

Microsoft Business Intelligence Interoperability with SAP

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**Abstract**: This white paper describes the key aspects of the Microsoft Business Intelligence (BI) solution including the Microsoft products and services that are used in the solution. The paper also describes how these components can interoperate together to deliver an effective BI solution to SAP customers. It assumes that the reader has a working knowledge of SAP ERP solutions, and an understanding of Microsoft® products including Microsoft® Office Excel® 2007, Microsoft® Office SharePoint® Server 2007, and Microsoft® SQL Server® 2008.

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# Executive Summary

In today’s competitive marketplace, it is essential to give employees tangible insight into daily business activities. Having this business intelligence capability enables companies to make better, more relevant decisions, and it increases productivity across the organization. Providing employees with business intelligence keeps them engaged and it enables them to act knowledgeably based on the results of a thorough analysis of enterprise data.

That is why many SAP customers consider their selection of a business intelligence (BI) solution as a critical factor that directly affects the company’s health and future. This decision involves determining which BI platform can deliver the accessibility and interoperability needed to support the BI requirements of even the most demanding environments. SAP customers also want a BI solution that is efficient and cost effective.

SAP customers using the Microsoft® platform are confident in choosing Microsoft BI as an optimal solution that adds value to their SAP enterprise investment. The Microsoft BI solution enables customers to experience true pervasive business intelligence in their organization at a low cost through the tools they use every day.

To learn more about the Microsoft BI solution, see:

<http://www.microsoft.com/BI>

The key advantages to using the Microsoft BI solution with SAP include:

* **SAP investment optimization**. Microsoft BI gives customers visibility into the data collected in SAP applications and makes this data more accessible. It allows customers to extract data from their SAP deployment through a convenient means and provide it to employees, empowering them to make effective business decisions and to respond quickly to change.
* **Lower Total Cost of Ownership (TCO)**. The best part of this solution is that most SAP customers already own many of required Microsoft products and services used in the Microsoft BI solution. They just need to use these tools properly to enable a successful BI solution. By taking advantage of their existing investment in the Microsoft platform, SAP customers can obtain an immediate business advantage.
* **Use of familiar tools**. This solution uses familiar tools that employees use every day including Microsoft® Office Excel® 2007, Microsoft® Office SharePoint® Server 2007, and Microsoft® SQL Server® 2008. This enables ease of use, broad accessibility, minimized training requirements, and it accelerates end user adoption.
* **Single sign on.** This BI solution makes use of the single sign on capabilities with Microsoft and SAP applications. No additional logons are required.

# Microsoft BI Introduction

“The way we look at it, the more employees who have access to business data, the greater a company’s ability to anticipate changes and make adjustments.[[1]](#footnote-2)”

Kurt DelBene, Senior Vice President of the Microsoft Office Business Platform Group

Microsoft’s vision is to develop successful, comprehensive business intelligence (BI) solutions that are affordable, easily accessible, and widely available – solutions that bring “BI to the masses.”

In order to better understand Microsoft’s vision, SAP customers need to think bigger about BI. First, a BI solution needs to provide the capability for employees to anticipate changes and to respond rapidly to changing conditions. This means employees require ready access to relevant business information that provides clear insight into the health of the organization.

Providing pertinent business information to employees leads to better decision-making, and it increases productivity across the organization. In addition, a successful BI solution enables partners to deliver greater value to SAP customers without the need for additional technology investments.

In order to be successful, the BI solution must provide tailored functionality to people and groups across the entire organization. It must follow the well understood best practices of an organization and provide a comfortable environment.

In addition, a comprehensive BI solution must enable the extraction and transfer of data from virtually any data source, and, most importantly, it must work well with SAP. SAP customers can only realize the true benefits of a BI solution when it is powered by a stable and closely integrated BI platform that makes accurate, trustworthy, and timely SAP business data available to end users.

Typically, proprietary vendor BI applications have low adoption rates at most companies. Often these specialized vendor BI applications resolve only part of the customer’s BI requirements, and therefore do not fulfill the promise of pervasive BI. In addition, vendor software usually requires specialized training and the expense of licensing additional seats.

If a vendor BI solution is too costly to license, implement, and maintain, broad deployment might not be feasible. In this case, many areas within the company that require tactical and operational decision making are not adequately addressed, limiting the company’s ability to make informed choices.

# Making Microsoft BI People Ready

Microsoft’s goal is to bring pervasive BI solutions to SAP implementations in a proven, integrated environment. With tight interoperability that makes the best use of a company’s current Microsoft products and services, Microsoft BI adds tremendous value because it increases SAP deployment, minimizes training requirements, and increases end user adoption.

Traditional BI vendors have not been able to truly address Microsoft’s goal in actual business environments. In many cases, only a limited number of BI users actively use proprietary or specialized vendor tools. The biggest impediments to user adoption often involve the complexity of vendor BI tools and interfaces and the cost of software and user licenses.

However, the most successful vendor BI solutions employ Microsoft Office productivity applications including Office Excel as the tool of choice.

In order to assist SAP customers, the Microsoft People-Ready™ initiative can provide insights for integrating Microsoft technologies with SAP implementations to increase their return on investment (ROI).

For more information about the PeopleReady initiative, see:  
<http://www.microsoft.com/business/peopleready/default.mspx>

People-Ready solutions enable SAP customers to improve productivity and achieve their Microsoft BI goals quickly and cost effectively by bridging the gap between structured business processes and the SAP internal users’ familiar work environment. Microsoft People-Ready integrated solutions encompass the entire software stack including user experience, collaboration, business intelligence, development, middleware, and database connectors.

For more information about making SAP PeopleReady, see:  
<http://www.microsoft.com/isv/sap/>

As an SAP customer, the key challenge of successful Microsoft BI solution is to get timely access to data and to produce meaningful information with SAP to support critical business decisions. In the past, SAP addressed this issue through the SAP NetWeaver BI solution. More recently, SAP AG acquired the BusinessObjects (BO) software company to enable their BI solution. SAP BO is intended to make accessing SAP data easier.

For more information about SAP BI, see:  
<http://www.sap.com/usa/solutions/sapbusinessobjects/large/intelligenceplatform/index.epx>

# The SAP and Microsoft Alliance

Built using the proven experience of thousands of SAP customers worldwide, Microsoft products are trusted, productive, and intelligent, and deliver unprecedented value to SAP installations of all sizes. Microsoft is the platform most frequently selected for SAP solutions and application deployments.

For more than 15 years, SAP and Microsoft have a proven track record of mutually working together closely to ensure that the Microsoft platform and SAP solutions are tightly integrated. For example, SQL Server 2008 Enterprise Edition was tuned jointly by Microsoft and SAP engineers to ensure maximum performance and interoperability. For this reason, SAP and Microsoft are uniquely positioned to provide integrated business value to SAP customers.

SAP and Microsoft have a strong, long term relationship that is driven by customer satisfaction. The primary goal of the Microsoft relationship with SAP is to design and build products that achieve full interoperability. This includes joint product development, joint product launches, selling each other products, and other mutual activities.

As shown in Figure 1, achieving this goal requires that Microsoft and SAP work together closely in four general areas including client interoperability, applications and services, application infrastructure, and business alliance.



Figure 1: SAP and Microsoft alliance

# Microsoft Business Intelligence for SAP

The good news about Microsoft BI is that SAP customers using the Microsoft platform often already own some of the products and services in the Microsoft BI solution. SAP customers just need to know how to utilize them properly to realize this vision. The Microsoft BI solution enables SAP customers to experience pervasive BI in their organization at a low cost through the tools they use every day, including Microsoft SQL Server 2008, Microsoft Office, and Office SharePoint Server 2007.

Since SAP customers can take advantage of their existing investment in Microsoft products and services, they can receive immediate business value from the Microsoft BI solution. For this reason, the Microsoft BI solution enables ease of use, high end user adoption, and broad accessibility.

The following sections present two different scenarios that can be used to implement the Microsoft BI solution for SAP. Both of these scenarios describe convenient methods SAP customers can use to make the data from SAP accessible to end users. These two scenarios include:

* Scenario 1: Connect directly to SAP
* Scenario 2: Extract data from SAP BW

Note that within these two scenarios:

* SAP® Business Information Warehouse (SAP® BW) versions 3.5 and higher (latest version is called NetWeaver 7.0) is considered the end-to-end data warehouse solution.
* SAP® Enterprise Central Component (SAP® ECC), previously called SAP R/3, is the OLTP data source for SAP BW. SAP operational systems include integrated enterprise resource planning (ERP) software such as Finance, Logistics, Human Resource, and so on.

## Scenario 1: Connect Directly to SAP

In Scenario 1, SAP customers use Office Excel 2007 to connect directly to SAP BW. No data movement is required. Since most SAP customers already have Office Excel 2007 (Office 2007) deployed throughout their organization, this Microsoft BI solution can be implemented immediately.

This scenario enables information workers to pull live data, create charts, and perform calculations and pivot table analyses, all from within the familiar Excel environment. This enables organizations to easily and efficiently deliver important SAP BI information to the people who need it.

For more information on using Excel 2007 with SAP, see:  
<https://www.sdn.sap.com/irj/scn/weblogs?blog=/pub/wlg/8483>

Excel 2007 is natively supported in SAP NetWeaver BI. In Scenario 1, SAP NetWeaver BI is used to enable a direct connection between SAP BW and the Microsoft BI solution through three public reporting APIs. These APIs include OLE DB for Online Analytical Processing (OLAP), also called ODBO, XML for Analysis (XML/A), and OLAP Business API for (OLAP BAPI). This scenario does not use the Open Hub service.

Note that users will not need training in BEx or NetWeaver BI to get started with this capability. Users can simply upload Excel files to SharePoint Server 2007 to analyze and view Excel documents over the Web.

In addition, Microsoft provides a SAP certified connector to connect SQL Server Reporting Services (SSRS) directly to SAP BW in order to create SAP BW reports using SAP data sources. SSRS can be used to create, manage, publish, and deliver rich, highly formatted operational reports. This means, information workers can take advantage of SSRS reporting capabilities without the need to migrate SAP data to another platform.

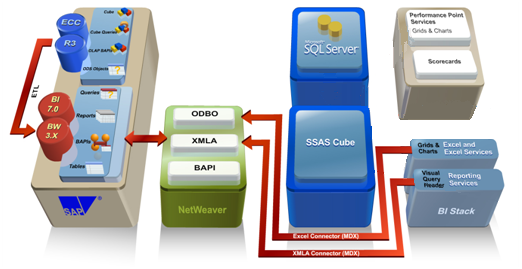


Figure 2. Scenario 1: Connect directly to SAP

The key elements of Scenario 1 require that:

* Excel 2007 and Excel Services in SharePoint are directly connected to SAP BW through the ODBO connector. The Microsoft PivotTable® service exposes BW cubes as OLE DB for OLAP.

In addition, Microsoft has certified partners that can enable PerformancePoint Services to work directly with SAP NetWeaver BI without requiring a separate persistent data store outside of SAP.

* SSRS is directly connected to SAP BW through the XML/A connector using the XML/A API via a .NET Framework data provider. This enables SSRS to create SAP BW reports using SAP data sources. The Visual Query Editor in SSRS exposes the structure of the information objects for the cubes provided through the XML/A interface. In SSRS, Report Builder 2.0 can enable end users to create reports through a convenient interface.

## Scenario 2: Extract Data from SAP BW

Scenario 2 is used to provide BI support to large SAP end user communities that require additional capabilities and improved performance. This scenario requires using the proprietary SAP Open Hub Service to extract the data, rather than the three public NetWeaver BI reporting APIs described in Scenario 1. It also requires implementing SQL Server Integration Services (SSIS) and SQL Server Analysis Services (SSAS). Note that the SAP Open Hub Service is provided by SAP to customers for an additional licensing cost.

For Scenario 2, in the typical data mart solution, SSIS is used to extract data from the SAP BW using SAP NetWeaver 7.0. SSIS pulls the data from SAP BW into SQL Server 2008 using the Open Hub Service interface. SSAS creates the analysis cubes and enables the entire BI environment. Then Microsoft BI front end product data is used to perform data analysis and for reporting purposes, as shown in Figure 3.

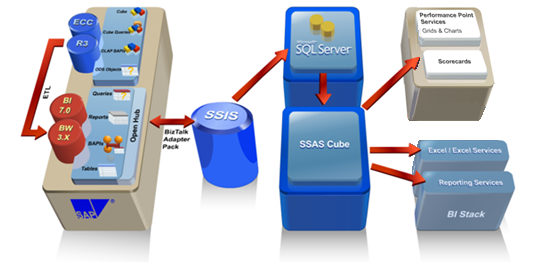


Figure 3. Scenario 2: Extracting data from SAP BW (data mart solution)

The key elements of Scenario 2 include:

* The SAP Open Hub Service API enables data to be extracted from SAP BW. Once the data is unloaded, it is stored in an external target. In this case, the destination is either a table in the relational database or a file such as a flat file. The staging BAPI is used to load the data. Both the Open Hub Service and the staging BAPI use remote function call (RFC) technology. These two interfaces are not Web service-based.
* SSIS uses Microsoft BizTalk Adapter 3.0 for mySAP Business Suite to extract data directly from SAP R/3. It enables a connection to the SAP tables and it is used to extract data from the relational data tables, access the data using SSIS, and move the data into SQL Server 2008.
* SSIS moves the data to SSAS to create the analysis cubes, which enables the BI environment and opens it to the BI front end using PerformancePoint® Services for SharePoint Server 2007 to enable grids and charts to be created. Note that SSAS is required to expose the data from SAP BW or R/3, ECC.
* Microsoft BI products also include Excel 2007, Excel Services, and SSRS. SSRS enables reports to be created using the data from SAP BW. In addition, Report Builder 2.0 allows end users to create reports through a convenient interface.

# SAP Business Suite with Microsoft BI Interoperability

The SAP Business Suite is a fully integrated family of products that provides integrated support for industry processes. It enables comprehensive business process support, with industry level specificity, that helps companies execute strategies that save operational costs or stimulate productivity, without the complexity of managing multiple technology platforms.

SAP Business Suite software is supported using the SAP NetWeaver platform. SAP NetWeaver enables businesses to align IT and business requirements, which reduces TCO. SAP combines composition technologies and application functionality to reduce IT complexity and increase business flexibility. It enables applications to be composed using enterprise services, orchestrates business processes and events, manages enterprise information, and delivers applications and content to users more quickly and cost-effectively.

For more information on SAP ERP, see:  
<http://www.sap.com/solutions/business-suite/index.epx>

As it concerns SAP Business Suite, the main aspects is uses are SAP ECC and SAP BW and a number of SAP NetWeaver interfaces as described below.

## SAP Enterprise Central Component

SAP Enterprise Central Component (SAP ECC), previously called SAP R/3, is integrated enterprise resource planning (ERP) software that includes Finance, Logistics, Human Resource Management, Manufacturing, Sales and Distribution (SD), and so on. SAP EEC is the OLTP data source for SAP BW that supports an enterprise or service oriented architecture (SOA).

## SAP Business Information Warehouse

SAP Business Information Warehouse (SAP BW) version 3.5 and higher, also called NetWeaver 7.0, is a software platform that is integral the SAP suite of applications. SAP BW uses a multi-tier architecture that can be used in both SAP and non SAP environments.

## SAP NetWeaver Interfaces

In the Microsoft BI solution, SQL Server 2008 uses SSIS to acquire data from SAP BW using the Open Hub Service interface, or using any of the three public NetWeaver BI reporting APIs as described below.

### Open Hub Service

The Open Hub Service enables the SAP NetWeaver BI system to become the hub of an enterprise data warehouse as shown in Figure 4. The Open Hub Service is a proprietary interface that enables the delivery of high quality, audited enterprise information to applications by calling the API using RFC technology with the SAP librfc32.dll. The Open Hub Service is provided to SAP customers for an additional licensing fee.

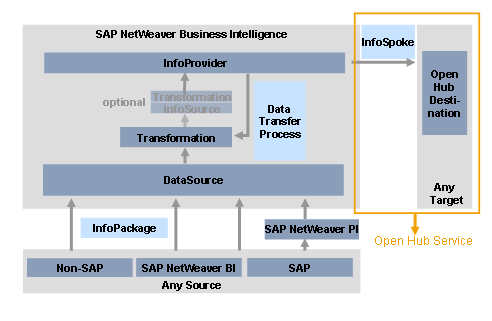


Figure 4. SAP NetWeaver BI Open Hub Service

For more information about the Open Hub Service, see:  
<http://help.sap.com/erp2005_ehp_04/helpdata/EN/ce/c2463c6796e61ce10000000a114084/frameset.htm>

SSIS provides a direct connection to the Open Hub Service API to write data extracts from SAP BW, and to transfer the data extracts to a local SAP BI database table or target. For the database table type an ODBC driver is used to move the data. When the Microsoft SAP certified connector is used, the data is moved through the Open Hub API using RFC.

### Public NetWeaver BI reporting APIs

With the release of SAP NetWeaver 7.0, data from SAP BI/BW can be accessed without requiring the Open Hub Service using three public NetWeaver BI reporting APIs including ODBO, XML/A, and OLAP BAPI as described below.

#### OLE DB for OLAP (ODBO)

In SAP BW, OLE DB for OLAP (ODBO) is a set of objects and interfaces that extend the capability of OLE DB to provide access to multidimensional data stores. OLAP applications typically handle huge volumes of complex interrelated data. ODBO is used to enable sophisticated data analysis by providing interactive access to a variety of views of the underlying information.

#### XML for Analysis (XML/A)

SAP BW also supports XML/A, which is an XML standard for OLAP that uses standard Internet protocols (XML and SOAP). XML/A provides reliable data access for Web applications, the Internet, mobile devices, and cross platform desktop components. XML/A is built on the ODBO specification and contains many similar interfaces, structures, and concepts. Also note that SSAS uses XML/A as the standard.

#### OLAP Business Application Programming Interface (OLAP BAPI)

In SAP BW 3.5 and higher (NetWeaver BI 7.0), OLAP BAPI is a set of interfaces for object oriented programming methods that enable a programmer to integrate third party software into the SAP R/3 product. For specific business tasks such as uploading transactional data, BAPIs are called and stored as RFC modules. OLAP BAPI uses the Multidimensional Expressions (MDX) query language to query multidimensional objects such as cubes and return multidimensional cellsets that contain the cube data.

# Microsoft BI Products and Services

In order to remain viable, companies need to provide business information in a way that is agile, accessible, and fast, every day. Microsoft’s BI tools use Microsoft platform products and technologies that are already in use in the workplace. This gives customers simplified, ready access to business information which leads to more informed decision making and better business performance.

When SAP customers take full advantage of their existing investment in Microsoft software, they can lower the cost of deploying BI solutions, which improves the ROI. Since most of the software is already implemented, Microsoft BI can also provide a lower TCO including lower investment costs and it lowers the cost associated with maintaining the configuration.

Microsoft BI products and services fall into three areas, as described below:

* **Microsoft BI infrastructure tools**. The SQL Server 2008 BI platform includes the SQL Server Database Engine, SSIS, SSAS, and SSRS.
* **Personal productivity tools**. Microsoft Office including Excel 2007, Visio 2007, and SQL Server 2008 Data Mining Add-Ins for Office 2007, and Duet for Microsoft Office and the mySAP Business Suite.
* **Organization and team tools**. Office SharePoint Server 2007, Enterprise Edition including Excel Services, PerformancePoint Services, Business Data Catalog, Report Center and Dashboards showing Key Performance Indicators (KPIs).

# Microsoft BI Infrastructure Tools

Increasing productivity by extending centralized access to an organization’s BI capabilities requires an enterprise-ready, scalable data infrastructure. Many businesses worldwide use the Microsoft SQL Server data platform with its powerful combination of BI features and services to implement BI within their organization.

## SQL Server 2008

SQL Server 2008 is an optimal data platform for SAP applications because it is an enterprise-ready, integrated data management and analysis solution. It is certified and fully compatible with SAP applications. By using SQL Server 2008, companies of any size that use SAP can share data across multiple platforms, applications, and devices, and find it easier to connect to internal and external systems. SQL Server 2008 provides the highest levels of scalability, reliability, availability, and security to SAP applications.

SQL Server 2008 supports large scale independent software vendor (ISV) applications. It delivers enhanced performance as compared to competitor platforms. It scales to some of the world’s largest workloads, as evidenced by strong industry standard benchmark results. Workload tests on SQL Server 2008 proved that SQL Server can take full advantage of the newest hardware and software architectures.

For more information about SQL Server 2008 benchmarks, see:  
<http://www.microsoft.com/sqlserver/2008/en/us/benchmarks.aspx>

In addition, SAP will no longer be using the 32-bit platform because it does not provide the scalability necessary to support large scale enterprise applications. Instead, SAP is certifying SQL Server 2008 Enterprise Edition with its two existing 64-bit platforms (x64 and IA64) to support large scale SAP applications.

SQL Server 2008 builds on the advancements in SQL Server 2005. It contains many new features and enhanced functionality that fully optimize the power of the underlying database for large scale SAP applications, while keeping the code independent.

SQL Server 2008 delivers competitive levels of security that meet stringent SAP application security requirements. In particular, it has security enhancements that provide strong authentication and access control, powerful encryption and key management capabilities, and enhanced auditing.

In addition, SQL Server 2008 provides a scalable BI platform that is optimized for data integration, reporting, and analysis. It enables SAP application customers to receive the benefits of its optimal, native integration and compatibility with the Windows Server platform.

Together, Microsoft Windows Server and SQL Server are the leading platform used for SAP:

* Today, more than 24,000 installations run on SQL Server 2008.
* Microsoft Windows® is the most popular platform for new SAP deployments. More than 58,000 SAP installations run on Microsoft Windows − more than all other platforms combined.
* 55 percent of all new SAP installations are deployed on Microsoft Windows.
* 42 percent of all new SAP installations are deployed on SQL Server 2008.
* Customers have deployed SAP on SQL Server 2008 with over 2,500 concurrent users and 11 terabytes of production data.
* SQL Server is the fastest growing database and BI vendor.
* Microsoft ships more SQL Server units than the total number of databases shipped by competitors.
* SQL Server is the number one OLAP server on the market.

SQL Server 2008 BI provides for data integration, data warehousing, analysis, and reporting, including powerful and intuitive tools for accessing and analyzing business information. SQL Server 2008 BI is a complete data platform that:

* Unifies storage and access for all data across the enterprise.
* Builds and manages sophisticated BI solutions.
* Increases the reach of the BI solution to empower all employees.

SQL Server 2008 BI technologies include the Database Engine, SSIS, SSAS, and SSRS as described below.

### SQL Server 2008 Database Engine

The SQL Server 2008 Database Engine is a core service that consists of a scalable, high-performance data storage engine for storing, processing, and securing data. The SQL Server Database Engine is used to store extremely large volumes of data making it an ideal choice for consolidating business data across the enterprise for analysis and reporting.

The Database Engine provides controlled access and rapid transaction processing to meet the requirements of the most demanding data consuming enterprise applications. The Database Engine can be used to create relational databases for online transaction processing or online analytical data processing. This includes creating tables for storing data and database objects such as indexes, views, and stored procedures for viewing, managing, and securing data. SQL Server Management Studio can be used to manage database objects and SQL Server Profiler can be used to capture server events.

For more information about the Database Engine, see:  
<http://msdn.microsoft.com/en-us/library/bb510417.aspx>

### SQL Server 2008 Integration Services

SSIS is a platform for building enterprise-level data integration and data transformation solutions with exceptional extract, transform, and load (ETL), and integration capabilities. SSIS ETL operations can populate and synchronize data from disparate data sources to a destination such as a data mart.

For more information about SSIS, see:  
<http://msdn.microsoft.com/en-us/library/ms141026.aspx>

SSIS can extract and transform data from a wide variety of sources such as XML data files, flat files, and relational data sources, and then load the data to one or more destinations. In particular, SSIS can load data into SAP NetWeaver 7.0 using a SAP destination, extract data from SAP NetWeaver 7.0 using the SAP source, and prepare extracted data for analysis in SSAS.

SSIS can solve complex business problems by copying or downloading files, sending e-mail messages in response to events, updating data warehouses, cleaning and mining data, and managing SQL Server objects and data.

#### Microsoft Connector 1.0 for SAP BI

In order to acquire the data for Scenario 2 (see Scenario 2: Extract Data from SAP BW above), using the typical data mart solution, SSIS extracts data from SAP BW and moves the data to SQL Server 2008 using the Open Hub Service interface. In this case, the data is transferred by using a relational database table.

For more information about this connector, see:  
<http://msdn.microsoft.com/en-us/library/dd299430.aspx>

The Microsoft Connector 1.0 for SAP BI enables massive data extraction to, and from, SAP NetWeaver BI within the SSIS environment as shown in Figure 5.

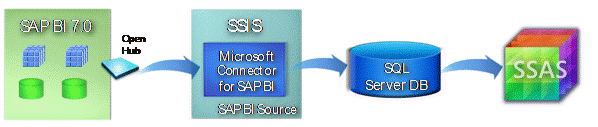


Figure 5. Microsoft Connector 1.0 in SSIS

Microsoft Connector 1.0 for SAP BI is an add-in for SSIS that is delivered in the Microsoft SQL Server Feature Pack. It provides an efficient and streamlined solution for integrating non SAP data sources with SAP BI. It also enables the construction of data mart solutions for SAP data in SQL Server 2008.

Once the SAP BW data is exposed as a data source of SQL Server 2008, SSAS can be used to create cubes, which enables the entire BI environment. In particular, SSAS can provide the data to PerformancePoint Services in SharePoint Server 2007.

#### Microsoft BizTalk Adapter 3.0 for mySAP Business Suite

The Microsoft BizTalk Adapter 3.0 for mySAP Business Suite is an SSIS component that exposes the SAP system as a Windows Communication Foundation (WCF) service. This adapter is part of the BizTalk Adapter Pack that contains a collection of key line of business (LOB) application adapters that enable Windows applications to integrate with SAP LOB applications.

This adapter enables adapter clients to retrieve metadata for operations and generate programming artifacts that can be used in programming solutions. The adapter enables a connection to SAP tables in order to extract data from the relational data tables, access the data using SSIS, and move the data into SQL Server 2008.

For more information about this adapter, see:  
<http://msdn.microsoft.com/en-us/library/cc185427.aspx>

### SQL Server 2008 Analysis Services

SQL Server 2008 enables organizations to build comprehensive, enterprise scale analytic solutions that deliver tangible business insight using familiar tools. SSAS is an analytical engine that contains a broad range of features and tools for data mining including both relational and cube data. SSAS does not require a data warehouse to do data mining. It can use tabular data from external providers, spreadsheets, and even text files.

For more information about SSAS, see:  
<http://msdn.microsoft.com/en-us/library/bb510517.aspx>

SSAS data mining can be used to create specialized algorithms to identify patterns, trends, and associations in business data for predictive purposes. SSAS can also be used to perform multidimensional analysis of OLAP cubes for large volumes of data including business measure aggregation and KPIs.

SSAS is used in conjunction with SSIS to build ETL processes for cleaning data and processing or updating models. SSRS is used to present predictions and enable users to explore the data.

SSAS models can be deployed to another server to allow users to perform analysis and predict outcome using stored models. Data mining models can be accessed through custom clients, including Web services, or by using Microsoft Office applications such as the SQL Server 2008 Data Mining Add-Ins for Office 2007, as described below.

The SAP BW or R/3 data that is extracted in SSIS can be used to construct the cubes. In this case, SSAS enables the entire environment for use and opens the cubes to the PerformancePoint Services for SharePoint.

### SQL Server 2008 Reporting Services

SSRS is an extensive server-based enterprise reporting platform that can be used to create, manage, publish, and deliver reports. Its programming features can be used to integrate or extend data and report processing in custom applications. SSRS combines the data management capabilities of the SQL Server and Windows Server platforms to deliver real-time information to support daily operations and drive decision making.

For more information about SSRS, see:  
<http://msdn.microsoft.com/en-us/library/ms159106.aspx>

In Scenario 1 (see Scenario 1: Connect Directly to Your SAP Investments above), SSRS can connect directly to SAP BW using the XML/A API using a .NET Framework data provider in order to create SAP BW reports. This enables information workers to use SSRS to build high quality reports using SAP data sources. SAP users can take advantage of SSRS reporting capabilities without the need to migrate their data to another platform.

SSRS makes SAP BW report authoring easy, consistent, and familiar. SSRS can be used to create pixel perfect operational reports on SAP NetWeaver 7.0 without requiring an expensive third party reporting solution.

For more information, see:  
<http://msdn.microsoft.com/en-us/library/cc974473.aspx>

With SSRS, report authoring is performed in the Business Intelligence Development Studio, using a custom built query designer. The SSRS Visual Query Editor exposes the structure of objects for the cubes provided through the XML/A API. Deployment is a simple, one step process that targets the Web as the report deployment platform. The reports created can be viewed over a Web-based connection, as part of a Windows application or within a SharePoint site.



Figure 6. Sample visualization components as part of SSRS

#### SQL Server Report Builder 2.0

In SSRS, the Report Builder 2.0 report authoring tool enables end users to create reports using SAP data. It also supports queries that use multidimensional data sources, including SSIS, Oracle, Hyperion Essbase, SAP NetWeaver BI, and relational data sources, such as SQL Server, Oracle, Teradata, OLE DB, and ODBC.

SQL Server Report Builder 2.0 provides a convenient report authoring environment to create reports including tables, matrixes, and charts using templates and predefined report models. Report Builder 2.0 contains features such as enhanced data layout, data visualization, richly formatted text, and on-demand rendering.

For more information about Report Builder 2.0, see:  
<http://msdn.microsoft.com/en-us/library/dd207008.aspx>

# Personal Productivity Tools

The Microsoft BI solution uses the Microsoft Office suite of applications for its personal productivity tools. This includes the rich feature sets available in Office Excel 2007 and Office Visio 2007, in addition to other add-ins and tools. Office applications are familiar to information workers − they know them and use them every day. By applying their existing Microsoft Office investment to the Microsoft BI solution, SAP customers can minimize their training requirements, increase end user adoption, and lower the TCO.

## Microsoft Office

Microsoft Office delivers enhanced capabilities for simplifying how people and teams work together, streamlining processes and content management, and improving business insight across an organization. With over 120 million licenses shipped, Microsoft Office 2007 delivers a familiar front end that is already installed on most desktop computers.

Microsoft Office has optimal, native integration and compatibility with the SQL Server 2008 data platform and the Windows Server platform. This deep integration enables Microsoft Office to unify BI data storage and access, simplify the development and management of sophisticated BI solutions, and extend its reach to all employees.

For more information about Office Enterprise 2007, see:  
<http://office.microsoft.com/en-us/suites/FX101674041033.aspx>

### Office Excel 2007

Microsoft Office Excel 2007 can be used to create and format spreadsheets and to analyze and share information to make more informed decisions across the enterprise. Excel 2007 can help to expose SAP data to end users conveniently and enable users and administrators to manage SAP transaction data more easily.

For SAP customers, Office Excel 2007 provides a convenient way to create, update, and transfer large amounts of data in SAP transactions and it simplifies manual data entry. For example, it enables information workers to stage the data for SAP transactions in a single complete view, instead of navigating through multiple SAP transaction screens and multiple lines items, with each screen giving only a partial view of the data. In addition, by using Excel 2007, SAP support can significantly reduce custom programming efforts.

For more information about Excel 2007, see:  
<http://office.microsoft.com/en-us/excel/FX100487621033.aspx>



Figure 7. PivotTable or PivotChart view created using a direct connection to SAP data fields

In addition, Excel 2007 has native integration with SQL Server 2008, and it can be used as an interface for OLAP analysis, data mining, and report rendering. Other advanced capabilities include:

* Excel 2007 has native connectivity to SAP NetWeaver BI 7.0. This enables end users to create pivot tables that connect directly to SAP and to publish these tables to the Web using Excel Services.
* With Excel 2007, users can browse data stored in multidimensional OLAP cubes in SSAS through improved access and integration. Excel 2007 can be used with other Microsoft tools to build PivotTable dynamic views that slice and dice data.
* Excel 2007 can employ SSAS features such as translations, KPIs, calculated members, named sets, and server actions.
* Predictive analysis enables non technical users to harness the highly sophisticated data mining algorithms of SSAS within the Office environment. The SQL Server 2008 Data Mining Add-Ins for Office 2007 (below) can be used to perform complex analysis directly in Excel 2007.
* Automatic analysis features can be used, for example, to highlight exceptions when the data differs from patterns in other areas of a table or data range, forecast future values based on current trends, analyze potential scenarios, and determine what must change to meet a specific goal.
* The Reporting Services Excel rendering capabilities preferred format report delivery feature enables users to receive reports directly in Excel.
* Excel Services in Office SharePoint Server 2007 provides improved data sharing. It enables Excel 2007 to share sensitive business information more broadly with enhanced security.
* With Excel Services, Excel 2007 can be used to navigate, sort, filter, input parameters, and interact with PivotTable views directly on the Web browser.

### Office Visio 2007

Office Visio 2007 is a drawing and diagramming application that is used to visualize, analyze and communicate complex information in graphical form. Visio 2007 also has native integration with SQL Server 2008, which enables it to:

* Render decision trees, regression trees, cluster diagrams, and dependency nets.
* Annotate, enhance, and present data mining graphical views.
* Save data mining models as Visio drawings that can be embedded in Office documents or saved as a Web page.

For more information about Visio 2007, see:  
<http://office.microsoft.com/en-us/visio/FX100487861033.aspx>

### SQL Server 2008 Data Mining Add-Ins for Office 2007

SQL Server 2008 supports predictive analysis that provides non technical users with a complete, intuitive set of data mining tools. These add-Ins are used with Excel 2007 to harness the data mining algorithms of SSAS within the Office environment to enable large data sets to be analyzed, for example, such as to identify issues and opportunities facing the organization. These add-ins can derive patterns and trends in complex data, visualize those patterns in charts and interactive views, and generate rich summaries for presentation and analysis.

For more information about this add-in, see:  
<http://www.microsoft.com/sqlserver/2008/en/us/data-mining-addins.aspx>



Figure 8. End user data mining accessible completely through Excel

## Duet for Microsoft Office and mySAP Business Suite

Developed jointly by SAP and Microsoft, Duet software provides seamless access to SAP business processes and data using Microsoft Office applications including Excel, Word, and Outlook synchronization, and Microsoft enterprise applications such as Microsoft Exchange.

Duet enables easy interaction with Office applications such as with extended application menus, the SAP specific smart panel, and business analytics. Duet also includes features such as time management, reporting and analytics, budget monitoring, workflow approval, sales, team, leave, travel, recruitment, and purchasing management, demand planning, and more.

For more information about Duet, see:  
<http://office.microsoft.com/en-us/duet/FX101686211033.aspx>



Figure 9. Duet time entry is added in the calendar on top of the regular meeting information

# Organization and Team Tools

The Microsoft BI solution uses Microsoft® Office SharePoint® Server 2007 to enable organizations and teams to share information, report on business activities, and drive business results. Office SharePoint Server 2007 has been adopted worldwide and many SAP customers are already using it within their organization. Information workers are familiar with SharePoint and already know how to use its basic features and capabilities.

For Microsoft BI, SharePoint Server 2007 gives employees across the organization greater visibility into business performance data that can facilitate more efficient, informed decision making and productivity. Employees can track their performance against corporate goals and analyze budgets and forecasts within one fully integrated product.

## Office SharePoint Server 2007, Enterprise Edition

***Breaking news…*** *PerformancePoint Services is now a shared service in SharePoint Server 2007 Enterprise Edition. This means, SAP customers can now obtain the monitoring and analytic components of the Microsoft BI solution − the dashboards and scorecards − for free. See “PerformancePoint Services” below for more information. All customers that have purchased SharePoint Server 2007 Enterprise Edition CAL with Software Assurance can download PerformancePoint Services to SharePoint as part of their original service*.

Office SharePoint Server 2007 is a widely adopted, comprehensive collaboration, publishing, and dashboard solution that can deliver improved value to SAP customers. It provides a shared location for viewing and interacting with an organization’s enterprise-wide BI content and tools including analytical views, reports, and KPIs. SharePoint Server 2007 is a prevalent portal presence among SAP customers.

For more information about Office SharePoint Server 2007, see:  
<http://office.microsoft.com/en-us/sharepointserver/FX100492001033.aspx>

SharePoint Server 2007 enables the widespread delivery of SAP information and data through Office applications and other Microsoft personal productivity tools.

It can integrate structured SAP data into SharePoint repositories including both Web access and programmatic access to collaborative content and materials. SharePoint Server 2007 can use this data as unstructured content using Microsoft platform products and technologies.

SharePoint Server 2007 provides full interoperability with SAP applications including the sharing, controlling, and reusing of information. This includes various interoperability options with SAP, from displaying SAP information in a portal page to creating complex business process solutions that incorporate SAP data. It provides secured access to information accessed across repositories and other systems. SharePoint Server 2007 can also incorporate SAP applications using the SAP iView Web Part.

In addition, SharePoint Server 2007 has native integration with SQL Server 2008 SSRS including:

* Uses one consistent user interface to manage and view reports.
* Tracks versions of reports stored in SharePoint Server 2007 document libraries.
* Uses the SharePoint Server 2007 Report Center template to build a report repository.
* Manages a single security model for reports through SharePoint 2007.

SharePoint Server 2007 BI capabilities include Excel Services, Business Data Catalog, and Report Center and Dashboards, and PerformancePoint Services as described below.

### Excel Services

Excel Services is a shared service in SharePoint Server 2007 that enables the loading, calculation, display, and reuse of Excel workbooks on SharePoint Server 2007 portals and dashboards, without requiring custom code. Excel Services can provide Office Excel-based reports, including KPIs, pivot tables and links to databases that can be viewed using a Web browser.

For more information about Excel Services, see:  
<http://msdn.microsoft.com/en-us/library/ms519581.aspx>



Figure 10. Excel Services showing KPIs over a browser

Excel Services is built on ASP.NET and Windows SharePoint Services 3.0 technologies. The three core Excel Services components include Excel Web Access, Excel Web Services, and Excel Calculation Services.

For more information about these services, see:  
<http://msdn.microsoft.com/en-us/library/ms582023.aspx>

These three components can be divided into two major groups: the components on the Web front end server including Excel Web Access and Excel Web Services, and the back end application server component called Excel Calculation Services. Excel Services also handle communication among the three components and load balances the requests made to Excel Calculation Services.

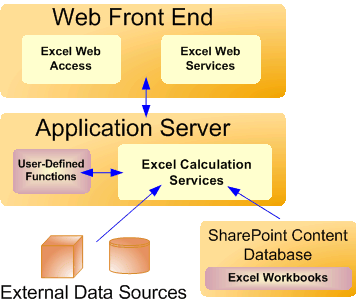


Figure 11. Excel Services components

The Excel OLE DB for OLAP connector for SAP enables a direct connection to the SAP BW cubes on the back end. In this case, Excel Services and Excel 2007 can use the PivotTable Service to expose BW cubes as OLE DB for OLAP, and the results can be published on SharePoint Server 2007 including the connection information. Note that the PivotTable Service provides OLE DB functionality for applications requiring access to multidimensional data and data mining services.

The Excel ODBO connector can be downloaded from SAP. Note that this connector only works with the correct version of NetWeaver BI 7.0 and the correct service packs.

For more information about the Excel ODBO connector, see:  
<https://www.sdn.sap.com/irj/scn/go/portal/prtroot/docs/library/uuid/1031a475-a633-2a10-f4b4-ccfe615c0517>

### Business Data Catalog

Business Data Catalog is a shared service in SharePoint Server 2007 that can easily integrate data from LOB applications including SAP applications with a SharePoint site, without requiring custom programming. It provides built-in support for displaying data from databases and Web services. Business Data Catalog can display this data in Office SharePoint Server 2007 lists, Web parts, search, user profiles and custom applications. In addition, it can search SAP records for structured and unstructured data.

For more information about Business Data Catalog, see:  
<http://msdn.microsoft.com/en-us/library/ms563661.aspx>

### Report Center and Dashboards (Key Performance Indicators)

In Office SharePoint Server 2007, the Report Center site includes templates optimized for report access, administration, and performance tracking. These site templates provide consistent administration for reports, worksheets, KPIs, and data connections.

In particular, a KPI is a quantifiable measurement for evaluating business success frequently over time. Showing KPIs in a dashboard is a fundamental example of business intelligence because it displays the right information easily in order to increase the user's productivity.

Office SharePoint Server 2007 can be used to centrally publish KPIs in a visual format to allow individuals, teams, managers, and businesses to quickly evaluate the progress made against measurable goals. KPIs can be used by anyone having the correct access and permissions.

A KPI list is a key component of the dashboard personalization features and it can be adapted to meet individualized needs. KPI lists can be stored in the Report Center or in any other site in SharePoint. A personal KPI list can be defined using the KPIs stored in SSIS, Office Excel, a SharePoint list, Business Data Catalog data sorted in a SharePoint list, or manually entered data.

For more information, see Including Key Performance Indicators and KPI Lists in:  
<http://msdn.microsoft.com/en-us/library/bb966994.aspx>

In addition, a KPI Web Part can be added to a dashboard to provide easy navigation that allows quick access to the KPIs needed most often. KPIs can be grouped together into a business scorecard to provide business executives with a quick and accurate historical summary of business success.



Figure 12. KPIs in SharePoint Server 2007

### PerformancePoint Services

***Breaking news…*** *PerformancePoint Services is now a shared service in SharePoint Server 2007 Enterprise Edition. This means, SAP customers can now obtain the monitoring and analytic components of the Microsoft BI solution − the dashboards and scorecards − for free. All customers that have purchased SharePoint Server 2007 Enterprise Edition CAL with Software Assurance can download PerformancePoint Services to SharePoint as part of their original service*.

PerformancePoint Services is a shared service of SharePoint Server 2007 that enables information workers to perform integrated BI performance monitoring and analysis. It provides dashboards, scorecards, and management reporting. PerformancePoint Services are provided along with the search, collaboration and content management features of SharePoint at no additional cost.

For more information about PerformancePoint Services, see:  
<http://office.microsoft.com/en-us/performancepoint/HA101639571033.aspx>

In the scenarios described above, SSAS enables the BI environment and opens it to PerformancePoint Services for SharePoint Server 2007 to enable grids and charts to be created. Note that SSAS is required to expose the data from SAP BW or R/3, ECC.

In addition, Microsoft has certified partners that can enable PerformancePoint Services to work directly with SAP NetWeaver BI, without requiring a separate persistent data store outside of SAP.



Figure 13. PerformancePoint Services KPI and cascading metric hierarchy

# Conclusion

In order to unlock the potential of the entire organization, SAP customers need a flexible BI solution that gives all employees tangible insight into daily business activities. This allows employees to make better, more relevant decisions, and it increases productivity across the organization.

In these times of tight IT budgets, the Microsoft BI solution provides SAP customers with a lower cost option. The best part of this Microsoft BI solution is that many SAP customers already have the required Microsoft services and products in use, which makes the Microsoft solution efficient and cost effective. This means, little investment is required to get started. SAP customers just need to use these tools properly to realize the Microsoft vision.

The Microsoft BI solution uses familiar tools that information workers use every day including Microsoft Office applications, Office SharePoint Server 2007, and Microsoft SQL Server 2008. The Microsoft BI solution does not require SAP customers to purchase proprietary or specialized applications or additional licensing, and it does not require additional BI resources and staffing.

The Microsoft BI solution is designed to help organizations transform SAP data, workflows, business processes, and informational assets into an insightful analysis that drives performance forward. It enables ease of use, broad accessibility, and minimizes training requirements. These factors empower information workers and accelerate end user adoption.

For more information, discuss the Microsoft BI solution with your Microsoft account management team and they can help you determine the best strategy for implementing BI within your SAP deployment.

To learn more about Microsoft BI products and services, please visit:

<http://www.microsoft.com/BI>

# Links and References

Multiple SAP BI interoperability papers

<http://www.microsoft.com/isv/sap/technology/interop/bi.aspx>

SSIS and SAP BI White Paper

<http://msdn.microsoft.com/en-us/library/dd299430.aspx>

SSRS and SAP NetWeaver BI Technical Article

<http://msdn.microsoft.com/en-us/library/cc974473.aspx>

Microsoft .NET and SAP - Interoperability

<http://www.microsoft.com/learning/en/us/Books/12513.aspx>

SQL Server 2008

<http://www.microsoft.com/sqlserver/2008/en/us/application-platform.aspx>

<http://www.microsoft.com/sqlserver/2008/en/us/overview.aspx>

<http://www.microsoft.com/sqlserver/2008/en/us/news-reviews.aspx>

Windows Platform Support

<http://www.microsoft.com/windowsserver2008/en/us/default.aspx>

<http://www.microsoft.com/windowsserver2003/evaluation/news/analystreports/default.mspx>

Lower Total Cost of Ownership SQL Server 2008

<http://www.microsoft.com/sqlserver/2008/en/us/benchmarks.aspx>

<http://www.microsoft.com/sqlserver/2008/en/us/pricing.aspx>

<http://www.microsoft.com/sqlserver/2008/en/us/licensing-faq.aspx>

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1. <http://www.microsoft.com/presspass/features/2009/jan09/01-27KurtDelbeneQA.mspx> [↑](#footnote-ref-2)