OpenPowerNet

Release Notes Version 1.5.0

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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 1.5.0. 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 1.5.0 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
GUI	Graphical User Interface
ODBC	Open Database Connectivity
PSC	Power Supply Calculation

2 List of files on DVD delivery

```
OPN_InstallationInstruction_1.5.0.pdf
OPN_ReleaseNotes_1.5.0.pdf
OPN_UserManual_1.5.0.pdf
OpenPowerNet\my.ini
OpenPowerNet\createUser.bat
OpenPowerNet\OpenPowerNet-1.5.0.zip
OpenTrack\OpenTrack.V_1.7.2.2013-05-30.zip
ThirdPartyPrograms\ required by OpenPowerNet, see Installation Instructions
update\
```

3   Main functionality

OpenPowerNet version 1.5.0 has the following main functionality:

- Calculation of AC, 2AC and DC power supply system,
- Calculation of magnetic coupling of conductors is done internally,
- AC / 2AC power supply models:
    - Transformer,
    - Auto transformer,
    - Booster transformer,
- DC power supply models:
    - Rectifier,
    - 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,
- Calculation 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,
- 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:
        - Feeder current versus time and as TRLPC[1],
        - 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),

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[1] The **T**ime-**R**ated **L**oad **P**eriods **C**urve (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.

- o Conductor and connector current versus time and as TRLPC[1]
- o Voltage versus time and as TRLPC[1]
- o Energy overview
- o Vehicle specific overview

4 Changes since version 1.4.4

- **General:**
  - OpenPowerNet runs now only on 64bit.
  - The automatic analysis GUI is now integrated into the GUI.
  - The ODBC and database handling has improved significantly and is now more user friendly.
  - Using the database schema name to record the simulation data. If this attribute is set in the Project-File the schema defined in the ODBC DSN is ignored only the host of the DSN will be used.
  - Add delta load feature to change the course weight at stations. Getting the total course mass from OpenTrack in each time step and save to database table engineData.
  - The database table structure has changed, therefore previous recorded simulations can't be analysed by this version.
  - Improved XML-schema handling by make schemas available by default to the GUI integrated XML editor.
  - All messages got a unique ID.
  - Supporting UTF8 characters.
  - Third party software is updated to current versions.
- **Database:**
  - Add OTversion to table sim.
  - Add auxiliary tables.
  - Add mass_t to table engineData.
  - Add recursive delete to tables. Now a delete to one row in table sim deletes all dependent rows in all other tables.
  - Delete tables storage_psc, storage_psc_data and engineDataOT.
- **ATM:**
  - Auxiliary is now recorded very detailed (9 different types), see User Manual chapter 4.3.3.1.
- **PSC:**
  - Remove old voltage stabilisation storage (XML element StorageV). The voltage stabilisation and energy saving energy storage is still available.
- **GUI:**
  - Integrate Automatic Analysis GUI.
  - Add database rename, drop simulation and drop database.
  - Dump file upload and database export dialog provide now a list of available database schemas.
  - Message Console format is now more compact to save lines.

- OpenPowerNet ERROR message is now not send to OpenTrack for display. Instead of this a hint to check the APserver messages is displayed in English.
- All schemas are now added to the XML Schema Catalog. ➔ Menus to get the schema path is removed.
- Add menu to open ODBC Data Source Administrator.
- Add OpenTrack documentation to GUI Help.

- **Excel Analysis:**

  - none

- **Analysis Tool:**

  - GUI is now integrated into OpenPowerNet GUI.
  - Presets: Overview tables are now adjustable under "TableTypes".
  - Text elements in charts are now linked to a separate sheet "TEXT_" where they can be edited easily for the particular Excel file.
  - Create substation feeder and device overviews for whole network.
  - Added description page for substation overviews.
  - Magnetic field: Images, mean image and video can now be created in one step. A complete preview is currently not available, use conductor position preview of the magnetic field selection editor or generate output to adjust the view settings.
  - Charts for line: Using substation name instead of feeder name as label for infeed items for better overview.
  - Fixed TRLPC calculation for timestep size different from 1 s.

5   Known restrictions

OpenPowerNet is tested with OpenTrack version 1.7.2 (2013-05-30) 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.

The Engine-File uses the RailML rollingstock schema version 1.03 with OpenPowerNet specific extensions and is therefore not 100% compatible with the mentioned version 1.03.

6 Version of corresponding documentation

The following table lists the version of the documents related to OpenPowerNet 1.5.0.

Document	Version
Installation Instruction	1.5.0
User Manual	1.5.0

7 Known issues

The following table contains all known but unsolved issues.

ID	Summary	Status
371	When using larger time steps other than 1s, 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. Workaround 1: Use always 1s simulation time steps. 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 ….. The simulation will be terminated by OpenPowerNet in case of OpenTrack requests outside of the time raster.	Can't be solved.
458	The information of split, merged and connected courses is not available in OpenPowerNet. Therefore the engine energy storage of an engine will be reset to the initial values even if the new course is connected with the previous course and the two courses represent the same physical train.	Open
582	Creation of magnetic field image needs the desired character set to be used for output set as system locale as Matlab plot functions do not handle unicode characters.	Open