

# Business Application with Sap Bi

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## ABSTRACT

Business intelligence systems based on SAP BI which is used by an enterprise is an effective option to inform and guide our decision making to keep our products and services competitive. SAP Netweaver Business Warehouse (SAP NetWeaver BW) is the name of the Business Intelligence, analytical, reporting and Data Warehousing solution produced by SAP AG. It was originally named SAP BIW (Business Information Warehouse), then abbreviated to SAP BW, but is now known as "SAP BI" at the end user level. In contrast, "BW" is still used to describe the underlying Data Warehouse Area and Accelerator components. It is often used by companies who run their business on SAP's operational systems.

## Keywords

Business; Intelligence; SAP; NetWeaver; BI

## 1. INTRODUCTION

SAP NetWeaver BI is a powerful and scalable BI platform. The reporting tools within SAP NetWeaver BI offer a quick and easy way to gain access to the information we need. Its management tools let we integrate and store data from sources throughout the organization and beyond – sources that contribute to strategic analysis and decision-making. BI technologies provide historical, current and predictive views of business operations. Common functions of business intelligence technologies are reporting, online analytical processing, analytics, data mining, process mining, complex event processing, business performance management, benchmarking, text mining and predictive analytics.

### BI in SAP NetWeaver

SAP NetWeaver Business Intelligence (SAP NetWeaver BI) paints a complete picture of your business to satisfy the diverse needs of end users, IT professionals, and senior management.



## Integration

### 1) Integration with Other SAP NetWeaver Components

BEx Information Broadcasting allows we to publish precalculated documents or online links containing business intelligence content to the portal. The Business Explorer portal role illustrates the various options that are available to we when working with content from BI in the portal.

### Integration with BI Content Add-On

With BI Content, SAP delivers pre-configured role and task-based information models and reporting scenarios for BI that are based on consistent metadata. BI Content provides selected roles within a company with the information they need to carry out their tasks. The information models delivered covers all business areas and integrate content from almost all SAP and selected external applications

## 2. FEATURES OF DATA WAREHOUSING

### 1) Data Warehousing

Data warehousing in BI represents the integration, transformation, consolidation, cleanup, and storage of data. It also incorporates the extraction of data for analysis and interpretation. The data warehousing process includes data modeling, data extraction, and administration of the data warehouse management processes.

### 2) BI Platform

The business intelligence platform serves as the technological infrastructure and offers various analytical technologies and functions. These include the Analytics Engine, the Metadata Repository, Business Planning and Simulation, and special analysis processes such as data mining.

### 3) BI Suite: Business Explorer

The SAP NetWeaver Business Intelligence Suite, the Business Explorer (BEx), provides flexible reporting and analysis tools for strategic analyses, operational reporting, and decision-making support within a business. These tools include query, reporting, and analysis functions.

The Business Explorer allows a broad spectrum of users access to information in the SAP BW using the Enterprise Portal, the intranet or mobile technologies.

### 3. DATA WAREHOUSING

#### 1) Purpose of Data Warehousing

Data warehousing forms the basis of an extensive businessintelligence solution that allows we to convert data into valuable information. Integrated and company-specific data warehousing provides decision makers in our company with information and knowledge about goal-oriented measures that will lead to the success of the company. For data from any source and of any age.

Data warehousing in BI allows we to directly access source data as well as physically storing data in BI.

#### 2) Integration

We can analyze, interpret and distribute the data in the data warehouse using the BI suite of tools. When physically storing data in BI, we can use the planning and analytical services tools for editing data.

#### 3) Time Variance

All data in Data Warehouse is accurate as of some moment in time, providing an historical perspective. This differs from the operational environment in which data is intended to be accurate as of the moment of access. The data in the Data Warehouse is, in effect, a series of snapshots. Once the data is loaded into the enterprise data store and data marts, it cannot be updated. It is refreshed on a periodic basis, as determined by the business need. The operational data store, if included in the Warehouse architecture, may be updated.

#### 4) Non-Volatility

Data in the Warehouse is static, not dynamic. The only operations that occur in Data Warehouse applications are the initial loading of data, access of data, and refresh of data. For these reasons, the physical design of a Data Warehouse optimizes the access of data, rather than focusing on the requirements of data update and delete processing.

#### 5) Modeling

In modeling, we can create and edit all the objects and rules of the Data Warehousing Workbench that are required to transfer, update and analyze data. We can also execute functions related to these.

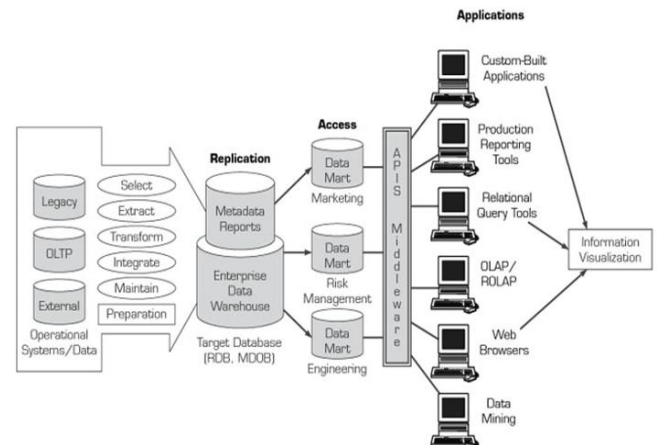
The objects are displayed in modeling in a tree structure. The objects are sorted here according to hierarchical criteria. Using the context menu for the objects, we can select the corresponding maintenance dialog for the objects or carry out the relevant functions. Data that logically belongs together is stored in the source system in the form of Data Sources. Data Sources are used for extracting data from a source system and transferring it into the BI system.

The Persistent Staging Area (PSA) is the inbound storage area for data from the source systems in the BI system. The requested data is saved, unchanged from the source system.

The transformation specifies how the data is updated and transformed, from the source, into the InfoProvider or an InfoSource. The transformation rules map the fields of the source to at least one InfoObject in the target. The information is mapped in structured form using the InfoObjects.

### 4. DESINGNING OF DATA WAREHOUSING

Designing a data warehouse is very different from designing an online transaction processing (OLTP) system. In contrast to an OLTP system in which the purpose is to capture high rates of data changes and additions, the purpose of a data warehouse is to organize large amounts of stable data for ease of analysis and retrieval. Because of these differing purposes, there are many considerations in data warehouse design that differ from OLTP database design.



Data warehouse data must be organized to meet the purpose of the data warehouse, which is rapid access to information for analysis and reporting. Dimensional modeling is used in the design of data warehouse databases to organize the data for efficiency of queries that are intended to analyze and summarize large volumes of data. The data warehouse schema is almost always very different and much simpler than the schema of an OLTP system designed using entity-relation modeling. Verification tables used in OLTP systems to validate data entry transactions are not necessary in the data warehouse database. This is because the data warehouse data has been cleansed and verified before it is posted to the data warehouse database, and historical data is not expected to change frequently once it is in the data warehouse. Transaction locking considerations, and transactions themselves, play very small roles in data warehouse databases. OLTP systems specialize in large volumes of data update transactions. In contrast, data warehouses specialize in rapid retrieval of information from stable data, and data updates consist primarily of periodic additions of new data

Backup and restore strategies also differ in a data warehouse from those necessary for an OLTP system. Much of the data in a data warehouse is unchanging history and does not need repetitive backup. Backup of new data can be accomplished at the time of update, and in some situations it is feasible to do these backups from the data preparation database to minimize performance impact on the data warehouse database. Restore policies for a data warehouse might also differ from those for an OLTP, depending on how critical it is for an organization to have uninterrupted access to data warehouse data.

#### A) Data Acquisition

Data retrieval is one of the data warehousing processes in BI. BI

provides mechanisms for retrieving data from various sources.

The following sections describe the sources available for the data transfer to BI and how the sources are connected to the BI system as source systems. They also describe how the data can be transferred from the sources.

The extraction and transfer of data generally occurs upon request of BI (pull). The sections about the scheduler, process chain and monitor describe how such a data request is defined and how the load process can be monitored in the BI system.

#### **B) Transformations**

The transformation process allows us to consolidate, cleanse, and integrate data. We can semantically synchronize data from heterogeneous sources. When we load data from one BI object into a further BI object, the data is passed through a transformation. A transformation converts the fields of the source into the format of the target.

We create a transformation between a source and a target. The BI objects Data Source, InfoSource, Data Store object, InfoCube and InfoSet serve as source objects. The BI objects InfoSource, InfoObject, Data Store object and InfoCube serve as target objects. A transformation consists of at least one transformation rule. Various rule types, transformation types, and routine types are available. These allow us to create transformations – from very simple to highly complex.

**Transformation rules:** Transformation rules map any number of source fields to at least one field in the target. We can use different rules types for this.

**Rule type:** A rule type is a specific operation that is applied to the relevant fields using a transformation rule.

**Transformation type:** The transformation type determines how data is written into the fields of the target.

**Transformation group:** A transformation group is a group of transformation rules. A transformation group contains one transformation rule for each key field of the target. A transformation can contain multiple transformation groups. Transformation groups allow us to combine various rules. This means that we can create different rules for different key figures for a characteristic.

The source contains three date characteristics: order date, delivery date and invoice date. The target only contains one general date characteristic. Depending on the key figure, this is filled from the different date characteristics in the source. Create three transformation groups which, depending on the key figure, update the order date, delivery date, or invoice data to the target.

**Routine:** We use routines to implement complex transformation rules.

#### **C) Further Processing Data**

We have loaded data into an InfoProvider and now we want to process this data further.

#### **D) Data Distribution**

As well as data staging and data processing, the data warehousing capabilities in BI also offer processes for distributing data. We can distribute data within the BI system, or load it for other applications in other systems. In the latter case, the BI system is the source, or hub, of the data transfer.

The data transfer process is available for distributing data within the BI system.

#### **E) Data Warehouse Management**

The Data Warehousing Workbench is the central point of entry when managing most Data Warehouse Management processes. It provides tools and functions for metadata and process management. Data Warehouse Management in BI incorporates various tools and functions:

We use process chains, we can automatically control load processes, the further processing of data in BI, and additional central processes in BI. The scheduler is the tool that defines the load process in BI. We can monitor the requests for load and data transfer processes using the respective monitors.

In InfoProvider administration, we can display technical information about the content of the InfoProvider. This provides information on the requests that are already in the InfoProvider and allows us to rebuild InfoProviders.

Information Lifecycle Management allows us to classify data according to how current it is and archive it as required. This simplifies the administration of the data warehouse and improves performance. To ensure that the data warehousing solution represents the structure of our company and fulfills its requirements, we have to define who has access to which data.

An authorization allows a user to perform a certain activity on a certain object in the BI system. There are two different concepts for this depending on the role and tasks of the user: standard authorizations and analysis authorizations.

Information on BI objects can be managed in the form of documents. In Reporting, documents can be created, displayed and found using full-text search. In the Documents functional area of the Data Warehousing Workbench, in addition to the functions for creating, importing and exporting documents and searching within documents, there are also functions for the administration of BI document management.

Transport system: BI development projects are not usually implemented in a productive system, but in a system landscape with one or more development and test systems. Using the transport connection, we can collect newly created or changed BI objects in the respective development system and then transport it into the required target system using the Change and Transport Organizer (CTO).

Content that is delivered to business areas by a BI customer or consulting partner is referred to as Customer and Partner Content. The functionality of customer or partner content complements and enhances the options for using the Business Content delivered by SAP.

In BI, Technical Content is delivered along with Business Content. On the one hand, this includes objects that allow us to analyze the processes in the BI system and to optimize them for performance. On the other hand, technical content also includes special DataStore objects that provide data for BEx personalization, for generating analysis authorizations.

#### **F) Real-Time Data Acquisition**

Real-time data acquisition supports tactical decision making. In terms of data acquisition, it supports operational reporting by allowing us to send data to the delta queue or PSA table in real time. We use a daemon to transfer Data Store objects that have been released for reporting to the ODS layer at frequent regular

intervals. The data is stored persistently in BI. We use real-time data acquisition if we want to transfer

data to BI at frequent intervals and access this data in reporting frequently or regularly.

The Data Source has to support real-time data acquisition. The option to support real-time data acquisition is a property of a Data Source. Data Sources that are released for real-time data acquisition cannot be used for standard data transfer.

Data is loaded into BI at frequent, regular intervals and is then posted to the DataStore objects that are available for operational reporting. In BI, special InfoPackages are created for real-time data acquisition. These are scheduled using an assigned daemon and are executed at regular intervals. With certain data transfer processes for real-time data acquisition, the daemon takes on the further posting of data to DataStore objects from the PSA. As soon as data is successfully posted to the Data Store object, it is available for reporting. Refresh the query display in order to display the up-to-date data. The query displays the time that the data was last refreshed by a daemon run. Even if no new data has been posted, the query displays the time of the last daemon run.

The requests for InfoPackages and data transfer processes are synchronized and remain open throughout several load processes. They are only closed when the size limits and time limits set in the InfoPackage are exceeded. The data transfer process copies these settings from the InfoPackage. When requests are closed, new requests are opened automatically and the data transfer for real-time data acquisition continues with these new requests. The data are available in reporting as soon as they have been successfully posted to the Data Store object.

This also requires an InfoPackage for transferring the data but the InfoProvider is used exclusively to determine the size and time limit for the requests, and the size of the data package.

## **5. BI PLATFORM**

The Business Intelligence platform serves as a technological infrastructure and offers various analytical technologies and functions.

Online Analytical Processing (OLAP) provides information preparation for large amounts of operative and historical data. The OLAP processor enables multi-dimensional analyses from various business perspectives.

The Metadata Repository enables us to display information on the metadata objects from the BI system in the running system or to use it independent of BI system operation.

With Business Planning and Simulation, we create planning applications. The areas of application range from simple, manual data entry to complex planning scenarios.

Special analysis processes such as Data Mining can be achieved using the Analysis Process Designer. Using an analysis process, information can be combined in the BW system in order to create new information. This new information can be obtained using analytical processes, such as data mining methods or simpler, customer-specific calculations and transformations.

## **6. BI SUITE: BUSINESS EXPLORER**

### ***A. Purpose***

The Business Explorer provides flexible reporting and analysis

tools for strategic analyses and decision-making support within a company. These tools include query, reporting, and analysis functions. As an employee with access authorization, we can evaluate past or current data on various levels of detail and from different perspectives not only on the Web but also in Microsoft Excel.

We can use BEx Information Broadcasting to distribute Business Intelligence content from SAP BW by e-mail either as precalculated documents with historical data, or as links with live data. We can also publish it to the Enterprise Portal.

### **B. Features**

The following overview shows the functional areas of the Business Explorer:

#### ***1) Query, Reporting, and Analysis***

The data in the SAP Business Information Warehouse is structured into self-contained business data areas. We analyze the dataset of the Business Information Warehouse by defining queries for InfoProviders in the BEx Query Designer. By selecting and combining InfoObjects or reusable structures in a query, we determine the way in which we navigate through and evaluate the data in the selected InfoProvider.

Analyzing data on the basis of multi-dimensional data sources makes it possible to analyze several dimensions at the same time. We have the option of implementing any number of variance analyses. The data, displayed in the form of a table, serves as the starting point for a detailed analysis for an sourcing a variety of questions. A large number of interaction options, such as sorting, filtering, swapping characteristics or local calculations allow flexible navigation through data for the runtime. We can also display data in graphics and evaluate geographical data on a map. Furthermore, using exception reporting, we can establish those objects that deviate from the norm or are critical, send messages automatically about deviating values, or calculate the values in an alert monitor.

#### ***2) BEx Web***

Web Application Design allows us to use the generic OLAP navigation in Web applications as well as Business Intelligence Cockpits for simple or highly individual scenarios. We can use standard markup languages and Web Design APIs to implement highly individual scenarios with user-defined interface elements. Web application design comprises a broad spectrum of interactive Web-based business intelligence scenarios that we can adjust to meet our requirements using standard Web technologies.

The BEx Web Analyzer provides us with a standalone, comfortable Web application for data analysis that we can call using an URL or as an iView in the Enterprise Portal. We can open a query or a view in the Web Analyzer or we can define a new query. We can switch from the tabular to the graphic view using the tab pages, or we can request information from selected data providers and we can call the BEx Broadcaster.

#### ***3) BEx Information Broadcasting***

BEx Information Broadcasting allows us to make objects with Business Intelligence content available to a wide spectrum of users, according to our requirements.

We can publish queries and Web templates to any BW role or directly to the Enterprise Portal from the BEx Query Designer and BEx Web Application Designer design tools. The Business

Explorer portal role illustrates the various options that are available to us when working with content from SAP BW in the Enterprise Portal.

#### **4) Integration into the SAP Enterprise Portal**

We can integrate business-relevant content from the SAP Business Information Warehouse seamlessly into a SAP Enterprise Portal. Integration takes place with the help of the BEx Broadcaster, the BEx Web Application Designer, the BEx Query Designer, KM Content, SAP Role Uploads, or the Portal Content Studio. Depending on the type of integration, we create different objects with different displays in the portal.

The SAP Enterprise Portal enables us to access applications from other systems and sources, such as the Internet or intranet. Using one entry point, we can reach both structured and unstructured information. In addition to content from Knowledge Management, business data from data analysis is available to us from the Internet and from the Intranet.

### **7. SUMMARY**

The reporting, analysis, and interpretation of business data is of central importance to a company in guaranteeing its competitive edge, optimizing processes, and enabling it to react quickly and in line with the market. With Business Intelligence (BI), SAP NetWeaver provides data warehousing functionality, a business intelligence platform, and a suite of business intelligence tools

with which an enterprise can attain these goals. Relevant business information from productive SAP applications and all external data sources can be integrated, transformed, and consolidated in BI with the toolset provided. BI provides flexible reporting, analysis, and planning tools to support us in evaluating and interpreting data, as well as facilitating its distribution. Businesses are able to make well-founded decisions and determine target-orientated activities on the basis of this analysis.

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