EPC 15x2 – CHANGE NOTES

Change notes for the Edge-PC: EPC 1502 & EPC 152

Application note
ah_EPC_en_changes

1 General information

This document contains all changes made between firmware version 2021.9 and the current firmware version of the EPC 15x2.
(Order No.: EPC 1502 - 1185416
EPC 1522 - 1185423).

Current firmware version: 2024.0.9 LTS

Recommended:
To be able to use all new functions of a firmware version, always use all elements of the toolchain in the same version. The toolchain includes, for example, PLCnext Engineer, SDK and PLCnext CLI.

Note:
In the context of a firmware update, the controller will be restarted. During this time, the plant availability can not be guaranteed.

Note:
Any EPC 15x2 with hardware version 05 or newer no longer has WIFI functionality.

2 Table of contents

Make sure you always use the latest documentation.
It can be downloaded at phoenixcontact.net/product/1185423.

3 Changes in firmware version 2024.0.9 LTS

- To be able to use all new functions of the firmware, you need PLCnext Engineer version 2024.0 LTS or newer.
  Select the latest template for firmware version 2024.0 LTS in the PLCnext Engineer project.
- In order to update to firmware version 2024.0.3 LTS or newer at least a firmware version 2023.0 LTS or newer must be installed on the PLC. Older firmware versions will not accept the *.rauc firmware update file.
- Further information, example code or instructions can be found on the Edge-Device Github Forum: www.github.com/PLCnext/EdgeDevices

This section describes changes made between firmware version 2024.0.3 LTS and firmware version 2024.0.9 LTS.

3.1 Error corrections

DataLogger

The “IDataLoggerService2” “ReadVariablesData” method returned unexpected results like records for the NULL entries in the database, but these only contained the “consistency” flag and the record type and no value.

Network

Under high network load the built-in Ethernet interface of the affected PLC types sometimes can reach a blocking state. In this state only a power reset can re-enable the interface communication. To avoid this the PLCnext Technology network driver has a mechanism implemented to detect such situations and to react with a reset of the specific interface. By default behavior of the Linux network stack a predefined default gateway configuration got lost during this reset. This “Known Issue” has been fixed.

RSC

It was not possible to use a string length of greater than 4096 bytes in the data type “RscString<int N>” of RSC services.

TLS FB

- A high CPU load that was associated to the use of the “TLS_2” function blocks has been detected in the previous firmware version.
- The TLS_*_2 FB could not detect some passive socket closed when “a cable got pulled”. The TLS_*_2 FB continued to show an active connection for quite some time, way beyond the PLC's KeepAlive settings. In combination with PLCnext Engineer version 2024.0.4 LTS or newer this issue has been solved. Note: This issue was erroneously reported as fixed with firmware 2024.0.6 LTS. Now it has definitely been fixed.
- After adding an instance of the function block TLS_SOCKET_2 to the project via Download Changes (“Write and Start Project Changes” in PLCnext Engineer) the PLC stops with a “Arp::System::Commons::Plc::NullReferenceException”. This problem occurs with PLCnext Engineer version 2024.0.3 LTS. In combination with PLCnext Engineer version 2024.0.4 LTS or newer this issue has been solved.
- *The TLS_*_2 FB could not detect some passive socket closed when “a cable got pulled”. The TLS_*_2 FB continued to show an active connection for quite some time, way beyond what the KeepAlive settings on the PLC. In combination with PLCnext Engineer version 2024.0.4 LTS or newer this issue has been solved.*
  Note: This error was originally classified as fixed, but continued to occur. It was finally fixed with firmware versions 2025.0 and 2024.0.9 LTS.
- There has been a notable increase in CPU load when TLS_*_2 FB instances with PLCnext Engineer version 2024.0.3 LTS are active. In combination with PLCnext Engineer version 2024.0.4 LTS or newer this issue has been solved.
- The error code “0xC204” (“The datagram is too long") could sporadically occur on the TLS_SEND_2 function block, although there was no length overrun in the application. In combination with PLCnext Engineer version 2024.0.4 LTS or newer this issue has been solved.

WBM

The role “UserManager” did not have the permission for the LDAP configuration in the WBM as described in the documentation.

ANSI C

The ANSI C function “getBufferPtrByPortname()” created unnecessary copies of the buffer. As a consequence buffers returned by a previous call to this function (to get the buffer of a different port) were not updated to the fieldbus. This bug has been fixed.

System watchdog

Sporadically a system watchdog could occur. A possible cause of these watchdogs could be found in the connector to the PLCnext Store, especially when the PLC was not connected to the store. The system watchdog was preceded by a SIGSEGV.

OPC UA client

When the OPC UA client configuration is loaded and “ns=0” is specified in the identifier of <LocalVariable> element or in the <NodeId> element of the <RemoteVariableDescriptor>, a SIGSEGV (segmentation fault) could occur which led to a system watchdog.

OPC UA server

- Very sporadically a SIGSEGV (segmentation fault) could occur which led to a system watchdog. The SIGSEGV could occur when a a new PLC project was downloaded while a connected OPC UA client performed a longer operation, e.g. writing a large array.
- With a large number of OPC UA variables, sporadically an unexpected segmentation fault could occur after some time of apparently normal operation.

Alarms

A memory leak has been fixed in the alarm server. This leak could occur when alarms were viewed in the eHMI and the browser was closed abruptly (without deleting the created alarm subscription).

HMI

When retrieving variable values via the POST method of the REST API a memory leak may occur. To avoid this problem register and read the variables as a group or use the GET method of the REST API instead.
This known issue has been fixed.

OPC UA client

If the OPC UA client was connected to another OPC UA server and this server was restarted, the OPC UA client did no longer update its monitored items.

OPC UA server

Very sporadically a SIGSEGV (segmentation fault) could occur which led to a system watchdog. The stack trace in the Output.log file indicated that one or more methods of the class “Arp::Services::OpcUAServer::Internal::InformationModel::Common::SampleGroup” was involved. In many cases this error occurred when variables have been removed from or added to the list of monitored items, where in parallel other clients created or freed OPC UA sessions. The longer the list of monitored items, the more likely it was that the error occurred.
This known issue has been fixed.

3.2 Known limitations and errors

The known limitations and errors can be found in the PLCnext Info Center at:
https://www.plcnext.help/te/Known_issues.htm - Here you will find a constantly updated overview of all known issues.

3.3 Security updates

The following security updates have been made in this release. For more information about the specified CVE numbers, see:

- https://nvd.nist.gov/vuln
- https://cert.vde.com

Information on the Phoenix Contact “PSIRT” can be found at: https://www.phoenixcontact.com/psirt

Git

– CVE-2024-32002

OpenSSH

– CVE-2024-6387
– CVE-2024-39894

OpenSSL

– CVE-2024-4603
– CVE-2024-2511
– CVE-2024-4741

FastCGI

– CVE-2025-23016

Glib

– CVE-2024-52533

Libxml2

– CVE-2025-27113

Libexpat

– CVE-2024-50602

Openssh

– CVE-2025-26465
– CVE-2025-26466

Openssl

– CVE-2024-9143

Openvpn

– CVE-2024-5594

Vim

– CVE-2024-41957
– CVE-2024-41965

Nano

– CVE-2024-5742

OpenSSL

– CVE-2024-5535
– CVE-2024-6119

Python

– CVE-2024-6232
– CVE-2024-7592

SSH

A DoS (Deny of Service) attack using LOIC (Low Orbital Ion Canon) at port 22 resulted in high RAM usage.

Bash

PxC PSIRT Report: Some bash scripts that are allowed to be executed by users in the “plcnext” group or the “plcnext_firmware” user were vulnerable to unsafe environment variable injection.

Security profile

– Correction of parameter “AllowTcpForwarding” of ssh configuration in security profile from “yes” to “no”.
– The sshd_config for the security profile missed the include mechanism from default configuration.

Curl

– CVE-2024-9681
– CVE-2024-11053
– CVE-2025-0167

4 Changes in firmware version 2024.0.3 LTS

- To be able to use all new functions of the firmware, you need PLCnext Engineer version 2024.0 LTS or newer.
  Select the latest template for firmware version 2024.0 LTS in the PLCnext Engineer project.
- In order to update to firmware version 2024.0.3 LTS or newer at least a firmware version 2023.0 LTS or newer must be installed on the PLC. Older firmware versions will not accept the *.rauc firmware update file.
- Further information, example code or instructions can be found on the Edge-Device Github Forum: www.github.com/PLCnext/EdgeDevices

This section describes changes made between firmware version 2023.0.6 LTS and firmware version 2024.0.3 LTS.

4.1 New Edge functions

Firmware Update
Please follow the update instruction attached inside the firmware container. Optional the update instruction can also be found HERE.
You do not need to install any "Pre-Update App".

DHCP via WIFI
The EPC 15x2 can now connect to a router using DHCP instead of a status IP address.
Inside the WBM "Network" Tab, DHCP can now be enabled via WIFI.
The physical ports X2 and X3 still require a static IP address.
Further info can be found on Github: DHCP

Easy factory reset
If a factory reset is required, for instance due to losing the password or due to other issues with the EPC 15x2, the device can be reset to factory settings while booting up.
Further info can be found on Github: Factory-Reset

New Functions with FW 2024.0 LTS
All new functions of FW 2024.0 are of course also available for the EPC 15x2.
An important change is for instance the support of OPC UA client and server

4.2 New functions

DataLogger

The recording of variables in the context of an IDLE task has been improved. Instead of recording each task cycle the recording time stamp is used to approximate to the sample rate.

GDS

Concurrent data exchange from different CPU cores has been optimized. In particular 2 or more ESM tasks assigned to different ESM (CPU core) and exchanging data with the same I/O buffer could block each other. In worst case scenarios an ESM task watchdog could occur. The performance optimization of the I/O buffer minimizes the risk of an ESM task watchdog.

IEC 61131

Download Changes (“Write and Start Project Changes” in PLCnext Engineer) while variables are forced, is now supported. In combination with firmware 2024.0 LTS (or newer) PLCnext Engineer 2024.0 LTS (or newer) does no longer reset the force state implicitly before downloading changes. Now the forcing state is kept if variables, which are currently forced, do still exist as forcible variables in the changed project. Otherwise the firmware rejects the Download Changes command and emits a notification.

In this case the user can check the list of forced variables in PLCnext Engineer and unforce variables that prevent downloading changes.

Licenses

The PLCnext firmware is capable of using licenses, which are managed by a license server in the network. Currently this feature can only be used with the PLCnext Simulation products because only the license “PLCnext ENG SIM” can be hosted on a license server (PC). For other PLCnext controllers this capability is only a preparation for future features. The access to the license server can be configured via WBM. Currently if a license server is configured, no licenses can be accessed which are stored at the device or LIC SD card.

Proficloud

The Proficloud can be configured to send the values of the marked variables to an MQTT server instead of the Proficloud. This MQTT server can be in a local network or in the cloud. The MQTT server to be used, can be configured in the WBM.

System

– If a system watchdog (SWD) occurs due to a fatal error that has caused a PLCnext process to die, the following files are saved before the system is rebooted:
  – reason.log
  – kernel.log
  – sys.log

  If an LTTNG session is active, its trace is saved, too. These files are saved to the folder */opt/plcnext/watchdogDaemon/[timestamp]* where *[timestamp]* is created from the time at which the SWD occurred. If more than 3 SWD occur, the oldest folder will be removed. If the PLC is rebooted due to the hardware watchdog reset, it is not possible to save these files. This can happen if the hardware watchdog is no longer triggered by the firmware, for example due to a heavy, high-priority load on the system.
– In combination with firmware 2024.0 LTS (or newer), PLCnext Engineer (2024.0.1 LTS or newer) supports configurable alarms.
– Changes of PLC states are serialized and dedicated state transitions can be monitored with a timeout. This prevents from scenarios in which a low-priority task requests to change the PLC state (which can also occur implicitly, for example by calling the “RestartDevice()” method of “IDeviceControlService”) while the PLC Manager is performing another state transition (for example from “PlcState::Running to PlcState::Stop”).

4.3 Changes

Linux

- The OpenSSL library has been updated to version 3.0. The PLCnext firmware uses this version only. For compatibility reasons the previous OpenSSL library (version 1.1.1) still exists in the file system. As this version is outdated, it will be removed in one of the next firmware releases. For applications (including PLCnext Apps) which use the OpenSSL library, an update is recommended as soon as an application version is available, which uses OpenSSL 3.0.
- LTTng has been updated to version 2.13.9 and there has been a significant change in the “lttng-ust” (LTTng user space tracing). If an application/library is instrumented with LTTng user space tracing and has been compiled without using the “ArpTracing.cmake” support of the LTTng user space tracing in PLCnext SDK (available since FW 2022.6), the instrumented application/library cannot be loaded any longer by the firmware (“undefined symbol” is reported in Output.log). In that case the instrumentation of LTTng user space tracepoint in the application/library has to be changed to use the “ArpTracing.cmake” support of the PLCnext SDK and it needs to be recompiled. Matlab Simulink applications, which use the “PLCN_EnableLTTNG” compile option, have to be compiled with PLCnext Target for Simulink v2.3 or newer.
- Library “paho-mqtt-c” has been updated to version 1.3.13.

OPC UA

- The OPC UA client and server use the OpenSSL library to validate X.509 certificates using the OpenSSL flag X509_V_FLAG_X509_STRICT. As firmware 2024.0 LTS is updated to OpenSSL 3.0, the X.509 certificate validation became more strict, especially for non self-signed certificates. This may cause the server to return the error “BadSecurityChecksFailed” on client connection attempts. Make sure that, according to OPC UA Part 6, client issuer as well as client application X.509 certificates are conform to RFC 5280, especially to the sections listed below. This applies to self-signed certificates as well as user-managed certificates.
  - 4.1.1.2 signatureAlgorithm
  - 4.1.2.6 Subject
  - 4.2.1.1 Authority Key Identifier
  - 4.2.1.2 Subject Key Identifier
  - 4.2.1.3 Key Usage
  - 4.2.1.6 Subject Alternative Name
  - 4.2.1.9 Basic Constraints
- In the NamespaceArray of the OPC UA server the index of namespace http://phoenixcontact.com/OpcUa/PubSubConfiguration has changed from index 8 to index 2. This namespace is optional and it appears only if the feature “OPC UA PubSub” is activated on the WBM page “System Services”. Currently the firmware does not provide anything in that namespace, it is only a preparation for future extensions.

4.4 Error corrections

Axioline

Some Axioline modules (for example analog outputs) provide status information in their process data. In case of a module error (for example loss of power supply) these process data inputs are filled with an error code. However, in certain situations these process data inputs returned “0” instead of the error code. This error has been corrected. Only process data inputs of modules connected to the controller's local bus have been affected. Not affected are retrieving module errors via PDI request as well as displaying these errors at the WBM page “Diagnostics - Local Bus”.

ESM

- If two ESM tasks cause a task watchdog at (nearly) the same time, the event task “Arp.Plc.Esm.OnException” was executed twice. Additionally, the PLC was attempted to be stopped twice in parallel. This failed and the PLC had to be rebooted. This error has been corrected and the event task as well as the PLC stop is now executed only once.
- In some situations calling the function block “GET_EXCEPTION_INFOS” in the event task “Arp.Plc.Esm.OnException” caused an exception. This has been fixed. In additon to update to firmware 2024.0 LTS or newer, the PLC project has also to be re-compiled using PLCnext Engineer 2024.0.1 LTS or newer.
- In combination with PLC IDLE task and Axioline configured to use that IDLE task as “Trigger Task”, the PLC project stops after some time due to a task watchdog. After that the PLC had to be rebooted.

EtherNet/IP

Sporadically the activated “EtherNet/IP” component could block a PLC state change after project download.

GDS

It was possible to force a variable with a value of an inappropriate data type.

IEC 61131

- When breakpoints are set in the IEC 61131-3 program, the “PlcState::Debugging” flag was reset in the transition from “PLC STOP” to “PLC HOT START” and then set again when changing from “PLC Running” to “Debugging”. The fieldbus output values could be switched on again for a short time period when the PLC was in the state “Running”.
- “Download Changes” (“Write and Start Project Changes” in PLCnext Engineer) implicitly creates a backup of the current project. If “Download Changes” is not possible (for any reason), the current project is restored from this backup. If “Download All” (“Write and Start Project” in PLCnext Engineer) is performed immediately after a rejected or failed “Download Changes” attempt, the PLC is reset. Resetting conflicted with restoring and ended in an I/O exception. The firmware now keeps the state flag “Running | DcgNotPossible” until the restoring process has been finished. Depending on the project size, the restoring process may take several seconds. Note that PLCnext Engineer 2023.9 (or newer) checks this state before it offers the “Download All” option.
- In case of large projects and an extensive use of certain firmware function blocks, an exception could occur after a “Download Changes” attempt (“Write and Start Project Changes” in PLCnext Engineer). The following is reported in the Output.log: “SetupPlc(changing) with out of memory error - GC heap of the application domain”. The firmware function blocks have been updated in PLCnext Engineer version 2023.0.6 LTS and in 2024.0 LTS (or newer).
- An exception after “Download Changes” (“Write and Start Project Changes” in PLCnext Engineer) has been triggered if the function block “AR_STATISTIC_ITERATE” was enabled and generated new values. To fix this bug, re-compile and download the project using PLCnext Engineer 2024.0 LTS (or newer).
- In the function “MOVE” that is used with the function “EN/ENO”, a value of a multi-element-variable was assigned to a wrong address. To fix this bug, re-compile and download the project using PLCnext Engineer 2024.0 LTS (or newer).
- In a C# eCLR Library the runtime created a vectored exception when calling “File.Exists(null)”.

OPC UA client

The GDS client could not access PLC variables (attribute “LocalVariable” in XML element “eUAClientNodeMapping”) if “Visibility of variables” is set to “None” in the OPC UA configuration of PLCnext Engineer.

OPC UA server

- A fatal exception could occur if “IndexRange” is used when accessing a variable that is not of type array or of type string.
- After the OPC UA server started with a changed project the server might return “BadNodeIdUnknown” when a client tried to continue monitoring an existing subscription item.
- Subscriptions did not work after a warm or cold start with project changes.
- A sporadic fatal exception could occur in case of OPC UA session creation and login.
- If several elements of a string array are subscribed using “IndexRange”, a fatal error occurred and the PLC stopped.

PROFINET

- If a “write record” could not be processed immediately by the PROFINET stack, it was buffered. When a new transmission attempt was made, it was then incorrectly sent as a “read record” packet.
- The RSC service “IAcyclicCommunicationService::RecordWrite()” has a timeout in which the profinet device has to respond. In some cases this timeout was too short and has been increased to 15s. The IEC function block “WRREC” internally uses this service, too.
- A PROFINET device with a device access point (DAP) starting at “Slot 1” could not be accessed via the “AR_MGT” function block.
- An inconsistent “SF-LED” state could occur at the PROFINET controller, if in case of an activated network port monitoring of a connected PROFINET switch the controller was plugged to another port during runtime and then plugged back to the original port.
- The PROFINET controller sent a “Write Request” with wrong lengths calculated in the “NDR header” when establishing the connection. This led to a “Write Response” error for PROFINET stations with very large parameter records (for example “PN/PB Gateway”).
- After PROFINET alarms of a certain severity occurred, these were not reset again for going alarms and remained in the diagnostic memory. As a result they were displayed incorrectly in the WBM and it could also happen that the “SF-LED” remained active.

Proficloud

- A fatal exception occurred if the Proficloud component with “Remanent Buffering” was enabled and the DataLogger component was manually disabled on the WBM page “System Services”.
- If a Proficloud TSD connection was lost, the logging was flooded with an unnecessary number of messages.
- If a Proficloud connection was disconnected, the connection could not be deactivated in the WBM.
- When a physical connection to the Proficloud was interrupted for several hours and re-established afterwards, the component could not reconnect automatically to the Proficloud.

SPLC

In case of a synchronization error in combination with the SPLC hardware, numerous synchronization timers could sporadically be created. This could result in a PLC task watchdog.

System

- After starting the PLCnext Engineer logic analysis, which contained an element of an array of struct, a system watchdog could occur sporadically.
- A system watchdog with reboot could occur while reading software information of a PLCnext Engineer project. This issue could occur if the manifest file in the PCWE directory is deleted after the “File::Exists” call but before the file is accessed by other operations. This could be the case during a “Download Changes” process (“Write and Start Project Changes” in PLCnext Engineer).
- Sometimes an OPC UA client did not receive the last “UpdateStatus” message after a successful installation of a firmware update. The last message informs about the reboot of the device (100 %) but the client only saw the “copy rootfs” message (90 %).
- If the controller was in the standard PLC status “ready/blocked” after a system watchdog, a “FATAL - Exception” was triggered if the “General Data (SPLC)” page of the SPLC was opened in the WBM.

WBM

- The “User Partition” value that was displayed on the WBM page “Cockpit” did not match the value of the global IEC 61131 system variable “USER_PARTITION.MEM_USAGE”.
- The memory partition was displayed in the WBM in “MiB” but shown with the unit “MB”. Now it is calculated as MB.

4.5 Known limitations and errors

The known limitations and errors can be found in the PLCnext Info Center at:
https://www.plcnext.help/te/Known_issues.htm
Here you will find a constantly updated overview of all known issues.

4.6 Security updates

BusyBox will be disabled in a future firmware release and replaced by other packages if necessary.

The following security updates have been made in this release. For more information about the specified CVE numbers, see:

– https://nvd.nist.gov/vuln
– https://cert.vde.com

Information on the Phoenix Contact “PSIRT” can be found at: https://www.phoenixcontact.com/psirt

Curl

– CVE-2023-38039
– CVE-2023-46219
– CVE-2023-46218
– CVE-2023-38545
– CVE-2023-38546
– CVE-2022-43551
– CVE-2022-43552
– CVE-2023-27533
– CVE-2023-27534
– CVE-2023-28320
– CVE-2023-28321
– CVE-2023-28322
– CVE-2023-28319
– CVE-2023-23914
– CVE-2023-23916
– CVE-2023-23915

DBus

– CVE-2023-34969
– CVE-2022-42010
– CVE-2022-42011
– CVE-2022-42012

File

– CVE-2022-48554

Git

– CVE-2023-22490
– CVE-2023-25652
– CVE-2023-29007
– CVE 2022-41903
– CVE-2022-23521

GRPC

– CVE-2023-33953
– CVE-2023-32731
– CVE-2023-32732
– CVE-2023-4785
– CVE-2023-44487

Libcap

– CVE-2023-2603

Libssh

– CVE-2023-6004

GDS

Security notifications for write access were not deacti vated if a new PLC project was loaded without activation.

GLib

– CVE-2023-29499
– CVE-2023-32636
– CVE-2023-32643
– CVE-2023-32611
– CVE-2023-32665

C-ares

– CVE-2022-4904
– CVE-2023-32067
– CVE-2023-31147
– CVE-2023-31130
– CVE-2023-31124

Freetype

– CVE-2023-2004

Firewall

It was possible to establish an SSH connection at boot time of the PLC before the firewall is started. This connection remained active even when the firewall is activated and configured to block this connection.

Kernel

– CVE-2022-1012

Libxml2

– CVE-2022-40303
– CVE-2016-3709
– CVE-2023-28484
– CVE-2023-29469

N-curses

– CVE-2023-29491

Network

In the case of an attack with a high network load, network communication could be permanently interrupted despite an activated firewall and activated Netload Limiter. This could only be remedied by a restart of the controller.

Glibc

– CVE-2023-5156
– CVE-2023-4911

NTP

– CVE-2023-26551
– CVE-2023-26552
– CVE-2023-26553
– CVE-2023-26554
– CVE-2023-26555
– Any content could be injected into the NTP configura tion file via the WBM configuration of the NTP service if a line break was inserted in the comment field.

NVT

– CVE-2022-29900
– CVE-2022-29901

OPC UA

The manual firmware update procedure via an OPC UA server did not work as documented.

OpenSSH

– CVE-2023-48795
– CVE-2023-51384
– CVE-2023-51385

OpenSSL

– CVE-2023-5363
– CVE-2023-4807
– CVE-2023-3817

Zlib

– CVE-2023-45853

Python

– CVE-2022-40897
– CVE-2023-40217

Procps

– CVE-2023-4016

SQLite

– CVE-2023-7104

SqashFS

– CVE-2021-41072

Sudo

– CVE-2023-42465

GnuTLS

– CVE-2024-0553
– CVE-2024-0567
- CVE-2023-4911

Tcpdump

With the call “sudo tcpdump” it was possible to read the contents of files without read rights.

UM

The “User Manager” accepted a newly created PLCnext user with the name “plcnext_firmware”. The “UID” and the access rights were identical with the internal user “plc-next_firmware”.

Vim

– CVE-2023-5441
– CVE-2023-5344
– CVE-2023-5535
– CVE-2023-4781
– CVE-2023-4734
– CVE-2023-4733
– CVE-2023-4736
– CVE-2023-4735
– CVE-2023-4750
– CVE-2023-4738
– CVE-2023-4752
– CVE-2023-4751
– CVE-2023-48231
– CVE-2023-48237
– CVE-2023-48706
– CVE-2023-46246

Perl

– CVE-2023-47100

OpenSSL

- CVE-2023-2650
- CVE-2023-0464
- CVE-2023-0465
- CVE-2023-0466
- CVE-2023-0286
- CVE-2022-4304
- CVE-2023-0215
- CVE-2022-4450
- CVE-2023-0216

Podman

- CVE-2022-2989

Python

- CVE-2022-45061
- CVE-2023-24329

Rsync

- CVE-2022-29154

SNMP

- CVE-2022-44792
- CVE-2022-44793

Sqlite

- CVE-2022-46908
- CVE-2022-35737

Strongswan

- CVE-2023-26463

Sudo

- CVE-2023-22809
- CVE-2023-27320
- CVE-2023-28486
- CVE-2023-28487

Syslog

- CVE-2022-38725

Tar

- CVE-2022-48303

Vim

- CVE-2022-4141
- CVE-2022-4292
- CVE-2023-0049
- CVE-2023-0054
- CVE-2023-2426
- CVE-2023-2609
- CVE-2023-2610

5 Changes in firmware version 2023.0.6 LTS

- To be able to use all new functions of the firmware, you need PLCnext Engineer version 2023.0 LTS or newer.
  Select the latest template for firmware version 2023.0 LTS in the PLCnext Engineer project.
- In order to update to firmware version 2023.0.3 LTS or newer at least a firmware version 2022.0 LTS or newer must be installed on the PLC. Older firmware versions will not accept the *.rauc firmware update file.
- Further information, example code or instructions can be found on the Edge-Device Github Forum: www.github.com/PLCnext/EdgeDevices

This section describes changes made between firmware version 2023.0.5 LTS and firmware version 2023.0.6 LTS.

5.1 EDGE functions

Firmware Update
Please follow the update instruction attached inside the firmware container. Optional the update instruction can also be found HERE.

Apps

The Firmware 2023.0.6 LTS no longer comes with pre-installed Apps like Node-RED or InfluxDB natively installed inside the Linux OS.
If you are still running FW 2022.0 with a working instance of Node-RED or InfluxDB that you want to migrate, please install Firmware 2023.0.5 first, otherwise the native instance of Node-RED/InfluxDB will be erased.
If your Apps are already running in containers (shown in WBM "Apps" / Any "PLCnext Store" App) there will be no changes at all. - Of course any app will run after the Firmware-Update just li-ke before.

Sharing of apps or whole applications

Any PLCnext Store App can be easily shared to other PLCnext devices.
For instance, if you want to deploy a pre-configured Grafana Dashboard to multiple EPCs, this can be done easily, without to configure the App on each device individual again.
Further information: Share Apps/Applications

5.2 Error corrections

Proficloud

When Proficloud was configured to cache values (WBM setting “Remanent Buffering Enabled”) and the connection between PLC and Proficloud was broken, the consumed memory increased. If this situation continued for too long, this could even cause a “System Watchdog”.

System

Update of “paho” library from version “v1.3.10” to “v1.3.12”. This update solves several incompatibilities with the IEC 61131-3 “IIoT_Library_V4.01”. In particular, it fixes a “system watchdog” in combination with “MQTT-Client FB” in case of a failed MQTT connection.

5.3 Known limitations and errors

The known limitations and errors can be found in the PLCnext Info Center at:

https://www.plcnext.help/te/Known_issues.htm

Here you will find a constantly updated overview of all known issues.

5.4 Security updates

- As part of the OpenSSH update from “8.4p.1” to “8.8p1” (or newer), “SHA1” will be disabled in a future firmware release.
- BusyBox will be disabled in a future firmware release and replaced by other packages if necessary.

The following security updates have been made in this release. For more information about the specified CVE numbers, see:

- https://nvd.nist.gov/vuln
- https://cert.vde.com

Information on the Phoenix Contact “PSIRT” can be found at: https://www.phoenixcontact.com/psirt

C-ares

- CVE-2022-4904
- CVE-2023-32067
- CVE-2023-31147
- CVE-2023-31130
- CVE-2023-31124

Curl

- CVE-2022-43551
- CVE-2023-38545
- CVE-2023-38546
- CVE-2022-43552
- CVE-2023-23914
- CVE-2023-23916
- CVE-2023-23915
- CVE-2023-28320
- CVE-2023-28321
- CVE-2023-28322
- CVE-2023-28319
- CVE-2023-27533
- CVE-2023-27534

Firewall

It was possible to establish an SSH connection at boot time of the PLC before the firewall was started. This connection remained active even when the firewall was activated and configured to block this connection.

Freetype

- CVE-2023-2004

Git

- CVE-2023-22490
- CVE-2023-29007

Glibc

- CVE-2023-4813
- CVE-2023-5156
- CVE-2023-4911

Libxml2

- CVE-2022-40303
- CVE-2023-28484
- CVE-2023-29469

Ncurses

- CVE-2023-29491

OpenSSL

- CVE-2023-2650
- CVE-2023-0464
- CVE-2023-0465
- CVE-2023-0466
- CVE-2023-3817

Rsync

- CVE-2022-29154

Sqlite

- CVE-2022-46908

Syslog-NG

- CVE-2022-38725

Tar

- CVE-2022-48303

6 Changes in firmware version 2023.0.5 LTS

- In order to update to firmware version 2023.0.5 LTS or newer at least a firmware version 2022.0.8 or newer must be installed on the PLC. Older firmware versions will not accept the *.rauc firmware update file.
- To be able to use all new functions of the firmware, you need PLCnext Engineer version 2023.0 LTS or newer. Select the latest template for firmware version 2023.0 LTS in the PLCnext Engineer project

- Further information, example code or instructions can be found on the Edge-Device Github Forum: www.github.com/PLCnext/EdgeDevices

This section describes changes made between firmware version 2022.0.7 and firmware version 2023.0.5 LTS.

All parts of the previously released version are included in the current version.

6.1 EDGE functions

Firmware Update

Please follow the update instruction attached inside the firmware container. Optional the update instruction can also be found HERE.

Apps

Users who had used the pre-installed Node-RED and/or InfluxDB in FW 2022.0:

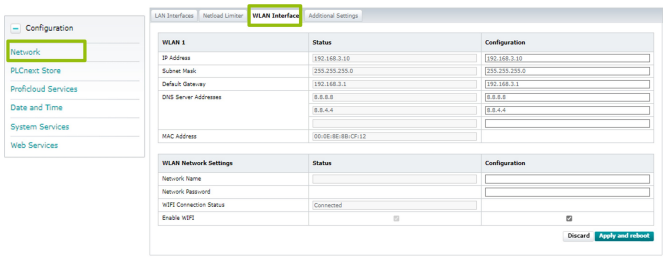
The running processes are stopped during the firmware update. If user data has been created (i.e. user has a running project), separate Node-RED and/or InfluxDB instances are installed via Docker in the same version as previously used. All data is copied from the pre-installed instance to the container. Ultimately, Node-RED and/or InfluxDB should run as usual after the firmware update. If necessary, the nodes must be checked once after the update and deployed again.

Users who did not use the pre-installed Node-RED and/or InfluxDB in FW 2022.0:

To keep the system lean, the natively pre-installed apps Node-RED and InfluxDB are automatically deleted after the firmware update.
If you want to use them again after the update, installing them via our PLCnext Store is as easy as usual. - The version can also be selected more flexibly here.

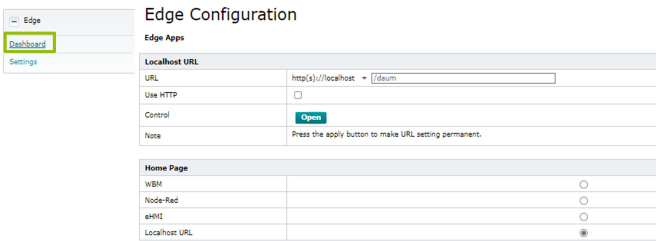
WBM configurations (WIFI)

The WBM has been fundamentally revised and now offers far more functions and an improved overview. The configuration for the WIFI can now also be found at the "Network" tab as well as the "Default route" (important configuration for any internet access.



DisplayPort Visualisation

The local DisplayPort Visualisation has improved greatly. The performance increased a lot, bigger dashboards can be shown locally.
The configuration has also improved. You can now access any local URL, for instance a installed Grafana dashboard or any other local URL can now be shown on a local DisplayPort Monitor.
The configuration can be found inside the WBM under "Edge":



6.2 New functions

HMI

The display of a “System Use Notification” when logging in to HMI applications is now supported.

IEC 61131-3

The “DEVICE_INFO” function block is now supported in user applications (PLCnext Engineer 2023.0 LTS or newer).

OPC UA

- The PubSub feature was extended with the following facets:
  - Subscriber UADP Dynamic Data or Events Facet
  - Publisher UADP Dynamic Data or Events Facet
  - Subscriber UADP Flexible Layout Facet
  - Publisher UADP Flexible Layout Facet
- The OPC UA server supports references to nodes in its own address space according to “https://reference.opcfoundation.org/Core/docs/Part17/A.2/”.
- The “Minimum UA Client Profile” has been implemented. Currently only manual configuration is supported (configuration via PLCnext Engineer is in progress).
- OPC UA supports ReverseConnect. PLCnext Engineer 2022.9 or newer and the related template are required for the configuration of this feature.

PLCnext Store

- Extension of PLCnext Store support with the following sub-jects:
  - Specifying the ContainerID for license operations.
  - Report active ContainerIDs to the PLCnext Store.
  - Transfer SD card slot status to the PLCnext Store.
  - In addition to licences bound to the device, licences can now also be bound to the LIC SD cards.
- New file formats (*.PlcNextRaC, *.PlcNextRaU, *.PlcNextRaR) for offline licensing in combination with the PLCnext Store are supported.

PROFINET

- Adjustable process data widths for the built-in PROFINET device in combination with the GSDML configuration are now supported. Instead of the previous fixed value of 512 bytes, you can now select from a predefined set of values between 2 and 512 bytes.
- In case of module differences, the notification “Arp.Io.PnC.ArReady” contains information about the “ModuleDiffblock” which has been sent by the PROFINET device. The module difference is also dis -played on the PROFINET page in the “Diagnostics” area of the WBM.

Proficloud

- The update of the application via Proficloud is supported. In PLCnext Engineer 2022.9 and newer an export of an updated application can be generated (“Export PLCnext Engineer Software Package”/“Export PLCnext Engineer Software Package (with sources)”). The exported files can be uploaded to the Proficloud and from there assigned to further devices (for this the “DMS Basic Add-on” is required).
- In case the connection between the Proficloud and the PLC is interrupted, the data can now be cached perma nently in the PLC and sent after reconnection. The fea ture can be enabled and configured via the “Proficloud Services” page in the WBM.

DataLogger

The DataLogger has been improved to emit more notifications.

IEC 61131-3

A new function block “UPS_DIAGNOSTICS” can be used by the application. For further details on this function block refer to the help of PLCnext Engineer 2022.6 or newer. Additionally, the new system variable “UPS_ DIAGNOSTICS” was introduced.

Linux/OS/Docker

- The local gRPC server was integrated for the first time. With this first step gRPC offers a kind of standardized open source, programming language independent, lo cal interface to most of the published RSC services.
- The Docker engine Podman was integrated for the first time. With this step Podman is exclusively available for use in context of PLCnext Store apps.

Security

- An integrity check for PLCnext Engineer projects was implemented. The action in case of an integrity breach can be configured (“Warning” mode is enabled by de- fault, “Error” mode can be configured).
  Note: If the integrity check is active, any project is checked while loading. This means that an integrity breach is also detected for projects without the hash code, e.g. projects that are created with a PLCnext Engineer version prior to 2022.6. The notifica -tion payload will report: “Manifest file 'PCWE.mani- fest.config' does not exist.”.
- During startup a notification is emitted which lists all installed PLCnext apps.

– The syslog configuration has been extended to include events logged by “podman”.
– Security-related notifications are logged to a dedicated notification archive. Additionally these notifications are forwarded to the Linux syslog. In the WBM the Linux
syslog client can be configured to forward its log messages to one or more syslog servers.

System

Restricted SFTP access can be configured to predefined folders.

WBM

– The TLS version and a cipher suite can be selected on the “Web Services” page.
– If a password expiration is configured, the WBM shows a warning after login indicating when the password will expire within the configured period.
– On the page “License Management” the UUID of the PLC is shown if a license is stored on the PLC.
– A WBM page “Integrated UPS” has been introduced for diagnostics of the Integrated Uninterruptible Power Supply.
– Password complexity rules and session properties can be configured on the WBM page “User Authentication”.
– NTP servers can be configured on the new WBM page “Date and Time”.
– The new “Netload Limiter” tab on the page “Network” now supports the display of “NetLoadLimiter” statistic values and the user configuration for each network interface.
– The generation of the new private key “RSA 2048 Hardware protected key” is now supported in “Add Identity Store”, “Key Type” on the “Certificate Authentication” page.
– A new WBM page “Cockpit” is provided.
– WBM users can change their own password directly via the new “Cockpit” page.

RSC

The RSC service “IDeviceStatusService” is extended to read additional information. The items “Status.Memory.Usage.Percent.Actual”, “Status.RunStopSwitch.Supported” and “Status.RunStopSwitch.Position” have been added.

5.2 Changes

ESM

– The maximum task latency in multi core applications (by using C++ or IEC 61131-3 programs in different tasks on dif-ferent ESM) has been reduced significantly.
– The power down sequence has been refactored for PLCs with an integrated UPS. The ESM event task “Arp.Plc.Esm.OnStop” is now terminated at latest after 500 ms (even in case of a configured watchdog beyond 500 ms). If this event task is terminated, the retentive data are regarded as invalid and do not persist. As a consequence, a cold restart is performed when the power returns.
– The handling of the “Idle” task by the ESM has been optimized. The resulting cycle time is shorter and the idle task is now executed more often.

GDS

The GDS has been optimized so that less time is required to execute the GDS connectors.

Firmware update/downgrade

When a firmware version 2023.0 or newer is installed and is then downgraded to firmware version 2023.0, the application is implicitly removed and all configurations except the network configuration (file /etc/network/interfaces) are reset to the factory default configuration.

IEC 61131-3

The function block “UPS_DIAGNOSTICS” has been renamed to “READ_UPS_DIAGNOSTICS” because the original name caused a conflict with the system variable of the same name.

Linux/SDK

– Some PLCnext SDK header files included the namespace “Arp::System::Commons::Threading” by accident. This has now been corrected. In order to eliminate compiler errors, C++ projects created by the customer may need to include the namespace explicitly (e.g.

statement “using Arp::System::Commons::Threading;”) or use the fully qualified name by preceding the name of the related types with “Arp::System::Commons::Threading::”.

- LDAP (libldap) has been updated to version 2.5.12. This version does no longer depend on “libgcrypt20.so”. Therefore, “libgcrypt” is no longer part of the PLCnext Linux.
- GCC compiler has been upgraded from version 9.3 to version 11.2. When executed on Microsoft Windows with MinGW, the feature “pre-compiled header” does not work due to this update (gcc reports an internal error).
- By accident some PLCnext SDK header files included the namespace “std”. This has now been corrected. In order to eliminate compiler errors, C++ projects created by the customer may need to include the namespace explicitly (i.e. statement “using std;”) or use the fully qualified name by preceding the name of the related types with “std::”.
- During refactoring of some PLCnext RSC services, type aliases were removed. This also happened inside the “IDataLoggerService2” which utilizes the “VariableInfo” class from namespace “Arp::Plc::Gds::Services”. Before the refactoring this class was introduced into the “Arp::Services::DataLogger::Services” namespace by the “VariableInfo.hpp” file, located in the same directory as the “IDataLoggerService2.hpp”. By now, the “VariableInfo” class is not directly included in the “Arp::Services::DataLogger::Services” namespace but used as a type alias inside the “IDataLoggerService2” interface. This means, applications that used the “VariableInfo.hpp” before the refactoring of the “IDataLoggerService2” now have to include the following statement in order to compile successfully: “using VariableInfo = Arp::Services::DataLogger::Service::IDataLoggerService2::VariableInfo;”

OPC UA

The “ManufacturerUri” has been renamed again from http://www.phoenixcontact.com" to http://phoenixcontact.com.

System

The feature “reset to default setting” now considers OCI containers. The folders below will now be removed:

- /media/rfs/rw/var
- /media/rfs/rw/data

WBM

– A security notification “Security.Arp.System.Um.SystemUseNotificationSet” is issued when the “System Use Notification” is changed via WBM.
– Details about the “ModuleDiffBlock” are displayed on the PROFINET page in the “Diagnostics” area of the WBM. In particular the Module ID of the module that is physically present at the device is displayed.

6.3 Error corrections

C++

RSC services that return values as 'out' parameters of an array data type and are called from C++ code, now clear the array before writing any value.

ESM

– The LOGIC ANALYZER in PLCnext Engineer did not log any variable values if an ESM task of type “IDLE” has been selected. This occurred with firmware version 2022.6 and 2022.9 and has been fixed for firmware version 2023.0.0 LTS.
– If an ESM task has a fatal error and exits immediately, an un-handled follow-up exception leads to a deadlock of the ap-plication.

HMI

When changes made in the HMI project were applied with “Download Changes”, a “SIGSEGV” exception could occur that resulted in a PLC system watchdog (SWD).

Network

– Parallel access of multiple instances to the network adapter port status could result in error messages or exceptions.
– When an Ethernet network storm occurs at an Ethernet interface that is used by PROFINET and the Ethernet link is cut off and reconnected again, an ESM task watchdog could occur.

WBM/Security

– The option “Exclude admin users from timeout” did not work, the admin cannot be excluded. This option can be set at the “Session Configuration” tab of the WBM page “User Authentication”.
– On the WBM page “Network” in the “Configuration” area, LAN interfaces and ports were displayed incorrectly.

IEC 61131-3

– When debugging IEC code using breakpoints in PLCnext Engineer, the PLC stopped with an exception.
– Using the C# method “DateTime.Now” in a static class

PLCnext Store

If an app created a file with write permissions in the temporary files directory ("/var/tmp/appsdata/"), these write permissions were removed after a system reboot. As a result, the app could no longer write to the file.

Notifications

– C# call stack after unhandled exception was doubled in “Notification.log”.

OPC UA

– When an eCLR component variable (IEC 61131-3 resource global variable), e.g. Arp.Plc.Eclr/PLC_CRC_PRJ, was configured to be published via “PubSub”, an exception occurred during start-up. The “PubSub” component and the “UA Server” could apparently not be reached afterwards.
– Some file transfer issues were fixed, e.g. “Writable” attribute was always true and PLC crash when removing permissions.
– When using a custom information model namespace the “BrowseName” was not returned to the OPC UA client.

PROFINET

– If the “MaintenanceItem: Demanded” and the “Property Flag” “Maintenance Demanded” both occurred in the same PROFINET alarm frame, the alarm was not displayed in the PROFINET bus diagnostics in the WBM.
– In connection with a set PROFINET cycle time of 1 ms, the PROFINET controller could experience increased latency. This behavior was caused by an unfavorable timing during the communication processing of the process data.
– During the startup parameterization of a subordinate IO-Link master at an “AXL F BK PN TPS” bus coupler, the error message “0xA002” (wrong module found) could occur.
– When reading the “ModuleDiffBlock” with the function block “GET_MODULE_DIFF_BLOCK” it could happen that the states “WRONG_MODULE” and “NO_MODULE” were not returned. The error occurred when there is a module difference but no submodule difference. With “WRONG_MODULE” and “NO_MODULE” there is no submodule difference and therefore the difference was incorrectly not saved.
– If a bus coupler was operated via the PROFINET controller as a subordinate device without connected I/O modules, the “SF” LED was not activated. The bus coupler reports an “SF” and the PROFINET diagnostics in the WBM also shows this state, but neither the status LED nor the system variable “PNIO_SYSTEM_SF” indicated this.
– When loading the project, an exception could occur if the following applied: A submodule with different input and output data width with corresponding data ports was registered to the controller’s PROFINET device via the bus configuration of the superior PROFINET controller.
– Setting values of “maxSlots” or “maxSubslots” in the PROFINET settings files were not effectively adopted.
– The “MaxSupportedRecordSize” from the GSDML description of a PROFINET device will now be evaluated and interpreted accordingly by the PROFINET controller. Special cases that e.g. “MaxSupportedRecordSize” of a PROFINET device is greater than the maximum record size of the PROFINET controller will be handled correctly.
– When a superior PROFINET controller attempted to set an IP address of the PROFINET device of the PLCnext controller while the system was booting, the firmware could crash (SIGSEGV).

RSC

When calling the “IDeviceInfoService” with parameters “General.Hardware.VersionMajor” or “General.Hardware.VersionMinor”, the device responded with “ident not found” in the “Output.log” file.

System

– When installed apps requested a restart of the firmware, it could sporadically happen that this restart was not performed properly.
– After updating from firmware version 2021.6.7 to 2022.6.1, the firewall returned error messages regarding IPv6.
– In connection with “Docker” support, the kernel flag “CONFIG_MACVLAN” was set incorrectly.
– It could sporadically happen that the PLC went into an error state during “Download changes”. Even downloading the project did not solve the error state. The PLC had to be rebooted.
– The file “/var/log/daemon.log” could become very large and in worst case it could cause an out of memory situation. This file is now considered by “logrotate” and therefore can no longer become that large.

User Manager

- Deleting all entries in “Blocked Passwords” in the WBM under “Security”, “User Authentication”, “Password Policy” did not work. After “Apply and reboot”, all default entries were still present.
- The security notification “ResetUserRolesFailed” could not be triggered.

WBM

- The “Additional value” in the PROFINET diagnostics of a device was displayed unformatted.
- The “Additional value” in the PROFINET diagnostics of a device was displayed with wrong error code.
- Incorrectly parameterized modules were not always displayed as faulty in the “Tree View” of the PROFINET diagnostics.
- A “Link down” error was shown in the PROFINET diagnostics for a device, although a “Disappear” alarm has already been received.
- Very long DNS names were displayed unclearly in the PROFINET diagnostics for a device.
- On the WBM page “Network” in the “Configuration” area, LAN interfaces and ports were displayed incorrectly.
- Different “escape” behavior on different WBM pages has now been unified.
- Some long diagnostic texts in the context of PROFINET device diagnostics were truncated.
- The “Integrated Uninterruptible Power Supply” WBM page displayed the “HFAIL” state as a “warning” instead as an “error”.
- When updating an older firmware version to version “2022.6.1”, WBM access was not possible after the reboot. The only remedy was to restart the controller again.

6.4 Known limitations and errors

The known limitations and errors can be found in the PLCnext Info Center at:

https://www.plcnext.help/te/Known_issues.htm

Here you will find a constantly updated overview of all known issues.

6.5 Security updates

- As part of the OpenSSH update from “8.4p.1” to “8.8p1” (or newer), “SHA1” will be disabled in a future firmware release.
- Busy box will be disabled in a future firmware release and replaced by other packages if necessary.

The following security updates have been made in this release. For more information about the specified CVE numbers, see:

- https://nvd.nist.gov/vuln
- https://cert.vde.com

Information on the Phoenix Contact “PSIRT” can be found at: https://www.phoenixcontact.com/psirt

Busybox

- CVE-2022-30065

Curl

- CVE-2022-32207
- CVE-2022-32206
- CVE-2022-32208
- CVE-2022-32205
- CVE-2022-35252
- CVE-2022-42915
- CVE-2022-42916

Dpkg

- CVE-2022-1664

E2fsprogs

- CVE-2022-1304

Git

- CVE-2022-29187
- CVE-2022-39260
- CVE-2022-39253
- CVE 2022-41903
- CVE-2022-23521

Gnutls

- CVE-2022-2509

HMI

- Hardening against DoS attacks.
- Hardening against memory leak problems in case of network attacks.
- In some cases requests via the “REST” interface to variables of data type “STRING” that are not marked as “HMI” could cause the PLC to crash.

- Hardening the input validation of user names in “User Authentication”.
- Hardening of Cross-Site-Request-Forgery (CSRF) attack in user based web management.
- The post-payload of the “WebConfiguration.cgi?SetHttpsCertificateIdentityStore” function could be modified in a way that could potentially be exploited via reflected XSS (cross-site scripting).

Libtirpc

- CVE-2021-46828

Libxml2

- CVE-2022-40304

Libexpat

- CVE-2022-40674
- CVE-2022-43680

Linux

- CVE-2022-1015
- CVE-2022-1016

Logrotate

- CVE-2022-1348

OpenSSL

- CVE-2022-2097

Python

- CVE-2022-42919
- CVE-2021-29921

SSH

- CVE 2002-20001
  The following vulnerable DHE KEX algorithm(s) of the openSSH server have been completely removed:
  - diffie-hellman-group14-sha256
  - diffie-hellman-group16-sha512
  - diffie-hellman-group18-sha512
  - diffie-hellman-group-exchange-sha256

StrongSwan

- CVE-2022-40617

Sudo

- CVE-2022-43995

User Manager

- By mistake, the “SecurityToken” when creating and modifying users was always “0000000” in the security notifications.
- Hardening of Trust and Identity Stores.

Vim

- CVE-2022-1927
- CVE-2022-1942
- CVE-2022-2129
- CVE-2022-2175
- CVE-2022-2182
- CVE-2022-2183
- CVE-2022-2343
- CVE-2022-2207
- CVE-2022-2210
- CVE-2022-2344
- CVE-2022-2304
- CVE-2022-2345
- CVE-2022-2231
- CVE-2022-2287
- CVE-2022-2284
- CVE-2022-2289
- CVE-2022-2288
- CVE-2022-2264
- CVE-2022-2206
- CVE-2022-2257
- CVE-2022-2208
- CVE-2022-2285
- CVE-2022-2286
- CVE-2022-2257
- CVE-2022-2522
- CVE-2022-2571
- CVE-2022-2580
- CVE-2022-2581
- CVE-2022-2598
- CVE-2022-3234
- CVE-2022-3235
- CVE-2022-3256
- CVE-2022-3278
- CVE-2022-3296
- CVE-2022-3297
- CVE-2022-3324
- CVE-2022-3352
- CVE-2022-3705

C-ares

- CVE-2021-3672

WBM

– Umlauts in the password of the “User Manager” were not handled correctly. The password rule for upper and lower case was not followed. This could lead to unintentionally weaker passwords.
– Hardening of WBM against Cross-Site-Scripting.

Zlib

– CVE-2022-37434

Freetype

– CVE-2022-27404
– CVE-2022-27405
– CVE-2022-27406

GLIBC

– CVE-2022-23218
– CVE-2022-23219
– CVE-2021-35942
– CVE-2020-6096
– CVE-2020-29562

LDAP

– The LDAP “GroupMappings” were compared with “case sensitivity” on the controller, although the “case sensitivity” support was disabled on the LDAP server. No error message indicating this fact was thrown. Now when the firmware reads in its LDAP server configuration, the LDAP “GroupMappings” were converted to lower case.
– The cipher list setting for the LDAP TLS configuration for the server connection was not properly applied. As a result, the highest possible encryption method was not always selected for the communication.

Ncurses

– CVE-2022-29458

Nginx

– CVE-2021-3618

Podman

– CVE-2022-1227
– CVE-2022-27649

Protobuf

– CVE-2021-22570

Rsync

– CVE-2020-14387

SSL

– CVE-2011-1473
– CVE-2011-5094

CSV

– Sanitized the output (CSV file) of the notifications export in the WBM in order to prevent CSV injection software attack from CVE-2014-3524.

System

– It was possible to get admin rights partially via a reconfiguration of the user roles “Engineer” or “Commissioner”.

7 Changes in firmware version 2022.0.7 LTS

- To be able to use all new functions of the firmware, you need PLCnext Engineer version 2022.0.1 LTS or newer.
  Select the latest template for firmware version 2022.0.0 LTS in the PLCnext Engineer project.
- Further information, example code or instructions can be found on the Edge-Device Github Forum: www.github.com/PLCnext/EdgeDevices

7.1 Known limitations and errors

The known limitations and errors can be found in the PLCnext Info Center at:
https://www.plcnext.help/te/Known_issues.htm
Here you will find a constantly updated overview of all known issues.

7.2 Security updates

- As part of the OpenSSH update from “8.4p.1” to “8.8p1” (or newer), “SHA1” will be disabled in a future firmware release.
- BusyBox will be disabled in a future firmware release and replaced by other packages if necessary.

7.3 EDGE functions

Firmware Update
Please follow the update instruction attached inside the firmware container. Optional the update instruction can also be found HERE.

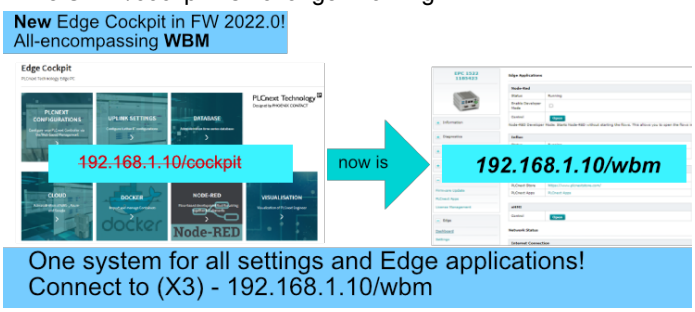
Apps
Firmware 2022.0.7 still includes the pre-installed Apps Node-RED and InfluxDB database.
In contrast to the firmware 2021.0.7, InfluxDB [version 1.8] was updated to Version 2.0.
If you have a running instance of InfluxDB wirh Firmware 2021.0.7, data might be missing after the update. The database must be re-configured after the update.

WIFI
The WIFI can now be conifgured inside the WBM to connnect to a WIFI access point and in the end to access the internet wirelessly.
Further information: Network configuration FW 2022.0

DisplayPort Visualisation
A local DisplayPort monitor can now be used as a cost-effective HMI solution. The WBM can be accessed locally.
Further inforamtion: DispayPort Visualisation

Data collection with Node-RED
Further pre-installed Nodes were added to collect data easily via OPC UA or REST.
Further information: Node-RED data collection

Cockpit/WBM
All functions, apps and configurations can now be accessed via a Web-Based-Management.
To access the "WBM" of your Edge-PC, connect to:
(default LAN1 / X3: 192.168.1.10/wbm)
The URL "/cockpit" is no longer working.



7.4 New functions

Linux/OS/Docker

The local gRPC server was integrated for the first time. With this first step gRPC offers a kind of standardized open source, programming language independent, local interface to most of the published RSC services.

WBM

- Password complexity rules and session properties can be configured on the WBM page “User Authentication”.
- NTP servers can be configured on the new WBM page “Date and Time”.

PROFINET

- PROFINET diagnostic information for modules and submodules are logged as notifications (Notification Logger). Additionally this information is shown on the “Profinet” page in the “Diagnostics” area of the WBM. Furthermore, in case of a PROFINET error, the WBM page displays a plain text in English language along with the corresponding error code. The plain text is issued for the module or submodule level. PLCnext Engineer 2022.0.1 LTS or newer (a template for firmware 2022.0 LTS or newer has to be used as well) collects the corresponding texts from the device description file (FDCML resp. GSD) of the related PROFINET devices. The collected texts are part of the downloaded project.
- Support of PROFINET “ModuleDiffBlock” information with RSC service “IArConfigurationService” and IEC 61131-3 function block “GET_MODULE_DIFF_BLOCK” (PLCnext Engineer 2022.0.1 LTS and newer). The WBM already displays a module difference in the tree view and also shows the message “wrong module” in the device details of the PROFINET diagnosis.

Cyber Security

Security-related notifications are logged to a dedicated notification archive. Additionally these notifications are forwarded to the Linux syslog. In the WBM the Linux syslog client can be configured to forward its log messages to one or more syslog servers.

7.5 Changes

GDS

In case of GDS configuration errors, all errors are collected into a single notification. The previous firmware versions only stated the first configuration error and stopped further reading of the configuration files.

C++/SDK

Due to a minor cleanup of the namespaces, some missing using statements may cause an error when compiled with an SDK version 2022.0 or newer. This may occur in following cases:

1. If the classes “Arp.System.Commons.Console” or “Arp.System.Commons.Environment” are used, insert a “using namespace Arp::System::Commons;” statement as a remedy.
2. If any class of the “Arp.System.Commons.Exceptions” namespace is used, there are two remedies:
   If the dedicated exception header file has been included, insert a “using namespace Arp::System::Commons::Exceptions;” statement as a remedy.
   If the general header file “Arp/System/Commons/Exceptions.h” has been included, insert a “using namespace Arp;” statement as a remedy.

EtherNet/IP™

The EtherNet/IP product code of the slave device has been changed from 8220 to 8228. This may affect the configuration of the corresponding Ethernet/IP master if it relies on the product code.

HMI

For projects compiled with PLCnext Engineer 2022.0.1 LTS (and newer) with a template for firmware 2022.0 LTS (and newer), the system variable HMI_STATUS was replaced by the system variable HMI_STATUS2. It was replaced because the member HMI_STATION_NUM has been added to the HMI_STATUS_STRUCT and as a consequence the new data type HMI_STATUS2 needed to be implemented in PLCnext Engineer.

PROFINET

Reduction of frequent and for end users unhelpful messages in the log file “Output.log”. This mainly concerns messages in the PROFINET context.

7.6 Error corrections

The following errors have been rectified:

Network

- Although the “Netload Limiter” was enabled, the PLC project could be affected by special network packet storms.
- With heavy network load, CPU load problems could occur due to a great volume of logging messages.

IEC 61131-3

- When a function block programmed in SFC (Sequential Function Chart) was changed in PLCnext Engineer, these changes could not be sent to the PLC using “Download Changes” due to an exception. This error only occurred with firmware 2021.9
- In rare cases, the PLC could not be restarted after stopping when using PLCnext Engineer. The problem only occurred when a cold and warm start were performed and a PROFINET controller was used. The problem did not occur during a hot start. The PLC had to be rebooted.
- In rare cases, when the firmware rejected a “Download Changes” command, the project was damaged and had to be downloaded again.

System

In rare cases, the PLC could run immediately into an ESM task watchdog after a power reset.

PROFINET

A timer overflow in the PROFINET stack that occurred after 49 days was fixed. This mainly affected protocols like DCP during connection establishment or the cyclic LLDP neighbor discovery.

Retain

Retain variables inside a function block that have been added by a “Download Changes” command have been stored in the retentive memory with the value 0. As a consequence, the value was set to 0 after stop and warm start . This error occurred since firmware version 2021.0 LTS.

Notifications

After a connection loss when displaying notifications in the PLCnext Engineer cockpit, it could happen that the display of notifications in the WBM generally no longer worked. Only the error message “Lost connection to Controller! (timeout)” was displayed.

7.7 Known limitations and errors

The known limitations and errors can be found in the PLCnext Info Center at:

https://www.plcnext.help/te/Known_issues.htm

Here you will find a constantly updated overview of all known issues.

7.8 Security updates

- As part of the OpenSSH update from “8.4p.1” to “8.8p1” (or newer), “SHA1” will be disabled in a future firmware release.
- Busy box will be disabled in a future firmware release and replaced by other packages if necessary.

The following security updates have been made in this release. For more information about the specified CVE numbers, see:

- https://nvd.nist.gov/vuln
- https://cert.vde.com

Information on the Phoenix Contact “PSIRT” can be found at: https://www.phoenixcontact.com/psirt

SSL

- CVE-2021-3712
- CVE-2021-3711
- Deprecated encryption versions “TLSv1.0” and “TLSv1.1” were allowed over certain ports.

Strongswan

- CVE-2021-41990
- CVE-2021-45079

Open SSH

- CVE-2016-20012

Open VPN

- CVE-2020-15078

Nettle

- CVE-2021-3580 (CVSS: 7.5)
- CVE-2021-20305 (CVSS: 8.1)

GIT

- CVE-2021-40330
- CVE-2021-21300

GLIBC

- CVE-2021-35942
- CVE-2020-6096
- CVE-2020-29562

GNUTLS

- CVE-2021-20231
- CVE-2021-20232
- CVE-2020-24659

LIBSSH2

- CVE-2019-17498

LIBXML2

- CVE-2021-3517
- CVE-2021-3518
- CVE-2021-3537

PERL

- CVE-2020-10878
- CVE-2020-10543
- CVE-2020-12723

TAR

- CVE-2021-20193

NGINX

- CVE-2021-23017

NET-SNMP

- CVE-2019-20892

GMP

- CVE-2021-43618

Python

- CVE-2019-20907

LIBEXPAT

- CVE-2021-45960
- CVE-2022-22824
- CVE-2022-22823
- CVE-2022-22822
- CVE-2022-22825
- CVE-2021-46143
- CVE-2022-22826
- CVE-2022-22827
- CVE-2022-23852
- CVE-2022-23990
- CVE-2022-25235
- CVE-2022-25236
- CVE-2022-25313
- CVE-2022-25314
- CVE-2022-25315

CURL

- CVE-2021-22946
- CVE-2020-8169
- CVE-2021-22926
- CVE-2020-8177
- CVE-2021-22922
- CVE-2021-22947
- CVE-2021-22897
- CVE-2021-22925
- CVE-2021-22923
- CVE-2021-22898

– CVE-2022-22576
– CVE-2022-27778
– CVE-2022-27779
– CVE-2022-27782
– CVE-2022-27774
– CVE-2022-27776
– CVE-2022-30115
– CVE-2022-27780
– CVE-2022-27781
– CVE-2022-27775
– CVE-2022-32207
– CVE-2022-32206
– CVE-2022-32208
– CVE-2022-32205

Cyrus SASL

– CVE-2019-19906
– CVE-2022-24407

HMI

Hardening against DoS attacks.

IPv6

Fixed IPv6 firewall rules despite IPv6 is not fully supported yet.

LIBXML

– CVE-2022-29824
– CVE-2022-23308

LDAP

A change from the registered “Cipher Suite” to the default value in the LDAP configuration did not work.

PROFINET

– The public “IConfigurationService” could be used by mistake in the C++ SDK without authorization.
– The data length at the “IAcyclicCommunicationService::RecordWrite” was not checked properly. This could result in memory being read beyond the vector boundary and sent as record data.

WBM/HMI

Deprecated SSL/TLS protocols in nginx web server have been disabled. Only TLS v1.2 and v1.3 are now enabled.

OpenSSL

– CVE-2022-0778

OPC UA

- Unified Automation reported several security risks for the OPC UA SDK 1.7.6 and before. All reported issues are fixed with the update of OPC UA SDK version 1.7.7.

– Controller to controller (C2C) data exchange via UDP protocol has been implemented according to the OPC UA Publish and Subscribe specification. “Publisher UDP UADP Periodic Fixed Profile” and “Subscriber UDP UADP Periodic Fixed Profile” are supported. Signing and encryption are not supported yet. The communication can be configured via PLCnext Engineer (from version 2022.0.1 LTS). The
– CVE-2021-45117

BASH

– CVE-2019-18276

BusyBox

– CVE-2022-28391
– CVE-2021-42374
– CVE-2021-42386
– CVE-2021-42380
– CVE-2021-42381
– CVE-2021-42379
– CVE-2021-42384
– CVE-2021-42378
– CVE-2021-42382
– CVE-2021-42385
The documented CVEs were not fixed via an update of busybox. Instead, the affected busybox components have been removed: The following config switches have been switched off (“not set”):
CONFIG_FEATURE_SEAMLESS_LZMA=y
CONFIG_ASH=y
CONFIG_AWK=y
In the case of “AWK” it makes no difference as this tool is also integrated from the core utils library. The shell “ASH” and the “LZMA” algorithms (i.e. for unzip) are no longer supported.
– CVE-2018-1000500

OpenVPN

- CVE-2022-0547

Vim

- CVE-2022-1381
- CVE-2022-1420
- CVE-2022-1733
- CVE-2022-1796
- CVE-2022-1621
- CVE-2022-1616
- CVE-2022-1619
- CVE-2022-1629
- CVE-2022-1735
- CVE-2022-1769
- CVE-2022-1785
- CVE-2022-1620
- CVE-2022-1674
- CVE-2022-1771
- CVE-2022-1886
- CVE-2022-1851
- CVE-2022-1898
- CVE-2022-1720
- CVE-2022-1154
- CVE-2022-0943
- CVE-2022-1160
- CVE-2022-1381
- CVE-2022-0729
- CVE-2022-0572
- CVE-2022-1420
- CVE-2022-0696
- CVE-2022-0685
- CVE-2022-0714
- CVE-2022-0361
- CVE-2022-0368
- CVE-2021-3973
- CVE-2021-3796
- CVE-2021-4166
- CVE-2022-1733
- CVE-2022-1796
- CVE-2022-1621
- CVE-2022-1616
- CVE-2022-1619
- CVE-2022-1629
- CVE-2022-1735
- CVE-2022-1769
- CVE-2022-1785
- CVE-2022-1620
- CVE-2022-1674
- CVE-2022-1771
- CVE-2022-1886
- CVE-2022-1851
- CVE-2022-1898
- CVE-2022-1927
- CVE-2022-1942
- CVE-2022-1720
- CVE-2022-2129
- CVE-2022-2175
- CVE-2022-2182
- CVE-2022-2183
- CVE-2022-2343
- CVE-2022-2207
- CVE-2022-2210
- CVE-2022-2344
- CVE-2022-2304
- CVE-2022-2345
- CVE-2022-2208
- CVE-2022-2231
- CVE-2022-2287
- CVE-2022-2285
- CVE-2022-2284
- CVE-2022-2286
- CVE-2022-2289
- CVE-2022-2288
- CVE-2022-2264
- CVE-2022-2206
- CVE-2022-2257

ZLib

- CVE-2018-25032