PTMSC Project

Wireless **A**pplication **P**rotocol based **C**ustomer **R**elationship **M**anagement **S**ystem (**WAPCRMS**)

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Abstract

WAP is the convergence of two rapidly growing technology wireless network and Internet. The number of mobile subscribers continuously increase, this phenomenon reflects that people request to work more mobility. The significance of customer relationship is being recognised again; CRM application becomes a strategy system in many corporations to maintain good customer relationship. Can the front-end employee access the CRM system over the air to provide better customer service? This project integrates the WAP into CRM system. In technical aspect we will evaluate the performance, reliability, and saleability of the system. And we study the impact of wireless component added to CRM in the business aspect.

1 Introduction

WAPCRMS is the acronym of Wireless Application Protocol base Customer Relationship Management System.

In the end of 90's, we testified for the information technology made a tremendous impact on the relationship between the business and the customer. Once Internet highway is connected, you can buy the book you like in Amazon, then go to Citibank to manipulate your bank account, do the payment and review investment portfolio at any time. Businesses have to provide 7 x 24 hours service. Is it the end of shock? No, it is just the beginning.

Wireless computing will be the next battlefield shifted from the Internet. Although people can access the Internet easily, they still need to stick in their desktop with a wire. The wireless technology let them free and out of the office. The wireless device such as mobile phone, and PDA become more powerful and the wireless network get more reliable. To be competitive, the subscription fee is cut to a reasonable price. According to Gartner Group report, the number of mobile subscribers will be over 300 million in 2000, and requests of mobility keep increasing. The potential of the wireless market has been phenomenal. Either businessmen or customers can do their business via the devices in their palm at any time, anywhere and any place.

WAP is a de-facto standard for you to use wireless technology to interact with the Internet with wireless device. It is important that this industry standard is at the protocol level instead of at the application level. All the three mobile phone big players – Ericisson, Motorola and Nokia are have all adopted it.

More and more enterprises are realising that "Customer Value" is the key of success for today business. Where is the revenue from? The answer is so simple: Customers. Enterprises make use of high-end technology to collect, store and analysis the huge volume of customer information. "To understand more your customers" and "To know the value of your customers" are today slogans. Customer Relationship Management System creates new opportunities for companies to achieve competitive advantage through better customer service, knowing general customer trends and the individual buying patterns of specific customers.

Sales application is one of the main functional components of the CRM system. Sales force automation help to automate the fundamental activities of sales professionals like scheduling, account management, proposal generation and management. All these will increase the sales

representatives' productivity. Of course, the management can easily manage and monitor the sales team activity and performance.

This project, we focus on sales application component of CRM , and try to integrate them with the WAP. We will evaluate the performance, reliability, and saleability of the system. And we study the impact of wireless component added to sales application in the business aspect.

1.1 WAP Overview

1.1.1 Introduction

Wireless Application Protocol, the fullname of WAP, is a new de-facto standard to use wireless technology to interact with the Internet.

The Internet connects the whole world together with a wire. It is not enough! Million of knowledge workers are tied to the desktop by the wires. Wireless computing breaks those constraints and let people out of offices. The people can be online any time, any where.

However, the growth of wireless computing was so slow at the beginning. The main reason is the infrastructure are not ready. Relying the cellular infrastructure for data communication did not quite work before. However, the cellular network have upgraded from analog to digital, and the third generation (3G) network is coming. Currently, data rate is ranged from 9.6Kbits/sec to 64Kbits/sec, 3G would deliver data at 2Mbits/sec. 3G network services will include support for all existing PSTN services, voice message service, point-to-mulitpoint dispatch services, as well as multimedia. [14] Now, we have a reliable wireless Internet infrastructure.

Wireless technology is becoming more and more popular for business and emergency service. Nokia and Deutsche Bank have created the first WAP-based banking site in Germany. In Helsinki, a test group of WAP cops are using mobile handset to check license-plate number, and ambulances are sending emergency rooms wireless info on a patient's condition before they arrive at the hospital.[16]

1.1.2 WAP Forum

In June 1997, Ericsson, Motorola, Nokia and Phone.com (former Unwired Planet Inc.) formed the Wireless Application Protocol Forum (http://www.wapforum.com). The WAP forum is an industry group dedicated to the goal of enabling sophisticated telephony and information services on wireless devices. Up to February 1999, more than 80 members joined the WAP forum. It's important to note that the wireless industry is standardized at protocol level on WAP, not at the application level. The concern is your device support the open WAP protocol or not, the platform-related issues, like operating system, are not important.

The objectives of the WAP Forum are [1] :

- To bring Internet content and advance data services to digital cellular phones and other wireless terminals.
- To create a global wireless protocol specification that will work across differing wireless network technologies.
- To enable the creation of content and applications that scale across a very wide range of bearer nework and device types.
- To embrace and extend existing standards and technology wherever appropriate.

1.1.3 Mobile Device Constraints[2]

Mass-market, handheld wireless devices like Palm Pliot, Window -CE haves a more constrainted computing environment compared to desktop computers. Because of fundamental limitation of battery life and form factor, wireless devices trend to have:

- Less powerful CPUs
- Limited Memory
- Limited Battery
- Smaller display screen with low resolution
- Input Devices have limited capacity

1.1.4 Wireless Network Constraints[2]

- Less Bandwidth (range from 300 bits/sec. to 10kbits/sec.)
- More Latency (5 – 10 sec round trip latency are common)
- Less Connection Stability
- Less Predictability Availability

On the other hand, as bandwidth increases, battery consumption also increase. So even as wireless network improve their reliability high bandwidth, the battery lif e will still limit the effective throughput of data sending and receiving.

1.1.5 WWW Model vs. WAP Model

The remarkable point of WAP is make use of the existing standards and technology. WAP specification extends and leverages the existing Internet techonology such as XML, Scripting and digital data network standards on all wireless networks.

The Internet World Wide Web architecture provides a very flexible and powerful programming model (Figure 1). The client, web browser, sends requests for named data objects to a Web Server, and the server responds with the data encoded using the standard format

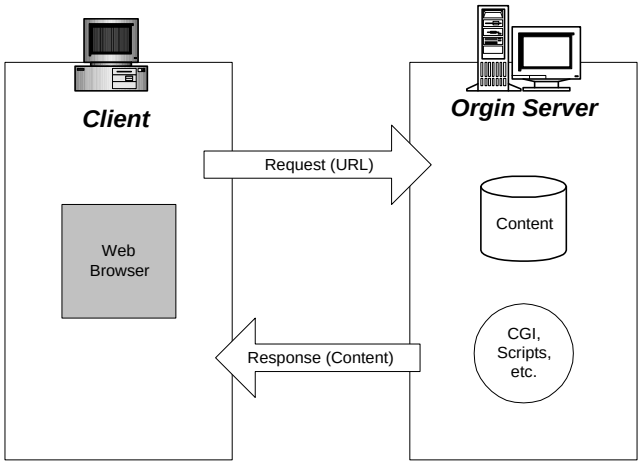


Figure 1 WWW Programming Model

The WAP programming model (Figure 2) is similar to the WWW programming model. This provides a number of benefits to the application developer community, including a familiar programming model, proven architecture, and the ability to leverage existing tools (e.g. Web Server, XML).

Content is transported using a set of standard communication protocol based on the WWW communication protocols. A micro browser in the wireless terminal is analogous to a standard web browser.

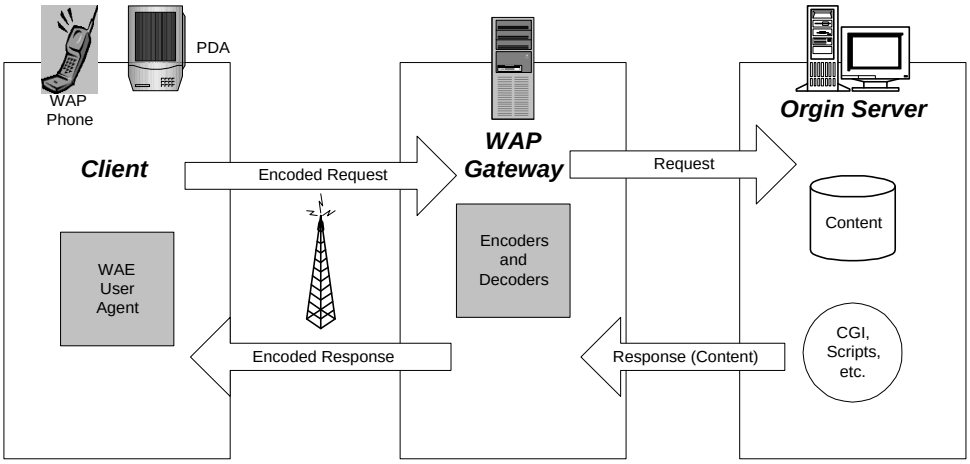


Figure 2 WAP Programming Model

WAP utilises proxy technology to connect between the wireless domain and the WWW. The WAP proxy typically is comprised of the following functionality:

Protocol Gateway – it translates requests from the WAP protocol stack to the WWW protocol stack. At the same time, it translates the WWW content (HTML) to WAP content (WML).

Content Encoder and Decoder – It encode the WAP content into compact binary format to reduce the size of data over the limited bandwidth network.

Standards for WAP are based on the WWW model:

- WWW-standard URLs are used to identify WAP content on origin servers.
- WWW-standard URIs are used to identify local resources in a device.
- All WAP content is given a specific type consistent with WWW typing.
- WAP content formats are based on WWW technology and inclu de display markup, calendar information, images and scripting language.
- WAP communication protocols enable the communication of brower requests from the mobile device to the network web server.

1.1.6 WAP Architecture

The WAP architecture provides a scaleable and extensible environment for application development for mobile communication devices. The WAP layered architecture enables other services and applications to utilise the feature of the WAP stack through a set of well defined interfaces.

The protocol stack in WAP optimizes standard Web protocols, such as HTTP, for use under the low bandwidth, high latency wireless network. The WAP protocol use less than half the number of packets that the standard HTTP/TCP/IP stack uses to deliver the same content.

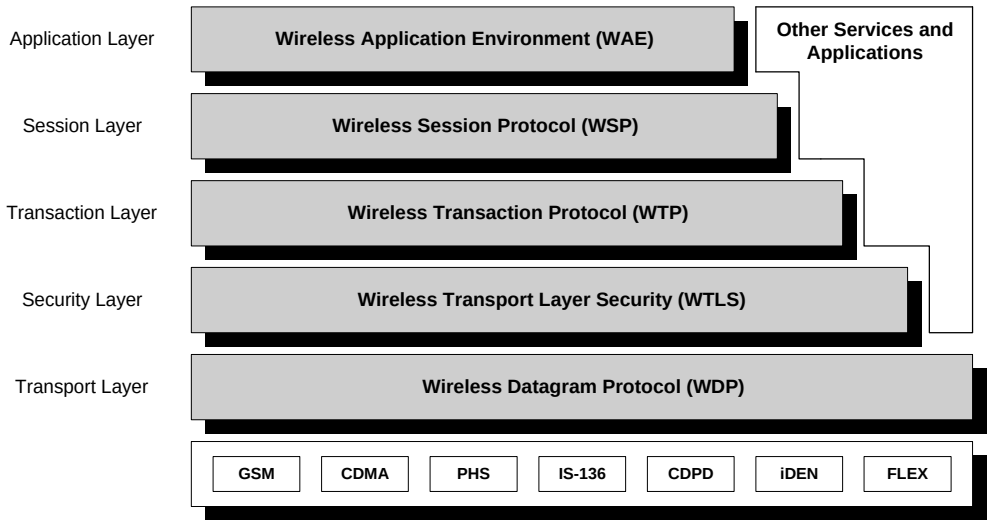


Figure 3 WAP Architecture

- Wireless Application Environment (WAE)

WAE establishs an interoperable environment that allow operators and service providers to build application and services on wide variety of wireless platform in efficient and useful manner.

- Wireless Session Protocol (WSP)

Provide the application layer with a consistent interface for two session services. The first is a connection-oriented service that operate above the WTP. The second is a connectionless service that operates WDP.

- Wireless Transaction Protocol (WTP)

The WTP runs on top of a datagram service and provides as a light-wieght transaction-oriented protocol that is suitable for implementation in thin client.

- Wireless Transport Layer Security (WTLS)

WTLS is a security protocol based upon the industry-standard Transport Layer Security protocol, formerly known as Security Socket Layer (SSL). IT provides data integrity, privacy, authentication and denial of service protection.

- Wireless Datagram Protocol (WDP)

The WDP operates above the data capable bearer services supported by the various network types. WAP offers a consistent services to the upper layer protocols of WAP and communicate transparently over one of the available bearer services.

1.1.7 Wireless Markup Language (WML)

Wireless Markup Language (WML) is based on the Extensible Markup Language (XML). It is designed for small, narrowband width wireless devices.

The characteristics of WML

WML offers text and image support, and has a variety of formatting and layout commands.

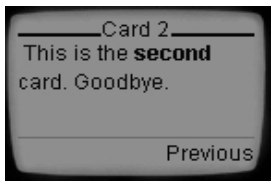
WML cards are grouped into decks. A WML deck is similar to an HTML page in that is identified by an URL and is the unit of content transmission.

WML offers support for managing navigation between cards and decks, and include commands for event handling.

Parameters can be set for the WML decks using a state model. Variables can be used in place of stirng and are substituted at runtime.

WML is organized into a collection of cards and decks. Cards are grouped together into decks. A deck is the smallest unit of WML that is unique URL document i s send from server to a user agent. Each card is a single visible user interaction for data input.

```
<?xml version="1.0"?>
<!DOCTYPE wml PUBLIC "-//WAPFORUM//DTD WML 1.1//EN" "http://www.wapforum.org/DTD/wml_1.1.xml">
 <wml>
        <card id="First_Card" title="Card 1">
                <do type="accept" label="Next">
                        <go href="#Second_Card"/>
                </do>
                <p>
                Hello. This is the <b>first </b>card.
                </p>
        </card>
        <card id="Second_Card" title="Card 2">
                <do type="prev" label="Previous">
                        <prev/>
                </do>
                <p>
                        This is the <b>second</b> card. Goodbye.
                </p>
        </card>
 </wml>
```



A valid WML deck is a valid XML document and therefore must contain an XML declaration and a document type declaration. A typical document header contains:

```
<?xml version="1.0"?>
<!DOCTYPE wml PUBLIC "-//WAPFORUM//DTD WML 1.1//EN" "http://www.wapforum.org/DTD/wml_1.1.xml">
```

1.1.8 WMLScript

WMLScript, which is based on ECMAScript , is designed to provide general scripting capabilities to the WAP architecture. Specifically, WMLScript complements the WML. As all WML content is static, the following list contain some capabilities that are not supported by WML:

Validation of User Input

Access to facilities of the device (e.g. Make phone calls, access SIM card etc.)

Generate message and dialogs locally, hence reducing the need for expensive round-trip to show alert, error, confirmation etc.

Allow extension to the device software and configuring a device after it has been deployed.

WML was designed to overcome these limitations and to provide programmable functionality that can be used over narrowband communication links in clients with limited capabilities.

Scripting enhances the standard browsing and presentation facilities of WML with behavioural capabilites. They can be used to support more advanced UI functions, add intelligence to the client, provide access to the device and its peripheral functionality and reduce the amount of bandwidth needed to send data between the server and the client.

1.2 CRM Overview

1.2.1 Introduction

Enterprises become aware of the value of customers again. They understand that the customer loyalty and retention are no more based on lowering the price, the key point is the quality of customer service. They have to know who the ta rget customers are, where they are, what they want and what they needs.

As the hardware costs decrease and the functionality increases, the enterprises are able to collect and store Gigabyte or even Terabyte transactions volume. Make use of new information technology such Data Warehouse and Data Mining, it is feasible to analyst these huge volume of customer information in critical time limit and justified costing. The finding not only help the company 'competitive edge', but also valuable for strategy planning.

1.2.2 Customer Orientation

Customer Satisfaction is the primary determinant of customer loyalty and subsequent retention and the key to creating a valuable business organization. [4] It is different between market orientation and customer orientation, althoughboth approaches are ultimately aimed at improving business performance and customer satisfaction. Market orientation focuses equally on customers and competitors. Customer orie ntation mainly concentrates on customers and the process of customer acquisition, satisfaction and retention. The philiosphy is that competitors may come and go, without customers there is no market to orient on.

The traditional reactive sales and marketing, services are out-of-date, you cannot just ask your customers what they want and then give it to them. This approach won't give you the whole story – many customers don't know what they really want until someone offers it to them. Today, we are talking about the relationship marketing, providing pro-active sales and services. The e -business mode on Web catalyze the achievement of one-to-one marketing.

1.2.3 What is CRM?

Customer Relationship Management (CRM) is essentially focus on pro viding optimal value to customers – through the way that companies communicate with them, how they sell them, and how they service them – as well as through the traditional means of product, price, promotion and place of distribution. [19]

For ERP system, they focus on automating and optimising the daily operations such as human resource, inventory management, finance and manufacturing. As a result, the companies can be improved their organisational efficiency and lower the administration costs. However, the business world is becoming more customer -orientated, which cannot be achieved by ERP. For CRM system, they help enterprise to automating and improving the front-line business process such as sales, marketing, customer service and support.

Whereas ERP implementations can result in improve organisational efficiency, CRM aims to provide organisational effectiveness by reducing sales cycles, and selling costs,

identifying markets and channels for expansion, and improving customer value, satisfaction, profitability and retention.[3]

Furthermore, the CRM system integrates multiple channels of communication with customers like call centre, web, E-mail and face-to-face. All customer information can be shared to every department within the company. It is very important for all the departments refer to the same set of customer information; they deal with the customer with a coherent strategy. Especially for the manufacturing, the customer relationship can be strengthened, price can be reduced, and new products and functions can be developed and improved to meet the customer needs.

1.2.4 CRM Applications

The CRM applications are a convergence of three application components and channels. Application components include

1) Sales Applications
   SFA(Sales Force Automation), which is the cornerstone of CRM , automate the fundamental activities of sales professionals. Such as scheduling, Sales forecasting , account or territory assignment and management, all these modules increase sales representative productivity and reduce cost of sales.
2) Marketing Applications
   They primarily aim to empower marketing professionals by providing a conprehensive framework for the design, execution and evaluation of marketing campaigns and other marketing related activities. You must realize that marketing automation and SFA are complementary, they play a different role in the customer life cycle.
3) Customer Service and Support Applications.
   These applications are typically deployed through a call center environment or over the web for self -service and allow organizations to support the unique requirements of their customers with accuracy, efficiency and quick response time. Besides this, they help to transition the customer service sections from cost centers to profit center.

Enterprise have a number of channels to communicate and interact with customers like through face-to-face, the Web, call centers, phone, email or through partners. To optimize the customers response, channel mix strategy is a must for CRM.

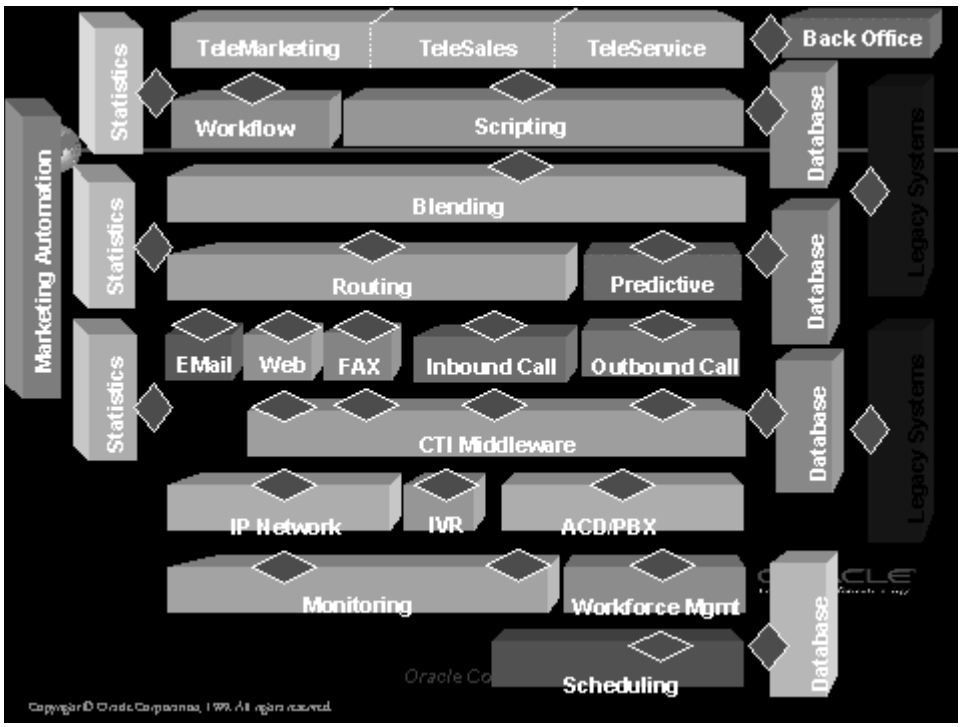


Figure 4 CRM Call Center Environment

2 System Objective

WAPCRM System focuses on the Sales Force Automation (SFA) for direct Sales Corporation. The WAPCRM have to achieve the following objectives:

2.1 Improve Customer Satisfaction

- 24 hours Services
  Customers can check the product information and place their inquiry via the Internet in 24 hours
- Improve Fast Response Time
  Once the inquiry received, it immediately distri buted to the right sales representatives to follow. Sales representatives can contact the customers within a short period of times. Reduce response time for customer inquiry, the company improve customer satisfaction and loyalty.
- Customers Feel Confident
  System allow the sales representatives to check inquiry details , customer and product information over the air at anytime, anywhere. They have accurate, up-to-date information on palm, customers have confidental to to company sales professionalism.
- Understand Customer Behavior
  By studying the details sales activities about customer, the salesman eaily views the buying behavior and the needs of each customers.

2.2 Streamline Operation and Reduce Cost

- Shorten Sales Cycle
  Once the inquiry com e in, the salesman can approach, negotate , quote the price without back to office since all information can be accessed by a click. The system also reduce the paper work and improve the information flow. The cost per transaction can be lowered.
- Better Communication Channels
  A number of communication channels are introduced within the system. First, the customers can place the inquiry via the Internet either Web submit or E-mail instead of phone -in. For the internal, the sales administration pass the infor mation effectively to sales team. Within the sales term, sales representatives have a new reporting channel to their managers, the managers can comment on the sales representatives' activities.
- Reduce the hardware cost
  The sales representatives can access ed the CRM system via PDA instead of desktop PC. Comparably, the investment cost of desktop PC is a number of times than PDA one. Only WAP enabled device, no proprietary hardware is required.
- Low Software Deployment Cost
  The system has to be W eb architecture enable global deployment and upgrade to remote users easily. This reduce deployment costs and improve the mobility of sales

with the mobile devices which support the application.

2.3 Increasing Revenue

- Sales Representative Productivity
  Sales reps can access and update the sales information at any time, anywhere and any places. It reduce their time to stay in the office desktop, they can concentrate on the sales activity.
- Better Sales Team Management
  Sales manager can give an advice to each sales activity of their salesman. They know which customers, or prospects their salesman is handling. The most important, the manager can empower their sales force to proactively track and monitor their performance and to incent them to achieve goals.
- Improve Win Probability
  Sales reps can effectively target their selling efforts to focus on high -value deals and meet revenue targets. By tracking customer history, sales rep understand much more about the customer. The chance for successful sale can be increas ed. On the other hand, the sales managers can identify their top performers and assign them to the top account that have the highest win probability.

3 System Requirement

3.1 System Overview (Ref. 7)

There is totally 6 process in the 1st level Data Flow Diagram of the WAPCRM system.

- Process 1.1 Maintenance
- Process 1.2 Prospect Handling
- Process 1.3 Inquiry
- Process 1.4 Activities Tracking
- Process 1.5 Performance Report
- Process 1.6 Price Approval

3.2 Entity Activities Overview

Customers can do the following activities via the Internet:

a) Update their informaton (Function 1.1)
b) Log their inquiry /Sales Prospect (Function 1.2)
c) Enquiry the product information (Function (1.3)

Sales Administration requires to support the sales force at the b ack office, the following activites can be performed :

a) Sales administration staffs are responsible to maintain the customer, salesman and products information. (Function 1.1)
b) Sales administration have to record all the phone -in customers inquiry / Sales Prospect (Function 1.2)

Sales representatives can perform the following activities via the PDA:

a) Enquiry and update the sales prospect assigned to him/her. (Function 1.2)
b) Enquiry product Information,including pricing informa tion and stock on hand (Function 1.3)
c) Record the sales activities and read the manager's advice (Function 1.4)
d) Enquiry his /her own customers and related sales activities. (Function 1.4)
e) Send price approval request to sales manager (Function 1.6)

Sales man agers can access the same functions as the sales representatives. In addition, the following functions can be accessed:

a) View their own salesman customers, sales prospect and activities. (Function 1.4)
b) Give an advices to sales activities to their own salesman (Function 1.4)
c) View the sales performance report of their sales team (Function 1.5)
d) Approve / reject the price approval request. (Function 1.6)

3.3 Process Overview

3.3.1 Maintenance (Process 1.1)

Master files (Customer, Product, and Salesman) maintenance process is accessed by sales administration staffs and customers.

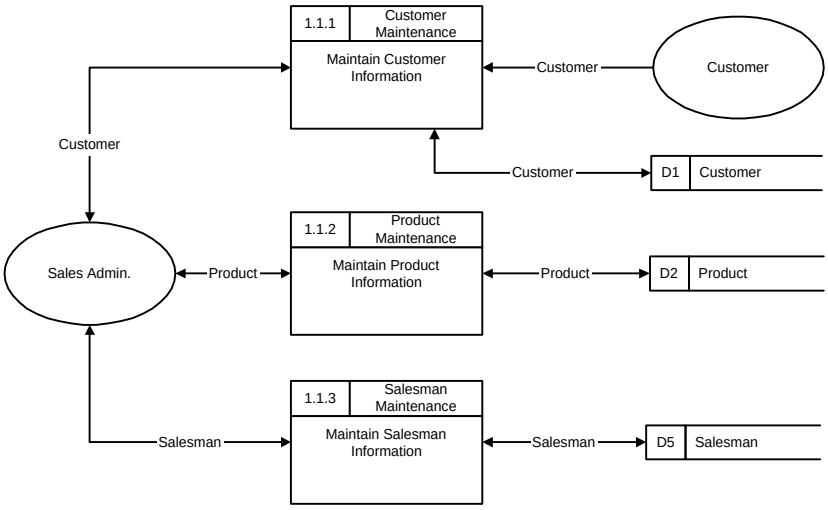


Figure 5 Level 2 DFD of Maintenance

Function 1.1.1 Customer Maintenance

- Sales adminstration staffs are responsible to create, update and delete the customer information.
- Customer can update their own information like contact no, address, email etc.

Function 1.1.2 Product Maintenance

- Sales adminstration staffs are responsible to create, update and delete the company production information

Function 1.1.3 Salesman Maintenance

- Sales adminstration staffs are responsible to create, update and delete the salesman information such as salesman code, salesman name, his/her managers, his/her subordinates etc.

3.3.2 Prospect Handling (Process 1.2)

This process is to handle the customer sales prospect . Once the sales prospect is logged, sales representative will be assigned to handle and keep track the status until the deal is closed. Make sure that all the prospects are being followed and their status keep update in the sales cycle.

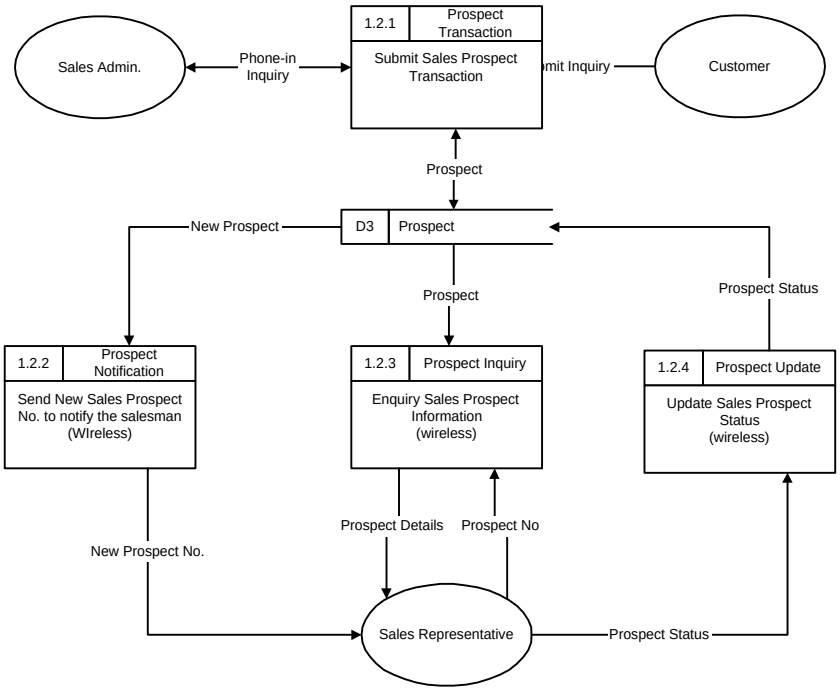


Figure 6 Level 2 DFD of Prospect Handling

Function 1.2.1 Prospect Transaction

- Sales administration staffs record all the phone -in customer sales prospect information such as contact name, contact phone, address and product interest etc.
- Customer also log the sales prospect by themselves via the Internet
- Once the prospect is logged, its status is set to "under progress"

Function 1.2.2 Prospect Notification (Wireless)

- This function monitor any new prospects are created. It will send a notification (Sales Propect ID) to sales representative's mobile device. Ensure the sales representative can handle the sales prospect without any time delay.

Function 1.2.3 Prospect Inquiry (Wireless)

- Sales representative can access the system to check the prospect detail information by supplying the Sales Prospect ID.

Function 1.2.4 Prospect Update (Wireless)

- After each sales activities with the customers, sales representative can update the prospect's status until the prospect is closed either win or loss to competitor

3.3.3 Inquiry (Process 1.3)

Inquiry process includes a number of inquir y functions for customer, sales adminstration staff, or sales representatives to check customer and product information.

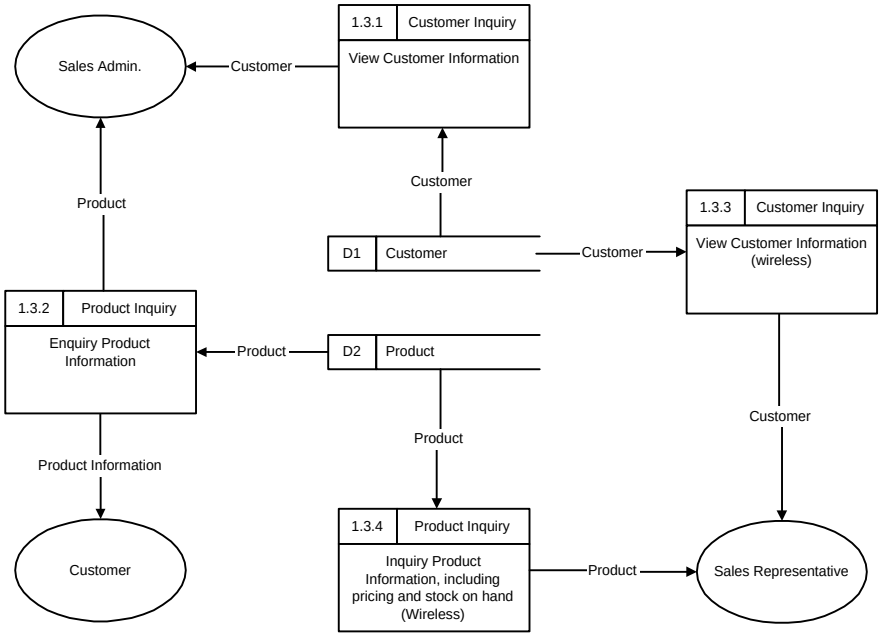


Figure 7 Level 2 DFD of Inquiry

Function 1.3.1 Customer Inquiry

- Back-office staffs can check the customer information like addresss, fax, telephone and products in use etc.

Function 1.3.2 Product Inquiry

- Back-office staffs check the -to-date product information including stock on hand and pricing information
- Customers can check the up -to-date product information (Exclude price and stock on hand).

Function 1.3.3 Customer Inquiry (Wireless)

- It is same functionality as the function 1.3.1, it is used by the sales representative through the mobile device.

Function 1.3.4 Product Inquiry (Wireless)

- It is same functionality as the function 1.3.2, stock on hand and price information are the plus. It is only accessed through the sales representative's mobile device.

3.3.4 Activities Tracking (Process 1.4)

This process is the new communication chann el between sales representatives and their managers. Sales representatives have to record every sales activities after customer visit. The sales manager can review the activities one by one and give advice to assist his/her subordinates work. This reduc e the face-to-face review time between the manager and his subordinates, but the sale team management become more efficiency. Another objective is all the customers related sales activities be logged, the sales representative can easy view the customer behavior.s.

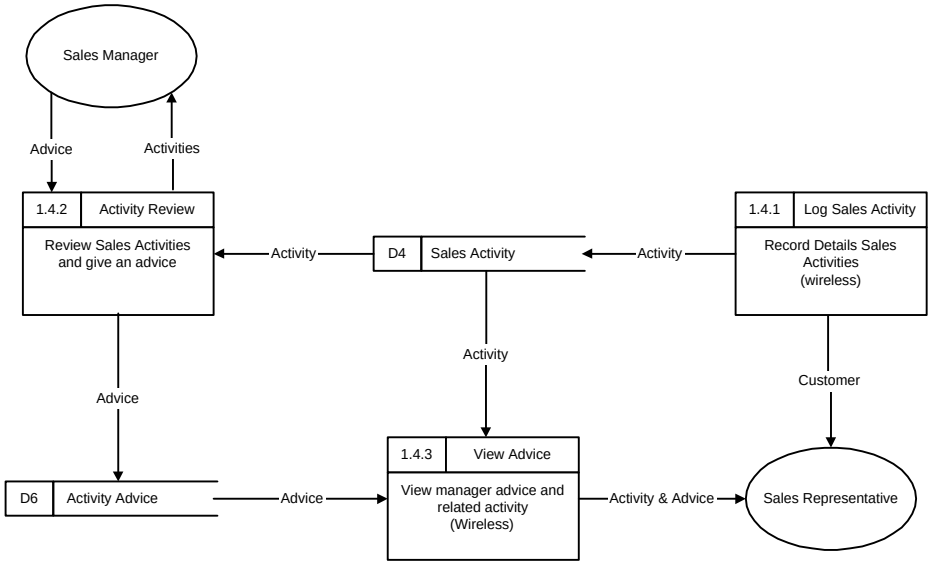


Figure 8 Level 2 DFD of Activity Tracking

Function 1.4.1 Log Sales Activities (Wireless)

- Sales representative can record the activities details for related customer, such as activity type, the abstract content they discuss with the customers.

Function 1.4.2 Activity Review

- Sales managers can view their own subordinates sales activities at the back offices. They can give advice to specific activities or even call the sales representatives to s ee them.

Function 1.4.3 View Advice (Wireless)

- Sales representative can view the advice given by his/her managers.

3.3.5 Performance Report (Process 1.5)

This process is to collect the sales prospect , sales activities information to gene rate a number of performance analysis report for the sales manager to review the overall performance of his/her sales team or down to each sales representative.

3.3.6 Price Approval (Process 1.6)

This proccess is to smooth price approval procedure. The sales re presentative send the request for prices approve to back office. The system will notify the authorized manager once the request is received. The sales manager can approve, reject or adjust the price, then send it back to sales representative through the automatic notfication mechanism. This process will facilitates the whole sales cycle.

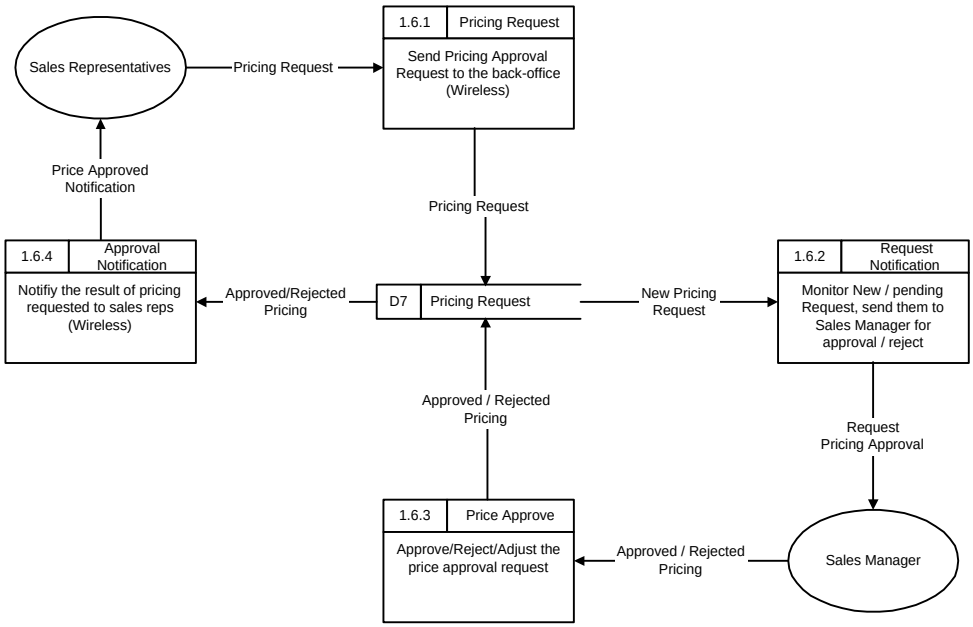


Figure 9 Level 2 DFD of Price Approval

Function 1.6.1 Pricing Request (Wireless)

- Sales representative send pricing request to back office with details information such as product, request price and for which customer.

Function 1.6.2 Request Notification

- This function will send the new come -in pricing approval requests and the pending request to the authorized managers to do the approval.

Function 1.6.3 Pricing Approve

- Once the manager receive the pricing request, he can decide to approve, reject or adjust the new price for the sales representatives.

Function 1.6.3 Approval Notification (Wireless)

- This process notify the sale representatives their request was be processed by manager. They can view the new prices suggested by their manager.

3.4 Technical Overview

To automate the sale force, the system make use of the wireless technology to increase the mobility of sales representatives. Sales representatives can access the CRM system via the PDA over the air. The following list is the requirements must be achieved via the PDA at any time and anywhere.

- Enquiry customer information, product information, prospect details, and advice given by manager.
- Update prospect status, sales activity details and schedule.
- Request the pricing approval
- Send the notification to sales representative while new prospect is assigned, request price is approved or urgent information

To solve the above requirement, the WAP technology work in two operations : ***Pull*** and ***Push***.

3.4.1 Pull Model

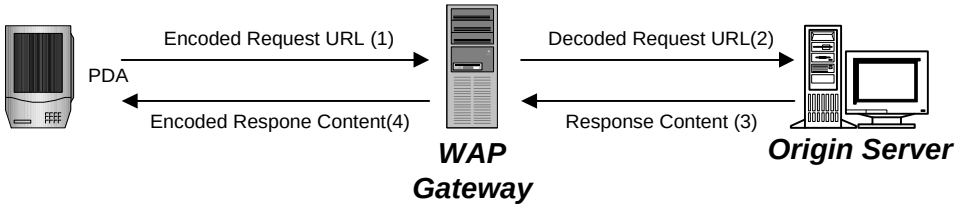


Figure 10WAP Pull Model

Actually, WAP Pull technology is exactly the sames as the Web-based model.

1. The WAP Client send the encoded request URL to WAP Gateway.
2. WAP Gateway decode the request URL and then send to the content server.
3. Server process the request and send the response content to the WAP Gateway.
4. WAP Gateway encode the response content and send back to the requested client.

3.4.2 Push Model

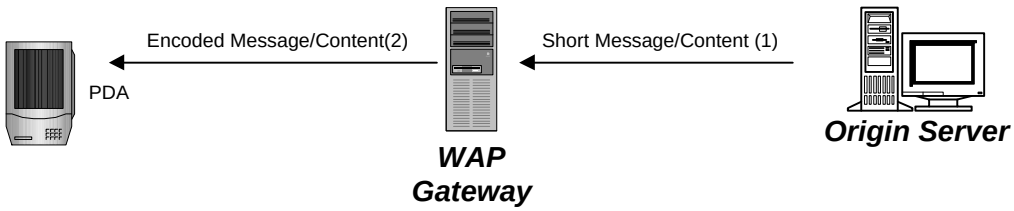


Figure 11WAP Push Model

In the push model, the server push the content to the client(s), the client acts as a receiver only.

4 Functional Specification

4.1 Function Overview

4.1.1 Web Function

Function ID	Function Name	Data Store	User
1.1.1	Customer Maintenance	Customer	Customer Sales Administrator
1.1.2	Product Maintenance	Product	Sales Administrator
1.1.3	Salesman Maintenance	Salesman	Sales Administrator
1.2.1	Prospect Transaction	Prospect	Customer Sales Administrator
1.3.1	Customer Inquiry	Customer	Sales Administrator
1.3.2	Product Inquiry	Product	Sales Administrator
1.4.2	Activity Review	Sales Activity Activity Advice	Sales Manager
1.5	Performance Report	Customer Prospect Sales Activity	Sales Manager
1.6.2	Request Notification	Pricing Reqest	Sales Manager
1.6.3	Price Approve	Pricing Request	Sales Manager

4.1.2 Wireless Function

Function ID	Function Name	Data Store	User
1.2.2	Prospect Notification	Prospect	Sales Representative
1.2.3	Prospect Inquiry	Prospect	Sales Representative
1.2.4	Prospect Update	Prospect	Sales Representative
1.3.3	Customer Inquiry	Customer	Sales Representative
1.3.4	Product Inquiry	Product	Sales Representative
1.4.1	Log Sales Activity	Sales Activity	Sales Representative
1.4.3	View Advice	Sales Activity Sales Advice	Sales Representative

4.1.3 Automatic Function

Function ID	Function Name	Data Store
1.2.2	Prospect Notification	Prospect
1.6.2	Request Notification	Pricing Request
1.6.4	Approval Notification	Pricing Request

4.2 Web Functional Design

Interal staffs (Sales Adminstr ation and Sales manager) can access the CRMS through the intranet using Internet Browser. And also some of the functions can be accessed by customer via the Internet connection.

Either internal staffs or customers must have a user ID and password to authe nicate their identify before using the CRMS.

4.2.1 Customer Maintenance

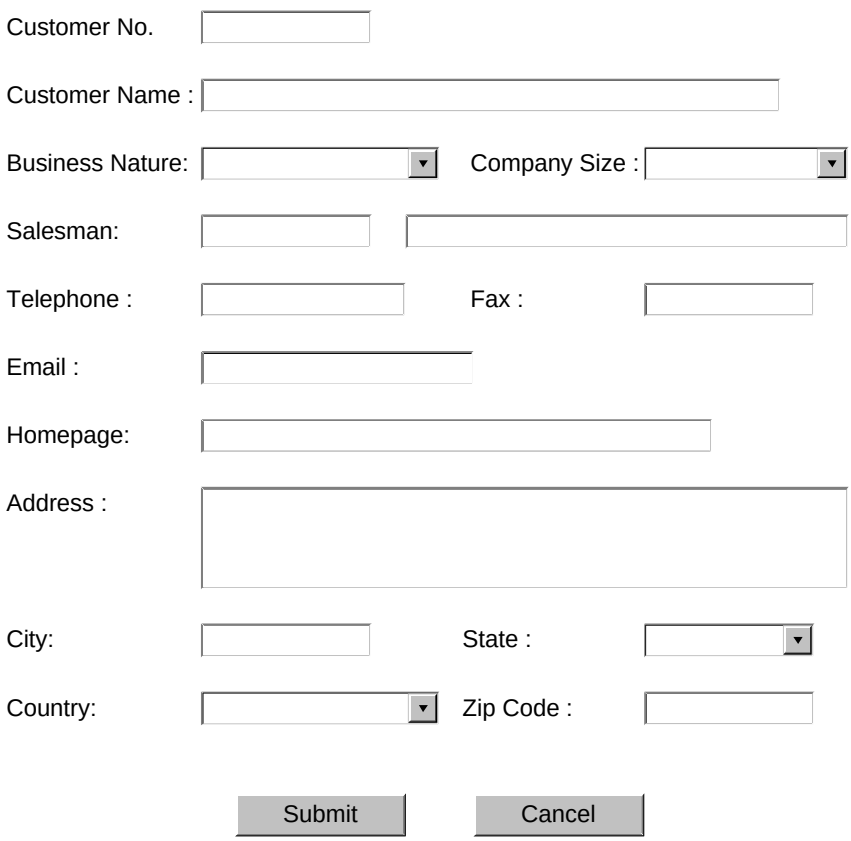


Figure 12 Customer Maintenance Page

Both internal sales administration staff and customer can access this function.

The sales administra tion staff can add and modify the customer information. They can search the customer record by Customer No, Customer Name, or Telephone number.

Customer No is the unique identifier for customer record.

Customer Name, telephone, Email and Address are the mandatory fields. The salesman who is assigned to take care of the current customer account.

For customer, he/she can modify his/her own information after login the system

4.2.2 Product Maintenance

This function can be accessed by sales administration to mainta in the product information.

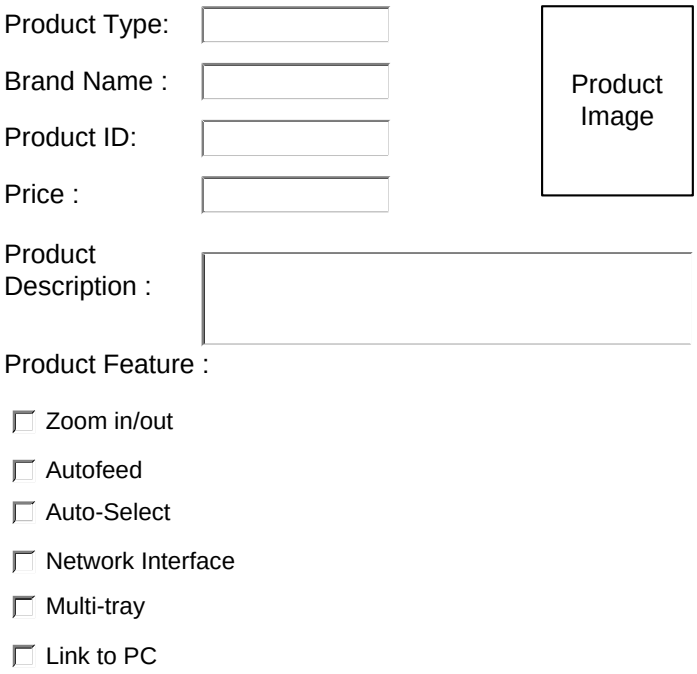


Figure 13Product Maintenance Page

Product ID is primary key to identify the product.
Product can be classified into different product type such as Copier, Fax, Printer etc.
The product photo in Bitmap or JPEG can be uploaded to store in database.

4.2.3 Salesman Maintenance

This function can be accessed by sales administration to maintain the salesman team.

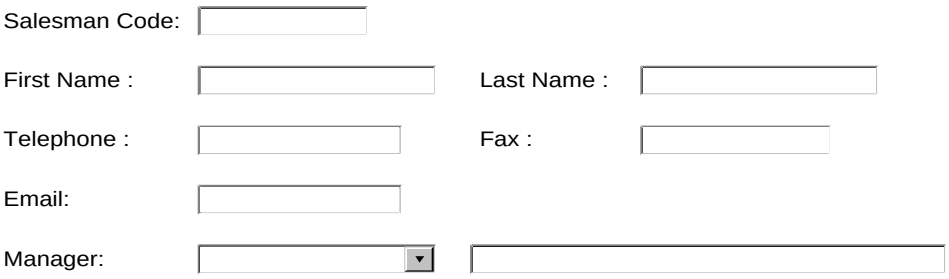


Figure 14Salesman Maintenance Page

Salesman code, salesman name, mobile phone and email address are the mandatory fields. Sales team is a generic tree structure. The manager code field is to fill in the upper level of the manager who supervises the salesman. Each manager can supervise one or more salesman. Salesman without manager code is the root (top manager) of the sales team.

4.2.4 Prospect Transaction

Both sales administration staff and customer can access this function to log the sales prospect.

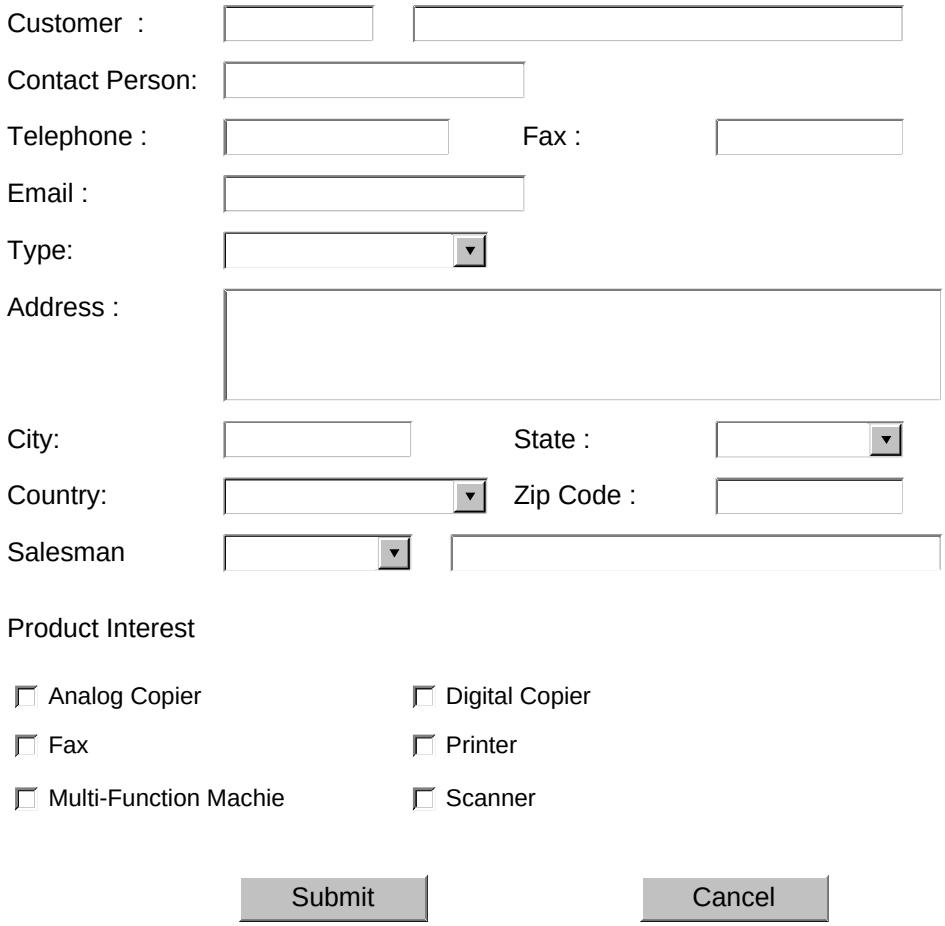


Figure 15 Prospect Page

Customers have to login before entering the sales prospect . The customer no. And customer name is shown for display only.

Sales Administration has to enter the related customer for sales prospect , otherwise the system will create the new customer no while the sale prospect is added.

Salesman Code, address, contact name, telephone and product interested are the mandatory fields. Press [Submi t] to confirm the prospect. The server responses "Prospect No.: xxxxxxxxx is logged, thank you for using service" if the prospect is logged successfully.

The system will send a message to notify the salesman the new prospect is logged.

4.2.5 Customer Inquiry

This function is similar to customer maintenance function, only the update is not allowed.

4.2.6 Product Inquiry

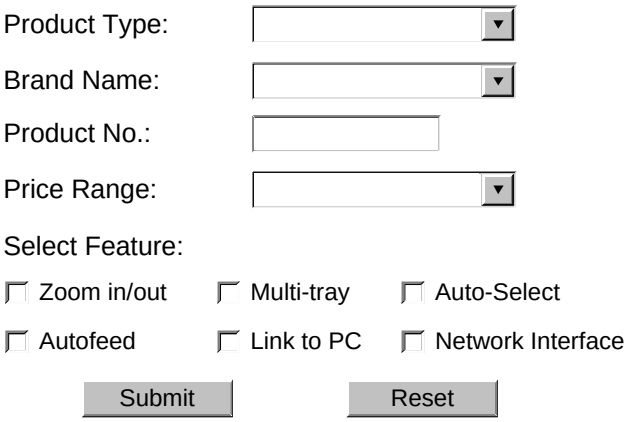


Figure 16 Product Searching Criteria

This function is used to search for the product information and its details.
Customer can search the desirable product by entering the search criteria such as brand name, product type, product no., and pricing range, also select one ore more product features.
The product matched the search criteria is listed out in the table formation. By clicking the row, the corresponding details product information with product photo are shown
For the internal staff, the product detail pricing and stock quantity are shown.

4.2.7 Activity Review and Advice

Only sales manger can access this function. The sales manager can only view these activities logged by his/her subordinates.

Salesman :

Activity Date: To

Actvity Type

Show Advice ☑

Search Reset

Salesman : xxxxx **Activity Date**99/99/9999 **Subject** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Manager : xxxxx **Advice Date**99/99/9999 **Subject** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Manager : xxxxx **Advice Date**99/99/9999 **Subject** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Manager : xxxxx **Advice Date**99/99/9999 **Subject** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Salesman : xxxxx **Activity Date**99/99/9999 **Subject** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Manager : xxxxx **Advice Date**99/99/9999 **Subject** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Manager : xxxxx **Advice Date**99/99/9999 **Subject** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Salesman : xxxxx **Activity Date**99/99/9999 **Subject** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Salesman : xxxxx **Activity Date**99/99/9999 **Subject** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Manager : xxxxx **Advice Date**99/99/9999 **Subject** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Figure 17 Sales Activity List

The manager searches the activities by salesman code, activity date, activit y type, and related customer. "Show Advice" checkbox is to select to display the related advice or not.The activities are grouped by salesman and sorted in chronological order. The activities and its related advice are grouped together. The subject of act ivities is displayed in the list.

Salesman : xxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Activity Date : 99./99/9999 **Activity Type** : xxxxxxxxx
Customer : xxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Contact Person : xxxxxxxxxxxxxxxxxxxxxxx

Subject : xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Activity Details
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Previous Next Advise

Figure 18 Activity Details

Double click the activity row, the detail activity / advice is shown. Click the [Advice] button to add the new advice to the activity.

4.2.8 Price Approve

Sales manager to approve the pricing request logged by salesman uses this function. Once the salesman logs the pricing request, the system will send an email to notify his manager to do the approval. Manager can get the request by key in the Reque st ID or search the unapproved request in the waiting queue.

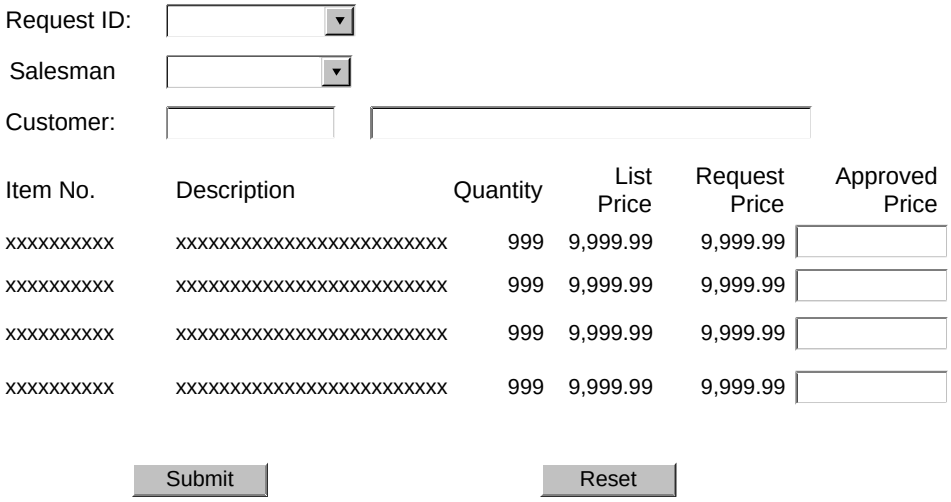


Figure 19 Pricing Approval Page

Manager can simply approve / reject the whole request, or review the pricing of each item. Press [Submit] to confirm the approval action, then the system will send message to notify the salesman.

4.3 WAP Functional Design

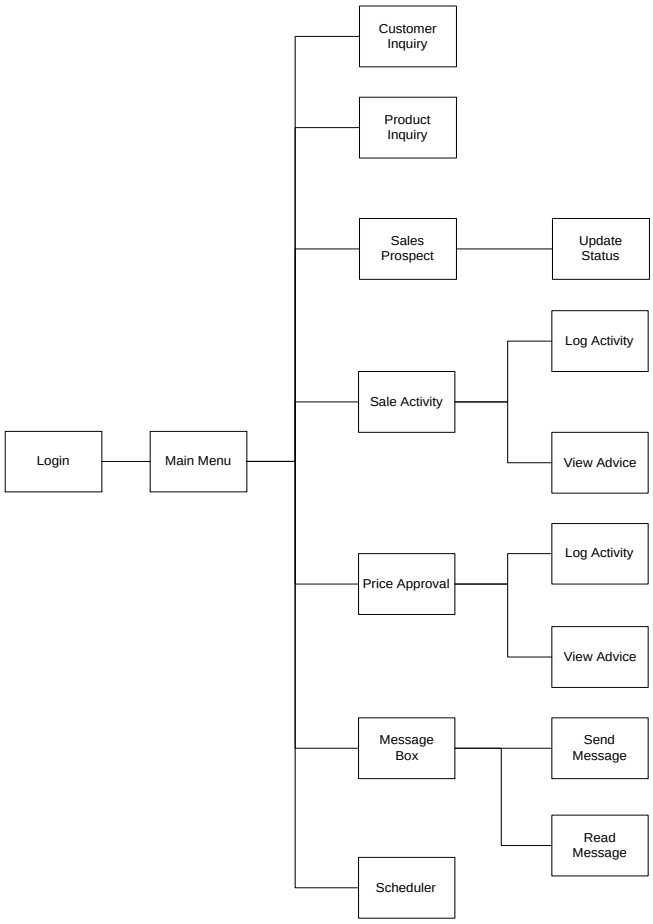


Figure 20 WAP Screen Flow Overview

4.3.1 System Login

User must key in the access code to verify the permission to use the system, the subscriber ID will be checked against the access code. If verification fail, "Access Denied" is shown.

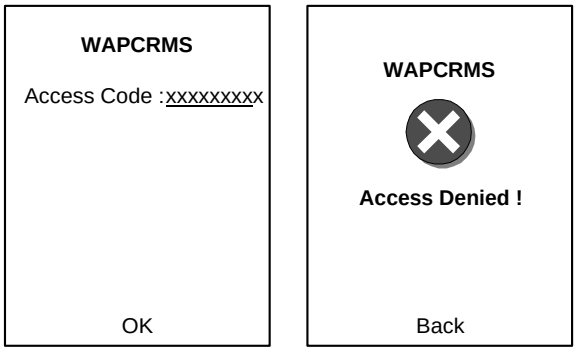


Figure 21 a) Login and b) Access Denied

4.3.2 Main Menu

A list of function items shown, user can select any of one to enter the function, sub-menu screen or logout the system.

The main menu shown after login, salesman can choose one of them to perform the function they want or to log out the system.

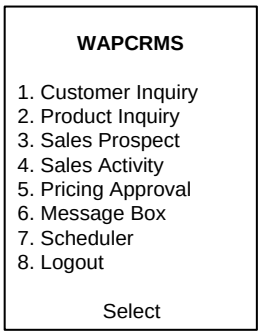


Figure 22 WAP Main Menu

4.3.3 Customer Inquiry

Salesman can enter any one of the search criteria – Customer No, Customer Name, Phone or Contact Person. The request send back to the Server when [Search] is selected.

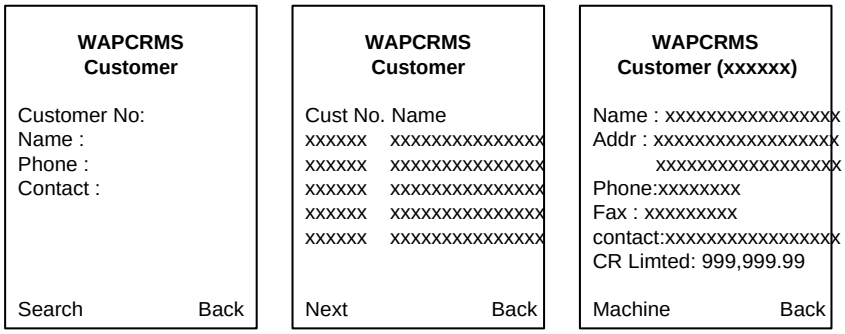


Figure 23 Customer Inquriy

After the server receive the request, it process the search in the customer base and send the matched result to client with a list of matched records. As the screen size and brandwidth constraints, only a few records is sent each time. The salesman select the customer in the list, then the details information of selected customer shown.

Choose [Machine] option, the machines owned by the customer displayed. Select the desired machine which details information shown in the next screen.

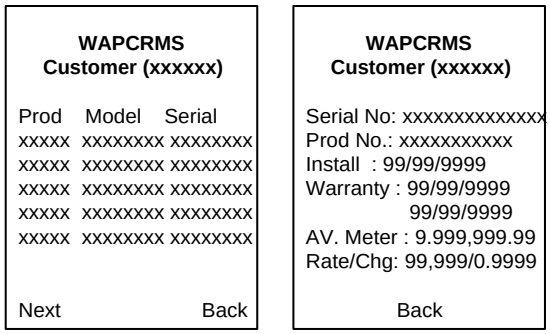


Figure 24 Machines Owned By Customer

4.3.4 Product Inquiry

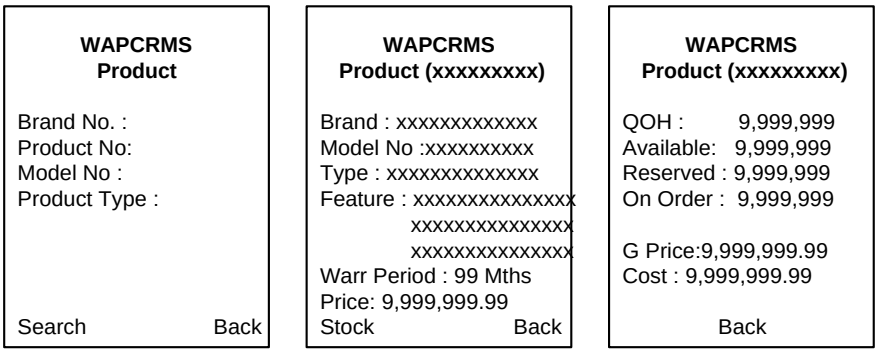


Figure 25 Product Inquiry

Salesman keys in the sea rch criteria – Brand No., Product No., Model No. or Product Type. Send the request to server, the server returns the result set to the client. The salesman can check the product information, pricing and also the stock quantity like Quanity On Hand, Reserved Quanity, Quantity Available and Quantity On Order.

4.3.5 Sales Activity

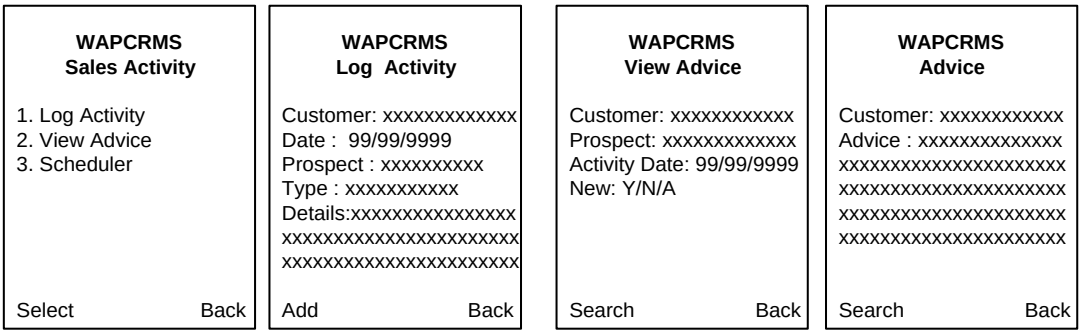


Figure 26 Log Sales Activity and View Advice

Sub-menu is shown with 3 menu items : 1) Log Activity, 2) View Advice and 3) Scheduler

Log Activity – Enter the details of the sales activity with related customer, press [Add] to save the databse.

View Advice – Enter the search criteria, and sent back to server. The matched advice sent back to client side.

Scheduler – Enter the new appointment – Call the PDA preloaded scheduler program

4.3.6 Sales Prospect Inquiry

Once the salesman receives the new prospect notification, he can use the prospect no. or customer name, phone or contact to get details information from the server.
Also the salesman can update the status of the prospect by select the proper status and press [update] to send back to server.

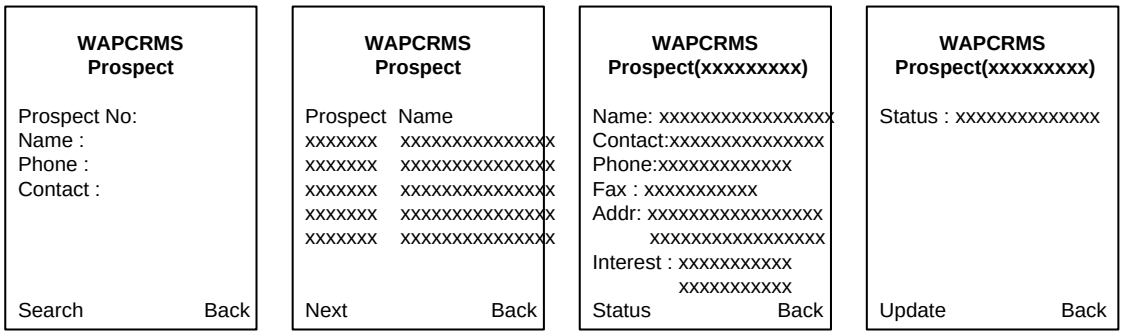


Figure 27 Prospect Inquiry & Update

The prospect status is to keep track of the life cycle of the prospect.

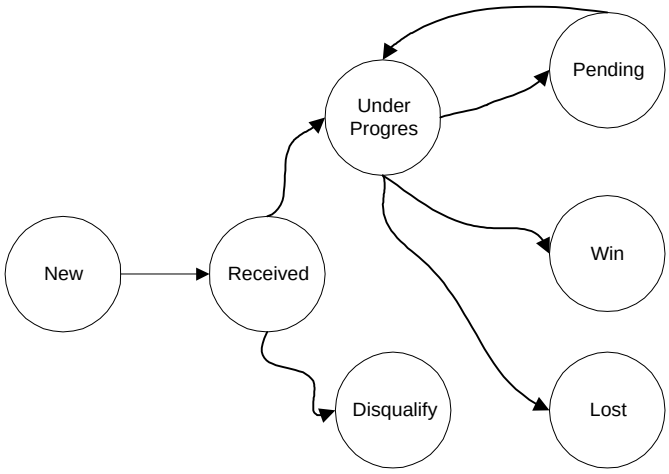


Figure 28 Life Cycle of Prospect

Status	Description
New	The initial status of the prospect.
Received	Salesman has received the prospect
Under Progress	Salesman start to handle the prospect
Disqualify	The prospect does not match the business
Pending	The prospect is pended for a while
Win	Salesman wins the prospect, and become the order
Loss	Salesman loses the prospect to the competitors

4.3.7 Price Approval

Within the price a pproval screen, there are 2 menu items – a) Request and b) Check Approval

Request – Salesman can enter the item and request price for the customer. The request is sent back to the office, and notify the senior manager to proceed it.

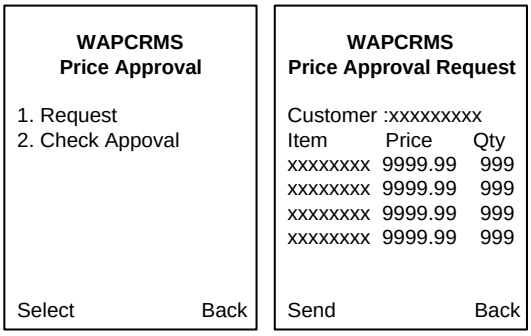


Figure 29 Pricing Request

Check Approval – Once the managers approved, adjusted or rejected the request, the system sends the notification to the salesman, so the salesman can check approved requests. Check the approved pricing for each required items.

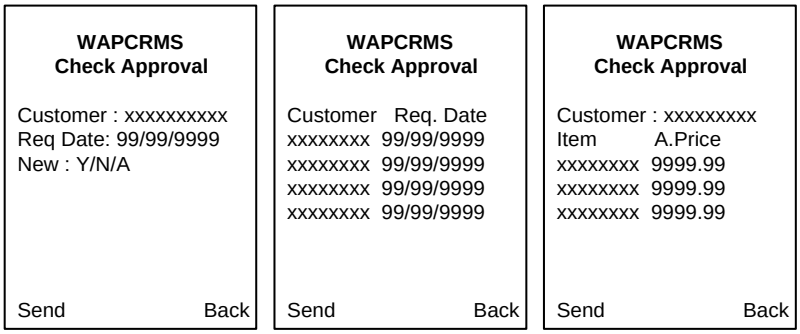


Figure 30 Check Price Approval

4.4 Automatic Function

4.4.1 Prospect Notification

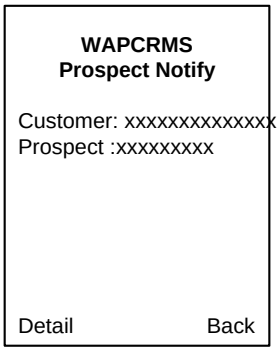


Figure 31 Prospect Notification

This function is to ensure all the new prospects send to the salesman within a short period.

- When the sales prospect is created by customer or sales administrator, this action triggers the prospect notification.
- The system constructs a message "New prospect : xxxxxxx on 99/99/9999 99:99" and add to the outgoing queue. The recipient is the assigned salesman of the prospect.
- The systems monitor the outgoing message queue, send the message to the recipient mobile device over the air.
- The new message sh own on the client screen notifies new *prospect* with *Customer Name* that is assigned to him/her.
- Based on the prospect ID on the short message, the salesman press [detail] to view the sales prospect information (i.e. Prospect Inquiry Function) via the mobile device.

4.4.2 Request Notification

This function is to notify the sales manager, there is a price approval request wait for his / her approval.

- When the salesman send the pricing request to system, the request is added to the system.
- System monitors any new request or pending requests exists. If found, the system will send the email to the corresponding sales manager to notify him/her to do the price approval

4.4.3 Approval Notification

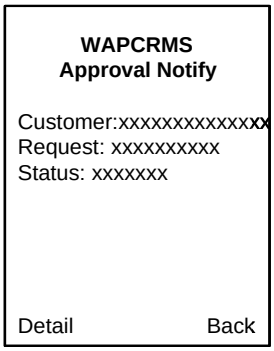


Figure 32Approval Notification

This function is to notify the salesman when the sales manager approves his/her pricing request. He/she can check the result of the request.

- When the sales manager completed the price approval, the system will construct a short message into the outgoing queue.
- Same as the prospect notification, the message will send to the salesman who raises this pricing approval request.
- The new message shown on the client screen notifies with the request ID, customer name and status (approved/ adjusted/ rejected).
- Based on the Request ID on the short message, the salesman can check the approved pricing detail information by select [Detail] button

5 Logical Data Model

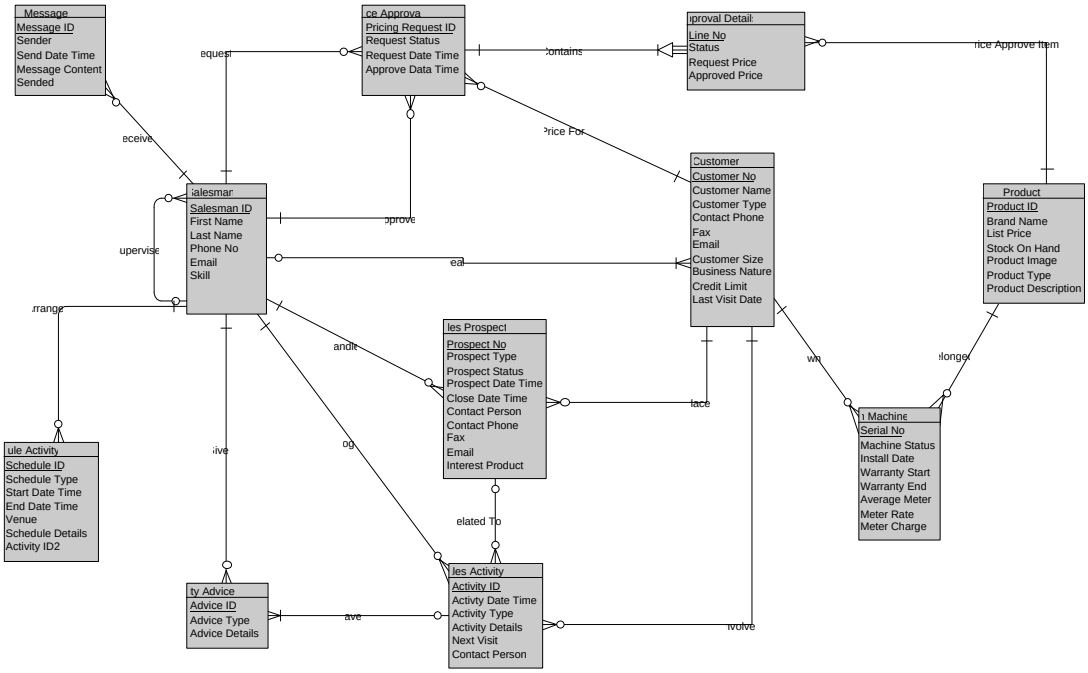


Figure 33 Logical Data Model

5.1 Entity List

Customer	Customer is the central element of the systems. Each customer is assigned to 1 salesman to deal.
Salesman	Salesman is the basic element of the sales team. Each salesman may be supervised by 1 manager.
Sales Activity	Salesman log every sales activity f or his/her customers. This is the life history of customer.
Sales Prospect	Customer can raise one or more sale prospects, the prospect is followed by the salesman from birth to death.
Advice	Advice gived by sales manager to corresponding sale activity. Each sale activity may have one or more manager to advise.
Schedule	Calendar daily events of salesman
Message	Outgoing Message send out to salesman over the air.
PriceRequest	Price Approval Request rasied by salesman for new pricing offer to specified customer
PriceRequestDetail	The details items model, request pricing,and approved pricing for each Price Approval Request.
Product	Product is the product information such as brand name, product type, feature and also machine outlook. Price and stock quantity are stored.
OwnMachine	The information of machines which bought by the customers. Each machine has unique serial no.

5.2 Relationship

Entity	Entity	Relationship	Description
Customer	Own Machine	Own	One customer may own one or more machines for any m odel. Each machine can be owned by only one customer
Customer	Price Approval	Price For	Salesman can raise a number of price approval request s for one customer. Each price approval request is for specificed customer.
Customer	Sales Prospect	Place	Customer can place one or more sales prospects for the product interested.
Customer	Sales Activity	Involve	Customer must involve in every sales activity. Each activity can relate to one specified customer only.
Price Approval	Price Approval Details	Contains	Each price approval request contains a number of pricing approval details for different items with different pricing.
Product	Price Approval Details	Price Approve Item	Different products may have one or more approval details. Each ap proval detail only has one item for approval.
Product	Own Machine	belonged	One ore more products with same model can be sold to the same customer. Each machines sold with unique serial no.
Sales Activity	Activity Advice	Have	Every sales activity may rec eive one ore more advice from manager.
Sales Prospect	Sales Activity	Related To	Sales prospect may in volve a number of sales activities. Sales activity may relate to one prospect.
Salesman	Message	Receive	Salesman will receive a number of message. Unique message is sent to only 1 recipient.
Salesman	Schedule Activity	Arrange	Salesman has to arrange his/her schedule with a number of events involved.
Salesman (Manager)	Price Approval	Approve	Manager can approve the pricing request submitted by his subordinates only.
Salesman	Price Approval	Request	Salesman can submit a number of pricing approval request.
Salesman	Sales Activity	Log	Salesman has to log his/her sales activitiy everyday.

Entity	Entity	Relationship	Description
Salesman (Manager)	Activity Advice	Give	Manager can give his/her advice to the sales activity
Salesman	Customer	Deal	Each salesman can deal with a num ber of customer accounts. The customer can be assigned to one and only one salesman to handle.
Salesman	Salesman (Manager)	Supervise	Salesman is supervised by one manager. The salesman without supervisor who is the head of the sales team
Salesman	Sales Prospect	Handle	Salesman can handle a number of sales prospects, which are placed by his/her own customers. Sales prospects can be handled by one and only one salesman.

6 Physical Data Model

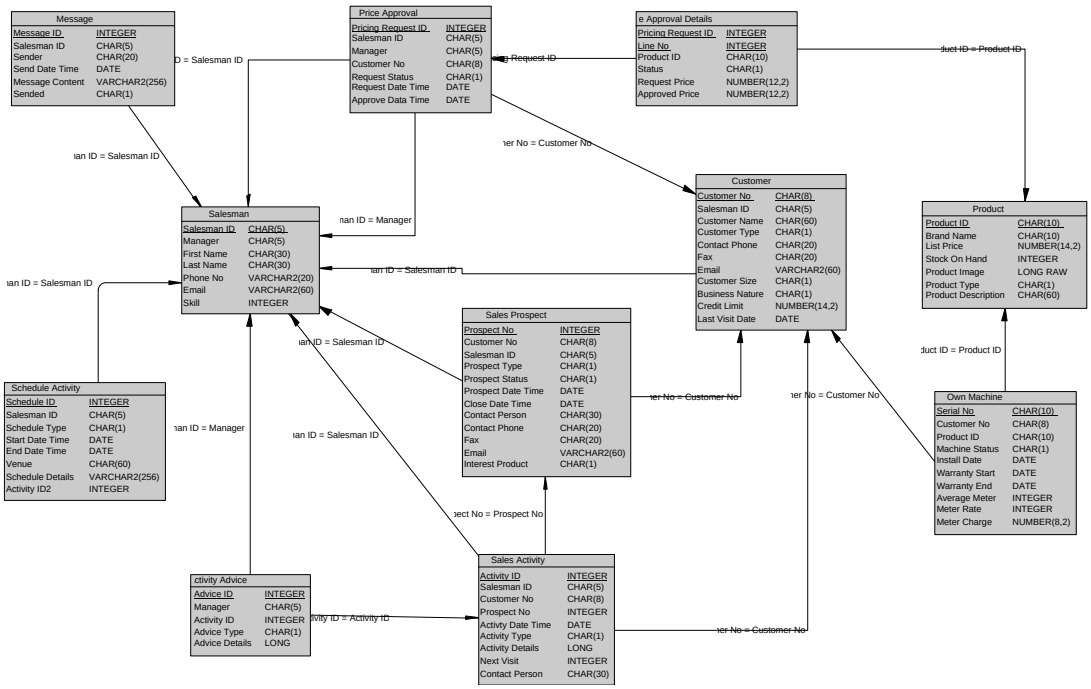


Figure 34 Physical Data Model

6.1 Table list

Name	Code	Description
Activity Advice	Activity Advice	Manager Advice for Salesman Activity
Customer	Customer	Customer Master Records
Message	Message	Outgoing Message Queue
Own Machine	Own Machine	Machines Owned by Customer
Price Approval	Price Approval	Pricing Approval Request Header
Price Approval Details	Price Approval Details	Pricing Approval Request Details
Product	Product	Product Master Records
Sales Activity	Sales Activity	Salesman Activity for related customers
Sales Prospect	Sales Prospect	Customer Sales Prospect
Salesman	Salesman	Salesman Master Records
Schedule Activity	Schedule Activity	Salesman Schedule

6.2 Table indexes list

Table	Name	Unique	Cluster	PKey	FKey	AltKey
Activity Advice	Activity Advice_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Activity Advice	Give_FK1	FALSE	FALSE	FALSE	TRUE	FALSE
Activity Advice	Have_FK2	FALSE	FALSE	FALSE	TRUE	FALSE
Customer	Customer_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Customer	Deal_FK1	FALSE	FALSE	FALSE	TRUE	FALSE
Message	Message_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Message	Receive_FK1	FALSE	FALSE	FALSE	TRUE	FALSE
Own Machine	Own Machine_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Own Machine	belonged_FK2	FALSE	FALSE	FALSE	TRUE	FALSE
Own Machine	Own_FK1	FALSE	FALSE	FALSE	TRUE	FALSE
Price Approval	Price Approval_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Price Approval	Approve_FK2	FALSE	FALSE	FALSE	TRUE	FALSE
Price Approval	Price For_FK3	FALSE	FALSE	FALSE	TRUE	FALSE
Price Approval	Request_FK1	FALSE	FALSE	FALSE	TRUE	FALSE
Price Approval Details	Price Approval Details_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Price Approval Details	Contains_FK1	FALSE	FALSE	FALSE	TRUE	FALSE
Price Approval Details	Price Approve Item_FK2	FALSE	FALSE	FALSE	TRUE	FALSE
Product	Product_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Sales Activity	Sales Activity_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Sales Activity	Involve_FK2	FALSE	FALSE	FALSE	TRUE	FALSE
Sales Activity	Log_FK1	FALSE	FALSE	FALSE	TRUE	FALSE
Sales Activity	Related To_FK3	FALSE	FALSE	FALSE	TRUE	FALSE
Sales Prospect	Sales Prospect_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Sales Prospect	Handle_FK2	FALSE	FALSE	FALSE	TRUE	FALSE
Sales Prospect	Place_FK1	FALSE	FALSE	FALSE	TRUE	FALSE
Salesman	Salesman_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Salesman	Supervise_FK1	FALSE	FALSE	FALSE	TRUE	FALSE
Schedule Activity	Schedule Activity_PK	TRUE	TRUE	TRUE	FALSE	FALSE
Schedule Activity	Arrange_FK1	FALSE	FALSE	FALSE	TRUE	FALSE

6.3 Reference list

Name	Code	Parent Table	Child Table
Receive	Receive	Salesman	Message
Arrange	Arrange	Salesman	Schedule Activity
Approve	Approve	Salesman	Price Approval
Request	Request	Salesman	Price Approval
Own	Own	Customer	Own Machine
Related To	Related To	Sales Prospect	Sales Activity
Price For	Price For	Customer	Price Approval
Price Approve Item	Price Approve Item	Product	Price Approval Details
belonged	belonged	Product	Own Machine
Log	Log	Salesman	Sales Activity
Give	Give	Salesman	Activity Advice
Deal	Deal	Salesman	Customer
Supervise	Supervise	Salesman	Salesman
Contains	Contains	Price Approval	Price Approval Details
Handle	Handle	Salesman	Sales Prospect
Have	Have	Sales Activity	Activity Advice
Place	Place	Customer	Sales Prospect
Involve	Involve	Customer	Sales Activity

6.4 Table information

6.4.1 Activity Advice

Card of the table Activity Advice

Name	Activity Advice
Code	Activity Advice
Comment	Manager advise for corresponding sales activity

Column list of the table Activity Advice

Name	Code
Activity ID	Activity ID
Advice Type	Advice Type
Advice Details	Advice Details
Manager	Manager
Advice ID	Advice ID

Column Activity ID of table Activity Advice

Name	Activity ID
Code	Activity ID
Comment	Sales Activity Reference ID
Table	Activity Advice
Data Type	INTEGER
Length	
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Advice Details of the table Activity Advice

Name	Advice Details
Code	Advice Details
Comment	Sale Manager Advice Details
Table	Activity Advice
Data Type	TEXT
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Advice ID of the table Activity Advice

Name	Advice ID
Code	Advice ID
Comment	Unique Internal ID
Table	Activity Advice
Data Type	INTEGER
Length	
Precision	
Primary	TRUE
Foreign Key	FALSE

Column Advice Type of the table Activity Advice

Name	Advice Type
Code	Advice Type
Comment	
Table	Activity Advice
Data Type	CHAR(1)
Length	1
Default	C
Validation	C – Comment F – For Your Information I - Important S – See Me
Primary	FALSE
Foreign Key	FALSE

Column Manager of the table Activity Advice

Name	Manager
Code	Manager
Comment	Salesman (Manager) who give the advice
Table	Activity Advice
Data Type	CHAR(5)
Length	5
Precision	
Primary	FALSE
Foreign Key	TRUE

Key list of the table Activity Advice

Name	**Code**
AdviceKey	AdviceKey

Key AdviceKey of table Activity Advice

Name	AdviceKey
Code	AdviceKey
Comment	The Unique Advice ID for Activity Advice
Table	Activity Advice
Constraint Name	PK_ACTIVITY ADVICE
Primary	TRUE

Index list of the table Activity Advice

Name	Code
Give_FK1	Give_FK1
Have_FK2	Have_FK2
Activity Advice_PK	Activity Advice_PK

Index Activity Advice_PK of table Activity Advice

Name	Activity Advice_PK
Code	Activity Advice_PK
Comment	Primary Key Activity Advice for Unique Advice ID
Table	Activity Advice
Unique	TRUE
Column	Advice ID
Cluster	FALSE

Index Give_FK1 of table Activity Advice

Name	Give_FK1
Code	Give_FK1
Comment	Related Manager (Salesman Code in Salesman table) gives the advice
Table	Activity Advice
Column	Manager
Unique	FALSE
Cluster	FALSE

Index Have_FK2 of table Activity Advice

Name	Have_FK2
Code	Have_FK2
Comment	The corresponding activity ID of the advice
Table	Activity Advice
Column	Activity ID
Unique	FALSE
Cluster	FALSE

6.4.2 Customer

Card of the table Customer

Name	Customer
Code	Customer
Comment	Basic Customer Information

Column list of the table Customer

Name	Code
Customer Size	Customer Size
Email	Email
Fax	Fax
Business Nature	Business Nature
Password	Password
Credit Limit	Credit Limit
Last Visit Date	Last Visit Date
Salesman ID	Salesman ID
Customer No	Customer No
Contact Phone	Contact Phone
Customer Name	Customer Name
Customer Type	Customer Type

Column Business Nature of table Customer

Name	Business Nature
Code	Business Nature
Comment	Predefined business nature of the customer
Table	Customer
Data Type	CHAR(1)
Length	1
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Contact Phone of table Customer

Name	Contact Phone
Code	Contact Phone
Comment	Primary Contact Phone number of the customer
Table	Customer
Data Type	CHAR(20)
Length	20
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Credit Limit of table Customer

Name	Credit Limit
Code	Credit Limit
Comment	Credit Limit for the Customer
Table	Customer
Data Type	NUMBER(14,2)
Length	14
Precision	2
Format	999,999,999.99

Primary	FALSE
Foreign Key	FALSE

Card of the column Customer Name of the table Customer

Name	Customer Name
Code	Customer Name
Comment	The full name of the customer name
Table	Customer
Data Type	CHAR(60)
Length	60
Precision	
Primary	FALSE
Foreign Key	FALSE

Card of the column Customer No of the table Customer

Name	Customer No
Code	Customer No
Comment	Unique ID for customer no, also act as login ID
Table	Customer
Data Type	CHAR(8)
Length	8
Precision	
Primary	TRUE
Foreign Key	FALSE

Column Customer Size of table Customer

Name	Customer Size
Code	Customer Size
Comment	Predefined Customer Size for Customer
Table	Customer
Data Type	CHAR(1)
Length	1
Precision	
Primary	FALSE
Foreign Key	FALSE

Card of the column Customer Type of the table Customer

Name	Customer Type
Code	Customer Type
Comment	Customer Type of the Customer
Table	Customer
Data Type	CHAR(1)
Length	1
Default	P
Checking	P - Potential Customer C - Current Customer I - Inactive Customer
Primary	FALSE
Foreign Key	FALSE

Column Email of table Customer

Name	Email

Code	Email
Comment	Email address of the customer
Table	Customer
Data Type	VARCHAR2(60)
Length	60
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Fax of table Customer

Name	Fax
Code	Fax
Comment	Fax number of the customer
Table	Customer
Data Type	CHAR(20)
Length	20
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Last Visit Date of table Customer

Name	Last Visit Date
Code	Last Visit Date
Comment	The last visit date of this customer, automatic updated by the system
Table	Customer
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Salesman ID of table Customer

Name	Salesman ID
Code	Salesman ID
Comment	Assigned Salesman to handle customer account, check against the salesman master file
Table	Customer
Data Type	CHAR(5)
Length	5
Precision	
Primary	FALSE
Foreign Key	TRUE

Key list of the table Customer

Name	**Code**
CustomerKey	CustomerKey

Key CustomerKey of table Customer

Name	CustomerKey
Code	CustomerKey
Comment	Customer No is the unique key

Table	Customer
Constraint Name	PK_CUSTOMER
Primary	TRUE

Index list of the table Customer

Name	Code
Deal_FK1	Deal_FK1
Customer_PK	Customer_PK

Index Customer_PK of table Customer

Name	Customer_PK
Code	Customer_PK
Comment	Primary Key Index of Customer (Customer No)
Table	Customer
Column	Customer ID
Unique	TRUE
Cluster	FALSE

Index Deal_FK1 of table Customer

Name	Deal_FK1
Code	Deal_FK1
Comment	Assigned Salesman FK
Table	Customer
Column	Salesman ID
Unique	FALSE
Cluster	FALSE

6.4.3 Message

Card of the table Message

Name	Message
Code	Message
Comment	Notify Message send to salesman over the air

Column list of the table Message

Name	Code
Send Date	Send Date
Send Time	Send Time
Message Content	Message Content
Sended	Sended
Message Type	Message Type
Message ID	Message ID
Sender	Sender
Recipent ID	Recipent ID

Column Message Content of table Message

Name	Message Content
Code	Message Content
Comment	
Table	Message
Data Type	VARCHAR2(256)
Length	256
Precision	
Domain	<None>
Primary	FALSE
Foreign Key	FALSE

Column Message ID of table Message

Name	Message ID
Code	Message ID
Comment	Unique Message ID
Table	Message
Data Type	INTEGER
Length	
Precision	
Domain	<None>
Primary	TRUE
Foreign Key	FALSE

Column Message Type of table Message

Name	Message Type
Code	Message Type
Comment	
Table	Message
Data Type	Char(1)
Length	1
Validateion	M – Email A – Approved Price Request P – Prospect Information
Primary	FALSE

Foreign Key	FALSE

Column Salesman ID of table Message

Name	Recipent ID
Code	Recipent ID
Comment	The recipent of this message
Table	Message
Data Type	CHAR(5)
Length	5
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Send Date Time of table Message

Name	Send Date
Code	Send Date
Comment	The send date of the message
Table	Message
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Send Time of table Message

Name	Send Time
Code	Send Time
Comment	The send time of the message
Table	Message
Data Type	Time
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Sended of table Message

Name	Sended
Code	Sended
Comment	
Table	Message
Data Type	CHAR(1)
Length	1
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Sender of table Message

Name	Sender
Code	Sender
Comment	
Table	Message

Data Type	CHAR(20)
Length	20
Precision	
Primary	FALSE
Foreign Key	FALSE

Key list of the table Message

Name	Code
MessageKey	MessageKey

Name	MessageKey
Code	MessageKey
Comment	
Table	Message
Constraint Name	PK_MESSAGE
Primary	TRUE

Index list of the table Message

Name	Code
Receive_FK1	Receive_FK1
Message_PK	Message_PK

Index Message_PK of table Message

Name	Message_PK
Code	Message_PK
Comment	Unique Message ID for each message
Table	Message
Column	Message ID
Unique	TRUE
Cluster	FALSE

Index Receive_FK1 of table Message

Name	Receive_FK1
Code	Receive_FK1
Comment	The message recipent
Table	Message
Column	Recipent ID
Unique	FALSE
Cluster	FALSE

6.4.4 Own Machine

Card of the table Own Machine

Name	Own Machine
Code	Own Machine
Comment	Different model of m achine owned by Customer . The basic information of the machine which is owned by customer

Column list of the table Own Machine

Name	Code
Warranty End	Warranty End
Warranty Start	Warranty Start
Average Meter	Average Meter
Meter Rate	Meter Rate
Meter Charge	Meter Charge
Customer No	Customer No
Serial No	Serial No
Install Date	Install Date
Product ID	Product ID
Service	Date
Machine Status	Machine Status

Column Average Meter of table Own Machine

Name	Average Meter
Code	Average Meter
Comment	Average meter reading of the machine used per month
Table	Own Machine
Data Type	INTEGER
Length	8
Format	9,999,99
Primary	FALSE
Foreign Key	FALSE

Column Customer No of table Own Machine

Name	Customer No
Code	Customer No
Comment	The customer who own this machine
Table	Own Machine
Data Type	CHAR(8)
Length	8
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Install Date of table Own Machine

Name	Install Date
Code	Install Date
Comment	The installation date of the customer machine
Table	Own Machine
Data Type	DATE
Length	
Precision	
Primary	FALSE

Foreign Key	FALSE

Column Machine Status of table Own Machine

Name	Machine Status
Code	Machine Status
Comment	The current status of machine
Table	Own Machine
Data Type	CHAR(1)
Length	1
Validation	U – In Use I - Installation D – Desposed X – Service Required
Primary	FALSE
Foreign Key	FALSE

Column Meter Charge of table Own Machine

Name	Meter Charge
Code	Meter Charge
Comment	The meter charge paid for the machine
Table	Own Machine
Data Type	NUMBER(8,2)
Length	8
Precision	2
Primary	FALSE
Foreign Key	FALSE

Column Meter Rate of table Own Machine

Name	Meter Rate
Code	Meter Rate
Comment	The meter rate of the machine
Table	Own Machine
Data Type	INTEGER
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Product ID of table Own Machine

Name	Product ID
Code	Product ID
Comment	The model no of the machine
Table	Own Machine
Data Type	CHAR(10)
Length	10
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Serial No of table Own Machine

Name	Serial No
Code	Serial No

Comment	Unique Serial No. of the machine
Table	Own Machine
Data Type	CHAR(10)
Length	10
Precision	
Primary	TRUE
Foreign Key	FALSE

Column Warranty End of table Own Machine

Name	Warranty End
Code	Warranty End
Comment	The warranty end date of the machine
Table	Own Machine
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Warranty Start of table Own Machine

Name	Warranty Start
Code	Warranty Start
Comment	The warranty start date of the machine
Table	Own Machine
Data Type	DATE
Length	
Precision	
Domain	<None>
Primary	FALSE
Foreign Key	FALSE

Column Service Date of table Own Machine

Name	Service Date
Code	Service Date
Comment	The last service date of the machine
Table	Own Machine
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Key list of the table Own Machine

Name	Code
OwnershipKey	OwnershipKey

Key OwnershipKey of table Own Machine

Name	OwnershipKey
Code	OwnershipKey
Comment	
Table	Own Machine
Constraint Name	PK_OWN MACHINE

Primary	TRUE

Index list of the table Own Machine

Name	Code
Own_FK1	Own_FK1
belonged_FK2	belonged_FK2
Own Machine_PK	Own Machine_PK

Index Own Machine_PK of table Own Machine

Name	Own Machine_PK
Code	Own Machine_PK
Comment	
Table	Own Machine
Column	Serial No
Unique	TRUE
Cluster	FALSE

Index Own_FK1 of table Own Machine

Name	Own_FK1
Code	Own_FK1
Comment	
Table	Own Machine
Column	Customer No
Unique	FALSE
Cluster	FALSE

Index belonged_FK2 of table Own Machine

Name	belonged_FK2
Code	belonged_FK2
Comment	
Table	Own Machine
Column	Product ID
Unique	FALSE
Cluster	FALSE

6.4.5 Price Approval

Card of the table Price Approval

Name	Price Approval
Code	Price Approval
Comment	Salesman request price approval, manage can approve, reject or adjust.

Column list of the table Price Approval

Name	Code
Request Status	Request Status
Customer No	Customer No
Request Date	Request Date
Request Time	Request Time
Approve Date	Approve Date
Approve Time	Approve Time
Pricing Request ID	Pricing Request ID
Manager	Manager
Salesman ID	Salesman ID

Column Approve Date of table Price Approval

Name	Approve Date
Code	Approve Date
Comment	The date manager approved the request
Table	Price Approval
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Approve Time of table Price Approval

Name	Approve Time
Code	Approve time
Comment	The time manager approved the request
Table	Price Approval
Data Type	Time
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Customer No of table Price Approval

Name	Customer No
Code	Customer No
Comment	The request for customer no
Table	Price Approval
Data Type	CHAR(8)
Length	8
Precision	
Domain	Customer No
Primary	FALSE
Foreign Key	TRUE

Column Manager of table Price Approval

Name	Manager
Code	Manager
Comment	Manager who approved this request
Table	Price Approval
Data Type	CHAR(5)
Length	5
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Pricing Request ID of table Price Approval

Name	Pricing Request ID
Code	Pricing Request ID
Comment	Unique Reference ID
Table	Price Approval
Data Type	INTEGER
Length	
Precision	
Primary	TRUE
Foreign Key	FALSE

Column Request Date of table Price Approval

Name	Request Date
Code	Request Date
Comment	The date salesman submit the request
Table	Price Approval
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Request Time of table Price Approval

Name	Request Time
Code	Request Time
Comment	The time salesman submit the request
Table	Price Approval
Data Type	Time
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Request Status of table Price Approval

Name	Request Status
Code	Request Status
Comment	The current status of the request
Table	Price Approval
Data Type	CHAR(1)
Length	1

Default	R
Validation	R- Requested P – Approved J – Rejected A – Adjusted
Primary	FALSE
Foreign Key	FALSE

Column Salesman ID of table Price Approval

Name	Salesman ID
Code	Salesman ID
Comment	The salesman who place the request
Table	Price Approval
Data Type	CHAR(5)
Length	5
Precision	
Primary	FALSE
Foreign Key	TRUE

Key list of the table Price Approval

Name	Code
PriceReqKey	PriceReqKey

Key PriceReqKey of table Price Approval

Name	PriceReqKey
Code	PriceReqKey
Comment	
Table	Price Approval
Constraint Name	PK_PRICE APPROVAL
Primary	TRUE

Index list of the table Price Approval

Name	Code
Approve_FK2	Approve_FK2
Price For_FK3	Price For_FK3
Request_FK1	Request_FK1
Price Approval_PK	Price Approval_PK

Index Approve_FK2 of table Price Approval

Name	Approve_FK2
Code	Approve_FK2
Comment	The sales manager approve the request
Table	Price Approval
Unique	FALSE
Cluster	FALSE

Index Price Approval_PK of table Price Approval

Name	Price Approval_PK
Code	Price Approval_PK
Comment	The primary key of the price approval request
Table	Price Approval

Unique	TRUE
Cluster	FALSE

Index Price For_FK3 of table Price Approval

Name	Price For_FK3
Code	Price For_FK3
Comment	The request for the customer
Table	Price Approval
Unique	FALSE
Cluster	FALSE

Index Request_FK1 of table Price Approval

Name	Request_FK1
Code	Request_FK1
Comment	The salesman place the request
Table	Price Approval
Unique	FALSE
Cluster	FALSE

6.4.6 Price Approval Details

Card of the table Price Approval Details

Name	Price Approval Details
Code	Price Approval Details
Comment	A number of approval details involved in the price

Column list of the table Price Approval Details

Name	Code
Status	Status
Request Price	Request Price
Approved Price	Approved Price
Pricing Request ID	Pricing Request ID
Product ID	Product ID
Line No	Line No

Column Approved Price of table Price Approval Details

Name	Approved Price
Code	Approved Price
Comment	The price approved by the manager.
Table	Price Approval Details
Data Type	NUMBER(12,2)
Length	12
Precision	2
Primary	FALSE
Foreign Key	FALSE

Column Line No of table Price Approval Details

Name	Line No
Code	Line No
Comment	Internal No.
Table	Price Approval Details
Data Type	INTEGER
Length	
Precision	
Primary	TRUE
Foreign Key	FALSE

Column Pricing Request ID of table Price Approval Details

Name	Pricing Request ID
Code	Pricing Request ID
Comment	The request ID related to the price approval header
Table	Price Approval Details
Data Type	INTEGER
Length	
Precision	
Primary	TRUE
Foreign Key	TRUE

Column Product ID of table Price Approval Details

Name	Product ID
Code	Product ID

Comment	The product requested by the salesman
Table	Price Approval Details
Data Type	CHAR(10)
Length	10
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Request Price of table Price Approval Details

Name	Request Price
Code	Request Price
Comment	The pricing for specified item requested by the salesman
Table	Price Approval Details
Data Type	NUMBER(12,2)
Length	12
Precision	2
Primary	FALSE
Foreign Key	FALSE

Column Status of table Price Approval Details

Name	Status
Code	Status
Comment	The status of each item details
Table	Price Approval Details
Data Type	CHAR(1)
Length	1
Default	R
Validation	R- Requested P – Approved J – Rejected A – Adjusted
Primary	FALSE
Foreign Key	FALSE

Key list of the table Price Approval Details

Name	Code
PriceReqDKey	PriceReqDKey

Key PriceReqDKey of table Price Approval Details

Name	PriceReqDKey
Code	PriceReqDKey
Comment	
Table	Price Approval Details
Constraint Name	PK_PRICE APPROVAL DETAILS
Primary	TRUE

Index list of the table Price Approval Details

Name	Code
Contains_FK1	Contains_FK1
Price Approve Item_FK2	Price Approve Item_FK2
Price Approval Details_PK	Price Approval Details_PK

Index Contains_FK1 of table Price Approval Details

Name	Contains_FK1
Code	Contains_FK1
Comment	
Table	Price Approval Details
Column	Customer No
Unique	FALSE
Cluster	FALSE

Index Price Approval Details_PK of table Price Approval Details

Name	Price Approval Details_PK
Code	Price Approval Details_PK
Comment	
Table	Price Approval Details
Column	Request ID
	Line No.
Unique	TRUE
Cluster	FALSE

Index Price Approve Item_FK2 of table Price Approval Details

Name	Price Approve Item_FK2
Code	Price Approve Item_FK2
Comment	
Table	Price Approval Details
Column	Product ID
Unique	FALSE
Cluster	FALSE

6.4.7 Product

Card of the table Product

Name	Product
Code	Product
Comment	Machine Details

Column list of the table Product

Name	Code
Product Image	Product Image
Stock On Hand	Stock On Hand
Product Type	Product Type
Product Description	Product Description
Product ID	Product ID
List Price	List Price
Brand Name	Brand Name

Column Brand Name of table Product

Name	Brand Name
Code	Brand Name
Comment	
Table	Product
Data Type	CHAR(10)
Length	10
Precision	
Primary	FALSE
Foreign Key	FALSE

Column List Price of table Product

Name	List Price
Code	List Price
Comment	
Table	Product
Data Type	NUMBER(14,2)
Length	14
Precision	2
Primary	FALSE
Foreign Key	FALSE

Column Product Description of table Product

Name	Product Description
Code	Product Description
Comment	
Table	Product
Data Type	CHAR(60)
Length	60
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Product ID of table Product

Name	Product ID

Code	Product ID
Comment	
Table	Product
Data Type	CHAR(10)
Length	10
Precision	
Primary	TRUE
Foreign Key	FALSE

Column Product Image of table Product

Name	Product Image
Code	Product Image
Comment	
Table	Product
Data Type	LONG RAW
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Product Type of table Product

Name	Product Type
Code	Product Type
Comment	
Table	Product
Data Type	CHAR(1)
Length	1
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Stock On Hand of table Product

Name	Stock On Hand
Code	Stock On Hand
Comment	
Table	Product
Data Type	INTEGER
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Key list of the table Product

Name	Code
ProductKey	ProductKey

Key ProductKey of table Product

Name	ProductKey
Code	ProductKey
Comment	
Table	Product
Constraint Name	PK_PRODUCT

Primary	TRUE

Index list of the table Product

Name	Code
Product_PK	Product_PK

Index Product_PK of table Product

Name	Product_PK
Code	Product_PK
Comment	
Table	Product
Unique	TRUE
Cluster	FALSE

6.4.8 Sales Activity

Card of the table Sales Activity

Name	Sales Activity
Code	Sales Activity
Comment	Every salesman activity interacts with each customer. (We can also call this as Customer History)

Column list of the table Sales Activity

Name	Code
Activity Type	Activity Type
Activity Date Time	Activity Date Time
Activity Date	Activity Date
Activity Details	Activity Details
Next Visit	Next Visit
Contact Person	Contact Person
Activity ID	Activity ID
Prospect No	Prospect No
Salesman ID	Salesman ID
Customer No	Customer No

Column Activity Details of table Sales Activity

Name	Activity Details
Code	Activity Details
Comment	Salesman Activity Details
Table	Sales Activity
Data Type	TEXT
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Activity ID of table Sales Activity

Name	Activity ID
Code	Activity ID
Comment	Unique Activity Reference Number
Table	Sales Activity
Data Type	INTEGER
Length	
Precision	
Primary	TRUE
Foreign Key	FALSE

Column Activity Type of table Sales Activity

Name	Activity Type
Code	Activity Type
Comment	What kind of activity
Table	Sales Activity
Data Type	CHAR(1)
Length	1
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Activty Date Time of table Sales Activity

Name	Activity Date Time
Code	Activity Date Time
Comment	Salesman Activity Date Time
Table	Sales Activity
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Contact Person of table Sales Activity

Name	Contact Person
Code	Contact Person
Comment	
Table	Sales Activity
Data Type	CHAR(30)
Length	30
Precision	
Domain	<None>
Primary	FALSE
Foreign Key	FALSE

Column Customer No of table Sales Activity

Name	Customer No
Code	Customer No
Comment	
Table	Sales Activity
Data Type	CHAR(8)
Length	8
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Next Visit of table Sales Activity

Name	Next Visit
Code	Next Visit
Comment	Next Visit point to the Schedule Activity for mark the next visit date
Table	Sales Activity
Data Type	INTEGER
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Prospect No of table Sales Activity

Name	Prospect No
Code	Prospect No
Comment	
Table	Sales Activity

Data Type	INTEGER
Length	
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Salesman ID of table Sales Activity

Name	Salesman ID
Code	Salesman ID
Comment	
Table	Sales Activity
Data Type	CHAR(5)
Length	5
Precision	
Primary	FALSE
Foreign Key	TRUE

Key list of the table Sales Activity

Name	Code
ActivityKey	ActivityKey

Key ActivityKey of table Sales Activity

Name	ActivityKey
Code	ActivityKey
Comment	
Table	Sales Activity
Constraint Name	PK_SALES ACTIVITY
Primary	TRUE

Index list of the table Sales Activity

Name	Code
Involve_FK2	Involve_FK2
Related To_FK3	Related To_FK3
Log_FK1	Log_FK1
Sales Activity_PK	Sales Activity_PK

Index Involve_FK2 of table Sales Activity

Name	Involve_FK2
Code	Involve_FK2
Comment	The customer involved in the sales activity
Table	Sales Activity
Column	Customer No
Unique	FALSE
Cluster	FALSE

Index Log_FK1 of table Sales Activity

Name	Log_FK1
Code	Log_FK1
Comment	The salesman who log the sales activity
Table	Sales Activity
Column	Salesman ID

Unique	FALSE
Cluster	FALSE

Index Related To_FK3 of table Sales Activity

Name	Related To_FK3
Code	Related To_FK3
Comment	The related sales prospect of the sales activity
Table	Sales Activity
Column	Prospect No
Unique	FALSE
Cluster	FALSE

Index Sales Activity_PK of table Sales Activity

Name	Sales Activity_PK
Code	Sales Activity_PK
Comment	
Table	Sales Activity
Column	Activity ID
Unique	TRUE
Cluster	FALSE

6.4.9 Sales Prospect

Card of the table Sales Prospect

Name	Sales Prospect
Code	Sales Prospect
Comment	Sales Prospect mean a opportunity for business sells

Column list of the table Sales Prospect

Name	Code
Contact Phone	Contact Phone
Contact Person	Contact Person
Close Date	Close Date
Fax	Fax
Email	Email
Interest Product	Interest Product
Customer No	Customer No
Prospect No	Prospect No
Prospect Date	Prospect Date
Prospect Time	Prospect Time
Prospect Status	Prospect Status
Salesman ID	Salesman ID
Prospect Type	Prospect Type

Column Close Date Time of table Sales Prospect

Name	Close Date
Code	Close Date
Comment	Log the prospect close date when prospect status is set to WIN or LOSS
Table	Sales Prospect
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Card of the column Contact Person of the table Sales Prospect

Name	Contact Person
Code	Contact Person
Comment	Customer Contact for Prospect
Table	Sales Prospect
Data Type	CHAR(30)
Length	30
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Contact Phone of table Sales Prospect

Name	Contact Phone
Code	Contact Phone
Comment	Contact Phone Number
Table	Sales Prospect
Data Type	CHAR(20)
Length	20

Precision	
Primary	FALSE
Foreign Key	FALSE

Column Customer No of table Sales Prospect

Name	Customer No
Code	Customer No
Comment	
Table	Sales Prospect
Data Type	CHAR(8)
Length	8
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Email of table Sales Prospect

Name	Email
Code	Email
Comment	
Table	Sales Prospect
Data Type	VARCHAR2(60)
Length	60
Precision	
FALSE	
Foreign Key	FALSE

Column Fax of table Sales Prospect

Name	Fax
Code	Fax
Comment	
Table	Sales Prospect
Data Type	CHAR(20)
Length	20
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Interest Product of table Sales Prospect

Name	Interest Product
Code	Interest Product
Comment	
Table	Sales Prospect
Data Type	CHAR(1)
Length	1
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Prospect Date of table Sales Prospect

Name	Prospect Date
Code	Prospect Date
Comment	

Table	Sales Prospect
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Prospect Time of table Sales Prospect

Name	Prospect Time
Code	Prospect Time
Comment	
Table	Sales Prospect
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Prospect No of table Sales Prospect

Name	Prospect No
Code	Prospect No
Comment	Unique Reference No
Table	Sales Prospect
Data Type	INTEGER
Length	
Precision	
Primary	TRUE
Foreign Key	FALSE

Column Prospect Status of table Sales Prospect

Name	Prospect Status
Code	Prospect Status
Comment	Status keep check the progress of the salesman follow
Table	Sales Prospect
Data Type	CHAR(1)
Length	1
Default	N
Validation	N – New
	R – Receive
	U – Under Progress
	P – Pending
	D – Disqualify
	W – Win
	L – Loss
Primary	FALSE
Foreign Key	FALSE

Column Prospect Type of table Sales Prospect

Name	Prospect Type
Code	Prospect Type
Comment	Type of Sales Prospect
Table	Sales Prospect
Data Type	CHAR(1)

Length	1
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Salesman ID of table Sales Prospect

Name	Salesman ID
Code	Salesman ID
Comment	
Table	Sales Prospect
Data Type	CHAR(5)
Length	5
Precision	
Primary	FALSE
Foreign Key	TRUE

Key list of the table Sales Prospect

Name	Code
ProspectKey	ProspectKey

Key ProspectKey of table Sales Prospect

Name	ProspectKey
Code	ProspectKey
Comment	
Table	Sales Prospect
Constraint Name	PK_SALES PROSPECT
Primary	TRUE

Index list of the table Sales Prospect

Name	Code
Place_FK1	Place_FK1
Handle_FK2	Handle_FK2
Sales Prospect_PK	Sales Prospect_PK

Index Handle_FK2 of table Sales Prospect

Name	Handle_FK2
Code	Handle_FK2
Comment	The salesman who handle the sales prospect
Table	Sales Prospect
Column	Salesman ID
Unique	FALSE
Cluster	FALSE

Index Place_FK1 of table Sales Prospect

Name	Place_FK1
Code	Place_FK1
Comment	The customer who place the sales prospect
Table	Sales Prospect
Column	Customer No
Unique	FALSE
Cluster	FALSE

Index Sales Prospect_PK of table Sales Prospect

Name	Sales Prospect_PK
Code	Sales Prospect_PK
Comment	
Table	Sales Prospect
Column	Prospect No
Unique	TRUE
Cluster	FALSE

6.4.10 Salesman

Card of the table Salesman

Name	Salesman
Code	Salesman
Comment	Sales Team structure with each salesman details

Column list of the table Salesman

Name	Code
Phone No	Phone No
Last Name	Last Name
Email	Email
Skill	Skill
Salesman ID	Salesman ID
First Name	First Name
Manager	Manager

Column Email of table Salesman

Name	Email
Code	Email
Comment	
Table	Salesman
Data Type	VARCHAR2(60)
Length	60
Precision	
Primary	FALSE
Foreign Key	FALSE

Column First Name of table Salesman

Name	First Name
Code	First Name
Comment	
Table	Salesman
Data Type	CHAR(30)
Length	30
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Last Name of table Salesman

Name	Last Name
Code	Last Name
Comment	
Table	Salesman
Data Type	CHAR(30)
Length	30
Precision	
FALSE	
Foreign Key	FALSE

Column Manager of table Salesman

Name	Manager

Code	Manager
Comment	The manager, who supervise the salesman, is the existing salesman
Table	Salesman
Data Type	CHAR(5)
Length	5
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Phone No of table Salesman

Name	Phone No
Code	Phone No
Comment	
Table	Salesman
Data Type	VARCHAR2(20)
Length	20
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Salesman ID of table Salesman

Name	Salesman ID
Code	Salesman ID
Comment	Unique Code for salesman
Table	Salesman
Data Type	CHAR(5)
Length	5
Precision	
	TRUE
Foreign Key	FALSE

Column Skill of table Salesman

Name	Skill
Code	Skill
Comment	
Table	Salesman
Data Type	INTEGER
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Key list of the table Salesman

Name	Code
SalesmanKey	SalesmanKey

Key SalesmanKey of table Salesman

Name	SalesmanKey
Code	SalesmanKey
Comment	
Table	Salesman
Constraint Name	PK_SALESMAN

Primary	TRUE

Index list of the table Salesman

Name	Code
Supervise_FK1 Salesman_PK	Supervise_FK1 Salesman_PK

Index Salesman_PK of table Salesman

Name	Salesman_PK
Code	Salesman_PK
Comment	
Table	Salesman
Column	Salesman ID
Unique	TRUE
Cluster	FALSE

Index Supervise_FK1 of table Salesman

Name	Supervise_FK1
Code	Supervise_FK1
Comment	
Table	Salesman
Column	Manager
Unique	FALSE
Cluster	FALSE

6.4.11 Schedule Activity

Card of the table Schedule Activity

Name	Schedule Activity
Code	Schedule Activity
Comment	The schedule event of the salesman

Column list of the table Schedule Activity

Name	Code
Venue	Venue
End Date	End Date
End Time	End Time
Schedule Details	Schedule Details
Activity ID2	Activity ID2
Schedule ID	Schedule ID
Start Date	Start Date
Start Time	Start Time
Salesman ID	Salesman ID
Schedule Type	Schedule Type

Column Activity ID2 of table Schedule Activity

Name	Activity ID2
Code	Activity ID2
Comment	Unique Activity Reference Number
Table	Schedule Activity
Data Type	INTEGER
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column End Date of table Schedule Activity

Name	End Date
Code	End Date
Comment	
Table	Schedule Activity
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column End Time of table Schedule Activity

Name	End Time
Code	End Time
Comment	
Table	Schedule Activity
Data Type	DATE
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Salesman ID of table Schedule Activity

Name	Salesman ID
Code	Salesman ID
Comment	
Table	Schedule Activity
Data Type	CHAR(5)
Length	5
Precision	
Primary	FALSE
Foreign Key	TRUE

Column Schedule Details of table Schedule Activity

Name	Schedule Details
Code	Schedule Details
Comment	
Table	Schedule Activity
Data Type	VARCHAR2(256)
Length	256
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Schedule ID of table Schedule Activity

Name	Schedule ID
Code	Schedule ID
Comment	Unqiue Identifier of the schedule
Table	Schedule Activity
Data Type	INTEGER
Length	
Precision	
Primary	TRUE
Foreign Key	FALSE

Column Schedule Type of table Schedule Activity

Name	Schedule Type
Code	Schedule Type
Comment	
Table	Schedule Activity
Data Type	CHAR(1)
Length	1
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Start Date of table Schedule Activity

Name	Start Date
Code	Start Date
Comment	
Table	Schedule Activity
Data Type	DATE
Length	
Precision	
Primary	FALSE

Foreign Key	FALSE

Column Start Time of table Schedule Activity

Name	Start Time
Code	Start Time
Comment	
Table	Schedule Activity
Data Type	Time
Length	
Precision	
Primary	FALSE
Foreign Key	FALSE

Column Venue of table Schedule Activity

Name	Venue
Code	Venue
Comment	The location for the event
Table	Schedule Activity
Data Type	CHAR(60)
Length	60
Precision	
FALSE	
Foreign Key	FALSE

Key list of the table Schedule Activity

Name	Code
ScheduleKey	ScheduleKey

Key ScheduleKey of table Schedule Activity

Name	ScheduleKey
Code	ScheduleKey
Comment	
Table	Schedule Activity
Constraint Name	PK_SCHEDULE ACTIVITY
Primary	TRUE

Index list of the table Schedule Activity

Name	Code
Arrange_FK1	Arrange_FK1
Schedule Activity_PK	Schedule Activity_PK

Index Arrange_FK1 of table Schedule Activity

Name	Arrange_FK1
Code	Arrange_FK1
Comment	
Table	Schedule Activity
Column	Salesman ID
Unique	FALSE
Cluster	FALSE

Index Schedule Activity_PK of table Schedule Activity

Name	Schedule Activity_PK
Code	Schedule Activity_PK
Comment	
Table	Schedule Activity
Column	Schedule ID
Unique	TRUE
Cluster	FALSE

7 Data Flow Diagram

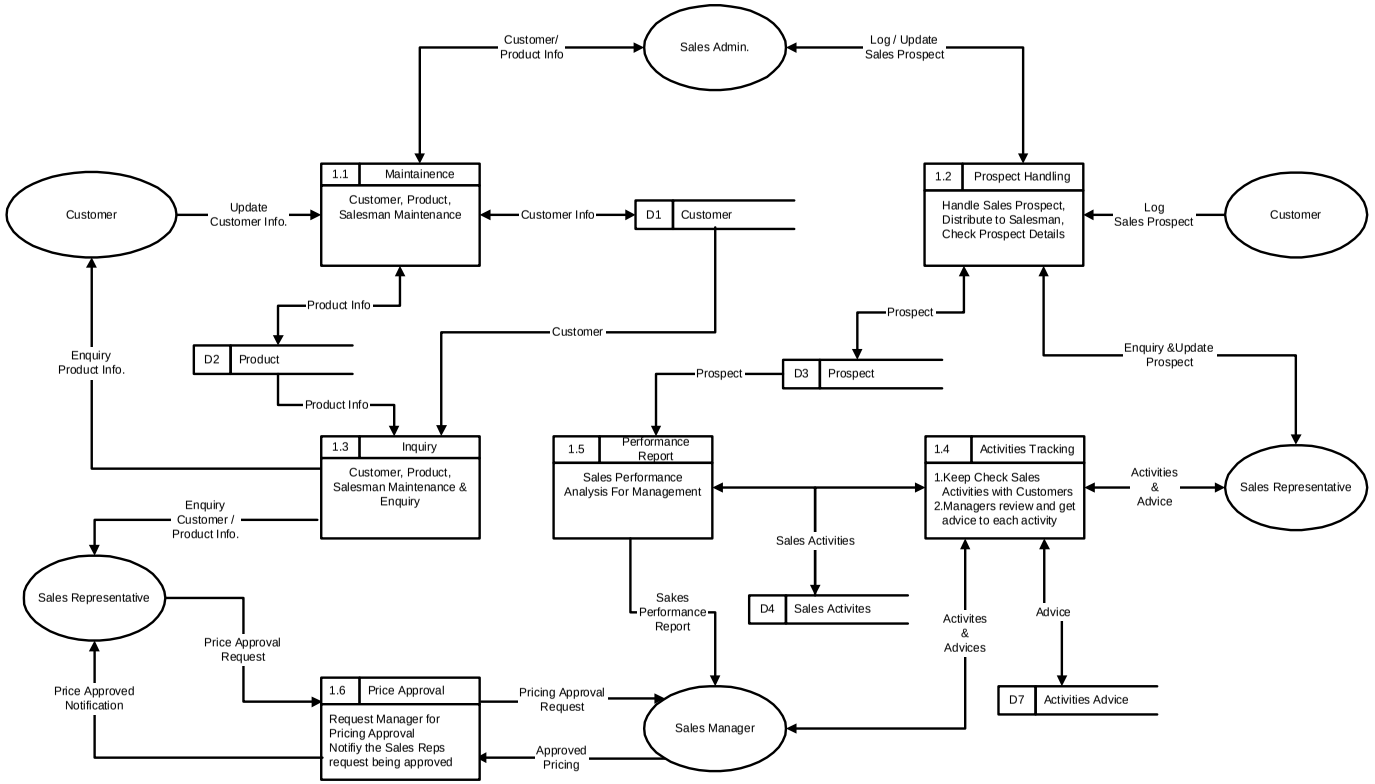


Figure 35 Level 1 DFD

8 System Architecture

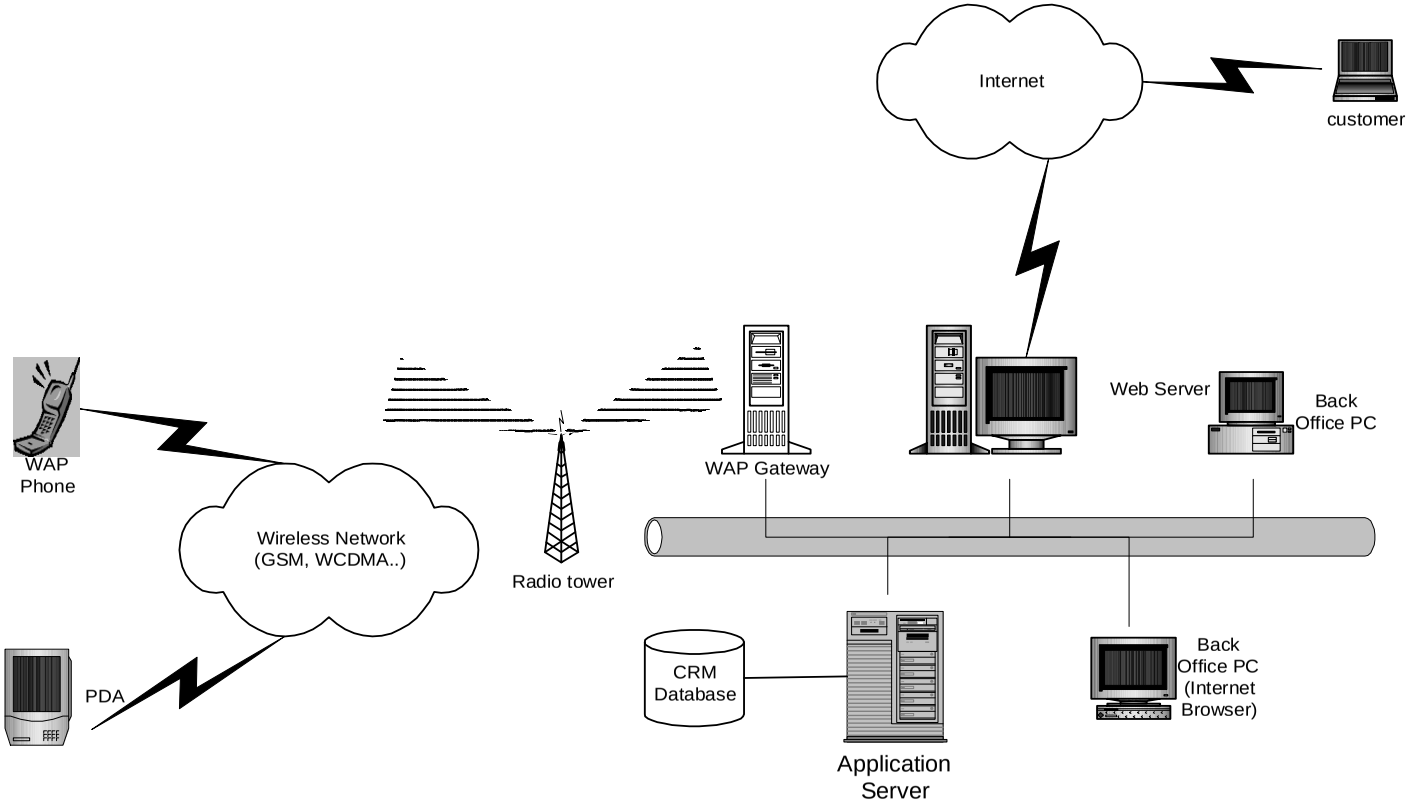


Figure 36 System Architecture

9 Technical Reference

9.1 Hardware

1. Database Server

Oracle Database run on NT Platform for CRMS Database

2. Web Server

Microsoft IIS Web Server generates both static and dymanic HTML / WML content to Web browser or WAP browser.

3. WAP Gateway

Communicate with WAP Client and Web Server to encode and decode the WML contents.

4. Client PC

To run the following applications:

Internet Browser – Access the web-based CRMS by the backoffice staffs or the customer

WAP Browser Emulator (PDA/ Phone) – Access CRMS using WAP.

9.2 Software

- Microsoft NT Server 4.0
- Microsoft IIS Web Server
- Microsoft IE 5.0 / Netscape Communicator 4.7
- Nokia WAP Server
- WAP Browser on Window / PalmOS
- PalmOS 3.0 Emulator

Development Tools

Server Side	• Oracle SQL Plus • Case Tool – PowerDesigner • ASP (Active Server Page) Script • Java 2 with JDBC 2.0 • HTML
Client Side	• Java 2 • HTML • WML • WMLScript

10 Related Web Site

[1] WAP Forum http://www.wapforum.org

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[14] WAPORACLE http://www.waporacle.com/index.cfm

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[11] *Ericsson Review No. 3 1999 – Messaging-over-IP – A network for messaging and information services (page 142 – 147)* – Janne Lundqvist and Bo Svensson

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[18] ***日経Business 11 October 1999 - 携帯電話からネット接続** (page 28 - 31)*

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WAP Forum 3
WAP Gateway 20
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