

CHALMERS



Online Sales System

Master of Science Thesis [in the Programme Software Engineering & Technology]

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Göteborg, Sweden, March 2011

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A Sales System is an online web application of sells forest products, paper in particular, around the world.

Department of Computer Science and Engineering
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Online Sales System

Thesis Report

Table of Contents

Acknowledgement

Abstract

1.	Introduction	1
1.1.	Acquirer	1
1.2.	Background	1
1.3.	Problem Statement	1
1.4.	Problem Area	2
1.5.	Scope of project	4
2.	Overview of current working	5
2.1.	Initiation of Order	5
2.2.	Finding Mill/Customer	5
2.3.	Create/Sent Pro forma Invoice.....	5
2.4.	Order to Mill	6
2.5.	Handle Shipment.....	6
2.6.	Generate B/L (Bill of lading).....	6
2.7.	Generate Documents for Bank.....	6
2.8.	Receive Payment.....	6
3.	Requirements	7
3.1.	Hardware Requirements	7
3.2.	Functional Requirements	8
3.3.	Non-functional requirements	8
4.	Technological and Product Factors	10
4.1.	Technological Factors.....	10
4.2.	Product Factors	11
5.	Product Perspective.....	14
5.1.	System Interfaces.....	14
5.2.	User Interface	15
5.3.	Hardware Interfaces	15
5.4.	Software Interfaces.....	15
5.5.	Communication Interface	15
5.6.	Memory Constrains.....	15
5.7.	Site adaptation requirements.....	16
5.8.	Assumption and Constrains	16
6.	System functionality	17
6.1.	Customer.....	17
6.2.	Account Management	18
6.3.	Finance Manger	20
7.	Use Cases.....	22

8.	Functions	23
8.1.	System responses	23
8.2.	Error handling and recovery	23
8.3.	Communication facilities	23
8.4.	Performance Requirement	23
8.5.	Software System Attributes	23
8.6.	Design Constraints	27
9.	Fortex AB solution recommendation	28
9.1.	ERP/CRM Comparison.....	28
9.2.	In-House Development	28
9.3.	OpenBravo	29
9.4.	OpenERP	30
9.5.	SalesForce	31
9.6.	Compiere.....	32
9.7.	Bizagi	32
9.8.	Microsoft Dynamics GP	33
10.	Recommendations	35
	Reference List:.....	36
	Appendix 1	37
	Appendix 2	49

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Abstract

Online Sales System is a web application which is a product of FSA Fortex AB ¹. The idea of this thesis is to study the company's current working. And propose a solution in order to digitalize their current processes and overcome the current issues which are being faced daily due to lack of computerized solution. This need of digitalization of their current processes related to order handling will help the company in forecasting their business growth. The customer places an order through a website which is examined and later accepted by Fortex AB. Fortex AB looks for a potential supplier against each customer order and sends a pro forma invoice which is generated by the system, as it is termed as a mini agreement between Fortex and supplier.

As an initial step of the thesis, the understanding of Fortex AB current work flow is built. After that the system requirements were identified and documented. Theoretical review of similar systems was made. And as a result of this thesis recommendations were given to Fortex AB, whether the system should be developed in house or by using other existing systems like ERP or CRM.

¹ Name of the company

1. Introduction

1.1. Acquirer

The acquirer of this thesis is an enterprise named FSA Fortex AB, consisting of retailers dispersed around the globe.

1.2. Background

FSA FORTEX AB is a company that buys and sells forest products, paper in particular, around the world. It is a small size company which has sales in approximately 35 countries and suppliers in some 25 countries. The company handles shipments and financing to customers. It handles about 1,150 shipments per year approximately.

Currently FSA FORTEX AB doesn't have any computerized system to manage workflow of orders. This situation is causing hurdles in management and overall productivity of company.

1.3. Problem Statement

In today's fast paced society, it's very hard to be competitive without using cutting-edge technology available in market. After years of business, the data has grown much for Fortex. It is becoming a challenge for Fortex to manage that data in an effective way. To be more productive in order processing, Fortex needs a solution which can facilitate their current processes with use of technology and software.

With increased amount of orders, it is becoming difficult for Fortex to manage orders in effective and efficient manner. It is very hard to go through all paper work and backtracking orders. If there is any complain or review of any order, it takes large amount of effort and time to backtrack and fix the problem. This results in loss of resources, increased time, and low output.

All orders are managed using different papers; all information regarding one order is stored in one physical file. This file contains all the documents related to that particular order. Once Fortex receive an order, they assign a unique number to that order/file. Some of financial details regarding orders are managed in an Excel sheet.

Currently in FSA Fortex the work flow followed is not very efficient due to lack of Software and digital media usage. Workflow from order quotes, order to invoice and payments are today made manually without the help of a computerized management system. This means a lot of manual work, which leads to the loss of control over operations. Due to higher workloads and more errors, delay in the whole process is experienced on daily basis. No database exists and thus poor ability to pick out statistics on for example the existing order stock.

FSA FORTEX AB needs an administrative system that should be built to suit their specific organization. There exist no readymade systems that can meet all of FSA Fortex Business needs. Requirements are unique and complex which make use of third party tailored system difficult to implement.

The system should primarily involve the internal work, but will in future have the ability to integrate with various parties, such as book keeping, bank and suppliers.

1.4. Problem Area

Fortex AB is currently facing difficulties in managing paper work. Received orders are processed throughout their process completion cycle on paper documents. Handling of these documents (records) in a large number increase the overall order processing e.g. in documents verification, generating reports, back tracking of orders and payments, and information retrieval. Therefore, there is a need of a data management system, providing an effective and efficient record keeping, along with an easy document management system for;

- Fortex Performa invoice Generation.
- Sending order to supplier.
- Creating customer invoice.
- Generating documents for bank (bill of lading¹).
- Sending Bill of lading to customer.

² Term used by Fortex AB

1.4.1. Customer Management

Fortex is currently following very complex work flow for managing customers, which is at most due to lack of computerized processes. Customers, clients, sales persons are contacted directly to or by Fortex. There is no such system currently at place which can provide details of the stakeholders swiftly, represented through graphical/histogram or by any effective means of information sharing, which is based on stakeholder's historic data.

1.4.2. Invoicing

Fortex is maintaining most of its information on physical documents. Invoices are handled in physical document formats, where orders can be received by means of an email, fax or a phone call. Every actor is currently using their own format for placing an order, mostly by pdf, word document or other means of communication. This makes information management difficult and complex for Fortex, and utilizes much more resources to manage that information. This is mainly due to the absence of any specified format by which customers can place their orders.

1.4.3. Order traceability

Order traceability is the most time consuming process throughout the order life cycle. It increases the overall effort due to lack of any computerized management system for information traceability. All the information at present is cross checked manually, which most of the time makes traceability much more difficult and exhaustive. It gets more complex when dealing with orders with a larger life cycle.

1.4.4. Financial Details Management

Financial details are handled on multiple Excel Sheets at present. There is no such efficient system available which can help Fortex to manage their financial details. They are facing challenges in handling and updating financial information while performing different processes during completion of one order. For Fortex it is important to verify financial information at every step during orders from multiple files, and documents which makes it more complex and time consuming.

1.4.5. Demarcations

The application does not focus on the development of systems that authorizes the payments from the customer.

1.5. Scope of project

Scope of this project is to investigate and design a software solution which can facilitate Fortex in performing their daily tasks, improving efficiency, and helping them to be more productive. This project will provide a solution through which Fortex can easily manage, handle and generate all required information in their respective format when needed. It will help them to manage order details, financial data, and historical data and also in producing documents of different formats for different customers.

This solution will help Fortex in reducing effort spend on managing orders. It will also provide them opportunity to explore possibility of generating documents, managing financial details and analyzing historical data with use of digitalized solution.

2. Overview of current working

Fortex AB is managing all documents, orders, and customers with the help of filing systems. They are not using any computerized system to manage the business. Most of the documents produced are kept in different files, according to customers/countries and time.

The actors involved are as following:

- Fortex AB
- Agent
- Customer
- Mill
- Bank
- Shipping company
- Other regularotory agencies

Current order flow of Fortex AB is as follows.

2.1. Initiation of Order

This step involves receiving order from customer, or receiving goods details from mill which needs to be sold.

2.2. Finding Mill/Customer

Fortex then look for a mill from where they can find the goods that are required by customer. This step also includes negotiations on different aspects of order like price, delivery time, mode of payment etc. In case of mill wishing to sell goods, Fortex looks for customer who is interested in buying goods.

2.3. Create/Sent Pro forma Invoice

Fortex will then generate Pro forma invoice to communicate price with customer. This is considered as mini agreement between Fortex and Customer on price and other aspects of order. In some cases customer don't need to send formal approval of Pro forma Invoice.

2.4. Order to Mill

After customer agrees on Pro forma Invoice, Fortex will order the goods to the mill. This order will include all the detail of goods, cost, delivery time, shipment details including ports detail etc.

2.5. Handle Shipment

When goods are manufactured by the mill, they transport those goods to Fortex. In some cases the mill can handle shipments but it's mostly Fortex who manages shipment of goods to the customer. This includes finding shipping company, communicating ports of delivery and receiving, goods details etc.

2.6. Generate B/L (Bill of lading)

Once shipment is started, Fortex will start working to manage B/L.

2.7. Generate Documents for Bank

In many cases, to complete the delivery, Fortex needs to generate and compile documents in order to let customer get their delivery from port. This process includes communication between bank and Fortex, finalizing packing list and compiling documents for bank/customer.

2.8. Receive Payment

After completion of all above steps, Fortex will receive payment on basis of invoice generated. In some cases, Fortex will generate invoice in the end, after the delivery has been done.

3. Requirements

Fortex AB system is a combination of software and hardware components, whose purpose is to provide services related to sales and purchase of goods. All the information is being stored in database, and retrieved when needed by means of display or print.

There are four stakeholders involved in the system (Fortex AB, Mill, Customer, and Bank). All the communication between Fortex AB, Mill and Customer has to be digitalized as a part of this thesis and the communication between bank and Fortex is out of the thesis scope.

These requirements are elicited during informal meetings with the stakeholders within Fortex AB. These requirements are divided into three main categories: hardware, functional, and non-functional requirements. Which are as following;

3.1. Hardware Requirements

- 1) Dedicated application server with minimum specification, are as;
 - a. Intel Core 2 Quad
 - b. Memory 2*2GB DDR3
 - c. Hard Disk 1 x 360 GB HDD SATA
 - d. Ethernet Card 10/100/1000 Mbps
 - e. Microsoft Windows 2003 Small Business Server.

- 2) Dedicated Microsoft SQL Server 2008 with minimum specification, are as;
 - a. Intel Core 2 Quad
 - b. Memory 2*2GB DDR3
 - c. Hard Disk 1 x 360 GB HDD SATA
 - d. Ethernet Card 10/100/1000 Mbps
 - e. Microsoft Windows 2003 Small Business Server

- 3) UPS with software to perform proper shutdown in case of power failure.
- 4) Wireless modem and Ethernet network card.

3.2. Functional Requirements

- 1) System must be able to add/modify customer.
- 2) Customer must be able to view his/her personal details only.
- 3) System must be able to accept orders from the customer via email or online form.
- 4) Customer must be able to view his/her orders history.
- 5) Each customer must be able to view placed order status.
- 6) System must alert Fortex AB for new orders.
- 7) Fortex should be able to change the status of the order between order executions.
- 8) System must generate pro forma and customer invoice against an order.
- 9) Customer should be able to validate and confirm their invoice.
- 10) Fortex AB must be able to view pro forma invoice and packing list sent by the mill.
- 11) Fortex AB must be able to view order history of a customer.
- 12) Fortex AB must be able to validate and manage customers order against payments.
- 13) System must store information related to shipment and banking for each order.
- 14) The system must guarantee secure access to the stored data, managing the permissions according to the user profile.
- 15) The system must support easy addition of functionalities and enhancements
- 16) The system should support device upgrading or changing of devices.

3.3. Non-functional requirements

- 1) The system shall be accessible from anywhere in the world.
- 2) The system shall be made available 99% yearly.
- 3) System shall automatically make backups after every 4 months. This can be tuned according to company needs too.
- 4) System connectivity with internet shall be ensured through backup line.

- 5) The safety of the system information shall be insured by means of firewall.
- 6) The Fortex AB system is going to be used commercially, so the project is not open-source and the source code cannot be published.
- 7) The Fortex AB system is the first project for the company, therefore there is no such existing system which needs to be integrated.

4. Technological and Product Factors

4.1. Technological Factors

<i>Technological Factors</i>	<i>Flexibility and Changeability</i>	<i>Impact</i>
T1: General-purpose hardware		
<i>T1.1: Processor</i>		
The processor must be good enough to use the system, according to the institution size (number of users).	The processor for the server is going to be chosen according to the Fortex AB size and it will probably be reviewed/updated after every 3 years, according to the technological advances and the institution's growth.	The change of processor will not require changes in the system source code. It will only affect the overall performance of the system.
<i>T1.2: Disk</i>		
Disk space should be proportional to the number of orders. It should be at least 30 MB * Number Of Orders.	It should be taken into account that, in the future, the typical maximum size of an order can exceed 50 MB. It is also supposed that the number of orders will have an average growth of 15% to 30%. The disk must be updated as needed.	A disk upgrade is not suppose to require changes in the system source code, but not doing it on time will affect the system performance, availability and reliability.
<i>T1.3: Network</i>		
Institution must have a connection to the Internet of at least 15 MBit/s.	The number of clients (Global) is likely to grow as the number of company users increases. The broadband is strongly necessary to access the server, which has the information of all the clients and orders in the system.	The expected response time and the availability of information through the network will be strongly affected if it does not have enough bandwidth.
<i>T1.4: Access devices</i>		
The system will be accessed from web by the clients and staff.	In the future, the system should support access from different kinds of devices. It is important that the system support integration with new devices e.g. desktop application, android, iPhone, and other mobile platforms.	The usability of the system is affected by this aspect. It impacts in viewing company information.

<i>Technological Factors</i>	<i>Flexibility and Changeability</i>	<i>Impact</i>
T2: Software technology		
<i>T2.1: Firewalls</i>		
The network must have a firewall that controls the flow of information in order to prevent unauthorized access.	The firewall configuration must be updated as needed in order to provide as much security as possible to the company's information.	Unauthorized access could affect the data reliability and the order's information safety.
<i>T2.2: Server OS</i>		
The server OS should be Unix based, since it's cheaper and it manages the resources in an optimal way.	Even the server OS is likely to be updated as new versions become available.	The OS updates should be transparent to the system.

4.2. Product Factors

<i>Product Factors</i>	<i>Flexibility and Changeability</i>	<i>Impact</i>
P1. Functional features		
<i>P1.1: Version management</i>		
The system should be able to add information in the order whenever needed, without deleting prior information.	If an order is split into two or more orders, or a portion of order is cancelled, or an invoice is modified the system should maintain all the information.	It would impact on the data storage.
<i>P1.2: Multiuser</i>		
It should be possible for several persons at different locations to view an order at the same time.	The requirements are stable.	There should be a session control unit responsible for dealing with concurrent access to data.
<i>P1.3: Information updating control</i>		
The system should prevent certain users from updating some categories of information.	This feature should be configurable. The rules for different types of users to update some categories of information can change in the future.	This feature affects the system's information updating.
<i>P1.4: Backward compatibility</i>		
The system must have the possibility to add digitized versions of	When needed, users are going to enter paper-based order information.	There should be an attachment unit to deal with this.

Product Factors	Flexibility and Changeability	Impact
previous paper-based orders.		
P2: User interface		
<i>P2.1: User interaction model</i>		
The system should have predefined profiles for different types of users e.g. account manager, financial manager, customers, etc. Each different profile has a filter, which makes the user view only relevant information related to clients and orders. The objective is to avoid information overload.	In future versions, each user would be able to create/modify its own filter.	This feature affects the output controller component.
<i>P2.2: User interface portability</i>		
The system should be able to display information on different types of devices: PC's, thin clients or even handheld computers.	More devices may arise in the future. The system should be scalable.	This feature affects the output for different devices.
P3: Performance		
<i>P3.1: Order/Client information retrieval performance</i>		
Order/client information retrieval may not exceed 2.0 seconds.	This requirement for retrieval time can be reduced in the future.	Profiling techniques should be used in order to eliminate bottlenecks.
<i>P3.2: Fortex AB system capacity</i>		
System must support a high number of orders (at least 1,000,000).	These numbers may grow in the future.	This feature affects the order's sharing and storage.
P.4: Dependability		
<i>P4.1 Safe transfer of information</i>		
<i>The system should be able to safely transfer information between different users.</i>	Requirements are stable.	This has an impact on the way the system performs communication over a network.
<i>P4.2 User authentication</i>		
<i>The system should prevent un-authorized</i>	Requirements are stable.	This feature affects the company private information.

Product Factors	Flexibility and Changeability	Impact
<i>persons from reading the company's order/client information.</i>		
P4.3 Availability		
The system must show correct information 24 hours a day, 7 days of a week, all year.	Requirements are stable.	This may require redundant hardware.
P5: Failure Detection, reporting, recovery		
P5.1 Recovery		
The system must survive communication breakdown and failures, keeping the data available.	There's no flexibility in this requirement.	This may result in code spread across the system that aims to warn system administrators of some failure. There should also be a history/log manager system to deal with integrity.
P5.2 Error, Access and Transactions Logging		
The system must record all the access made by users, clients, and staff.	The consult to this information may be done according to the users' permissions or profile.	This feature affects the transaction handling adding new responsibilities to the system.
P.6: Service		
P6.1 Extendable		
The system should be able to support new types of data previously not supported, specially related to different types of invoices (regional).	More information may be needed to be stored in future.	It impacts all the components of the system that deals with data handling.
P6.2 Maintenance of Software		
The domain rules related to the orders/clients; and data manipulations are likely to change in time according to new laws and communication protocols.	This is a fact about the implementation of this kind of systems, so the system is very likely to change in time.	This impacts the implementation of the system in order to make it easy to maintain and change in the future.

5. Product Perspective

The Online Sales System is not a part of a large system. It is a standalone web application which will digitalize the current Fortex AB processes. It is being claimed by Fortex AB that it is very hard to work with existing mean of handling orders which is based on paper. Therefore, it is good for Fortex AB to have a digitalized system through which they can search and process orders without hassling through the piles of documents. This will also help the staff to access the information remotely. Thus, the solution to be developed should be a web-based application instead of desktop application. The figure 1 depicts a block diagram showing major interconnections of web-based system.

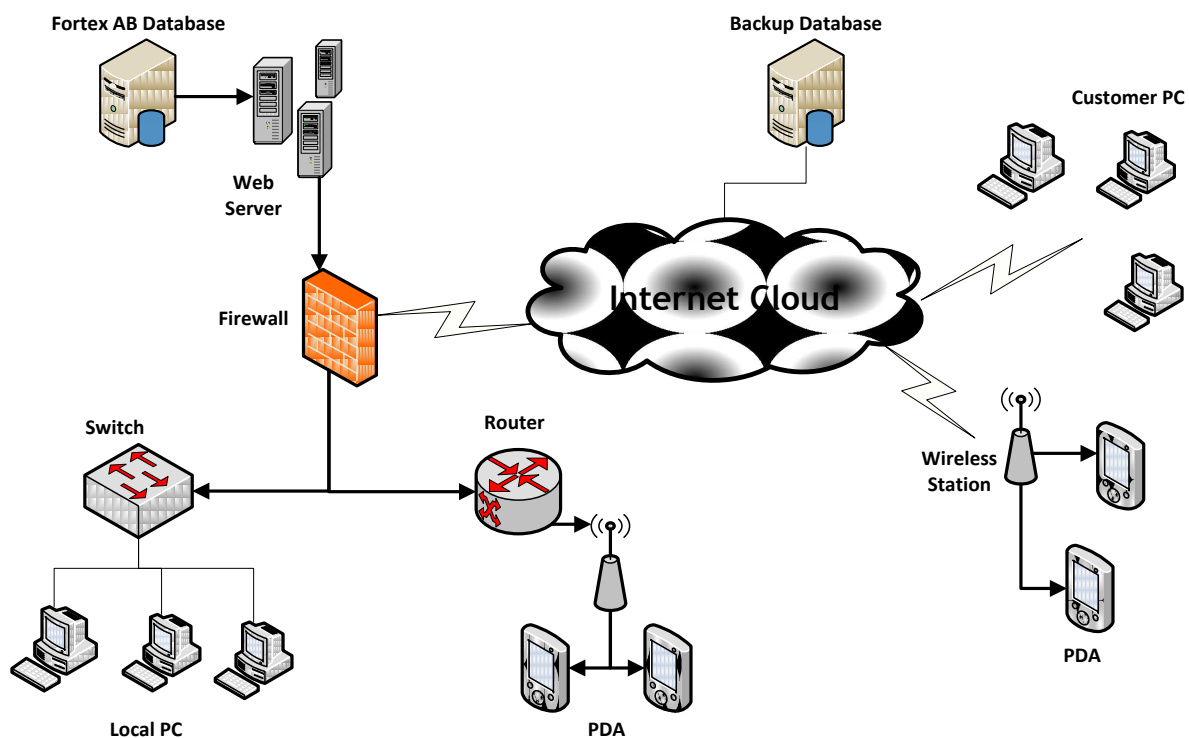


Figure 1: Deployment model of Fortex AB

5.1. System Interfaces

There are three different types of users who are interacting with the system interface.

- Customer
- Account manager
- Finance manager

Customer of Fortex AB shall be able to order, search, track and edit order information, in addition to this he can cancel an order under certain conditions. On the other hand the system shall let “Account Manager” to approve/reject an order, add new suppliers, and products. The “Finance Manager” shall be able to handle financial transactions and logistic support like shipment.

In future the system shall be able to let Shipment Company, bank and supplier to interact directly with the system.

5.2. User Interface

The user interaction with Fortex AB will be through the website, initially. In future, according to the business need the company would like to have a mobile software version as well. This interface has to be “user friendly” and intuitive so that the user won’t get lost or gets frustrated. Moreover, the web’s standards concerning graphical user interface will be respected.

5.3. Hardware Interfaces

The hardware recommended is a computer or any other terminal such as PDA, iPhone, iPad, and cellular phone which supports a web browser.

5.4. Software Interfaces

The system must be designed in a way that it can interact with multiple data storage locations. The web interface must be written in a web standard language such as Asp.Net, php, and etc.

5.5. Communication Interface

The Fortex AB system should support commonly used web browsers such as Internet Explorer, Firefox, Google Chrome, Safari, Opera and Netscape. More over the system shall provide support for mobile devices such as iPhone, and PDAs; and iPad.

5.6. Memory Constrains

No memory constrains were identified.

5.7. Site adaptation requirements

Since the system is not an up gradation of any existing system, therefore there is no adaptation required.

5.8. Assumption and Constrains

The following constrains were identified for Fortex AB

- Internet connection for web server shall be available 24 hours a day and 7 days a week.
- In case of downtime the communication shall not affect the user.
- Continuous downtime shall not exceed a day.
- All the payments are handled by the Bank, which is not the part of the system.
- The system shall support at least 600 users simultaneously.
- Data encryption shall be used for sensitive data sharing between user and the system.
- The system shall support its deployment at more than one geographical location, if needed.
- It should be possible/easy to add new functionality into the system without affecting it.
- The system shall accept customer order in different formats such as in XML, PDF, and JPEG (scanned paper) other than through company's website.

6. System functionality

The project features discussed in this thesis are based upon three modules, which are taken into consideration, namely Customer, Account Management and Financial Management. Customer module will help in order booking, order inquiry, payment delivery, shipment information, and etc. Account Management module is responsible for create, viewing, confirming, and changing information related to orders and customer. Whereas the Finance Management will deal with the generation, validation, and confirmation of pro-forma invoice and customer invoice; and will manage customer payments.

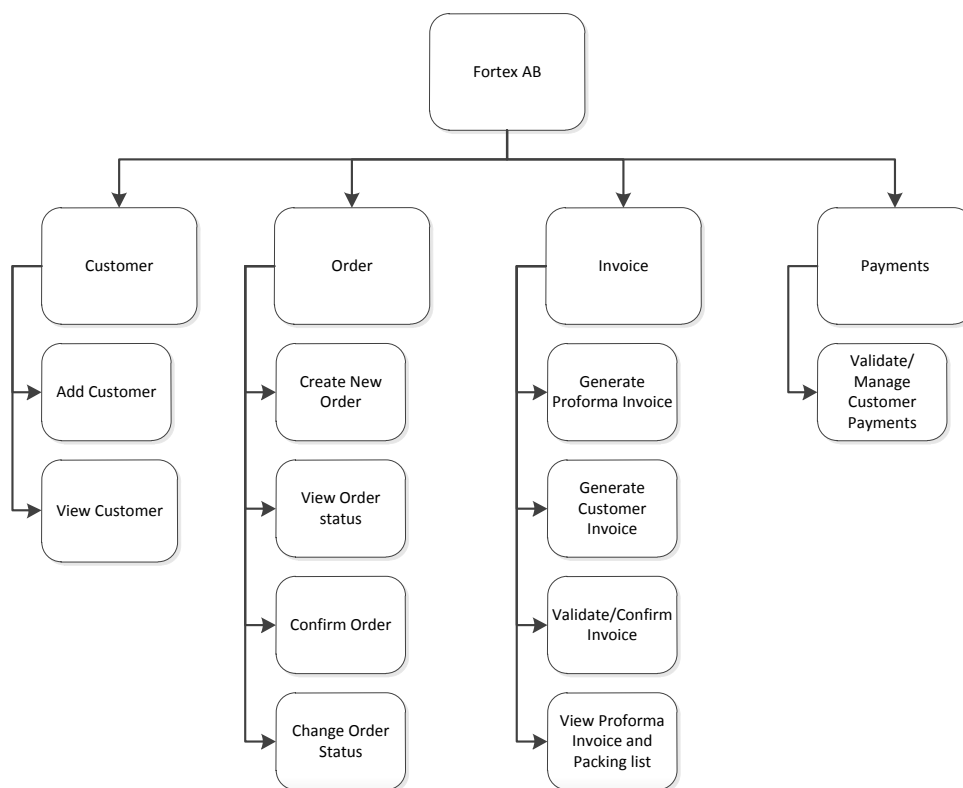


Figure 2: System functionality

6.1. Customer

6.1.1. Order Booking

The customer started with the placement of order through Fortex AB website. Only authorize/registered users can place an order. A web form is provided through which customer places his/her order details like (product, quantity, delivery date, product specification, etc.)

6.1.2. Order Inquire

After placing an order each customer is provided with a unique order number. Whenever customer needs to perform order inquires he/she has to provide order number to view his orders details.

6.1.3. Payment Delivery

All payment details related to a particular or number of orders can be view under this section. Customer will be shown list of all the placed orders, with the most current placed order at the top. By clicking an order the system will generate all the payments (Paid or pending) details in response to the clicked order.

6.1.4. Confirm Pro forma Invoice

Each time when an order is placed customer has to confirm the pro forma invoice which is being generated on behalf of Fortex AB as an agreement of what Fortex AB is going to deliver to the customer and on which conditions. With the help of an email alert system, the customer is being informed to confirm the pro forma invoice within given date; otherwise the system will automatically mark the pro forma invoice as confirmed.

6.1.5. Receive Shipment

The customer can view his shipment details with respect to each order, such as port of loading, port of discharge, Ocean vessel, final destination and date. In some cases order can be split up into sub orders. In such a case all the shipment details related to respective sub order will be shown, according to the information retrieved by Fortex AB.

6.2. Account Management

6.2.1. Create New Order

To start an order at Fortex AB, the customer needs to place an online order through the website provided by Fortex AB. This information will trigger the process of order execution, where, Fortex will receive an order by the customer provided with list of products to be purchased. The information gathered through this feature will help Fortex in knowing attributes like when the customer wants the goods to be delivered, at what price, and how

much in quantity; etc. Moreover, any additional information provided by the customer is also saved through this online form at the time of order creation.

6.2.2. View Order Status

This feature will help the account managers to view the current status of a particular order, which is in process. The status information generated by this feature, against an order number, will be as Accepted/ in process/ Rejected/ extended/ etc.

6.2.3. Confirm Order

After receiving an order by the customer it is very important to confirm the order in order to move to the next step of negotiation between the Customer and Fortex; and Fortex and the supplier. It is the responsibility of an account manager to confirm, and verify the order information.

6.2.4. Change/view Order Status

After the confirmation of an order, its status is updated to “Accepted” or “In process”. However, if later in between the order execution process, due to any circumstance, the order can't be process or it is halt then it is the responsibility of the account manager to change the status accordingly (rejected, extended, or etc.). This feature will help the account managers in managing the current order state.

6.2.5. Generate Pro-forma Invoice

At this stage, Fortex has been provided with the list of products by the customer. This pro-forma invoice will help Fortex to communicate with the supplier for the good which are listed by the customer. It is a draft agreement document and will help both Fortex and the Supplier to understand the conditions on which the goods are being purchased or sold respectively. This invoice is being generated through the information provided at the time of order placement by the customer, like products specification. This feature will accelerate the pro-forma invoice, generating invoice with just a single click.

6.2.6. View customer payment and order history

This feature will help to view customer payment and order history through the unique number assigned to them respectively. The user input the assigned unique number in the given form and as in response system generates all the historic data. This information helps the account manager in taking the decision at the time of a new order placement by

customer. On the basis of the information provided by these feature account manager accepts or rejects the new order placed by the customer.

6.3. Finance Manger

6.3.1. Generate Customer Invoice

After the negotiation between Fortex and the supplier on the customers listed product (price, quantity, delivery date, etc.) this feature will help Fortex to generate invoice for the customer. With the help of this feature the invoice is generated into different formats (word, pdf, xml, etc.) and can be emailed to the customer according to the functionality embedded in the system.

6.3.2. Validate/Confirm Invoice

It is the responsibility of the customer to confirm the invoice in order to further process the order. The customer may completely or partially agree on the invoice. In such a case it is the finance manager who needs to validate the invoice before placing an order to the supplier. This feature will resolve, if any, issues related to the validation and confirmation of the invoices.

6.3.3. View Pro-forma invoice and Packing list

It is an important feature for the finance manager in order to cross check the shipments packing with the placed order. This feature will make things easier for verification by the finance manager, providing the pro-forma invoice and packing list at a single screen.

6.3.4. Manage Customer and Supplier Payments

All the customer and supplier payments are tracked down under this feature. This feature will help the finance manager to check individual order payments, as well as all the payments (multiple orders) by a particular customer or supplier. These payments can be viewed in terms of received date, due date, or amount.

6.3.5. Manage shipment and bank information

All the shipment details and bank related information is stored against an order in from of an attachment file, as shipment and bank is not connected directly to Fortex AB system.

6.3.6. View customer payment/order history

This feature will help to view customer payment and order history through the unique number assigned to them respectively. The user input the assigned unique number in the given form and as in response system generates all the historic data. This information helps the finance manager in the verification and validation of the order, especially when an order is split into sub orders.

6.3.7. View customer details

This feature helps the finance manager to view customer contact details like address, shipping address, official contact number, social security number and other legal details. This information is provided to shipping company at the time of shipment. Moreover this information also helps Fortex AB with completing legal terms with the bank.

6.3.8. Edit order details

At time within the order execution process changes are made in order due to different factors such as on demand of customer, error found in order product specification, or unavailability of particular product in an order. In such a case this feature helps finance manager to make those changes respectively. In case of major changes like removal of any product from the order or changing the quantity of a particular product the invoice is generated again against those changes.

7. Use Cases

The expected use cases created from the requirements collected by Fortex is as follows;



Figure 3: Use Case Diagram

For more specific requirements and Fortex AB process Model see Appendix 1 and Appendix 2 accordingly.

8. Functions

8.1. System responses

The system shall prompt the user in case of any missing information on GUI (Graphical User Interface), concerned to mandatory or wrong input format. All the mandatory field are marked with a start (*). The process will not complete successfully until all the mandatory information is not provided according to the required format.

8.2. Error handling and recovery

The system will handle up to 80% to 95% of the error and exceptions. In case of a fatal error the system will be divert towards the backup servers until the system is not fully recovered from it failure state. The process of error handling and recovery shall be kept transparent for the users of the system.

8.3. Communication facilities

The system shall generate an alert in order to notify any malfunctioning of communication between different web servers, database servers and disconnection of internet link.

8.4. Performance Requirement

The system shall support up to 400 to 700 user connections simultaneously. The server should have a dedicated internet connection with at least 15 Mbp/sec of bandwidth. The response time of the server shall not exceed 3 seconds in normal conditions, with user having minimum bandwidth of 56Kbp/sec. In exceptional cases, the system may take up to 8 to 15 seconds to respond back to the user request.

8.5. Software System Attributes

This section describes the nonfunctional requirements for Fortex AB.

8.5.1. Usability

8.5.1.1. Symbolical Interfaces

The system of Fortex AB will be used by all kinds of users, especially by business people. Therefore interface of application should be informative in such a way that user belonging to any business class feels easy while browsing and traversing the application. It should be easy to view all business related information with a single click. As the application is going to be used in different countries and is not being used by the people of any specific language or

region that's why it will emphasize on pictorial, symbolical and visual interfacing instead of textual interfacing so that user may understand by just viewing some specific icon or image.

8.5.1.2. Feel Like Other Applications

The application's layout should resemble other popular application's solutions to which user is already familiar with, like ERP (Enterprise Resource Planning) and CRM (Customer Relationship Management). So that user may not feel strange or difficult in using and traversing any feature.

8.5.1.3. Easy Application layout and Accessibility

Applications map should be easy so that user can access any section of application by making at most 4 clicks and by browsing less links. Site map standards related to such applications should be followed strictly.

8.5.1.4. Internationalization/Localization

The Fortex AB application is typically representing a multicultural and intercultural society, where the company deals with different regions like Africa, Middle East, Latin America and Asia. The application should have English as a standard interface language, and Swedish as secondary. The application should support printing of documents in different languages other than English and Swedish.

This means that the application is not regional specific rather it may expand to multiple regions, culture and languages. Currently application is being used by Swedish people in start, therefore for other regions English language is set as a default language. Therefore, in future it may require that any region demands the application to be in their native language. So the application design should be able to accept the new components which can represent the features like language, and interface of other regions.

The architecture of the application should be bendable in a way that if the developers want to add some new linguistic or interface features for any new geographical region the change only takes place in the presentation layer of application for that specific local region's interface. To add the interface for some new geographical region there should not be any major change in business logic layer or data access layer of the application.

8.5.1.5. Easy to Learn

There should be an adequate guide to help users learn to use the features of the application. It should be easy to use help, and should have user friendly error messages. The application must be easy to learn, so if the user has used the application once or several times, then the next time the same user can use the application very easily without exploring it.

8.5.2. Reliability

8.5.2.1. Availability

The application should be accessible from anywhere in the world via Internet. The application should guarantee 99.9% of its availability to the users.

8.5.2.2. Mean Time to Failure

The mean time to failure for the application should not be less than 6 month.

8.5.2.3. Maximum down time of the system

The maximum downtime due to any failure (server crash or failure due to code) must not be more than a day.

8.5.2.4. Maximum Bugs Rate

The maximum bugs expected in first 6 months should not exceed 5 Bugs per 100 function points (both in business logic layer and scripting language) and 10 interface bugs.

8.5.3. Performance

8.5.3.1. Fast Response Time for User Login

The average response time for user login after entering user name and password should be no more than 3 sec and the maximum response time should be 10 seconds.

8.5.3.2. Fast Average Time for Rendering a Page

After clicking on any link the result should be rendered within no more than 1 second in average and it should not take more than 10 seconds in maximum.

8.5.3.3. Minimum number of concurrent users

The application should be able to address at least 600 users concurrently.

8.5.4. Security

8.5.4.1. User Authentication and Concurrency Controls

The application has three types of users having different kind of privileges and access rights:

Customer:

The user has the access to his personal information related to order, payments and general information. The user can only edit his personal information like address, shipping address, telephone number, and etc. Other information related to orders, the customer can only place an order but can't edit or remove the placed order.

Account Manager:

The account manager can access information related to approved or pending orders which still needs an approval. The authorized user can only view details related to customer order history, payments and the status of in process order of a particular customer. Moreover, the account manager is responsible for generating the pro forma invoice only.

Finance Manager:

The finance manager is allowed to access information related to the orders, such as generate invoice, validate/confirm invoices, check payment details, payments of supplier, shipping details, order history, check packing list, and bank communication details with respect to each order.

There must be proper data validation controls. In this case, the invalid data that may make the system vulnerable will not be entered into the application. The data must be securely stored in the application servers and should be accessible only by the authenticated users based on the privileges given to the users. The personal information such as name, email address, address, telephone number, date of birth, nationality, and religion and etc. belonging to the user A should not be accessible for the user B, except Fortex AB.

8.5.5. Maintainability

8.5.5.1. Un-interruptible Web Application Upgrade

The web application should be designed in a way that upgrading in the server codes may not interrupt the execution of the application.

8.5.5.2. Un-interruptible Database Upgrade

The database system and the hardware servers should be able to be upgraded with newer design without stopping the application from execution.

8.5.5.3. Remote Web Application Upgrade

The web application administration has to be able to upgrade the web application with new modules or components remotely.

8.5.5.4. Maintenance Utility

A maintenance utility has to be designed consisting following features:

- Database backup and restore
- Database Server up gradation
- Web application statistics report

8.5.6. Technology for Development

As the Online Sales System application is a global application which is going to be used by the users belonging to various region of the world, therefore, it should be developed and designed by using some open source and platform independent technology. The following technologies are being used to develop the system according to the need.

- Microsoft Visual Web Developer 2010 Express (Free)
- C#.NET
- Asp.Net
- IIS Server.
- SQL SERVER or MySql
- Adobe Photoshop CS4 Professional

9. Fortex AB solution recommendation

This section of the thesis report provides overview of ERP (Enterprise Resource Planning) and CRM (Customer Relationship Management) solutions which are suitable for Fortex AB in accordance with the requirements gathered in previous sections. It will do small analysis and comparison among available ERP/CRM. As there are countless ERP solutions available in the market, this report will only cover solutions which are popular and widely used in market.

In this section we will also discuss different options, advantages and disadvantages of ERP solutions and few recommendations will be presented which can help Fortex AB to decide which option is more suitable for them [1,2,3].

9.1. ERP/CRM Comparison

An ERP system allows integrating technology, customer service, planning, manufacturing, finance and human resources where as CRM system helps in tracking and managing customer relations. Comparison among different available options for ERP and CRM systems is presented in section below. These options were discussed and decided with the assistance of Fortex AB. Options discussed in section are

- **In-house Development** (Development from scratch of new software)
- **OpenBravo** (ERP)
- **OpenERP** (ERP)
- **SalesForce** (CRM)
- **Compiere** (ERP)
- **Bizagi - BPM Suit** (Process Modeler)
- **Microsoft Dynamics GP**

9.2. In-House Development

In-House development means development of totally new software, which is customized build according to needs of Fortex AB. For any new software, it can take long time, repetitive and iterative bug fixing and more resource consumption. Following are few important aspects of In-House Development.

Advantages

- Software will be developed according to requirements of Fortex, which means that it would be in better position to fulfill needs of Fortex.

Disadvantages

- In-House development will take longer period of time than deployment of third party software. This can result in more resource spending.
- Quality of In-house development will be iterative, which means that it will be improved with the time. There will be bugs in start, which will need time to fix.

9.3. OpenBravo

URL: <http://www.openbravo.com/>

OpenBravo is open source ERP software. They have more than 1,000 customers all over the world. They do have large support, documentation and guides online. OpenBravo can be installed on computer, or can be used on Cloud. OpenBravo uses Linux as operating system, Postgre SQL for database, Apache Tomcat and OpenJDK.

Advantages

- This software is Open Source, which means that it will cost less if self-deployed and self-maintained.
- They have one support partner based in Sweden. They can help in deployment of OpenBravo.

Disadvantages

- Fortex will need IT resource to maintain the software. (Community Edition)
- Custom report generation (Invoice, Performa Invoice) can be difficult to customize.
- It can take up to three months to setup the working system.
- This system is Linux based, which can result in difficulty to maintain the system.

Comparison among two suitable editions of OpenBravo is provided below.

Community Edition	Professional Edition
Free	€500 to €400 /User (3 user minimum)
Self-Implementation	Business Partner Implementation
No support for anything	Support from Business Partner
No backup	Backup and Data Management
No premium feature	Premium Features Included

9.4. OpenERP

URL: <http://www.openerp.com/>

OpenERP is one of the leading Open Source software in market. They have huge support from Open Source community, documentation and partners. They have highly “Modular Approach”, which means that we can chose among different modules (Finance, HR, CRM etc.) for Fortex. It can be used “Software as Service” or installed on own server. Technology used in OpenERP is Linux, Python, PostgreSQL, and XML-RPC [4].

Advantages

- Its “Modular Approach” can help in selecting only desired features for Fortex, which will make it more easy to use.
- This software is Open Source, which means that it will cost less if self-deployed and self-maintained.
- There are two partners based in Sweden. They can help in deployment of OpenERP.

Disadvantages

- Fortex will need IT resource to maintain the software. (Community Edition)
- Custom report generation (Invoice, Performa Invoice) can be difficult to customize, they are supporting OpenOffice instead of Microsoft Office or Excel.
- It can take several months to setup the working system.

Comparison among two suitable editions is provided below.

Community Edition	From Partner (Publisher Warranty)
Free	1 800 € / Year (Up to 10 Users user)
Self-Implementation (No Support)	Business Partner Implementation (With Support)
No Backup	Backup and Data Management
Self-Hosting	Bug fixing

9.5. Salesforce

URL: <http://www.salesforce.com/se/>

This is one of the most promising, innovative and latest CRM system. It is cloud based, which means that Fortex needs just to use the system, which is already implemented, maintained and functional. They have very good portfolio, many big companies are using this product. They also support integration of addition of third-party developed applications, which means you can buy features from any other company to integrate into your Salesforce account [5].

Fortex can use their trail version for 30 days, which can help them to see the functionality of the software.

Advantages

- This system is very easy to start with. There is no need of implementation and maintenance; this is already handled by Salesforce.
- Salesforce is easy to use, secure, efficient and reliable.
- They have their office in Sweden, which can help in better support.
- Selection of custom based application is very useful. They have an application store, from where Fortex can buy application developed by third-party. (<http://sites.force.com/appexchange/home>)

Disadvantages

- This system is developed as CRM, which means managing some of ERP features can be little difficult.
- Currently, there is no support for “Finance Management”

Comparison among their two Editions is provided below.

Enterprise Edition	Unlimited Edition
125\$/User (Per Month)	250\$/User (Per Month)
Normal support	Premier 24x7 support
Space: 20 MB per user	Space: 120 MB per user
10 Customer applications	Unlimited
SB Development Acct: 10	SB Development Acct : Unlimited
Support via phone	Designated Administrator

9.6. Compiere

URL: <http://www.compiere.com/>

Compiere is Open Source, Cloud based ERP software. There are many features already defined in the software, new features can be build. It can also integrate services from third-party. They don't have impressive portfolio, and looks somewhat non-professional. Although they have nearly all functionality, but they don't have good support from community and in documentation.

That software can work both with PostgreSQL and Oracle.

Advantages

- They are Open Source and also Cloud based.
- They have a feature which can help to access system via Mobile.
- Secure, no time and cost required for implementation.
- It can also integrate third-party applications.

(<http://sites.force.com/appexchange/home>)

Disadvantages

- Not very professional, not many customers.
- No office in Sweden, Only office in USA.
- Customization of reports can be difficult.

Comparison among their two Editions is provided below.

Professional Edition	Enterprise Edition
750\$/User (Per Year)	950\$/User (Per Year)
No Web-service support	Web services support
Premium, Phone Support	Premium, Phone Support
No Management Dashboard	Management Dashboard Including

9.7. Bizagi

URL: <http://www.bizagi.com/>

This is totally new concept of generating software based on the work-flow or process-flow that companies are following. It seems very promising and unique solution. I don't have too much experience in BPM "Business Process Modeling", so I am not in

very good position to give recommendations on that. It needs to be explored further. Here are few points that I think are important to consider.

Advantages

- Not much technical skills required to manage system and modify.
- May be it will take less time for development.
- Cheaper than other solutions

Disadvantages

- Small company, not too much support available.
- Modeling of all processing, business rules can be challenging.

9.8. Microsoft Dynamics GP

URL: <http://www.microsoft.com/dynamics/en/us/products/gp-overview.aspx>

Microsoft product named "Microsoft Dynamics GP" is one of the market leaders. It has its large amount of customers all over the world. They have excellent support via documentation, phone and community based. This software can be integrated with MS Outlook, MS Excel and MS Word. They have very professional software. That software is already implemented and hosted on MS servers, all Fortex need to do is to use it (May be some customization of reports needed) [6].

According to their support center it cost about **12,000 Kr / User per Year**. Which is not yet been confirmed by Microsoft Dynamics GP.

Advantages

- Already hosted, implemented and maintained by MS.
- Developed and supported by one of the market leader Microsoft
- Office in Sweden, with multiple partners inside Sweden.
- Large and excellent support online and offline.
- Can be easily integrated with MS Outlook, MS Excel and MS Word.

Disadvantages

- Can be little expensive (I personally think it will be less expensive than Salesforce)
- May be there will be need for some customization.

10. Recommendations

Sales system is an online solution for handling orders. It provides easy and quickest way of finding and managing information related to orders. In recent days by studying and exploring different ERP/CRM systems [7, 8, 9, 10], I would like to say few words about suitable options for Fortex.

It is experienced that **SalesForce** and **Microsoft Dynamics GP** are very suitable needs of Fortex. They can be up and running very soon, they don't need too much time for customization as most of the company requirements are meet. One important aspect is that Fortex don't need too much technical know-how to manage these systems. They are already hosted and maintained by providers [5, 6].

I personally suggest Microsoft Dynamics GP for Fortex. Three important reasons to prefer **Microsoft Dynamics GP** over **SalesForce** are:

- Many of employees are already familiar with User Interfaces of Microsoft. This will make it easy for them to learn and use that software
- This software can be integrated with all the software which Fortex is currently using.
- This software is developed, designed and maintained by Microsoft. They have large Research and Development resources, which make it more promising and suitable for long term.

SalesForce is designed as CRM system, whereas Microsoft Dynamics GP is designed as ERP system for small and middle level companies which fit Fortex AB requirements [1, 11]. As company focus is on Enterprise instead of having Customer Management System. Therefore, Microsoft Dynamics GP would be the best choice for Fortex AB.

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Appendix 1

1. Specific requirements

In this section we will discuss the software requirements in detail.

1.1. Order Booking:

Use case ID	CUST0001_01	
Use case Name	Order Booking	
Actor (s)	Customer	
Description	Customer will place an order into the system.	
Preconditions	Customer should be on the "Start Page".	
Flow of Events		
Line	Actor Action	System Response
1	User clicks on "Place Order" link on the "Start Page".	System displays a form to be filled.
2	User enters the information in the form and clicks "Register Order" button.	System validates the user information and save the new order information into the system.
Post conditions	Customer order is saved.	
Alternative Flow 1		
At line 1 Customer Clicks on cancel button.		
Line	Actor Action	System Response
1A	Customer clicks on cancel button.	System will take the user to Start page.
Post conditions	User will be taken to some other section of the System.	
Alternative Flow 2		
At line 2 Customer enter invalid data in the form.		
Line	Actor Action	System Response
2A	Customer enters data in correct format	System validates the data.

1.2. Inquire about Order:

Use case ID	CUST0001_02	
Use case Name	Inquire Order	
Actor (s)	Customer	
Description	Customer will be able to view his/her order details.	
Preconditions	Customer should be on the "Start Page".	
Flow of Events		
Line	Actor Action	System Response
1	User clicks on "Order Inquire" link on the "Start Page".	System ask for Order No.
2	User enters the Order No. and clicks "View" button.	System validates the customer Oder No. and displays the related order information.
Post conditions	Customer order information is displayed.	
Alternative Flow 1		
At line 1 Customer Clicks on cancel button.		
Line	Actor Action	System Response
1A	Customer clicks on cancel button.	System will take the user to Start page.
Post conditions	User will be taken to some other section of the System.	
Alternative Flow 2		
At line 2 Customer enter invalid Order No.		
Line	Actor Action	System Response
2A	Customer enters in correct order no.	System validates the data. And move to Start page.

1.3. Create New Order

Use case ID	ACTM0001_01	
Use case Name	Create Order.	
Actor (s)	Account Manager	
Description	Account Manager will be able to create a new order in the system.	
Preconditions	User should be on the Home Screen of the system.	
Flow of Events		
Line	Actor Action	System Response
1	User clicks on "Create New Order" link on the "Home Screen".	System opens a form.
2	User enters the Order information and clicks "Save" button.	System validates the Order information and Save the new order information.
Post conditions	Order information is stored into the system.	
Alternative Flow 1		
At line 1 Customer Clicks on cancel button.		
Line	Actor Action	System Response
1A	Customer clicks on cancel button.	System will take the user to Home Screen.
Post conditions	User will be taken to some other section of the System.	
Alternative Flow 2		
At line 2 Customer enter invalid information.		
Line	Actor Action	System Response
2A	Customer enters in correct order information.	System validates the data. And highlight the invalid information.

1.4. View Order Status

Use case ID	ACTM0001_02 / CUST0001_03	
Use case Name	View Order Status	
Actor (s)	Account Manager / Customer	
Description	User will be able to view customer order status.	
Preconditions	User should be on the Home Screen of the system.	
Flow of Events		
Line	Actor Action	System Response
1	User clicks on "View Order Status" link on the "Home Screen".	System ask for the Order No.
2	User enters the Order No. and clicks "View" button.	System validates the Order No. and displays the Orders current status in the system.
Post conditions	Order is Completed/ Pending/ In process/ Rejected / Approved.	
Alternative Flow 1		
At line 1 User Clicks on cancel button.		
Line	Actor Action	System Response
1A	User clicks on cancel button.	System will take the user to Home Screen.
Post conditions	User will be taken to some other section of the System.	
Alternative Flow 2		
At line 2 Customer enter invalid Order No.		
Line	Actor Action	System Response
2A	Customer enters in correct order No.	System validates the data. And display invalid Order No. and takes the user back to Home Screen

1.5. Confirm Order

Use case ID	ACTM0001_03	
Use case Name	Confirm Order.	
Actor (s)	Account Manager	
Description	Account Manager will be able to confirm the order.	
Preconditions	User should be on the "Pending Order" screen of the system.	
Flow of Events		
Line	Actor Action	System Response
1	User clicks on one of the pending Order on the "Pending Order" screen.	System displays all the information related to the particular order.
2	User may edit order information and click "Approve Order" button.	System validates the Order information and Save the order status as Approved.
Post conditions	Order status is set to be approved.	
Alternative Flow 1		
At line 1 User Clicks on reject button.		
Line	Actor Action	System Response
1A	User clicks on reject button.	Order status is set to be rejected and system will take the user to the Home Screen.
Post conditions	User will be taken to some other section of the System.	
Alternative Flow 2		
At line 2 User click on cancel button		
Line	Actor Action	System Response
2A	User Clicks on the Cancel button	System doesn't change the order status and takes the user to Home Screen.

1.6. Generate Pro-forma Invoice

Use case ID	ACTM0001_04	
Use case Name	Generate Pro-forma Invoice.	
Actor (s)	Account Manager	
Description	Account Manager will be able to generate pro-forma invoice.	
Preconditions	User should be on the "Orders" screen of the system.	
Flow of Events		
Line	Actor Action	System Response
1	User clicks on one of the preview pro-forma invoice on the "Orders" screen.	System displays all the information related to the particular order pro-forma invoice.
2	User may edit information and click "Generate pro-forma Invoice" button.	System validates the information. Save the changes done and generate the pro-forma invoice (pdf, word doc, print, xml, etc.)
Post conditions	Pro-forma invoice related to particular order will be generated.	
Alternative Flow 1		
At line 1 User Clicks on cancel button.		
Line	Actor Action	System Response
1A	User clicks on cancel button.	System will take the user to the "Home Screen".
Post conditions	User will be taken to some other section of the System.	

1.7. View/Edit Customer Details

Use case ID	ACTM0001_05	
Use case Name	View/Edit Customer Details.	
Actor (s)	Account Manager	
Description	Account Manager will be able to view/edit customer information.	
Preconditions	User should be on the “Customers” screen of the system.	
Flow of Events		
Line	Actor Action	System Response
1	User selects the customer and click “View” button.	System displays all the information related to the particular customer.
2	User may edit customer information and click “Save” button.	System validates the Customer information and Save the information into the system.
Post conditions	Customer information is updated.	
Alternative Flow 1		
At line 1 User Clicks on cancel button.		
Line	Actor Action	System Response
1A	User clicks on Cancel button.	System doesn’t change the Customer information and takes the user to Customer Screen.
Post conditions	User will be taken to the Customers Section of the system.	
Alternative Flow 2		
At line 2 User enter invalid information.		
Line	Actor Action	System Response
2A	User enter invalid customer information	System highlights the invalid information. And doesn’t make any changes into the customer information.

1.8. Generate Customer Invoice

Use case ID	FNDEP0001_01	
Use case Name	Generate Customer Invoice.	
Actor (s)	Finance Manager	
Description	Finance Manager will be able to generate invoice for the customer.	
Preconditions	User should be on the “Home Screen” of the system.	
Flow of Events		
Line	Actor Action	System Response
1	User clicks on “Create Customer Invoice” button.	System asks for the customer’s order number.
2	User may edit information and click “Generate Customer Invoice” button.	System validates the information. Save the changes done and generate the Customer invoice (pdf, word doc, print, xml, etc.)
Post conditions	Customer invoice related to particular order will be generated.	
Alternative Flow 1		
At line 1 User Clicks on reject button.		
Line	Actor Action	System Response
1A	User clicks on cancel button.	System will take the user to the “Home Screen”.
Post conditions	User will be taken to some other section of the System.	

1.9. Validate/Confirm Invoice

Use case ID	FNDEP0001_02	
Use case Name	Validate/Confirm Invoice.	
Actor (s)	Finance Manager	
Description	Finance Manager will be able to confirm the order invoice.	
Preconditions	User should be on the "Orders" screen of the system.	
Flow of Events		
Line	Actor Action	System Response
1	User clicks on one of the "Order Invoice" button.	System displays invoice related to the particular order.
2	User may edit invoice information and click "Approve Invoice" button.	System validates the invoice information and Save the information into the system.
Post conditions	Order status is set to be approved.	
Alternative Flow 1		
At line 1 User Clicks on cancel button.		
Line	Actor Action	System Response
1A	User Clicks on the Cancel button	System doesn't change the invoice information and takes the user to Orders Screen.
Post conditions	User will be taken to some other section of the System.	

1.10. Pro-forma invoice and Packing List

Use case ID	FNDEP0001_03	
Use case Name	Pro-forma invoice and Packing List	
Actor (s)	Finance Manager	
Description	Finance Manager will be able to cross check and approve pro-forma invoice and packing list.	
Preconditions	User should be on the "Orders" screen of the system.	
Flow of Events		
Line	Actor Action	System Response
1	User clicks on one of the preview pro-forma invoice on the "Orders" screen.	System displays all the information related to the particular order pro-forma invoice.
2	User click on "Packing List" button for that particular orders pro-forma invoice.	System checks for the Packing list information and display, if any information is found.
Post conditions	Pro-forma invoice and Packing list related to particular order is displayed.	
Alternative Flow 1		
At line 1 User Clicks on Cancel button.		
Line	Actor Action	System Response
1A	User clicks on cancel button.	System will take the user to the "Home Screen".
Post conditions	User will be taken to some other section of the System.	

1.11. Manage/Validate Customer Payments

Use case ID	FNDEP0001_04	
Use case Name	Manage/Validate Customer Payments	
Actor (s)	Finance Manager	
Description	Finance Manager will be able to Manage and validate customer payments.	
Preconditions	User should be on the “Customers” screen of the system.	
Flow of Events		
Line	Actor Action	System Response
1	User selects the customer and click “View Payments” button.	System displays all the information related to the particular customer payments (order wise).
2	User may edit payment information and click “Save” button.	System validates the payment information (Receive date, due date, etc.) and Save the information into the system.
Post conditions	Customer information is updated.	
Alternative Flow 1		
At line 1 User Clicks on Cancel button.		
Line	Actor Action	System Response
1A	User clicks on Cancel button.	System doesn’t change the Payment information and takes the user to Customer Screen.
Post conditions	User will be taken to the Customers Section of the system.	
Alternative Flow 2		
At line 2 User input invalid payment information		
Line	Actor Action	System Response
2A	User enter invalid customer information	System highlights the invalid information. And doesn’t make any changes into the payment information.

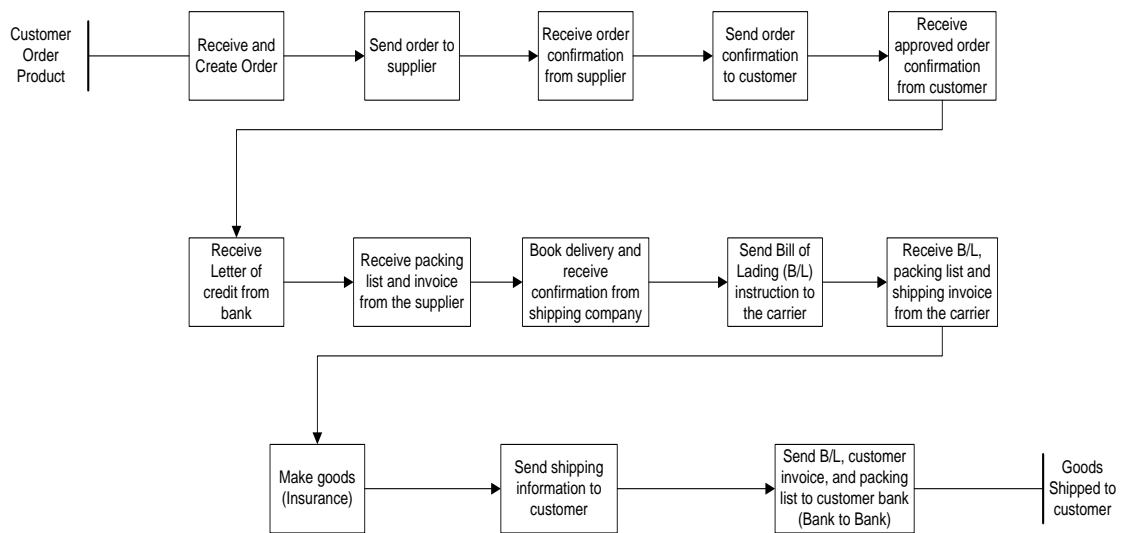
1.12. Change Order Status

Use case ID	FNDEP0001_05	
Use case Name	Change Order Status	
Actor (s)	Finance Manager	
Description	User will be able to change the order status to complete/need attention/waiting.	
Preconditions	User should be on the Orders Screen of the system or at the Home Screen	
Flow of Events		
Line	Actor Action	System Response
1	User clicks on "View Order Status" link on the "Home Screen" or "Order Screen".	System ask for the Order No.
2	User enters the Order No. and clicks "View" button.	System validates the Order No. and displays the Orders current status in the system.
3	User changes the status of the order to complete/need attention/waiting.	System saves the status of the Order.
Post conditions	Order is Complete/need attention/waiting.	
Alternative Flow 1		
At line 1 User Clicks on cancel button.		
Line	Actor Action	System Response
1A	User clicks on cancel button.	System will take the user to Home Screen or Order Screen.
Post conditions	User will be taken to some other section of the System.	
Alternative Flow 2		
At line 2 Customer enter invalid Order No.		
Line	Actor Action	System Response
2A	Customer enters in correct order No.	System validates the data. And display invalid Order No. and takes the user back to Home Screen or Order Screen

Appendix 2

2. Process Map

Process Model (Order) – Fortex AB



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