BUSINESS PORTAL DEVELOPMENT BASED ON SAP

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Abstract - In an organization, there will be various departments. Communication across the departments plays an important role for the data management and helps the organization to run smoothly and efficiently. Lack of communication may lead to data redundancy and inconsistency. Here, SAP comes into picture. The main objective of this paper is to develop a business portal in order to facilitate effective data processing and information flow across organizations. Portal development mainly focuses on Customer, Vendor and Employee with SAP Database. It is designed for maintaining the data of all the Customers, Vendors and Employees carrying out their activities with the organization including different modules of SAP namely Sales and Distribution, Material Management, Human Resource and Finance.

Keywords - SAP, Business Portal, Customer, Vendor, Employee.

I. INTRODUCTION

All businesses, from big corporations and multinationals to little stores, can use the SAP system. Automation, monitoring, and more control over all departments and activities increase productivity. This implies that investing in procedures requires less time and money.

It provides better collaboration and communication between departments. For instance, you can use the SAP system to gain control over all processes and avoid repeating unnecessary tasks or duplicating information across several platforms. This also ensures business transparency. It has increased security of internal information. So, a complete full stack development portals are designed for business applications with SAP inclusive for Customer, Vendor and Employee.

II. SAP

SAP stands for Systems Applications and Products in Data Processing where it provides the centralized system for carrying out the business activities by integrating various departments in data communication which shares the common database.

SAP is the world's leading producer of software founded in the year 1972 which helps in the management of business processes. It also helps in developing solutions that facilitate information flow across organizations and effective data processing.

Fig 1. SAP Integration

SAP helps companies and organizations of all sizes and industries to run their business profitably. And to grow sustainably.

256

III. SALES AND DISTRIBUTION (SD)

SAP SD (Sales and Distribution) which is one of the main components of SAP ERP system. This module is used to manage shipping, billing, selling and transportation of products and services in an industry or organization.

This module is a part of the SAP Logistics module. It manages customer relationships starting from raising an inquiry and quotation to sales order with reference of prerequisite documents (that is inquiry and quotation) and billing of the product or service. SAP SD module is closely integrated with other modules like SAP MM (Material Management) and SAP PP (Production Planning).

Process Flow of SAP SD are as follows:-
- Sales Inquiry.
- Quotation
- Sales Order Creation
- Checking for the availability
- Order Confirmed
- Delivery
- Billing
- Invoice / Payment

IV. MATERIAL MANAGEMENT (MM)

SAP MM (Materials Management) is a module of the SAP ERP software package used for Procurement Handling and Inventory Management. All supply chain functions, including consumption-based planning, planning, vendor evaluation, and invoice verification, are covered by SAP Materials management.

Procure-to-Pay cycle defines how the organization procures the goods and services it needs to do business. The steps involved in P2P Cycle are as follows

- Determination of Requirement
- Vendor Selection
- Creating Purchase Order
- Processing Purchase Order
- List of delivery
- Picking and Packing
- Verification against predefined quality
- Posting goods receipt
- Posting invoice and verification

V. HUMAN RESOURCE (HR)

An essential SAP module is SAP Human Capital Management (SAP HCM). It is also referred to as SAP HRMS, or SAP Human Resource Management System (HR).

It is possible to automate record-keeping procedures using SAP HR software. The HR division can benefit greatly from the payroll and administration papers in this framework.

It mainly deals with the followings:
- Organizational Management
- Personnel Administration
- Time Management
- Payroll Accounting
- Travel Management

VI. FINANCE

SAP FI is a core module in SAP ERP. It is a central component that allows the organization to control and manage all its financial data. It aids in the analysis of a company's financial standing in the market. Other SAP modules like SAP SD, SAP PP, SAP MM, SAP SCM, etc. can be integrated with it.

It mainly deals with the followings:
- Invoice Details
- Payment and aging
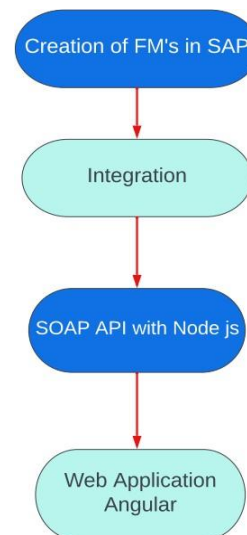- Credit/Debit Memo

VII. METHODOLOGY PROPOSED

Fig 2. Process Flow

257

A. Creation of Function Modules in the Backend

In the SAP system, for every portal respective Functional Modules are developed using ABAP language (Advanced Business Application Programming). It is the fourth generation programming language used for development and automation purposes in SAP software. FM's are created by using the Tcode SE37. And Custom tables (for login tables) are created by using the Tcode SE11.

B. Integration (Middleware - using Web Service / (PI/PO))

For Middleware we use,
- Customer Portal - RFC (Web service)
- Vendor and Employee - SAP PI/PO

C. SOAP API with Node js

Node.js is an open-sourced, cross-platform JavaScript run-time environment that lets developers write command line tools and server-side scripts outside of a browser. Server can easily communicate with the frontend via SOAP APIs using Node.js. It also provides packages like Express.js that makes it even easier to build web applications.

D. Web Application using Angular

Angular is an open-source Java Script Framework for building web applications using HTML and Typescript. Typescript is the superset of Java Script, it is nothing but JavaScript and some additional features i.eES6 features.

VIII. CUSTOMER PORTAL

The objective of the customer portal is to understand the functionalities of Sales and Distribution (SD) and Finance (FI) modules. This portal is to be designed for maintaining the data of all the customers carrying out business with the organization. The need of Customer portal is to access and view the complete transaction between the company and customer.

Development Technology stack to be used for Customer Portal are
1. Front End - **Angular**
2. Middleware - **SAP RFC Web Service**
3. Back End - **SAP Database**

A. Front End
1. Customer Login

Customer login page is designed to login with the user-ID as Customer-ID and the Password. While authenticating, the presence of the Customer-ID in the standard table has to be checked, post which both the Customer-ID and the password must be verified in the custom table (Z-table).

The Customer-ID will reach the SAP ERP system via RFC Web Service. Once the Customer-ID and Password is validated in the SAP ERP system the response will be sent back to the portal with the validation result. Once the validation is successful, the Customer will be allowed to access their respective Dashboard.

2. Customer Profile View

Customer profile page is designed to display the customer information. When the customer requests to view his information, a web-service call will be initiated from the portal and collects all the master data from the SAP system via RFC web services call. The collected customer information will be displayed.

3. Customer Dashboard

The customer dashboard is designed and developed to have the end to end transactions between logon customer and the company. This page is developed to have complete sales data belonging to that customer, Such as
    i. Inquiry data
    ii. Sale order data
    iii. List of Delivery

4. Customer Finance Sheet

The customer financial sheet needs to have a complete financial transaction between the customer and the company. This page needs to be developed to have complete financial data belonging to that customer, Such as
    i. Invoice details
    ii. Payments and aging
    iii. Credit/Debit memo

B. Middleware
RFC Web Service

SAP RFC Web Service is used as middleware to integrate the SAP ERP Portal with the SAP Database. A web service connection is to be made via the RFC function modules. The adapters

258

provide the end to end communication between the application and database.

C. Back-end

The complete back-end is implemented using SAP ECC/S4 Systems via ABAP (Advanced Business Application Programming).

IX. VENDOR PORTAL

The objective of the vendor portal is to understand the functionalities of the Material Management (MM) and Finance (FI) module. This portal is designed for maintaining the data of all the vendors carrying out business with the organization. The need of a vendor portal is to access and view the complete transaction between the company and vendor.

Development Technology stack to be used for Vendor Portal are
1. Front End - **Angular**
2. Middleware - **SAP PI/PO**
3. Back End - **SAP Database**

A. Front End
1. Vendor Login

Vendor login page is designed to login with the user-ID as vendor-ID and the password. While authenticating, the presence of the vendor-ID in the standard table has to be checked, post which both the vendor-ID and the password must be verified in the custom table (Z-table).

2. Vendor Profile View

Vendor profile page is designed to display the Vendor information. When the Vendor requests to view his information, a web-service call will be initiated from the portal and collects all the master data from the SAP system via SAP PO in a synchronous call. The collected Vendor information will be displayed.

3. Vendor Dashboard

The Vendor dashboard is designed and developed to have the end-to-end transactions between logon Vendor and the company. This page is developed to have complete sales data belonging to that Vendor, Such as
    i. Request for Quotation
    ii.Purchase Order
    iii.Goods Receipt

4. Vendor Finance Sheet

The vendor financial sheet is developed to have a complete financial transaction between the vendor and the company. This page is developed to have complete financial data belonging to that vendor, Such as
    i. Invoice details
    ii. Payments and aging
    iii. Credit/Debit memo

B. Middleware

SAP Process Integration / Process Orchestration (PI/PO) is used as middleware to integrate the SAP ERP Portal with the SAP Database. A seamless synchronous connection is to be made via the adapters (ABAP PROXY/ RFC/ IDOC) available. The adapters provide the end to end communication between the server and database.

C. Backend

The complete back-end is implemented using SAP ECC/S4 Systems via ABAP (Advanced Business Application Programming). All the ABAP programs are to be saved in packages with the corresponding TR (Transport Request).

X. EMPLOYEE PORTAL

The objective of the Employee portal is to understand the functionalities of the Human Resource (HR) and Finance (FI) module. This portal is designed for providing info about the organization and employees, getting the pay slip as printable, leave balance and to request leave. The need of the Employee portal is to have quick and easy access to HR-related transactions and services.

Development Technology stack to be used for Customer Portal are
1. Front End - **Angular**
2. Middleware - **SAP PI/PO**
3. Back End - **SAP Database**

A. Front End
1. Employee Login

Employee login page is designed to login with the user-ID as Employee-ID and the Password. While authenticating, the presence of the Employee-ID in the standard table has to be checked,

259

post which both the Employee-ID and the password must be verified in the custom table (Z-table).

The Employee-ID will reach SAP ERP system via SAP PO interface. Once the Employee-ID and Password is validated in the SAP ERP system the response will be sent back to the portal with the validation result.

Once the validation is successful, the Employee will be allowed to access their respective Dashboard.
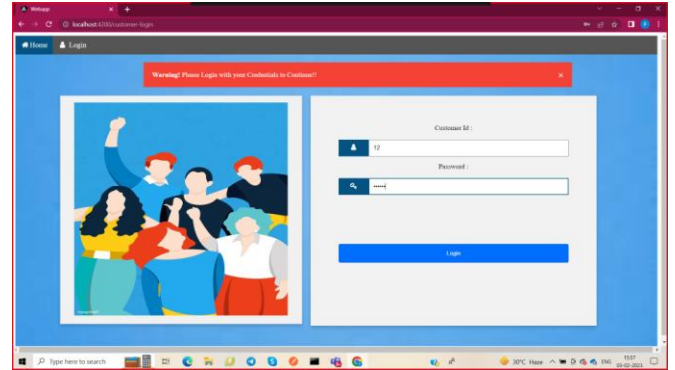
2. Employee Dashboard

The employee dashboard is designed and developed to have end to end transactions with the employees and the company. Employee dashboard contains the complete functionalities such as
1. Employee profile data
2. Leave request
3. Pay slip

The dashboard represents each employee's organization, hierarchy, Projects assigned and performance charts.
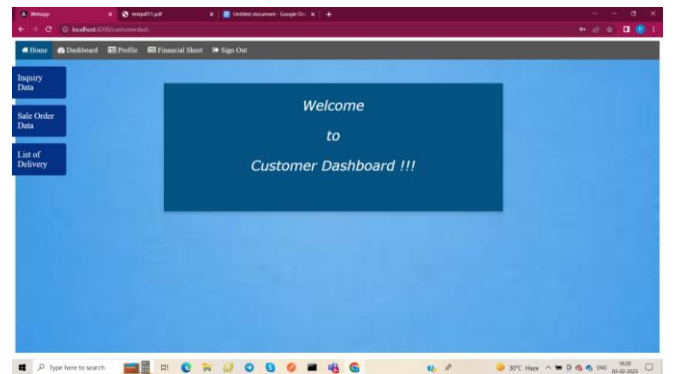
3. Employee Profile data View

The Employee profile page is designed to display the Employee information. When the Employee requests to view his information, a web-service call will be initiated from the portal to collect all the necessary Information from the SAP ERP system by SAP PO's synchronous call and the collected Employee information will be displayed.

B. Middleware

SAP Process Integration / Process Orchestration (PI/PO) is used as middleware to integrate the SAP ERP Portal with the SAP Database. A seamless synchronous connection is to be made via the adapters (ABAP PROXY/ RFC/ IDOC) available. The adapters provide the end to end communication between the server and database.

C. Back-end

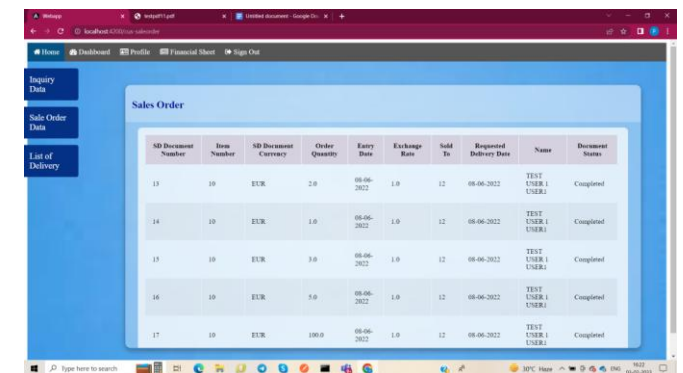The complete back-end is implemented using SAP ECC/S4 Systems via ABAP (Advanced Business Application Programming).
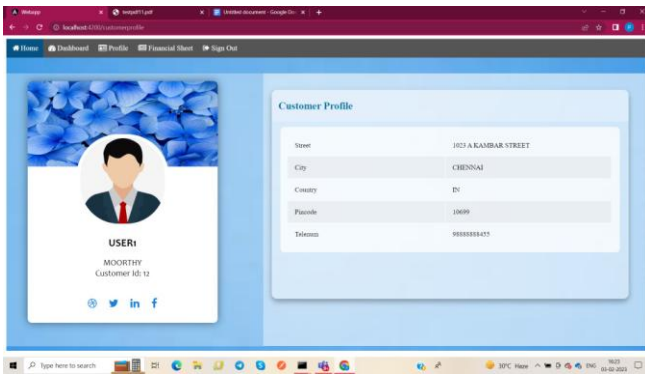
XI. RESULTS

Fig 3. Customer Portal - Login Page

Fig 4. Customer Portal - Dashboard

Fig 5. Customer Portal - Sales Order Data

260

Fig 6. Customer Portal - Profile
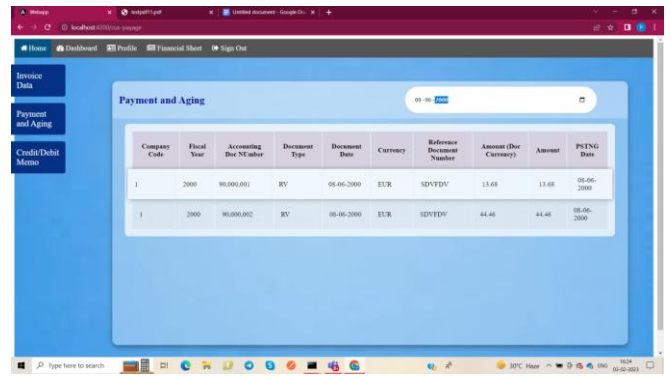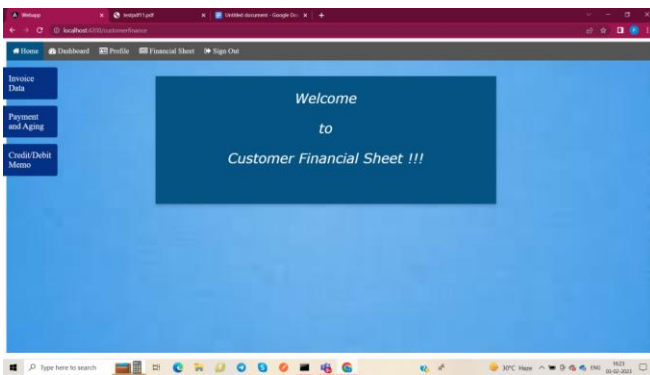
Fig 7. Customer Portal - Financial Sheet

Fig 8. Customer Portal - Payment and Aging with Search Filter
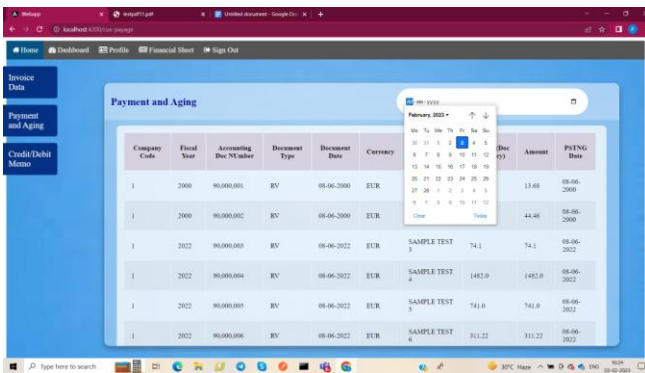

Fig 8.1. Customer Portal - Payment and Aging with Search Filter

XII. CONCLUSION

Full stack web application for Customer, Vendor and Employee is developed. This helps in better communication across various departments. It also helps companies and organizations of all sizes to run their business more efficiently and profitably.

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261