

Clampx Active Restaurant Manager

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Certificate of Approval

It is certified that the work contained in this project entitled

Clampx Active Restaurant Manager

Was carried out by Muhammad Usman Mansha, Yousef Khan and Dil Muhammad under our supervision and in our opinion it is fully adequate in scope and quality and has been found satisfactory for the degree of Bachelors in Information Technology

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DEDICATION

To Allah the Almighty

&

To our Parents and Faculty

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We are deeply thankful to our Advisor and Co-Advisor, Mr. Bilal Ali Rizvi and Mr. Muhammad Bilal for helping us throughout the Final Year Senior Design Project course in accomplishing our final year project. Their guidance on each step during FYP, their support at every point of time and their motivation enabled us and guided us in the achievement of the objectives of the project.

ABSTRACT

Clampx – ARM (Clampx Active Restaurant Manager) is a solution to the major problems in management of restaurant industry. Restaurant industry is one of the most profitable businesses in Pakistan. Restaurants are often very large sized or there are many branches of them, which makes it difficult for owners to manage their daily sales and inventory. There is no such automated system available in Pakistan to manage sales and inventory, where there is a system calculating inventory left, based on sales of recipes up to more grained level.

Most of the restaurants are using only Point of Sales while others may use systems to manage sales and inventory but both are distinct applications with different method of calculation of daily transactions and different results at the end of the day. This solution is an integrated system for sales and inventory calculating daily cost based on sold inventory i.e. cost of each ingredient in a recipe up to grams level for cost of that duration, also showing the actual inventory left and precise profit calculation.

This ultimate objective of this product is to automate restaurants Inventory and Sales Management problems and will provide an integrated solution for managing restaurant in Pakistan.

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List of Abbreviations

ARM	Active Restaurant Manger
ADF	Application Development Framework
XML	Extensible Markup Language
BC	Business Component
JSF	Java Server Faces
POS	Point of Sales
POI	Point of Inventory

1 INTRODUCTION

1.1 INTRODUCTION

This chapter focuses on the significance of the complete system for managing daily transaction at restaurant, some available systems, problem statement, scope of the project, objectives and technologies used in the project.

1.2 PREFACE

Restaurant industry is one of the most popular and well-known industries especially in Pakistan. Having a glance over the surroundings and we can see number of successful Restaurants. This business grows rapidly and is also most profitable if successful. As the business grows each restaurant needs an automated system, which should take the sales and inventory in to account. There should be a system, which should manage sales feature so that manager or owner can make complete analysis on sales daily, monthly or even yearly. Besides this, there is another important factor in this business; there is a need to keep the track of the entire inventory needed, used and available. As on the large scale it becomes impossible to track the whole inventory manually. The large Restaurants have number of recipes and dishes on the daily basis, so no one can take care of each ingredient used in any recipe manually. There should be a system, which should simplify and manage all the above issues so that the owner will be well aware of his business to be more successful.

1.3 PROBLEM

As discussed above, the restaurant industry is growing, which makes it little difficult to manage. The owners need complete and robust solutions to the problems they face in managing their business like manage inventory in an efficient and profitable manner, also tracking of the sales on daily basis more efficiently. Managing the inventory often becomes a headache and also create

problems. The approach being used by the solution providers for managing inventory is not very helpful in this regard.

1.4 PROPOSED SOLUTION

In legacy restaurant management systems, we have the calculation of inventory individually at point of inventory and sales in point of sales. Unlike those C-ARM is the system having integrated POS and POI. Each sale transaction will be adding an entry of a sold recipe menu item and simultaneously it will add to the inventory used at gram level of all the ingredients at individual level.

Now, at the end of the day when a owner will generate a report, he'll be finding exactly the same inventory left in inventory store as it being shown by the system. The system will show exactly the precise grams of an ingredient as precise the recipe saved in the system.

At the end of the day, the owner will be able to get the following benefits:

- Increase the profitability by reducing the theft of inventory
- Get the printed sales bills
- Get the report in .pdf as well as in printed form and can easily analyze the trends of inventory used and menu items more popular
- Get notified for the inventory item shortage
- Get notified when a particular menu item gets out of the profit margin
- Will be able to set justifiable profit margin by getting instant trend of ingredient prices variation that is/not affecting the overall profit

1.5 PROJECT SUCCESS CRITERIA

In this project as we mainly focusing on the problems of restaurant industry, the success of the project will be the level of the solution going to be provided. We need to make the system simple and integrated and put precise calculations to provide easy and correct results.

1.6 PROJECT OVERVIEW

This is a broad solution to the problems we found by visiting different restaurants like Savour Foods, Des Pardes Restaurant, Dreamland Motel and Sooper Grill Restaurant.

In legacy restaurant management systems, the owners have to use two distinct systems:

- Point of Sales
Manages sales and generate sales reports
- Point of Inventory
Management of inventory, keep track of inventory in hand and reports of inventory used

Now, we are going to integrate both the systems to get precise results by integrating both the systems. Inventory in hand will be deducted on the sale of one dish which means we will have exactly the same inventory left in the report generated by point of inventory as much we have sold.

Now, there might be different cases like we used some of the food that is not sold: is used for let say manager or some employee or guest, so we will add an option of miscellaneous usage. So there will be no effect on the inventory.

1.7 PROJECT SPECIFICATION:

Talking about the specification of our application, first of all it is a web based application and will run in browser. The preferred browser is Mozilla Firefox. The application will be deployed on a computer or a server machine

User will login first of all with the credentials (Username, Password). Login and authorization process is based on standard Java Authentication is based on Java Authentication and Authorization Service (JAAS).

After successful login, user will get the option he is allowed to do. All these menus and operations will be based on Role and group of the user. Now, talking

about different privileges, let say if a user has access to Point of Sales option, he will only see the menus of Sales part. He can add a sale only if he has access too. Similarly for deleting or updating a sale the user needs permissions

There will be a role of the owner as well manager for Point of Sale, Manager for Point of inventory etc. These entire users will have there own privileges and access rights.

Now, adding a sale to the system will add a new sale as well as simultaneously deduct the inventory from inventory in hand, which will definitely give us the remaining inventory at the end of the day.

Owner will able to get the detailed printed list of the sales and inventory deduction on need.

The idea is lot wider and some interesting parts are left for future work, so that we keep working on them in future to produce a big full fledge application to bring something new and simpler for managing restaurants. Plan consists:

- POS (Point of Sales)
- POI (Point of Inventory)
- Mobile based ordering (Table tablets/phones)
 - It is the part of the idea but not in the current scope. Will be designed as a future work for our company's product.

1.9 SCOPE

Following are minimum requirements in term of scope of our system:

- Meta Framework
- Point of Sales
- Point of Inventory
- All the application should be developed following the standards of ADF and Oracle.

1.10 OBJECTIVES

Following are the objectives of our system:

- Performance of the system, it should be user friendly in terms of usage and response
- User friendly in terms of display ad icons
- User should be having access to only those menus he has privilege for or the group has privilege to which this user belongs
- There should be help available to use the system

1.11 PROPOSED PRODUCT COMPONENTS

Following are the main components of ARM:

- ADF Security
- Meta Framework
- Menus and Options based on User privileges
- Point of Sales
 - a. Add / Delete / Update new Ingredient
 - b. Add / Delete / Update Menu Items
 - c. Print the receipt
 - d. Print the reports of a duration
- Point of Inventory
 - a. Add / Delete / Update Inventory
 - b. Print the reports

1.12 INTRODUCTION TO TOOLS & TECHNOLOGIES USED

1.12.1 Oracle JDeveloper 11g Release 2

Oracle JDeveloper is a free integrated development environment that simplifies the development of Java-based Service oriented Architecture (SOA) and Java EE (J2EE) applications. JDeveloper offers complete end-to-end development to Oracle Fusion Middleware and Oracle Fusion Applications with support for the full development life cycle.

1.12.1.1 Features:

Major features of Oracle JDeveloper release 2 are:

- Integrates enterprise development environment
- Visual and declarative editors
- Complete development lifecycle coverage
- Built in development framework
 - ADF stands for Application Development Framework on top of JSF
- Advance features of Java like:
 - Web Services
 - Service Oriented Architecture
 - Web Development

1.12.1.2 Benefits:

Major benefits of Oracle JDeveloper release 2 are:

- Increase development productivity
- Simpler tooling portfolio
- Self Contained
- Free development and Available for all platforms

Oracle JDeveloper covers the full development lifecycle from initial design and analysis, through the coding and testing phases, all the way to deployment.

Let us talk about the available resources and the forums for the tool we are discussing:

- **Resources:** <http://www.oracle.com/technetwork/developer-tools/adf/learnmore/index-101235.html>

The ADF Community, comprehensive Documentation, free step-by-step collection of tutorials and code snippets those made freely available by ADF users all help users to stay motivated, jump hurdles, and learn about crucial shortcuts and optimizations in ADF development.

- **Question Answer Community:** <https://forums.oracle.com/forums/> is created where developers ask question which are either answered by other people working with different oracle technologies or by the Oracle staff. Most of the time we don't even have to ask the question as the problems we face have already been asked and seen to. This discussion forum also named as OTN Discussion Forums

1.12.2 Oracle Weblogic Server 11g

Oracle WebLogic Server is one of the industry's best application server for building and deploying enterprise Java EE applications. These deployments are done with the support for new features for lowering cost, improvement of performance, enhancing scalability and supporting the Oracle Applications portfolio.

1.12.2.1 Features:

Main features of Weblogic server are:

- Flexible in downloading and installations
- Implementation of Java standards
- Better performance as compared to other application servers available
- Good user interface

1.12.2.2 Benefits:

Benefits of Weblogic server are:

- User can install only the required part
- Compatible and interoperable
- Simplified mechanism
- Good security mechanism based on realms

1.12.3 Oracle Database Express Edition 11g Release 2:

1.12.3.1 Features and Benefits:

Oracle express edition is:

- Administer the database (Oracle XE)
- Create tables, views and other database objects
- Import, export and view table data
- Run queries and generate SQL scripts
- Generate reports

1.13 CONCLUSION

Oracle technologies and tools are being used for the execution of this project are very helpful tools and easy to develop using them as lot of resources and code snippets with snapshots are available. Therefore, it is a very easy to learn and use product as compared to other Java EE tools available.

2 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter focuses on the emphasis of some of the existing Point of Sales used by different restaurants, some other general-purpose point of sales, which are the alternatives of POS. Also we will be discussing some point of inventories.

We will discuss the advantages and disadvantages (Pros and Cons) of these systems.

2.2 BACKGROUND

Restaurant industry is one of the most popular and well-known industries especially in Pakistan. Having a glance over the surroundings and we can see number of successful Restaurants. This business grows rapidly and is also most profitable if successful. As the business grows each restaurant needs an automated system, which should take the sales and inventory in to account. There should be a system, which should manage sales feature so that manager or owner can make complete analysis on sales daily, monthly or even yearly. Besides this, there is another important factor in this business; there is a need to keep the track of the entire inventory needed, used and available. As on the large scale it becomes impossible to track the whole inventory manually. The large Restaurants have number of recipes and dishes on the daily basis, so no one can take care of each ingredient used in any recipe manually. There should be a system which should simplify and manage all the above issues so that the owner will be well aware of the his business to be more successful

In the very beginning when the restaurant started, data is not stored to calculate sales and purchases. It was roughly estimated. But later on when the restaurant industry started to grow, the importance of data increased. Owners felt that they should save data for business analysis and for future decisions. They started to save data on paper. They performed manual calculations to analyze the sales and purchases. Later on with the evolution of technology, people started to save data in other manners e.g. in text files, excel sheets etc. With sudden growth of human-computer interaction, software are replacing human efforts. Computer also played an important role in the development of restaurant industry. But now manual storage of sales and purchases is avoided. Owners and managers want that they should be able to see the status of sales and purchases just with one click. They may be interested to see details of a specific order or in a report generation.

There are number of Restaurants in which POS is currently in use. POS is very common in Pakistan not only in Restaurants but also in stores and marts etc. Also there are many open and free POS systems available over the internet like copper and unicenta. At most of the places, excels sheets are very common for the sales record but this is kind of manual representation which is static way of showing information. Any change or update needed is much difficult and problem creating in excel sheets. But still this way is much conventional than total manual systems where there is no way to change or find the specific data.

Then there is Restaurant Inventory Control System that is known as Point of Inventory. This feature counts on inventory on ingredients and recipe level. Each recipe or dish may contain number of ingredients in it; also system will have knowledge about the inventory before and after the recipe gets ready. In this way system will have complete knowledge of inventory used in each recipe, available inventory and used inventory. There will be proper synchronization of the actual inventory available and the inventory shown by the system. In this way there will be no loss of inventory because system may check at ingredient level. Internationally this feature has significant importance but locally (in Pakistan) this is not available.

2.3 TOP COMPETITORS – POS

There are a lot of systems available; we will be discussing a few of them we have seen while surveying the market.

2.3.1 Milestone – Billing and Reservation System

This system is being used by Dreamland motel. We have checked this system as well as took some snapshots of it. It is a system basically used only for the sales and reservation purposes. This system is not complete in terms of functionality enough that dreamland owners rely more on manual entries.

Point of Sales running in this Restaurants has some problems like serial number problem like when the two slips of the same order are drawn, the system counts these as two orders which is a serious bug in system and this flaw may lead to wrong end result and conclusion of sales. It means that when the order is placed uniquely then analyzing that order multiple times should not change actual data.

Following is the snapshot of the system we are discussing:



Figure 2-1 - Milestone Solution for Dreamland Motel

Following is the snapshot of “Food Bill Form” in milestone solution

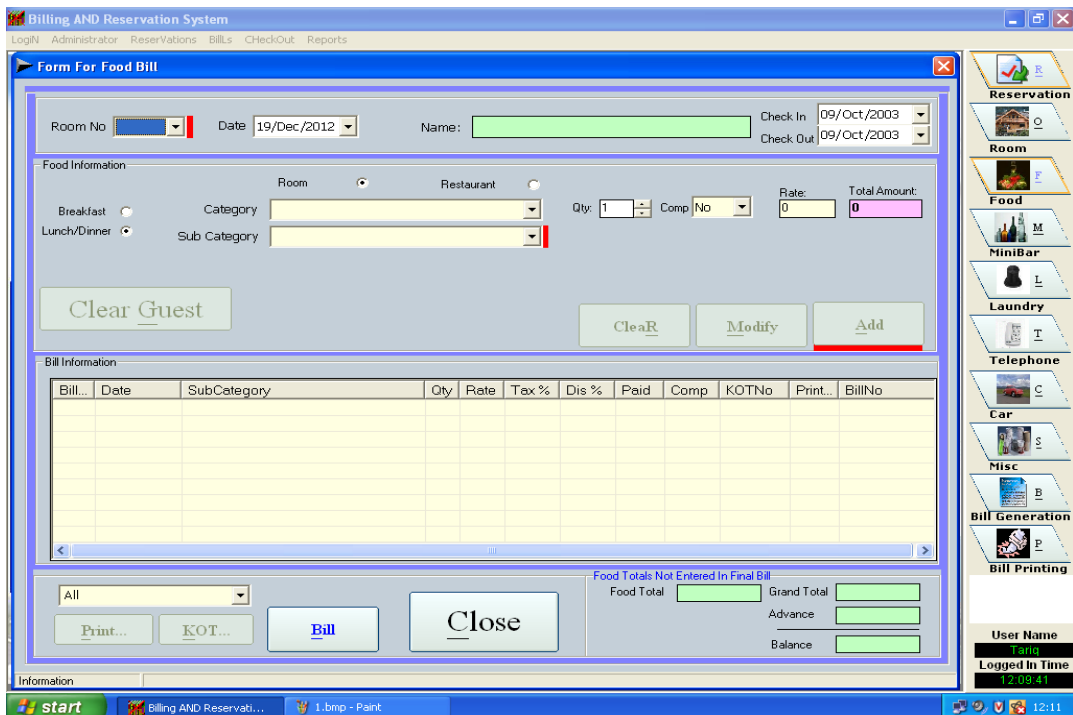


Figure 2-2 - Milestone Solution Food Bill Form

2.3.2 Unicenta

Unicenta is a freely available and open source POS. It is touch screen based POS and can run on different platform like Windows, Linux and Mac OS X. It is also available for Android and iPhone.

<http://www.unicentaopos.co.uk/>

2.3.3 Copper

Copper point of sales (POS) provides sales management for different businesses with a cash register system. This cash register system stores product information, makes the checkout process lot quicker and also more accurate for customers and records.

- Easily record sales transactions
- Print receipts for customers
- Manage product pricing and discounts

Copper point of sale is easy to navigate, and is also compatible with touch screen terminals and also with barcode scanners, helping users in saving time.

2.3.4 RM POS (Restaurant Management Point of Sales)

This system have a number of modules, all these are POSs

- Table Service POS
- Bar POS
- Quick Service POS
- Pizza and Delivery POS

<http://www.rmpos.com/>

These modules can be bought together but still we can easily note that all these are again just sales part.

2.3.5 Conclusion

There are a lot of systems available to manage sales, but no system available so far, which is specifically integrated with backend inventory calculation.

So we need a system, which saves the sales, generates reports as all the above-mentioned systems do but at the same time there is a need of system, which will be integrated with sales and will give the results of inventory by deducting the inventory on ingredient level of each sale.

So, we desperately need a system having following problems solved:

POS (Point of Sales):

There is a need of efficient, user friendly and flawless Point of Sales where all the sales work should be handled. The POS should be efficient enough to count on daily sales so that at the end of day or a month or a year the manager or owner should see the ups and downs in sales. The format of the information should be easy to understand and there should not be any kind of flaw.

Stop Inventory Theft:

There will be proper count over inventory used and inventory available so that there will be no inventory theft. At large scale this is very important feature because this feature can increase lot of profitability in business.

2.4 RELATED TOOLS AND TECHNOLOGIES

There are many related alternatives to JDeveloper and ADF, which could have been used to make this product instead. This portion is to reveal the Why's and Why not's of other tools and technologies.

2.4.1 JSF – Framework (Technology)

JSF stands for Java Server Faces. JSF is rich featured framework for Java EE technology.

JSF is a framework that could have been used for the development of this product. Following are the major features of JSF

Major Features:

- JSF is standard web user interface framework for Java.
- Built on top of Servlet API.
- JSF is a component framework
- UI components are stored on the server.
- Easy use of third party components.
- Event driven programming model.
- Events generated by user are handled on the server.
- Navigation handling.
- Can automatically synchronize UI components.
- JSF supports multiple client devices.
- JSF has extensible architecture.
- International language support.
- Extensive tool support (Sun, Oracle, IBM etc.).
- Rapid application development approach.

2.4.2 Netbeans & Eclipse – IDEs (Tools)

Netbeans and Eclipse are the two alternate IDEs for the Java EE web application development but both of these tools are not as robust and user friendly so talking about tool while working on ADF there is only tool that can be used is JDeveloper.

2.5 WHY ADF? – TECHNOLOGY (CONCLUSION)

High-level features of Oracle Application Development Framework and why we preferred it over JSF is listed below:

- ADF is a high level framework over JSF. It has a set of new and richer JSF components
- One of the major changes in flow of application is, in ADF we moved from page flows to process flows
- Introduced data bindings, simpler and easier
- Application development made simple, no need of writing much code

2.6 WHY JDEVELOPER? – TOOL (CONCLUSION)

High-level features of JDeveloper IDE are:

Java Edition	Java EE	Studio Edition
Java SE 6 Support	JSP	ADF Data binding
Code Editor	Struts	ADF Faces
Code Navigation	JSF	ADF Faces Skin Editor
Refactoring	JSF 2.0	ADF Mobile
Swing	Facelets	ADF Business Components
Unit Test	EJB	ADF Swing
Version Control	TopLink	ADF Deployment
Audit & Metrics	Web Services	BPEL Designer
Debugging	Restful Web Services	ESB Designer
Profiling	UML	Portlet Development
Ant Support	Database Development	Portlet/JSF Bridge
Maven Support	Deployment management	and Oracle BI
XML Support	Hudson	

3 Methodology

3.1 INTRODUCTION

In this chapter the system's architecture and sequence of activities in the system have been explained. This chapter gives description of methodology and system implementation overall as well.

3.2 PROCESS

The general process and sequence of tasks for adding new menu item and then selling it is as follows:

Step 1: Add new ingredients. All those ingredients that are possible to be used in any menu item /dish/recipe.

Step 2: Add new recipe, using all those existing ingredients and add quantity of each ingredient as well as the overall profit margin that is minimum to be achieved.

Step 3: After adding new menu item with its price set, we just need now to sell it at POS

Step 4: When a single or multiple menu items are sold, the quantity of each ingredient supposed to be used in that quantity will be subtracted from the total existing inventory

Step 5: Generate reports for getting the list of daily sales and daily inventory deduction and additions to get exact inventory in hand

3.3 SYSTEM ARCHITECTURE

The above mentioned and described sequence of tasks is the description of two integrated modules:

- POS (Point of Sales)
- POI (Point of Inventory)

Before completing these two sub systems as we followed the product level approach, so we build a meta-framework for the purpose of populating all the menus (these menus are not the menu items of food, these are the menus that are to be shown on pages of the whole application)

This meta-framework is database driven approach of authentication and authorization purposes. We will be discussing it in detail below.

3.3.1 Meta Framework:

The Entity Relationship Model also known as ERD used for the Meta Framework for Menus based on User's Authorization is shown below:

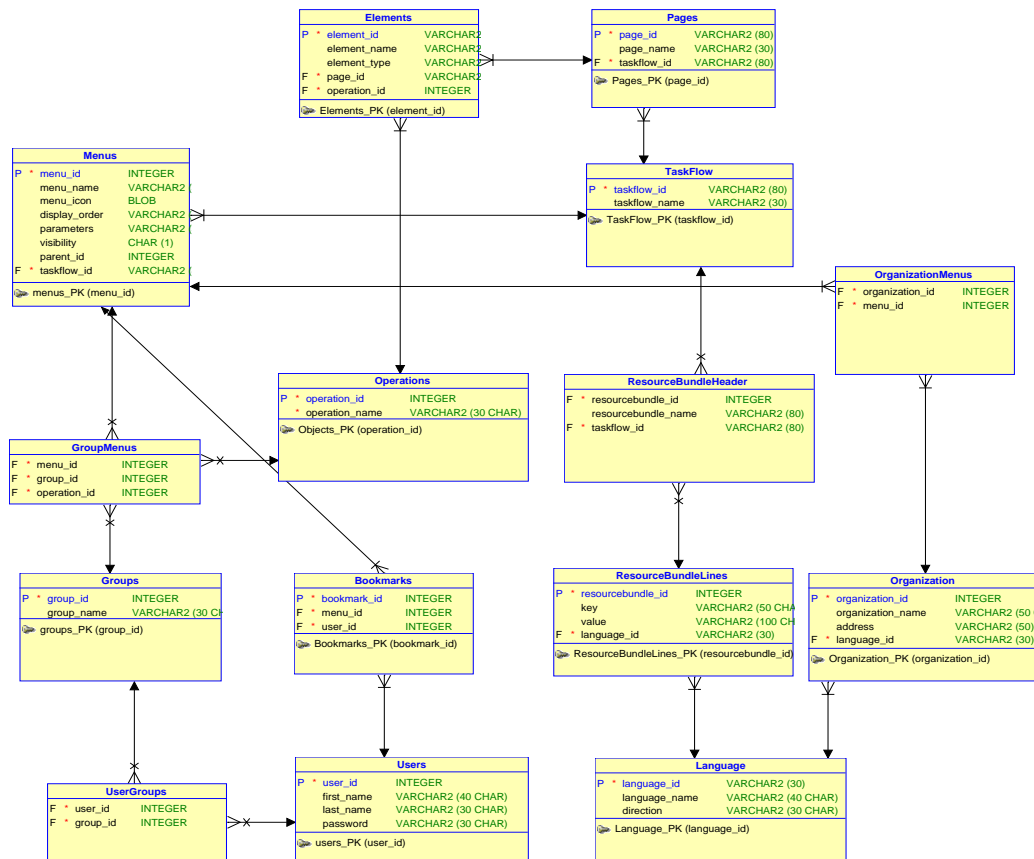


Figure 3-1 - Meta Framework Entity Relationship

First of all we have Users of the system registered and stored in the database. Each user belongs to a Group. Now, we have stored all the Menus of the system in the database which we fetch at the time when required

3.3.2 Architecture of ADF Application:

Architecture of an ADF Web application is:

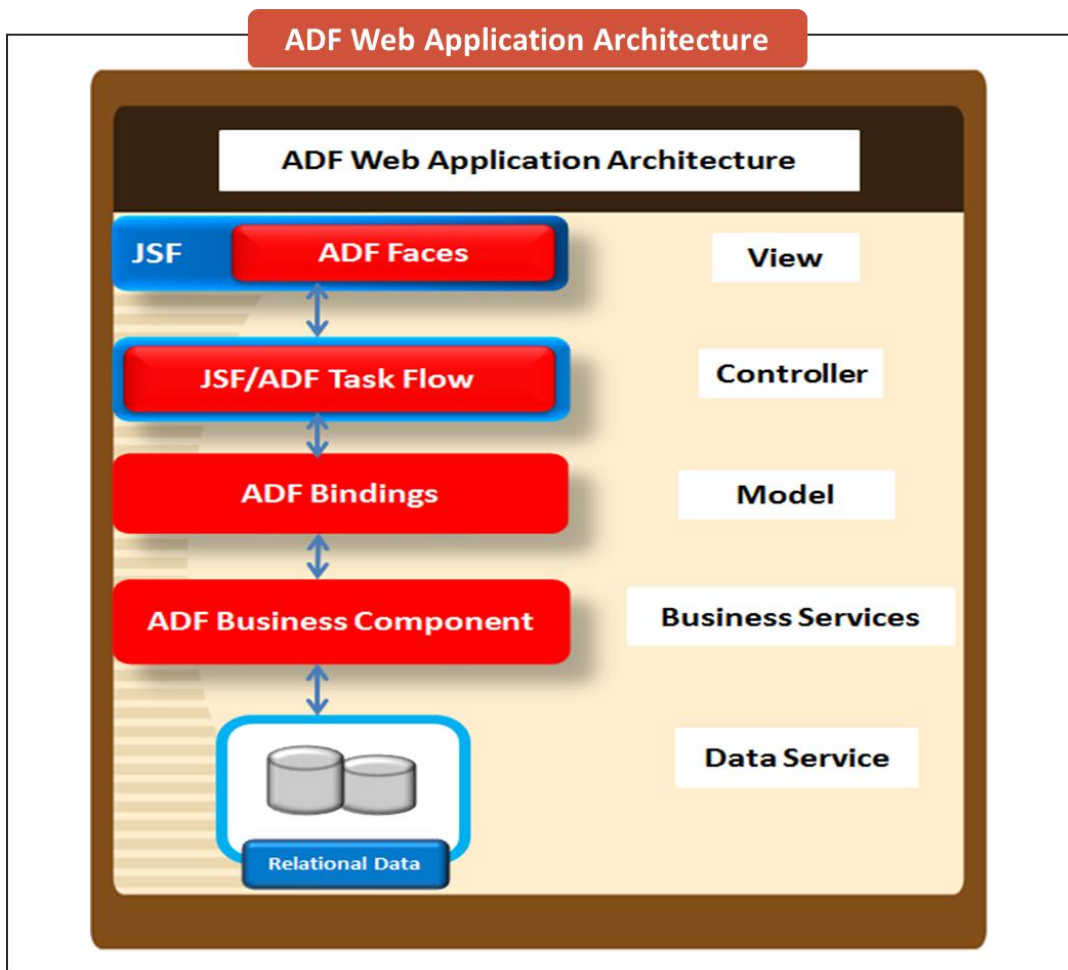


Figure 3-2 - ADF Web Application Architecture

Above diagram is to give a broader idea of an ADF application as a whole. Let us discuss these 5 main items clearly reflected by the above diagram in detail:

3.3.2.1 View:

An ADF application might be desktop application, mobile application or web-based. Our application is a web-based application as we talked about it earlier. The views are the web pages that are either JSF pages or ADF faces.

3.3.2.2 Controller:

We discussed while the discussion about our framework that it is build on the top of JSF, so in this layer we define controllers to handle our functionality which are JSF controllers and on top of them ADF controllers.

3.3.2.3 Model:

ADF gives us concept of binding where we can easily bind entities to pages (views). It is entirely a new concept and came under the heading of Model in our web based ADF application

3.3.2.4 Business Services:

ADF Business Components / Services and JDeveloper (The Tool) simplify the development, delivery, and customization of business applications for the Java EE platform. Using ADF Business Services (Components), the developers now aren't required almost nothing to write the application infrastructure code required by the typical Java EE applications. The tasks that we can perform without writing any code are:

- Connect to the database
- Retrieve data
- Lock database records
- Manage transactions

3.3.2.5 Data Services:

Data Services are the provider of data when needed; the data service we are using is the database data service. Other data services include web services returning results in any type of XML like JSON or KML etc.

The Oracle Fusion technology stack includes a concept of Active Data Service (ADS), which is basically a server-side push framework. It allows developer the facility where developer needs to provide real-time data updates for ADF Faces components. He / She can bind ADF Faces components to a data source and ADS pushes the data updates to the browser client. Now, in this case the browser client doesn't require to explicitly requesting for it

The application as a whole is named as ARM

We will be discussing the architecture in more details as follows with using a diagram that clearly shows the type of available Views, Models, and Data Services etc. also highlighting those we are using in our application.

The diagram of detailed ADF Application architecture is shown below:

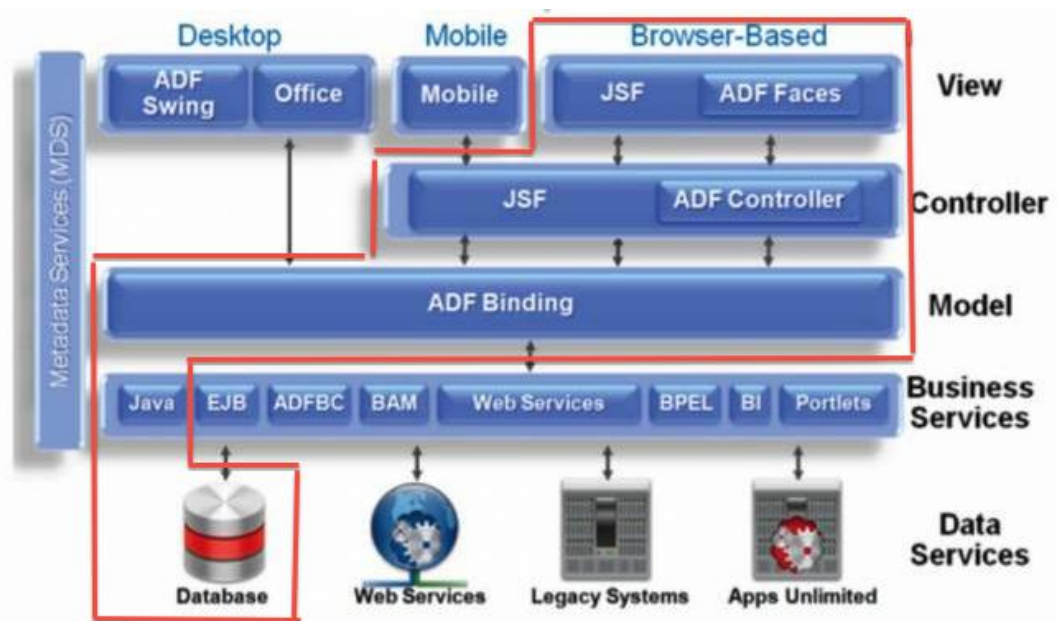


Figure 3-3- Detailed ADF Application Architecture

Highlighted is the part of architecture we have followed for our application. An ADF application is a broader term, having three major types of applications.

- Desktop
- Mobile
- Web or Browser-based

3.3.3 ARM Application & System Architecture:

ARM Application Architecture as the heading mentions refers to different layers our application is divided into and their relationship. It is simple to understand the flow of application while following Oracle specifications.

System architecture refers to the components of application and their mutual relationship. Unlike Application Architecture it is more towards the flow between the modules instead of the flow between the layers.

Diagrams of Application and System Architecture are shown below:

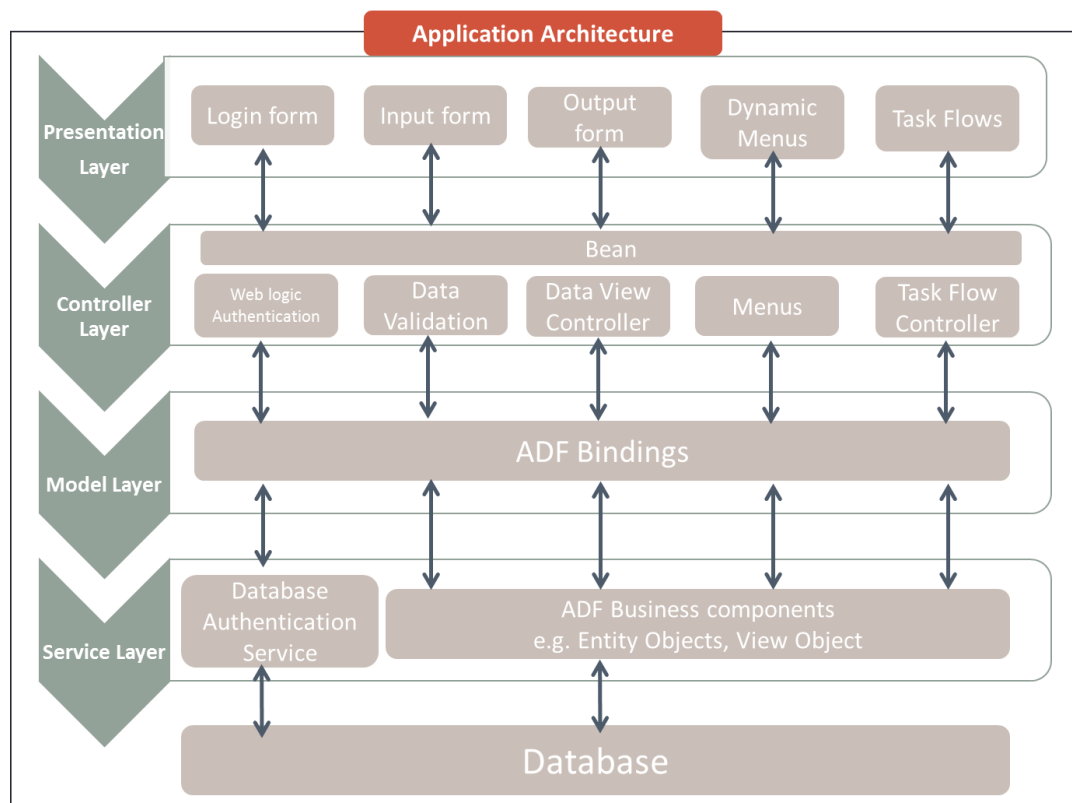


Figure 3-3 - ARM Application Architecture

Above diagram shows the division of responsibilities divided on each layer as suggested by Oracle. There should never be a jump of a layer while talking to other layer, we have to separately identify and divide the responsibilities per layer.

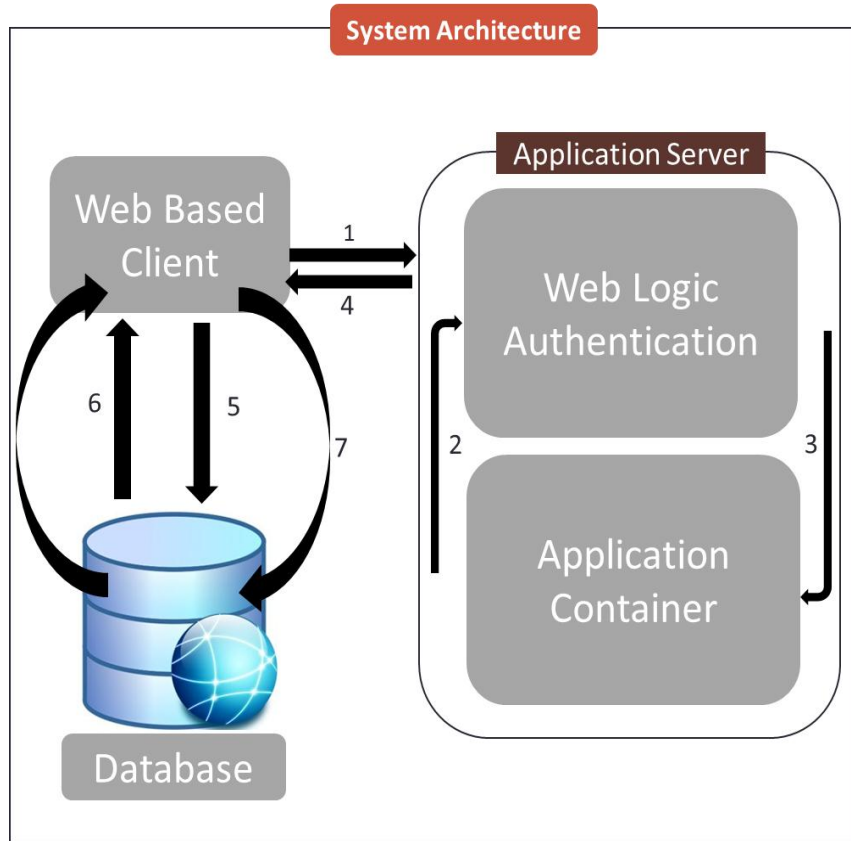


Figure 3-4 - ARM System Architecture

ARM is a web based application as we discussed time and again. So it will run in browser like:

- Internet Explorer
- Google Chrome
- Mozilla Firefox
- Comodo Dragon
- Safari

ARM is deployed on some application server like Weblogic. We are using integrated Weblogic server for deployment of our application so far. As we all know there are two major parts of application server

- Web Application Container
- Services

On the next page we will be discussing the sequence as numbered in the diagram, how the request is made and response is generated and returned.

3.3.3.1 Sequence of Request/Response:

ARM will make a request from browser on http protocol. The request will be made to web logic application server and the process will be as follows:

1. Web Logic application server holds the application deployed in web container.
2. Web logic server provides additional services like Authentication and Authorization Service. It is a recommended service should be chosen for web application Authentication and Authorization purposes.
3. Weblogic authentication service authenticates and provides access to authorized resources of the particular application in Application container.
4. In step 4, the authorized resource rendered by Renderer of the type of request returns the rendered resource to the client who requested for the resource.
5. Next step is to render the menus which will be rendered on the basis of saved values in database. Request is made for these menus.
6. Database also returns the allowed menus to the user and these menus are populated on the page or resources that logged in user have access.
7. Next step is to create / update / retrieve / delete actions and committing and rollback the actions based on the needs. User creates transactions, query for data stored in database and display it.

This is the broader discussion on the sequence of the request made and their subsequent responses. But this process is not as simple as described here. Lot of back-end responsibilities and services are used to make it look that simple.

3.3.3.2 Application Flow:

ARM has three major types of users:

- Sales Person
- Inventory Personnel
- Admin

The responsibilities and the tasks they will do, is explained in fairly simple way in below shown diagram:

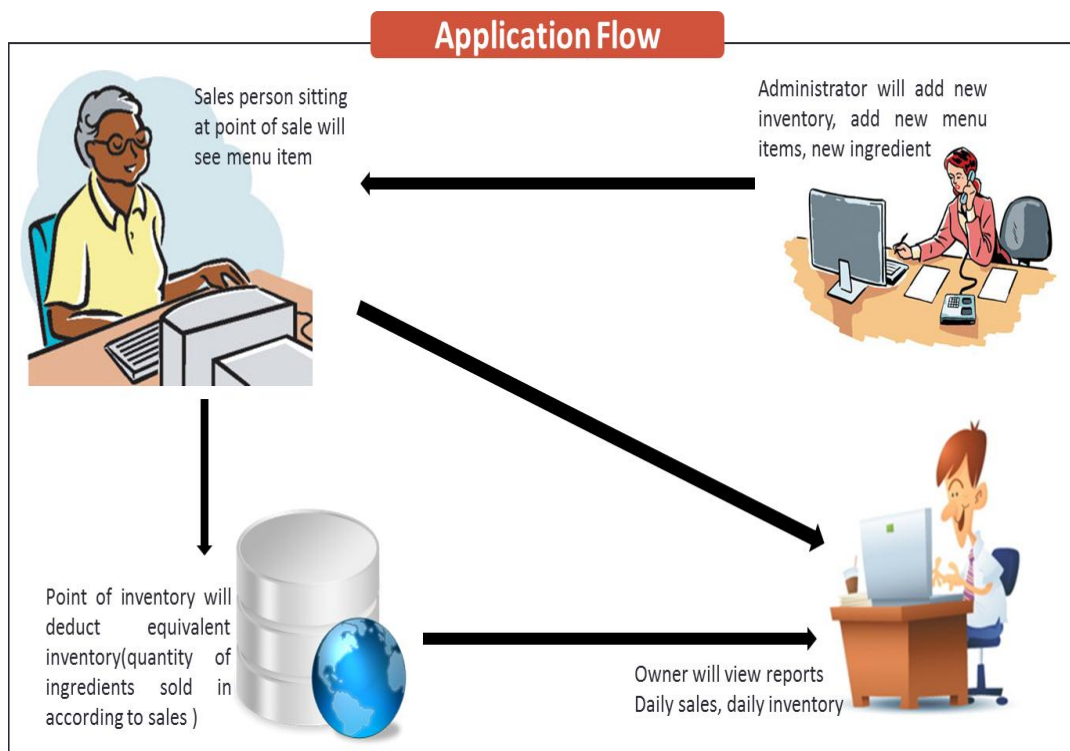


Figure 3-5 - Application Flow Diagram

Final reports to the owner will be integrated after calculating all the transactions in both sales side and inventory side.

3.3.4 ARM Schema:

ARM Schema is shown below:

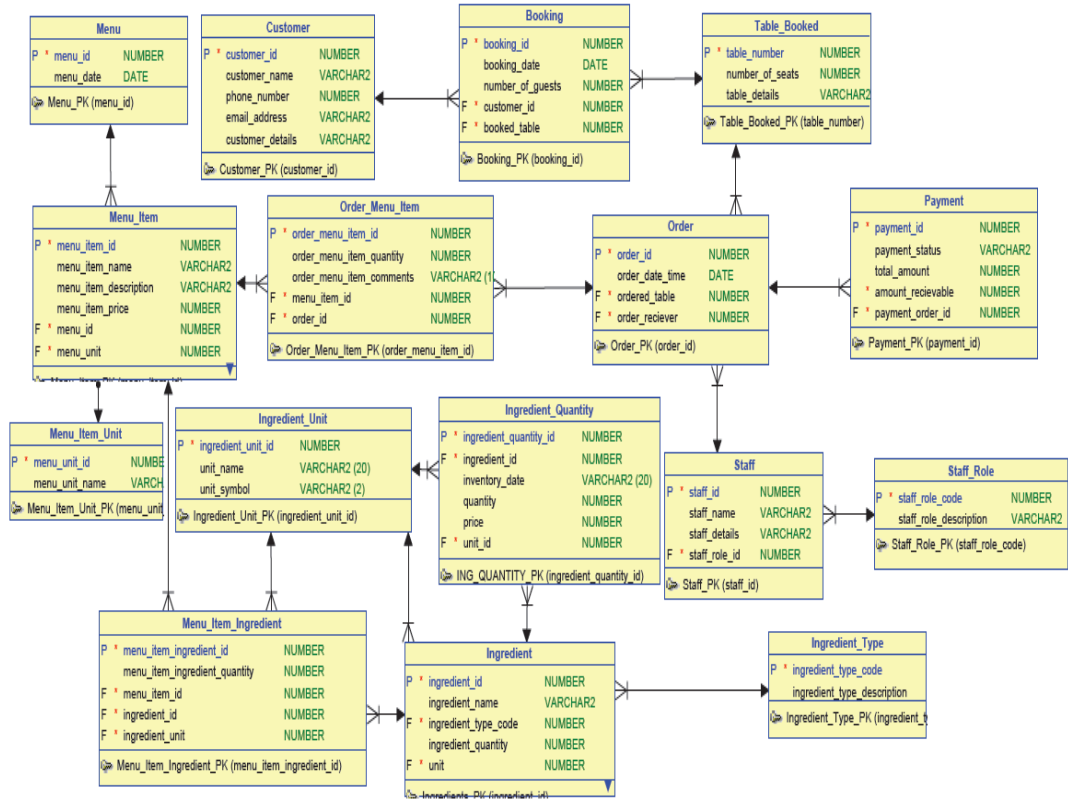


Figure 3-6 - ARM Schema

3.3.5 Code Structuring:

The major components of the application as a whole in terms of code modules are listed below as we are following the generic structuring and code division into sub projects suggested by Oracle

- ARMCommonModel
- ARMMaster
- ARMCommonCode
- ARMCommonUi

“com.clampx.arm” is the package prefix and will be reflected in all of the sub modules as it follows the suggested naming convention of application package structure by Oracle.

- “com” refers to company
- “clampx” refers to our company name
- “arm” is three letter name of our application, as suggested by Oracle

These subsystems have their own tasks and responsibilities. We will be discussing each sub system or project in detail below:

3.3.5.1 *ARMCommonModel*

ARMCommonModel contains all models refer to entities and their bindings and queries on those entities as described above. Package structure of ARM Common Model is:

- ❖ com.clampx.arm
 - commonmodel
 - ◆ entities
 - ◆ lovs
 - ◆ queries
 - ◆ services

3.3.5.2 *ARMMaster*

ARMMaster is the entry and control point of whole application. It contains all the main files that control the flow of whole program. Also authentication i.e. Login is also controlled in this project. Package structure of ARMMaster is shown:

- ❖ com.clampx.arm
 - master
 - ◆ model
 - entities
 - queries
 - services
 - ◆ viewcontroller

3.3.5.3 *ARMCommonCode*

Common code like utilities that is required in all phases of project as well as is required for different projects is placed here.

Package structure is given:

- ❖ com.clampx.arm
 - commoncode
 - ◆ framework
 - ◆ utils

3.3.5.4 *ARMCommonUi*

UI Components such as templates also known as master pages are placed in this package.

4 Results

4.1 LOGIN MODULE:

ARM application starts up and a login page appears asking user to enter User login credentials.

4.1.1 Actions:

- Type username in UserName field.
- Type password in Password field.
- Press Enter Key or Click on Login

4.1.2 Operation:

User is authenticated based on His / Her password stored earlier in the system.

4.1.3 Login Form:

Login form is shown below:

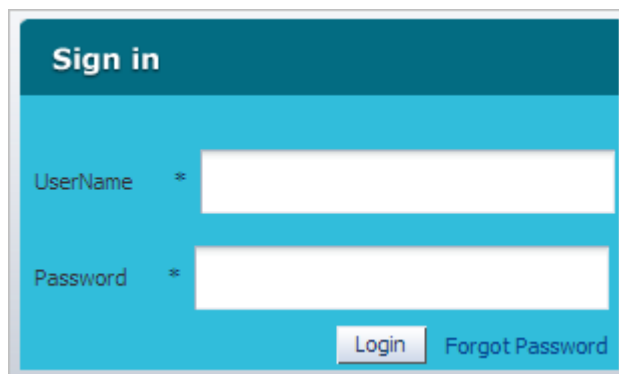
The image shows a screenshot of a web application's login form. The form has a dark teal header with the text "Sign in" in white. Below the header, there are two input fields. The first field is labeled "UserName" with an asterisk (*) to its right, and the second field is labeled "Password" with an asterisk (*) to its right. At the bottom right of the form, there are two buttons: "Login" and "Forgot Password". The entire form is set against a light blue background.

Figure 4-1 - Login Form

4.2 ARM MASTER PAGE TEMPLATE:

ARM Master Page Template is a template we used as common part in all the pages.

It is a single shared template with top and left part same for all the pages with central part being changed according to the pages we are navigated to. So, It has 3 major parts:

- Header
- Left Hand Side Menus Tree
- Central Varying part

Detail of each part is listed below:

- Header
 - Logo
 - Restaurant Name
 - User name & Logout Button

Header part is shown below:



Figure 4-2 - Header

- Left Hand Side
 - Tree structure of Menus
 - Tabs
 - Trees
- Center
 - Form displayed based on the menu item we selected from the Left Hand Side Tree and Tabbed structure

Left hand side menus tree structure and the central part that is being changed according to the menu selected are shown on the next page.

We'll show all the menus available and all the pages based on them. Click any menu item to load page fragment inside Home Page Template.

The detailed menus in each Show Detail Item are shown below:

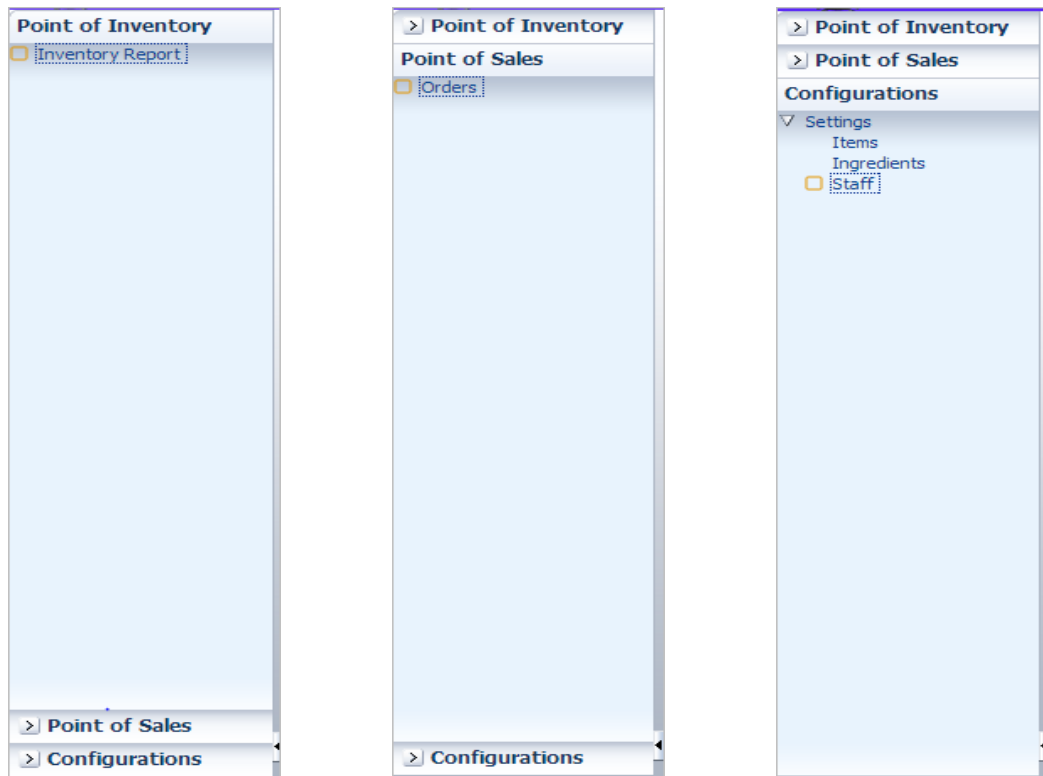


Figure 4-3 - Menus

4.3 ARM - POINT OF SALES:

One of two major modules of our application is Point of Sales. It is a place providing an interface to manage new sales.

Following is the snapshot of the POS:

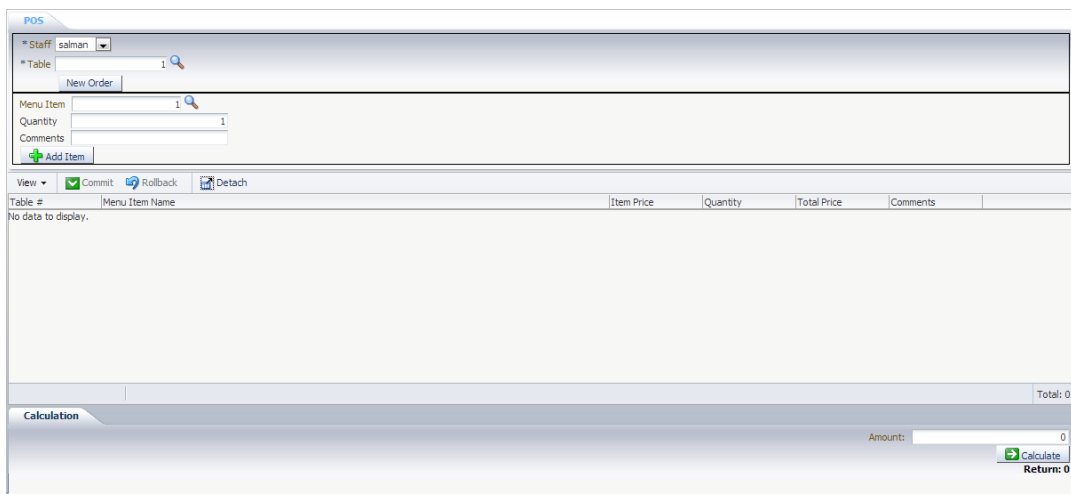


Figure 4-4 - Point of Sales

System operator at Sales desk selects the waiter for current order and also selects table number.

After clicking “New Order”, now you can add new menu items for a particular order being processed currently.

Snapshot of a complete order is listed below:

The screenshot shows a POS interface with the following elements:

- Staff: salman
- Table: 1
- Menu Item: 110
- Quantity: 10
- Buttons: Add Item, Commit, Rollback, Detach
- Table with columns: Table #, Menu Item Name, Item Price, Quantity, Total Price, Comments
- Calculation section with Amount: 15000 and Return: 4000

Table #	Menu Item Name	Item Price	Quantity	Total Price	Comments
1	karahi	400	10	4000	
1	Karahi	700	10	7000	

Figure 4-5 - ARM Order

Sequence of step need to be followed for completing an order is listed below:

- Create “New Order” after selecting waiter name and table number
- Menu item ID in “Menu Item” field
- Quantity of Menu Item
- Click “Add Item” or Press Enter
- Enter Amount received from customer
- Calculate will show amount to return
- Bill is also opened and saved. It can be printed too

Exceptions:

If user wants to deduct some quantity of a menu item already added, set menu item id in “Menu Item” field, negative quantity in quantity field and click “Add Item”

4.4 ARM ORDER BILL:

Sample ARM order bill is shown:

It contains the list of menu items in current order, date, total bill along with the table information.

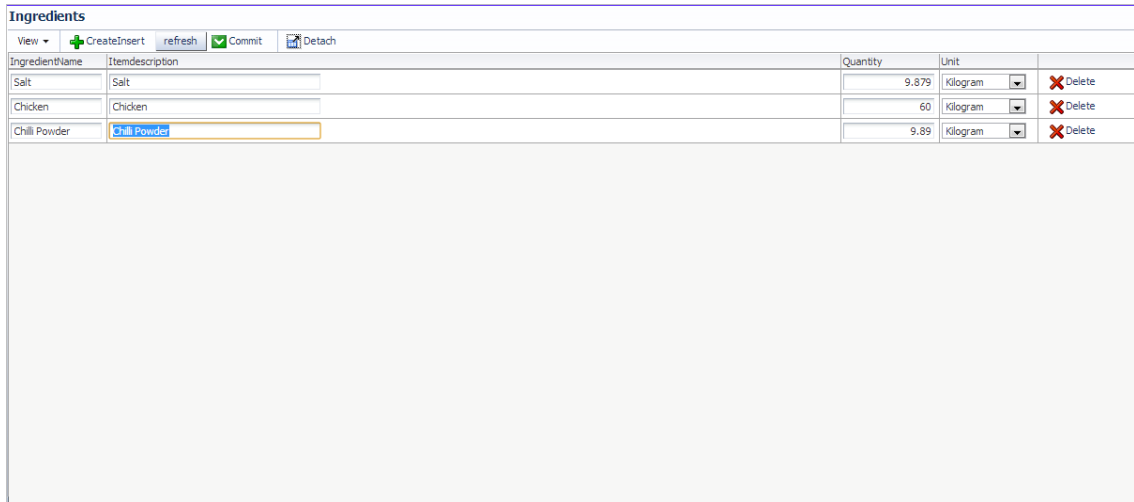
Clampx ARM			
Table # 1			
Monday 03 June 2013			
Name	Unit Price	Quantity	Total
karahe	400	10	4000
Karahe	700	10	7000

Monday 03 June 2013 Grand Total: 11000 Page 1 of 1

Figure 4-6 - ARM Order Receipt

4.5 ARM POINT OF INVENTORY:

ARM Point of Inventory showing the inventory remaining of every existing inventory item in the unit selected by the user while inserting that particular menu item.



IngredientName	Itemdescription	Quantity	Unit	
Salt	Salt	9.879	Kilogram	Delete
Chicken	Chicken	60	Kilogram	Delete
Chili Powder	Chili Powder	9.89	Kilogram	Delete

Figure 4-7 - ARM Inventory Report

New inventory item can be added by simply clicking “CreateInsert”, putting all the information like name, description, selecting unit form the drop down list and finally setting the quantity.

An inventory item can be deleted by simply clicking Delete button at the right side of that row.

To add some quantity to an existing inventory item, put new total quantity in “Quantity” field and click commit.

Clicking commit after each change is a safer option to avoid any erroneous behavior.

4.6 ARM MENU ITEM MANAGER:

Adding new menu item and their respective ingredients are very simpler and easier.

Click “CreateInsert” to add new Menu Item; Fill “Menu Item” fields like Name, Price and Description

The screenshot shows two tabs: 'Menu Items' and 'Ingredients'. The 'Menu Items' tab is active and displays a table with columns: MenuItemName, MenuItemDescription, MenuItemPrice, and a Delete button. The table contains five rows of data:

MenuItemName	MenuItemDescription	MenuItemPrice	Delete
mix gosht	full	400	Delete
Karahi	full	700	Delete
karahi	half	400	Delete
Chicken Pheer	full	200	Delete
daal	Fried	50	Delete

The 'Ingredients' tab is also visible and shows a table with columns: IngredientId, Quantity, Unit, and a Delete button. It contains two rows of data:

IngredientId	Quantity	Unit	Delete
Chicken	1	Kilogram	Delete 1
Salt	10	Gram	Delete 1

Figure 4-8 - ARM Menu Item Add Form

Select new added menu item; Click CreateInsert1 in Ingredients tab to add new ingredients for that dish, Ingredients can be added from ingredients form explained on next page. Select unit i.e. Gram or Kilogram for particular ingredient based on the amount being used in this menu item.

Clicking commit after each change is a best practice to avoid any errors.

Adding new ingredients can be managed from the form below:

The screenshot shows the 'Ingredients' tab with a table for adding new ingredients. The table has columns: IngredientName, Itemdescription, Quantity, Unit, and a Delete button. It contains three rows of data:

IngredientName	Itemdescription	Quantity	Unit	Delete
Salt		9.879	Kilogram	Delete
Chicken		60	Kilogram	Delete
powder	df	9.89	Kilogram	Delete

Figure 4-9 - ARM New Ingredient Form

5 Discussion

ARM is an application based on Application Development Framework (ADF). The tool used is Oracle JDeveloper 11g Release 2 for development purposes.

Basic knowledge for building ADF based applications is to go through the life cycle of Java EE application. ADF is a comprehensive framework by Oracle for building advance Java EE applications providing great infrastructure services, robust application framework, highly recommended java authentication and authorization based security as well as greater visual and declarative application development experience.

6 Conclusion

ARM is an integrated application where we integrated two major modules of our application:

- Point of Sales
- Point of Inventory

ARM - Point of Sales shares the same data that is being used for Point of Inventory too.

Transaction made from both the systems; At Point of Sales a new order is placed at the same time the system deduct the inventory that is used in each particular menu item sold in that order, which results in synchronized result and more accurate results in terms of inventory in hand to avoid inventory theft and incorrect calculations.

Transactions at Point of Inventory are:

- Add new inventory item
- Update inventory quantity

7 Recommendations

ARM is developed based on Application Development Framework using tool Oracle JDeveloper 11g Release 2.

Fusion Web Application Development on JDeveloper is highly recommended for enterprise web applications. This tool provides lot of Rich Faces Components for building beautiful User Interfaces with addition to the robust application architecture and service oriented approach.

ADF is extension to JSF providing lot of Business Components like Entity Objects, View Objects and View Links etc. and Services (Business Modules) that can be used for separate module development in a large scaled application.

8 References

8.1 UNDERSTANDING THE SYSTEM

www.rmpos.com/

8.2 LEARN JDEVELOPER

<http://www.oracle.com/technetwork/developer-tools/jdev/overview/index-100269.html>

8.3 GENERATE BILL

<http://sameh-nassar.blogspot.com/>

9 Appendices

A snapshot of the tool we used for development of ARM:

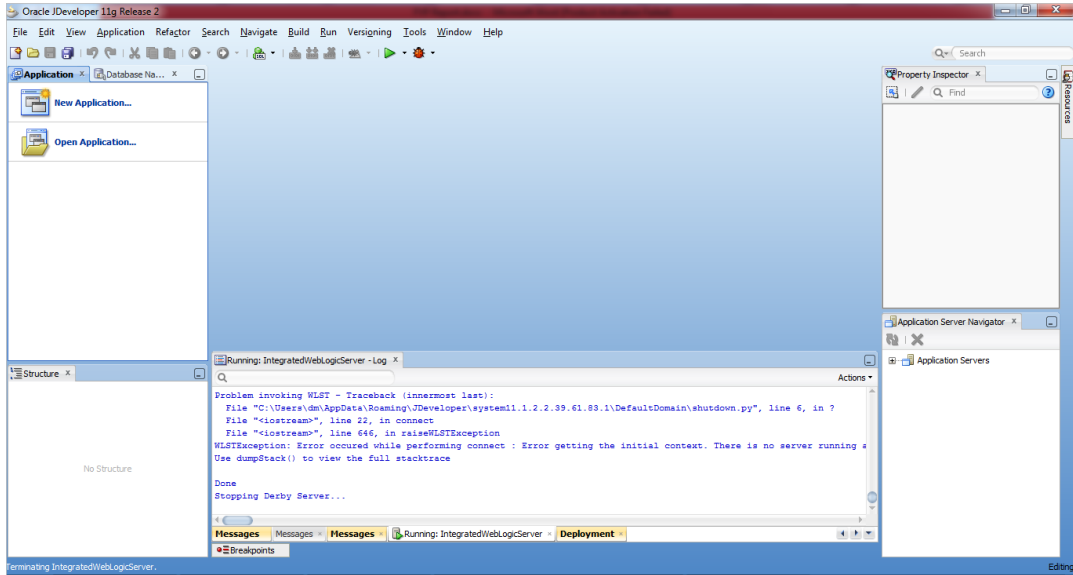


Figure 9-1 - Oracle JDeveloper