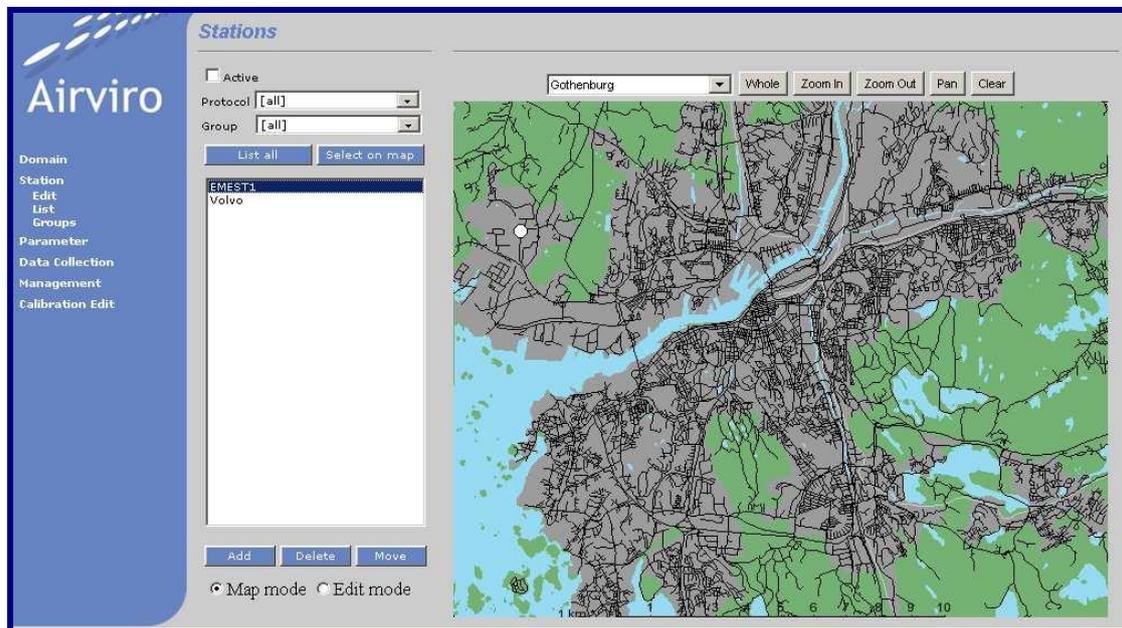


## Airviro User's Reference



## Using the Indico Administration Module

### How to fetch data automatically from remote stations



## Using the Indico Administration Module

### How to fetch data automatically from remote stations

#### Amendments

Version	Date changed	Cause of change	Signature
3.11	May 2007	Upgrade to Airviro version 3.11	GS
3.12	January 2009	Upgrade	GS
3.13	January 2009	Upgrade	GS
3.20	August 2010	Upgrade	GS

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## 6.1 Introduction

Automatic data collection is impressive once it is working, but setting up a system to handle it is non-trivial to achieve. The Indico Administration Client has been built to help with this so that the whole process is user friendly, but nevertheless a good understanding of how each part of the data collection works is important if you want to be able to sort out problems.

Data is usually fetched using modems. The Airviro computer first runs an **external protocol**, which contacts a specified remote **station**. The station answers and waits for instructions. The external protocol then sends instructions to the remote station including a request for the latest data. The station responds to the instructions, the computer receives the new data and the conversation is complete. The new data is then loaded into the **time series database** so that other programs (such as the Indico Presentation Client) can access it.

Automatic data collection is carried out via external protocol programs. Every external protocol is different, because each type of logger is different. This means that the documentation cannot really become specific enough to be able to lead step by step through the external protocol editor where all the external protocol information is given.

Indico Administration Client is one of the three main tools in Airviro (Indico Presentation, and Indico Report and Indico Validation), intended for acquiring, storing, editing, presenting, analyzing, reporting and exporting time series data.

## 6.2 Getting Started

The Indico Administration Client has been designed to make it easier to control and monitor data collection activities.

When Airviro has been installed at the Airviro Server, it is possible to navigate to your Airviro URL with a browser over Internet/Intranet.

After logging in with user-ID and password, the user is presented with a list of available

**Web Modules** and **Domains**. See *Figure 6.2.1* and *6.2.2*.

Clicking on the Indico Administration and the frame menu will appear. When they have been selected, the user selects a **Domain**.



Figure 6.2.1. Input User and password.

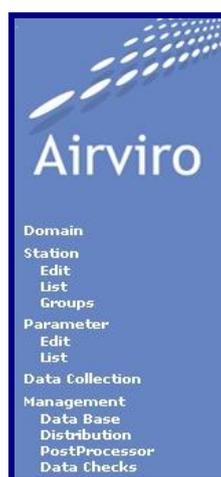


Figure 6.2.2. Menu.

The main window is split up into different sections (*Figure 6.2.2*):

- DOMAIN** Select the domain to work with.
- STATION** This allows the user to access the station interface, where it is possible to create, modify or delete existing stations. The configuration for automatic data collection is made here as well.
- PARAMETER** This provides an interface to the parameter database. Existing parameters can be altered and new parameters can be created.
- DATA COLLECTION** This page is used to control the data collection. The state of the automatic data collection can be changed here.

**MANAGEMENT** This enables you to alter the state of the Airviro database manager.

### 6.3 Viewing and Editing the Parameter Database

The parameter database contains information about the different substances measured. This includes gaseous pollutants such as sulphur dioxide, carbon monoxide, etc. and also meteorological parameters such as temperature and wind speed. A parameter can be anything that is measured as a variation against time.

In the **Parameters** menu, selecting **List**, the following sub-windows will appear.

#	Key	Descr	Unit	Alim	Gmin	Gmax	Imin	Imax	Maxeq	Eps	Grad
0001	SO2		ug/m3	100	0	100	0e+00	1e+07	6	0.0e+00	-1e+00
0002	NO		ug/m3	5000	0	1000	0e+00	1e+04	6	0.0e+00	-1e+00
0003	NO2		ug/m3	100	0	150	0e+00	1e+07	0	0.0e+00	-1e+00
0004	CO		mg/m3	100	0	15	0e+00	1e+05	6	0.0e+00	-1e+00
0007	HCl		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
0008	O3		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
000C	Ko1		ug/m3	100	0	100	-5e+00	1e+04	0	0.0e+00	-1e+00
0017	Ammoniak		ug/m3	100	0	100	0e+00	1e+04	6	0.0e+00	-1e+00
0018	Hg		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
0021	Bensen		ug/m3	100	0	10	0e+00	1e+04	24	0.0e+00	-1e+00
0022	Toluen		ug/m3	100	0	30	0e+00	1e+04	24	0.0e+00	-1e+00
0023	P-Xylen		ug/m3	100	0	10	0e+00	1e+04	24	0.0e+00	-1e+00
0027	Formaldeh		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
0040	Klor		ug/m3	100	0	100	0e+00	1e+04	6	0.0e+00	-1e+00
0042	CO2		ug/m3	100	0	200	0e+00	1e+05	6	0.0e+00	-1e+00
00EQ	Ekoreture	st		500	0	500	0e+00	1e+05	24	0.0e+00	-1e+00
00HC	HC		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
00hc	simHC		mg/m3	100	0	200	0e+00	1e+04	0	0.0e+00	-1e+00
0820	ethane		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
0830	propane		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
084i	i-butane		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
084n	n-butane		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
085c	cy-pentan		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
085i	i-pentane		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
085n	n-pentane		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
0910	ethene		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
0920	propene		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
0931	1-butene		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
093c	ci2-buten		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
093i	i-butene		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
093t	tr2-buten		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
0941	1-pentene		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00
0951	1-hexene		ug/m3	100	0	180	0e+00	1e+04	6	0.0e+00	-1e+00

Figure 6.2.3. List of the parameters

In the first column is the parameter key - a unique 4-letter identifier refers to each parameter. In the second column is a description of the parameter; so that you know which parameter the key refers to. The fourth column could in the future provide the possibility to have alarm limits, but this currently has not been implemented (concentration level alarms can be implemented using the external protocol).

The third, fifth and sixth column are for use with the Indico Presentation Module, which displays the units of the graph parameters underneath the graphs, and also needs a default minimum and maximum for each parameter that it uses so that correct scales are created on the graphs.

The last five columns are used to check against any incoming data associated with a particular parameter, unless the data has already failed a check by an external protocol. **Imin** and **Imax** are the minimum and maximum acceptable values, and **MaxEq** is the maximum number of equal consecutive values that will be accepted, plus or minus the value **Eps**. **Grad** is the maximum allowable difference between two

values of data differing by an hour. If data is not passing one of these checks, the data will be assigned with a status indicating the check that failed.

### 6.3.1 Creating and Editing Parameters

Click on **Edit** under **Parameters** to be able to view and edit individual parameters, or to be able to create new ones.

Unit	Graph Min.	Graph Max.	Offset	Factor
0 Celsius	0	30	0	1
1 kelvin	0	30	-273	1
2				
3				
4				

Data checks	
Alarm limit	50
Max number of equal values	12
Allowed Variation	0
Absolut Min	-5
Absolut Max	40
Max gradient (per time unit)	9999
Log Error status	<input type="checkbox"/>

Figure 6.3.2. Edit parameters

In the left side is a list of all the parameters currently defined. To view all the details stored about a given parameter, just click on the parameter name. All the information that was displayed in the parameter database summary, is this time much more nicely presented. Click on the **Add** button in the bottom left corner if you want to create a new parameter.

The most important piece of information for each parameter is its parameter key, and once a parameter has been assigned a key you cannot alter the key. The parameter also needs a name so that you can recognize it in the parameter list. Fill in these two pieces of information next to **Name** and **Key**.

Next fill in the **Presentation information**. The **Unit**, **Graph min.** and **Graph max.** are required by the Indico Presentation Client when it draws a graph involving the parameters. It is always important for a person looking at a graph to know what units it represents. For most gaseous pollutants this will be  $\mu\text{g}/\text{m}^3$ . You can specify up to 4

new units. The **Offset** and **Factor** is the scaling from the default unit. Offset is needed for conversions between units, like Celsius and Fahrenheit (*Figure 6.3.2.*)

Fill in the likely minimum and maximum value that would be required for the graph axis. This can be altered in the Indico Presentation Client but a default value is required when the graph is first produced. The **Alarm limit** is currently not implemented.

### 6.3.1.1 Checking the Incoming Data

Now move onto the **Data checks** section, where it is possible to define various limits to check the incoming data. All incoming data is checked against the limits defined here. The data is assigned a status code, which indicates if data is OK or the reason that it not passed the check. The data is still stored in the time series database whether or not it is checked OK (see Volume 5 -Indico Validation), but users using the Indico Presentation client can choose only to use data with certain status codes.

A consecutive number of equal values often indicates instrument failure, so set **Max number of equal values** to what you consider would indicate such a failure. The **Allowed variation** is related to this - if the difference between two adjacent values is less than the allowed variation then they are considered to be equal. Instruments also usually have a measurement range outside of which their readings cannot be relied upon. Enter these limits next to **Absolute min** and **Absolute max**. **Max gradient** is the maximum allowable difference between two hourly values of data.

Error messages from the data collection are stored in the directory `/usr/airviro/log/`, the files are called `avlog.YYMMDD` (YY is the year, MM the month and DD the day). These files are normally saved for a month before being deleted by the system. If the **Log Error Status** is checked both for the parameter and the station for a time series, a log entry is added for data with bad status in the `avlog` file.

When you have finished defining the parameter click on **Apply** to save your data.

## 6.4 Understanding the Station Database and Setting Up a Station

### 6.4.1 Viewing the Station Database

Each site where data is measured is called a station. If you click on **List** under **Station** on the frame and a summary of the station database will be presented on the screen:

Station	Op	Bad	Update	Next
GM1 Shell	NO	0	900122 12:00	700101 01:00
GM2 Lejonet	NO	0	910823 12:00	910823 13:35
GM3 Jarnbrott	NO	0	910116 15:00	910701 13:10
GM4 Risholmen	NO	0	910116 15:00	910701 13:10
GM5 Femman	NO	0	900101 01:00	700101 01:00
GO1 Gamlestaden	NO	0	900122 12:00	700101 01:00
GO2 Molndal	NO	0	900122 12:00	700101 01:00
GO3 Rya	NO	0	900122 12:00	700101 01:00
GO4 Volvo	NO	0	900122 12:00	700101 01:00
GO5 Jarntorget	NO	0	900122 12:00	930407 00:00
GOX EMEST1	NO	0	900122 12:00	700101 01:00
GOY EMEST2	NO	0	900122 12:00	700101 01:00
TST AcceptTest	NO	0	700101 01:00	700101 01:00

Figure 6.4.1. Station List

In the first column you see the station key. A unique 3-letter identifier refers to each station, which is the internal name of the station. In the second column is a description of the station. This is a name associated with the station key so that you know which station the key refers to.

The third column shows whether the station is in operation or not, i.e. if it is due to be called automatically at some specific time. The next column shows any bad (unsuccessful) calls and can also show whether any alarm limits have been reached. The last two columns show the date and time of the last successfully fetched data, and the next call time (this is only relevant for operational stations).

## 6.4.2 Creating or Editing a Station

The active stations are visualized by checking the **Active** check box. (*Figure 6.4.2.*)

The protocol needs a lot of information about the set up of the logger that it will be contacting, and you can select the protocol associated of the station that to wants to edit.

You can choose a Station group to associate your editing. These **groups** can be created in Indico Administration. A station can then be assigned to one or several station groups. This is useful if you have a system with a large number of stations.

Click on **Edit** under **Station** to see more information about a particular station. When you click on **Select on map** a cross pointer will allow you to select the area on the map that you are interested in. Select an area with the mouse by pressing and holding the left mouse button in one corner, dragging it over the area and then releasing it. Alternatively, if you are not interested in a particular area and would like to see all stations, click on **Show all**.

Then double click on the station, i.e. Molndal, and **Station** sub-window appears. The user can also use the toggle button **Edit mode** to open these sub-windows.

In the left side of the sub-window is a list of existing stations. If you want to edit an existing station, just click on the station name in the list and that stations details will appear. If you want to create a new station, then click on the **Add** button in the bottom below left hand corner. The station sub-window disappears and a cross hair appears, waiting for you to define the location of the new station. Click on the map at the site of the station. The stations sub-window will then reappear.

- **Name Information**

Start by filling in the name of the station. Click in the box beside **Name** and enter a name that will be recognized by you and other users as identifying the station. Next fill in the **Key**. This is the system name for the station and must be a unique 3-letter identifier, and conventionally follows a naming pattern. The first letter represents the location of the station, for example all stations in Göteborg have G as the first letter of the key. The second letter usually describes the type of data measured at the station. The most important types are O for Opsis analyzers and M for Campbell loggers. The last letter distinguishes between different stations of the same type. You do not have to follow this convention - as long as the key is unique.

The screenshot shows the 'Stations' administration interface. On the left, there is a list of stations: Femman, Gamlestaden, Jantorget, Larson Davis, Lejonet, Molndal (selected), Sjuan, and Tian. Below the list are buttons for 'Add', 'Delete', and 'Move'. At the bottom left, there are radio buttons for 'Map mode' and 'Edit mode' (selected). The main area is titled 'Stations' and contains several sections:

- Name Information:** Name: Molndal, Key: GO2
- Main Information:**
  - Operate
  - Log Error status
  - Latest update: 09/122 12:00
  - Time to call: 700101 01:00
  - Argument: (empty)
- Configuration:**
  - Time Restrictions: (button)
  - Protocol Settings: ops (dropdown)
  - Miscellaneous: (button)
- Limits:**
  - Bad calls: 0
  - Alarm limit: 6
  - Stop limit: 12
- Station group:**
  - 0: g1
  - 1: 2|NO2
  - 2: 3|NO2
  - 3: 4|HNO3
  - 4: 5|NOx
  - 5: 6|PAN
  - 6: 7|HNO3
- Error message:** Failed to collect data

At the bottom center, there is an 'Apply' button.

Figure 6.4.2. Edit Station

- **Main information**

Next comes **Main information**, but this is actually the last thing to fill in. Once the station is fully configured for automatic data collection, fill in the date and time for the next data collection beside **Time to call** and activate the tick box beside **Operate**.

Once data collection is running the **Latest update** field automatically updates itself.

If the **Log Error status** is checked both for the parameter and station for a time series data being stored in the time series database and the data check result in a bad status, a log message is written to avlog. See the explanation for parameters above.

This **argument** is automatically updated by the data collection daemon after a successful data fetch. Each protocol requires a specific argument that specifies the start date and time of the data to be collected. This has to be in the correct format for the station that is contacted to understand what is required.

If you are using the “ops” protocol then the argument is the date and time e.g. 000508 12:00. If the OPSIS station has several paths then there must be an argument for each path. The arguments should be separated by a space.

If you are using the “cam” protocol then you must give the pointer position e.g. 1046. If you give a pointer position 0 then all data in the logger will be fetched.

Each protocol requires an argument describing the start time of the data required. The external protocol program requires the argument. This takes different formats for different protocols - for example, Opsis loggers take a normal date and time format but Campbell loggers require a pointer which does not seem to have anything to do with time at all. Enter a suitable argument beside **Argument**. This argument is automatically updated after data has successfully been collected from the station. A resource is also normally required as a means of contacting the station, and this is usually a modem.

Airviro systems have been successfully used with loggers from the following manufacturers:

- Campbell (always used for Airviro principal masts)
- Opsis Analyzers using ComVision
- Opsis loggers
- Horiba
- Envidas
- Philips / DMS / A30
- Odessa
- Nilu
- Aanderaa
- Dasibi
- Marksman
- API
- ESC

- Ecotech
- TEOM
- All loggers / instrument with support for the Extended Bavarian protocol

- **Limits**

Move on to **Limits**. You can define your own alarm limit and stop limit, which typically take values of 5 and 10 respectively. When the number of consecutive bad calls reaches the alarm limit, a warning alarm message can be sent, and when the stop limit is reached another alarm message can be sent and the station ceases to be operational. When this happens you must first find out and solve the problem, then reset the number beside **Bad calls** to 0 and make the station operational again.

---

**Note:** It is usually much easier to copy an existing station when creating a new station. First select the station that you want to copy and then click on **Add**. All the information will be copied to the new station.

---

- **Station group**

Finally you can choose a **Station group** to associate your station. These groups can be created in **Groups** in the **Station** menu on the frame. A station can then be assigned to one or several station groups. When you look at time series data in Indico Presentation Client you can choose to only look at stations for a particular station group. This is useful if you have a system with a large number of stations.

Station groups can also be used for dealing with mobile stations. Every time a mobile station moves it becomes a new station with a new station key. However the mobile station can have its own station group so that it is easy to use Indico Presentation Client to select all stations that are actually the same, mobile station.

- **Error Message**

With this text box, the user can visualize the error messages generated by the data collection daemon.

- **Configuration**

#### 6.4.2.1 Restricting the Call Times

Click on **Time restrictions** and the Time restrictions sub page will appear. Here you can restrict the times and the days when the system will call the station. Under Hours click on the hours that the station may be contacted (note that you can click on All for a short-cut). The hours that will be used are those that are highlighted, the same for Weekdays.



Figure 6.4.3. Time Restriction

Next fill in **Misc. (Miscellaneous) information**. First comes the **Call int.** (call interval, in minutes). This describes how long the system waits between each call to the station. Of course this depends on the restrictions that you have made under **Hours** and **Week days** - if you have restricted calls to be only between the hours of 6 and 7 then the station will only be contacted between the hours of 6 and 7, even if the call interval is 180 minutes. Try to call fairly frequently to avoid loss of data - it is best to call at least once a day to collect hourly data, and if you want to have fairly recent data during the day you will need to call 3 or 4 times a day, or even every hour.

The **Retry int.** is the time to wait (retry interval, in minutes) after a bad call before retrying. The optimum time to wait varies between systems, but 3 minutes is quite popular.

**Start min** (minute) and **Stop min** (minute) restrict the parts of the hour to use when calling a station. For example, if **Start min.** is 10 and **Stop min.** is 30, then calls to the station may only be made between 10 past and half past the hour. This can be very useful in helping to avoid more than one process trying to use the modem at the same time.

**Max factor** is the maximum number of seconds that is allowed to fetch **one** hour's worth of data. For each call the maximum allowable call time is calculated, which depends on the number of hours of data to be collected, plus a default connection time that is added because it sometimes takes a while to establish contact with a station. If a call exceeds its maximum call time then the process is terminated by the collection daemon. A value of 0 here means no restrictions.

Click on **OK** to save you choices and to return to the **Stations** sub-window.

### 6.4.2.2 Defining the Protocol to Use

Here you define which data collection protocol to use, along with other information required by the protocol. However most of the information for the external protocol is entered with the **Argument and Resources**.

The station is however not yet ready to be automatically set to fetch data. The external protocol needs a lot of information about the setup of the logger that it will be contacting, and you now have to start the external protocol editor, which lies under **Protocol Settings** in the **Stations** windows.

### 6.4.2.3 Miscellaneous information

Click on **Miscellaneous** and sub-window will appear.

Figure 6.4.4. Miscellaneous information

In **Geographic info** you can move the station and define its height above the ground.

The **Time Information** is birth and death time. The birth time of a station is automatically stored here when a new station is created. If a station ceases permanently to be operational then you may want to call it “dead” and you enter the death time. In the future this might be more relevant and most be used with mobile stations.

Under **Protocol**, Resources can be the name of the resource (device file) such as `/dev/ttyS0` or to be able to specific from a set of modems it can be specified by:

**type (T)** Indicates the type of resource (ex TModem, TDirect).

**speed (S)** Specifies which speed the resource supports (ex S2400 or S1200).

**property (P)** Specifies a certain type of modem (ex PHST, PDiscovery)

Most external protocols require a resource to use (such as a modem). For systems that have several modems with different capabilities, it is possible to just specify a resource type to use, so that any available resource matching that type can be used.

Alternatively, you may instead just specify a specific resource, but it is better to give the resource type, as this is unaffected if the actual resource changes name or if more resources become available when the system is expanded.

If you have got 3 modems, two of which work at 2400 bauds and one at 1200, then you would prefer to use a 2400 modem, and beside “resources” you type

Tmodem, B2400 Tmodem, B1200

This means “use type modem at 2400 bauds, but if none are available use type modem with 1200 bauds”.

Under **Statistics** a summary of good and bad calls to the station is presented.

Now fill in the **Attributes**. Here you can specify three additional features connected with the data that is collected. Choose **Logging** if you want to keep a log of all transactions with the station (you usually want this with live stations). Choose **Dummy station** if the station is not actually operational but data appears at regular intervals anyway (for example if it is distributed from another computer system). Setting the **Dummy station** flag means that you can set the **Operate** flag under **Main information** but it will be ignored by the data collection daemon.

Choose **Save raw data** if you want to save the data as a file in the format that it arrives in as well in standard format in the time series database. This is sometimes needed to sort out problems with data collection but in normal cases is not necessary.

Now fill in the **Contact information**. Here you can specify additional information about the contact including her/his email.

Click on **OK** to save your changes.

### 6.4.3 Setting Up the External Protocol Information

This is the most complicated part of setting up an operational station and is intended for use only by users who have had system administration training. It requires detailed information about how the logger has been configured and which parameter is measured on each channel.

Choose the correct protocol from the protocol list that appears.

Now choose a station, a list of all stations that have already been configured for the protocol will appear, and you can choose one, and then click **Edit Mode**. This gives you a list of all the stations that have been set up in the station database, which will use the protocol that you have currently chosen.

Once you have loaded a station your external protocol editor should look something like the one shown. Level sub-window is a list of properties. Each property specifies some specific information about the logger such as the way the channels are configured or the way in which it can be contacted.

Each property (Level) must therefore be given the correct value or values (Number). A property will enable you to edit it.

With the button **Root** you have the possibility to return to the root level. There you will be able to add properties and to enter values to each one of them.

You can clone (copy) these complex properties until you have the correct number of them.

Activating the **filter level** and the data-header of the list disappears.

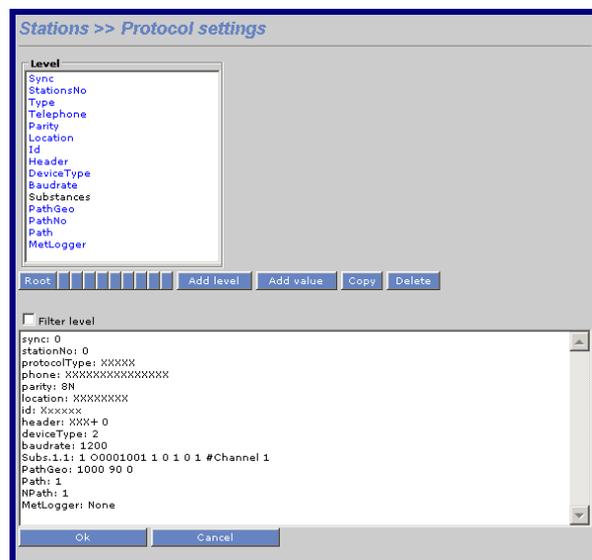


Figure 6.4.5. Protocol Settings

---

**Note:** you can request to the System Administrator to configure the “Import” protocol that is used it to extract existent data from a station.

---

When you have finished supplying the data to the external protocol, save the data by choosing **Ok** under the **Protocol settings** sub-windows.

#### 6.4.3.4 Starting the Data Collection

It is now time to test the automatic data collection. Return to the Stations window, and select your station. Select **Edit Mode** and click on **Operate** so that the toggle button beside it shows as selected. Fill in Time to call with a time 5 minutes from now. Fill in **Latest update time** as some time a few hours ago. It is not a good idea to try and collect too much data at once, especially with a new station, which might not work at first, as it is easy to forget to define something important. Save the station and wait for the call time. Check that the station appears in the data collection idle queue (click on **Data Collection** on the frame). Watch the modem and make sure it calls at the correct time.

When it has finished the call, look in the data collection queue again to see if the call was successful (i.e. 0 bad calls). If this is the case then you have successfully set up automatic data collection, otherwise you have to check everything that you defined very carefully and try to work out what is wrong.

### 6.5 Examining the Data Collection Processes

Click on **Data Collection** on the frame. This shows the processes that are under the control of the data collection daemon (**cold**), together with their current status. First you see the state of **Collection Mode**, which in most ordinary cases should be **MULTIPLE**, i.e. it can deal with more than one data collection process at any one time. Next is the database(s) that currently have operational stations. In most cases there will be just one database although in some cases there can be more. The other important things here are three queues, called **Idle**, **Wait** and **Running**.

The **Idle** queue contains all the stations that are operational. These stations are to be contacted at the time shown under **Next**. You can also see the number of bad calls and the resources that may be used.

The **Wait** queue is for stations that are due to be contacted but have to wait until a resource is available, for example if the modem that is to be used to contact the station is taken up by another process.

The **Running** queue shows any current activities - all stations from which data is currently being fetched. The length of time that the current collection has taken so far is also shown.

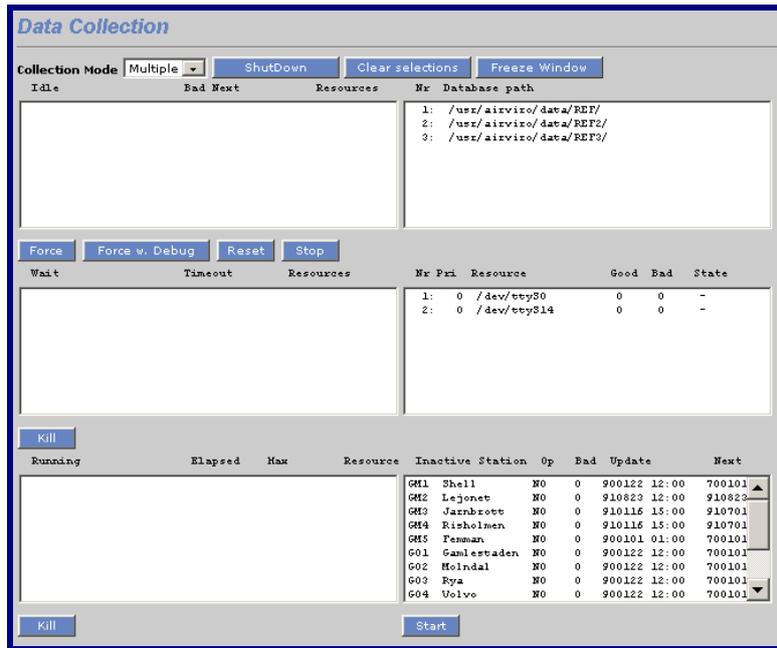


Figure 6.5.1. Data Collection

At the left is a list of all the resources that are available to be used by the data collection daemon. These resources keep a count of good and bad calls that they have made since the collection daemon was started.

This summary of the data collection processes only describes what was happening at all the moment.

## 6.6 Examining the Database Management Processes

### 6.6.1 Management

Click on **Management** in the menu, and select **Data Base**. This brings up a sub page where you can view or modify the state of the Airviro database manager. The database manager is storing incoming time series data in the time series database. The manager can run in different modes:

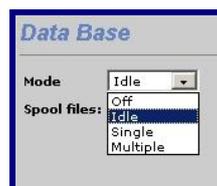


Figure 6.6.1. DataBase-Management

- **Off:** the database manager is not running. No data will be written to the time series database. The data is stored in a spool archive and when the mode is changed to **Multi** the data is written to the database.
- **Idle:** the database manager is running but does nothing. No data is written to the time series database.
- **Single:** the database manager is running but does only write data to the first domain. **PI:** Check this with Lars.
- **Multi:** the database manager is running and writes data to all domains.

With **Spool files** the user can identify the number of spool files and invalid files (0), in the spool directory of the current Domain. If the database manager is running in mode **multi**, the number of spool files should be 0. Invalid files should always be 0.

**HINT:** For a normal system running data collection, the state of both of them should be **Multi**. This means that the database manager can deal with several domains.

### 6.2.3. Distribution

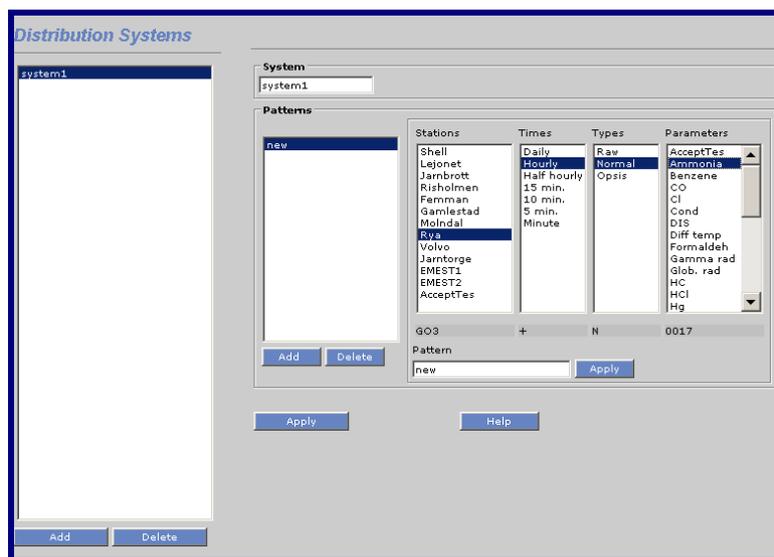


Figure 6.6.2. Distribution Systems

Click on **Management** in the menu, and select **Distribution**. With this option, the user can save time series data for distribution. Airviro saves this data in file that is located in `/usr/airviro/data/<domain>/dist/`. Using the **Dist**, **Fdist** and **Hdist** protocols data can be sent to other Airviro systems.

To decide which time series that should be put in distribution archives a rule based system is used. The rules are based on the five first letters of the time series key: **SSSRT**, where the three **S**:s are the station key, **R** the time resolution and **T** the type of data. It is possible to define rules using pattern matching. A **?** means any character, a **\*** means one or more of any characters.

A rule that is only a **\*** would put all incoming data in the distribution archive. A rule that is **GM5+?** would put all data from the station GM5 with time resolution + (hourly) with any type. A rule that is **??+M** would put all normal hourly data in the distribution archive.

The four lists Stations, Time res, Types and Parameters is only an help to know the time series key letters. Using the lists it is possible to define a time series pattern.

Airviro can distribute data to one or more systems. These are shown in the leftmost list. Each system can have one or more distribution rules defined. These rules are listed in the **Pattern** list.

A distribution directory with the same name as specified in **System**, is created under `/usr/airviro/data/<domain>/dist/`.

Help is currently not implemented.

### 6.6.3 Time Series Post Processor

When data enters into the time series database it is possible to define what post processing that will be made with the data. Typical post processing is calculation of averages and sums but also to scale raw values to scaled values (See Indico validation).

To decide which time series that should be post processed a rule based system is used. The rules are based on the 12 letters of the time series key: **SSSRTPPPPIII**, where the three **S**:s are the station key, **R** the time resolution, **T** the type of data, the four **P**:s the parameter key and the three **I**:s the instance. It is possible to define rules using pattern matching. A **?** means any character, a **\*** means one or more of any characters.

To each rule an action is chosen. The action works on the data that fulfilled the rule. The actions are: Calculation of 30 min averages, Calc hourly avg, Calc daily avg, Scale, Hourly sum, Daily sum, Calc NO2, Adjust. TEOM.

A rule that is only a **\*** would perform the action specified on all incoming data. A rule that is **GM5+\*** would apply for all time series with station GM5, time resolution + (hourly) and with any type, parameter and instance. A rule that is **??+MTEMP???** would apply to all time series with hourly resolution, normal values and with TEMP as parameter.

The four lists Stations, Time res, Types and Parameters is only an help to know the time series key letters. Using the lists it is possible to define a time series pattern.

The rules are applied to incoming data starting with the topmost rule and ending as soon as a rule apply.

**Help** is currently not implemented.

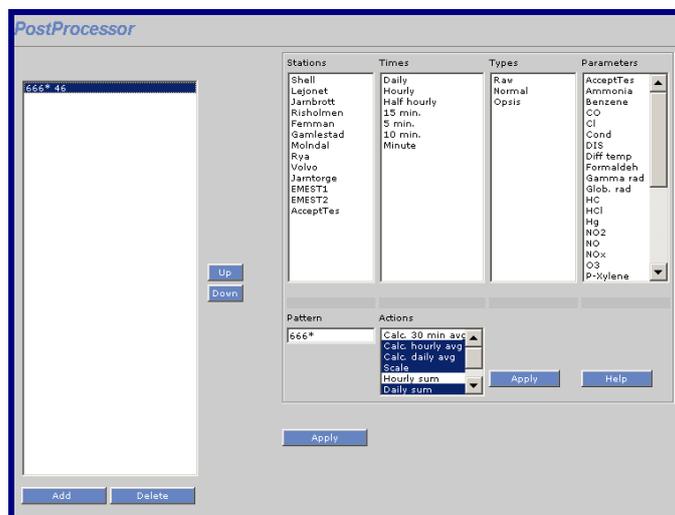


Figure 6.6.3. Postprocessor

## 6.6.4 Data Checks

Data checks are normally being made per parameter but here it is possible to add checks based on time series. It is made defining rules which applies to all incoming time series data.

To decide which time series that should be checked a rule based system is used. The rules are based on the 12 letters of the time series key: **SSSRTPPPPIII**, where the three **S**:s are the station key, **R** the time resolution, **T** the type of data, the four **P**:s the parameter key and the three **I**:s the instance. It is possible to define rules using pattern matching. A **?** means any character, a **\*** means one or more of any characters.

The rule **GM5+MTEMP???** would apply for all time series with station GM5, time resolution + (hourly), type normal, parameter TEMP and for any instance.

To each rule checks are performed: **Minimum**, **Maximum** and **Suspect** changes the status and writes a message to the avlog file. **Alarm** writes an alarm message to the avlog file that contains the **Comment**.

The four lists Stations, Time res, Types and Parameters is only an help to know the time series key letters. Using the lists it is possible to define a time series pattern.

Indico Real Time reads the avlog file periodically and when a new alarm appears in

the log file the Alarm button starts to flash red and an alarm sound can be heard.

**Help** is currently not implemented.

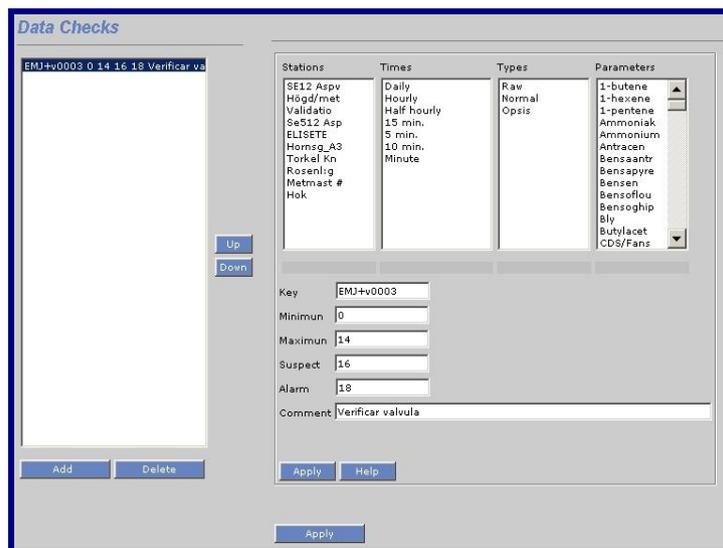


Figure 6.6.4. Data Checks