

Integrating Systems Through Universal Transformation Using IBM WebSphere Transformation Extender



Redguides for Business Leaders



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- Realize the business value of WebSphere Transformation Extender
- Understand the key concepts and functionality
- Gain insight from typical integration scenarios



Executive overview

One of the challenges facing businesses today is integrating their enterprise business systems. Often these businesses have a significant investment in a range of custom and packaged business applications. Each of these applications is different and most likely were not designed to interact with other applications (creating what is known as *information silos*). These information silos result in disparate systems where information becomes trapped in incompatible data formats, rendering this valuable information useless or, at a minimum, difficult to use or exchange between applications.

To share and exchange this vital information, businesses need to write code to transform often complex formats (from application A) into different and often equally complex formats for the receiving applications. This often requires an in-depth understanding of the applications and formats as well as specialized programming skills.

Another consideration is that businesses in specific industries must adhere to industry standard formats such as Health Insurance Portability and Accountability Act (HIPAA), electronic data interchange (EDI), or Society for Worldwide Interbank Financial Telecommunication (SWIFT), translating in and out of other business-application formats.

Businesses also need to transform in and out of packaged business applications such as SAP® IDOC. Mapping successfully to these formats requires IT organizations to write and maintain specialized programs to perform the conversion and check content validity and quality.

More challenges arise as these standards evolve. For example, SWIFT is moving to a new industry standard for financial data exchange (SWIFT MX messages). In the future, this standard will replace the currently used messaging standard, which is commonly known as SWIFT MT messages. As a consequence, the companies that use these data formats must be prepared for transformation and coexistence of these data formats.

Instead of occupying your IT organization with the task of creating these specialized programs, IBM® WebSphere® Transformation Extender can simplify and automate this entire process. WebSphere Transformation Extender provides universal access or universal integration between systems. With WebSphere Transformation Extender, organizations can transform information from many different disparate systems into a common format. WebSphere Transformation Extender provides data or information that can be more effectively analyzed and used for a greater purpose or that can be transformed directly into any target format.

Figure 1 provides a high-level overview of the WebSphere Transformation Extender capabilities.

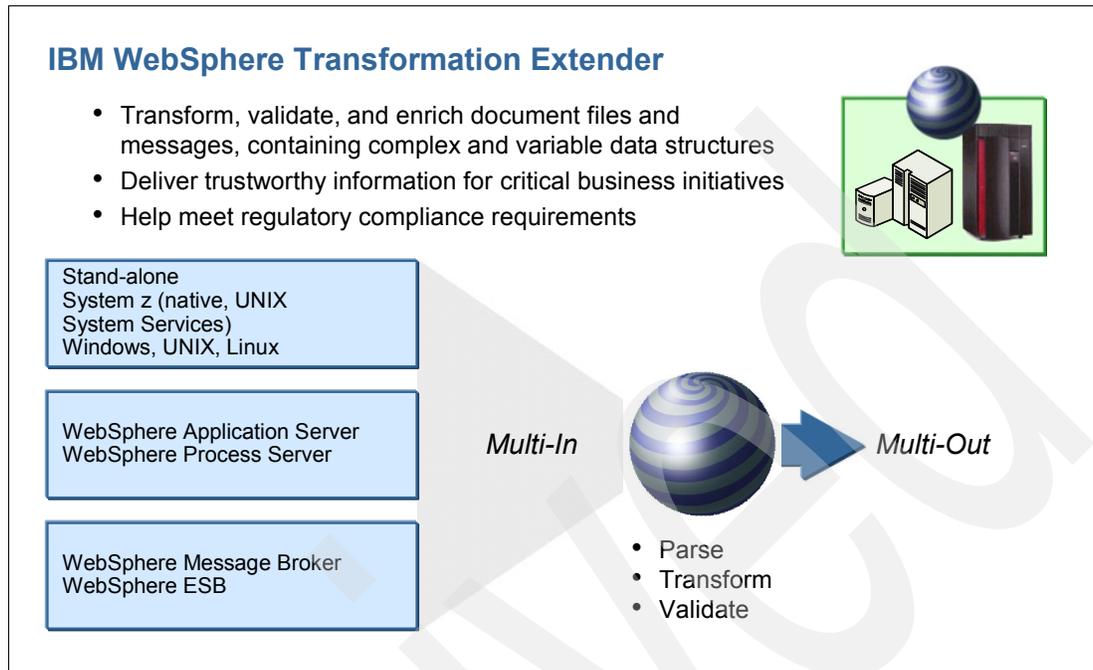


Figure 1 WebSphere Transformation Extender capabilities

WebSphere Transformation Extender plays a strategic role in allowing your organization to create and manage a dynamic infrastructure in the following ways:

► Reduce costs

The digitally-connected world is driving a convergence of business and IT assets, creating integrated “smart” assets. This converged, dynamic infrastructure must be cost effective.

► Improve service

By design, a dynamic infrastructure is service-oriented and focused on supporting and enabling employees, partners, and customers in a highly responsive way.

► Manage risk

Extending your business to an increasingly connected and collaborative world requires the confidence and trust that your infrastructure is secure and resilient.

This IBM Redguide™ publication shows how IBM WebSphere Transformation Extender V8.2 can help you solve application integration problems. This guide also shows where WebSphere Transformation Extender can add value to your application integration needs. We discuss the basic concepts and methods of execution. We also illustrate three sample scenarios that show how WebSphere Transformation Extender can integrate applications within an existing business environment. These scenarios and this guide can help you to understand the product framework as you get started on application integration.

For specific technical details about WebSphere Transformation Extender or for step-by-step guidance on how to implement a scenario, see the IBM Redbooks® publication *IBM WebSphere Transformation Extender 8.2*, SG24-7693.

WebSphere Transformation Extender: A universal data transformation solution

The WebSphere Transformation Extender product is a powerful, transaction-oriented universal data transformation and validation solution. It automates the transformation of data (transactions) that is needed by various applications that work with their own data formats and data types. This product eliminates the need for hand-coding or specialized applications that are responsible for doing these data transformations between formats.

WebSphere Transformation Extender transforms data in any format (from the source application) and routes it (in the appropriate receivers format) to any number of receiving applications:

- ▶ Possible data formats include XML, non-XML, and mixed formats.
- ▶ Possible sources of data include files, relational databases, message-oriented middleware, packaged applications, or other external sources.

WebSphere Transformation Extender is a solution that can quickly adapt to changing requirements and minimize the impact and cost of change on your business applications. It provides the following capabilities and benefits:

- ▶ Code-free design and deployment
There is no “language” to WebSphere Transformation Extender. The transforms and data process are all maintained within the spreadsheet-like GUI, and your IT team never needs to write code to handle complex transforms.
- ▶ Self-describing data model
WebSphere Transformation Extender uses data in its native format and can handle complex and mixed data types by using one design environment.
- ▶ Data validation as part of the transformation process
Data is validated to content rules and context usages as part of the transformation process. There is no need to write separate logic or have separate executions to provide extremely rich data validation.
- ▶ High-throughput of complex transforms and enhancements
WebSphere Transformation Extender has a unique many-to-many model to transform and process data, which allows it to execute all transforms, lookups, and data enrichments with only one pass of the data.
- ▶ One engine with multiple deployment options including the IBM System z® platform
By using the same design environment, transformation can be deployed to several runtime environments, including embedded, stand-alone batch, and event-driven scenarios, across many operating system platforms.

The WebSphere Transformation Extender family delivers editions for both batch and event-driven systems, extending an enterprise service bus (ESB) or business process management (BPM) solution, as shown in Figure 2 on page 4. The editions can be embedded with customer applications written in a variety of languages including C, COBOL, Java™, and .Net. WebSphere Transformation Extender supports many platforms where your organization can deploy WebSphere Transformation Extender in z/OS® batch, CICS®, IMS, UNIX® System Services, and Linux® on System z environments.

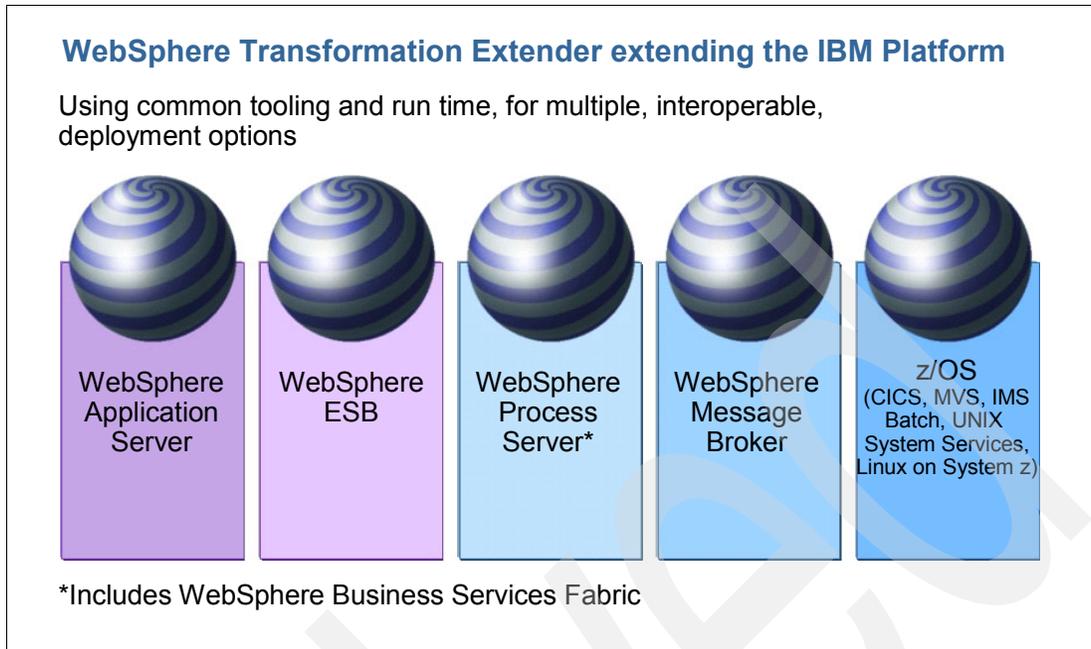


Figure 2 WebSphere Transformation Extender works with many products

How WebSphere Transformation Extender solves business problems

We provide three scenarios that show how your organization can use WebSphere Transformation Extender to help your data and information flow freely between applications and to outside parties.

First, we describe two specific scenarios that use WebSphere Transformation Extender and the WebSphere Transformation Extender Packs for SWIFTNet. These two scenarios involve a credit transfer between two international companies. In each scenario, we use WebSphere Transformation Extender to interpret, validate, and transform the SWIFT message.

SWIFT is a global provider of secure financial messaging services. This provider is an industry-owned cooperative that supplies secure, standardized messaging services to nearly 8,000 institutions in over 200 countries. Members of the cooperative include banks, broker-dealers, and investment managers. SWIFT also encompasses corporate and market infrastructures in payments, securities, treasury, and trade. Messages are exchanged by using SWIFT's own network infrastructure, SWIFTNet, which is a Secure IP Network.

The second scenario is an extension of scenario 1. This scenario uses WebSphere Transformation Extender to easily make the transition between the commonly used SWIFT MT data format and the new SWIFT MX format, which the bank must implement.

The third scenario uses WebSphere Transformation Extender on the System z platform. In this scenario, company A has acquired company B, which has its own order processing system. We integrate these systems *while changing the existing systems as little as possible*. With the best scenario of not changing the existing systems at all, this is possible by using WebSphere Transformation Extender.

Scenario 1: Exchanging data with other companies

Company A wants to pay an invoice to company B. Typically the companies never give each other hard cash. Instead, they use their respective banks as intermediaries. For example, company A instructs its bank to make a payment to B. Company A's bank then performs a money transfer to company B's bank. The companies and the banks are in different countries. The money transfers between the banks (in different countries) typically pass over a special network for SWIFT financial transactions. Figure 3 shows how the banks and the SWIFT network participate in the payment process.

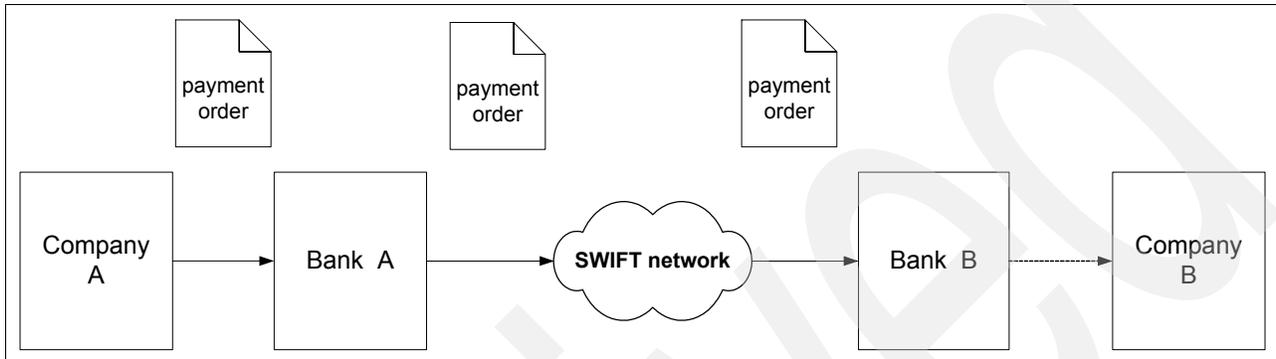


Figure 3 The business scenario with SWIFT network

Besides being a networking system, SWIFT also defines specific message formats for financial transactions. A payment instruction as used in this scenario is also known as the SWIFT MT103 message.

In reality the data flow for a financial transaction also includes several acknowledgements. However for simplicity, we do not go into more detail about acknowledgements for this scenario.

Solution

Figure 4 illustrates the passage of the payment message through the ESB of bank A that is implemented in scenario 1.

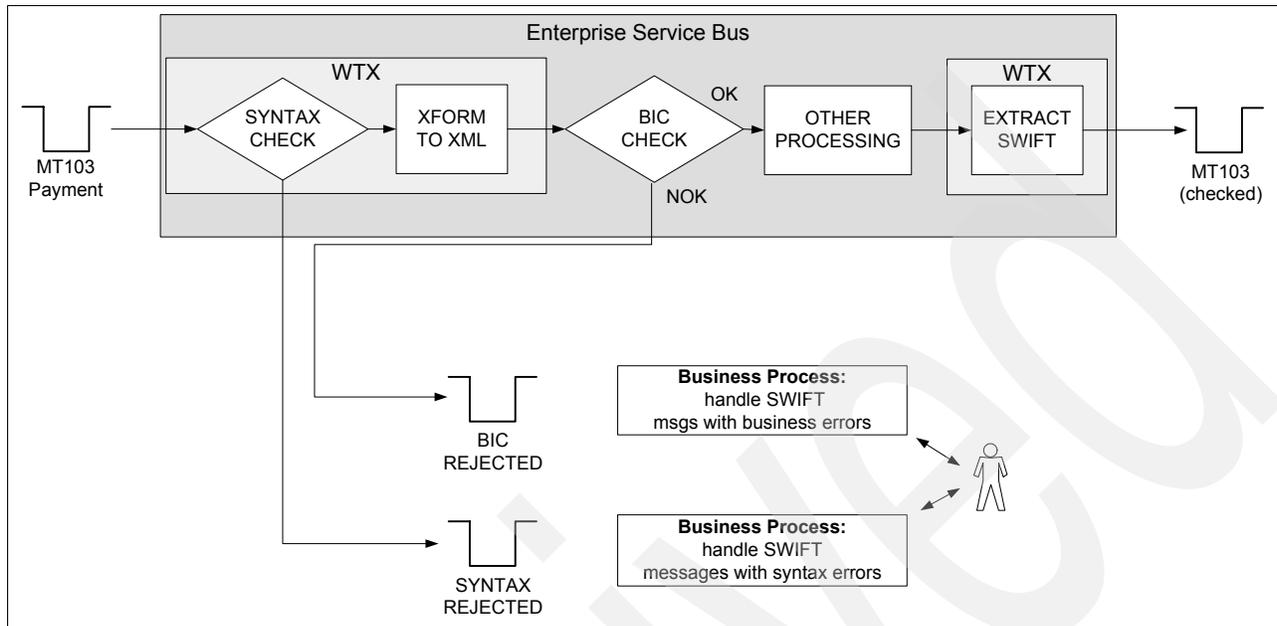


Figure 4 The solution for scenario utilizing WTX and WebSphere ESB

The SWIFT MT103 message comes from the front-end system. WebSphere Transformation Extender's is responsible for ensuring that the message has the correct syntax and content before it is sent it to the back-end systems and the SWIFT network.

The ESB uses WebSphere Transformation Extender with the Pack for SWIFTNet FIN to interpret the message and transform the message in an XML format that is more easily understandable by the ESB. This XML format also contains the entire original SWIFT message in one of its fields. WebSphere Transformation Extender checks whether the payment request has the correct syntax. In this case, it populates the XML fields with values that it retrieves from the SWIFT message. In the case of an invalid syntax, it sets one of the XML fields to indicate that the message is incorrect and cannot be processed.

In the case of a correct syntax, the ESB performs additional validation steps on the content of the message. For example, a validation that was implemented is whether the Bank Identifier Code (BIC) of the receiver is valid and connected to the SWIFT network. This validation is implemented in a Web service.

Note: In a real-world situation, you might perform more validation checks. However, for simplicity of the scenario, we limit the validation to just the BIC check.

If both the syntax check and BIC check are valid, the payment is forwarded to the back-end systems for interbank payment processing. A second map is used to extract the original MT103 message from the XML wrapper to send it out.

If either the syntax or the BIC is invalid, the payment order enters a business process to take the appropriate actions. This process can be implemented in WebSphere Process Server, with human interaction, for example.

Benefits of this solution

The benefits of this solution include significant validation and transformation of data, ensuring accurate processing. More specifically, this solution includes the following benefits:

- ▶ The company can validate the incoming SWIFT message against the standard, therefore, ensuring that there is a valid message *before* processing it.
- ▶ WebSphere Transformation Extender guarantees an easy transformation of SWIFT to XML, enabling easy handling of the message in a familiar XML format within the ESB.
- ▶ The SWIFT messaging standard data formats and complex validation rules are delivered in the Industry Pack and can be readily used. The company does not need to go through the costly effort of implementing and maintaining these messages and the validations.
- ▶ The company automatically receives the yearly updates on the SWIFT messages. Changes can be applied in an easy way, drastically reducing costs compared to a manual approach.
- ▶ It guarantees flexibility toward the future, as we explain in the next scenario.

Scenario 2: Easily transitioning between the SWIFT MT and SWIFT MX message format

SWIFT has defined a set of implementations based on the ISO 20022 XML standard referred to as “SWIFT MX messaging.” SWIFT has announced a phased plan that will replace certain MT message types with their equivalent MX. This change implies that banks must adopt the new MX data format and that a transition period of coexistence is needed between the two messaging standards.

Obviously the bank wants to avoid having to change its internal applications to adhere to the new standard.

The MT103 message and the MX pacs.008 message

Figure 5 shows a classic SWIFT MT103 message. The data is contained within a series of initiators and delimiters.

```
{1:F01TSTBDEDDCXXX1234123456}{2:I103TSTCETAAAXXN}{4:  
:20:ABCD123456789  
:23B:CRED  
:32A:071016EUR10000000,50  
:50K:John Doe  
Bourgetlaan 42  
BE  
:59:J Doe  
Bourgetlaan 42  
BE/BRUSSELS  
:71A:SHA  
-}
```

Figure 5 Example of a Swift MT103 message

Figure 6 shows a small part of the equivalent SWIFT MX pacs.008 message. In this new message format, the data is contained within XML tags.

```

<IntrBkSttlmAmt Ccy="EUR">10000000.5</IntrBkSttlmAmt>
<IntrBkSttlmDt>2007-10-16</IntrBkSttlmDt>
<ChrgBr>SHAR</ChrgBr>
<Dbtr>
  <Nm>John Doe</Nm>
  <PstlAdr>
    <AdrLine>Bourgetlaan 42</AdrLine>
    <Ctry>BE</Ctry>
  </PstlAdr>
</Dbtr>
<DbtrAgt>
  <FinInstnId>
    <BIC>TSTBDEDDXXX</BIC>
  
```

Figure 6 Example of a SWIFT MX pacs.008 message

Solution

Thanks to WebSphere Transformation Extender and the Packs for SWIFT, transforming between SWIFT MT and MX is no more than plugging the MT-MX transformations (delivered as part of an industry pack) into the system. These MT-MX transformations implement the set of translation rules that SWIFT has published to support the coexistence of MT and MX messages.

For example, to start sending out payments in the new MX format while maintaining the possibility to send messages in the classic MT format, the company can take the map that transforms the current MT103 messages to the new pacs.008 messages, as delivered by IBM. The company can use the map in the system. If the data must be sent in the new MX format, it is first transformed by this map.

In this example, the company does not need to change its internal applications and can exploit the development work done by IBM.

Figure 7 illustrates the flow for using WebSphere Transformation Extender to send payments in the new MX format, while maintaining the possibility to send messages in the classic MT format.

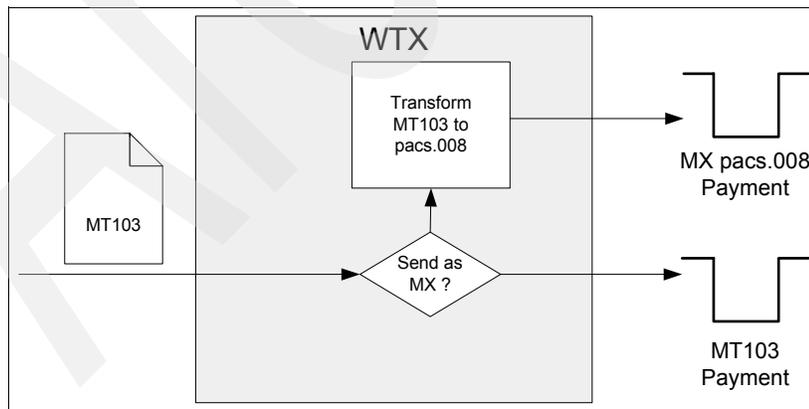


Figure 7 Scenario 2 - Sending payments in the new MX format while maintaining the option to send messages in the classic MT format

Benefits of this solution

Organizations do not need to go through the risky and expensive operation of changing internal systems to adopt the new SWIFT MX standard. Instead of going through the costly and error-prone development of these transformations, they can use the work that IBM has done in the available Industry Packs. The transformations between the SWIFT MT and SWIFT MX data formats are delivered *as ready to use* and can be plugged in where needed. This saves organizations a lot of time and money and helps them move to the new standard in a timely and comfortable way.

Scenario 3: Integrating a company’s acquisition applications

In this scenario, company X has an order processing system that is handled by two COBOL programs, PROG1 and PROG2, that are called in sequence in a job control language (JCL). PROG1 receives the orders, checks if they are valid, and splits them. PROG1 writes the valid order records in a fixed length file that is read by PROG2, which processes the orders, as shown in Figure 8.

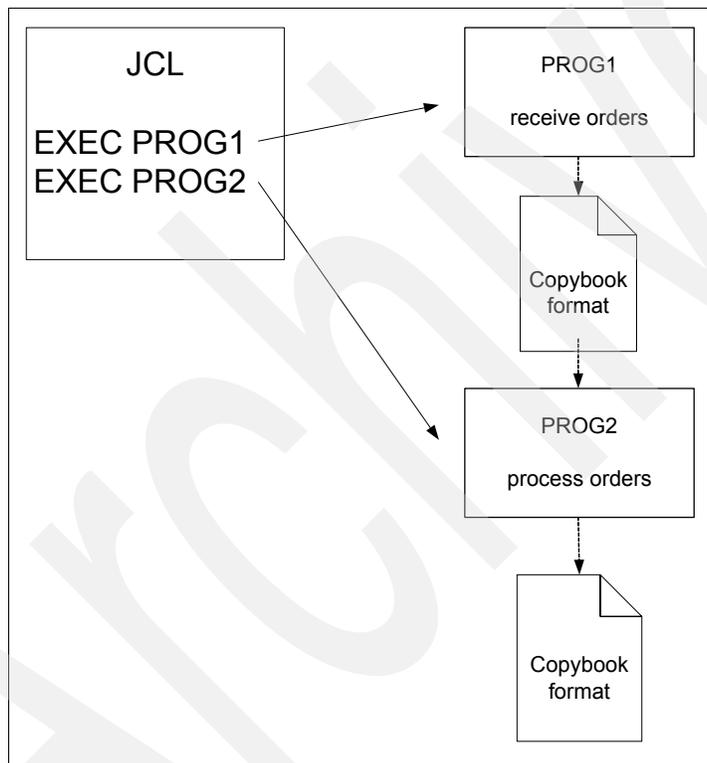


Figure 8 Original architecture

Company X acquired company Y, which has its own order processing system. Company X wants to integrate these systems while changing the existing systems as little as possible. The best scenario is not to change the existing systems at all.

Company Y’s order processing system has two parts:

- ▶ A COBOL program, PROG3, which processes the orders that come from old partners
- ▶ A Java 2 Platform, Enterprise Edition (J2EE™) application that processes the orders that come from new partners

The J2EE application reads XML files as input, while the COBOL program expects fixed-length files.

One option is to change PROG1, which receives all orders, to dispatch to the other three systems, based on the customer ID, as shown in Figure 9. In this scenario, PROG1 must also convert the data to the format that is expected by each of the three systems. Unfortunately this will impact several other systems and will have a long development cycle. Also, producing XML from a COBOL program is not a trivial task and requires specific skills.

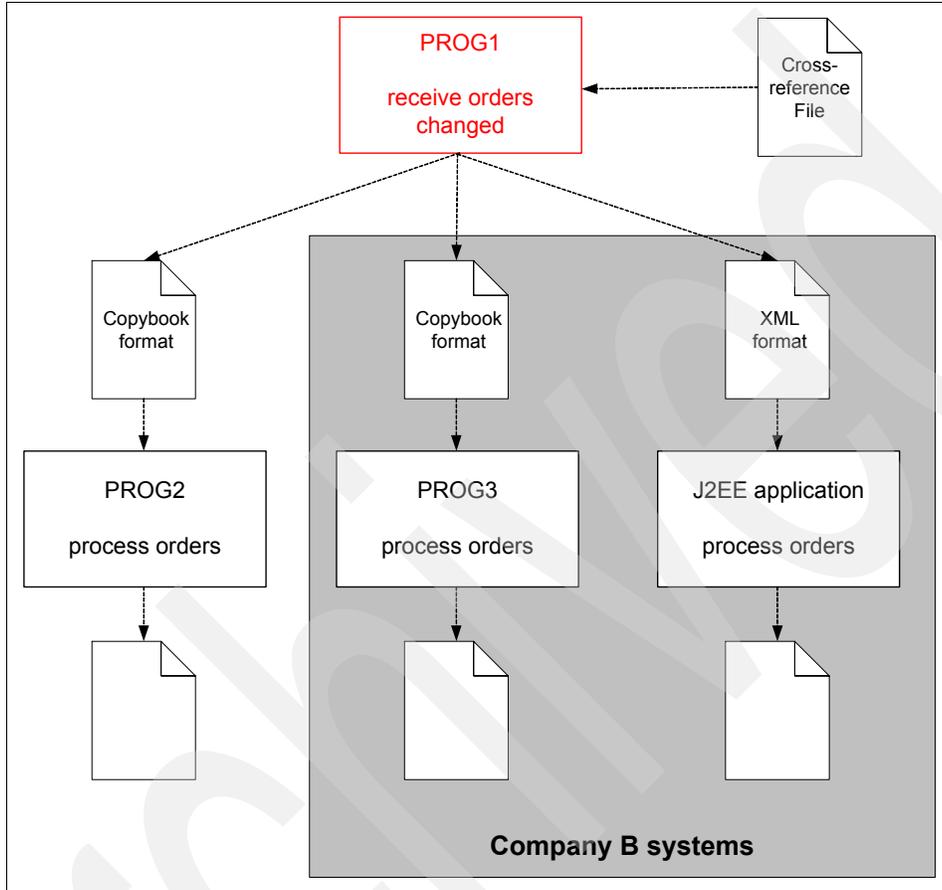


Figure 9 Alternative architecture without WebSphere Transformation Extender

Solution

This problem is easily solved by using WebSphere Transformation Extender, without changing any of the existing applications. In the proposed new architecture, WebSphere Transformation Extender reads the fixed-length file that is produced by PROG1. Based on the customer ID, WebSphere Transformation Extender transforms the format of the data and dispatches it to the appropriate system.

Additionally, WebSphere Transformation Extender can introduce a powerful logging and error handling mechanism. Figure 10 shows this proposed architecture.

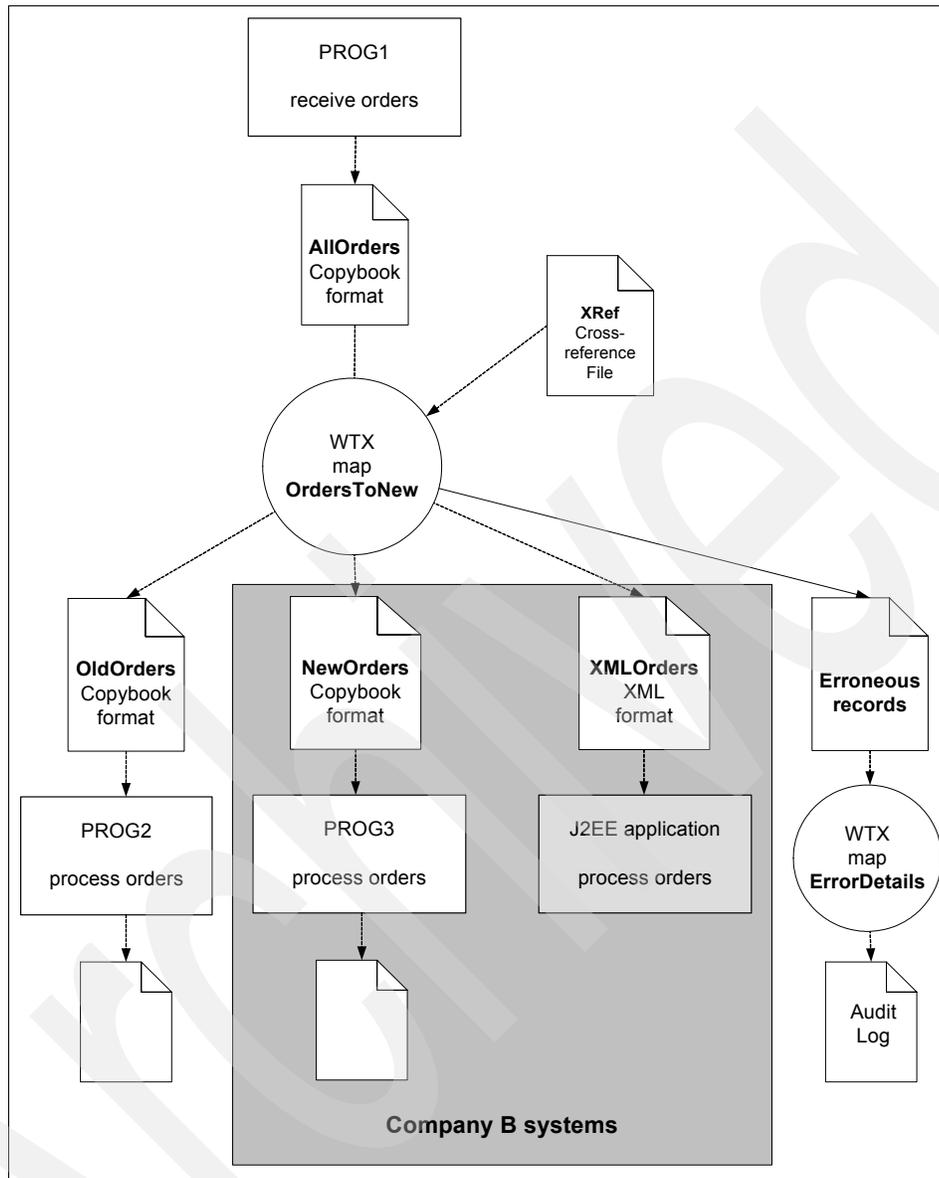


Figure 10 Proposed architecture with WebSphere Transformation Extender

Benefits of this solution

This solution offers the following benefits:

- ▶ The ability to handle additional orders in a different format with no modification to existing applications and no new programming
- ▶ The integration of new systems with no alteration to new or old systems
- ▶ The ability to add error logging and handling with no programming or alteration
- ▶ The ability to easily and quickly build interfaces and transformations, with no programming and fewer errors
- ▶ The ability to open existing applications to new style data formats, such as XML

How WebSphere Transformation Extender can benefit your business

WebSphere Transformation Extender minimizes the impact that integration imposes on an application. WebSphere Transformation Extender maintains each transformation mapping, including content validation and format variations, in a portable form, regardless of sources, target applications, platforms, or adapter requirements, and without the user having to write code. Its powerful write-once, deploy-anywhere portable technology enables you to grow your infrastructure with your business.

New business services can be delivered quicker, with business-driven enhancements turned around in shorter cycles. Business is also better served when electronic documents that are exchanged between organizations can be validated before they are sent or received. As a result, costly errors and corrective actions that are required to resend the documents are eliminated. Validation checking is also important for businesses that must comply with regulatory and industry requirements for business-to-business transactions. In-process validation of data before it is mapped eliminates wasted processing time, which can be expensive.

What makes WebSphere Transformation Extender so different? WebSphere Transformation Extender has the following unique capabilities that make it extremely powerful:

- ▶ WebSphere Transformation Extender has a unique many-to-many model of transforming and processing data. With this model, WebSphere Transformation Extender can run all transforms, lookups, and data enrichments with only one pass at the data, making it one of the best performing transformation engines on the market.
- ▶ Data is validated to content rules and context usages as part of the transformation process. It is not necessary to write separate logic or have separate executions to provide extremely rich data validation.
- ▶ There is no “language” to WebSphere Transformation Extender. The transforms and data process are all maintained within the spreadsheet-type GUI. It is not necessary to write code to handle complex transforms.
- ▶ WebSphere Transformation Extender uses self-describing data models to handle data in its existing format and has a unique mechanism for describing data in its existing form.

Figure 11 summarizes the types of problems that WebSphere Transformation Extender excels at solving.

Problems that WebSphere Transformation Extender solves	
<p>Interoperability</p> <ul style="list-style-type: none"> • Connects applications, databases, processes within the enterprise • Partners processes across the enterprise • Powerful transformation and routing 	<p>Speed</p> <ul style="list-style-type: none"> • Easy design and implementation • Fast maintenance without coding • Rapid adaptation to change
<p>Simplified complexity</p> <ul style="list-style-type: none"> • No coding • Consistent approach to multiple types of integration • Reusable objects 	<p>Adaptability</p> <ul style="list-style-type: none"> • Uses the existing IT infrastructure • Fully supports existing IT investments such as databases and messaging middleware • Non-invasive integration • Application and industry packs
<p><i>A powerful, portable, transformation engine</i></p>	

Figure 11 Problems solved by WebSphere Transformation Extender

Using information to make more intelligent choices

Today, more than ever, organizations are under pressure to use their information to make better and more intelligent choices. WebSphere Transformation Extender can serve a strategic role, because it enables much easier integration of systems and successful sharing of data.

► **Volume of digital data**

With the proliferation of user devices, sensors, and actuators, the nature of data is changing. Data volumes and network bandwidth are expected to grow ten-fold in the next three years.

WebSphere Transformation Extender enables more meaningful sharing of data, because it allows transformation to a common format that can be understood and used by different systems.

► **Vast variety of information**

With the expansion of information comes large variances in the complexion of available data that is *extremely noisy* with lots of errors and no opportunity to cleanse it in a world of real-time decision making.

WebSphere Transformation Extender provides a solution for handling different types of data, making it readable between disparate systems.

► **Velocity of decision making**

The market demands that businesses optimize decisions, take action based on good information, and use advanced predictive capabilities, all with speed and efficiency.

By using WebSphere Transformation Extender's capability to connect different systems, databases, and other sources of information, you are better informed and in a strategic position to make decisions based on the latest information. Furthermore, WebSphere Transformation Extender allows for rapid and flexible design of applications, maximizing speed and efficiency.

- ▶ Shift in what we analyze

Enterprises need a broader, systems-based approach to the information that they examine and optimize. Stream computing and event-processing capabilities enable the analysis of massive volumes of data.

WebSphere Transformation Extender has event-driven capabilities that can look across a broad array of systems and execute according to specific rules and triggers.

WebSphere Transformation Extender offering

In this section, we describe the WebSphere Transformation Extender Design Studio, an overview of the deployment editions, and the available industry solution packs. WebSphere Transformation Extender can help *accelerate the time to value* in the following ways:

- ▶ Ease of design by using the Design Studio to visualize both simple and complex data types and map between them using a code-free approach
- ▶ Broad range of deployment options available to suit your specific business needs
- ▶ Ready-to-use capabilities through available industry and enterprise packs to integrate with a range of industry standard data formats with your enterprise infrastructure

WebSphere Transformation Extender Design Studio

Integration developers and data architects use the WebSphere Transformation Extender Design Studio to visualize both simple and complex data types. The Design Studio enables them to map between simple and complex data types by using the tool's robust data-processing and manipulation capabilities, a coding-free activity.

A comprehensive, yet extensible library of prebuilt functions can be assembled graphically into macro-based rules that are familiar to spreadsheet users. Rules can be assembled for text manipulation, mathematical calculations (including technical math), date and time handling, and accessing the host environment where the engine resides. Macros are also provided for iterating through records and line items. For example, a developer can iterate sales orders, with the ability to compute or validate subtotals. Design Studio provides the means for developing event-driven application-to-application integration, business-to-business integration, and consumer-to-business application integration.

You can use Design Studio to complete the following tasks:

- ▶ Define your data.
- ▶ Create maps for your data.
- ▶ Manage the systems of maps that you create.
- ▶ Develop and test maps and systems in a Microsoft® Windows® environment.

Design Studio includes the following components:¹

Type Tree Editor The modeling component that is used to define data objects, including source and target data structures.

Map Editor The modeling component that is used to develop maps that define your data transformation logic.

¹ For more specific information about each of the Design Studio components, together with examples of how to use these components while modelling your solution, defining and mapping your data, and managing the overall transformation process, see the Redbooks publication *IBM WebSphere Transformation Extender 8.2*, SG24-7693.

Database Interface Designer

The modeling component that is 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 execution requirements.

Integration Flow Designer

The modeling component that is used to define and manage data integration processes. Use the Integration Flow Designer to define interactions among maps and systems of maps, to validate the logical consistency of workflows, and to prepare systems to run.

The Type Tree Editor and Map Editor are Eclipse-based tools. The Eclipse workbench delivers a common, standards-based user experience across the WebSphere portfolio and is supported by many independent software vendors.

Transformations and validations can be fully developed, analyzed, and tested on a developer's workstation by using Design Studio, before generating a platform-specific compiled format for use with any WebSphere Transformation Extender edition engine. As a file-based solution, no additional database repository is required to manage the transformation artifacts. Any preferred Eclipse-supported source-code management solution can be used to manage the assets between development teams.

Broad range of deployment editions to fit your requirements

WebSphere Transformation Extender is packaged in different editions to suit the deployment mode that best fits your requirement:

- ▶ As a batch-file processing engine called from a command script, batch or command file, or System z job control language (JCL)
- ▶ As an event-driven server, either stand-alone or as an ESB or BPM extender
- ▶ As an embedded engine inside any COBOL, C, or Java application

WebSphere Transformation Extender runtime editions

WebSphere Transformation Extender is a product that is available with different runtime architectures, depending on the method in which you want to call the transformation run time.

You can access the transformation engine in the following different ways:

- ▶ In batch mode, in which the map is started with a command
- ▶ In event-driven mode, in which the map automatically starts based on one or more events
- ▶ By using WebSphere Message Broker, which starts the map to delegate complex mapping and validation tasks to WebSphere Transformation Extender
- ▶ By WebSphere ESB or WebSphere Process Server, both of which can hand off complex transformations and validations to WebSphere Transformation Extender
- ▶ From other software by using one of the WebSphere Transformation Extender APIs

Any program written in one of the supported languages can delegate transformations and validations to WebSphere Transformation Extender by using the APIs.

Figure 12 shows a schematic overview of the different execution methods. Each WebSphere Transformation Extender edition is a subset of these methods.

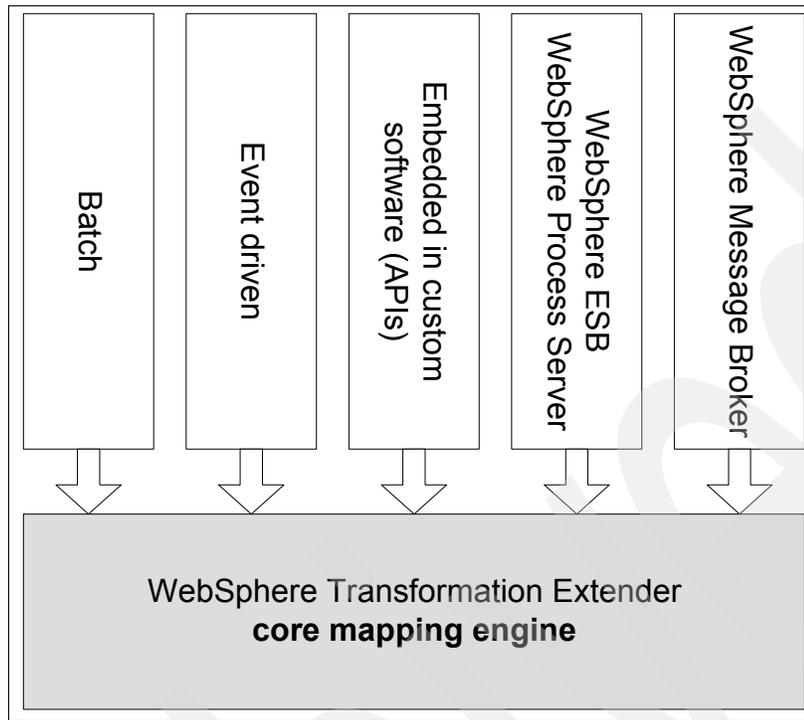


Figure 12 Ways to access the WebSphere Transformation Extender run time

WebSphere Transformation Extender with Command Server

By using WebSphere Transformation Extender with Command Server, transformations can be run directly from a command line, shell script, timer, or JCL (on System z). An existing application and infrastructure can be extended with minimal intrusion. WebSphere Transformation Extender with Command Server for System z supports MVS batch, CICS, and IMS environments, and includes the components in the WebSphere Transformation Extender for Application Programming edition.

WebSphere Transformation Extender with Launcher

WebSphere Transformation Extender with Launcher provides a stand-alone event server to host the WebSphere Transformation Extender engine. It includes the command line and script processing capabilities that are in WebSphere Transformation Extender with Command Server.

The Launcher activates transformations when triggered by an event, which might be a file creation, a message arriving on a WebSphere MQ queue, a database trigger, a scheduler, or many other options including combinations of triggers. The Launcher offers an online run-time environment that synchronizes and controls complicated data transformations while maintaining and optimizing the execution environment for the transformations.

WebSphere Transformation Extender with Launcher can handle complex events and support time- and availability-based event synchronization on combinations of triggers on multiple input sources. For the System z platform, this edition runs under the UNIX System Services environment.

WebSphere Transformation Extender for Integration Servers

WebSphere Transformation Extender for Integration Servers provides extenders to other WebSphere products, providing installation and integration support. WebSphere Transformation Extender complements the native mediation and business-rule capabilities of these products and can process large documents and messages with more complex formats that are not based on XML. By using WebSphere Transformation Extender, you can solve critical business problems in real time with support for industry standards and regulatory compliance.

The following WebSphere Transformation Extender products are packaged as WebSphere Transformation Extender for Integration Servers:

- ▶ WebSphere Transformation Extender for Message Broker
- ▶ WebSphere Transformation Extender for WebSphere Process Server and WebSphere ESB

The Eclipse-based Design Studio can be installed into an existing WebSphere Message Broker Toolkit or WebSphere Integration Developer installation, providing a single development tool for flow creation and data transformation.

WebSphere Transformation Extender for Message Broker

WebSphere Transformation Extender for Message Broker provides the capability to run WebSphere Transformation Extender transformation maps from within a WebSphere Message Broker message flow. This product enhances the ESB features of WebSphere Message Broker with the universal transformation capability of WebSphere Transformation Extender. Therefore, you can use this extender to transform and distribute different messages across various systems and applications.

WebSphere Transformation Extender for WebSphere Process Server

The WebSphere Transformation Extender for WebSphere Process Server product enhances solutions that are built with the WebSphere ESB, WebSphere Process Server, and the WebSphere Integration Developer products. These products use default WebSphere Transformation Extender bindings that are ready to deploy WebSphere Transformation Extender in mediation flows and business processes. These default bindings can be generated from within WebSphere Integration Developer, which is the development studio for WebSphere Process Server and WebSphere ESB. WebSphere Transformation Extender for Integration Servers can also enhance solutions that are built with WebSphere Business Services Fabric.

When Design Studio is installed with WebSphere Integration Developer, an Eclipse-based wizard simplifies the map design. This edition takes advantage of the Service Component Architecture (SCA).

WebSphere Transformation Extender for Application Programming

WebSphere Transformation Extender for Application Programming is used to deploy transformations in custom programming environments and application servers. The C, Java, Enterprise JavaBeans™ (EJB™), COBOL, and .Net APIs are available to engage the transformation engine to process a prebuilt transformation directly from the application.

WebSphere Transformation Extender SDK

The WebSphere Transformation Extender software development kit (SDK) delivers the *development* environment for all of the APIs, such as C, Java, EJB, and COBOL, to integrate custom programming environments directly to WebSphere Transformation Extender. In addition, you can develop custom adapters for WebSphere Transformation Extender, by using

the SDK, and deploy them in any base edition. The SDK is available for writing client programs that connect directly to the stand-alone WebSphere Transformation Extender transformation engine. It also provides sample programs that show how to call the WebSphere Transformation Extender engine from several different APIs. The WebSphere Transformation Extender SDK adds the capability of the Application Programming edition to the other base editions.

WebSphere Transformation Extender on System z

Mainframes continue to play a key role in many enterprises, both in traditional and service-oriented architecture (SOA) environments. A single mainframe can perform the work of several servers, reducing administration overhead and the green footprint from an energy-conserving perspective. In some cases, the volume of data is simply too large to be moved off the mainframe (for example, the data in a very large database). In other cases, a system does not provide an upgrade path.

Data affinity is a common justification for transforming data on the mainframe itself, where the critical business applications reside. Also, mainframes can simply be the most reliable and scalable platforms 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 taking advantage of the scale, security, and expertise that they have on the mainframe.

The WebSphere Transformation Extender engine is available on the System z platform for embedding in COBOL or PL/I applications or use in batch processing. It can also be integrated with IBM DB2® software and participate in IBM CICS or IBM IMS transactions. WebSphere Transformation Extender also supports Linux on System z technology.

WebSphere Transformation Extender on System z provides the ability to quickly connect and interface existing batch applications among themselves and with industry standards. By using Design Studio on Windows, users build processing and integration rules, integrate data of disparate types from disparate sources, and process data objects natively without the need to program in COBOL, PL/I or Java. WebSphere Transformation Extender can work directly in any System z architecture.

WebSphere Transformation Extender on System z provides the following advantages among others:

- ▶ Eliminates custom integration programming for transforming data
- ▶ Avoids costly changes to applications written to older industry standards
- ▶ Improves quality assurance by validating information exchanges outside of the applications
- ▶ Reduces time and cost, maintaining interfaces to evolving standards
- ▶ Allows for fewer IT backlogs and code free maintenance

Industry solutions: Accelerating the time to value

WebSphere Transformation Extender Industry Packs help to accelerate time to value as your organization develops and maintains solutions based on industry standard and information exchange formats that you need to transform into internal business-application formats. Industry Packs provide ready-to-use capabilities to integrate with a range of industry standard data formats with your enterprise infrastructure. Industry Packs provide predefined type tree

templates, conversion map. In selected packs, they provide validation maps and tools to reduce risk from projects that require conformance to mandatory and advisory guidelines that are required by regulatory bodies or industry service providers.

When used with WebSphere Transformation Extender, WebSphere Transformation Extender Industry Packs provide an infrastructure that offers the following advantages:

- ▶ Enables compliance with government or industry mandates
- ▶ Controls administrative costs
- ▶ Streamlines business processes
- ▶ Facilitates the accuracy and timeliness of information
- ▶ Reuses existing business systems
- ▶ Adapts to new technologies as they emerge
- ▶ Integrates multiple systems and standards
- ▶ Automates cross-organizational exchanges
- ▶ Delivers trustworthy information for critical business initiatives

Industry Packs are combined into industry groups for the purpose of announcements of new releases that are related to the packs, and pack versions are aligned to the group versions. WebSphere Transformation Extender offers the following industry-specific packs:

- ▶ WebSphere Transformation Extender Packs for Healthcare
 - HIPAA electronic data interchange (EDI)
 - Health Level Seven (HL7)
 - National Council for Prescription Drug Programs (NCPDP)
- ▶ WebSphere Transformation Extender Packs for Financial Services
 - National Automated Clearing House Association (NACHA)
 - Single Euro Payments Area (SEPA)
 - Financial eXchange™ Protocol (FIX)
 - SWIFTNet FIN
 - SWIFTNet Funds
- ▶ WebSphere Transformation Extender Packs for Insurance
 - Association for Cooperative Operations Research and Development (ACORD)
- ▶ WebSphere Transformation Extender Packs for EDI
 - WebSphere Transformation Extender Pack for EDI for Administration, Commerce, and Transport (EDIFACT)
 - WebSphere Transformation Extender Pack for X12
 - WebSphere Transformation Extender Pack for EANCOM
 - WebSphere Transformation Extender Pack for Trading Data Communications Standard (TRADACOMS)
 - WebSphere Transformation Extender Pack for Odette

As standards evolve and are updated, IBM provides timely updates to the pack contents, helping to protect existing investments year after year. Pack contents are imported into Design Studio tools to help ensure that your business can quickly assimilate new industry-led requirements.

Enterprise packs: Accelerating connectivity to ISV business applications

WebSphere Transformation Extender provides a range of technology connectors and adapters that are delivered as a single package. WebSphere Transformation Extender Enterprise Packs provide ready-to-use capabilities to accelerate the connectivity of

WebSphere Transformation Extender with key independent software vendor (ISV) business applications. The following enterprise packs are offered:

- ▶ WebSphere Transformation Extender for PeopleSoft®
- ▶ WebSphere Transformation Extender for SAP R/3®
- ▶ WebSphere Transformation Extender for SAP XI
- ▶ WebSphere Transformation Extender for Siebel®

Each Enterprise Pack provides the capability for WebSphere Transformation Extender to use one or more interfaces that are provided by the vendor for external applications to communicate and exchange business information.

In addition to detailed documentation of the interfaces and the steps needed to integrate the application, adapters and plug-in “assist” applications are provided for both synchronous and asynchronous connectivity to the WebSphere Transformation Extender transformation engine. Where the ISV application supports and publishes well-defined data exchange formats (for example SAP), importers are included that help discover and replicate the application-specific metadata. These importers ensure a higher degree of compliance with the syntax, semantics, and structure. By using these enterprise packs, developers, testers, and production staff can accomplish more through deeper integration with their enterprise environments.

Adapters

WebSphere Transformation Extender provides resource adapters that are used to retrieve and route data. They provide access to databases, files, messaging systems, enterprise applications, and other data sources and targets. An *adapter* is a technical connector that can be “plugged” into a source or destination, without parsing. You can use adapters with the Command Server, Launcher, or with a map in a map rule. A subset of adapters is supported on z/OS and includes WebSphere MQ, file, and FTP.

Each adapter includes a set of adapter commands that can be used to customize its operation. For example, when using the WebSphere MQ adapter, you use the adapter commands to specify different queues and queue managers, specific messages by message ID, specific sets of messages with the same message ID, message descriptors in your data, and more.

Resource adapters answer the questions: “Where should the data come from?” and “Where should the data go?” The resource adapters that are provided with the WebSphere Transformation Extender products enable data transformation and adapter-specific behavior recognition on different systems and data structures.

JCA adapters

A group of WebSphere Adapters is also provided. The WebSphere Adapters are Java EE Connector Architecture (JCA) based. The following adapters are specifically included:

E-mail	Includes support for multiple attachments and headers
FTP	Allows remote files to be renamed after they have been read
SAP	Adds support for the Query Interface for SAP Software
PeopleSoft	Adds a listener interface for Component Interfaces
Siebel	Adds a listener interface for Component Interfaces

Adapters on System z

When using WebSphere Transformation Extender for z/OS in batch, CICS, and IMS, the following adapters are provided:

- ▶ DB2
- ▶ Files (QSAM and VSAM)
- ▶ FTP
- ▶ MQ

When using WebSphere Transformation Extender with Launcher under UNIX System Services, the following adapters are provided:

- ▶ CICS
- ▶ DB2 (MVS and CLI)
- ▶ EMAIL
- ▶ Files (hierarchical and native file systems)
- ▶ FTP
- ▶ MQ
- ▶ Oracle®

Extended Functions

A couple of separate extended functions are available to provide specialized functionality. These functions include the WebSphere Transformation Extender Secure Adapter Collection and the WebSphere Transformation Extender SNMP Collection.

IBM WebSphere Transformation Extender Secure Adapter Collection

The WebSphere Transformation Extender Secure Adapter Collection provides additional technology adapters to encrypt and decrypt data. It uses several popular standards, including Secure Multipurpose Internet Mail Extensions (S/MIME), Secure Sockets Layer (SSL), and OpenPGP. WebSphere Transformation Extender Secure Adapter Collection works with any base edition.

WebSphere Transformation Extender SNMP Collection

The WebSphere Transformation Extender SNMP Collection enables integration with network management applications. The Simple Network Management Protocol (SNMP) Collection includes an SNMP Agent that enables monitoring and management by an SNMP manager and an SNMP Adapter. The adapter enables the sending of alerts to SNMP manager products from WebSphere Transformation Extender maps.

Trading Manager

Electronic commerce data flows from external sources to internal destinations and from internal sources to external destinations, and possibly to other internal organizations.

WebSphere Transformation Extender Trading Manager is a client/server product for managing and processing electronic commerce data that provides the capabilities for managing and controlling the business-to-business integration of partner relationships and message flow. Trading Manager users can audit, control, monitor, and view the entire business-to-business integration environment across the extended enterprise with secure data exchange fully integrated with back-end systems.

WebSphere Transformation Extender Trading Manager is an application of WebSphere Transformation Extender with Launcher deployed with EDI Industry Packs as a business-to-business hub.

WebSphere Transformation Extender Trading Manager consists of two components:

- ▶ **Partner Manager**

This component is a graphical application that is used to administer partner and trade link information, create a comprehensive database of an organization's electronic commerce information, and manage e-commerce activity.

- ▶ **Message Manager**

This component is a runtime system that manages the integration of partner messages by using a predefined system of maps that process electronic commerce data. These maps are used to validate and route data. The Message Manager is the runtime component of the Trading Manager.

Summary

You can add great business value to your organization's application integration projects by using WebSphere Transformation Extender. This Redguide publication explained how organizations can minimize the impact that integration imposes on a business and their applications by using WebSphere Transformation Extender.

WebSphere Transformation Extender maintains each transformation mapping, including content validation and format variations, in a portable form, regardless of sources, target applications, platforms, or adapter requirements, and without the user having to write code. Business services can be delivered quicker, with business-driven enhancements turned around in shorter cycles. In addition, business is better served when electronic documents that are exchanged between organizations can be validated before they are sent or received, eliminating costly errors and corrective actions. Ultimately, with WebSphere Transformation Extender, your organization can more effectively transform and share data, overcoming barriers between disparate systems and incompatible data formats.

Other resources for more information

For additional information about application integration, consult the following resources:

- ▶ *IBM WebSphere Transformation Extender 8.2*, SG24-7693

<http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/sg247693.html?Open>

- ▶ *IBM XML Toolkit for z/OS Users Guide*, SA22-7932-06

http://www-03.ibm.com/servers/eserver/zseries/software/xml/pdf/ug_v1r9.pdf

- ▶ The "WebSphere Transformation Extender Online Library," which is a set of Adobe® Acrobat® PDF files that contain the WebSphere Transformation Extender documentation

- ▶ WebSphere Transformation Extender product page

<http://www-01.ibm.com/software/integration/wdatastagetx/>

- ▶ WebSphere Transformation Extender Support

<http://www-01.ibm.com/software/integration/wdatastagetx/support/index.html>

- ▶ WebSphere Transformation Extender Information Center

<http://publib.boulder.ibm.com/infocenter/wtxdoc/v8r2m0/index.jsp>

- ▶ Various articles about WebSphere Transformation Extender on IBM developerWorks®, including a large collection of articles, tutorials, forums, and other content for developers who use IBM software and technologies

<http://www.ibm.com/developerworks/search/searchResults.jsp?searchType=1&searchSite=dw&searchScope=dw&query=websphere+transformation+extender&Search=Search>

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