WebSphere® software

IBM

IBM WebSphere Transformation Extender, Version 8.1

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

Contents

Introduction

IBM WebSphere® Transformation Extender is a universal transformation engine ready to be deployed stand-alone, embedded within applications, in most IT infrastructures. It can play a pivotal role in helping IBM clients transform, validate and route vital business across internal business systems, as well as 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 standalone 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 recent 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 healthcare, as well as in financial services 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 commonly used transformations ready to use. 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, validation rules and 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 integrating applications and information stores with custom adapters, or for calling the transformation engine when embedded inside an application or application server, programming interfaces are available as a 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 in COBOL applications, in triggering batch applications, as well as in integrating IBM CICS® applications and IMS applications and UNIX® System Services (USS) on the IBM z/OS® platform.

Flexible deployment

You can deploy WebSphere Transformation Extender in several ways:

- *As a stand-alone server, connecting to applications with technology adapters.*
- *As a hosted component in a Java™ 2 Platform, Enterprise Edition (J2EE) application server.*
- *Embedded inside your custom C, Java, and COBOL applications using the application programming interfaces (APIs) provided in a software development kit (SDK).*
- *Integrated with IBM enterprise service bus (ESB) offerings, extending their existing transformation capability. These can be loosely coupled with a technology adapter or can be tightly coupled, as in the case of IBM WebSphere Transformation Extender for Message Broker.*

Time to value

Your integration developers and architects can use IBM WebSphere Transformation Extender Design Studio to visualize 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 is included to help reduce development time with easy-to-use rules specifications for validation, transformation and routing. You need the APIs in the SDK only when adding transformation capability directly into applications or writing custom adapters.

You can also help accelerate time to value with optional WebSphere Transformation Extender industry and application packs. Each pack provides solutions to integrate industry-wide common data formats across your enterprise infrastructure, including predefined metadata and importers for major industry applications and standards, such as X12 EDI, HIPAA, HL7 and SWIFT. As standards change, IBM provides timely upgrades to the solution packs, helping to protect your investment and help ensure that your business can quickly assimilate industry-led requirements.

WebSphere Transformation Extender overview

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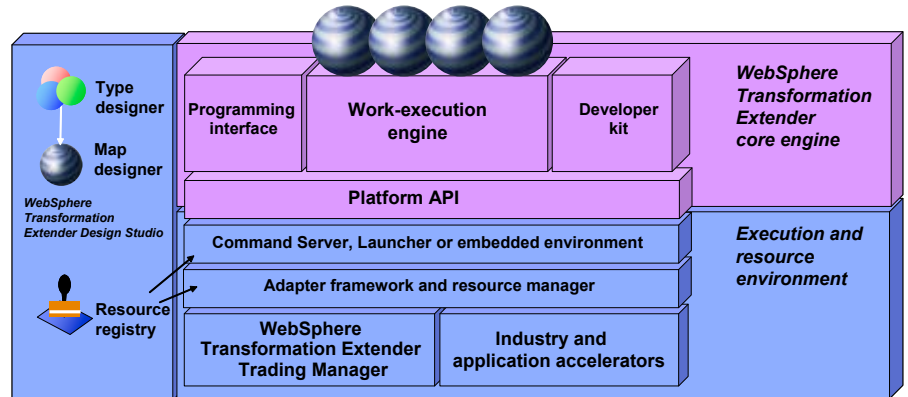

Figure 1. WebSphere Transformation Extender component overview

Core engine

The core work-execution (transformation) engine performs the tasks of parsing inbound data and applying 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.

Execution and resource environment

These components extend the core engine with more implementation capabilities. The industry and application packs 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. Application packs accelerate the integration of critical applications, such as SAP, Siebel and PeopleSoft. 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 directory paths or file names to actual names at run time. This makes it possible to use the same maps and systems definitions in different systems.

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 and 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.

Trading manager

Trading manager 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, monitor and view an entire business-to-business (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 work-execution engine for system test and production implementation. The key productivity tools for designers are described below.

Type designer is the data-object 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 includes importers for automatically generating type trees (data-object definitions) for data that is described in formats such as XML and COBOL Copybooks, and structures specific to applications like 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 functionality 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.
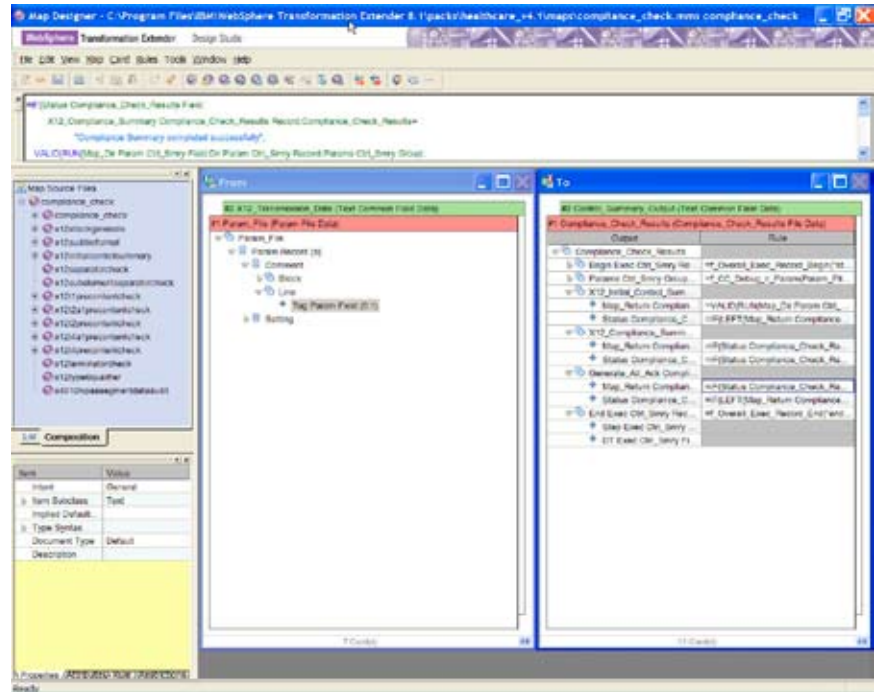

Figure 3. Map designer

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 to meet mapping and implementation requirements.

The *integration flow designer* is used to define interactions among maps and systems of maps, to validate the logical consistency of workflows and to prepare systems of maps to run (see Figure 4).
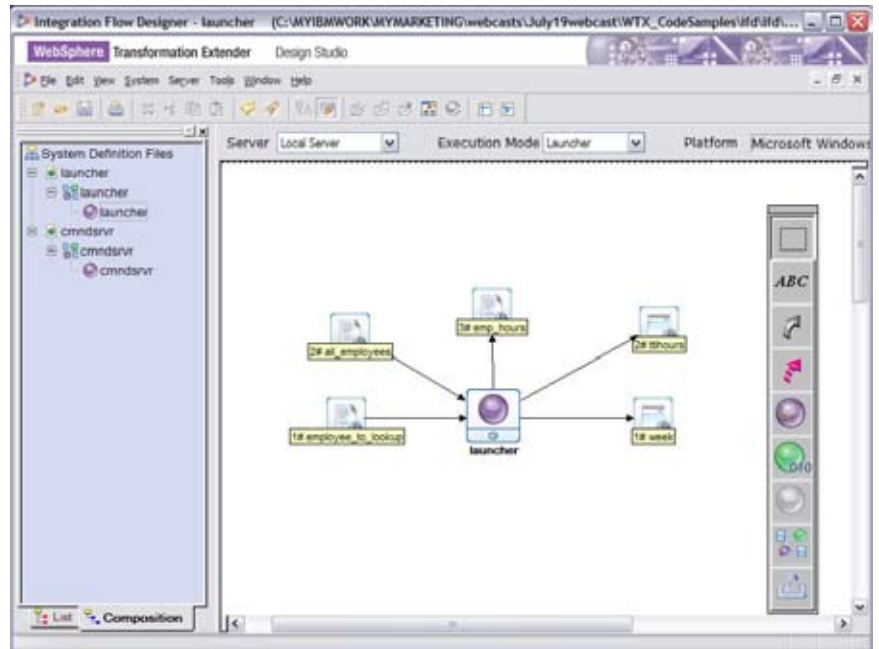

Figure 4. Integration flow designer

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.

Command server is the server component that enables command-driven implementation. The Windows version is included as part of WebSphere Transformation Extender Design Studio for testing maps within the map-designer development environment.

Resource registry is an application that provides a resource alias repository, used to abstract parameter settings using aliases that resolve at run time to specific resources within the enterprise. These variables are automatically resolved to the actual resources (such as directory paths, database names, message queues and server names) at run time, making it possible to use the same map and system definitions in different environments.

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, and 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) 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 event server runtime environment provided in the WebSphere Transformation Extender with Launcher edition. Refer to "Packaged offerings tailored to your integration needs" on page 13 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.

	Launcher administration GUI 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).
	Management console 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.
	Event server monitor 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.
	Snapshot viewer 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.

Table 1. Management and monitoring

New 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 spanning run maps that helps 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

Enhanced code-page support means that 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.

Performance

An extended performance 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 transformation performance profile 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 USS 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 include acosine, atan, asin, cosine, cosineh, exponential, factorial, log, power, sin, sinh, sqrt, tan, tanh.*
- *Miscellaneous functions include GetLocale, GetInstallDirectory, GetResourceAlias.*
- *XML functions include ValidateXML, ApplyXSLT, XPathQuery, ChangeXMLEncoding.*

New dynamic functions enable you to easily extend WebSphere Transformation Extender, and 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.

New industry packs
WebSphere Transformation Extender packs have also been enhanced to deliver better performance, more function and more currency with industry standards.

- *IBM WebSphere Transformation Extender Pack for HIPAA EDI, Version 4.2 provides updated support for the latest developments in HIPAA, including claims attachments.*
- *IBM WebSphere Transformation Extender Pack for X12, Version 2.7 supports the latest X12 5030 standard.*
- *IBM WebSphere Transformation Extender Pack for EDIFACT, Version 2.7 supports the new EDIFACT D05A and D05B standards.*
- *IBM WebSphere Transformation Extender Pack for SWIFTNet FIN, Version 4.2 supports SWIFT SRG 2006.*
- *IBM WebSphere Transformation Extender Trading Manager, Version 7.8 supports the latest versions of X12, EDIFACT, and HIPAA and includes an enhanced EDIFACT subsystem for increased performance.*

Packaged offerings tailored to your integration needs

WebSphere Transformation Extender is made available as a number of basic editions tailored to the functionality 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 embedding)

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.

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 and 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 SDK is a packaging 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 custom adapters for WebSphere Transformation Extender and deploy them with any base edition.

Industry packs

Industry packs include:

- *IBM WebSphere Transformation Extender Pack for EDIFACT*
- *IBM WebSphere Transformation Extender Pack for X12*
- *IBM WebSphere Transformation Extender Pack for EANCOM*
- *IBM WebSphere Transformation Extender Pack for ODETTE*
- *IBM WebSphere Transformation Extender Pack for TRADACOMS*
- *IBM WebSphere Transformation Extender Pack for SWIFTNet Fin*
- *IBM WebSphere Transformation Extender Pack for SWIFTNet Funds*
- *IBM WebSphere Transformation Extender Pack for HIPAA EDI*
- *IBM WebSphere Transformation Extender Pack for HL7*
- *IBM WebSphere Transformation Extender Pack for NCPDP*

Application packs

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

This edition enables you to manage and control the B2B integration of partner relationships and message flow.

IBM WebSphere Transformation Extender Pack for Web Services

This edition extends built-in capabilities with the ability to send Web services requests to an SOA service provider directly from a transformation. WebSphere Transformation Extender PACK for Web Services works with any base edition.

IBM WebSphere Transformation Extender Security Collection

This edition provides other adapters to encrypt and decrypt data according to many popular standards. Adapters include Secure Multipurpose Internet Mail Extensions (S/MIME), Secure Sockets Layer (SSL) and OpenPGP. WebSphere Transformation Extender Security Collection works with any base edition.

IBM WebSphere Transformation Extender Launcher Agent

This edition adds an inbound HTTP agent for WebSphere Transformation Extender that enables WebSphere Transformation Extender with Launcher to listen and respond to HTTP requests. WebSphere Transformation Extender Launcher Agent requires the IBM WebSphere Transformation Extender with Launcher base edition.

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, WebSphere Transformation Extender industry PACKs enable 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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*   The adapters not included are those for connection
    to Web services and encryption protocols.

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