SYBASE®

Excel RTD Output Adapter Guide

Sybase CEP Option R4

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Introduction

The Sybase® CEP RTD (Real-Time Data) Adapter for Excel enables you to integrate real-time data streams from Sybase CEP Server into your Microsoft Excel worksheets. The Sybase CEP Excel Adapter is an RTD server that subscribes to real-time Sybase CEP streams and returns the data to cells in the Excel worksheet. The real-time data can come from any Sybase CEP Server and data stream on the network to which the user has proper rights/privileges. The data that is used is specified via standard RTD formulas inserted into the Excel worksheet cells.

System Requirements

Describes the required components for the Sybase CEP RTD Adapter for Excel, including Sybase CEP Server and User Desktop requirements.

Supported platform:

Platform	Supported OS	Compiler	JDK Version
Windows (32-bit, 64-bit)	Windows 2003 Server (32-bit, 64-bit), XP Professional (32-bit, 64-bit)	MSDEV 2005 SP1	5.0 Update 12

The Sybase CEP RTD Adapter for Excel requires the following components:

Sybase CEP Server:

- Sybase CEP Server R4.

User Desktop:

- Microsoft Excel 2003 or higher.
- Microsoft .NET 3.5 Runtime or higher.

Install the Shared Add-in Support Update for Microsoft .NET Framework 2.0 (KB908002). You can get this by going to www.microsoft.com and searching for "KB908002".

Install the Office 2003 Update "Redistributable Primary Interop Assemblies". Acquire this at www.microsoft.com; search for "Redistributable Primary Interop Assemblies".

Installation

If you upgrade to a new version of the Sybase CEP RTD Adapter for Excel, remove the previous version using the Add or Remove Programs item in Control Panel before continuing.

Download the Sybase CEP RTD Adapter for Excel file from the Sybase website. Open the file to begin installation and follow the prompts to choose where you want the adapter to install.

During the Adapter installation, you are prompted to enter the following:

• Installation Folder. The default is `C:\Program Files\SybaseC8\Sybase CEP Excel Adapter`.

• Install for yourself or anyone. The default is "Just me".

The Sybase CEP RTD Adapter for Excel is installed in the folder you specify

Configuration

There are two sets of configuration options for the Sybase CEP RTD Adapter for Excel:

• Adapter Configuration settings.

• Stream URI Connection/Alias settings.

Both of these are described in the sections below.

Adapter Configuration Settings

The adapter configuration settings are maintained inside the Windows Registry. The Sybase CEP RTD Adapter for Excel Registry key is located at `HKEY_LOCAL_MACHINE \Software\C8\Excel\RTD`. Decribes configuration parameter values you can set at this registry key, including BufferSize, DefaultStreamUri, LogFile, and LogLevel.

The Sybase CEP RTD Adapter for Excel Registry key is located:

For a 32-bit window, in

```
HKEY_LOCAL_MACHINE\Software\SybaseC8\Excel\RTD\
```

For a 64-bit window, in

```
HKEY_LOCAL_MACHINE\Software\Wow6432Node\SybaseC8\Excel\RTD\
```

Note: The Excel adapter only recognizes the registry key equivalent to win32 in all Windows platforms. Use regedit to edit the win64 registry key to make it the same as win32.

At this registry key, you can set and manage the following configuration parameter values:

• BufferSize: This is the maximum number of data stream output rows retained in the RTD adapter buffer. The default is to retain 100 rows.

• DefaultStreamUri: This is the default stream URI to use if none is specified in the RTD formula/function call.

• LogFile: Specifies the log file if logging is desired.

The default value is,

```
LogFile=%TEMP%\SybaseC8-Excel-RTD.log.
```

The global Window environment variable TEMP points to different locations on different platforms.

In a 32-bit Window,

```
%TEMP%= C:\Windows\Temp
```

In a 64-bit Window,

```
%TEMP%= C:\Windows\Temp\1
```

• LogLevel: Specifies the level of detail of the logging. Valid levels are OFF, FATAL, ERROR, WARN, INFO, DEBUG, ALL. For example, if the level is set to "WARN", then messages about warnings, errors, and fatal errors are logged. "Information" and "Debug" messages are not written to the log file. LogLevel is only useful if LogFile is set to specify a valid file name.

There is a second set of registry key values under the Key: StreamUriAlias. The value(s) of these keys represent aliases for Stream URIs, which you can reference in the RTD function call rather than specifying the full stream URI. The Sybase CEP RTD Adapter for Excel contains a separate utility (`rtdcfg.exe`) for specifying and managing these URI aliases. Manage the URI aliases from the utility program rather than editing the registry keys directly. Currently, `rtdcfg.exe` is only available in 32-bit Windows; it will support 64-bit Windows in R4.

Stream URI Connection/Alias Settings

Stream URI aliases simplify specifying URI connections to Sybase CEP data streams. A stream URI alias is an alternate name used in the RTD function call instead of the full stream URI path.

The URI alias also enables you to define authentication parameters (user name and password) with each URI alias, thereby eliminating the need to specify the authentication parameters in each Excel formula using the RTD function call.

Note: The passwords are fully encrypted and hidden by the URI Alias utility for security purposes.

To run the URI Alias connection manager utility, do the following:

• Open the folder where you installed the Sybase CEP RTD Adapter for Excel.

• Run the application: rtdcfg.exe.

To create a new RTD connection alias, click the New button. You are then prompted to enter the following connection settings:

• Connection Id: This is the name you give the connection alias. This is the name you use in the RTD function call to refer to the URI alias.

• Stream URI: This is the Sybase CEP URI representing the data stream. A stream URI typically takes the following form:

```
ccl://hostname:port/Stream/workspace-name/
   project-name/stream-name
```

For example:

```
ccl://localhost:6789/Stream/Default/AlgorithmicTrading/
   StreamSummary
```

See the section Connecting to Streams over a Network in the *Sybase CEP Integration Guide* for more information about how to specify Sybase CEP streams with URIs.

• User Name: This is the user name the back-end server uses to authenticate the connection. If user authentication on the Sybase CEP Server is not enabled, then you may leave this field empty. Please refer to the *Sybase CEP Administration Guide* for full information on how to enable and configure authentication with the Sybase CEP Server.

• Password: This is the password the back-end server uses to authenticate the connection. If user authentication on the Sybase CEP Server is not enabled, then you may leave this field empty. Please refer to the *Sybase CEP Administration Guide* for full information on how to enable and configure authentication with the Sybase CEP Server.

• Confirm Password: This is to confirm the user password specified above. This value must match the password that you entered in the previous field.

Note: The Password and Confirm Password fields are encrypted for security purposes.

To edit an existing RTD connection alias, highlight the connection you wish to edit and click the Edit button. Then you may change any of the connection settings as described above. Click OK to save the RTD connection alias settings, or Cancel to abort the changes.

To delete an RTD connection alias, highlight the connection you wish to delete and click the Delete button. You will be prompted to confirm the deletion. Click Yes to complete the deletion, or No to abort.

Using Sybase CEP RTD Adapter for Excel

The Sybase CEP RTD Adapter for Excel is initially loaded whenever you open a spreadsheet that contains an RTD function that uses "C8.RTD" as its service provider. Start the Sybase CEP Server and Sybase CEP project containing the streams referenced by the Excel worksheet before opening the Excel worksheet. If the streams do not already exist, then the adapter cannot connect to them.

The RTD function call enables you to specify what data populates the sheet in the following ways:

• Filter the stream by field value: You can specify what field values must match to be included.

• Historical by index: You can specify how far back in the history you want to go. You can request the most recent tuple as index 1, the next most recent as index 2, and so on.

Using the Sybase CEP RTD Plugin and Function

The Microsoft Excel RTD() function supports `=RTD(ProgID,Server,String1, [String2],...)` syntax. Describes the parameters of this function, including the ProgID and Server values, and String..StringN parameters.

```
=RTD(ProgID,Server,String1,[String2],...)
```

The parameters of this function are as follows:

• The ProgID value is the COM program ID of the RTD server plugin. In this case, the function call refers to the Sybase CEP RTD plugin program which has the ID C8.RTD.

• The Server value is the URL of the location of the server where the RTD plugin is installed. The Sybase CEP RTD plugin is installed on the local machine, requiring this value to be left blank. Therefore, all syntax references and examples for the Sybase CEP RTD plugin leave the second value empty (",,"). This is the correct syntax.

• The String1..StringN parameters are specific to the plugin being used. The Sybase CEP RTD plugin for Excel uses these parameters to form the query.

Using the standard Microsoft Excel RTD() function syntax as a reference, the Sybase CEP RTD function takes the following syntax:

```
=RTD("C8.RTD", [, "STREAMURI", stream-uri]
  [, "FIELD", field-name] [, "INDEX", index]
  [, "FILTER", field-name, field-value])
```

The parameters to the function are described below:

- "C8.RTD": The ProgID of the RTD server. It tells Excel to use the Sybase CEP Adapter to interpret the rest of the arguments.
- "STREAMURI": Specifies the stream from which the RTD server subscribes and extracts the data. It can be a full stream URI or a stream alias configured in the registry. If you specify the full URI, you must declare it as follows (please refer to the Sybase CEP Engine documentation for more details):

```
ccl://[user:password@]host[:port]/Stream/
   workspace-name/project-name/stream-name
```

- "FIELD": Specifies which field value to take from the tuple.
- "INDEX": Specifies how far back to go into the tuple history. A value of "1" specifies the most recent tuple. A value of "2" specifies the next most recent, and so on.
- "FILTER": Specifies a filter to refine the tuples that are returned. For example, the arguments ("FILTER", "Symbol", "DELL") only matches tuples where the Symbol field equals "DELL".

RTD Function Examples

Contains examples for using the adapter.

This function returns the latest Symbol field value from the TradingStation example without authentication:

```
=RTD("C8.RTD",, "STREAMURI",
"ccl://localhost:6789/Stream/Default/TradingStation/StreamTrades",
"FIELD", "Symbol")
```

This function retrieves the same data, but adds authentication as user "alice" and password "bob":

```
=RTD("C8.RTD",, "STREAMURI",
   "ccl://alice:bob@localhost:6789/Stream/Default/
      TradingStation/StreamTrades",
   "FIELD", "Symbol")
```

This function retrieves the same data, but instead uses the URI connection alias "trades" as defined via the URI Connection utility and contained in the registry. Note that lowercase option names are acceptable:

```
=RTD("c8.rtd",, "streamuri", "trades", "field", "Symbol")
```

This function retrieves the same data, but instead specifies an index of 1, and tells the adapter to retrieve the value from the most recent tuple:

```
=RTD("C8.RTD",, "STREAMURI", "trades", "FIELD", "Symbol", "INDEX",
1)
```

This function connects to the same stream, but instead specifies an Index of 2 in order to retrieve the value from the second most recent tuple:

```
=RTD("C8.RTD",, "STREAMURI", "trades", "FIELD", "Symbol", "INDEX",
2)
```

This function connects to the same stream, but instead retrieves the history based on the current row relative to cell A5:

```
=RTD("C8.RTD",, "STREAMURI", "trades", "FIELD", "Symbol", "INDEX",
row()-row(A$5))
```

And finally, this example is updated with the latest price where the Symbol field value is equal to "DELL":

```
=RTD("C8.RTD",, "STREAMURI", "trades", "FIELD", "Price", "FILTER",
"Symbol", "DELL")
```

RTD Refresh Interval

Excel does not update RTD data for every single update. It refreshes RTD data periodically based on a system-wide throttle interval named Excel.Application.RTD.ThrottleInterval. You can set the throttle interval with either Visual Basic/VBA or the Registry.

Set the throttle interval:

• Via Visual Basic / VBA: You can set Application.RTD.ThrottleInterval. in immediate mode or in a startup handler.

• Via the Registry: On startup, Excel initializes the throttle interval from the registry value.

For Excel 2002:

```
HKEY_CURRENT_USER\Software\Microsoft\Office\10.0\
   Excel\Options\RTDThrottleInterval
```

For Excel 2003:

```
HKEY_CURRENT_USER\Software\Microsoft\Office\11.0\
   Excel\Options\RTDThrottleInterval
```

Set the throttle interval to any one of the following values:

ThrottleInterval value	**Effect**
-1	Manual mode. Never automatically refreshes. Excel.Application.RTD.RefreshData must be called.
0	Checks for updates every chance it gets.
>0	Excel waits at least the specified number of milliseconds before getting updates.

For more information, please refer to the following Microsoft FAQ item from MSDN, which explains the details best:

```
http://msdn2.microsoft.com/en-us/library/
   aa140060(office.10).aspx#odc_xlrtdfaq_howconfigrtdthrottle
```

Sybase CEP Excel Adapter Example

The Sybase CEP RTD Adapter for Excel installation contains an example Excel worksheet that subscribes to, filters, and visualizes a Sybase CEP data stream in Excel. This sample Excel worksheet is named C8ExcelExample.xls.

This example works with the Algorithmic Trading project example that ships with the Sybase CEP Engine (you can find the project example in the folder examples\Finance \AlgorithmicTrading under the Sybase CEP Repository).

Excel Adapter Example URI Alias Configuration

In the Sybase CEP Excel Adapter example worksheet, the RTD function calls are coded to use two URI connection aliases: "ATInTrades" and "ATSummary". You must create these URI connection aliases prior to running the Sybase CEP Excel Adapter example. Steps require you to start the Sybase CEP RTD Connection utility, create the two URI connection aliases using the New button, and configure the URI connection aliases.

In the Sybase CEP Excel Adapter example worksheet, the RTD function calls are coded to use two URI connection aliases: "ATInTrades" and "ATSummary". You must create these URI connection aliases prior to running the Sybase CEP Excel Adapter example.

1. Start the Sybase CEP RTD Connection utility (rtdcfg.exe).

2. Create these two URI connection aliases using the New button. If you have not configured authentication on the Sybase CEP Server, then the URI connection alias configurations are:

• Connection Id: ATInTrades

• Stream URI: ccl://hostname[:port]/Stream/workspace-name/AlgorithmicTrading/StreamInTrades

• Username: <leave blank>

• Connection Id: ATSummary

• Stream URI: ccl://hostname[:port]/Stream/workspace-name/AlgorithmicTrading/StreamSummary

• Username: <leave blank>

If you use the default Sybase CEP installation settings, and are running the Sybase CEP Excel Adapter example on the same machine as the Sybase CEP Server, the two URIs are:

ccl://localhost:6789/Stream/Default/AlgorithmicTrading/StreamInTrades

ccl://localhost:6789/Stream/Default/AlgorithmicTrading/StreamSummary

Please note that if you have enabled authentication to your Sybase CEP Server, then you need to add a username and password to the URI connection alias with the proper rights to read the streams from the AlgorithmicTrading example.

Running the Example Worksheet

How to run the Sybase CEP Excel Adapter example. Steps require you to install the Sybase CEP RTD Adapter for Excel, create the two URI connection aliases "ATInTrades" and "ATSummary", open Sybase CEP Studio and connect to the server and workspace in which you want to run the example, load and start the AlgorithmicTrading project example, and open the Sybase CEP Excel Adapter example file C8ExcelAdapter.xls.

To run the Sybase CEP Excel Adapter example:

1. Install the Sybase CEP RTD Adapter for Excel.

2. Create the two URI connection aliases "ATInTrades" and "ATSummary".

3. If your Sybase CEP Server is not currently running, start your Sybase CEP Server.

4. Open Sybase CEP Studio and connect to the server and workspace in which you want to run the AlgorithmicTrading project example.

5. Load the AlgorithmicTrading project example from the examples\Finance \AlgorithmicTrading folder under the Sybase CEP Repository.

6. Start the AlgorithmicTrading project example.

7. Go the Sybase CEP RTD Adapter for Excel folder and open the Sybase CEP Excel Adapter example file C8ExcelAdapter.xls.

If the project is running properly and the URI connection alias is configured correctly, you should see the real-time data streams filling the cell values in the worksheet, and the graphs shifting in real time.