

*IBM WebSphere Business Integration Collaborations  
for Healthcare Version 1.0*  
*IBM WebSphere Business Integration Collaborations  
Version 4.5*



# Solution Overview

**Note!**

Before using this information and the product it supports, be sure to read the general information under “Notices and Trademarks” on page 13.

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This edition applies to:

Version 1 of IBM® WebSphere® Business Integration Collaborations for Healthcare (5724-H61)

Version 4, Release 5, of IBM WebSphere Business Integration Collaborations (5724-C12)

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## Solution overview

Healthcare companies are currently facing a challenging business environment, requiring new Internet protocol-based (IP) services, cost reductions, and improved customer retention. IBM<sup>(R)</sup> WebSphere<sup>(R)</sup> Business Integration Collaborations for Healthcare addresses the needs of these firms by integrating manual and automated processes in order to efficiently and quickly deliver new revenue-generating services. By streamlining and enabling the reengineering of these processes, WebSphere Business Integration Collaborations for Healthcare also allows service providers to significantly reduce their operating expenses and increase their profit margins.

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## Industry trends and challenges

Healthcare companies today face a multitude of challenges that range from meeting competitive pressures to building new networks that address changing customer needs. With the advent of IP networks and increasing popularity of the Internet worldwide, Healthcare companies have shifted their focus to building the infrastructure required to provide new services to their customers. In order to minimize costs, improve access to data, and generate additional revenues from the introduction of new services, several major obstacles must be overcome, including the following:

- Inability to quickly provide new revenue-generating services
- Lack of operational efficiency
- Inability to differentiate services
- Difficulty integrating data from disparate systems
- Inability to implement company protocols using existing applications

The obstacles listed above can be overcome through integration between various departments and processes within healthcare companies. For this reason, healthcare companies are focused on establishing an infrastructure that connects disparate systems and allows for a patient-centric view of services, while significantly enhancing efficiency in their operations.

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## Key business processes

Many end-to-end business processes are common across the healthcare industry. To achieve their main goals, individual companies and the healthcare industry as a whole must streamline these processes and ensure that their systems are able to work together to maintain efficiency and flexibility. The key end-to-end business processes in the healthcare industry can be broken into the following categories:

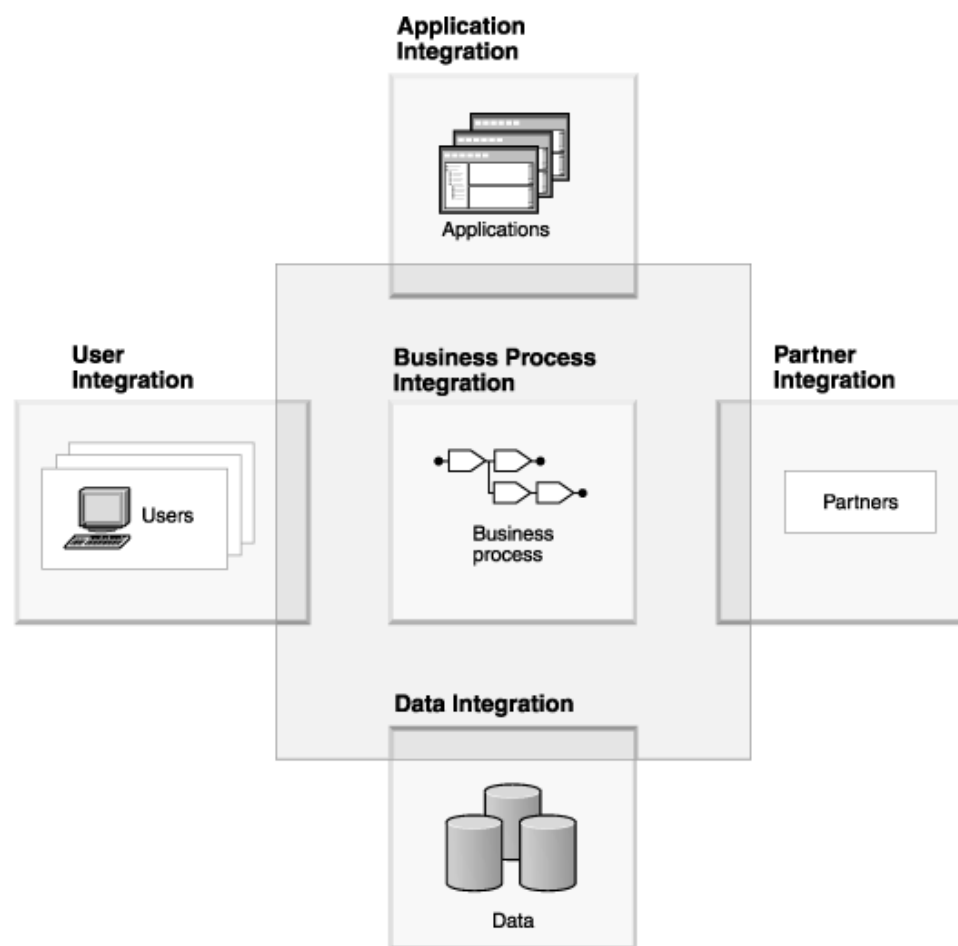
- Electronic medical record enablement
- Error reduction through the use of automated protocols
- Operational effectiveness through business process automation
- Compliance reporting
- Outcome management

The challenge of business integration is to provide an automatic solution that links all participants of an enterprise in order to provide end-to-end service. In this context, a participant can be an *application*, a software program that provides

required business functionality; a *user*, any authorized personnel, such as a nurse, technician, administrator, or physician; or a *business information unit*, data that records a business transaction.

To meet these business integration challenges, systematic business process models are required that achieve the following results:

- Simplify internal communications and communications with suppliers and partners.
- Record the ways that the enterprise handles requests.
- Identify process activities and the functional interfaces that support the activities.
- Identify control points and critical performance metrics.
- Improve service productivity and quality.
- Introduce new process automation .



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## Healthcare integration requirements

Healthcare companies now require best-of-breed solutions that link business support systems (BSS) and operations support systems (OSS) in order to achieve greater efficiency and to reduce costs. Industry integration solutions that allow rapid introduction of new services without creating disruptions to the critical operations give the services the greatest chance of success. The ability to provide services rapidly, integrate operations with partners and content providers, and obtain a patient-centric view of various services are key business integration

priorities. Healthcare firms also need to retain the ability to monitor and measure the quality of service in order to differentiate offerings and to provide a tiered price structure.

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## Solution description and benefits

WebSphere Business Integration Collaborations for Healthcare enables healthcare companies to integrate business support systems and operations support systems and to rapidly provide new services to their staff, all in accordance with the Health Level Seven (HL7) open standard for the exchange, management, and integration of healthcare data. (For a full description of the HL7 Standards Developing Organization and protocols, go to [www.hl7.org](http://www.hl7.org)). Through the use of pre-built collaborations, it effectively provides examples that automate the business process steps of end-to-end solutions, such as static compliance reporting, patient electronic medical records (EMR), and cascading orders. Used in conjunction with the IBM WebSphere Business Integration Adapter for Healthcare Data Protocols, WebSphere Business Integration Collaborations for Healthcare enables integration of best-of-breed solutions with existing HL7-enabled legacy systems.

WebSphere Business Integration Collaborations for Healthcare is designed for hospitals and other health care providers who are seeking to build processes that maintain their existing applications while taking advantage of the benefits offered by an enterprise-wide business integration strategy. The WebSphere Business Integration Collaborations for Healthcare package includes:

- A set of MQ WorkFlow processes, which can be used to model an organization's high-level processes.
- A set of collaboration templates, which can be used as building blocks in an organization's system, depending on the transactions that are required.
- A set of business objects, which can be used to interact with existing HL7-enabled applications.

The collaboration templates included in WebSphere Business Integration Collaboration for Healthcare Transaction operate on HL7 2.4-type business objects.

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## Business rules

The following business rules apply to each WebSphere Business Integration Collaborations for Healthcare use case. Additional business rules that apply to specific use cases are noted, if required, under those specific use cases:

- No data validation on incoming messages is required. Messages are presumed "good" and pre-validated.
- There is no requirement to provide scripts, tools, or any other entity that manages the data stores. Clean up is a services or client activity. Database optimization is outside the scope of the solution and is the responsibility of services or client entities.
- WebSphere Business Integration Collaborations for Healthcare relies on a *private process* to deliver transactions to endpoint applications in the appropriate form, and then to subsequently return the appropriate response in an implementation specified form. In this context, a *private process* is one that contains non-generic elements; that is, elements that are specific to each endpoint.
- Privacy and security of any data held in the data stores is outside the scope of the use case.





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## Technical overview

WebSphere Business Integration Collaborations for Healthcare provides a scalable framework that allows business support systems to seamlessly interact with back-end operations' support systems. WebSphere Business Integration Collaborations for Healthcare provides both *information connectivity and integration* (ICI) and business process integration, or *business process management* (BPM).

A choreography manager orchestrates the macro flows or sequential processing steps necessary to provide a service. It also provides support for long-running transactions or those that require human intervention. A collaboration manager manages information at the application level.

The prebuilt collaboration templates included in this solution provide examples of business processes and the synchronization of data across all relevant applications and systems using a common business object model. The advantage of the common business object model is that no application needs to be altered significantly in order to communicate with another. Information from one application is routed through the collaboration manager, where the application-specific business object is converted to a generic business object, which in turn communicates with other applications.

IBM WebSphere Business Integration Adapter for Healthcare Data Protocols can be used to integrate the business support systems and operations support systems applications.

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## WebSphere Business Integration framework

The WebSphere Business Integration framework is built around three elements: people, content, and processes. In this context, *people* are human beings who play a role in a business process either as a service requester (such as a patient) or as a service provider (such as an employee of the business). *Content* represents a set of business entities that provide the business services. *Process* consists of a choreography of business operations that controls the sequence in which business operations are executed.

There are many different approaches to business integration. WebSphere Business Integration solutions integrate business processes by integrating enterprise applications as business service providers that support predefined business processes. The integrated elements comprise the solution model of an enterprise system.

WebSphere Business Integration makes application integration easier and more flexible by giving business process control to an entity that is separate from the applications themselves. When the business process control invokes an application, the application simply provides services as defined by its published interfaces. The control and business flow logic are separated from the application, and the start and exit conditions are moved into the business process model. The applications are thus divided into modules that are invoked by the business process manager at the appropriate points, in order to perform the program activities defined in the business process model. This approach eliminates the need for an individual

application to have knowledge of the business logic associated with process operations, and provides the benefit of allowing business logic to be independently modified as the business evolves.

Business processes define the sequences that an enterprise uses to organize its work for customer transactions within the enterprise. This way of organizing the central activities of a business is called *business process management* (BPM). The sequence between business processes is called *business process choreography*. Once business processes are clearly defined, businesses can monitor and improve these processes accordingly, providing enhanced control to the healthcare professional and allowing individuals to influence and change the business processes.

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## HL7 business process framework

Instead of redefining a new set of business process models, WebSphere Business Integration Collaborations for Healthcare complies with the HL7 Standard, Version 2.4. The HL7 framework serves as a blueprint for process direction and as a starting point for the development and integration of business and operations support systems (BSS and OSS). HL7 supports healthcare enterprise-level processes and subprocesses in an end-to-end approach. It provides a neutral reference point for healthcare service providers when they consider process reengineering needs, partnerships, alliances, and general working agreements with other service providers. HL7 defines typical functions, inputs, and outputs within the healthcare space. HL7 also describes points of interconnection that make up the end-to-end operation process flows for business processes that are specific to the healthcare industry.

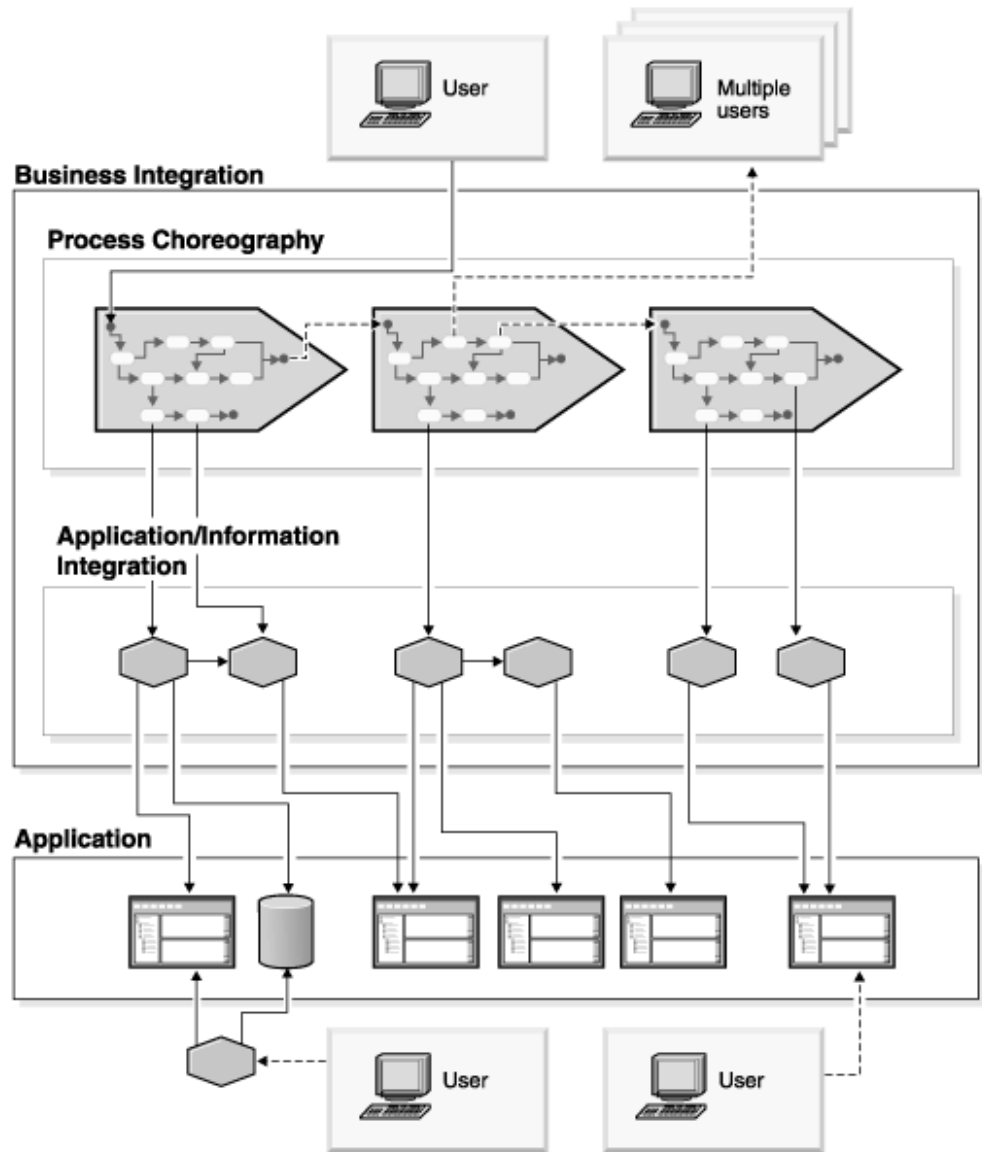
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## WebSphere Business Integration Collaborations for Healthcare solution model

The diagram below shows a high-level view of WebSphere Business Integration Collaborations for Healthcare solution model. The model is divided into three layers:

- Process choreography
- Application/information integration
- Applications

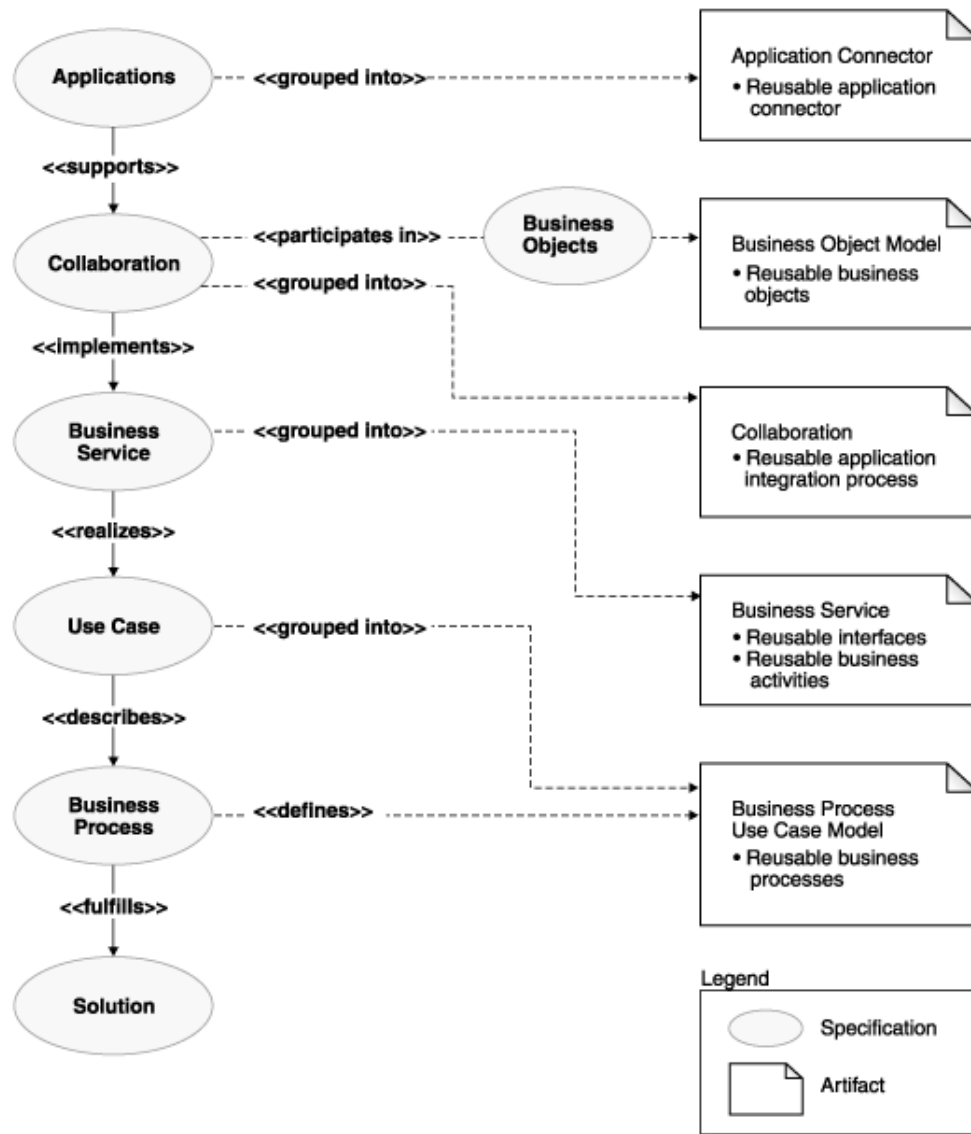
The process choreography layer and application/information integration layer are further grouped into the business integration layer. The business integration layer is the hub of the WebSphere Business Integration solution architecture.



A process is a series of actions that are undertaken to produce a given result. Processes can be considered on multiple levels. At a high level, business processes are strategic processes that define the ways in which a business is run. At the lowest level, there are operational processes that can contain a single transaction, wrapped in business logic. Between the two ends of the spectrum are different levels of processes called collaboration processes that fall between the operational and the strategic model.

As shown in the diagram above, the process choreography layer consists of a set of business process models. A business process model represents a business process. The application/information integration layer shown in the diagram above consists of a set of collaboration models. Each collaboration model defines an integration process for application business functions or information. Finally, the applications layer consists of applications that provide business services (or operational processes) required by business processes.

The following diagram shows the specification of the submodels that comprise the total WebSphere Business Integration Collaborations for Healthcare solution model, and the artifacts that contain groupings of each of the submodels:



The following sections describe the details of each of the elements of the solution model.

## Business process model

The use of systematic business process models makes it easier to evaluate and improve the business processes themselves. Employing business process modeling techniques brings efficiency improvements and removes barriers within organizations and across cooperative, internal organization projects. Instead of redefining a new set of business process models, WebSphere Business Integration Collaborations for Healthcare is compliant with an open standard. The WebSphere Business Integration Collaborations for Healthcare business processes are built according to HL7 Standard, Version 2.4.

End-to-end business processes can be divided into many business processes called process elements. The process elements are building blocks that can be used to assemble end-to-end business processes. WebSphere Business Integration Collaborations for Healthcare delivers such building blocks in order to provide the maximum flexibility and speed when integrating a business process management solution. These building blocks are business process models.

A business process consists of a choreography of business activities. This choreography specifies the following information:

- The sequence of processing from one business activity to another.
- The responsibility of participants to provide the required services for each activity.
- The information required as inputs to activities.

Business processes manage and monitor how a business process is executed, and they require the support of all participants in the process. However, business processes do not specify how an individual activity is done.

A business activity can be classified as a manual activity or an automated activity. A manual activity represents a user interaction. An example of a manual activity is a work item for a customer service representative (CSR) to perform a credit check on a customer. An automated activity includes a business operation performed by an application.

An automated activity requires the support of one or more applications that are business process participants. Normally this can be achieved by sending one or more requests for business functions to applications or application components. A business function is a unit of operation by an application with specific, well-defined inputs and outputs. Functions tend to be dedicated to a single purpose. For classification and implementation purposes, business functions with related or complementary capabilities are grouped into function groups.

Each of the WebSphere Business Integration Collaborations for Healthcare business process models includes a proposed choreography. It is assumed that the choreography of a business process can change over time, and can be different from one organization to another. The proposed choreography therefore does not attempt to define a standard choreography. It is provided as a reference or template for easy implementation. The WebSphere Business Integration Collaborations for Healthcare business process definition tools provide the flexibility to modify the choreography.

## **Use case model**

A use case model describes the details of the business process. It is the specification of a business process that describes its various requirements. In WebSphere Business Integration Collaborations for Healthcare, use cases also show the predefined interrelations of the business activities contained within a business process.

## **Business services**

Business services provide a model of interfaces that are accessible by a business process. These interfaces hide the implementation details of the business services. An automated business process activity invokes a business function in order to obtain a business service. The business functions that are invoked by business process activities are normally aggregate functions that can be further divided into

functions provided by applications. WebSphere Business Integration Collaborations for Healthcare uses collaborations to aggregate application-level functions.

The aggregate function described above has a one-to-one relation with a business process activity. Each aggregate function represents a possible high-level business service that can be achieved by underlying applications. The business service is therefore a very useful reference model for determining business process activities that can be achieved. Aggregate business functions, like simple business functions, are also defined as functional interfaces. A functional interface defines the input and output condition of the interface and the services it provides.

Business services can be treated as reusable models for automated business activities. They can also be used to link business process activities to business functions.

## **Business object model**

A business object is defined as a piece of information or data that is relevant to a business and that needs to be stored and used across multiple business transactions. Some of these objects are of interest only to a single application, in which case the business object can be stored by that application's private data store.

A business object can be transferred from one application to another application or from one user to another user during the course of a business process. On the other hand, multiple applications may make use of the same business object for different purposes. Any business object shared in one of these ways should be considered as a shared business object.

In WebSphere Business Integration Collaborations for Healthcare, this business information is shared between individual applications by a business object model. The business object model represents all the business objects in the current release. Each business object in the business object model represents an item of business information required within the healthcare domain. It has well defined attributes can be mapped to the application-specific attributes.

## **Collaboration**

A business activity is supported by an aggregate business function. The aggregate business function is supported by one or more fine-grain functions performed by applications. A collaboration model describes the aggregation process of invoking fine-grain functions. It also synchronizes shared information in disparate applications.

A function group is a collection of related and complementary business functions. For reusability, a collaboration normally models a function group rather than a single business function.

Collaboration models can play two roles: A collaboration model can be a service provider of a business process activity, or it can be a service consumer that uses services provided by a business process.

## **Applications**

WebSphere Business Integration Collaborations for Healthcare treats applications as resources of the solution that can be integrated in order to support specific business processes. In order to make the integration easy and flexible, business

process flows are separate from the applications themselves. This approach eliminates the need for individual applications to have knowledge of the business logic associated with process operations.

Some applications have business processes embedded inside the application that can not be separated from the application. When this is the case you can either choose not to use the application in order to maintain centralized control, or if the embedded business processes is equivalent to a business process provided by WebSphere Business Integration Collaborations for Healthcare, you can treat the embedded business process as an external business process that is directly called from an end-to-end process. If the embedded process is only a part of a larger WebSphere Business Integration Collaborations for Healthcare business process, you can modify that business process so that the embedded business process is also embedded inside the WebSphere Business Integration Collaborations for Healthcare business process.

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## Collaboration objects

IBM's integration technology provides the flexibility and scalability to implement a variety of e-business models. *Collaboration objects* contain the business logic that describes a fundamental business process, coordinating the functionality of business processes for different applications and enabling data exchange between them.

WebSphere Business Integration Collaborations for Healthcare contains a workflow and collaboration template set that can be adapted for individual use. Each of the collaboration templates that make up WebSphere Business Integration Collaboration for Healthcare facilitate business process reengineering and address specific integration challenges.

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## Business process example

The following example demonstrates a simple check and update of a patient's medical record. In this scenario, a physician examines information in a patient's electronic medical record (EMR), issues instructions for application of a new drug, validates that the patient is covered for the new medication and updates the EMR if the medication is approved. A portlet application initially displays the EMR. This portlet also collects the physician input and places the medication request on a queue. The EMR workflow issues an e-mail notifying interested parties that the updated EMR is ready for display.

**Business problem:** A physician needs to check both the patient's medical history and insurance records before prescribing a new drug.

**Business benefit realized:** The physician is quickly able to determine if the new drug is appropriate for the patient and whether the patient's insurance company will cover the cost.

**Workflow utilized:** Electronic Medical Record

### Process

1. A physician examines a patient's EMR and issues a request for a new medication.
2. A message is routed to a queue.
3. The order is stored.

4. The insurance payer is queried on patient coverage.
5. The insurance payer responds with *patient covered*.
6. The order is sent to a workflow to manage the processing of the pharmacy order.
7. The order is processed.
8. The order is examined for compliance alert processing (for example, *anthrax*).
9. Order information is added to the patient's EMR.
10. An e-mail containing a notification of the updated EMR is sent.

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## Related concepts

- Solution Architecture
- Solution Implementation Guide



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