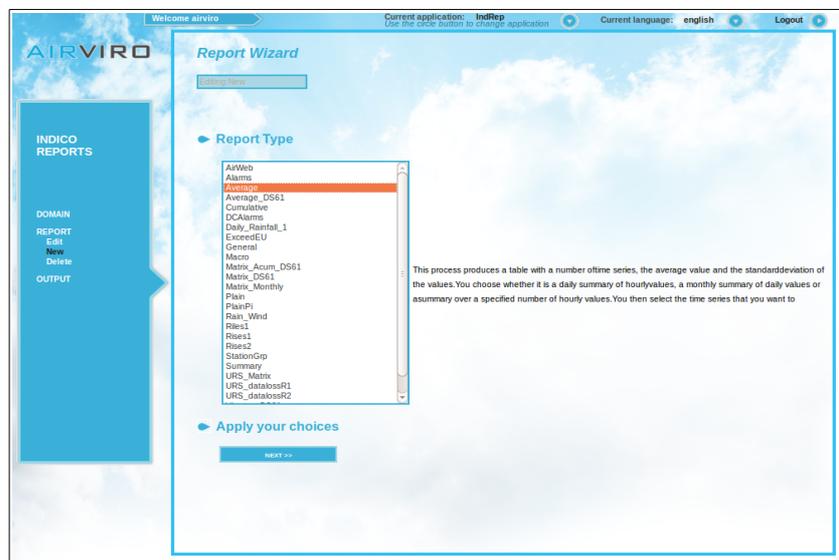


Airviro User's Reference



Working with Indico Report

How to get the most out of your data stored in the Time Series Database of the AIRVIRO system

Amendments

Version	Date changed	Cause of change	Signature
3.00.11	May 2004	New module	GS
3.11.20	Oct2007	Upgrade	GS
3.12	January 2009	Upgrade	GS
3.20	June 2010	Upgrade	GS
3.21	December 2010	Upgrade	GS
3.21	July 2012	Review	GS
3.22	April 2013	Upgrade	GS
3.23	Nov 2014	Upgrade	GS
4.00	April 2015	New version	GS
4.00	Aug 2018	Review	GS
4.01	May 2019	Upgrade	GS
5.00	Nov 2019	Review	GS
5.00	Dec 2020	Review	DC

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4.1 Introduction to Indico Report

Indico Report is – along with Indico Administration and Indico Validation - one of the three main tools in Airviro Air Quality Management, intended for acquiring, storing, editing, presenting, analysing, reporting and exporting time series data.

4.1.1 What is Indico Report?

Indico Report is a powerful tool for reporting data stored in the time series database.

With Indico Report it is possible to create reports that can be automatically executed at a specified time interval such as at the end of every day. Typically this would be a summary table of some kind that can automatically be sent as an email or printed. There are many different types of report or templates available to create reports.

A set of five standard output formats (called process types) is provided.

With Indico Report, you can:

- Create different types of reports.
- Assess data capture
- Automatically run reports at specified time intervals.
- Send reports to a mailbox, printer, screen or file.
- Use Indico Macros to create reports.

An experienced user will be able to use Airviro as an integrated monitoring system to extract valuable information from the measured data and then use it to evaluate dispersion calculations.

4.1.2 How does Indico Report client work?

This Airviro module runs on any PC or other devices running Internet Explorer 6 or later, Firefox or any other mozilla based browsers

After logging in to Airviro with your user-ID and password, a domain must first be selected, and then Indico Report module should be chosen from the available modules. All data processing is made on the Airviro server and afterwards the results are sent to the web browser or to the specified device (printer, mailbox, etc).

Airviro version v5.00 or higher dont need Java Runtime Enviroment to run.

4.2 Getting started

All the examples outlined here are based on the Airviro (Göteborg) Reference System, included in all Airviro system installations. Here you will find two years of hourly meteorological and ambient air measurement data.

4.2.1 Indico Report main window overview

After Indico Report has been loaded into your web browser, you will see a list of menu options on the left side of the window. To successfully complete the set up for a report, it is advisable to work through the menus sequentially, from **DOMAIN** down to **OUTPUT**, as some settings may depend on previous choices.

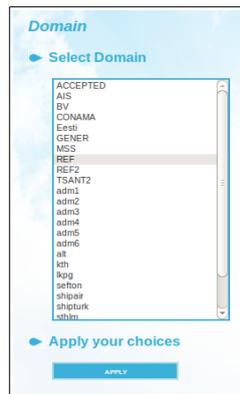


Figure 4.1. Domain

4.3. The Main Menu of the Indico Report module

The main window contains several available options:

DOMAIN For selecting the domain to work with.

REPORT It has a dropdown submenu with three different options, Edit/Delete, New and List scheduled.

It allows the user to edit, create or delete Reports, and display scheduled reports.

OUTPUT Allows you to display a report preview on the screen or to execute and send a report to an already specified output device, such as mail, files, printer or screen (for more details on this see **Destination** on section 4.3.4 Basic Concept of Report Configuration).



Figure 4.2 Menu.

4.3.1. General Concepts

DOMAIN is the first menu option, which takes you to a sub window where you can select the domain for which the report will be made from.

The next menu is **REPORT** which has three options: **Edit/Delete**, **New** and **List scheduled**, each one of them takes you to different sub windows where you can create new Reports, Edit or Delete existing ones.

In the **OUTPUT** sub window you can preview or run an existing report.

4.3.2. Database Concepts

When working with Indico Report you are accessing the Airviro time series database, so it is important to understand how a time series is defined.

A time series contains measurement observations. The following elements must be specified in order to define a time series:

- **station** : It defines from which measurement site the data is being collected
- **parameter**: It defines which parameter is being measured, e.g. gas concentration, air temperature, wind direction, etc.

- **instance:** Used to differentiate among several measurements of the same parameter at the same site. In the case of DOAS measurements, the instance indicates which path (light beam) has been used for the measurements. In the case of meteorological mast measurements, the instance should indicate the height at which the measurement has been made. This element can also be used to differentiate between measured values and calculated values for a parameter (in which case the instance might instead be named CAL).
- **attributes:** describes the available properties of the measurement. Usually, Value and Status are the stored attributes. In the case of DOAS measurements, it could be value, standard deviation or/and light.

4.3.3. The Report Wizard Sub windows

The Report Wizard sub windows are designed to be as versatile as possible, by incorporating the preferences of different customers. To open the report wizard, select **New** (to create a new report) or **Edit** (to modify an existing report) under the option menu **Report**

4.3.4. Basic Concept of Report Configuration

- Reports

You can create, edit, select or delete **reports** based on different **report types** or templates available (for more details on this see section 4.4. Default Report Types) . Existing reports can be edited and modified and then saved with a different name if necessary.

Each report is based on a certain report type or template. The first step is selecting a report type from a list for creating/editing a report in Report Wizard.

After a Report type has been selected you must go through the entire wizard configuration by clicking the **[NEXT >>]** button to complete all the necessary steps. The information required to fill in the configuration of a report will be different for each report type. For each new report you must go through all these steps, having the possibility to go back to a previous step to make changes if you need to reconfigure anything, simply by pressing

the [**<< Back**] button . Once you have gone through all the wizard steps, at the final step you have to press the [**SAVE REPORT**] button in order to save the newly configured report. A message saying that “Report saved” will be shown.

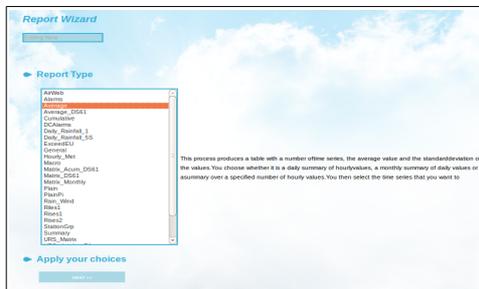


Figure 4.3 Report Wizard.

- Report Output

Reports can either be scheduled to be made automatically or can be made on demand. Use the **Output** menu to make reports on demand. By pressing the [**Preview**] button the report is shown in a new window. By pressing the [**Execute**] button the report is sent to the destination specified in the report configuration. The Time period text box is meant to specify the end of the period used for the report.



Figure 4.4. Output.

HINT: When you press the **PREVIEW** button, the output specified in the configuration of the report is NOT used, instead the report is shown on your screen. The Execute button will send the report to the output destination that has been specified in the report configuration.

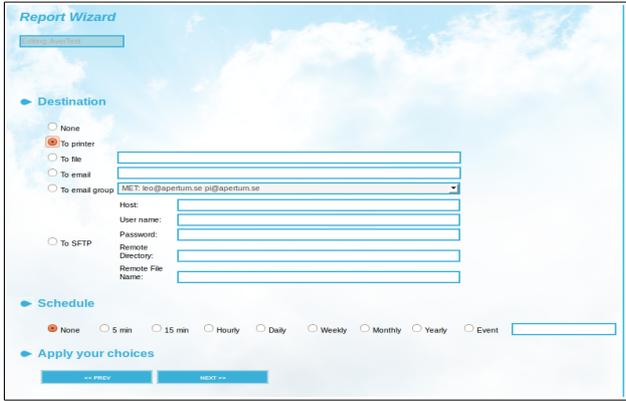
Destination

The previous step before saving a report configuration is to set the output device and schedule for the report.

A report may have different destinations. See *Figure 4.5*

The available options are:

- ◆ None: Use this option if the report is only for viewing on the screen .
- ◆ To printer: Send the report to a printer connected to the server.
- ◆ To file: Save the report in a file on the server. The whole folder path should be specified.
- ◆ To email: A valid email address must be entered. If the report should be sent to more than one recipient use space as separator between the email addresses.
- ◆ To email group: Select the email group in the dropdown list. Email groups are administrated in IADM.
- ◆ To SFTP: Select this option if the report is to be sent with SFTP. Host, user name, password, remote directory and remote file name must be specified.



The screenshot shows the 'Report Wizard' interface with the 'Destination' step selected. The 'To printer' radio button is checked. The 'To email' radio button is also checked, and its associated text input field contains the email addresses 'MET: lro@apertum.se pi@apertum.se'. The 'To SFTP' radio button is unchecked, but its associated input fields for Host, User name, Password, Remote Directory, and Remote File Name are visible. The 'Schedule' section has 'None' selected. At the bottom, there are 'PREV' and 'NEXT' buttons.

Figure 4.5. Destination.

Schedule

The default is **None** which means that no automatic report will be made. To generate and viewing a report, the option menu **Output** must be used.

It is also possible to automatically generate a report at certain time intervals or events. The available time intervals are: 5 minutes, 15 minutes, hourly, daily, weekly, monthly, yearly and event.



Figure 4.6. Schedule.

Execution

Producing a report can basically take place in three slightly different ways:

- ◆ By pressing the [**PREVIEW**] button in the Output window a new window will open, showing some status information on the progress while the report is generated. once this is finished, the data produced will be shown on screen.
- ◆ By pressing the [**EXECUTE**] button, as in the previous case, a new window will open to show the progress while the report is generated, then the report will be sent to the Output destination device specified in the configuration page of the report wizard (screen, file, or email).
- ◆ Report configurations which are saved with a schedule (for automatic execution) will be executed on the server, without showing the progress information window.

Note: logging out or closing the progress window will abort the execution.

4.4. Default Report Types

4.4.1 Alarms

This report type produces a table with the alarm states (warning, alarm and alert).

You can also add a title, description and select a report type. For example: General, Alarms days v/s level, Alarm hourly v/s level, Monthly alarm v/s level , Time v/s level and User v/s alarm.

Output formats available are pdf, text or excel.

4.4.2 Average

Displays the selected time series data together with the average value and the standard deviation. Up to eight time series can be selected. You must also write a title and select a format. If you have specified hourly values then the instance will be for the previous day, if you have specified daily values then the instance will be for the previous month. It is also possible just to indicate a specific number of hours back in time.

The report type can be shown as plain text, pdf, csv or excel.

4.4.3. Average_DS61

This process is similar to the Average report, but includes the reason why data has been deleted.

You can input two comments with 100 characters.

The report type can be shown as plain text, postscript or excel.

4.4.4. Cumulative

Produces a more complex output of cumulative ratios, data capture and maximum and average values. You set up the cumulative ratios by first choosing a number of levels, the distance between each level and the value for the first level. Alternatively you can specify 8

levels. The percentage of data that is below that level is calculated for each level. The result is a table showing percentile values. Again, if you have specified hourly values then the instance will be for the last day, if you have specified daily values then the instance will be for the previous month. It is also possible just to indicate a specific number of hours back in time.

The report type can be shown as PS percent values, PS Gray levels and Plain text.

4.4.5. Exceed EU

This process produces different tables for exceedance, for a specific substance a Report period (annual, quarterly and monthly), a Report Language and Report Type (pdf or Excel). Different Destinations and Schedules are available for this report type,

Finally the defined report can be saved as a macro for future usage.

4.4.6. General

It uses a saved Indico macro to generate a listing of data in a tabular format. Day, week, month, quarter or year can be chosen. The report will then be produced for the day, week, etc. previous to the specified date. When specifying a macro; title, restrictions and time series will be used to generate the output. The unit slot in the variable selection will be used for heading each one of the columns. When specifying the setup you can select the time period and resolution to be used. The higher resolution depends on which database you have available, i.e., it could be 5 minute, quarter hourly, etc.

The resolution or the time period is used for computing the total averages, maximum, minimum and standard deviation values that appear at the bottom of the table. An additional summary is also given for the resolution of the table.

4.4.7. Macro

It uses a saved Indico macro, keeping all the same information except the time period, which can be specified by the number of hours worth of data that you want to include in the graph. In this case the printout is graphical, and you can select output format. The stop

time of the graph will be the end of the specified time period unless a number of hours forward has been specified.

4.4.8. Plain

This report produces a nice and simple list of the selected data.

It lists the data that you have selected for a specified number of hours. The stop time will be the specified time. Output can be plain ASCII text, SKV format (i.g. for importing to certain spreadsheet programs) or Airviro format.

4.4.9. Matrix_Monthly

This process produces a matrix, containing the Days in the columns and the hours in the rows.

You must specify a title, station and parameter name.

This report type displays the selected time series data together in the rows, showing the average, the standard deviation, maximum and minimum values.

4.4.10. Summary

This report type allows the creation of up to 8 column of processed time series data. (Average, Maximum, Minimum, etc)

You must add a title and select the report period: day, month, quarter and year.

Then you can select the output format. Finally the defined report can be scheduled or sent to different outputs and saved as a macro for future usage.

4.5. Examples

4.5.1. Example 1: Producing Daily Summaries

Suppose that some of your real time data comes from an open path-measuring site (such as an Opsi analyzer). With this data you need to keep an eye not only on the data values

but also the standard deviations, light levels and status values associated to the data. It is possible to print a daily summary for each one of the substances measured at the site, and in this example a table for NO₂ data will be created.

Firstly select the option **New** from the **REPORT** menu

Now, in the **Report Type** sub window, select the template or report type **Average** from the list and click on the button **[NEXT]** to go on.

In the next configuration step, you have to choose a time period for your report: 'daily', 'monthly', or 'specified' if you want to set the number of hours back for your report. Select 'daily and' then press **[NEXT >>]** to continue. Select the time series you are interested in, the time period could be requested in some cases depending on whether your selected data consists of hourly, daily values, etc.

Select an Opsis **Station** (in this case Jarntorget), the **Parameter** (NO₂), the **Instance** (001) and the **Attribute** (value) and add the selection by pressing the button **[NEW]**. Repeat the sequence selecting the other **Attributes** (Std dev, light and status). Now the four relevant time series for path 1 have been selected. Click on **[Next >>]** and continue through the other wizard steps by entering Report title, data capture limit and exceedance levels.

In the following step select the output format 'plain text' or 'PostScript' from among the available options in the list and click on **[NEXT >>]**. Now you have to specify the output device and schedule. Under **Destination** choose **Mail** and write your email address so that the generated report will be sent to you when it is executed. Finally, click **[NEXT >>]** one more time and save the report assigning a name to it..

It is quite important to give the newly configured report a meaningful name, . Save this one as '**opsis_daily_no2**'.

Preview.

The data used in this example has information with bad status values. The table ignores missing data and calculates the standard deviation and average value of the data that is

present, however data with bad status is included unless otherwise is specified in a special resource file (ask your system administrator). These values are only relevant for the actual data values, as the standard deviation of the standard deviation is not too meaningful.

Once you are satisfied with your newly configured report you might decide that you want a similar one to be made every day. To print it automatically once a day, choose Daily.

Schedule

The report output will be automatically sent out at a specified time every night. The default time for daily instances is at fifty minutes past midnight, but this can be modified.

Title: Järntorget NO2 analysis

Period: 91051201 - 91051224

Date: 940420

Järntorget				
	NO2 /001 µg/m ³ Value	NO2 /001 µg/m ³ Std dev	NO2 /001 µg/m ³ Light	NO2 /001 µg/m ³ Status
910512 01	22.4	0.7	42.0	14.0
910512 02	25.9	0.7	42.0	14.0
910512 03	23.6	0.7	42.0	14.0
910512 04	59.8	0.8	42.0	14.0
910512 05	35.8	0.7	42.0	14.0
910512 06	5.6	0.7	42.0	14.0
910512 07	5.4	0.6	42.0	14.0
910512 08	6.7	0.6	42.0	14.0
910512 09	7.7	0.6	42.0	14.0
910512 10	8.3	0.7	42.0	14.0
910512 11	10.0	0.6	49.0	14.0
910512 12	10.5	0.7	42.0	14.0
910512 13	13.5	1.5	35.0	14.0
910512 14	16.0	0.8	35.0	14.0
910512 15	-0.6	3.6	14.0	4.0
910512 16	0.6	3.8	21.0	8.0
910512 17	1.9	3.5	14.0	8.0
910512 18	23.9	2.5	21.0	14.0
910512 19	23.4	1.2	28.0	14.0
910512 20	19.7	0.7	42.0	14.0
910512 21	30.7	0.7	42.0	14.0
910512 22	44.3	0.7	42.0	14.0
910512 23	38.1	0.7	42.0	14.0
910513 00	18.1	0.6	49.0	14.0
Std.dev.	15.0	1.0	10.0	2.6
Average	18.8	1.2	37.3	13.1

4.5.2. Example 2: Making Cumulative Reports

Create a new report named '**cumulative_so2**'. As in the previous example, select 'New' from menu **REPORT**. Then select the 'Cumulative' report type and press [**NEXT >>**].

Select one of the available time period for reports (daily, monthly or specified) and Click on [NEXT >>] . Then select the time series that you are interested in from the **Time Series** sub window

Select **Station** Molndal, **Parameter** (SO₂), **Instance** (001) and **Attribute** (value), add the selection by pressing the button [NEW], and repeat for **Instances** 002 and 003, then click on [NEXT >>] to go on.

Next you are asked to specify how many limits to use. In order to appreciate the cumulative approach it is best that the distance between limits is not too large so you will need quite a few - say 15. Now you must specify the distance between limits. This depends on the range of your data but you can choose a size of 10 for now and change it later if you need to. Next you must specify the start limit, i.e. the level that you would like for the first limit. Enter 0. Finally you will be asked for a table title and you must also select an output format - those beginning with PS are PostScript formats, in particular the PostScript grey scale format looks very good.

Title: SO2 levels at Mölndal

Period: 89031301 - 89031324

Date: 940110

	Molndal SO2 /001 ug/m3 Value	Molndal SO2 /002 ug/m3 Value	Molndal SO2 /003 ug/m3 Value
0.00 ug/m3	100%	100%	100%
10.00 ug/m3	62%	58%	88%
20.00 ug/m3	42%	42%	58%
30.00 ug/m3	25%	25%	46%
40.00 ug/m3	8%	21%	29%
50.00 ug/m3	4%	21%	25%
60.00 ug/m3	0%	17%	21%
70.00 ug/m3	0%	8%	21%
80.00 ug/m3	0%	4%	8%
100.00 ug/m3	0%	0%	8%
110.00 ug/m3	0%	0%	4%
120.00 ug/m3	0%	0%	4%
130.00 ug/m3	0%	0%	0%
140.00 ug/m3	0%	0%	0%
Data capture	100%	100%	100%
Highest	55.30	88.90	130.00
Average	20.32	25.91	37.78

If you are using the reference database then you can look at the days with data for Molndal station.

Choose **NONE**: under **Schedule** and press the **NEXT** button. Save the report.

To view the report go to the **Output** menu, enter the date 890314 in the Time Period textbox and click on **[PREVIEW]**, your report will be generated as if today's date were 14 March 1989 so it will use data from 13 March 1989. The data on that day had significantly higher values than usual and it is also interesting to see the big difference between the three different Opsi paths even though they are relatively close to each other.

Although this cumulative option might sound a bit complicated it is really quite simple. If you look at the results for path 1 you will see that:

All values are greater than 0 $\mu\text{g}/\text{m}^3$

62% of values are greater than 10 $\mu\text{g}/\text{m}^3$

42% of values are greater than 20 $\mu\text{g}/\text{m}^3$

4% of values (i.e. one value) are greater than 50 $\mu\text{g}/\text{m}^3$.

None of the values are greater than 60 $\mu\text{g}/\text{m}^3$.

For path 3 the values are much higher and there is a maximum value of 130 $\mu\text{g}/\text{m}^3$.

Title: SO2 levels at Mölndal

Period: 89031301 - 89031324

Date: 940420

	Moindal		
	SO2 /001 µg/m³ Value	SO2 /002 µg/m³ Value	SO2 /003 µg/m³ Value
0.0 µg/m³			
10.0 µg/m³			
20.0 µg/m³			
30.0 µg/m³			
40.0 µg/m³			
50.0 µg/m³			
60.0 µg/m³			
70.0 µg/m³			
80.0 µg/m³			
90.0 µg/m³			
100.0 µg/m³			
110.0 µg/m³			
120.0 µg/m³			
130.0 µg/m³			
140.0 µg/m³			
Data capture	100%	100%	100%
Highest	55.3	88.9	130.0
Average	20.3	25.9	37.8

Gray levels: Here you can see two different examples of outputs. The first one is a plain output - it is made up of ASCII texts and symbols and can be printed out to any printer. The second is a PostScript output, which has a much better quality. In this particular case it is possible to show the percentages as a grey scale.

4.5.3. Example 3: Using the General Processor

Firstly you need to define and save a new macro in Indico Presentation , Make one using a time series with 2 plot variables, x1 and x1+5. You should assign a title on the graph, as this will then be used as a title for the report. Save the macro as '**general_macro**', Now go back to the Report Module.

As in the previous examples, click on menu option **NEW** and choose the **General** report type, then, click on the **[NEXT >>]** button, select the macro from which the report is going to be based on (look for the macro **general_macro** in the macro list).

Next you select the time period - in this example choose **Week**. Next you select the time resolution for the calculations, select '**hour**' from the options available. Click **[NEXT >>]** (in a weekly table daily values are displayed but you could use another resolution such as

hourly or five minute values to calculate the mean, standard deviation, max. and min. values).

In the next step you select an output format - select **PostScript** if your system can handle it, otherwise select **plain**. This example shows calculated NO₂ levels compared with the actual levels.

Finally, you are prompted to enter the destination and schedule and then, in the last step. to enter a name. Write **example_general** and click on **APPLY** to save the report.

Comparison of calculated and actual NO₂ levels

		µg/m ³	µg/m ³
	891120	50.1	33.9
	891121	33.1	21.9
	891122	46.3	40.1
	891123	85.3	84.0
	891124	55.9	45.9
	891125	38.8	30.0
	891126	36.5	31.1
Hour	Average	49.4	41.0
	Std Dev	25.8	28.8
	Minimum	15.4	12.6
	Maximum	183.9	205.0
	Samples	70.0	70.0
Day	Average	49.4	41.0
	Std Dev	17.7	20.4
	Minimum	33.1	21.9
	Maximum	85.3	84.0
	Samples	7.0	7.0

Column 1 : $94+.0698*x1-0.117*x3+1030/(1+x1*x1)-222/\ln(1+x1)$

Column 2 : x5

Computation: Average, 0% data capture