



AnalytiX-BI Quick Start



APPLICATION NOTE

June 2017

Description: AnalytiX-BI gives you the ability to cohesively visualize your data. It allows you to merge data from multiple data sources and then visualize these data sets as one.

General Requirement: Basic familiarity with GraphWorX64, GridWorX and Hyper Historian. This example requires that there be some logged Hyper Historian data, preferably from the sample Hyper Historian configuration.

Introduction

AnalytiX-BI was created to offer these features:

- Improved data accessibility
- Data processing
- Data modeling/context
- Dramatically improved read performance via caching
- Addressing visualization fragmentation

With AnalytiX-BI, data is imported into tables and relationships are established. The data can then be explored, sliced and rolled up on the fly (for example, "Count all faults for the year 2016 and group by building" or "Show the sum of energy consumption for the years 2016 and 2015").

Setting up AnalytiX-BI

Data Flows

Data Flows define the data you will want to analyze with AnalytiX-BI and do some basic manipulations on it.

Before getting started, if you have not yet logged any Hyper Historian data go to Hyper Historian in Workbench and start the service so you begin logging some data.

1. Open Workbench and expand AnalytiX to find **BI Server**. Expand BI Server.
2. Right click on Data Flows and select **Add Data Flow Folder**. Name this folder "Factory1" and hit **Apply**.
3. Now right click on the newly made Factory1 folder and select **Add Data Flow**. Name this Data Flow "Factory1_Source".
4. Inside your Factory1_Source panel you should see a "Steps" list. Click on **Click here to add a new step** and select **Dimensions → Historical Tags**.
5. A Data Sources panel should appear. Click the **Click to add multiple tags** link in its header.
6. Browse to My Computer → Historical Data → Hyper Historian → Configuration → **Various Signals**. Select all tags in this folder and click **OK**, then **Apply**.
7. Right click on Factory1, and select **Add Data Flow** again.

8. Name this Data Flow "Factory1_Data".
9. Click on **Click here to add a new step** and choose **Historical Data → Hyper Historian Raw Data**.
10. Add the same set of Various Signals tags as in step 6.
11. Set the Start and End Time to be a period where you have data, then click **Apply**.

Time Settings	
Start Time:	5/26/2017 7:13 PM ☐ Use Parameter
End Time:	5/26/2017 8:13 PM ☐ Use Parameter

Figure 1 – Time Settings

12. There are many possible ways to edit your data flow. You can create new columns, delete existing ones, or filter your data using the buttons at the bottom right of the Data Flow Editor.

PointName	Value	Timestamp
hh:\Configuration\Signals\RampFast	34.63333333333333	5/26/2017 5:13:00 PM
hh:\Configuration\Signals\RampFast	36.71666666666667	5/26/2017 5:13:00 PM

Figure 2 – Data Flow Editor (Add, Delete, Filter)

Data Models

Data Models define relationships between multiple Data Flow tables.

1. Right click on Data Models and click **New Data Model**.
2. Name your Data Model "Factory1".
3. Check the **Online** box and hit **Apply**.
4. Right click on our new Factory1 model and click **Add Data Table**.
5. In the Data Source we're going to want to pick one of our Data Flows from the previous section. Browse for My Computer → AnalytiX → BI Server → Data Flows → Factory1 → **Factory1_Source**.
6. After you select your data source the data should populate in the Preview pane. If it does not immediately populate, click away from the Data Source field.

Name	DisplayName	Description	LowRange	HighRange	E
RampFast	Ramp Fast	Fast Ramp Signal	0	100	
Ramp	Ramp Med	Ramp Signal	0	100	
RampSlow	Ramp Slow	Slow Ramp Signal	0	100	

Figure 3 - Preview of your Data Table



AnalytiX-BI Quick Start



APPLICATION NOTE

June 2017

7. Name your Data Table "Source" and hit **Apply**.
8. Right-click on Factory1 and select **Add Data Table** again.
9. For this table's data source, browse for My Computer → AnalytiX → BI Server → Data Flows → Factory1 → **Factory1_Data**.
10. Name this Data Table, "Data" and click **Apply**.
11. Go back to the **Factory1** data model by double-clicking on it in the tree or selecting the Factory1 tab if it is still open.
12. You should see a set of tables similar to Figure 4. If not, click **Refresh**.

Name	DataType
Name	String
DisplayName	String
Description	String
LowRange	Double
HighRange	Double
EngineeringUnits	String
ServerName	String
PointName	String
Level 0	String
Level 1	String

Name	DataType
PointName	String
Value	Double
Quality	UInt32
Timestamp	DateTime

Figure 4 – Data Model Tables

13. Drag the dot at the top of the **Data** box to the dot on the top of the **Source** box. Make sure to drag from Data to Source and not the other way around!

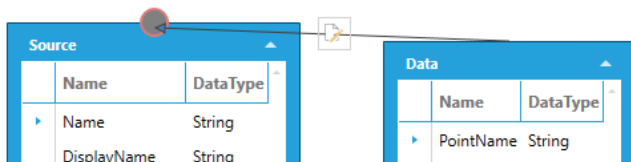


Figure 5 - Connecting Tables

14. The Relationship Editor should appear. Set the two empty fields under Primary Key Table and Foreign Key Table to both be PointName, then click **Add**.

Name	PrimaryTable	ForeignTable	PrimaryCol	ForeignCol
FK_Source_Data	Source	Data	PointName	PointName

Figure 6 – Configuring Relationship Editor

13. Click **OK** and **Apply**. The relationship between our tables has been defined.

Data View

Data Views can be used to pre-create queries you expect to use often in a GridWorX Viewer.

1. To create a new data view right click on the **Factory1** data model and choose **Add Data View**. Name it "CustomDataView".
2. Paste this query into the Data Source field:

```
SELECT Source.Name, Sum(Data.Value) FROM Source INNER JOIN Data ON Source.PointName = Data.PointName
```

3. Click away from the Data Source field to see a preview of your view, then click **Apply**.

For more details on how to create your own views, see the "SQL Grammar in AnalytiX-BI Server" page in the help files.

Viewing AnalytiX-BI Data in KPIWorX

1. Open GraphWorX64 and go to Runtime.
2. Select **KPIWorX** in the Tools section of the Runtime ribbon.
3. On your right, you will see the Component Library. In the Controls section, find the **Filter** control. Drag it onto your display.
4. On the left side of your screen you'll find the data browser, Browse to My Computer → AnalytiX → BI Server → Models → Factory1 → Source and drag **DisplayName** onto the filter control.
5. Grab one of the arrows on the sides to customize the size of your filter and make room for more charts.



AnalytiX-BI Quick Start



APPLICATION NOTE

June 2017

6. Drag these charts on to your display, resizing each one to make room for the next:

- Data Diagram
- Categorical Chart
- Treemap
- Donut.

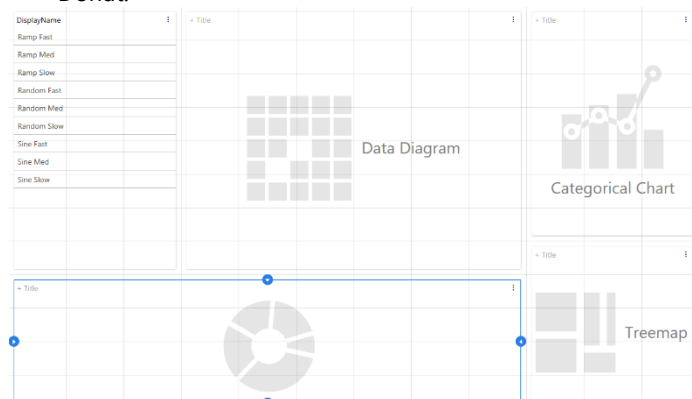


Figure 7 – Adding Charts and Controls to a KPIWorX Display

7. Click on your Data Diagram and select the **Settings** panel.

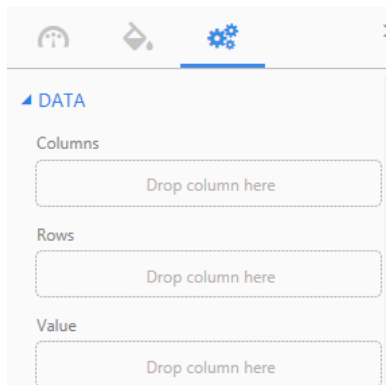


Figure 8 – Setting up Data Diagram in KPIWorX

8. From the data browser, drag the **DisplayName** tag into Columns.
9. Expand **Data** and drag **Timestamp** into Rows.
10. Expand **Value**, and drag **Sum** into Value. This will calculate an aggregate for the Value column.
11. You should see that as soon as you complete the data mapping, the data diagram will begin to populate.
12. In the Settings panel under Horizontal Axis, set Angle to 65 degrees. This will allow us to read all of our tag names. You may make other settings changes, if desired.
13. Select your Categorical Chart. Set its Category (X-axis) to **Timestamp**.

14. Drag **Value** from the data browser into Value (Y-axis), then click on it and choose **Sum**. This is another way to set an aggregate.

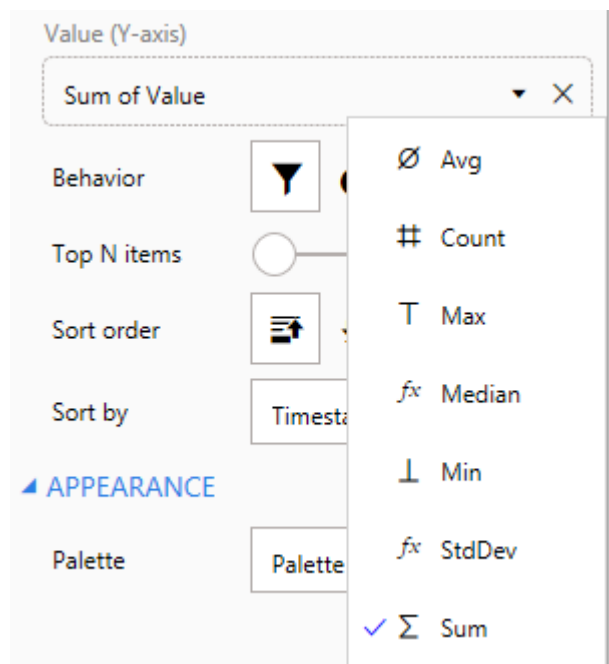


Figure 9 – Setting Sum of Value on Data

15. We want to plot more than one series, so drag **Timestamp** into the Value (Y-axis) as well, and choose **Count** as its aggregate.



Figure 10 - Two Series in a Chart

16. Set Sort to be by **Timestamp**.
17. Make other changes as desired. For instance, you can change the Palette color, or move the Legend position to the bottom.
18. Select the Treemap. As before, drag **DisplayName** to Category and **Sum of Value** to Value. Under Appearance, turn on labels.
19. Lastly, select the Donut chart. Rather than dragging the tags into the Settings panel, drag them directly onto the Donut chart. First drag **DisplayName**, then **Sum of Value**. They should get mapped into Category and Value, respectively. Under Appearance, turn on labels.



AnalytiX-BI Quick Start



APPLICATION NOTE

June 2017

20. Go into Presentation mode by clicking the  icon in the top right.
21. Select some tags in the Display Name box. Note how the other charts update to show only the values for those selected tags.
22. Exit Presentation mode.
23. Click on one of your charts and drag one of the arrows to make space for another control.
24. From the Component library, drag a **Gauge** control into the empty space, or select the empty space and then select Gauge.
25. Map **Sum of Value** to the Gauge (either drag it onto the Gauge itself, or into the Value field in Settings).
26. In the Gauge settings, drag **Sum of Value** into Selected Value, and set Maximum value to 3,000,000.

Our final display should look something like Figure 11.

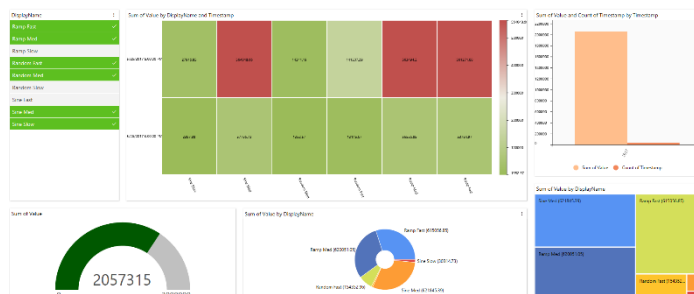


Figure 11 – KPIWorX Display

You can find other useful controls in KPIWorX, such as the Map control.



Figure 12 – Map Control

Drill Down in KPIWorX Widgets

1. In our KPIWorX display, click the  icon to go into Presentation mode.

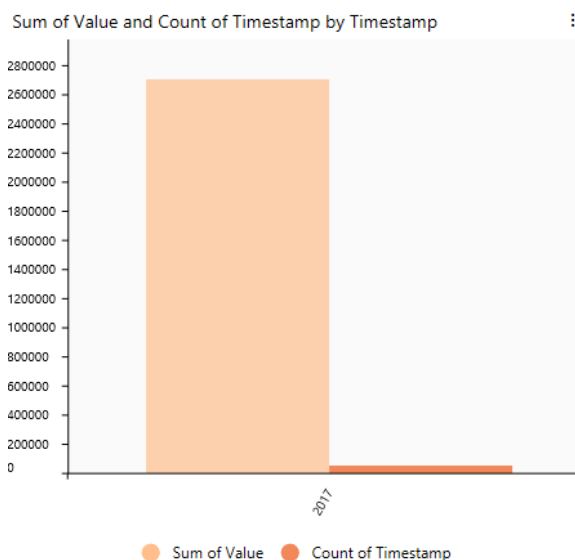


Figure 13 – Drill down year

2. Double click on a bar in your Categorical Chart. You should be able to drill into your data, narrowing in on your time frame. You'll not that not only will the Categorical Chart drill down, but the other charts will filter on that same time frame as well!



AnalytiX-BI Quick Start



APPLICATION NOTE

June 2017

Sum of Value and Count of Timestamp by Timestamp

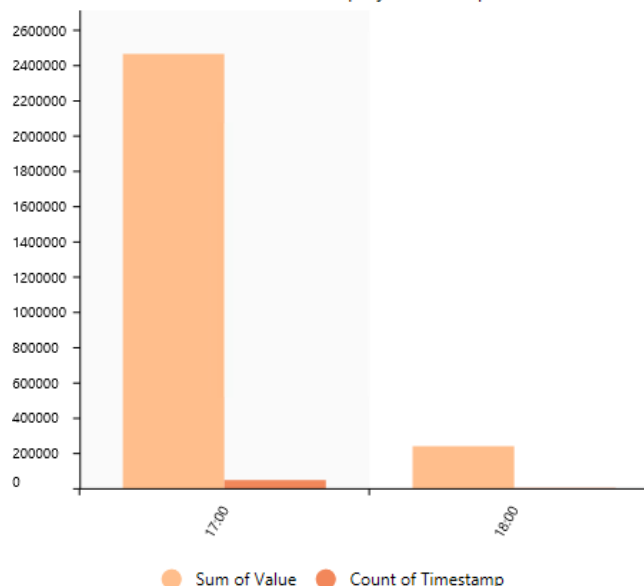


Figure 14 – Drilling down to hours

- To go back up, click the menu icon in the top right corner or right-click on the chart and choose **Drillup**.

Sum of Value and Count of Timestamp by Timestamp

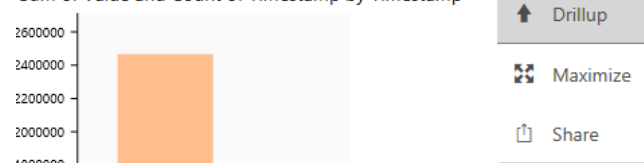


Figure 15 – Drill up option

Using AnalytiX-BI Data in GraphWorX64 Controls

GridWorX Viewer

- Open GraphWorX64.
- Add a GridWorX Viewer to your displays.
- Double-click on the GridWorX Viewer and select the Grid object in the tree.
- In the source tab, click **Add new Subscription (+)**, select **Data Set Tag Subscription** and browse for My Computer → AnalytiX → BI Server → Data Flows → Factory1 → **Factory1_Data**.
- Click **OK** or **Close** to all dialogs and go into runtime. You should see logged data coming from Hyper Historian. Because we are looking at a Data Flow the data is not

cached, so it may take some time to load, depending on how much data you have logged.

- Go back into configure mode. Add another GridWorX display under this one. Subscribe this one to a Data Model: My Computer → AnalytiX → BI Server → Models → Factory1 → **Data**.
- Go in Runtime again. You should notice that the GridWorX Viewer looking at the Model loads faster than the one looking at the Data Flow because the Model data has been cached in the BI server.
- Exit configure mode. Edit one of the preexisting GridWorX Viewers and change the subscribed tag to My Computer → AnalytiX → BI Server → Models → Factory1 → **CustomDataView**.
- Go in Runtime, and you should now see the data as it was defined in that view.

Data Diagram

- Another control that we can use in GraphWorX64 is the Data Diagram. Add a Data Diagram control to your display.
- Double-click on the Data Diagram to configure it.
- In the Data Source field browse for My Computer → AnalytiX → BI Server → Models → Factory1 → **Data**.
- For Horizontal Binding, pick **Timestamp**.
- For Vertical Binding, pick **PointName**.
- For Value Binding, pick **Value**.
- Scroll down to Horizontal Axis and set the Labels Angle to **65**.
- Go in Runtime. You should see a data diagram similar to the figure below.

Data Diagram

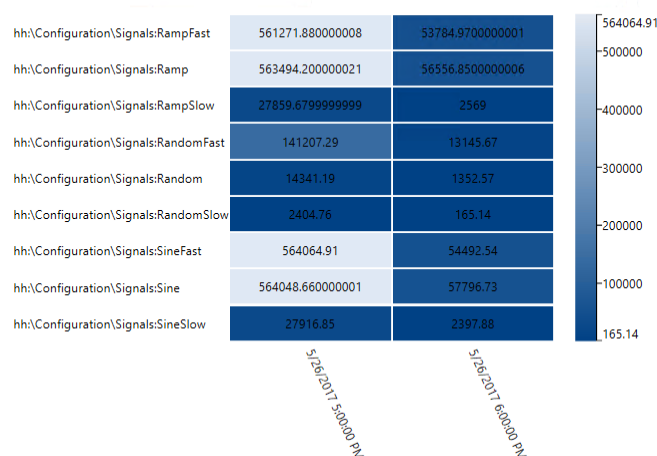


Figure 16 – Data Diagram control