TIBCO BusinessEvents®

Release Notes

Software Release 5.1.4
November 2014

TIBCO™

Two-Second Advantage®

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Contents

Preface

TIBCO BusinessEvents® allows you to abstract and correlate meaningful business information from the events and data flowing through your information systems, and take appropriate actions using business rules. By detecting patterns within the real-time flow of events, TIBCO BusinessEvents can help you to detect and understand unusual activities as well as recognize trends, problems, and opportunities. TIBCO BusinessEvents publishes this business-critical information in real time to your critical enterprise systems or dashboards. With TIBCO BusinessEvents you can predict the needs of your customers, make faster decisions, and take faster action.

Topics

Typographical Conventions

The following typographical conventions are used in this manual.

Table 1   General Typographical Conventions

Convention	Use
ENV_NAME *TIBCO_HOME* *BE_HOME*	TIBCO products are installed into an installation environment. A product installed into an installation environment does not access components in other installation environments. Incompatible products and multiple instances of the same product must be installed into different installation environments. An installation environment consists of the following properties: • **Name** Identifies the installation environment. This name is referenced in documentation as *ENV_NAME*. On Microsoft Windows, the name is appended to the name of Windows services created by the installer and is a component of the path to the product shortcut in the Windows Start > All Programs menu. • **Path** The folder into which the product is installed. This folder is referenced in documentation as *TIBCO_HOME*. TIBCO BusinessEvents installs into a directory within a *TIBCO_HOME*. This directory is referenced in documentation as *BE_HOME*. The default value of *BE_HOME* depends on the operating system. For example on Windows systems, the default value is `C:\tibco\be\5.1`.
`code font`	Code font identifies commands, code examples, filenames, pathnames, and output displayed in a command window. For example: Use `MyCommand` to start the foo process.
`bold code font`	Bold code font is used in the following ways: • In procedures, to indicate what a user types. For example: Type **`admin`**. • In large code samples, to indicate the parts of the sample that are of particular interest. • In command syntax, to indicate the default parameter for a command. For example, if no parameter is specified, `MyCommand` is enabled: MyCommand [**`enable`** | disable]

Table 1   General Typographical Conventions (Cont'd)

Convention	Use
italic font	Italic font is used in the following ways:
	• To indicate a document title. For example: See *TIBCO ActiveMatrixBusinessWorks Concepts*.
	• To introduce new terms For example: A portal page may contain several *portlets*. Portlets are mini-applications that run in a portal.
	• To indicate a variable in a command or code syntax that you must replace. For example: `MyCommand` *PathName*
Key combinations	Key name separated by a plus sign indicate keys pressed simultaneously. For example: Ctrl+C.
	Key names separated by a comma and space indicate keys pressed one after the other. For example: Esc, Ctrl+Q.
	The note icon indicates information that is of special interest or importance, for example, an additional action required only in certain circumstances.
	The tip icon indicates an idea that could be useful, for example, a way to apply the information provided in the current section to achieve a specific result.
	The warning icon indicates the potential for a damaging situation, for example, data loss or corruption if certain steps are taken or not taken.

Table 2   Syntax Typographical Conventions

Convention	Use
[ ]	An optional item in a command or code syntax.
	For example:
	`MyCommand [optional_parameter] required_parameter`
|	A logical OR that separates multiple items of which only one may be chosen.
	For example, you can select only one of the following parameters:
	`MyCommand param1	param2	param3`

Table 2   Syntax Typographical Conventions

Convention	Use
{ }	A logical group of items in a command. Other syntax notations may appear within each logical group.
	For example, the following command requires two parameters, which can be either the pair `param1` and `param2`, or the pair `param3` and `param4`.
	`MyCommand {param1 param2}	{param3 param4}`
	In the next example, the command requires two parameters. The first parameter can be either `param1` or `param2` and the second can be either `param3` or `param4`:
	`MyCommand {param1	param2} {param3	param4}`
	In the next example, the command can accept either two or three parameters. The first parameter must be `param1`. You can optionally include `param2` as the second parameter. And the last parameter is either `param3` or `param4`.
	`MyCommand param1 [param2] {param3	param4}`

Connecting with TIBCO Resources

This section provides links to helpful TIBCO resources.

How to Join TIBCOmmunity

TIBCOmmunity is an online destination for TIBCO customers, partners, and resident experts, a place to share and access the collective experience of the TIBCO community. TIBCOmmunity offers forums, blogs, and access to a variety of resources. To register, go to http://www.tibcommunity.com.

How to Access TIBCO Documentation

You can access TIBCO documentation here:

http://docs.tibco.com

How to Contact TIBCO Support

For comments or problems with this manual or the software it addresses, contact TIBCO Support as follows:

• For an overview of TIBCO Support, and information about getting started with TIBCO Support, visit this site:

  http://www.tibco.com/services/support

• If you already have a valid maintenance or support contract, visit this site:

  https://support.tibco.com

  Entry to this site requires a user name and password. If you do not have a user name, you can request one.

Release Notes

Check the TIBCO Product Support web site at https://support.tibco.com for product information that was not available at release time. Entry to this site requires a username and password. If you do not have a username, you can request one. You must have a valid maintenance or support contract to use this site.

As is standard in a major release, this edition of the release notes has been purged of all content pertaining to prior releases. To see information pertaining to a prior release, see the release notes provided with that release.

Topics

New Features

This section lists the features added since the last major release of this product.

TIBCO BusinessEvents Express Content relating to Berkeley DB OM, Cache OM, and backing store is not relevant to TIBCO BusinessEvents Express edition.

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TIBCO Software, Platforms, and Third Party Software

- Support for Microsoft SQLServer 2014 was added.
- The following optional software is supported for use with TIBCO BusinessEvents:
  - TIBCO ActiveMatrix BusinessWorks 5.12
  - TIBCO Enterprise Message Service 8.1 for JMS Channel
  - TIBCO ActiveSpaces 2.1.4 for AS Channel and Catalog Functions

HTTP

- Added the AccessLogValue feature for HTTP, which logs the monitoring details for the request and response communication.
- Added the global variable support for all HTTP channel's advanced configuraion properties.
- Added the timeout support for asynchronous HTTP communication.
- Added a new property `httpstatuscode`. Defining the property `httpstatuscode` in the HTTP response event sets the response code in the HTTP response. This property is case insensitive and can be defined as the String or Integer type.
- Added a new catalog function to get the protocol version used by the request from the client.

```
HTTP.Servlet.Request.getProtocol(Object request)
```

Cluster Membership Datagrid Properties

New options have been added to provide you with greater stability when network issues that could result in an outage, occur. These options apply to cluster members only; remote clients try to reestablish the connection to the proxy in the background.

The following new properties are added in the CDD file:

- `be.engine.cluster.as.member.timeout`

  The `timeout` parameter specifies how many milliseconds DataGrid waits for a member to reconnect, if it loses connection to the metaspace. The default value is 30000 milliseconds.

- `be.engine.cluster.as.suspend.threshold`

  The `threshold` parameter specifies the number of host connections that can be lost before the cluster goes into a suspended state. When the cluster is suspended, members cannot leave or join the cluster. If connectivity is lost for a seeder member of a space, doing a read or write for that space might cause a protocol timeout. The default value is -1, which indicates that the cluster is never suspended.

Recovery Options for Shared Nothing Persistence

The `be.engine.cluster.recovery.distributed.strategy` parameter is now also supported for the shared nothing persistence. There are four new recovery policies added as part of the recovery options. When shared nothing persistence is implemented and recovery is issued, then the policy determines when and how recovery can be made. The default value of the property is `no_data_loss`.

The policy value can be:

- `no_data` - Recover the space without any data. This is same as removing shared nothing persistence files.

- `data_loss` - Recover the space with available data from each seeder. If recovery is done with missing seeders, there is a potential for data loss, because not all members are started, to ensure that all data is recovered. This policy ensures best-effort recovery with the available data.

- `no_data_loss` - (Default) Recover the space only if there are enough members to be able to recover the data before shutdown. If enough seeders are not available to recover the previous state of the cluster, recovery throws an exception.

- `exact_cluster` - Recover the space only if all of the members that were active before the shutdown are available in the cluster. If there are more or less cluster members than before the shutdown, recovery throws an exception.

When the `exact_cluster` policy is used; it is advisable to set 'Cache Agent Quorum' to the total number of cache nodes. This increases the chances of a successful recovery. In such a case, set the `be.engine.cluster.as.minSeeders` property's value as the Cache Agent Quorum value minus the number of backup copies.

Starting with this release, the seeder information (the current seeder list) is stored in the shared nothing persistence files during shutdown. This information is then used during startup or restart to perform recovery. If the cluster is exactly the same during startup (that is, exactly the same members are available and quorum is satisfied), then fast loading of the data is performed.

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- A new catalog function was added for Process Orchestration to set the default Exception handler function URI for a given template:

```
void Process.Template.setExceptionHandler(Object template,
String handlerFunctionURI)
```

- Support for these two platforms was added: TIBCO Runtime Agent^{TM} version 5.9.0 and TIBCO Administrator ^{TM} version 5.9.0

- The WSDL import wizard now generates resources for handling SOAP/JMS bindings. For the complete explanation, see BE-5552 in the Closed Issues section.

- Support for SOAP/JMS in WSDL export was provided, as explained in BE-20444 in the Closed Issues section.

- Property be.engine.cluster.as.hostaware.hostname was added.

Hostnames that are used in identifying members (and therefore naming shared nothing file/folders) are generated from the underlying OS. If you want to assign hostnames manually instead, for reasons such as hostname/machine changes or testing, you can provide hostnames in the CDD at each PU level using the property `be.engine.cluster.as.hostaware.hostname`.

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Security

- Support for Transport-level Security in the TIBCO BusinessEvents DataGrid
- Support for Transport-level security in the AS Channel

- Support for Transport-level security in the MetaSpace Catalog Functions
- Support for Host Aware Replication in the TIBCO BusinessEvents DataGrid

TIBCO Software, Platforms, and Third Party Software

Support for the following products and product versions is added in this release:

- Tomcat server version 7.0.42 is now supported for use with HTTP channels
- The following optional software is supported for use with TIBCO BusinessEvents:
  — TIBCO Enterprise Message Service 8.0.0
  — TIBCO ActiveSpaces 2.1.2 for AS Channel and Catalog Functions
- IBM WebSphere MQ 7.5
- Microsoft SQLServer 2012 AlwaysOn Availability Groups
- OpenLDAP and Microsoft ActiveDirectory 2012 R2 for authentication to MM and TIBCO BusinessEvents WebStudio
- Internet Explorer 10 and 11 for TIBCO BusinessEvents WebStudio and MM
- Support for the following platforms has been added:
  — Microsoft Windows 8.1, Server 2012 R2
  — Mac OS X Server 10.8.x-

Miscellaneous

- TIBCO BusinessEvents Studio Tester now can create test data templates, populate test data files, and run tests through command line.
- Support for secure LDAP connections for TIBCO BusinessEvents WebStudio and MM.
- Aggregate queries catalog functions are now present in TIBCO BusinessEvents Studio by default.
- For Business Rule and Inference tasks, double clicking the resource allows you to open the editor.
- A new operation is added to the studio-tools utility to generate encrypted passwords for password global variables.
- TIBCO BusinessEvents DataGrid log files generated in TIBCO BusinessEvents now allow specifying the name, size and rolling parameters for the log files to rollover, so that they don't fill up the file system.
- Rule Management Server and WebStudio now support connections over SSL.

- It is now possible to integrate RMS and WebStudio with the subversion source control system.

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TIBCO Software, Platforms, and Third Party Software

- Support for the following platforms has been added:
  - Mac OS X Server 10.6.x and 10.7.x. Java for OS X 2012-006 is required by the design time components for Mac OS X. Java for OS X 2012-006 is NOT provided with TIBCO BusinessEvents.
  - AIX POWER 7.1
- The following optional software is supported for use with TIBCO BusinessEvents:
  - TIBCO Enterprise Message Service 7.0.0
  - TIBCO Administrator 5.8
  - TIBCO Runtime Agent 5.8

  The following software is required by the ActiveSpaces channel:
  - TIBCO ActiveSpaces 2.0.2
- Support for JRE 7.0 has been added.
- Support for IBM DB2 9.7.x and 10.1.x for the backing store has been added.
- Support for IBM Tivoli Directory Server V6.3.x has been added.
- Support for Oracle Directory Server Enterprise Edition 11g R1 has been added.

Building an EAR File in Memory

EAR files are now built in memory by default. The compiler does not use the file system during code generation. Instead, the Studio JVM is used to load all the Java classes and resources into memory until the build process is completed.

However, you can choose to use the file-system based compiler to build EAR files as described:

- In TIBCO BusinessEvents Studio, select the menu **Window > Preferences** to open the Preferences dialog. Select **TIBCO BusinessEvents > Code Generation** on the left panel and then set the **Compilation Mode** to **File System**.

- When using the Studio Tools utility to build an EAR file, set the option `-lc` to use the file-system based legacy compiler.

When building an EAR file in memory for a large project, the JVM may run out of `PermGenSpace` and/or heap space. In such cases, edit the `BE-HOME/studio/eclipse/studio.ini` and `BE-HOME/studio/bin/studio-tools.tra` file to set appropriate values for the JVM settings. By default the heap size is set to `-XX:MaxPermSize=256m`.

Statistics Enhancements

The property `be.stats.threading.model` now enables you to control the performance of the statistics aggregators. The values are:

- **none** - use the calling thread for doing the aggregation (not recommended, but is useful in debugging).
- **single** - run all the aggregation in a single thread (default mode).
- **multi** - run the aggregations on multiple threads. There are four aggregators: destinations, events, engine, and thread pool. Each aggregator runs on an individual thread resulting in four new threads.

See In-Memory Performance Statistics Specifications on page 110 for detailed specifications for the statistics enhancement.

Java Collection Functions

Java Collection functions have been added. These functions allows you to work with `java.util.Map` and `java.util.collection` API.

Documentation for these functions is provided in the tooltips which you can access from the Catalog Functions view in TIBCO BusinessEvents Studio.

ActiveSpaces Functions

ActiveSpaces functions have been added. These functions allows you to work with ActiveSpaces Java API.

Documentation for these functions is provided in the tooltips which you can access from the Catalog Functions view in TIBCO BusinessEvents Studio.

HTTP Channel Enhancements

The following configuration settings have been added for HTTP channels. They are set in the Advanced tab of the HTTP channel resource editor:

- Connector Type – Connector type under Tomcat server. The values are:
  - NIO – Non blocking connector
  - BIO – Blocking connector

  Default is NIO.

- No. of Connector Instances – The property indicates the number of connector instances (of connector type) to be created. The ports will be used incrementally from the base port defined in the associated transport. For example, if the base port defined in the transport is 8080 and total number of instances defined is 3, then tomcat will start three connectors each on port 8080, 8081, and 8082. If any of the port is already occupied, connectors will incrementally move to the next available port. Default value is 1.

- Session Timeout Interval – Maximum inactive time interval post when the current user session will be timed out. Default value is 1800 secs (30 minutes).

Option to Copy a Set of Items for CDD Collections

Copy option is added in CDD editor for Collections. The option copies complete set of items of CDD collection under new name. The option adds the prefix `copy_` to the old collection name to generate new name ("`copy_<old-name>`").

Option to Duplicate Decision Table Rows in WebStudio

WebStudio allows you to duplicate a row in the decision table using the **Duplicate Row** button in the decision table editor. A new row is created with the same conditions and actions as the original row, but with a different ID.

Miscellaneous

- Calendar for the DateTime Field in View based Business Rules.
- Concurrent RTC feature is now available for In Memory Object Management as well.
- Shared nothing persistence is now supported for TIBCO BusinessEvents WebStudio and TIBCO BusinessEvents Views in addition to the None and Backing Store persistence options.

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TIBCO Software, Platforms, and Third Party Software

Support for the following products and product versions is added in this release:

- Eclipse 3.7.2
- The following optional software is supported for use with TIBCO BusinessEvents:
  - TIBCO ActiveMatrix BusinessWorks 5.10.0
  - TIBCO Enterprise Message Service 6.3.0.
  - TIBCO Hawk 4.9.0
  - TIBCO Rendezvous 8.4.0
  - TIBCO Runtime Agent 5.7.4

  The new channels require the following software:
  - **ActiveSpaces channel** - TIBCO ActiveSpaces 2.0.1
  - **Hawk channel** - TIBCO Hawk 4.9.0
- Tomcat server version 7 is now supported for use with HTTP channels.
- New platform support for AIX POWER 6.1 (64 bit) and Red Hat Enterprise Linux 6.x (x86 32 bit and 64 bit) has been added.
- Support for Google Chrome has been added. See product readme for further details.
- Support for OpenSSH to enable MM to perform remote start and deployment of TIBCO BusinessEvents engines running on Microsoft Windows.

Action Rule Function Based Approach for HTTP Requests

Now HTTP channels also provide the option of using action rule functions on the message instead of converting messages to events using a deserializer. In the action rule function based approach, HTTP request parameters and data are retrieved using HTTP functions and processed using rule functions. The **Is Page Flow** parameter of the destination identifies the approach used by the destination for processing HTTP requests.

Deploy J2EE Web Applications on HTTP Channels using .WAR

You can now deploy one or more web application on a single HTTP channel. The resource path for the web applications is the absolute path of *.WAR file or a directory containing resources in the directory structure mandated by J2EE web applications standard.

ActiveSpaces Channel

The ActiveSpaces channel connects TIBCO BusinessEvents to TIBCO ActiveSpaces metaspace. This enables TIBCO BusinessEvents to monitor the activities on the TIBCO ActiveSpaces metaspace and receive events from TIBCO ActiveSpaces and convert them into events in TIBCO BusinessEvents. A set of catalog functions to control the type of events in TIBCO ActiveSpaces are also provided.

Hawk Channel

The Hawk channel connects TIBCO BusinessEvents to TIBCO Hawk domain and can be configured to use either TIBCO Rendezvous or TIBCO Enterprise Message Service transports. The Hawk channel enables TIBCO BusinessEvents to receive events from the Hawk monitor and transform them into events. A set of catalog functions are also provided which are used to control the Hawk microagents through Hawk APIs.

Shared Resources: ActiveSpaces Connection and Hawk Connection

Shared resources, ActiveSpaces connection and Hawk Connection have been added to connect to a space in TIBCO ActiveSpaces and a TIBCO Hawk domain respectively. These shared resources are used when configuring the respective channels.

Rule Management Server (RMS)

Earlier RMS was available with TIBCO BusinessEvents Decision Manager add-on only, but from this release RMS is available as a part of TIBCO BusinessEvents Standard Edition. RMS is a lightweight server component for managing the repository of TIBCO BusinessEvents projects. It provides an easy, secure, and scripted deployment lifecycle. RMS is supported on all platforms that support TIBCO BusinessEvents. Users can access RMS remotely from TIBCO BusinessEvents WebStudio.

It does not have to be installed on users' machines. RMS enables business users to check out projects. The necessary project resources are copied to their workspace. When users are finished working with the projects, they submit the decision tables and business rules to RMS for approval. Now RMS also support for 64-bit studio tools. See *TIBCO BusinessEvents Developer's Guide* for details.

TIBCO BusinessEvents WebStudio: An Online Tool for Business Users

TIBCO BusinessEvents WebStudio, an online tool which allows business users to create or manage business rules in a web browser has been added in this release. It allows the business user to define a business rule based on the rule template and rule template view defined by the developer in TIBCO BusinessEvents Studio. Similar to TIBCO BusinessEvents Decision Manager, a decision table in TIBCO BusinessEvents WebStudio is defined using the virtual rule function. Rule templates, rule template views, and virtual function are created in TIBCO BusinessEvents Studio by developers and stored in RMS repositories. See *TIBCO BusinessEvents Developer's Guide* for details.

Rule Template, Rule Template View and Business Rules

A rule template is a specialized type of rule, and a rule template view puts a user-friendly interface around the rule template for use in TIBCO BusinessEvents WebStudio. Rule templates and rule template views enable business users to define executable rules (called *business rules*) within limits defined in the rule template.

View Decision Tables

Decision table provide a graphical way to build complex business rules. Decision tables can now be viewed in TIBCO BusinessEvents WebStudio even if TIBCO BusinessEvents Decision Manager add-on is not installed. Decision table is available in editable mode only if TIBCO BusinessEvents Decision Manager add-on is installed.

Backing Store Persistence Options

The backing store can be configured with one of the following persistence options:

- None: When the cluster does not have a backing store.

- Shared All: Provides persistence using one of the supported DBMS products: `Oracle, SQL Server, DB2, or Berkeley DB`.

- Shared Nothing: Allows data to be stored at individual node level, without sharing the data across the cluster. Shared nothing persistence can be configured to use synchronous or asynchronous communication.

See *TIBCO BusinessEvents Developer's Guide* for details.

Load Balancer

Content aware load balancing enables messages with the same routing key to be sent to a specific agent (subscriber) is available in this release. See *TIBCO BusinessEvents Developer's Guide* for details.

Support for Multiple Cluster and Multiple CDD Deployments in MM Server

The MM Server now supports deployments for one or more clusters and with multiple deployment units pointing to different EAR or CDD files. See *TIBCO BusinessEvents Administration* for details.

MM Server Supports Monitoring In-Memory Applications

The MM server can now be used to monitor and manage In-Memory applications. Consequently, MM server is now available in TIBCO BusinessEvents Express. See *TIBCO BusinessEvents Administration* for details.

Ability to Generate JDBC Deployment Scripts From TIBCO BusinessEvents Studio

TIBCO BusinessEvents Studio provides an alternative approach to generate the project-schema-specific SQL scripts using the JDBC Deployment wizard. The wizard also allows you to generate SQL scripts to migrate existing backing store database. See *TIBCO BusinessEvents Developer's Guide* for details.

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Platform and Third-Party Software

Support for the following software is added in this release:

- JRE usage on different platforms is as follows:
    - JRE 1.6.0.30 on Windows, Linux and Solaris
    - JRE 1.6.0.09 on HP-UX
    - JRE 1.6.0 build pap6460sr9-20101125_01(SR9) on AIX
- The following optional software is supported for use with TIBCO BusinessEvents:
    - TIBCO Runtime Agent 5.7.3
    - TIBCO ActiveMatrix BusinessWorks 5.9.3
    - TIBCO Administrator 5.7.1

Release 5.0

Globalization

TIBCO BusinessEvents and all its add-on products are now G11N certified.

New Cache Provider

The default cache provider is now TIBCO BusinessEvents DataGrid. When configuring Cache OM, an option is provided to choose a cache provider: TIBCO or Oracle Coherence. The built-in cache provider, TIBCO BusinessEvents DataGrid, is the default.

Quick Fix Feature

The Quick Fix feature enables you to create concepts, events, and rule functions without leaving the rule editor, as well as to add properties to existing concepts and events. The feature is available when an unknown reference appears in the rule or rule function code.

Adding External Library and Custom Function Paths

TIBCO BusinessEvents Studio now provides an option to add external libraries or custom functions via the Debug Configurations > ClassPath tab, and the Run Configurations > ClassPath tab, for your convenience.

Support for Array Types for Rule Functions

Support for array types is now available for rule functions. The form editor pop-up dialog for selecting scope variables now has a check box, isArray. You can specify a variable array in the source editor in the usual way, for example, `int[] myArr`.

TIBCO BusinessEvents Monitoring and Management Authentication

TIBCO BusinessEvents Monitoring and Management now supports file based and LDAP based authentication. It also supports authorization using two predefined roles: USER and ADMINISTRATOR.

LDAP Authentication has New Property

For LDAP authentication, a new property, `be.auth.ldap.useRoleDN`, enables you to use non-fully-qualified names for LDAP

Write-Behind Strategy Now Supported for Backing Store

TIBCO BusinessEvents now supports write-behind strategy in JDBC Backing Store. Applications can now be configured as Cache-Aside or Write-behind.

Changes in Functionality

This section lists changes in functionality since the last major release of this product.

TIBCO BusinessEvents Express Content relating to Berkeley DB OM, Cache OM, and backing store is not relevant to TIBCO BusinessEvents Express edition.

Release 5.1.4

TIBCO BusinessEvents and POODLE Vulnerability

TIBCO BusinessEvents has a number of security transports that utilize secure protocols, such as, SSLv3. The POODLE vulnerability is now addressed in the TIBCO BusinessEvents 5.1.4 release.

The following components are affected in TIBCO BusinessEvents:

- **HTTP/s Channels** In order to mitigate the POODLE vulnerability, the SSLv3 protocol is disabled by default in the HTTP/s channel in TIBCO BusinessEvents. Import or manually update the existing projects to 5.1.4 , and regenerate the EAR files to disable SSLv3.

  To perform the manual update:

  a. Open the project in TIBCO BusinessEvents Studio.

  b. Open the HTTP channel for editing and select the **Advanced** tab.

  c. Set the value of the **SSL Server: Protocols** field to "TLSv1,TLSv1.1,TLSv1.2".

     This allows all the TLS protocol versions and disables the SSLv3 protocol.

- **TIBCO BusinessEvents WebStudio** The SSLv3 protocol is now disabled for the HTTP/s connections in TIBCO BusinessEvents WebStudio.

TIBCO BusinessEvents Statistics

Metrics collection is disabled by default, which results in the significant performance improvement.

If the TIBCO BusinessEvents Monitoring and Management component is monitoring the deployment, enable the following statistics properties:

```
<property name="be.stats.enabled" value="true"/>
<property name="com.tibco.be.metric.publish.enable" value="true"/>
```

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- Behavior has changed for some BPMN Catalog Functions:

  — `Process.Template.newJobContext()` signature changed to

    `String newJobContext(Object template, String extId)`

  — `Process.Template.getTemplate()` signature changed to

    `Object getTemplate(String name, int revision)`

  — `Process.Activity.moveTo()` signature changed to

    `int moveTo(Object job, String activityName)`

Release 5.1.2

- The `sessionConcept` concept is now not required to be in the scope of the callback rule function. Remove session concept from the call back rule function scope from existing projects using page flow destination.

- The default value of the `be.engine.concurrentwm.enable.newImpl` property is now `true` when the concurrent RTC is enabled for the inference agent.

- When there are conflicting schemas defined, the conflicting schemas are ignored and a message is added to the log file. Further, inside of BE Studio, a warning message is added to the conflicting resources stating that there is a conflict.

  If conflicting schemas define different structures, there is a potential to see validation errors for those resources which refer to the conflicting/ignored schemas. Previous versions would have allowed the project to build but would have encountered runtime errors.

- The Generate Deployable functionality now works on HPUX, AIX, and Solaris platforms.

- Global variables are being allowed for some CDD variables.

- Shared JDBC Connection resource has been added to the RMS.ear which can be configured to point to database for persistence if a database backing store is used for RMS Fault-Tolerance.

- The `-pl` option is now added to pass the project library path to the buildEar operation of the studio-tools utility.

- If the cache uses a database in write-behind mode, a database outage will not cause the BE cluster to cease processing.

- Custom functions can now be used in Mapper transformations.

- Support for the "History" feature, when shared nothing option is used as the persistence option for Backing Store, has been added.

- TIBCO BusinessEvents now has the capability to reference EXTERNAL trusted certificates, thereby avoiding the need to embed the certificates in the project.

Release 5.1.1

Startup Method for Inference Agents in a Cluster

The inference agents in a cluster start up serially, where the second one does not start up until the first one is completely started. This behavior is different from the 4.x version of the product where inference agents start concurrently.

Folder Structure for Generated Classes

The extra artifact type `src` folder is dropped in TIBCO BusinessEvents release 5.1.1. Now, the code generated package, with `.java` and `.class` files, is present directly under base folder. In TIBCO BusinessEvents release 5.1.0 each artifact has its own `src` folder, which in turns contains code generated package with `.java` and `.class` files.

For example, there is a project `TempProject` with Concepts C1 and Events E1.

The folder structure for the generated classes in TIBCO BusinessEvents release 5.1.0 is as follows:

\<base folder\>`/conceptSrc/be/gen/Concepts/C1.class`

\<base folder\>`/conceptSrc/be/gen/Concepts/C1.java`

\<base folder\>`/eventSrc/be/gen/Events/E1.class`

\<base folder\>`/eventSrc/be/gen/Events/E1.java`

Now, the new folder structure for the generated classes in TIBCO BusinessEvents release 5.1.1 is as follows:

\<base folder\>`/be/gen/Concepts/C1.class`

\<base folder\>`/be/gen/Concepts/C1.java`

\<base folder\>`/be/gen/Events/E1.class`

\<base folder\>`/be/gen/Events/E1.java`

Overwrite Option (-x) for `generateClass` and `generateDTClass` Commands

The overwrite option (-x) of the generateClass and generateDTClass commands now don't provides the true|false values. When the -x option is used, the generateClass and generateDTClass commands overwrites the existing classes at the output location. When the -x option is not used, the generateClass and generateDTClass commands prompts you for overwrite confirmation, if the command finds same classes at the output location.

Release 5.1

Deploying from TIBCO Administrator

If TIBCO Administrator is to be used for deployments, ensure that TIBCO Runtime Agent and TIBCO BusinessEvents are installed in the same *TIBCO_HOME*. This was not the case in earlier releases.

Miscellaneous

- The performance of the Function Argument Mapper and XPath Formula Builder features has been improved.

- Concepts were stored in the TIBCO BusinessEvents DataGrid cache as BLOBs in earlier releases. Now you can choose to store the concepts as tuples or BLOBs by setting a property in the CDD Cluster tab.

- Certain routine startup actions are now logged at DEBUG level instead of INFO level, to reduce the log data generated at startup. For information on configuring logging levels, see *TIBCO BusinessEvents Developer's Guide*.

Release 5.0.1

The following changed features are included in this release because they address issues in the earlier release.

Embedded Persister with Shared-All Functionality

This release provides persister functionality. This functionality uses the included TIBCO BusinessEvents DataGrid software as the cache provider. It uses Oracle Berkeley DB Java Edition version 4.1.17 (not bundled with this service pack) as the data store. See Embedded Persister with Shared-all Functionality on page 120 for configuration and usage details.

You must obtain a separate license for the Oracle Berkeley DB Java Edition software that is appropriate for your usage if you wish to use the embedded persister functionality.

Remotely Stopping a PU using MM Tools

You can now remotely stop a PU using mm-tools, using the following operation:

```
-op stop
```

For example:

```
mm-tools --propFile mm-tools.tra -op stop -puc CS -m
100.100.100.101
```

Using Public/Private Key Authentication with mm-tools

This functionality requires some configuration. See Using Public/Private Key Authentication with mm-tools on page 67 for details.

Creating a single connection with one client ID

By default, TIBCO BusinessEvents creates two connections to a JMS server, with the following client IDs:

*user client id*_queue

*user client id*_topic

To create a single connection using the clientID specified in the Channel resource properties, or in the JMS Connection shared resource if used, add the following property in the CDD and set as shown for all agents:

be.channel.jms.unified=true

When the connection is configured using a JMS Connection shared resource you must also do the following. Ensure that the topic and queue connection factories on the JMS Connection shared resource Advanced tab match each other. Also, when using TIBCO Enterprise Message Service, use GenericConnectionFactory for both.

Enabling Studio Tools buildEAR operation on Solaris SPARC Platforms

The `buildEar` operation in the studio-tools command line utility now works on Solaris SPARC platforms, with configuration. See Enabling Studio Tools buildEar operation on Solaris SPARC on page 116 for details.

Encoding Parameter Added to File.readFileAsString

The catalog function `File.readFileAsString()` can now read text in languages such as Spanish. It now takes an encoding as an optional input parameter.

Change in Defaults for Enabling Parallel Operations

In the post-RTC phase, use of parallel operations is generally safe only when locking is used. The parallel operations feature is enabled using this property:

`Agent.`*agent name*`.enableParallelOps=true`

Before this release, parallel operations was enabled by default when cache aside database write strategy was used. However, many projects that use cache aside do not otherwise require locking.

Now parallel operations is enabled by default only when both cache aside AND concurrent RTC features are used. (Use of concurrent RTC also generally requires locking.)

Parallel operations can also be used with cache aside when concurrent RTC is not used. However, it must be explicitly enabled, and correct locking must also be used as needed.

Exporting to and Importing Global Variables from Project Libraries

In version 3.0 (but not in 4.0) it was possible to export global variables to a project library and then import the project library for use in another project. It was also possible to override such a global variable with another global variable with the same name, by ordering the imported libraries. Also in version 4.0, when imported variables were used in a project, after EAR file generation, the imported variables were not merged and placed in `tibco.xml` within the EAR file.

Now global variables can be exported into project libraries. In the Build Path > Project Libraries tab, up and down arrows allow you to order the libraries. In the Global Variables view, the Project Source column shows the source project and the Override column shows overrides using arrow icons.

Release 5.0

Buildear Tool Replaced

The command-line `buildear` tool has been replaced by the Studio Tools utility `buildear` option.

Change in Order of Precedence at Runtime

Now properties specified in the TRA file used at runtime override the same properties specified in the CDD file.

Cache Provider Changes

The Oracle Coherence software is no longer bundled with TIBCO BusinessEvents. You can still use a supported version of Oracle Coherence, for which you have a license that is appropriate for your usage.

Cache-based Examples Use TIBCO BusinessEvents DataGrid

All cache-based examples now use the default cache provider, TIBCO BusinessEvents DataGrid.

Validating a Project or Project Resource

TIBCO BusinessEvents Studio now supports validation for an entire project or for a selected project resource. The validation is enhanced to perform validation at the project, folder, or individual resource level.

Project Analyzer is also enhanced to include shared resources (HTTP Connection, Identity Resource, JDBC Connection, JMS Connection, JMS Application Properties, JNDI Configuration, Rendezvous Transport).

Externalized Store for Trusted Certificates

TIBCO BusinessEvents now supports storing the trusted certificates for SSL in a folder external to the project. You can use a special global variable `BE_GLOBAL_TRUSTED_CA_STORE` to reference this folder.

Metadata Properties Now in CDD (Except TIBCO BusinessEvents Data Modeling)

Metadata properties (also known as extended properties) are no longer supported for entities, except for use with TIBCO BusinessEvents Data Modeling. The other settings that were available using metadata properties are now available in the CDD file in the Cluster tab, in the Domain Objects settings.

HTTP Channel Properties Now in HTTP Channel Advanced Tab

HTTP Channel now has an Advanced Tab to provide advanced configuration settings for the internal server used by the Channel. Those settings were formerly in the CDD file.

Entity Properties for Backing Store Now in CDD

Entity-level backing store configuration was formerly done using entity metadata properties. Now it's configured in the Cluster Deployment Descriptor file.

Backing Store Configuration Uses CDD for Special Cases

The Cluster Deployment Descriptor file is now also used for cases that require project configuration before running the backing store setup utility. You can specify the CDD to use as an argument to the utility.

Monitoring and Management JMX Port Configuration

The JMX port configuration for monitored engines has changed such that only one JMX port is opened, to better handle firewalls.

Version of TIBCO Hawk Requirement for TIBCO BusinessEvents Monitoring and Management

The version of TIBCO Hawk provided with TIBCO Runtime Agent is sufficient to provide machine-level metrics in the TIBCO BusinessEvents Monitoring and Management component. Before the fully licensed version was required.

JMS Connectivity

By default, be-engine connects to all defined channels on startup, including those not mentioned in the Cluster Deployment Descriptor file. This is because such channels can be used as output channels. However this is not always desired.

TIBCO BusinessEvents now provides an option to disable queue or topic connections for specific JMS destinations. Add the following properties to prevent such connections to the queue or topic:

```
be.channel.tibjms.queue.disabled=DestinationProjectPath

be.channel.tibjms.topic.disabled=DestinationProjectPath
```

Cache-Related Function Name Changes

The below cache related functions that were formerly preceded by C_ are no longer preceded by C_. Their functionality remains the same, and the functions can be used with both the Oracle and TIBCO cache providers. The following table shows the functions that have been renamed.

Coherence Category Name	TIBCO BusinessEvents DataGrid Category Name
C_CacheGetEntityById()	CacheGetEntityById()
C_CacheLoadConceptByExtId()	CacheLoadConceptByExtId()
C_CacheLoadConceptByExtIdByUri()	CacheLoadConceptByExtIdByUri()
C_CacheLoadConceptById()	CacheLoadConceptById()
C_CacheLoadConceptIndexedByExtId()	CacheLoadConceptIndexedByExtId()
C_CacheLoadConceptsByExtId()	CacheLoadConceptsByExtId()
C_CacheLoadEntity()	CacheLoadEntity()
C_CacheLoadEventByExtId()	CacheLoadEventByExtId()
C_CacheLoadEventByExtIdByUri()	CacheLoadEventByExtIdByUri()
C_CacheLoadEventById()	CacheLoadEventById()
C_CacheLoadParent()	CacheLoadParent()
C_CacheName()	CacheName()
C_CacheReevaluate()	CacheReevaluate()
C_ClassName()	ClassName()
C_EnableCacheUpdate()	EnableCacheUpdate()
C_Flush()	Flush()
C_Index()	Index()
C_Lock()	Lock()
C_TransactionProperties()	TransactionProperties()
C_UnLock()	UnLock()

Deprecated and Removed Features

This section describes deprecated features (if any), and lists features, if relevant, that may be useful alternatives to the deprecated features. Any use of a deprecated feature should be discontinued as it may be removed in a future release. You should avoid becoming dependent on deprecated features and become familiar with the suggested alternative features.

This section also lists features that are removed (if any).

For a list of all unused and deprecated properties from this or prior releases, see the appendix Deprecated and Unused Properties in *TIBCO BusinessEvents Installation*

TIBCO BusinessEvents Express Content relating to Berkeley DB OM, Cache OM, and backing store is not relevant to TIBCO BusinessEvents Express edition.

Deprecated Features

Release 5.1.4

No features are deprecated in this release.

Release 5.1.3

No features are deprecated in this release.

Release 5.1.2

Following platforms have been deprecated in this release:

- Microsoft Windows 7 32-bit on x86

- Microsoft Windows Server 2008 32-bit on x86

- Novell SUSE Linux Enterprise Server 10.x 32-bit on x86

- Novell SUSE Linux Enterprise Server 11.x 32-bit on x86

- Red Hat Enterprise Linux Server 5.x 32-bit on x86

- Red Hat Enterprise Linux Server 6.x 32-bit on x86 Sun Solaris 10 32-bit on SPARC

Release 5.1.1

No features are deprecated in this release.

Release 5.1

- The BUILT-IN server option for HTTP channels is no longer required and has been removed. Tomcat server version 7 is now supported, and it provides the functionality previously provided by the BUILT-IN server type.

- The cache plus memory object management feature (Cache+Memory) is deprecated for applications that have more than one active inference agents (max Active > 1) and use transactional data. Using this feature for multiple active inference agents may result in inconsistent data and the rule functions may not be triggered. However Cache+Memory mode is available for:

  — applications using reference data.

  — applications that have one active and n passive inference agents and use transactional data.

- Embedded integration between TIBCO BusinessEvents and TIBCO ActiveMatrix BusinessWorks is deprecated in this release.

- TIBCO Enterprise Message Service version 4.x is deprecated in this release.

- Support for Red Hat Enterprise Linux 4.x is deprecated in this release.

Release 5.0.1

No features are deprecated in this release.

Release 5.0

No features are deprecated in this release.

Removed Features

Release 5.1.4

No features are removed in this release.

Release 5.1.3

No features are removed in this release.

Release 5.1.2

Support for following platforms has been removed:

- HP PA-RISC

- Microsoft Windows XP

- Microsoft Windows Server 2003

Release 5.1.1

No features are removed in this release.

Release 5.1

- The Berkeley DB OM (persistence) option has been removed from the product. Caching options have replaced the need for it. All mention of Berkeley DB OM has been removed from documentation.

- TIBCO Enterprise Message Service version 4.x is no longer supported.

Release 5.0.1

No features are removed in this release.

Release 5.0

- The legacy Oracle Types backing store implementation is removed in this release. Use the current backing store implementation. See the migration instructions in *TIBCO BusinessEvents Installation* for details.

- Cache Loader Class property is removed from the CDD Cluster tab because the value is set internally based on settings.

- The base_types.sql file has been removed. It is no longer needed. It was used with the Oracle Types backing store.

- Use of Solaris 8 and Solaris 9 is no longer supported.

Migration and Compatibility

This section explains how to migrate from a previous release to this release.

For detailed migration advice and procedures, see the *TIBCO BusinessEvents Installation* guide.

TIBCO BusinessEvents Express Content relating to Berkeley DB OM, Cache OM, and backing store is not relevant to TIBCO BusinessEvents Express edition.

Release 5.1.4

Ensure that all related used software meets the required minimum versions. See New Features, page 2 for details.

Back up projects and rebuild project EAR files after upgrading from the versions 5.1.0, 5.1.1, 5.1.2, or 5.1.3.

Converting the Shared Nothing Persistence Data Files to the New Format

If you are upgrading from TIBCO BusinessEvents version 5.1.0 to version 5.1.4 and have implemented the shared nothing persistence, then you must convert any shared nothing persistence data files to the new format.

See Running the as-convert Utility on page 32 for information on how to perform the data conversion using the off-line conversion utility as-convert.

If you are upgrading from TIBCO BusinessEvents version 5.1.1, 5.1.2, or 5.1.3 to version 5.1.4, then no conversion is required for any shared nothing persistence data files.

Update the Shared Nothing Folder Structure as per HostAware Naming Convention

Deployments of TIBCO BusinessEvents version 5.1.0 or version 5.1.1 with shared nothing persistence needs to be migrated to make use of the HostAware replication feature in version 5.1.4.

See Update the Shared Nothing Folder Structure as per HostAware Naming Convention, page 30 for manual migration.

However, you could also perform an automated migration, see Automated Migration on page 29 for more information.

HostAware replication is the default replication behavior since 5.1.2 onwards. Unless you turned off HostAware replication in 5.1.2 or 5.1.3, and you want it on in 5.1.4, there is no need to update the folder structure if you upgrade from 5.1.2 or 5.1.3 to 5.1.4.

Release 5.1.3

Ensure that all related used software meets the required minimum versions. See New Features, page 2 for details.

Back up projects and rebuild project EAR files after upgrading from the versions 5.1.0, 5.1.1 or 5.1.2.

Converting the Shared Nothing Persistence Data Files to the New Format

If you are upgrading from TIBCO BusinessEvents version 5.1.0 to version 5.1.3 and have implemented the shared nothing persistence, then you must convert any shared nothing persistence data files to the new format.

If you are upgrading from TIBCO BusinessEvents version 5.1.1 or 5.1.2 to version 5.1.3, then no conversion is required for any shared nothing persistence data files.

Update the Shared Nothing Folder Structure as per HostAware Naming Convention

Deployments of TIBCO BusinessEvents version 5.1.0 or version 5.1.1 with shared nothing persistence needs to be migrated to make use of the HostAware replication feature in version 5.1.3.

HostAware replication is the default replication behavior since 5.1.2 onwards. Unless you turned off HostAware replication in 5.1.2, and you want it on in 5.1.3, there is no need to update the folder structure if you upgrade from 5.1.2 to 5.1.3.

Automated Migration

In case you are not sure about the hostnames, or find it difficult to perform manual migration, you can also use studio-tools application to migrate the folder structure.

Run the following studio-tools command on each server/machine and for each engine deployed on those machines.

```
studio-tools -sharednothing migrate-files -p <datastore path> -c
<cluster name> -n <engine name>
```

For example:

```
studio-tools -sharednothing migrate-files -p c:\data -c
EventManagement -n cache01
```

Alternatively, you can turn off HostAware replication by setting the property `be.engine.cluster.as.hostaware.enable` to false in the CDD file at the cluster level. In that case the manual migration is not necessary.

Release 5.1.2

Ensure that all related software used meets required minimum versions. See New Features on page 2 for details.

Backup projects and rebuild project EAR files after upgrading from 5.1.0 or 5.1.1.

Converting the Shared Nothing Persistence Data Files to the New Format

If you are upgrading from TIBCO BusinessEvents version 5.1.0 to version 5.1.2, and have implemented the shared nothing persistence, then you must convert any shared nothing persistence data files to the new format.

If you are upgrading from TIBCO BusinessEvents version 5.1.1 to version 5.1.2, then no conversion is required for any shared nothing persistence data files.

Update the Shared Nothing Folder Structure as per HostAware Naming Convention

Deployments of TIBCO BusinessEvents version 5.1.0 or version 5.1.1 with shared nothing persistence needs to be manually migrated to make use of the HostAware replication feature introduced in TIBCO BusinessEvents version 5.1.2.

> HostAware replication is the default replication behavior in 5.1.2.

This manual migration allows the data to be recovered after upgrading to 5.1.2. Perform this step on all the machines in the cluster.

The manual step requires updating the shared nothing folder structure to reflect the new cluster member names convention for HostAware. Currently, the shared nothing folder structure consists of only member name in 5.1.0/5.1.1. The complete file path for data-store is:

*<cluster>/<space>/<member>/<member>*_store_*<number>*.

With host aware functionality in 5.1.2, all member names consists of two parts: *<host>* and *<member name>*, as *<host>.<membername>*. The complete file path for data-store should be:

*<cluster>/<space>/<host>.<member>/<host>.<member>*_store_*<number>*.

For example, the shared nothing folder structure could look similar to this:

```
/EventManagement/dist-unlimited-bs-readOnly-EventManagement--be_ge
n_Concepts_Record/cache/cache_store_1378511471
```

Update the path to reflect the HostAware naming convention:

```
/EventManagement/dist-unlimited-bs-readOnly-EventManagement--be_ge
n_Concepts_Record/<host>.cache/<host>.cache_store_1378511471
```

Where, *<host>* needs to be replaced by the hostname. This step needs to be performed for all the members participating in the cluster.

To find hostname, backup your existing files and start the cluster to look for the hostname in as-admin.

If hostname is fully qualified, then replace the dot'.' with underscore'_' in the name. For example, if the hostname is host1.acme.com, use host1_acme_com as hostname.

Alternatively, you can turn off HostAware replication by setting the property `be.engine.cluster.as.hostaware.enable` to `false` in the CDD file at the cluster level. In that case this manual migration is not necessary.

Release 5.1.1

Ensure that all related software used meets required minimum versions. See New Features on page 2 for details.

Backup projects and rebuild project EAR files after upgrading from 5.1.0.

Converting the Shared Nothing Persistence Data Files to the New Format

TIBCO BusinessEvents DataGrid version 2.0.2 provided with TIBCO BusinessEvents version 5.1.1, uses a new format for the shared nothing persistence data files. If you are upgrading from TIBCO BusinessEvents version 5.1.0 to version 5.1.1, and have implemented the shared nothing persistence, then you must convert any shared nothing persistence data files to the new format.

An off-line conversion utility, `as-convert`, is provided to perform this data conversion. The utility automatically detects the release that created the data files and converts them to the release 2.0.2 format.

Running the as-convert Utility

The `as-convert.exe` file is located in the following directory:

`TIBCO_HOME/as/2.0/bin`

Before you run `as-convert`, stop all the DataGrid agents and seeders. The **as-convert** utility must be run off-line.

Use the following command syntax to run the utility:

as-convert -data_store *<directory_path>* **-metaspace** *<metaspace_name>*
-space *<space_name>* **-name** *<membername>* **-file** *<file_name>* **-compact**
-dry_run -verbose -log *<log_file>* **-debug** *<log_level>*

Table 1 describes the parameters for `as-convert`.

Table 1   Parameters for as-convert

Parameter	Usage
-data_store	*directory_path* specifies the path to the data store to convert.
-metaspace	To specify conversion of the data files for all of the spaces defined for a metaspace, specify a metaspace name.
-space	To specify conversion of the data files for a specific space within the metaspace, specify the space name with the -space parameter and the metaspace name with the -metaspace parameter.
-name	To specify conversion of the data files for a specific space member, specify the member name with the -name parameter, the space name with the -space parameter, and the metaspace name with the -metaspace parameter.
-file	To specify conversion of a specific file, specify the filename with the -file parameter, the data store path with the -data_store parameter, and the metaspace name with the -metaspace parameter.
-compact	Deletes any white spaces in converted file. White spaces can be added to the data file as a result of processing Takes, which delete data.

Table 1   Parameters for as-convert

Parameter	Usage
`-dry_run`	To run the utility without actually converting the data store and output informational messages, include the `-dry_run` parameter
`-help`	Provides a summary of the command syntax for **as-convert**.
`-verbose`	Print more output on the console.
`-log`	Specifies the name of a log file to which to write log information
`-debug`	Specifies the log level for messages output by the utility.

Usage Notes

The `as-convert` utility converts shared nothing files from one format (or one version) to another (usually higher). The utility does the following:

• If a file name is provided, processes that file and prints out the result.

• If a space name is provided along with the member name and metaspace name, converts all files that belong to that space.

• If a member name is provided along with the space name, converts files for that member only.

• If a metaspace name is provided, the utility does the above for each space that is part of the metaspace.

• If no argument is provided, processes the entire data store — reads each subdirectory and converts all files.

• The `dry_run` option will just touch the files and identify the files that are older than the current version. This option is good for estimating how many files need conversion.

as-dump utility

Another offline utility `as-dump` is also provided with TIBCO BusinessEvents release 5.1.1. The `as-dump` utility reads the content of shared nothing files. The `as-dump.exe` file is located in the following directory:

`TIBCO_HOME/as/2.0/bin`

Use the following command syntax to run the utility:

as-dump -v *<directory_path>*

The optional parameter –v is used to print verbose output on the console. The *directory_path* argument identifies the path of shared nothing files.

Release 5.1

Ensure that all related software used meets required minimum versions. See New Features on page 2 for details.

Back up projects and rebuild project EAR files after upgrading from 5.0.0

See the *TIBCO BusinessEvents Installation* guide for detailed procedures that need to be performed when migrating from older versions to 5.1.

Release 5.0.1

Ensure that all related software used meets required minimum versions. See New Features on page 2 for details.

Back up projects and rebuild project EAR files after upgrading from 5.0.0

Release 5.0

Additional migration steps are introduced in this release due to architectural changes. See the migration chapters in the *TIBCO BusinessEvents Installation* guide. Below are general details.

In all cases, you must regenerate all EAR files after you upgrade.

Upgrading from Version 4.0.1

You can import 4.0.1 TIBCO BusinessEvents Studio Studio-based projects in TIBCO BusinessEvents Studio 5.0.0 workspace. With a few exceptions, the projects are automatically migrated to 5.0.0 TIBCO BusinessEvents Studio-based projects. Read the migration chapters in *TIBCO BusinessEvents Installation* to understand what manual actions you may have to take.

Upgrading from Version 4.0.0

If you are upgrading from 4.0.0, first upgrade to 4.0.1 and then migrate to 5.0.0.

Upgrading from Version 3.x

You can import 3.x TIBCO Designer-based projects in TIBCO BusinessEvents Studio. With a few exceptions, the projects are automatically migrated to 5.0.0 Eclipse-based projects. Read the migration chapters in *TIBCO BusinessEvents Installation* to understand what manual actions you may have to take.

Upgrading From an Earlier Version

If your existing installation is a version earlier than 3.0.0 upgrade to the latest 3.x release, and migrate your project. Then upgrade to 5.1.0 and migrate your projects. To upgrade to 3.0, read the migration chapters in *TIBCO BusinessEvents Installation* and follow all instructions carefully.

Closed Issues

The table in this section lists the issues that were closed in the named releases.

TIBCO BusinessEvents Express Content relating to Berkeley DB OM, Cache OM, and backing store is not relevant to TIBCO BusinessEvents Express edition.

Closed in Release	Key	Summary
5.1.4	BE-21514	When concept or event are created and deleted in the same RTC, the TIBCO BusinessEvents engine slows down heavily. The concept or event (on deletion) are deleted from TIBCO BusinessEvents but not from the heap. This was fixed.
5.1.4	BE-21507	In the Linux platform, when a rule or rule function was accessed from the project library in the BusinessEvents Studio, the "assertion failed" error was thrown. This was fixed.
5.1.4	BE-21470	When cache size and result set was very large for the Browser Query Language (BQL), the query performance was very poor. This was fixed.
5.1.4	BE-21442	When mutiple inference agents are used with the shared nothing persistence in the SYNC mode, and very frequent updates are made to the concept, then the latest version of concept was not returned every time. This was fixed.
5.1.4	BE-21228	In the Linux platform, where TIBCO BusinessEvents 5.1.x and TIBCO Runtime Agent 5.9.0 were installed in the same *TIBCO_HOME*, the cache node start was generating the core dump file. This was fixed.
5.1.4	BE-21205	When several engines, using TIBCO BusinessEvents DataGrid, are started at the same time, then some engines might get stuck and never fully come up. This was fixed.

Closed in Release	Key	Summary
5.1.4	BE-21136	In TIBCO BusinessEvents WebStudio, the notifications `onOverdraft_Gold.ruletemplateinstance` and `setAccountTypeAsGold.ruletemplateinstance` were to be removed from the overdraft notifications. This was fixed.
5.1.4	BE-21135	TIBCO BusinessEvents did not properly handle the value escaping in its call to `String.replaceAll()`
5.1.4	BE-21112	In the TIBCO BusinessEvents Studio debugger, the RuleInput view was not working correctly.
5.1.4	BE-21054	With the load balancer configuration, pending messages were not confirmed from the TIBCO BusinessEvents router/receiver inference engines to EMS. This was fixed.
5.1.4	BE-21044	Added capability to call specialized preprocessor rulefunctions for SOAP over the JMS operation-specific events. This was added.
5.1.4	BE-21039	HTTP.sendSecureAsynchronousRequest() did not allow for timeout or error handling. This was fixed.
5.1.4	BE-21025	The catalog function File.fileReadLine() did not work as expected. This was fixed.
5.1.4	BE-21018	Ability to disable the 'Expect' header in request from TIBCO BusinessEvents to external Web Service was requested. This was provided.
5.1.4	BE-20989	Alter script was not generated if the max-size in CDD was set to beyond 4000 (CLOB). This was fixed.

Closed in Release	Key	Summary
5.1.4	BE-20987	When the XSLT transformation is used in the TIBCO BusinessEvents custom function, the `java.lang.AbstractMethodError` exception was thrown. This was fixed.
5.1.4	BE-20985	Removing an entry from the Test Data column in BusinessEvents Studio caused the column data to slide over. This was fixed.
5.1.4	BE-20980	An NPE was thrown when a project with call activity task was deployed through Tibco Administrator. This was fixed.
5.1.4	BE-20979	TIBCO BusinessEvents MM had a Generic Web Server directory traversal vulnerability. This was fixed.
5.1.4	BE-20975	RuleSessionStopWatchKeeper metrics could not be disabled. This was fixed.
5.1.4	BE-20966	The following exception was occuring: `Get "java.lang.RuntimeException:` `com.tibco.cep.query.api.QueryException:` `java.util.NoSuchElementException"` This was fixed
5.1.4	BE-20884	When query contains (boolean or/and boolean), a `java.lang.RuntimeException:` `com.tibco.cep.query.api.QueryException:` `java.lang.NullPointerException` is thrown when the debug log level(*:debug) was enabled. This was fixed.
5.1.4	BE-20881	More information was needed to link the exception in the advisory event directly to the event/data for which it was raised. This was provided.

Closed in Release	Key	Summary
5.1.4	BE-20862	There were issues with cluster management in an unstable network environment.
		New properties are added to provide greater stability, see Cluster Membership Datagrid Properties on page 3 for more details on the properties.
5.1.4	BE-20854	The Global Variables modified by TIBCO BusinessEvents Monitoring and Management were not working.
		This was fixed.
5.1.4	BE-20853	While trying to build an EAR file in TIBCO BusinessEvents studio, the following error was thrown:
		`java.lang.Exception: java.lang.IllegalArgumentException: -1'`
		This was fixed.
5.1.4	BE-20748	With the shared nothing persistence, when one cache engine was gracefully shutdown, it took a long time to stop.
		This was fixed.
5.1.4	BE-20737	Both the Receiver and Router Destination MBean code needed to check if a bean had registered before attempting to register again.
		This was fixed.
5.1.4	BE-20718	Generated Decision Table Classes were NOT deleted, even though the Decision Table was deleted in WebStudio.
		This was fixed.
5.1.4	BE-20716	Request to completely disable the metrics/statistics in TIBCO BusinessEvents.
		This was provided.
5.1.4	BE-20102	Updating a concept would not occur, and the required rules were not triggered.
		This was fixed.

Closed in Release	Key	Summary
5.1.4	BE-19057	At design time, dragging and dropping a concept to move it failed to fix up `ownerPath` of any properties. Now the quickFix utility is enabled to fix the concept.
5.1.4	BE-18611	The activities of the TIBCO BusinessEvents cache server suspended on issuing disconnect. This was fixed.
5.1.4	BE-17981	If multiple references to the same element were present in the project, the null pointer exception was thrown during the cache startup. TIBCO BusinessEvents Studio now gives the validation error, if duplicate references are present in the project.
5.1.4	BE-17641	In TIBCO BusinessEvents 5.0.0, when you try to cache the load concept using the external ID which was found in local cache, then the log debug line contains the text, "Found in local cache". The text was not appearing in the TIBCO BusinessEvents 5.1.x release. This was fixed.
5.1.4	BE-17445	When a artifact was moved to a project from another project without using the **Refactor > Move** command, the error was thrown while building EAR. TIBCO BusinessEvents Studio now gives the validation error, if the artifact is moved without using the **Refactor > Move** command.
5.1.4	BE-16019	Connecting to EMS using SSL in TIBCO BusinessEvents Studio threw the error `no trusted certificates are set.` This was fixed.

Closed in Release	Key	Summary
5.1.3	BE-5552	The WSDL import wizard now generates resources for handling SOAP/JMS bindings in the following way:
		Events
		• One Event type named /Events/SoapJms: this event type inherits from SOAPEvent and provides a set of properties that may be useful for SOAP/JMS (see also the RegisterSoapEventUris function below).
		• Operation-specific events are imported similarly to SOAP/HTTP WSDL import.
		Channels
		• A JMS channel (by default located at /Channels/SoapJms) for each different set of parameters, with the following:
		• One shared JMS connection resource (by default located in the Transport folder of the imported service folder).
		• One destination for each different set of destination parameters (by default named destinationName), using the serializer SoapMessageSerializer and the default event type /Events/SoapJms (see the RegisterSoapEventUris function).
		Rules
		• One rule for each operation, imported similarly as for the SOAP/HTTP WSDL import. By default the rule replies with a SOAP fault saying that the operation is not implemented.
	BE-5552 (continue.)	**RuleFunctions**
		• One RuleFunction for each operation, imported similarly as the SOAP/HTTP WSDL import. If desired this can be used as a preprocessor function.
		• One RuleFunction named RegisterSoapEventUris (by default located in the Transport folder of the imported service folder). This function instructs the deserializer how to deserialize messages into operation-specific events instead of using the destination's default.
		• RegisterSoapEventUris registers, in the JMS SoapMessageSerializer, an event type for each operation that is reachable by a SOAP/JMS binding. It should be invoked as a startup function.

Closed in Release	Key	Summary
5.1.3	BE-5074	Now it is possible to re-use the workKey in the scheduler.
5.1.3	BE-3819	Deleted entities are now removed from the write-behind SharedAll store instead of being marked for deletion.
5.1.3	BE-20740	Enhancement request to re-use the work key in the scheduler. This was provided
5.1.3	BE-20721	When `explicit.tuple` is set to `TRUE`, a `NPE` is thrown when writing to cache if the concept array property is assigned with a null value. This was fixed and no null pointer exception is thrown any more.
5.1.3	BE-20720	Resolution issue were reported when the XSDs were in project libraries. The imported project library payload properties from XPATH are now showing up correctly.
5.1.3	BE-20715	SN+Eviction - update sequence on the same key sometimes returns null values for an old tuple. This was fixed.
5.1.3	BE-20711	It was requested that the conflicting schema check be refined to the element level instead of the targetNamespace level. This was fixed.
5.1.3	BE-20694	Deployed class logging statements for DT hot deployment did not depict the class name. This was fixed.
5.1.3	BE-20656	Different instances of the dashboard were showing different results in the chart, and logs were showing has `java.lang.NullPointerException`.
5.1.3	BE-20653	Different instances of the dashboard were showing different results in the chart, and logs were showing `java.lang.ClassCastException`. This was fixed.
5.1.3	BE-20577	XPath builder did not support the calender return type from any custom functions JAR. This was fixed.

Closed in Release	Key	Summary
5.1.3	BE-20445	Support for merging SOAP/JMS resources during WSDL import was added.
5.1.3	BE-20444	Support for SOAP/JMS in WSDL export was requested.
		This was provided.
5.1.3	BE-20437	SQL alter scripts were improperly altering concepts that have not been changed when they had a DateTime field with history enabled.
		This was fixed.
5.1.3	BE-20322	If the first login fails because of an incorrect credential, all subsequent logins will fail even if correct credentials are specified.
		This was fixed.
5.1.3	BE-20321	While running RMS as a Windows service, the option "Generate Deployable" would hung and time out.
		This was fixed and deployables are generated properly.
5.1.3	BE-20320	Basic validation for Domain Model usage is now supported.
5.1.3	BE-20115	Double quote around "SOAPAction" were missing in the release 5.1.2.
		This was fixed.
5.1.3	BE-20105	The recovery time for shared nothing is longer when using AS 2.0.2 HF9 compared with AS 2.0.2 HF6.
		This was fixed.
5.1.3	BE-20104	The function Engine.Rtc.abortRTC() was not working as expected. Deleted concepts were still stored in cache, even after calling abortRTC().
		This was fixed.
5.1.3	BE-20057	100% CPU usage in the secondary (passive) agent was occurring when it was started before the primary (active) agent.
		This was fixed.
5.1.3	BE-20056	WebStudio login username/password didn't support multibyte characters for file-based authentication.
		This was fixed.

Closed in Release	Key	Summary
5.1.3	BE-20054	Managing the life cycle of Domain models in WebStudio/RMS and BE Studio is expected to proceed without restarting RMS. This was fixed.
5.1.3	BE-20050	The BQL Query (delete from ...) was giving a NullPointerException after enabling the option "Shared Nothing". This was fixed.
5.1.3	BE-20049	Support for Proxy configuration in HTTP-based catalog functions was added.
5.1.3	BE-20036	A TIBCO BusinessEvents Engine working as a Windows Service required that TIBCO Hawk and TIBCO Rendezvous be installed first. This was fixed.

5.1.3	BE-20018	An error appeared in the log while executing `Query.Util.executeInDynamicQuerySession`:
		
		`java.lang.RuntimeException:`
		`com.tibco.cep.query.api.QueryException:`
		`java.lang.IllegalStateException: The maximum number of`
		`identifiers has been reached`
		
		This was fixed.

5.1.3	BE-19966	When using the AS.lockEvent() channel function, there was no option to specify timeout. This was fixed.
5.1.3	BE-19962	Transaction error handler rule function did not work when the persistence was shared nothing with Sync. Add property `be.engine.txn.error.function.recursive.rtc=true` in CDD along with the existing property `be.engine.txn.error.function`. This was fixed.
5.1.3	BE-19961	Enhancement was requested for ScheduledEvent to support CRON syntax as 4th parameter. This was provided.

Closed in Release	Key	Summary
5.1.3	BE-19300	When shared nothing persistence is used, the getInstance Hawk method in TIBCO Administrator doesn't return data for an external ID search. This was fixed.
5.1.3	BE-18004	Provide a SOAP message serializer for the JMS channel. A serializer/deserializer for SOAP/JMS has been added to the JMS destinations. This serializer handles the conversion between JMS messages and SOAPEvent events. Two helper catalog functions are provided as well: • SOAP.registerEventUri() void registerEventUri(String eventUri, String destinationUri, String serviceName, String soapAction) It associates an event type to a given input destination, target service, and SOAP action. This is used by the SOAP/JMS deserializer to generate events of specific types (eventUri), instead of using the default event type resolution mechanism. — eventUri: String path of an event type in the project. — destinationUri: String path of the BusinessEvents destination receiving the message. If empty, matches all destinations. — serviceName: String name of the target service declared in the message received. If empty, matches all service names. — soapAction: String value of the soapAction parameter in the message received. • SOAP.newCorrelationId() String newCorrelationId(String responseEventUri) Creates a new correlation ID for use when sending a message in a request/response case. This is used by the SOAP/JMS deserializer to generate a response event of a specific type, instead of using the default event type resolution mechanism. — responseEventUri: String path of an event type in the project. — returns: String correlation ID.

Closed in Release	Key	Summary
5.1.2	BE-20017	You can configure Delivery mode and Acknowledgement mode in JMS channel at design time and runtime using global variables.
		Global variables must have the following values to work at runtime:
		For Delivery Mode
		• `PERSISTENT : value="2"`
		• `NON-PERSISTENT : value="1"`
		• `RELIABLE(TIBCO Proprietary) : value="22"`
		For Acknowledgement Mode
		• `AUTO_ACKNOWLEDGE : value="1"`
		• `CLIENT_ACKNOWLEDGE : value="2"`
		• `DUPS_OK_ACKNOWLEDGE : value="3"`
		• `EXPLICIT_CLIENT_ACKNOWLEDGE(TIBCO Proprietary) : value="23"`
		• `EXPLICIT_CLIENT_DUPS_OK_ACKNOWLEDGE(TIBCO Proprietary) : value="24"`
		• `NO_ACKNOWLEDGE(TIBCO Proprietary) value="22"`
5.1.2	BE-19997	When you try to create a rule based on the rule template with a SOAP event, WebStudio throws an exception.
5.1.2	BE-19955	The default value of the `be.engine.concurrentwm.enable.newImpl` property is now `true` when the concurrent RTC is enabled for the inference agent.
5.1.2	BE-19948	In TIBCO BusinessEvents Studio, the tooltip documentation for the Event.routeTo catalog function contains many dollar characters ($) within the properties argument.
5.1.2	BE-19927	The sessionConcept concept is now not required to be in the scope of the callback rule function. Remove session concept from the call back rule function scope from existing projects using page flow destination.
5.1.2	BE-19920	The ActiveSpaces catalog function AS.query() returns entire matched objects, which could results in OOM error in JVM heap. To avoid this, the catalog function should return a iterator, which could be used to see next results (iterator.next()).

Closed in Release	Key	Summary
5.1.2	BE-19906	A new property, tibco.be.datetime.parse.lenient, is introduced to control the validation of DateTime field ranges when using the DateTime.parseString function.

By default, the property is set to true and the values of the DateTime field ranges are normalized to fit the expected ranges.

Set the property to false to ensure that the values of the DateTime field ranges are not normalized. An error will be thrown if the DateTime field ranges are out of the expected range. |
5.1.2	BE-19902	An exception was thrown when an inference agent listening on an HTTP channel received an HTTP Put request along with an empty content-type header and Transfer Encoding as chunked.
5.1.2	BE-19898	Fixed the error, java.lang.NoClassDefFoundError, thrown when building an EAR file using the studio-tools utility.
5.1.2	BE-19824	The function `Metaspace.Tuple.getDateTime` method threw `NullPointerException` when the retrieved `datetime` value in the tuple was `null`.

Closed in Release	Key	Summary
5.1.2	BE-19807	When checking out a project in WebStudio, an operation timeout error was thrown if the operation took more than four minutes. This has been fixed and all the artifacts are listed in the checkout dialog. The fix requires the browser cache to be cleared before retrying the operation.
		When you click "Checkout", the time taken by the script depends on the volume of data being loaded. In case of a long running script, a browser warning is presented with the message "Long running script, do you want to stop it?"
		[Yes/No]". Select "Yes" to proceed.
		The in-built security checks by browsers present this warning to ensure that there are no underlying malware scripts or webroot sweepers running, and the script in question is known and safe.
		To avoid the warning message, you can update the browser configuration and increase the maximum time to run scripts. For example, if using Firefox:
		1. Go to the configuration page by opening a new tab and entering "about:config" in the address bar.
		2. Search for the Preference Name "dom.max_script_run_time". Double-click the preference name and enter a new value.
		NOTE: After updating the configuration, there may still be a slight delay on the browser.
5.1.2	BE-19781	The EAR file generation failed when a second try catch block was added in the first try catch block.
5.1.2	BE-19761	When multiple hotfixes of version 5.1.1 were applied on a machine, TIBCO Administrator displayed different versions of TIBCO BusinessEvents engines.
5.1.2	BE-19756	When DB Concepts are used with the Cache Only mode, there is inconsistency between the entity cache and object table, if the DB Concept instances are evicted from the entity cache. This happens since the object handles for the evicted DB Concepts still remain in the object table.
5.1.2	BE-19701	Only the concept property which has history enabled should be stored as BLOB in TIBCO ActiveSpaces cache instead of the whole concept.

Closed in Release	Key	Summary
5.1.2	BE-19693	TIBCO BusinessEvents returned invalid time when the DateTime concept was retrieved from cache while using shared nothing.
5.1.2	BE-19691	When using shared nothing persistence, TIBCO BusinessEvents ignored the time zone stored in the cache. This has been fixed. **Note** The property `be.engine.cluster.as.tuple.explicit.store_timezones` must be set to true in the CDD file to ensure that the time zone is retrieved correctly from the cache.
5.1.2	BE-19684	Scheduled events were not always created when the expiration time was reached. This issue was seen when a large number of events were scheduled within a short time period. The incorrect behavior resulted in a failure to execute instructions that depended on the scheduled event.
5.1.2	BE-19634	When a project was checked-out in WebStudio, all the double-byte concept names, concept property names, event names, and event property names were garbled. Creating a rule on such garbled attribute names was supported incorrectly.
5.1.2	BE-19618	TIBCO BusinessEvents do not support the SSLv3 protocol.
5.1.2	BE-19610	The User Name on JMS Connection supported global variable but the icon did not appear in 5.1.0 and 5.1.1 versions.
5.1.2	BE-19603	The rule template instance builder now supports the use of APIs "startsWith" and "endsWith" to check strings. These functions can be used in conditions as part of the rule template instance "When" section.
5.1.2	BE-19600	TIBCO BusinessEvents scheduler failed to expire more than 1000 items at once when it was configured with Oracle backing-store and the property 'be.engine.scheduler.workitems.batchsize' was set to a value greater than 1000. (Default value for this property is 500.) This has been resolved and the property can now be set to a value greater than 1000.
5.1.2	BE-19598	Catalog function Metaspace.Tuple.containsValue() always returned false for String and Character type fields. This has been fixed.

Closed in Release	Key	Summary
5.1.2	BE-19593	TIBCO BusinessEvents WebStudio did not work as expected behind a load balancer because WebStudio used the absolute paths instead of relative paths, particularly the "/ws" in the context path.
5.1.2	BE-19591	TIBCO BusinessEvents DataGrid behaved in non-deterministic ways in the presence of significant network outages. In some cases, it would crash or become unusable. This fix makes it behave predictably in the presence of any type of network outage. In case of long network outages, processes thrown out of the cluster will rejoin gracefully after the network connectivity has been re-established and the affected members are restarted.
5.1.2	BE-19589	TIBCO BusinessEvents Spotfire Add-on Bundle was unable to connect to the TIBCO BusinessEvents DataGrid and expose the cache data on Windows platform due to a missing DLL. This hotfix provides the missing DLL file to fix the issue. To enable the fix: 3. Run Setup.exe available at `%TIBCO_HOME%\as\2.0\containers\2.0.2\dotNet\bin\win_x86_64` to register the DLL in the GAC. 4. Update the path to append `%TIBCO_HOME%\as\2.0\lib` to include the native libraries. TIBCO BusinessEvents Spotfire Add-on Bundle was unable to connect to the TIBCO BusinessEvents DataGrid and expose the cache data on Windows platform. This has been fixed.

5.1.2	BE-19581	When the database server closed JDBC connections after a period of inactivity, TIBCO BusinessEvents did not recreate them and threw exceptions. Now all connections are monitored to ensure the pool can be recovered in a timely manner. In some cases satisfactory results require use of the following property, set as shown:
		
		`be.jdbc.test.connections.checkall=true`
		
		The following property works with `debugRole` logging role. It causes additional debug messages to be logged showing the connections that are being monitored.
		
		`be.jdbc.test.connections.logall=true`

Closed in Release	Key	Summary
5.1.2	BE-19573	The JDBC backing store updates for certain changes to contained concepts (especially arrays) were slow. The performance for the following changes has been improved: • parent concept is modified • child concept is modified • child concept is added or removed. To enable the fix, add the property `be.backingstore.containedconceptarray.addremoveonly` in the CDD file at the cluster level and set it to true. The property is false by default. This property can be used together with the property `be.backingstore.unmodified.skip` to further optimize database operations. **NOTE** Do not use this property if there are changes to contained concepts where the position of the child concepts is modified or if a child concept is nullified. If you choose to do so, note that the modifications will not be written to the database.
5.1.2	BE-19571	Validation exceptions were observed when new rules with custom conditions with more than one parameter separated by a comma(,) were added through WebStudio.

5.1.2	BE-19569	The backing store has been fixed to recognize the type "SQL Server" and apply special settings such as the following properties properly:
		
		`<property name="be.backingstore.optimize.reads" value="true"/>`
		`<property name="be.backingstore.optimize.writes" value="true"/>`

5.1.2	BE-19563	The Add and Delete buttons on the Rule Template Bindings form in TIBCO BusinessEvents Studio were missing. This issue was observed only on Linux platform.
5.1.2	BE-19559	On Solaris platform, the studio-tools utility failed to build an EAR file and threw an exception if the TIBCO BusinessEvents project contained database concepts.
5.1.2	BE-19556	The TCP server pool can now grow and shrink when needed to support up to 512 simultaneous clients.

Closed in Release	Key	Summary
5.1.2	BE-19552	Scheduler related queries executed on `WorkItems` table would, in some cases, result in sub-optimal SQL plans and full table-scans. These scheduler related queries have been fixed to eliminate these inefficiencies.
5.1.2	BE-19547	TIBCO BusinessEvents WebStudio did not handle double-byte or unicode characters for languages such as Chinese, Korean, and Japanese correctly. These characters were garbled and displayed as question marks ("????") in WebStudio.
5.1.2	BE-19436	Studio-tools were not installed on Solaris x86.
5.1.2	BE-19435	When working with multiple projects on WebStudio, there was no way to keep only the active project open and close all of the other projects. This functionality was not easily visible in WebStudio and has been provided.
5.1.2	BE-19433	When using in-memory mode, it was possible to create a concept and an event with the same `extid`. If you set the property `java.property.be.engine.kernel.unifiedExtIdMap` to true in the `tra` file, then it gives an exception for duplicate `extId` for events and concepts.
5.1.2	BE-19431	When trying to load classes, TIBCO BusinessEvents engine showed redundant warnings in the log for unnecessary classes, which were not required to be loaded in the cache.
5.1.2	BE-19430	Silent uninstallation was not supported on different platforms, such as 32-bit Windows, and 32 and 64-bit Linux.
5.1.2	BE-19427	It was not possible to get header information from HTTPS requests. Now you can get header information using event properties with the same name as the header properties. You need to replace "-" with "_". To access URI, use the API, `HTTP.getRequestURI`, passing the event.
5.1.2	BE-19419	WebStudio now supports SSL configuration. For more information, see *Enabling SSL Authentication in RMS* section in the "Configuring RMS and RMS Projects" chapter of *TIBCO BusinessEvents Developer's Guide*.

Closed in Release	Key	Summary
5.1.2	BE-19410	The time zone value recorded in the log files was incorrect if the specified time zone included minutes. For example, if the time zone was set to GMT +5:30, the log file recorded this value as GMT +5.
		To fix the issue, set the system property `be.trace.print_tz_minutes` to `true`. Note that the fix is disabled by default.
5.1.2	BE-19407	The following catalog functions are included for creating a space to store data outside of the TIBCO BusinessEvents defined spaces in TIBCO ActiveSpaces: • `createUserSpace()` • `recoverUserSpace()` • `setCachePolicy()` • `getCachePolicy()` • `setCapacity()` • `getCapacity()` • `setPersistencePolicy()` • `getPersistencePolicy()` • `setPersistenceType()` • `getPersistenceType()` • `setReplicationCount()` • `getReplicationCount()` • `setReplicationPolicy()` • `getReplicationPolicy()`
5.1.2	BE-19368	The icon indicating global variable support for the User Name field on JMS Connection was missing. This has been fixed.
5.1.2	BE-19291	Hot deployment of a rule template instance failed and threw an exception (NullPointerException) if the pre-conditions area contained a function that used the entity declared in scope as is. For example, "Instance.isNew (field)".

Closed in Release	Key	Summary
5.1.2	BE-19234	After starting two inference agents without specifying the engine name, shutting down the first inference agent caused the other inference agent to shut down too. Additionally, Microsoft Windows threw an APPCRASH error.
5.1.2	BE-19217	TIBCO BusinessEvents engine failed with an error "Identity type: url is not supported" when using a secure JMS channel that used an identity file in the SSL configuration. This has been fixed.
5.1.2	BE-19183	The inference agent did not stop processing messages when the number of cache agents dropped below the quorum count. This has been fixed by changing the default value of minimum seeders. TIBCO BusinessEvents now sets the value of minimum seeders for user defined spaces to the same value as the quorum size, by default. Previously, the default value of minimum seeders was always '1' and the inference agent continued processing as long as there was at least one cache agent. To override the default value of minimum seeders, you can specify the new value using the following property: `<property name="be.engine.cluster.as.minSeeders" value="3">`
5.1.2	BE-19177	TIBCO BusinessEvents allows you to disable cookies when accepting or sending HTTP requests, if needed. Cookies are enabled by default.
5.1.2	BE-19176	The `SpaceName` field in the AS channel file under the destinations section is not picking up the values from global variables.
5.1.2	BE-19173	Reverse references were not updated properly and caused an exception, `ArrayIndexOutOfBoundsException`. This has been fixed.
5.1.2	BE-19159	Upon deployment, TIBCO BusinessEvents did not honor the global variable settings for a folder of the project if the same folder existed in an imported project library.
5.1.2	BE-19157	The QName functions are now available in the XPath Formula Builder.
5.1.2	BE-19155	When a rule triggered by a timer event tried to access a scorecard before the startup rule function initialized and asserted the scorecard, a `DuplicateExtIdException`, was thrown. This was observed when concurrent RTC was true and the timer event and the startup rule function were executing in parallel.

Closed in Release	Key	Summary
5.1.2	BE-19135	In business rules, expressions built by end-users containing more than one level of drill-down (for example, person.address.zip) were not always evaluated correctly at runtime.
5.1.2	BE-19126	The User Name field in JMS connection did not accept global variables.
5.1.2	BE-19103	Fixed issues with the TIBCO Rendezvous transport with SSL. To use the secure transport: • ensure that the certificates given to tibrvsd are in PEM format. • edit the file `be-engine.tra` and add `%RV_HOME%/lib/tibrvjsd.jar` to `tibco.env.STD_EXT_CP`.
5.1.2	BE-19101	SSL configuration parameters for TIBCO Rendezvous, HTTP, and JMS shared resources can now be specified using global variables.
5.1.2	BE-19095	When running quick updates on filters, entry processors, and entry aggregators, an `IllegalMonitorStateException` was thrown by Oracle Coherence. This is a known issue with Oracle Coherence version 3.7.1.2 and has been fixed in version 3.7.1.3. This hotfix bundles Oracle Coherence version 3.7.1.3 which fixes the issue.
5.1.2	BE-19078	SSL configuration parameters for TIBCO Rendezvous, HTTP, and JMS shared resources can now be specified using global variables.
5.1.2	BE-19067	RMS now supports the use of OpenLDAP for LDAP authentication. To enable the use of OpenLDAP, edit the RMS.cdd to: - add the property "`be.auth.ldap.type = openldap`". - set the property "`be.auth.ldap.roleAttr = member`". NOTE: Ensure that the property 'be.auth.ldap.type' is not defined when using Microsoft Windows Active Directory, IBM Tivoli Directory Server, or Oracle Directory Server.
5.1.2	BE-19052	Upon deployment, TIBCO BusinessEvents did not honor the global variable settings for a folder of the project if the same folder existed in an imported project library.
5.1.2	BE-19047	When multiple TIBCO BusinessEvents engines were started at the same time, one of the engines acquired the cluster lock and never released it. This caused the other engines to wait indefinitely for the lock to be released. This has been fixed in TIBCO BusinessEvents DataGrid.

Closed in Release	Key	Summary
5.1.2	BE-19045	TIBCO BusinessEvents did not honor the value of the local cache size and the expiry time specified in the CDD file.
5.1.2	BE-19044	The inference engine's local cache (L1 cache) was disabled for persistence modes "Shared All" and "None". It is now enabled for these two modes. **NOTE** The local cache is kept disabled for the shared nothing persistence mode by design.
5.1.2	BE-19021	Performing a partial recovery using preload fetch size for an entity caused the TIBCO BusinessEvents engine to hang during startup. This has been fixed. For Entry Browsers, select one of the following values from the drop-down: • **ALL** The browser iterates through all the entries stored in the space at creation time and continues to iterate as changes occur in the space. • **NEW** The browser skips iterating through the entries stored in the space at creation time and only iterates through new changes that occur in the space. • **SNAPSHOT** The browser only iterates through the entries stored in the space at creation time.
5.1.2	BE-19020	Fixed issues with the TIBCO Rendezvous transport with SSL. To use the secure transport: • ensure that the certificates given to tibrvsd are in PEM format. • edit the file `be-engine.tra` and add `%RV_HOME%/lib/tibrvjsd.jar` to `tibco.env.STD_EXT_CP`.
5.1.2	BE-19005	The distribution scope for ActiveSpaces channel destinations is configurable now.
5.1.2	BE-18991	Support for ActiveSpaces subscriber functionality using subscriber catalog functions has been added. To enable the fix, add the property `"-Dcom.tibco.cep.functions.as.metaspace.subscriber=true"` in `studio.ini` or in `studio.tra` and restart TIBCO BusinessEvents Studio.
5.1.2	BE-18966	SSL configuration parameters for TIBCO Rendezvous, HTTP, and JMS shared resources can now be specified using global variables.

Closed in Release	Key	Summary
5.1.2	BE-18927	When using the studio-tools utility, catalogs were not loaded if the library path was specified only with the -cp option and not in the `.beproject` file. This has been fixed and you can now specify the library path in either or both of `.beproject` file and `-cp` option. If the path in the .beproject file contains a classpath variable, ensure that the variable is defined as a Java property. And when using the `-cp` option, specify the absolute path.
5.1.2	BE-18839	In case of integration with TIBCO ActiveSpaces, there was no way to specify the timeout to try discovery URL when a cluster has network issues and all the members try reconnecting. A new MetaSpace catalog function, `setConnectTimeout()`, is now added to ActiveSpaces catalog functions.
5.1.2	BE-18824	The properties `be.mm.auth.ldap.adminPassword` and `javax.net.ssl.trustStorePassword` now support obfuscated passwords.
5.1.2	BE-18775	The ActiveSpaces channel can now be configured with multiple listen URL, using a semicolon as the delimiter. The ActiveSpaces channel also supports the use of a range of ports when specifying the listen URL. For example, you can specify the listen URL in one of the following ways: - tcp://*MACHINE1:PORT;MACHINE2:PORT* - tcp://*MACHINE1:PORTn1-PORTn2;MACHINE2:PORTn3-PORTn4* **NOTE** If the same hostname or IP address is specified multiple times in the listen URL, only the first occurrence is taken into consideration.
5.1.2	BE-18774	The QName functions are now available in the XPath Formula Builder.
5.1.2	BE-18733	TIBCO BusinessEvents engine tried to initialize a local channel twice, once for each agent during its startup sequence and consequently threw an IllegalStateException. This was observed when two agents used a local channel to share data with each other and were configured to run in the same processing unit.

Closed in Release	Key	Summary
5.1.2	BE-18715	An invalid EAR file was generated if the Time to Live (TTL) setting for an event was greater than 24 days (or 2147483647 ms). This has been fixed. Also, TIBCO BusinessEvents Studio now accepts a Time to Live value greater than 24 days.
5.1.2	BE-18714	On UNIX, semi-colon (;) was hard-coded in RMS logs instead of colon (:).
5.1.2	BE-18704	When selecting an event for a rule, rule function, or a transition declaration, events containing a payload element did not show up in the 'Select Resource' wizard.
5.1.2	BE-18694	When an event property value was modified in the preprocessor and then sent out with the event through either sendEvent or routeTo, the sent event did not reflect the modified value. This has been fixed.
5.1.2	BE-18668	Hot deployment for a business rule that did not use Views or Bindings failed if the business rule was modified from WebStudio.
5.1.2	BE-18667	Hot deployment for a business rule that uses Views or Bindings failed if the business rule was modified from WebStudio.
5.1.2	BE-18620	A memory leak was observed when using the HTTP Channel. To enable the fix, update the garbage collection parameter in be-engine.tra as follows: `java.extended.properties=-server -Xms2048m -Xmx2048m -XX:NewSize=1228M -javaagent:%BE_HOME%/lib/cep-base.jar -XX:MaxPermSize=512m -XX:+UseParNewGC -XX:+UseConcMarkSweepGC` **Note** The new parameter for garbage collection must be set to 60% of the available heap. For example, if the available heap size is 2048M, the garbage collection parameter 'NewSize' is set to 1228M.
5.1.2	BE-18603	The size of the shared nothing persistence files continued to grow even though the number of concepts was relatively constant. Over a long period of time, the file size could grow unbounded. This has been fixed. Note that the file size will still grow to the size of its peak usage. If a new peak is reached, the file size changes to the new peak usage. The file size will remain at its highest peak usage even when concepts are removed. This is the expected behavior. If the file usage is below its peak, any free file space will be reused when more concepts are created.

Closed in Release	Key	Summary
5.1.2	BE-18575	The size of the shared nothing persistence files continued to grow even though the number of concepts was relatively constant. Over a long period of time, the file size could grow unbounded. This has been fixed. Note that the file size will still grow to the size of its peak usage. If a new peak is reached, the file size changes to the new peak usage. The file size will remain at its highest peak usage even when concepts are removed. This is the expected behavior. If the file usage is below its peak, any free file space will be reused when more concepts are created.
5.1.2	BE-18561	Hot deployment failed with a ConcurrentModificationException if the project EAR file contained JAR files that were created by the user.
5.1.2	BE-18554	In order to achieve fault tolerance in the RMS server, one had to manually add a JDBC connection to the `RMS.ear` file. To provide fault tolerance to all HTTP based BusinessEvents projects, refer to "HTTP and SOAP Channels" section in chapter 6 of TIBCO BusinessEvents Developer's Guide.
5.1.2	BE-18552	Looking up a concept in the cache by extId failed even though the concept existed in the TIBCO BusinessEvents DataGrid cache. This was observed only for cache entries that were evicted when the size of the cache exceeded the limit.
5.1.2	BE-18533	TIBCO BusinessEvents was unable to load the file `be-engine.xml` that is used to specify properties modifiable when deploying with TIBCO Administrator. This has been fixed.
5.1.2	BE-18360	An exception, SAXParseException, was thrown when logging in from WebStudio if a role DN for the user contained the XML special characters in its name. When adding role names containing the XML special characters to the access control file, replace the characters in the role names as listed below: • "&" by "&" • "'" by "'" If role names containing special characters are defined as adminRole in the RMS.cdd file, then the characters in the CDD file should also be replaced.
5.1.2	BE-18328	Performing a partial recovery using preload fetch size for an entity caused the TIBCO BusinessEvents engine to slow down.

Closed in Release	Key	Summary
5.1.2	BE-18320	TIBCO BusinessEvents can now handle Korean characters.
5.1.2	BE-18310	A new property, tibco.be.datetime.parse.lenient, is introduced to control the validation of DateTime field ranges when using the DateTime.parseString function. By default, the property is set to true and the values of the DateTime field ranges are normalized to fit the expected ranges. Set the property to false to ensure that the values of the DateTime field ranges are not normalized. An error will be thrown if the DateTime field ranges are out of the expected range.
5.1.2	BE-18265	TIBCO BusinessEvents version 4.x was unable to load the file be-engine.xml that is used to specify properties modifiable when deploying with TIBCO Administrator. This has been fixed.
5.1.2	BE-18250	Multiple cache node failure was observed when using TIBCO BusinessEvents DataGrid.
5.1.2	BE-18226	The catalog function StudioUtil.buildEar returned true even if it failed to generate the EAR file.
5.1.2	BE-18209	When some Active Directory users tried to log in, an exception (HeadersTooLargeException) was thrown if the total size of the CNs or DNs of the associated groups was large.
5.1.2	BE-18205	TIBCO BusinessEvents did not catch the incorrect assignment between a contained concept property array and a contained concept array during project validation, or when building an EAR file. However, an exception was thrown at runtime.
5.1.2	BE-18204	A NullPointerException was thrown when building an EAR file in Studio if the project contained variables that were incorrectly declared as "Date" instead of "DateTime".
5.1.2	BE-18201	The option to build an EAR file using the legacy compiler (parameter '-lc') was missing from the StudioUtil.buildEar catalog function.
5.1.2	BE-18197	When mapping a DateTime value to a concept's DateTime property, the milliseconds value was missing from the concept's DateTime property.

Closed in Release	Key	Summary
5.1.2	BE-18195	TIBCO BusinessEvents failed to build an EAR file when an incorrect declaration type was used in the project, and no validation errors were thrown.
5.1.2	BE-18194	With the property 'be.engine.cluster.as.tuple.explicit' set to true concepts that were loaded would fire rules as though all their properties had been modified.
5.1.2	BE-18188	When defining a coercion in the XSLT mapper, the cardinality of the coercion was not saved after applying the mapping.
5.1.2	BE-18168	The build version displayed in TIBCO Administrator was different from the actual build version.
5.1.2	BE-18166	When using shared nothing persistence or when the property 'be.engine.cluster.as.tuple.explicit' was set to true, and a non-array concept property of type DateTime was stored in the TIBCO BusinessEvents DataGrid, the time zone was not stored. To ensure that the time zone value is stored, set the property 'be.engine.cluster.as.tuple.explicit.store_timezones' to true in the CDD file and restart the cluster. For applications using shared nothing persistence, the persistence files must be deleted before restarting the cluster with the property set to true.
5.1.2	BE-18159	An error was thrown when trying to insert or update a record into a table with the primary key column managed by IDENTITY in SQL Server.
5.1.2	BE-18147	When using Shared-all persistence, providing null values to one or more field names caused the operation to hang.
5.1.2	BE-18128	TIBCO BusinessEvents Views and RMS can now be configured to support secure LDAP connections using the property be.auth.ldap.ssl. Set the property to true in the CDD file to enable secure LDAP connections.
5.1.2	BE-18121	TIBCO BusinessEvents MM can now be configured to support secure LDAP connections using the property be.mm.auth.ldap.ssl. Set the property to true in the CDD file to enable secure LDAP connections.
5.1.2	BE-18115	Performance degradation was observed when inference agents were added and shared nothing persistence was used. The degradation was visible even when the additional inference engines were idle.

Closed in Release	Key	Summary
5.1.2	BE-18114	When upgrading from version 5.1 to 5.1.1, the `be/5.1/bin/be-engine.tra` file used to get overwritten with a new template `be-eninge.tra` file, and all the previous custom parameter value entries would get lost.
5.1.2	BE-18104	TIBCO BusinessEvents threw an 'Invalid username and password' error when connecting to an authorization enabled Hawk domain using EMS.
5.1.2	BE-18096	When multiple engines configured to listen on the same HTTP or HTTPS port were started, the engines start without throwing a port binding error. However, it was observed that only the engine that was started first processes the HTTP requests on the configured port. This is because the channel is started only on the engine that was started first.
5.1.2	BE-18064	A memory leak was observed in TIBCO BusinessEvents DataGrid when repetitive calls to getSpaceDef() were made and the space definition existed.
5.1.2	BE-18050	The timescope attribute for Entry Browsers and Event Listeners can now be configured for an ActiveSpaces channel destination from TIBCO BusinessEvents Studio. For Event Listeners, select one of the following values from the drop-down: • **ALL** The listener starts with all the tuples currently in the space at creation time (which will be presented as an initial set of PUT events) and then is continuously updated according to changes in the space. • **NEW** The listener starts empty and is updated only with events related to new or updated tuples in the space. • **SNAPSHOT** The listener contains only PUT events corresponding to the tuples stored in the space at creation time. • **NEW_EVENTS** The listener starts empty and is updated with all events that occur in the space after creation time.
5.1.2	BE-18025	A high CPU usage was observed when running a project with Object Management set to 'In Memory'. The CPU usage remained high even when the engine was idle.

Closed in Release	Key	Summary
5.1.2	BE-17985	When using cache-aside strategy, CacheLoadConceptByExtId or Instance.GetbyExtId were not retrieving the data from the backing store if the data was not in the cache.
5.1.2	BE-17982	Existing concepts were not loaded into the cache by the functions, getByExtIdByUri or cacheLoadExtIdByUri, after the application was restarted if the property 'useObjectTable' was set to false and the concept was added in the Domain Objects override section. This was observed when using a backing store with Shared All persistence.
5.1.2	BE-17971	This hot fix enables the hot deployment of new properties into existing TIBCO BusinessEvents concepts. This functionality is only available when: • Cache Object Management is enabled with no persistence or shared nothing persistence. • The concepts with new properties are cache-only. To enable this functionality: Before starting TIBCO BusinessEvents Studio to build the EAR file: 1. Add the following line to the vmargs in the studio.ini file: `-Dcom.tibco.be.hotdeploy.concept=true` 2. Set the property com.tibco.be.hotdeploy.concept=true in the CDD file. Note the following restrictions: • When enabling this functionality with no backing store, ensure that the property be.engine.cluster.as.tuple.explicit=true is set in the CDD file. This property is set to true by default when using shared nothing persistence. • Adding a concept property of type contained concept with the contained concept type set to an existing concept is not supported.
5.1.2	BE-17969	When exporting a decision table to Excel, the column values were not exported to the correct column.
5.1.2	BE-17968	Following a failure to build a project, the worklist status for the RMS project was not reverted to its earlier status.

Closed in Release	Key	Summary
5.1.2	BE-17964	You can configure the TIBCO BusinessEvents DataGrid protocol timeouts by setting the following properties in the CDD file.
		For read timeout, set be.engine.cluster.as.read.timeout = <timeout_value_in_milliseconds>
		For write timeout, set be.engine.cluster.as.write.timeout = <timeout_value_in_milliseconds>
5.1.2	BE-17946	When running the TIBCO BusinessEvents engine in the write-behind mode, with DataGrid for object management caching and backing store enabled, getById or getByExtId returned a null value when the object existed in database but not in the cache.
5.1.2	BE-17942	When using shared nothing persistence, the shared nothing file contained corrupted data for a specific concept. This caused data loss and failure during recovery.
5.1.2	BE-17938	If too many domain name values are associated with a decision table, an exception is thrown when it is exported to Excel:
		"Export to Excel Failed due to: java.lang.IllegalArgumentException: String literals in formulas can't be bigger than 255 characters ASCII"
5.1.2	BE-17909	In WebStudio while working with decision tables, sometimes the **select all** option did not work well for the domain model drop-down.

Closed in Release	Key	Summary
5.1.2	BE-17807	The be-jdbcdeploy utility supports the use of encrypted passwords to generate alter scripts. Perform the following tasks to generate and use the encrypted passwords:
		1. Generate the encrypted text using the studio_tools utility
		Run the following command:
		`studio_tools.exe -crypto encrypt -i input text`
		The encrypted text is written to STDOUT. The exit status 0 indicates success and -1 indicates error.
		Ensure that the exit status is 0 before using the encrypted text.
		2. Set the password property in be-jdbcdeploy.tra.
		Before running the be-jdbcdeploy utility, edit the be-jdbcdeploy.tra file and set the password property, be.jdbc.schemamigration.pwd, to the generated encrypted text. (To use plain text, set the value of this property to the plain text password.)
5.1.2	BE-17767	Catalog functions replyEvent and replyEventImmediate that send the event and return the JMS header property, especially JMSMessageID, as the return values have been added.
		To enable the new functions, set the following property in studio.tra: `TIBCO.BE.function.catalog.Event.ext=true`
5.1.2	BE-17724	The *TIBCO BusinessEvents Developer's Guide* incorrectly lists the option to specify the Studio project directory in the command to migrate Coherence functions as `-projectDir`. The correct option is '`-p`'.
5.1.2	BE-17716	Following a quorum recovery (engines resume automatically once the minimum cache servers count is reached again), you can now choose to manually restart the engines to prevent data corruption that may occur after quorum recovery.
		The property, be.engine.cluster.minCacheServers.strict.selfRepair, has been added to control this behavior. This property can only be applied when the property 'be.engine.cluster.minCacheServers.strict' is set to true.
		By default, the property '`be.engine.cluster.minCacheServers.strict.selfRepair`' is set to true. Set this property to false if you want to manually restart the engines after quorum recovery.

Closed in Release	Key	Summary
5.1.2	BE-17601	The inference agents in a cluster started up serially, where the second one did not start up until the first one completely started. This behavior was different from the 4.x version of the product where inference agents started concurrently.
		Set the `be.engine.startup.parallel` property value to `true` to enable the concurrent start of inference agents.
5.1.2	BE-17585	Support for Global Variables for optional JNDI properties used to work only at runtime, but a connection test in TIBCO Business Studio used to fail.
5.1.2	BE-17581	RMS checkout did not work when users with multiple roles (associated by the memberOf attribute) had only one of the roles defined in the access control file and the artifact type config file. This issue was observed when using Active Directory.
5.1.2	BE-17580	Exceptions were thrown when using the function Cluster.DataGrid.CacheLoadConceptsByExtId(extIds) and the persistence was set to none. This has been fixed.
5.1.2	BE-17544	Following a restart, the null values in a string array were not loaded from the backing store although the record existed in the database.
5.1.2	BE-17544	TIBCO BusinessEvents did not load the null values from backing store after a restart. As a result, concepts with null values stored in a string array were lost when the engine was restarted.
		A new property, be.backingstore.nullarrayorhistoryvalue.skip, can be used to control this behavior. Set the property to false in the CDD file to enable the null arrays or history values to be loaded from the backing store.
5.1.2	BE-17501	In a rule template, one could not nest a `call`, `create`, or `modify` statement into a block created with an `if`, `for`, or `while` clause.
5.1.2	BE-17499	To select a domain model in the Bindings tab of the rule template, earlier a text field was provided instead of a **Browse** button.
5.1.2	BE-17331	In the FraudDetectionCache example, the cache mode of the FraudCriteria scorecard is incorrect.

Closed in Release	Key	Summary
5.1.2	BE-17214	After renaming a folder, the SymbolList type of an Event's ExpiryAction was not updated. This caused an error when building the EAR file for the project.
5.1.2	BE-17211	The try-catch exception handler could not be used with call, create, or modify statements of a rule template.
5.1.2	BE-17120	In a multiple cache servers and inference agent environment, the scheduler assignment seemed to be random if the current scheduler was killed. The fix provided in Hotfix 1 ensured that control is assigned to only those nodes which have the scheduler property, be.engine.cluster.scheduler, set to true. However, the scheduler property was not being honored during startup and this has been fixed.
5.1.2	BE-16980	When TIBCO BusinessEvents engine was used as a SOAP client, to send a SOAP request successfully to an external service, one had to: — manually add a soapAction property to the SOAP request event — assign the correct value (soapaction value in the WSDL) to the property
5.1.2	BE-16001	With Write Behind backing store strategy, if the inference engine is restarted RuntimeExceptions are observed while processing events.
5.1.2	BE-15681	When a cache server with write-behind is restarted, it does not join the inference agent. The inference agent keeps throwing exceptions in the debug log.
5.1.2	BE-15268	A runtime exception was thrown by the mapper when one or more of the incoming data nodes in the mapping was NULL.
5.1.2	BE-15152	A java.lang.NumberFormatException was returned when a SOAP request did not contain a content-length header.
5.1.2	BE-14878	TIBCO BusinessEvents engine acting as a SOAP client did not support the TOMCAT server type. When requests were sent using `HTTP.sendRequest()` or `HTTP.sendAsynchronousRequest()`, the `SoapEventOut` and the callback rule function were not created and a Null Pointer Exception was thrown.
5.1.2	BE-14837	Even after successful installation of TIBCO BusinessEvents version 5.0.1, TIBCO Administrator did not show the service pack version. It only showed the base version, that is, 5.0.0.

Closed in Release	Key	Summary
5.1.2	BE-14109	Deployment from TIBCO Administrator fails if the EAR file contains .metadata folders.
5.1.2	BE-13203	The JMS Connection fields under the Advanced tab, Topic Connection Factory and Queue Connection Factory, can now be specified using global variables.
5.1.2	BE-11762	When exporting or importing decision tables, the metadata for the **Take Actions of One Row At Most** checkbox was not being preserved.
5.1.2	BE-10219	It was not possible to use RMS server in fault tolerance mode. To provide fault tolerance to all HTTP based TIBCO BusinessEvents projects, refer to "HTTP and SOAP Channels" section in chapter 6 of *TIBCO BusinessEvents Developer's Guide*.
5.1.2	BE-9646	The WSDL export utility generated a non-working WSDL when the input destination was defined using a collection in the CDD file.
5.1.2	BE-4884	In version 3.0, the instructions for configuring the product on a 64-bit Linux machine were incorrect in *TIBCO BusinessEvents Installation*.
5.1.1	BE-11406	Application properties like `--propFile` can now be passed through the debug configuration from Studio. For `--propVar`, property needs to be added in CDD along with its value.
5.1.1	BE-11481	The current values for global variables were lost when BE-MM server was restarted. Only the default values set in Studio Global Variables editor were shown.
5.1.1	BE-11532	The performance profiler file remained empty when the project used Cache object management.
5.1.1	BE-11957	TIBCO BusinessEvents Studio throws an error if a WSDL file inside a project or inside a project library refers to an XSD in a project library.
5.1.1	BE-13291	When the project library and the project have the same event (or concept), deleting the event (or concept) from the local project causes XSLT mapper errors to be thrown in the project library rules or rule functions. This is observed if the project library contains a rule or a rulefunction that uses the XSLT mapper to define that event (or concept).
5.1.1	BE-14382	The global variable `deployment` was not set by default in the EAR file.

Closed in Release	Key	Summary
5.1.1	BE-15098	TIBCO BusinessEvents could not retrieve the JMSXDeliveryCount property within a JMS message.
5.1.1	BE-15207	Objects written to the cache expired instantly, when the engine was running on Windows 32-bit platform.
5.1.1	BE-15268	A runtime exception was thrown by the mapper when one or more of the incoming data nodes in the mapping was NULL.
5.1.1	BE-15462	BE console throws NumberFormatException when the SOAP request do not have content length header.
5.1.1	BE-15508	The `mmtools` utility could not be used to stop the engine, if BE-MM security was enabled in `be-engine.tra` and the credentials of the remote machine was used.
		Instead, provide the credentials used to log in to the BE-MM UI and then stop the engine using the `mmtools` utility.
5.1.1	BE-16035	The StopEngine method did not close the TIBCO Enterprise Message Service (EMS) connection before exiting.
5.1.1	BE-16144	`abortRTC()` did not stop the RTC immediately, and events were not consumed from memory when `abortRTC` was called.
5.1.1	BE-16226	When writing large data to the database using DataGrid as the backing store, a runtime exception was thrown.
5.1.1	BE-16609	RMS server throws an error, if length of studio-tools command is more than the OS permissible limit of 32767 characters.
5.1.1	BE-16719	An `ArrayIndexOutOfBoundsException` error was thrown when a query was executed after starting or stopping the only cache server.
5.1.1	BE-16720	While the inference agent was running, if the cache server was restarted, the recovery process to reload the data from the backing store did not start.
5.1.1	BE-17079	After committing, resources were not listed in the worklist and the RMS server displayed `DuplicateExtIDException`.
5.1.1	BE-17239	In WebStudio, for rule template instance serialization, nodes did not appear in the same order that they were defined in the rule template.

Closed in Release	Key	Summary
5.1.1	BE-17250	When starting the RMS server and logging in to the client, the system displayed a Post RTC error and threw, `UnsupportedOperationException`, if Coherence was used.
5.1.1	BE-17251	In BRMS project for JDBC SQL Server scripts, when the primary key constraints in a generated SQL script had the same names for two tables, execution threw an error while setting up WebStudio for the SQL Server.

5.1.1	BE-17322	The Hawk Channel example `readme.html` has been updated with the correct commands to run the example:
		
		`cd c:/tibco/BE5.1/be/5.1/examples/standard/HawkChannel`
		`c:/tibco/BE5.1/be/5.1/bin/be-engine --propFile`
		`c:/tibco/BE5.1/be/5.1/bin/be-engine.tra -u default -c`
		`HawkChannel/hawk.cdd HawkChannel.ear`

5.1.1	BE-17323	When using the TIBCO BusinessEvents DataGrid, an invalid argument error was thrown if the discovery URL was specified as "`tcp://`" or if the hostname in the discovery URL contained the characters 't', 'c', or 'p'.
5.1.1	BE-17327	Exceptions are thrown when opening a decision table from WebStudio on AIX, Solaris, and HP-Itanium only. This is observed even when TIBCO BusinessEvents Decision Manager add-on is installed.
5.1.1	BE-17364	High CPU utilization was observed when the TIBCO BusinessEvents engine was running in cache mode.
5.1.1	BE-17418	On Windows 32-bit and Linux 32-bit installations, some jar files and libraries are incorrectly present in *TIBCO_HOME*/be/5.1/lib/ext. The installer removes these jars and libraries at the end of the installation.
5.1.1	BE-17435	Rules were not triggered, if the concepts in the rule's scope were in the Rete network. This was observed when using shared nothing persistence without any Overrides.
5.1.1	BE-17457	Attributes such as `AvgTimeInRTC` and `AvgTimePreRTC` were not updated for Event MBeans.
5.1.1	BE-17482	When using shared nothing persistence in Cache only mode, the rule to update the child in a contained concept was executed multiple times in one RTC erroneously.
5.1.1	BE-17510	Building an EAR file failed, if a variable of a primitive type was defined in the Action Context section of a rule template before any template statement.

Closed in Release	Key	Summary
5.1.1	BE-17511	The IN clause in a query now supports a dynamic list of one or more binding variables. If the binding variable is an array, all the array elements will be appended to the final IN clause in the query.
5.1.1	BE-17589	Running a query of the form `select * from` threw exceptions if the concept had null values in its properties.
5.1.1	BE-17616	Upon a full cluster restart, the ID generator was incorrectly reset to zero instead of starting from one greater than the last generated ID. This caused duplicate IDs and related data inconsistencies. Note that this issue occurred for deployments with `useObjectTable` set to false.
5.1.1	BE-17726	Shared nothing persistence now supports memory-only mode.
5.1.1	BE-17750	`be-jdbcdeploy` utility ignored the metadata property `max.Length` for history enabled string properties.
5.1.1	BE-17765	In Memory objects such as concepts, score cards, or events, were not getting initialized properly when using shared nothing persistence.
5.1.1	BE-17862	When using shared nothing persistence, the creation of Parent and Child concepts failed sometimes.
5.1.1	BE-17863	When servicing continuous queries, the inference agents published changes to their agentTxn caches. A memory growth was observed because the agentTxn cache was incorrectly configured as an unlimited cache. A new property, `be.agent.query.continuous.allow`, is added to configure the query agent and is set to false by default. Set this property to true for the query agent to request for changes to be published when servicing continuous queries.
5.1.1	BE-17867	When the Entity Cache Size property in CDD have value less than 10000, the capacity in ActiveSpaces is displayed as INVALID.
5.1.1	BE-17868	When you upgrade from TIBCO BusinessEvents version 5.1.0 to version 5.1.1 and start cache agent, TIBCO BusinessEvents fails during the recovery, which uses persistence files created by the TIBCO BusinessEvents DataGrid. The as-convert utility is now provided to migrate the persistence files. See Converting the Shared Nothing Persistence Data Files to the New Format on page 31 for more details on the as-convert utility.

Closed in Release	Key	Summary
5.1.1	BE-17872	The HTTP response processing stopped, when there was no data to process in the RTC.

5.1.1	BE-17890	The cache agents failed to start completely and the status did not change from Starting to Running with the following message repeated in the logs:
		
		`[as.kit] Waiting for space`
		`[objectTableCache-bs-readOnly-OrderCDD--ObjectTableIds] to`
		`be ready`

5.1.1	BE-17899	A `java.lang.reflect.InvocationTargetException` error is thrown while exporting TIBCO BusinessEvents artifacts as WSDL from a project.
5.1.1	BE-17908	Import and export operations for decision tables are failing in WebStudio on AIX, Solaris, and HP-Itanium only.
5.1.1	BE-17912	The javadocs were not updated for the `System.ID.nextId()` function for cache-based object management (OM), which was deprecated in TIBCO BusinessEvents version 5.0.x.
5.1.1	BE-17928	A rule function configured in the shutdown function of the CDD file was not called when the engine was stopped or killed from TIBCO Administrator.
5.1.1	BE-19550	The try-catch exception handler could not be used in call, create, or modify statements of a rule template.
5.1.1	BE-19899	In a multiple cache servers and inference agent environment, the scheduler assignment seemed to be random if the current scheduler was terminated. Set the property `be.engine.cluster.scheduler` to `true` for the nodes that can be considered for scheduler ownership. The fix ensures that control is assigned to only those nodes which have the scheduler property set to `true`.
5.1.1	BE-3964	In TIBCO Administrator, clicking on any service instance under All Service Instance caused an `IllegalArgumentException`, if the service instance was not running on TIBCO BusinessEvents.
5.1.0	BE-17132	When the property be.backingstore.unmodified.skip was set to true, updates made to a contained concept resulted in missing or extra entries in the relationship table.

Closed in Release	Key	Summary
5.1.0	BE-16878	`CreateInstanceFromXML` did not throw an exception object when the payload contained a validation error such as an incorrect type value for an element based on the concept definition.
5.1.0	BE-16811	When the cache servers in a cluster were restarted alternately, a `protocol_timeout` error was thrown by the cache nodes.
5.1.0	BE-16810	When cache servers were killed and restarted, the inference engine sometimes threw a segmentation fault error and stopped running.
5.1.0	BE-16690	On UNIX platforms, the Processing Units (PU) failed to start even when the BE-MM server started and the deployment went through successfully.
5.1.0	BE-16683	The cache server failed to start and hung while initializing the BDB provider if BDB database types were used.
5.1.0	BE-16671	Data loss from the cluster was observed if any of the agents were killed (gracefully) during processing.
5.1.0	BE-16584	Shutting down an inference engine using <Ctrl+C> resulted in multiple exceptions and the inference engine was not killed.
5.1.0	BE-16506	Performance degradation was observed when loading a space with a large data.
5.1.0	BE-16486	Engines crashed soon after forming a cluster, where the engines were on Windows and Linux platforms.
5.1.0	BE-16475	Calls to the database using `QueryUsingSQL()` failed with the exception `java.lang.ClassCastException: com.tibco.cep.studio.core.adapters.ConceptAdapter cannot be cast to com.tibco.cep.designtime.model.event.Event` after a call to `BusinessWorks.init()`.
5.1.0	BE-16467	When inference agents join the PersisterSpace as seeder, a (restarted) cache agent did not become the OWNER of the Berkeley DB. This lead to a `not_enough_persisters` exception.
5.1.0	BE-16446	`CreateInstanceFromXML` did not throw an exception when a mismatch between the value in the XML and the type of the property to be created was encountered.

Closed in Release	Key	Summary
5.1.0	BE-16436	When trying to create a sequence diagram on the event, the sequence diagram of the rule (or the rulefunction) was created instead if the event and the rule (or the rulefunction) existed with the same name in the project.
5.1.0	BE-16260	TIBCO BusinessEvents Studio failed to build a project and threw an `CompilationFailedException`, if a concept with property of type ContainedConcept was refactored.
5.1.0	BE-16236	When using the shared nothing persistence option on AIX platform, the engine hung when creating ObjectTable space.
5.1.0	BE-16235	Shutting down an inference agent on AIX platform resulted in a core dump.
5.1.0	BE-16220	When restarting a cache server, an exception was thrown during recovery if the backing store had large data.
5.1.0	BE-16180	Shutting down an engine using <Ctrl+C> key killed the other engine type as well and exceptions were thrown on both (cache and inference) engines.
5.1.0	BE-16051	On AIX platform, the load balancer did not work as expected and threw a runtime exception.
5.1.0	BE-16002	An exception `org.eclipse.emf.common.util.BasicEList$BasicIndexOutOfBoundsException` was thrown by the inference agent during start up. This was caused by a seralization error in the cluster configuration.
5.1.0	BE-15910	Data consistency issues were seen when using the DataGrid as some rules were not triggered or some updates were not reflected.
5.1.0	BE-15908	When a cache server with discoverable nodes on Linux and another on Windows is started, and then all the remaining nodes are started at the same time, the engine crashed.
5.1.0	BE-15906	When starting the cache server, the engine pre-loaded records from a database although the property `pre-load-enabled` was disabled in the CDD file.

Closed in Release	Key	Summary
5.1.0	BE-15886	Exceptions were thrown when engines in a heterogeneous cluster were shutdown using <Ctrl+C> on Windows and `pkill be-engine` on Linux and the engines suspended.
5.1.0	BE-15865	Studio-tools is now supported on Solaris x86. See *TIBCO BusinessEvents Installation* for the steps to enable Studio-tools on Solaris x86.
5.1.0	BE-15710	When a cache server configured to use Shared-All persistence with Berkeley DB backing store was killed when writing to the database, another cache server takes over. However, the inference engines threw exceptions when trying to create new concepts.
5.1.0	BE-15638	The inference agent threw a "space_not_found" exception when the cache server was restarted.
5.1.0	BE-15481	Exceptions were thrown when a cache server without a backing store was restarted.
5.1.0	BE-15460	An exception was thrown when starting a cache server after deploying the application with a DataGrid Unicast address to BE-MM.
5.1.0	BE-15304	In a multiple cache servers and multiple inference engines scenario where all the inference agents were processing events, if one of the inference agent was killed, all other inference agents also stopped processing events.
5.1.0	BE-15290	On Linux 64-bit platform, an UnsupportedOperationException was thrown when creating objects with backing store enabled.
5.1.0	BE-15186	Inference engines hanged after engines were killed and restarted in a random manner.
5.1.0	BE-15167	When an Event was copied from another Event, the Declaration section on the Advanced Tab showed the old values for the Term and Alias fields instead of new values.
5.1.0	BE-14955	The XSLT and XPath mappers showed the internal @Id attribute of a concept or event and the internal @ref attribute of concept references as a String (with icon "ABC"). However, these internal attributes should be long (have icon "321").
5.1.0	BE-14873	Duplicate ext id exceptions were thrown when duplicate concepts were inserted into the Berkeley database.

Closed in Release	Key	Summary
5.1.0	BE-14705	Checking out a RMS project failed with an exception if the baselocation was configured with a lower case driver letter. For example, `c:/tibco4/be/5.0/rms/examples`.
5.1.0	BE-14527	When diagrams such as Project view, Concept view, or Event view were opened or closed for more than 30minutes, TIBCO BusinessEvents Studio crashed with the following exception: "org.eclipes.swt.SWTError: No more handles"
5.1.0	BE-14357	When a BE-MM server is restarted, the machine deployment status on the UI is lost. For example, the status "Machine not deployed" was shown although the machine was deployed successfully.
5.1.0	BE-14150	On Red Hat Linux, an exception was thrown when trying to expand the items in Catalog Functions view in TIBCO BusinessEvents Studio.
5.1.0	BE-13941	Changes made to the global variables from TIBCO Administrator were not reflected at runtime.
5.1.0	BE-13804	In TIBCO BusinessEvents Studio, the Test Connection button for JMS Connection shared resources failed if the connection was set up to use JNDI.
5.1.0	BE-13716	TIBCO ActiveMatrix BusinessWorks project libraries containing resources such as global variables, XSD files and shared resources like RV, JMS, JMS properties, and HTTP connections, can be used in TIBCO BusinessEvents now. These resources are independent of TIBCO BusinessEvents and TIBCO ActiveMatrix BusinessWorks.
5.1.0	BE-13578	The default Java version for code generation in Studio was 1.5 instead of 1.6. The menu option Windows > Preferences > Tibco BusinessEvents > Code Generation Java version displays the default version.
5.1.0	BE-13575	An error was reported when loading a concept with a String property longer than 64KB.
5.1.0	BE-13528	The QName group of XPath functions was missing from the Function Argument Mapper in release 5.0.

Closed in Release	Key	Summary
5.1.0	BE-13482	By default, TIBCO BusinessEvents creates two connections to a JMS server, with the following client IDs: *<user client id>*`_queue` *<user client id>*`_topic` To create a single connection with the client ID the same as configured, add the following property and set as shown in all agents: `be.channel.jms.unified=true` With this setting, and when a connection is configured via a JMS shared resource, the topic and queue connection factories on the Advanced tab must be the same. When using TIBCO Enterprise Message Service, use GenericConnectionFactory for both.
5.1.0	BE-13450	The XSLT mapper showed all variable defined in the project. When local variables were declared with same name in if-else clause, the XSLT mapper showed both variables in the list.
5.1.0	BE-13393	Testing the JMS Connection caused exceptions to be thrown if the path to *EMS_HOME*`\lib` was specified in `studio.tra`.
5.1.0	BE-13346	With TIBCO BusinessEvents DataGrid as the cache provider, bulk deletes of hundreds of entities in a single RTC were slow.
5.1.0	BE-13270	Log level for selected engines can be changed at runtime using the setLogLevel() function.
5.1.0	BE-13221	With TIBCO BusinessEvents DataGrid clusters, process memory kept on growing.
5.1.0	BE-13211	Tooltip for XPath.executeWithEvent() is updated with an example.
5.1.0	BE-13129	Changes to the values of global variables made with TIBCO Administrator at the application level were overwritten with the values from the project.
5.1.0	BE-13121	When a backing store was disabled, `PendingDBWrites` JMX metrics were still updated.
5.1.0	BE-13114	With multicast TIBCO DataGrid clusters, nodes fail to start up when multiple nodes attempt to start up and join the cluster in rapid succession. This issue occurs sporadically, mostly on UNIX platforms, especially Linux.

Closed in Release	Key	Summary
5.1.0	BE-13086	With JMS channels, event acknowledgement was not sent until after the event's time to live period expired, even when using the explicit client acknowledgement option.
5.1.0	BE-13056	Log files showed redundant warnings when the engine was loading external classes: `Pre-existing class not found, ignoring external class`.
5.1.0	BE-13053	Remote JMX Port was not enabled when the OM type was set to in-memory.
5.1.0	BE-12989	In TIBCO BusinessEvents DataGrid clusters, cache only events with a TTL greater than zero were not expiring fast enough.
5.1.0	BE-12984	JMS channels were not able to receive messages synchronously. Now you can set the following property at the appropriate level to enable the channel to receive messages synchronously: `com.tibco.cep.driver.jms.receiver = true` The following supporting properties are also provided: `com.tibco.cep.driver.jms.receiver.wait` = *maximum blocking time*, in milliseconds, for each call to receive(). The default is 500. `com.tibco.cep.driver.jms.receiver.shutdown.wait` = *maximum wait time*, in seconds, after attempting to stop the receiver, before a forceful stop is attempted. The default is 60.
5.1.0	BE-12939	The memory consumption of some XSLT functions has been reduced.
5.1.0	BE-12882	TIBCO BusinessEvents DataGrid clusters sometimes did not discover nodes.
5.1.0	BE-12872	It was not possible to add a custom serializer in TIBCO BusinessEvents Studio. Now the drop-down list allows text entry as well as selection from a list.
5.1.0	BE-12864	After a network disconnect and recovery, nodes in a TIBCO BusinessEvents DataGrid cluster stopped responding during the cluster discovery process.
5.1.0	BE-12833	Validating a project did not report the conflicts arising from using an alias of 'e' and using 'e' in an exception catch block. However, an exception was thrown when generating an EAR file for the project.

Closed in Release	Key	Summary
5.1.0	BE-12828	The Function Argument Mapper UI displayed the type of all time event properties as String.
5.1.0	BE-12812	Building an enterprise archive file for a DBConcept project failed if one of the property was XML type in the database.
5.1.0	BE-12738	Domain model entries were not case sensitive. Now m and M (for example) are recognized as different entries.
5.1.0	BE-12699	The MM server was not discovering the cluster topology when the host name was specified in the site topology editor using the fully qualified name. Now the host name is always resolved to its fully qualified domain name (even if the simple name is entered) and the host name is also validated against the IP address. If they don't resolve to the same host then an `UnknownHostException` is thrown.
5.1.0	BE-12677	The function Instance.PropertyArray.indexOfConceptReference() now compares IDs and returns the index for the location in the array without loading all referenced concepts.
5.1.0	BE-12657	Rule functions used for the rule ranking feature must have a Validity setting that includes Condition (Action Only is not sufficient). When an Action Only rule function was used, however, no validation error was thrown.

5.1.0	BE-12614	Incorrect debug log entry, with the channel and destination information inverted, was observed when the cache server was running as a cluster scheduler. For example:
		
		`[14 giu 2011 13:05:51][DEBUG][main] -`
		`inference-A2AController connected input channel`
		`/Channels/Utility/Validator/MonitorJms to destination`
		`/Channels/Utility/Validator`
		
		where the actual channel is `/Channels/Utility/Validator` and actual destination is `/Channels/Utility/Validator/MonitorJms`.

5.1.0	BE-12572	When using the TIBCO BusinessEvents Studio RMS menu option Generate Deployable, with large projects, the success message did not display, even though the deployable files were generated.
5.1.0	BE-12550	There was a memory leak in the cache server when TIBCO BusinessEvents DataGrid was the cache provider and a backing store was enabled.

Closed in Release	Key	Summary
5.1.0	BE-12549	With TIBCO DataGrid as the cache provider, the engine threw the exception: Found in ObjectTable but not in base table. Possible race condition
5.1.0	BE-12541	The abs function was missing from the Function Argument Mapper in version 5.0.0.
5.1.0	BE-12537	TIBCO Administrator could not deploy a TIBCO BusinessEvents EAR file that contained Rational Clearcase files. (Such files would be present in a project that had been checked out of Rational Clearcase before the EAR file was built.)
5.1.0	BE-12525	The `be-jdbcdeploy` utility did not create tables for objects located in a subfolder called `core`.
5.1.0	BE-12520	The LDAP admin password is now encrypted.
5.1.0	BE-12519	A memory leak occurred during bulk deletes of concepts in a single RTC.
5.1.0	BE-12502	Functions, `sendEventExt`, `replyEventExt`, and `routeToExt`, are added. The functions take a `forceImmediate` argument, which when set to true, send or reply to an event immediately. The functions `sendEventExt` and `replyEventExt` also throw an exception if the send operation threw an exception instead of logging it and returning null.
5.1.0	BE-12498	In queries, functions with one or more PropertyAtom arguments failed with an exception.
5.1.0	BE-12430	In the post-RTC phase, use of parallel operations is generally safe only when locking is used. The parallel operations feature is enabled using this property: `Agent.`*agent name*`.enableParallelOps` Before this hotfix, parallel operations was enabled by default when cache aside (the default database write strategy) was used. However, many projects that use cache aside do not otherwise require locking. Now parallel operations is enabled by default only when both cache aside *and* concurrent RTC features are used. (Use of concurrent RTC also generally requires locking.) Parallel operations can also be used with cache aside when concurrent RTC is not used. However, it must be explicitly enabled, and correct locking must also be used as needed.

Closed in Release	Key	Summary
5.1.0	BE-12414	Documentation did not point to guidelines customers needed for using Coherence as the cache provider. Now links are provided in Chapter 22, Cache OM and Cluster Configuration, in *TIBCO BusinessEvents Developer's Guide*.
5.1.0	BE-12301	Selecting <Ctrl+Click> or <highlight+F3> did not take the user to the source code from the project library.
5.1.0	BE-12299	The Quick Fix feature was creating incomplete concept property entries. Errors occurred as a result, when using the concept properties in the rule editor and when building an EAR file.
5.1.0	BE-12244	The catalog function `C_CacheLoadConceptByExtId (String extId, boolean includeContained)` can be used to load the root concept only by setting the parameter `includeContained` to false.
5.1.0	BE-12231	The CDD did not support properties with data types other than String. Additional data type support has been added along with validation for boolean and integer data types.
5.1.0	BE-12227	The `.beproject` descriptor contained absolute paths to the project library and did not support the use of variables to define the path.
5.1.0	BE-12185	Rule conditions of the form Instance.isModified(<concept>) were not always re-evaluated when <concept> was modified.
5.1.0	BE-12159	Restarting the cache servers caused the inference engine to freeze and throw an `entry_not_found` exception.
5.1.0	BE-12146	TIBCO BusinessEvents engines acting as SOAP clients did not support the TOMCAT server type. When requests were sent using `HTTP.sendRequest()` or `HTTP.sendAsynchronousRequest()`, the `SoapEventOut` and the callback rule function were not created and an NPE was thrown.
5.1.0	BE-12130	Support for HTTP 1.1 method types has been added.

Closed in Release	Key	Summary
5.1.0	BE-12097	On certain projects, where TIBCO ActiveMatrix BusinessWorks was contained in TIBCO BusinessEvents, and TIBCO ActiveMatrix BusinessWorks used XML features, the following exception appeared during TIBCO ActiveMatrix BusinessWorks initialization: `java.lang.NoSuchMethodError: com.tibco.sdk.a.a.a` Ensure that BEBWUtils.getProject() is able to load TIBCO BusinessEvents resources into the TnsCache.
5.1.0	BE-12083	An exception in `RTCTransactionManager.TxnTask_Actions.run()` prevented the Post RTC from completing.
5.1.0	BE-12071	The Generate Deployable menu option did not work when RMS was running on HPUX, AIX, and Solaris platforms, except the Solaris SPARC 32-bit platform.
5.1.0	BE-12047	The value of the Message Encoding setting from the CDD file could not be overriden by TIBCO Administrator at deploy time.

Closed in Release	Key	Summary

5.1.0	BE-11612	With the TIBCO BusinessEvents Monitoring and Management mm-tools component, it was not possible to authenticate a user using certificates when performing deploy and remote start and stop operations.
		
		Now you can use this functionality as follows.
		
		1. On the computer hosting the MM server, use a utility to create a public/private key pair. The `ssh-keygen` utility is widely available. Two files are generated. They are referred to as follows:
		
		— *PK_FILE_NAME* (The file containing the private key)
		
		— *PK_FILE_NAME*.pub (The file containing the public key)
		
		Place both generated files in the same directory on the computer hosting the MM server. For example, put them in *BE_HOME*/mm/certificates.
		
		2. On computers hosting the to-be-monitored cluster PUs that you want to remotely deploy, start, or stop, copy the contents of the *PK_FILE_NAME*.pub file to the file containing the list of authorized keys for the user who will be logging in remotely. For example, for SSH using certificates for authentication, the authorized keys file is called 'authorized_keys' and it is stored in the `.ssh` directory of the user who will be logging in remotely, that is, in ~/.ssh/authorized_keys.
		
		3. When executing a command with mm-tools, use the new option -pkf to specify the fully qualified path to the \<PK_FILE_NAME\> file, that is, the file with the private key. For example:
		
		Remote Deploy:
		`mm-tools --propFile mm-tools.tra -op deploy -m 100.100.100.101 -pkf` *BE_HOME*`/mm/certificates/PK_FILE_NAME`
		
		Remote Start:
		`mm-tools --propFile mm-tools.tra -op start -puc CS -m 100.100.100.101 -pkf` *BE_HOME*`/mm/certificates/PK_FILE_NAME`
		
		Remote Stop:
		`mm-tools --propFile mm-tools.tra -op stop -puc CS -m 100.100.100.101 -pkf` *BE_HOME*`/mm/certificates/PK_FILE_NAME`

5.1.0	BE-11768	The runtime value of global variables of type Boolean was always false.

Closed in Release	Key	Summary

5.1.0	BE-11763	An error message was logged when starting the application instead of a warning or INFO message:
		
		`Error [main] - [root] Mar 14, 2011 12:34:45 PM`
		`com.tibco.security.providers.SecurityVendor_j2se <clinit>`
		`INFO: Initializing JSSE's crypto provider class`
		`com.sun.net.ssl.internal.ssl.Provider in default mode`

5.1.0	BE-11713	The RMS server now starts without errors on UNIX platforms.
5.1.0	BE-11457	An option to disable the "generate deployable" menu option has been added to the RMS menu.
5.1.0	BE-11456	In RMS, the Approve or Reject action was available to every user regardless of their role. As part of this fix, you can now use the following global variable to choose the name of the administration role: RMS/Approval/adminRole. The default value is "Administrator".
5.1.0	BE-11462	Function calls `Instance.getById`, `Event.getById`, `Instance.getByExtId`, and `Event.getByExtId` look for objects in cache when the OM type is set to Cache OM, even for objects whose cache mode is set to Memory Only. Instead use `Instance.getByIdByUri`, `Event.getByIdByUri`, `Instance.getByExtIdByUri`, and `Event.getByExtIdByUri`. These functions do not look in the cache if the concept with the given URI is configured as memory-only.
5.1.0	BE-11411	When using Cache object management, preprocessors were not executed when data was asserted using the Studio tester in TIBCO BusinessEvents Studio.
5.1.0	BE-11342	In RMS, checking the details of the code that need approval has been simplified. Now every workitem detail has a right-click "Open" menu option which allows a reviewer to view the checked-in file in read-only form before approving it. A limitation in this release is that shared resources cannot be viewed in this way.
5.1.0	BE-11134	In the JMS Connection shared resource dialog, the JNDI Context URL field did not support use of global variables. If a value was specified using a global variable, the Test Connection button displayed a failure message.

Closed in Release	Key	Summary
5.1.0	BE-11133	In the JMS Connection shared resource dialog, clicking the Test Connection button always caused a success message to display when the Use JNDI for Connection Factory check box and Use Shared JNDI Configuration check box were checked, even when the JNDI Configuration field was blank or did not specify a valid URL.
5.1.0	BE-11074	LDAP authentication did not work for Windows ActiveDirectory.
5.1.0	BE-10963	Name of resource type for decision tables should be specified correctly in documents.
5.1.0	BE-10403	In TIBCO BusinessEvents Studio, the Test Connection button for JMS Connection shared resources failed if the connection was set up to use JNDI.
5.1.0	BE-9985	Error when starting RMS on AIX due to incorrect values for the properties LIB_PATH and PSP in `be-rms.tra`.

5.1.0	BE-8483	When using a JMS channel configured for SSL, with Client Authentication enabled and a Certificate/Private Key combination used for the Identity Resource on the client side, the engine would throw a `javax.jms.JMSSecurityException` error. This is due to a limitation in the default security libraries. For this feature to work in TIBCO BusinessEvents, you can use Entrust security libraries, which are part of the TIBCO Runtime Agent installation. To use Entrust, do the following:
		
		 1. Add the entrust libraries to the classpath. For example:
		
		 `C:/tibco/tpcl/5.6/lib/entrust`
		
		 2. In the be-engine.tra file, add this line:
		
		 `TIBCO_SECURITY_VENDOR=entrust61`

Closed in Release	Key	Summary
5.1.0	BE-8207	In version 3.0 (but not in 4.0 or 5.0) it was possible to export global variables to a project library and then import the project library for use in another project. It was also possible to override such a global variable with another global variable with the same name, by ordering the imported libraries.
		Also in version 4.0 and 5.0, when imported variables were used in a project, after EAR file generation, the imported variables were not merged and placed in `tibco.xml` within the EAR file.
		Now global variables can be exported into project libraries. In the Build Path > Project Libraries tab, up and down arrows allow you to order the libraries. In the Global Variables view, the Project Source column shows the source project, and the Override column shows overrides using arrow icons.
5.1.0	BE-3976	Incorrect validation warning "The variable <Global Var name> is unused." observed although the global variable was used in a rule.
5.1.0	BE-3872	Queries with bind variables in the Where clause resulted in exceptions. Example of such a query:

		`select parent.value from /Concepts/ChildConcept child,`
		`/Concepts/ParentConcept parent where child.value = and`
		`child.parent = parent@id`

5.1.0	BE-3523	The inference engine threw an exception on startup if the project included a global TimerEvent in the declaration section of a rule.
5.1.0	BE-3259	Schemas generated from TIBCO BusinessEvents entities using the schema generator were not fully compatible with the XMLInstance resources of TIBCO Designer.
5.1.0	BE-2961	The maximum number of events to be processed can now be configured in the project CDD file.
		In the project CDD file, select the Threading Model for a particular destination and choose the option 'Destination Queue'. Provide the inputs to the destination queue:
		• **Queue Size** - Specify the number of events per queue.
		• **Thread Count** - Specify the number of threads.
5.1.0	BE-2606	TIBCO BusinessEvents can import XPDL files created by Business Studio Modeler using the project library.

Closed in Release	Key	Summary
5.1.0	BE-1670	The Hawk method GetExecInfo displayed the value of the version as null in TIBCO Administrator. This has been fixed to display the version of the TIBCO BusinessEvents engine.
5.1.0	BE-1580	It was not possible to export a state diagram to SVG format, if the network connection was not available or was made through proxy
5.1.0	BE-1449	The JMS header properties JMSType and JMSReplyTo were not serialized or deserialized correctly in an event.
5.1.0	BE-1202	Reverse reference to the sub-concepts in the base concept when adding sub-concepts inherited from the base concept is removed.
5.0.1	BE-14360	In the JMS Connection shared resource, the User Name field did not support use of global variables and was not decorated with the globe icon that indicates support for global variables.
5.0.1	BE-14305	When a TIBCO BusinessEvents application was restarted, events that were set to cache plus memory mode and whose time to live (TTL) setting was greater than zero were not loaded from the backingstore into memory. Therefore they did not trigger rules that they should have triggered.
5.0.1	BE-10216	TIBCO BusinessEvents Monitoring and Management (MM) deployment time information was lost after restarting MM. Now the deployment time information is saved to a file located under BE_HOME/mm/deployed, and the last deployment time is correctly displayed in the UI.
5.0.1	BE-14272	The rule editor displayed an error if the @id attribute access was used on a simple event.
5.0.1	BE-14247	The TIBCO BusinessEvents Studio Ignored Files preference (Preferences > TIBCO BusinessEvents > Code Generation > Shared Resources > Ignored Files) was not working. The Ignored Files options enable you to exclude files that match user-configurable patterns from the Shared Resources.sar part of an EAR file.
5.0.1	BE-14173	The catalog function Instance.updateInstanceFromXML threw exceptions when adding a new contained concept to a PropertyAtom.
5.0.1	BE-14108	Building the EAR file was failing for certain projects.

Closed in Release	Key	Summary
5.0.1	BE-14071	When an event payload referenced an element in a project library schema, the schema file failed to open when the user clicked the Go to referenced resource button (next to the Schema field in the Simple Event editor). Now when you click the button, the schema (XSD) file opens in a text editor (not the form-based editor used for schemas stored directly in the project).
5.0.1	BE-13975	The Help content for Studio Run Configuration was incorrect and has been updated.
5.0.1	BE-13970	In certain cases, when a channel lost the connection to a TIBCO Enterprise Message Service server, the engine did not attempt to reconnect.
5.0.1	BE-13955	The JNDI User Name field in the JNDI Configuration, JMS Connection, and JDBC shared resources did not take a global variable. Now it does. Global variables are supported for all JNDI configuration fields in all three editors, that is, the JNDI Connection Factory, JNDI Context Url, JNDI User Name, and JNDI Password fields.
5.0.1	BE-13911	Using the unary minus operator with a concept property would cause an error when building the EAR.
5.0.1	BE-13859	If a project library had contained concepts, the project would throw an error at runtime.
5.0.1	BE-13649	The build EAR process was taking several hours for complex projects.
5.0.1	BE-13356	TIBCO BusinessEvents Studio did not start on SUSE Linux.
5.0.1	BE-13086	With JMS channels, event acknowledgement was not sent until after the event's time to live period expired, even when using the explicit client acknowledgement option.
5.0.1	BE-13575	An error was reported when loading a concept with a String property longer than 64KB.
5.0.1	BE-13528	The QName group of XPath functions was missing from the Function Argument Mapper in release 5.0.

Closed in Release	Key	Summary
5.0.1	BE-13346	With TIBCO BusinessEvents DataGrid as the cache provider, bulk deletes of hundreds of entities in a single RTC were slow.
5.0.1	BE-13221	With TIBCO BusinessEvents DataGrid clusters, process memory kept on growing.
5.0.1	BE-13121	When a backing store was disabled, PendingDBWrites JMX metrics were still updated.
5.0.1	BE-12989	In TIBCO BusinessEvents DataGrid clusters, cache only events with a TTL greater than zero were not expiring fast enough.
5.0.1	BE-12939	The memory consumption of some XSLT functions has been reduced.
5.0.1	BE-12882	TIBCO BusinessEvents DataGrid clusters sometimes did not discover nodes.
5.0.1	BE-12828	The Function Argument Mapper UI displayed the type of all time event properties as String.
5.0.1	BE-12872	It was not possible to add a custom serializer in TIBCO BusinessEvents Studio. Now the drop-down list allows text entry as well as selection from a list.
5.0.1	BE-12864	After a network disconnect and recovery, nodes in a TIBCO BusinessEvents DataGrid cluster stopped responding during the cluster discovery process.
5.0.1	BE-12738	Domain model entries were not case sensitive. Now m and M (for example) are recognized as different entries.
5.0.1	BE-12699	TThe MM server was not discovering the cluster topology when the host name was specified in the site topology editor using the fully qualified name. Now the host name is always resolved to its fully qualified domain name (even if the simple name is entered) and the host name is also validated against the IP address. If they don't resolve to the same host then an `UnknownHostException` is thrown.
5.0.1	BE-12657	Rule functions used for the rule ranking feature must have a Validity setting that includes Condition (Action Only is not sufficient). When an Action Only rule function was used, however, no validation error was thrown.

Closed in Release	Key	Summary
5.0.1	BE-12550	There was a memory leak in the cache server when TIBCO BusinessEvents DataGrid was the cache provider and a backing store was enabled.
5.0.1	BE-12541	The abs function was missing from the Function Argument Mapper in version 5.0.0.
5.0.1	BE-12537	TIBCO Administrator could not deploy a TIBCO BusinessEvents EAR file that contained Rational Clearcase files. (Such files would be present in a project that had been checked out of Rational Clearcase before the EAR file was built.)
5.0.1	BE-12525	The be-jdbc deploy utility did not create tables for objects located in a subfolder called "core."
5.0.1	BE-12520	The LDAP admin password is now encrypted.
5.0.1	BE-12519	A memory leak occurred during bulk deletes of concepts in a single RTC.
5.0.1	BE-12299	The Quick Fix feature was creating incomplete concept property entries. Errors occurred as a result, when using the concept properties in the rule editor and when building an EAR file.
5.0.1	BE-12146	TIBCO BusinessEvents engines acting as SOAP clients did not support the TOMCAT server type. When requests were sent using HTTP.sendRequest() or HTTP.sendAsynchronousRequest(), the SoapEventOut and the callback rule function were not created and an NPE was thrown.
5.0.1	BE-12549	With TIBCO BusinessEvents DataGrid as the cache provider, the engine threw the exception: `Found in ObjectTable but not in base table. Possible race condition`
5.0.1	BE-12083	An exception in RTCTransactionManager.TxnTask_Actions.run() prevented the Post RTC from completing.
5.0.1	BE-11768	The runtime value of global variables of type Boolean was always false.

Closed in Release	Key	Summary

5.0.1	BE-8483	When using a JMS channel configured for SSL, with Client Authentication enabled and a Certificate/Private Key combination used for the Identity Resource on the client side, the engine would throw a `javax.jms.JMSSecurityException` error.
		
		This is due to a limitation in the default security libraries. For this feature to work in TIBCO BusinessEvents, you can use Entrust security libraries, which are part of the TIBCO Runtime Agent installation. To use entrust, do the following:
		
		• Add the entrust libraries to the classpath. For example:
		
		`C:/tibco/tpcl/5.6/lib/entrust`
		
		• In the `be-engine.tra` file, add this line:
		
		`TIBCO_SECURITY_VENDOR=entrust61`

5.0.1	1-ANUYMG	Refactoring did not work well in the Domain Objects section of the Cluster tab in the CDD Editor. Changes made to TIBCO BusinessEvents entities such as events, concepts and so on were not reflected in this section of the editor.
5.0.1	1-9CDYRL	Starting with the 3.0 release, the TIBCO BusinessEvents API worked only with In Memory object management. (It did not work with Persistence or Cache object management).
5.0.1	1-86QOZR	Using `sendEvent()` to send an event to an IBM MQ JMS server failed.
5.0.1	1-ASPLV7	If a TIBCO BusinessEvents 3.x project refers to a project library that has global variables, and the project is imported into TIBCO BusinessEvents Studio, the project did not have the global variables.
5.0.0	BE-9888	In TIBCO BusinessEvents Studio, the UI showed errors if Ontology functions were not called properly in the rule editor.
5.0.0	BE-2899	If the `be-jdbcdeploy` utility created lines longer than 2499 characters, SQL scripts failed to execute.
5.0.0	BE-2651	The `engine.primary.activated` advisory event was sent twice during startup.
5.0.0	BE-1621	The ontology function template for the timer event closure attribute indicated that it could accept objects, but it can accept only Strings (as documented).

Closed in Release	Key	Summary
5.0.0	BE-1264	Engines did not automatically try to reconnect to TIBCO Enterprise Message Service server when the connection was lost.
5.0.0	BE-11932	TIBCO BusinessEvents now validates whether a channel's queue destination subject is populated.
5.0.0	BE-11931	Fault tolerance did not work correctly with RVCM transport.
5.0.0	BE-11929	Use of `sendEvent()` to send an event to an MQ Series destination failed when called from a rule that had a TimeEvent in the declaration.
5.0.0	BE-10980	Building an EAR file for a project that contained a project library caused an exception.
5.0.0	BE-10498	When JDBC backing store was used, the TIBCO BusinessEvents engine threw an error when attempting to store and retrieve a concept that had a contained concept array, with history.
5.0.0	BE-10494	In the MM component, it was not possible to edit global variables when the global variables' total character length exceeded 8192.
5.0.0	BE-10394	Import WSDL was not working for abstract WSDLs.
5.0.0	BE-10332	Returning a concept array in a rule function was causing an error at engine start-up.
5.0.0	BE-10322	When a field name exceeded 30 characters, sometimes the `be-jdbcdeploy` utility did not generate SQL scripts correctly.
5.0.0	BE-10321	Global variables with an empty value and defined with type Password did display an encrypted value.
5.0.0	BE-10299	The `studio-tools` command-line utility for building EAR files was throwing an exception when a project includes any custom function that took a concept array as a parameter.
5.0.0	BE-10295	In the Function Argument Mapper, when the `@id` attribute of an input was mapped to a concept reference property in the Function panel, the value of the concept reference property was set to null. This problem did not occur in the context of a rule function used as a start up function.

Closed in Release	Key	Summary
5.0.0	BE-10237	After setting the following property to true in `studio.ini`: `TIBCO.BE.function.catalog.Instance.serialize.instance` The `Instance.serializeInstance()` function showed only nulls at runtime.
5.0.0	BE-10172	It was not possible to externalize SSL certificates. They could only be stored in the project. Now you can store trusted certificates outside of the project and use the following global variable to point to the certificate storage location: `BE_GLOBAL_TRUSTED_CA_STORE` This variable is documented in *TIBCO BusinessEvents Developer's Guide*.
5.0.0	BE-10056	With JDBC backing store, database cursors were not properly closed when `Coherence.C_CacheLoadEventById()` method was called with a 'non-existent' id. Under some circumstances this could cause database cursors to expire.
5.0.0	BE-10031	There was no way to identify which post RTC transactions failed or which events were not sent out during the post RTC phase. Now you can register a callback function with TIBCO BusinessEvents. The transaction error handler rule function is invoked each time a database transaction exception occurs, and each time a send event exception occurs. See section on Transaction Error Handler Rule Function in *TIBCO BusinessEvents Developer's Guide* for details.
5.0.0	BE-9908	In TIBCO BusinessEvents Studio, the UI showed errors if Ontology functions were not called properly in the rule editor.

Closed in Release	Key	Summary
5.0.0	BE-9898	After importing a TIBCO BusinessEvents project from a different workspace and giving it a different name from the original name of the project, some project resources are not available, due to the project naming structure.
		Before, you had to open the affected files in a text editor and manually fix the naming.
		Now, a resource validation check detects when an entity's name, folder, namespace, or owner project name (`ownerProjectName` attribute) does not match the underlying file in the project.
		In addition, a "Quick Fix" feature has been added. To invoke the Quick Fix, right click on the validation problem in the Problems View and select "Quick Fix."
		This is documented in *TIBCO BusinessEvents Developer's Guide*
5.0.0	BE-9870	Upgrading to latest Coherence libraries was throwing "Storage Not Configured" errors.
5.0.0	BE-9645	When you right-clicked a project name in Studio Explorer, the Refactor > Rename option was not available.
5.0.0	BE-9644	With Cache object management, and when cache-aside was not used, "Storage Not Configured" errors were sometimes seen while starting up inference engines, even when the cluster was configured properly and the cache server or servers were up and running.
5.0.0	BE-9603	No TIBCO BusinessEvents agents started when the input destinations for any one agent in the CDD were configured such that the directly configured destinations and referenced collections of destinations were listed in mixed order.
5.0.0	BE-9429	In TIBCO BusinessEvents Studio, the CDD was correctly updated for refactoring changes, but if the CDD file was open for editing in TIBCO BusinessEvents Studio when the changes were made, the open file did not reflect the changes. Additionally, the Save button became enabled. If you then saved the CDD file, the old paths were retained and overwrote the correct ones.
5.0.0	BE-9425	TIBCO BusinessEvents did not create an EAR file when any event had a high value for the time-to-live (TTL) setting, for example, 35 days.

Closed in Release	Key	Summary
5.0.0	BE-8487	On the AIX platform, when a backing store was used, a `NoClassDefFoundError` was thrown when trying to start engines.
5.0.0	BE-7354	Refactoring did not work well in the Domain Objects section of the Cluster tab in the CDD Editor. Changes made to TIBCO BusinessEvents entities such as events, concepts and so on were not reflected.
5.0.0	BE-5802	Shortcut keys "Shift+Home", "Shift+End", "Home", "End" did not work in the Form editor for Rules and Rule Functions. For the TIBCO BusinessEvents Decision Manager state modeler feature, the shortcut keys also did not work in the rule and expression editors.
5.0.0	BE-5264	If the payload of a SOAPEvent was invalid or had been deleted, and another event inherited from this event, project validation did not report that the payload of the inheriting event was invalid
5.0.0	BE-5173	Even after successful generation of the EAR file, TIBCO BusinessEvents Studio did not always show the message "EAR File was successfully generated."

Known Issues

The table in this section lists known issues in this release.

 TIBCO BusinessEvents Express Content relating to Berkeley DB OM, Cache OM, and backing store is not relevant to TIBCO BusinessEvents Express edition.

Key	Summary/Workaround

BE-21471	**Summary** The `as-convert` utility might give error while converting shared nothing files from one format to another.
	
	Workaround The `as-convert` utility gives error while converting a shared nothing file, which have the view count as zero.
	
	When error occurs, run the `as-dump` utility on the file to check if the view count is zero. When the view count is zero, the `as-dump` utility gives the output similar to the following output:
	
	`<Exception>`
	`FileProcessor.cpp: 69: initFile: file_header_invalid -`
	`file_name=/Users/Work/tibco/data/ms/dist-unlimited-bs-readOnly-met`
	`a1--be_gen_Events_GetInfo/cache-6/cache-6_store_1412048660, load`
	`view number is zero`
	`</Exception>`.
	
	If the view count is zero, you can ignore the error (which should be a warning instead).

Key	Summary/Workaround
BE-21230	**Summary** On some UNIX platforms like zLinux, HP, AIX or Solaris, the studio-tools utility might not launch properly due to corruption of the configuration area.
	Workaround The issue is due to a corrupt configuration area. Some necessary third party plugins are removed from the configuration file, and are not loaded. In case of failure, follow the below steps:
	1. Rename the `eclipse-platform/eclipse/dropins/eclipse` directory to any other name, for example, `eclipse-platform/eclipse/dropins/eclipse.moved`.
	2. Run the studio-tools utility.
	3. After the successful execution of the studio-tools utility, rename the directory (`eclipse.moved`) to `eclipse` again.
	4. Run the studio-tools utility again.
	As a result of renaming the eclipse directory, eclipse regenerates the `bundles.info` file, as the files have changed locations.
BE-21056	**Summary** The TIBCO BusinessEvents Installation guide mentions that all TIBCO BusinessEvents users must have read, write, and execute permissions for the `bin` directory and the following should be executed:
	`chmod 777 /opt/tibco/be/5.1/bin/`
	The numerical `777` gives permission to all non-binary owners as well for read, write, and execute. This permission level does not meet the corporate security standard.
	Workaround Use `755` permission, by which only the binary owner has the write permission.
BE-21005	**Summary** Importing the DBConcepts projects with events gives a few errors regarding the owner path.
	Workaround Use the Quick Fix options to resolve the issue.
BE-20960	**Summary** The function `Cluster.scheduleRepeatingEvent()` is not mentioned in the 5.1.3 release notes as a new functionality. Also, it is not present in the online documentation present on the docsite for the catalog functions.
	Workaround None

Key	Summary/Workaround
BE-20818	**Summary** When a cache server is started with CSH shell in AIX, the engine crashes with coredump. **Workaround** Use BASH shell instead.
BE-20678	**Summary** After enabling TIBCO Hawk 5.1.0, the PU is not shown as started in the MM UI. **Workaround** Use TIBCO Hawk 4.9 instead.
BE-20446	**Summary** Semicolon (;) is not used as column separator while generating a test data template. **Workaround** None.
BE-20329	**Summary** The parallel recovery check box is not needed and should be removed from CDD. **Workaround** None. Ignore the checkbox.
BE-20081	**Summary** Win 32-bit Installation: TIBCO BusinessEvents engine does not start from the console and throws the error `"Error occurred during initialization of VM java/lang/NoClassDefFoundError: java/lang/invoke/AdapterMethodHandle"`. **Workaround** When TIBCO BusinessEvents is installed over an existing 5.1.1 installation, the environment variable `tibco.env.JVM_LIB_PATH` in `*.tra` files must be corrected to point to `TIBCO_HOME/tibcojre/1.7.0/bin/client/jvm.dll`.
BE-20078	**Summary** Sometime when shutting down MM, you might get an INVALID_OBJECT exception. **Workaround** None.
BE-20056	**Summary** When username or password for TIBCO BusinessEvents WebStudio contains multibyte characters, login fails for file based authentication. **Workaround** Do not use multibyte characters in username and password.
BE-20036	**Summary** Running be-engine, RMS, MM, and Views engine as a Windows service requires Hawk and Rendezvous to be installed on the same machine where the Windows Service is setup, even if Hawk and Rendezvous are not used by TIBCO BusinessEvents. **Workaround** Install TIBCO Hawk and TIBCO Rendezvous.

Key	Summary/Workaround
BE-19937	**Summary** When the ODBC driver (`ojdbc.jar`) is present at `lib\ext\tpcl`, the stopChannel catalog function throws exception during runtime. **Workaround** Use patched version of the ODBC driver (`ojdbc.jar`).
BE-18100	**Summary** TIBCO BusinessEvents Hawk Channel does not work with TIBCO Hawk version 5.0 or 5.1 **Workaround** Use TIBCO Hawk version 4.9 instead.
BE-17943	**Summary** In TIBCO BusinessEvents Studio, the values of environment variables are overwritten if the variable have same name, irrespective of whether variables are written in different cases. For example, Path and PATH are both processed as same variable. **Workaround** None.
BE-17886	**Summary** While TIBCO BusinessEvents DataGrid can run on virtual machines (VMs) in most environments, the following issues have been observed under some circumstances: • IP multicast on VMs has unpredictable latency times, and sometimes drops data, which causes GMP multicast to fail or cause various issues. • VMWare snapshots might cause members to disconnect from each other. • When running on VMs in Linux 32-bit and 64-bit environments, or on Solaris x86 32-bit or 64-bit environments, multicast discovery sometimes fails or suspends. This occurs more often with TIBCO RV discovery than with PGM discovery. **Workaround** None.
BE-17812	**Summary** The Create JDBC deployment scripts wizard fails to browse and find the CDD files if the CDD files for the project are nested in a folder under the Deployments folder. For example, if the CDD file is under `/Deployments/runtime/mycdd.cdd` rather than `/Deployments/mycdd.cdd`, the wizard fails to find `mycdd.cdd`. **Workaround** Enter the path to the CDD file manually to proceed.
BE-17793	**Summary** Opening the Table Analyzer for decision tables with large number of rows sometimes throws an exception at the client side. Also, the analyzer fails when the decision table has more than 10000 rows. **Workaround** None.

Key	Summary/Workaround
BE-17708	**Summary** When installing a 32-bit version of TIBCO BusinessEvents on a 64-bit system, an error "Failure to create the Java Virtual Machine" may sometimes be thrown. Consequently, the TIBCO BusinessEvents applications such as Studio, be-engine.exe, be-rms.exe, and be-mm.exe fail to start. **Workaround** Edit the configuration file for the TIBCO BusinessEvents applications and reduce the heap size to -Xms512m and -Xmx512m.
BE-17564	**Summary** An error may sometimes be thrown when starting TIBCO BusinessEvents Studio after successfully installing TIBCO BusinessEvents 5.1.1. **Workaround** Run the command studio.exe -clean -noSplash to start Studio.
BE-17310	**Summary** When using shared nothing persistence option, the field names in TIBCO BusinessEvents cannot start with an underscore character ("_"). **Workaround** Ensure that field name does not start with an underscore ("_") character.
BE-17293	**Summary** In Load Balancer a runtime exception is thrown when the TTL for an event elapses and the event is not consumed. **Workaround** None.
BE-17291	**Summary** Under ActiveSpaces and Berkeley DB mechanism, with only one cache and inference running, if only the cache agent is restarted the data discrepancy occurs. **Workaround** Restart the whole cluster if only one cache agent is available in the cluster or keep more than one cache agents in the cluster.
BE-17212	**Summary** When binding variables are used within the XPath mapper, their values are shown as null. **Workaround** None.
BE-17097	**Summary** The value for \<type\> element in the deployment configuration file is incorrect when the file is generated using the export option of the AppManage utility. **Workaround** Edit the generated deployment configuration file and set the value of the \<type\> element to "be".
BE-17063	**Summary** The editor gives error when scorecard is used as argument for the modify statement in the rule template. **Workaround** In the rule template, scorecard can be the argument of a modify statement only if it is declared in the rule scope.

Key	Summary/Workaround
BE-16990	**Summary** After log-in, if RMS server is restarted, then re-login of same user gives the `UniqueConstraintException`. The issue happens if RMS server is started with Berkley DB configuration. **Workaround** None.
BE-16650	**Summary** Starting any PU after deployment results in an exception if TIBCO Runtime Agent 5.7.0 is installed after installing TIBCO BusinessEvents. However, there is no problem when using TIBCO Runtime Agent 5.7.4. **Workaround** It is recommended to use TIBCO Runtime Agent 5.7.4 independently, without any prior installation of TIBCO Runtime Agent 5.7.0.
BE-16615	**Summary** When WebStudio runs in Microsoft Internet Explorer 9.0 browser, double click on any decision table cell do not make it editable. **Workaround** None.
BE-16409	**Summary** Dragging and dropping artifacts on DT is unavailable on Red Hat Linux 6 platform. **Workaround** None.
BE-15873	**Summary** Stopping all the discovery nodes (using Ctrl+C) causes exceptions to be thrown. **Workaround** Run multiple discovery nodes instead of a single discovery node.
BE-15728	**Summary** When TIBCO BusinessEvents is using TIBCO BusinessEvents DataGrid cache and a database that is on a WAN (at a large physical distance), event processing becomes slow and can lead to DataGrid timeouts. **Workaround** None.
BE-15720	**Summary** Fully qualified name of concept should be used for the create command in rule template, for example, `create Concept.<conceptname>`. **Workaround** None.
BE-15114	**Summary** A `NullPointerException` was thrown on the low priority inference agent when performing a fail over using `maxActive` property. This was observed when using the TIBCO Cache Provider with backing store. **Workaround** Configure the EMS queues to be exclusive when `maxActive = 1`. Set the priority on inference engines to be the same.

Key	Summary/Workaround
BE-14951	**Summary** The XPath builder does not list the attributes of a complex type defined in a WSDL file. **Workaround** None.
BE-14740	**Summary** Rule-based timer events are not recovered in cache only mode. **Workaround** Use a scheduler instead of the timer events.
BE-14585	**Summary** In a multi-agent environment, transitions are not processed when events with Cache+Memory Object Management are not sent in the order as defined in the state machine. **Workaround** None.
BE-13547	**Summary** With the cache aside backing store configuration, if the inference engine is killed after the transactions are published to cache, but before being committed to the database, data inconsistency between the cache and database is observed. **Workaround** Restart the cluster to fetch the correct records and republish the EMS messages.
BE-12056	**Summary** In some situations the TIBCO BusinessEvents Monitoring and Management server hangs while a console user switches from viewing one processing unit to viewing another. **Workaround** Restart the TIBCO BusinessEvents Monitoring and Management server.
BE-12055	**Summary** New members are unable to join the cluster if one of the existing nodes in the cluster is unresponsive. **Workaround** None.
BE-11709	**Summary** Shared resources cannot be opened in the RMS History tab. **Workaround** None.
BE-11687	**Summary** TIBCO BusinessEvents Monitoring and Management server does not support double byte characters in the project name. **Workaround** Do not use double byte characters in the project name.
BE-11616	**Summary** Profiler does not generate any output when running the engines in cache mode. **Workaround** None

Key	Summary/Workaround
BE-11587	**Summary** When the TIBCO BusinessEvents DataGrid cache provider is used, cache related statistics do not appear in the Monitoring and Management console. **Workaround** None
BE-11540	**Summary** TIBCO BusinessEvents Monitoring and Management server does not support double byte characters in the site topology file name. **Workaround** Do not use double byte characters in the site topology file name.
BE-11535	**Summary** TIBCO BusinessEvents Monitoring and Management server does not support double byte characters in site topology processing unit configuration names. **Workaround** Do not use double byte characters in site topology processing unit configuration names.
BE-10835	**Summary** Renaming or moving or deleting Identity Shared Resources is not reflected in the HTTP SSL Configuration for HTTPS Connection dialog box. **Workaround** None
BE-9838	**Summary** This issue occurs when using the XSLT mapper, if "Surround with Choice" is used on an attribute, and you click "OK" without populating the final `[When]` condition. When the mapper is later reopened, the final `When` statement no longer surrounds the attribute and the mapper shows an empty 'When' attribute. **Workaround** Complete all `[When]` conditions when "Surround with Choice" is used.
BE-9837	**Summary** This issue occurs when using the XSLT mapper, if "Surround with Choice" is used on an attribute and you click "OK" without populating the [When] conditions. When the mapper is later reopened, the `when` statement no longer surrounds the attribute and the mapper shows an empty 'Choose/When' attribute. **Workaround** Complete the condition before clicking "OK."
BE-9836	**Summary** This issue occurs when using the XSLT mapper, if "Surround with If" is used on an attribute and you click "OK" without populating the condition. When the mapper is later reopened, the `if` no longer surrounds the attribute and the mapper shows an empty 'If' attribute. **Workaround** Complete the condition before clicking "OK."

Key	Summary/Workaround
BE-9174	**Summary** In projects that involve integration with TIBCO ActiveMatrix BusinessWorks, changes made to the TIBCO BusinessEvents EAR file while TIBCO Designer is open are not reflected in the ActiveMatrix BusinessWorks plug-in activities, such as SendEvent. (The EAR file is referenced in the RuleServiceProvider Configuration Resource in TIBCO Designer.) **Workaround** Restart TIBCO Designer to load the changes in the EAR file.
BE-8445	**Summary** If the TIBCO Designer™ Add-in for TIBCO Business Studio™ product required by TIBCO ActiveMatrix BusinessWorks is installed in the same Eclipse environment as TIBCO BusinessEvents Studio, enterprise archive generation fails for TIBCO BusinessEvents Studio projects. **Workaround** None.
1-AUKJNT	**Summary** The ActiveMatrix BusinessWorks `InvokeRuleFunction` activity sometimes throws a `java.lang.StackOverFlowException`. **Workaround** None.
1-ATETI4	**Summary** When using the command-line `buildear` tool to generate an enterprise archive for TIBCO BusinessEvents Studio project that was imported from a 3.x TIBCO Designer project, sometimes this harmless exception may be thrown even when the EAR file generates successfully: `org.eclipse.core.internal.resources.ResourceException`
1-APZLY5	**Summary** The TIBCO BusinessEvents Monitoring and Management server occasionally throws a `NullPointerException` when the server is shutting down **Workaround** None.
1-AP0B0E	**Summary** If a project refers to a project library, rule functions defined in the project library are not available for selection when defining event preprocessors in the CDD Editor. **Workaround** None.
1-AMQMGB	**Summary** Project Validation does not throw any errors if a non-existent global variable name is used in some TIBCO BusinessEvents entities such as Shared Resources and channels. **Workaround** None.
1-ALY1P5	**Summary** In the XPath formula builder, under the Logical functions category, if the `xor` function is used, a false warning "Always true" is shown. **Workaround** None.

Key	Summary/Workaround
1-AJ7M0T	**Summary** If you are using payloads in events that refer to an element inside an XSD and there are multiple XSDs present in the project with the same element, the TIBCO BusinessEvents engine throws a NullPointerException when deserializing an event with payload. **Workaround** Keep only the XSD that you need in your TIBCO BusinessEvents Studio project and remove the ones that are not needed.
1-AGWRLS	**Summary** In a JMS Connection Shared Resource, if the JNDI Configuration resource is renamed, the new name of the JNDI Configuration resource is not reflected in the JMS Connection Shared Resource. **Workaround** Manually update to the new name.
1-AF5OHI	**Summary** Unlike in TIBCO Designer, when a new project is created in Business Events Studio, some global variables such as Domain and Deployment are not created by default. **Workaround** Create these global variables manually.
1-AEQ6AE	**Summary** In the XSLT Mapper opened up by `Event.createEvent` or `Instance.createInstance` functions, no validation error is thrown if a non scalar value such as a node is dragged and dropped onto the input of a field that can only accept a scalar value. **Workaround** None.
1-AE3GXX	**Summary** In JMS channels, `CLIENT_ACKNOWLEDGE` acknowledgement mode does not roll back pre-fetched and unacknowledged JMS messages to the queue when the TIBCO BusinessEvents engine stops responding. **Workaround** None.
1-ABTGG7	**Summary** TIBCO BusinessEvents Studio cannot Reset to the original schema after having made changes to the schema in a mapper. **Workaround** Undo the changes manually.
1-ABDH3C	**Summary** Even after successful generation of the EAR file, TIBCO BusinessEvents Studio may not always show the message "Ear File was successfully generated." **Workaround** Check whether the EAR file generated or not.
1-919P9B	**Summary** You cannot assign a `DateTime` to a bind variable in queries. **Workaround** In the query, use `/#Datetime/parseLong($milliseconds)` and pass a long integer in `$milliseconds`.

Key	Summary/Workaround
1-9146V5	**Summary** In queries, the type of a bind variable is enforced by its surrounding expression. **Workaround** In the query, use the following expressions to assign the desired type to the bind variable `$x`: • For int and long use: `($x + 0)` • For double use: `($x + .0)` • For String use: `($x || "")` • For Boolean use: `($x or false)` • For DateTime, pass a long instead of a DateTime and use: `/#Datetime/parseLong($x)`
1-8YHHBD	**Summary** When ActiveMatrix BusinessWorks is contained within TIBCO BusinessEvents, JAR files that are part of an alias library should be extracted from the EAR during the deployment process, but are not. **Workaround** Manually place the JAR files in the classpath.
1-8KLNE4	**Summary** If the location of the persistence database directory is specified using the Database Environment Directory field in the Object Management tab, persistence files are created in the root directory. **Workaround** Specify the location using the property `be.engine.om.berkeleydb.dbenv`. The files are then placed in a directory whose name matches the BAR name.
1-8A9FA9	**Summary** When you use the XPath mapper to assign a concept to a field of type `any` in the payload of an event, and that concept has a contained concept property with an `extId` that is not `null`, the following exception occurs: `ExtIdAlreadyBoundException: Event is already bound to` *extId* Where *extID* is the instance extId of the concept or its contained concept. **Workaround** None.
1-7UGVMG	**Summary** Async checkpoint is not working. **Workaround** Use sync checkpoint. It is enabled by default.

Key	Summary/Workaround
1-7M7QOT	**Summary** The hot deployment feature does not handle changes made to non-TIBCO BusinessEvents resources, specifically JMS or Rendezvous connection resources. **Workaround** If you need to change these resources, you must restart the TIBCO BusinessEvents engine.
1-6MMNZW	**Summary** When a primary statemachine's concept is moved to a folder, then secondary statemachine's path to the called primary statemachine does not get updated. **Workaround** Update it manually.
1-630PGL	**Summary** Assigning an empty string ("") to a field in a mapper function will result in a null string. **Workaround** Set `TIBCO.BE.xsltVersion` to 2.0 in the `designer.tra` file and regenerate the mapper XSLT template by opening the mapper function and clicking OK. (This is a non-supported feature because it is part of the XSLT 2.0 specification, which the W3C has not yet released.)

Appendix A **Documentation for New Functionality for Release 5.1.1**

This appendix provides additional details for some items listed in the section New Features on page 2 for Release 5.1.1.

Topics

In-Memory Performance Statistics Specifications

All Destinations Stat MBean [com.tibco.be.Agent.<AgentID>.Stats. Destinations.All]

Operation Name	Return Type	Notes
getStats(nameOrExpression)	- String name - long eventsReceivedPerSecond - String lastEventReceived - long totalEventsReceived - long totalEventsSent	Search for stats using a full name or a regular expression. Use *<blank>* as argument to get all known destinations.
getStatsByEventsReceived(nameOrExpression, boolean ascending)	- String name - long eventsReceivedPerSecond - String lastEventReceived - long totalEventsReceived - long totalEventsSent	Search for stats using a full name or a regular expression sorted by events received (ascending or descending). Use *<blank>* as argument to get all known destinations.
getStatsByEventsSent (nameOrExpression, boolean ascending)	- String name - long eventsReceivedPerSecond - String lastEventReceived - long totalEventsReceived - long totalEventsSent	Search for stats using a full name or a regular expression sorted by events sent (ascending or descending). Use *<blank>* as argument to get all known destinations.

<Destination Name> Stat MBean [com.tibco.be.Agent.<AgentID>.Stats. Destinations.<Destination Name>]

Operation Name	Return Type	Notes
getEventsReceivedPerSecond	long	The running events received per second (will be revised every time an event is received). If no event is received, then it shows the last computed value.
getLastEventReceived	long	Shows the time when the last "events received per second" was calculated. Effectively, it shows when the last event was received on a destination.
getTotalEventsReceived	long	The total number of events received after the destination became active.
getTotalEventsSent	long	The total number of events sent after the destination became active.

Engine Stat MBean [com.tibco.be.Agent.<AgentID>.Stats. Engine]

Operation Name	Return Type	Notes
getTotalRTCs	long	Total number of RTCs.
getAverageRTCTime	double	The average RTC time (in msecs).
getRulePerformanceStats(nameOrExpression)	• String uriOrSignature • long invocationCount • double averageProcessingTime • double averageConditionProcessingTime	Search for rule stats using a full name or a regular expression. Use *<blank>* as argument to get all known rules/rule functions.

Operation Name	Return Type	Notes
getRulePerformanceStatsByProcessingTime(nameOrExpression, ascending)	• String uriOrSignature • long invocationCount • double averageProcessingTime • double averageConditionProcessingTime	Search for stats using a full name or a regular expression sorted by processing time (ascending or descending). Use *<blank>* as argument to get all known rules/rule functions.
getRulePerformanceStatsByConditionProcessingTime(nameOrExpression, ascending)	• String uriOrSignature • long invocationCount • double averageProcessingTime • double averageConditionProcessingTime	Search for stats using a full name or a regular expression sorted by condition processing time (ascending or descending). Use *<blank>* as argument to get all known rules/rule functions.

Event Stats MBean [com.tibco.be.Agent.<AgentID>.Stats.Event]

Operation Name	Return Type	Notes
getAverageEventProcessingTime	double	The average processing time per event.
getEventsPerSecond	long	The running events received per second (will be revised every time an event is processed). If no event is processed, then shows the last computed value.
getLastEventProcessedTime	long	Shows the time when the last "events per second" was calculated. Effectively, it shows when the last event was processed
getTimerEventsFired	double	The number of timer events fired.
getTotalEventsReceived	long	The total number of events processed (includes timer events).

**Scorecard Based Stat Deployer MBean
[com.tibco.be.Agent.<AgentID>.Stats. UserDefinedStats]**

Operation Name	Return Type	Notes
register (namepattern)	Integer (count of registered ScoreCards	The MBean finds all the scorecards matching the name pattern and wraps them with a dynamic MBean. Each score card MBean is registered as [com.tibco.be.Agent.<AgentID>.Stats. scorecard.<ScoreCardName>].
unregister (namepattern)	Integer (count of unregistered ScoreCards	

**All Thread Pool/ Job Queue Stat MBean
[com.tibco.be.Agent.<AgentID>.Stats. tpool.All]**

Operation Name	Return Type	Notes
getStats(nameOrExpression)	• String name • long activeThreads • long maximumThreads • long queueCapacity • long queueSize	Search for stats using a full name or a regular expression. Use *<blank>* as argument to get all known thread pools.
getStatsByActiveThread(nameOrExpression, boolean ascending)	• String name • long activeThreads • long maximumThreads • long queueCapacity • long queueSize	Search for stats using a full name or a regular expression sorted by active thread count(ascending or descending). Use *<blank>* as argument to get all known thread pools.
getStatsByQueueSize (nameOrExpression, boolean ascending)	• String name • long activeThreads • long maximumThreads • long queueCapacity • long queueSize	Search for stats using a full name or a regular expression sorted by queue size(ascending or descending). Use *<blank>* as argument to get all known thread pools.

<Thread Pool Name> Stat MBean [com.tibco.be.Agent.<AgentID>.Stats. tpool_jqueue.<Thread Pool Name>]

Operation Name	Return Type	Notes
getActiveThreads	long	The total number of active threads.
getMaximumThreads	long	The maximum number of threads in the thread pool.
getQueueCapacity	long	The capacity of the job queue associated with the thread pool.
getQueueSize	long	The number of jobs in the queue associated with the thread pool.

Appendix B **Documentation for Changed Functionality for Release 5.0.1**

This appendix provides additional details for some items listed in the section Changes in Functionality on page 15 for Release 5.0.1.

Topics

Enabling Studio Tools buildEar operation on Solaris SPARC

The `buildEar` operation in the `studio-tools` command line utility now works on Solaris SPARC platforms, with configuration.

To enable Solaris installations to execute the studio-tools command line utility buildEar operation, follow the steps below.

1. Install TIBCO BusinessEvents 32-bit 5.0.1 on a Solaris SPARC 64-bit machine.

2. Install TIBCO BusinessEvents 32-bit 5.0.1 on a Linux machine.

3. Download and install Eclipse 3.4.2 for Solaris SPARC. You can download the software from this location:

http://archive.eclipse.org/eclipse/downloads/drops/R-3.4.2-200902111700/index.php

Select the following option: Solaris 10 (SPARC/GTK 2). The filename is `eclipse-SDK-3.4.2-solaris-gtk.zip`.

4. Copy the following files from a Linux installation to the corresponding file location in the Solaris installation:

BE_HOME/studio/eclipse/plugins

BE_HOME/studio/bin/studio-tools.tra

BE_HOME/eclipse-platform/eclipse/links/TIBCOBusinessEvents-Studio-plugins.link

BE_HOME/eclipse-platform/eclipse/plugins/*emf*

BE_HOME/eclipse-platform/eclipse/plugins/*uml*

BE_HOME/eclipse-platform/eclipse/plugins/javax.xml_1.3.4.*.jar

BE_HOME/eclipse-platform/eclipse/plugins/org.apache.commons.codec_1.3.0.*.jar

BE_HOME/eclipse-platform/eclipse/plugins/org.apache.commons.httpclient_3.1.0.*.jar

BE_HOME/eclipse-platform/eclipse/plugins/org.apache.commons.lang_2.3.0.*.jar

BE_HOME/eclipse-platform/eclipse/plugins/org.apache.xerces_2.9.0.*.jar

BE_HOME/eclipse-platform/eclipse/plugins/org.apache.xml.resolver_1.2.0.*.jar

BE_HOME/eclipse-platform/eclipse/plugins/org.apache.xml.serializer_2.7.1.*.jar

---

5. On the Solaris machine, edit the following file:

    BE_HOME/studio/bin/studio-tools.tra

    Specify the appropriate environment paths for all path variables such as `TIB_HOME`, `BE_HOME`, `TIB_JAVA_HOME`, `JVM_LIB_PATH` and so on.

6. On the Solaris machine, edit the following file:

BE_HOME`/eclipse-platform/eclipse/links/TIBCOBusinessEvents-Studio-plugins.link`

> Specify the path to the TIBCO BusinessEvents Studio plugins, as appropriate for the Solaris installation.

7. Copy the wrapper executable from *TIBCO_HOME*`/tools/wrapper/wrap` (or `wrap64`) to *BE_HOME*`/studio/bin/studio-tools`.

8. Change directory to *BE_HOME*`/eclipse-platform/eclipse` and run the command:

```
eclipse –clean -initialize
```

You can now execute the `studio-tools buildEar` operation. See *TIBCO BusinessEvents Developer's Guide* for details.

Using Public/Private Key Authentication with mm-tools

With the TIBCO BusinessEvents Monitoring and Management mm-tools component, it was not possible to authenticate a user using certificates when performing `deploy` and remote `start` and `stop` operations. (See Changes in Functionality on page 15 for details about the `stop` operation.)

Now you can use this functionality as follows.

1. On the computer hosting the MM server, use a utility to create a public/private key pair. The `ssh-keygen` utility is widely available. Two files are generated. They are referred to as follows:

   PK_FILE_NAME: The file containing the private key.

   PK_FILE_NAME`.pub`: The file containing the public key.

   Optionally, you can specify a passphrase.

   Place both generated files in the same directory on the computer hosting the MM server. For example, put them in *BE_HOME*`/mm/certificates`.

2. On computers hosting the to-be-monitored cluster PUs that you want to remotely deploy, start, or stop, copy the contents of the *PK_FILE_NAME*`.pub` file to the file containing the list of authorized keys for the user who will be logging in remotely.

   For example, for SSH using certificates for authentication, the authorized keys file is called 'authorized_keys' and it is stored in the `.ssh` directory of the user who will be logging in remotely, that is, in `~/.ssh/authorized_keys`.

3. When executing a command with mm-tools, use these new options:

   `-pkf` The fully qualified path to the *PK_FILE_NAME* file, that is, the file with the private key.

   `-pph` The passphrase, if you specified one when creating the public/private key pair. (The following example shows the -pph option.)

Example Commands

Remote Deploy:

```
mm-tools --propFile mm-tools.tra -op deploy -m 100.100.100.101 -pkf
BE_HOME/mm/certificates/PK_FILE_NAME
```

Remote Deploy, with passphrase:

```
mm-tools --propFile mm-tools.tra -op deploy -m 100.100.100.101 -pkf
BE_HOME/mm/certificates/PK_FILE_NAME -pph passphrase
```

Remote Start:

```
mm-tools --propFile mm-tools.tra -op start -puc CS -m
100.100.100.101 -pkf BE_HOME/mm/certificates/PK_FILE_NAME
```

Remote Stop:

```
mm-tools --propFile mm-tools.tra -op stop -puc CS -m
100.100.100.101 -pkf BE_HOME/mm/certificates/PK_FILE_NAME
```

Embedded Persister with Shared-all Functionality

This form of data persistence uses TIBCO BusinessEvents DataGrid as the cache provider and Oracle Berkeley DB Java Edition software as the data store (not bundled with the TIBCO BusinessEvents software).

You must obtain a separate license for the Oracle Berkeley DB Java Edition software that is appropriate for your usage, if you want to use the embedded persister functionality.

With this shared-all persistence implementation, cache servers act as persisters, and provide the service of interacting with the persistence layer.

All cache nodes must have access to a reliable shared file system. The Berkeley DB database is created within this shared file system.

This feature provides following operations:

Reading from the Data Store

Persisters load data in bulk from the data store at startup.

The following functions are used to load individual concepts into cache:

```
CacheLoadConceptByExtIdByURI()
CacheLoadConceptById()
```

Writing to the Data Store

Data is flushed to the operating system buffers for every write operation. TIBCO BusinessEvents uses WRITE_NO_SYNC durability by default, which means that the Berkeley DB will flush every write to the operating system's buffers immediately but not call fsync. In case of an application crash, there will be no data loss as long as the underlying operating system synchronizes its buffers to disk.

Notes

- TIBCO BusinessEvents internally sets durability to WRITE_NO_SYNC durability. This behavior can be overridden by setting the je.txn.durability property in the je.properties file. See Configuring the Embedded Persister on page 121.

- The CacheLoadConceptByExtId() function is not supported when used with this feature.

- Scorecards are not persisted (and so cannot be recovered).

- Scheduler events are not persisted (and so cannot be recovered)

Configuring the Embedded Persister

This section explains how to configure the embedded persister.

1. Download the supported version of the Oracle Berkeley DB Java Edition software from the Oracle web site. Place the `je-4.1.17` JAR file in the following directory, as shown:

   BE_HOME`/hotfix/lib/ext/tpcl/je-4.1.17.jar`

> **No Impact on TIBCO BusinessEvents Decision Manager** An earlier version of Berkeley DB software is used for the TIBCO BusinessEvents Decision Manager RMS feature (`lib/ext/tpcl/je.jar`.). The Berkeley DB software you install for the embedded persister feature also works with RMS without any modifications. The location specified for the newer version is ahead of the existing software location in the classpath. Therefore conflicts are avoided.

2. Open the project CDD and in the Cluster tab, set the following:
   — Set object management type to Cache: right click Object Management in the navigation tree and select Cache.
   — Select Object Management in the navigation tree and in the Configuration panel, set the Provider to TIBCO.
   — Select Backing Store in the navigation tree and in the Configuration panel Enabled field, clear the check box, to ensure that backing store functionality is disabled.

3. To configure the cache agent, do the following (see Table 2, CDD Configuration Properties, on page 122 for details).
   a. Add and configure the following required properties in the CDD file:

      `be.engine.cluster.persistenceProvider`

      `be.backingstore.useobjecttable`

      `be.engine.cluster.as.lock.ttl`

   b. If you want to specify a non-default name and location for the datastore directory, add and configure the following property.
      `be.persistenceprovider.bdb.directory`

4. Save the CDD file and build project EAR files for deployment.

5. You can optionally override the datastore default configuration. In the directory where the datastore will be created, add a properties file and name it `je.properties`. Add and configure properties as explained in Table 3, Berkeley DB JE Properties, on page 124.

Reference to CDD Properties

This section provide a reference to the CDD properties

Table 2   CDD Configuration Properties

Property	Notes
Cache Agent Properties	
`be.engine.cluster.persistenceProvider`	Required. Specifies the implementation. Required value is as follows: `"com.tibco.cep.persister.ASBDBPersistenceProviderImpl"` Set at the cluster level. Do not change this value.
`be.backingstore.useobjecttable`	Required. Required value is `false`.
`be.engine.cluster.as.lock.ttl`	Required. Value is specified in milliseconds. Controls the time after which TIBCO BusinessEvents DataGrid will forcibly unlock a space key. Thirty seconds is a reasonable value when the system not operating under heavy load (More than 2000 transactions per second may required a longer timeout period). Default value is 30000.
`be.persistenceprovider.bdb.directory`	Optional. Specifies the name and file location of the database. If this property is not specified, a directory named `datastore` is created under the working directory. This property is required if you add a `je.properties` file and place it in a non-default location. (See Configuring the Embedded Persister on page 121 for details.)

Table 2   CDD Configuration Properties (Cont'd)

Property	Notes
Inference Agent Properties	
`be.engine.cluster.persistenceProvider`	
	Required. Specifies the implementation. Required value is: `"com.tibco.cep.persister.ASBDBPersistenceProviderImpl"` Do not change this value.
`be.backingstore.useobjecttable`	
	Required. Set to `false`.
`be.engine.cluster.as.lock.ttl`	
	Required. Value is specified in milliseconds. Controls the time after which TIBCO BusinessEvents DataGrid will forcibly unlock a space key. The default value of thirty seconds is a reasonable timeout for normal loads, such as less than 2000 transactions per second. Default value is 30000.
`be.engine.cluster.as.node.retry.times`	
	Required. Specifies the number of times TIBCO BusinessEvents retries a `put` or `putAll` call on the TIBCO BusinessEvents DataGrid cache. Each retry is done after five seconds. The number of retries depends on the `be.engine.cluster.as.lock.ttl` property. To calculate the value for retry times, use the following formula: `retry.times=lock.ttl/5+1` For example, if you set `be.engine.cluster.as.lock.ttl` to `30000`, then you would set the `be.engine.cluster.as.node.retry.times` value to 7.

Reference To Berkeley DB (JE) Properties

This section provides a reference to the Berkeley DB JE properties. See Configuring the Embedded Persister on page 121 for details about adding the properties file. For more details on the Berkeley DB JE properties, refer to the Berkeley DB product documentation:

http://www.oracle.com/technetwork/database/berkeleydb/je-faq-096044.html

http://docs.oracle.com/cd/E17277_02/html/GettingStartedGuide/administration.html#propertyfile

Table 3 Berkeley DB JE Properties

Property	Notes
`je.txn.durability`	Indicates the durability of a transaction. Possible values are `WRITE_NO_SYNC`, `NO_SYNC`, and `SYNC`. TIBCO BusinessEvents internally sets durability to `WRITE_NO_SYNC`. You can override that setting using this JE property.
`je.log.numBuffers`	The number of write buffers that the Berkeley DB uses internally. Default value is `3`.
`je.log.bufferSize`	The size of each write buffer. Default value is `1048576`.
`je.log.totalBufferBytes`	The sum of sizes of all the write buffers. Default value is `3145728`.
`je.maxMemoryPercent`	The percentage of the JVM maximum memory to which the cache is limited. Default value is 60%

Guidelines for Using Coherence Cache Provider

Documentation did not point to guidelines customers needed for using Coherence as the cache provider. The following links provide these guidelines:

Checklist and guidelines before architecting a new project:

http://download.oracle.com/docs/cd/E15357_01/coh.360/e15723/deploy_checklist.htm
http://download.oracle.com/docs/cd/E15357_01/coh.360/e15723/deploy_plat_consid.htm
http://download.oracle.com/docs/cd/E15357_01/coh.360/e15723/tune_perftune.htm

Coherence Network Protocol

http://download.oracle.com/docs/cd/E15357_01/coh.360/e15723/cluster_tcmp.htm
http://download.oracle.com/docs/cd/E15357_01/coh.360/e15723/tune_datagramtest.htm

Coherence Metrics

http://download.oracle.com/docs/cd/E15357_01/coh.360/e15723/appendix_mbean.htm
http://download.oracle.com/docs/cd/E15357_01/coh.360/e15723/appendix_operational.htm