# SAP® Business ByDesign™ for Subsidiaries
Overview of Functional and Technical Integration
with Headquarters SAP ERP

**SAP** Business **ByDesign**™

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# Integrating Subsidiaries with SAP® Business ByDesign™ and SAP ERP

Many companies that run the SAP® ERP application as their corporate enterprise resource planning (ERP) system are moving to a two-tier model to support their subsidiaries. With this model, they choose a subsidiary ERP system that meets subsidiary functional requirements and is less expensive to deploy, easier to change, and simpler to manage. Yet it also satisfies corporate requirements, which typically include regulatory transparency, operational metrics visibility, use of centralized business functions, and key data rollup.

Many of these companies are selecting the SAP Business ByDesign™ solution as their subsidiary ERP system for those reasons. The powerful solution is fast to deploy, offers a low cost of ownership, meets functional and industry requirements, and provides deep integration with SAP ERP used at headquarters ("HQ SAP ERP system"). This paper focuses on the integration between SAP Business ByDesign and SAP ERP. It describes the six integration scenarios between SAP Business ByDesign and SAP ERP: data exchange, process integration, master data integration, analytics integration, IT management integration, and structured custom-integration scenarios. It then goes on to describe the technology and architecture behind these integration scenarios.

# Challenges Facing Subsidiary Systems as Companies Expand

Fortune 5000 companies are expanding their footprint to take advantage of market opportunities. As a result, they are doing the following:
- Opening sales offices in new regions and growing existing sales and distribution operations
- Acquiring new companies to either consolidate their position in existing market segments or expand into new areas
- Setting up new joint ventures

Such activities increase the number of subsidiaries within their corporate hierarchy: international and local sales and distribution offices, small operating divisions, customer service units, and joint ventures.

The IT solutions at these subsidiaries come under pressure because they have to:
- Support the current business model of the subsidiary in an efficient manner – meeting both industry and business-specific requirements
- Ensure that they can scale and are flexible to meet the changing needs of a subsidiary and do not become an impediment for future growth
- Provide transparency to the HQ for risk and compliance, as well as for tracking operational performance against plans
- Support intracompany transactions such as buying and selling between corporate and subsidiaries
- Enable a shared-services structure such as centralized purchasing
- Support financial consolidation for global financial reporting
- Enable organizations to easily and rapidly deploy systems at new subsidiaries gained through acquisition, so they can achieve business integration quickly

Most subsidiaries' integrated business solutions don't meet the requirements listed above and should be replaced.

**IMPLEMENTING A TWO-TIER ERP MODEL**

IT budgets at most subsidiaries are small. In addition, the subsidiaries typically don't have adequate IT resources to deploy and support a corporate ERP system. The best approach for these subsidiaries is to standardize on an integrated business solution that meets their functional requirements and is less expensive to deploy, easier to change, and simpler to manage. But it still must meet corporate requirements for regulatory transparency, support visibility into operational metrics, leverage centralized business functions, and deliver key data rollup. Such a deployment model, where corporate and subsidiaries have different ERP systems by choice, is called a two-tier ERP model.

Interest in a two-tier ERP model continues to grow, as evidenced by analyst publications. Forrester Research, Inc., in its October 2010 report titled "It's time to clarify your global ERP strategy," said: "Large multinational firms need to consider their global ERP strategy as they balance the need to reduce IT complexity with the need to support the increasingly diverse requirements of their myriad markets, offerings, and channels." Similarly, in a July 2011 report titled "Hype Cycle for ERP, 2011," Gartner said: "A governed, two-tier ERP strategy can provide significant business benefit through process standardization, better support of divisional needs, and improvements in data quality and reporting from smaller business units, while lowering the operational costs of the combined systems."

## IMPORTANCE OF SUBSIDIARY-HQ SAP ERP INTEGRATION IN A TWO-TIER ERP MODEL

A two-tier ERP strategy provides organizations with an opportunity to standardize on one subsidiary ERP system and create standardized templates for deployment that meet functional and budgetary requirements. By selecting a subsidiary ERP system that is built on a software-as-a-service (SaaS) paradigm, they not only reduce the up-front hardware, software, data center, and implementation costs needed to deploy such a system. They also eliminate the need to hire and retain system administrator resources to manage and operate the system. This significantly lowers their cost of ownership and allows them to deploy a best-in-class system quickly while staying within budget. But a rich SaaS-based ERP system that meets a subsidiary's functional and budgetary requirements is not enough. It is also critical for the selected subsidiary system to support deep information integration with the HQ SAP ERP system.

Many organizations that run SAP ERP at the corporate level are selecting SAP Business ByDesign as their subsidiary ERP system because it meets all three requirements:
- Fast deployment and low cost of ownership
- Support for rich capabilities that meet functional and industry requirements
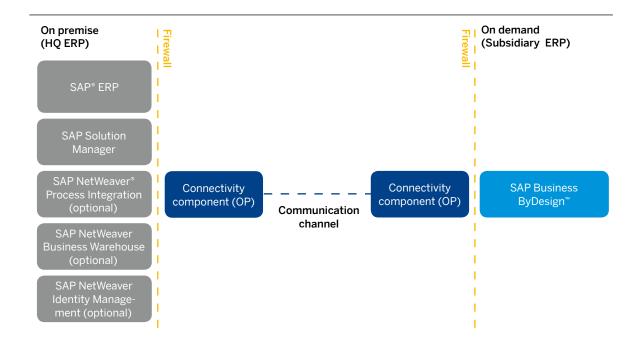- Deep integration with SAP ERP

## INTEGRATION SCENARIOS BETWEEN SAP Business ByDesign AND THE HQ SAP ERP SYSTEM

SAP Business ByDesign supports six types of integration scenarios with the HQ SAP ERP system:
- Data exchange
- Process integration
- Master data integration
- Analytics integration
- IT management integration
- Structured custom integration

Before diving into the details of functional integration scenarios supported by SAP Business ByDesign, we will provide a quick overview of the technical integration between these two systems (see Figure 1).

**Figure 1: System Landscape of HQ SAP ERP Integrated with  SAP Business ByDesign**

## Technical Integration Overview, Connectivity, and Upgrades

SAP's philosophy is that it should not force customers to update or upgrade their HQ SAP ERP system in order to integrate with SAP Business ByDesign at the subsidiary level. Integration scenarios between these two systems work with SAP ERP, version 6.00 SP 15 (that is, without any enhancement packages), and the SAP Solution Manager application management solution, version 7.01 SP27. In addition, several end-to-end business processes run with lower releases as well, down to SAP ERP version 4.0A, though they may need a communication hub (such as SAP NetWeaver® Process integration technology).

It is SAP's goal to use integration capabilities within these releases of SAP ERP when developing integrated business processes. However, that may not be possible for all end-to-end processes. In such a scenario, missing integration capabilities can be added as integration components. The integration components are nonmodifying, small, independent add-ons to SAP ERP version 6.0. They are subject to strict development rules and governance at SAP to ensure that they do not impact the regular operations of the SAP ERP release. In addition, their content is restricted to integration capabilities.

SAP NetWeaver components serving as hubs in the headquarters system landscape are optional, but add further benefits:
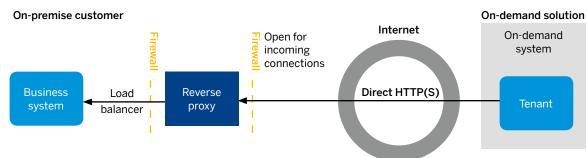- SAP NetWeaver Process Integration for mediated process integration with multiple or third-party systems
- SAP NetWeaver Business Warehouse component for analytics integration

SAP Business ByDesign is delivered in a cloud model operated by SAP. A standard SAP Business ByDesign tenant is configured for a subsidiary and enables business processes integration with that subsidiary.

A crucial security point is access from SAP Business ByDesign to the on-premise landscape of the HQ SAP ERP system. The technical connectivity between SAP Business ByDesign (cloud) and SAP ERP (on-premise) is facilitated by connectivity components. The connectivity components of the cloud landscape (SAP Business ByDesign) are provided and operated by SAP, and the corresponding components in the on-premise landscape (SAP ERP) are chosen and operated by the enterprise's IT organization based on its security standards. SAP Business ByDesign communications are based on HTTP(S) and the secure socket layer (SSL) protocol, while a secure reverse proxy protects the on-premise environment (Figure 2). SAP plans to offer an alternative based on an SSL tunnel approach as another communication option to support individual enterprise IT policies. This will include a dedicated connectivity component for the on-premise landscape.

SAP Solution Manager enables lifecycle management of a large enterprise's on-premise landscape with its subsidiaries' SAP Business ByDesign tenants. In its landscape model (transaction SMSY), SAP Solution Manager represents an SAP Business ByDesign tenant as a product system with a tenant number and other basic information. SAP Solution Manager also provides process models and test cases spanning on-premise and on-demand systems. It supports lifecycle management processes such as the following.

Figure 2: Communications Channel and Connectivity – SAP® ERP and SAP Business ByDesign™

- Implementation: The implementation of an SAP Business ByDesign solution for a subsidiary consists of a standard implementation of an SAP Business ByDesign tenant, as well as setup of integration to on-premise systems as needed by end-to-end processes. This integration setup consists of:
  – SAP Solution Manager configuration
  – Preparation of technical connectivity within the on-premise landscape
  – Master data extraction from on-premise systems and import to SAP Business ByDesign
  – Integration configuration of on premise and on demand (technical and business connectivity)
  – User creation

  For testing purposes, a separate SAP Business ByDesign test tenant can be configured and connected to on-premise test systems.
- Upgrades and updates: Simultaneous upgrade or update of subsidiary cloud tenants and related systems in an on-premise landscape is virtually impossible since, in the cloud landscape, hundreds of SAP Business ByDesign tenants across multiple customers are upgraded simultaneously. SAP takes special care to ensure compatibility of integration interfaces between cloud and on-premise systems used in joint end-to-end processes. After an upgrade of the SAP Business ByDesign solution, functionality already in use continues to be available without a need to update or upgrade an on-premise system or an integration component. However, to benefit from new or improved functionality in SAP Business ByDesign (resulting from an update or upgrade), it may be necessary to upgrade the on-premise integration component. This should have no impact on the underlying ERP system and can be done any time after the SAP Business ByDesign update or upgrade.
- Monitoring: SAP plans to offer availability monitoring of the subsidiary SAP Business ByDesign tenants in SAP Solution Manager.
- Incident management: Support tickets (incidents) can originate from both on-premise and cloud systems. The subsidiary typically staffs a key user who operates as the integrated help desk of the SAP Business ByDesign tenant and interacts with the corporate IT department using the service desk component in SAP Solution Manager. Incidents are distributed flexibly between cloud tenants, SAP Solution Manager, and SAP support. Incidents from the SAP Business ByDesign tenant can be accessed from the service desk component in SAP Solution Manager.
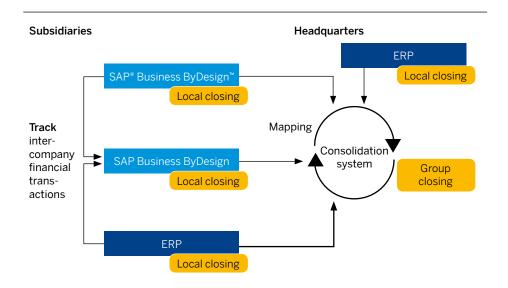
The powerful SAP Business ByDesign solution is fast to deploy, offers a low cost of ownership, meets functional and industry requirements, and provides deep integration with the HQ SAP ERP system.

## INTEGRATION SCENARIOS

Using the technical aspects of the integration between SAP ERP and SAP Business ByDesign discussed above as a foundation, let's take a closer look at the six types of integration scenarios between the subsidiary system and HQ system.
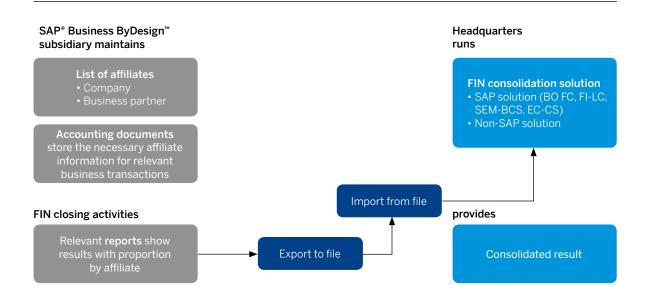
**Data-exchange scenarios:** At a minimum, the subsidiary system should support data exchange such as financial data consolidation preparation for HQ systems. Such integration between subsidiary and corporate enables the subsidiary to operate independently and autonomously but allows corporate to easily consolidate financials and perform global financial reporting. SAP Business ByDesign provides auditable local closing data, which can be imported into the corporate group consolidation system where group closing activities such as mapping, validation, financial consolidation, and reporting take place (see Figure 3). SAP Business ByDesign local closing data provides financial data showing intercompany business per affiliate on dimensions such as general ledger account, functional area, company, segment, and profit center.

**Figure 3: Financial Consolidation Data Exchange in SAP Business ByDesign**

Future data-exchange scenarios may include budgeting and customer-channel demand consolidation. Figure 4 shows how data exchange works for a subsidiary for a financial consolidation scenario. After local closing is completed, the data can be extracted using the "Extraction of Financial Data" function within SAP Business ByDesign. SAP predelivers two basic packages for data extraction: one for GDPdU needs (Germany specific) and one generic for consolidation preparation purposes. Data is exported in the "SAP Audit" format (compatible with International Data Encryption Algorithm, or IDEA), and a log file is created as well. The log contains information such as when created and by whom, parameters, and extraction results.

**Figure 4: File Export for Financial Consolidation Data Exchange**

**SAP® Business ByDesign™ subsidiary maintains**

**List of affiliates**
• Company
• Business partner

**Accounting documents**
store the necessary affiliate information for relevant business transactions

**FIN closing activities**

Relevant **reports** show results with proportion by affiliate

Export to file

Import from file

**Headquarters runs**

**FIN consolidation solution**
• SAP solution (BO FC, FI-LC, SEM-BCS, EC-CS)
• Non-SAP solution

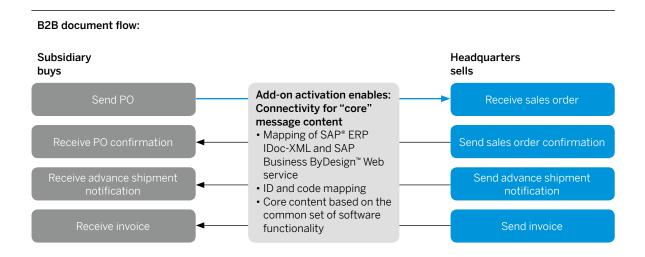provides

Consolidated result

**Process-level integration scenarios:** Many subsidiaries need to closely coordinate activities and collaborate with headquarters, which requires process-level integration between the subsidiary ERP system and the HQ SAP ERP system. For example, as an organization opens new sales and marketing subsidiaries, it now has to support an increasing volume of cross-company purchasing and sales. Finished goods are delivered from headquarters to international subsidiary distribution sites (or drop-shipped from headquarters to international customers). Similarly, a manufacturing plant set up as a subsidiary can sell to headquarters or another division of the company. Figure 5 shows such a scenario between a subsidiary running SAP Business ByDesign and HQ running SAP ERP. In this scenario, the material flow is from HQ to a subsidiary's warehouse, and the integration uses business-to-business messages (IDoc-XML) for purchase order, advanced shipping notification (ASN), and invoice.

Other process-level integration scenarios that SAP intends for future releases include shared services such as:
- Shared services HR: Central HR provides employee data to subsidiary, time recordings are transferred from subsidiary to central HR, payroll administration is done by central HR, and payroll results are transferred to subsidiary's financial accounting.
- Shared services purchasing: Central purchasing negotiates purchasing contracts that are used by the individual subsidiaries to directly purchase from the supplier; central purchasing then transfers the contract data to the subsidiary, which reports purchased quantities back to central purchasing.
- Shared project management: In large enterprises, subsidiaries may collaborate in projects with corporate (or other divisions) and vice versa. In such scenarios, subsidiary team members should be able to record time and expenses against the project activities assigned to them. Integration between the project management functionality in SAP Business ByDesign to the project systems functionality in the SAP ERP of the large enterprise supports such a scenario.

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**Figure 5: Process Integration Scenario for Subsidiary Buying from HQ in SAP Business ByDesign**

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**B2B document flow:**



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- Integration with other systems: Some subsidiaries want to integrate their e-commerce sites with SAP Business ByDesign to offer central availability check, customer-specific pricing, and product master data. Similarly, others may want to integrate SAP Business ByDesign with other internal systems. The process integration mechanisms can be used as a starting point to support such scenarios.

Technical considerations for process integration: Asynchronous message exchange is used to couple processes between SAP ERP and SAP Business ByDesign. This helps ensure a robust, reliable, and scalable communication. Two different communication flavors are supported:
- Point-to-point (P2P) communication
- Mediated communication using an integration hub

Note: SAP NetWeaver Process Integration is not mandatory in the on-premise landscape but supported if a customer already operates it.

The semantic format of the communication is either enterprise service or intermediate document (IDoc). In both cases, the technical transport channel of communication is SOAP Web services. RFC-based communication is not supported. With SAP ERP release 6.0, enhancement package 5, the asynchronous P2P enterprise services will be possible. To support SAP ERP 6.0 without the enhancement packages, SAP enabled the IDoc format for communication with SAP Business ByDesign and added the SOAP channel for IDocs. With IDocs, several existing integration interfaces of the on-premise SAP ERP can be leveraged for subsidiary end-to-end processes without any code changes. Missing integration capabilities can be added with integration components.

IDs (keys) of business entities and code values can differ in SAP ERP and SAP Business ByDesign. Therefore, SAP provides a new component in SAP Business ByDesign that transforms IDs or code values in inbound and outbound messages. The mapping information can be predefined for an end-to-end process, maintained manually, or stored while importing master data from SAP ERP.

Local monitoring and error handling of messages is available in both systems. In SAP Business ByDesign, error handling is supported by business task management.
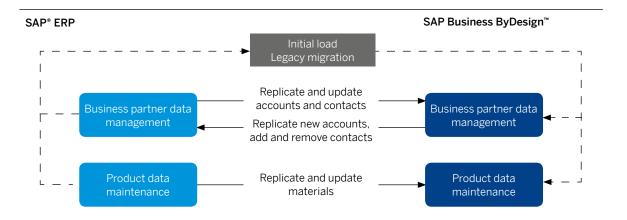
The best approach for subsidiaries is to standardize on an integrated business solution that meets their functional requirements and is less expensive to deploy, easier to change, and simpler to manage.

**Master data integration scenarios:** When subsidiaries coordinate and collaborate with headquarters, they need to maintain and synchronize key master data such as customer and product information. SAP Business ByDesign provides a packaged solution for both initial master data load as well as ongoing real-time updates. For the initial load, SAP Business ByDesign provides a data extractor framework, which includes prebuilt content such as SAP ERP migration templates and data maps. In addition, SAP Business ByDesign supports ongoing synchronization of accounts, contacts, and product data using IDocs or enterprise services (see Figure 6).

Technical considerations for process integration: For initial load, the standard SAP Business ByDesign data migration infrastructure is leveraged. It is complemented by a generic data extractor framework, which is available as an integration component for SAP ERP. Prebuilt content for this framework, consisting of SAP Business ByDesign migration templates, configuration, and algorithms in ABAP™ programming language, is available as additional integration component for selected master data entities. The steps for initial load are as follows:

- ERP data extractor reads relevant data from the on-premise system and stores it to file type Microsoft XML spreadsheet (Microsoft Office 2003) in the format defined by the template. This file can be easily edited with Microsoft Excel.
- The migration workbench in SAP Business ByDesign reads the file and transforms IDs and values if the mappings exist, or allows creation of new IDs if mappings don't exist. After the data passes consistency checks, it is written into the corresponding master data objects in SAP Business ByDesign. Mapping information of newly created IDs is also recorded.

Ongoing changes or creation of new master data can be aligned in both directions by asynchronous message format. As in the initial load, ID (key) and value mapping information is used, or a new ID or mapping is created by SAP Business ByDesign. Either existing enterprise services or IDocs can be used for master data integration, or new services or IDocs can be developed and delivered to the HQ SAP ERP system as integration components.

## Figure 6: Master Data Integration Scenario in SAP Business ByDesign



SAP® ERP

SAP Business ByDesign™

Initial load
Legacy migration

Business partner data management

Replicate and update accounts and contacts

Replicate new accounts, add and remove contacts

Business partner data management

Product data maintenance

Replicate and update materials

Product data maintenance

**Analytics integration scenarios:** Often, the HQ needs to either compare performance across subsidiaries or incorporate data from various subsidiaries within a geographic, business, or industry cluster to analyze trends. A subsidiary must be able to support analytics integration.

SAP Business ByDesign supports rich analytics within the solution, but it also exposes its multidimensional analytical views (MDAVs) as Web services so they can be used by the SAP NetWeaver Business Warehouse (SAP NetWeaver BW) component at HQ as operational data providers. SAP NetWeaver BW pulls and schedules this extraction – both for direct access and replication scenarios. The data extraction process is logged for tracking and diagnostics purposes.

Configuration and administration can be done from SAP NetWeaver BW as follows:
• Configure a subsidiary's SAP Business ByDesign tenant as a source system for SAP NetWeaver BW
• Select MDAVs as data sources from SAP Business ByDesign tenants and use them as SAP NetWeaver BW data sources

**IT management integration scenario:** Many subsidiaries have very limited IT resources. An integrated cloud-based SAP Business ByDesign solution allows subsidiaries to continue to minimize IT investments. SAP Business ByDesign further reduces the pressure on subsidiary IT resources by automatically distributing incidents originated from the subsidiary solution to the service desk component in SAP Solution Manager, so they can be addressed by the corporate IT department (see technical overview earlier in this section). This level of IT management integration reduces the cost of the supporting subsidiary system by meeting local IT support needs without requiring local investments in IT support resources.

**Structured custom-integration scenarios:** SAP Business ByDesign is a highly extensible and configurable solution. The key user tools enable end users to do a code-free adaptation of the system by allowing them to easily customize fields, change the look and feel, and configure new work centers. The SAP Business ByDesign studio supports adding extensions such as new forms, reports, business object types, user interfaces, and services. Standard integration scenarios (described above) are preserved through extensions made to the system.

If a customer needs an integration scenario that is not currently available in the standard set, this can be built using the existing Web services ("A2X services") delivered by SAP Business ByDesign. If the available Web services are not sufficient, a new Web service can be created using the SAP Business ByDesign software development kit (SDK). This newly created Web service can then be used to develop the required integration scenario.

SAP Business ByDesign supports six types of integration scenarios with the HQ SAP ERP system.

**SAP Business ByDesign: THE RIGHT CHOICE**

SAP Business ByDesign is a single, integrated business man-agement solution that helps improve control, efficiency, and visibility within the subsidiary and across the organization. In addition to its rich functionality, SAP Business ByDesign inte-grates with the HQ SAP ERP system like no other SaaS offering available. As a result, you get an integrated view of the entire operation, your data is synchronized, and cross-functional processes become more efficient. SAP Business ByDesign supports six categories of integration scenario, while other ERP vendors offer integration with SAP ERP primarily at a data-exchange level. Such a deep portfolio of integration for SAP Business ByDesign is possible because SAP understands SAP ERP better than anyone else.

The combination of rich functionality, SaaS delivery model, and analytics, as well as support for multiple integration scenarios (leveraging sophisticated integration technology), makes SAP Business ByDesign an ideal solution for a two-tier ERP model.

If the available Web services are not sufficient, a new Web service can be created using the SAP Business ByDesign software development kit.

**SAP**

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