



# Application Note 0008 Using ReportBuilder™ with Inductive Automation's Ignition SCADA system.

## Introduction

ReportBuilder™ can access Inductive Automation Ignition historically logged data to an MySQL Server via the ReportBuilder™ **Ignition MySQL FunctionPack**. This document describes the steps for configuring this FunctionPack and assumes you have a functioning MySQL Server already installed and that Ignition has been configured to log data to it.

## Overview

The **Ignition MySQL FunctionPack** provides the interface for ReportBuilder™ to access data logged to an Ignition MySQL database by one or more Ignition systems. By default, Ignition logs to multiple tables, one for each month. This design makes data retrieval faster and easier to manage, but presents challenges to consumers of the data. In addition, the tables are optimized to store tag name information in a separate table and the timestamps are stored as an integer. The **Ignition MySQL FunctionPack** handles the complicated sql statements and conversions necessary for reporting data from these tables.

## Prerequisites/Requirements

1. **MySQL ODBC 5.3 ANSI Driver** or later (version might be different for your system) Referred by the MySQL Installer as Connector/ODBC x86 Architecture. You must download and install this ODBC driver on the workstation that you will use to report data from. The following product information applies to the version tested:
  - a. Product Home: <http://dev.mysql.com/downloads/connector/odbc/>
  - b. Release Changes: <http://dev.mysql.com/doc/relnotes/connector-odbc/en/news-5-3-6.html>
  - c. Typical Install Path: C:\Program Files (x86)\MySQL\Connector ODBC 5.3\
2. **MySQL Time zone description tables** must be loaded with the applicable time zone data. These tables are part of your MySQL Server and are empty by default. You must populate them with the required data files to enable the MySQL Server to properly determine and calculate time zone differences and daylight savings time. You may download the Time zone data here: <https://dev.mysql.com/downloads/timezones.html>. We recommend downloading the POSIX standard time zone data file. Once the file is downloaded, it must be unzipped and loaded into the MySQL Server using the mysql command line utility. The following is an example of importing the time zone data using the utility and assumes the files have been unzipped. From a command line prompt:
  - a. Change the active directory to: C:\Program Files\MySQL\MySQL Server 5.7\bin>
  - b. Enter the following command: `mysql -u root -p mysql < C:\YourFolder\timezone_posix.sql`
  - c. You must enter the password for your root account when prompted.
3. **WorkSmart CreateMakeIntervals Utility**. (This utility is included on the ReportBuilder™ installation media in the following location: DVD:\MakeIntervals\). This utility will create a stored procedure called *make\_intervals* in the database where your Ignition historical data is logged. The *make\_intervals* stored procedure is used by some of the ReportBuilder™ **Ignition MySQL FunctionPack** functions that return evenly spaced data (e.g., List Intervals, List Maximums, List Minimums, List Averages, List Counts, and List Sums). All other functions do not require the *make\_intervals* stored procedure. If you wish to make use of these evenly spaced data functions, you will need to run this utility against your MySQL database that Ignition is logging to.

The utility will require that you provide the root user account and password in order to work properly.

## Steps

The following steps will be performed to setup ReportBuilder™ to report Ignition history data. Once completed, you will be ready to build reports in Microsoft Excel and should refer to the ReportBuilder™ Client online help for building reports.

1. Install components.
2. Add an ODBC DSN (Data Source Name) that connects to your Ignition database in the MySQL Server. This is an x86 DSN and must not be confused with a
3. Load the MySQL Time zone description tables.
4. Run the WorkSmart CreateMakeIntervals utility.
5. Create a new ReportBuilder™ Server Project.
6. Point the ReportBuilder™ Client to your new ReportBuilder™ Project.

## Step 1, Install Components

You will be installing the following components:

1. MySQL Connector/ODBC x.x.x (available as a download from the MySQL web site). This component enables ReportBuilder™ to connect and query MySQL databases.
2. WorkSmart Automation ReportBuilder™ Server version 6.1.3 or later (provided with the ReportBuilder™ installation DVD). This component provides a means to configure the tags you will be reporting with ReportBuilder™
3. WorkSmart Automation ReportBuilder™ Client Version 6.1.3 or later (also provided with the ReportBuilder™ installation DVD). This component is a Microsoft Excel Add-in that provides additional functions for querying data from the MySQL Ignition database and presenting it inside a Microsoft Excel Workbook.
4. WorkSmart CreateMakeIntervals utility. (also provided with the ReportBuilder™ installation DVD). Copy this utility to a folder on your machine and start it up.
  - a. Enter the name of your MySQL Server in the TCP/IP Server field. This is usually localhost or the ip address.
  - b. Enter root in the User field.
  - c. Enter the password for the root user in the Password field.
  - d. Select the database your Ignition SCADA is logging to from the Database drop down menu.
  - e. Click the Make Intervals button.
5. Load the MySQL Time zone description tables with time zone data. Refer to the instructions provided from the MySQL web page where this is downloaded from.

### ReportBuilder™ Server and ReportBuilder™ Client Location

The ReportBuilder™ Server application can exist anywhere on the network and can be installed on the same machine as a ReportBuilder™ Client. ReportBuilder™ Server only needs to be installed on a single machine. Install the ReportBuilder™ Client Excel Add-in on every machine that you want to build and run reports from (and are licensed for).

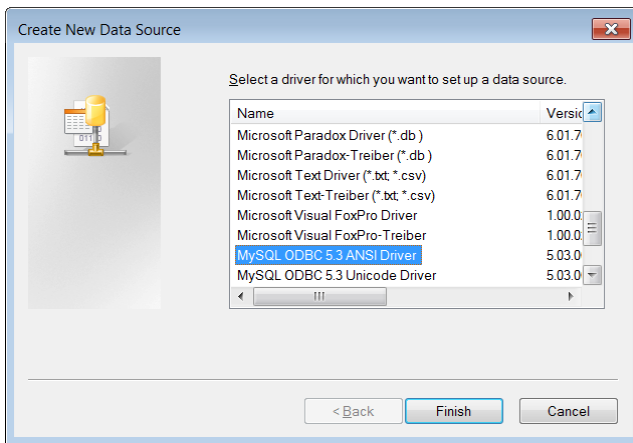
## MySQL Connector/ODBC x.x.x Location

Install the MySQL Connector/ODBC x.x.x driver on each machine that you install a ReportBuilder™ Client and ReportBuilder™ Server as both require the driver to function properly.

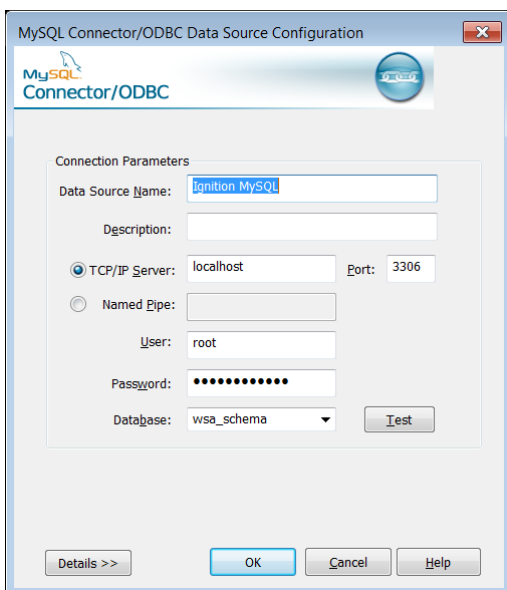
## Step 2, Add an ODBC DSN Connection

In order for third party applications (including ReportBuilder™) to access the MySQL server using the ODBC interface, a new Data Source Name (DSN) needs to be configured. The DSN must be configured as an x86 DSN and by default 64-bit operating systems beginning with Windows Vista default to the 64-bit. You must invoke the 32-bit version of the Data Source Administrator instead (see below).

- Open the x86 (32-bit) Data Sources (ODBC) dialog from C:\Windows\SysWOW64\odbcad32.exe.
- Select the System DSN tab.
- Select the Add... button.
- Select the MySQL ODBC x.x ANSI Driver and select finish.



- Configure the connection as shown in the diagram below (this assumes the user 'root' in MySQL Server with a password, and the Ignition database is called *wsa\_schema*, your user, password, and database name will be different).



- Click on OK to complete the setup.

### Step 3, Create a new ReportBuilder™ Server Project

Before proceeding, verify the following:

- You have successfully installed the MySQL Connector/ODBC Driver (available for download). The ODBC driver allows third-party applications like ReportBuilder™ to access MySQL databases.
- You have successfully added an ODBC DSN Connection to your MySQL database that Ignition is logging data to.
- You have successfully installed the WorkSmart Automation ReportBuilder™ Server and ReportBuilder™ Client components.

#### Create a new ReportBuilder™ Server Project

To create a new ReportBuilder™ Project, perform these steps:

1. Start the ReportBuilder™ Server application.
2. From the File menu, Click **New**.
3. From the **Save As** Dialog, enter a valid path and filename for the project XML file and Click **Save**. A new ReportBuilder™ Server application XML file will be created. (This should be saved in a folder that is shared out over your network to allow other ReportBuilder™ Client installations to connect to it.)

#### Configure a ReportBuilder™ Server Database Definition

To configure a ReportBuilder™ Database, perform these steps:

1. In the left-hand pane, select Databases then right-click in the right-hand pane. Click **New**.

##### **Step 1: Enter a Database Name:**

Enter a Name for this database, e.g. **Ignition\_db** (*this is an arbitrary name chosen by you.*)

##### **Step 2: Enter a Description (optional):**

Enter a description for this database, e.g. **Ignition Historical Data**

##### **Step 3: Build a Connection String:**

Click **Build**. The Microsoft Data Link Properties window appears.

- a. From the **Provider** tab, highlight **Microsoft OLE DB Provider for ODBC Drivers** then click the **Next** button.
- b. From the **Connection** tab, select the **Use data source name** radio button, then select the data source name from the drop down list box (select **Ignition MySQL** as in the previous Add ODBC Connection example).
- c. Skip over step 2, the credentials entered at the ODBC DSN will be used to log on to the database.

- d. In step 3, select the database name that your Ignition system is logging data to and then click **Test Connection** button to verify you are able to access the database.
  - e. Click **OK** when finished; you will return to the ReportBuilder™ Database Dictionary window.
2. Click **Save and Close** to save this database definition.

### Configure a ReportBuilder™ Server Table Definition

By design, Ignition logs to more than one table. You will only need to define one table though as ReportBuilder™ will determine which table to query data based on the reporting time frame.

To configure a ReportBuilder™ Table, perform these steps:

1. In the left-hand pane, select Tables then right-click in the right-hand pane. Click **New**.

#### **Step 1: Select the Database for this Table:**

Select the **Ignition\_db** Name from the drop down list.

#### **Step 2: Select or Enter a Table Name:**

Select from the drop down list or enter the name of a ClearSCADA Historic View. (In this example select **sqlt\_data\_1\_2016\_09**. The tables available from the drop down list will be different for you. It doesn't really matter which one you choose, so long as you choose one with the same naming convention). Typically, there is one table per month and in this example, the table is named for September of 2016.

#### **Step 3: Select a FunctionPack for this Table:**

Select **Ignition MySQL** from the drop down list.

#### **Step 4: Enter Columns required for this FunctionPack:**

From the Date/Time Column tab, select or enter the name of the column where the date and time stamp is logged for this table. Enter or select the column name **t\_stamp** for this field.

- a) Click ... to see a list of available columns.
- b) Select the **t\_stamp** column for this field then click **OK**.

From the Format Time tab, assign the **Ignition MySQL Time Format** to the table.

- a) Click **Select...** to see a list of available SQL Time Formats.
- b) Select **Ignition MySQL Time Format** and then click **Close**.

Note: If the Ignition MySQL Time Format is not configured on your system, build a new one that will format the time as: **yyyy-mm-dd hh:mm:ss** The SQL Time Format Result should look like this: 2016-11-28 09:11:58

From the Summary Column and List tab, enter any column available. This column is not used by the FunctionPack directly but is required for assigning a list of evenly spaced intervals that are used for the evenly spaced data functions.

- a) Click ... to see a list of available columns.

- b) Select **tagid** for this field then click **OK**.

Click the **Summary Value Lists ...** button to see available lists. Select the **Ignition MySQL Intervals** list and then click **Close**.

Note: If the Ignition MySQL Intervals Summary List is not configured on your system, build a new one with the following entries:

| DISPLAY NAME        | COLUMN VALUE |
|---------------------|--------------|
| 15 Second Intervals | 15           |
| 30 Second Intervals | 30           |
| 1 Minute Intervals  | 60           |
| 5 Minute Intervals  | 300          |
| 15 Minute Intervals | 900          |
| 1 Hour Intervals    | 3600         |
| 24 Hour Intervals   | 86400        |

**Step 5: Assign a Column List to this Table (optional):**

Click the **Column Lists ...** button to see available lists. Select the **Ignition MySQL Column** and then click **Close**.

Note: If the Ignition MySQL Column List is not configured on your system, build a new one with the following entries:

| DISPLAY NAME  | COLUMN NAME   |
|---------------|---------------|
| FloatValue    | FloatValue    |
| IntValue      | IntValue      |
| DateValue     | DateValue     |
| DataIntegrity | DataIntegrity |

2. Click **Save and Close** to save this table definition.

Configure a ReportBuilder™ Server Tag Group Definition

To configure a ReportBuilder™ Tag Group, perform these steps:

1. In the left-hand pane, select Tag Groups then right-click in the right-hand pane. Click **New**.

**Step 1: Enter a Group Name:**

Enter a Name for the new Tag Group (*This is an arbitrary name chosen by you.*)

**Step 2: Enter a Description (optional):**

Enter a Description for the new Tag Group.

**Step 3: Enter a Menu Order (0-Top):**

Enter a numeric value for the Menu Sort Order (*0=Top of the List*)

2. Click **Save and Close** to save this Tag Group definition.

## Configure a ReportBuilder™ Server Tag Definition

*You should skip this step if you have multiple tags in your Ignition application and move ahead to the next section titled Importing Tags with Tag Import Wizard.*

To configure a single ReportBuilder™ Tag, perform these steps:

1. In the left-hand pane, select Tags then right-click in the right-hand pane. Click **New**.

**Step 1: Enter a Tag Name:**

Enter the name of the tag exactly as it appears in the Ignition SCADA application. (Only the full name of the tag is entered here. e.g., **sensor 1/humidity** this assumes that a tag exists in Ignition SCADA called sensor 1/humidity as installed as part of the Ignition example projects.)

**Step 2: Enter a Description (optional):**

Enter a Description for the new Tag.

**Step 3: Enter the Eng Units (optional):**

Enter the engineering units for the new Tag.

**Step 4: Select a Group Name:**

Select the desired Tag Group from the drop down list.

**Step 5: Select a Database:Table:**

Select the Database and Table to which the tag belongs. (e.g., Ignition\_db: sql\_data\_1\_2016\_09)

**Step 6: Select or Enter the Column:**

Select or enter the name of the column where the data values are logged in this table for this tag. Enter the column name **floatvalue** in this field.

- a) Click ... to see a list of available columns.
- b) Select **floatvalue** for this field then click **OK**.

**STEP 7: Enter a Data Type (optional):**

For sorting purposes only. You may enter anything you wish here.

2. Click **Save and Close** to save this Tag definition.

Note: You must add a tag definition to the ReportBuilder™ Tagname Dictionary for each tag that you wish to report on.

## Importing Tags with Tag Import Wizard

To import tags from an Ignition database to a ReportBuilder™ Project, perform these steps:

1. From ReportBuilder™ Server, perform the following configuration as a minimum:
  - a. ReportBuilder™ Database definition.
  - b. ReportBuilder™ Table definition.
  - c. ReportBuilder™ Tag Group definition.
2. From the Tools menu, Click **Import / Export - Import Tags from SCADA Data Source...**  
The Tag Import Wizard appears.
3. Follow the steps as requested by the Tag Import Wizard by clicking **Next** until finished:
  - a. For the ReportBuilder Database Connection step, select the name you called your ReportBuilder™ Server Database definition that connects to your Ignition historical database. *(In this example Ignition\_db.)*
  - b. For Data Source Table step, select or enter **sqlth\_te**. *(The sqlth\_te table contains a row of data for each tag being logged by Ignition.)*
  - c. For the Matching Fields step, select or enter the following in each field:
    - i. Tagname: **tagpath**  
  
Note: The following fields require that you place a check mark in the checkbox next to the field. Un-checked fields are not imported.  
  
    - ii. Description (skip): (no corresponding description field is available)
    - iii. Eng Units: Leave blank (no corresponding engineering unit field is available.)
    - iv. Column: Enter **'floatvalue'** *(Text inside of single quotes is imported implicitly, type the word floatvalue surrounded by single quotes.)*
    - v. Data Type (optional): **datatype**
4. For the ReportBuilder™ Database and Table step, select the name of the Ignition database followed by the name of the table e.g., Ignition\_db: sql\_data\_1\_2016\_09.
5. For the ReportBuilder™ Tag Group step, select the name of the group that you would like these tags to be imported to. *(This can be changed later using the ReportBuilder™ Import/Export via Excel feature.)*
6. For the Existing Tags step, choose whether to overwrite or skip existing tags in your ReportBuilder™ Project. Check the **Overwrite existing tags** checkbox to overwrite tags. Un-check to skip existing tags.
7. Click **Finish** to begin the import.



#### **Step 4, Connect the ReportBuilder™ Client Add-In to your new ReportBuilder™ Project**

Now that you have completed building your ReportBuilder™ Server Project, you will need to point the ReportBuilder™ Client to use it when reporting data.

##### **Connecting to a ReportBuilder™ Server Application XML file**

1. From the Excel ReportBuilder™ ribbon, click **ReportBuilder** then **Connect to ReportBuilder Project**. The Windows Explorer Browse dialog appears.
2. Browse to the location of your ReportBuilder™ Server Application XML file and select it then click **Open**.
3. Next, refresh the project to use the new file. From the Excel ReportBuilder™ ribbon, click **ReportBuilder** then **Refresh ReportBuilder Project Database**. The current project is now ready to be used.

You are now ready to begin building reports in Microsoft Excel!