Data Logging with XLReporter

Overview

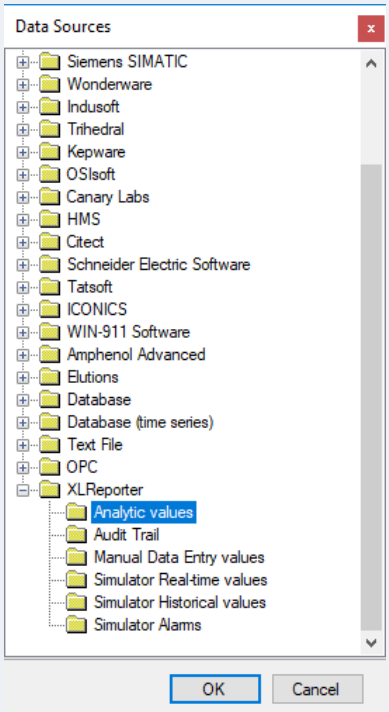
Logging process data to a centralized relational database can prove invaluable for creating descriptive and in-depth reports. XLReporter's solution for data logging are Data Snapshots, which are taken periodically or on event. There are other analytic types available in XLReporter to do everything from statistics like average, minimum, and maximum, to analytic types that can derive things like uptime and downtime of different machines in the plant. These are discussed in a separate document.

Project Setup

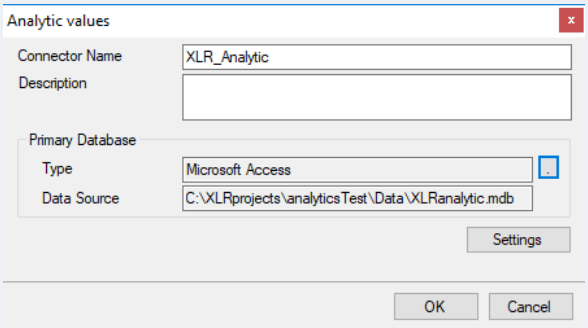
The following describes the setup for data logging with Data Snapshot Analytics.

Data Connector

In the **Project Explorer**, add a new data connector by navigating to the **Data** tab, selecting **Connectors**, and clicking **Add**.



For the **Data Source**, expand **XLReporter** and select **Analytic Values**. The following display is used to specify where the analytic values are stored.

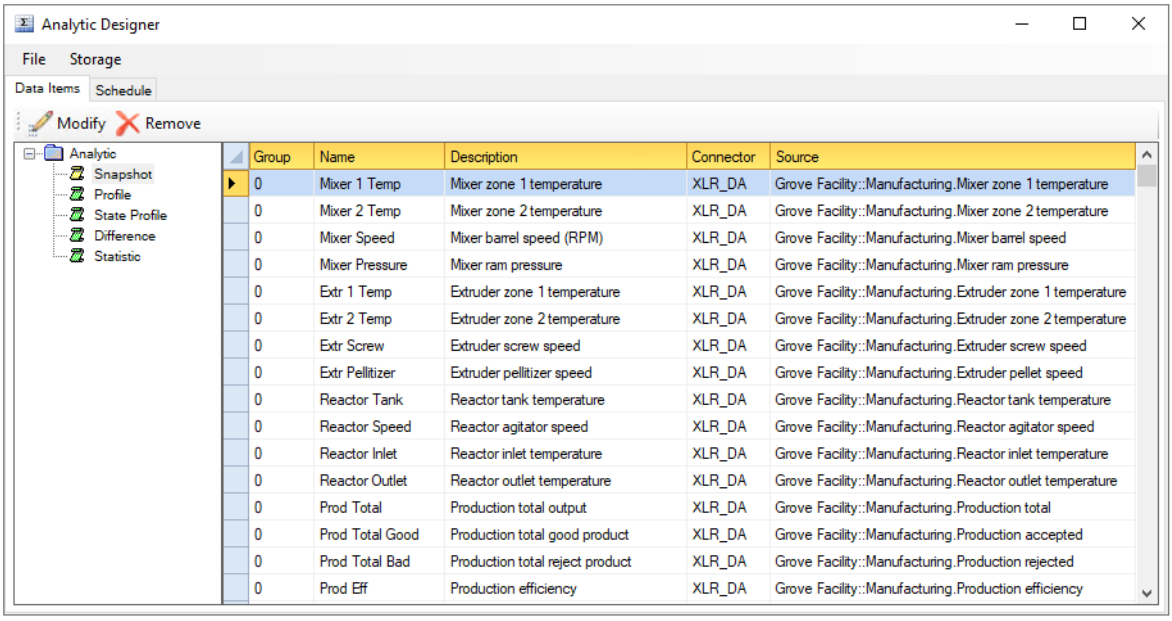


The **Primary Database** is where the data collection is be stored and is defined by clicking the browse pushbutton [...]. There are options to select Microsoft SQL Server and MySQL. A blank Microsoft Access database called *XLRanalytic.mdb* is provided in the *Data* folder of the project.

When selections are complete, click **OK** and a set of tables are created in the database to receive the logged data. In the next section, we will specify what will be logged.

Analytic Designer

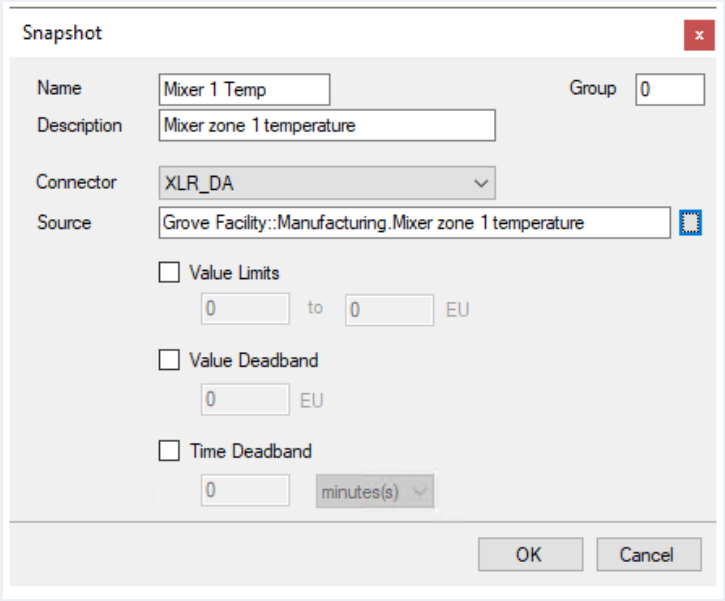
From the **Project Explorer Data** tab, open the **Analytic Designer**.



Group	Name	Description	Connector	Source
0	Mixer 1 Temp	Mixer zone 1 temperature	XLR_DA	Grove Facility::Manufacturing.Mixer zone 1 temperature
0	Mixer 2 Temp	Mixer zone 2 temperature	XLR_DA	Grove Facility::Manufacturing.Mixer zone 2 temperature
0	Mixer Speed	Mixer barrel speed (RPM)	XLR_DA	Grove Facility::Manufacturing.Mixer barrel speed
0	Mixer Pressure	Mixer ram pressure	XLR_DA	Grove Facility::Manufacturing.Mixer ram pressure
0	Extr 1 Temp	Extruder zone 1 temperature	XLR_DA	Grove Facility::Manufacturing.Extruder zone 1 temperature
0	Extr 2 Temp	Extruder zone 2 temperature	XLR_DA	Grove Facility::Manufacturing.Extruder zone 2 temperature
0	Extr Screw	Extruder screw speed	XLR_DA	Grove Facility::Manufacturing.Extruder screw speed
0	Extr Pellitizer	Extruder pellitizer speed	XLR_DA	Grove Facility::Manufacturing.Extruder pellet speed
0	Reactor Tank	Reactor tank temperature	XLR_DA	Grove Facility::Manufacturing.Reactor tank temperature
0	Reactor Speed	Reactor agitator speed	XLR_DA	Grove Facility::Manufacturing.Reactor agitator speed
0	Reactor Inlet	Reactor inlet temperature	XLR_DA	Grove Facility::Manufacturing.Reactor inlet temperature
0	Reactor Outlet	Reactor outlet temperature	XLR_DA	Grove Facility::Manufacturing.Reactor outlet temperature
0	Prod Total	Production total output	XLR_DA	Grove Facility::Manufacturing.Production total
0	Prod Total Good	Production total good product	XLR_DA	Grove Facility::Manufacturing.Production accepted
0	Prod Total Bad	Production total reject product	XLR_DA	Grove Facility::Manufacturing.Production rejected
0	Prod Eff	Production efficiency	XLR_DA	Grove Facility::Manufacturing.Production efficiency

Snapshot

To configure a **Snapshot**, either double-click a row in the grid or select a row **and** click **Modify**.



Enter a **Name** or accept the default. When triggered on time or event from the **Scheduler**, the process value specified as **Source** is collected and sent to the database.

As part of the configuration, the following options can be configured to reduce the volume of data stored in the database:

- **Value Limits**
  If enabled, the value is only stored if it is within the limits specified.
- **Value Deadband**
  If enabled, the value is only stored if the difference between it and the previous value is at least the deadband value specified.
- **Time Deadband**
  If enabled, the value is only stored if the amount of time since the last value was stored is at least the deadband time specified.

Note that a **Group** can also be specified. This is used by the **Scheduler** to determine which **Snapshots** to process (see **Schedule** section).

Schedule

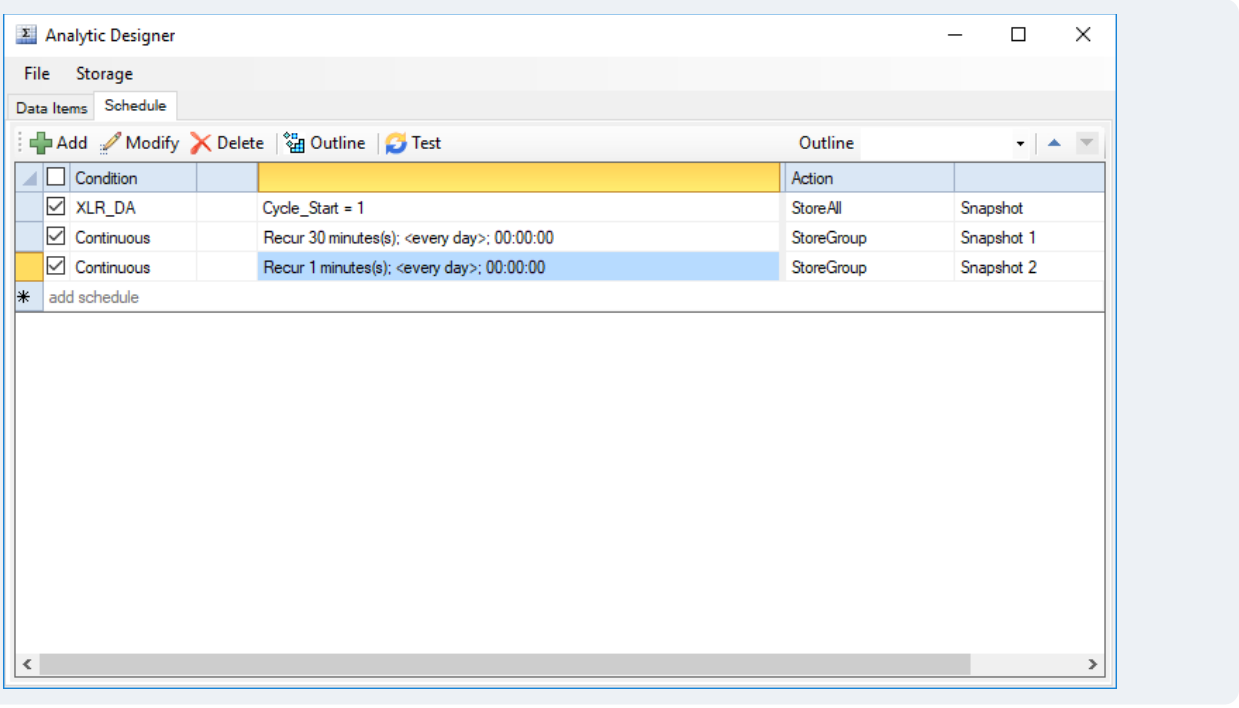
Store Actions

In the Scheduler, the **Store** action causes the **Snapshot** in the previous section to be logged either periodically or on event.

Groups

Each **Snapshot** is configured with a **Group** number which, by default, is set to *0*. This can be set to a specific number so that only analytics in a specific group are stored. Group *0* is considered the global group, which means that any data point configured as *0* is stored regardless.

As an example, consider the following:



In the above **Schedule**, there are three actions configured:

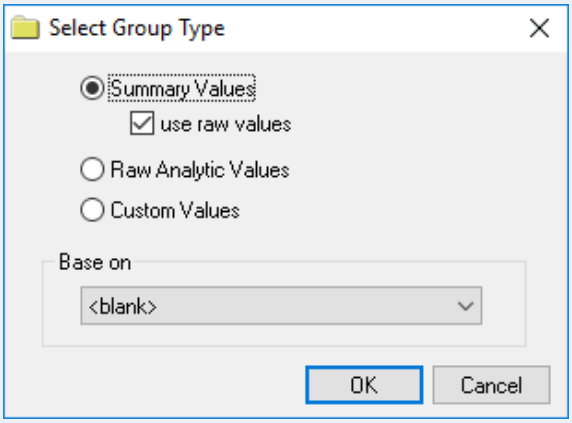
- A **StoreAll** action to run on the event *Cycle_Start = 1* to store all Snapshots.
- A **StoreGroup** to run *every 30 minutes* to store Snapshots assigned to group 1.
- A **StoreGroup** to run *every 1 minute* to store Snapshots assigned to group 2.

Each line of the schedule can be forced to run by selecting a row and clicking **Test**. The **Database Manager** tool from the **Project Explorer** can be used to verify that the values in the database.

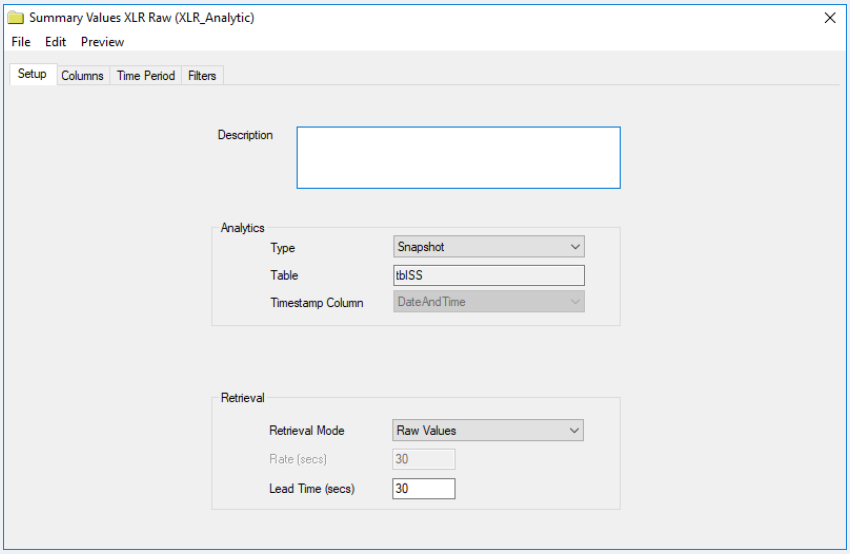
Data Group

The first step in getting the analytic **Snapshots** into a report is to design a **History Group**. This is usually done as part of template design. However, a quick method is to configure a data group directly.

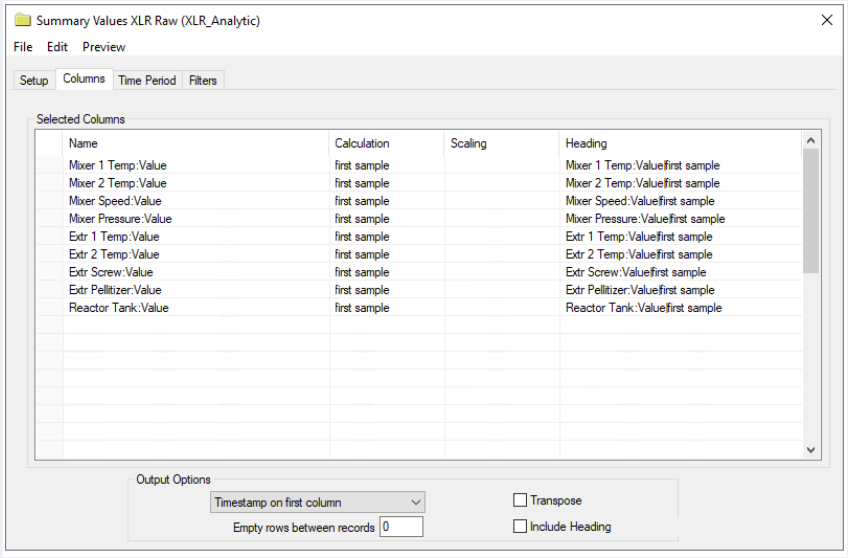
On the **Tools** tab of the **Project Explorer** open **Connector Groups**. Select the **XLR_Analytic** connector and click **Add**.



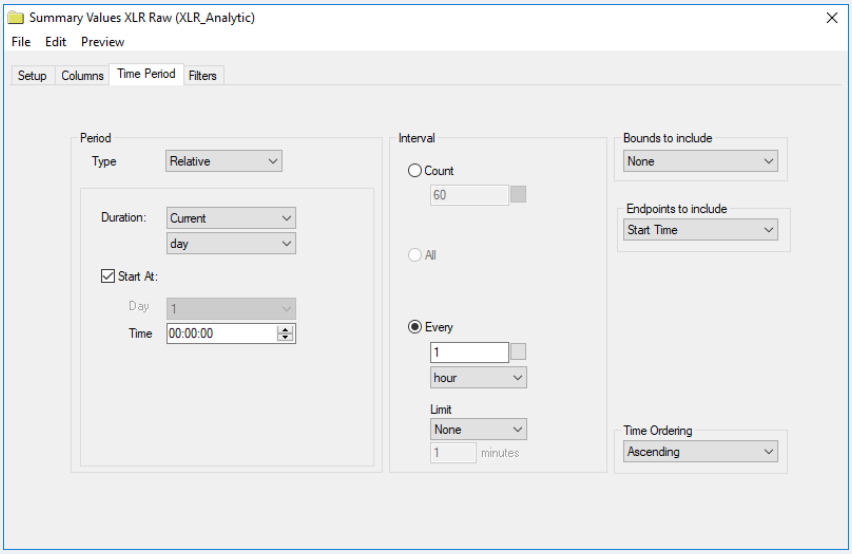
In the **Select Group Type** dialog, make a selection.



Under the **Setup** tab, set the **Type** to *Snapshot* and **Table** to *tblSS*



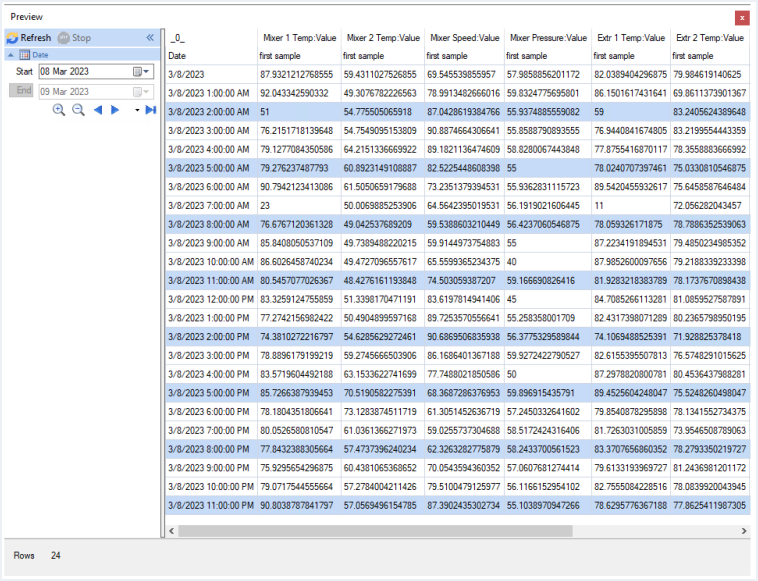
Under the **Columns** tab, Select the tags from the **Tag Browser** using the [...].



Under the **Time Period** tab, set the **Period** and **Interval**.

Click the **Preview** button.

Set the **Start Date** and click **Refresh.**



_0_	Mixer 1 Temp:Value	Mixer 2 Temp:Value	Mixer Speed:Value	Mixer Pressure:Value	Extr 1 Temp:Value	Extr 2 Temp:Value
Date	first sample	first sample	first sample	first sample	first sample	first sample
3/8/2023	87.9321212768555	59.431102752685	69.545539855957	57.9858856201172	82.0389404296875	79.984619140625
3/8/2023 1:00:00 AM	92.043342590332	49.3076782226563	78.9913482666016	59.8324775695801	86.1501617431641	69.8611373901367
3/8/2023 2:00:00 AM	51	54.775505065918	87.0428619384766	55.9374885559082	59	83.2405624389648
3/8/2023 3:00:00 AM	76.2151718139648	54.7549095153809	90.8874664306641	55.8588790893555	76.9440841674805	83.2199554443359
3/8/2023 4:00:00 AM	79.1277084350586	64.2151336669922	89.1821136474609	58.8280067443848	77.8755416870117	78.3558883666992
3/8/2023 5:00:00 AM	79.276237487793	60.8923149108887	82.5225448608398	55	78.0240707397461	75.0330810546875
3/8/2023 6:00:00 AM	90.7942123413086	61.5050659179688	73.2351379394531	55.9362831115723	89.5420455932617	75.6458587646484
3/8/2023 7:00:00 AM	23	50.0069885253906	64.5642395019531	56.1919021606445	11	72.056282043457
3/8/2023 8:00:00 AM	76.6767120361328	49.042537689209	59.5388603210449	56.4237060546875	78.059326171875	78.7886352539063
3/8/2023 9:00:00 AM	85.8408050537109	49.7389488220215	59.9144973754883	55	87.2234191894531	79.4850234985352
3/8/2023 10:00:00 AM	86.6026458740234	49.4727096557617	65.5599365234375	40	87.9852600097656	79.2188339233398
3/8/2023 11:00:00 AM	80.5457077026367	48.4276161193848	74.503059387207	59.166690826416	81.9283218383789	78.1737670898438
3/8/2023 12:00:00 PM	83.3259124755859	51.3398170471191	83.6197814941406	45	84.7085266113281	81.0859527587891
3/8/2023 1:00:00 PM	77.2742156982422	50.4904899597168	89.7253570556641	55.258358001709	82.4317398071289	80.2365798950195
3/8/2023 2:00:00 PM	74.3810272216797	54.6285629272461	90.6869506835938	56.3775329589844	74.1069488525391	71.928825378418
3/8/2023 3:00:00 PM	78.8896179199219	59.2745666503906	86.1686401367188	59.9272422790527	82.6155395507813	76.5748291015625
3/8/2023 4:00:00 PM	83.5719604492188	63.1533622741699	77.7488021850586	50	87.2978820800781	80.4536437988281
3/8/2023 5:00:00 PM	85.7266387939453	70.5190582275391	68.3687286376953	59.896915435791	89.4525604248047	75.5248260498047
3/8/2023 6:00:00 PM	78.1804351806641	73.1283874511719	61.3051452636719	57.2450332641602	79.8540878295898	78.1341552734375
3/8/2023 7:00:00 PM	80.0526580810547	61.0361366271973	59.0255737304688	58.5172424316406	81.7263031005859	73.9546508789063
3/8/2023 8:00:00 PM	77.8432388305664	57.4737396240234	62.3263282775879	58.2433700561523	83.3707656860352	78.2793350219727
3/8/2023 9:00:00 PM	75.9295654296875	60.4381065368652	70.0543594360352	57.0607681274414	79.6133193969727	81.2436981201172
3/8/2023 10:00:00 PM	79.0717544555664	57.2784004211426	79.5100479125977	56.1166152954102	82.7555084228516	78.0839920043945
3/8/2023 11:00:00 PM	90.8038787841797	57.0569496154785	87.3902435302734	55.1038970947266	78.6295776367188	77.8625411987305