

OpenPowerNet

Release Notes Version 1.17.0

Institut für Bahntechnik GmbH
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Document No. OPN/RN/1.17.0

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1 Introduction

1.1 Overview

The purpose of this document is to describe the changes and the status of OpenPowerNet version 1.17.0. The document contains:

- List of delivered files on DVD,
- Description of the main functionality,
- Any restrictions known,
- List of corresponding documentation and
- Known issues.



1.2 Configuration

See document Installation Instruction version 1.17.0 for required third-party software versions.

1.3 Acronyms and abbreviations



The following abbreviations are used within this document.

Abbreviation	Description
2AC	2 Phase AC
AC	Alternating Current
ATM	Advance Train Module
DC	Direct Current
DVD	Digital Versatile Disk
EFE	Engine File Editor
GUI	Graphical User Interface
NMMV	Network Model Microscopic Viewer
OCS	Overhead Catenary System
ODBC	Open Database Connectivity
OPN	OpenPowerNet
OT	OpenTrack
PDF	Portable Document Format
POT	Power Over Time
PSC	Power Supply Calculation
SoC	State of Charge
VLD	Voltage Limiting Device
XML	Extensible Markup Language

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2 List of files on DVD delivery



OpenTrack/ (all installation files)
openpowernet_app_01.17.00.msi
openpowernet_system_components_01.17.00.exe
OPN_InstallationInstruction_1.17.0.pdf
OPN_ModellingCheckList_1.17.0.pdf
OPN_ReleaseNotes_1.17.0.pdf
OPN_UserManual_1.17.0.pdf

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3 Main functionality



OpenPowerNet version 1.17.0 has the following main functionality:

- Calculation of AC, 2AC and DC power supply system,
- Calculation of magnetic coupling of conductors is done internally,
- Possible electrical network configurations include, but are not limited to:
 - Highspeed railway,
 - Freight railway,
 - Metro systems with OCS or 3rd/4th rail,
 - Monorail systems,
 - Tram networks,
 - Trolleybus networks,
 - Battery buses with charging station.
- AC / 2AC power supply models:
 - Transformer,
 - Static Frequency Converter (SFC),
 - Auto transformer,
 - Booster transformer,
- DC power supply models:
 - Rectifier/Inverter,
 - Stationary energy storage for stabilisation of line voltage and energy saving,
 - Voltage limiting device model to limit the touch voltage,
- Calculation of tractive effort with retroactive effect to the railway operation simulator OpenTrack,
- Consideration of regenerative braking,
- Consideration of tractive and braking current limitation,
- Consideration of power factor at vehicle pantograph,
- Calculation of electrical engines with single or multiple propulsion systems,
- Division of power consumption for multiple train operating companies,
- Evaluation of engine energy storage charging from regenerative braking and/or catenary,
- Evaluation of catenary-free operation,
- Consideration of coasting behaviour of the courses,
- Consideration of changing train mass at station stops,
- Calculation of short circuit currents,
- Quick evaluation of network structure using constant current engine model,
- Visualisation of results using prepared Excel-Files and
- Visualisation of results using the automated analysis of the Analysis Tool generating Excel and PDF files for:
 - Minimum pantograph voltage,
 - Maximum touch voltage,
 - Maximum leakage current,
 - Substation:

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- Feeder current versus time and as TRLPC¹,
- Busbar voltage versus time,
- Power (P,Q,S) versus time and as TRLPC for input, output and total (per substation and total of all substations of a network),
- Power factor versus time,
 - Magnetic Field as flux density (B-field) and field strength (H-field),
 - Conductor and connector current versus time and as TRLPC¹,
 - Voltage versus time and as TRLPC¹,
 - Energy overview,
 - Vehicle specific charts,
 - Vehicle specific overview
- Visualisation of scenario results comparison using the Analysis Tool.

¹ The **Time-Rated Load Periods Curve** (TRLPC) shows the maximum or minimum of a set of varying window-size averages where the window time duration is defined by the x-axis value.

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4 Changes

4.1 Version 1.17.0 vs. 1.16.0

4.1.1 New Features

- OPN-10264: Implement Power Over Time Device for AC networks
 - It is now possible to add a "Power Over Time" device to AC networks, see the corresponding tutorial and description at the User Manual.
- OPN-16136: Implement Investigation Rule for Static Short Circuit Calculation
 - It is now possible to run static short circuit simulations without OpenTrack, see the corresponding description at the User Manual.
- OPN-15355: Add capability to calculate Converter short circuit
- OPN-16054: Implement support for US and UK units in Analysis Comparison

4.1.2 Improvements & Changed Behaviour

4.1.2.1 Calculation



- OPN-15960: Remove obsolete project file attributes from XML schema
- OPN-16220: Improve XML schema documentation

4.1.2.2 Analysis & Selection Editor

- OPN-16119: Disable start button during output creation
- OPN-16171: Several improvements to output creation
 - Improve axis scaling for charts where calculated values exceed the defined scale settings, e.g. in SoC charts. This also fixes non-matching primary and secondary y-axis in SPQ charts.
 - Fix drawing of marker lines for coordinate system to not hide the actual value series.
 - Improve sorting of values in some overview tables.
- OPN-16188: Improve axis scaling around 0V in comparison charts
 - Set minimum axis scale in line voltage comparison charts with fixed scale step to 0.0 if it would become negative otherwise. This could apply e.g. to short circuit simulations when option "Hide Panto 0V" is set to false.

4.1.2.3 Automation Config

- OPN-16173: Improve table formatting and page name
- OPN-16168: Make debug.log file visible again
- OPN-16272: Reduce path lengths in workspace project.
 - The Scenarios folder will now be created directly next to the Automation-Config.sims file without the additional SimulationSuite folder. Existing projects have to be reorchestrated.
 - All OPN project files will now be located directly in the OPN folder of each scenario without the additional Data folder.
 - Analysis output will now be created directly in a subfolder of the OPN folder of each scenario without the additional Output folder.

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- Change Analysis output folder names for Voltage and Current to reduce path length.
- Make PID value on Investigation Scenarios Page optional.
- Further improve the Tutorial project files to make use of the new features.
- OPN-16280: Remove OpenTrack Scenarios page.
- OPN-16296: Using input files with identical names from different folders, e.g. Switch-File and TypeDefs-File with identical name, would lead to files being overwritten in the scenario folder and failing consistency check. Using identical file names on Investigation Scenarios Page will now be prevented by the validator on that page.

4.1.2.4 Usability & Setup

- OPN-16129: Increase default timeout for server and OT
 - Increase default receive timeout for server from 30 minutes to 5 hours to prevent abort of long running simulations during enable keys phase.
- OPN-16143: Improve structure of the tutorial project to make use of the new features.

4.1.3 Bugfixes

- OPN-16131: ANACMP Fix index out of bounds for many scenarios in chart
- OPN-16216: ANA Fix values outside of scale with warning for some simulation scenarios
- OPN-16004: OPNCORE Fix connected courses with OT auxiliaries or different formations
 - Fix connected courses would always use the formation (train type) of their predecessor.
 - Fix auxiliary power defined in OpenTrack was not shown in the results for connected courses, although it was included in the engine power.
- OPN-16009: SEL Detect invalid selection of Panto item for Lines U_Conductors chart
- OPN-16062: ANA Fix error on engine outside of corridor
 - If a particular engine of a course with multiple engines does not occur in the selected corridor and time scope at all, this would lead to error INT-E-920 (engine has no data) and creation of analysis output would be aborted. Now there will be warning ANA-W-580 in such case and the engine in question will be skipped in calculation and output. There will be output for the remaining engines though. In overviews, the number of engines of a course corresponds to those that occur in the corridor, which might be less than the number of engines that are actually part of the formation.
 - The value "route time outside of corridor" of an engine will now be limited to the time steps between first and last occurrence of its course. The value included all time steps of the selected simulation time scope before.
- OPN-16084: OPNCORE Fix SQL syntax error due to invalid string conversion for simulation with huge amount of engines
- OPN-16137: DOC Fix ODBC Connector description in AC Tutorial
- OPN-16163: GUI Fix error on startup from defender check
 - Skip the Windows Defender check on GUI startup as it was irritating and did not work after Windows Updates from 2025/12.
- OPN-16164: ANA Fix losses in substation device overview

- Value for losses could be too small in line for "power out" in device overview if there were timesteps with power being exactly 0.0.
- OPN-16176: DOC Rework user manual chapter "Tractive Effort Tutorial"
- OPN-16177: GUI Fix handling of missing default project directory
- OPN-16186: CSEL Fix handling of option "Hide Panto 0V"
- OPN-16191: OPNCORE Fix usage of gain factors for DC Converter
 - The optional attributes gainMinimumFactor and gainMaximumFactor were ignored for the Ufl controller element of DcConverterTypes in TypeDefs file.
- OPN-16238: OPNCORE Fix license check for unlimited model elements in limited license type
- OPN-16240: ANA Fix handling for definition of negative y-axis for rail-earth-diagrams via custom preset
- OPN-16264: ANA Fix vehicles trlpc min not implemented
- OPN-16266: OPNCORE Fix several error messages
 - Fix several error messages that could lead to broken message texts or crashes.

4.1.4 OpenTrack

- The OpenTrack version tested with OpenPowerNet is 1.10.8 (2025-12-22).

5 Known restrictions

OpenPowerNet 1.17.0 is tested with OpenTrack version 1.10.8 (2025-12-22) and should only be used with this version.

OpenPowerNet is a single user application. It is not tested to use the same database for multiple users at the same time.

6 Version of corresponding documentation

The following table lists the version of the documents related to OpenPowerNet 1.17.0.

Document	Version
Installation Instruction	1.17.0
User Manual	1.17.0

7 Known issues

The following table contains all known but unsolved issues.

ID	Summary	Status
371	<p>When using larger time steps other than 1s or 0.5s, OpenTrack sends the requests not for all courses in the same time raster but OpenPowerNet is designed to calculate always in the same time raster.</p> <p>Workaround 1: Always use 1s or 0.5s simulation time steps, which is recommended for best performance and accuracy anyways.</p> <p>Workaround 2: Set all times within OpenTrack in the raster according to the selected simulation time step, e.g. for 3s time step only time hh:mm:00, hh:mm:03, hh:mm:06</p> <p>The simulation will be terminated by OpenPowerNet in case of OpenTrack requests outside of the time raster.</p>	Can't be solved.
n/a	Due to a limitation of the Excel VB interface, sheet names must not use international character sets. Therefore all sheet names will be created in English.	Can't be solved.
n/a	Warning message PRE-W-506 might be displayed on localised systems. This happens due to a limitation of the Excel VB interface, if the printer can not be set correctly. Technical background: As Excel sets the page size of new sheets according to the current printer, a printer with proper setup has to be selected before creating output. This is normally achieved using "Microsoft XPS" printer. If it fails, the user has to take care, that the system default printer is configured as desired. The warning message may be ignored in this case.	Can't be solved.
n/a	Vehicles, charts for all courses with multiple time windows: As data is written to the sheet sorted by engine first and timestep second, the chart series in a subchart can not be limited as easy as if sorted by timestep and therefore will contain time data from other subcharts. The axis scaling will be set correctly though.	Can't be solved.
OPN-13883	While merging with attribute mergeNetwork="false" the model parsing might fail with error message INT-E-353 as the network is still evaluated and checking references to master network.	Open

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