



IBM Software Group

**WebSphere® Process Server V6.0.2**  
**WebSphere Integration Developer V6.0.2**  
**WebSphere Enterprise Service Bus V6.0.2**

***WebSphere Adapter V6.0.2 new features***



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This presentation provides details about some of the new features of the IBM WebSphere adapters for the 6.0.2 release.

## Goals

- Provide details for new common features
- At end of presentation, you should be able to:
  - ▶ Convert content using the Data Transformation Framework
  - ▶ Setup a Highly Available adapter
  - ▶ Understand the Event Management Framework
    - Utilize new filtering capabilities
- Prerequisites to understanding this presentation
  - ▶ Knowledgeable of WebSphere Integration Developer, WebSphere Process Server and 6.0 WebSphere Adapters

The goals for this presentation are to provide more details into some of the new foundation features. The presentation will cover the data transformation framework, the adapter high availability setup and the event management framework. It is assumed that you have previous knowledge of WebSphere Process Server, WebSphere Integration Developer and version 6.0 of the WebSphere adapters.

## Agenda

- Provide details of the following enhancements
  - ▶ Data Transformation Framework
  - ▶ High Availability – Failover
  - ▶ Event Manager
- For each of these enhancements, as applicable
  - ▶ Benefits compared to existing 6.0 capabilities
  - ▶ Description of the enhancement
  - ▶ Introduction to the tool and runtime support
  - ▶ Considerations for problem determination
  - ▶ Usage scenario



The agenda of this presentation is to provide the details of how the data transformation framework can be utilized to convert semi-structured data to and from a format that the business object understands. It also discusses what it means to have an adapter running as highly available and explain the new event manager frameworks capabilities. For each of these enhancements you will be able to see the benefits over the previous version's capabilities by describing the enhancement and showing the tool and runtime support requirements. The presentation also covers any special consideration for problem determination and possible usage scenarios.

## Section

# ***Data transformation framework***

This section discusses the data transformation framework.

## Data transformation framework

<b>Existing 6.0</b>	No data transformation for 6.0 adapters WBIA data handler provided converted business objects to and from serialized formats
<b>New 6.0.2</b>	Data transformation framework provides similar functionality to WBIA data handlers Based on open SCA and upcoming Common Model for Transformation standards
<b>Benefits</b>	Allows semi-structured data to be transformed into a XML or format that a business object understands Provides similar capabilities to WBIA data handler

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There is currently no support for data transformation with the version 6.0 of the adapters. The WebSphere Business Integration Adapter data handler does provide the ability to convert business objects to and from serialized formats. The data transformation framework provides very similar functionality to the WebSphere Business Integration Adapter data handlers. The data transformation framework is also based on the open service component architecture and the common model for transformation standards. With the data transformation framework you can convert semi-structured data to and from either xml or any other format that the business object requires.

## Data transformation framework

- Allows for transformation of Business Objects to and from semi-structured formats like XML and fixed-width.
- Provides for user-configured data binding
  - ▶ Specify during Enterprise Service Discovery
  - ▶ Provided XMLBOSerializerDataBinding or specify your own custom data binding
- Applicable to the technology adapters (Flat Files, E-mail, and FTP)



The transformation of data is user-configured during the enterprise service discovery process. You can use the `xmlBOSerializerDataBinding` which is provided with the foundation classes or you can specify your own custom data binding that was developed previous to running enterprise service discovery. The data transformation functionality is an important new feature for the technology adapters, but is not applicable to the application adapters.

## Transition types

- Semi-Structured data (XML, delimited, etc) → SDO
- Raw Pass-through
- Generic Outbound, SDO → Semi-Structured
- Custom bindings
- Pre-parsing to determine data type



Some examples of data transition type are semi-structured data. They could be XML, delimited or some other format that a custom binding understands to an SDO. Or they can be a raw pass-through without transformation, or a generic outbound flow with an SDO converted back to a semi-structured form. The use of custom bindings allows you to define and map any form of data to and from what the business object expects. The data transformation framework also allows pre-parsing of the data to determine what the following data type is for conversion.

## Required configuration and implementation

- DefaultObjectName
- EventContentType

EventContentType:	<input type="text"/>
FileContentEncoding:	<input type="text"/>
DefaultObjectName:	<input type="text"/>

- Wrapper Business Object InteractionSpec properties
  - ▶ RecipientList
  - ▶ PriorityLevel



During the enterprise service discovery process there are two activation spec properties that can be set to support Data Transformation Framework (DTF). The defaultObjectName specifies the fully-qualified wrapper object name to be used for the transformation and wrapping of the inbound unstructured events. The EventContentType is used for adapters which support multiple object types per activation spec. Some adapters may also specify additional wrapper Business Object properties in the interaction spec such as a recipientList and priorityLevel.



## Record formats

- Wrapper Object Definition

- ▶ UnstructuredRecord

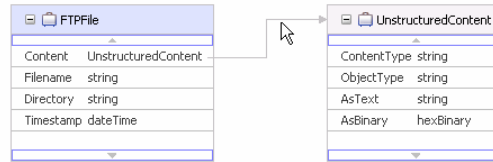
- UnstructuredContentDataBinding

- ▶ Converted to SDO

- Wrapper BG

- Wrapper Business Object

- Property Content Business Object or UnstructuredContent Business Object



- Content-Specific Data Bindings

- ▶ UnstructuredRecord

- XML Data binding

- ▶ XSD required

Here is an example of the wrapper object definition for an FTP based adapter. It contains an unstructured record which can be defined by the unstructureContenDataBinding, a filename, directory and timestamp. The structure of the SDO should be a business graph that contains the wrapper Business Object with a property content Business Object or an unstructured content Business Object. There may also be content specific data bindings, such as SalesOrder, customer, that can consume an unstructured record or a XML data binding which requires an XSD to specify the data structure.

## Data binding specific metadata

- Metadata provided in XSD definition
  - ▶ BiDi information to transform data
  - ▶ Content-type identification
  - ▶ Pre-parsing function selector
    - FunctionSelector, DataBinding
  - ▶ SDO Annotation
    - WrapperName, ContentType, Charset
  - ▶ Return values

Data binding specific metadata must be provided in an XSD definition. Examples of metadata content are bi-directional text transformation, content-type identification, pre-parsing function selector, SDO annotation and return values. The pre-parsing function selector allows the data type to be determined and then specify a databinding that must be used to parse the data. An SDO annotation would specify the wrappername, which is a fully qualified name of the content-specific wrapper SDO, content type, such as text or xml, and the target character set for this data object type.

## Error handling

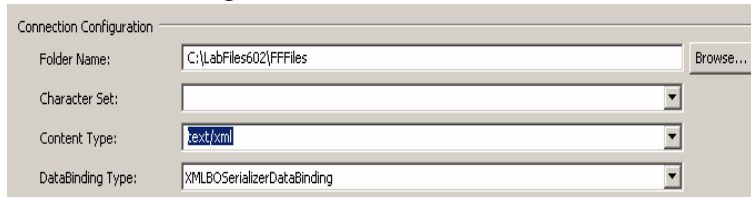
- Exceptions seen by invoking component
- Adapter does not distinguish between
  - ▶ Endpoint, Data binding or otherwise



Any exception that occurs during data transformation will be propagated to the invoking component. The adapter does not distinguish between errors due to problems with the endpoint, the data binding or otherwise. It simply understands that there is a problem and propagates the exception.

## Enterprise metadata discovery changes

- Connection Configuration



Connection Configuration

Folder Name: C:\LabFiles602\FFFfiles Browse...

Character Set: [dropdown]

Content Type: text/xml [dropdown]

DataBinding Type: XMLBOSerializerDataBinding [dropdown]

- Selection Properties

- ▶ ServiceType, Operations, Namespace, Business Object Location Function Selector

- Configuration data binding metadata properties

- ▶ WBIDataBindingImpl, WBIDataHandlerDataBinding, WBIXMLDataBinding
  - DataHandlerClassName, DataHandlerMOName

During enterprise metadata discovery, some additional properties have been added for data transformation. The connection configuration provides entry fields for the folder name where the XSD files are located, the content type to be used for all Business Objects, and the data binding type for the expected content. When XSDs are present and the user would select a set to be included in the service description then the selection properties will be shown. The Business Object location function selector would be shown only if the service type is inbound. The metadata properties for the listed data bindings are hard-coded into the foundation classes and will be shown to the user during Enterprise Service Discovery if these data bindings are used. Currently the WBIDataHandlerDataBinding will expose the DataHandlerClassName and DataHandlerMOName.

## Bi-directional support in DTF

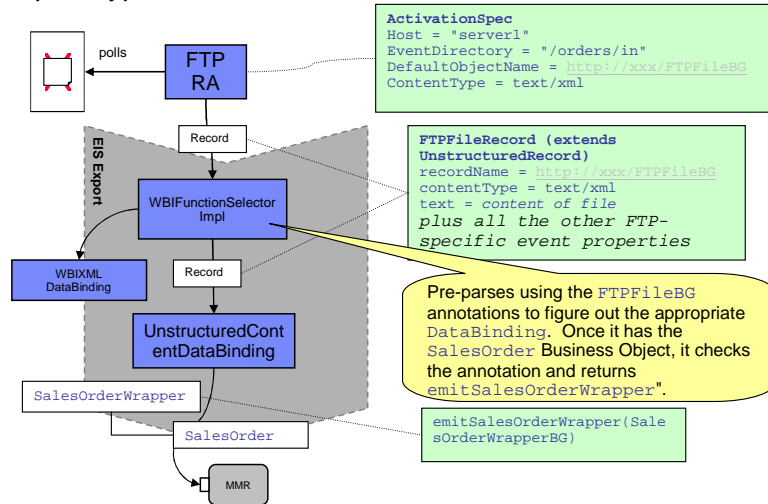
- Text transformation between WebSphere Process Server and the EIS
- Content data
  - ▶ FTPFileDataBinding, FlatFileDataBinding, EmailDataBinding custom bindings
  - ▶ Formats include Name value, Fixed width, EDI, Delimited, XML
- Meta / configuration data
  - ▶ Adapter specific
  - ▶ Part of a record



The E-mail, FTP, and Flat File adapters support Bi-Directional text transformation between WebSphere Process Server and the EIS. For those adapters the bi-directional text transformation occurs on content data and meta or configuration data. The content data is converted by the adapter specific custom data binding. The file formats supported for Bi-directional text transformation include name value, fixed width, EDI delimited and xml. Each adapter supports its own specific metadata as part of a record that will be converted.

## FTP RA with XML data transformation

- text/xml
- Metadata in complexType for SalesOrder



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Here is an example of a possible data transformation usage. As the XML record comes into the adapter it is pre-parsed to determine the business object type. It determines that the record is a salesOrder type and uses the SalesOrderWrapper to parse the content into a salesOrder business object for the client application.

## Section

# ***Adapter high availability***

This section covers the adapter high availability or failover that is supported for all adapters.

## High availability - Failover

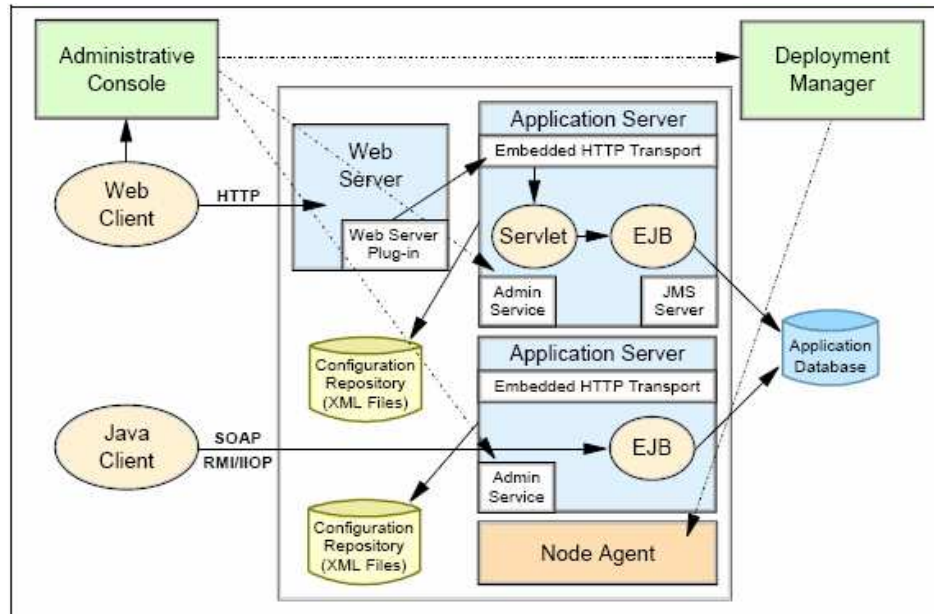
<b>Existing 6.0</b>	No High Availability support
<b>New 6.0.2</b>	<ul style="list-style-type: none"> <li>▪ Will allow adapter instances to be marked as Singleton within a cluster. At any given point of time only one adapter instance would be looking for events from an event store.             <ul style="list-style-type: none"> <li>▶ New "Enable HA Support" property on adapter</li> <li>▶ Requires enhanced support from WebSphere Network Deployment</li> </ul> </li> </ul>
<b>Benefits</b>	A failed adapter or server can failover to a backup



The current version 6.0 adapters do not have any high availability or failover support. In 6.0.2, multiple instances of an adapter can register with the HA manager to provide failover support. Only one of the instances will be active at any point in time. If that adapter or server fails, then the HA manager will select another adapter to handle inbound events. This HA support requires the WebSphere Network Deployment environment.



## WebSphere process and data availability



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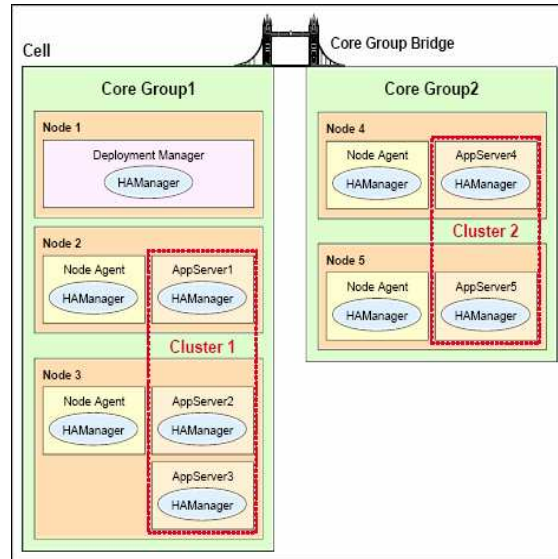
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Here you see a typical WebSphere application environment without high availability or failover capabilities. There are two application servers. One is handling all Web client requests and the other handles all Java client requests. This provides a good separation of work load but does not have any way to redistribute work automatically.

## Cluster terminology

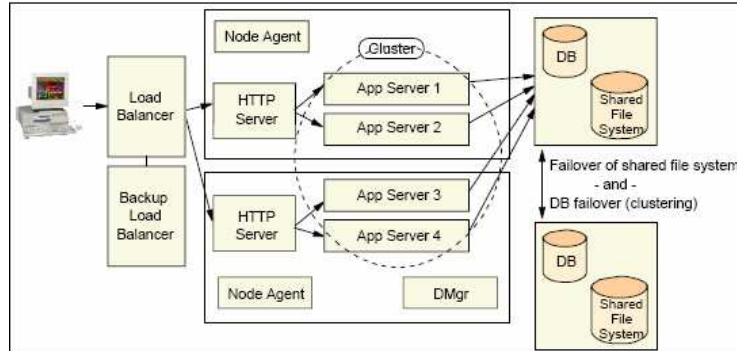
1. **Server:** provides core functionality
2. **Node:** represents a physical machine. A node can have multiple servers.
3. **Cluster:** group of managed servers
4. **Core Group:** physical grouping of processes which could host singleton services.
5. **Cell:** Logical grouping of clusters



This slide defines some cluster terminology. Here you see multiple servers which provide the core application support functionality. A node represents a physical machine and may have multiple servers. A cluster is a group of managed servers across multiple nodes. The core group is a grouping of processes that can host singleton services, and the cell is a logical grouping of clusters.

## Clustering

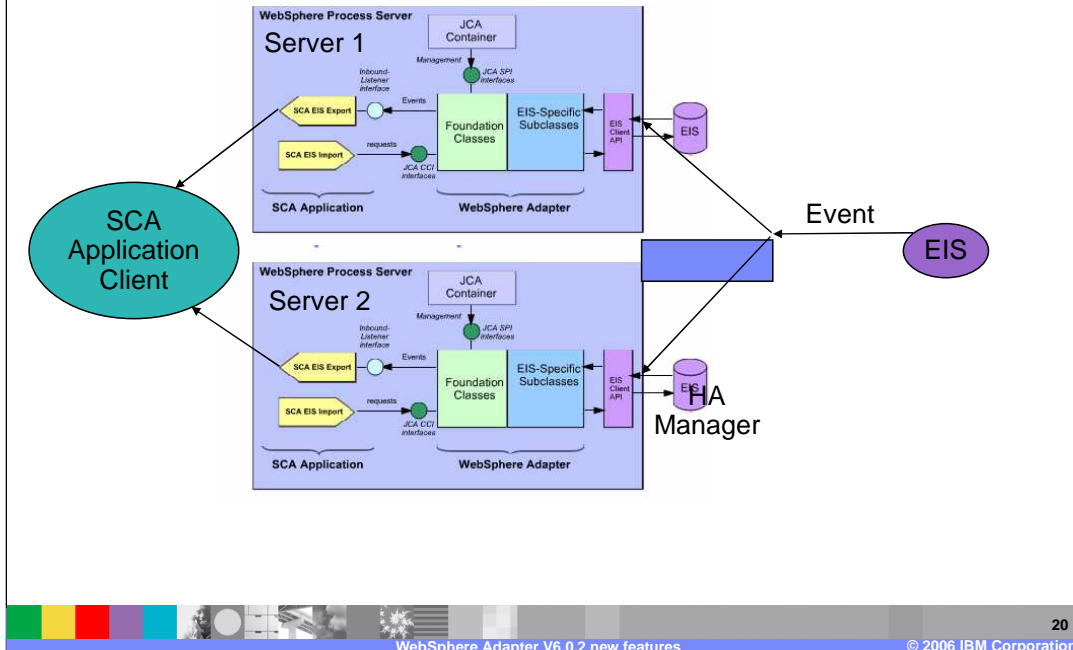
- Provides scalability, performance and high availability



- Scalability
  - Vertical scaling
  - Horizontal scaling
- Performance is achieved by load sharing
- If one of the servers goes down then all the services are failed over to the backup server

By clustering servers you can achieve better scalability, performance and high availability. Scalability can be either vertical or horizontal scaling. Performance is achieved by load balancing the work between the servers in the cluster. The HA manager will monitor the work load on each system and route the work to the system that can handle it best. For failover capability the HA manager will redirect the incoming work to another server if one of the servers in the cluster fails. For the WebSphere adapters, only fail over capability is provided for inbound events.

## HA manager inbound operation



Here you see a clustered environment with two servers. Both servers have an adapter registered with the HA manager for inbound events from the EIS. Both adapter instances will be running but the HA manager will send the inbound events to only one adapter instance. If that adapter instance fails then the HA manager will redirect all subsequent events to the other adapter. If the previous adapter restarts, the HA manager will continue to send events to the second adapter unless it fails.

## HA adapter operation

- Inbound operation
  - ▶ enableHASupport to true
  - ▶ Container registers adapter instances to HA manager with policy 1 of N
  - ▶ All adapter instances are started, but only one of them is active
- Outbound operation
  - ▶ No special handling required for outbound operation. This feature is available as it was in the previous release.
  - ▶ WLM distributes the workload between multiple adapter instances

To enable an adapter for high availability failover, the enableHASupport property must be set to true. The container will register each instance of the adapter with the HA manager. All adapter instances are started but only one will receive inbound events. For outbound operations, nothing has changed from the version 6.0 release. The outbound operations are distributed between the multiple adapter instances by the work load manager.

## Supported WebSphere Process Server version and platform coverage

- Supported for all clustering configurations for outbound request processing
- Supported for the following platforms when configured for inbound event processing for high availability clusters only:
  - ▶ Supported on WebSphere Process Server and WebSphere Enterprise Service Bus Version 6.0.1.3 and later
  - ▶ Supported on WebSphere Process Server and WebSphere Enterprise Service Bus Version 6.0.2
- Adapter Network Deployment is supported on the following platforms:
  - ▶ Windows®, Linux® (**includes Linux on z and i**), AIX®, Solaris™ and HPUX
  - ▶ No support for deploying WebSphere Adapters in a clustered environment on z/OS®.
  - ▶ No support for i5/OS®.

High availability requires a WebSphere Network Deployment clustered environment. The adapter support requires WebSphere Process Server or WebSphere Enterprise Service Bus version 6.0.1.3 or later or version 6.0.2. The listed platforms are supported. WebSphere adapters are not supported in z/OS clustered environment and i5/OS is not yet supported.

## Section

# ***Event management framework***



This section will cover new enhancements for the event management framework.

## Event management framework

<b>Existing 6.0</b>	<p>Previously, two tables were needed, event distribution table (EDT) and the event store.</p> <p>Only asynchronous processing supported</p>
<b>New 6.0.2</b>	<p>Processes events from the event table</p> <p>Assured Event Delivery</p> <p>Databases supported include the same list supported by Process Server</p> <p>Event Sequencing, Persistence and Filtering</p>
<b>Benefits</b>	<p>Eliminates the second database connection</p> <p>More control over event processing</p> <p>Event filtering capabilities</p>

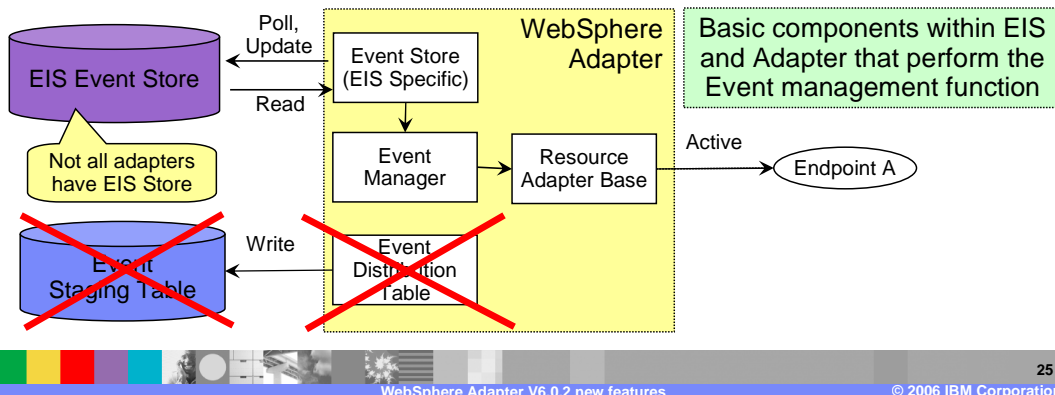
In version 6.0 of the adapters, two tables were required to support the once-and-once-only event delivery. In WebSphere Adapters version 6.0, the event distribution table has been removed and only the event store is required. All databases supported by WebSphere Process Server are now supported for adapters. There have also been improvements in event sequencing, persistence and event filtering. These enhancements eliminate the second database, and give more control over event processing through the use of event filters.



## Event management framework

### ▶ Assured Event Delivery

- Previously, two tables were needed, event distribution table (EDT) and the event store.
- Now, single event table contains all of the information (new XID column)
  - No longer need separate EDT table. EventStoreWithXid interface provided.
- Easier configuration using WebSphere data source for configuration (JNDI name, username and password for data source, table name)



This diagram shows the different components that enable the event management framework to handle incoming events. The EventStoreWithXid interface is provided by the Adapter foundation classes for all the adapters to exploit. The EIS Event Store is the store within the EIS system. Not all EIS back-ends have an EIS store. For example, SAP EIS does not have an EIS Store and lets the adapter manage the events. The event management framework supports both situations – whether EIS Event store is supported or not. Each adapter implements the base classes in a different way and those are covered in the specific adapter presentations.

When adapter gets the event from the EIS either by push or pull, an XID is added to a new field in the event store provided by the event manager. The XID allows the event management framework to support “once-and-only-once” delivery of events. Once the delivery transaction is complete the event will be removed from the event store. The configuration of the event store is easier using the WebSphere data source for configuration.

## Section

# *Summary*

In summary . . .

## Summary

- Data Transformation Framework
- High Availability – Failover
- Event Management Framework

... you have learned these new features provided for the adapters for the 6.0.2 release. The data transformation framework provides the capability to convert semi-structured data to and from the form that is required for the business object. This is supported only for the technology adapters. In a high availability Network Deployment environment, the adapters now support the failover capability. The event management framework has been improved by removing the event distribution table and now uses XA transactions to guarantee once-and-once-only delivery of incoming events.

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