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WebSphere Business Integration V6.1

WebSphere Adapter overview



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This presentation provides a general overview of the IBM WebSphere® adapters.

Agenda

- IBM WebSphere Adapters V6.1 portfolio
- Common new features and enhancements
- Enterprise Metadata discovery
- Common monitoring and logging
- Common problem determination and error handling
- Summary



This presentation starts with a recap of the current available adapters. It also reviews the enhancements to the existing adapters, and then looks at new and improved Enterprise Metadata Discovery, showing the common sequence of installing and configuring an adapter. Then it goes through some of the generic configuration in monitoring and logging for all adapters. At the end, there is an overview of common problem determination and error handling.

Section

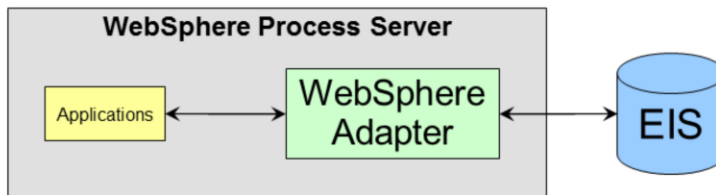
WebSphere Adapters V6.1 portfolio



This section recaps all of the available WebSphere Adapters in V6.1.

Overview – Available in V6.1

- IBM WebSphere Adapters – currently available on distributed platforms
 - ▶ IBM WebSphere Adapter For Flat Files V6.1
 - ▶ IBM WebSphere Adapter for FTP V6.1
 - ▶ IBM WebSphere Adapter for JDBC™ V6.1
 - ▶ IBM WebSphere Adapter for E-Mail V6.1
 - ▶ IBM WebSphere Adapter for SAP Applications V6.1
 - ▶ IBM WebSphere Adapter for PeopleSoft Enterprise V6.1*
 - ▶ IBM WebSphere Adapter for Siebel Business Applications V6.1*
 - ▶ IBM WebSphere Adapter for JD Edwards EnterpriseOne V6.1*
 - ▶ IBM WebSphere Adapter for Oracle E-Business Suite V6.1
- Runtime support on z/OS® platform for all but Siebel and JD Edwards adapters
- Implement J2EE Connector Architecture (JCA 1.5)
- Integrated with WebSphere Process Server and WebSphere Enterprise Service Bus V6.1
- Use adapter foundation classes that enhance JCA 1.5 and encapsulate many common adapter functions



* No major functionality change

Here is the list of adapters that are available for version 6.1. They include the Flat File, FTP, E-mail and JDBC technology adapters along with the SAP, PeopleSoft, JDE, Oracle E-Business and Siebel application adapters. Since there is no major functionality change, the adapters with asterisk will not have detailed presentations. To recap, these are all based on a set of foundation classes that enhance the JCA 1.5 specification. These foundation classes contain many new features for the 6.1 release.

Section

New features and enhancements common for all adapters



This section covers new features and enhancements for all WebSphere Adapters.

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New in V6.1

New
V6.1

- Support pure IPv6 space format
 - ▶ Communicate data to endpoint for network protocols other than IPv4
 - ▶ Identify the address space format through host IP address
 - ▶ Mandatory to enable JVM to use IPv6 address space
 - Add this statement `-Djava.net.preferIPv4Stack=false -Djava.net.preferIPv6Addresses=true`

Application servers

Application servers > server1 > Process Definition > Java Virtual Machine

Use this page to configure advanced Java(TM) virtual machine settings.

Configuration Runtime

Generic JVM arguments

`-Djava.net.preferIPv4Stack=false`

Executable JAR file name

Disable JIT

Operating system name

Apply

- Simplify event database requirement for inbound scenario
 - ▶ Create an in-memory representation of event table to store all necessary info
 - Event Table is not mandatory
 - ▶ Data sourceJNDIName is no longer required
 - AssuredOnceDelivery is not supported.
 - ▶ Valid for FF, FTP, and E-Mail adapters

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IBM WebSphere Adapter 6.1 now supports IPv6 address space format, so it can communicate data-to-endpoint information for network protocols other than IPv4. Typically, Resource adapters identify the address space format - IPv4 or IPv6 - through the host IP address either in the Activation Specification for inbound or in the Managed Connection Factory system for outbound. There is no other property to specify IPv4 or IPv6. Before testing the adapter, set the JVM arguments in WebSphere Process Server to enable the JVM to use the IPv6 address space.

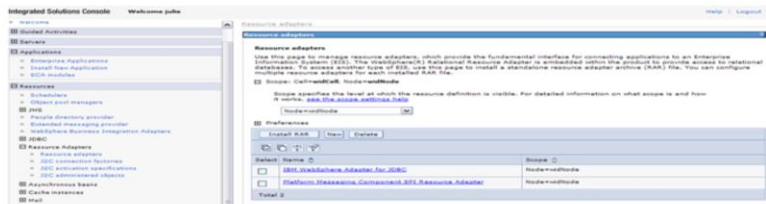
Furthermore, IPv6 has a different format for IP addresses than IPv4. The JDBC Adapter uses a JDBC driver to establish connection to a database, so if a database is installed on a pure IPv6 machines then it depends on the JDBC driver for that database to provide IPv6 connectivity support. The Adapter does not process or analyze the IP address to determine if the address is IPv6 format or not for adapters to be made aware of IPv6 formats. Refer to database documentation to see if IPv6 is supported.

The next new feature is to support event persistence without creating a JNDI data source and an external event table. When the DataSourceJNDIName is null, this feature is used. One in-memory representation of event table is created to store all necessary information. However, this feature does not support AssuredOnceDelivery. If AssuredOnceDelivery property is set to true, the warnings are generated in the log.

New in deployment



- Allows user to deploy RAR separately
 - Administrative console - Resources → Resource Adapters → Resource Adapters



- Available to all J2EE application components running in the WebSphere Process Server
- Options
 - ✓ "On Server for use by multiple application"
 - ▶ "With module for use by single application"
- Limitation
 - ▶ Not support different versions
 - Dependent jars, vendor supplied library, adapter itself



In earlier versions, the deployment of a resource adapter can be done at application-level only. The RAR file is packaged within a separate Enterprise Archive File (EAR) and that EAR is deployed; the resource adapter is made available to only the J2EE application components of that EAR. This requires that each resource adapter be packaged in its own separate EAR file before deployment to the application server. This approach prevents different versions of shared libraries packaged with the adapters from interfering with one another and allows you to upgrade a single adapter at a time without concern for destabilizing other adapters.

Starting in V6.1, you can now deploy the RAR at the node-level. The resource adapter is made available to all J2EE application components running in the WebSphere Process Server and can be considered as a global deployment. During Enterprise Metadata Discovery, you have to select the option "On Server for use by multiple application" so that the RAR file is not embedded in the generated EAR file. This means that you generate all required artifacts of the SCA layer without actually including the RAR file. Then you have to deploy the RAR file separately at the node level, so that it can be referred by deployed EAR files. This RAR is shared by all J2EE application deployed at that node level. Refer to the WebSphere Process Server user's guide for additional details on how to deploy a RAR at the node level.

Section

Enterprise metadata discovery



This section covers the new and improved enterprise metadata discovery function.

Discovery process

- All adapters are part of WebSphere Integration Developer V6.1
 - ▶ (WebSphere Integration Developer root)/Resource Adapters
 - ▶ Enterprise Metadata Discovery wizard flow
 - Import the .rar file for the JCA adapter into the WebSphere Integration Developer tool as a connector project
 - Start new external service
 - Select the resource adapter
 - Add external dependencies
 - Specify the configuration properties
 - Object browsing
 - Specify the selection properties
 - Select the project

This section describes various steps, screens and properties in the Enterprise Metadata Discovery (EMD) wizard. All adapters are now part of WebSphere Integration Developer V6.1 and are included in Resource Adapters directory of WebSphere Integration Developer. The user has the option to import the RAR into the workspace as a Connector project or to start new External Service, select the Resource Adapter and import the RAR for that particular adapter. External dependencies can also now be added during EMD. User can specify additional properties on the objects to be imported and last but not least, select the appropriate module. The tool generates EIS Import SCA component for outbound, EIS Export SCA component for inbound, along with the Business Objects, WSDL files and other artifacts. The EIS SCA components can then be wired with other SCA components that make up the business application.

More details can be found in detail presentations.

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Discovery process

The screenshot shows the IBM Business Integration Developer interface. The 'New' menu is open, showing the path: File → New → External Service. The 'Artifact Evolution' wizard is also visible, with 'External Service' selected in the 'Artifact Evolution' list. A red circle highlights 'External Service' in the menu, and a red box highlights 'Artifact Evolution' in the wizard. A green arrow points from the menu to the wizard.

- Adapter configuration wizard can be invoked from
 - ▶ From menu option
 - File → New → External Service
 - ▶ From Business Integration view
 - Right click, New → External Service
 - ▶ From Assembly Diagram of module

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There are multiple ways to invoke the adapter configuration wizard. The wizard can be invoked from a Menu option or directly from the Business Integration view. In addition, the wizard can also be invoked from the Assembly Diagram of an existing SCA module.

Resource configurations

▪ Before V6.1

- Manually edit schemas files to modify properties.

▪ In V6.1

- You can define and configure
 - Data binding
 - Data handler
 - Functional selector

▼ Data Binding Configuration

Data binding configuration can be used for configuring properties for an individual data binding. It can be reused by all components in the scope of the current module.

Name	emailWrapperDB
Namespace	http://EmailInforPassThru
Class name	com.ibm.j2ca.email.emd.runtime.EmailWrapperDataBinding Browse...
Select a binding(s):	<input type="checkbox"/> HTTP <input type="checkbox"/> JMS <input type="checkbox"/> MQ <input type="checkbox"/> FTP <input type="checkbox"/> Flat File <input checked="" type="checkbox"/> E-Mail

▼ Data Handler Configuration

Data handler configuration can be used for configuring properties for an individual data handler. It can be reused by other dat

Name	emailFixedDH
Namespace	http://EmailInModule
Class name	com.ibm.wbiserver.datahandler.xml.XMLDataHandler Browse...
Select a binding(s):	<input checked="" type="checkbox"/> HTTP <input checked="" type="checkbox"/> JMS <input type="checkbox"/> MQ <input checked="" type="checkbox"/> FTP <input type="checkbox"/> Flat File <input checked="" type="checkbox"/> E-Mail

▼ Function Selector Configuration

Function selector configuration can be used for configuring properties for an individual function selector. It can be reused by all

Name	emailFS
Namespace	http://EmailInModule
Class name	com.ibm.j2ca.email.emd.runtime.EmailFunctionSelector Browse...
Select a binding(s):	<input type="checkbox"/> HTTP <input type="checkbox"/> JMS <input type="checkbox"/> MQ <input type="checkbox"/> FTP <input type="checkbox"/> Flat File <input checked="" type="checkbox"/> E-Mail

Before version 6.1, it was necessary to manually edit schema files in order to modify properties. The adapter now provides an editor to define and configure data binding, data handler, and function selector classes. The main purpose is to allow you to reuse them multiple times. More details are covered in detail presentation of each adapter.

Section

Monitoring and logging common for all WebSphere adapters



This section covers common monitoring and logging for all WebSphere Adapters.

Monitoring and logging



- Improved First Failure Data Capture (FFDC) support
 - ▶ Provide information on objects of interest when exceptions occur
 - ▶ Collect to log files in WPS_root/profiles/logs/ffdc directory
 - ▶ Enable for JDBC and PeopleSoft adapters
- Extend monitoring pluggability to ARM (ITCAM), PMI, and CEI
 - ▶ An ARM agent such as Tivoli Composite Application Manager for Response Time Tracking can perform response time collection and analysis.

<http://www.ibm.com/developerworks/tivoli/library/t-armtcamrtt/index.html>



The First Failure Data Capture, or FFDC is now enabled for JDBC and PeopleSoft adapters; it was not available in V6.0.2. Its utilities provide an automated snapshot of the system environment when an unexpected internal error occurs. The FFDC feature runs in the background and collects events and errors that occur during the adapter runtime. The data that is captured can be used to identify exception processing that may have taken place during the execution of the adapter.

Adapters can generate and log Application Response Measurement, or ARM, information using Tivoli ITCAM or other ARM agents. The resource adapters are instrumented with the Application Response Measurement API, an API that allows adapters to collect and manage transaction end-to-end response time and volumetric information.

Monitoring and logging: PMI

- Enable PMI for Adapters in WebSphere Process Server

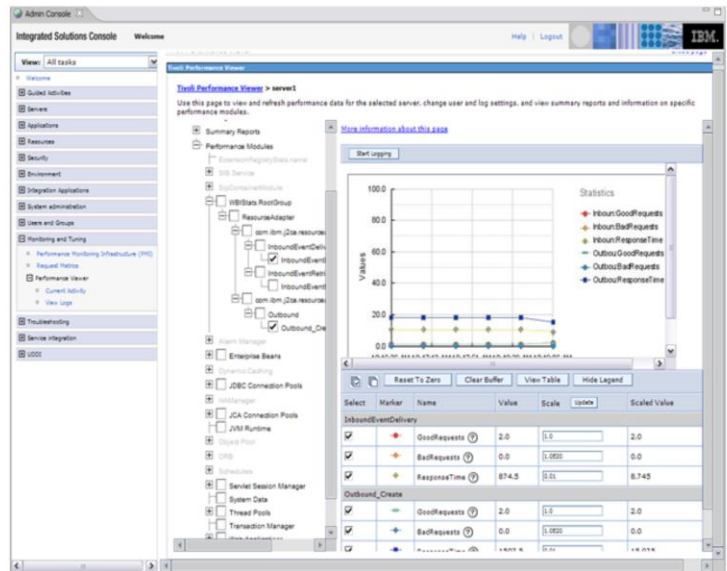
The screenshot displays the Performance Monitoring Infrastructure (PMI) configuration interface. On the left, the 'General Properties' tab is active, showing the 'Enable Performance Monitoring Infrastructure (PMI)' checkbox checked. Below it, the 'Currently monitored statistic set' is set to 'Customize', which provides fine-grained control to selectively enable statistics. On the right, the 'Custom monitoring level' tab is active, showing a tree view of the server configuration. A table lists the monitoring statistics for the adapters:

Select	Counter	Type	Description	Status
<input type="checkbox"/>	BadRequests	CountStatistic	WBI Monitoring PMI Number of Requests	Enabled
<input type="checkbox"/>	GoodRequests	CountStatistic	WBI Monitoring PMI Number of Requests	Enabled
<input type="checkbox"/>	ResponseTime	TimeStatistic	WBI Monitoring PMI Response Time	Enabled
Total 3				

The Performance Monitoring Infrastructure, abbreviated PMI, is the underlying framework in WebSphere Application Server that gathers performance data from various runtime resources, including adapters. The purpose of monitoring is to observe the processing progress of WebSphere Business Integration applications, and the WebSphere Business Integration system itself, and publish the results of this observation. By using PMI, you can observe the progress of running the adapters and other business integration applications, and publish the results. PMI collects data, such as average response time and total number of requests, from various components in the server, and organizes the data into a tree structure.

Monitoring and Logging: PMI

- Retrieve PMI data through Tivoli Performance Viewer
 - ▶ Show statistics of the resource adapters



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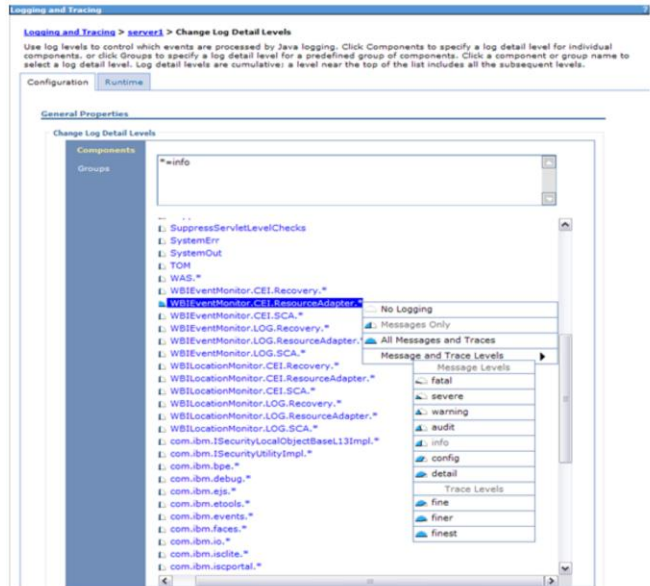
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This is a snapshot from the Tivoli Performance Viewer. It shows the tree structure rooted at a server; a tree node directly under the server is called a PMI module. And a tree node under a module is called a PMI submodule which can be recursively organized by submodules. Each PMI module and submodule contains a list of PMI data collected from the corresponding WebSphere components. Some modules and submodules collect data from run time entities, while the others aggregate the data. You can retrieve PMI data through monitoring tools like Tivoli Performance Viewer that ships with WebSphere Application Server; it can be used to verify the statistic values, hierarchy and names.

Common event infrastructure

- Enable common event infrastructure for Adapters in WebSphere Process Server
 - ▶ Troubleshooting → Logging and Tracing → Change Log Detail Levels
 - WBIEventMonitor.CEI.ResourceAdapter.*=finest
 - WBIEventLocation.CEI.ResourceAdapter.*=finest



The Common Event Infrastructure, or CEI, is a set of modular event processing components that provide functions to capture information about significant system or business occurrences. WebSphere Process Server includes the common event infrastructure technology, which is used by the adapters to create, transmit, persist and distribute events. You can enable logging CEI messages in the trace log files by changing the log detail levels as described in the slide.

Section

Problem determination and error handling common for all WebSphere adapters

This section covers common problem determination and error handling for all WebSphere Adapters.

Problem determination: Log and trace files

- WebSphere Process Server
 - ▶ <WPS_Home>\profiles\<profile>\logs\<server>\SystemOut.log
 - ▶ <WPS_Home>\profiles\<profile>\logs\<server>\SystemErr.log
 - ▶ <WPS_Home>\profiles\<profile>\logs\ffdc\xxxxxx.log
- Adapter Logs and Traces Files
 - ▶ Messages and Exceptions logged in these files
- Enterprise metadata discovery logs, specified during discovery
 - ▶ Default: <WID_workspace>\.metadata\<Adapter>MetadataDiscovery.log
- WebSphere Integration Developer
 - ▶ <WID_workspace>\.metadata\.log



The location of the log and trace files is specified here. The WebSphere Process Server log files are the System out and System error log files in the profile logs directory of the server.

Then there are the adapter log and trace files. The trace file locations are specified using the log and trace file attributes on the adapter. In addition, the trace files location and trace strings are specified in the administrative console of the Process Server for the server's change log and trace file option.

While running the enterprise metadata or service discovery tools, the log file is within the WebSphere Integration Developer workspace in the directory specified.

The overall log file for WebSphere Integration Developer is in the workspace metadata log file.

Problem determination: Logging

- User messages and Language translated

Logging Level	Content
Fatal	Task cannot continue. Component cannot function.
Severe	Task cannot continue. Component can still function. This also includes conditions that indicate an impending unrecoverable error, that is, reporting on situations that strongly suggest that resources are on the verge of being depleted.
Warning	Potential error or impending error. This also includes conditions that indicate a progressive failure, that is, the potential leaking of resources.
Audit	Significant event affecting server state or resources
Info	General Information outlining overall task progress
Config	Configuration change or status

The different logging levels are specified on this page. These messages are translated and they appear in the WebSphere Process Server System out log files.

Problem determination: Tracing

- Service level information for IBM Support
 - Not translated
 - Specified at the Adapter level through its custom properties

Tracing Level	Content
Fine	Trace info – general trace, plus method entry / exit / return values
Finer	Trace info – detailed trace
Finest	<ul style="list-style-type: none">▪ Trace info – most detailed trace▪ Includes all detail needed to debug problems

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The trace strings are more geared towards IBM Support. The different tracing levels are specified on this page. These are specified at the Adapter through its custom properties.

Error handling



- Enhance to ensure appropriate and meaningful error messages are displayed.
- Outbound error handling
 - ▶ The Adapter creates fault exceptions for business errors to distinguish from ResourceExceptions
 - DuplicateRecordException
 - MatchesExceededLimitException
 - MultipleMatchingRecordsException
 - RecordNotFoundException
 - MissingDataException
- Inbound error handling
 - ▶ The adapter will create a ResourceException if there are any errors in the event store
 - ▶ Handled by the event manager

While running the outbound operations, the adapter will create faults for any business errors encountered while processing the outbound request. This is applicable for WebSphere Process Server, WebSphere Enterprise Service Bus, and other runtimes that have SCA support. A new class, `WBIFaultException`, serves as a base fault class extending `FaultException`. `FaultException` extends `ResourceException` and allows Adapters to differentiate a fault, or business exception, from a `ResourceException`. Some of the base fault exceptions are shown on this page. Refer to each adapter's user guide for more details on different fault exceptions.

For inbound operations, the adapter creates a `ResourceException` if there are any errors in the event store. This is then handled by the event manager. If the ping query returns a failure, the adapter creates a `CommException`. The foundation classes try to re-establish connection to the database based on the `RetryInterval` and `RetryLimit` property values. The `RetryInterval` and `RetryLimit` properties are defined in the base classes functional specification.

Section

Summary and references

This section provides the summary of the overview presentation.

Summary

- This presentation covered an overview of the new and enhanced IBM WebSphere Adapters V6.1
 - ▶ Enterprise metadata discovery
 - ▶ Monitoring and logging
 - ▶ Problem determination log and trace levels and file locations
 - ▶ Error handling

This presentation covered an overview of the new and enhanced IBM WebSphere Adapters for the 6.1 release. You have reviewed the changes in the enterprise service discovery that is now provided as part of the WebSphere Integration Developer. The common monitoring and logging across all the adapters and common problem determination by using the log and trace files provided details of how to configure the different levels of messages that can be provided. Much of the common functionality has been moved into the adapter foundation classes. Finally, different fault handling exceptions have been introduced to distinguish from business exceptions from Resource Exceptions for outbound processing.

References

- Java connector architecture
 - ▶ <http://java.sun.com/j2ee/connector/index.jsp>
- Enterprise metadata discovery whitepaper
 - ▶ <http://www.ibm.com/developerworks/java/library/j-emd/>



This page lists some references that can be helpful for additional resources.

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