

Date and Time Handling

This guide is intended to enable architects, developers and system administrators to understand how dates, times and time zones are handled in Blue Prism.

Blue Prism is commonly deployed across multiple time zones, and it is important to understand the way that dates and times are handled and processed by Blue Prism. This is necessary also for deployments where all devices are configured with common time zone settings where the selected time zone is subject to daylight saving adjustments.

The following product design principles relates should be considered:

- For storage and data transfer, an instant in time is always represented as UTC.
- Within the user interface, dates and times are commonly presented according to the user's local time preferences (as determined by the Operating System or browser).
- Schedule start times are saved based on the local time-zone settings of the device used to configure the schedule. Schedules are executed by the server based on the server's local time.

This data sheet illustrates these principles, and describes situations where there are exceptions when working with certain versions of the product.

Highlighted content within this guide indicates scenarios that are not consistent with the associated design principles.

Data Types

Within Blue Prism Processes, there are three data types related to the handling of dates and times:

- Time – represents a particular time of day.
- Date – represents a particular day.
- DateTime – represents a specific moment in time at a specific time in history.

Time zones are only relevant to the DateTime data type.

Session Logs

A session is an instance of a Process running (or Pending) on a Runtime Resource, initiated either by a Scheduled Task or directly in Control Room. This does not include running Processes directly from Process Studio. Session Logs record session start and end times and also the actions of a process as it is executed.

Logs can be accessed from within the system via the Session Management “View Log” option or from the view log functionality beneath Process Logs and Audit Logs beneath System – Audit.

	Version 5	Version 6/7
Stored as	Local time of the Application Server. Where a direct database connection is used, this will be the local time of the database server.	Local time of the Resource which executed the session along with UTC offset.
Displayed as	Local time of the Application Server. Where a direct database connection is used, this will be the local time of the database server.	Local time of the Resource which executed the session along with a UTC offset. User local time is available via tool-tip.
Exported as	Local time of the device which completed the export.	Local time of the Resource which executed the session.
Additional info	<p>Session logs are stored based on the local time of the application server (or the database if using a direct database connection). Session logs are exported based on the client local time where they are exported.</p> <p>The session log entries (i.e. the stage-level logs) are saved using the database time.</p> <p>It is essential that the Database Server, Application Server and Interactive Client must all have the same time zone, otherwise when viewing the session logs the log times will be incorrect.</p>	<p>Session logs are stored in the database in the local time of the resource which ran the session, along with an offset value which describes how the time zone of the resource relates to UTC. Session log times are displayed in the user interface as the local time on the resource when the session ran. Session logs are exported with the local time of the resource when the session was run along with a UTC offset.</p>

Audit Logs

Audit logs represented the significant changes performed by a user that are recorded in a log file for later inspection. Audit Logs record the date and time of each event and the user/resource/process/object involved. The time source for the associated timestamps is the database server.

	Version 5	Version 6/7
Stored as	UTC	UTC
Displayed as	User Local Time	User Local Time
Additional Info	The Application Server and Interactive Client must have the same time-zone. If they do not, the times in the audit log viewer will be offset by the difference between server and client.	

DateTime Data Items

DateTime Data items are used to store values that represent both a date and an associated time. While these can potentially be used to store information relating to any time zone, DateTime Data objects do not inherently contain any information that indicates what timezone the value relates to.

When they are subject to processing by Blue Prism, such as when passed to code stages, it is expected that the format of the stored value will be UTC.

Passing DateTime Data Items to and from Code Stages

	Version 5, 6, and 7
DateTime objects passed into Code Stages	UTC All DateTime Data Items passed into code stages are assumed to be UTC.
DateTime Data Items set from a Code Stage.	Values will be set based on the DateTime.Kind property of the DateTime object (variable) within the code stage: <ul style="list-style-type: none">• DateTime.Kind is set to Local or Unspecified: The value will be converted to UTC when it is saved to the Data Item.• DateTime.Kind is set to UTC, it will be saved to the Data Item as is.
Exported as	It is strongly recommended that DateTime code stage inputs are appropriately interpreted within the code stage. When data is saved to a DateTime Data Item if the value is assumed to not already be in UTC format, it will be converted prior to being saved.

Passing Collections which contain DateTime Data Items to and from Code Stages

When collections are used as inputs or outputs

	Version 5	Version 6
When used as inputs to a code stage	Local– DateTime Data Item values are assumed to be presented in Local time.	UTC – DateTime Data Items values are assumed to be presented in UTC.
When received as outputs from a code stage	UTC – Values will be processed based on the DateTime.Kind property of the DateTime object (variable) within the code stage: <ul style="list-style-type: none"> • DateTime.Kind is set to Local or Unspecified: The value will be converted to UTC when it is saved to the Data Item. • DateTime.Kind is set to UTC, it will be saved to the Data Item as is. 	
Additional Info	By default the DateTimeMode of the .NET DataTable is set to unspecified, therefore all DateTime objects will be assigned a Kind of Unspecified. Therefore, if unchanged, the values will be converted to UTC when assigned to a Data Item.	By default the DateTimeMode of the .NET DataTable is set to unspecified, therefore all DateTime objects will be assigned a Kind of UTC.

Scheduler

The start times for schedules are saved based on the local time-zone settings of the device used to configure the schedule. They are executed by the server based on the server's local time. It is therefore essential that:

- All servers that are enabled to run schedules are configured with common time zone settings.
- When configuring a schedule, the start time is adjusted to suit the time zone on the Blue Prism Server(s).

This behavior is consistent between version 5 and 6.

Web Services

When consuming DateTime information via a Web Service, Blue Prism will correctly interpret the time zone information supplied with the DateTime in the incoming XSD data types.

 This behavior is consistent between version 5, 6, and 7.

Work Queues

Dates associated with Work Queues Item records, for example, created, started, deferred date) are stored as UTC. When viewing work queues in the Control Room the times are converted from UTC to the local time of the user profile. When interacting with work queues from a process using the Work Queues internal business object, it is expected that all times will be passed to the VBO as UTC. Using non-UTC values will cause unexpected behavior.

 This behavior is consistent between version 5, 6, and 7.

Internal Business Objects

Internal Business Objects which accept Date, Time or DateTime data types as input parameters are detailed below. The column labelled Time zone indicates the format the inputs are expected to be received in.

 This behavior is consistent between version 5, 6, and 7.

Action	Input Values	Time Zone
Add to Queue	Defer Until	UTC
Copy Item to Queue	Defer Until	UTC
Defer	Defer Until	UTC
Delete Processed Items	Date Threshold	UTC
Get Completed Items	Start Date	UTC
Get Exception Items	Start Date End Date	UTC
Get Item Data	Loaded DateTime Deferred DateTime Completed DateTime Exception DateTime	UTC
Get Report Data	Finished Start Date Finished End Date Loaded Start Date Loaded End Date	UTC
Get Transaction Data	Start Date/Time End Date/Time	UTC

Visual Business Objects

A number of Visual Business Objects (VBOs) are provided with Blue Prism to provide utility functions. Any actions in these VBOs which use dates are listed below, with information regarding how dates are handled.

Collection Manipulation VBO

The actions listed follow the behavior outlined in the table:

- Append Field (Number)
- Append Field (Text)
- Append Rows to Collection
- Copy Rows
- Delete Column
- Delete Field
- Fill Blanks
- Filter Collection
- Remove Dots from Headers
- Remove Empty Rows
- Remove Null Rows
- Rename Collection Fields
- Rename Field
- Set Collection Field
- Set Column Names from Expected Collection
- Sort Collection
- Reverse Collection

	Version 5	Version 6/7
Expected input date format	Local – DateTime Data Item values are assumed to be presented in Local time.	UTC - DateTime Data Item values are assumed to be presented in UTC.
Displayed as	UTC	UTC
Additional info	With Version 5 editions of these VBOs it is likely that unexpected conversion occurs between the data being passed in, and subsequently passed out.	Assumes that the VBO shipped with Version 6 is in use.

MAPIEx VBO

The table below outlines the actions and the DateTime format that is expected for each DateTime parameter.

Action	Parameter	Time zone
Get Mail	Sent Time	UTC
Get Mail	Received Time	UTC
List Mail within DateTimes	Minimum Date Time	Local
List Mail within DateTimes	Maximum Date Time	Local

 This behavior is consistent between version 5, 6, and 7.

Utility - Date and Time Manipulation VBO

The table below outlines the actions and the DateTime format that is expected for each DateTime parameter.

Action	Parameter	Time zone
DateAdd	DateTime	Either UTC or Local
DateAdd	Result	Same as the provided input DateTime
Format Date	Date Time	Either UTC or Local
Get Time of Day	Time of Day	Specified by Input Parameter

 This behavior is consistent between version 5, 6, and 7.

Data - SQL Server VBO

Get Collection

The table below outlines behavior when using collections with this VBO.

	Version 5	Version 6/7
Time Zone of DateTime objects in returned collection	Converted from Local to UTC	UTC