Enterprise Resource Planning using SAP

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Abstract:- SAP was established in Walldorf, Germany, in 1972. It stands for Data Processing Systems, Applications, and Products. It has expanded and changed over time to become the top provider of client/server business solutions, for which it is now renowned. The main benefit of using SAP as your company's ERP system is that it has a very high level of application integration, ensuring data consistency throughout the system and the company as a whole. Table drive customization software is called SAP. With a shared set of programmes, it enables businesses to quickly alter their business requirements.

Keywords:- SAP, ERP, HANA, ABAP, CRM.

I. INTRODUCTION

ERP (Enterprise Resource and Planning) solutions and services are offered by SAP, a market leader. Regardless of their size and power, organizations from various industrial sectors can use the Enterprise Resource Planning (ERP) software. Almost every functional area of a business process, including the purchase of goods and services, sale and distribution, finance, accounting, human resources, manufacturing, production planning, logistics, and warehouse management, is supported and integrated by the ERP package.

II. PROBLEM STATEMENT

The main goal of the portal development is to help one become a full-stack techno functional consultant and to help them gain business level understanding of the SAP core functional modules. It can be design as SAP ERP Portal for a specific organization which is usually a user-friendly portal. SAP Portal which needs to be developed for following verticals, As the front-end portal application system will be the data center for Angular and SCP app.

The verticals are to be developed as follows
- Customer Portal (Angular App)
- Vendor Portal (Angular App)
- Employee Portal (Angular App)

III. GENERAL TERMS

- **Systems Applications and Products (SAP):** SAP (Systems, Applications and Products) is a German multinational software corporation that specializes in enterprise resource planning (ERP) software. SAP's ERP software helps businesses manage various aspects of their operations, including finance, sales, procurement, logistics, and human resources.

- **Enterprise Resource Planning (ERP)**: ERP (Enterprise Resource Planning) is a type of software that helps businesses manage and integrate various aspects of their operations, such as finance, human resources, procurement, inventory, and sales.

- **High performance Analytic Appliance (HANA)**: HANA (High-Performance Analytic Appliance) is an in-memory database and application platform developed by SAP. It is designed to process large amounts of data in real-time and enable businesses to make informed decisions based on up-to-date information.

- **Advanced Business Application programming (ABAP)**: ABAP (Advanced Business Application Programming) is a high-level programming language developed by SAP for the development of custom business applications and extensions within the SAP environment.

- **Customer Relationship Management (CRM)**: CRM (Customer Relationship Management) is a software system used to manage interactions with customers and prospects throughout the customer lifecycle. It involves the use of data and technology to streamline and automate customer-facing processes, such as sales, marketing, and customer support.

IV. EXISTING SYSTEM WITH DRAWBACKS

- **Lack of integration:** Existing systems were often siloed, meaning that different departments within an organization used different software systems that didn't communicate with each other. This lack of integration made it difficult toshare information and collaborate effectively.

- **Manual processes:** Many existing systems relied on manual processes, such as paper-based forms and manual data entry. These processes were time-consuming and prone to errors, which could result in inaccurate data and delayed decision-making.

- **Limited functionality**: Existing systems often had limited functionality, which meant that organizations had to use multiple systems to manage different aspects of their operations. This added complexity and made it harder to get a complete picture of the organization's performance.

- **High maintenance costs:** Maintaining existing systems could be expensive, as organizations had to pay for hardware, software licenses, and IT staff to manage and maintain the systems.

- **Limited scalability**: Existing systems often had limited scalability, meaning that they were designed to handle a specific number of users or transactions. This made it difficult for organizations to grow and expand their operationswithout investing in new systems.

Overall, these drawbacks made it difficult for organizations to manage their operations efficiently and effectively. SAP was designed to address these issues by providing a comprehensive, integrated system that could handle all aspects of an organization's operations.

V. ARCHITECTURE

- **Presentation Layer:** This layer provides a user interface for accessing and interacting with the SAP system. It includes components such as the SAP GUI (Graphical User Interface) and web-based interfaces.
- **Application Layer:** This layer provides the core functionality of the SAP system, including business logic and process management. It includes components such as the Application Server (AS) and the Business Application Programming Interface (BAPI).
- **Database Layer**: This layer provides the storage and retrieval of data used by the SAP system. It includes components such as the SAP HANA database and the MaxDB database.
- **Integration Layer:** This layer provides the ability to integrate the SAP system with other systems and applications. It includes components such as the SAP NetWeaver Process Integration (PI) and the SAP Cloud Platform Integration (CPI).
- **Infrastructure Layer**: This layer provides the underlying infrastructure for the SAP system, including hardware, operating systems, and network infrastructure.
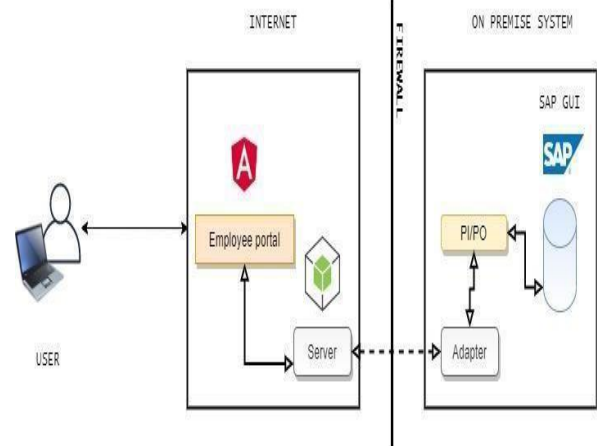

Fig. 1: Customer Portal Architecture

Fig. 2: Vender Portal Architecture

Fig. 3: Employee Portal Architecture

VI. PROPOSED SOLUTION

Implementing ERP using SAP typically involves several stages. The first stage is to define the scope of the implementation, which involves identifying the business processes that will be supported by the system. The next stage is to configure the system to meet the specific needs of the organization, which involves setting up the master data, organizational structures, and other system settings. Once the system is configured, the next stage is to perform data migration, which involves transferring data from the legacy systems to SAP. After the data is migrated, the system is tested to ensure that it is functioning as expected. Finally, the system is rolled out to the organization, which involves training users and providing ongoing support to ensure that the system is being used effectively. Throughout the implementation process, it is important to have a project team in place to manage the implementation and ensure that the project stays on track and within budget.

- ➢ *Integration*
- Data consistency
- Standardized processes
- Open architecture
- API integration
- Real-time data

- ➢ *Automation*
- Workflow automation
- Batch processing
- Reporting automation
- Integration with other systems
- Artificial intelligence (AI)

- ➢ *Real-time information*
- Real-time analytics
- In-memory computing
- Mobile access

- ➢ *Scalability and Flexibility*
- Modular design
- Customization
- Cloud-based deployment
- Integration with other systems
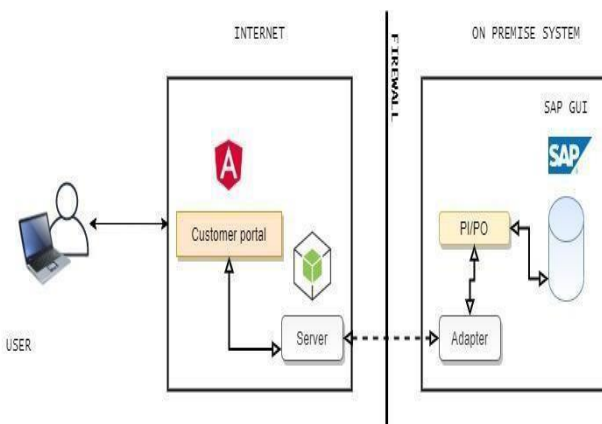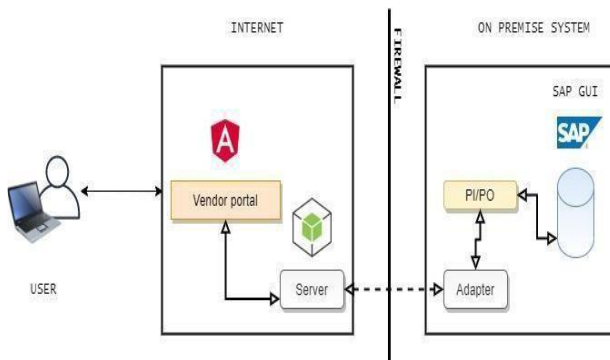- Upgrades and updates

VII. TECHNOLOGY STACK

Fig. 4: Front End.

Fig. 5: Middleware

Fig. 6: Backend

VIII. HOW MODULES WORKS

A. *Customer Portal:*

➢ *Objective of development:*

The objective of the customer portal is to understand the functionalities of Sales and Distribution (SD) and Finance (FI) module. 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.

B. *Front-end:*

➢ *Customer Login:*

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

➢ *Customer Profile View:*

Customer profile page needs to be 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 webservices call. The collected customer information will be displayed.

➢ *Customer Dashboard:*

The customer dashboard needs to be designed and developed to have the end-to-end transactions between logon customer and the company. This page needs to be developed to have complete sales data belonging to that customer, Such as

• Inquiry data
• Sale order data
• List of Delivery

➢ *Customer Financial Sheet:*

The customer financial sheet need 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

✓ Invoice details
✓ Payments and aging
✓ Credit/Debit memo
✓ Overall sales data

C. *Middleware:*

➢ *RFC Web service:*

SAP RFC Web service is used as middleware to integrate the SAP ERP Portal with the SAP Database. A webservice connection is to be made via the RFC function module s. The adapters provide the end-to-end communication between the application and database.

> *Back-end:*

The complete back-end have to be 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).

D. Vendor Portal:

> *Objective of development:*

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

E. Front-end:

> *Vendor Login:*

Customer login page needs to be 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).

> *Vendor Profile View:*

Vendor profile page needs to be designed to display the Vendor information. When a vendor requests to view his information, the portal will launch a web service call that will synchronously gather all of the master data from the SAP system via SAP PO. The collected Vendor information will be displayed.

F. Vendor Dashboard:

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

G. Vendor Financial Sheet:

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

H. Middleware:

> *SAP PI/PO:*

As middleware, SAP Process Integration / Process Orchestration (PI/PO) connects the SAP ERP Portal and 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.

> *Back-end:*

The complete back-end have to be 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).

I. Employee Portal:

> *Objective of development:*

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

J. Front end:

> *Employee Login:*

Employee login page needs to be 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, post which both the Employee-ID and the password must be verified in the custom table (Z-table).

> *Employee Dashboard:*

The employee dashboard needs to be designed and developed to have end to end transactions with the employees and the company. The dashboard design should resemble the MS office 365 dashboard. Employee dashboard should contain the complete functionalities such as
- Employee profile data
- Leave request
- Pay slip

The dashboard represents each employee's organization, hierarchy, Projects assigned and performance charts. All information in the dashboard must have real-time data.

> *Middleware:*

The SAP ERP Portal is integrated with the SAP Database using middleware called SAP Process Integration / Process Orchestration (PI/PO). 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.

> *Back-end:*

The complete back-end have to be 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).

IX. PERFORMANCE EVALUATION

We can evaluate the performance and success of the project employing SAP ERP in two ways:

- **Cost efficiency:** Despite its high initial adoption costs, SAP ERP can ultimately bring significant cost savings to the organization. Its functionality allows companies to eliminate redundant processes and gain economies of scale. Additionally, integrating different departments within a company by using SAP ERP allows companies to work faster and more efficiently.

- **Improved Business Processes:** SAP ERP helps companies to improve the efficiency and effectiveness of their business processes. By using standardized and streamlined processes, companies can achieve higher accuracy and lower errors, while also increasing their customer service abilities. Additionally, SAP ERP can help companies to reduce the time and cost of training staff, as well as helping to reduce the time to process orders and respond to customer requests.
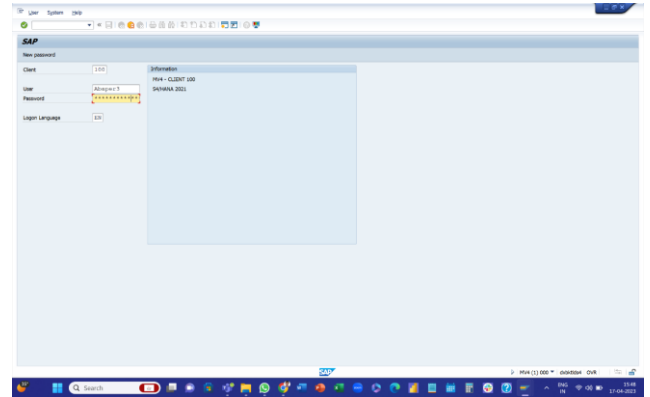
X. RESULT

Fig. 7: Login Page

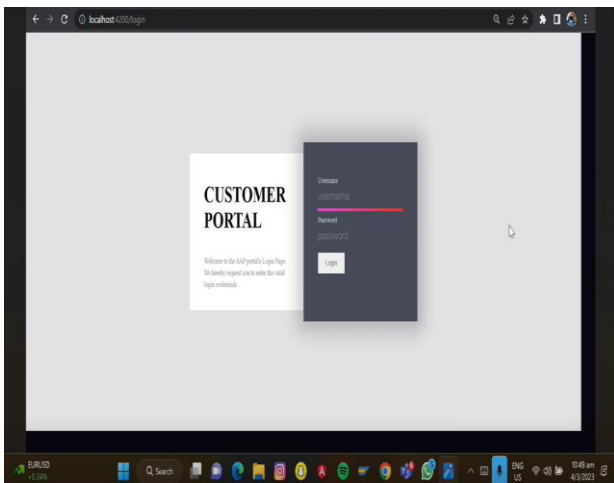Fig. 8: Sale Order request helps the customer place an order to the vendor
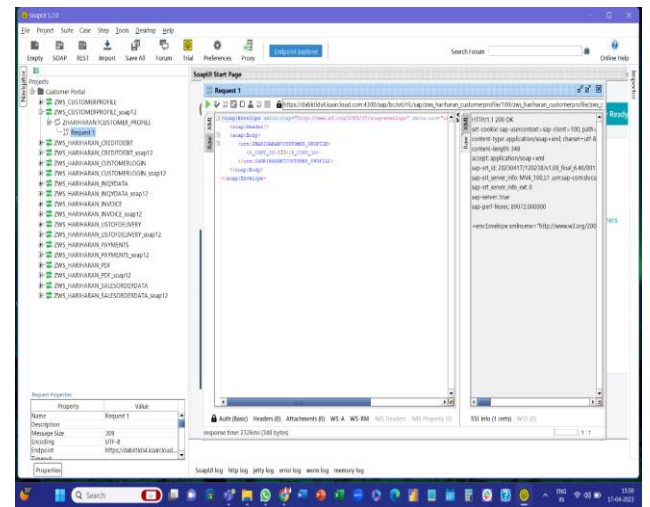

Fig. 9: SAP User Interface

Fig. 10: Simple Object Access Protocol SOAP that test's function groups before integration

XI. CONCLUSION

Final conclusion is the implementation of an ERP solution using SAP has had a positive impact on companies. It has been successful in streamlining and optimizing business processes, improving access to real-time information, reducing cost and complexity, and integrating core business functions. All of these benefits have resulted in increased efficiency and productivity, improved workflow accuracy, and improved customer experience. With the help of an ERP using SAP, companies have seen significant improvements in their overall business performance.

XII. FUTURE ENHANCEMENT

SAP ERP (Enterprise Resource Planning) has been a leading software solution for managing business processes, financial management, human resources, supply chain management, and customer relationship management for several decades. As technology evolves, the future scope of SAP ERP is likely to continue expanding in the following ways:

- **Cloud-based Solutions:** SAP is expected to focus on cloud-based solutions and transition from on-premise solutionsto cloud-based ones. This transition would allow businesses to access SAP ERP systems anytime and anywhere, withminimal infrastructure investment.
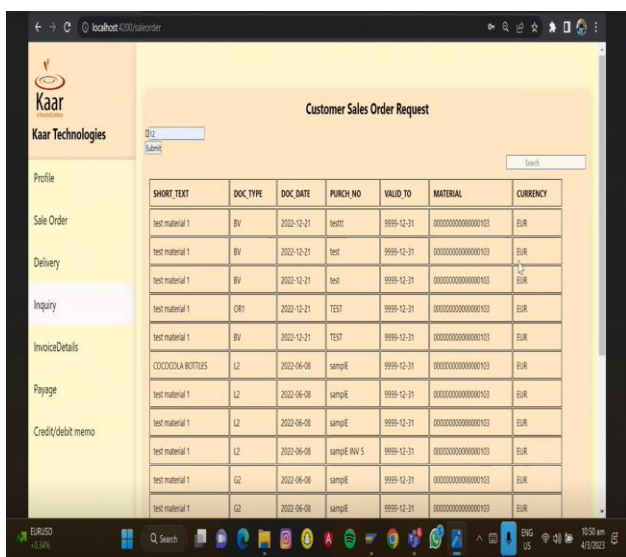
- **Artificial Intelligence (AI) and Machine Learning (ML):** SAP is likely to incorporate AI and ML capabilities intoits ERP solutions. This integration would help businesses automate repetitive tasks, improve decision-making, and provide better insights into business operations.
- **Internet of Things (IoT):** SAP is expected to leverage IoT capabilities to provide real-time visibility into business operations. IoT will enable SAP to collect and analyze data from various sources, such as sensors and devices, to optimize business processes and reduce costs.
- **Integration with other Systems:** As businesses adopt new systems, SAP ERP is expected to provide better integration with those systems to provide a seamless experience. Integration with other systems will enable businesses to share data across different platforms and improve overall efficiency.
- **Improved User Experience**: SAP is likely to focus on improving the user experience of its ERP systems by makingthem more intuitive and user-friendly. This would enable businesses to get the most out of their ERP solutions, evenwith minimal training.

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