



Version 6.1



## Product Overview

**Note!**

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

This edition applies to Version 6, Release 1, Modification 0, of *IBM WebSphere MultiChannel Bank Transformation Toolkit* (5724-H82) and to all subsequent releases and modifications until otherwise indicated in new editions.

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## Bank Transformation Toolkit overview

This document provides a high-level introduction to the IBM® WebSphere® Multichannel Bank Transformation Toolkit (Bank Transformation Toolkit) product, a component-based toolkit for developing enterprise applications. This document describes the benefits of using the toolkit and gives a brief description of the architecture, each of the provided components, and the development model.

The audience for this document is business and sales professionals, project managers, and anyone else who is interested in a high-level introduction to the Bank Transformation Toolkit. Solution architects and anyone requiring more understanding of the architecture of this product should refer to the Solution Architecture.

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## Introduction

Financial institutions are diversifying their offerings and adapting their products and services to ensure that they are able to respond to future market challenges and support changing business operations in an increasingly competitive environment.

The traditional teller is becoming obsolete. Many existing branch information systems are based on old technologies, such as financial-specific controllers or basic PC systems. These systems are no longer adequate or appropriate for meeting the challenges of the new environment, which include competitive factors such as the following:

- Reduced margin, especially in traditional products
- Increased competition
- Multiple channel environments
- Better informed customers who are sensitive to price and service quality
- Faster product introduction and reduced product life cycles

Financial institution services are mainly supported by applications whose core logic and data reside on host or enterprise systems. For a bank teller application, access to these services (for example, to conduct a withdrawal transaction) requires delivery channels and a transaction posting engine that can handle the many tasks involved with transaction processing. The delivery channel and transaction posting engine must be able to manage the user interface, gather operation data, build host messages, process host responses, log transaction information into an electronic journal, access financial devices, and all other activities involved with processing the transaction. The IBM WebSphere Multichannel Bank Transformation Toolkit is the transaction posting engine used by many financial institutions and other organizations for accessing back-end systems for banking delivery channels such as the traditional branch, call center, banking kiosk, Internet banking, and mobile access.

The Bank Transformation Toolkit provides a set of facilities to help with each of the processes and concepts mentioned above, modeling the real-life components of a teller system as objects and presenting them to development teams in a very familiar way. It accomplishes the following:

- Implements a simple but effective architecture that ties all components together in a loosely coupled fashion and makes them highly independent of each other.
- Uses normal object-oriented techniques that enable you to adapt to specific customer requirements; but is also highly parametric, which is a "must" requirement for teller systems.
- Abstracts the commonalities of local branch operations for financial transactions in a way that is easy to understand, develop, and maintain.
- Provides a way to deliver financial transactions as reusable and easily maintainable "model" objects.
- Provides an architecture and a class library that facilitate the structuring and development of teller applications by promoting reuse and providing the services required for the transaction processes.

In summary, the IBM WebSphere Multichannel Bank Transformation Toolkit product is a pragmatic infrastructure designed and built so that existing mission-critical systems can evolve rather than be replaced. Its architecture provides an environment for high development productivity and great flexibility to meet the challenges of the new pace of change in both technology and the banking industry.

## Rationale behind the toolkit

The IBM WebSphere Multichannel Bank Transformation Toolkit product is a component-based framework for developing enterprise e-business applications. It offers software components that package a coherent set of functions. Each component package explicitly specifies the interface for the services it provides and also for the services it requires from other components. Component implementation details are encapsulated and kept separate from the interface specifications. The components can be independently developed, delivered, and installed in a way that allows you to build larger components and complete solutions.

Component-based application development is more cost-efficient and competitive than traditional methods. These benefits are realized through reduced requirements for software development skills and reduced development time. The value of these benefits continues to increase as the market demands increasingly sophisticated software applications at the same time that competitive pressures demand reduced time to market.

The Bank Transformation Toolkit is well suited for building Web-based financial services applications such as bank branch systems as well as building solutions for a wide variety of retail delivery channels, including Internet banking, call centers, stand-alone kiosks, automated teller machines (ATMs), and mobile access terminals such as wireless access protocol (WAP) capable cellular phones. The toolkit's multichannel support and dynamic component composition provide the foundation used to simultaneously meet the requirements of each of these retail delivery channels.

The toolkit is built on Java™, an open industry standard and the object-oriented programming language of choice. Because the WebSphere software platform for e-business adheres to open industry and Internet standards, your investment is well protected. These standards include TCP/IP, HTML, HTTP, J2EE (Java, JSP, JCA, JDBC, EJB, and so on), Web 2.0, Rich Client, JSF and Web Services. The toolkit components promote highly productive application development by supporting code reuse and the use of parameterization techniques to define business

operations and their related objects. The toolkit preserves investment in existing enterprise systems by providing specially designed components that can communicate with these systems.

The Bank Transformation Toolkit is used to build applications with a multichannel architecture that extends the reach of a financial institution's information system services to all of its delivery channels. Financial institution services are most often supported by applications whose core logic and data reside on large-scale host systems. Financial service delivery channels, such as a bank teller application or an Internet banking application, must access transaction functions on these systems (for example, to transfer funds between accounts). The toolkit uses JCA connectors to integrate delivery channels with large-scale OLTP system. It includes components designed to handle all aspects of transaction processing for every channel: managing the user interface, providing navigation dialogs, gathering operation data, building host messages, processing host responses, logging transaction information, accessing financial devices, and more.

The Bank Transformation Toolkit is highly customizable and its application is not limited to the financial services industry. Consider the toolkit a potential solution to your transaction processing requirements no matter what your industry is.

The toolkit runtime provides National Language Support (NLS) for the following languages in group 1: Brazil Portuguese, French, Hebrew, Japanese, Korean, Simplified Chinese, Traditional Chinese, and Spanish. The toolkit also provides NLS for the following languages in group 2: Arabic. It also provides Bi-directional Languages Support (BIDI). The toolkit externalizes any end user text or messages from runtime components in resource bundles.

The Bank Transformation Toolkit provides pre-tested, user-configurable application components that can be quickly assembled into a complete financial services application. The Bank Transformation Toolkit provides a number of tools that support the development of applications. All the tools are plug-ins of Rational® Application Developer (RAD) and WebSphere Integration Developer (WID).

## Benefits of using the toolkit

The Bank Transformation Toolkit is based on J2EE and other mature Internet technologies. This ensures that toolkit-built applications can be deployed with confidence as integral parts of robust production systems. The toolkit's design hides technical complexity from solution designers, which allows them to focus on business function rather than on the underlying technical details.

These features create benefits in the areas of project completion time, intermediate and long-term cost-effectiveness, and readiness for future changes, improvements, and evolution.

### Reduced risk

The Bank Transformation Toolkit is a fast and competitive way to solve your application needs, but being fast and competitive does not mean that you are left exposed to risk. Here are some of the ways that the toolkit reduces risk:

#### Proven product

The toolkit is a mature product developed by an industry leader in software applications for the financial services sector.

#### Systems work together

The extensive use of open computing industry standards (including Internet standards) protects against incompatibilities between systems.

**Protection against obsolescence**

The inherent flexibility and updateable nature of toolkit-based applications protects these applications from becoming obsolete.

**Fast response to the business environment**

The application development environment allows quick changes to applications in response to changing business conditions.

**Build it right the first time**

The application development environment supports teamwork, and this in turn promotes dialog and sharing of ideas; fewer details will be overlooked.

**Preserve stable IT infrastructures**

The toolkit provides JCA LU0 and JCA LU62 Connectors for you to connect your toolkit applications to existing systems that have been providing reliable services.

**Faster time to market**

The development approach that the toolkit promotes is designed to shorten development cycles and flatten the learning curve for the project team. The objective of this approach is to effectively save development effort, improve consistency, and reduce the time to market for all delivery channels. Following are some of the ways that the toolkit reduces time to market:

**Shortened development cycles**

The toolkit provides an environment that supports rapid application development by exploiting the benefits of component reuse. It does this by promoting the extensive use of object-oriented techniques and a high degree of application object parameterization.

**Ready-to-use components**

The toolkit provides a set of pre-built infrastructure components with well-defined interfaces. The components are ready to be incorporated into delivery channel applications; a project team needs only to learn how to use them, not how to build them.

**Parametric application definition**

The toolkit reduces the effort required to add new function to a toolkit-based application by providing the richness tooling plug-ins to create the definitions for the function.

**Flattened learning curve**

The toolkit productivity tools hide the underlying technical details of the toolkit. This reduces the amount of time and effort needed by a project team to learn the toolkit features and how to use them to deliver a solution. The development model creates a clear separation of roles that allows project team members to focus on their specific tasks.

**Cost-effective application development**

The Bank Transformation Toolkit application development product can provide cost savings at the earliest stages of development planning and all the way to deployment. Here are some of the ways that the toolkit reduces development costs:

**Less reliance on high-level programming skills**

From back-end connectors to user interface building blocks, the toolkit provides components that are easy to understand and use. This increases the size of the developer pool and reduces training costs.

**Write once and deploy on several platforms**

A toolkit-based application is portable across several platforms. Instead of



a costly "from-the-ground-up" development effort for each target platform, you define the application just once and then manage the deployment to any of the supported platforms.

#### **Faster application development with fewer developers**

The quicker an application can be developed the lower the cost. The toolkit's pre-built components reduce the person-hours needed to complete an application.

#### **Improved development team communication**

The Rational Application Developer and Websphere Integration Developer provides team development environment.. A common repository for the development products keeps the entire team synchronized and up-to-date. This avoids costly duplication of effort and rework.

#### **Enhanced development using a graphical user interface**

With the Process Editor in WebSphere Process Server, developers can visually choreograph business processes for various applications. They do not have to spend time working with different interfaces and low-level APIs. Drag-and-drop tools allow them to define the sequence and flow of information between different business logic activities. Individual business logic activities and even entire workflows become building blocks that can be reused in developing other applications. Further gains in productivity are possible because runtime support for these new J2EE workflow capabilities is fully integrated in the application server to deliver a single administration and deployment environment.

#### **Reduced application operating costs**

After an application is deployed, the costs of operating the application become an important measure of success. The toolkit offers cost savings that take effect at and continue beyond deployment. Following are some of the ways that the toolkit reduces operating costs:

##### **Preservation of back-end systems**

Deployment of a toolkit-based application does not require changes in existing business logic or transactions run in back-end systems. The toolkit uses JCA connectors to connect existing back-end systems and the application located on a middle-tier server.

##### **Reduced maintenance and operational costs**

The use of the network computing architecture, which is based on Internet technologies, results in immediate cost savings on client administration, code distribution, and server management. In addition, toolkit solutions minimize the code distribution that is required for incremental changes.

##### **Operational portability**

If operational conditions require that the application be moved to another platform, this can be quickly performed since the application is platform-independent.

##### **Ease of maintenance**

During operation, it is common to discover that application changes are needed. The environment and the distributed nature of the application support easy, quick, and universal application updates no matter how many application delivery channels and users are affected.

##### **Adjustments to suit available system resources**

Technology and systems are subject to change; toolkit-based applications can quickly be adapted to take advantage of more system resources or compensated for a reduction in resources.

### **Reduced workstation requirements**

The distributed architecture of toolkit-based applications reduces the resources needed to deliver the application to the user. User workstations need to do little more than support the application presentation and any directly connected peripherals. Adding workstations is extremely cost-efficient since the server-based application can be distributed to any number of client workstations.

### **Common functionality across channels**

An application can be designed to provide a common set of functions across multiple delivery channels. This consistent approach to service delivery promotes user satisfaction and reduces the training time needed if the user moves between channels.

### **Extendable and adaptable applications**

Information technology is fast changing and so is the financial services market. An application developed for the needs of today can rapidly become obsolete. To protect you from this, every Bank Transformation Toolkit solution has features that allow it to be easily extended and adapted. Changes can be made to match the evolution of IT systems, business expansion, business diversification, and other predictable or unforeseen shifts. Following are some of the ways that the toolkit allows you to compete instead of becoming obsolete:

#### **Multichannel enabled**

The multi-tier architecture enables component reuse among delivery channels. Transaction requests from every channel are handled by the enterprise systems in the same way as any other channel. This promotes uniform, consistent, and rapid deployment of financial services through all your delivery channels. New channels may be added as needed or as they become available.

#### **Easy integration with existing (and upcoming) systems**

The toolkit integrates easily with present and future systems because it is based on open Internet standards such as HTML, SSL, HTTP, XML, TCP/IP, JavaBeans™, Enterprise JavaBeans, and JDBC. It includes JCA compliant SNA LU0 and LU62 resource adapters to facilitate its ability to develop applications that interact with other systems.

#### **Platform portability and system scalability**

Thanks to the portability of Java between operating systems and hardware platforms, toolkit applications can be ported from one operating system to another with minimal impact. You can easily change your branch platform (for example, from Windows® to Linux®), and you can also change the role played by your IT system components. For example, you may want to move part of the business logic from a branch system running on one operating system to a regional or centralized system based on a different operating system; moving the logic between server levels and operating systems is a simple procedure.

#### **Service Oriented Architecture (SOA) enablement**

The toolkit enables customer applications to support Service Oriented Architecture (SOA). The transaction flow can now be implemented using the Process Choreographer. When a complex transaction involves backend web services, the toolkit supports Web Services JSR 109 standard and it allows web service invocations from the toolkit's own business layer. On the other hand, the BTT business logic can be treated as a service to be reused by the other application systems. Furthermore, the web service interfaces of JCA SNA LU0/LU62 connectors are in readiness for the web service invocation for legacy connectivity.

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## Architecture

This section introduces the parts of Bank Transformation Toolkit product:

- Enterprise server
- Middle-tier application server
- Client
- Sample deployment configuration

### Enterprise server

The enterprise server, or the back-end server, contains the existing core business logic of the financial institution that is accessed by the toolkit application. A toolkit application does not require changes to such a system or changes to its messaging interface. This is possible because the toolkit includes a rich set of back-end system connector components and message formatters. BTT JCA SNA and Invoker component are provided for SNA (LUA interfaces), JMS, EJB, WebServices, and any other customer extensions.

On the other hand, if you have already built up the SOA based back-end system such as ESB, the toolkit enables your applications to support Service Oriented Architecture (SOA) integration.

Bank Transformation Toolkit interfaces with WebSphere Process Server (which contains WebSphere ESB) for business process automation and enterprise application integration. WebSphere Message Broker and WebSphere Business Services Fabric can be added depending on the SOA requirements. But typically, they do not interface with BTT directly.

The entire banking SOA reference architecture includes the following flow and control concepts:

- Channel Interaction Orchestration
  - Screenflow: A lightweight Web/rich client tier control mechanism (usually a finite-state-machine) that guides the user from screen to screen. States and flows are encoded in XML.
  - Channel Application Microflow: A lightweight Web/rich client tier control mechanism that provides a structured way to organize channel application operations such as screen flows, logging, reusable channel specific logic, invocation of business processes, and invoking back-end services. Tooling is specific to and integrated with the channel application platform. Flows are visually designed and encoded in XML.
- Business Process Automation
  - Macroflow: Long-running process or process involving human tasks to be performed by multiple people. Encoded in BPEL as a linear process or Business State Machines.
- Enterprise Application Integration
  - Service Composition: The creation of a coarse-grained service from a number of finer-grained services and simple flow logic. Usually created using SCA components.
  - Service Orchestration: Invocation of multiple services in the context of a microflow or macroflow execution. A flow or state machine can be used as the control construct to create a composite service from element services.
  - Routing and Transformation: Routing of a service request to a service provider at runtime according to pre-determined rules and the transformation

of the service name, number and type of parameters, and data structures as needed so as to insulate service consumers from service providers.

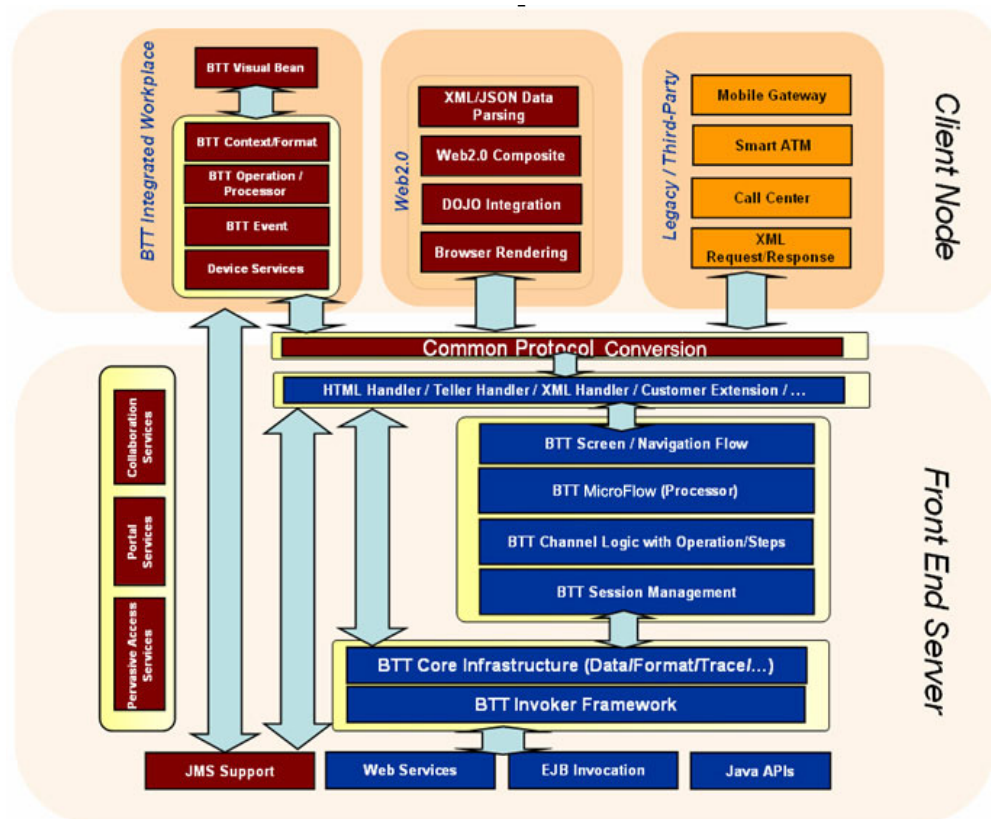
- Dynamic Service Selection: Determination of how to resolve a service binding at runtime.

## Middle-tier application server

The middle-tier server hardware (also known as the Front End Server) delivers the toolkit-based application to the clients using a TCP/IP connection. IBM WebSphere Application Server runs on the middle-tier server for this purpose and processes requests from clients once the application is running. Handling client requests involves managing dialogs (and the user interface for light client types), launching business operations that interact with back-end transactional systems or SOA based systems, processing local transactions, and sending responses to the client. This architectural layer contains logic that is intended to be common across delivery channels, as well as technical functions such as electronic journaling, parameter tables, and store-and-forward.

The design and portability of the product allow middle-tier servers to exist at either the branch level (one server per branch), the regional level (one server per a group of branches), or even at a centralized level (a single server for the entire financial institution). These options provide the flexibility to achieve the right balance between the number of servers and network bandwidth, with no changes to application logic.

The following diagram shows the middle-tier application server.



## Client

A client in the three-tier architecture contains little logic. The logic it does have is usually presentation logic or logic required locally to do such things as accessing financial devices or validating entered data. The code to execute the client logic is downloaded on an on-demand basis, and therefore does not reside on the client, but on a Web server. The Bank Transformation Toolkit supports any kind of physical client device that uses the following technologies:

- Java Client
- HTML Client
- JSF client
- Web2.0 Client

The toolkit provides implementations for current client technologies but these concrete implementations anticipate that significant differences might be found when realizing solutions. The toolkit is not limited to these technologies because its design is generic and can be extended to support other technologies.

## Sample deployment configuration

### Bank teller

A bank teller application topology consists of a number of client workstations with financial devices attached. The workstation downloads the client application on request from a Web server. The client applications, which mainly deal with presentation and local financial device handling, have access to the branch server (that is, the solution application server) using the HTTP or SSL protocols.

The solution application server provides common services such as electronic journaling and parameter tables to the client workstations, as well as access to the transactional logic of the back-end enterprise servers. A toolkit server application can also be deployed on the physical server for a regional or central data center without changes to the application.

### Internet banking

In an Internet banking topology, users obtain access to financial services through a Web browser (or other device) connected to the Internet. The user interface is normally HTML with additional technologies such as JavaScript™, DHTML, or XML. In such an environment, the solution application server is able to process requests from Web browsers (or other devices that issue HTTP requests), obtain the proper data from enterprise servers, and generate the appropriate view for the client device to display using HTML pages for Web browsers or XML messages for those devices that support it. The application server is usually located at the central site, and is protected by a firewall.

### Kiosks and ATMs

The toolkit can be used in kiosks or ATMs that run Internet technologies such as a Web browser and Java. In this environment, the client usually is a Java application (or applet). In addition to the presentation logic, the client application manages the financial devices normally present in a kiosk (such as MSR/E, chip card reader, receipt printer, passbook printer, bar code readers, and touch screen displays) using the financial device services that the toolkit provides. The kiosk connects to the application server using the HTTP or SSL protocols. In some cases, kiosks are located in branches, which handle them as branch workstations. Kiosks can also be connected directly to the server through public or private lines.

### Mobile terminal and PDA

Users equipped with laptops running a Web browser can connect to corporate toolkit servers using the SSL protocol. In this scenario, the toolkit server is usually located at the central site and is protected by a firewall. It is also feasible to have mobile users connected to the branches to which they belong.

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## Components

The Bank Transformation Toolkit contains the following components:

- Core components
- Presentation components
- Service components
- Business components
- Development tools
- Runtime tools

### Core components

The Core components are the main entities of the IBM WebSphere Multichannel Bank Transformation Toolkit.

The core components includes the following:

- Operation
- Flow
- Formatter
- Data element
- Initialization manager
- Element factory
- Invoker
- Exception
- Events
- Externalizer
- Trace

### Presentation components

The Bank Transformation Toolkit provides components that facilitate the construction of the client presentation logic. The toolkit includes the Rich Client infrastructure, a set of SWT Visual beans, as well as the support for JavaServer Pages (JSPs).

The following are the provided presentation components:

- Rich Client infrastructure, which offers pre-build components to save your effort on developing teller systems.
- SWT Visual beans, which is based on Rational Application Developer, Visual editor and DSE Visual Beans.
- JSP support, which includes custom JSP tags and utility beans to enable applications to retrieve information from the operation context hierarchy, get resources, and handle errors. If your application requires additional behavior, you can build new tags using the `JspContextServices` interface.

## Service components

The Bank Transformation Toolkit provides a set of service objects that enable an application to complete an operation. These services include host communications, journaling, store-and-forward for off-line operations, financial devices for input and output operations, and more.

The service components include the following:

- Communication services:
  - JCA LU0
  - JCA LU62
  - MQ connector
- Database services:
  - Database Table Mapping
  - Electronic Journal
  - Store
- LDAP Access service
- Generic Pool
- Financial Device services:
  - Check Reader Device service
  - JXFS service
  - LANDP<sup>®</sup> MSR/E Device service
  - WOSA Device service

## Business components

The business components include the following:

- Foreign Exchange
- Cash Drawer
- Counter

## Development tools

The Bank Transformation Toolkit provides a number of tools that support the development of applications. The Bank Transformation Toolkit provides a number of tools that support the development of applications. All the tools are plug-ins of Rational Application Developer (RAD) and WebSphere Integration Developer (WID).

The development tools include the following:

- Formatter Simulator
- Migration Tool
- SWT Visual Beans Editor
- Transaction Editor
- Validation Tools

## Runtime tools

Runtime tools are used to fetch or record information of the BTT runtime.

The Runtime tools include the following:

- Runtime Monitor tool



- Trace Facility

## **Support tool**

The Support tool includes the following:

- APAR Tool



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