

Dashboard for Materials Management in SAP

Pratik Thorat¹, Ashutosh Bathe², Manal Junare³, Shashank Gadam⁴, Tejrao Marode⁵,

Pallavi Bute⁶

^{1,2,3,4}B.E Student, Information Technology, SSGMCE, Maharashtra, India

⁵Assistant Professor, Department of Electronics and Telecommunication, SSGMCE, Maharashtra, India

⁶Assistant Professor, Department of Information Technology, SSGMCE, Maharashtra, India

Abstract – In 1972 four former IBM employees founded SAP AG, Since its inception, SAP has made significant development and marketing efforts on standard application software, including the R/2 system for mainframe application and the global market with R/3 system for open client/server technology. The company name SAP that is Systems, Applications and Products in Data Processing is a standard software package that can be configured in multiple areas and adapted to specific needs of company. To meet those needs, SAP includes a large number of business tasks, leaving room for further enhancements or adapting to business practice changes. SAP itself is providing thousands of standard reports, thereafter to meet the business process of client, client (Student Consumer Co-operative Store) require few of the customized reports in Materials Management module in their required format.

Index Terms- System application product, Enterprise resource planning tool, materials management, ALV.

1. INTRODUCTION

1.1 SAP

SAP is an acronym for Systems, Applications and Products in Data Processing. It is a standard software package that can be configured in multiple areas and adapted to specific needs of company. To support those needs, SAP includes large number of business functions, leaving room for further enhancements or adaptability to business practice changes.

SAP itself provides thousands of standard reports for any business process, commonly required by the profit making industries. SAP ERP does not contain generalized reports for non-profit organization client needs to customize these reports in SAP ERP. The MATERIALS MANAGEMENT reports used by the client of SAP are in different standards from SAP standard. Hence there is need to develop such reports which will be helpful to reduce cost of SAP implementation. thereafter to meet the business process of client, client require few of the customized reports in Materials Management module in their required format.

1.2 ERP systems

An ERP system is made up of enterprise resource planning applications that share databases and interact with each

other, which means it can remove data from departments and give everyone a single source of information. This system can automate key business processes and help reduce risk, ensure regulatory compliance and speedy reporting. [1]

ERP systems must be replaced by Internet applications and separate systems that can communicate together. But over time, organizations are forced to control IT budgets, and the complexity, transparency and cost of ownership have become crucial. Thus organizations have begun to focus on modern ERP systems and aim to create added value by reducing the cost of it. [2]

The Ground Foundation of ERP Systems is a general database that provides the possibility to include all the processes required for a given company. These processes are usually in the areas of finance, control, product planning, logistics, sales, materials management and human resources. [3]

General and integrated databases can be used by various SAP modules. For example, an employee with data in an HR module is working as a product supervisor. Data about him is simultaneously accessible to the production planning module as well as the human resources module. Thanks to deep integration of applications it is possible to use only one database without any other interface and data can be inserted into the system only once.

1.3 Brief History

SAP Company was founded in 1972 by five former IBM employees in Germany. SAP stands for Abbreviations of the Software, Envaldungen und Products. It translates into English as Software, and Applications and Products. The founders wanted to develop a product that would cover all the processes and manage the entire economics of the organization.

In 1972 the first standard software for financial accounting was released. This product was the foundation of the SAP R/1 system, not yet fully featured with the ERP system. Letter R refers to real-time processing.

SAP R/2 was released in 1979. and was the first real ERP system. In 1992, SAP R/3 was a breakthrough, based on the

client server architecture. It uses relational databases and can be run on any hardware and software. SAP R/3 is the first in the market for SAP standard software for the management of business economics. [4]

New components have been delivered since 2004 with a central business suite called MySAP ERP.

1.4 ERP Market

The ERP Market shows continual growth. In case of big organizations that have more than 1000 employees in Germany, SAP has market share about 55% and worldwide about 27%. It is the leading ERP System. [5]

1.5 SAP Products

SAP products are a complex solution for all internal departments in the organization. However, SAP can also accommodate certain processes outside the organization and thus override the general ERP solution.

Products can be divided into three categories:

Technical components, such as SAP Enterprise Portal, SAP Master Data Management or SAP Exchange Infrastructure. These components are known as SAP NetWeavers.

Products relating to the management of the organization. Here are XApps, applications that overlay separate component segments. Then MySAP Business Suite, an application that maintained core organizational management. The last part of the second category is SAP Smart Business Solutions - these are for small and medium enterprises. They include SAP Business One and SAP all in-one products.

Specialized solutions for solid businesses such as SAP for Automotive or SAP for Aerospace.

1.6 Materials Management Module

To achieve different business processes, different materials are needed. The SAP MM module corresponds to the material flow from the point at which the material enters the organization until the final point and its dimensions are converted (like planning or controlling). That is why it is a particle module for SAP Logistics and other modules are dependent on it. [6]

Its core is the purchase of materials. This should be done with the right amount, the right value, and the useful time. Buying is important because organizations try to supply a small amount of resources but at the same time avoid such situations when there is insufficient inventory to produce. Basic purchases are made through purchase order, purchase order, receipt of goods and receipt.

As per the requirement of client we are going to prepare the dashboard for Materials Management module in SAP ABAP. The dashboard will be the integration of three modules which are GST report module, Vendor report module and Advance vendor payment report. The individual modules are available in ECC 5.0, the problem here is that user needs to find the required module, the dashboard will make available all the three modules on same place and thus user need not to worry about finding the different modules.

Also the client require customized reports and not the standard report, for that required customization should be made in standard reports provided by SAP.

2. LITERATURE SURVEY

SAP Enterprise Resource Planning Central Component which is called 'SAP ECC' is an on-premise enterprise resource planning (ERP) software that is commonly referred to as simply "SAP ERP." Digital information created in one area of the business is integrated with data from other areas of the same business by ECC Software.

ERP which stands for Enterprise Resource Planning is business process management software that allows an organization to employ a system of integrated applications for managing a business and automate back office tasks. ERP Includes:

- Product Planning
- Development
- Manufacturing Processes
- Sales and Marketing.

SAP ERP 5.0 was released in 2004 and SAP ERP 6.0 in 2005. Between 2005 and 2019, SAP has regularly issued a number of incremental packages to address the changing needs of customers. SAP ECC 5.0 is part of SAP ERP 2004 that runs on SAP NetWare 2004. SAP ECC 6.0 is a part of SAP ERP 6.0 (2005) that runs on SAP NetWeaver 7.0 (2004s). ECC 5.0 we are able to use memory upto 100-110 GB hard disk space, whereas in case of ECC 6.0, it occupies minimum 250-320 GB (Dump included). ECC 5.0 accepts only Oracle 9i while ECC 6.0 accepts Oracle 10g. ECC 5.0 provides various functionalities such as:

- Complete traceability of business processes.
- It encloses all business requirements and permit minor modifications to adapt it to our needs.
- Ultimate level of detail.
- Offers a complete set of applications to manage any business.
- Programming / development / flexible
- Centralized and reliable accounting.

- Filters to manage various aspects of the employees and department or company parameters.
- Helps to plan bonuses, valuations based on the budget available in an effective way.
- Industry standard business processes with slightest customization.

3. RESEARCH ELABORATION



Fig -1: Dashboard Structure

GST REPORT

GST is a simple tax levied on inputs and business outputs. Own businesses do not pay GST (in general program) do not pay GST - it is paid by a private citizen. But businesses collect GST on behalf of the government and must be sent back to the government on a regular basis. That way almost every transaction you do as a business will attract GST in one form or another. If you are registered for GST then you have to send a refund to the government on a regular basis - we call this the GST cycle. Basically, whenever a good or service is sold, it is subject to goods and services tax (rates may vary by country). This GST is added to the price of the goods or services and is collected by the supplier who will then send it.

VENDOR REPORT

This report is useful in appraising detailed information about each vendor. The Vendor Report help you focus on a variety of vendor-related data and provide pertinent information on your vendors including the applicable credit limits, discount rates, contacts, vendor addresses, vendor factors. Each vendor report is specifically designed to provide a number of options so that you can generate data for the specific information you need.

ADVANCE VENDOR PAYMENT REPORT

Advance payments are made before a good amount or service actually arrives. In many cases, if the buyer does not come and pays at the time of payment, the advance payment

protects them if they do not pay the seller. The advance is paid as assets in the company's balance sheet. As these assets are used, they are expended and recorded in the income statement for that period. Advance payments are sometimes called Down payments. Once the goods and services are acknowledged or delivered, the down payment will be cleared against the final invoice. Payment must be recorded to the seller as an asset on the balance sheet. Payments below are posted as Special General Ledger (G / L) transactions to support this requirement.

THE CONCEPT

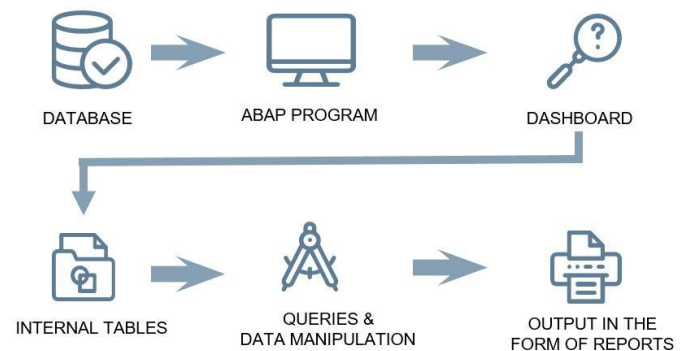


Fig -2: The concept behind programming

The concept is simple and straight. The data from database is taken as reference while writing the code for the dashboard. This data from database is then inserted into internal table of the program and manipulation is now done on data as per the requirement of user. Queries performs the manipulation and generates the output.

TECHNOLOGIES USED

Since the ABAP program was selected for the implementation of the functionality, it is necessary to describe the technologies used during the development. The program should have three main parts which are: input screen, logic, output screen with functionality for document creation.

PROGRAMMING LANGUAGE

ABAP i.e. Advanced Business Application Programming which is a native programming language in SAP environment, is the language used for program implementation. ABAP Objects which is being latest and object-oriented is used by SAP. Compatibility with its previous versions (e.g. ABAP/3) is guaranteed. A 3-tier architecture model – presentation layer, application server and databases is used by SAP. ABAP programs runs on the application server, the second level. Every layer can run independently on different computer and there is communication between each layer. For performance and security purposes application servers are usually placed on different servers. The run-time system can be viewed as a virtual machine, similar to Java virtual machine. A key component of the ABAP run-time system is the database interface that translates database independent statements, Open SQL, into the statements understood by the underlying

database, Native SQL. SAP can work with different types of databases and run the same ABAP program on all of them. [7]

SELECTION SCREEN

The input screen of the transaction is called selection screen in SAP terminology. This is the location of the initial interaction with the user when the user first selects the terms to select the data and then displays it in the output. As the selection screen is only partially customizable, SAP provides standard components that are used. There are several ways for implementing the selection screen. The most used components with its proper SAP naming are as follows [8]:

- Input interval – SELECT-OPTIONS
- Input value – PARAMETERS (checkbox included)
- Radio buttons – RADIOBUTTON GROUPS
- Block of components – BLOCKS

DATA RETRIVAL

Once the selection screen is filled with the input data, they are drifted to the selection logic. The selection logic fetches the required data for the output. There are several types of selects that can be used to retrieve the data. The way of writing the selection procedures is important because of the performance, the readability and the maintainability of the code. SAP provides more concepts of writing selects and it is up to developer to choose the best concept to achieve his goal. The most commonly used select types in ABAP will be introduced. [9] The description is followed by an example of the given selection procedure.

Select all fields of a SAP database table into temporal table. This select reaches onetime into the database and fetches all the data from the database table into the temporal table. The data are now in memory and can be accessed a lot faster.

Select command:- Select all fields of a SAP database table into temporal table. This select reaches onetime into the database and fetches all the data from the database table into the temporal table. The data are now in memory and can be accessed a lot faster. The internal table 'ctab' have the structure which contains data from multiple tables.

Select...endselect command:- This type of select will iterate over the whole database table and reaches into database the number of times the size of database table or the number of times the condition is fulfilled (not specified here). This is the slowest kind of select, but it can be useful if the programmer wants to do some processing after the selection of each row. However, the same functionality can be achieved by selecting into internal table and then looping it. It is much faster to loop the table in memory.

```
SELECT L~NAME1 L~STCEG L~ORT01 L~PSTLZ L~REGIO
L~MCOD1
K~LIFNR K~EBELN K~KNUMV K~BUKRS K~KALSM
B~EBELP B~BEWTP B~BWART B~BUDAT B~BELNR
B~SHKZG B~WRBTR B~MATNR B~DMBTR B~MENGE
B~AREWB B~REWRB B~GJAHR B~LFBNR B~BUZEI
B~BLDAT R~XBLNR R~STBLG R~KNUMVE R~RMWWR
INTO CORRESPONDING FIELDS OF TABLE CTAB
*custom code*
ENDSELECT.
```

SELECT-JOIN:

```
... [( { data_source [AS tabalias]} |join
{[INNER] JOIN}|{LEFT|RIGHT [OUTER] JOIN}|{CROSS JOIN}
{ data_source [AS tabalias]} |join [ON join_cond] ] ... .
Addition:
... ON join-condition
```

Effect:

The set of query results in the join expression includes columns of two or more data sources. Using an joined expression, the left side joins the right side which are as follows:

- [INNER] JOIN (inner join)
- LEFT|RIGHT [OUTER] JOIN (outer join)
- CROSS JOIN (cross join)

For an internal or external pair, each joining expression must have a join-condition after ON. Joining expressions for cross join cannot contain any joining conditions.

Applied to the entries specified at the bottom left and right, the data source is a single data source. Database tables must be transparent. As specified as a single source after FORM using AS, an optional table name can be specified for the data source. The data source may exist more than once in the included expression and may contain alternate names. Pooled and cluster tables cannot be added using join expressions.

Joining expressions can be specified to add both sides. An joining expression can be nested in repetition. The number of interconnected data sources is limited. The maximum number is defined so that the select statement can be executed on all supported database systems and is currently set to 50. Join more than 49 if consistently known Generates syntax errors. If not, they cause runtime errors.

The priority in which nested join expressions are evaluated is specified as follows:

For inner and outer joins, the priority is determined by the position of the ON conditions. From left to right, each ON condition is assigned to the directly preceding JOIN and creates a join expression. Join expressions of this type can be enclosed in parentheses, (). This is optional. Explicitly specified parentheses must match the parentheses specified implicitly by the ON conditions. By default, cross joins are evaluated from left to right. The priority of the evaluation can be influenced by parentheses ().

If several cross joins are combined, the order of the evaluation is irrelevant. The result is always the same and the number of rows is the product of the number of rows of all involved data sources.

If cross joins are combined with inner and outer joins, the result can depend on the order of evaluation or the parentheses.

Results set for inner joins

In a single result set, the internal pair joins the row of columns in the set of results with the columns in the left row. This result set contains all combinations of rows whose columns meet the join-condition. If there are no lines in the left and right side results that satisfy the pair-condition, the resultant row is not created in the result set.

Results set for outer joins

External join creates the same result set as internal result. The difference is that for each selected row on the left, at least one row, as the left outer array, or as the outer right join to the right. The result is created in the set, though the join position is not satisfied with any lines on the other side. The columns on the other side that do not meet the condition join-condition are filled with null values. The cross join creates the cross product of the set of results on the left and the set of results on the right. The number of rows in a set of cross join results is the product of the number of sets of results that join.

Results set for cross join

The left column of the cross joins the row of columns in the set of results in the columns of the row in the sets of results. The cross join creates the cross product of the set of results on the left and the set of results on the right. This results set contains all possible combinations of rows. The number of rows in a set of cross join results is the product of the number of sets of results that join.

```
SELECT *required fields of tables*
INTO CORRESPONDING FIELDS OF TABLE INTERNALTABLE
FROM (( ( EKKO AS K
INNER JOIN EKBE AS B ON K~EBELN = B~EBELN )
INNER JOIN RBKP AS R ON B~BELNR = R~BELNR )
LEFT OUTER JOIN LFA1 AS L ON K~LIFNR = L~LIFNR )
WHERE *condition*
```

Temporal Tables

In SAP terminology, the temporal table is called an internal table. It contains the records of an ABAP program which is being executed. An internal table exists during the run-time of the SAP program. They are used to process large amounts of data using the ABAP language. In the internal table, all entries are of the same composition and key.

The personal record of the internal table is entered by an index or key. Internal tables can be used as temporary storage areas or temporary buffers, where data can be modified as needed. These tables occupy memory not only at the time of announcement but also at the time of running.

The size of the internal table or the number of rows in it is not fixed. The size of an internal table changes according to the requirements of the program associated with the internal table. But it is recommended to keep the internal tables as small as possible. This is to prevent the system from running slowly, as it is struggling to process large amounts of data. They can be used to hold the results of calculations that could be used later in the program.

An internal table can also hold records and data so that these can be accessed quickly rather than having to access it from database tables. They are hugely versatile and can be defined using any number of other defined structures [10].

SAP LIST VIEWER

The SAP List Viewer (ALV) is an integrated element of the ABAP programming environment. It allows the application developers to quickly implement the display of structured datasets by providing three different ALV tools, one each for the display of:

- Simple and two-dimensional tables
- Hierarchical-sequential lists
- Tree structures

The SAP List Viewer provides the application developers with: A unified API for all ALV tools wherever possible. A coherent API, earliest possible error detection during programming (e.g. the exceptions indicate, when the

methods are not possible in specific situations). Functions for accessibility are integrated into ALV, they do not have to be programmed. With the ALV, a uniform programming techniques can be used in order to display various lists, tables or tree structures [11].

For this given program, a simple two-dimensional table will be used. It contains any number of rows, each has the same structure and no hierarchical relationships to one another. The structure is defined by the columns.

ABAP Includes

ABAP Includes are separate ABAP programs that can be used to modularize the source code. Their usage allow to use the same source code in different programs. Includes also allow to manage complex programs in order to make them more readable and separate the functionality.

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4. RESULTS AND FINDINGS

ECC 5.0 has following limitations:

- Licensing costs are high.
- The user experience is not friendly, it is difficult to teach new SAP users.
- Any changes or improvements should be made by professionals with higher fees in general, not for everyone.
- Management cost, requires a team on site to manage.
- SAP does not have a good tax platform.
- Development, ongoing maintenance and consulting solutions are more expensive.
- Core SAP ERP does not have the inviting user experience of some modern solution.

SAP ERP 6.0 provides more than 300 functional improvements that can improve process efficiency. In addition, it integrates the functions of most SAP industry solutions so that this solution no longer needs to be independently installed and installed. The new software also simplifies daily business tasks through more appealing and integrated user-interface concepts that increase user productivity and satisfaction, but the problem here is the upgradation cost of SAP ECC 5.0 to ECC 6.0 is very high and so better solution is to customized the standard reports as per the requirement of client.



Fig -3: Selection Screen for GST report

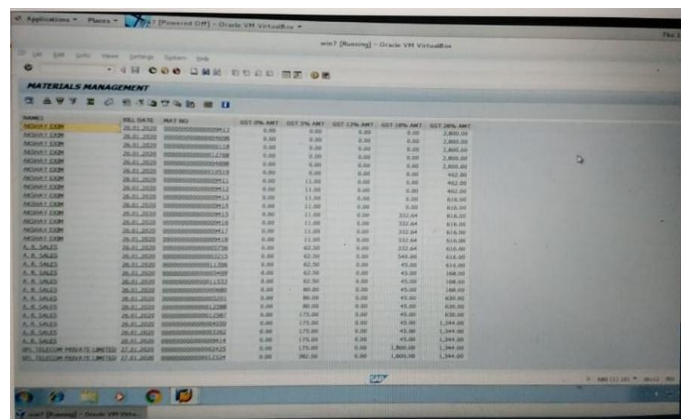


Fig -4: Output for GST Report

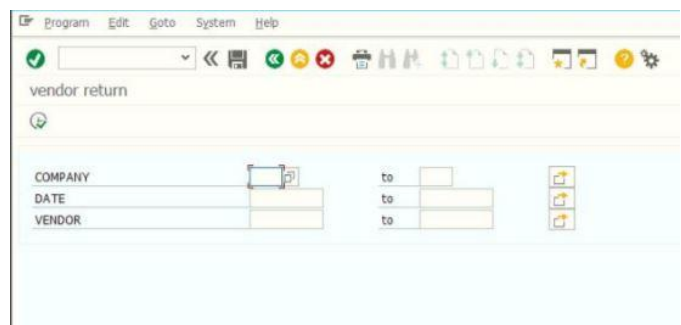


Fig -5: Selection Screen for Vendor Report

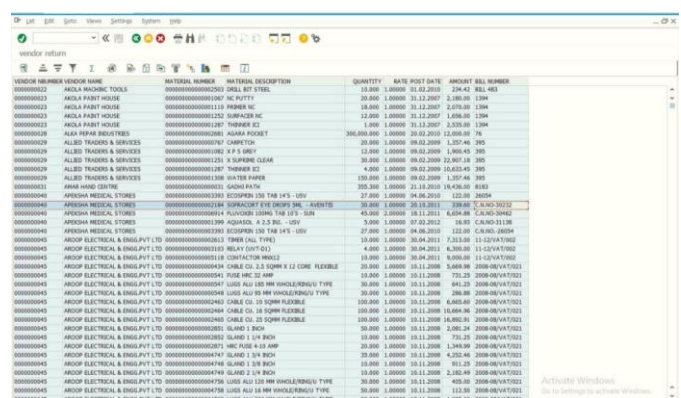


Fig -6: Output for Vendor Report

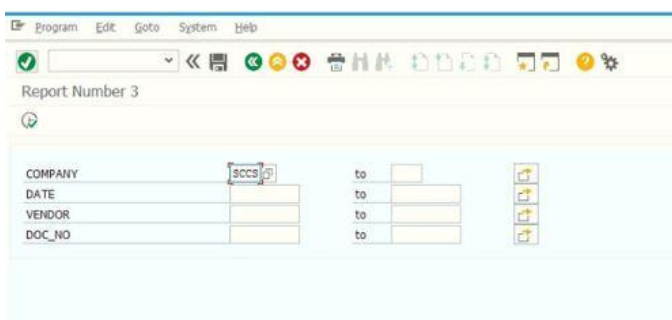


Fig -7: Selection Screen for Advance Vendor Payment Report

VENDOR NAME	MATERIAL NUMBER	MATERIAL DESCRIPTION	QUANTITY	RATE	POST DATE	AMOUNT	BELL NUMBER	DOCUMENT NUMBER	GL INDIATOR
NARANG SALES	0000000000000781	JAM 100GR KESAN	4,204.000	357.00000	29.08.2011	1,500,828.00	1385	5109022094	
NARANG SALES	0000000000000782	JAM 500GR KESAN	2,142.000	357.00000	29.08.2011	764,361.00	1385	5109022094	
NARANG SALES	0000000000000783	SAUCE 500GR NO ONDIN NO GARLE KESAN 750	3,213.000	1,071.00000	29.08.2011	3,438,513.00	1385	5109022094	

Fig -8: Output for Advance Vendor Payment Report

3. CONCLUSION

Overall design and implementation of this tool is satisfactory as per the requirements of organization. We implemented a DASHBOARD tool which fetches data from SAP Database (DDIC) and generate GSTR2 REPORTS. Standard SAP reports are available for any profit making organization but these reports are needed to be designed again or to be customized for non -profit making organization. Thus our DASHBOARD consists of customized report generation program managed by Top-Level management for analysis.

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BIOGRAPHIES



Mr. Pratik Thorat, BE in Information Technology SSGMCE Shegaon,



Mr. Ashutosh Bathe, BE in Information Technology SSGMCE Shegaon,



Mr. Manal Junare, BE in Information Technology SSGMCE Shegaon,



Mr. Shashank Gadam, BE in Information Technology SSGMCE Shegaon,



Mr. Tejrao Marode, Assistant Professor, Department of Electronics and Telecommunication, SSGMCE, Shegaon.



Ms. Pallavi Bute, Assistant Professor, Department of Information Technology, SSGMCE, Shegaon.