



IBM WebSphere Transformation Extender, Version 8.1

*Helping you transform, validate and route vital business information
between applications, across and beyond your organization.*

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Introduction

IBM WebSphere® Transformation Extender is a universal transformation engine ready to be deployed either stand-alone or embedded within applications in most IT infrastructures. It can play a pivotal role in helping IBM clients transform, validate and route vital business information across internal business systems, as well as through their extended value chain of trading partners. You can make the most of WebSphere Transformation Extender by using it to automate the exchange of high volumes of large business documents containing sophisticated structured content, which you can manage without having to write additional code. You can also gain significant benefit when you use automatic, in-flight data validation to help ensure industry-standard and regulatory compliance. The product's universality makes it equally at home as a stand-alone solution or when adding value to IBM WebSphere infrastructures – enabling you to reuse skills and assets necessary to address changing business requirements and develop new business solutions.

This white paper discusses the WebSphere Transformation Extender product family, illustrating the breadth and depth of its capabilities as a universal transformation engine for the WebSphere platform. The target audience for this paper is anyone considering introducing new transformation services or wanting to upgrade their existing transformation capability with a comprehensive, universal solution.

Track record

WebSphere Transformation Extender is the result of IBM's rebranding and continued development of the IBM WebSphere DataStage™ TX transformation engine and industry accelerators IBM acquired with the purchase of Ascential Software Corporation. Also, Ascential had gained access to core technology from its acquisition of Mercator Software. WebSphere Transformation Extender is a mature technology that includes support for the IBM System z™ platform, and complements the IBM WebSphere product portfolio. The product has an extensive customer base in financial services, as well as in healthcare and insurance.

Value proposition

WebSphere Transformation Extender is designed to meet the needs of information- and application-integration architects and developers who need to integrate diverse and complex data across your enterprise. IBM offers comprehensive support for using industry-standard electronic documents with transformations that are ready to use. Originally designed with electronic data interchange (EDI) users in mind, WebSphere Transformation Extender can process large documents of virtually any size and complexity. WebSphere Transformation Extender has GUI-based design tools that enable you to quickly design data structures and validation rules, as well as manage transformation and routing requirements, without the need for programming skills. You can use these design tools to handle almost any electronic-document content of practically any sophistication. For writing custom adapters, and for client applications wishing to call the transformation engine, programming interfaces are available as a software developer kit.

Service oriented architecture

Choosing WebSphere Transformation Extender gives you a simple entry point to service oriented architecture (SOA), without having to worry about disrupting your business. The IBM WebSphere SOA approach recommends a top-down, enterprise vision and architecture to help ensure consistency, while enabling a bottom-up implementation, project by project, service by service. No matter where you are in the SOA life cycle, WebSphere Transformation Extender performs a key role, whether you are just starting out with a small project, or you have already implemented your SOA.

Web services

WebSphere Transformation Extender provides integration solutions that accelerate the adoption of Web services, helping to eliminate the time-consuming and risky overhaul of critical business systems. By providing support for importing Web Services Description Language (WSDL), through the WSDL importer, and sending and receiving SOAP messages (using SOAP and HTTP adapters), WebSphere Transformation Extender products enable solutions for both consumers and providers of Web services.

Mainframe scalability

Mainframes continue to play a key role in many enterprises for several reasons. In some cases, the volume of data, such as very large databases, is simply too large to be moved off the mainframe. In other cases, an upgrade path isn't available, such as with IBM IMS™ software. Also, mainframes can simply be the most-reliable platform upon which to run corporate data for day-to-day business functions. Many enterprises have made strategic commitments to deploy data-integration applications on mainframes. These enterprises want to continue to take advantage of the scale, security and expertise they have on the mainframe.

WebSphere Transformation Extender usage includes IBM AIX®, Microsoft® Windows®, and Linux® platforms, Red Hat and SUSE Linux, Sun Solaris Operating Environment and HP-UX. But more significantly, WebSphere Transformation is being used with COBOL applications to handle batch-file applications integrating with IBM DB2®, as well as participating in IBM CICS® and IMS transactions, all on the IBM z/OS® platform.

Flexible deployment

You can deploy WebSphere Transformation Extender in several ways:

- *As a stand-alone, event-driven server, connecting to applications with technology adapters*
- *As a batch-file processing engine called from a command script or JCL*
- *As a hosted component in WebSphere Process Server*
- *As a hosted component of WebSphere Enterprise Service Bus*
- *As a hosted plug-in of WebSphere Message Broker*
- *As a hosted component in any Java™ 2 Platform, Enterprise Edition (J2EE) application server*
- *As an embedded engine inside your COBOL, C, Java applications*

Time to value

Your integration developers and architects can use IBM WebSphere Transformation Extender Design Studio to visualize both simple and complex data types, mapping between them using the robust data-processing and manipulation capabilities provided – a coding-free activity. A comprehensive library of prebuilt functions reduces development time. Familiar to spreadsheet users, a powerful yet user-friendly macro capability allows sophisticated rules to be designed for validation, transformation and routing.

You can also help accelerate time to value with optional WebSphere Transformation Extender industry and enterprise application packs. Each pack provides solutions to integrate industry-wide common data formats across your enterprise infrastructure, including predefined format templates, conversion maps and validation support for major industry standards, such as X12 EDI, Health Insurance Portability and Accountability Act (HIPAA) and Society for Worldwide Interbank Financial Telecommunication (SWIFT), and enterprise applications such as SAP. As standards change, IBM provides timely upgrades to the solution packs, helping to protect your investment and helping to ensure that your business can quickly assimilate industry-led requirements. And any XML-based standard can be imported by the client.

WebSphere Transformation Extender overview

Figure 1 summarizes the constituent components of the WebSphere Transformation Extender family. This section describes in more detail the role these components play. Some have been mentioned in passing in the previous sections.

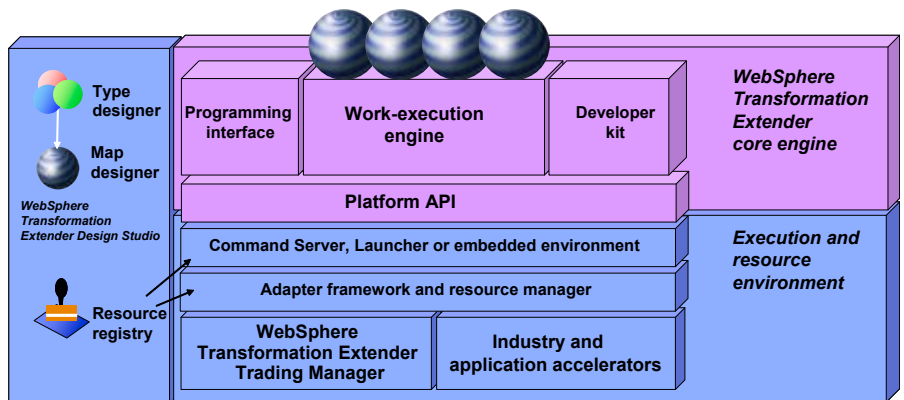


Figure 1. WebSphere Transformation Extender component overview

Core engine

The *core work-execution (transformation) engine* parses inbound data and applies functions to validate and manipulate fields to generate the outbound data. Programming and platform interfaces enable applications or operating-system scripts to call the transformation engine directly. The ability for a single transformation map to handle multiple inputs and route to multiple outputs (many-to-many) is a key differentiator, especially because each source can present its own format to the engine.

Execution and resource environment

The *framework for adapters* manages the interface between the transformation engine and the adapters used to connect applications, while the *resource manager* resolves logical-name aliases of system resources to actual names (such as directory paths, database names, message queues and server names) at run time. This makes it possible to use the same maps and systems definitions in different environments, for example differentiating test, development and production systems. The resource registry is the repository for resource aliases used by the resource manager.

Command server

Command server components let you control how a transformation is implemented by calling the transformation engine directly from a command line, shell script or timer. These components enable you to integrate batch applications or infrastructure with minimal intrusion.

Launcher

A *launcher* is an online runtime environment that synchronizes and controls complex data transformations. The launcher activates transformations based on triggers, which can be a file creation, a message arriving on an IBM WebSphere MQ queue, a database trigger, a timer or many other options, including combinations of triggers. A launch event agent is also available as an option, adding an inbound HTTP agent to listen and respond to HTTP requests.

Industry and application accelerators

These components extend the core engine with implementation capabilities. The *industry and application accelerators* provide time-to-value accelerators for integration solutions. Industry-standards adoption helps mitigate transformation challenges by exchanging common documents within a trading-partner community that adheres to a standard exchange format and protocol. Enterprise application accelerators speed the integration of critical applications, such as SAP, Siebel and PeopleSoft.

WebSphere Transformation Extender Trading manager

Trading manager is an application of WebSphere Transformation Extender with Launcher deployed with EDI industry packs as an EDI or business-to-business (B2B) hub. It includes two components: partner manager (a graphical client for administering partner and trade-link information) and message manager (a runtime system that manages integration of inbound and outbound partner messages). Users can audit, control and monitor an entire B2B integration environment across the extended enterprise.

Design tools

Design tools are provided as a GUI-based integrated development environment (IDE) in which you can develop, import, test and performance-tune transformations and metadata. Then, you can deploy them to the execution engine for system test and production implementation. The following sections describe the key productivity tools for designers. *Type designer* is the modeling component used to create and manage type trees that define properties for data structures, define containment of data, create data-validation rules and more (see Figure 2). It provides importers for automatically generating type trees (data-format definitions) for data that is described in formats such as XML and COBOL Copybooks, and structures specific to applications such as SAP R/3, BEA Tuxedo, TIBCO Rendezvous and PeopleSoft EnterpriseOne.

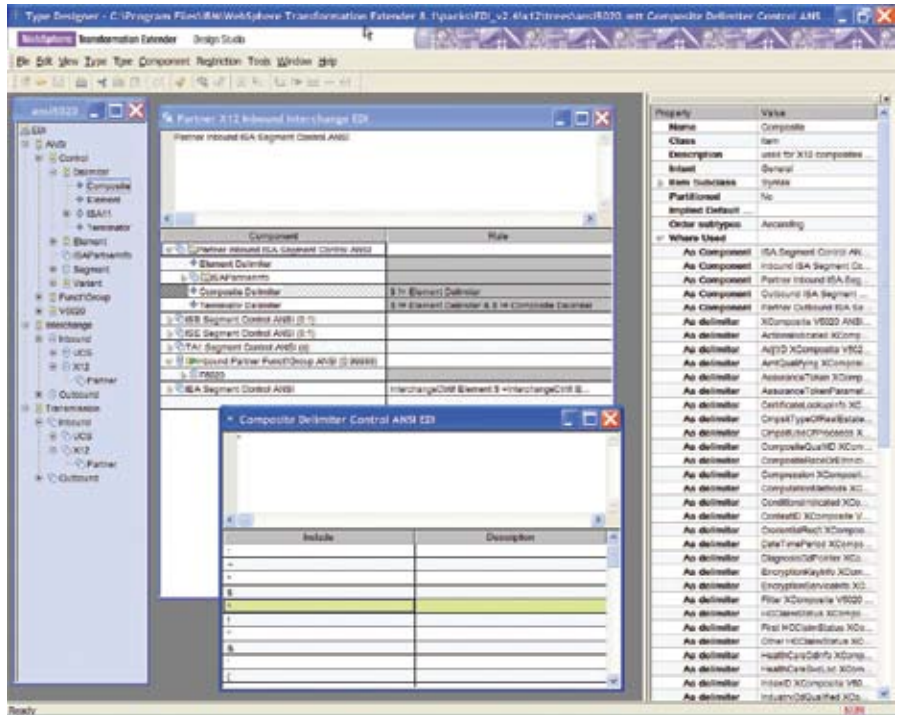


Figure 2. Type designer

Map designer is the modeling component used to formulate transformation and business rules (see Figure 3). It uses data-object definitions created in the type designer as inputs and outputs. The map designer provides a function that enables you to specify rules for transforming and routing data, as well as the environment for analyzing, compiling and testing the maps that are developed.

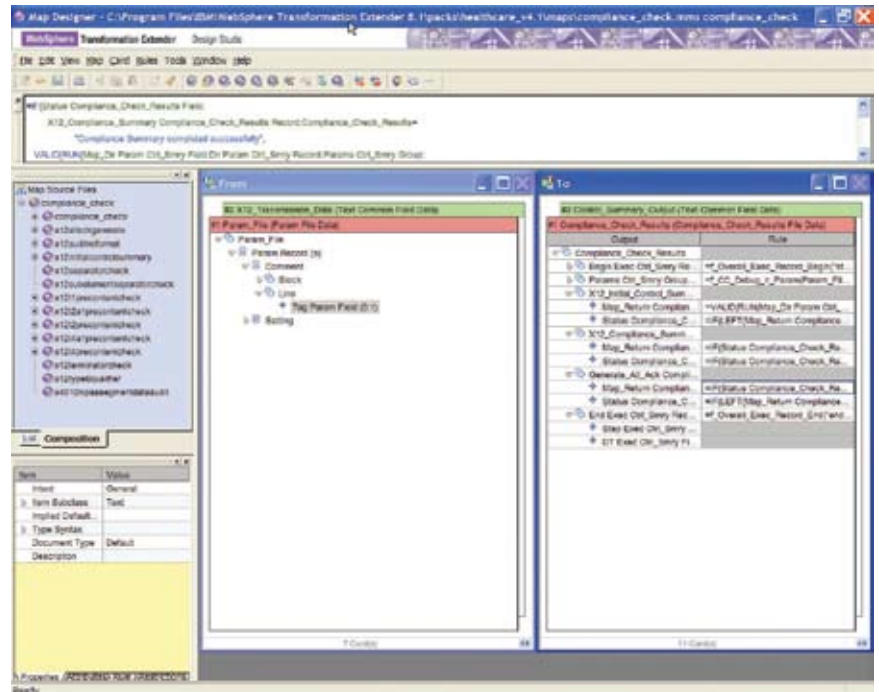


Figure 3. Map designer

Database interface designer is the modeling component used to import metadata about queries, tables and stored procedures for data stored in relational databases. The database interface designer identifies characteristics, such as update keys and database triggers, of those objects that need to meet mapping and implementation requirements.

IBM WebSphere Transformation Extender, Version 8.1

The *integration flow designer* is used to define interactions between maps, which together constitute a map system. A map system is deployed to the event-driven environment provided with the WebSphere Transformation Extender with Launcher edition (see Figure 4). Users of the WebSphere Transformation Extender for Message Broker would use the flow editor provided with the Message Broker toolset to define interactions between transformation nodes. Type-tree maker is a scripting tool that automates the capture of metadata from machine-processable sources to create graphical metadata in the form of type trees.

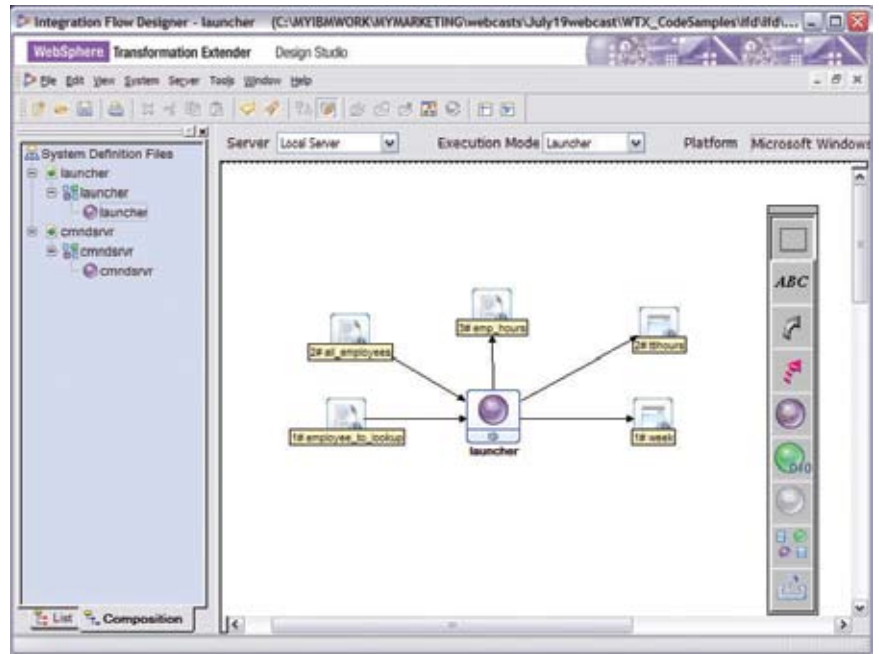


Figure 4. Integration flow designer

Command-line alternatives

Command-line utility commands also automate many deployment-related activities of design studio tools applications, including type-tree analysis, importing and exporting type trees, map compilation, importing and exporting map-source files, and system deployment. These utilities offer the basic functions to run from the command line or within a command script.

Manage artifacts

The design tools provide a direct interface to any source-control package that supports the Source Code Control Interface (SCCI) application programming interface (API). This capability gives you a choice of source-control package (such as IBM Rational® ClearCase®, Microsoft Visual SourceSafe or Merant PVCS) that you can use to control the versions of the transformation artifacts.

Monitor and manage

The management and monitoring tools are graphical applications that enable you to view, stop and start transaction instances running in the WebSphere Transformation Extender with Launcher edition. See “Packaged offerings tailored to your integration needs” on page 14 for a summary of packaging options. These graphical tools, shown in Table 1, run on Windows and UNIX® and can be used with remote and local hosted launchers. Where the WebSphere Transformation Extender engine is hosted by an application server, the hosting server provides monitoring and management support.





	<p><i>Launcher administration GUI</i> is the administrative interface to the event server, from which you can specify deployment directories, configure users and user-access rights, specify listening ports and define properties for Java Remote Method Invocation (RMI).</p>
	<p><i>Management console</i> is the management and monitoring interface for the event server, from which you can start, stop, pause and resume the system, as well as view information about the status of the event server and maps that are being run.</p>
	<p><i>Event server monitor</i> is a Windows GUI showing a dynamic, detailed view of watches (single map instances) as they run, as well as providing the capability to create snapshots of detailed watch activity.</p>
	<p><i>Snapshot viewer</i> is a Windows GUI that you can use to display snapshots taken in the event server monitor that show details about event server activity at a specific moment in time.</p>

Table 1. Management and monitoring

New functions introduced in Version 8.1

WebSphere Transformation Extender is a powerful enhancement to many native transformation capabilities included in other WebSphere products and in stand-alone or programming environments. IBM WebSphere Transformation Extender, Version 8.1 introduces the following enhancements:

- *Enhanced code-page support that helps expand globalization*
- *A new map profiler that spans run maps, helping to improve performance*
- *Consumability improvements, such as a new remote debugger, an enhanced GUI and easier accessibility*
- *New mapping and dynamic functions that help increase the power and flexibility of your transformations*

Globalization

To support globalization, WebSphere Transformation Extender now has more than 200 code pages and multiple locales. WebSphere Transformation Extender, Version 8.1 can automatically convert between code pages and validate output fields, such as date and time, based on object locale. Collation, searching and comparisons are also performed automatically based on locale. Any character from any code page can now be entered directly into the WebSphere Transformation Extender Design Studio.

In addition, WebSphere Transformation Extender now supports the following national languages other than English: French, German, Italian, Japanese, Korean, Brazilian Portuguese, Spanish, simplified Chinese and traditional Chinese.

Performance

An extended map-profiler utility records time and implementations that span run maps. As a result, you can now get a clear picture of the performance characteristics of your entire transformation process at a glance. You no longer have to split a complex map into a series of stand-alone maps or ignore run maps in your analysis. The entire map profile for the transformation is displayed in a single report that you can view as a text file or import into another program, such as a spreadsheet, for analysis.

Consumability

The current visual debugger built into WebSphere Transformation Extender Design Studio has been extended to debug remote transformations. From within WebSphere Transformation Extender Design Studio, you can debug a transformation running on a remote Windows, UNIX, Linux, or z/OS UNIX System Services computer. You do not need to duplicate the entire runtime environment on your development machine to take advantage of the remote-debugger capabilities, including breakpoints, data inspection, step-in-out-over and more. Also, the user interface includes more than 30 individual enhancements specifically designed to make the development and testing environment faster and easier to use. The design remains consistent with previous versions. Accessibility has been enhanced. Almost the entire user interface in WebSphere Transformation Extender is now compliant with the U.S. Government Section 508 of the Rehabilitation Act. In addition, windows can be navigated by the keyboard, and new colors are now configurable. New accessible icons are also available.

Power functions

New functions give new power to extend transformations and applications. These are, in addition to the 120 functions previously available:

- *Math functions, which include acosine, atan, asin, cosine, cosineh, exponential, factorial, log, power, sin, sinh, sqrt, tan, tanh.*
- *Miscellaneous functions, which include GetLocale, GetInstallDirectory, GetResourceAlias.*
- *XML functions, which include ValidateXML, ApplyXSLT, XPathQuery, ChangeXMLEncoding.*

New dynamic functions enable you to easily extend WebSphere Transformation Extender. You can call user-defined C/C++ functions directly from a transformation using the same syntax and semantics as a functional map. You can also pass text, integers, and date and time elements to these functions. You now have the capability to develop a cross-platform library of user-defined functions that behave as if they were native mapping functions.

Packaged offerings tailored to your integration needs

WebSphere Transformation Extender is made available as a number of base editions tailored to the functions needed to complete your projects. Each comes with a broad range of technology adapters to facilitate application integration. They also include support for WebSphere MQ, Java Message Service (JMS), File Transfer Protocol (FTP), TIBCO Rendezvous and other transport protocols.

IBM WebSphere Transformation Extender (for application programming)

You can use this base edition to deploy transformations in custom programming environments. It contains the core engine with C, Java, Enterprise JavaBeans (EJB) and COBOL APIs. This edition is also suited for embedding within original equipment manufacturer (OEM) offerings and is the edition recommended for integration with WebSphere Enterprise Service Bus, WebSphere Process Server and WebSphere Application Server.

IBM WebSphere Transformation Extender with Command Server

This base edition includes the core engine, without the APIs, but with the capability to control how a transformation is implemented by calling the transformation engine directly from a command line, shell script or timer. This edition is often used to extend an existing application and infrastructure with minimal intrusion.

IBM WebSphere Transformation Extender with Launcher

This is the lead edition, which includes the capabilities of IBM WebSphere Transformation Extender with Command Server and adds the full runtime server environment that synchronizes and controls complex data transformation flows. The launcher activates transformations based on triggers, which can be a file creation, a message arriving on a WebSphere MQ queue, a database management system (DBMS) trigger, a timer or many other options, as well as combinations of triggers.

IBM WebSphere Transformation Extender for Message Broker

This product is equivalent to the WebSphere Transformation Extender with Launcher edition, but delivered as a node within a WebSphere Message Broker message flow. WebSphere Message Broker users can take advantage of the advanced capabilities of WebSphere Transformation Extender when processing in-flight messages.

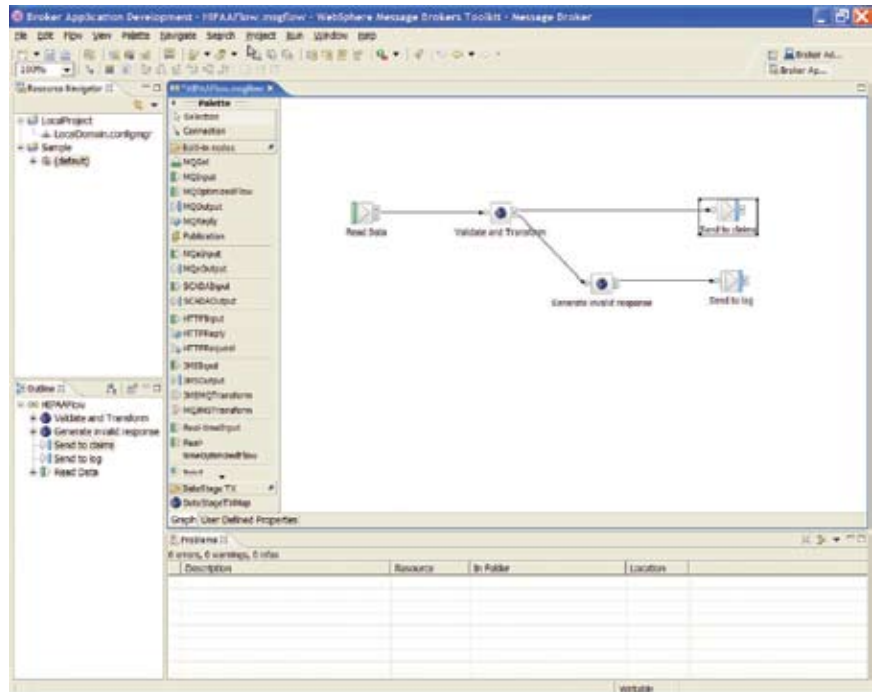


Figure 5. WebSphere Message Broker

IBM WebSphere Transformation Extender Design Studio

The design studio is where transformations and metadata are developed, imported, tested and performance-tuned. After these processes are complete, the transformation is moved to the base edition host system for system test and production implementation.

IBM WebSphere Transformation Extender SDK

WebSphere Transformation Extender Software Developer Kit (SDK) is a package of the APIs such as C, Java, EJB and COBOL, separate from the WebSphere Transformation Extender base edition, which also includes them. With the SDK, you can also develop clients and custom adapters for the other WebSphere Transformation Extender editions.

Industry packs

WebSphere Transformation Extender industry packs provide out-of-the-box capabilities to integrate a range of industry-standard data formats with your enterprise infrastructure. Industry packs enable developers to accelerate the delivery of transformation solutions. They provide predefined type-tree templates, conversion maps and, in some cases, validation maps and tools to remove risk from projects that require conformance to mandatory and advisory guidelines required by the regulatory body or industry service provider. Industry packs are refreshed as industry standards evolve between releases, with more packs planned.

WebSphere Transformation Extender Pack for Single Euro Payments Area (SEPA) is a new pack introduced to help banks and financial institutions meet their compliance obligations to the European Union initiative to have a pan-European electronic payments infrastructure. It includes templates for SEPA credit transfers and direct debits, mapping between SEPA and SWIFT message type103, as well as validation for European Payment Councils SEPA-implementation guidelines.

Industry packs include:

Banking and finance

- *IBM WebSphere Transformation Extender Pack for SEPA*
- *IBM WebSphere Transformation Extender Pack for SWIFTNet Fin*
- *IBM WebSphere Transformation Extender Pack for SWIFTNet Funds*

Health care

- *IBM WebSphere Transformation Extender Pack for HIPAA EDI*
- *IBM WebSphere Transformation Extender Pack for HL7*
- *IBM WebSphere Transformation Extender Pack for NCPDP*

EDI

- *IBM WebSphere Transformation Extender Pack for EANCOM*
- *IBM WebSphere Transformation Extender Pack for EDIFACT*
- *IBM WebSphere Transformation Extender Pack for ODETTE*
- *IBM WebSphere Transformation Extender Pack for TRADACOMS*
- *IBM WebSphere Transformation Extender Pack for X12*

Application packs

WebSphere Transformation Extender application packs provide out-of-the-box capabilities to accelerate the connectivity of WebSphere Transformation Extender with key independent software vendor (ISV) business applications (see Figure 6).

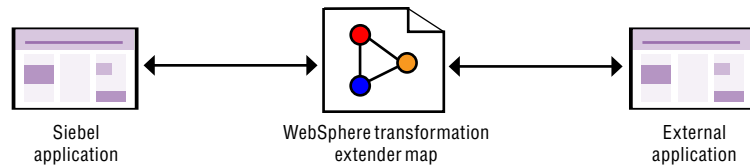


Figure 6. Accelerate integration of a Siebel application with an application pack.

Each applicationpack provides the capability for WebSphere Transformation Extender to leverage one or more interfaces provided by the vendor for external applications to communicate and exchange business information.

Application packs include:

- *IBM WebSphere Transformation Extender Pack for PeopleSoft Enterprise*
- *IBM WebSphere Transformation Extender Pack for SAP R/3*
- *IBM WebSphere Transformation Extender Pack for SAP XI*
- *IBM WebSphere Transformation Extender Pack for Siebel*

IBM WebSphere Transformation Extender Trading Manager

IBM WebSphere Transformation Extender Trading Manager integrates information that is exchanged between the enterprise and your trading partners. It supports the latest versions of X12, EDIFACT and HIPAA, and it includes a performance-enhanced EDIFACT subsystem. It manages and controls the B2B integration of partner relationships and message flow. Users can audit, control, monitor and view the entire B2B integration environment across the extended enterprise with security-rich data exchange, fully integrated with back-end systems. Trading Manager includes two components. Partner manager is a graphical client for administering partner and trade-link information. Message manager is a runtime system that manages integration of inbound and outbound partner messages.

Summary

WebSphere Transformation Extender is the universal transformation engine for both data- and application-integration specialists and programmers who need to integrate diverse and complex data sets, documents and messages across their enterprises. Its powerful write-once, deploy-anywhere portable technology enables you to grow your infrastructure with your business. Furthermore, the WebSphere Transformation Extender family of products enables you to accelerate your time to market, with the confidence that your data complies with the latest industry formats and regulations.

For more information

To learn more about the IBM WebSphere Transformation Extender family of products, contact your IBM representative or IBM Business Partner, or visit:

ibm.com/software/integration/wtx

To join the Global WebSphere Community, visit:

www.websphere.org



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