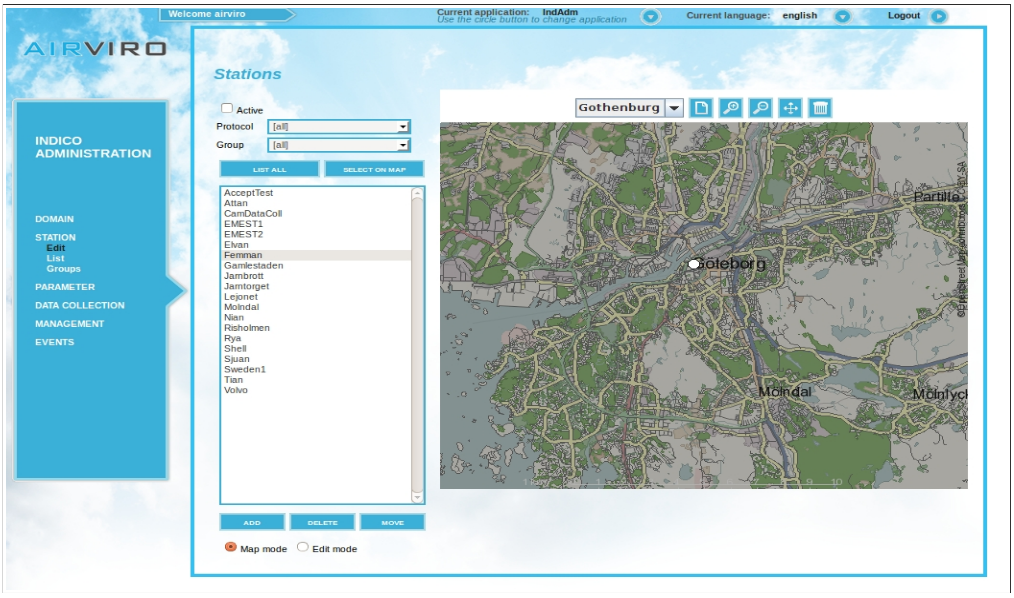
Apertum

Volume 6

Airviro User's Reference



Using the Indico Administration Module

How to fetch data automatically from remote stations

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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
3.21	Dec 2010	Upgrade	GS
3.21	June2012	Review	GS
3.22	April 2012	Upgrade	GS
3.23	Nov 2014	Upgrade	GS
4.00	April 2015	New Version	GS
4.00	Aug 2018	Review	GS

Contents

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

Once Airviro has been properly installed on the *server*, you can begin using it by typing the correct URL in your web browser over Intranet/Internet. */Figure 6.2.1. Input User and password .* The web interface controls all web modules, including **Indico Administration**, Indico Presentation, Indico Report, and Indico Validation among others.

After logging in with user-ID and password, the user must select an available domain and choose an Airviro web module.

In **Current application** you can see the actually selected Module. Using the arrow button You can choose another module.

Click in the arrow button **Current language** *to s*elect the language to work with. In version 4.0 this function is not available yet. With **Logout** you can close the airviro windows and return to the login window.

Figure 6.2.1. Input User and password.

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.

EVENTS This allow the user to define events for time series and stations.

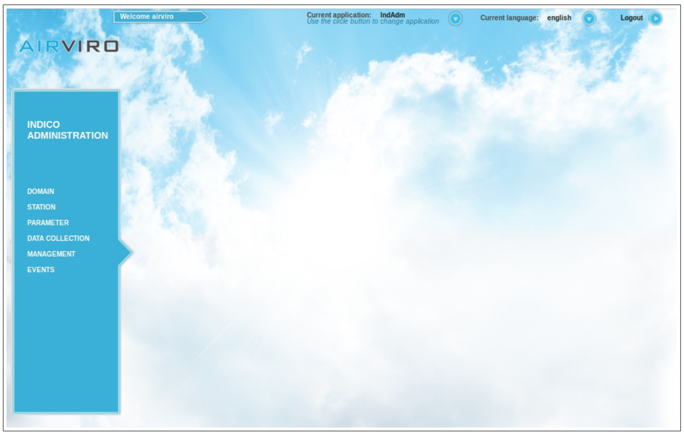

Figure 6.2.2. Main windows.

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 Kol        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 6.3.1 List of the parameters

In the first column the parameter key is shown, it is a unique 4 letters identifier refers to each parameter. The second column contains a parameter description; so that you know which parameter the key refers to. The fourth column has been used to define alarm limits,, but this is not in use anymore (concentration level alarms can be implemented using Indico Alarms).

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.

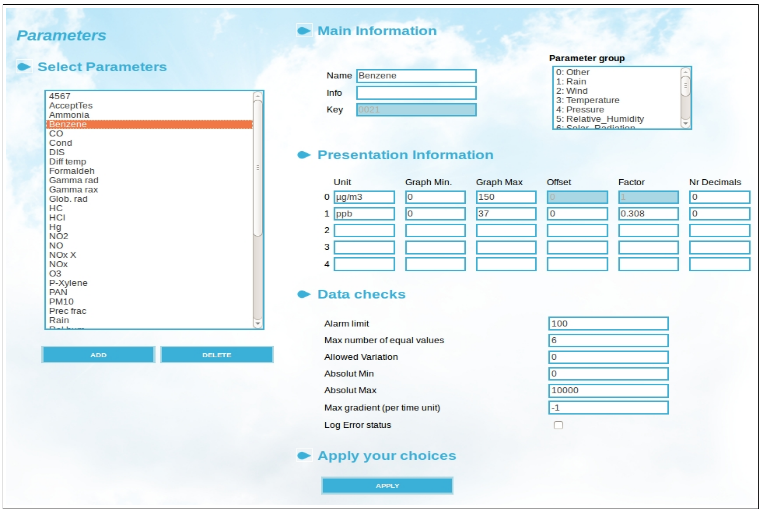

Figure 6.3.2. Edit parameters

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 which units are being represented For most pollutants this will be µg/m3. 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.

6.3.1.1 Checking the Incoming Data

Now move onto the **Data checks** section, were it is possible to defines 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 why it has 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.

The **Alarm limit** is not used anymore. 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
--------------------------------------------------------
265  Sweden1     NO    0s  700101 01:00   700101 01:00
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
GM7  Sjuan       NO    0   900122 12:00   700101 01:00
GM8  Attan       NO    0   070911 02:57   070912 02:57
GM9  Nian        NO    0   070911 02:58   070912 02:58
GMA  Tian        NO    0   070911 02:58   070912 02:58
GMB  Elvan       NO    0   070911 02:59   070912 02:59
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
XY1  CamDataColl NO   12s  150304 07:05   150305 11:40
```

Figure 6.4.1. Station List

In the first column you see the station key. A unique 3-letter identifier that refers to each station, which is the internal name of the station. The second column shows the station name.

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 datalogger set up of 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 **StnGroups** 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 mouse 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, 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 **LIST ALL**.

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

On the left side of the sub-window, a list displays the existing stations. If you want to edit an existing station, you must just click on the station name in the list and the station info will be displayed. If you want to create a new station, just click on the **ADD** button in the left bottom corner. The station sub-window disappears and a cross cursor appears, and you should position the new station on the map. The stations sub-window will then reappear.

6.4.2.1. Name Information

Start by filling in the the station name. Click on 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.

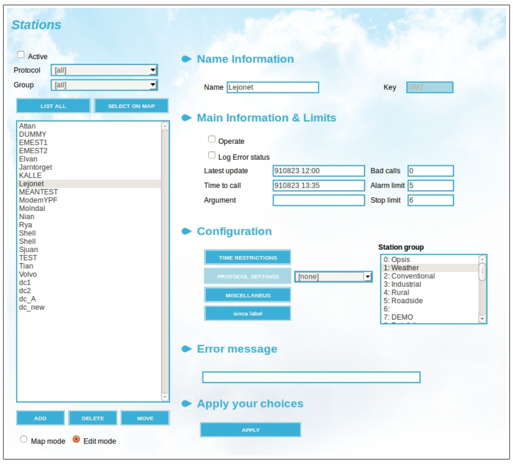

Figure 6.4.2. Edit Station.

6.4.2.2. Main information & Limits

Next comes **Main information & Limits** , 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, for both the parameter and station for a time series, and the data being stored in the time series database has a bad status, a log message will be written to avlog.

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.

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.

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

- Monitor Labs/Monitor Europe
- Thermo (42i, 43i, 48i, 49i)
- Met1
- BAM1020Campbell (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

6.4.2.3. Configuration

- **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 during the week when the system will try contact 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.

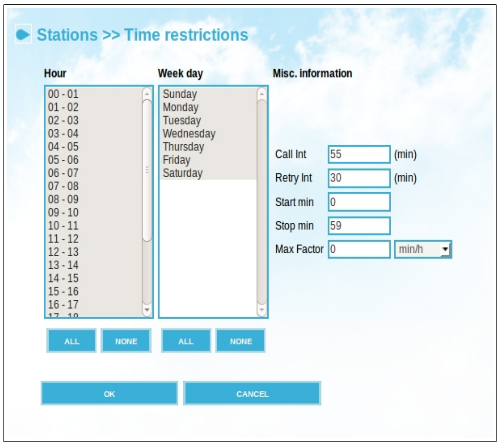

Figure 6.4.3.Time Restriction

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.

- **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.

- **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 **PROTOCOL SETTINGS.**

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.

- **Miscellaneous information**

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

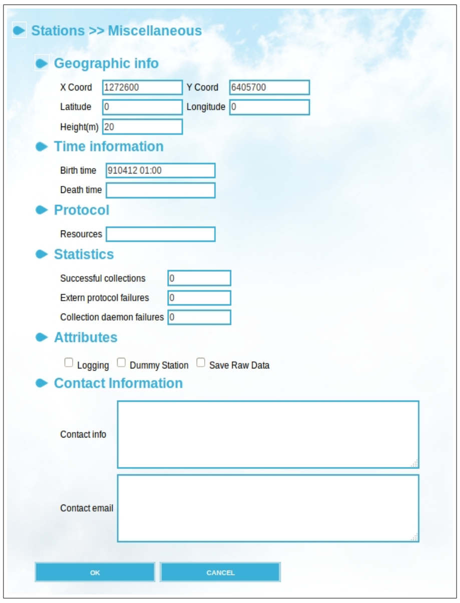

Figure 6.4.4. Miscellaneous information

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.

6.4.2.4. Error Message

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

6.4.2.5. Apply your choices

Click on **APPLY** 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.

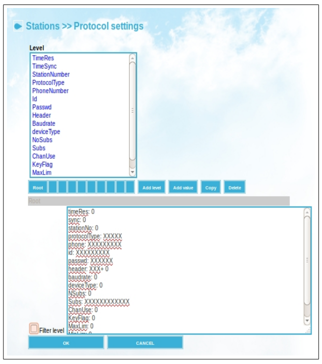

Figure 6.4.5. Protocol Settings

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 that 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.

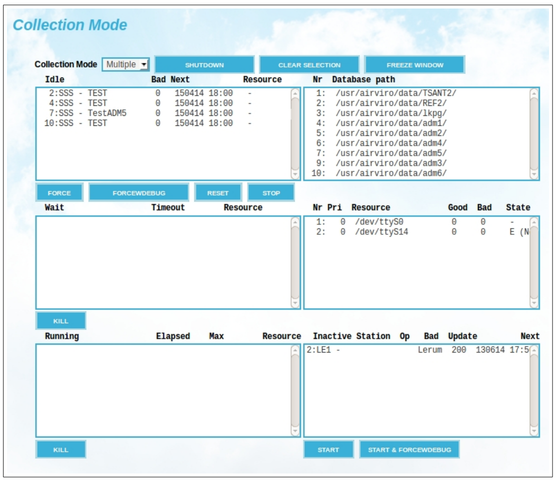

Figure 6.5.1. Data Collection

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:

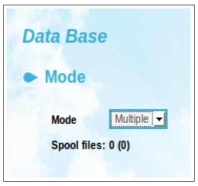

Figure 6.6.1. DataBase-Management

- 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 it only takes care of the first domain that is specified in the configuration file for the time series database manager.

- 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

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.

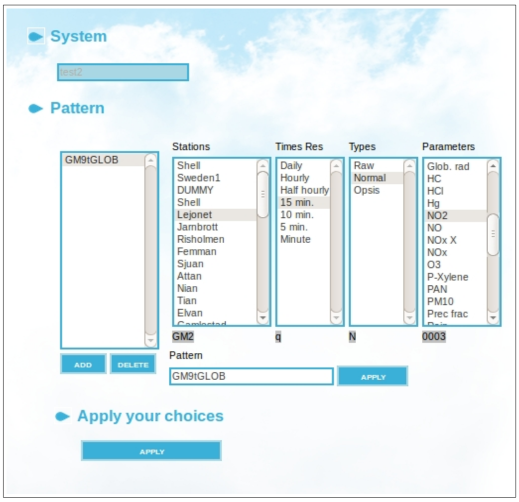

Figure 6.6.2. Distribution Systems

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/*.

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.

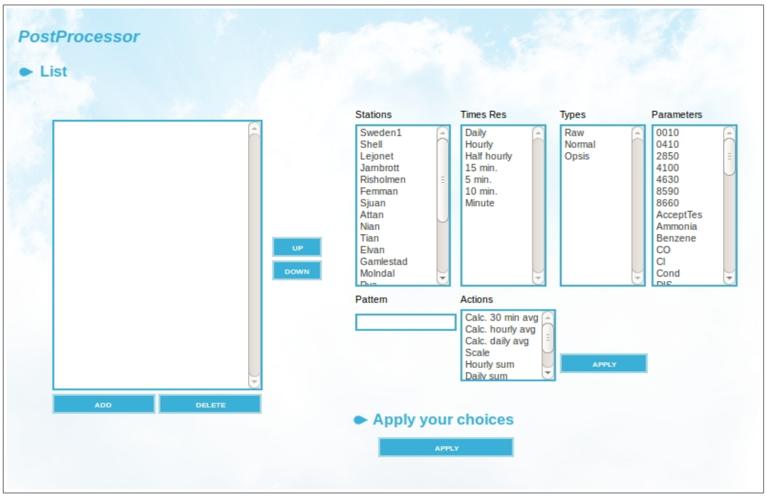

Figure 6.6.3. Postprocessor

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 an 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.

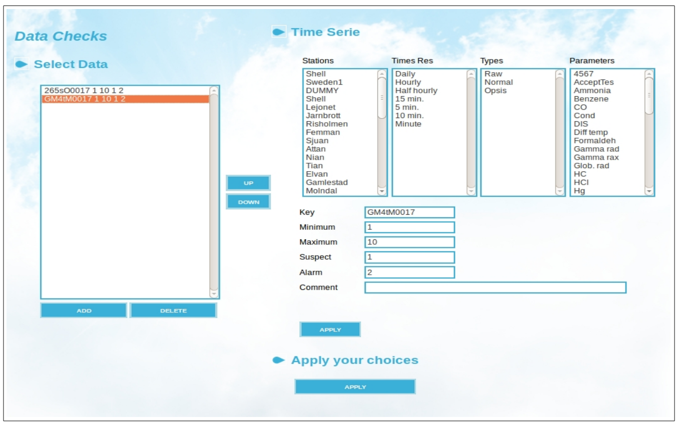

Figure 6.6.4. Data Checks

6.7 Events

These events can be used in Indico Validation. They are used to record events that has happened for a station or a time series as well as adding comments to the validated time series.

6.7.1 Type

Users can define different Event Types. For example:

- Events for a station such as when somebody visited the station or a power failure occurred.
- Comments for a time series, for example when a data is deleted or modified.
- Event messages coming from data collection process.

For each type, user must define a name, an Event Key (4 characters) an icon type and a source (time series or station). Event Types are selectable in Indico Validation.

The user can change the color assigned to an event.

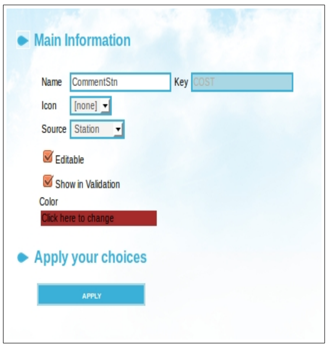

Figure 6.7.1. Data Checks.

6.7.2 Icon

The user can input an icon (upload an image file) and associate it to an event type.

6.7.3 Edit

The user can select an event from the list and edit it.

For station, the information shown is the name, date and the event text.

For time series, the name, resolution, parameter, instance, date and event text are displayed.

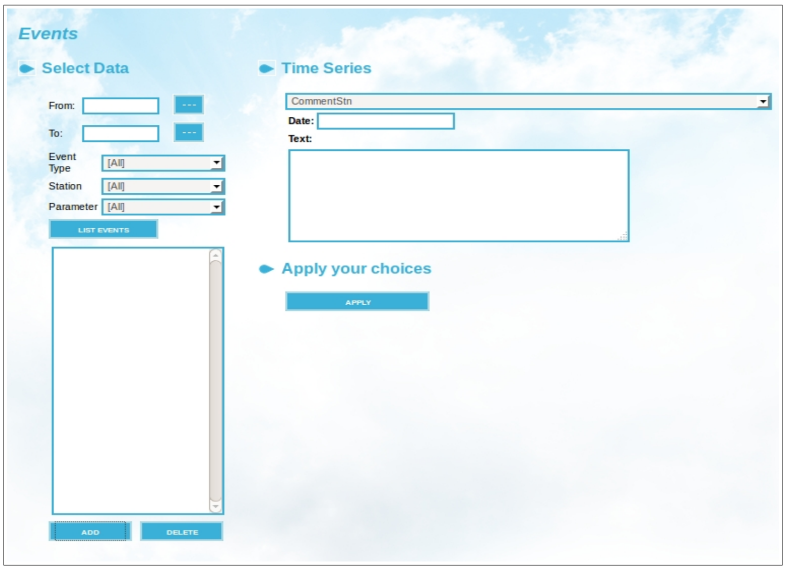

Figure 6.7.2 Edit.