

2022.01-02 [235917]

2021-10-29

+ New Features and Changes

Scenario Management

- + Column filters for scenarios and modifications: Column filters similar to the ones in lists have been introduced in the various tables of the 'Edit project' floating dialog. This applies in particular to modifications and scenarios. **(18751)**

✓ Fixed Bugs

Data Model

- ✓ Crash in case of link type without VD functions in the network: If there were no link VD functions in the network and you created a link type, it could crash in various situations as a result, for example when displaying the list of link types. This bug has been fixed. **(23255)**

Dialogs

- ✓ No project directory in Publisher export: The parameter dialog for the export to PTV Visum Publisher did not use project directories to save its settings. This bug has been fixed. **(23245)**
- ✓ Parameter 'a' at function graph for function type 'Combined': The distribution parameter 'a' is irrelevant for the function type 'Combined'. Nevertheless, it could be edited on the 'Function graph' dialog page of the choice model parameter dialog. This error has been fixed. **(23273)**
- ✓ Selection of transparent colors was applied incorrectly: In graphic parameter dialogs for point objects, under certain circumstances, the selected color was not applied correctly if it was transparent. This bug has been fixed. **(23162)**

Graphics

- ✓ Color of marked network objects: In the network editor, some network objects (including zones) were always drawn in red when marked, regardless of the color set in the graphic parameters for marked objects. This bug has been fixed. **(23178)**

Graphics 3D

- ✓ SBA visualization bug: In some cases, the SBA visualization was only displayed smoothly when the mouse was moved. This bug has been fixed. **(23009)**

I/O Installation

- ✓ Communication with PTV Visum Publisher does not use proxy settings: For communication with PTV Visum Publisher, the Windows proxy server settings were not used until now. Therefore, no communication was possible when using proxy servers. This error has been fixed. **(23159)**

I/O Interfaces

- ✓ Problems after railML import of line blocks: The railML import of line blocks (together with vehicle journeys or separately) could result in line blocks whose internal structure was incorrect. As a result, various problems could occur, for example infinite loops when displaying these line blocks or when writing a network file. This error has been fixed. **(23214)**
- ✓ Termination criterion in GPX import for loops: In the GPX import, so far, the termination condition was the length of the path in the network compared to the direct distance between the start and end points of the GPX track. In this criterion, the length of the GPX track is now used for comparison, which allows the import of nearly circular tracks. **(22060)**

Junction Editor

- ✓ Bing Maps logo always visible: The Bing Maps logo was always visible in the Junction Editor, even when the map was disabled. This bug has been fixed. **(23236)**

Lists, Timetable Editor, Junction Editor, Matrix Editor, Procedure Sequence

- ✔ Input of 'z' in cells not possible: It was previously not possible to directly enter a text with focus on an editable cell (for text) if this text started with the character 'z'. This bug has been fixed. Input after double-clicking in the cell (to explicitly start editing mode) was not affected. **(14863)**

Network Editor

- ✔ The location search worked only with certain projections. This bug has been fixed. **(23242)**
- ✔ Update of relation from zones to locations at Undo and Redo. If a zone polygon is modified in such a way that the set of allocated locations changes, the relation to these allocated locations was not adjusted after 'Undo' or 'Redo'. This bug has been fixed. **(23247)**

Other Procedures

- ✔ Network check 'Link orientation': The network check function 'Link orientation' used to take into account the already existing orientations. This error has been fixed, i.e. link orientations are now always calculated as if the (main) node was newly created, and differences to this solution are output as possible corrections. **(23150)**

PrT Assignment

- ✔ Impedance incorrect at nodes with unknown control type for ICA: If ICA is set as the method for node impedances, then the impedance at nodes with an unknown control type (which is the value of the turn VD function in this case) was evaluated incorrectly in the assignment variants 'Equilibrium assignment Bi-conjugate Frank-Wolfe', 'Equilibrium assignment', 'Equilibrium assignment LUCE' and 'Incremental assignment'. This error has been fixed. **(23234 🚫)**
- ✔ Reading of version file failed during ICA assignment with MPA: If an assignment was calculated with ICA using connector shares per OD pair (MPA) and the result was saved as a version file, such version files could not be read in again. This error has been fixed. Version files written in this state can still be opened at the loss of the possibility to set up a later ICA assignment based on the existing assignment. **(23227)**
- ✔ Turns never counted as converged in dynamic stochastic assignment: In the dynamic stochastic assignment, turns never counted as converged. If the 'Ignore turns' option was not selected, the inner iteration only terminated when the maximum number of inner iterations was reached. This bug has been fixed. **(23254)**

Visum Files

- ✔ References to files on non-existent network drives: Crashes no longer occur when reading in version files with attributes of type File that contain references to files on a network drive that is not available. **(23251)**
- ✔ Zone allocation of locations from old demand files: When importing locations from demand files that were written with PTV Visum 2021 or earlier and therefore did not contain a distinction between geometric or user-defined zone allocation, the zone allocation was set to 'geometric'. This error has been fixed. **(23250)**

🚫 Breaking Changes

PrT Assignment

- 🚫 Impedance incorrect at nodes with unknown control type for ICA: If ICA is set as the method for node impedances, then the impedance at nodes with an unknown control type (which is the value of the turn VD function in this case) was evaluated incorrectly in the assignment variants 'Equilibrium assignment Bi-conjugate Frank-Wolfe', 'Equilibrium assignment', 'Equilibrium assignment LUCE' and 'Incremental assignment'. This error has been fixed. The results of the mentioned procedure variants change accordingly. **(23234 ✔)**

2022.01-01 [235364]

2021-10-19

+ New Features and Changes

ANM

- + SBA penalty for merging vehicles in ANM: The value of the node attribute 'SBA penalty for merging vehicles' introduced with ID 22231 is now transferred to Vissim via ANM. **(22323)**

COM-API

- + Access to hybrid assignment parameters: COM access to the parameters for headway-based supply in the context of timetable-based assignment has been added. **(23158)**
- + Logging of rejected calls: When a COM call to Visum is rejected, the cause is now output to the log file to make troubleshooting easier. **(23195)**

I/O Interfaces

- + Acceleration of the PuT Updater: A moderate acceleration was achieved in the PuT Updater (Import 'PuT supply from Visum'). **(23172)**

Installation

- + Update CodeMeter Runtime: The CodeMeter Runtime deployed with PTV Visum has been updated to CodeMeter 7.30a. **(23231)**

PuT Assignment

- + Coordination in hybrid assignment: When using headway-based supply in a timetable-based assignment, it is now also possible to consider coordination groups between headway-interpreted time profiles. **(23132)**

Visum Files

- + Error message when reading corrupt Visum files: For all version files written with PTV Visum 2021 or newer, errors in the file that occurred after the version file was written (e.g. during storage or transfer) are reliably detected. The error message issued in this case has now been significantly improved. In particular, the section of the version file affected by the data error is also mentioned. **(23039)**

Fixed Bugs

COM-API

- ✓ Unspecific error message when using SaveVersion with an invalid path: Attempting to save a version file using SaveVersion in an invalid path previously resulted in the unspecific error message 'A serious error (Code e06d7363) has occurred in the script'. This message has been improved. **(23200)**

Data Model

- ✓ Incorrect format of WKT strings: In certain cases, WKT strings for line-shaped geometries were output in an incorrect format. This affected both the attributes of all network objects and the export to PTV Visum Publisher. This error has been fixed. **(22822)**

Dialogs

- ✓ Design hourly volume for impedances at the node is displayed rounded: In the 'General procedure settings' dialog, on the dialog page for impedances at nodes, the factor by which the attribute selected for calculating the design hourly volume is multiplied was displayed with two decimal places. As a result, entering and then exiting the dialog implicitly rounded this coefficient to two decimal places. This error has been fixed. **(21488)**
- ✓ Editability in various graphic parameters dialogs: In various graphic parameters dialogs (e.g. for links bars in the network editor), not all attributes were grayed out in the table if they did not work with the current settings. This bug has been fixed. **(22817)**
- ✓ Note on specific projections for background maps: In the graphic parameters dialog, a note is displayed on the 'Background map' page for map providers that deliver the map as tiles, stating that changing the projection can speed up background map retrieval. However, detecting this feature did not work for some tile services, including PTV map services. This bug has been fixed. **(22910)**
- ✓ Quick access in attribute selection dialog did not update when aliases were changed: The 'Quick access' section in the attribute selection dialog did not update when an alias was created, edited, or deleted from the dialog. This bug has been fixed. **(21761)**

Graphical Procedures

- ✓ Controls in the 'Graphics tools (Flow bundle)' tool window too small: In the 'Graphics tools' tool window, the layout of the controls on the 'Flow bundle' page was often inconvenient. This has been fixed. **(23006)**

Graphics

- ✓ Marking remained when deleting nodes: After deleting nodes, the marking of the nodes remained visible. This error has been fixed. **(23126)**

- ✔ Problems with special WMS service from Taiwan: Several specific problems that occurred when using the WMS service at <https://wms.nslc.gov.tw/> as a background map have been solved. **(22458)**

I/O Interfaces

- ✔ Connection to Personal Geodatabase not possible: The connection to the Personal Geodatabase was not possible because the ESRI license check always failed. This error has been fixed. **(23174)**
- ✔ Creating user-defined attributes in railML import parameter dialog resets entries: Entries made in the 'RailML import' dialog on the 'Attributes for timetable data' tab in the upper area for flagging imported vehicle journeys were reset when the 'Create user-defined attributes' button was pressed. This error has been fixed. **(20781)**
- ✔ Incorrect format of WKT strings: In certain cases, WKT strings for line-shaped geometries were output in an incorrect format. This affected both the attributes of all network objects and the export to PTV Visum Publisher. This error has been fixed. **(22822)**
- ✔ Infinite loop during railML import: An infinite loop no longer occurs during simultaneous import of vehicle journeys and line blocks from railML in certain cases. **(23163)**
- ✔ Unspecific error message in case of failed connection to personal geodatabase: If no installation of the used ESRI software is found or no license to use it is available, no connection to the Personal Geodatabase can be established. The error message indicating one of these two reasons has been improved. **(22839)**

Junction Editor

- ✔ Incorrect calculation of tCur for uncontrolled nodes: For nodes with control type 'uncontrolled', the travel time in the loaded network tCur of the turns was calculated differently in the node impedance calculation according to ICA and in assignments, especially with regard to the application of the maximum value and the maximum multiple of t0. The calculation is now uniformly performed as follows: The maximum value is applied to the node tCur, i.e. to the value of the node VD function, still without the turn's entered travel time supplement t0, which is added afterward. The reference value for the maximum t0 multiple is the node t0 with a possible soft blocking via the node VD function. **(23191)**

Lists

- ✔ Column filter for identifier attributes: Especially in the data model for the PuT supply, there are some identifier attributes (e.g. 'Operator identifier' at vehicle journeys) that are primarily intended for a readable display in the timetable editor. For these attributes, the column filter did not work in lists. This error has been fixed. **(21037)**
- ✔ Crash during assignment with selection in path list: No more crash when executing a PuT assignment if a PuT path leg list is open and individual path legs are marked in this list. **(23153)**
- ✔ List with active column filter empty after recovery from version file: If a version file in the window configuration contained a list in which a column filter was set to an attribute that was a multiple enumeration type (e.g. 'VSystem'), this list was initially empty after the recovery because all rows were filtered out. This error has been fixed. **(21256)**

Main Window

- ✔ Crash when 'Check network' tool window is open: A crash no longer occurs when changing the network (e.g. loading a version file) with the 'Check network' tool window open. **(23102)**

Matrix Editor

- ✔ Calculation operations affected all matrices: If a matrix editor displayed several matrices and the tool window 'Matrices' was visible at the same time, a calculation operation (e.g. Set value) triggered in the shortcut menu of a matrix affected all matrices displayed in the matrix editor. This bug has been fixed. **(22988)**

Miscellaneous

- ✔ Cancel when license is lost reacts very slowly: If 'Cancel' was pressed in the dialog indicating the loss of the connection to the license in use, it took too long for the program to respond in a way visible to the user. This bug has been fixed. **(22965)**
- ✔ Logging of the activity protocol failed: If no network was loaded yet and the activity protocol was activated in the user settings, the creation of an activity protocol failed. This also applied to subsequent program starts. This error has been fixed. **(23175)**
- ✔ Visum terminates after loss of license: If several instances of PTV Visum were started and the connection to the license server was lost, one of these instances was sometimes terminated without further interaction as soon as the connection to the license server was restored. This error has been fixed. **(23189)**

Network Editor

- ✔ Z-coordinates when creating links: When creating links, the Z-coordinates of the intermediate points of the link were not interpolated from the Z-coordinates of the two limiting nodes, but were all set to 0. This bug has been fixed. **(23146)**

PrT Assignment

- ✔ Incorrect calculation of tCur for uncontrolled nodes: For nodes with control type 'uncontrolled', the travel time in the loaded network tCur of the turns was calculated differently in the node impedance calculation according to ICA and in assignments, especially with regard to the application of the maximum value and the maximum multiple of t0. The calculation is now uniformly performed as follows: The maximum value is applied to the node tCur, i.e. to the value of the node VD function, still without the turn's entered travel time supplement t0, which is added afterward. The reference value for the maximum t0 multiple is the node t0 with a possible soft blocking via the node VD function. **(23191)**
- ✔ Incorrect consideration of through traffic bans: In certain constellations, the consideration of "No through traffic" was incorrect, namely when the shortest path left and re-entered the restricted traffic area for a relation starting and ending in the restricted traffic area, but the path inside the traffic area was more favorable for other relations. In affected cases, crashes could occur but also passing assignment procedures with incorrect results. This error has been fixed. **(23196)**
- ✔ Merge weights did not always work in SBA: In the simulation-based dynamic assignment (SBA), merge weights did not always work correctly. This affected in particular one-lane ramps to multi-lane highways with left-hand traffic. This error has been fixed. **(23179)**
- ✔ Wrong node impedances in dynamic stochastic assignment: In the dynamic stochastic assignment, node VD functions were incorrectly evaluated based on the turn volumes instead of based on the node volumes. This error has been fixed. **(23193)**

Procedure Sequence

- ✔ Marking in procedure sequence extremely slow: Marking rows (=procedures) in the procedure sequence was unreasonably slow. This was especially noticeable when (accidentally) selecting all rows of a longer procedure sequence by clicking in the upper left cell. This error has been fixed. **(22932)**

PuT Assignment

- ✔ Crash during assignment with selection in path list: No more crash when executing a PuT assignment if a PuT path leg list is open and individual path legs are marked in this list. **(23153)**
- ✔ Crash in the transfers list after delay analysis: Crashes no longer occur in the display of the transfers list if a timetable-based assignment with calculation of the risk of delays was executed and transfers were saved 'between time profiles' in accordance with the general procedure settings. **(23144)**
- ✔ Headway-based assignment after deleting a line: If a headway-based assignment was executed directly after deleting a line, the results could differ from those calculated after opening the version again. This bug has been fixed. **(23203)**
- ✔ Incorrect rounding if volumes are saved at another demand segment: If at least two demand segments were assigned together and the volume of at least one demand segment was saved at another demand segment, and rounding of demand and volume was activated at the same time, rounding was incorrect. This error has been fixed. **(23181)**
- ✔ Start fares did not take effect in speed-optimized headway-based assignment: When using fares in the headway-based assignment with the passenger information level 'Optimal Strategies', the start fare of the fare systems did not take effect when using the speed-optimized algorithm. This error has been fixed. **(23201)**

PuT Operating Indicators

- ✔ Calculation of transport performance based on direct assignment: It was previously not possible to calculate indicators of transport performance based on a direct assignment. This error has been fixed. In this case, implausible paths are now not taken into account, and the calculation of transport performance per territory and time interval is now also possible. **(23107)**

Visum Files

- ✔ Crash when importing a version file with line block editor open: Sporadic crashes no longer occur when importing a version file with window recovery when a line block editor is opened at this time. **(23130)**

❗ Breaking Changes

PrT Assignment

- ❗ Incorrect calculation of tCur for uncontrolled nodes: For nodes with control type 'uncontrolled', the travel time in the loaded network tCur of the turns was calculated differently in the node impedance calculation according to ICA and in assignments, especially with regard to the application of the maximum value and the maximum multiple of t0. The calculation is now uniformly performed as follows: The maximum value is applied to the node tCur, i.e. to the value of the node VD function, still without the turn's entered travel time supplement t0, which is added afterward. The reference value for the maximum t0 multiple is the node t0 with a possible soft blocking via the node VD function. This changes assignment results in networks affected by the maximum values as well as results of the node impedance calculation according to ICA. **(23191)** ✅
- ❗ Incorrect consideration of through traffic bans: In certain constellations, the consideration of "No through traffic" was incorrect, namely when the shortest path left and re-entered the restricted traffic area for a relation starting and ending in the restricted traffic area, but the path inside the traffic area was more favorable for other relations. In affected cases, crashes could occur but also passing assignment procedures with incorrect results. This error has been fixed. **(23196)** ✅

Junction Editor

- ❗ Incorrect calculation of tCur for uncontrolled nodes: For nodes with control type 'uncontrolled', the travel time in the loaded network tCur of the turns was calculated differently in the node impedance calculation according to ICA and in assignments, especially with regard to the application of the maximum value and the maximum multiple of t0. The calculation is now uniformly performed as follows: The maximum value is applied to the node tCur, i.e. to the value of the node VD function, still without the turn's entered travel time supplement t0, which is added afterward. The reference value for the maximum t0 multiple is the node t0 with a possible soft blocking via the node VD function. This changes assignment results in networks affected by the maximum values as well as results of the node impedance calculation according to ICA. **(23191)** ✅

2022.01-00 [234416]

2021-09-27

+ New Features and Changes

Activity Profile

- + Detail view: The filtering of the elements in the detail view can now be canceled or can only be based on the selected time. **(21199)**

COM-API

- + Output of notes in case of rejected COM calls: If the Visum COM server is busy, it can generally happen that incoming COM calls are rejected (exception 'RPC_E_SERVERCALL_RETRYLATER' (0x8001010A)). In this case, a note on possible causes is now output to the log file to facilitate the search for possible causes. **(23085)**
- + Remove zigzags: Until now, zigzags in line routes could only be removed interactively. Now, with a new COM function, this possibility is also available via the COM API. **(22625)**

Data Model

- + New relations between point objects and surface objects: There are new multi-relations between nodes or POIs (point objects) and surface objects (territories, main nodes, POI surfaces, restricted traffic areas). This allows to identify the containing surface objects or contained nodes or POI point objects respectively. **(19406)**
- + Relation from link to allocated count locations: Access to the count locations allocated to a link has been accelerated. **(17236)**
- + Time series and time interval sets: Standard time series can be defined on the basis of time interval sets. Conversely, time interval sets with the corresponding time intervals can be generated from standard time series. **(19924)**

Demand Procedures

- + List for activity chains: There is a new list for activity chains. **(19465)**

Dialogs

- + Line breaks in column headers: In lists and embedded grids, column headings are automatically wrapped. The height of the heading line can be set separately for this purpose. **(11199)**
- + PuT Operating Indicators: After the functional enhancements by the stop point analysis, the procedure parameter dialog of the PT operational indicators was restructured and made clearer. **(22984)**

- + Time series and time interval sets: Standard time series can be defined on the basis of time interval sets. Conversely, time interval sets with the corresponding time intervals can be generated from standard time series. **(19924)**
- + Tour planning: After the functional enhancements of the route planning, the procedure parameter dialog was restructured and made clearer. **(22119)**

I/O Interfaces

- + Error messages when accessing PTV Visum Publisher: The error messages issued when accessing PTV Visum Publisher have been made more specific and are now also written to the log file to make them more transparent. **(23129)**

Installation

- + Power saving mode: The PTV Visum application now survives power saving mode, which is common especially on laptops, i.e. if the system is put into power saving mode while the Visum instance is running, the same instance can continue to be used after the system is restored. **(22940)**

Junction Editor

- + Attribute ID 'Cislandoffset': The attribute ID of the leg attribute 'Cislandoffset' has been changed to 'Lateraloffset'. **(23013)**
- + Change of default values: The default values of the following attributes have been changed: Length (Detector), Has separate right turn (Leg), and channelized turn (Leg). **(22668)**
- + Check of SCs: A check for transport consistency is provided for signal controls of the Vissig type. It finds transport conditions that do not make sense. In the Vissig window, these are highlighted in red. **(22461)**
- + Creating detectors: When creating detectors, the attribute 'TSys' is preset with the lane attribute of the same name. **(22924)**
- + Crosswalks: The geometry calculation for crosswalks has been adjusted so that crosswalks are correctly placed and displayed even in non-standard cases. **(22173)**
- + Display of lane turns: The geometry calculation for lane turns has been modified. **(22175)**
- + Display of the center island: The display of the center island has been improved. It is no longer displayed as paved. **(22551)**
- + Network section: The network section of the Junction editor is saved with the global layout. **(22936)**
- + Usability: Various improvements have been made to improve usability and support existing workflows while editing. **(22667)**
- + Vissim previewer updated: The Vissim version used for the node preview has been updated to PTV Vissim 2022.00-00. **(22746)**

Lists

- + Line breaks in column headers: In lists and embedded grids, column headings are automatically wrapped. The height of the heading line can be set separately for this purpose. **(11199)**
- + List for activity chains: There is a new list for activity chains. **(19465)**

Main Window

- + Login to PTV Cloud: The user's login to PTV Cloud is shown in the program. **(21188)**

Miscellaneous

- + Creating zones: The process of creating zones for large matrices has been accelerated. **(23074)**
- + Version comparison with command line parameters: Simple version comparison ('Compare current network with version file') is possible using command line parameters. For the comparison, Visum must be started with the parameters -h [VerFile1] -j [VerFile2]. **(22985)**

Network Editor

- + Check network for inaccessible stop points: The network check function 'Boarding and alighting at inaccessible stop points' now displays a special message in advance in case there are no connectors in the network instead of listing all stop events. **(23024)**
- + Multiple selection of network objects: By dragging a rectangle, a multi-selection of the selected network object type is made. The objects can be edited, but they are not filtered as in the spatial selection. **(21933)**

- + Network check for link orientations: A new network check function has been added. It checks whether the current orientations match those that would be set during a recalculation. A corresponding repair function is also provided. **(21965)**

Other Procedures

- + ABM tours: The procedure "Generate path sequences from tours" generates path sequences from ABM tours. Path sequences, in contrast to tours, can be displayed and analysed as paths of existing assignments. **(20249)**
- + Pseudo-dynamic volumes (PDV): There is a new procedure, the pseudo-dynamic volumes (PDV), which is used to generate dynamic volumes for links based on the paths of a static assignment and a demand time series. **(17218)**
- + SC split optimization: The option 'Retain intergreens' in the general procedure settings has been removed, i.e. the intergreen matrix for signal groups is always taken into account. If this is empty, the value of the SC attribute 'Standard intergreen' applies. **(22904)**

PrT Assignment

- + BPR type VD function: The special handling for integer exponents in the BPR function has been removed. **(21477 🚫)**
- + Classical equilibrium assignment: The procedure has been modernized and significantly accelerated. **(17641 🚫)**
- + Equilibrium_Lohse procedure: If a PrT assignment of the 'Equilibrium_Lohse procedure' variant exists when opening a version file in the procedure sequence, a warning is issued because this procedure has been discontinued, i.e. it will no longer be available from the release version in 2023. **(22892)**
- + Pseudo-dynamic volumes (PDV): There is a new procedure, the pseudo-dynamic volumes (PDV), which is used to generate dynamic volumes for links based on the paths of a static assignment and a demand time series. **(17218)**

PuT Assignment

- + Discomfort Skim Matrix: In the general procedure settings, the time unit can be set for the PT skim matrices. However, this did not work for the skim matrix discomfort due to overload, it was always calculated in seconds. This has now been changed, the discomfort skim matrix is now always calculated according to the general procedure settings. **(21962)**
- + Headway-based Assignment: The simultaneous headway-based assignment of many demand segments has been accelerated. **(22693)**
- + Hybrid PuT assignment (timetable-based and headway-based): In the timetable-based assignment, it is now possible to consider a part of the supply, for which either no timetable is known or for which the specific timetable is not relevant from the customer's point of view due to the very dense supply, as a headway-based supply. No vehicle journeys need to be defined on this part. PuT path legs on a headway-based supply have no reference to specific vehicle journeys. **(18487)**
- + Service frequency: The calculation of the service frequency considers coupled vehicle journeys. As a result, two coupled vehicle journeys are only counted as one trip opportunity in the service frequency. **(22370)**

PuT Line Blocking

- + It's possible to manually insert empty trips in a line block. **(22969)**

PuT Operating Indicators

- + Number of Section service trips: For the evaluation of double traction, the key figure number of section service trips can be evaluated differentiated by vehicle combination and territory. For this purpose, two new indicators have been introduced: 'Number of section service trips' at the Territory- PuT detail and 'Number of section service trips-vehicle combination' at the vehicle journey item. **(21769)**
- + Revenue for vehicle journey items: In addition to vehicle journeys, revenues are also reported for vehicle journey items. **(20807)**
- + Stop point analysis: The new stop point analysis summarizes the operational and traffic performance indicators from the perspective of the stop point and offers new indicators. A list of the indicators can be found in the manual. The 'Number of service trips' indicators are renamed 'Number of stops events' for stops and stop points. The indicator of the stop events at territories, Territory PuT detail and Territory PuT detail-vehicle journey item are prefixed with 'Number', so that the naming is consistent. **(21718)**
- + Transport supply: Indicators for the transport supply can now be calculated if only headway information is available for the service. Indicators on the aggregation below the time profile are not possible. **(13934)**
- + Vehicle Journey Items: The number of stop events are calculated at the vehicle journey items. Additionally they are derived on the basis of vehicle journey section, and without considering couplings. **(19578)**

Visum Files

- ⊕ Warning when overwriting version file in newer format: When overwriting an existing version file, a warning is now issued if a file in a format of an earlier program version is replaced by the current version in the process, so that the file can then no longer be opened in the older program version. The prerequisite is that you activate the general warning regarding the overwriting of existing files in the user settings. **(19363)**

✓ Fixed Bugs

Add-Ins

- ✓ Error when using weighted aggregation in 'Calculate Matrix': Using the weighted aggregation (function 'AVGW') in the 'Calculate Matrix' add-in resulted in an error message. This error has been fixed. **(23082)**

COM-API

- ✓ Effect of AddAllColumns at lists dependent on user setting: The effect of the 'AddAllColumns' method on list objects (I...List) was previously dependent on the user's settings for preselecting time intervals for attributes with subattributes AHP or AHPI or AZI. This error has been fixed in that this method now always creates columns for all subattribute values, analogous to the method of the same name at 'ITableAttrSelection'. **(22991)**
- ✓ Exporting transposed lists to array: No more crash when exporting a transposed list (e.g. list 'PuT assignment statistics' or list 'Emission statistics (HBEFA)') via the SaveToArray method. Transposed lists are also saved to the array in non-transposed form, i.e. the first dimension corresponds to the objects, the second to the attributes per object. **(22868)**

Data Model

- ✓ Attributes of structural properties inaccessible for Tour-based model: The attributes of the network object structural property were only accessible with the add-on module EVA, although they are also required in demand models of type Tour-based model. This error has been fixed. **(23055)**
- ✓ Restriction of the duration of the calendar period: For very long calendar periods, the number range is not sufficient to display points in time distinctively, with a wide variety of negative effects on the data model and procedures. The duration of the calendar period is therefore now limited to a maximum of 50 years. **(22961)**
- ✓ Shortest path search criterion for empty trips at the block version: The shortest path search criterion when creating empty trips was previously saved as an attribute ID at the block version, although it was actually an enumeration type. Therefore, the previous attribute 'Link attribute for shortest path' at the block version has been made obsolete and replaced by the new attribute 'Criterion for shortest path searches used for empty trips' of appropriate (enumeration) type. **(23004)**

Demand Procedures

- ✓ Sorting of activity locations: Activity locations are sorted in lists, among others, according to the associated activity codes. However, the sorting differed from the sorting in activity lists with regard to upper and lower case. This has been changed: The sorting with regard to activities is now identical in both lists. **(22959)**

Dialogs

- ✓ Crash after changes to signal programs: A crash no longer occurs when selecting a signal program in the SC dialog after signal programs of the signal control assigned to this SC have been removed. **(23066)**
- ✓ Crash in parameters dialog of 'Spatial PuT analysis': No more crash when deleting an attribute entry in the parameters dialog of the procedure 'Spatial PuT analysis' if it is the only attribute entry of this procedure. **(22926)**
- ✓ Crash on empty file name for matrix operand from file: A crash no longer occurs when exiting the 'Select the operand for ...' dialog if loading a matrix from file is selected but no file name is indicated. **(22712)**

Filters

- ✓ Filter on empty multi-enumeration type (e.g. TSysSet) did not always work correctly: If the condition was set in the filter that an attribute of an enumeration type that allows multiple selections (typically sets of objects such as TSysSet, DSegSet, etc.) was not equal to the empty set or contained at least one element of the empty set, network objects whose attribute value was the empty selection fulfilled this filter condition. This bug has been fixed. **(22917)**

Formulas

- ✓ Crash when accessing demand segments whose volumes are stored at other demand segments: If it was indicated in the general procedure settings for a PuT demand segment that the volumes would be stored at another demand segment, Visum crashed until now, if either a demand matrix correction was executed for this demand segment or the assignment matrix was accessed via a formula. This error has been fixed. **(23104)**
- ✓ Error in MIRROR_LOWER function inside formula matrices: The MIRROR_LOWER function available in formula matrices returned incorrect results under certain conditions. This bug has been fixed. **(23070)**

Graphics 3D

- ✔ Warnings during SBA visualization: If trajectories of an SBA assignment were displayed in the 3D network editor, but were not recorded during the SBA assignment, warnings that occurred during the assignment possibly interrupted the recording of the trajectories. This error has been fixed. **(22864)**

I/O Interfaces

- ✔ Crash when exceeding size limit for Access export: A crash no longer occurs when exporting large amounts of data to MS Access when the size limit of 2GB is exceeded. An error message now indicates the limit. Since Access limits the file size itself, the actual problem can only be solved by using other databases, e.g. SQLite. **(22649)**
- ✔ Trajectory export to PTV Visum Publisher: When exporting trajectories to PTV Visum Publisher, incorrect data could occur. This error has been fixed. **(22911)**
- ✔ Warning for unlisted OCPs during railML import: If OperationControlPoints (OCPs) were used in trainPart elements while importing railML that are not listed in the infrastructure, this violation of the referential integrity of the railML file was previously accepted silently. Now such files can still be read in, but a warning lists all affected OCPs. **(23058)**
- ✔ Windows for login and Visum Publisher export sometimes in the background: On certain systems, it could happen that the window for login as well as the window for export to PTV Visum Publisher was not displayed as part of Visum but as a separate window in the Windows taskbar and could also be hidden by the main window of Visum. This error has been fixed. **(22998)**

Junction Editor

- ✔ Display of the Signal times view: The Signal times view was not displayed correctly in some cases. This error has been fixed. **(23049)**
- ✔ Display of the stop line: For nodes of the control type 'Two-way yield', the stop lines were drawn incorrectly on all lanes of links and not only on lanes of links that have to give way. This error has been fixed. **(23035)**
- ✔ Right-turns in opposite flow in ICA calculation: When calculating the node impedance according to ICA, for the opposite flow of a permitted left turn with the option 'ICA right turn will influence opposing left turn' switched on, the right turns of the opposite direction were only taken into account for this opposite direction in the case of shared straight/right lanes. This error has been fixed. **(23056)**

Lists

- ✔ Analysis rows in path lists when switching the demand segment: After switching the displayed demand segments of a path list, the analysis rows (Min, Max, Sum or Avg) continued to display values matching the previously displayed content of the list. This error has been fixed. **(23030)**
- ✔ Case-sensitive key attribute changes: For network object types whose key is a string (e.g. transport system or line), this key attribute could not be changed in a list if this change consisted only of case-sensitive key changes. This bug has been fixed. **(22221)**
- ✔ Marking when releasing the mouse outside the cells: If the mouse is released outside the display area of the cells when marking a whole block in a list or in the matrix editor, the marking displayed as a preview was not applied. This bug has been fixed. **(22775)**

Matrix Editor

- ✔ Marking when releasing the mouse outside the cells: If the mouse is released outside the display area of the cells when marking a whole block in a list or in the matrix editor, the marking displayed as a preview was not applied. This bug has been fixed. **(22775)**

Matrix Estimation

- ✔ Consideration of PT walk trips: The matrix correction procedure adjusts demand matrices in such a way that the resulting volumes correspond as closely as possible to count values. Previously, PT walk trips were also taken into account in the volumes, although they were presumably never counted in the count values. The procedure has now been changed: PT walk trips are no longer taken into account in the volumes. **(22879)**
- ✔ Crash when accessing demand segments whose volumes are stored at other demand segments: If it was indicated in the general procedure settings for a PuT demand segment that the volumes would be stored at another demand segment, Visum crashed until now, if either a demand matrix correction was executed for this demand segment or the assignment matrix was accessed via a formula. This error has been fixed. **(23104)**

Network Comparisons

- ✔ No display of differences between POIs and user-defined tables: When comparing the current network to a version file, the values of both networks are displayed. However, this did not work for the values of user-defined attributes at POI categories or user-defined tables. This bug has been fixed. **(23119)**

Network Editor

- ✔ Crash when removing trivial zigzag routings: Crashes no longer occur when repairing trivial zigzag routings if the coupling would have to be removed for a vehicle journey of the affected line route and the corresponding query was answered with 'No'. **(22925)**
- ✔ Network section incorrect when marking ABM objects without a location reference: When marking an ABM object without a location reference, e.g. a newly inserted trip, the network editor showed the area around the coordinate (0, 0) when the synchronization mode 'Move' or 'Autozoom' was switched on. This error has been fixed. **(23020)**

Other Procedures

- ✔ Message during 'Set travel times': When executing the special function 'Set travel times' for user-defined PrT paths, an error message occurred and the action could not be undone. This error has been fixed. **(23023)**
- ✔ Multimodal assignment conceals error messages: If error messages occurred during the execution of the procedure 'Multimodal assignment', the procedure was still considered to have been executed successfully, and as a result, subsequent procedure steps in the procedure sequence were executed. This error has been fixed. **(22982)**
- ✔ Negative buffer size possible in 'Intersect' dialog: In the parameter dialog of the 'Intersect' procedure, negative values could be entered for the buffer size of the source or target object, which were then treated as 0 during the actual calculation. This error has been fixed. **(23025)**

Passenger Surveys

- ✔ Change between vehicle journeys on the same time profile always implausible: If in multi-line survey data specific vehicle journeys were indicated by their number and a change from one vehicle journey to another vehicle journey on the same time profile was required within a path, this path was always marked as implausible. This error has been fixed. **(23038)**

PrT Assignment

- ✔ Calculation of vCur-PrTSys: The calculation of v0-PrTSys and vCur-PrTSys was not consistent, so that certain VD functions returned vCur values that were smaller than v0PrT. This error has been fixed. **(23005)**
- ✔ Incorrect network volumes in intermediate steps: In the Bi-conjugate Frank-Wolfe, Incremental assignment, and Equilibrium_Lohse methods, network volumes were not calculated correctly in the intermediate steps, which deteriorated the convergence. This error has been fixed. **(22906)**
- ✔ Rare crash in various assignments: A possible, but very rare cause for crashes in various PrT assignment procedures has been fixed. **(22913)**
- ✔ Right-turns in opposite flow in ICA calculation: When calculating the node impedance according to ICA, for the opposite flow of a permitted left turn with the option 'ICA right turn will influence opposing left turn' switched on, the right turns of the opposite direction were only taken into account for this opposite direction in the case of shared straight/right lanes. This error has been fixed. **(23056)**
- ✔ Warm start for PrT assignment with ICA: The calculation of the PrT assignment with ICA with warm start took unnecessarily long because the values were not saved in the version file. This error has been fixed. **(22511)**
- ✔ Warnings during SBA visualization: If trajectories of an SBA assignment were displayed in the 3D network editor, but were not recorded during the SBA assignment, warnings that occurred during the assignment possibly interrupted the recording of the trajectories. This error has been fixed. **(22864)**

PuT Assignment

- ✔ Connection file import and network changes: The program no longer crashes when carrying out a timetable-based assignment using percentage shares (MPA) and based on a connection file if, between writing this connection file and using it as the basis for the assignment, the network has been changed so that previously connected zones are no longer connected. In this case, the use of the connection file is now rejected. **(23064)**
- ✔ Wrong search impedance at transition from DRT to lines: When using Branch&Bound search in timetable-based assignment with DRT, the impedance was incorrectly calculated when transferring from a DRT path leg to a path leg covered with a PuT line transport system. This error has been fixed. **(23141)**

PuT Operating Indicators

- ✔ Crash on user cancelation: A crash no longer occurs when the user explicitly cancels the procedure 'PuT operating indicators'. **(22963)**

- ✔ Slight errors in line blocks lead to error messages in PuT operating indicators: If the calculation of costs and vehicle requirements in the PuT operating indicators was based on line blocks that contained slight errors (e.g. vehicle errors or layover time errors), this led to the output of an error message in the message window. In this situation, however, the calculation can still be performed, and the PuT operating indicators procedure is then considered to have been completed successfully. This error has been corrected by downgrading the message to a warning. **(22980)**
- ✔ Two errors occurred when calculating indicators for the network object 'Territory PuT detail vehicle journey item': Firstly, the indicators 'Number of service trips' (with and without coupling) were not distributed to the individual vehicle combinations for evaluation levels with vehicle combination. Secondly, values could be output for territories in which the relevant vehicle journey item was not located, if the section for the subsequent vehicle journey item was located in this territory. Both errors have been fixed. **(22819)**

Ride Sharing

- ✔ Tours with stop event exceeding day change: The execution of the procedure 'Tour planning' or the import from PTV MaaS Modeller failed if a vehicle tour contained a stop event that started before the day change and ended afterwards. This error has been fixed. **(23065)**

Subnetwork Generator

- ✔ Attribute values at vehicles per block item type were lost: When generating a subnetwork, values of attributes at vehicle units and at vehicle combinations that had subattribute block item type (e.g. cost rate, range, etc.) were lost. This error has been fixed. **(23012)**

Visum Files

- ✔ Faulty files result from '&' in codes: In certain cases procedure parameter files and version files could be created that were not readable if the character '&' occurred in strings (e.g. in DSeg code 'P&R'). This error has been fixed. **(23019)**
- ✔ Non-deterministic behavior of the network reader when completing line routes: In certain special cases, non-deterministic behavior could occur when reading in line routes or system routes to complete the route course if inserted elements were located on link stop points and no path could be found during the shortest path search for completing the line course. This bug has been fixed. **(23069)**
- ✔ Switched off Vissig SCs are switched on: If a signal control (SC) of the type Vissig was switched off via the attribute but had a valid signal program, it was implicitly switched on when writing and later reading the version file. This error has been fixed. **(22983)**

❗ Breaking Changes

Filters

- ❗ Filter on empty multi-enumeration type (e.g. TSysSet) did not always work correctly: If the condition was set in the filter that an attribute of an enumeration type that allows multiple selections (typically sets of objects such as TSysSet, DSegSet, etc.) was not equal to the empty set or contained at least one element of the empty set, network objects whose attribute value was the empty selection fulfilled this filter condition. This bug has been fixed. Thus, procedures that are restricted to 'Active network objects only' deliver different results than before. **(22917)**

Junction Editor

- ❗ Right-turns in opposite flow in ICA calculation: When calculating the node impedance according to ICA, for the opposite flow of a permitted left turn with the option 'ICA right turn will influence opposing left turn' switched on, the right turns of the opposite direction were only taken into account for this opposite direction in the case of shared straight/right lanes. This error has been fixed. As a result, the results of the assignment with ICA change. **(23056)**

Matrix Estimation

- ❗ Consideration of PT walk trips: The matrix correction procedure adjusts demand matrices in such a way that the resulting volumes correspond as closely as possible to count values. Previously, PT walk trips were also taken into account in the volumes, although they were presumably never counted in the count values. The procedure has now been changed: PT walk trips are no longer taken into account in the volumes. This may change the results. **(22879)**

PrT Assignment

- ❗ BPR type VD function: The special handling for integer exponents in the BPR function has been removed. This can change the results of the BPR function slightly. **(21477)** [+](#)

- ❗ Calculation of vCur-PrTSys: The calculation of v0-PrTSys and vCur-PrTSys was not consistent, so that certain VD functions returned vCur values that were smaller than v0PrT. This error has been fixed. As a result, calculation results may change. **(23005)**
- ❗ Classical equilibrium assignment: The procedure has been modernized and significantly accelerated. This changes the results of the procedure. **(17641 +)**
- ❗ Incorrect network volumes in intermediate steps: In the Bi-conjugate Frank-Wolfe, Incremental assignment, and Equilibrium_Lohse methods, network volumes were not calculated correctly in the intermediate steps, which deteriorated the convergence. This error has been fixed. This changes the results of the mentioned assignment methods. **(22906)**
- ❗ Warm start for PrT assignment with ICA: The calculation using the option 'Use current assignment result as initial solution' for PrT assignment with ICA took unnecessarily long because the values required for the warm start were not saved in the version file. This error has been fixed. As a result, the results of the assignment with ICA change when using the 'Use current assignment result as initial solution' option. **(22511)**

Visum Files

- ❗ Switched off Vissig SCs are switched on: If a signal control (SC) of the type Vissig was switched off via the attribute but had a valid signal program, it was implicitly switched on when writing and later reading the version file. This error has been fixed. As a result, after writing and reading the version file, the attribute value changes compared to the previous state and subsequently also the results of various procedures (e.g. ICA calculation, Assignment with ICA). **(22983)**

PrT Assignment

- ❗ Right-turns in opposite flow in ICA calculation: When calculating the node impedance according to ICA, for the opposite flow of a permitted left turn with the option 'ICA right turn will influence opposing left turn' switched on, the right turns of the opposite direction were only taken into account for this opposite direction in the case of shared straight/right lanes. This error has been fixed. As a result, the results of the assignment with ICA change. **(23056)**

2022.00-00 [231683]

2021-07-26

+ New Features and Changes

ANM

- + Signal data: During the ANM export the content of the SC attribute 'Signal program data' are written into the ANM file to transfer data of signal controllers. **(22523 ❗)**

Add-Ins

- + Adaptation of add-ins to Python 3.9 environment: All add-ins delivered with PTV Visum have been updated to Python 3.9. **(22723)**
- + The wx-Python library has been updated to version 4.1.1. Add-Ins that are part of the Visum installation have been adapted. **(22157)**

COM-API

- + Access to currently loaded scenario: There is a new COM method at IProject that returns the currently loaded scenario as an IScenario object. **(16926)**
- + Changed return value of 'GetFilteredSet' and 'FilteredBy': The methods 'GetFilteredSet' and 'FilteredBy', available on network object container objects like 'ILinks', no more return an unspecific object of type 'ICollectionBase', but the specific network object container object of the same type as the method has been called on. Therefore, specific methods available for this type can be called directly. E.g. for an 'ILinks' object you may directly call 'SplitAtStopPointOnLink' on the result of the 'GetFilteredSet' or 'FilteredBy' operator. **(20420)**
- + Check if an attribute exists: The new method AttrExists on the IAttributes object allows to query whether there is already an attribute with the specified attribute ID in the network. **(19430)**
- + End literals in the COM documentation: For enumeration types, the last literal of the enumeration type, which is not a permissible expression, was sometimes listed in the COM documentation. This error has been fixed. **(18739)**
- + Extensions for COM access of markings: COM access is now possible for markings of type StopSequenceItem, Storyboard, StoryboardAction, CameraPosition. **(16318)**

- + Fast access through new methods 'GetMultipleAttributesRaw' / 'SetMultipleAttributesRaw': Analogous to the accelerated access methods for matrices there are new accelerated access methods 'GetMultipleAttributesRaw' / 'SetMultipleAttributesRaw' designed for reading / writing attribute values. In the helper library VisumPy.helpers shipped together with Visum there is also a pair of methods with the same names. These check the integrity of the passed parameters and should be used when using these new accelerated access methods. **(18512)**
- + Import and Export of .sig files: At ISignalControl there are new COM methods for the import and export of .sig files. **(22214)**
- + ItemByKey method for access to a single attribute: The new ItemByKey method at the IAttributes object now allows direct access to a single attribute. Parameter is the attribute ID, returned is the corresponding IAttribute object. **(15504)**
- + More functions for adding and removing columns in lists: The COM objects for lists (I...List) now provide more functions to add or remove columns, similar to the ITableAttrSelection object. In particular, all columns of a category (e.g. 'PrT Input') can be added using 'AddColumnsForCategory'. **(20942)**
- + Multiple PrT shortest path searches via COM: A new COM function allows the calculation of many PrT shortest path searches with one function call. **(22158)**
- + Option in list of persons: The option 'Location as household' or 'Location as long-term choice' available in the list of persons is now also accessible through the COM method SetObjects of IPersonList. **(22006)**
- + Paste from clipboard via COM: The new method PasteFromClipboard() at Visum.Lists. has been introduced which allows to paste content from the clipboard via COM in lists. **(22030)**
- + Support for Python 2 ends: Python 2 is not supported anymore. Corresponding parts of the installation of PTV Visum have been removed. Scripts must be adapted to Python 3. **(22074)**

Data Model

- + Bicycle traffic: When a new network is created, it automatically includes a transport system, a mode, and a demand segment with the name Bike. **(22683)**
- + Converting POIs to locations: POIs can be converted into locations. The POIs are either subsequently deleted or for the location a reference to the originating POI is created to subsequently transfer further attributes from the POI to the location. **(20606)**
- + Copy and paste of definitions of user-defined attributes (UDA): The definitions of user-defined attributes (UDA) can be copied from one version file to another via the clipboard. Corresponding functionality can be found in the context menu of the list of attributes. **(21740)**
- + Cost of line blocks / -elements: The total costs of line blocks and line block elements are shown. An additional attribute at the respective object shows the weighted costs according to the set cost function. **(20643)**
- + Cost rate per vehicle: The cost rate per vehicle always refers to the analysis period. In existing models, that use the analysis horizon as a reference period, the cost rate is divided by the projection factor of the valid day 'daily' and the reference period is set to analysis period. **(21985)**
- + Default for storage of PrT paths: The default for saving PrT paths in the general procedure parameters has been changed to 'Save as connections'. **(12808)**
- + Display of attributes with percentages: Attributes that typically represent proportions (e.g. vol/cap ratio) are displayed in the format 'Percent' by default, whereby the floating point number is multiplied with 100. **(21217)** 
- + Evaluation of elevation data of links: There are four new calculated attributes of links that evaluate elevation data from the link polygon including its intermediate points. **(22117)**
- + Generation of objects of the node geometry: For nodes and main nodes with a default geometry the objects of the node geometry (legs, lanes, lane turns) are always generated when reading version files. Consequently, the corresponding lists always show all objects and evaluations based on attributes of these objects are available immediately. **(21795)**
- + Integration of daily plans with the calendar: Daily signal plans can now also be allocated to calendar days. The attribute 'Daily signal program list number' has been abolished, instead the daily signal plans allocated to calendar days can be viewed via the SC attribute 'Daily signal program list number per day (CDay)'. In the procedure 'Set signal times', the active signal program is now set for the respective calendar day. **(22297)** 
- + New relation to effective signal groups: There is a new relation from stages to effective signal groups. The effective signal groups are the signal groups that are actually green during a stage. **(22496)**
- + New relations between stop points and territories: There are new relations between stop points and territories showing containing territories and contained stop points, respectively. **(22258)**
- + New relations of POIs: There are two new relations from POIs, namely to the nearest node and to the nearest active node. **(22003)**
- + New relations of locations: There are two new relations from locations, namely to the nearest node and to the nearest active node. **(22342)**
- + Path items: The vehicle tour items, which result from dispatching a ride sharing service, now contain information about charging time and dwell time at holding areas. **(22454)**

- + Regulated traffic areas: The network object 'Toll systems' has been renamed to 'Regulated Traffic Areas' and the functionality has been extended. In addition to the area toll, regulated traffic areas of type 'No through traffic' and 'No traffic' can now be defined and taken into account in static assignments as well as in the simulation-based assignment (SBA). Regulated traffic areas are taken into account in the impedance function. A restriction to active areas is possible for the calculation of the impedance. In particular, the renaming of the network object affects the COM interface, since corresponding COM objects and methods have been renamed as well. **(16841 🚫)**
- + Relation from node to allocated location: Nodes have a relation to all locations for which they are the nearest (or nearest active) node. **(22665)**
- + Unification of the data model for signal control: With the exception of RBC control, signal controllers are defined in Visum based on the Vissig data model. Previously defined internal signal controllers are converted to Vissig when read in Visum 2022. The signal data is stored into an attribute 'Signal program data' of the SC. The same applies when reading models with Vissig control, i.e. signal data is also read into this attribute and no longer stored in external .sig files. Some of the Vissig control data, especially attributes of signal groups and stages, are reflected in Visum and can be edited in the junction editor or in lists. More complex signal controllers are to be edited via the Vissig GUI. **(22209)**
- + Unique geometric or user-defined allocation of locations to zones: Locations now have an allocated zone, which can optionally be defined geographically. An attribute can be used to specify whether or not this is to be understood as a manually allocated zone or the zone in which the location is found. The relation from the location to the zone outputs the relevant zone. Conversely, a new relation at the zone outputs all locations allocated to this zone. **(22655)**
- + Unlimited number of demand segments: The number of demand segments within a network is no more limited (was max. 512 up to now). **(22584)**
- + Volume capacity ratio attributes: The naming of the volume capacity ratio attributes has been standardized. The average ratio in the line hierarchy is now consistently referred to as 'MeanVolSeatCapRatio' or 'MeanVolTotalCapRatio'. The ratio at the line route- and travel time- profiles were named 'VolSeatCapRatio' and 'VolTotalCapRatio', respectively. At the links, the utilization of public transport is now called 'VolSeatCapRatioPuT' and 'VolTotalSeatCapRatio'. **(22130 🚫)**

Data Model, Graphics

- + Adjusting graphic parameters: The adjustment of graphic parameters has been accelerated, so that in particular operations based on the data model of public transport (such as the aggregation of line routes) have shorter run times. **(21910)**

Demand Procedures

- + Distribution functions Logit and Combined: The distribution functions Logit and Combined were previously formulated with a parameter 'a'. In the subsequent calculations, this parameter appeared in both the numerator and the denominator, which is why it could not have any effect on the results and was therefore superfluous. This parameter has now been removed and can no longer be entered by the user. However, the results may still change slightly due to minimal numerical inaccuracies. **(21385)**
- + Message for trip distribution with Kirchhoff: The error message when calculating a trip distribution with negative Kirchhoff exponent and non-positive utility values has been improved. **(21585)**
- + Trip generation with negative savings in the freight demand calculation: If the values of savings become negative, then the transformed savings are set to zero regardless of the function type used. This means that tours from A to B via C back to A are not used, if they are more expensive than the sum of tours A-B-A and A-C-A. **(21870 🚫)**

Dialogs

- + Encoding for text files: The options for encoding of text files in the user settings have been removed. The default UTF8 is now always used. **(22296 🚫)**
- + Extensions for the SC dialog: The dialog for signal control has been extended to import and export .sig files. **(22212)**
- + Language and add-ons: The language settings can be found under the user preferences in the 'GUI / General' branch. The 'GUI / add-ons' branch shows additional modules. You can activate and deactivate these to limit the number of functionalities on the user interface. The license dialogue only shows the information about your license. **(20796)**
- + PuT operating indicators: In the procedure parameter dialog for PuT operating indicators, the grid in the Tab 'User-defined attr.' has been replaced by a modern list grid. **(22885)**
- + Saving matrices: When saving matrices in binary format there is an additional option for saving column and row names. **(21804)**
- + Transform network coordinates: For a coordinate transformation, the user can choose between the center of the network and a free coordinate as the center. The center point of the transformation is the coordinate that will not change during scaling and rotation. **(22066)**

Filters

- + Automatic activation of filters when editing: Filters are activated automatically when the filter is edited. **(21775)**
- + Line and stop filter: The filter dialogs of the lines and the stops cover all associated hierarchy levels. Line routes, travel time profiles etc. as well as stop areas and stops are accessible in tabs. The selection of the displayed tab when opening the filters is now more intelligent. In general, the dialog opens with the tab that was open for the last time during the session. Access from special views or on specific hierarchy levels are considered and the selection of the initial register is adjusted. **(21580)**
- + Use of active network objects for 1:1 relations: When filtering network objects that have a 1:1 relation to other network objects (e.g. connector to zone), the active network objects can be referred to by selecting the aggregation function 'CountActive' objects as an attribute and setting the value to 1 (true) or 0 (false). **(21000)**

Formulas

- + Allocation of time series elements to matrices: When converting percentage time series to matrix time series the time series elements are references by matrix references using the code and time information of corresponding matrices. **(21094)**
- + Line breaks in formulas: Line breaks in strings within formulas are allowed arbitrarily. **(22631)**

Graphics

- + Column charts: Column charts are available for vehicle journeys, time profiles, and as a network-wide evaluation. **(21526)**
- + Drawing of markings: Drawing of markings is done in the background without blocking the program. When selecting many objects the synchronization can be switched on via the context menu entry 'Synchronize marking'. **(19121)**
- + Improvements for the SVG export: The SVG export parameters include an additional option for the transformation of coordinates. The new option corresponds to the default and adjusts the range of coordinates. **(22790)**
- + SVG Export for the geometry view: For the geometry view of the junction editor there is now the possibility of the SVG export. **(22473)**
- + Speed up of drawing of markings: Drawing of markings has been accelerated significantly. **(14294)**
- + Visualising path sequences: When visualizing path sequences, paths from an existing assignment can optionally be used. Up to now, all existing paths were displayed. The improved functionality now only draws exactly one, randomly selected assignment path. **(19268)**

I/O Interfaces

- + Consistent allocation of the code during VDV452 import: During the VDV452 import, stop areas now receive the same code as stop points assigned to them. **(21509)**
- + DBF Import: Data from DBF files can be imported to PTV Visum. After specifying a name, a user-defined table is created with the contents of the DBF file. This function can also be called via COM. **(22517)**
- + Data base format: The default data base format for both the export as well as the import has been changed to SQLite. **(22251)**
- + Emme- Import: The interface for importing data from Emme (4 or smaller) has been updated. Additional 'extra attributes' are imported. Polypoints of links and m-lines for changes to the Link TSys have been considered. The dialogues have been modernized. **(22029)**
- + Import MapFan DB: Increment P company provides detailed map data for Japan. Visum imports Map Fan DB data directly into an empty network. Both the roads and the railroads data are transferred. **(22065)**
- + RailML Import: If the RailML files contain additional information for timetables, blocks, vehicles, or vehicle combinations that previously had no equivalent in Visum, these can now be assigned to attributes or created as user-defined attributes. **(19485)**
- + railML-Import: Line blocks without the underlying journeys in railML files can be transferred to PTV Visum. The prerequisite is, that the required journeys already exist in the model. The block information is mapped to the existing journeys during import. **(22053)**
- + railML-Import: Not only operation, control or stop points can be used to describe the route, but also link information. The attributes holding this information are now selectable not only on the destination but also on the origin side. **(21802)**
- + railML-Import: Vehicle information will be read from railML data 'vehicles' and 'formations' and is assigned to vehicle units and vehicle combinations within PTV Visum. **(21673)**

Installation

- + Support for Python 2 ends: Python 2 is not supported anymore. Corresponding parts of the installation of PTV Visum have been removed. Scripts must be adapted to Python 3. **(22074)**
- + The wx-Python library has been updated to version 4.1.1. Add-Ins that are part of the Visum installation have been adapted. **(22157)**
- + Update of Python 3.X: The Python 3 environment has been updated to version Python 3.9.5 (Release Date: May 3, 2021). At the same time, the supplied libraries have been updated to the latest version. **(21572)**

Junction Editor

- + Background map: In the geometry view of the junction editor, a background map can optionally be displayed. **(22319)**
- + Editing link geometry: The geometry of links can be edited interactively in the geometry view of the junction editor. **(22469)**
- + Graphic parameters: For the geometry view there are graphic parameters that are saved in the version file and in the global layout. **(22320)**
- + Junction editor layout: The global layout has been extended. It also includes the view of the junction editor. Via the menu Junction editor > Open junction editor layout it is possible to read global layouts partially, i.e. with the information saved for the junction editor only. **(22884)**
- + New relation to effective signal groups: There is a new relation from stages to effective signal groups. The effective signal groups are the signal groups that are actually green during a stage. **(22496)**
- + Selection of signal program: The combo box for selecting the signal program is also available for stages in the Junction editor under geometry. **(22507)**
- + Signal timings - View: The signal timings view in the junction editor now always shows the geometry view in the upper part and the signal groups in the lower part. For stage-based SC, the interstages are also displayed. interstages can be freely moved within the cycle time. The duration of the interstages can also be changed via the context menu. **(22462)**

Lists

- + Column filter: The selection of the filter category in column headers has been extended by the entries 'Empty' and 'Not empty'. This allows distinguishing between the entries '0' and 'Empty' for attributes that allow empty values. **(20654)**
- + Copy and paste of definitions of user-defined attributes (UDA): The definitions of user-defined attributes (UDA) can be copied from one version file to another via the clipboard. Corresponding functionality can be found in the context menu of the list of attributes. **(21740)**
- + Paste from clipboard via COM: The new method PasteFromClipboard() at Visum.Lists. has been introduced which allows to paste content from the clipboard via COM in lists. **(22030)**
- + SC list: The list of SC has been improved. SC can be created and deleted via the list. The context menu has been extended and enables access to the SC dialog, to the Vissig GUI or the allocation of nodes and main nodes to the SC. **(22445)**

Lists, COM-API

- + The previously implicitly connected lists for PrT paths from assignments (i.e. with demand segments) on the one hand and user-defined paths (i.e. allocated to path sets) on the other hand have been separated at the user interface as well as in the COM interface. Therefore, in the 'Lists' menu under 'Paths' there are now separate entries to the lists 'PrT Paths' and 'PrT paths on link level' for the assignment paths and to the lists 'Path sets', 'Paths' and 'Path items' for the user-defined paths. Similarly, at the ILists object in COM via CreatePathList or CreatePathItem the list for user-defined paths or their elements is opened. Switching the IPrTPathList by specifying a path set in the SetObjects method is no longer possible. **(18702)**

Matrix Editor

- + Editing filtered entries: filtered entries in the matrix editor are hidden by default. If a rectangle is drawn interactively over active and passive entries and a value is assigned to the entries, the changes are only applied to the active elements. **(18136)**
- + Editing headers of views: The headers of the matrix editor, matrix histogram and matrix comparison can be changed under the menu of the corresponding view > Change header.... **(21277)**
- + Matrix histogram, Matrix comparison: Both the matrix histogram and the matrix comparison optionally take into account the filters on zones, OD pairs, or matrix values. **(2651)**
- + Matrix histogram: For long-running calculations in the matrix histogram, a progress bar and a remaining time are displayed. It is possible to cancel this calculation. **(21791)**
- + Matrix histogram: The user guidance in the 'Matrix histogram' view has been improved. **(17634)**
- + Rounding in the matrix editor: The method used for random round has been changed to bucket round. **(19408)**

Network Editor

- + Aggregation of zones or territories: If zones or territories are aggregated by an attribute, the value of this attribute is taken over. **(22279)**
- + Allocation of time series elements to matrices: When converting percentage time series to matrix time series the time series elements are references by matrix references using the code and time information of corresponding matrices. **(21094)**

- + Calculation of z-coordinate when splitting a link: When splitting a link, the z-coordinate is calculated for the new node. This also considers the z-coordinates of the link polygon points. **(22661)**
- + Drawing of markings: Drawing of markings is done in the background without blocking the program. When selecting many objects the synchronization can be switched on via the context menu entry 'Synchronize marking'. **(19121)**
- + Location search: A location search allows you to navigate quickly in large networks. In the network editor, you will find a button that allows you to enter short search terms. Potential hits will be displayed. The location of the selected address is displayed in the network editor. **(15590)**
- + MapTiler background maps: Maps provided by the provider MapTiler are now available as background map. **(22754)**
- + Network Check: A new check finds stops that have no PuT-Walk connection to zones but at which time profiles allow boarding and alighting. The optional repair function prohibits boarding and alighting at such stops. **(21587)**
- + Remove zigzags: The check for zigzag routing of line and system routes has been changed. Trivial zigzags are now also zigzags that have profile points only on one of the links that have been traversed multiple times. These are taken over during the repair. **(20950)**
- + Remove zigzags: The check of zigzag routings of line and system routes has been extended to loops. A loop is created when the same route point is passed over several times. Within the loop, the same route points are traversed for the outward and return directions. Trivial loops have no further profile points within the loop. After checking for zigzags and loops, these are reported and optionally repaired. **(20982)**
- + Speed up of drawing of markings: Drawing of markings has been accelerated significantly. **(14294)**

Network Editor, COM-API

- + Split links: A function to split links at link stop points is available via the context menus of links and link stop points. The function can be called via COM on basis of a container of links and stop points as well as on single links and stop points. **(19321)**

Other Procedures

- + Integration of daily plans with the calendar: Daily signal plans can now also be allocated to calendar days. The attribute 'Daily signal program list number' has been abolished, instead the daily signal plans allocated to calendar days can be viewed via the SC attribute 'Daily signal program list number per day (CDay)'. In the procedure 'Set signal times', the active signal program is now set for the respective calendar day. **(22297 🚫)**
- + Signal optimization: Green time optimization for Vissig controllers with signal group-based programs is now also available. **(22385)**
- + Shortest path search: The shortest path search that is used outside the private transport assignment has been improved and accelerated. **(21818)**

PrT Assignment

- + Bicycle assignment: A new PrT assignment method for bicycle traffic was added, taking into account special aspects of cyclists' behavior. **(22052)**
- + Improvements for the method bi-conjugate Frank-Wolfe (BFW): The assignment method bi-conjugate Frank-Wolfe has been improved: Firstly, memory consumption has been reduced and secondly, the assignment fulfills the condition of proportionality across transport systems. **(20009 🚫)**
- + Look ahead distance for lane choice in SBA: For lane choice, a look-ahead distance can be taken into account beyond the end of the link that the vehicle enters. For this purpose, a new link attribute 'SBA look-ahead distance for lane choice' has been introduced, which defines the distance starting from the ToNode of the link. **(17847)**
- + Messages for calculations of PrT skim matrices: The output of messages when executing the PrT skim matrix calculations has been improved. **(21929)**
- + Messages when initializing PrT assignments: The output of messages when initializing PrT assignments has been improved. **(20968)**
- + Precise message on warm start of SBA with percentage connectors (MPA): If percentage connectors with distribution for individual relations (MPA) are used, the simulation-based dynamic assignment (SBA) cannot be based on an existing assignment result. However, when trying to do so, a non-specific error message appeared so far, which did not point out this cause. This message has been improved. **(19907)**
- + Regulated traffic areas: The network object 'Toll systems' has been renamed to 'Regulated Traffic Areas' and the functionality has been extended. In addition to the area toll, regulated traffic areas of type 'No through traffic' and 'No traffic' can now be defined and taken into account in static assignments as well as in the simulation-based assignment (SBA). Regulated traffic areas are taken into account in the impedance function. A restriction to active areas is possible for the calculation of the impedance. In particular, the renaming of the network object affects the COM interface, since corresponding COM objects and methods have been renamed as well. **(16841 🚫)**
- + SBA - calibration of capacity downstream of merges: For the simulation-based assignment (SBA) a new node attribute has been introduced that enables calibration of capacity downstream of merges. The node attribute 'SBA penalty for merging vehicles' increase the minimum time between vehicles if they are entering the same destination lane but come from different origin lanes. **(22231)**
- + SBA random number generator: The random number generator used in SBA has been replaced. **(22291 🚫)**

- + Setting for the design hourly volume at nodes: The option 'Volume PrT [PCU]' as the design hourly volume for the calculation of impedances at nodes has been removed. Instead the option 'Volume PrT with base volume [PCU]' is used and the settings for the base volume under PrT settings > Assignment is considered. **(21496 🚫)**
- + Usage of formula attributes in the PrT impedance function: When using formula attributes in the detailed impedance definition, they will be highlighted in yellow and a tooltip is being used to indicate restrictions when using volume-dependent attributes apart from tCur. **(18357)**

Procedure Sequence

- + Copy & paste for procedures: Procedures can be copied from one version file to another via the clipboard. New context menu entries are available for this purpose. Copying can be carried out either for one or more marked procedure steps or for one or more marked groups. **(19280)**

PuT Assignment

- + Headway-based assignment with a headway of zero: A headway of zero is not allowed in the headway-based assignment. The assignment will be aborted with an error message. **(22493 🚫)**
- + Messages for PuT assignment procedures: The output of messages when executing PuT assignments has been improved. **(21657)**
- + Skim 'Path leg attribute' now uses path leg attribute: Previously, the 'Path leg attribute' skim used a time profile attribute for definition, contrary to its designation. Now, a path leg attribute is actually used, so that, for example, the vol/cap ratio of the vehicle journey items used can be evaluated. Only those indirect attributes are available whose value results from the assignment. **(21961)**
- + Skim for adaptation time: The skim adaptation time is also available for analysis time intervals. **(21001)**
- + Speed-up for constructing data structures for shortest path search: The construction of data structures containing shortest paths for PuTWalk and PuTAux has been accelerated. This has a particular effect when opening version files that contain public transport assignments. **(22104)**

Ride Sharing

- + A vehicle that cannot serve new trip requests returns to a holding area. The selection of the area is no longer based on distance alone, but on a cost function. In addition to distance, this function includes the capacity, weight, and potential of the holding area. The current and future demand now influences the decision of which holding area is selected. **(22334)**
- + Dispatching: A major extension of the dispatching algorithm now allows for more flexible service schemes: For each trip request, all pickup (resp. drop-off) locations within a certain walking time from the origin (resp. destination) can be considered for tour planning. This creates additional flexibility in vehicle dispatching and typically reduces the number of vehicles needed. The dispatcher will define the pickup and drop-off combination for a trip request. The choice of the best-fitting pickup and drop-off can be controlled through a combination of the level of service (= short walk access and egress) and efficient vehicle usage (= short extra travel time) in one generalized cost function. **(21861)**
- + Ideal travel distance: The tour planning procedure determines the parameter Ideal travel distance. This is stored on the public transport path leg and indicates the shortest distance to serve a trip request. **(20787)**
- + Loops in vehicle tours: It is possible to correctly map loops of vehicle tours in the PrT path. Such loops occur when a vehicle departs from a node and is ordered back to the same node before reaching the next stop. A clean separation between idle and travel time is now possible in such cases. **(19791)**
- + Tour planning: Optionally, serving all trip requests without stopover can be enforced during trip planning, i.e. only trip requests with the same pickup and drop-off nodes combination can be served together (time pooling). This is particularly relevant for VTOLs (air cabs) **(22140)**

Safety

- + APM (Accident Prediction Model) attributes for sections: All APM attributes (APM accident count, APM accident density, APM accident rate, APM accident cost, APM accident cost density, APM accident cost rate) are now also available for sections. **(19575)**

Scenario Management

- + Access to currently loaded scenario: There is a new COM method at IProject that returns the currently loaded scenario as an IScenario object. **(16926)**
- + Calculation state and global layout: The calculation state also depends on the global layout. If the global layout has been changed, the calculation state is set to 'Calculated (not up-to-date)'. **(20993)**
- + Calculation times of scenarios: The Tab Scenarios contains three new attributes Calculation start time, Calculation end time, and Calculation duration. **(16622)**
- + Log-Entry about used version file: When creating a project, a log entry is created with the directory and name of the base version used. **(20866)**

- + Modifications and allocated scenarios: Under the tab Modification there are two new attribute 'Scenarios' and Scenarios (completed). The attribute 'Scenarios' lists the number of scenarios in which the modification is explicitly used the attribute 'Scenarios (completed)' displays the numbers of all scenarios including those in which a modification depends on another one. **(19459)**
- + Name of base version: The name of the base version can be changed under Tab 'Basic settings' > 'Project settings...'. **(12453)**

Subnetwork Generator

- + Unused stops: Stops that are located on active routes or nodes can now optionally be included in the subnet even if they are not served by active line routes. **(20302)**

Timetable Editor

- + Naming of regular services: Vehicle journey attributes and their relations can be used as a prefix for naming regular services. **(20492)**

Visum Files

- + Default encoding of text files: The default encoding of text files has been changed to UTF8. **(21242 🚫)**
- + Junction editor layout: The global layout has been extended. It also includes the view of the junction editor. Via the menu Junction editor > Open junction editor layout it is possible to read global layouts partially, i.e. with the information saved for the junction editor only. **(22884)**
- + Reading of older binary files: Reading binary files in the format before Visum 11.03 is no longer supported in Visum 2022. In addition to version files, this also applies to graphic parameter files, procedure parameter files, list layouts and filter files. **(22403)**
- + Reading of text files: UTF-32 encoded text files cannot be read anymore in PTV Visum. **(21901)**

🚫 Breaking Changes

ANM

- 🚫 Signal data: During the ANM export the content of the SC attribute 'Signal program data' are written into the ANM file to transfer data of signal controllers. From PTV Vissim 2022 the data of the attribute 'Signal program data' are imported for fixed time control. **(22523 +)**

Add-Ins

- 🚫 Crash when expanding 'wx' in the Python console: No more crash when displaying the possible values within the autocompletion when entering 'wx' (after an import statement 'import wx') in the Python console. Due to incompatible changes in the newer version of wx it may be necessary to adapt the code of your own Python applications. **(20946)**

COM-API

- 🚫 Changed default regarding non-editable attributes for export methods: For the Visum.IO.SaveNet, Visum.IO.SaveDemandFile, Visum.IO.SaveAccessDatabase, Visum.IO.SaveToMsSqlServerDatabase and Visum.IO.SaveSQLiteDatabase methods, which all export data based on a specified layout file, the default of the 'editableOnly' parameter has been changed to 'false'. Thus, if the parameter is not set, all attributes specified in the layout file are actually exported, whereas previously the non-editable attributes were filtered out. With unchanged client code, the behavior changes accordingly if the parameter in question is not explicitly set in this code. **(22008)**
- 🚫 Spelling of Property IAttribute.Category corrected: The spelling of Property IAttribute.Category has been changed. It was previously written in lower case. Depending on the target language, client code must be adapted. **(22687)**

Data Model

- 🚫 Display of attributes with percentages: Attributes that typically represent proportions (e.g. vol/cap ratio) are displayed in the format 'Percent' by default, whereby the floating point number is multiplied with 100. This changes results of these attributes, because the multiplication with 100 is not done until the display is in the format 'Percent'. **(21217 +)**
- 🚫 Integration of daily plans with the calendar: Daily signal plans can now also be allocated to calendar days. The attribute 'Daily signal program list number' has been abolished, instead the daily signal plans allocated to calendar days can be viewed via the SC attribute 'Daily signal program list number per day (CDay)'. In the procedure 'Set signal times', the active signal program is now set for the respective calendar day. This eliminates the need for the daily plan number. **(22297 +)**

- ❗ Regulated traffic areas: The network object 'Toll systems' has been renamed to 'Regulated Traffic Areas' and the functionality has been extended. In addition to the area toll, regulated traffic areas of type 'No through traffic' and 'No traffic' can now be defined and taken into account in static assignments as well as in the simulation-based assignment (SBA). Regulated traffic areas are taken into account in the impedance function. A restriction to active areas is possible for the calculation of the impedance. In particular, the renaming of the network object affects the COM interface, since corresponding COM objects and methods have been renamed as well. Scripts must be adapted accordingly. If toll systems of the type area toll are defined, these are automatically taken into account in static assignments or SBA if the impedance component Toll-PrTSys is included. **(16841 +)**
- ❗ Volume capacity ratio attributes: The naming of the volume capacity ratio attributes has been standardized. The average ratio in the line hierarchy is now consistently referred to as 'MeanVolSeatCapRatio' or 'MeanVolTotalCapRatio'. The ratio at the line route- and travel time- profiles were named 'VolSeatCapRatio' and 'VolTotalCapRatio', respectively. At the links, the utilization of public transport is now called 'VolSeatCapRatioPuT' and 'VolTotalSeatCapRatio'. **(22130 +)**

Demand Procedures

- ❗ Calculation of the diagonal in the procedure P+R lot choice: When calculating the utility in the procedure P+R lot choice, the values of the diagonal were not calculated or initially set to zero. This error has been fixed. The values of the diagonal are now set to -99999. This can change calculation results in demand models with P+R. **(22062)**
- ❗ Trip generation with negative savings in the freight demand calculation: If the values of savings become negative, then the transformed savings are set to zero regardless of the function type used. This means that tours from A to B via C back to A are not used, if they are more expensive than the sum of tours A-B-A and A-C-A. This can change results of the trip generation in the freight demand model. **(21870 +)**

Dialogs

- ❗ Encoding for text files: The options for encoding of text files in the user settings have been removed. The default UTF8 is now always used. This may result in changes in output files. **(22296 +)**

Lists, COM-API

- ❗ The previously implicitly connected lists for PrT paths from assignments (i.e. with demand segments) the one hand and user-defined paths (i.e. allocated to path sets) on the other hand have been separated at the user interface as well as in the COM interface. Therefore, in the 'Lists' menu under 'Paths' there are now separate entries to the lists 'PrT Paths' and 'PrT paths on link level' for the assignment paths and to the lists 'Path sets', 'Paths' and 'Path items' for the user-defined paths. Similarly, at the ILists object in COM via CreatePathList or CreatePathItem the list for user-defined paths or their elements is opened. Switching the IPrTPathList by specifying a path set in the SetObjects method is no longer possible. **(18702 +)**

PrT Assignment

- ❗ Improvements for the method bi-conjugate Frank-Wolfe (BFW): The assignment method bi-conjugate Frank-Wolfe has been improved: Firstly, memory consumption has been reduced and secondly, the assignment fulfills the condition of proportionality across transport systems. This changes the assignment results. **(20009 +)**
- ❗ SBA lane selection on links with several pockets or channelized turns at the ToNode: On links to nodes with multiple pockets and/or channelized turns, unrealistic lane changes could occur. This error has been fixed. When entering a link, vehicles now already select lanes that allow them to turn at the to node of the link according to their route. This behavior could be achieved in PTV Visum 2021 using the UDA 'SBAUseLaneChoiceLookaheadForPockets' (ID 21780). The UDA is now no longer required. This changes SBA assignment results. **(22308)**
- ❗ SBA random number generator: The random number generator used in SBA has been replaced. This changes the results of SBA. **(22291 +)**
- ❗ Setting for the design hourly volume at nodes: The option 'Volume PrT [PCU]' as the design hourly volume for the calculation of impedances at nodes has been removed. Instead the option 'Volume PrT with base volume [PCU]' is used and the settings for the base volume under PrT settings > Assignment is considered. Calculation results can change if the settings for the design hourly volume at nodes was not in line with the settings for the base volume of (main) turns. **(21496 +)**

PuT Assignment

- ❗ Headway-based assignment with a headway of zero: A headway of zero is not allowed in the headway-based assignment. The assignment will be aborted with an error message. This changes assignment result or the assignment cannot be executed without adjusting the headway. **(22493 +)**

Ride Sharing

- ❗ Pre-booking time on the previous day: If demand exists early in the day, the creation time of the associated trip requests can be on the previous day. This case was previously not mapped correctly, resulting in distributions of the pre-booking time not being respected. This error has been fixed. In return, the maximum possible pre-booking time has been reduced from 48h to 23h 59m 59s. In previous Visum versions, the import from PTV MaaS Modeller can no longer be used to import tour planning results in which individual trip requests occur with an origin time before the day change. **(22510)**

Visum Files

- ❗ Default encoding of text files: The default encoding of text files has been changed to UTF8. This can change output files, e.g. .net and .att files. **(21242 +)**

Other Procedures

- ❗ Integration of daily plans with the calendar: Daily signal plans can now also be allocated to calendar days. The attribute 'Daily signal program list number' has been abolished, instead the daily signal plans allocated to calendar days can be viewed via the SC attribute 'Daily signal program list number per day (CDay)'. In the procedure 'Set signal times', the active signal program is now set for the respective calendar day. This eliminates the need for the daily plan number. **(22297 +)**

PrT Assignment

- ❗ Regulated traffic areas: The network object 'Toll systems' has been renamed to 'Regulated Traffic Areas' and the functionality has been extended. In addition to the area toll, regulated traffic areas of type 'No through traffic' and 'No traffic' can now be defined and taken into account in static assignments as well as in the simulation-based assignment (SBA). Regulated traffic areas are taken into account in the impedance function. A restriction to active areas is possible for the calculation of the impedance. In particular, the renaming of the network object affects the COM interface, since corresponding COM objects and methods have been renamed as well. Scripts must be adapted accordingly. If toll systems of the type area toll are defined, these are automatically taken into account in static assignments or SBA if the impedance component Toll-PrTSys is included. **(16841 +)**