

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



Solution Architecture

Note!

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Third Edition (December 2003)

This edition applies to:

- Version 1 of *IBM® WebSphere Business Integration Collaborations for Telecommunications®* (5724-H59)
- Version 4, Release 5, of *IBM WebSphere Business Integration Collaborations* (5724-C12)

and to all subsequent releases and modifications until otherwise indicated in new editions.

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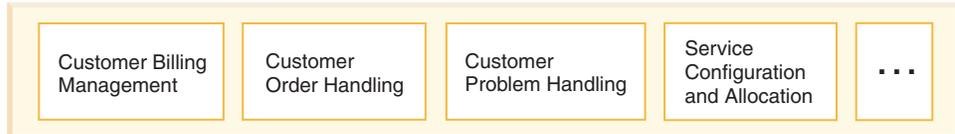
Solution architecture

The WebSphere Business Integration Collaborations for Telecommunications solution architecture is derived from the WebSphere Business Integration Collaborations for Telecommunications solution model (described in the WebSphere Business Integration Collaborations for Telecommunications Solution Overview) The architecture also follows the WebSphere Business Integration solution architecture map for cross-industries, shown in the following diagram.

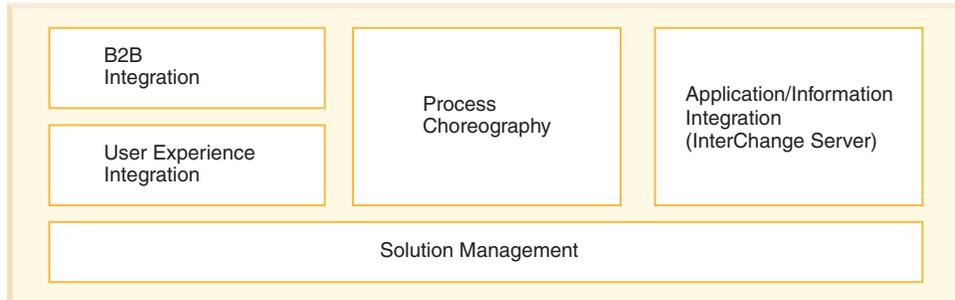
Solution Studio



Industry Libraries



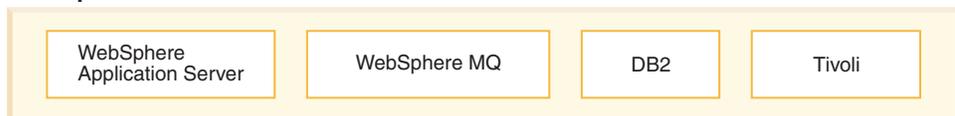
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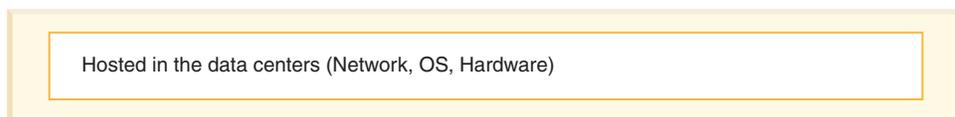
Common Solution & Integration Services



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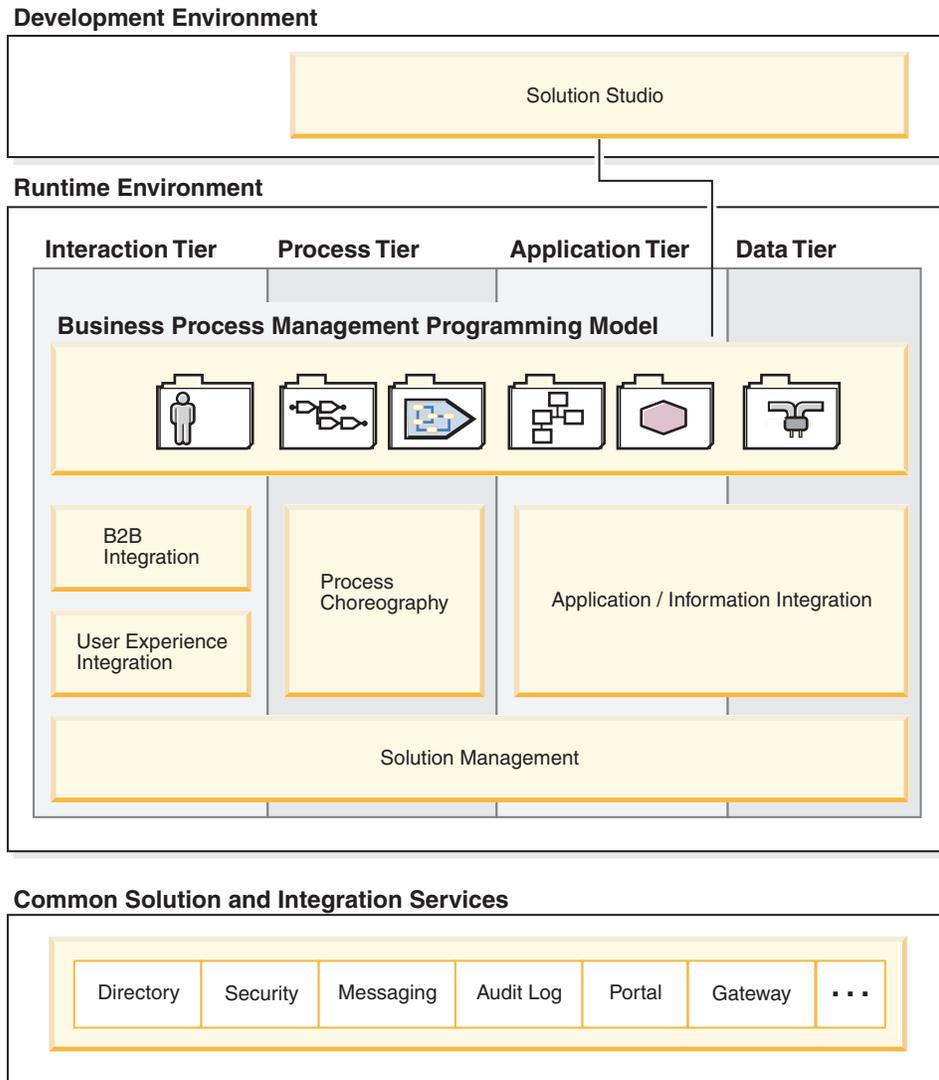
Infrastructure



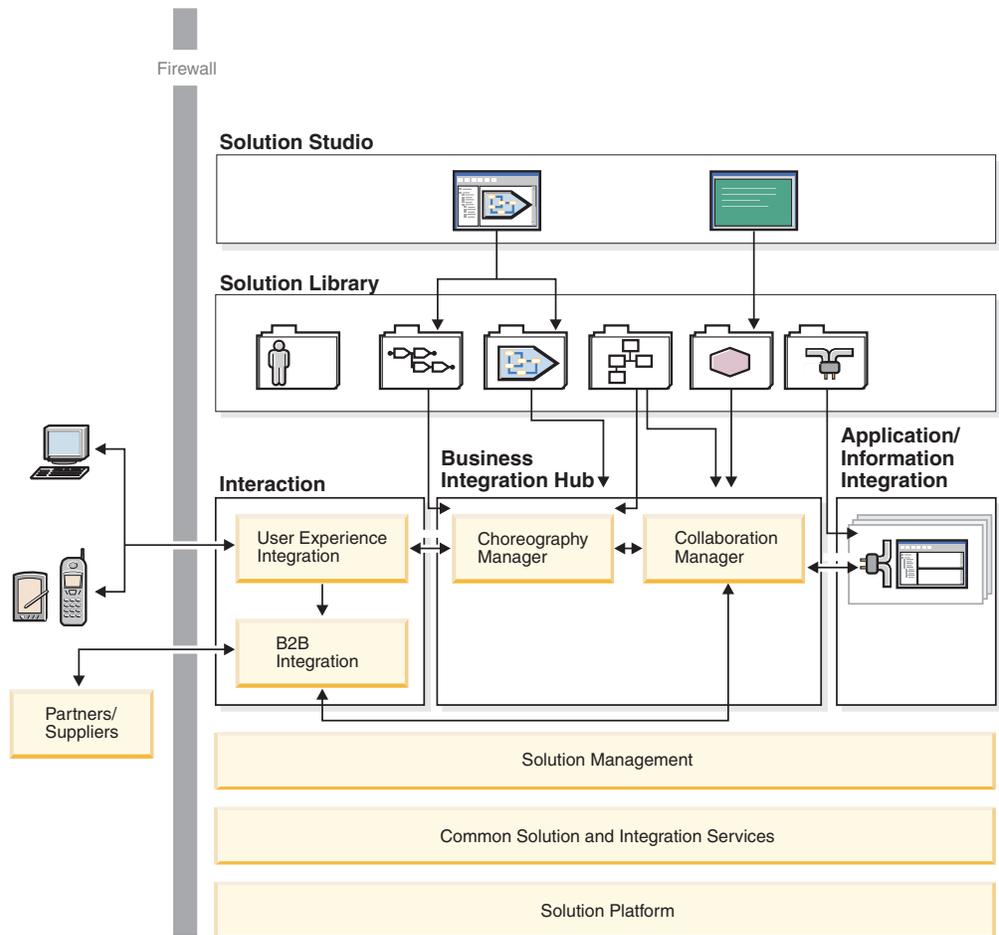
The architectural elements identified in the WebSphere Business Integration solution architecture map are as follows:

- The Solution Studio layer provides a set of development tools that you can use to use and customize artifacts included in the solution industry library, or to create new artifacts.
- The Industry Libraries layer provides the artifacts that define the WebSphere Business Integration Collaborations for Telecommunications solution, including business process templates, collaborations, business objects and adapters.
- The Runtime Solutions layer defines the integration patterns that govern the interaction of logical components in a particular business integration solution deployment. Within this layer, the Solution Management element provides tools for managing these patterns and components in runtime.
- The Common Solution and Integration Services layer contains services that are common to all business integration solution deployments, such as directory, messaging and exception services.
- The WebSphere Platform layer consists of applications in the WebSphere software family for e-business that provide the runtime environment in which services and logical components function.
- The infrastructure layer consists of hardware and software elements infrastructures required by the WebSphere platform.

The following diagram shows the logical view of the Business Integration Solution Architecture. This diagram shows a categorization of the elements of the Industry Libraries and Runtime Solutions layers according to the logical tiers that they occupy.



The following diagram shows the interaction of business integration solution elements. The core of the WebSphere Business Integration Collaborations for Telecommunications Solution Architecture is the Business Integration Hub, shown at the middle of the diagram.



The following sections describe the elements of the WebSphere Business Integration Collaborations for Telecommunications solution architecture in greater detail.

Business Integration Hub

The Business Integration Hub is architected based on a flow composition model. In the context of a flow composition model, a business service (including a business process) is an entity that performs one or more business functions. The rules for composing a complex business service from other business services are described by a flow model. A flow model is a directed graph with nodes that represent business services, and links between nodes that represent the flow of control and information between the business services.

In the WebSphere Business Integration Collaborations for Telecommunications business integration model, the Business Integration Hub is further divided into two layers. The process choreography layer consists of a set of business process models, and the application/information integration layer consists of a set of collaboration models. In a flow composition model, a business process model is defined by business process flow, and a collaboration model is defined by collaboration flow. The main difference between the two types of flows is that a business process flow models flows in the context of business operations and using business terms whereas a collaboration flow models flows in the context of application and information integration.

From a technological view, a business process flow is a coarse grained top-level flow that describes a strategic process of a business that is independent of any particular application. A business process flow follows a particular order; this ordering is defined as choreography. The eTOM does not define the macro-flow, but only defines and categorizes the business activities of the macro-flow (such as customer order handling or customer service provisioning).

It is often the case that application integration requires that logical operations be mapped to more complex interactions with external systems. For example, creating a purchase order might involve an application creating a purchase order header and adding a line item. Using collaboration flows to mediate between business process flow and applications allows business processes to be isolated from the legacy business functions provided by existing applications.

Collaboration flows also play a role as application adaptors. You can use collaboration flows to aggregate business services provided by discrete applications in order to support high-level services requested by business process flows. A collaboration flow can also be treated as a sub-flow or micro-flow of a business process flow. In some applications, micro-flows may already be embedded within the application itself.

In WebSphere Business Integration Collaborations for Telecommunications, the difference between business process flows and collaboration flows is that business process flows are targeted for business process management purposes whereas collaboration flows are used to access services provided by applications.

In order to manage these two types of flows, the Business Integration Hub has two sub-components, the Choreography Manager and the Collaboration Manager. The Choreography Manager provides the runtime environment that manages instances of business process flows, whereas the Collaboration Manager handles instances of collaboration flows.

Choreography Manager

The Choreography Manager provides the runtime environment for business process flow instances. A business process flow instance is a runtime construct representing a business process flow that can be deployed in the Choreography Manager. The Choreography Manager is responsible for interpreting and keeping track of business process flow instances, administering their execution, and logging events that result from this execution. If a business process flow contains automated business activities, the Choreography Manager performs the right activities at the right time. If a business process flow contains interactive business activities, Choreography Manager creates the work items and moves them to participant work lists.

The WebSphere Business Integration Collaborations for Telecommunications uses WebSphere MQ Workflow Server as its Choreography Manager. WebSphere MQ Workflow is an implementation of the flow composition model that manages macro-flows. You can build business process flows for WebSphere MQ Workflow using WebSphere MQ Workflow Buildtime tools. The WebSphere MQ Workflow Server runs business process flow instances by navigating through the business process models. Applications are invoked automatically, and work items are created and distributed to the worklists of people involved.

For details about WebSphere MQ Workflow runtime, please refer to the WebSphere MQ Workflow document titled **Getting Started with Runtime**.

Collaboration Manager

The Collaboration Manager provides the runtime environment for collaboration flow instances. A collaboration flow instance is the runtime construct representing a collaboration flow that can be deployed in the Collaboration Manager. The Collaboration Manager is responsible for interpreting the collaboration flow definitions of a collaboration flow instance. Since a collaboration model has close relationships with business object model, the Collaboration Manager is also responsible for routing business objects to the connected applications. The Collaboration Manager is also responsible for monitoring the interactions between applications, enabling and disabling interactions to the applications and specifying the mapping for each business object that is passed between applications.

A collaboration's main responsibility is to act as an integrator of business functions. A business function may have synchronous or asynchronous responses. If an asynchronous response is required the Collaboration Manager manages the return of responses back to the appropriate service requester.

The WebSphere Business Integration Collaborations for Telecommunications solution uses IBM WebSphere InterChange Server as its Collaboration Manager. IBM WebSphere InterChange Server is an implementation of the flow composition model that focuses on micro-flows. IBM WebSphere InterChange Server provides a runtime environment for collaboration flow instances. Each collaboration flow instance is called a collaboration object. A collaboration object is created from a collaboration template. A collaboration template is created using the Process Designer tool. A collaboration template contains all the information contained in the collaboration model, but it is not executable.

Solution Management

The solution management layer contains a set of tools that are used to configure and manage the architectural components such as the Choreography Manager and Collaboration Manager. In the current release, the WebSphere Business Integration Collaborations for Telecommunications solution does not provide a unified tool for this purpose. Instead, it uses the combination of the following tools provided by WebSphere MQ Workflow and IBM WebSphere InterChange Server:

- WebSphere MQ Workflow Administration Utility
- IBM WebSphere Business Integration System Manager

WebSphere MQ Workflow Administration Utility

The WebSphere MQ Workflow Administration Utility is the WebSphere MQ Workflow system administration tool that interacts with the WebSphere MQ Workflow Administration Server. You can use the MQSeries Administration Utility to ask the MQSeries Administration Server to list operational properties of the system, to query, stop and start system components, and to access system and error log records.

WebSphere Business Integration System Manager

WebSphere Business Integration System Manager is the IBM WebSphere InterChange Server configuration and management tool. You can use the WebSphere Business Integration System Manager to perform the following tasks:

- Connect to multiple installations of the InterChange Server
- View, configure, and design collaborations and adapters
- Create map and relationship definitions

- Start and stop collaborations, connectors, and the InterChange Server
- Define schedules to run, stop, and pause collaborations and connectors
- View the operational state of the WebSphere Business Integration Server components
- Trace a process flow for an event that has been received by a connector, or for a call that has been received by a collaboration

Application adapters

An application adapter provides translation services when the Business Integration Hub communicates with an application. It moves data between the hub and an application. More specifically, an application adapter contains a connector that connects an application to the Collaboration Manager of the Business Integration Hub. The WebSphere Business Integration Collaborations for Telecommunications application adapters are implemented based on the IBM WebSphere Business Integration Adapter programming model.

In a WebSphere Business Integration Collaborations for Telecommunications solution, each application needs an application-specific adapter. A set of telecommunications-related application adapters is provided by WebSphere Business Integration Collaborations for Telecommunications. If you want to connect to an application for which an adapter does not exist, you can build the adapter by using the IBM WebSphere Business Integration Adapter Development Kit. This development kit consists of a set of APIs and base components for the development of a WebSphere Business Integration adapter. For more information on developing adapters, refer to the Solution Implementation Guide.

User experience integration

User experience integration is supported by a set of architectural components that enable user interactions with the Business Integration Hub.

Although WebSphere Business Integration Collaborations for Telecommunications does not provide templates for user experience, WebSphere Business Integration Collaborations for Telecommunications uses WebSphere Portal Web Server as the user experience architectural components. WebSphere Portal Server has a portal engine whose main responsibility is to aggregate content from different sources and to serve the assembled content to multiple devices. Additionally, the portal engine decouples the presentation details of the portal page from the characteristics of the portlets. This separation enables each portlet to be developed and maintained as a discrete component, which in turn enables faster and easier development of specialized portlets for the overall portal site.

Portlets are the visible components that users see on their portal pages. Portlets can be as simple as an e-mail inbox or as versatile as a sales forecast from an ERP application. From a technical point of view portlets are very similar to Java servlets, except that they only return a subset of the output page.

B2B Integration

The B2B integration provides the capability to communicate with partners and or suppliers in order to get provided services. In this release, WebSphere Business Integration Collaborations for Telecommunications does not provide an architecture component for this layer. Instead, it uses third-party applications such as Nightfire as a means to access B2B services.

Common Solution and Integration Services

Based on WebSphere Business Integration Cross Industry Solution Map, the Common Solution and Integration Services layer provides a set of services for the Solution Manager layer. The set of services includes a directory service, security service, messaging service, audit log service, exception service, process management service, portal service, and gateway service. In this release, the WebSphere Business Integration Collaborations for Telecommunications solution architecture does not provide any additional service other than using services already available in WebSphere MQ Workflow Server and IBM WebSphere InterChange Server. Two types of service, audit logging and security services are available in both WebSphere MQ Workflow Server, and IBM WebSphere InterChange Server. Please refer to the related documents of WebSphere MQ Workflow Server and IBM WebSphere InterChange Server for further information about these services.

Solution Studio

The WebSphere Business Integration Collaborations for Telecommunications solution studio consists of a set of tools for designing, deploying and maintaining processes and process instances. The tools can be divided into the following categories:

- Process template development tools
- Adapter development tools
- Solution management tools

The current release does not provide a unified tool that connects each individual tool together. Instead, you can use the tools provided by WebSphere MQ Workflow and IBM WebSphere InterChange Server system. The following sections describe a set of tools that are useful for solution development with WebSphere Business Integration Collaborations for Telecommunications.

WebSphere MQ Workflow Buildtime

The WebSphere MQ Workflow Buildtime is part of a WebSphere MQ Workflow system that offers a graphical editor for creating and editing process models.

In WebSphere Business Integration Collaborations for Telecommunications solution, WebSphere MQ Workflow Buildtime is the tool that you can use to model business process flows. You can also use the Buildtime to modify a predefined WebSphere Business Integration Collaborations for Telecommunications business process. When defining or redefining a process, you need to define or modify the properties for the three main components:

- Business process (including activities)
- Organization of people
- System resources

Process Designer

The Process Designer is a graphical editor included in the IBM WebSphere Business Integration Toolset that you can use for creating and editing collaboration templates.

The WebSphere Business Integration Collaborations for Telecommunications solution uses IBM WebSphere InterChange Server to manage collaboration object

flows. The collaboration object flow can be designed using the Process Designer. The definition of a collaboration object flow is contained in a collaboration template.

For more information on using the Process Designer to create collaboration templates, see the Collaboration Development Guide.

IBM WebSphere Business Integration Adapter Development Kit

The Adapter Development Kit is a set of adapter APIs that you can use to develop application adapters.

This is the base component for developers to create a new adapter. The WebSphere Business Integration Collaborations for Telecommunications solution includes a set of application adapters for applications that are commonly used in the telecommunications industry. If you require an adapter for an application for which an adapter does not already exist, you can build the adapter by using the Adapter Development Kit .

For more information on using the IBM WebSphere Business Integration Adapter implementation toolkit to create adapter templates, see the Adapter Development Guide.

IBM WebSphere Business Integration Modeler

The IBM WebSphere Business Integration Modeler (formally called Holosofx BPM Workbench) is an industry-independent process-modeling tool that provides the following features:

- Common workbench for business and IT units
- Powerful analysis capabilities
- Animated simulations
- Detailed graphical and tabular reporting
- User interface design
- Export capabilities into rapid application development tools
- Integration with leading workflow engines

The IBM WebSphere Business Integration Modeler can integrate closely with WebSphere MQ Workflow Server. You can implement, simulate and analyze a process flow in the IBM WebSphere Business Integration Modeler, and then export the process as a WebSphere MQ Workflow FDL file that can run on the WebSphere MQ Workflow Server.

For more detailed information on the IBM WebSphere Business Integration Modeler, refer to www.ibm.com/software/integration/wbimodeler/.

Industry Library

The WebSphere Business Integration Collaborations for Telecommunications solution includes a set of artifacts that are used to integrate a business integration solution for a telecommunications enterprise. The set of artifacts is based on the solution models and the solution architecture. The artifacts are divided into two types: software artifacts and textual artifacts. These artifacts together comprise the industry solution library.

The WebSphere Business Integration industry solution library consists of a set of solution models. Each of the solution models is designed as a customizable template that can be used to accelerate a business integration solution. Within each WebSphere Business Integration solution industry, there is a specific subset of the industry solution library that is composed of the following templates:

- Business process templates
- Collaboration templates
- Business object templates
- Application adapters

In addition, the WebSphere Business Integration Collaborations for Telecommunications solution has the following textual artifacts:

- Business process use case models
- Business services reference

The following sections describe the details of these artifacts.

Use case models

The WebSphere Business Integration Collaborations for Telecommunications solution describes business process activities in a business process use case model. Each use case model depicts the business activities that make up a business process, as well as the typical order of these activities. It is understood that enterprises that implement the business process model may want to change the order in which the business activities are executed; the solution architecture provides the capability for modification in a site engagement project.

The WebSphere Business Integration Collaborations for Telecommunications business process use case models are provided as documents. These documents provide conceptual overviews and describe the use cases for each individual business process templates in the telecommunications industry solution library.

Business process templates

The WebSphere Business Integration Collaborations for Telecommunications business process templates are bundled in the WebSphere Business Integration Collaborations for Telecommunications industry solution library. A business process template is a deliverable that contains a business process model. Each business process template represents a model of a business process based on the business process use case model described in the WebSphere Business Integration Collaborations for Telecommunications business process use case models. The WebSphere Business Integration Collaborations for Telecommunications business process templates are delivered as FDL files. These FDL files can be deployed to the WebSphere MQ Workflow Server as business process instances.

Collaboration templates

The collaboration templates are bundled in the WebSphere Business Integration Collaborations for Telecommunications industry solution library. A collaboration template is a deliverable that contains a collaboration model. A collaboration template defines the collaboration required to integrate fine-grain application functions in order to support a business process activity. Using WebSphere Business Integration System Manager, a collaboration object can be created from a collaboration template. A collaboration object is an application integration process instance that runs on the IBM WebSphere InterChange Server.

Business services

The WebSphere Business Integration Collaborations for Telecommunications business services is a text reference contained within the Solution Implementation Guide that describes all of the business services of the WebSphere Business Integration Collaborations for Telecommunications solution. An business service describes the function of an aggregate function. It defines the input, the output, and the type of service that is provided to support a business activity. It also provides a map for the collaboration templates that support the business service.

Each business service has a one-to-one relationship with an automated business process activity. It can be used as a reference for modeling a new business process

Generic business object templates

The WebSphere Business Integration Collaborations for Telecommunications generic business object (GBO) templates are bundled in the WebSphere Business Integration Collaborations for Telecommunications industry solution library. A WebSphere Business Integration Collaborations for Telecommunications GBO template is a deliverable that represents a Telco generic business object model. GBO templates are delivered in many different formats including WebSphere Business Integration Server GBOs, workflow messages defined in FDL files, and as class diagrams.

● Related reference

- Solution overview
- Solution implementation guide

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