<table>
<thead>
<tr>
<th>Data:</th>
<th>Status</th>
<th>Description/Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intended release date:</td>
<td>2019-08-19</td>
<td></td>
</tr>
<tr>
<td>Release date:</td>
<td>2019-08-19</td>
<td></td>
</tr>
<tr>
<td>Released by:</td>
<td>Mark Heitmann</td>
<td></td>
</tr>
<tr>
<td>Scope:</td>
<td>R4.2-05</td>
<td></td>
</tr>
<tr>
<td>Required for:</td>
<td>Status</td>
<td>Description/Link</td>
</tr>
<tr>
<td>Engineering system:</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Runtime/Operator/Gateway system:</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Necessary actions after installation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Build all&quot; of the projects and download:</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Build of at least one task and download:</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Logoff:</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Server reboot:</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Please also note:</td>
<td>Important notes:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AutoYaST version 4.2-051.0.190305 or later must be installed before installing the patch.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Installation of Language DVD V4.2-05.2 is necessary for correcting the error of keyboard layout switching.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Two previously supported call parameters have been dropped for AnslDriver; one new parameter has been added.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Due to these changes, the affected APROL systems must be saved again and then compiled so that the AnslDriver can be started in the runtime environment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Due to changes to the build procedure and update of CAE library &quot;APROL&quot;, &quot;Build (all libraries)&quot; and &quot;Build (project)&quot; of all CAE projects must be carried out after patch installation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B&amp;R has made changes to the following software packages that are subject to the GPL: nut, ntp, usbguard, monit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The associated source code is stored in the APROL environment in directory &quot;/opt/aprol/src&quot;.</td>
<td></td>
</tr>
<tr>
<td>Patch versions included:</td>
<td>R4.2-05P1, R4.2-05P2, R4.2-05P3</td>
<td></td>
</tr>
</tbody>
</table>

1. Corrections and updates

1.1. AprolMqttClient: Supported QoS levels in Azure mode
2. Corrections and updates to previous APROL patches (APROL R4.2-05P3) .......................... 9

2.1. Corrupt file "/etc/services" after APROL server shutting down incorrectly .......................... 10
2.2. Driver for the AprolSqlServer .......................... 10
2.3. Corrections in project part "mapp View Content" .................................................. 11
2.4. Corrections regarding pin types .......................... 12
2.5. Important corrections to the patch mechanism .......................... 12
2.6. MQTT: Limitation of maximum password length .................................................. 13
2.7. Creation of localization texts. .................................................. 13
2.8. ApcHwInfo: Correct live data of a UPS on the APC3100 .................................................. 13
2.9. DownloadManager: Incorrect calculation of partition sizes .................................................. 14
2.10. DownloadManager: Unwanted exit .................................................. 14
2.11. TrendViewer: Call parameter for preselection of query source in the TrendViewer / Data retrieval from the logging server .................................................. 15
2.12. Saving the visibility of a trend curve .................................................. 15
2.13. Pin types with path specifications .................................................. 16
2.14. Automation Studio 4.5.3.86 service pack .................................................. 16
2.15. Latest version of manual "D6 - Security" as draft version .................................................. 16
2.16. JasperReports Server certificates .................................................. 17
2.17. Start page of the APROL product documentation .................................................. 17
2.18. Completion of the English APROL product documentation .................................................. 18
2.19. Wine environment: Incorrect permissions .................................................. 18
2.20. AnslDriver: Loss of current values when restarting the rCPU .................................................. 19

3. Corrections and updates to previous APROL patches (APROL R4.2-05P2) ......................... 19

3.1. Password entry for ANSL authentication .................................................. 19
3.2. Error corrections for online parameter management .................................................. 20
3.3. Configuring AS hardware on an external Windows system .................................................. 20
3.4. AnslDriver: Synchronized PV registration with redundant runtime system .................................................. 21
3.5. DownloadManager: Configurable waiting time for download to redundancy partner .................................................. 22
3.6. USBGuard: Corrections and updates .................................................. 23
3.7. Transferring a password policy when using the default settings .................................................. 24
3.8. B&R gateway coupling: Configuration of "MRB", "MRE" and "Unit" .................................................. 25
3.9. CFC configuration: Optimization of the auto-router / individual connections .................................................. 25
3.10. Installing the "VLC media player" .................................................. 26
3.11. No switching of the keyboard layout .................................................. 26
3.12. Applying current hardware upgrades .................................................. 27
4. Corrections and updates to previous APROL patches (APROL R4.2-05P1) .................. 30

4.1. Missing requirement entries if all tasks of the CAE project were built incorrectly .......... 30
4.2. Improved stability of APROL TLS ................................................................. 30
4.3. ControllerManager: Unintended exit when using the variable view and existing INA connection ................................................................. 32
4.4. ApcHwInfo: Incorrect status when exiting the application ........................................ 32
4.5. Display of the range of values in the tooltip of visualization elements "InputOutputBox" and "Slider" .................................................................................. 33
4.6. Optimizations for AS hardware configuration on an external Windows system ............. 33
4.7. Performance losses during "Build project" caused by selected verbose level .................. 33
4.8. OPC UA client DA blocks ................................................................................. 34
4.9. Corrections for the DownloadManager .................................................................. 35
4.10. Error behavior in download mode "manual" with only one rCPU switched on .............. 35
4.11. OPC UA: Connection UaRClient/OPC UA server of the controller with security mode "Non-secure" ................................................................. 36
4.12. Frame of text objects in CFC ............................................................................ 37
4.13. AproMqttClient: Corrections and performance optimization .................................. 37
4.14. Removing whitelists ......................................................................................... 37
4.15. Transferring password policies ......................................................................... 38
4.16. Using the APROL start scripts ........................................................................... 38
4.17. B&R UPS to APC3100/PPC3100 ..................................................................... 39
4.18. Diagnosis of ANSL authentication for accessing the controller .............................. 39
4.19. KTowiTool: Reading a card using ADMITTO RFID card reader ......................... 39
4.20. Missing start path when specifying a relative path ................................................. 40
4.21. Corrections for new language English (GB) ....................................................... 40
4.22. APROL SDM: Status display for language "German (DE)" .................................... 41
4.23. Troubleshooting in the connection editor ............................................................ 41
4.24. Utilization regulation for AnslDriver .................................................................. 41
4.25. Providing a context-related wine environment ..................................................... 42
4.26. Preventing operation of USB mass storage devices .............................................. 43
4.27. Using the access data of "MonitSystemOperator" ................................................ 44
1. Corrections and updates

1.1. AprolMqttClient: Supported QoS levels in Azure mode

The AprolMqttClient used the fixed, non-changeable QoS level 1 in Azure operating mode without considering the corresponding value of the respective block pin. This could have resulted in long response times since the message must be acknowledged by the MQTT server. After correction, AprolMqttClient uses the value stored at the QoS pin of the respective block. Possible values in Azure mode are [0 | 1] since the server does not support value 2. A value of 2 results in a configuration error and ends the AprolMqttClient after reading the configuration.

A&P: 653074 Also available starting with: R4.2-06 Text correction: Schulte On: 2019-07-17
Documentation: Not necessary

Contents
Files: /opt/aprol/bin/AprolMqttClient: Version 2.1.113.2.6
CAE DB: ---
Runtime DB: ---

1.2. Error messages when starting SysInfo

When SysInfo was started, error messages that did not apply to pure operator stations were previously written to the APROL system messages.

A&P: 654069 Also available starting with: R4.2-06 Text correction: Schulte On: 2019-07-25
Documentation: Not necessary

Contents
Files: /opt/aprol/bin/SysInfo: Version 2.1.200.2.4
CAE DB: ---
Runtime DB: ---

1.3. Determining necessary licenses

If additional operator systems were configured on a redundant runtime system, the number of required licenses could not be determined correctly.
## 1.4. Permanent indexing by Linux service "Baloo"

Due to the continual file indexing carried out by the Linux service "Baloo", applications or services could no longer be executed correctly.

When updating the KDE environment (i.e. after updating the APROL system software), the Linux service is now stopped and switched off.

### Contents

- **Files:**
  - /opt/aprol/lib*/libCaeExpl.so.3.1309.7
  - /opt/aprol/lib*/libStatisticInfo.so.1.5.1
  - /opt/aprol/lib*/libWibuLicenseDlg.so.1.38.1
  - /opt/aprol/bin/SysInfo: Version 2.1.200.2.4

### CAE DB:
---

### Runtime DB:
---

### 1.5. Connection error when using ANSL authentication

When using ANSL authentication, a connection to the ANSL server could not be established under certain conditions since it rejected the connection.

The correction was carried out by applying a new ANSL-UIF version.

### Contents

- **Files:**
  - /opt/aprol/scripts/AprolUpdateKde: Version 1.117.2.3

### CAE DB:
---

### Runtime DB:
---
1.6. Freezing of the graphical user interface when using a multi-touch panel

When using a multi-touch panel on a B&R Automation PC or Panel PC (via connection to SDL), the graphical user interface may have frozen.

APROL does not support the use of UTF8StringAPI functions in ST or SFC code. However, writing an SSTRING variable in ST and SFC code can be performed using function "brsstrncpy" of AS library "asbrstr". This makes it possible to write to a connecter of type SSTRING in an SFC step, for example.
1.8. Using the "chrome" rendering engine in mapp View Content and widget TextView

Due to changed data management, the mapp View Content editor and widget TextView could not be used together with the "chrome" rendering engine.

1.9. DisplayCenter: Increasing memory consumption when using call parameter "-alarmSound"

When call parameter "-alarmSound" was used, the memory consumption of the DisplayCenter process increased continuously while the warning tone was output.

1.10. Start behavior of the DisplayCenter

The start procedure of the DisplayCenter was delayed depending on the number of operator groups assigned to the operator.
1.11. Out-of-the-box installation of a redundant controller

The second download of an out-of-the-box installation of a redundant controller (with empty CF cards) could not be successfully completed. The necessity of an initial transfer during the second download was not automatically detected.

1.12. Storing core files

File "/etc/profile.br" specifies that core files are written to the Linux file system if an application is exited unintentionally. Due to an incorrect entry in file "profile.br", the name of the core files included the corresponding timestamp.

This resulted in a continuously increasing requirement for hard disk drive storage space.
1.13. **OperatorManager: Rights overview of all operators**

In the OperatorManager, the rights overview for all operators could not be created in the formats PDF or ODS.

**Note:**
The documents are created generically based on the current status of the rights assignment in the CAE. The overview can then be opened with a PDF reader or in the LibreOffice spreadsheet (ODS document).

<table>
<thead>
<tr>
<th>A&amp;P: 655664</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-08-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not necessary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Contents**

**Files:**
- /opt/aprol/scripts/AprolBuildOds: Version 1.5

**CAE DB:** ---

**Runtime DB:** ---

1.14. **Stabilization of the ANSL user interface**

Communication to redundant controllers could be further stabilized by corrections in the ANSL UIF (changeset 368895).

<table>
<thead>
<tr>
<th>A&amp;P: 653319</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-08-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not necessary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Contents**

**Files:**
- /opt/aprol/lib*/libAnslUIF.so.4.5.1013
- Dependencies:
  - /opt/aprol/lib*/libCaePKI.so
  - /opt/aprol/lib*/libAnslUIFWrapper.so
  - /opt/aprol/lib*/libCtrlDialogs.so
  - /opt/aprol/lib*/libCaeCPUInstaller.so
  - /opt/aprol/lib*/libCPUInstaller.so
  - /opt/aprol/lib*/libCaeController.so
  - /opt/aprol/lib*/libCaeDownload.so
  - /opt/aprol/lib*/libCaePKI.so
  - /opt/aprol/lib*/libCaePrj.so
  - /opt/aprol/lib*/libCaeExpl.so
  - /opt/aprol/lib*/libAprolAnslUIFLogging.so
  - /opt/aprol/bin/AnslConnect
  - /opt/aprol/bin/AnslDriver
  - /opt/aprol/bin/ControllerLoader
  - /opt/aprol/bin/ControllerManager
  - /opt/aprol/bin/CaeManager
  - /opt/aprol/bin/DownloadManager
  - /opt/aprol/bin/CPUInstaller

**CAE DB:** ---

**Runtime DB:** ---
2. Corrections and updates to previous APROL patches (APROL R4.2-05P3)

2.15. Corrupt file "/etc/services" after APROL server shutting down incorrectly

After an APROL server failed to shut down correctly, file /etc/services (containing service names and port numbers) was corrupted in some cases. The probability of this error occurring was reduced by a structural change to the ChronoPlex startup script. However, the cause of this problem still lies in the incorrect shutdown of the servers since the file system can no longer write its cache data to the data storage medium in this case and corrupt files are created.

Note:
The following generally applies: Incorrect shutdown of an APROL server, e.g. by explicitly switching off the power supply without a controlled shutdown of the system, can still result in data loss and an inconsistent system state. These are operating system properties that installed applications cannot effect or change.

A&P: 645579  Also available starting with: R4.2-06  Text correction: Schulte  On: 2019-06-07
Documentation: Not necessary

Contents
Files: /etc/init.d/aprollogging: Revision 1.26.2.1
CAE DB: ---
Runtime DB: ---

2.16. Driver for the AprolSqlServer

The database engine of the SQL server has been updated. The database drivers must therefore be reinstalled and reconfigured on Windows servers. The JDBC database driver must be reconfigured both in Linux and Windows.

Note:
The use of the JDBC configuration parameter "SSLAllowHostMismatch" is therefore no longer necessary.
2.17. Corrections in project part "mapp View Content"

1) When resetting style properties to the default values, they were displayed correctly in the editor but not stored in the database.

2) When copying/pasting blocks, the values of pins or of assigned style properties were not correctly applied if they were of IEC type BOOL.

3) An unexpected exit of the CaeManager could occur after pressing any key combination and closing the associated confirmation dialog box.
### 2.18. Corrections regarding pin types

If a special pin type was used to configure a hyper macro constant (e.g. DevCfg), the stored default value could not be displayed or changed due to system-internal changes.

When using a pin type of IEC type BOOL, entries "True (1)" and "False (0)" were offered for selection in the drop-down list instead of the discrete values stored in the enumeration during instantiation.

### 2.19. Important corrections to the patch mechanism

1) In the context of larger CAE projects, patch installation could freeze when started from the CaeManager. Due to competing accesses from the copy process and TbaseServer, the backup may have been damaged. If necessary, CaeBackup should be used instead to backup the CAE database. This is now explicitly pointed out in this case.

2) After the patch mechanism is exchanged (at the beginning of the patch installation), the root password is requested for the server restart, which is then immediately triggered.

Changes were made to the KDE session management for APROL R4.2-05, which means that a server restart is no longer permitted in the KDE session.
This also prevented the request to reboot at the end of the patch mechanism, which still used KDE mechanisms for this purpose.

3) In this context, problems with unpacking TGZ archives could also be corrected.
4) Important patch installation steps are now logged in the configuration report.

<table>
<thead>
<tr>
<th>A&amp;P: 648410, 642994, 644674</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-06-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not yet implemented</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.20. MQTT: Limitation of maximum password length

Up to now, the user password with which the AprolMqttClient logs in to the MQTT server could have a maximum length of 32 characters. This limitation has been removed so that the validator of call parameter "-password" now permits passwords with a length of 64 kB of characters. The AprolMqttClient password must only be re-entered if the previous password length of 32 characters was not sufficient. This is the case if a Microsoft Azure cloud should be connected via SAS token, for example.

<table>
<thead>
<tr>
<th>A&amp;P: 646879</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-06-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not yet implemented</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.21. Creation of localization texts

The creation of the TR files required for localization has been corrected.

<table>
<thead>
<tr>
<th>A&amp;P: 639104</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-06-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not necessary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

<table>
<thead>
<tr>
<th>Files:</th>
<th>/opt/aprol/lib*/libAppInfo.so.2.222.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAE DB:</td>
<td>---</td>
</tr>
<tr>
<td>Runtime DB:</td>
<td>---</td>
</tr>
</tbody>
</table>

Contents

<table>
<thead>
<tr>
<th>Files:</th>
<th>ENGIN/CAEdb/caedb/drvDB/drvPlsAprolMqttClient.imp: Revision 1.59.2.3 /opt/aprol/lib*/libAprolValidator.so.1.254.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAE DB:</td>
<td>---</td>
</tr>
<tr>
<td>Runtime DB:</td>
<td>---</td>
</tr>
</tbody>
</table>

Settings and updates to previous APROL patches (APROL R4.2-05P3)
2.22. ApcHwInfo: Corrupt live data of a UPS on the APC3100

By correcting the interfaces, values "UpsBatCurrent" (discharge current) and "UpsBatVoltage" (output voltage) of a UPS on the APC3100 are now correctly determined again.

Also available starting with: R4.2-06  Text correction: Schulte  On: 2019-06-07
Documentation: Not necessary

Contents

Files: /opt/aprol/lib*/libMtcx.so.1.15.2
       /opt/aprol/bin/ApcHwInfo: Version 2.1.23.2.3

CAE DB: ---
Runtime DB: ---

2.23. DownloadManager: Incorrect calculation of partition sizes

Despite errors in calculating the partition size, a forced initial transfer could be performed. After correction, the download is aborted in this case after the partitioning check and a corresponding error message is displayed.

Also available starting with: R4.2-06  Text correction: Schulte  On: 2019-06-07
Documentation: Not necessary

Contents

Files: /opt/aprol/lib*/libCaeCPUInstaller.so.1.290.8

Dependencies:
       /opt/aprol/bin/DownloadManager

CAE DB: ---
Runtime DB: ---

2.24. DownloadManager: Unwanted exit

Using ANSL authentication to establish a connection to the controllers could lead to an unintended exit of the DownloadManager.
2.25. TrendViewer: Call parameter for preselection of query source in the TrendViewer / Data retrieval from the logging server

When using new call parameter "-queryLoggingServer", the logging server is selected as the query source for the trend data and not, as usual, the local runtime system. In the TrendViewer, it is also possible to interactively change the query source via menu option "Tools / Query source". The currently selected query source is displayed as an icon in the status bar.

Note:
It only makes sense to use call parameter "-queryLoggingServer" if trend data forwarding has been configured in the CAE project (parameter "-enable_forwarding" of the TrendServer).

Necessary action:
If the forwarding of trend data is configured, call parameter "-queryLoggingServer" should be used for the TrendViewer in the APROL system.
2.26. Saving the visibility of a trend curve

The visibility of a trend curve in the diagram can be configured in the shortcut menu of the slot or in the slot properties (tab "Display").
This setting is now saved in the diagram's configuration file.

<table>
<thead>
<tr>
<th>A&amp;P: 644579</th>
<th>Also available starting with:</th>
<th>R4.2-06</th>
<th>Text correction:</th>
<th>Schulte</th>
<th>On:</th>
<th>2019-05-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not available yet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files:
- /opt/aprol/lib*/libTrendChart.so.1.189.1
- /opt/aprol/cnf/TrendViewer/TrendViewerConfig.dtd: Revision 1.4.18.1

<table>
<thead>
<tr>
<th>CAE DB:</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runtime DB:</td>
<td>---</td>
</tr>
</tbody>
</table>

2.27. Pin types with path specifications

If a pin type containing a path was used in a graphic block, the path could not be selected in the instantiated block.
The selection of paths from a drop-down list is now possible again.

<table>
<thead>
<tr>
<th>A&amp;P: 642589</th>
<th>Also available starting with:</th>
<th>R4.2-06</th>
<th>Text correction:</th>
<th>Schulte</th>
<th>On:</th>
<th>2019-06-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not necessary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files:
- /opt/aprol/lib*/libCaedb.so.3.566.7
- /opt/aprol/bin/CaeManager: Version 3.2.353.2.2

<table>
<thead>
<tr>
<th>CAE DB:</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runtime DB:</td>
<td>---</td>
</tr>
</tbody>
</table>

2.28. Automation Studio 4.5.3.86 service pack

Automation Studio for hardware configuration of the controllers is supplied in the current version 4.5.3.86SP).
The current Service Pack contains further optimizations/corrections for the AS/HW configuration.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not yet implemented</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files:
- /opt/aprol/VMIMAGES/ISO/AS_SP_AS45.exe
- /opt/aprol/VMIMAGES/ISO/AS_VERSION_AS45.exe

<table>
<thead>
<tr>
<th>CAE DB:</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runtime DB:</td>
<td>---</td>
</tr>
</tbody>
</table>
2.29. Latest version of manual "D6 - Security" as draft version

The current updates to improve system security are described in manual "D6 - Security for R4.2-06 (draft)". Among other things, chapter "Preventing operation of USB mass storage devices" explains updates to USBGuard.

Note:
After the patch has been installed, manual "D6 - Security for R4.2-06 (draft)" is also offered on the start page of the APROL documentation. This is a pre-release that is not yet finalized for the future APROL R4.2-06, containing updates and new features that are already relevant in this patch.

2.30. JasperReports Server certificates

If the JasperReports Server should be operated on a redundant control computer with a global cluster, different configuration steps are required depending on the browser used. The necessary procedure is explained in the manual "D6 - Security for R4.2-06 (draft)", chapter "Other certificate management / Certificates of the JasperReports Server".

Note:
After the patch has been installed, manual "D6 - Security for R4.2-06 (draft)" is also offered on the start page of the APROL documentation. This is a pre-release that is not yet finalized for the future APROL R4.2-06, containing updates and new features that are already relevant in this patch.

2.31. Start page of the APROL product documentation

The APROL product documentation start page was not complete. Certain subchapters were not visible and navigating to these subchapters was not possible.
2.32. Completion of the English APROL product documentation

The missing English translations of individual APROL documentations have been completed. The scope of the English translations thus corresponds to the German documentation content contained in this patch.

2.33. Wine environment: Incorrect permissions

Directory "/home/<Engineering system>-wine" needs the permissions of the associated Linux user (of the engineering environment). Invalid permissions caused error messages when using the wine environment. At the end of the patch installation, the wine environment is now correctly set up for all engineering systems.
2.34. AnslDriver: Loss of current values when restarting the rCPU

While the AnslDriver communicated with a redundant controller, static values may not have been read correctly if both CPUs were started after the driver. A new ANSL UIF (changeset 362203) was applied to fix the problem.

3. Corrections and updates to previous APROL patches (APROL R4.2-05P2)

3.1. Password entry for ANSL authentication

Existing password entry limitations for ANSL operator authentication on the controller have been removed. With the exception of control characters and quotation marks, all characters are permissible when entering passwords. For cross-connections of type ApCnfAnslC (customer cross-connection) and ApCnfAnslS (system cross-connection), the validators for password entry have also been adjusted.
3.2. Error corrections for online parameter management

A wait cursor that shows the process is running is now displayed when opening an import file in the online parameter import.

When selecting a non-compliant file format, an associated message is now displayed.

3.3. Configuring AS hardware on an external Windows system

The missing installation of an Automation Studio service pack was not detected on an external Windows system.

The necessary AS version is now checked on the basis of the Windows registry.
3.4. AnslDriver: Synchronized PV registration with redundant runtime system

In addition to the load regulation for the AnslDriver already in APROL R4.2-05 Patch 1, the simultaneous startup of both redundancy components has been adjusted.

In the event of reconnects, the AnslDrivers of a redundant runtime system carry out their PV registration one after the other and no longer – as before – simultaneously. This extends the PV registration phase overall but leaves the CPU of the controller with more remaining time available for low priority system services. It ensures that the client controlling the process registers its objects with the controller first. Only when this procedure is completed does the driver without process control start its object registration.

The behavior described here is only effective during the clients startup. In the event of reconnects (reconnection after loss of connection), this is not possible. For this reason, the clients restart in the event of a complete loss of connection so that the client startup behavior takes effect after the subsequent connection establishment. A complete connection loss occurs when both the primary and optional alternative routes have lost connection to the target.

To avoid unwanted side effects, two new call parameters are provided:
- disableReduSync
- disableRestartOnConnectionLoss
Both call parameters are switched off by default so that the "old" behavior must be explicitly enabled by setting both parameters.

Call parameter -disableReduSync switches off the successive registration of the communication objects of the two redundancy clients so that they can register their PVs simultaneously as before. The result is that the load on the CPU is increased during the registration phase but the registration itself is faster overall.

Parameter -disableRestartOnConnectionLoss prevents the clients from restarting after a complete connection loss. The result is that the reconnect procedure is not synchronized and results in an increased CPU utilization at this time. This is not expected to shorten the registration period.

Corrections and updates to previous APROL patches (APROL R4.2-05P2)
The behavior described here serves together with the adjustments according to section "DownloadManager: Configurable waiting time for download on "redundancy partner" (see below) to implement the download while the application is running with reduced load for the controllers. At the same time, the possibility of controlling the system should be preserved.

A&P: 638314, 641714, 636874
Also available starting with: R4.2-06 Text correction: Schulte
On: 2019-04-18
Documentation: Not yet implemented

3.5. DownloadManager: Configurable waiting time for download to redundancy partner

Due to a large number of process variables that must be read once when downloading a runtime system and restarting the AnslDriver, there may be delays when starting the AnslDriver. When using redundant runtime systems, the complete reception of all process values is a prerequisite for the AnslDriver to take charge of the process control.

In R4.2-05, the server controlling the process may have already been stopped and loaded before this state was reached.

To prevent this, you can now configure a download waiting time for the system that has control of the process.

After starting the last loaded runtime system, the system waits at least for the configured period of time until the download of the system that has control of the process is started.

The waiting time is configured in file "/home/<Engineering system>/ENGIN/cnf/DownloadManager/PreventiveWaitingForRedundancyPartner.cfg".

You can configure a waiting time in seconds for all runtime systems in this project with "WaitingTime=100", for example.

A specific waiting time can be configured for a runtime system by an additional entry specifying the APROL system instance "WaitingTime_<ASINST> = 300".

If the file does not exist or no global and no runtime system-specific waiting time has been configured, the download of the redundancy partner is started after reaching runlevel 5 of the last loaded system.

Example for file "PreventiveWaitingForRedundancyPartner.cfg":
WaitingTime=100
WaitingTime_RUNOPCUAREDU1=300
WaitingTime_RUNTIME_04=300

In this example configuration, all runtime systems in the project - with two exceptions - wait 100 seconds after startup. The two explicitly named systems each wait 300 seconds.

Note:
This is a temporary solution. For APROL R4.2-06, automatic determination of the system states is being developed. Due to the complexity of the solution, it cannot be supplied in a patch.

**Necessary action:**
To determine the necessary waiting time, which usually does not change significantly between the different downloads, diagnostic variables `S2A_CtrlInstanzName_M_DrvRunState` and `S2A_CtrlInstanzName_S_DrvRunState` of the AnslDriver can be used.

**A process leading AnslDriver runs through the following states:**
- 2 - Configured
- 3 - PV registration running
- 7 - PV registration complete
- 8 - Process control taken over

**An AnslDriver without control of the process with set call parameter "-slaveConnect" runs through the states 2 - 3 - 4 or 2 - 3 - 5 (see below).**
- 2 - Configured
- 3 - PV registration complete / standby reached (call parameter "-slaveReadValues" not used)
- 5 - PV registration complete / standby reached, data received (call parameter "-slaveReadValues" used)

Determine the times via "IosEv -pv S2A_*?_DrvRunState -noheader" during a runtime system download. Add one PV entry per AnslDriver instance. Measure the duration of the state transitions from 2 to 4 or 2 to 5 of the standby drivers. Use this time span as a guide value for the minimum waiting time.

<table>
<thead>
<tr>
<th>A&amp;P: 638474</th>
<th>Also available starting with: 4.2.06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-04-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation: Not yet implemented</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**3.6. USBGuard: Corrections and updates**

In order to meet the security policies of many companies, APROL offers a software-based solution that prevents operation of USB mass storage devices that are not explicitly permitted.

The 3rd-party software USBGuard in combination with USBGuard QT Viewer for Linux regulates the use of USB devices. Only USB devices that have been approved in a whitelist are permitted to be used here. All other USB devices are blocked.

USBGuard and USBGuard QT Viewer can be used without additional configuration for easy handling. For this purpose, script "AprolSetSecurity" is executed automatically with call parameters "-usbguard ownrules" during AutoYaST installation or an APROL update.
Regardless of the call parameters used, basic USB devices are always enabled. Basic USB devices are of type "keyboard", "mouse" and "USB hub". In addition, USB devices of type "Technology Guard" are always enabled to prevent license violations when using USBGuard.

Alternatively, the following call parameters can be passed to script AprolSetSecurity:

- `+usbguard`: Allows using the default setting in which the basic USB devices and Technology Guards are listed.
- `+usbguard ownrules`: Enables your own rules in addition to the default setting. If further USB devices should be enabled, they must be explicitly entered in a separate configuration file (`"/home/aprolsys/APROL/cnf/usbguard/own_rules.conf"`). These additional USB devices must be defined using the rule language syntax of USBGuard.
- `+usbguard secure`: In addition to the default setting, enables all USB devices connected to the control computer at the time of the script call.
- `+usbguard secure ownrules`: In addition to the default setting, enables all USB devices connected to the control computer at the time of the script call and also takes own rules into account.
- `+usbguard <secure|ownrules|secure ownrules> force`: Enables the configuration although an existing configuration exists.
- `-usbguard`: Deactivates USBGuard protection and stores the previously enabled configuration.

Notes:
1. Script AprolSetSecurity must be called with alternative call parameters as Linux superuser "root".
2. Basic USB devices and Technology Guards can be replaced at any time, even if USBGuard is enabled.
3. If USB devices that were previously blocked by USBGuard should be enabled, USBGuard can be stopped and started with a changed configuration.
4. USBGuard QT Viewer outputs messages when known or unknown USB devices are connected to the control computer. To be able to call the viewer from the KDE menu and "System tray", AutoYaST DVD V4.2-051.0.190305 or later must be installed.
5. USB interfaces that are integrated in B&R touchscreens with SDL connector are not automatically enabled. To enable these USB interfaces, the IDs of these USB interfaces must be entered in file `/home/aprolsys/APROL/cnf/usbguard/own_rules.conf` and USBGuard must be restarted with call parameter "force".

---

A&P: 637544, 638449, 639269, 640324

Also available starting with: R4.2-06

Text correction: Heitmann

On: 2019-04-15

Documentation: Manual "D6 - Security", chapter "Preventing operation of USB mass storage devices"

Contents

Files:

- `/opt/aprol/scripts/AprolSetSecurity: Version 1.8.2.11`
- `/opt/aprol/share/locale/de/LC_MESSAGES/AprolSetSecurity.mo: Revision 1.6.2.7`
- `/opt/aprol/skel/system_config/AdminStandard/.config/menus/Aprol_BuRAdmin.menu: Revision 1.9.2.1`
- `/opt/aprol/skel/system_config/GatewayService/.config/menus/Aprol_BuRService.menu: Revision 1.11.2.1`

CAE DB: ---

Runtime DB: ---

Corrections and updates to previous APROL patches (APROL R4.2-05P2)
3.7. Transferring a password policy when using the default settings

Transferring a password policy to the LDAP server failed if the default settings were used in dialog box "LDAP Server properties". The reason for this was the proposed base DN. After correction, the field "Base DN for password policy" does not contain an entry.

<table>
<thead>
<tr>
<th>A&amp;P: 632069</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-03-26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation: Not necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files:
- /opt/aprol/python/APROL/AprolConfigVers.pyc: Version 1.2.307.2.13
- /opt/aprol/python/APROL/AprolConfigModules/AprolConfigLdapMgmt.pyc: Revision 1.26.2.3
- /opt/aprol/etc/LDAP/server/struktur.ldif: Revision 1.1.1.72.1

CAE DB: ---
Runtime DB: ---

3.8. B&R gateway coupling: Configuration of "MRB", "MRE" and "Unit"

When creating a "BuR gateway connection" (project part "APROL system"), the beginning and end of the measuring range as well as a "unit" can now be configured for variables.

<table>
<thead>
<tr>
<th>A&amp;P: 638404</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-03-26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation: Not yet implemented</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files:
- APROL_SOURCE/ENGIN/CAEdb/caedb/drvDB/gwCcInaGw.imp: Revision 1.24.2.2
- APROL_SOURCE/ENGIN/CAEdb/caedb/drvDB/gwCcInaGw_source.imp: Revision 1.21.2.2

CAE DB: Yes
Runtime DB: Yes

3.9. CFC configuration: Optimization of the auto-router / individual connections

The auto-router was already optimized for APROL R4.2-00 to transfer logical connection information to CFCs. It was therefore possible to route all logical connections completely and automatically, even in complex CFCs.

This corresponds to a scenario in which all blocks are already placed in the CFC and all connection information is logically available but must be routed automatically.

In practice, blocks and the associated connections are actually placed or created one after the other. The automatic routing of the connecting lines results correctly but may require finishing of the line routing. For example, connections were routed at a great distance around placed blocks.

The two aforementioned scenarios are therefore differentiated now so that a different parameterization of the auto-router algorithm is used in the second scenario. This corresponds more to the old behavior of the auto-router before the change for R4.2-00.
In addition, the two functions for optimizing individual connections that could previously only be accessed using mouse/key combinations are available as options in shortcut menu "Connections":

1. "Optimize connecting line" or [Ctrl] + [Shift] + [Middle mouse button]
   The connecting line is re-routed to the next connection point, where the connection point stays in place so that the connection is shortened only between connection points. This is recommended if several connections are laid with adjacent connection points in the sense of a bus and these connection points should therefore be retained as much as possible.

2. "Shorten connecting line" or [Ctrl] + [Middle mouse button]
   The connecting line to the next connection point is shortened and, as a rule, the connection points are shifted so that the connection is as short as possible.

Both functions can be executed on a connection, a border entry of a certain connection or on one block for all of its connections.

Note:
Function "Optimize connecting line" can also be called several times so that alternately different connection courses result.

<table>
<thead>
<tr>
<th>A&amp;P: 637644</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-04-05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not yet implemented</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

| Files: | /opt/aprol/lib*/libCaeCFC.so.4.676.11 |
| CAE DB: | --- |
| Runtime DB: | --- |

### 3.10. Installing the "VLC media player"

Due to the provider having changed the package names, installation of the 3rd-party software "VLC media player" could not be carried out.
Program "AprolConfigMediaPlayer" was adjusted thereupon.

Note:
"VLC media player" and "MPlayer" can be installed from the command line using program "AprolConfigMediaPlayer". During online installation with "AprolConfigMediaPlayer", all necessary files for offline installation are stored in the mirror directory (default: "/var/cache/aprol"). The downloaded packages can be installed offline on another control computer with the same APROL software version.

<table>
<thead>
<tr>
<th>A&amp;P: 638854</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-03-28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not necessary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

| Files: | /opt/aprol/scripts/AprolConfigMediaPlayer: Version 1.16.2.1 |
| CAE DB: | --- |
| Runtime DB: | --- |
3.11. No switching of the keyboard layout

The keyboard layout was not switched correctly for some foreign languages.

Note:
The necessary corrections are provided on Language DVD 4.2-05.2.

<table>
<thead>
<tr>
<th>A&amp;P: 639194</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Heitmann</th>
<th>On: 2019-04-15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation: Not necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files:
- /opt/aprol/bin/KdeglobalsLangChooser: Version 2.1.17.2.5
- and Language DVD 4.2-05.2

CAE DB: ---
Runtime DB: ---

3.12. Applying current hardware upgrades

Numerous updates and corrections for hardware modules already delivered with AS have been applied to the APROL environment as hardware upgrades.

In APROL, the hardware upgrades necessary for error-free operation in the current release are automatically updated when the AS/HW configuration is opened in the CaeManager.

<table>
<thead>
<tr>
<th>A&amp;P: 639295</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-04-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation: Not necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files:
- /opt/aprol/AS/ISO/AS_VERSION_AS45.ini: Revision 1.1.2.3
- /opt/aprol/AS/ISO/HW AS45.tgz
- /opt/aprol/AS/ISO/HW AS45.tgz.md5

CAE DB: ---
Runtime DB: ---

3.13. Applying a new ANSL-UIF

If a redundancy switchover (manually triggered or due to a redundancy event) occurred with a redundant controller in state "bumpless switchover possible", there may have been a connection interruption during the switchover. By applying a new ANSL-UIF, the connection establishment could be optimized.

Note:
Due to the aforementioned changes, ANSL UIF (changeset 353834) was applied.
3.14. Use/Change of plant constants in a redundant environment

If a plant constant is connected to a connector in the project part CFC, an assignment "<Connector> = <Value of plant constant>" is performed in the "INIT_UP" of the task. This means that the value is set once when the task is started.

If the logic is now active and the value of the plant constant is changed, the following is observed in a redundant environment:

**Example control computer:**
When downloading, an APROL system is loaded first. The changed logic is active. The new value is written to the connector within the task; the started CC task "does not control the process". Due to the system-dependent configuration of the connector, the old value from the "CC task that has control of the process", which has not yet been loaded, is adjusted to the connector of the CC task of the previously loaded APROL system. Thus, the new value is lost. The same happens when the other APROL system is subsequently loaded. The behavior of controllers is the same as the aforementioned.

The assignment was shifted to the cyclic part of the CC task or controller task.

**Note:**
Due to the cyclic assignment, it is no longer possible to change the connector via "pio / CFC debugging - Set I/O".
3.15. Partial deletion of files in the installation area

The generation directories of library checks are cleaned up by the database optimization that is also carried out during a CaeBackup. This cleanup incorrectly handled the context-related wine environments, deleting files under "/opt/aprol/br/wine".

Files in $HOME and ROOT were also affected as well as files on mounted devices.

<table>
<thead>
<tr>
<th>A&amp;P: 640714</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Heitmann</th>
<th>On: 2019-04-15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation: Not necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files: /opt/aprol/lib*/libStd.so.6.172.9

CAE DB: ---
Runtime DB: ---

3.16. Accessing a redundant JasperReports Server with web browser Chromium

If you use a redundant JasperReports Server on a system with a global cluster in R4.2-05, you must add the specific certificates of the redundancy partners to the certificate database as being trustworthy in addition to the global cluster certificate when using the web browser Chromium.

Reason: When the APROL SDM is opened via the cluster name, the web server identifies itself with the shared global cluster certificate. The JasperReports Server alternatively identifies itself with the server-specific certificates of the web server when called via the cluster name. If the Chromium web browser only knows the certificate of the global cluster to be trustworthy, which results exclusively opening the APROL SDM via the cluster name, it rejects the connection to the JasperReports Server. In this case, the "same" server, represented by the cluster name, identifies itself with a different and unknown certificate.

Note:

Workaround (to be performed for all CC accounts):
1. Open the Chromium web browser for all affected CC accounts
2. Open the APROL SDM of both servers of the global cluster individually using the hostnames of these servers.
3. Add their certificates as being trusted according to the instructions in manual "D6 - Security", chapter "Other certificate usage / Certificates of web browsers".
4. If not already added, the global cluster certificate must also be added as trusted in the same way.

<table>
<thead>
<tr>
<th>A&amp;P: 641439</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Hendrik Krüger</th>
<th>On: 2019-04-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation: Not yet implemented</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files: ---
CAE DB: ---
Runtime DB: ---
4. Corrections and updates to previous APROL patches (APROL R4.2-05P1)

4.1. Missing requirement entries if all tasks of the CAE project were built incorrectly

When aborting the build procedure of all tasks of the CAE project – with disabled user option "Stop action if an error occurs" – no associated requirement entries were created for the default task of each hardware target.

**Note:**
Based on the requirement entries, the user is not only prompted to correct the error but gets a message to also perform a "Build (target)" for all affected targets.

<table>
<thead>
<tr>
<th>A&amp;P: 630704</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-02-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation: Not necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Contents**

<table>
<thead>
<tr>
<th>Files:</th>
<th>/opt/aprol/bin/devil: Version 2.1.964.2.10</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAE DB:</td>
<td>---</td>
</tr>
<tr>
<td>Runtime DB:</td>
<td>---</td>
</tr>
</tbody>
</table>

4.2. Improved stability of APROL TLS

**This patch provides the following improvements for APROL TLS:**

1. When updating from an older release (≤ R4.2-03) to R4.2-05P1, "Requirement for save" is displayed for APROL systems of type "Gateway" due to the renewed CC module call parameters for TLS.
2. During automatic certificate creation with action "Complete PKI configuration", the IP addresses for cluster, primary and secondary CPU are entered in the "Subject alternative name" extension of the certificate for redundant controllers.
3. During automatic certificate creation with action "Complete PKI configuration", OPC UA server certificates are now created and assigned using the fully qualified hostname.
4. If a default certificate is assigned in the context of an ANSL client, although client-specific certificates already exist, the default certificate is no longer automatically supplemented for the communication partners, unless it is required for this individual connection.
5. Redundancy synchronization is also possible via the engineering tools if a connection cannot be established to one of the CPUs after the download due to a corrupt TLS configuration or incorrect ANSL authentication parameters.
6. During the controller's build procedure, an error is displayed along with that displayed in the TLS configuration overview if the certificate of a system cross-connection is missing in the trusted list of the ANSL server.
7. When building all tasks of the project ("Build all"), all data relevant for TLS connection for the DownloadManager are stored in the database even if the build was not successful for all tasks. In this case, requirement markings for a new build procedure are displayed for incompletely generated project parts even if option "Stop action if an error occurs" is disabled in the productivity settings.

8. If a download to a controller is carried out, all open ControllerManagers are notified about the download so that they apply the changed connection parameters. This means that a ControllerManager restart is no longer required.

9. Deactivated controllers whose PKI configuration is still available under "Unused" in the TLS configuration overview receive no entry "Requirement for Build" for changes to this configuration or the assigned certificates.

10. When downloading a new controller or after restoring a CAE or project backup of an existing controller, the handling of the current connection information of each CPU is now correct.

11. When a build is performed on a "not TLS-capable" controller, the certificates of the engineering and diagnostics tools in the project are not validated.

12. When updating section CCS or PKI of the TLS configuration overview, it becomes disabled. This prevents further actions (e.g. saving) from being performed during the update, which can lead to a crash of the CaeManager.

13. OPC UA server certificates can also be created during the autocomplete of the PKI configuration. The fully qualified hostname is now preferred in the URI of these certificates. If no fully qualified hostname has been configured for the controller, the hostname of the controller is used. If this has not been configured either, the IP address of the controller is used instead. Thus, a valid URI can always be generated.

14. Dialog box "Redundancy management" from the DownloadManager can now use the configured connection of the primary and secondary CPU, even if the redundancy partners are configured with different connection parameters (TLS or ANSL authentication). If both rCPUs can be reached, a manual synchronization of the application data or a redundancy switchover can be initiated. After synchronization, a reconnect with the "new" (possibly former) parameters is performed. These "new" parameters must then be entered manually in the DownloadManager so that the reconnect can also occur there.

15. A missing controller certificate in node "trusted" of the engineering tools results in the output of an error during the project build procedure. It is otherwise not possible for the engineering tools (DownloadManager, ControllerManager, etc.) to establish a connection with TLS after downloading the controller in this scenario.

The following optimizations are possible by using AR OS version A0453:

AR OS version A0453 can be obtained as AR upgrade and installed in the CaeManager.

1. For controllers with cross-communication, a page fault occurred when the connection to the partner CPU was lost.

2. For example, if the security mode of a cross-connection driver on a controller is changed, these changes also take effect without a manual warm restart.

3. When a securely configured ANSL communication connection lost its connection temporarily due to network failure, there was an increased utilization of DRAM memory caused by memory leaks.

4. After rebooting the controller, ANSL connection security mode "Secure" could not always be established.

The following improvements for APROL TLS are achieved by using AR OS version D0462 (only available in APROL R4.2-06 and later):

1. The certificates of the communication partners are validated by the controller with regard to matching hostname or IP address. To determine the hostname, a DNS server must be configured.
2. If certificates of the communication partners were configured in directory "trusted" of the HTTP server of the controller, the HTTP client (browser) must identify itself with the corresponding certificate when establishing the connection.

<table>
<thead>
<tr>
<th>A&amp;P</th>
<th>Also available starting with:</th>
<th>Text correction:</th>
<th>On:</th>
</tr>
</thead>
<tbody>
<tr>
<td>630779, 630699, 630704, 627094, 630759, 630679, 630754, 631254, 625949, 625944, 631739, 630074, 630769, 631964, 630769, 633399, 636564</td>
<td>R4.2-06</td>
<td>Hendrik Krüger</td>
<td>2019-03-11</td>
</tr>
</tbody>
</table>

Documentation: Not yet implemented

### Contents

**Files:**

- `/opt/aprol/bin/devil: Version 2.1.964.2.10`
- `/opt/aprol/lib*/libCaedb.so.3.566.5`
- `/opt/aprol/lib*/libPKIData.so.1.106.14`
- `/opt/aprol/lib*/libCaeCPUInstaller.so.1.290.2`
- `/opt/aprol/bin/ControllerManager: Version 2.1.607.2.8`
- `/opt/aprol/lib*/libCaePKI.so.1.112.21`
- `/opt/aprol/lib*/libAnslUIFWrapper.so.1.347.2`
- `/opt/aprol/lib*/libX509_Certificates_GUI.so.1.32.2`
- `/opt/aprol/lib*/libCtrlDialogs.so.1.108.2`
- `/opt/aprol/bin/DownloadManager 3.3.497.2.3`
- `/opt/aprol/scripts/AprolConfig: Version 1.2.307.2.9`
- `/opt/aprol/scripts/AprolConfigCmd: Version 1.2.307.2.9`

CAE DB: ---

Runtime DB: ---

### 4.3. ControllerManager: Unintended exit when using the variable view and existing INA connection

If the variable view was opened for an existing INA connection and complex variables (e.g. structures or arrays) were added here, the ControllerManager exited unintentionally. After correction, it is ensured that the variable view is displayed as expected.

<table>
<thead>
<tr>
<th>A&amp;P</th>
<th>Also available starting with:</th>
<th>Text correction:</th>
<th>On:</th>
</tr>
</thead>
<tbody>
<tr>
<td>631459</td>
<td>R4.2-06</td>
<td>Schulte</td>
<td>2019-02-11</td>
</tr>
</tbody>
</table>

Documentation: Not necessary

### Contents

**Files:**

- `/opt/aprol/bin/ControllerManager: Version 2.1.607.2.8`

CAE DB: ---

Runtime DB: ---

### 4.4. ApcHwInfo: Incorrect status when exiting the application

The status of APROL system service ApcHwInfo was not displayed correctly in the StartManager. For example, the status "lost" (instead of "stopped") was output after correct exit of the service. The static UPS variables (e.g. DeviceId and ModelNumber) of service ApcHwInfo were not filled with data on an APC3100 or PPC3100; the dynamic data of the service were filled.

**Note:**
The APROL system service can now also be called without Linux superuser "root" rights.
4.5. Display of the range of values in the tooltip of visualization elements "InputOutputBox" and "Slider"

If no range of values was configured in the context of InputOutputBox or Slider, this state was not previously correctly displayed in the tooltip. After correction, no tooltip will be displayed in the aforementioned case. This information is otherwise displayed in the tooltip if a value range start or end was specified.

4.6. Optimizations for AS hardware configuration on an external Windows system

The AS hardware configuration procedure on an external Windows system has been further optimized, and possible error sources have been eliminated. Previously, the necessary texts for APROL drivers and mapp View may not have been copied to the VMware environment, which meant that these texts were missing in the logbook entries.

Note:
After an AR upgrade, the previously missing texts are completed in the environment of the external Windows system.

It is now ensured that an older client (CaeManager) can also communicate with newer servers (Windows). Downgrade of AprolRemoteExecServer is therefore no longer necessary.
4.7. Performance losses during "Build project" caused by selected verbose level

Depending on the selected verbose level, the "build project" of large CAE projects may have suffered performance losses. A higher verbose level, and therefore increased processing of output, caused a delay in the build procedure. The internal system processing for the output dialog box was optimized so that no performance losses occur now as a rule.

<table>
<thead>
<tr>
<th>A&amp;P: 631289</th>
<th>Also available starting with:</th>
<th>R4.2-06</th>
<th>Text correction:</th>
<th>Schulte</th>
<th>On: 2019-02-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not necessary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files: /opt/aprol/lib*/libAprolQtDialogs.so.2.294.2

CAE DB: ---

Runtime DB: ---

4.8. OPC UA client DA blocks

Read and write blocks and the associated templates were provided in conjunction with the introduction of the OPC UA client DA blocks. These blocks can be used to configure the one-time writing or reading of a node. The function is triggered or, as with write blocks, this can also be event-based.

This functionality is now also provided in the OPC UA client connection to also complete the range of functions for configuring the client in this field. It was previously already possible to write to nodes but the configuration was stored below section "Subscriptions", which in turn was incorrect since writing does not take place in the context of subscriptions.

For this purpose, the new sections "NodesToWrite" and "NodesToRead" have been provided, in which the configuration can now be carried out separately.

Note:

For performance reasons, the monitoring of nodes is always preferable to the cyclic triggering of the read service that you have configured yourself.

In addition, the interpretation of the provider status of input PVs on write and read blocks has been corrected for the configuration of UaRClient.

This affected variables written by the DisplayCenter since UaRClient had previously ignored unsupplied variables at the VALUE inputs of write blocks.

System pins "Namespace" and "BrowseName" specified in OPC UA client DA block "MethodCall" were editable, i.e. the pins could also be deleted.

Only user pins are permitted to be edited in template blocks and not system pins. This possibility of misconfiguration has been corrected.

The connected OPC UA server can provide both the source timestamp and the server timestamp (depending on the server used). In addition, the local timestamp can now also be used as a timestamp for the process data.

In APROL R4.2-05 and later, all three timestamps can be configured in the OPC UA client connection and CAE block UaSessionExt.
4.9. Corrections for the DownloadManager

When a controller download with AR OS change was manually started, the download was started but not continued. If action "Force initial download" was explicitly selected in this case, the download was successful. The reason for this was the error handling of unsuitable partitioning. In this case, after correction, download is aborted after the partitioning check has been performed and a corresponding error message is displayed.

A simultaneous download to a large number of controllers may have resulted in an unintended exit of the DownloadManager. After optimizations for multi-threading, this error no longer occurs.

In addition, the redundancy-relevant ANSL connections are now correctly listed in the tooltip of the dialog box.
4.10. Error behavior in download mode "manual" with only one rCPU switched on

It was previously not possible to abort a download in mode "manual" if only one rCPU was switched on. There was an incorrect offer to synchronize the application data or perform a redundancy switchover at this point. After correction, the download is finished correctly at this point.

<table>
<thead>
<tr>
<th>A&amp;P: 630569</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-02-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not necessary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files: DownloadManager 3.3.497.2.2, /opt/aprol/lib64/libCaeCPUInstaller.so.1.290.4

CAE DB: ---

Runtime DB: ---

4.11. OPC UA: Connection UaRClient/OPC UA server of the controller with security mode "Non-secure"

If UaRClient connects to an OPC UA server via security mode "None" and security policy "None", certain parameters of the connection may have to be reconfigured; otherwise, no communication will be established. This is especially true when using the OPC UA server of the B&R controller. The parameters listed below are available in the APROL connection of UaRClient (at session level) and on block UaSessionExt of library APROL. The corrected library APROL is included in the patch.

Parameter "DisableEncryptedPasswordCheck" must be set to value "true" if security mode "None" and security policy "None" are used and the OPC UA server requests a plain text password for user authentication.

Note: Transferring passwords in plain text is not activated by default for security reasons.

Parameter "DisableTrustedCertificateForUserTokenRequired" must be set to the value "true" if security mode "None" and security policy "None" are used and if the OPC UA server requests an encrypted password for user authentication and the certificate of the OPC UA server is not known to UaRClient. Trusting unknown certificates is not recommended for security reasons. The certificate of the OPC UA server should be included in UaRClient's node "trusted". Since the updated APROL library is a basic library, not only a build for this library should be performed but also a "Build (all libraries)" after the patch installation (see header entry under "Also note").

<table>
<thead>
<tr>
<th>A&amp;P: 629879</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-02-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not yet implemented</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files: /opt/aprol/lib64/libOpcUaRuntimeClientCore.so.1.305.8

UaRClient 2.1.20.2.1

ENGIN/CAEdb/caedb/drvDB/gwCcOPCUAClient.imp: Revision 1.112.2.5

ENGIN/CAEdb/caedb/drvDB/gwCcOPCUAClient_source.imp: Revision 1.114.2.6

lib_APROL.imp

CAE DB: Yes

Runtime DB: ---
4.12. Frame of text objects in CFC

If setting "Display frame" was not explicitly selected for text objects in the CFC, the frame was still displayed. After correction, the frame is displayed or hidden in both CFC and SFC according to the setting.

A&P: 629824 Also available starting with: R4.2-06 Text correction: Schulte On: 2018-02-07
Documentation: Not necessary

Contents
Files: /opt/aprol/lib64/libCaeCFC.so.4.676.9
CAE DB: ---
Runtime DB: ---

4.13. AprolMqttClient: Corrections and performance optimization

AprolMqttClient previously took a long time to process a large number of subscription messages. Until now, the reason for this was an internal limitation of 10 messages per communication cycle of 100 ms. The limit has now been changed by default to 2000 messages. In addition, the limitation can now be configured via call parameter ";-maxSubMessagesPerLoop" in the range of values between 100 and 10000 messages per cycle.

When changing the connection state from "not connected" to "connected", there was an unintentional exit of the client in rare cases. This procedure was prevented by appropriate measures.

The following corrections were also applied to the message formats of publish messages:

- Values of IEC data types ULIINT, LWORD and DT were not sent in decimal notation
- Values of IEC data type TIME were not sent correctly; these values were interpreted internally as data type time of day (TOD)
- Values of IEC data type DT were exported with insufficient accuracy; these are now sent with an accuracy of 1 microsecond (6 decimal places)
- Subscribe values of IEC data types ULIINT/LWORD were not correct if the highest bit was set.
- Values of DT IEC data types were only published with a maximum of 2^32 seconds in string representation.

A&P: 632284, 634369, 634409, 634824 Also available starting with: R4.2-06 Text correction: Schulte On: 2019-02-07
Documentation: Manual "X99 - CC modules", chapter "AprolMqttClient call parameters"

Contents
Files: drvPlsAprolMqttClient.imp
/opt/aprol/bin/AprolMqttClient: Version 2.1.113.2.4
CAE DB: Yes
Runtime DB: ---
4.14. Removing whitelists

Previously configured whitelists could not be removed using Linux command "AprolFirewallCtl -d".

**Note:**
The firewall provided by SUSE can be modified in such a way that only certain remote computers are permitted to access the local computer. This configuration is based on IP address filtering. The system or network administrator can use prepared whitelists for this purpose.

<table>
<thead>
<tr>
<th>A&amp;P: 625894</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-02-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation: Not necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Contents**

**Files:**
- AprolJobDispatcher 1.1.75.2.1
- AprolSignTool 1.1.6.2.1
- AprolFirewallCtl 1.11.2.2

**CAE DB:** ---

**Runtime DB:** ---

4.15. Transferring password policies

When transferring a password policy to the LDAP server (CaeManager / Extras / Settings / Global engineering options / LDAP password policies), the logic of the confirmation dialog box for executing the action was inverted.

**Note:**
LDAP password policies can be created, managed and assigned to operators in the context of a CAE project for easier configuration of the LDAP server. A suitable password policy can enable the function of "Password expires" so that after a set time the validity of the password expires and the operator must assign a new password, for example.

<table>
<thead>
<tr>
<th>A&amp;P: 631884</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-02-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation: Not necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Contents**

**Files:**
- /opt/aprol/lib64/libAprolLdapConfig.so.1.81.1

**CAE DB:** ---

**Runtime DB:** ---

4.16. Using the APROL start scripts

Call parameter "--replace_or_add_args" caused the start procedure to abort when APROL GUI applications were called using the associated start scripts.

**Note:**
Call parameter "--replace_or_add_args" can be used to overwrite call parameters already configured for starting the application or to add additional call parameters.
4.17. B&R UPS to APC3100/PPC3100

The UPS daemon displayed incorrect type information when using B&R UPS for this Automation PC/Panel PC.
The determination of type information was adapted for this hardware. The affected UPS daemon is part of the associated AutoYaST DVD.

4.18. Diagnosis of ANSL authentication for accessing the controller

When using AR OS versions that do not support ANSL authentication, statuses "AnslLogin not supported" and "AnslLogin confirmed" were displayed simultaneously in the diagnosis.
In this case, after correction, only the status "AnslLogin not supported" is output.

4.19. KTowiTool: Reading a card using ADMITTO RFID card reader

Reading an RFID via the KTowiTool utility could not be performed when using an ADMITTO RFID card reader if the RFID information carrier was already placed at the start of the reading routine. Utility KTowiTool was no longer usable during this phase.
The behavior has been changed so that unsuccessful reading is aborted after 10 seconds with error code "ETIMEDOUT" (110).
Note:
The placement of an RFID medium before the start of the reading routine of KTowiTool does not lead to results. The medium should only be placed on the reader after the reader routine has started. This is the only way to start the reading procedure in the reader.

<table>
<thead>
<tr>
<th>A&amp;P: 634354</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-02-26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not yet implemented</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files:  
/opt/aprol/bin/KTowiTool: Version 2.1.60.2.1  
/opt/aprol/lib*/libAprolAdmittoLogin.so.1.2.2

CAE DB: ---  
Runtime DB: ---

4.20. Missing start path when specifying a relative path

When specifying a constant at an input pin used for inputting a relative path (e.g. "IVTEXT" of block AprCcAlarm), the start path for the file selection dialog box was missing. For example, if an HTML page was entered for the intervention text, it could not be opened at runtime.

<table>
<thead>
<tr>
<th>A&amp;P: 635029</th>
<th>Also available starting with: R4.2-06</th>
<th>Text correction: Schulte</th>
<th>On: 2019-03-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation:</td>
<td>Not necessary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contents

Files:  
/opt/aprol/lib*/libCaeCFC.so.4.676.2.9

CAE DB: ---  
Runtime DB: ---

4.21. Corrections for new language English (GB)

Despite successful installation of new language "English (GB)", country code 044, this language could not be selected in the project and library properties. This meant that it was not possible to switch the alarm and HMI application texts to the new target language.

In APROL SDM, the new language was not correctly displayed in section "Status of translation".

After switching the keyboard layout to the new language "English (GB)", the selected language was not used correctly and the language "English (US)" was displayed in this case.
4.22. APROL SDM: Status display for language "German (DE)"

In APROL SDM, the basic release of the translation and associated date were not displayed correctly in section "Status of translation".

4.23. Troubleshooting in the connection editor

Various corrections have been carried out to the connection editor to prevent possible error behavior.
4.24. Utilization regulation for AnslDriver

After connection is established, all AnslDriver objects are registered on the controller. In the past, this caused such a high load on the controller that the variable update of existing connections (e.g., controller-controller connection) was greatly delayed. To regulate this behavior, the new call parameter "-registerSendDelay" was provided and should prevent this interference in combination with other parameters. However, since this extends the registration phase of the variables, the call parameters concerned must be configured by the user as necessary.

The following parameters are decisive for the registration phase; the recommended values cause a longer (but less load-intensive) registration phase:

- registerSendDelay  Recommendation: >100 ms
- sendDelay  Recommendation: 2 ms
- bufSize  Recommendation: 4
- pvConnectTimeout  Recommendation: 0 (i.e. switched off)

Notes:
The actual effect depends on the number of objects to be registered. The effect will be much greater for a large number of variables that must be registered using many ANSL telegrams than for a few objects registered using a few ANSL telegrams.

With the provision of new call parameter "-registerSendDelay", the previous parameters "-connectPvBlockDelay" and "-connectPvBlockSize" became obsolete and were therefore dropped in the CC modules of the AnslDriver. New parameter "-registerSendDelay" is automatically activated with 100 ms to relieve the controller during the registration phase. To maintain the previous behavior, it is necessary to disable the call parameter deliberately.

Due to the aforementioned changes, ANSL UIF changeset 348057 was applied.

A&P: 634049, 636004  Also available starting with: R4.2-06  Text correction: Schulte  On: 2019-03-11

Documentation: Manual "X99 - CC modules", chapter "AnslDriver call parameters"

Contents

Files:
- /opt/aprol/bin/AnslDriver: Version 2.2.341.2.7
- ENGIN/CAEdb/caedb/drvDB/drvPisAnslDriver.imp: Revision 1.127.2.4
- ENGIN/CAEdb/caedb/onlineHelp.imp: Revision 1.99.2.3
- /opt/aprol/share/locale/de/LC_MESSAGES/CAEDB_AprolSystem.mo: Revision 1.364.2.5
- /opt/aprol/lib*/libAnslUIF.so.4.5.1010

CAE DB:  Yes
Runtime DB:  Yes
4.25. Providing a context-related wine environment

Separate wine environments are provided in one CC account environment. For example, a separate ".wine" directory is used for the "Build (Library)" operation of a CAE library or for the "Build" procedure of the hardware instance x of CAE project y. This enables changes to be applied in your own wine environment, even if another build procedure is performed at the same time. As part of a build procedure, the associated wine environment is reestablished and initialized, which minimizes problems that have occurred so far. Further corrections ensure that the build procedure for controllers partially containing mapp View can be performed without any problems.

Necessary action:
Due to the changes performed during the build procedure, it is recommended that a "build (all libraries)" and a "build (project)" of all CAE projects be performed after patch installation.

4.26. Preventing operation of USB mass storage devices

To prevent operation of USB mass storage devices, the software solution "USBGuard" is offered.

For easy handling, customers do not initially have to make their own settings.
In APROL R4.2-05P1 and later, script "AprolSetSecurity +usbguard ownrules" is automatically started during an AutoYaST update, APROL installation, APROL update or patch installation. This means that during such an installation/update, connected devices that are not of type "Mouse", "Keyboard", "Technology Guard" or "USB hub" (e.g. USB mass storage devices) are blocked by the activation of USBGuard and can no longer be used until USBGuard is stopped manually.

Alternatively, the following call parameters can be passed to the script:
• "+usbguard": Allows you to use the default setting (from /opt/aprol/etc/usbguard_default_rules.conf); you can enter USB devices of type "keyboard", "mouse", "Technology Guard" and "USB hub" here.
- "+usbguard ownrules": **Additionally** enables own rules (from /home/aprolysys/APROL/cnf/usbguard/own_rules.conf)
- "+usbguard secure": Activates all USB devices connected at the time the script was called (entry in file /etc/usbguard/rules.conf). In addition, USB devices of the type "keyboard", "mouse", "Technology Guard" and "USB hub" are activated.
- "+usbguard secure ownrules": Activates all USB devices connected at the time the script was called; your own rules are also taken into account. In addition, USB devices of the type "keyboard", "mouse", "Technology Guard" and "USB hub" are activated.

**Notes:**
1. The script with the alternative call parameters must be called as Linux superuser "root".
2. USB devices of type "keyboard", "mouse", "Technology Guard" and "USB hub" are enabled for all mentioned USBGuard call parameters.
3. USB devices of type "Keyboard", "Mouse", "Technology Guard" and "USB hub" can be exchanged at any time even if USBGuard is activated.
4. If USB devices that were previously blocked by USBGuard should be enabled, the configuration must be adjusted and USBGuard restarted. A direct restart via call script is possible with the corresponding call parameter.
5. To enable USB devices that were blocked when USBGuard was started, USBGuard must be stopped and the USB devices connected again. Only then is it possible for the computer's operating system to recognize the devices.
6. In the desktop environment, "USBGuard QT Viewer" is started and placed in the "System tray". This viewer outputs messages when known or unknown USB devices are connected to the computer. In order to guarantee a clear display, any interactive functionality was removed from the associated source code and then stored in directory "/opt/aprol/src/usbguard/" in accordance with the GPL.

**A&P:** 626834, 633144, 633564, 634159, 634724, 636209, 636199, 636954, 636949

**Also available starting with:** R4.2-06  **Text correction:** Schulte  **On:** 2019-03-07

**Documentation:** Manual "D6 - Security", chapter "Preventing operation of USB mass storage devices"

**Contents**

<table>
<thead>
<tr>
<th>Files:</th>
</tr>
</thead>
<tbody>
<tr>
<td>/opt/aprol/scripts/AprolSetSecurity: Version 1.8.2.11</td>
</tr>
<tr>
<td>/opt/aprol/scripts/AprolScriptsLibrary: Revision 1.576.2.10</td>
</tr>
<tr>
<td>/opt/aprol/etc/usbguard_default_rules.conf: Revision 1.3.2.4</td>
</tr>
<tr>
<td>/home/aprolsys/APROL/cnf/usbguard/ownrules_sample.txt</td>
</tr>
<tr>
<td>/opt/aprol/share/locale/de/LC_MESSAGES/AprolSetSecurity.mo: Revision 1.6.2.7</td>
</tr>
<tr>
<td>/opt/aprol/skel/default_config/.config/autostart/usbguard-applet-qtviewer.desktop: Revision 1.15.2.1</td>
</tr>
<tr>
<td>/opt/aprol/skel/system_config/EngineeringStandard/.config/menus/Aprol_BuRDesigner.menu: Revision 1.15.2.1</td>
</tr>
<tr>
<td>/opt/aprol/skel/system_config/RuntimeStandard/.config/menus/Aprol_BuRStandard.menu: Revision 1.1.2.2</td>
</tr>
</tbody>
</table>

**CAE DB:** ---

**Runtime DB:** ---
4.27. Using the access data of "MonitSystemOperator"

An empty HTML page was displayed when opening the system monitoring via "Monit". This error has been corrected.

To trigger the monitoring of a process via Monit again - and to restart the process itself if necessary - button [Login to enable monitoring] in column "Status" can be used as usual.
In the context of this APROL patch however, the access data of B&R operator "MonitSystemOperator" must be entered with password ".MonitSystemOperator" in the following authentication dialog box.

In APROL R4.2-06 and later, it will be possible to configure explicit operators in the OperatorManager for access to system monitoring via "Monit".
For increased security, "MonitSystemOperator" should be disabled and an own Monit operator created with unpublished password. This new operator must belong to operator group "MonitSystemGroup".
Note: Script PatchEnd calls AprolPrepare to enable the Apache and Monit configuration change.