

TM813

APROL Web Portal



Requirements

Training modules	TM800 – APROL System Concept TM811 – APROL Runtime System
Software	APROL
Hardware	1 control computer, 1 controller

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1 Introduction

This training module will take a look at the wide variety of tools provided in the APROL Process Control System that can be used to make it easy to perform analyses. This applies to actions made in the APROL **ENGINEERING** as well as **RUNTIME / OPERATOR** system. The standard reports are available as standard system queries without additional engineering effort.

The majority of these tools support the **HTML**, **XML**, and **CSV formats**, which means of course that it is possible to export to any of these formats. This results in a direct gateway to conventional browsers, spreadsheet programs, etc., that allow for easy processing of the data.

The 'Jaspersoft' reporting tool is available to create custom logs and/or reports comfortably. This is handled in a separate training.



Figure 1: Analysis

1.1 Objectives

Our goal for this training module is to provide you with a detailed description of the numerous and different tools included in the delivery of the APROL Process Control System, so you can become familiar with all of the options that these tools offer.

After completing this training, you will be able to evaluate and to analyze many different types of alarm data, process changes triggered from an **Operator Station**, etc. You will be able to easily find out when e.g. a temperature transmitter is defective or when an operator has made critical value changes. With the numerous reports, you obtain an overview of all actions which have been carried out. This does not only refer to the operating environment, but also the engineering.

A system check and analysis is possible at any time, because a system diagnosis is always available.

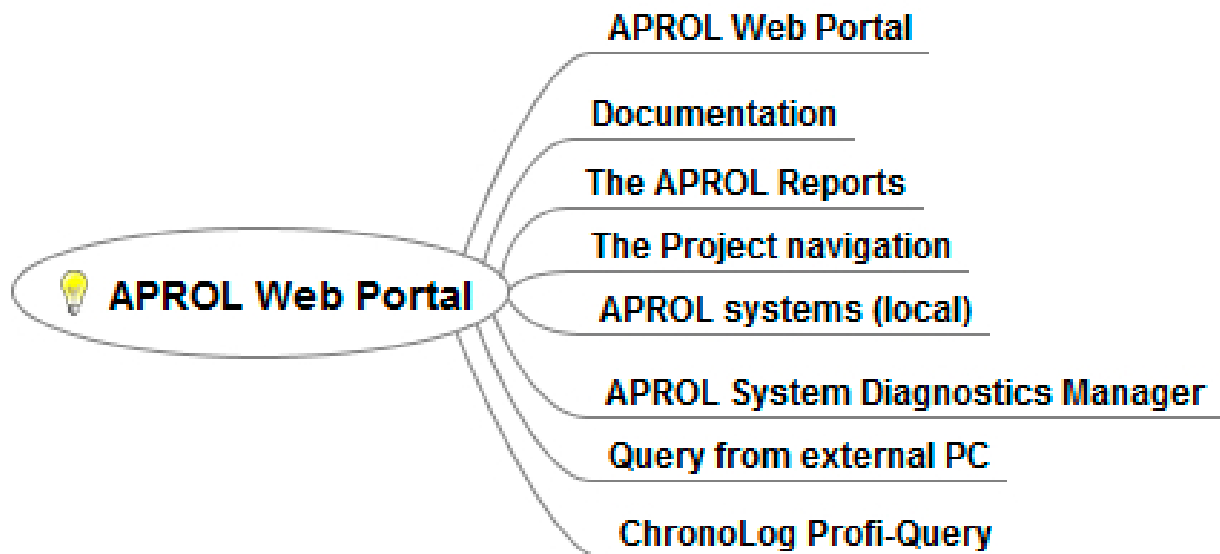


Figure 2: Overview

2 APROL Web Portal

There are a large number of various reports in APROL for the engineering, runtime, and operator environments. The APROL web portal was created to offer a clear overview and to be able to find the desired report as quickly as possible. It is started directly using the KDE menu or with the **'Reports / Overview'** submenu.

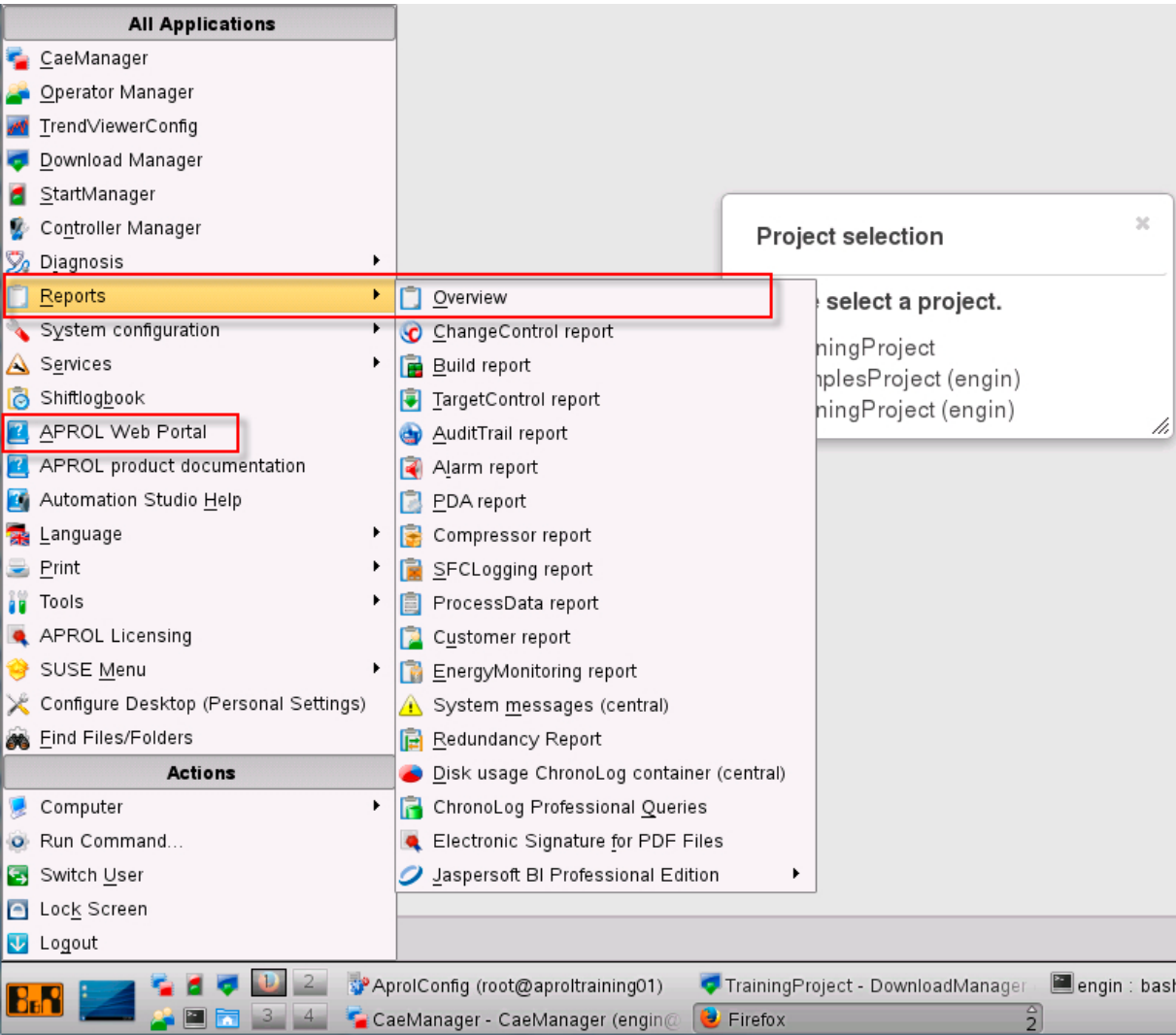


Figure 3: Starting the APROL Web Portal

The basic layout is the following (see navigation in the left area):

General navigation	Description
Project selection (combo box)	A selection can be made from different projects (if they exist) in engineering and also the operating environment. The Linux login which corresponds to project can be seen when selecting the project in an engineering context (e.g.: TrainingProject (engin)).

General navigation	Description
Documentation	The entire APROL Product Documentation is here. Further documentation which may be required additionally, e.g. Jaspersoft Documentation, is also integrated here.
Reports	All standard APROL reports and links to customer-specific reports are available here. There is a differentiation between 'Runtime reports', 'Interactive reports', 'APROL solution reports', 'Jaspersoft', and 'System and self-diagnosis reports'.
Project navigation	Display of the physical structure, control computer structure, and system type structure of the selected project.
APROL systems (local)	View of all systems installed on this server.
APROL SDM	APROL System Diagnostics Manager The automatically created system monitoring of the current server can be found here.

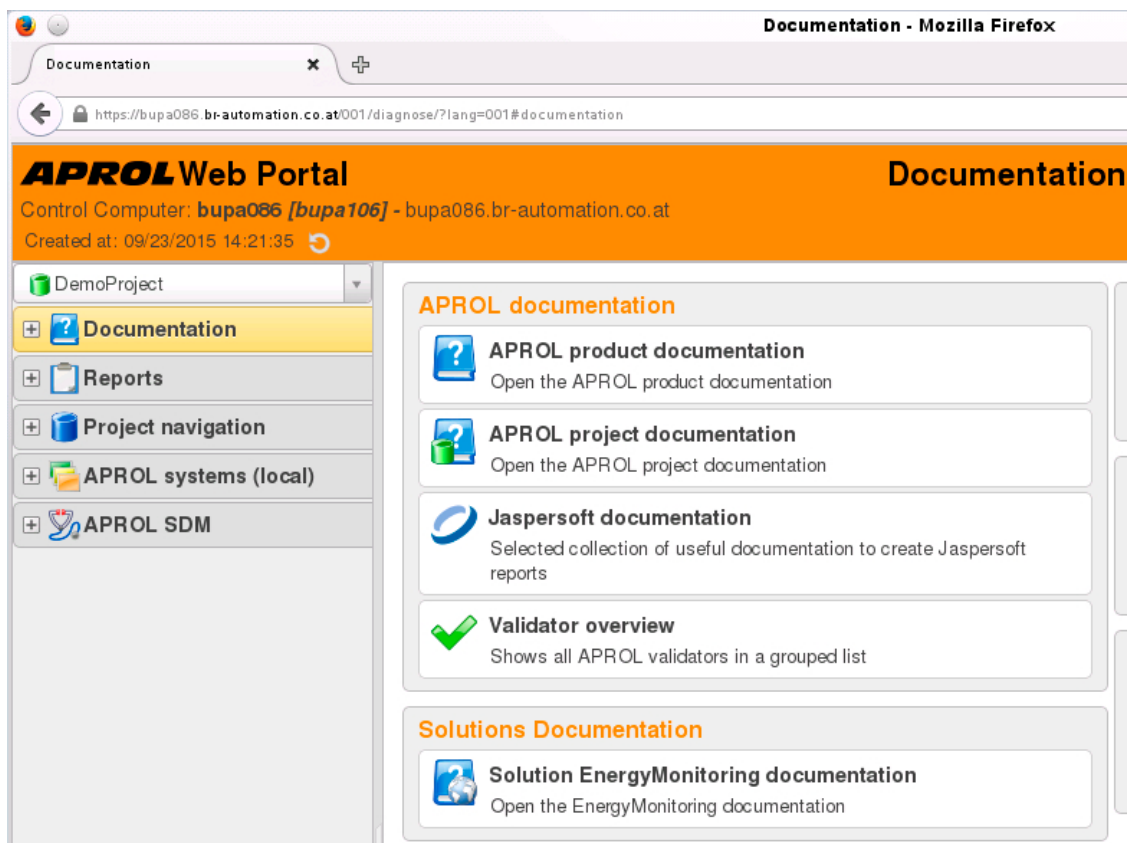


Figure 4: Navigation APROL Web Portal

3 Documentation

The documentation area in the APROL web portal contains the following calls:

Range	Details
APROL Documentation	APROL Product Documentation APROL Project Documentation Jaspersoft Documentation Validator overview
Solutions Documentation	Energy Monitoring Documentation
APROL SQL JDBC Configurator	Creating a URL to configure a JDBC data source (JAVA Database Connectivity)
SQL Table Definition	SQL Table Definition for ChronoLog Data

APROL documentation

 **APROL product documentation**
Open the APROL product documentation

 **APROL project documentation**
Open the APROL project documentation

 **Jaspersoft documentation**
Selected collection of useful documentation to create Jaspersoft reports

 **Validator overview**
Shows all APROL validators in a grouped list

Solutions Documentation

 **Solution EnergyMonitoring documentation**
Open the EnergyMonitoring documentation

AprolSql JDBC configurator

 **Creating an URL to configure a JDBC data source**
Creating an URL to configure a JDBC data source for connecting to an AprolSqlServer

SQL table definition

 **SQL table definition for ChronoLog data**
SQL table definitions for ChronoLog data to be provided by AprolSqlServer

Figure 5: The complete documentation in APROL

3.1 The APROL product documentation

The following image shows the APROL product documentation with the possibility to search and navigate.

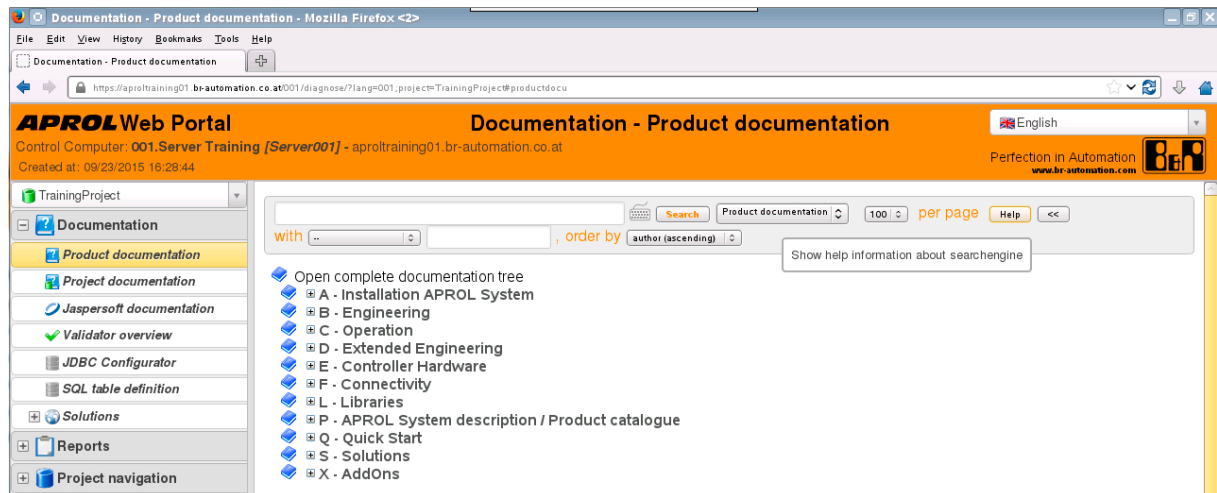


Figure 6: The APROL product documentation

Use the help as well as you can. The structure of the manuals and chapters should be self-evident. The implemented search may be of great help. The search help can be found in 'Help / Help'.

3.2 The APROL project documentation

The project documentation can be opened here if it exists in the path "`~\ENGINE\PROJECTS\<project name>.pgp\WEB\<country code>\DOCS\`" can be accessed with `index.htm`, and has been downloaded. The as-built project documentation from the CaeManager is often incorporated here. However, any other external documentation can be linked here.

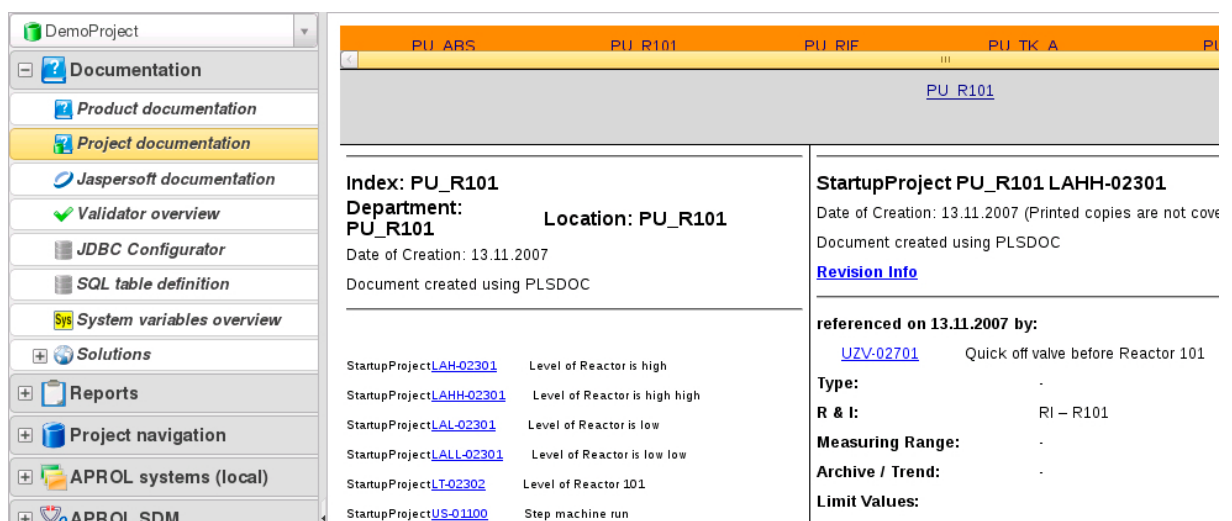


Figure 7: The APROL project documentation

3.3 The Jaspersoft documentation

The reporting tool from the provider 'Jaspersoft' are available in APROL to create customer-specific reports. The complete Jaspersoft documentation has been embedded to offer the necessary information.

Jaspersoft Documentation

Selected collection of useful documentation:

Document	Link
Jaspersoft Reports in APROL - Installationsanleitung deutsch	pdf
Jaspersoft Reports in APROL - Installation Guide english	pdf
APROL SQL-Handbuch deutsch	html
APROL SQL Manual english	html
SQL table definition for ChronoLog data	web

External Documentation by Jaspersoft:

Document	Link
Getting Started with Jaspersoft	pdf
JasperReports Server User Guide	pdf
Jaspersoft Studio User Guide	pdf
JasperReports Server Admin Guide	pdf

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>>> [Start of the APROL product documentation](#)

Figure 8: The reporting tool 'Jaspersoft' documentation

3.4 The validator overview

It is not possible to enter the wrong syntax in the APROL engineering. All input fields have so-called validators which guarantee this. They ensure that the data records cannot be saved if there is an erroneous entry. Because there are so many, the validators documentation is a necessity. This is realized with this call. The validator help can also be opened in the context of the corresponding input field.

APROL validators - Overview						
Expand all Collapse all						
Filter records:						
Validator Group/Name	Validator description	Minimum	Maximum	Auto.	Virt. Key.	Version
Alarm						
AcknowledgeText	Checks alarm acknowledgement text			✓		V2.00
AlarmGroupName	Checks an alarm group name		64 [Characters]	✓		V2.00
AlarmGroupNameEffective	Checks the alarm group actual name		32 [Characters]	✓		V2.00
AlarmPrioFilter	Checks alarm priority filters			✗		V2.00
ANSI-C						
Array						
Batch						
BIT						
CFC						
ChronoLog						
Controller						
Date and Time						
Dimension						
Equipment						
File system						

Figure 9: The validator overview

3.5 Additional documentation

The documentation is finalized with the 'Solutions Documentation', the 'APROL SQL JDBC Configurator', and the 'SQL Table Definition'.

The 'Energy monitoring Documentation' is in the section 'Solutions Documentation'. Everything concerning energy calculation and evaluation (according to ISO 50001) is explained in this.

The 'AprolSqlServer' is included in APROL and allows the ChronoLog database data to be queried via SQL statements. The AprolSqlServer must be configured over the 'APROL SQL JDBC Configurator' in order to be able to do this. Details about this are in the APROL documentation and in the training manual TM880. A training for report creation with Jaspersoft and AprolSqlInterpreter in APROL can also be booked.

APROL SQL JDBC configurator
 Creating an URL to configure a JDBC data source for connecting to an ArolSqlServer

Resulting configuration URL for Project: *TrainingProject*

```
jdbc:simba://aproltraining01.br-automation.co.at:55503;SYSTEM=aprolsys;PROJECT=TrainingProject;UseSsl=1;TrustedStorePath=/opt/aprol/etc/jkeystore;TrustedStorePassword=.aprol
```

Copy this URL into clipboard and then paste it into the configuration of your JDBC data source.

Select parameters

Select the data source you want to request:

Runtime data: ☒

Engineering data: ☐

(Keep in mind that runtime and engineering data may have different authentication accounts.)

Select data host:

Central loggingserver: ☒ aproltraining01.br-automation.co.at

Engineering host: ☐ aproltraining01.br-automation.co.at

Local host: ☐ aproltraining01.br-automation.co.at

Runtime server from this project: ☐ aproltraining01.br-automation.co.at

Figure 10: SQL JDBC Configurator

To round this off, the SQL Table Definition area contains the information for the SQL tables available for the selected project.

APROL SQL table definition for ChronoLog data
[Expand all](#) [Collapse all](#)

Filter records:

SQL-Table	Table description
Base	Static SQL tables contains pre-defined system tables.
PDA	Dynamic SQL tables concerning Process Data Aquisition.
PackML-PackML01PdaRec01	PDA record for PackML KPI
PackML-PackML01PdaRec02	PDA record for PackML state and mode
PAL-CtrlPerfMon01AcfRec01	PDA record for control performance monitoring auto correlation function
PAL-CtrlPerfMon01HurExpoRec01	PDA record for control performance monitoring hurst exponent

Figure 11: Available SQL Tables

4 The APROL reports

The APROL reports are divided into:

Reports - Category	Description
Runtime reports	Contains all runtime and/or operator environment reports.
Interaction reports	Reports which come from the engineering, AuditTrail, and shift logbook.
APROL Solutions reports	Energy Monitoring report and placeholder for future developments.
Reports powered by Jaspersoft	Customer-specific reports realized by Jaspersoft.
APROL SQL JDBC Configurator	Configuration of the AprolSqlServer
System and self-diagnosis report	System messages, logbooks, for analysis. This is necessary for support.

4.1 Reports in the runtime/operator system

XML technology (Extensible Markup Language) is used both in the Engineering and Runtime Systems as a platform-independent interface for exporting data. **Alarm**, **message**, and **trend system** data can be opened easily and conveniently and displayed on every workstation in the intranet (internet) using XML technology.

All that is needed is an **HTML browser** and a network connection to the control computer. This data can be displayed as an **HTML** page in any browser or saved as a **CSV** file (Comma Separated Value). This latter format allows information to be imported into spreadsheet programs (e.g. MS Excel, LibreOffice, etc.).

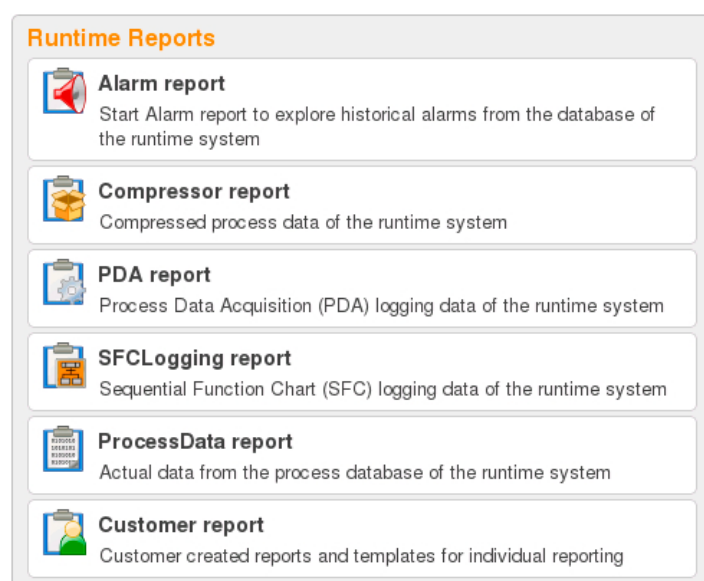


Figure 12: Runtime reports

4.1.1 Overview of the runtime/operator reports

The following image shows an overview of all reports, access to system and diagnostics data and many different type of documentation.

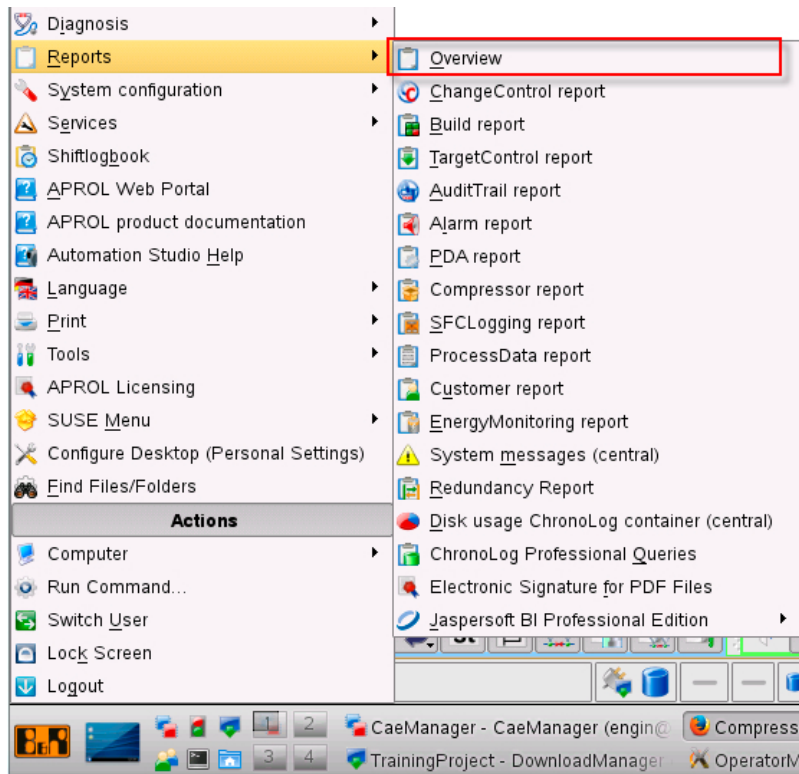


Figure 13: Query overview in the KDE menu

The **AlarmReport** for example, can be started directly via the KDE menu or via the **Query Overview** (which opens the APROL web portal).

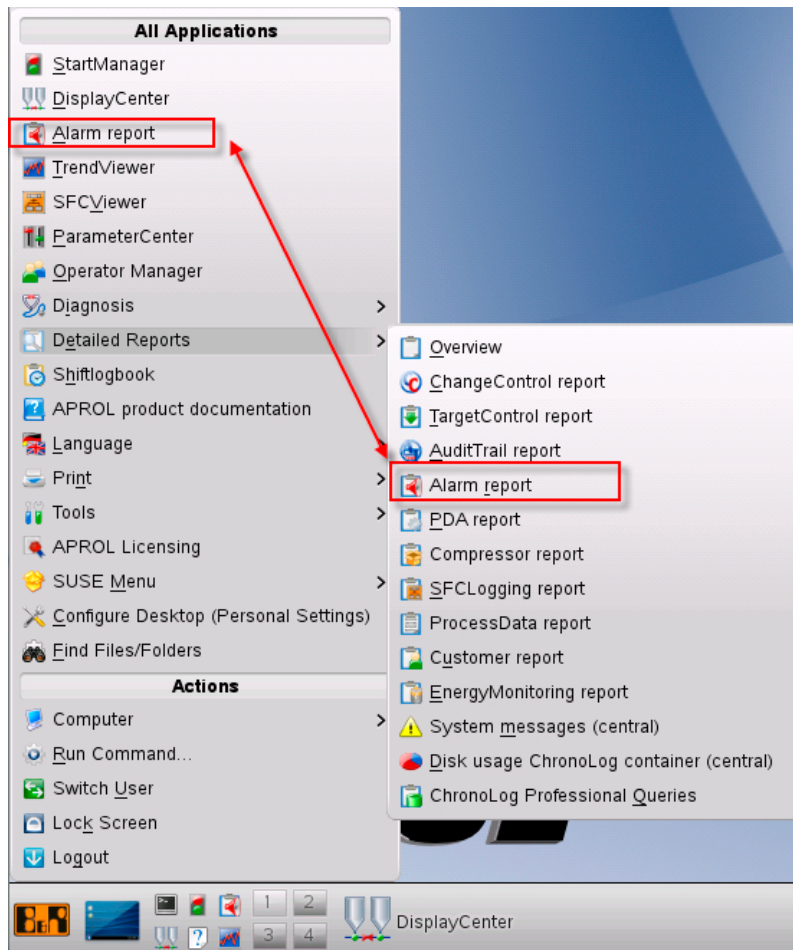


Figure 14: KDE menu

This means that the reports that can be found in the KDE entry **Detailed Reports** can also be found in the **Query Overview**.

It is possible to switch between English and German in the upper part of this overview (APROL web portal). Other languages can also be selected if installed (Russian, Chinese, etc.).

English is automatically pre-selected when opening this overview. When selecting a language, it is applied not only to this overview, but to the subsequent steps as well (i.e. calling the **AlarmReport**).

The APROL reports

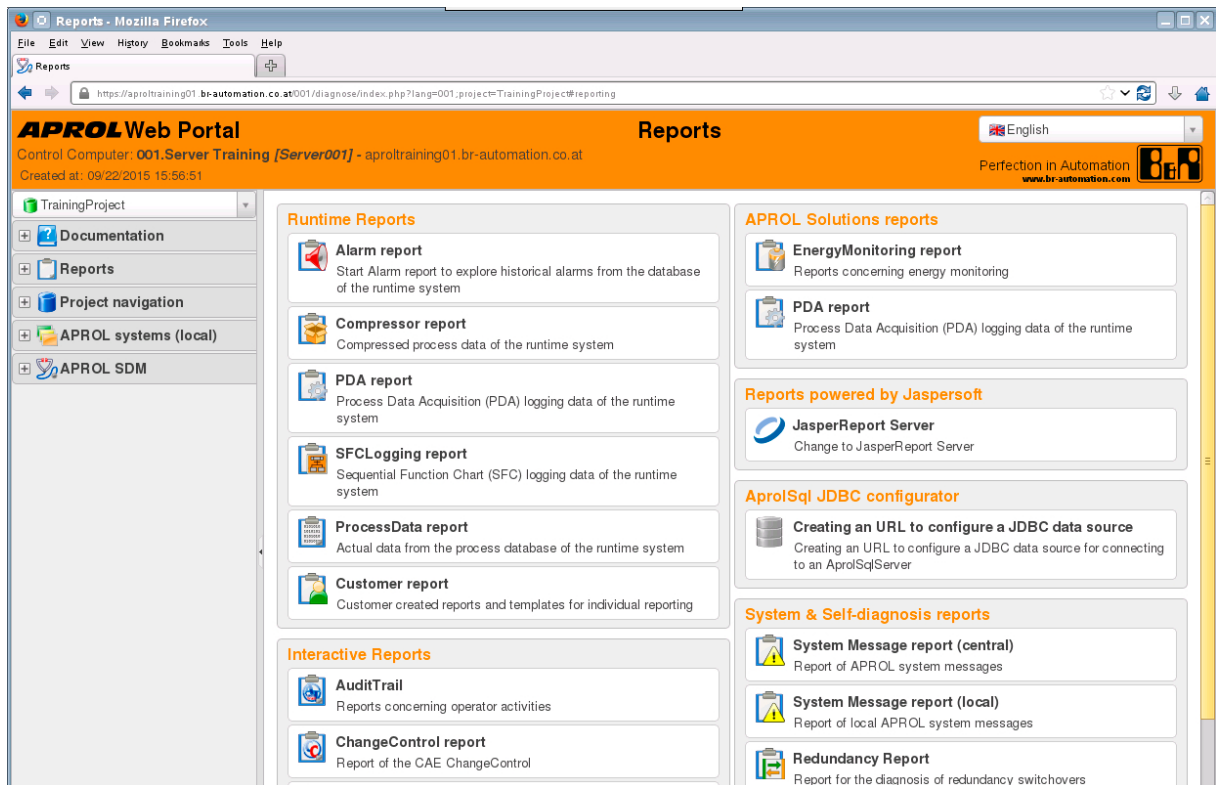


Figure 15: Query Overview

The following authentication dialog box appears, for example, when the AlarmReport is started and additional authentication is active:

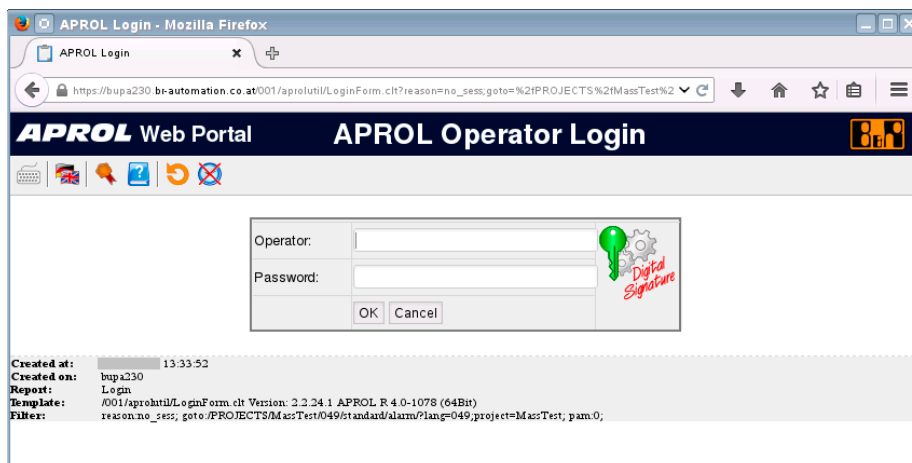


Figure 16: Authentication dialog

Authentication can be activated/deactivated in the **CaeManager**, in the project properties.

For this, right-click on the project root and select **'Properties'**.

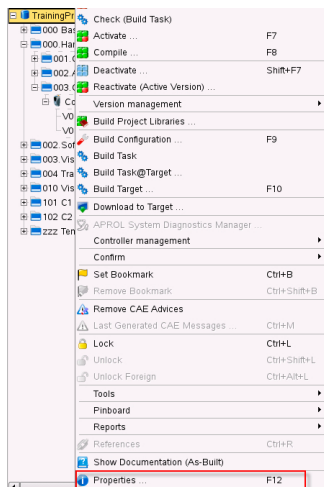


Figure 17: Project properties

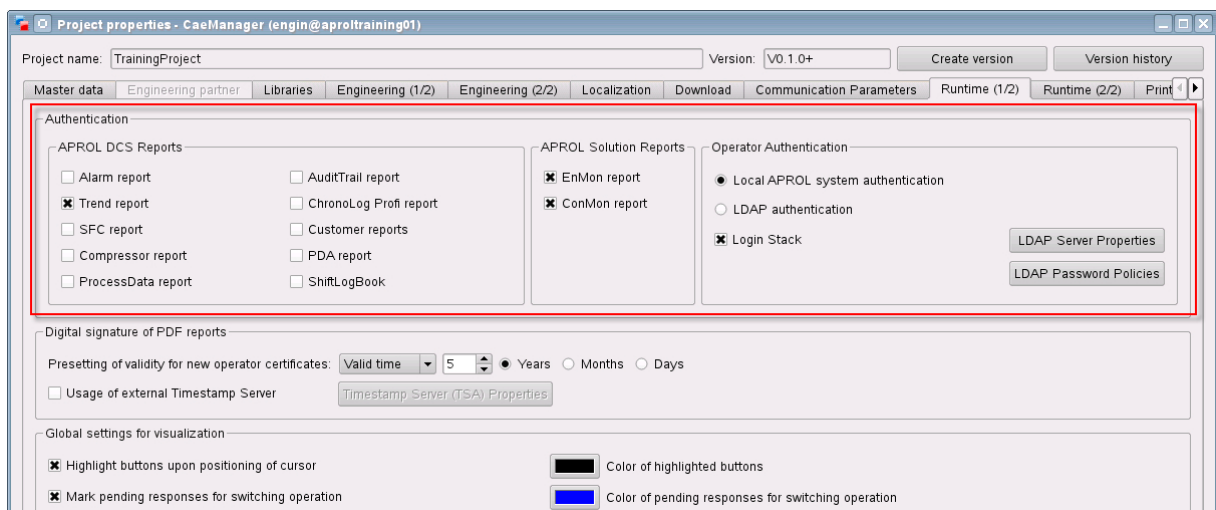


Figure 18: Authentication options in the CaeManager

4.1.2 AlarmReport

The **AlarmReport** is used to view and analyze the alarm and message records at any time. This utilizes the most modern Web techniques to view the data without being dependent on a specific platform and to easily implement expansions to the analysis at any time.

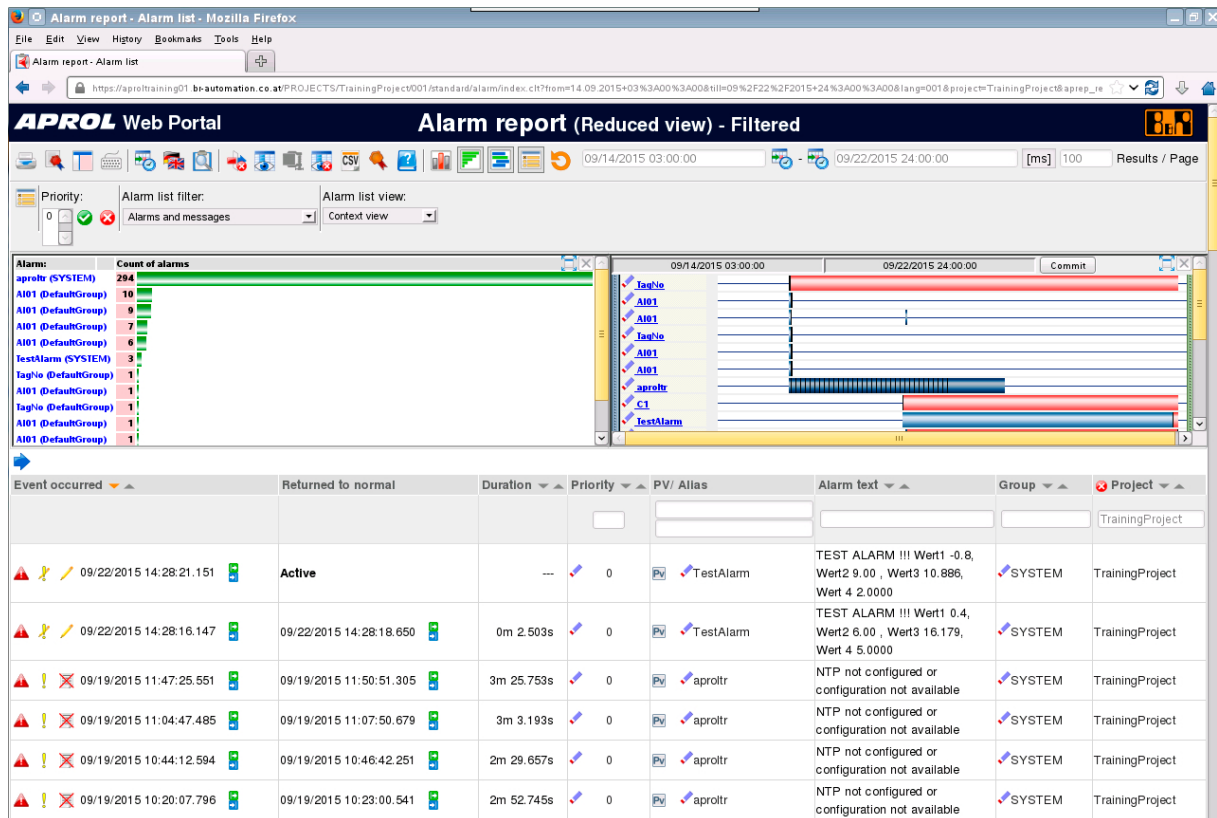


Figure 19: Example of an AlarmReport

For further information about the AlarmReport, please refer to **Training Module 811 – Runtime-System**, which includes the AlarmReport – a prerequisite for this training module.

4.1.3 Compressor report

The **Compressor Report** is used to read a recorded database. The data can be further processed as an HTML, XML or CSV version. This type of data collection is very useful for creating hourly, daily logs, etc.

4.1.3.1 The compressor function block

Before a compressor database can be read, the data must be recorded using compressor function blocks (found in the APROL library). These work with the help of the **ChronoLog** server mechanism.

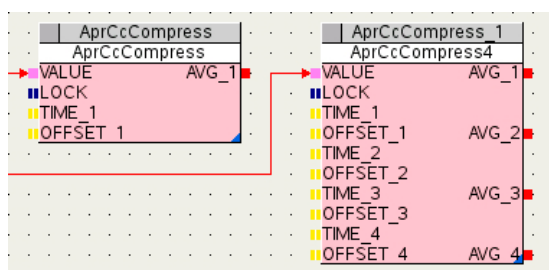


Figure 20: Compressor function block from the APROL library

This function block must be configured like this:

The process variable to be processed is connected to the **VALUE** input. The compression interval is defined using **TIME_1**. The offset for starting the compression interval can be specified with **OFFSET_1**.

The following values are valid as possible compression intervals: 1, 5, 10, 15, 20, and 30 minutes and 1, 2, 3, 6, 8, 12 hours and 1 day.

If only 1 minute were to be entered on **TIME_1**, then the **Compressor block** would write one data record each minute. This type of data record consists of a timestamp, the current value, the minimum, maximum and average value.

4.1.3.2 Data evaluation

The Compressor Report can be started right from the KDE menu or from the overview (only possible when the operator currently logged-in has the necessary permission).

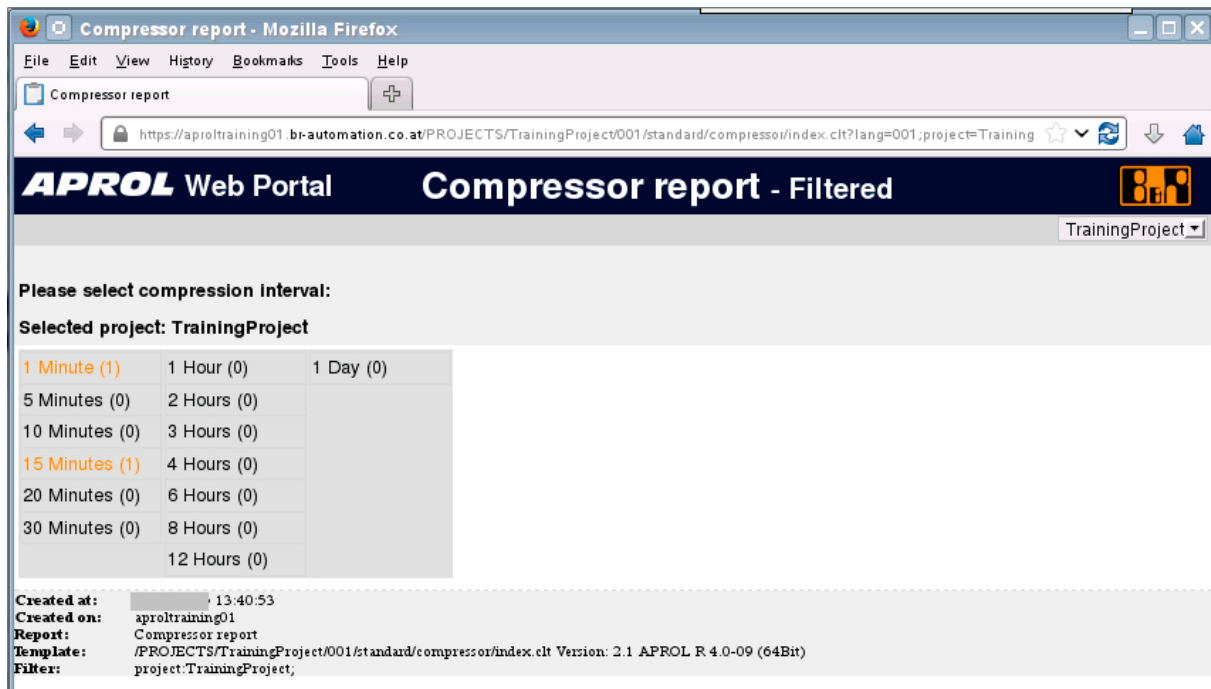


Figure 21: Selecting the time interval in the Compressor Report

The drop-down menu located in the upper area is needed for defining the project.

All possible time intervals are listed, but the time intervals used in the project are displayed with a yellow font and a link. The number of corresponding variables is shown in parentheses next to the time interval.

Clicking on one of these time intervals brings you to a page for selecting the variable and desired output value.

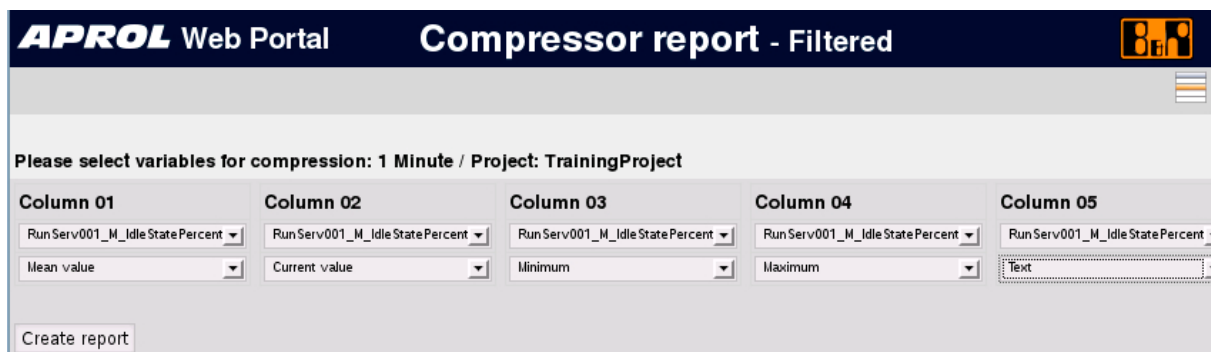


Figure 22: Defining the output value in the Compressor Report

The **'Select compression interval'** link brings you back to the previous page.

10 columns are provided for creating the best possible output log, but not all of the columns have to be used! The variable and desired value (average value, current value, minimum, maximum or text) can be defined as needed.

Variable A	Variable A	Variable A	Variable A	Variable B
Average	Maximum	Minimum	Current value	

The **[Create report]** button is used to create defined columns and display them on the next page in HTML format.

APROL Web Portal Compressor report - Filtered					
Date: 09/22/2015 [Compression: 1 Minute]					
Variable:	RunServ001_M_IdleStatePercent	RunServ001_M_IdleStatePercent	RunServ001_M_IdleStatePercent	RunServ001_M_IdleStatePercent	RunServ001_M_IdleStatePercent
Runtime system:					
Runtime instance:					
Field:	Mean value	Current value	Minimum	Maximum	Text
09/22/2015 00:00:00	97.5088	96.8672	96.3659	98.1179	---
09/22/2015 00:01:00	97.4691	96.3659	95.8595	97.9950	---
09/22/2015 00:02:00	97.5055	95.8595	95.7393	98.2412	---
09/22/2015 00:03:00	97.4711	95.7393	95.6195	97.9925	---
09/22/2015 00:04:00	97.4994	95.6195	95.6195	98.1203	---
09/22/2015 00:05:00	97.4141	96.2264	96.1250	97.9950	---
09/22/2015 00:06:00	97.4643	96.8672	96.3614	97.9925	---
09/22/2015 00:07:00	97.4913	96.7419	95.9950	97.9975	---
09/22/2015 00:08:00	97.5053	96.9925	96.6123	98.1179	---
09/22/2015 00:09:00	97.4926	96.7459	96.4912	98.1179	---
09/22/2015 00:10:00	97.4507	96.9849	96.2500	97.9950	---
09/22/2015 00:11:00	97.4631	96.8711	96.2453	98.1179	---
09/22/2015 00:12:00	97.4681	96.8750	95.7447	98.1203	---
09/22/2015 00:13:00	97.4250	97.0000	95.9950	97.9925	---
09/22/2015 00:14:00	97.4668	96.8711	96.4912	98.1203	---
09/22/2015 00:15:00	97.4478	96.8672	96.2453	98.1203	---

Figure 23: Displaying the desired compressor data

There are a few buttons above the table which allow you to navigate the database chronologically.

Icon	Description
	[Calendar] – Allows you to select a day in the calendar
	[Today] – Selection of the current day.
	[Previous day] – One day back.
	[Next day] – One day forwards.

The lines in the table are used to show separate data records, made up of a timestamp and the individual values.

Simply click on the respective value if one of the values must be changed manually (e.g. because the value was recorded incorrectly due to a faulty temperature transmitter).

Change/insert a record:

Date 09/22/2015

Time 00:08:00

Compression M1

Name TrainingProject/RunServ001_M_IdleStatePercent

Field	Value	New*)
Current value	96.9925	80
Mean value	97.5053	79
Minimum	96.6123	78
Maximum	98.1179	81
Text	---	PI 345

*) Old value will not be changed, if field is left blank!

Audit Trail Information

Operator aprot

Reason of change [required]: Sensor defect

Save Cancel

Figure 24: Window for changing a value

As can be seen in this image, any value can be changed in a data record. A window is always shown where any value from the data record can be changed.

If a change is made, then a text must be entered explaining why the change was made. The **[Save]** button is used to overwrite the value in the database. This process is simultaneously logged in the **AuditTrail** (text stating the reason, timestamp, operator, value change and project name).

Value changes can be viewed using the action filter **Modification logging data** in the **AuditTrail**. Additional information about this is provided in the **AuditTrail** section in this training module!

Three output formats are available, e.g. for creating a daily log: HTML, XML and CSV

An HTML document of the page which is displayed can be obtained with the **save function of the browser being used**. This allows you to further process the Compressor Report data using an HTML editor (MS FrontPage, Macromedia Dreamweaver, etc.).

You can also make an XML version by right-clicking on the **[Save compressor data as XML file]** button and then saving with the **save function of the browser being used**.

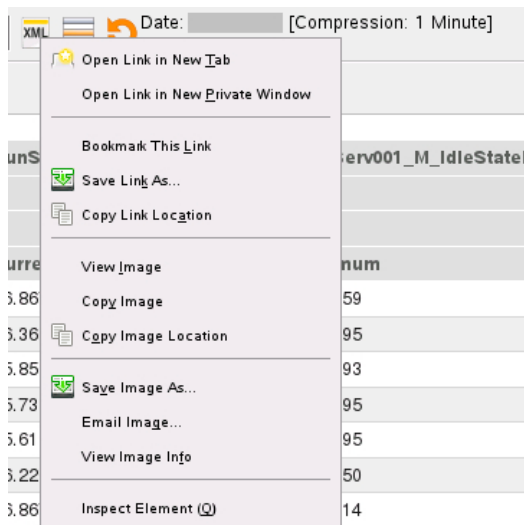


Figure 25: Saving XML

The created file can be viewed and (if necessary) further processed using XML-capable programs (Kwrite, MS Word, etc.).

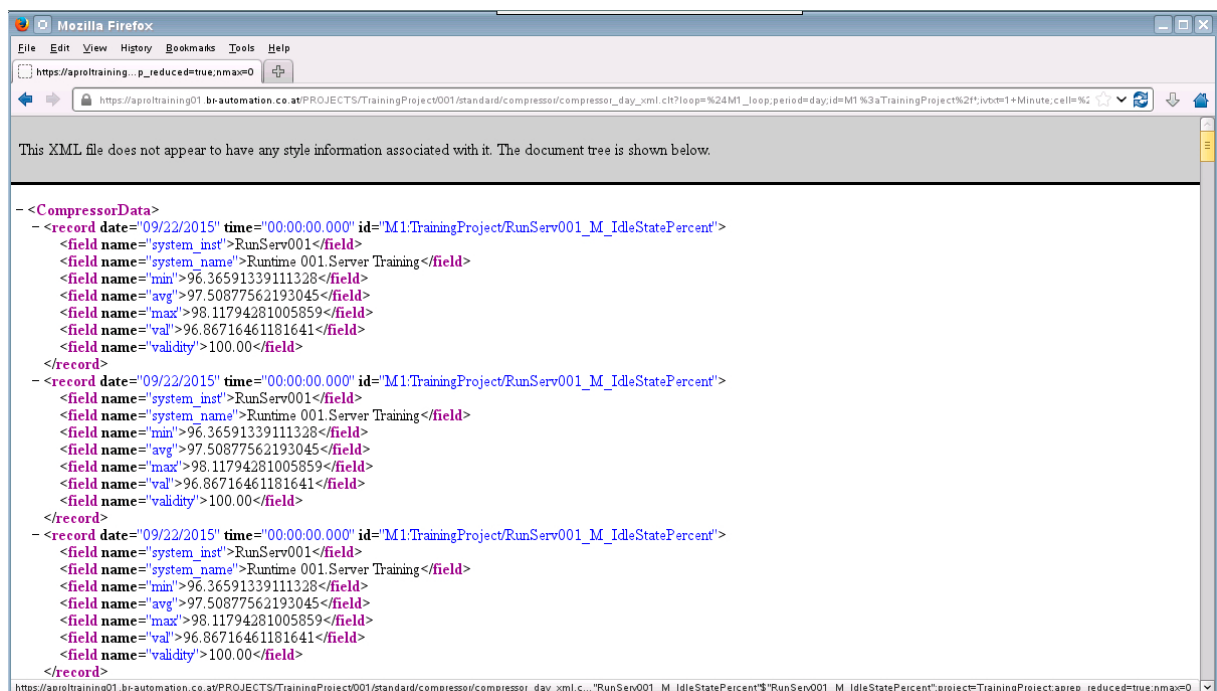


Figure 26: Example of an XML document

After calling the CSV version, you are queried about whether the CSV document should be saved or opened. A file must be created if you plan to further process the data. This file can then be imported to the spreadsheet program and made into e.g. a daily log or a diagram.

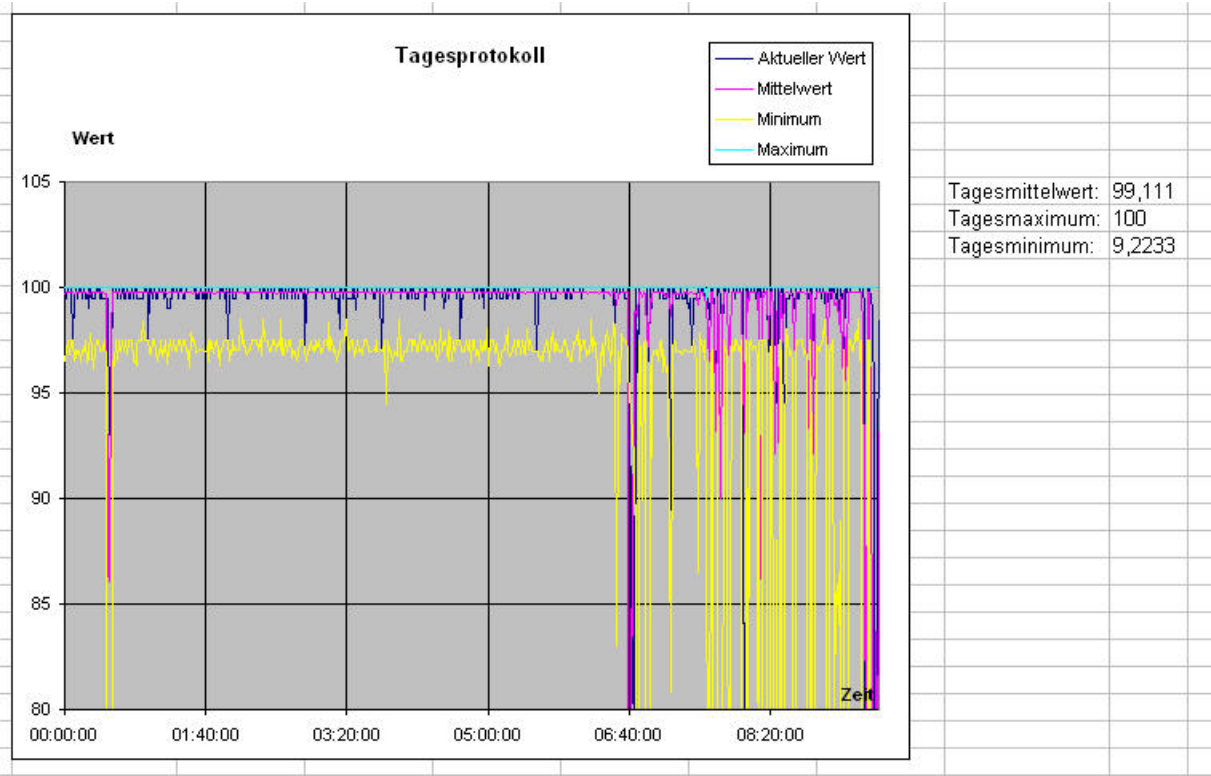


Figure 27: Example of a diagram from the CSV document

4.1.4 PDA Report

The PDS report shows data records which were recorded by PDA blocks in a list. By using the PDA blocks which can be created individually, customers can save exactly the data which is necessary for further processing in customer reports.

4.1.4.1 The PDA block

Before a PDA database can be read, the data must be recorded using PDA blocks. These blocks can now be stored individually in a customer-specific library. Open the desired library in the CaeManager navigation 'libraries'. A new block can be created by pressing the right mouse button and selecting the **"Process Data Acquisition Block ..."** function.

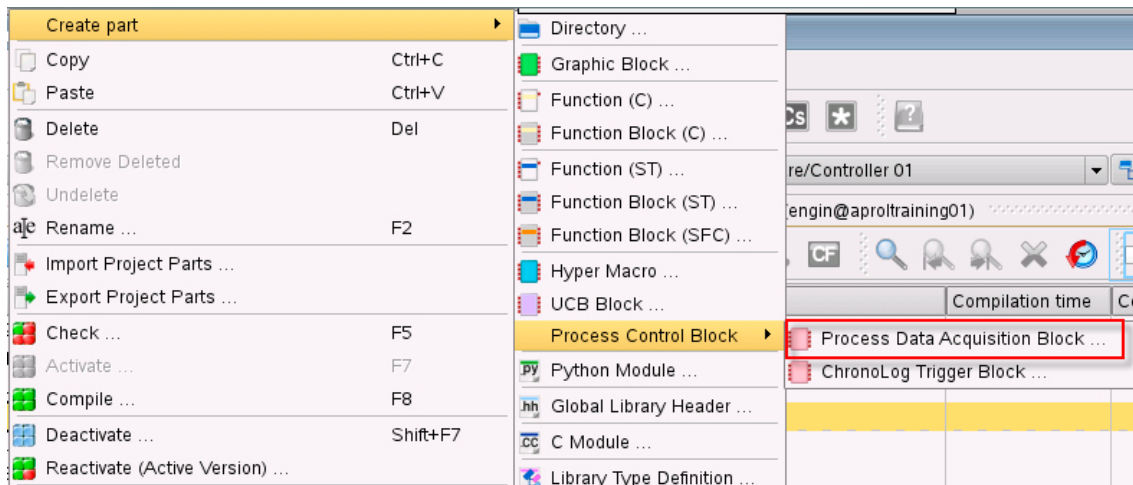


Figure 28: Creating a PDA block

inputs can now be added to the block as desired, in order to save the data record (later in the project) as it is needed. Exactly this table will also be available for SQL statements.

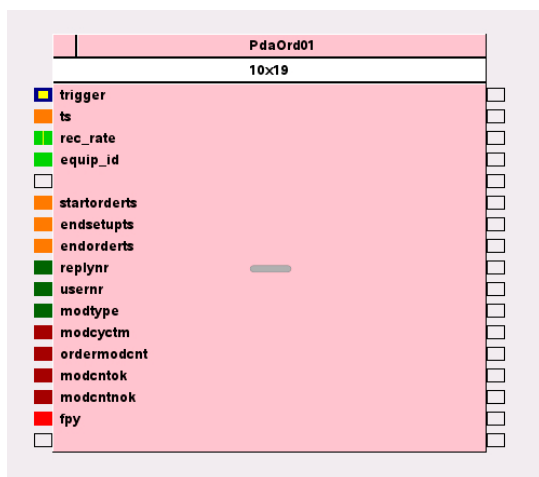


Figure 29: Example of a PDA block



Note:

Only pin names in small letters are allowed, because of the ChronoLog mechanism rules. This is checked by a validator.

4.1.4.2 Evaluation of the PDA data

The PDA report can be opened from the KDE menu or the overview (APROL web portal). All PDA records of the current day are displayed in a list when the report opens. In the left area, there are filters and selections for the data records which are required for analysis.

The screenshot shows the APROL Web Portal interface. The top bar displays the APROL logo and the title 'PDA report (Reduced view) - Filtered'. Below the bar, there is a sidebar on the left with 'Block view' and 'Equipment view' sections. The 'Equipment view' section has a list of filters: 0, AM, BM, EM, PDA_default, and PackML01. The main area displays a table with the following data:

Time	Library	Equipment
09/24/2015 12:36:16.000	PAL	PDA_default
09/24/2015 12:36:14.000	PAL	PDA_default
09/24/2015 12:36:13.000	PAL	PDA_default
09/24/2015 12:36:12.000	PAL	PDA_default
09/24/2015 12:36:02.000	PDA	BM
09/24/2015 12:36:02.000	PDA	BM
09/24/2015 12:36:02.000	PDA	BM
09/24/2015 12:36:02.000	PDA	BM
09/24/2015 12:36:00.000	PackML	PDA_default
09/24/2015 12:36:00.000	PackML	PDA_default

Figure 30: PDA report

The detail view is opened with the magnifying glass, in order to view a single data record. This report can be used to check if a data record has been stored correctly. This means a lot in the development phase of a project.

This data is procured later in customer-specific reports.

Process data acquisition block (PDA) []	Record of a floating point value []	001:Process data acquisition block (PDA) []	001:Process data acquisition block (PDA) []
Laser	21935	6415	7895
Laser	31897	6415	7895
Function	3369	6415	7895
Barcode	21834	6415	7895
Laser	2765	14127	6365
Laser	2765	2654	6365
Function6	-1	2654	6365
Function5	-1	2654	6365
Function4	-1	6365	2654
Function3	-1	2654	6365
Function2	-1	6365	6365
Function1	24278	2654	6365
Barcode	31035	2654	6365
Barcode	16450	2654	6365
Laser	31297	6415	7895
Laser	9584	6415	7895
Function	400	6415	7895

Figure 31: Details about PDA data

4.1.5 SFCLogging report

This is data from the **Sequential Function Charts** in the runtime system. It is interesting to know when, how long, etc., the steps of a logical sequence (also see step sequence) were executed. This information should be used for optimizing production processes and analyzing problems.

APROL Web Portal										SFCLogging report (Reduced view)	
24.09.2015 00:00:00										24.09.2015 24:00:00	
[ms]										100 Results / Page	
Time	D	E	S	C	Library	Block	Object name	Object type	Control	Value	Duration
24.09.2015 11:30:02.595	→	ⓘ	ⓘ	—	none	none	Set_home_pos2	Step	Active	Tip: ✖	---
24.09.2015 11:30:02.595	→	ⓘ	ⓘ	—	none	none	Stop_2ndConveyor	Step	Inactive	---	Begin: 2015-09-24 11:29:59.603 Pause: 0m 0s Duration: 0m 2.492s
24.09.2015 11:30:02.595	→	ⓘ	ⓘ	—	none	none	Stop_transport_storage	Step	Inactive	---	Begin: 2015-09-24 11:26:24.253 Pause: 0m 0s Duration: 3m 37.841s
24.09.2015 11:30:02.095	→	✓	ⓘ	—	none	none	Check_plant	Transition	Transition proceeded	---	---
24.09.2015 11:29:59.603	→	ⓘ	ⓘ	—	none	none	Stop_2ndConveyor	Step	Active	Tip: ✖	---
24.09.2015 11:29:59.603	→	ⓘ	ⓘ	—	none	none	Empty_2ndConv	Step	Inactive	---	Begin: 2015-09-24 11:28:03.174 Pause: 0m 0s Duration: 1m 55.938s
24.09.2015 11:29:59.113	→	✓	ⓘ	—	none	none	Check_empty2ndConv	Transition	Transition proceeded	---	---
24.09.2015 11:28:03.174	→	ⓘ	ⓘ	—	none	none	Empty_2ndConv	Step	Active	Tip: ✖	---
24.09.2015 11:28:03.174	→	ⓘ	ⓘ	—	none	none	Stop_Distributing_2ndConv	Step	Inactive	---	Begin: 2015-09-24 11:28:00.174 Pause: 0m 0s Duration: 0m 2.499s
24.09.2015 11:28:02.674	→	✓	ⓘ	—	none	none	Check_stopDistr	Transition	Transition proceeded	---	---

Figure 32: Typical SFC report

4.1.6 ProcessData Report

The **ProcessData Report** is used to read any process data located in the **losys** (global database) online and to save the data as an HTML or CSV document. After logging in successfully via the authentication dialog, the user arrives at the selection page for the process variable(s).

ProcessData report - Mozilla Firefox

ProcessData report

https://aproltraining01.br-automation.co.at/cgi-bin/losInitQuery.pl?lang=001,runtimesystem=runtime

ProcessData report **APROL**

Querying current values of process variables from server: aproltraining01.br-automation.co.at, Runtime system: runtime

Please preselect process variables

Mask: * losys port: 0 Accept

Select process variables to be queried

Selecting process variables (multiple selection possible)

- AL=001-CLIENTS
- AL=001-REDU
- AL_001_Compressed_Air_ack
- AL_001_Compressed_Air_ackbell
- AL_001_Compressed_Air_bellcnt
- AL_001_Compressed_Air_evtcnt
- AL_001_Compressed_Air_jockeyed
- AL_001_Compressed_Air_prio_0

or

File containing list of process variables: Optionally with absolute path on server, default extension = '.lst'.

Select format for display

Stylesheet: 001-losinouthtml.xml

Server-based storage of the result of the query to file: Extension (html/csv) will be completed. File in directory for web report of the runtime system

Start query

APROL R 4.0-09 (64Bit), © 1995-2015 Bernecker + Rainer Industrie-Elektronik Ges.m.b.H.
CGI: losInitQuery.pl, Version 1.1.1.1
XSL: losinhtml.xsl, Version 2.0

Figure 33: ProcessData report selection page

A mask/filter can be entered in the first page to limit the amount of process variables shown for selection. It is important to define the **losys port** when multiple control computers are used and therefore, the process variables are located on different control computers or RUNTIME systems.



Note:

The losys port is configured in the respective APROL system.

APROL system type:  Runtime system

Assigned Runtime system:

☒ Default Runtime system

☒ Runtime system with integrated operator system

☐ local losys for Gateway system

losys port:

Language:  German

KDE configuration: Basic

Control Computer assignment:

	Instance	CC-Account	Control Computer	Redundancy	Password	Sy St
1	RunServ001	runtime	 001.Server T  (Server001)	☐		☒

Figure 34: Parameters of the APROL system

The **[Accept]** button is used to activate the selected mask and the losys port. The next step involves selecting the process variables to be displayed. One or more variables can be selected (mouse click + CTRL key). You can then select an HTML or CSV style sheet depending on how you choose to process the data later. After setting HTML output and confirming your selection by clicking the **[Start query]** button, your screen will look something like this:

ProcessData report - Mozilla Firefox

ProcessData report

https://aproltraining01.br-automation.co.at/cgi-bin/losInOut.pl?lang=001&server=aproltraining01.br-automation.co.at&runtimeSystem=runtime&port=0&pv=RunServ001_M_TotalMemory

ProcessData report

Current values of process variables

Server:	aproltraining01.br-automation.co.at	Time of query:	09/22/2015 14:16:13 CEST
Runtime system:	runtime	losys port:	0

Process variable	Type	Value	Validity	Remanence
RunServ001_M_TotalMemory	REAL	15989.62890625000	Valid	Not remanent
RunServ001_M_TotalSwapMemory	REAL	2046.996093750000	Valid	Not remanent
RunServ001_M_Uptime	INT	616841	Valid	Not remanent
RunServ001_M_UsedMemory	REAL	13121.44140625000	Valid	Not remanent
RunServ001_M_UsedRootDiskSpace	REAL	89781.16015625000	Valid	Not remanent
RunServ001_M_UserStatePercent	REAL	1.756587147712708	Valid	Not remanent

[New query of process variables](#)

[Back to overview page](#)

APROL R 4.0-09, © 1995-2015 Bemecker + Rainer Industrie-Elektronik Ges.m.b.H.
 CGI: losInOut.pl, Version 1.1.1.1
 XML: losInOut, Version 2.1.10.2.5
 XSL: losInOut.html.xsl, Version 2.0

Figure 35: HTML display of a ProcessData report

The APROL reports

This type of report can be saved again as an HTML document and then further processed according to your needs.

The second method for a **ProcessData Report** would be to export the data to a CSV document. The process variables are selected like earlier. The CSV format is then defined as style sheet.

The same button **[Start query]** is then used to continue and a location is requested for saving the file. After being saved, the document can be integrated in a spreadsheet program and further processed for a log or something similar.

Process variable	Type	Value
aprolpc_TimeString	STRING	'09/22/2015 PM 04:36:27'
aprolpc_TimeZoneString	STRING	STRING
aprolpc_TotalMemory	INT	1034824
aprolpc_TotalSwapMemory	INT	1052216
aprolpc_UsedChronoLogDiskSpace	INT	125096
aprolpc_UsedMemory	INT	1003852
aprolpc_UsedRootDiskSpace	INT	19599632

4.1.7 Customer-specific report

Customer-specific reports are incorporated with this link. A separate seminar explains how to create them.

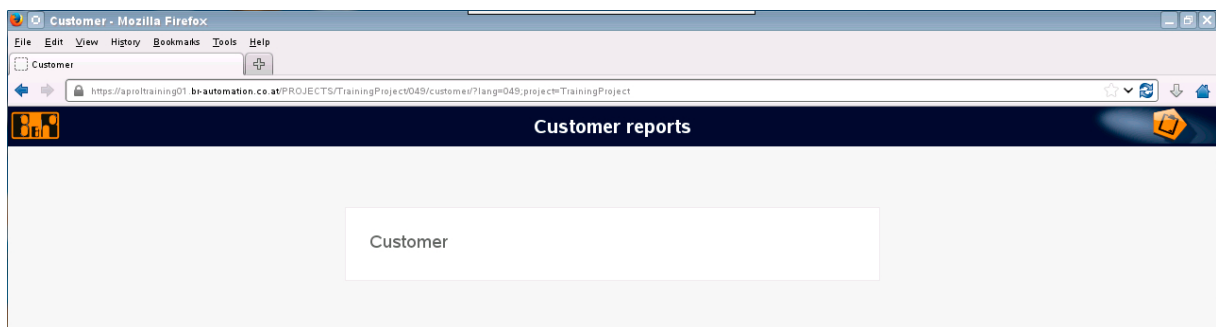


Figure 36: Customer reports

4.2 Interaction reports

These are reports which handle actions. This is important in the runtime and operating environments (action logging: **Who** did **what**, **when** from **where**), and also in the engineering environment (what was saved, compiled, loaded, ...). Because of this, the following reports are available:

Description	Description
AuditTrail	All actions in the runtime and operator environments are available in this report. All actions in an operator environment such as entering values, alarm handling, etc. are logged and saved.
ChangeControl Report	Many changes are made when an APROL is created. Each of these actions (versioning, saving, activating, compiling, ...) are recorded here and can be traced.
Build report	The result of compiling something is that something must also be created (built); see task for the controller for example --> machine code). These actions are listed here.
TargetControl report	If something was created, it must also be loaded and commissioned. All downloads to different targets such as controllers, control computers, operator stations, ... are maintained here.
Shift logbook	The shift logbook is available for the engineering, runtime, and operator environments. Actions such as service, device exchange, etc. are noted by the service employees. The course of the project can be documented in engineering.



Note:

Web queries which are located in the runtime system and have already been discussed are also provided in the engineering system!

4.2.1 AuditTrail Report



Who did what, when, where and how? (solely the why is not to be registered)

4.2.1.1 FDA Regulations 21 CFR

The rules of the FDA regulations 21 CFR (Code of Federal Regulations) must be mentioned in this context. These regulations are worldwide mandatory for each company and their locations which produce for the US market.

Part 11

Since August 2003, the standard 21 CFR, Part 11 has been used to regulate how electronic data is handled for the validation and inspection of systems and processes in the pharmaceutical, cosmetics and foodstuffs industries.

With the Part 11, the FDA comes up to the expectations of the gathering of information technology (industrial IT) for the fabrication and distribution process. A clear and explicit demand is that if computer-supported systems are introduced into existing plants instead of manual processes, neither the quality of the products nor the quality assurance is allowed to be impeded in any way whatsoever.

The regulation 21 CFR Part 11 demands a conclusive process documentation if it is partly or entirely in electronic form. Both the recording and storage of the data is referred to.

All relevant processes and interventions must be documented completely and available for viewing at any time. A user management regulates the rights and electronic signatures.

GAMP5

GAMP (Good Automated Manufacturing Practice) was called into life in the late 80s as a forum for the industry. One of the main goals of the GAMP forum was to design a guideline for suppliers of automated systems in the pharmaceutical industry.

The requirements of the European and north American inspection authorities were taken into account for this. The first draft was authorized in 1994 by the GAMP forum and sent to suppliers and interest groups.

GAMP 2 followed in 1996, GAMP 3 in 1998, GAMP 4 in December 2001, GAMP 5 in February 2008.

Many initiatives of handling the implementation:

The manner in which these specifications must be implemented for development, production, quality control and sales was determined by a variety of initiatives regarding the fields of economics, technology and science such as GAMP, GMA/NAMUR and APV.

4.2.1.2 General information

As mentioned earlier, the AuditTrail tracks all actions. These actions are given a timestamp defined by the system time.

The following actions are logged into AuditTrail:

- Overview of all actions
- All login actions for APROL own security login systems
- Interactive process control (actions in the process(es) via the DisplayCenter)
- External process control
- SFC actions (operating the SFC, e.g. jog mode)
- System control (actions from the StartManager, etc.)
- Controller management (amongst others, ControllerManager actions such as Watch, logbooks, forcing, ...)
- Alarm Management --> locking/releasing alarms (open alarm line, acknowledge/lock alarms, ...)
- Parameter history (recordings to parameter downloads, recipes, etc.)
- Log data modifications (modifying logged data, etc.)
- Unsuccessful actions (e.g. login rejected, ...)

Data is recorded without any extra configuration and contains all of the main data such as the timestamp, unique operator ID, and operator the terminal as well as detailed information concerning the respective operations and records.

This **WEB based reporting** provides predefined views for evaluation. Clear and meaningful reports which provide the required proof can be created using the filter technology. Platform independence is provided with the use of XML queries. This guarantees the use of reports in office environments.

It is also possible to start the AuditTrail directly from the process graphic. This allows the user to directly analyze the desired actions.

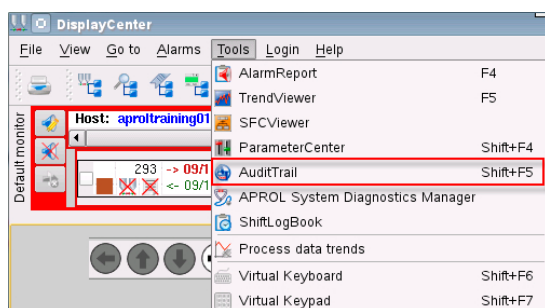


Figure 37: Starting the AuditTrail from the DisplayCenter

4.2.1.3 Calling up AuditTrail data

After logging in successfully via the authentication dialog box, the user arrives at the start page for AuditTrail.

The APROL reports

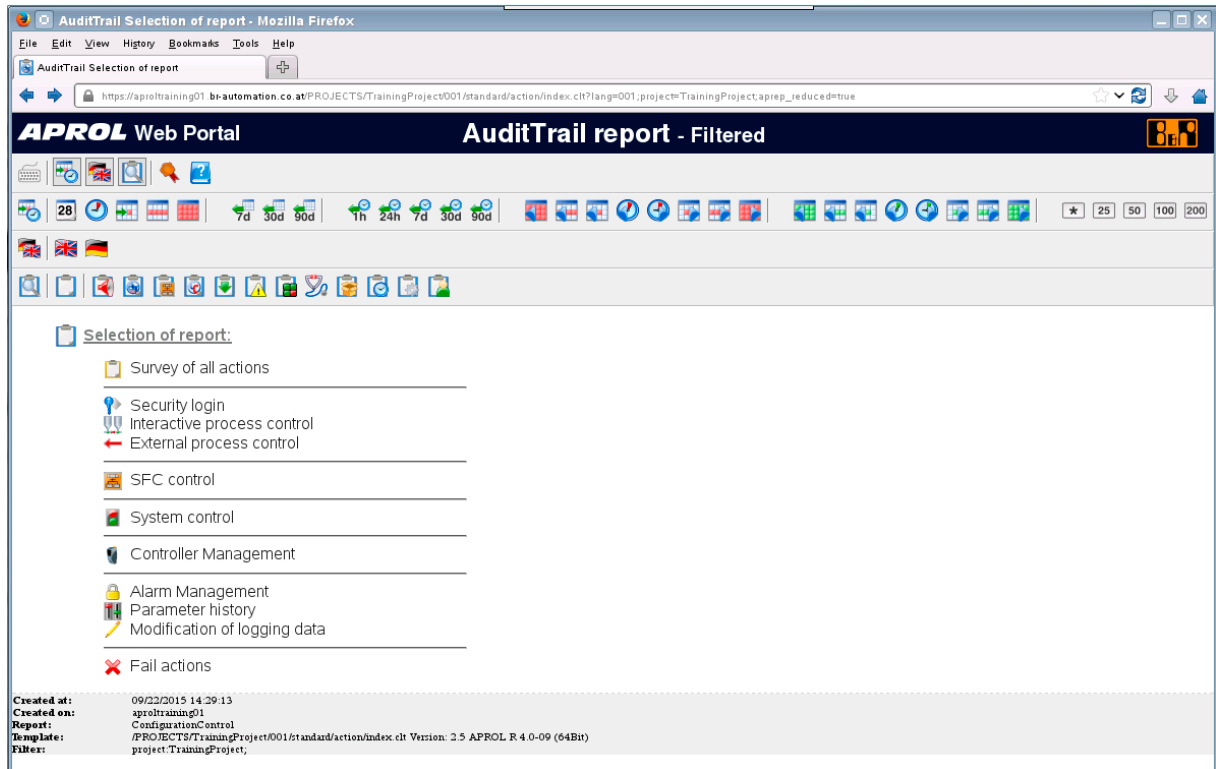


Figure 38: AuditTrail start page

The points which can be seen in the image here are the action groups that can be selected as filters by clicking on the respective option. (Security login, interactive process control, ...)

The **[Survey of all actions]** link brings you to the next page where all actions from the current day (00:00 – 24:00) are displayed.

Time	Action	Operator	Surname	Firstname	Server	Operator terminal	Project
09/22/2015 14:34:56	Alarm list closed	aprol	Superuser	aprol	aproltraining01	aproltraining01.br-automation.co.at:2.0	TrainingProject
09/22/2015 14:34:53	Alarm list filter modified	aprol	Superuser	aprol	aproltraining01	aproltraining01.br-automation.co.at:2.0	TrainingProject
09/22/2015 14:34:45	Alarm list opened	aprol	Superuser	aprol	aproltraining01	aproltraining01.br-automation.co.at:2.0	TrainingProject
09/22/2015 14:28:28	Process control	aprol	Superuser	aprol	aproltraining01	aproltraining01.br-automation.co.at:2.0	TrainingProject
09/22/2015 14:28:25	Graphic macro closed	aprol	Superuser	aprol	aproltraining01	aproltraining01.br-automation.co.at:2.0	TrainingProject
09/22/2015 14:28:21	Process control	aprol	Superuser	aprol	aproltraining01	aproltraining01.br-automation.co.at:2.0	TrainingProject
09/22/2015 14:28:21	Process control	aprol	Superuser	aprol	aproltraining01	aproltraining01.br-automation.co.at:2.0	TrainingProject
09/22/2015 14:28:21	Graphic macro opened	aprol	Superuser	aprol	aproltraining01	aproltraining01.br-automation.co.at:2.0	TrainingProject
09/22/2015 14:28:20	Process control	aprol	Superuser	aprol	aproltraining01	aproltraining01.br-automation.co.at:2.0	TrainingProject

Figure 39: AuditTrail parameters page

This page is made up of the following sections:

- Defining the time range
- Setting the filter
- Displaying the respective actions

As mentioned earlier, the current day (00:00 - 24:00) is automatically entered when this page is opened.

The desired time range can now be entered directly in the field or selected using the corresponding button.

Icon	Description
	Select date (in a pop-up window)
	Calendar for selecting a day
	Current hour
	Current day
	Current week
	Current month

The following window appears by pressing the **[Select date]** button:

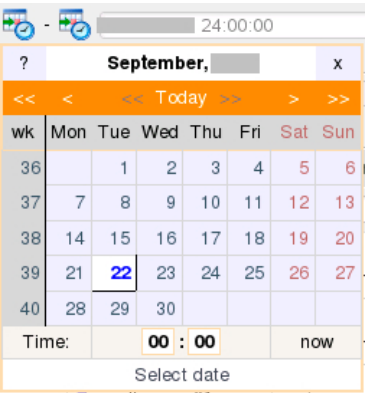


Figure 40: Window for entering date and time

It is also possible to shift the selected time range. There are two ways to do this, each with a variety of individual icons:

Shift time range according to calendar:

Icon	Description
	Previous month
	Previous week
	Previous day
	One hour backwards
	One hour forwards
	Next day
	Next week
	Next month

Shift time range to period of time:

Icon	Description
	One month backwards
	One week backwards
	One day backwards

Icon	Description
	One hour backwards
	One hour forwards
	One day forwards
	One week forwards
	One month forwards

The **[Update]** button is used to reload the defined time range. To reverse the chronological sorting of the actions, simply click on the **[Reverse sorting]** link or on the link on the **[Time]** column.

The actions displayed can be limited in the top right part of the window. The actions from all projects are shown if "Project..." is selected from the drop-down menu.



Note:

If the task exceeds a specific number of actions, then the actions are distributed throughout multiple pages.

If a filter is set, then the output is limited by this filter.

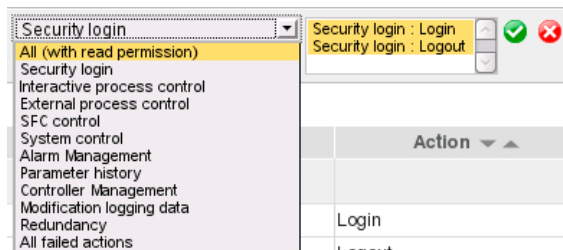


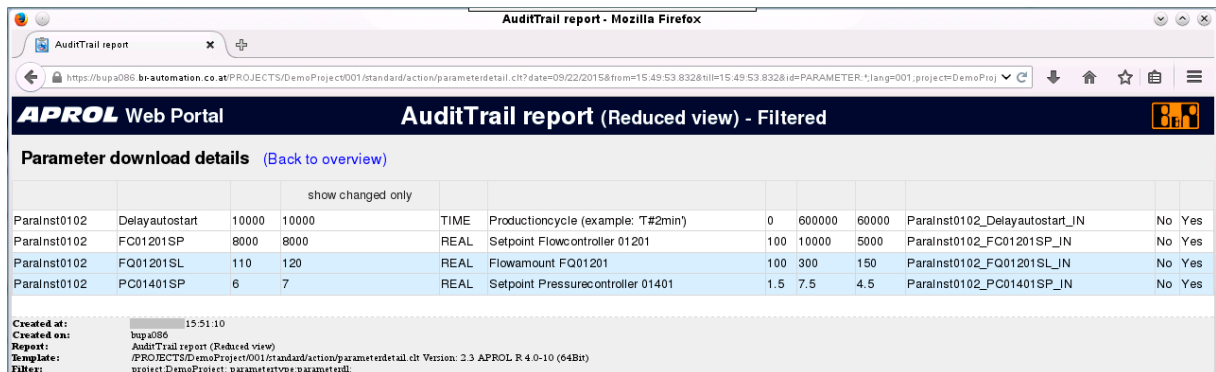
Figure 41: Set filter

To reset the filter, it must be deselected by clicking on it while holding the **[Ctrl]** key or with the **'red button'**.

When selecting the Parameter History action group, the details of the respective action can be viewed in the **'Change'** column.

This sample page illustrates a parameter download.

The APROL reports



APROL Web Portal											
AuditTrail report (Reduced view) - Filtered											
Parameter download details (Back to overview)											
show changed only											
ParaInst0102	Delayautostart	10000	10000	TIME	Productioncycle (example: T#2min)	0	600000	60000	ParaInst0102_Delayautostart_IN	No	Yes
ParaInst0102	FC01201SP	8000	8000	REAL	Setpoint Flowcontroller 01201	100	10000	5000	ParaInst0102_FC01201SP_IN	No	Yes
ParaInst0102	FQ01201SL	110	120	REAL	Flowamount FQ01201	100	300	150	ParaInst0102_FQ01201SL_IN	No	Yes
ParaInst0102	PC01401SP	6	7	REAL	Setpoint Pressurecontroller 01401	1.5	7.5	4.5	ParaInst0102_PC01401SP_IN	No	Yes

Created at: 15:51:10
Created on: hup-086
Report: AuditTrail report (Reduced view)
Template: /PROJECTS/DemoProject/001/standard/action/parameterdetail.ch Version: 2.3 APROL R 4.0-10 (64Bit)
Filter: project DemoProject, parameter type parameterid,

Figure 42: Sample page for a parameter change

Values that have been changed to a value different than the original value will appear blue.



Task :

Use an incorrect password when logging in and then try to find this action using the AuditTrail Report. Give yourself an overview of the entire AuditTrail with all of its analysis possibilities. Analyze your actions during the entire seminar by extending the time range of the query correspondingly.

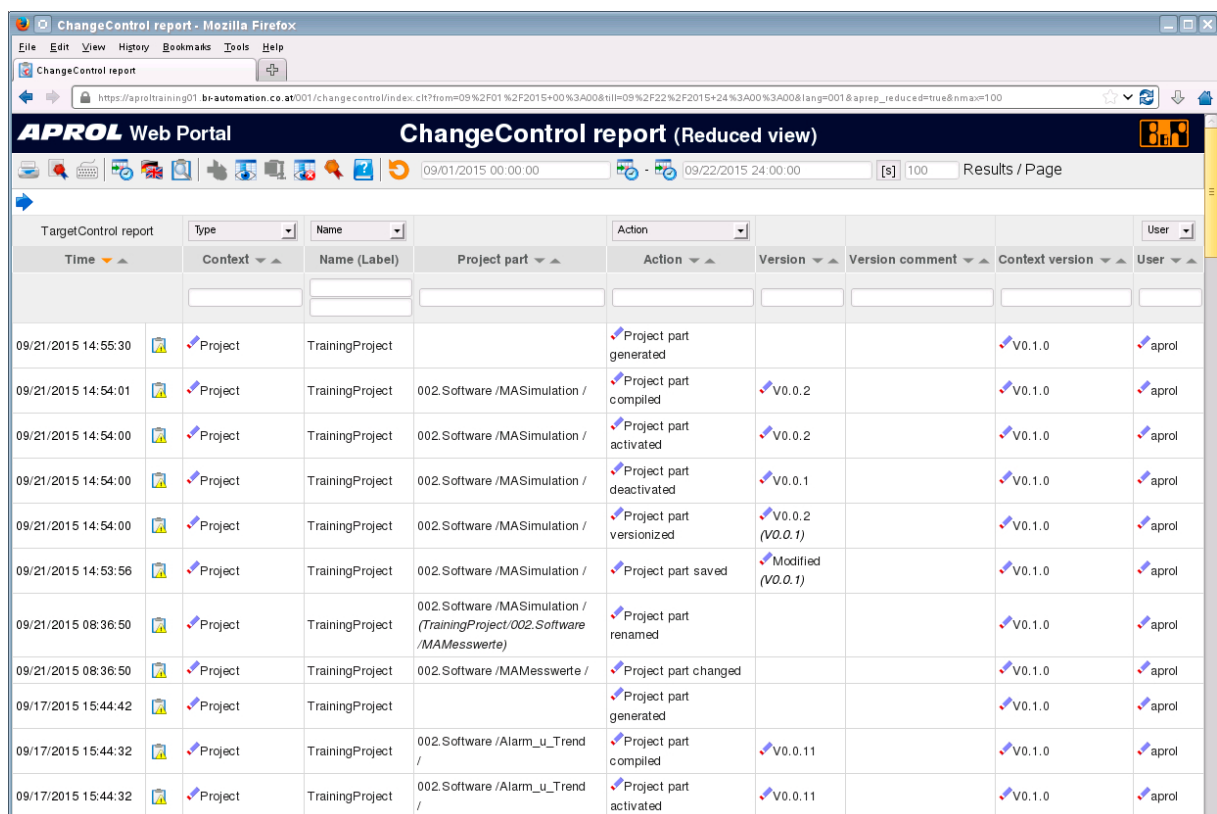
4.2.2 ChangeControl Report

The user which is responsible for critical project changes, for example, can be determined with the ChangeControl report. This makes it possible to create queries for the following actions:

- Project part deleted, activated, compiled, created, deactivated, removed, generated,
- (Project part deleted / activated / compiled / created / deactivated / removed / generated / re-named / saved / versioned /)
- Download
- Group created, changed (Group created , changed)
- Old version removed (Old version removed)
- CaeRestore, CaeBackup
-

This affects the areas backup management, libraries, database optimization, OperatorManager and project. After starting from the KDE menu, a browser (Firefox) is opened and displays the report.

Several filters are available to limit the query (e.g. **type**, **name**, **action**, **user**).



Time	Context	Name (Label)	Project part	Action	Version	Version comment	Context version	User
09/21/2015 14:55:30	Project	TrainingProject		Project part generated			V0.1.0	aprol
09/21/2015 14:54:01	Project	TrainingProject	002.Softwre /MASimulation /	Project part compiled	V0.0.2		V0.1.0	aprol
09/21/2015 14:54:00	Project	TrainingProject	002.Softwre /MASimulation /	Project part activated	V0.0.2		V0.1.0	aprol
09/21/2015 14:54:00	Project	TrainingProject	002.Softwre /MASimulation /	Project part deactivated	V0.0.1		V0.1.0	aprol
09/21/2015 14:54:00	Project	TrainingProject	002.Softwre /MASimulation /	Project part versioned	V0.0.2 (V0.0.1)		V0.1.0	aprol
09/21/2015 14:53:56	Project	TrainingProject	002.Softwre /MASimulation /	Project part saved	Modified (V0.0.1)		V0.1.0	aprol
09/21/2015 08:36:50	Project	TrainingProject	002.Softwre /MASimulation / (TrainingProject/002.Softwre /MAMesswerte)	Project part renamed			V0.1.0	aprol
09/21/2015 08:36:50	Project	TrainingProject	002.Softwre /MAMesswerte /	Project part changed			V0.1.0	aprol
09/17/2015 15:44:42	Project	TrainingProject		Project part generated			V0.1.0	aprol
09/17/2015 15:44:32	Project	TrainingProject	002.Softwre /Alarm_u_Trend /	Project part compiled	V0.0.11		V0.1.0	aprol
09/17/2015 15:44:32	Project	TrainingProject	002.Softwre /Alarm_u_Trend /	Project part activated	V0.0.11		V0.1.0	aprol

Figure 43: Example of a ChangeControl report



Task :

Change a CFC in the APROL engineering system and try to determine the change using the ChangeControl report.

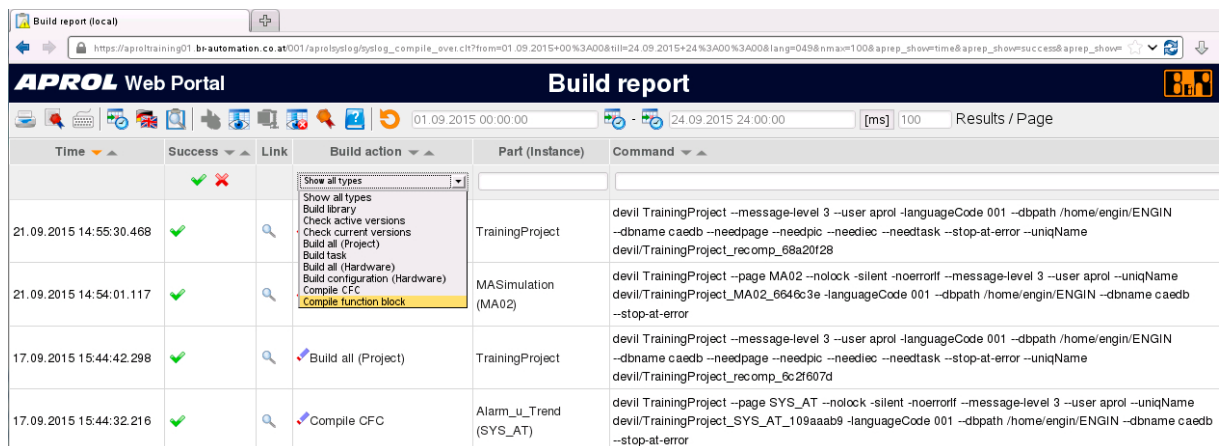
4.2.3 Build report

The ChangeControl report has shown us all of the changes in engineering. The build processes must now be started as the next step, to create all configurations and task for the subsequent download. All of these actions are recorded and are important to determine if the changes in the logic or configuration was created.

The following actions are available in the report:

- Build library
- Check activated state
- Check edit state
- Build all (Project)
- Build task
- Build all (Hardware)
- Build configuration (Hardware)
- CFC compiled
- Function block compiled

The result may appear as follows:



Time	Success	Link	Build action	Part (Instance)	Command
21.09.2015 14:55:30.468	✓		Show all types Build library Check active versions Check current versions Build all (Project) Build task Build all (Hardware) Build configuration (Hardware) Compile CFC Compile function block	TrainingProject	devil TrainingProject --message-level 3 --user aprol -languageCode 001 --dbpath /home/engin/ENGINE --dbname caedb --needpage --needpic --neediec --needtask --stop-at-error --uniqName devil/TrainingProject_rec omp_68a20f28
21.09.2015 14:54:01.117	✓		Build all (Project)	MASimulation (MA02)	devil TrainingProject --page MA02 --nolock --silent --noerrorif --message-level 3 --user aprol --uniqName devil/TrainingProject_MA02_6646c3e -languageCode 001 --dbpath /home/engin/ENGINE --dbname caedb --stop-at-error
17.09.2015 15:44:42.298	✓		Build all (Project)	TrainingProject	devil TrainingProject --message-level 3 --user aprol -languageCode 001 --dbpath /home/engin/ENGINE --dbname caedb --needpage --needpic --neediec --needtask --stop-at-error --uniqName devil/TrainingProject_rec omp_6c2f607d
17.09.2015 15:44:32.216	✓		Compile CFC	Alarm_u_Trend (SYS_AT)	devil TrainingProject --page SYS_AT --nolock --silent --noerrorif --message-level 3 --user aprol --uniqName devil/TrainingProject_SYS_AT_109aaab9 -languageCode 001 --dbpath /home/engin/ENGINE --dbname caedb --stop-at-error

Figure 44: Example of a build report



Task :

Check all build processes made in the last few days.

4.2.4 TargetControl report

After changes and extensions have been made to the engineering and it was created (build), it must now be put into operation. The download using the DownloadManager serves this purpose. The TargetControl report logs these actions. In addition, all controller manipulations (ControllerManager) are recorded.

This makes it possible to create queries for the following actions:

- Download
- Flash card (Flash Card)
- Module download, upload, deleted, modified, moved (download / upload / deleting / modified / moved)
- Restart CPU (Restart CPU)
- Setting clock (Setting clock)
- Task started, task stopped (Start / Stop task)
- Number of set task cycles (Set cycles)
- Task classes started, stopped (Start / Stop task class)
- Memory deleted (Memory deleted)
- Download AR OS
- Set value (Set value)
- Force value (Force value)
- Global force off (Global force off)
- Force value on, off (Force value on / off)
- Logbook deleted (Logbook deleted)
- Connect, connection established (Connect / Disconnected)
- Connection request (Request connection)
- Process control hand-over (Request CPU process control hand-over)
- Execute application synchronization (Request CPU application transfer)

Time	Application	Action	Target	Subtarget	Module	Project part	Instance	User	Project
09/21/2015 14:57:07.378	DownloadManager	Download	(Control Computer (Runtime System)) runtime@aproltraining01	all		001. Server Training (Runtime 001. Server Training)		aprol	TrainingProject
09/17/2015 15:45:31.148	DownloadManager	Download	(Control Computer (Runtime System)) runtime@aproltraining01	all		001. Server Training (Runtime 001. Server Training)		aprol	TrainingProject
09/17/2015 14:53:43.388	DownloadManager	Download	(Control Computer (Runtime System)) runtime@aproltraining01	all		001. Server Training (Runtime 001. Server Training)		aprol	TrainingProject

Created at: 09/22/2015 16:00:00
Created on: aproltraining01
Report: TargetControl report (Reduced view)
Template: /001/changecontrol/targetlist.cht Version: 2.4.26.2 APROL R 4.0-09 (64Bit)
Filter: project:TrainingProject,

Figure 45: Example of a TargetControl report

This guarantees being able to analyze all engineering actions. A project state and behavior of the plant which cannot be analyzed is therefore not possible.



Task :

Now try to review the last few days of the seminar and find your actions in engineering with the reports which have been described.

4.2.5 Shift logbook

The shift logbook is available in the runtime, operating, and engineering environments. In the runtime and operating environments, it documents incidents on the plant and provides the service employees with an environment to record the necessary actions. This used to be the so-called shift book which had to be positioned next to each operating station. It was of course impossible to synchronize this. The shift logbook has digitalized this and is stored centrally, but is still available on each operator station. The shift logbook in the engineering environment is used to log commissioning and all other necessary measures.

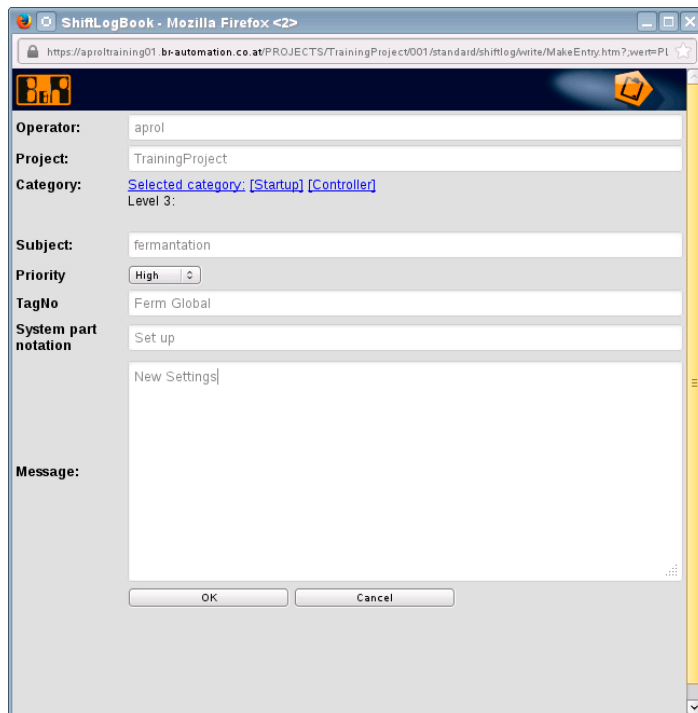
The entries in the shift logbook are categorized. They can be extended to suit the plant. Details about this can be found in the APROL product documentation.

Entries	Time	Priority	TagNo	Subject	System part notation	Category	Operator
2 Entries							
	09/25/2015, 09:16:52	Low	HYDRO global	Setup Plantpart hydro	Download	Startup/Controller/	aprol
	09/25/2015, 09:15:48	Low	HYDRO global	Setup Plantpart hydro	Download	Startup/Controller/	aprol

Created at: 09/25/2015 09:16:52
Created by: aprot@aproltraining01
Report: ShiftLogBook
Template: /PROJECTS/TrainingProject/001/standardshiftlogindex.clt Version: 2.4 APROL R 4.0-09 (64Bit)
Filter: project:TrainingProject,

Figure 46: Example shift logbook

A new entry in the shift logbook could look like this:



ShiftLogBook - Mozilla Firefox <2>

https://aproltraining01.br-automation.co.at/PROJECTS/TrainingProject001/standard/shiftlog/write/MakeEntry.htm?wert=PL

Operator: aprot

Project: TrainingProject

Category: [Selected category: \[Startup\] \[Controller\]](#)
Level 3:

Subject: fermentation

Priority: High

TagNo: Ferm Global

System part notation: Set up

Message: New Settings

OK Cancel

Figure 47: New entry in the shift logbook



Task :

Log a couple of the actions which you have made during the seminar.

4.3 APROL Solutions reports

The Solutions which are also offered in APROL have a defined scope of functionalities, depending on the solution and license. At present, the following solution reports are available without extra costs (ready to use):

Description	Description
Energy Monitoring report	The energy monitoring report contains everything that is relevant to evaluate all sorts of energy records. Details can be found in the documentation and will be handled in further seminars.
PDA report	View of all PDA data list form.

The energy monitoring report start window, which also contains the report navigation, appears as follows:

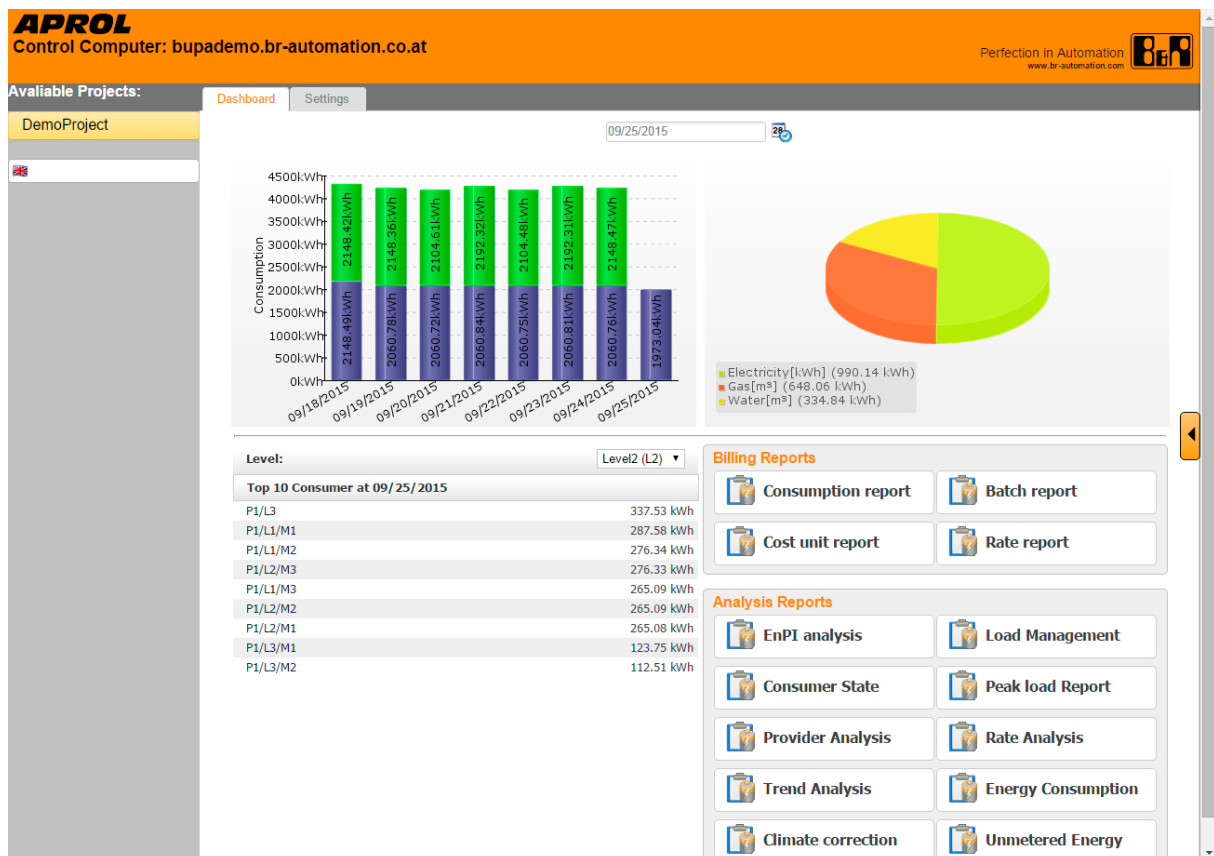


Figure 48: Energy Monitoring report

4.4 System and self-diagnosis report

4.4.1 System messages

Basically, every application logs different types of changes, actions, etc. in a separate logbook. The system messages application can be used to read and display this data. An error message is recorded if e.g. a project was not compiled correctly. These messages play a major role in identifying problems. There are **central** and **local** system messages, whereby the central messages can originate from multiple projects or runtime and operator stations.

After starting the program via the KDE menu, a window appears containing operating elements in the top section (like in all reports) that are used to define a time range for the query. The following list is used to select a message type in order to limit the number of system messages.

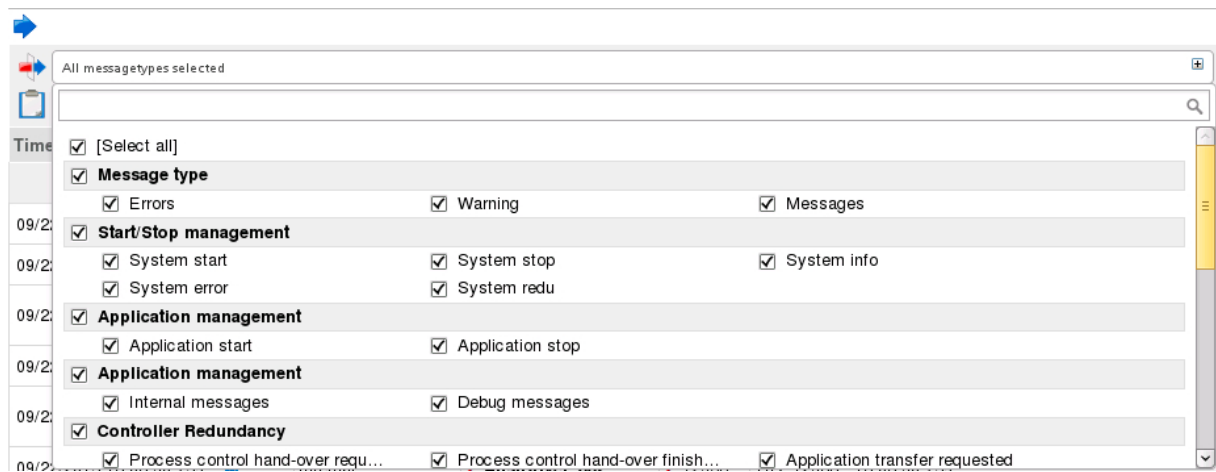


Figure 49: Selecting the message type

One or more types can be selected in this selection list. Querying is done automatically. Additionally, it's possible to refine the selection by clicking on the drop-down button. Another menu bar can be shown by clicking the '**Show/Hide report navigation**' button.

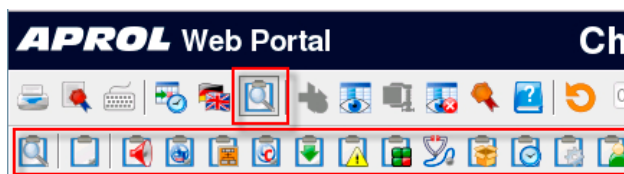


Figure 50: Report navigation

The **[Show application list]** link is of considerable importance. By selecting this link, a new list is shown in the left part of the window with the heading **Applications**.

The APROL reports

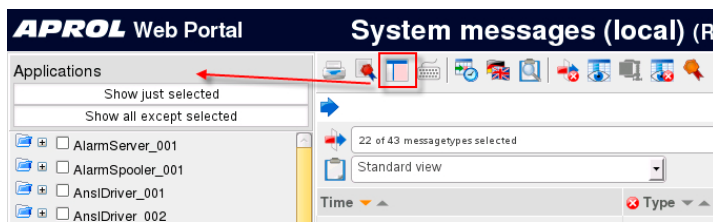


Figure 51: Show application list

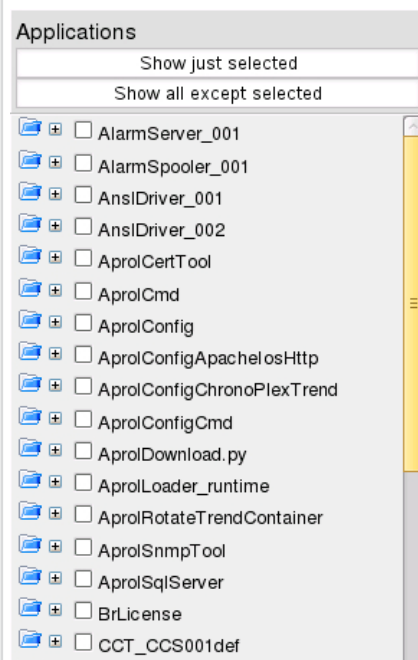


Figure 52: Application list

After selecting the application, you can view the messages and quickly get to the root of the problem.

Time	Type	Application	pid	Text
09/22/2015 16:32:14.861	App. start	CaeManager	2488	Startup of 'CaeManager' (CaeManager V 3.2.232.2.10, R 4.0-09) with args: --nocrashhandler
09/22/2015 16:32:09.989	App. stop	CaeManager	3607	Shutdown of 'CaeManager' with exit code 0
09/21/2015 08:35:10.467	App. start	CaeManager	3607	Startup of 'CaeManager' (CaeManager V 3.2.232.2.10, R 4.0-09) with args: --nocrashhandler
09/18/2015 09:14:57.439	App. start	CaeManager	17499	Startup of 'CaeManager' (CaeManager V 3.2.232.2.10, R 4.0-09) with args: --nocrashhandler
09/17/2015 10:06:45.556	App. start	CaeManager	20142	Startup of 'CaeManager' (CaeManager V 3.2.232.2.10, R 4.0-09) with args: -languageCode 049
09/17/2015 10:06:29.090	App. stop	CaeManager	20048	Shutdown of 'CaeManager' with exit code 1
09/17/2015 10:06:28.788	App. start	CaeManager	20048	Startup of 'CaeManager' (CaeManager V 3.2.232.2.10, R 4.0-09) with args: --help-all
09/16/2015 09:45:35.860	App. stop	CaeManager	7982	Shutdown of 'CaeManager' with exit code 0
09/16/2015 09:39:00.872	Message	CaeManager	11563	AS-HC (apc2100): PowerOff complete
09/16/2015 09:38:59.717	Message	CaeManager	11563	AS-HC (apc2100): Wait for PowerOff:
09/16/2015 09:38:44.522	Debug message	CaeManager	11563	AS-HC (apc2100): Removing USR_CONF finished
09/16/2015 09:38:43.354	Debug message	CaeManager	11563	AS-HC (apc2100): Wait for finish: Removing USR_CONF
09/16/2015 09:38:43.354	Debug message	CaeManager	11563	AS-HC (apc2100): Start application in VM: Removing USR_CONF

Figure 53: Query example for CaeManager messages

4.4.2 Redundancy report

A redundancy management needs to be implemented at this stage, because both the server (APROL system) and controller can be configured as being redundant in APROL. This entails monitoring the processes to recognize a redundancy failover (the switchover must be initiated) and also the involved manual operation. The following actions can be found in the redundancy report:

Filter	Filter redundancy
Standard view	Redundancy
ANSL system messages	Controller redundancy
Database locks	Server redundancy
Performance measurements	

The screenshot shows the APROL Web Portal interface. The title bar reads 'APROL Web Portal' and 'Redundancy report (central) (Reduced view) - Filtered'. The left sidebar lists various applications, including AlarmServer_001, AlarmSpooler_001, AnslDriver_001, AnslDriver_002, AprolCertTool, AprolCmd, AprolConfig, AprolConfigApacheosHttp, AprolConfigChronoPlexTrend, AprolConfigCmd, AprolDownload.py, AprolLoader_runtime, AprolRotateTrendContainer, AprolSnmpTool, AprolSqlServer, BrLicense, and CCT_CCS001def. The central pane shows a dropdown menu for 'Redundancy' with options: Standard view, ANSL system messages, Database Locking, Performance Measuring, Redundancy, and Controller Redundancy. The 'Server Redundancy' option is selected. The main table displays a list of redundancy events with columns for Application, Instance, PID, and Text. The events are all 'Client Redundancy' messages from 'AprolLoader_runtime' with PID 6969.

Application	Instance	PID	Text
AprolLoader_runtime	-	6969	Client redundancy
AprolLoader_runtime	-	6969	Client redundancy
AprolLoader_runtime	-	6969	Client redundancy
AprolLoader_runtime	-	6969	Client redundancy
AprolLoader_runtime	-	6969	Client redundancy
AprolLoader_runtime	-	6969	Client redundancy
AprolLoader_runtime	-	6969	Client redundancy
AprolLoader_runtime	-	6969	Client redundancy
AprolLoader_runtime	-	6969	Client redundancy
AprolLoader_runtime	-	6969	Client redundancy

Figure 54: Redundancy report

The selection list of all applications, drivers, and tools is in the left area of the report. Similar to the system messages, the desired entry should be selected first, in order to obtain an informative view of the query.

4.4.3 Controller logbooks

Controllers in an APROL project supply logbooks. It is of course possible to contact each controller online and load the respective logbook. It is much more simple to extract them from one place, i.e. the 'Controller logbooks' report. This report can also be opened from the redundancy report.

APROL Web Portal **Controller Logbooks (central) (Reduced view)**

Logbook
Show just selected
Show all except selected

4 of 7 messagetypes selected
Controller Logbooks

Time	Type	Controller Instance	CPU Type	Logbook	Error Description	ASCII Data
09/24/2015 09:33:10.776	Information	X20CP3586	Secondary	redund	The switchover level is now "bumpless".	Switchover state chang
09/24/2015 09:33:10.583	Information	X20CP3586	Primary	redund	The switchover level is now "bumpless".	Switchover state chang
09/24/2015 09:33:01.990	Warning	X20CP3586	Secondary	redund	The switchover level is now "major bump".	Switchover state chang
09/24/2015 09:33:00.880	Information	X20CP3586	Secondary	arlogsys	Connection identified as redundancy-relevant	rrConnection created: S
09/24/2015 09:33:00.669	Warning	X20CP3586	Secondary	arlogsys	Unknown error number	ApDrvEvt - ApDrvEvt:
09/24/2015 09:33:00.231	Warning	X20CP3586	Secondary	redund	The switchover level is now "major bump".	Switchover state chang

Figure 55: Example of a redundant controller logbook

4.4.4 Check installation

The entire current APROL installation is shown in this menu (installation data, current environment, installed applications, installed libraries and installed packages). Furthermore, the data and version number can be shown with **"Show all"** or only the data and the version differences with **"Show only differences"**.

Installed application (Installation type: Engineering, Runtime, Operator, Gateway)						Show only differences
Application name	IT	Original version Patch version	Original release Patch release	Installed version	Installed release	
✓ AlarmServer	✓	2.1.135.2.10	APROL R 4.0-10	2.1.135.2.10	APROL R 4.0-10	
✓ AlarmSpooler	✓	2.1.5.4.3	APROL R 4.0-10	2.1.5.4.3	APROL R 4.0-10	
✓ AnslConnect	✓	2.1.5.4.8.4.1	APROL R 4.0-10	2.1.5.4.8.4.1	APROL R 4.0-10	
✓ AnslCPUInstaller	✓	2.2.2.2.9.2.1	APROL R 4.0-10	2.2.2.2.9.2.1	APROL R 4.0-10	
✓ AnslDriver	✓	2.2.51.2.81.2.15	APROL R 4.0-10	2.2.51.2.81.2.15	APROL R 4.0-10	
✓ ApcHwInfo	✓	2.1.5.4.5	APROL R 4.0-10	2.1.5.4.5	APROL R 4.0-10	
✓ aprotArcnetInstall	✓	2.1.4.30.4	APROL R 4.0-10	2.1.4.30.4	APROL R 4.0-10	
✓ AprotAsHelp	✓	1.7	APROL R 4.0-10	1.7	APROL R 4.0-10	
✓ AprotAsHelp_de	✓	1.1.2.2	APROL R 4.0-10	1.1.2.2	APROL R 4.0-10	
✓ AprotAsHelp_en	✓	1.1.2.2	APROL R 4.0-10	1.1.2.2	APROL R 4.0-10	
✓ AprotAutoStartFrontends	✓	1.12	APROL R 4.0-10	1.12	APROL R 4.0-10	
✓ AprotBackupEnginContent	✓	1.78.10.1	APROL R 4.0-10	1.78.10.1	APROL R 4.0-10	
✓ AprotCaeBase	✓	1.3	APROL R 4.0-10	1.3	APROL R 4.0-10	
✓ AprotCaeRename	✓	2.0	APROL R 4.0-10	2.0	APROL R 4.0-10	

Figure 56: APROL SDM check installation with versions

Installed libraries						Show all
Library name		Original version Patch version	Original release Patch release	Installed version	Installed release	
CaeCFileClient	/opt/aprol/lib/libCaeCFileClient.so: undefined symbol: _ZNK23CreateLibPartDialogBase9classNameEv	---	---	⚠ Cannot open library!	⚠ ---	
CaeController	/opt/aprol/lib/libCaeController.so: undefined symbol: _ZNK20CreatePartDialogBase9classNameEv	---	---	⚠ Cannot open library!	⚠ ---	
CaeGlobal	/opt/aprol/lib/libCaeGlobal.so: undefined symbol: _ZTV18GlobalOptionDialog	---	---	⚠ Cannot open library!	⚠ ---	
CaeHFileClient	/opt/aprol/lib/libCaeHFileClient.so: undefined symbol: _ZNK23CreateLibPartDialogBase9classNameEv	---	---	⚠ Cannot open library!	⚠ ---	
CaelecComponents	/opt/aprol/lib/libCaelecComponents.so: undefined symbol: _ZN10CaeActions17ActShowParametersE	---	---	⚠ Cannot open library!	⚠ ---	
CaePrjPM	/opt/aprol/lib/libCaePrjPM.so: undefined symbol: _ZNK20CreatePartDialogBase9classNameEv	---	---	⚠ Cannot open library!	⚠ ---	
CaePythonClient	/opt/aprol/lib/libCaePythonClient.so: undefined symbol: _ZNK23CreateLibPartDialogBase9classNameEv	---	---	⚠ Cannot open library!	⚠ ---	
CaeSFCChartView	/opt/aprol/lib/libCaeSFCChartView.so: undefined symbol: _ZN10CaeActions20ActActivateDebuggingE	---	---	⚠ Cannot open library!	⚠ ---	

Figure 57: APROL SDM check installation with version differences

The APROL reports

4.4.5 Configuration history

This page shows all configuration changes in the system (e.g. language changes, starting AprotConfig, installation, etc.) and is designed similarly to AuditTrail. The differences are the filter functions.

The filters **"Message type"** and **"Message"** are available for limiting the query.

If no filter is selected, the search could look something like this (whereby the green entries are **configuration messages** and the blue entries **setup messages**):

APROL Web Portal Configuration report (Reduced view)							
09/22/2015 00:00:00 - 09/22/2015 24:00:00 [ms] 100 Results / Page							
Time	Message type	Message	Old value	New value	Application	AprotConfig aspect	Release
Show all sources Show all types Show all aspects							
09/22/2015 08:03:56.065	message	Aktivierung der Chronoplex-Konfiguration erfolgreich beendet.			script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 08:03:56.033	message	Ende der Änderungen für chronoplex			script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 08:03:56.017	message	alarm.limit	1000	200	script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 08:03:56.000	message	Beginn der Änderungen für chronoplex			script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 08:03:45.185	Warning	/etc/profile.br: line 26: ulimit: core file size: cannot modify limit: Die Operation ist nicht erlaubt.			script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 08:03:45.163	message	Passen Größe der ChronoLog-Containers an neue Konfiguration an. Fertig.			script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 08:00:37.165	message	Konfiguration nach /home/aprolysis/APROL/cnf/ChronoPlex/chronoplex.cnf schreiben...			script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 08:00:37.151	message	Die Grenze des ChronoLog-Containers alarm wird von 1000 MB nach 200 MB geändert. Dies kann einige Minuten in Anspruch nehmen.			script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 08:00:37.134	message	Konfiguration von /home/aprolysis/APROL/cnf/ChronoPlex/chronoplex.cnf lesen...			script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 08:00:36.813	message	Benutzer: sr			script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 08:00:36.799	message	Aktiviere Chronoplex-Konfiguration.			script_AprotConfig	chronoplex	APROL R 4.0-10
09/22/2015 07:59:51.343	message	Creating searchindex for project documentation: Engineeringssystem: /home/engin Project: DemoProject Language: 049			script_AprotCreateSearchIndex		APROL R 4.0-10
09/22/2015 07:59:46.394	message	Creating searchindex for project documentation: Engineeringssystem: /home/engin Project: DemoProject Language: 001			script_AprotCreateSearchIndex		APROL R 4.0-10
Created at: 09/22/2015 17:46:50 Created on: hup4086 Report: ConfigurationControl (Reduced view) Template: /001/sysconfigupdatehistory.ch Version: APROL R 4.0-10 (64Bit) Filter:							

Figure 58: APROL SDM - Configuration history without a filter

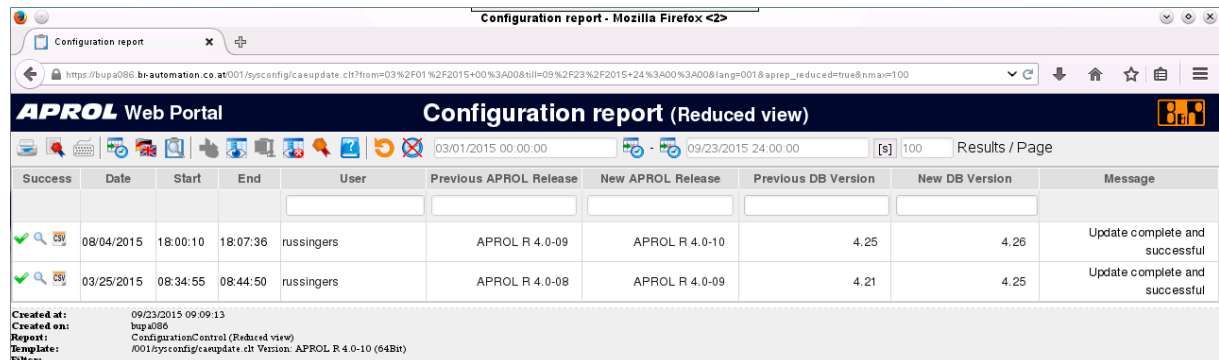
The result could look something like this with the **message filter "Setup information only"**:

APROL Web Portal Configuration report (Reduced view)							
03/22/2015 00:00:00 - 09/22/2015 24:00:00 [ms] 100 Results / Page							
Time	Message type	Message	Old value	New value	Application	AprotConfig aspect	Release
Show all Setup information Errors and warnings Show all aspects							
05/22/2015 10:26:42.366	Warning	Installation of Patch 1 APROL R 4.0-09 (R 4.0-09P1) not possible due to: Root log on not possible.			script_DisplayCenter		APROL R 4.0-09P1
Created at: 09/22/2015 17:53:46 Created on: hup4086 Report: ConfigurationControl (Reduced view) Template: /001/sysconfigupdatehistory.ch Version: APROL R 4.0-10 (64Bit) Filter:							

Figure 59: APROL SDM configuration history with filter

4.4.6 CaeDb update

This menu shows you who installed updates and when, if they were successful, are being processed, were cancelled, and the update content in detail.



Configuration report - Mozilla Firefox

Configuration report

https://bupa086-br-automation.co.at/001/sysconfig/caeupdate.ch?from=03%2F01%2F2015+00%3A00&until=09%2F23%2F2015+24%3A00%3A00&lang=001&aprep_reduced=true&nmax=100

APROL Web Portal Configuration report (Reduced view)

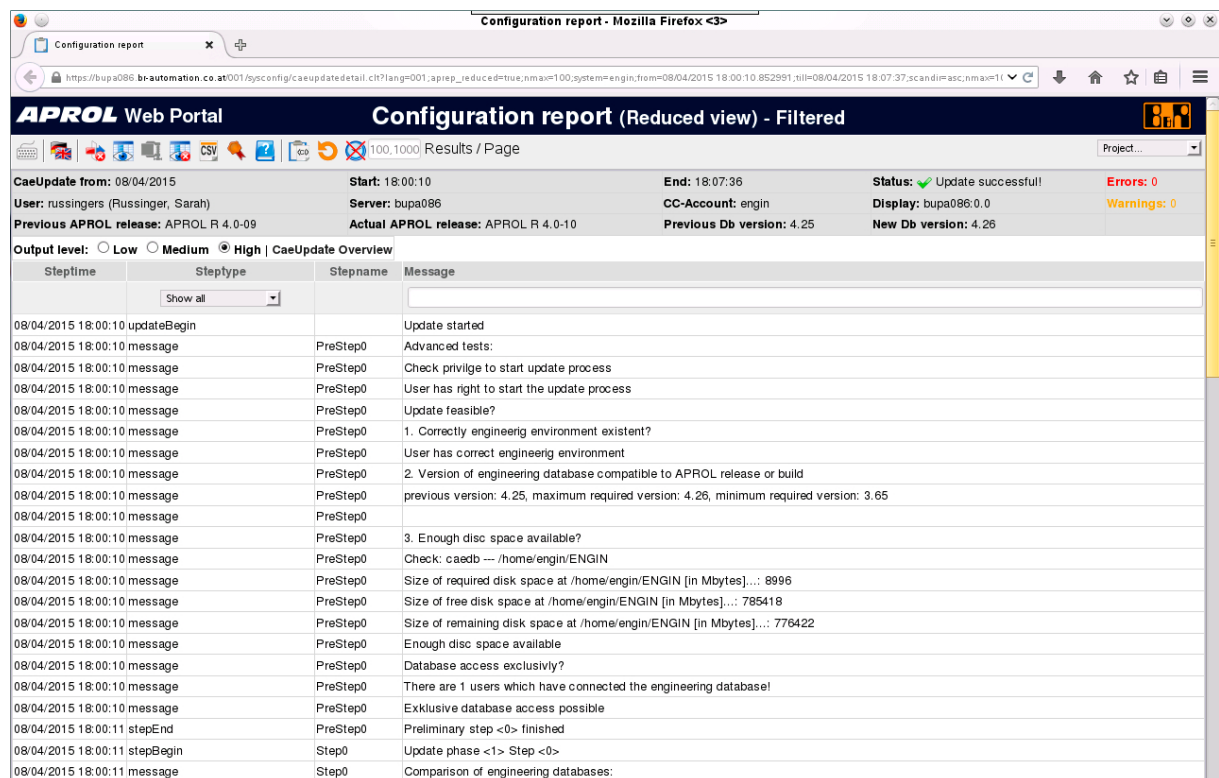
03/01/2015 00:00:00 09/23/2015 24:00:00 [s] 100 Results / Page

Success	Date	Start	End	User	Previous APROL Release	New APROL Release	Previous DB Version	New DB Version	Message
✓	08/04/2015	18:00:10	18:07:36	russingers	APROL R 4.0-09	APROL R 4.0-10	4.25	4.26	Update complete and successful
✓	03/25/2015	08:34:55	08:44:50	russingers	APROL R 4.0-08	APROL R 4.0-09	4.21	4.25	Update complete and successful

Created at: 09/23/2015 09:09:13
 Created on: bupa086
 Report: ConfigurationControl (Reduced view)
 Template: /001/sysconfig/caeupdate.ch Version: APROL R 4.0-10 (64Bit)
 Files:

Figure 60: SDM CaeDb Update

The update steps which were carried out are shown by clicking on the magnifying glass "Show details".



Configuration report - Mozilla Firefox

Configuration report

https://bupa086-br-automation.co.at/001/sysconfig/caeupdate/detail.ch?lang=001&aprep_reduced=true&nmax=100&system=engin&from=08/04/2015 18:00:10.852991&until=08/04/2015 18:07:37&scandir=asc&nmax=1

APROL Web Portal Configuration report (Reduced view) - Filtered

100,1000 Results / Page

Project...

CaeUpdate from: 08/04/2015 Start: 18:00:10 End: 18:07:36 Status: ✓ Update successful! Errors: 0
 User: russingers (Russinger, Sarah) Server: bupa086 CC-Account: engin Display: bupa086:0.0 Warnings: 0
 Previous APROL release: APROL R 4.0-09 Actual APROL release: APROL R 4.0-10 Previous Db version: 4.25 New Db version: 4.26

Output level: ☐ Low ☐ Medium ☒ High | CaeUpdate Overview

StepTime	StepType	Stepname	Message
08/04/2015 18:00:10	updateBegin		Update started
08/04/2015 18:00:10	message	PreStep0	Advanced tests:
08/04/2015 18:00:10	message	PreStep0	Check privilege to start update process
08/04/2015 18:00:10	message	PreStep0	User has right to start the update process
08/04/2015 18:00:10	message	PreStep0	Update feasible?
08/04/2015 18:00:10	message	PreStep0	1. Correctly engineering environment existent?
08/04/2015 18:00:10	message	PreStep0	User has correct engineering environment
08/04/2015 18:00:10	message	PreStep0	2. Version of engineering database compatible to APROL release or build
08/04/2015 18:00:10	message	PreStep0	previous version: 4.25, maximum required version: 4.26, minimum required version: 3.65
08/04/2015 18:00:10	message	PreStep0	3. Enough disc space available?
08/04/2015 18:00:10	message	PreStep0	Check: caedb --- /home/engin/ENGIN
08/04/2015 18:00:10	message	PreStep0	Size of required disk space at /home/engin/ENGIN [in Mbytes]...: 8996
08/04/2015 18:00:10	message	PreStep0	Size of free disk space at /home/engin/ENGIN [in Mbytes]...: 785418
08/04/2015 18:00:10	message	PreStep0	Size of remaining disk space at /home/engin/ENGIN [in Mbytes]...: 776422
08/04/2015 18:00:10	message	PreStep0	Enough disc space available
08/04/2015 18:00:10	message	PreStep0	Database access exclusively?
08/04/2015 18:00:10	message	PreStep0	There are 1 users which have connected the engineering database!
08/04/2015 18:00:10	message	PreStep0	Exklusive database access possible
08/04/2015 18:00:11	stepEnd	PreStep0	Preliminary step <0> finished
08/04/2015 18:00:11	stepBegin	Step0	Update phase <1> Step <0>
08/04/2015 18:00:11	message	Step0	Comparison of engineering databases:

Figure 61: APROL SDM CaeDb Update in detail as HTML version

4.4.7 CaeDb version

This page shows the changes caused by the database update.

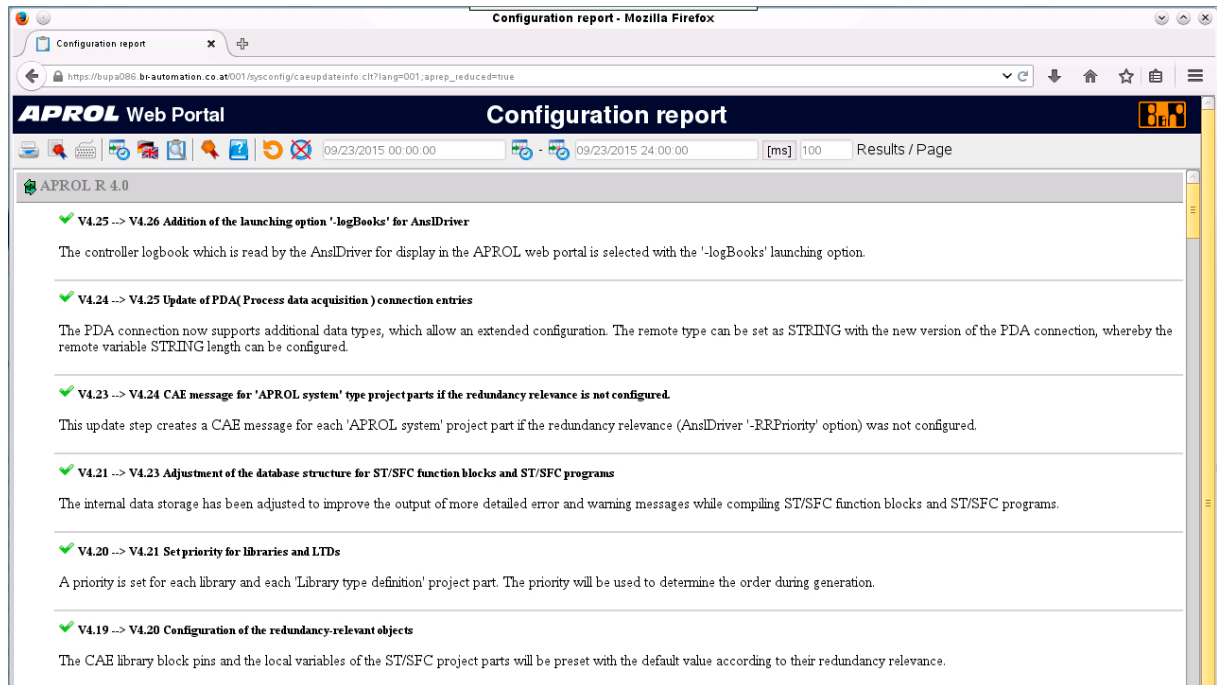


Figure 62: APROL SDM - CaeDb version

4.4.8 State of the translation

APROL is Unicode-capable and therefore available in many languages, i.e. can be prepared for new languages if necessary. The translation of the applications, e.g. DisplayCenter, TrendViewer, etc. is done by a partner or the customer. Each translation which is made can also be fed back by returning it to B&R. The 'Translation status' report shows an overview of the translations.

br-automation.co.at

APROL SDM - Translation Status

English

Perfection in Automation
www.br-automation.com

Translation status overview

APROL Release: APROL R 4.0-10 (64Bit)
Release date: 07/23/2015
Language DVD: no info (Required: 4.0-10)
[Feedback formular](#)

English (Language code:001)

Application type:	Level of translation	Base release of translation	Date
Engineering applications:	✓ Completely translated	R 4.0-10	07/23/2015
Comment:			
Operator applications:	✓ Completely translated	R 4.0-10	07/23/2015
Comment:			

German (Language code:049)

Application type:	Level of translation	Base release of translation	Date
Engineering applications:	✓ Completely translated	R 4.0-09	19.03.2015
Comment:			
Operator applications:	✓ Completely translated	R 4.0-09	19.03.2015
Comment:			

Figure 63: Translation status

4.5 Signing documents

The variety of reports in APROL and the customer-specific reports can also be signed. This is especially important for validated plants. Documents which are handed over to official bodies must/should also be signed. This certification can be carried out more than once (approval with two-man rule).

One enters the URL of the report which is to be signed in the upper area of this query or selects an existing PDF file. Then one must identify themselves as the operator with the corresponding certificate to make the signature. Only users who have been given a certificate in the user management and/or OperatorManager can make a signature.

The process can be finished after the reason for signing and the position have been entered.

Figure 64: Singing procedure

A signed document could appear as follows:

Event occurred	Returned to normal	Duration	Priority	PV/ Alias	Alarm text	Group	Project
09/28/2015 14:15:25.331	09/28/2015 14:15:26.332	0m 1s	0	AT_7892	Controller core warning (12002)	DefaultGroup	DemoProject
09/28/2015 14:15:19.928	09/28/2015 14:15:20.928	0m 1s	0	AT_7892	Controller core warning (12002)	DefaultGroup	DemoProject
09/28/2015 14:15:18.927	09/28/2015 14:15:19.928	0m 1s	0	TagNo	Controller core warning (12002)	DefaultGroup	DemoProject

Figure 65: Signed document

5 The project navigation

Access to the data of the selected project is possible in this area. The view can be changed with respect to the topology or different system types. The following differentiation is made:

Type of structure	Description
Physical structure	Listing of the project according to physical composition
Control computer structure	Listing according to what belongs to the respective control computer. This is of relevance for an MRS (multi-runtime system).
System type structure	Listing according to system type, i.e. engineering, runtime, operator, gateway, and controller

Project navigation

br-automation.co.at

Project navigation

Physical Structure

Component list of a project based on the physical structure

Control Computer Structure

Component list of a project based on the control computer structure

System-Type Structure

Component list of a project based on the system-type structure

Figure 66: Project navigation

Information such as controller IP addresses and the AR versions (Automation Runtime Version) can be read in a simple manner without having to consult the engineering. Example of the view of a system type architecture:

Project navigation - System-Type Structure

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Name (Instance) Expand all Collapse all	Conf.	Re.	Host name	Cluster	CC-Account	CPU	AR-OS	Description
Engin system engin@bupa086			bupa086		engin@bupa086			APROL runtime system
Runtime Systems CC01 (CC01) bupa086 (bupa106)			bupa086	bupa086	runtime@bupa086			APROL runtime system Single runtime server with hostname bupa086
Operator Systems								
Gateway Systems								
Controller Ctrl13 (Ctrl13) Ctrl12 (Ctrl12)			192.168.1.13 192.168.1.12			CP3586 (SG4) CP3586 (SG4)	E0409 E0409	Controller 13 for MPC 10*10*10 Controller 12 for TANK_C

Figure 67: System type structure view

6 APROL systems (local)

This shows and lists the APROL systems which are installed locally on the server. The different APROL systems are engineering, runtime, operator, and gateway. They are accommodated here.

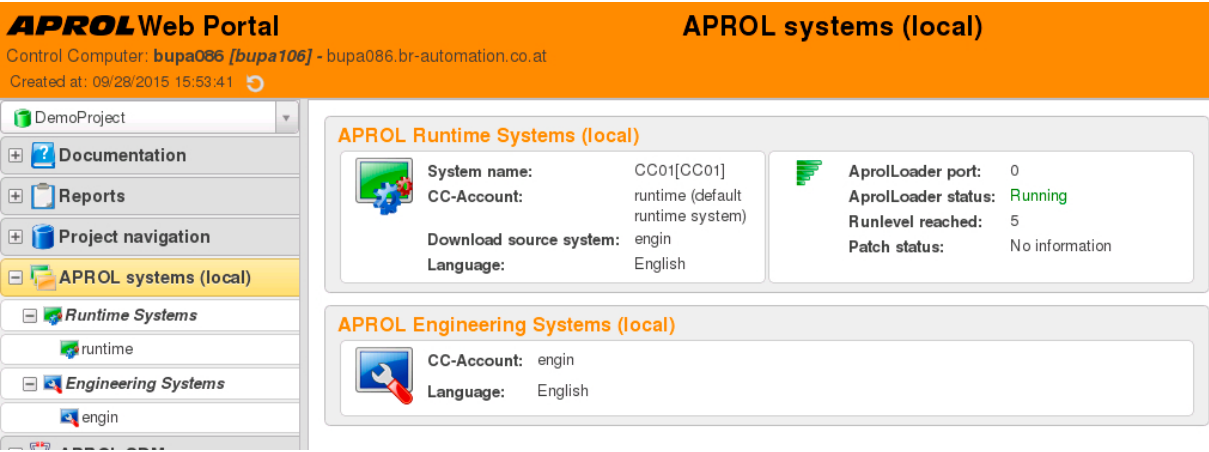


Figure 68: APROL systems

Data about AproLoader, Language, etc. can be found in this report.

7 APROL System Diagnostics Manager (APROL SDM)

The APROL System Diagnostics Manager is started using the **"Diagnosis>APROL System Diagnostics Manager"** KDE menu bar or **APROL Web Portal**. This tool provides an overview of the entire system.

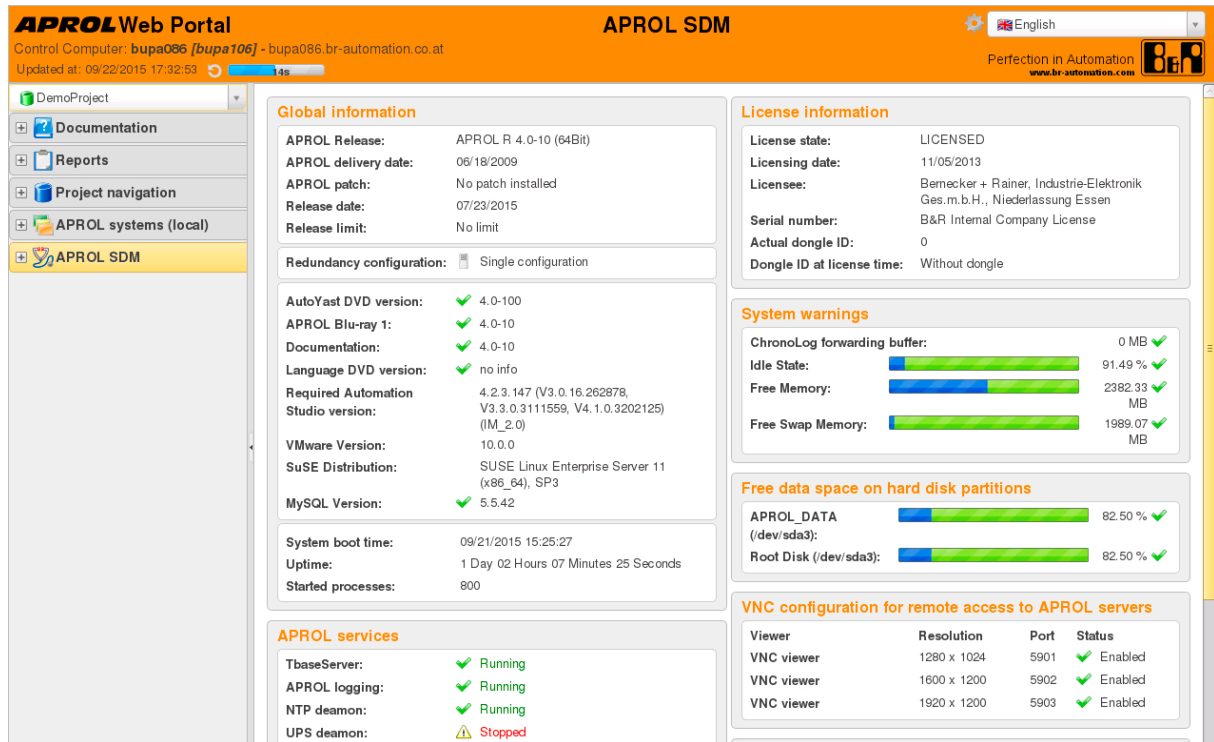


Figure 69: APROL SDM

A general overview is on the first page and contains the most important information such as release, license, APROL services, system warnings, memory, etc. This should be intuitive and self-explanatory. It also mirrors the data which is set in AprotConfig. The menu, which contains the following items, is on the left edge:

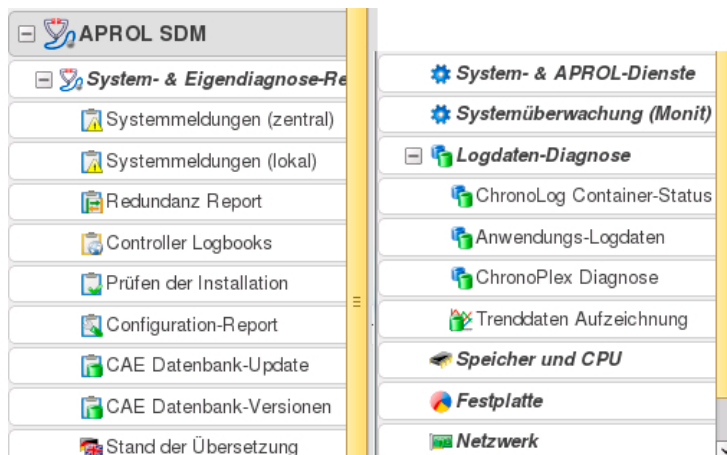


Figure 70: APROL SDM menu

- System and self-diagnosis report
 - System messages
 - Redundancy report
 - Controller logbooks
 - CheckInstallation
 - Configuration history
 - CaeDb update
 - CaeDb versions
 - Translation Status
- System & APROL Services
- System monitoring (Monit)
- Log data diagnosis
 - ChronoLog container status
 - Application log data
 - ChronoPlex diagnosis
 - Trend data recording
- Memory and CPU
- Hard disk
- Network

7.1 System and self-diagnosis report

This is the same functionality as described in the chapter above "The APROL reports / System and self-diagnosis".

7.2 System & APROL Services

The APROL services, AprotLoader, AprotSqlServer, etc. are displayed and monitored. As can be seen in the screenshot, data such as load and memory requirements of these background processes are displayed here.

Furthermore, the configuration of the system services and their status (NTP, UPS, LDAP, etc.) can be found here.

APROL Services					
Service	Status	File descriptors	Used memory	Used RSS memory	CPU load
AprotLoader	✓ Running	11 / 1024	248 MB	12 MB	0 %
AprotSqlServer	✓ Running	16 / 1024	988 MB	61 MB	0 %
ChronoPlex	✓ Running	45 / 1024	12 MB	1 MB	13 %
TbaseServer	✓ Running	42 / 1024	186 MB	97 MB	0 %
XServer	✓ Running	32 / 1024	151 MB	27 MB	0 %

System Services		
Service	Status	Description
NTP	✓ Running	Network Time Protocol (NTP) for clock synchronization between computer systems.
BIOS timeserver		
Source type	BiosClock	
Source	Ntp_Bios_1	
Network timeserver		
Timeserver	brateggedc1.br-automation.co.at	
Source type	TimeServer	
Source	Ntp_Net_2	
UPS	✗ Stopped	Network UPS Tools for monitoring power devices.
No power supply configured		
LDAP	✗ Stopped	Lightweight Directory Access Protocol (LDAP) for accessing information services over network.
Query DN	cn=LDAP Query,cn=Users	
Source type	and	

Figure 71: APROL SDM system and services

7.3 System monitoring (Monit)

Monit monitors all relevant central processes. The current state is detected and errors are displayed. Processes which are not running are recognized and restarted if necessary, in order to guarantee a high availability of the APROL process control system. A conclusion can be drawn about the system stability by interpreting the displayed restarts, process runtime, load, and memory requirements. If a value conspicuous, it can be selected for further analysis.

System	Status	Load	CPU	Memory	Swap
bupa086.br-automation.co.at	Running	[2.52] [2.59] [2.51]	16.2%us, 12.6%sy, 0.0%wa	66.4% [10855436 kB]	15.0% [316276 kB]

Process	Status	Total Restarts	Uptime	CPU Total	Memory Total
xinetd	Running 	0	7d 1h 43m	0.4%	1.4% [236812 kB]
tomcat	Running 	0	7d 1h 44m	3.7%	15.3% [2504512 kB]
syslog-ng	Running 	0	7d 1h 45m	0.0%	0.0% [1896 kB]
postgres	Running 	0	7d 1h 44m	0.0%	0.9% [150760 kB]
ntpd	Running 	0	7d 1h 44m	0.0%	0.0% [1620 kB]
mysql	Running 	0	7d 1h 44m	0.0%	0.1% [28244 kB]
slapd	Enable monitoring 	1	-	-	-

Figure 72: APROL SDM Monit

7.4 Login data diagnostics

Data to be recorded by APROL accumulates as chronologically sequenced data records which are generated using appropriate function blocks. The B&R ChronoLog system records all necessary data and provides a graphic and text display in this area. The ChronoPlex background processes are responsible, amongst others, for recording the data. Their monitoring is therefore essential. The following queries are possible:

Report name	Description
ChronoLog container status	Displays all containers and their 'Fill level'
Application log data	Shows if there is an extra buffer for a container, because the corresponding process is not active.
ChronoPlex diagnosis	Contains the diagnostics of all ChronoPlex processes.
Trend data recording	Shows the configuration and the ring buffer load of the trend system.

The first report is the report about the "ChronoLog Container Status".

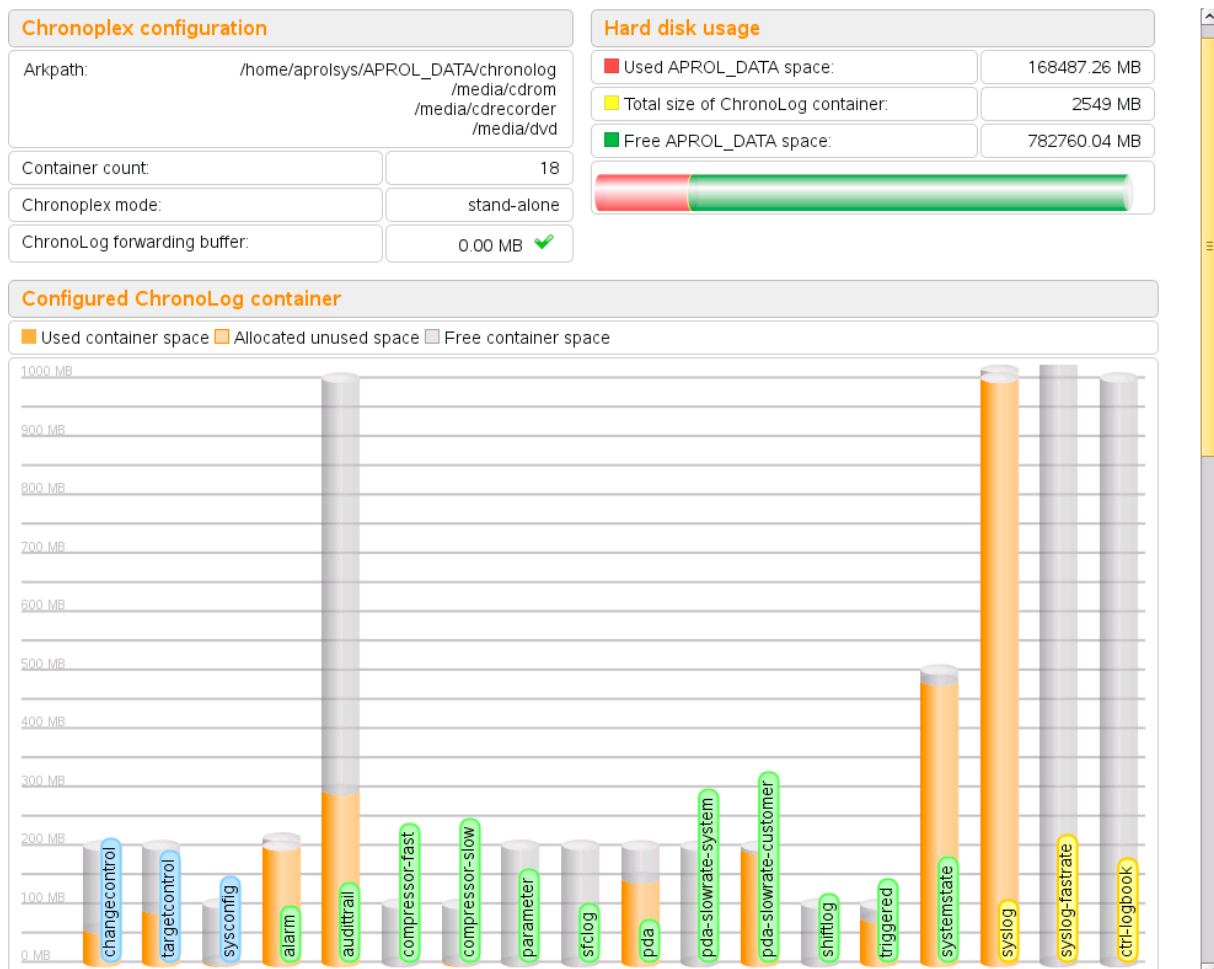


Figure 73: APROL SDM - ChronoLog (graphical)

APROL System Diagnostics Manager (APROL SDM)

The other reports are to be used, starting here. Contained is, the ChronoPlex configuration, the hard drive usage, the fill level of each container, and the respective details in list form. If a container is full, the FIFO principle is applied automatically.

Container name	Forwarding	Limit	Used	Free	Allocated space	First entry	Last entry
☐ changecontrol	✓	200.00 MB	58.36 MB	142.00 MB	0.00 MB	09.10.2013 15:43:11	23.09.2015 09:24:23
☐ targetcontrol	✓	200.00 MB	91.48 MB	109.00 MB	0.00 MB	10.10.2013 14:38:00	22.09.2015 08:00:06
☐ sysconfig	✓	100.00 MB	2.59 MB	98.00 MB	0.00 MB	09.10.2013 14:11:21	22.09.2015 08:03:56
☐ alarm	✓	200.00 MB	200.00 MB	0.41 MB	12.41 MB	14.09.2015 22:31:48	23.09.2015 05:00:04
☐ audittrail	✓	1000.00 MB	295.10 MB	705.00 MB	0.00 MB	09.10.2013 15:41:47	23.09.2015 09:27:19
☐ compressor-fast	✓	100.00 MB	0.00 MB	-- MB	0.00 MB		
☐ compressor-slow	✓	100.00 MB	3.67 MB	97.00 MB	0.00 MB	09.12.2013 10:00:00	23.09.2015 08:00:00
☐ parameter	✓	200.00 MB	0.84 MB	200.00 MB	0.00 MB	24.10.2013 13:49:28	22.09.2015 15:49:53
☐ sfclg	✓	200.00 MB	0.00 MB	-- MB	0.00 MB		
☐ pda	✓	200.00 MB	144.87 MB	56.00 MB	0.00 MB	25.08.2015 02:24:50	23.09.2015 09:28:00
☐ pda-slowrate-customer	✓	200.00 MB	195.23 MB	5.00 MB	0.00 MB	01.09.2015 09:36:00	23.09.2015 09:28:09
☐ pda-slowrate-system	✓	200.00 MB	1.38 MB	199.00 MB	0.00 MB	22.10.2013 14:00:00	29.05.2015 14:15:00
☐ shiftlog	✓	100.00 MB	0.01 MB	100.00 MB	0.00 MB	13.03.2014 13:15:26	06.05.2014 19:17:12
☐ triggered	✓	100.00 MB	77.63 MB	23.00 MB	0.00 MB	25.10.2013 13:46:29	21.09.2015 15:50:41
☐ systemstate	✓	500.00 MB	482.77 MB	18.00 MB	0.00 MB	07.05.2014 17:14:33	23.09.2015 09:27:49
☐ syslog	✓	1000.00 MB	1000.00 MB	0.28 MB	13.28 MB	29.05.2015 16:14:32	23.09.2015 09:28:11
☐ syslog-fastrate	—	10000.00 MB	1.81 MB	9999.00 MB	0.00 MB	07.11.2014 08:43:59	22.09.2015 15:00:18

Figure 74: APROL SDM - ChronoLog (text-based)

The report for the application log data should always be empty. Something normally only exists if there is an error with the records and data must be buffered temporarily.

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APROL SDM - Application Logdata

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Diagnose of Application Logdata Buffering

✓ Notice

There is no data in the data buffer and no data loss has occurred!

Application and record types	PId	Begin of buffer mode	Used buffer size	Size of discarded data	Time of first discard	Time of last discard
Expand all Collapse all						
No data available						

Figure 75: Application log data --> everything OK

The ChronoPlex diagnosis is an important tool for recognizing problems with the data records. It is divided into 'ChronoPlex information', 'ChronoLog forwarding buffer', 'ChronoPlex read rate for a certain container', and 'Status of the forwarding and forwarding buffer'. Details such as forwarding, read and write rates can be viewed with ease.

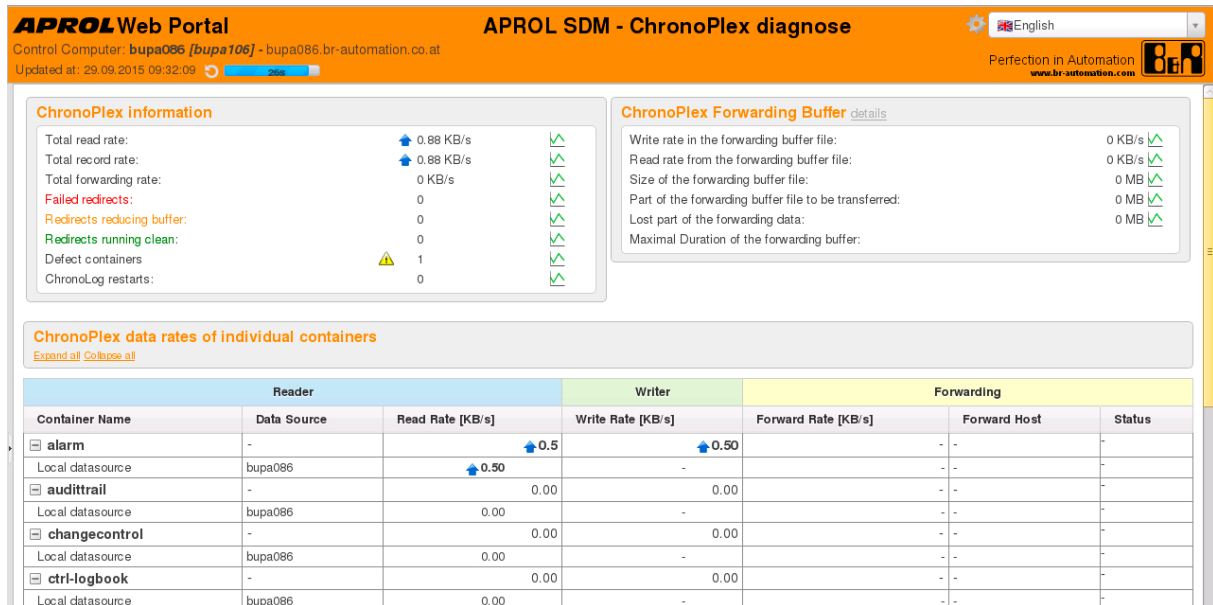


Figure 76: The ChronoPlex diagnosis

Finally, the trend records report is also available. The trend system normally works with a ring buffer which fills the containers TRD to TRD-5. It is therefore also absolutely necessary to monitor these containers. It is possible to recognize data losses at an early stage with this.

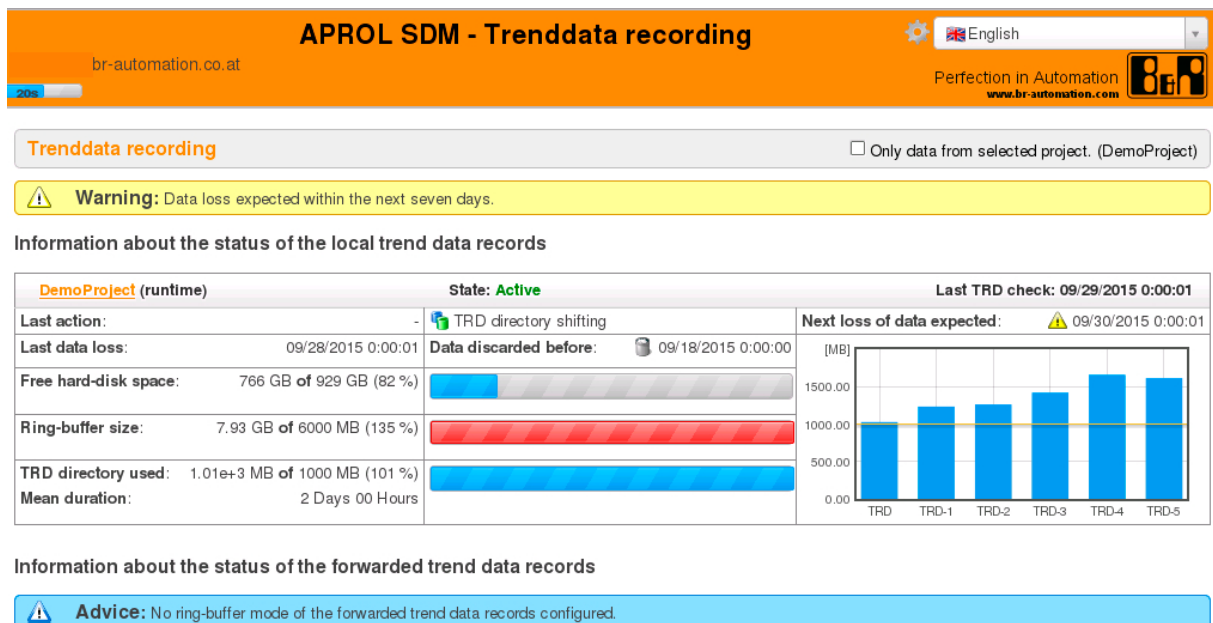


Figure 77: Overview of the trend containers

APROL System Diagnostics Manager (APROL SDM)

A reporting and monitoring of all historical data records is ensured. Details about this can be found in the APROL help documentation.

7.5 Memory and CPU

The memory load (**RAM** and **swap**) and CPU load are displayed in text form.

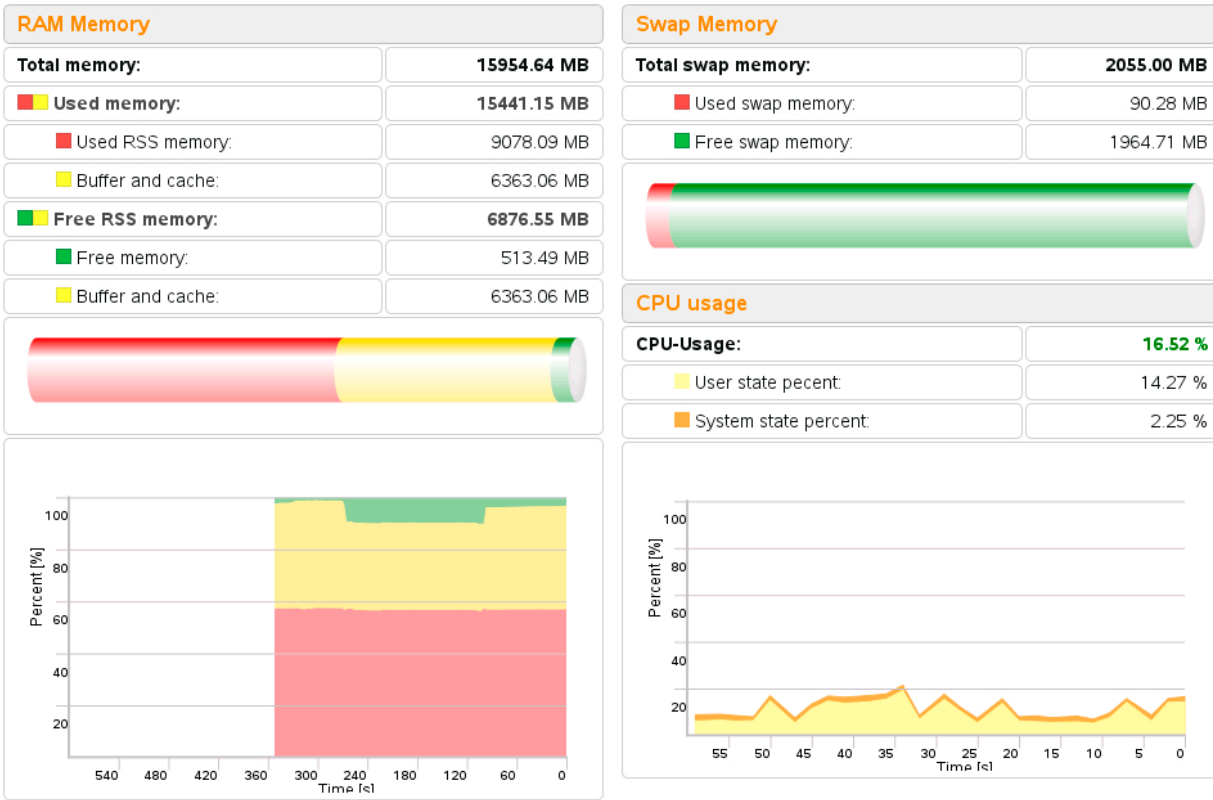


Figure 78: APROL SDM - Memory and CPU

7.6 Hard drive

On this page, the individual partitions on the hard disk and their memory allocations are shown in text and graphic form.

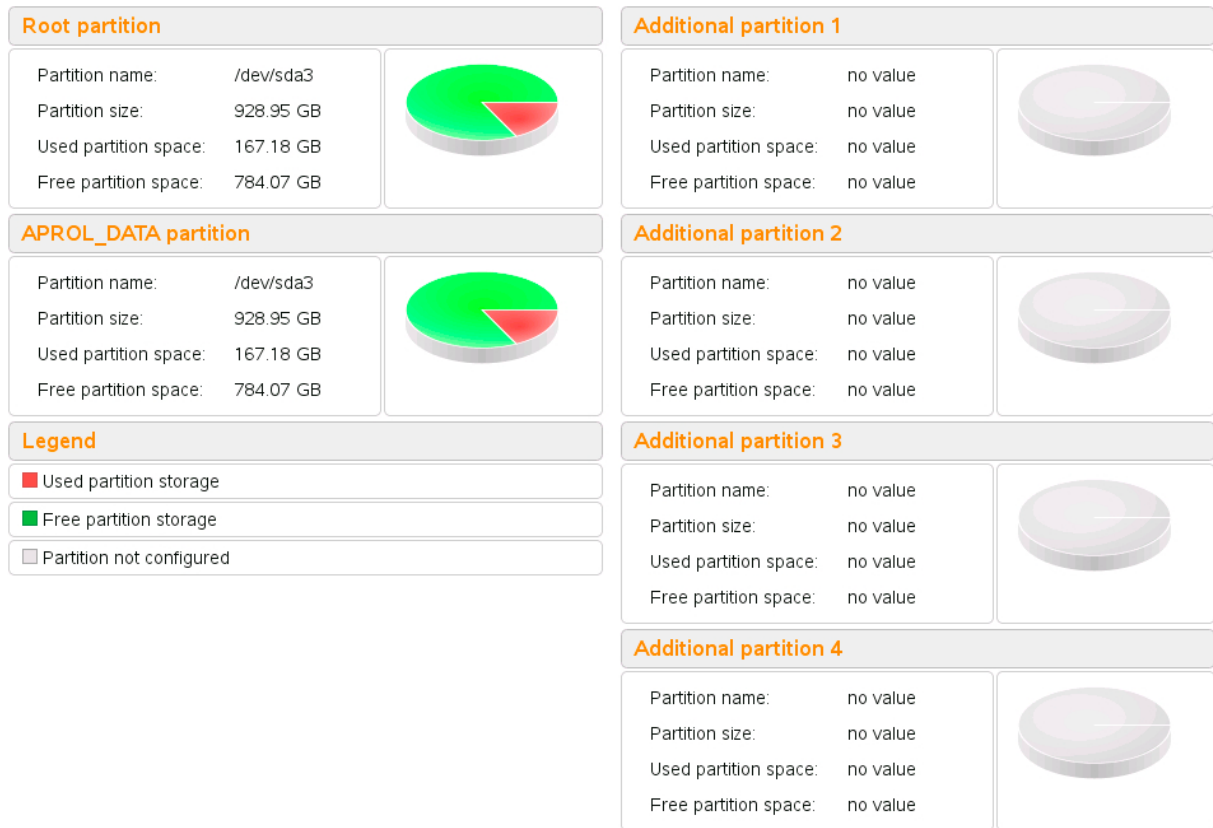


Figure 79: APROL SDM - Partitions with memory allocation

7.7 Network

An overview of the network configuration and cluster setting is also mandatory.

The system host name, MAC addresses, and IP addresses of the real (eth0, eth1, etc.) and virtual (vmnet1, vmnet8, etc.) network cards are displayed in the network configuration.

Network configuration		Global Cluster configuration	
Network device:	Loop device	Redundancy configuration:	Single
Hardware address:	00.00.00.00.00.00	Actual redundancy state:	Configured master (currently controlling the process)
IP address:	127.0.0.1	Configured Master/Slave:	no value
Network device:	eth0	Runtime cluster IP:	no value
Hardware address:	6c.3b.e5.0a.ef.69	Runtime cluster name:	no value
IP address:	10.43.235.199	Runtime cluster domain name:	no value
Network device:	eth1	Host name of the redundancy partner:	no value
Hardware address:	68.05.ca.11.b9.c1	Network device redundancy bus:	no value
IP address:	0.0.0.0	IP address redundancy bus:	no value
Network device:	eth2	Network device alternative redundancy bus:	no value
Hardware address:	68.05.ca.11.ef.04	IP address alternative redundancy bus:	no value
IP address:	192.168.1.100	Responsible CC-Account:	no value
Network device:	vmnet1		
Hardware address:	00.50.56.c0.00.01		
IP address:	192.168.46.1		
Network device:	vmnet8		
Hardware address:	00.50.56.c0.00.08		
IP address:	192.168.198.1		
DNS Server			
Domain Name Server:			
10.43.10.23	✓ Reachable		
10.43.10.24	✓ Reachable		

Figure 80: APROL SDM - Network configuration

The redundant configuration (if master or slave, the IP address of the redundant system, etc.), and the cluster status (global and local cluster) are displayed in the cluster settings.

7.8 Port status

APROL functionality is tied to the network settings, which are in turn tied to certain ports (see UDP and TCP technic). This area gives an overview and is available to detect if the desired ports are open. The ports can be re-scanned at any time to update the view. An external 'Port scan' is also supported. (support and reachability from external computers)

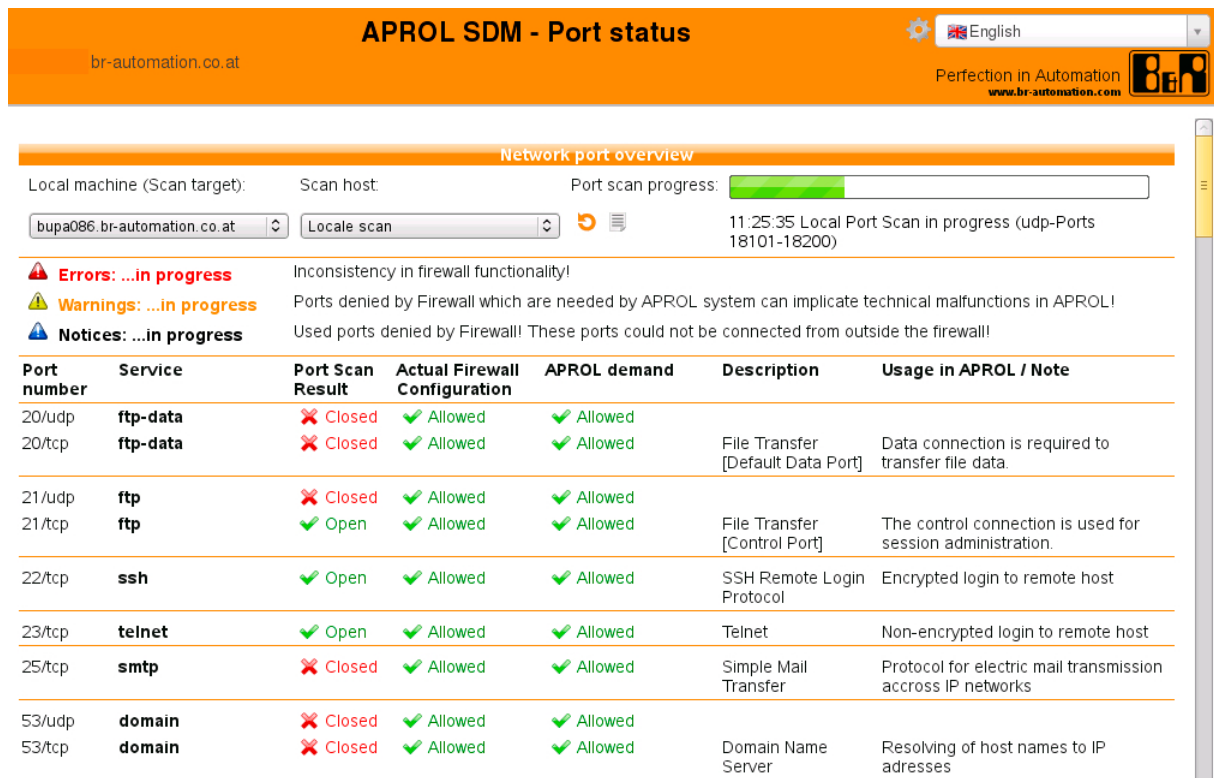


Figure 81: Port status

Details can be found in the APROL product documentation.

8 Queries from foreign devices

The web query from external devices is an important function. To do this, you open a browser (MS Internet Explorer, Mozilla Firefox, Google Chrome, etc.) and enter the host name of the APROL system in the address bar. Example: https://computer_name/



Note:

Save this link under your browser's favorites to access the query overview more quickly next time!

9 ChronoLog Profi query

The ChronoLog Profi query can be used to e.g. call values from compressor data, actions (Login, Logout, etc.), etc..

After logging in successfully via the authentication dialog box, the user arrives at the selection page for the query options in **ChronoLog Profi report**.

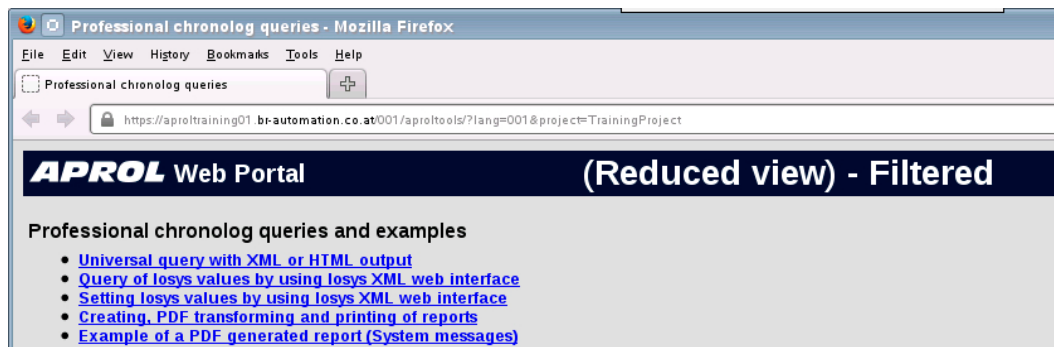


Figure 82: ChronoLog Profi query – selection page

[Universal query with XML or HTML output] is the most important point for this type of query!

Parametrization of professional chronolog queries

CGI parameters of query		
Name	Value	
Id:		? Help
Date:		? Help
From:		? Help
Till:		? Help
Output	HTML table ▼	? Help

URL:
[>>>Call url in frame below](#) [>>>Show template source text in frame below](#)
[>>>Call url in new web browser window](#) [>>>Show template source text in new browser window](#)

Figure 83: Universal query with XML or HTML output

The query is configured as follows:

Name	Description
Id	Pattern for the identifier of the data records being searched for (prefix) Examples:

Name	Description
	– M15:* for every 15 minutes compression from compressor blocks – H1:* for every hour compression from compressor blocks – USERACTION:* for all AuditTrail entries
Date	Date of the query time period in the format DD.MM.YYYY. If this has not been set, then the current date is used!
From	The start date and start time for reading the data in the format DD.MM.YYYY HH:MM(:SS\). Has priority over the "Date" parameter!
Till	End date and end time for reading the data. This value and the "From" value make up the time range when the data is read and has priority over the "Date" parameter!
Output	Output format: XML or HTML table

The "**USERACTION**" parameter includes these action types:

Action type	Description
login	Login procedure
logout	Logout procedure
loginfail	Loginfail
picopen	Opens a process graphic
picclose	Closes a process graphic
picopenmacro	Opens an image macro
picclosemacro	Closes an image macro
picopenalarmlist	Opens an alarm line
picclosealarmlist	Closes an alarm line
alarmdisable	Disables an alarm via the alarm list
alarmenable	Enables an alarm via the alarm line
alarmenableall	Enables all alarms (AlarmServer start)
piccontrolsystemcall	Triggers a system command
piccontrol	Input via a control/widget (for "Send pulse" type with the pulse duration)
piccontrolpythonbutton	Python button activation
piccontrolpythonuser	Logging call from a Python function
clogmodify	Modification of logging data
extsetval	Changing PV values via "external" programs (CaeManager, CaeViewer, pio and IoInOut)
sysstartapp	Application started
sysstopapp	Stop application
syssourceapp	Instruction to a client application capable of redundancy, that it should attempt to obtain the source status

Action type	Description
sysstartaprol	Starting a Runtime system
sysstopaprol	Stopping a Runtime system
sysinitaprol	Setting an APROL runlevel
syssourceaprol	Instruction to all running client applications capable of redundancy, that they should attempt to obtain the source status
syschangeproject	Project change in the StartManager
sysoptionmodified	Start option(s) for an application changed in the StartManager
picsetalarmfilter	Modification of the alarm filter in the AlarmMonitor
sysdownloadto	Download of an APROL system

If values in the database were changed now e.g. using the Compressor Report, then the changes could be viewed using the **clogmodify** action type.

The "ID parameter" entry would look like this:

"USERACTION:*clogmodify*"

You have to click on the **[create URL]** button after setting the parameters.

The following two links are provided for displaying the query:

Link	Description
"Call URL frame below"	Shows the output in the bottom part of the open window
"Call URL in new web browser window"	A new window is opened for the output

The source text from the output table can be displayed using the 2 additional links. This source text makes it possible to manually enter values in the table and to save as HTML.

An HTML table is displayed if the HTML output was defined and the URL was called. The values or actions are listed here according to the parameter:

Parametrization of professional chronolog queries

CGI parameters of query	
Name	Value
Id:	'USERACTION' ? Help
Date:	? Help
From:	? Help
Till:	? Help
Output:	HTML table ? Help

URL:

[>>>Call url in frame below](#)
[>>>Show template source text in frame below](#)

[>>>Call url in new web browser window](#)
[>>>Show template source text in new browser window](#)

Report of ChronoLog data recording		
Time	Identifier	Content
22.09.2015 13:57:27	USERACTION:TrainingProject/aprol/clogmodify/aproltraining01/192.168.0.200	user = aprot project = TrainingProject system = unknown action = clogmodify host = aprottraining01 display = 192.168.0.200 category = M1 name = TrainingProject/RunServ001_M_IdleStatePercent system_inst = RunServ001 system_name = Runtime 001 Server Training rdate = 2015-09-22 rtime = 00:08 val: '96.99247741699219' -> '80'; avg: '97.50531068750988' -> '79'; min: '96.61229705810547' -> '78'; max: '98.11794281005859' text = -> '81'; text: 'undefined' -> 'P1 345' reason = Sensor defect
22.09.2015 14:24:09	USERACTION:TrainingProject/aprol/login/aproltraining01/aproltraining01.br-automation.co.at	display = aprottraining01.br-automation.co.at 2 host = aprottraining01 system = runtime user = aprot firstname = aprot surname = Superuser project = TrainingProject device = --- superuser = false system_inst = RunServ001

Figure 84: HTML output of the ChronoLog Profi query

After clicking on the link, a location for saving is requested when outputting the XML.

This file can be further processed in an XML-capable program.



Task :

Use the Compressor Report to change a value, then search for this value change using the ChronoLog Profi query.

10 Summary

You are now able to use the provided XML queries to perform detailed analyses or similar processes and to further process the obtained data and values in many different ways.

Performing a quick export to the CSV format or to an HTML document is no problem at all for you now. This applies to the **engineering** and the **runtime** systems from APROL.

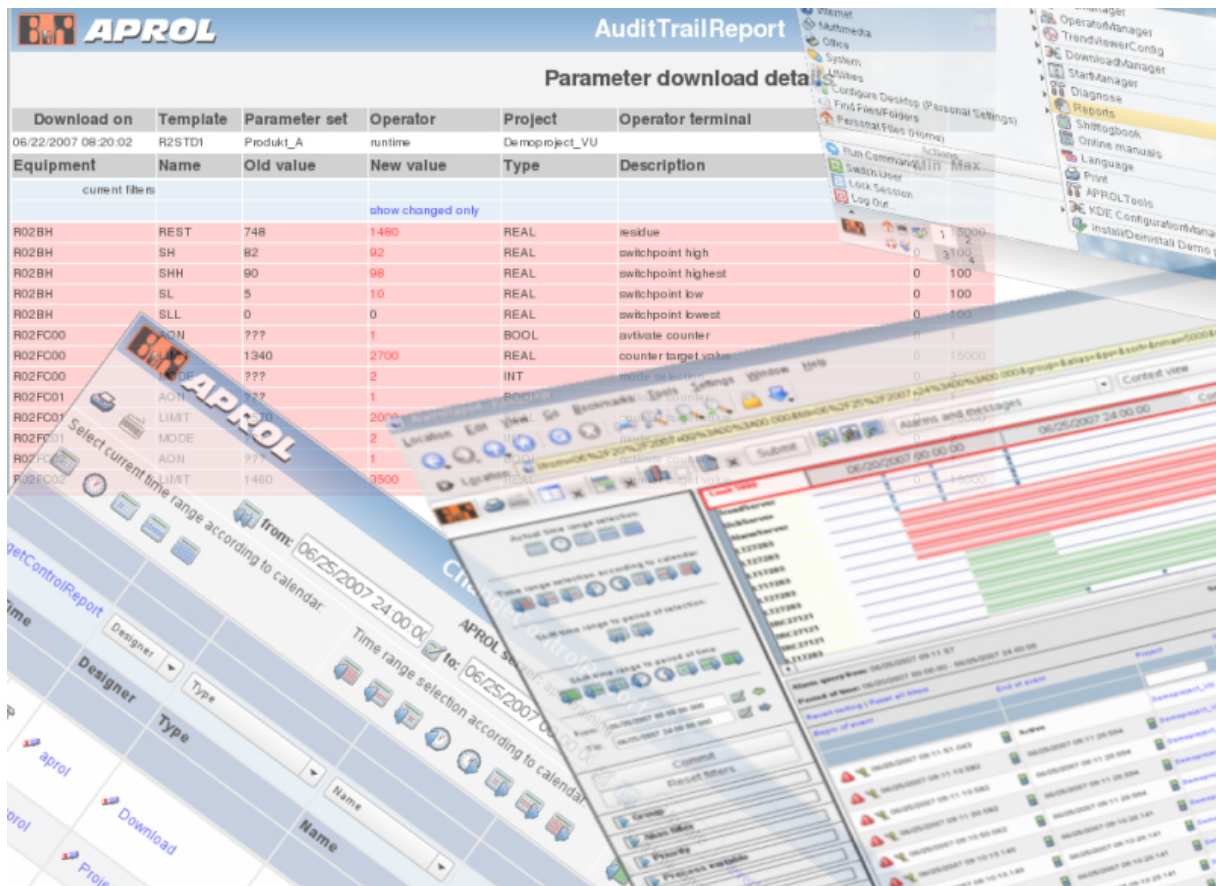


Figure 85: The complete package

11 APPENDIX

11.1 Objectives checklist (a few on-topic questions)

What is the difference between AuditTrail Report and Change Control?

What is the role or functionality of the ProcessData Report?

What are system messages and what are some examples of system messages?

You are recording the analog value of a pressure transmitter every minute. How do you change problematic, incorrect values in the database?

Are these types of changes collected or logged anywhere?

How do you find out if the current partition still has enough space for a project backup?

A piece of equipment came to a stop because of an unexpected stop command. How do you find out who is operating a specific Operator Station?

11.2 Solutions to the objectives checklist

Please take note of the necessary additional information.

Seminars and training modules



Automation Studio seminars and training modules

Programming and configuration	Diagnostics and service
SEM210 – Basics SEM246 – IEC 61131-3 programming language ST* SEM250 – Memory management and data storage SEM410 – Integrated motion control* SEM441 – Motion control: Electronic gears and cams** SEM480 – Hydraulics** SEM1110 – Axis groups and path-controlled movements** SEM510 – Integrated safety technology* SEM540 – Safe motion control*** SEM610 – Integrated visualization*	SEM920 – Diagnostics and service for end users SEM920 – Diagnostics and service with Automation Studio SEM950 – POWERLINK configuration and diagnostics* If you don't happen to find a seminar on our website that suits your needs, keep in mind that we also offer customized seminars that we can set up in coordination with your sales representatives: SEM099 – Individual training day Please visit our website for more information****. ****: www.br-automation.com/academy

Overview of training modules

TM210 – Working with Automation Studio TM213 – Automation Runtime TM223 – Automation Studio Diagnostics TM230 – Structured Software Development TM240 – Ladder Diagram (LD) TM241 – Function Block Diagram (FBD) TM242 – Sequential Function Chart (SFC) TM246 – Structured Text (ST) TM250 – Memory Management and Data Storage TM400 – Introduction to Motion Control TM410 – Working with Integrated Motion Control TM440 – Motion Control: Basic Functions TM441 – Motion control: Electronic gears and cams TM1110 – Integrated Motion Control (Axis Groups) TM1111 – Integrated Motion Control (Path Controlled Movements) TM450 – Motion Control Concept and Configuration TM460 – Initial Commissioning of Motors TM500 – Introduction to Integrated Safety TM510 – Working with SafeDESIGNER TM540 – Integrated Safe Motion Control	TM600 – Introduction to Visualization TM610 – Working with Integrated Visualization TM630 – Visualization Programming Guide TM640 – Alarm System, Trends and Diagnostics TM670 – Advanced Visual Components TM920 – Diagnostics and service TM923 – Diagnostics and Service with Automation Studio TM950 – POWERLINK Configuration and Diagnostics TM280 – Condition Monitoring for Vibration Measurement TM480 – The Basics of Hydraulics TM481 – Valve-based Hydraulic Drives TM482 – Hydraulic Servo Pump Drives TM490 – Printing Machine Technology In addition to a printed version, our training modules are also available on our website for download as electronic documents (login required): Visit our website for more information: www.br-automation.com/academy
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Process control seminars and training modules

Process control standard seminars	Process control training modules
SEM841 – Process Control Training: Basic 1 SEM842 – Process Control Training: Basic 2 SEM890 – Advanced Process Control Solutions	TM800 – APROL System Concept TM811 – APROL Runtime System TM812 – APROL Operator Management TM813 – APROL XML Queries and Audit Trail TM830 – APROL Project Engineering TM890 – The Basics of LINUX Visit our website for more information: www.br-automation.com/academy

* SEM210 - Basics is a prerequisite for this seminar.

** SEM410 - Integrated motion control is a prerequisite for this seminar.

*** SEM410 - Integrated motion control and SEM510 - Integrated safety technology are prerequisites for this seminar.

****Our seminars are listed in the Academy\Seminars area of the website.

*****Seminar titles may vary by country. Not all seminars are available in every country.



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