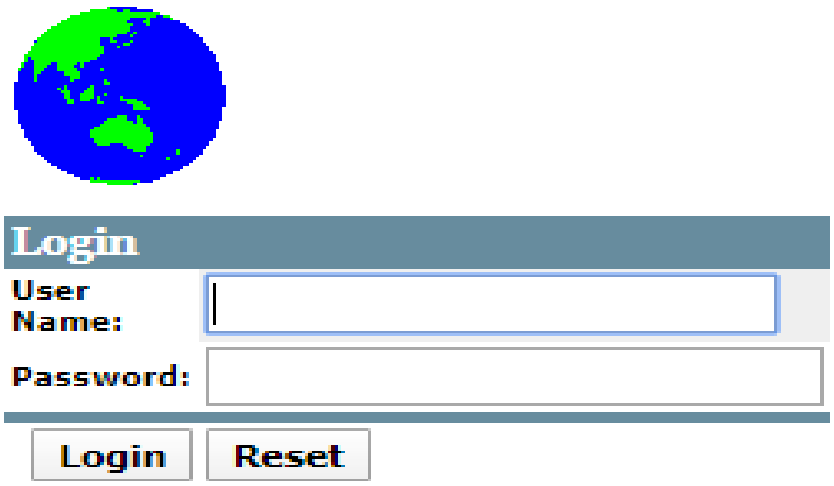


Figure 6.1.6 OEC Log in page

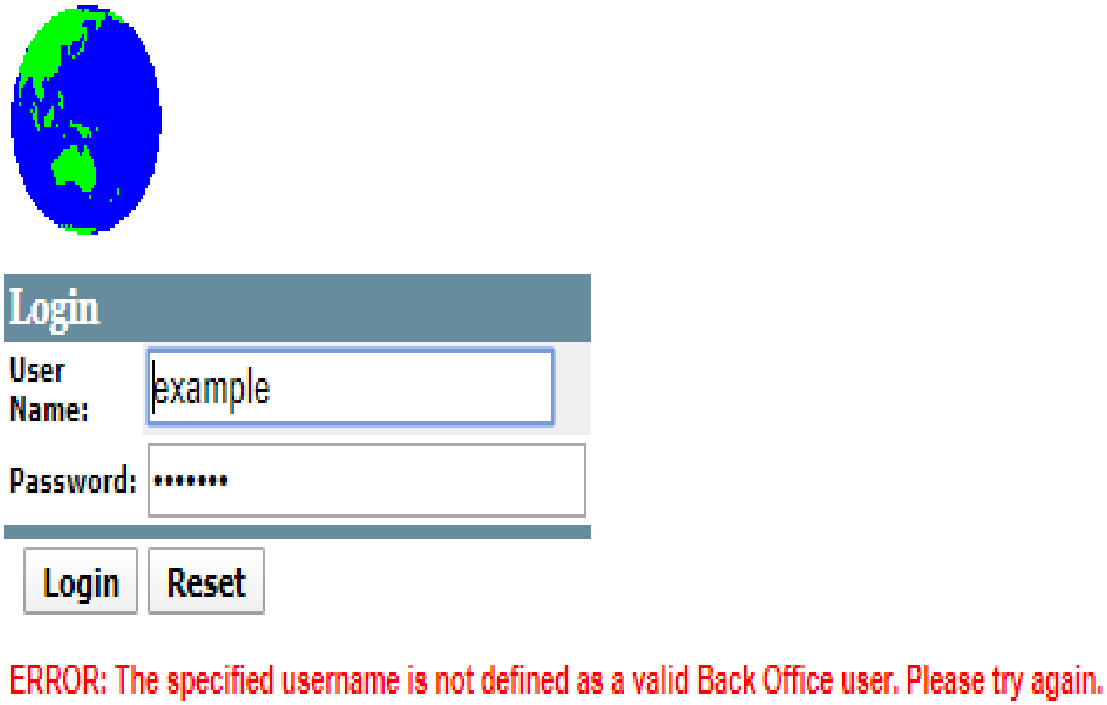


Figure 6.1.7 Log in failed with invalid credentials

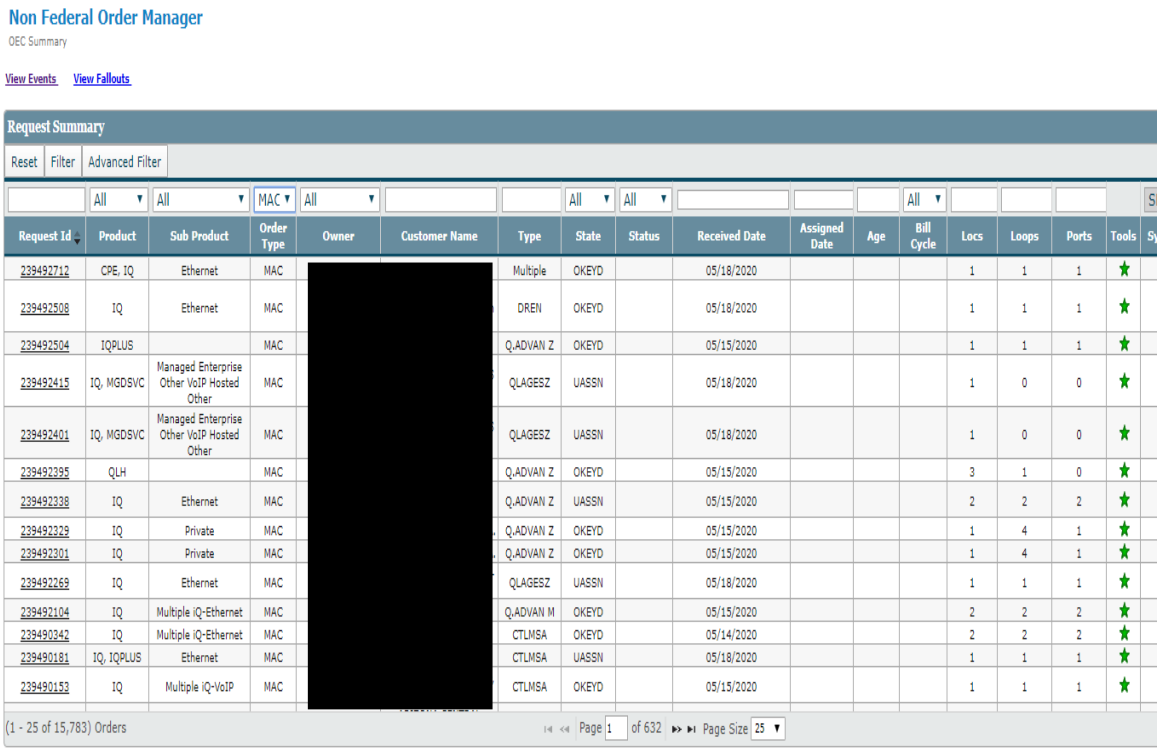


Figure 6.1.8 List of order in OEC app

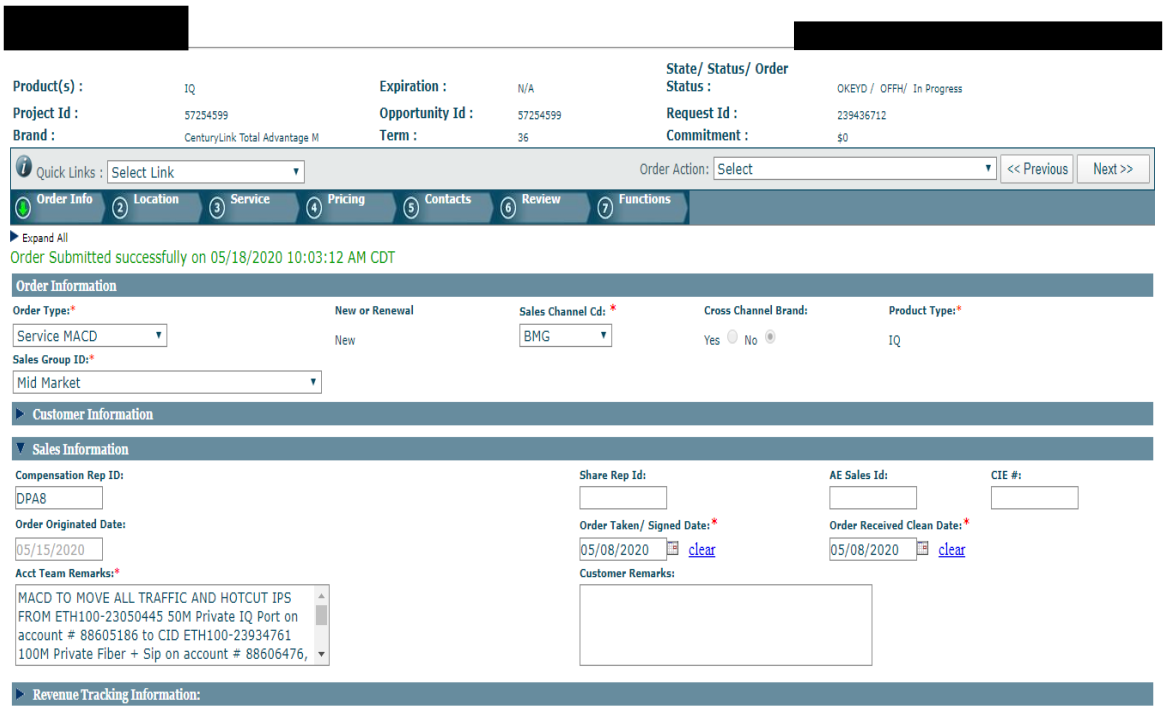


Figure 6.1.9 Order info tab

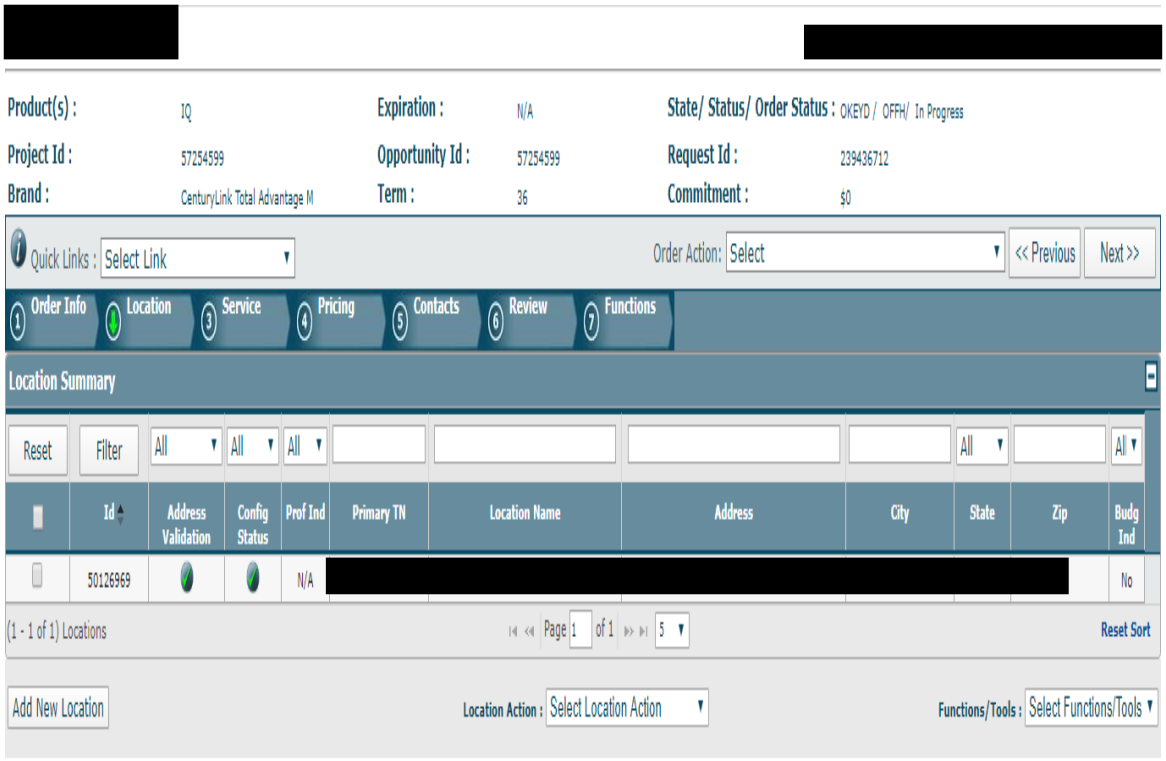


Figure 6.1.10 Location Tab

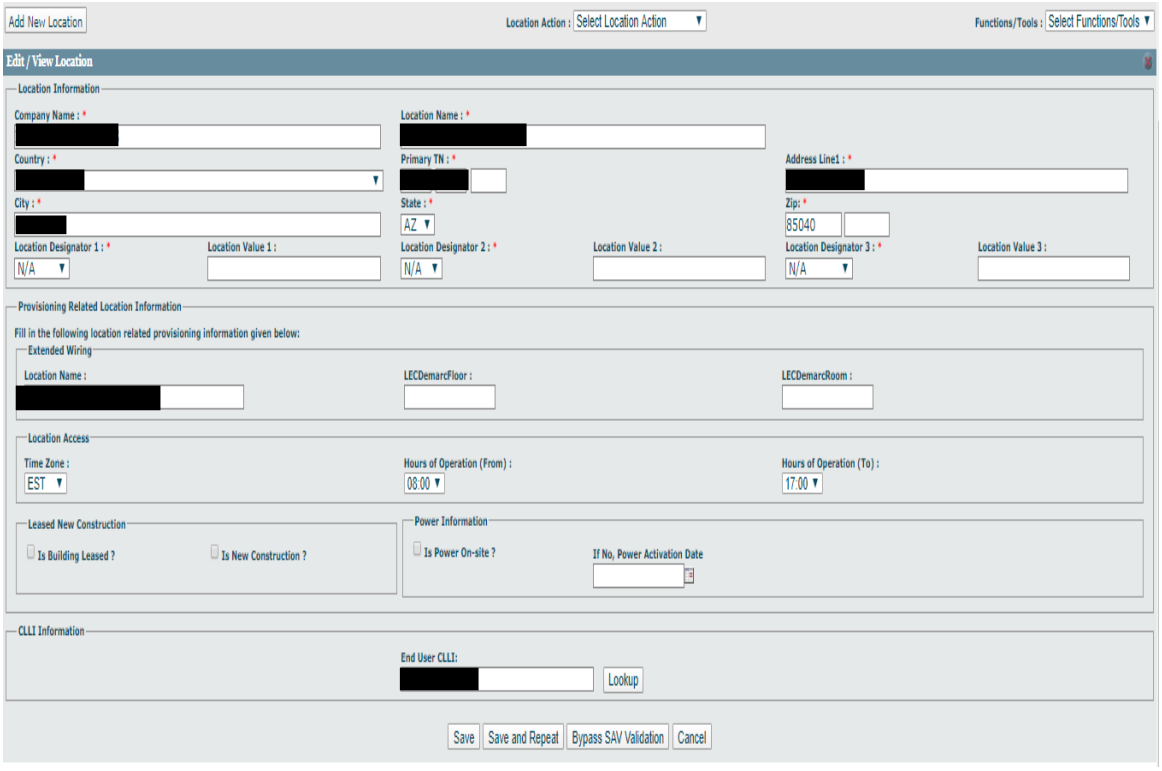


Figure 6.1.11 Location service details

[redacted] [redacted]

Product(s) :	IQ	**Expiration :**	N/A	**State/ Status/ Order Status :**	OKEYD / OFFH/ In Progress
Project Id :	57254599	**Opportunity Id :**	57254599	**Request Id :**	239436712
Brand :	CenturyLink Total Advantage M	**Term :**	36	**Commitment :**	$0

Quick Links : Select Link | Order Action: Select | << Previous | Next >>

1 Order Info | 2 Location | 3 Service | 4 Pricing | 5 Contacts | 6 Review | 7 Functions

Service Summary

Reset | Filter

	Ref ID	Location	Status	Supp Status	Cod Status	Order Type	Service Instance ID	Service Summary	Product	Brand	CDDD	Customer Account	Product Account	Core Sales Order ID	Related Orders	Large Order	Overlay Status
	1	Interior Solutions Phoenix	✓	NA	In Progress	MAC	5513110	00 : 1, 3D : 1, CPE : EQ-131156970 : 2, IQ : ETH100-23934761 : 1, LL : ETH100-23934761 : 1, PK : ETH100-23934761 : 1, QX : 4, VB : VB-131155534 : 2, VO : VO-131154423 : 1, VS : VS-131157149 : 4, WM : IM-128366766 : 1	IQ	Q.ADVAN M	05/18/2020	88606476	154731005	181979842			

Figure 6.1.12 Service Tab

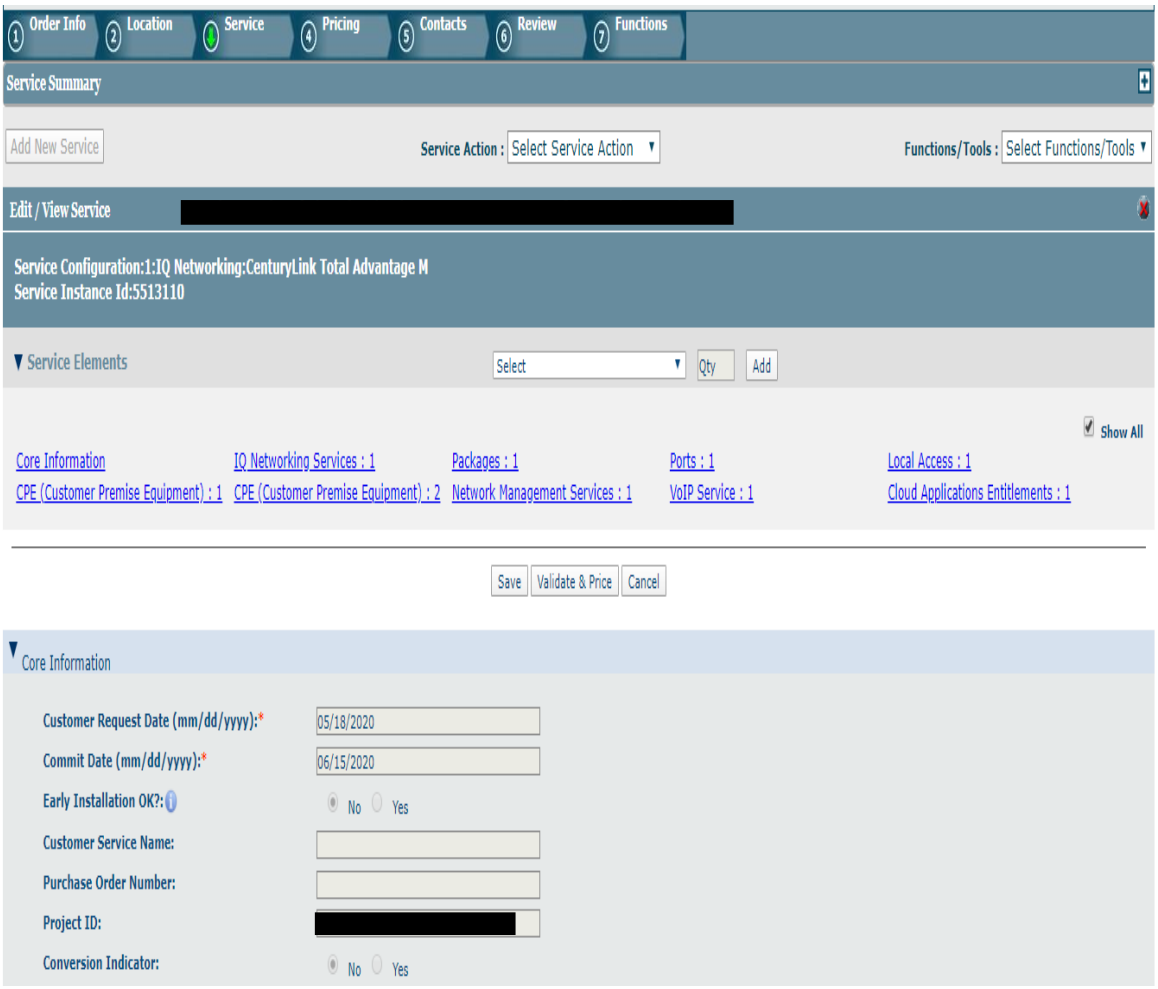


Figure 6.1.13(a) Service configuration

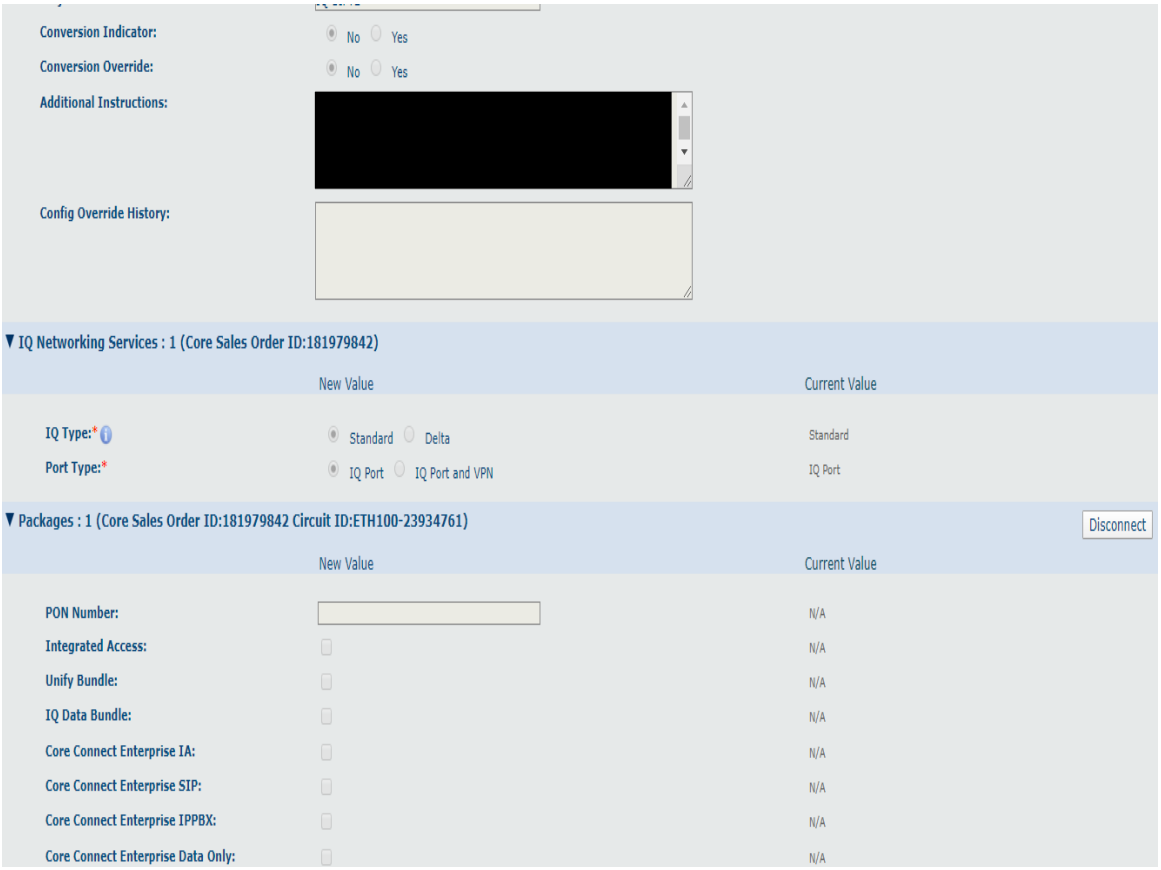


Figure 6.1.13(b) Service configuration

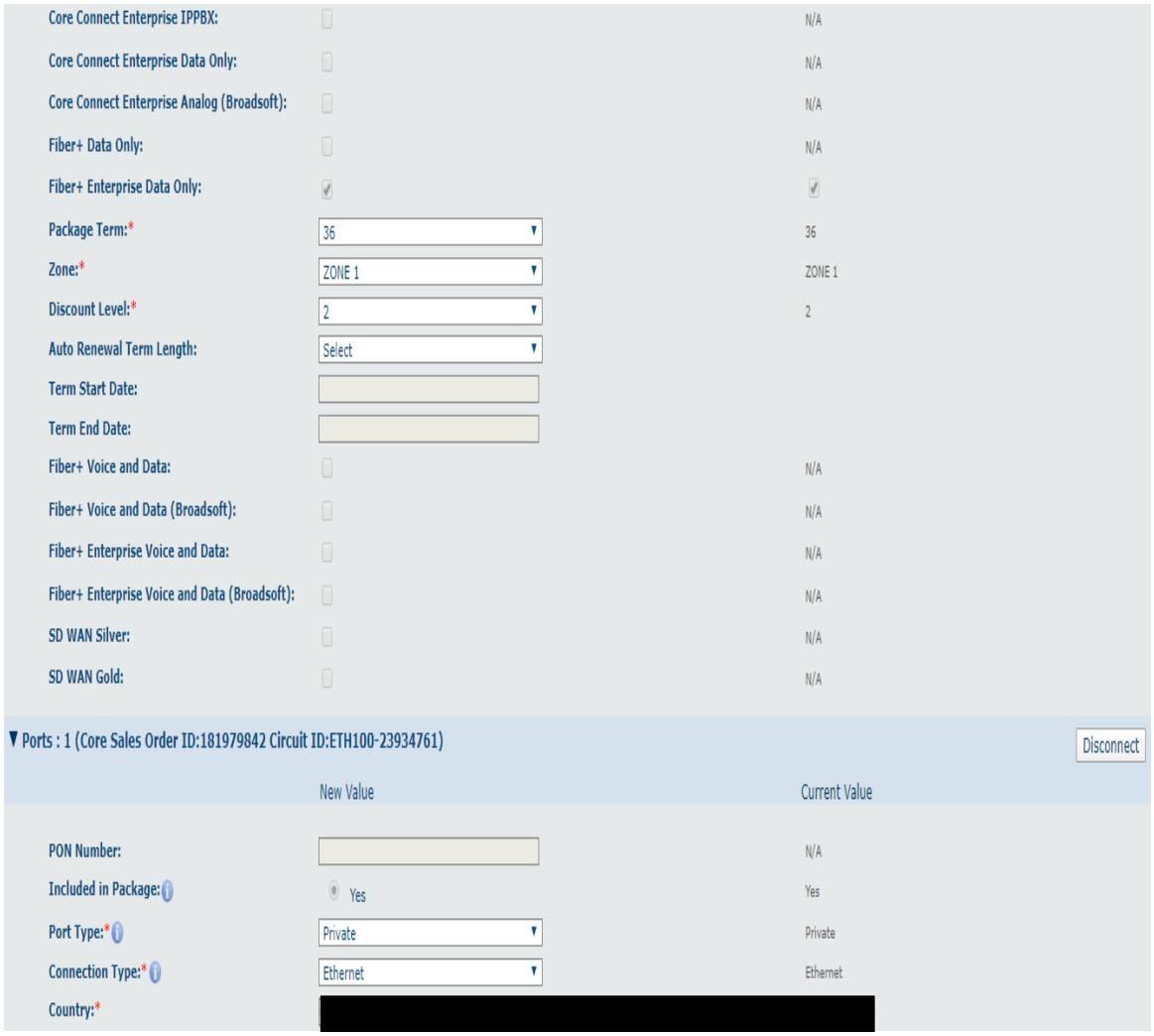


Figure 6.1.13(c)Service Configuration

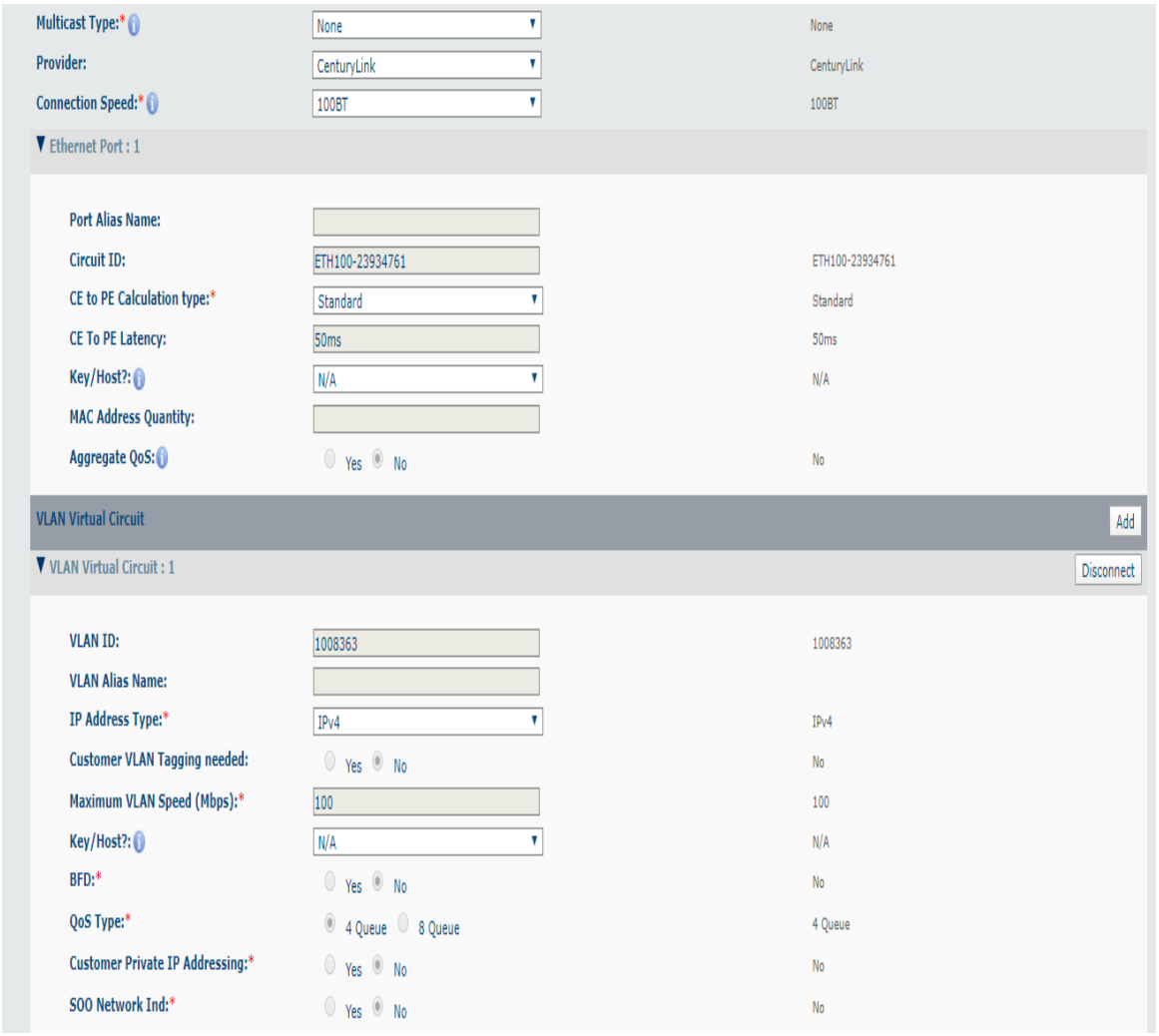


Figure 6.1.13(d) Service Configuration

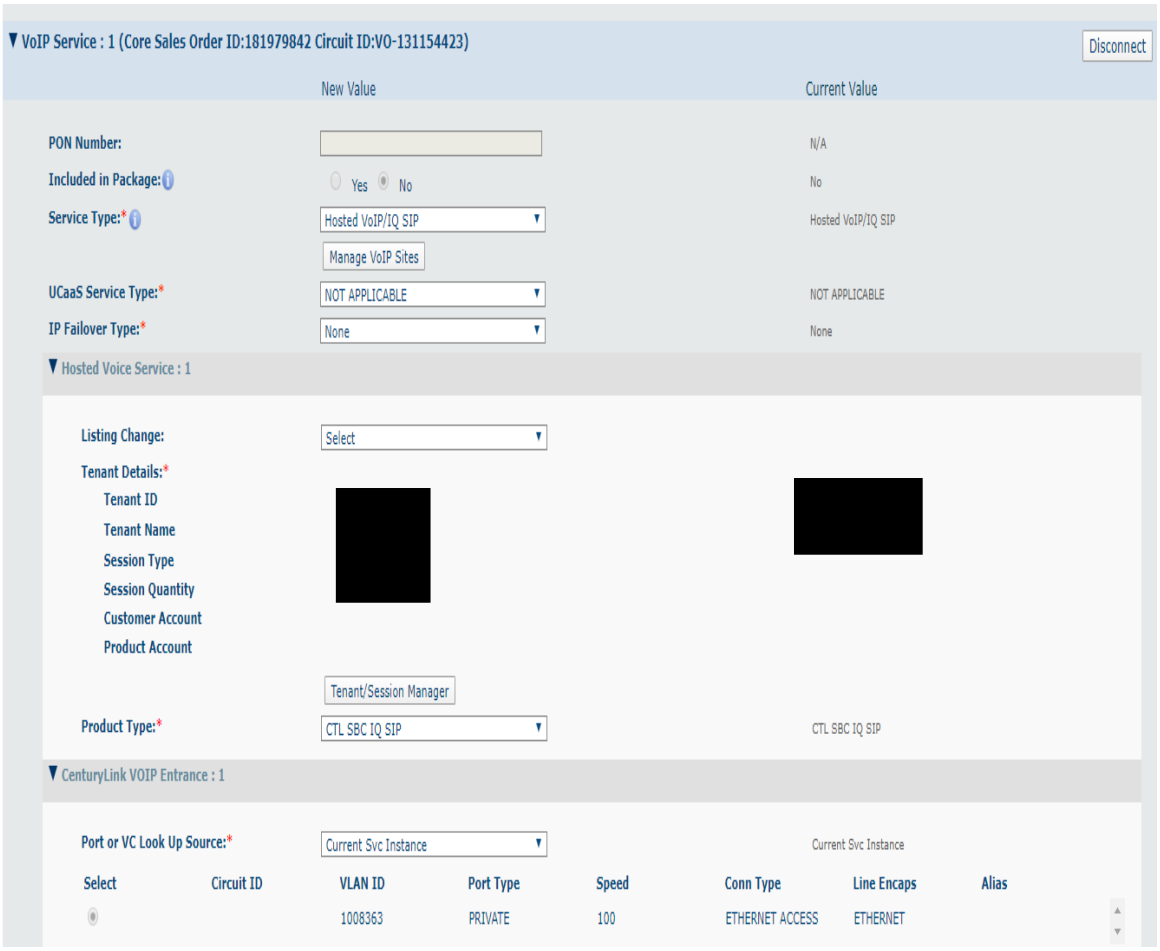


Figure 6.1.13(e) Service Configuration

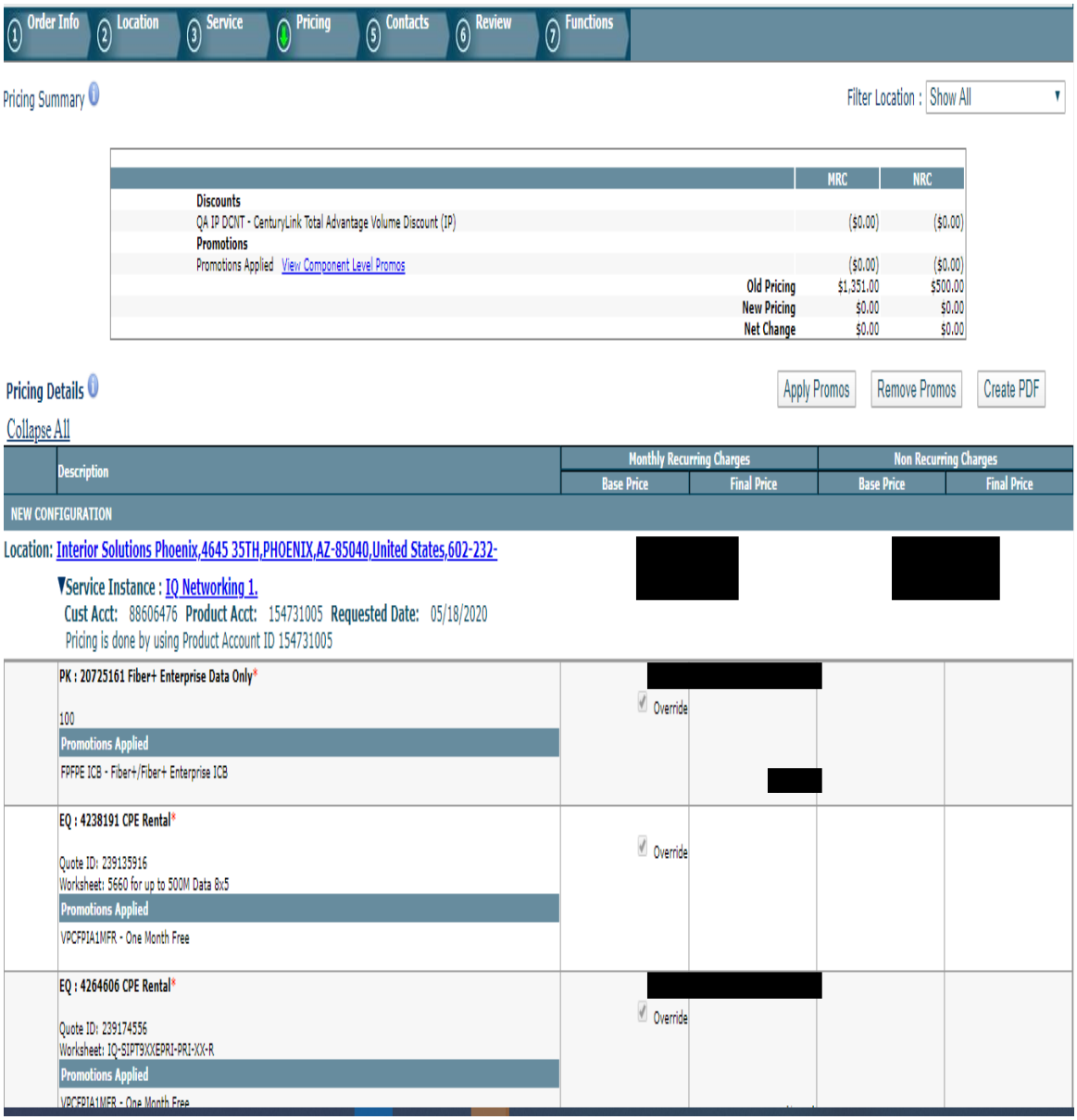


Figure 6.1.14 Pricing Tab

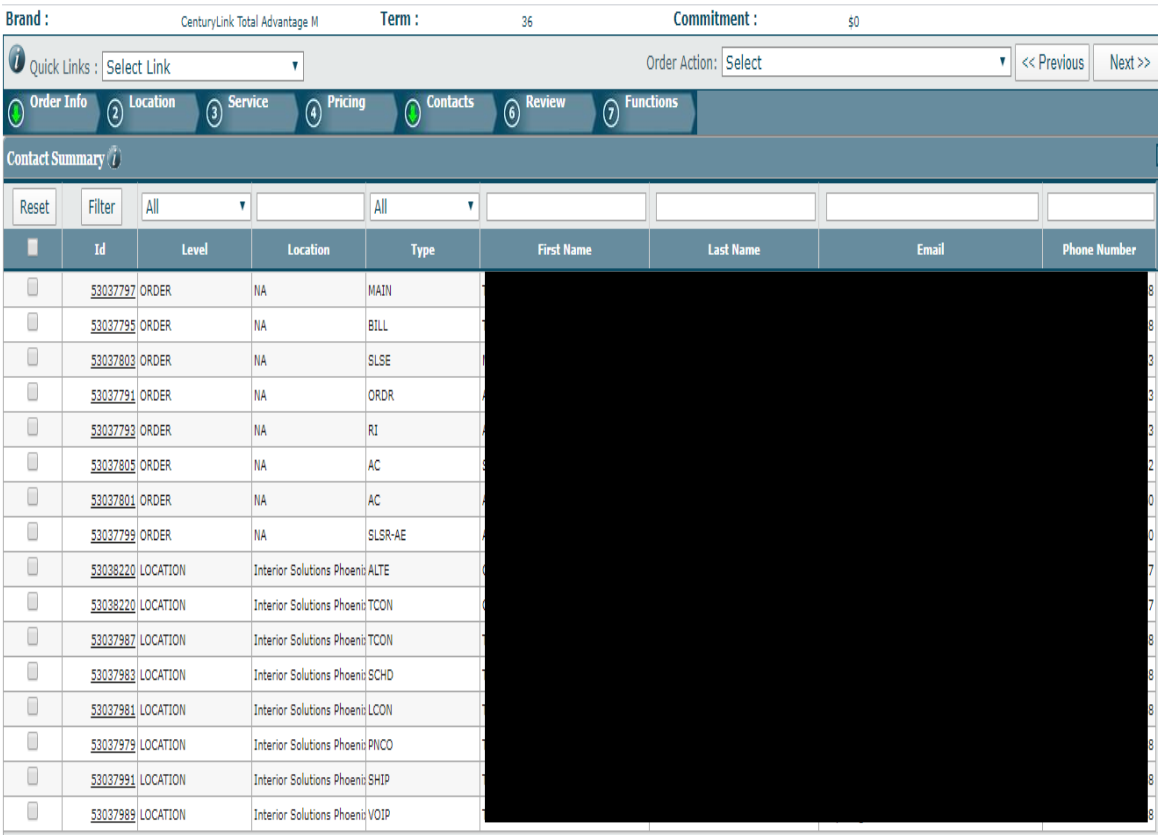


Figure 6.1.15 Contacts Tab

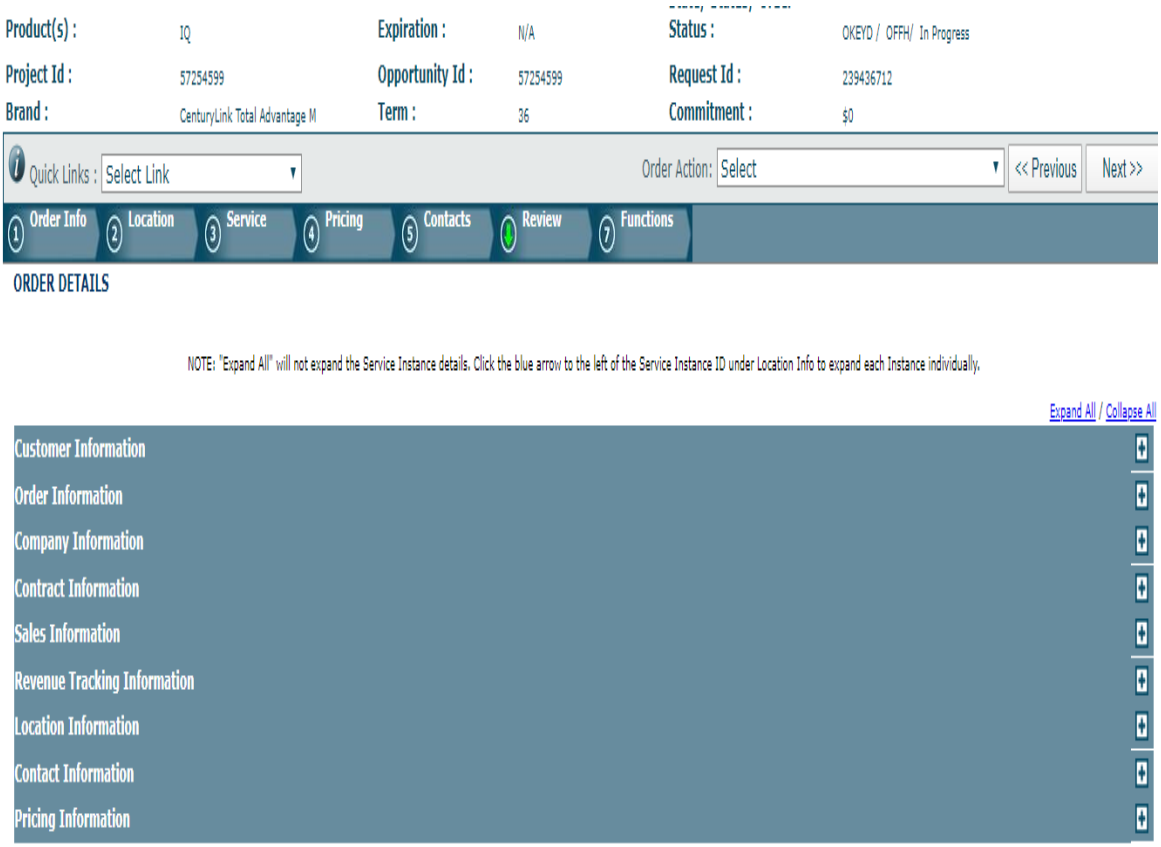


Figure 6.1.16 Review Tab

7. SOFTWARE TESTING

Software Testing refers to the procedure running a program with the intention of figuring out the error in the system. Testing is one of the important and crucial aspect of software engineering. Without testing the code will not be deployed to the production environment. The testing is done to find the bug or errors in the program or system. The main aim of software testing to make sure that the system is designed as per the requirements from the client and the desired input is giving the desired output. The testing ensures that the system is reliable, efficient and does the task what it is intended for. Although testing doesn't guarantee that the system is working exactly as per the requirement but provides an reliable assurance to users that the desired input gives the expected output.

7.1 TYPES OF TESTING

Unit Testing

All the modules of the order engineering system application are tested to ensure that all modules are working as expected in accordance with the functional requirements. The desired input should give the expected output and the undesired input should give the unexpected out that are validated as per the requirements of the system.

Integration Testing

It is done to verify that all links between modules of the system are working as per the expectation of the client. To recognize the flow of the system it is inevitable to navigate through all the system components.

System Testing

It is done when all modules are combined collectively to form a single system. System testing is performed to verify if all the modules are working as per the expectation of the client and all the validation and verification activities of the system is working as expected.

7.2 TEST CASES

7.2.1 Login Page

Sl.	Test Case	Input	Expected	Actual	Pass/Fail
1.	Valid Uname and password	Username and Password	Login Success	Login Success	Pass
2.	Wrong Uname and Valid Password	uname and Password	Wrong Uname or password	Wrong Uname and Password	Pass
3.	Valid Username and Wrong Password	uname and Password	Wrong uname or password	Wrong uname and Password	Pass
4.	Invalid Username and Password	Usernam e and Password	Wrong uname or password	Wrong uname and Password	Pass

7.2.2 Homepage

Sl.	Test Case	Input	Expected	Actual	Pass/Fail
1.	Navigation through all modules	Click Each Module	Navigate to the specified page	Navigates to the specified	Pass
2.	Navigation into order info tab	Click on order info tab	Navigates to the order info page	Navigates to the order info page	Pass
3.	Navigation into location tab	Click on location tab	Navigates to the location page	Navigates to the location page	Pass
4.	Navigation into service tab	Click on service tab	Navigates to the service config page	Navigates to the service config page	Pass
5.	Navigation into pricing tab	Click on pricing tab	Navigates to the pricing page	Navigates to the pricing page	Pass
6.	Navigation into Review tab	Click on Review tab	Navigates to the review page	Navigates to the review page	Pass

7.	Location Address acceptance	Enter the valid service address	Address acceptance is successful	Address acceptance is successful	Pass
8.	Location Address acceptance	Enter the in valid service address	Address acceptance is not successful	Address acceptance is not successful	Pass
9.	Service config validation	Correct service config details	validation is successful	validation is successful	Pass
10.	Service config acceptance	Incorrect service config details	Address acceptance is not successful	Address acceptance is not successful	Pass
11.	Global acceptance	Correct data for all tabs	Global acceptance is successful	Global acceptance is successful	Pass
12.	Global acceptance	In correct data for all tabs	Global acceptance is not successful	Global acceptance is not successful	Pass

8. CONCLUSION

The order Engineering center application helps the order engineers to key the enterprise orders for the telecom and internet services. The order Engineering center application interacts with other application through a web service or bus service call. The OEC application was initially developed to automate the process of manually keying through the excel sheet. The order Engineer used to enter the data through the excel sheet using macros and forward that to provisioning and billing team. The OEC application helps the order engineers to just add the different types of products and select the values from the dropdown list or the radio buttons. The data is sent to the downstream system in the XML from which goes to the provisioning system for provisioning of the elements and to the billing system for the billing of the components. All the billing and provisioning data of the customers is stored in the database and can be retrieved and modified any time if they go for enhancement.

9. FUTURE ENHANCEMENTS

The future enhancement of the project depends of the requirement from the Business. The Business should create an user story which will be picked up in that particular cycle and then worked for the implementation. The following is one such requirement from the Business users

- On a MACD orders the user will not be able to modify the service address in the location tab. The user wants this to be editable even on MACD orders.

10. BIBLIOGRAPHY

Websites Referred

1. https://www.tutorialspoint.com/sql/index.htm
2. https://www.toadworld.com/products/toad-for-oracle
3. https://stackoverflow.com/
4. www.geeksforgeeks.org/java/