

Last modified: 2016-11-24

16.01-03 [114674]

2016-11-22

+ New Features and Changes

COM

- + Creating the opposite direction of a line route: When creating the opposite direction of a line route (method `ILineRoute.InsertOppositeDirection`), a new parameter regulates whether new stop points shall be inserted for directed link stop points if the network contains no suitable stop points in the opposite direction. So far, such stop points were always inserted when called via COM, while a query was issued in case of interactive use. **(16890)**
- + Export of screenshots in 3-D view: With the new method `INetEditor3D.ExportNetworkImageFile`, you can capture a screenshot of the '3-D network view' that is independent of the current window size and screen resolution. **(16875)**

Data Model, Schematic Line Diagram

- + Output of IDs of edges in schematic line diagram: A new attribute at vehicle journeys as well as at vehicle journey items enables the output of the IDs of the edges of a schematic line diagram, which display the respective object (vehicle journey or vehicle journey item) or a part of it. The ID of the undirected edge is output. **(16860)**

Dialogs

- + Available page formats of the printer: The available page formats of the selected printer are now available directly in the print dialog and can be selected here. **(16833)**

Graphics 3-D

- + Playing a storyboard in the editor: The storyboard editor now scrolls automatically when playing a storyboard so that the currently played time is always visible in the storyboard editor. **(16851)**

Junction editor

- + ICA calculation after assignment with ICA: After an ICA assignment, the ICA calculation of the node can be performed only if the blocking back model is active. If it is not active, a warning is now issued before the execution of the ICA calculation with the possibility to activate the blocking back model directly. **(16840)**

PrT Assignment

- + Acceleration of the blocking back model: A new variant of the calculation procedure for the blocking back model has been provided, whose calculation is much faster and which utilizes the capacities more evenly. To activate the variant, activate the 'Exploit capacities evenly' option in the parameters of the blocking back model (in the general procedure settings). **(12862)**

✔ Fixed Bugs

COM

- ✔ Error handling in `IVisum.InitLegend()`: The `InitLegend` method at the `IVisum` object to initialize the legend returned mixed up values: In case of success, it reported an error and vice versa. This error has been fixed. **(16922)**

Data Model

- ✔ Attribute 'In schematic line diagram' at vehicle journeys and items: The attribute 'In schematic line diagram' at vehicle journeys and vehicle journey items used to return wrong values if, in the schematic line diagram, edges were connected to nodes that were no profile points but that were merely traversed. **(16923)**
- ✔ Inserting the opposite direction of a line route: Inserting the opposite direction of a line route no longer leads to an infinite loop if it uses directed link stop points that do not exist yet in the opposite direction. **(16865)**

Demand Procedures

- ✔ Attraction with subattribute for Nested Demand: The 'Nested Demand' procedure failed if you selected an attraction with subattribute (but not the default attraction attribute, which also has a subattribute) for the distribution. This error has been fixed. **(16889)**

Dialogs

- ✔ Graphic parameters dialog for a bar: If you changed the fill style settings (particularly the fill color) for a bar in the 'Edit bar' dialog, the change did not always take effect. This error has been fixed. **(16924)**
- ✔ Notification bar for scenario management and stop sequence: In some languages the notification bar for the scenario management and the stop sequence showed no control elements any more, but parts of the code. This error has been fixed. **(16863)**
- ✔ Progress indicator during printing: If a large quantity of tiles was printed, so far, the modal dialog remained non-reactive so that it looked like the program crashed for a while. This error has been corrected. **(16684)**

Graphical Procedures

- ✔ Lengths with PuT Aux in shortest path search: The length displayed for path legs in the 'PuT shortest path search' list that were covered with a PuT Aux transport system did not correspond to the total length of the path leg but to the length of the first link of the path leg only. This error has been fixed. **(16868)**

Graphics

- ✔ Scale when printing or in the print preview: The scale output in the print frame used to be incorrect when printing and in the print preview. This error has been fixed. **(16825)**

Graphics 3-D

- ✔ Classified display of bars or prisms by non-numerical attributes: A crash no longer occurs when drawing prisms or bars in 3-D, if a classification by a non-numerical attribute is set. **(16838)**
- ✔ Display error in case of complex prisms: In the case of complex polygons, the display of prisms used to contain display errors where 'pie slices' of the prism were missing. This bug has been fixed. **(16862)**
- ✔ Improvements of polygon offsets: When displaying very flat prisms or bars, the color of the embedded 2-D level used to overlap the margins of 3-D objects. This error has been fixed. **(16888)**
- ✔ Zooming the mouse wheel in "hand mode": A crash no longer occurs in "hand mode" if you drag the display with the left mouse button pressed and zoom with the mouse wheel at the same time. **(16880)**

I/O Interfaces

- ✔ Disconnect Personal Geodatabase: A crash no longer occurs when drawing a network with GIS objects if you disconnect the Personal Geodatabase and then undo the deletion of the GIS category. **(16024)**
- ✔ Shortened vehicle journeys in railML export: The arrival and departure times of vehicle journeys shortened at the front (i.e. vehicle journeys that do not start at the first time profile item) were shifted in the railML export. This error has been corrected. **(16937)**

Installation

- ✔ Automatic check out after license update: If there was a license among the licenses selected for automatic check out during program start, whose dongle has been updated, the automatic check out used to be canceled and the updated license data was retrieved. An 'unattended' program start (e.g. via COM) in particular could not be carried out. This error has been fixed: If there are other usable licenses apart from the updated license, the updated license is left out and the program is started with one of the known licenses. **(16884)**

Lists

- ✔ PuT paths and PuT path legs lists with user-defined attributes: A crash no longer occurs when exporting a PuT paths or PuT path legs list whose attribute selection includes user-defined attributes. **(16878)**
- ✔ Synchronization of very old list layouts: The synchronization mode of a list used to be undefined after reading in very old list layout files. This was indicated by grayed out synchronization buttons. This bug has been fixed. **(16901)**

Network Editor

- ✔ Finding network objects: The Search window was not synchronized when opened for the first time, even if synchronization was activated. This bug has been fixed. **(16903)**

PrT Assignment

- ✔ Connector nodes in blocking back model: Traffic flows between connectors and links took the capacity restrictions of the connector node into account even though they charge no turn during this transition. This error has been fixed. **(16877 🚫)**
- ✔ Demand from nested formula matrix: A crash no longer occurs when running an assignment (PrT or PuT) with MPA if the demand matrix is a formula matrix which itself uses another formula matrix. **(16617)**
- ✔ Multiple outbound straight turns of a link in SBA: So far, a link was not allowed to have two outbound straight turns when using the simulation-based assignment (SBA), regardless of the control type. This restriction is not necessary in case of nodes of the control type unknown, all-way-stop, or roundabout and has thus been removed. **(16559)**

Procedure Sequence

- ✔ Messages too long: If a procedure generates an extremely large number of messages that are shown in attribute 'Messages' in the procedure sequence, version files that cannot be read in again may result. This error has been fixed. **(16883)**

PuT Assignment

- ✔ Calculating skim discomfort without connections: A crash no longer occurs if the skim 'Discomfort' shall be calculated in the context of the timetable-based assignment or skim matrix calculation, yet this is not possible due to vehicle journey volumes or because no connections were saved and the user confirms the issued warning nevertheless. **(16797)**
- ✔ Capacity-restricted assignment and MPA: If you carried out a second search in a capacity-restricted assignment or an assignment with sharing transport systems while MPA was on (percentage connectors), the same path could be generated more than once (and thus attracted more demand without justification). This error has been corrected. **(16870)**
- ✔ Demand from nested formula matrix: A crash no longer occurs when running an assignment (PrT or PuT) with MPA if the demand matrix is a formula matrix which itself uses another formula matrix. **(16617)**
- ✔ Direct distance at stop areas: If you calculated the 'Direct distance' skim with the 'Calculate stop area skim matrix' operation, the result was always 0 for all relations. This error has been fixed. **(16824)**

Safety

- ✔ Terminating a Safety session: If the Safety tool window was open during a session, Visum would create user-defined attributes, POI categories etc. for Safety in all networks loaded during the same session. This error has been fixed. **(16777)**

Schematic Line Diagram

- ✔ Reallocating a line route: So far, the schematic line diagram did not react correctly when reallocating a line route to another line. As a consequence, layouts of the schematic line diagram that could not be read again could be saved. Version files that were saved afterwards could not be read either. This error has been fixed. **(16900)**

Visum Files

- ✔ All messages during procedure parameters import are errors: All messages (e.g. on unknown attributes) were issued as errors when reading XML procedure parameters files and version files, even in constellations in which processing could be continued without difficulty. Such messages are now issued as warnings. **(16898)**
- ✔ Damaged schematic line diagram layouts in version file: Reading a version file that contains the damaged layout of a schematic line diagram and then restoring the windows (user setting) no longer leads to a crash. **(16895)**
- ✔ Extended options when reading attribute files: A crash no longer occurs when reading attribute files for links if the extended options are open in the dialog. **(16837)**

Visum Files, Procedure Sequence

- ✔ User-defined attribute in Go To operation: If a 'Go To' procedure step was among the procedure parameters whose condition referred to a user-defined attribute, the set attribute was lost when saving and subsequently reading the version file. This error has been fixed. **(16887)**

🚫 Breaking Changes

PrT Assignment

- 🚫 Connector nodes in blocking back model: Traffic flows between connectors and links took the capacity restrictions of the connector node into account even though they charge no turn during this transition. This error has been fixed. This leads to changes in assignment results in connection with the blocking back model, in particular the assignment with ICA. **(16877 ✔)**

+ New Features and Changes

COM

- + Generating an object for the tabular timetable: If a COM object ITabularTimetable is created, which represents a tabular timetable and a tabular timetable is already open, the current settings for the layout, graphics parameters, and for the sorting of vehicle journeys are copied from the open tabular timetable. A subsequent export thus provides the same column selection etc. as the open timetable. **(16575)**

Dialogs

- + Spacing in graphic parameters dialog for POIs: In the graphic parameters dialog, the response to changes to the size of the dialog has been improved on the main page for POIs. Moreover, the icons of the tree view are now visible in many cases. **(16415)**

Graphics 3-D

- + Use of pixel size when recording storyboards: The pixel size preset at the storyboard (attribute 'Resolution (dots per inch)') is now used when recording a storyboard in order to scale the existing absolute sizes (in unit millimeters) of the embedded 2-D display to a reasonable size in the recorded video. **(16670)**

Graphics-3-D

- + Graphic editor for storyboards in 3-D view: A graphical editor is now available in the '3-D network view' window after loading a storyboard. Here you can edit the temporal position as well as the triggered actions of the storyboard actions. **(16801)**

I/O Interfaces

- + HAFAS data in UTF-8: HAFAS data can now also be imported if it is available in the form of text files in UTF-8 format. The format row '*F', which may be contained at the start of each HAFAS file, is evaluated for this. **(16196)**

Main Window

- + Synchronization of the message window in the 'other direction': So far, the related network objects were marked when marking a message with a network object reference. This now also works in the other direction, i.e. messages regarding this network object are now also marked in the message window when marking a network object. **(16697)**

Matrix Editor

- + Synchronization in both ways: The matrix editor is now synchronized in both ways, i.e. if you mark a cell, the related (main) OD pair is marked globally and the matrix editor responds to marked (main) OD pairs by marking the related cells. Particularly if two matrix editors are arranged side by side, both now mark the matrix entry of the same OD pair if it is marked in one of the two matrix editors. **(16252)**

Timetable Editor

- + Optimum height of tables in tabular timetable: In the tabular timetable, you can now set the optimum height for the two upper tables (for vehicles journeys and vehicle journey sections) by double-clicking the separator. **(16156)**

✓ Fixed Bugs

ANM

- ✓ PuT export in case of undirected link stop points: Undirected link stop points were not handled correctly during the ANM export. This could lead to the loss of PuT lines that served these stop points during the transfer from PTV Visum to PTV Vissim via ANM. This error has been fixed. **(16748)**

COM

- ✓ Cancel running a script : If you run a script with the COM command IVisum.ExecuteScriptFile and the execution is canceled by clicking 'Cancel' in the dialog, ExecuteScriptFile does not return an error, so that the calling code cannot respond to the cancellation by the user. This error has been corrected. **(16793)**

- ✔ Faulty system routes: A faulty system route used to be added to the network if, on the one hand, you entered an incomplete sequence of network items for the path using COM method `INet.AddSystemRoute` and, on the other hand, disabled the completion of the course through shortest path searches. The incomplete course of the system route could lead to subsequent program crashes. This error has been fixed: Visum no longer permits the creation of such system routes. **(16784)**
- ✔ Screenshot export: The export of a screenshot via COM (Methode `IGraphic.ExportNetworkImageFile`) did not succeed if the specified target folder did not exist. In addition, a misleading error message used to be issued in this case. The target folder is now created, if possible, and an improved message is issued otherwise. **(16757)**
- ✔ Shape file import via COM: When calling the shape file import via COM, attributes with subattributes were not mapped correctly to the target attributes in Visum. This error has been fixed. **(16836)**

Data Model

- ✔ Renaming and deleting transport systems with fares: Renaming and then deleting a (PuT) transport system in one session resulted in a faulty data model if at least one ticket type existed in the network (and thus supplements per transport system). As a consequence of this, version files could no longer be saved. This error has been fixed. **(16636)**

Dialogs

- ✔ Adding an assessment type for EVA weighting: If you created an assessment type under 'Define assessment types' in the procedure parameters dialog of the 'EVA weighting' procedure, the name of the new assessment type was not displayed during entry. This bug has been fixed. **(16779)**
- ✔ Copy/Paste Modal Split during EVA distribution/mode choice: In the procedure parameters dialog of the 'EVA distribution/mode choice' procedure, the Standardized assessment tab displays 8 decimal places. If you copied these values and pasted them to a different row, the transferred value was rounded to 6 decimal places. This bug has been fixed. **(16782)**

Graphics 3-D

- ✔ Improved display of prisms: There have been several improvements in the presentation of prisms. In particular the top of a prism could not be seen in some cases. The prisms now also have a bottom on the 0-level which shows if you see through from below through the transparent network level. **(16818)**

I/O Interfaces

- ✔ OpenStreetMap import with large IDs: In OpenStreetMap, the highest ID of an object has exceeded the range that can be represented by 32bit numbers. Such data could not be read in so far. This error has been fixed, i.e. OpenStreetMap data can now also be read in if it includes objects with IDs of such large sizes. **(16771)**
- ✔ Slow HAFAS import: In Visum 16, the HAFAS import was significantly slower than in previous versions. This error has been fixed. **(16760)**
- ✔ VDV452 export with user-defined Attributes: If user-defined attributes are output for lines when exporting VDV452, only one vehicle journey was exported at most for each line route. This error has been fixed. **(16762)**

Lists

- ✔ Filtered PuT paths lists with PuT path filter and network changes: Visum no longer crashes in case of certain changes to the network that affect the fare model if a PuT path list is visible, which only displays the paths of the OD pair filter and this OD pair filter contains filter conditions on PuT paths, which in turn refer to fare data and are changed by the network change. **(16162)**
- ✔ Rerouting with synchronized walk times lists: A crash no longer occurs when editing the course of a line route if a synchronized list with stop walk times (passenger transfers and walk times at stop or one of the three lists with specific walk times for time profiles, lines and directions, or transport systems) is open. **(16827)**

Main Window

- ✔ 'Show messages' in procedures: The program no longer crashes if you click the ' Show messages' button (to open the message window) of the warning message during a parallelized procedure. **(16729)**
- ✔ Running procedures while the message window is open: Crashes no longer occur when running parallelized procedures while the message window is open. This error has been fixed. **(16756)**

Matrix Editor

- ✔ No synchronization selectable: If a matrix editor was restored from the version file, you could not set its synchronization mode and the synchronization was not active. This bug has been fixed. **(16324)**

Miscellaneous

- ✔ No license available: If no license is available at the start of PTV Visum, so far, the program only reports that no license is available, but not the specific cause. This error has been fixed. If there are several licenses for selection, the concrete reason why it is not possible to use this last license is now issued for the last unsuccessful license. **(16750)**

Network Comparisons

- ✔ Update of comparison attributes on formulas: The comparison attributes (such as "This network - x") of version comparisons were not adjusted when updating the version comparison or when opening a version file with version comparison if the compared attribute was a formula attribute whose formula uses a user-defined attribute that has changed due to the update. This error has been fixed. **(16783)**

Network Editor

- ✔ Aggregating time profiles: When aggregating time profiles without the 'Time profiles with identical in-vehicle times and dwell times' option and coupled vehicle journeys existed on the time profiles, couplings could not be retained if in-vehicle times and/or dwell times of the partners changed in different ways. A separate message used to be issued for each affected coupling in this case without the possibility of disabling further messages. This error has been fixed. **(16269)**

PrT Assignment

- ✔ Estimate of the VD functions for turns in the assignment with ICA: In the context of the assignment with ICA VD functions are also estimated for turns, which, however, can have negative values in certain cases. In these cases, defaults are used with the consequence that the volume situation in the next iteration does not change and there is no way out of this situation. The estimate has been enhanced in such a way that it always returns meaningful values in the interesting range. **(16815 🚫)**

PuT Assignment

- ✔ Handling of paths before the start of the AP or past the end of the AP: Using paths, which lay wholly or partially before the start of the AP or past the end of the AP, from previous searches in timetable-based assignments led to incorrect interpretations of the temporal position of these paths and consequently wrong assignment results. This occurred, for example, when using cut off rules for connections in the context of the preselection. Such a re-use of paths takes place when using paths from another demand segment or from a different connection file in an assignment instead a search, in case of iterative procedure variants (capacity restriction or use of sharing transport systems), and in the 'Connection import' procedure. This error has been fixed. **(16768 🚫)**
- ✔ Import of fares per demand segment: If no search is carried out in the context of the timetable-based assignment but the connections from a connection file are used and the connection file contains different fares depending on the demand segment, these fares do not take effect in the assignment. This error has been fixed. **(16817)**
- ✔ Paths with PuT-Aux transport systems in preselection: In the preselection of connections in the context of the timetable-based assignment, the cut off rules for connections were applied separately with considerably worse values (for travel time, search impedance, and number of transfers) for groups of those connections that used a PuT-Aux transport system for a path leg than for groups of those connections without PuT-Aux. Some paths could thus survive that were considerably worse than the best paths in the other group concerning one criterion. This error has been corrected. **(16728 🚫)**
- ✔ Repeated search for capacity-restricted assignment: If a second search is carried out during the timetable-based assignment with capacity restriction, paths from the first search could be removed in the preselection after the second search, while some of the paths to be removed survived. This error has been corrected. **(16791 🚫)**

Schematic Line Diagram

- ✔ Inserting transfer nodes: The insertion of transfer nodes has been improved in the case where more than two adjacent nodes exist, i.e. the insertion position is better in a lot of cases and the course of the subsequent edges is more natural. **(16573)**

Timetable Editor

- ✔ Crash when changing the line selection: A crash no longer occurs when adding a line / line route / time profile to the line selection if a new network has previously been opened in the same session. **(16821)**
- ✔ Marking in the tool window Timetable lines: A crash no longer occurs when exiting PTV Visum if the tool window Timetable lines is open in the line selection mode, the synchronization is active, and elements are marked in the tree. **(16828)**

- ✔ New network while tool window 'Transfers' is open: Visum no longer crashes if you load a new network while the 'Transfers' tool window is open, which displays the transfers of a vehicle journey item. **(16773)**

Visum Files

- ✔ Canceling reading of XML procedure parameters: A crash no longer occurs if a message is displayed when reading an XML procedure parameters file and the reading process is canceled via the message. **(16796)**
- ✔ Formula attributes in model transfer files: When reading a model transfer file, which also contains changes to user-defined formula attributes, these changes were not adopted if the formula referred to other attributes that did not yet exist at this time - for example because they can be found further down in the file and are therefore read later. This error has been corrected. **(16535)**
- ✔ Time formats depending on the country setting: So far, the start time and the end time of the execution of procedures were saved in a format that depended on the current country setting of the computer when saving procedure parameters XML files and the version files. The resulting files could only be read with the same country setting, which made a transfer of the files more difficult. This error has been fixed. **(16792)**

❗ Breaking Changes

PrT Assignment

- ❗ Estimate of the VD functions for turns in the assignment with ICA: In the context of the assignment with ICA VD functions are also estimated for turns, which, however, can have negative values in certain cases. In these cases, defaults are used with the consequence that the volume situation in the next iteration does not change and there is no way out of this situation. The estimate has been enhanced in such a way that it always returns meaningful values in the interesting range. This changes the results of the assignment with ICA. **(16815)** ✔

PuT Assignment

- ❗ Handling of paths before the start of the AP or past the end of the AP: Using paths, which lay wholly or partially before the start of the AP or past the end of the AP, from previous searches in timetable-based assignments led to incorrect interpretations of the temporal position of these paths and consequently wrong assignment results. This occurred, for example, when using cut off rules for connections in the context of the preselection. Such a re-use of paths takes place when using paths from another demand segment or from a different connection file in an assignment instead a search, in case of iterative procedure variants (capacity restriction or use of sharing transport systems), and in the 'Connection import' procedure. This error has been fixed. In cases where connections from previous searches are reused, this leads to changes in assignment results. **(16768)** ✔
- ❗ Paths with PuT-Aux transport systems in preselection: In the preselection of connections in the context of the timetable-based assignment, the cut off rules for connections were applied separately with considerably worse values (for travel time, search impedance, and number of transfers) for groups of those connections that used a PuT-Aux transport system for a path leg than for groups of those connections without PuT-Aux. Some paths could thus survive that were considerably worse than the best paths in the other group concerning one criterion. This error has been corrected. This leads to different assignment results if an OD pair has paths with and without PuT-Aux transport systems of very different quality. **(16728)** ✔
- ❗ Repeated search for capacity-restricted assignment: If a second search is carried out during the timetable-based assignment with capacity restriction, paths from the first search could be removed in the preselection after the second search, while some of the paths to be removed survived. This error has been corrected. This causes changes in assignment results when using capacity restriction with a second search. **(16791)** ✔

16.01-01 [113274]

2016-10-12

+ New Features and Changes

Dialogs

- + Dialog 'Demand data': You can now copy & paste cells content and group by attribute values in the tables of all three tabs of the 'Demand data' dialog. **(13850)**
- + Editing line routes and time profiles: So far, in the 'Edit line route' dialog, you could not see whether the departure time or the arrival time was fixated at a profile point. This is now indicated by different graphic symbols. **(16203)**

Main Window

- + Synchronization of the message window: Marking a message with a reference to a network object now also marks the respective network object if it is of a type that can only be marked since Visum 16. OD pairs or time profiles, for example, can now also be marked if a message refers to one of these objects. **(16251)**

Network Comparisons

- Comparison attributes for matrix values in version comparisons: If you compare versions with a network loaded in the background, zones and main zones now offer a relation to the values of the other network. This particularly enables a display of the values, differences, and relative deviations between matrix values in the OD pair list. The matrix values of the other network of course are only available if you disable the 'Do not use matrices' option for version comparison. **(15347)**

PuT Assignment

- Attribute 'Number of remaining vehicles' at sharing stations: The calculated attribute 'Number of remaining vehicles', which is output for each sharing station when using sharing transport systems in timetable-based assignments, produced wrong results. This bug has been fixed. **(16733)**

✓ Fixed Bugs

Add-Ins

- ✓ 'Calculate Matrix' without matrices: If the 'Calculate Matrix' add-in was run in a network that did not contain any matrices, the program issued no useful error message so far. This error has been fixed. **(16681)**

COM

- ✓ Running scripts via COM: If you ran a script via the COM function `Visum.ExecuteScriptFile` and the script aborted with an exception, a dialog used to open, bringing the process to a stop. Furthermore, `ExecuteScriptFile` returned without an error, so that the calling code could not react to the exception. These errors have been fixed. **(16703)**

COM, Graphics

- ✓ Setting reference bars: If, by changing the scaling attribute of a bar, a new relation is generated between a flow bundle bar and a reference bar, the bars are rearranged in such a way that the two related bars adjoin each other. However, if the scaling attribute was set via COM, the sorting remained unchanged. This error has been fixed. **(16747)**

Data Model

- ✓ Editing indirect attributes of specific network objects: You could not edit the attributes of certain network objects when they were called up as indirect attributes via a relation. Visum used to crash in this case. This error has been fixed by rejecting such changes now. Example: Editing the attributes of the demand description in the 'Demand segments' list. **(16668)**

Demand Procedures

- ✓ Trip form PA in Nested demand: Running the 'Nested demand' procedure no longer causes a crash if there are demand strata with trip form = PA (i.e. round trip) for which no time-of-day choice is calculated. **(16702)**

Dialogs

- ✓ Dialog 'File properties': The dialog always displayed the option 'No special handling' for 'Handling of matrix data contained in the network', independently of the actual value. This bug has been fixed. **(16686)**
- ✓ Utility definition in procedure 'Tour-based model - Combined trip distribution / mode choice': When copying and pasting the utility definition on tab 'Distribution Utility' of the parameters dialog of the 'Tour-based model - Combined trip distribution / mode choice' procedure, an additional plus sign was inserted in the formula. This error has been fixed. **(16698)**
- ✓ size of the 'Read network (completing the courses of line routes/system routes)' dialog: Due to extensions, the 'Read network (completing the courses of line routes/system routes)' dialog got so large that you could not reach the buttons at the bottom any more with a low screen resolution (projector!). This error has been fixed: the dialog now features collapsible separators. **(16646)**

Graphical Procedures

- ✓ PuT shortest path search, changing parameters: A crash no longer occurs if option 'Consider only active vehicle journey sections' is activated in the search parameters after running a PuT shortest path search. **(16694)**

Graphics

- ✔ No line route courses in preview: If the calculation of the route course layer took longer than a certain threshold, the layer was not shown in the graphic parameters dialog when clicking 'Preview'. This bug has been fixed. **(16418)**

Graphics-3-D

- ✔ Editing storyboard attributes in the Storyboard editor: Editing attributes of a storyboard using the Storyboard editor in 3-D network view no longer leads to a crash. **(16739)**

Graphics-3D

- ✔ Repeated bar labels in embedded 2D network: Depending on the zoom level, bar labels frequently occurred more than once in the embedded 2D network of the 3D display. These unnecessary repetitions were significantly reduced. **(16705)**

I/O Interfaces

- ✔ Export General Transit Feed (GTFS): The export of the General Transit Feed (GTFS) produced invalid data if exported attributes contained commas. This error has been fixed. **(16530)**
- ✔ Pass through times in railML export: So far, during a railML export, no run times were output at the corresponding ocpTT element for time profile items at which boarding and alighting is not permitted (pass through). This error has been fixed. **(16667)**

Main Window

- ✔ Resetting window positions outside the screen: All windows were closed when resetting the window configuration from the version file if one of the windows was located outside the current screen. Data linked to the windows (graphic parameters, layouts) was lost in the process. This bug has been fixed by an arrangement of the windows as tabs in this case. **(16738)**

Matrix Editor

- ✔ Printing matrix comparisons: The term of the matrix comparison contained two flaws: The names of the compared matrices used to overlap the scaling of the axes and the labels in the legend extended beyond the margins of the legend. This error has been fixed. In the course of this, the print dialog for matrix comparisons has been converted to the new dialog, so that a preview is now available. **(15051)**
- ✔ Undoing/redoing changes to graphic parameters: A crash no longer occurs if you edit graphic parameters in the Matrix editor, close the editor, and subsequently undo or redo the changes to the graphic parameters. **(14907)**

Network Editor

- ✔ Smart map does not respond to zoom: The activated smart map did not respond to zooming in the network editor. The screen section was refreshed only when explicitly clicking the smart map. This bug has been fixed. **(16026)**
- ✔ Special function 'Create profile points' for line route items: On some occasions, a warning is issued when using the special function 'Create profile points' for line route items, for example when discarding assignment results. It was missing the 'Yes for all', 'No for all' and 'Cancel' buttons so that the warning had to be confirmed for each line route item. This bug has been fixed. **(16673)**

PrT Assignment

- ✔ Handling of separated signalized right turns (left turns in case of left-hand traffic) in SBA: In simulation-based assignments (SBA), separated signalized right turns (left turns in case of left-hand traffic) were assigned wrong follow-up gaps and consequently not enough capacity. This error has been fixed. **(16715)**
- ✔ ICA calculation at two-way nodes with very low turn volumes: The ICA calculation at (main) nodes which have a (main) turn with very low volumes used to contain errors, so that the travel time on affected turns was overestimated. This error has been fixed. **(16746)** 🚫

Procedure Sequence

- ✔ Deleting marked objects within procedures: Visum no longer crashes when deleting marked network objects while a procedure is running, e.g. via COM. **(16661)**

PuT Operating Indicators

- ✔ Calculation of the operator revenues: So far, revenues were only calculated for operators in the 'PuT operating indicators' procedure if the operators of all vehicle journeys defined on all time profiles were identical. In all other cases, no revenues were calculated for operators. This error has been fixed as follows: If paths were saved as connections during assignment, the revenue can be allocated to exactly one vehicle journey and to its operator from here. If only routes exist and therefore no reference to specific vehicle journeys, the revenue will be allocated to the operator specified at the line of the used time profile from now on. **(16651)**
- ✔ Person kilometers / person hours in case of different operators on a time profile: If different vehicle journeys of the same time profile had different operators, so far, person kilometers / person miles rendered on these vehicle journeys were not saved to the corresponding indicators. This error has been fixed. **(16701)**

PuT Passenger Survey

- ✔ 'Read survey data' procedure with foreign-language data sets: So far, you could not load data sets in a language other than the set language when using the 'Read survey data' procedure. This error has been solved: the language information of the version block is now analyzed. **(16700)**
- ✔ Plausibilization of passenger trip chains in survey data: Under specific conditions, the plausibilization of survey data could generate paths whose path legs were connected to passenger trip chains although no passenger trip chains existed at the vehicle journey sections used and they were not continuations on the same vehicle journey past the survey path leg either. This error has been fixed. **(16709)**

Timetable Editor

- ✔ Restoring the screen section in the graphical timetable: The screen section of the graphical timetable was not saved correctly to the layout file if a 24-hour display was active and the first hour of this 24-hour display did not start at 00:00. A false screen section was thus displayed when restoring the section (also from the version file). This error has been fixed. **(15832)**

Visum Files

- ✔ Loading version files: Loading version files was slowed down unnecessarily when activating the graphic layer 'Desire lines zones' or 'Desire lines main zones'. This error has been fixed. **(16590)**

❗ Breaking Changes

PrT Assignment

- ❗ ICA calculation at two-way nodes with very low turn volumes: The ICA calculation at (main) nodes which have a (main) turn with very low volumes used to contain errors, so that the travel time on affected turns was overestimated. This error has been fixed. This also affects the result of the assignment with ICA. **(16746)** ✔

16.01-00 [112583]

2016-09-18

+ New Features and Changes

COM-API

- + Executing many COM commands of StopDrawing: The execution of many COM commands in succession for the case that drawing the network with the property IGraphic.StopDrawing was disabled has been further accelerated. **(16631)**

Data Model

- + Relation line route item PuT detail to vehicle journey item: A new relation from the line route item PuT detail object to the vehicle journey item has been introduced. The vehicle journey item is determined by the line route item and the vehicle journey. This allows for example the output of the transit time of the last passed previous profile point. **(16630)**

Graphics

- + Recording of videos from storyboards in the 3D view: The 3D-view now allows to record storyboard animations (e.g. by moving between different camera perspectives) as video files. **(16085)**
- + Reverse side of bars in 3D: It is now possible to explicitly select a material for the reverse side of bars of links, connectors, and main turns. In particular, the reverse sides are visible if the option 'Use cross-section values' is not selected. **(16522)**

Miscellaneous

- + User tracking: Users who have agreed to take part can optionally (via the settings in the user preferences) see the data transferred. The data transferred is saved to a file 'Telemetrydata_<yyyymmdd>_<hhmmss>.log' located in the project directory for protocol files (default '%AppData%\PTV Vision\PTV Visum 16\Log'). When starting the program all files older than a day are deleted. **(16637)**

PrT Assignment

- + Approach capacity for roundabouts calculated using 'Kimber': So far the resulting capacity from the ICA calculation for 'Kimber' roundabouts was assigned to each outgoing turn of the approach, i.e. capacities of these turns have been overestimated. To realistically replicate capacities for approaches of 'Kimber' roundabouts a new link attribute 'Approach capacity for assignment with ICA' has been added which contains the capacity of the approach. In assignment with ICA this attribute is always used for the blocking back calculation, i.e. also when blocking back is not active for links. **(16377 🚩)**
- + Elimination of rounding errors in LUCE: Inevitably occurring rounding errors in LUCE have been reduced. **(16525 🚩)**
- + Read version files with PrT volumes: Reading PrT path volumes from a version file has been accelerated significantly. **(16551)**
- + Roundabouts ('Kimber') in assignment with ICA: The estimation of VDF parameters for roundabouts ('Kimber') and the calculation of delays in assignment with ICA has been modified so that the resulting parameters and also the delays are equal for all outgoing turns of an approach. This is now in line with the approach-based calculation in ICA for 'Kimber'. **(16375 🚩)**

PuT Assignment

- + Instable result for comparable partial routes: If within the connection search using Branch&Bound in the timetable-based assignment partial routes with the same impedance but different PuTAux transport systems exist, the alternative between the two was chosen randomly, especially in connection with the dominance. This error has been fixed. **(10754 🚩)**

PuT Passenger Survey

- + Multi-row survey data without attribute 'PathLegIndex': Multi-row survey data can be read even if the attribute 'PathLegIndex' is not included. In this case the first leg becomes the survey leg and must have a departure time. **(16519)**

Scenario Management

- + Closing the project dialog using Esc: To avoid an unintentional closure of the project dialog of the scenario management the Esc key cannot be used anymore to close this dialog. **(16619)**

Schematic Line Diagram

- + Synchronization: The schematic line diagram is now fully synchronized, i.e. marked directed edges are written to the global marking from which other views take information about marked objects. **(15747)**

Timetable Editor

- + Opening the line selection dialog: Opening the dialog 'Line selection' to determine the basic line selection has been accelerated considerably for networks with many lines, line routes and time profiles. **(16304)**

🟢 Fixed Bugs

Dialogs

- 🟢 Demand segments in the timetable-based assignment with capacity restriction: If a timetable-based assignment with capacity restriction for several demand segments is defined, it was not possible to select based on which demand segment the vol/cap ratio-dependent impedance is to be calculated in the Tab 'Search'. This error has been fixed. **(10752)**
- 🟢 Graphics parameter dialog for bars: On the page of the object selection in the graphic parameter dialog labels could not be read when an enlarged representation of text is selected in the Windows system settings. This error has been fixed. **(16355)**
- 🟢 Procedure parameter dialog 'Nested Demand': The program does not crash anymore when a demand stratum without model structure exist but with an attraction attribute that is different from the default. **(16635)**

Filters

- ✔ PuT assignment statistics with an OD relation filter after a TSys-based assignment: After a tsys-based assignment in the PuT assignment statistics the total number of passenger trips was always zero and the number of passenger trips without connection was negativ if an OD filter was active (even if effectively all OD relations were active). Also, corresponding attributes of zones were affected. This error has been fixed. **(16626)**

Graphics

- ✔ Display error in the line course layer: When drawing the line course layer under certain circumstances errors occurred (unnecessary loops of bars). This error has been fixed. **(15372)**
- ✔ Height bands with negative values in 3D: When in the simple prism display negative attribute values exist and the display of height bands was selected of which all classes include positive values the negative values were not allocated to the smallest class but were displayed in black. This error has been fixed. **(16654)**
- ✔ Link stop points in the line course layer: It two directed link stop points were located on opposite relative positions, i.e. one at position x of the link and the other one at position 1-x on the link in the reverse direction, outliners in the graphic display existed. This error has been fixed. **(16549)**
- ✔ Marking of PuT path legs or PrT path items: For the extended marking of a PuT path leg or a PrT path item the polygon of the FromZone and ToZone was not drawn even if the graphic parameters for marking were switched on. This error has been fixed. **(16538)**
- ✔ Unnecessary permutations in the line course layer: In the display of the line course layer line bars which follow the same link sequence in parallel did unnecessarily cross often. This error has been fixed. **(15669)**

I/O Interfaces

- ✔ GTFS-import fails on inconsistent data in calendar files: The GTFS import no longer completely fails when inconsitent serve_ids occur in the calendar.txt and calendar_dates.txt files. Instead, the corresponding valid day is now set to invalid for all calendar dates and the import is completed. **(16665)**
- ✔ Tag filter in the OSM import: Filtering tags in the OpenStreetMap import configuration did not work correctly if between the filtered values spaces existed in the configuration file. This error has been fixed. **(16632)**

Junction Editor

- ✔ Add cross walks and detectors: When under 'Geometry' one of the displays for 'Crosswalks', 'Detectors', 'Signal groups' or 'Stages' was selected the upper, i.e. graphical display in the junction editor was showing the wrong display for legs. In this case it was not possible to add crosswalks or detectors. This error has been fixed. **(16643)**
- ✔ The program does not crash anymore when opening a version file with an open junction editor and currently the junction editor shows the geometry or the turn volumes. **(16624)**

Network Comparisons

- ✔ Changes of transport systems: The program does not crash anymore when updating a version comparison with a comparison network in the background and in this network a transport system has been removed of which a related attribute e.g. an attribute with subattribute transport system was shown in a list. **(16644)**

Other Procedures

- ✔ Memory consumption for intersecting: If the procedure 'Intersect' has been executed either via Multi-edit or within the procedure sequence an unnecessary amount of memory was required. This error has been fixed. **(16621)**

PrT Assignment

- ✔ Attribute 'Suppressed upstream volume for assignment with ICA' for main turns: The values of the attribute 'Suppressed upstream volume for assignment with ICA' for main turns were not saved in the version file, i.e. after executing an assignment with ICA the values were correct, but after saving and opening the version file all values were zero. This error has been fixed. This error did not affect the corresponding attribute for turns. **(16391)**
- ✔ Attribute 'tCur-PrTSys for assignment with ICA' for (main) turns: The attribute 'tCur-PrTSys for assignment with ICA' for turns and main turns was not calculated correctly in case the blocking back model was active. This error has been fixed. **(16489)**

PuT Assignment

- ✔ Choice within the capacity-restrained timetable-based assignment: If a second search is used within the timetable-based assignment with capacity restriction the updated impedances of the connections were used in the search but not for the subsequent choice. Consequently, the starting solution for subsequent iterations was worse. This error has been fixed. **(16605)**

- ✔ Independence with several PuTAux transport systems: The calculation of the independence of connections within the timetable-based assignment was incorrect, when on a OD relation more than one path without using PuT and more than two paths with PuT lines existed. This could happen especially in networks with several PuTAux transport systems. This error has been fixed. **(10789)**
- ✔ Insert new zone after a TSys-based assignment: The program does not crash anymore when a tsys-based assignment has been executed and afterwards a zone was inserted for which demand was defined. **(16628)**
- ✔ When calculating a TSys-based assignment turns did not have a volume although they are of particular interest in this assignment. Passenger volumes are now calculated for turns in case the transport systems used are the same on the From-Link and To-Link and they are not of type PuTWalk. **(16627)**

PuT Passenger Survey

- ✔ Board and alight for path legs: So far in the plausibilization of survey data inputs for path legs have been considered as plausible when at the boarding stop boarding in the time profile was not allowed or at the alighting stop alighting was not allowed. This error has been fixed. More specifically, the data records are now considered as unplausible when at the ends of the survey leg boarding and alighting, respectively, is not allowed even if a continuation in the same vehicle journey is possible. In principle, it must be possible that at the ends of each leg the transfer is feasible. **(16578)**

Scenario Management

- ✔ Entries to the log in the scenario management: If entries to the log have been made with the dates of August 31st, October 31st or December 31st, respectively, the entries were rejected as invalid and not shown. At the same time a warning was shown indicating the invalid dates. This error has been fixed. **(16623)**
- ✔ Reading a network file additively with conflict avoidance and 'Compress with offset': If in the context of a scenario management project the option 'Compress with offset' is used in combination with conflict avoidance, then only the newly inserted objects are renumbered (ascending from the smallest globally available key) to avoid changing existing network objects which should not be regarded as modified. **(16469)**


❗ Breaking Changes

PrT Assignment

- ❗ Approach capacity for roundabouts calculated using 'Kimber': So far the resulting capacity from the ICA calculation was assigned to each outgoing turn of the approach, i.e. capacities of these turns have been overestimated. To realistically replicate capacities for approaches of 'Kimber' roundabouts a new link attribute 'Approach capacity for assignment with ICA' has been added which contains the capacity of the approach. In assignment with ICA this attribute is always used for the blocking back calculation, i.e. also when blocking back is not active for links. This changes assignment results of the assignment with ICA if roundabouts are calculated using the 'Kimber' method for ICA. **(16377 +)**
- ❗ Attribute 'Suppressed upstream volume for assignment with ICA' for main turns: The values of the attribute 'Suppressed upstream volume for assignment with ICA' for main turns were not saved in the version file, i.e. after executing an assignment with ICA the values were correct, but after saving and opening the version file all values were zero. This error has been fixed. This error did not affect the corresponding attribute for turns. This will change the results of an assignment with ICA in case a version file is read and the assignment with ICA uses a warm start and main turns exist in the network. **(16391)**
- ❗ Attribute 'tCur-PrTSys for assignment with ICA' for (main) turns: The attribute 'tCur-PrTSys for assignment with ICA' for turns and main turns was not calculated correctly in case the blocking back model was active. This error has been fixed. This changes the attribute values of 'tCur-PrTSys for assignment with ICA', but not the volumes of assignment. **(16489)**
- ❗ Elimination of rounding errors in LUCE: Inevitably occurring rounding errors in LUCE have been reduced. Thus, the results of the LUCE assignment change slightly. **(16525 +)**
- ❗ Roundabouts ('Kimber') in assignment with ICA: The estimation of VDF parameters for roundabouts ('Kimber') and the calculation of delays in assignment with ICA has been modified so that the resulting parameters and also the delays are equal for all outgoing turns of an approach. This is now in line with the approach-based calculation in ICA for 'Kimber'. As the consequence, assignment results in assignment with ICA change if roundabouts are calculated based on the 'Kimber' method. **(16375 +)**

PuT Assignment

- ❗ Choice within the capacity-restrained timetable-based assignment: If a second search is used within the timetable-based assignment with capacity restriction the updated impedances of the connections were used in the search but for the subsequent choice. Consequently, the starting solution for subsequent iterations was worse. This error has been fixed. As a result, the results of the timetable-based assignment with capacity restriction can change, in particular in cases where convergence was not yet reached. **(16605)**


- ❗ Independence with several PuTAux transport systems: The calculation of the independence of connections within the timetable-based assignment was incorrect, when on a OD relation more than one path without using PuT and more than two paths with PuT lines existed. This could happen especially in networks with several PuTAux transport systems. This error has been fixed. Consequently, the results of the timetable-based assignment can change. **(10789)**
- ❗ Instable result for comparable partial routes: If within the connection search using Branch&Bound in the timetable-based assignment partial routes with the same impedance but different PuTAux transport systems exist, the alternative between the two was chosen randomly, especially in connection with the dominance. This error has been fixed. Consequently, the results of the timetable-based assignment can change. **(10754** 

16.00-03 [111914]


2016-09-01

New Features and Changes


Dialogs

-  3D- graphic parameters: To display the 3-D network view it can be chosen between different display types. The access to the parameters for not selected display types is depicted in grey colour. **(16471)**


Graphics

-  3D graphic parameters: During initial editing of 3D graphic parameters a dedicated 3D standard parameter set is loaded (STD3D.gpax). This is now independent of the 2D graphics standard parameter file STD.gpa. **(16414)**


I/O Interfaces

-  Shape File Import: PTV Visum is able to import shape files of the type Polygon, PolygonZ or PolygonM. The option 'Replace boundaries' is now also provided for polygons, which contains z- or m- coordinates. **(16556)**



Main Window

-  Progress bar: The computation and display of route courses may take a while if a lot of data is available. In this time, the program will not handle new user requests. A progress bar is displayed in the status bar during this time. **(16412)**



PuT Line Blocking

-  Printing of the line block view: When printing the line block view as tiles page breaks are no longer located within a display layer, but at the dividing line between display layers or preferably - if possible and useful - at the beginning of a new line block. **(8506)**

Scenario Management


-  Attribute selection for grids of a project: The attribute selection for the grids in the main dialog of a project for scenarios, modifications, procedure parameter sets, and comparison patterns is now saved, i.e. the attribute selection is restored when the project is reopened, also from a different work station. **(15299)**
-  Editing base version: It is possible, though not recommended to change the projection of the coordinate system in the base version. The user receives a warning message when trying to perform this transformation and has the possibility to cancel. **(16365)**

Timetable Editor

-  Maintain marking and sorting: When the action 'Edit vehicle journey in its course' is executed marking and sorting in the tabular timetable editor are now preserved. **(14954)**
-  Tabular Timetable Editor: After inserting new vehicle journeys, they will be highlighted and the view will scroll to the earliest inserted vehicle journey. **(15171)**

Fixed Bugs

ANM

-  Simulation time interval for PuT Lines: The selected simulation time interval for PuT Lines was just exported correctly to ANM, if the annual calendar in the network settings starts with the day of the simulation time interval. This error has been solved. **(16193)**

- ✔ Slow export with many demand segments: The ANM export was very slow when many demand segments and time series elements were taken into account for the export of the .anmRoutes file. Furthermore, the progress bar was not updated when exporting matrices. Both errors have been fixed. **(16459)**

Data Model

- ✔ Delete lines: Deleting lines have taken longer due to internal changes. This inconvenience has been solved. **(16363)**

Dialogs

- ✔ Footer in print dialog: Entering an invalid high number in the image height of the print dialog in the footer tab could have caused a program crash. This error has been solved. **(16485)**

Graphics

- ✔ 3-D network view: Storing multiple camera positions under the same identifier is not possible anymore. Using the same identifier the existing position is overwritten after confirmation by the user. **(16490)**
- ✔ 3D link bars: For left hand traffic, labels and link bars are shown on the wrong side of the link. This error has been fixed. **(16435)**
- ✔ 3D-Prism display for POI: So far, the prism display for POIs did not work. This error has been fixed. **(16496)**
- ✔ Network disappears: If one leaves the network windows when navigating with the mouse in the Move mode of the 3-D network view and releases the mouse the network disappears and cannot be found again. This error has been fixed. **(16495)**
- ✔ Slow loading of background maps: Loading background maps was slow in some cases, when more requests were issued in parallel than sub domains were available by the service used. This error has been fixed. **(16518)**

I/O Interfaces

- ✔ ODBC Database connection: The exchange with PostgreSQL databases via the ODBC interface (MS SQL Server interface module) did not work due to library conflicts. This error has been solved. **(16208)**
- ✔ Parameters of the railML import: If an attribute mapping of the railML import is set to an empty attribute selection this setting has not been saved in the parameter file (*.puti) and was not restored when opening such a file. Additionally, the indicator of imported vehicle journeys was not saved correctly. Both errors have been fixed. **(16488)**
- ✔ Passenger trip chains in the railML import: The program does not crash anymore when deleting passenger trip chains which originate from a railML import in the same Visum session and in which several parallel vehicle journey sections in the course of a railML train element adjoin at a place where the category of this train element changes. **(16546)**
- ✔ Save to database: Column names might get long in particular by using indirect attributes. Too long names prevent the creation of tables in the database and will be truncated while the export. **(16464)**
- ✔ railML export: For the railML export version 2.1 is supported, but so far matching URLs for namespace and schemaLocation have not been given. This error has been fixed. **(16584)**

Installation

- ✔ License Management: If several licenses are available and the first one can't be used, the user has been notified. These messages are unnecessary and will no longer appear. The user is notified when no license could be booked. **(16468)**

Junction Editor

- ✔ Vissim node preview: Modifying the main node geometry during the Vissim node preview is open, might have led to a crash. This error has been solved. **(16460)**
- ✔ Vissim node preview: Selecting node legs, lanes, lane turns or crosswalks the Vissim node previewer was cleared. This error has been solved. **(16526)**

Lists

- ✔ PrT- Path lists: Closing a PrT-Path (leg) list might lead to a program crash if beforehand another path set was selected. This error has been solved. **(16555)**
- ✔ Search when editing: The program does not crash anymore when opening the search dialog (from a list or within the timetable editor) and a list cell is being edited. **(16565)**

Network Comparisons

- ✔ Create Mode within network merge mode: network objects can't be created in the network merge mode. If the network editor had been in the create mode when switch to the network merge mode, PTV Visum can't be closed or this mode can't be left. This error has been solved. **(16422)**

Network Editor

- ✔ Digitize line routes: So far it was possible to start editing the course of a line route while a line route (the same or another) was edited already with the consequence of a program crash. This error has been fixed. **(16564)**
- ✔ Quick View: It could happen while working with PTV Visum, that attributes in the Quick view were displayed multiple times. This error has been fixed. **(16524)**
- ✔ Removing objects: Pressing the 'Del' key in an opened search dialog could result in trying to remove all and not only the selected items. This error has been fixed. **(16429)**
- ✔ Transform coordinates in case of projection changes: When changing the projection the coordinates have been transformed, even when the transformation was switched off by the given option (This just affected Visum Versions 15 and 16 of the latest service pack). This error has been solved. **(16557)**

PrT Assignment

- ✔ Arrival time-related skim matrices: Multi-threaded calculation of arrival time-related, dynamic PrT skim matrices could lead to instable results. This error has been solved. **(16558)**
- ✔ ICA calculation of incremental delay for vehicle actuated signalized nodes: When calculating the incremental delay for nodes with vehicle actuated signal controllers the average green time was used instead of the maximum green time. Consequently, the available capacity was lower, and the incremental delay was higher. This error has been fixed. **(16461)**
- ✔ SBA output attributes in case of links without leg: The program does not crash anymore when output attributes like 'SBA used critical gap' for turns are calculated and a link at a node or main node exists which does not belong to any leg. **(16484)**
- ✔ SBA: The length of Meso Links was incorrect measured at roundabouts in left-handed traffic. This error has been solved. **(16423)**
- ✔ Using SBA in combination with roundabouts containing pockets and bypasses might have led to a program crash. This error has been solved. **(16476)**

Procedure Sequence

- ✔ Distributed computing of procedures and scenarios: After an increase of the number of Visum instances of the PTV Vision calculation server these additional instances were not used immediately for executing existing orders but only when new calculation orders were sent to the calculation server. This error has been fixed. **(16612)**

PuT Line Blocking

- ✔ Delete user-defined line block item types: When deleting user-defined line block item types the assigned line block items hadn't been deleted. This could cause program crashes and prevent saved versions to be reopened. This error has been solved. **(16568)**

PuT Passenger Survey

- ✔ Board stop and alight stop in single row survey data: Despite specifying a concrete vehicle journey and indices of vehicle journey items in single row survey data the attributes BoardStopNo and AlightStopNo were mandatory. This error has been fixed. **(16443)**
- ✔ Memory requirements for plausibilization: If the plausibilization of survey data is executed several times memory requirements grew unnecessarily. This error has been fixed. **(16577)**

Scenario Management

- ✔ Cancellation of calculation orders: If a current calculation of a scenario is cancelled the available number of Visum instances was not exhausted afterwards. This error has been fixed. **(16611)**
- ✔ Distributed computing of procedures and scenarios: After an increase of the number of Visum instances of the PTV Vision calculation server these additional instances were not used immediately for executing existing orders but only when new calculation orders were sent to the calculation server. This error has been fixed. **(16612)**
- ✔ Export partial Project: The project directories have been set to the initial state, after exporting a partial project. This error has been fixed. **(16504)**
- ✔ Export partial project: Certain constellations in comparison patterns could prevent locking a partial project after export. This error has been fixed. **(16500)**
- ✔ Start of many scenario calculations: If many scenario calculations were initiated in a single action, the calculation failed. This error has been fixed. **(16598)**

Subnetwork Generator

- ✔ Subnetwork Generator: If there was a path, which starts at an active zone and led to a passive link, the subnetwork generation has been cancelled. This error has been solved. **(16494)**
- ✔ Subnetwork Generator: The program has crashed during generating a subnetwork, if modelled nodes contain non-active cordon links. This error has been fixed. **(16486)**

Timetable Editor

- ✔ Crash after sorting: The program does not crash anymore when changing the line mode or when opening a new network, and previously vehicle journeys were sorted in the tabular timetable editor. **(16116)**
- ✔ Display of service trip patterns: The program does not crash anymore when service trip patterns are displayed in certain combinations. **(16545)**
- ✔ Edit vehicle journeys in their course: The program does not longer crash during the stop sequence calculation when cancelling the dialog 'Edit vehicle journeys in their course' **(16436)**
- ✔ Search when editing: The program does not crash anymore when opening the search dialog (from a list or within the timetable editor) and a list cell is being edited. **(16565)**

❗ Breaking Changes

PrT Assignment

- ❗ ICA calculation of incremental delay for vehicle actuated signalized nodes: When calculating the incremental delay for nodes with vehicle actuated signal controllers the average green time was used instead of the maximum green time. Consequently, the available capacity was lower, and the incremental delay was higher. This error has been fixed. As a result, the results of the ICA calculation of corresponding nodes change and subsequently, also results of an assignment with ICA change. **(16461)** ✔

16.00-02 [111102]

2016-08-01

+ New Features and Changes

Data Model

- + Numbers of POI categories: The numbers of POI categories are no longer predefined, but can be edited. **(11368)**

Demand Procedures

- + Demand-supply gap calculation for Nested Demand: The demand-supply gap for the nested demand model can now be calculated using the corresponding new procedure 'Nested demand gap calculation'. The calculation is in line with the WebTAG guidelines from the U.K. **(16382)**
- + Nested Demand Model: A new procedure enables the calculation of a nested demand. This can be either a model with nested mode choice only or a demand model with destination choice, mode choice and choice of the macro time period. These choices can appear in any order. **(14131)**

Graphics

- + Edit storyboards via lists: It is now possible to create objects in the lists 'Storyboards' and 'Storyboard actions'. For storyboard actions the start time and dwell time can be changed via a dialog opened from the list. This enables the definition of storyboards within PTV Visum. **(16376)**

Lists

- + Sum of marked cells: The sum of marked cells is shown in the status bar if several cells with numeric values are marked in a list. **(8650)**

PuT Assignment

- + Scaling of computation time of the timetable-based assignment: The scaling of computation time of the timetable-based assignment with the number of used cores has been improved further for applications where at least one zone-based fare is considered. **(16401)**

Schematic Line Diagram

- ⊕ Aggregation by an arbitrary attribute: In the schematic line diagram displayed vehicle journeys can now be aggregated by an arbitrary attribute in addition to line, line route etc. This makes it possible to also make use of user-defined or formula attributes as a criterion for aggregation. All vehicle journeys between two transfer nodes which have the same attribute value are summed up to one edge. **(14277)**

✓ Fixed Bugs

Add-Ins

- ✓ Add-In 'Import TransCAD Network': When executing the Add-in 'Import TransCAD Network' some of the attributes have not been taken over. This error has been fixed. However, the attribute identifiers of the definition layer and data layer of the imported shape file must match (note also case-sensitivity). **(16407)**
- ✓ Add-In 'Zone Catchment Area' in the procedure sequence: The Add-In 'Zone Catchment Area' is not offered in the procedure sequence anymore but it is available as Add-in from the script menu and can be executed interactively. **(16248)**

Dialogs

- ✓ Create Activity chains: If it fails to create an activity chain, maybe because it's already existing the dialog won't close anymore with an error message afterwards. The dialog will remain open, so that previous input isn't lost and can be corrected. **(14999)**
- ✓ Edit classification produces wrong class bounds for equidistant classifications: When editing an equidistant classification scheme, wrong class bounds could get calculated. This occurred when the upper bound was changed after an additional class was created. The bug was fixed. **(16366)**
- ✓ Edit link: When link attributes were modified on the page 'PrT TSys' in the 'Edit link' dialog, the calculated values for t0, tCur and Impedance were not refreshed. This bug was fixed. **(16211)**
- ✓ Network units and scale: When the network unit system was changed in the network settings dialog, and the dialog was closed thereafter without further visiting the page 'Scale', the network scale was not adjusted to the new unit and a misleading message was displayed. The network scale is now correctly adjusted to changes of the network unit system and no message appears.. **(16204)**

Graphical Procedures

- ✓ Transport system-based PuT shortest path search: The program does no longer crash when no path is found during a transport system-based PuT shortest path search. **(16404)**

Graphics

- ✓ Circle line in the route course layer: The display of circle lines in the route course layer was incorrect when the network section was so small that the complete route course was not visible. This error has been fixed. **(15493)**
- ✓ Graphic parameters of the tool window 'Smart map' in XML: If the graphic parameters of the smart map were written in XML format, nevertheless a binary file was created. Reading of graphic parameter files in XML also failed. Both errors have been fixed. **(16393)**
- ✓ Redefine classes for hypsometric display: The functions for the automatic definition of classes for a hypsometric display (equidistant, user-defined, Natural breaks) did not provide useful classes. This error has been fixed. **(16336)**
- ✓ Route course layer instable: Under certain circumstances multiple calculations of the route course layer could result in different displays. This error has been fixed. **(16288)**
- ✓ Tables for point objects: When the option 'underline' is selected for a row, the option 'Same color for all' was no longer respected and the colors individually chosen for each row were always used instead. This bug was fixed. **(16331)**

I/O Interfaces

- ✓ Import PuT supply from Visum: If the creation of stop points on links is enabled in the target network, it was possible that several stop points were created on the same link. If these stop points were not in the correct order of the course of the line route of the source network the line route could not be imported. Furthermore it could happen that turns were opened for a transport system although this was not allowed in the parameters. Both errors have been fixed. **(16303)**

Lists, Matrix Editor, Timetable Editor

- ✓ Artifacts in covered cells: Cells in the tables of lists, matrix editor or tabular timetable were not refreshed reliably during they are covered by other dialogs. This error has been fixed. **(15913)**

Main Window

- ✔ Accelerating matrix selection tree: If creating several new matrices in a network with many matrices while the tool window 'Matrices' is open the creation of these matrices were unnecessarily slowed down. This error has been fixed. **(16350)**

Matrix Editor

- ✔ Subtract matrices: When interactively subtracting a matrix from the matrix currently loaded the two operands were swapped, i.e. the matrix loaded was subtracted from the selected matrix. This error has been fixed. **(16420)**

Miscellaneous

- ✔ If there are command line parameters or configuration files with extension *.reg when starting the program, they were not regarded before the actual program start, i.e. the required user preferences were not effective in the current session. This error has been fixed. **(16433)**

Network Comparisons

- ✔ graphic parameters in network comparison mode: If a XML based graphic parameter file is selected within the dialog to create a network comparison, the file is denied during the creation of the network comparison. This error has been fixed **(16353)**

Network Editor

- ✔ Insert intermediate points for link polygons and in surfaces: Inserting intermediate points in link polygons and surfaces failed when the cursor has been moved outside the menu before clicking a menu item in the context menu. This error has been fixed. **(16290)**
- ✔ Split Link: While splitting a link the snapping functionality always prefer the link as object. Existing nodes, which could be used as new link node can't be selected. In order to provide the possibility to split a link, using existing nodes the selection snaps now first on nodes. If a new node should be inserted, the existing function u"";split according to lengthu""; can be used. **(16093)**
- ✔ Split link by specifying the link length and print area: The program does not crash anymore when a link is split by specifying a link length and when the print area is visible in the network editor. **(16368)**

PrT Assignment

- ✔ Increased demand segment set for TRIBUT-Equilibrium_Lohse method: The assignment is not cancelled anymore after the set of assigned demand segments has been increased. **(16163)**

PuT Assignment

- ✔ Calculation of fares: The calculation of fares has been accelerated for cases with many demand segments and fare systems. This has an effect on the timetable-based assignment and on the output of fares in PuT path lists and PuT path leg lists. **(16301)**
- ✔ Connections from connection file or from another demand segment: Chained-up vehicle journey sections and ring lines were accounted for in the calculation of the number of transfers and of walking times when the connections were imported from a connection file or from another demand segment. This bug was fixed. **(16351)**
- ✔ Timetable based assignment: The runtime for the timetable based assignment increase by using more than twenty cores. This issue has been fixed. **(16357)**

Safety

- ✔ Editing extended graphic parameters: If in the safety graphic parameters dialog the button 'Advanced ...' of accidents, black spots, or sections are clicked, the graphic parameter dialog for the corresponding POI categories opened, but could not be edited anymore. This error has been fixed. **(16380)**
- ✔ Languages Italian and German: After an Update the languages Italian and German did not work anymore, i.e. the tool window 'Safety' appeared in English. This error has been fixed. **(16385)**

Scenario Management

- ✔ Saving the result: Saving a calculated scenario as version file failed if the file already existed. This error has been fixed. **(16424)**

Timetable Editor

- ✔ Updating the window 'Interchanges': If the temporal position of a vehicle journey was shifted and this vehicle journey was listed in this tool window 'Interchanges' as reached or missed transfer it was still shown even if the condition for displaying it in the tool window did not apply anymore. The same happened the other way around, i.e. the vehicle journey was shifted and then not displayed even if the condition for reached and missed transfers was applicable. This error has been fixed. **(16313)**

Timetable Editor, Lists

- ✔ Dropdown menus within lists: If tables (lists with extended input options, tabular timetable) contains dropdown menus the menu have been as wide as the cell. The width is now related to the longest entry, to guarantee the entries are fully legible. **(16157)**

Visum Files

- ✔ Statistics of modification at transfer data files: When reading the model transfer files the option 'show statistics of modification' has no effect, that the statistics were never displayed. This error has been fixed. **(16384)**

16.00-01 [110175]

2016-07-05

+ New Features and Changes

COM-API

- + Multi-edit using formula: Multi-edit for attributes of network objects using the result of a formula (similar to the procedure 'Edit attribute') is now also available via COM (methods CreateEditAttributePara and EditAttribute under INet). **(16254)**

Dialogs

- + Create POI categorie: When creating a POI category the number can be selected from numbers not yet allocated. **(16122)**
- + Delete all messages: In the message window it is now possible to delete all existing messages using a new button. **(15578)**

Network Comparisons

- + Last type of version comparison used: PTV Visum now remembers the last type of version comparison used also after the sessions, and suggests this type as default for the next version comparison. **(8499)**
- + Network comparisons on line route items: Version comparisons on line route items or time profile items now match the respective objects from the source and the target network based on the key of the related nodes or stop points. Previously, the matching considered the relative position within the line route. The new matching approach assures a proper matching even if the route courses have changed. Therefore, the results are different from previous versions. **(15482 !)**

✔ Fixed Bugs

Add-Ins

- ✔ Evaluation for EVA: The program does not crash anymore when executing the Add-In 'EVA Auswertung'. **(16339)**
- ✔ Import GTFS: If two imports using the Add-In 'Import General Transit Feed' were executed one after the other, then the second import was incorrect. This error has been fixed. **(16311)**

Data Model

- ✔ Relations per demand segment: For PuT path legs a relation from each demand segment to ticket types, fare system, and fare zones exist. So far, these relations per demand segment were sorted differently and arbitrarily. This error has been fixed. **(16296)**
- ✔ Time-varying attributes: After restoring a deleting a time- varying attribute via the undo Function, the attribute hasn't been inserted into the formally position but has been appended at the end. This error has been fixed. **(16256)**

Filters

- ✔ Filter for OD pairs with a condition for PuT paths only: If a single condition for PuT paths is defined in the filter for OD pairs then so far only the OD pair filter was written to the filter file. The settings for 'Use filter' and 'Filter network volumes' were lost. This error has been fixed. **(15845)**

Formulas

- ✔ Formula attributes containing attributes of version comparison: When transferring formula attributes to other versions, it could happen that the attributes, based on a version comparison were assessed as 0. Only by opening the Editing Dialog the values have been updated. This behaviour has been corrected. **(16271)**

Graphical Procedures

- ✔ Deleting a flow bundle term: The program does not crash anymore when deleting a single term from the definition of the flow bundle. **(16340)**

I/O Interfaces

- ✔ VDV452 import: If VDV452 data without line blocks are imported and the table 'OPERATING_DEPARTMENT' contains an entry with number 0 lines, line routes, and time profiles were created, but vehicle journeys were not created. This error has been fixed. **(16310)**

Installation

- ✔ Language for license selection: The dialog for the license selection did always start with the language of the operating system (or English in case PTV Visum does not support the language of the operating system). This was also the case when an installation already existed and another language was selected. This error has been fixed. **(16337)**

Miscellaneous

- ✔ Sorting in the message window: The program does not crash anymore when sorting is triggered by a click right of the column headers of the actual columns. **(16289)**

Node editor

- ✔ Vissim-Preview fails to open for main nodes: Launching the Vissim-Previewer for main nodes resulted in an error message. The preview could not be displayed. This bug was fixed. **(16330)**

PrT Assignment

- ✔ Actual speed vCur for SBA: If the new simulation-based dynamic assignment (SBA) was used the attribute values for vCur (e.g. links) were incorrect by factor 3.6. This error has been fixed. **(16309)**

PuT Operating Indicators

- ✔ Procedure terminates with vehicle journeys after 24h: The procedure 'PuT operating indicators' terminates when the analysis period comprises exactly one day, revenues were calculated, 'consider only active vehicle journey sections' option is selected and there are vehicle journeys which start after 24:00. This error has been fixed. **(16308)**

Safety

- ✔ Display of accident black spots: When the display of accident black spots has been activated it unnecessarily took a long time to refresh the display. This error has been fixed. **(16335)**
- ✔ Minimum and maximum for accidents and heat maps: The minimum and maximum value and the proposed threshold value were not displayed in the graphics parameter dialog for accidents and heat maps. The values are now displayed. **(16333)**
- ✔ Userdefined attributes in the accident import: The import failed if userdefined attributes in the configuration of the accident import are specified which already existed in the network. This error has been fixed. These attributes are now reported so that the user can change the configuration to enable a complete import. **(16306)**

Scenario Management

- ✔ Export partial project: In the wizard for exporting a partial project it was not possible to reduce the column width once they were enlarged, because the context menu entries 'Adjust column width to window size' and 'Optimal column width' were not available. This error has been fixed. **(16242)**

Visum Files

- ✔ Reading old XML graphic parameter files: Some graphic parameter files written in XML format with previous release versions of Visum could not be read anymore. This error has been fixed. **(16314)**

- ✔ Reading of procedure parameter files (XML): When a procedure parameter file could not be read completely - e.g. due to unresolved references - inconsistent data structures could remain. This could result in crashes when saving version files or accessing VD functions afterwards. The bug was fixed. **(16322)**

❗ Breaking Changes

Network Comparisons

- ❗ Network comparisons on line route items: Version comparisons on line route items or time profile items now match the respective objects from the source and the target network based on the key of the related nodes or stop points. Previously, the matching considered the relative position within the line route. The new matching approach assures a proper matching even if the route courses have changed. Therefore, the results are different from previous versions. Therefore results of comparisons may differ from earlier versions. **(15482 +)**

16.00-00 [109902]

2016-06-21

+ New Features and Changes

ANM

- + Mapping of control type 'uncontrolled': When importing an ANM file ANM nodes with the control type 'uncontrolled' are now mapped to the corresponding control type in Visum. **(15390)**
- + Network check for ANM export: The previous network check functionality 'Check node geometries' has been redefined as network check 'Viability for ANM export' and extended correspondingly. Among other things the extensions include the information about transport systems for which the check is executed, the restriction to nodes for which the node attribute 'Use lane definition' is true, and a check for connectors to modelled nodes. For the latter, a warning is issued if the control type is different from 'unknown'. **(14554)**
- + SBA used gaps: The attributes for 'SBA used critical gap' and 'SBA used follow-up gap' are now written to the ANM file. The values originate depending on control type from the corresponding network objects turn or leg. When importing an ANM file into Visum the values are written to the attributes 'SBA preset critical gap' and 'SBA preset follow up gap' of corresponding network objects. If the values deviate from the default values, the attributes 'SBA use preset critical gap' and 'SBA use preset follow-up gap', respectively, are activated. **(15534)**

COM-API

- + COM access for fare zones: COM access to fare zones has been added to the COM interface. It is now possible to add and remove fare zones via COM. Standard methods are also offered for IFareZones and IFareZone. **(11799)**
- + COM-exceptions when user cancels operation: Now all operations which can be canceled by the user throw a COM-exception when the cancelation actually happens. In the past, the behaviour was inconsistent for different functions. **(13954)**
- + Control print settings through COM: The COM-API now provides full control about the print settings, including print area and print frame with header and footer. The print settings are accessed through the new object Visum.Net.PrintParameters and it's child objects. **(12574)**
- + Deprecated methods for matrices: The methods AddODMatrix, AddSkimMatrix, RemoveODMatrix, RemoveSkimMatrix are marked as deprecated and will be removed in the next release. **(15500)**
- + ExportVDV452Data: The method for exporting VDV data has been renamed into IExportVDV452Data. **(15221)**
- + Final removal of deprecated methods: Some methods which have been flagged as 'obsolete' if former releases have been removed definitely.
 - Visum.ImportHafasProject: Functionality is provided through Visum.IO.ImportPuTProject.
 - Visum.Net.AggregateActiveZones: Functionality is now in Visum.Net.Zones.AggregateSurfaces. **(14481 ❗)**
- + I/O-Operations: In order to provide a clearer structure to the API, several I/O-related methods have been relocated from IVisum to the new object IVisum.IO. **(14986 ❗)**
- + Intersect attributes: The functionality for intersecting attributes is accessible through COM. Call the new method Visum.Net.IntersectAttributes in order to use it. **(16202)**
- + List 'Assignment analysis': The list 'Assignment analysis' can now be accessed via COM. **(12865)**
- + New parameters for IProcedures.Save: The method IProcedures.Save has new parameters which optionally allow operations and/or functions to be saved. **(13216)**
- + Return value for indirect attributes when no related object exists: Indirect attributes now always return an empty value if no related objects exists. Previously, some attributes returned empty strings etc. **(15417 ❗)**

Data Model

- + Attribute 'Time reference' for matrices. A new attribute 'Time reference' provides information whether a skim matrix has been calculated with relation to departure or arrival time. **(16023)**
- + Changes of volume attributes for flow bundle calculation: The flow bundle volume attributes 'Volume flow bundle (PrT/PuT)' and 'Volume flow bundle-TSys(TSys)' have been replaced with the new attributes 'Volume flow bundle PrT [veh] (AHPI)', 'Volume flow bundle PuT [Pers] (AHP)', 'Volume without PuTWalk flow bundle PuT [Pers] (AHP)', 'Volume flow bundle-TSys [veh] (AHPI)', and 'Volume flow bundle-TSys [Pers] (AHP)'. For zones and main zones the attribute 'Origin traffic flow bundle (PrT/PuT)' and 'Destination traffic flow bundle (PrT/PuT)' have been replaced with 'Origin traffic flow bundle PrT [veh] (AHPI)', 'Destination traffic flow bundle PrT [veh] (AHPI)', 'Origin traffic flow bundle PuT [Pers] (AHP)', and 'Destination traffic flow bundle PuT [Pers] (AHP)'. **(15630 🚫)**
- + Consideration of PuT-Walk for attributes Volume PuT: The link attributes 'Volume PuT [Pers]', 'Volume-DSeg [Pers]' and 'Volume flow bundle PuT [Pers]' now considers the Volume of PuT-Walk. This is consistent with attributes for volumes of connectors. The previous calculation of volumes is covered by the link attributes 'Volume without walk PuT [Pers]', 'Volume without walk-DSeg [Pers]' and 'Volume without walk flow bundle PuT [Pers]'. The turn attributes were renamed accordingly. **(15712 🚫)**
- + Editing of indirect attributes: It is possible to edit indirect attributes of n:1 and 1:1 relations. **(10324)**
- + Passenger revenue of PuT path leg: The new attribute passenger revenue contains the product from the revenue of the PuT path leg and volume of the path. **(14591)**
- + Passenger trip chains: There is a relation between vehicle journey sections and incoming as well as outgoing passenger trip chains. Therefore, it is possible to depict passenger trip chains within the tabular time table and the list of vehicle journey sections and use them as filter attribute. **(15194)**
- + Relations from network to line block items: Several new relations allow access from a stop point to layover and depot layover block items there, to starting or ending vehicle journey block items, and from network elements (nodes, links, turns) to related line block items with relocation. **(13455)**
- + Shifting vehicle journeys to other time profiles: Shifting of vehicle journeys to other time profiles or even other line routes has been improved. For vehicle journey sections the same rule set as for vehicle journeys is now applied. **(14955)**
- + Spatial condition for usage of a fare: Within the fare calculation it is possible to distinguish between different types of fares depending on the spatial conditions. A specific opened fare system is selected if a path with all its path legs lies within a fare zone defined through a set of stops. **(8089)**
- + User-defined attributes: For user-defined attributes subattributes of type analysis time interval can be defined. **(15849)**

Demand Procedures

- + Procedure 'Nested mode choice': The procedure 'Nested mode choice' has been removed. Hierarchical options in mode choice can be modelled using the new procedure 'Nested demand' (see also ID 14131). Data read from previous versions must be adjusted manually. **(15946 🚫)**
- + Use of formulas in trip generation: Formulas including TableLookup can now be used in the procedure 'Trip generation'. **(8229)**

Dialogs

- + Adjusting columns via context menu: In dialogs which similar to lists have a grid the context menu entries and the behavior itself has been improved. Entries shown in the context menu and available actions depend on the click position. **(12897)**
- + Cancel within the dialog for completing the courses of line routes: It is possible to cancel the additively import of network data before importing the PuT data. Therefore the dialog for completing the course of lines routes / system routes is extended by a cancel option. **(13121)**
- + Closed transfers between stop areas: For closed transfers between stop areas a value of 24h is now shown instead of an empty cell. **(15876)**
- + Create line route: If in the dialog 'Create line route' the selection of line and the option 'Only active lines' are changed other settings remain unchanged. **(15009)**
- + Edit of time-varying attributes: Editing time-varying attributes for network objects has been simplified by the introduction of a list grid. **(15848)**
- + Input of values for time-varying attributes: The input of values for time-varying attributes has been simplified. Additionally, copy & paste can be used in lists to simpler transfer these values from one object to another. **(15896)**
- + Renumbering of matrices: Using the context menu entry 'Renumbering' it is now possible to renumber selected matrices in a version file. **(15875)**

Formulas

- + Syntaxhighlighting in the formula editor: Syntaxhighlighting in the formula editor is supported facilitating the identification of input errors. **(15529)**

Graphical Procedures

- + Acceleration of flow bundle calculation: The execution of flow bundles has been accelerated significantly. **(15882)**
- + Flow bundle calculation with time condition: In the flow bundle calculation a time condition can be considered. As results volumes, origin and destination traffic and optionally matrices per time interval can be produced. The time condition can only be applied to flow bundle calculations of results of a simulation-based dynamic assignment. **(15538)**
- + Flow bundle conditions for a set of stops with supply differentiation: The flow bundle analysis can be based on a selected set of stops. Doing this all active stops can be selected or the stops are picked by the selection of a fare zone. Within this condition the traffic types can be differentiated further by analysis lines. **(8136)**

Graphics

- + 3D-View: The new 3D-views allow to extrude the data contained in the network model into the 3rd dimension. Multiple of these view-only displays can be opened simultaneously to generate impressive animated renderings. Different display styles such as 3D prisms and 3D bars are available for different types of objects. Beyond the common styling and classification settings, a special 'hypsometric' style is available, which allows banded colors by hight level to be generated. **(15225)**
- + Markings for printout: When printing the network view markings can be switched on or off explicitly. **(8993)**
- + Print settings: The user interface for defining the print settings has been modernized. The settings, which used to be dispersed across several dialogs, are now all accessible through a single dialog. This new dialog is available in similar layout for all printable windows. It provides a dynamic preview of the outcome of the current settings. In conjunction with the refactoring of the COM-API for graphics parameters (see u'□');, also the API for print settings has changed and got extended e.g. by functions for controlling the print frame and area. **(12627)**
- + Warnings when loading background maps: Warnings are not shown anymore when loading static background maps from Bing. **(14627)**

I/O Interfaces

- + Configuration for the import of PuT networks: When using the OSM import it is possible to generate a pure public transport network. A corresponding configuration has been added. **(15619)**
- + Detour test optional in Importer 'PuT supply from Visum': The detour test validates the potential route in the destination network versus the length of the source network. Some data formats do not supply the length attributes. The import failed then. Now it is possible to switch off this test optionally. If the procedure recognized during the import that each element of the cost attribute is '0', it is suggested that the detour test is ignored. **(15260)**
- + Key attributes for VDV 452-export: When exporting data to the VDV 452 format, more options are provided for choosing source attributes for the key values to be used in the exported tables. This facilitates the data exchange with other systems. External key values stored in the data model can thereby be used for referencing records across systems. **(14908)**
- + Selection of valid days during the HAFAS Import: The selection of a valid day for coach journeys now follows the same rules as for standard vehicle journeys. **(15909)**
- + Transfer priorities at stops in the HAFAS import: The HAFAS import can optional include priorities for transfers at stops. The values are written to the attribute 'Priority for transfers' of stop areas. **(15274)**
- + VDV 452-Import - attributes for empty trips: The VDV 452-Import now stores key values for empty trips as UDAs for system routes and block elements. This facilitates a following export for bidirectional data exchange with external systems. **(15914)**

Installation

- + Centralized license administration: For the license management in more complex installations, e.g. multi-user access to a system through Remote Desktop Services, a centralized license selection mode for all users of the system can now be enforced. The mode can be controlled through the separate 'PTV Visum License Administrator' tool. If it is active, the individual license selection by the users is always overridden. **(15833)**
- + License management: The license management dialog has been tweaked. The responsibility was improved by reading license data from the dongle less frequently. The dongle searchlist and dongle status are now displayed within a single list. **(15029)**

Junction Editor

- + Crossing lane turns: There is a new option 'Provide crossing lane turns for insertion' in the junction editor. If activated, it is possible to define also crossing lane turns in the 'Geometry' view. **(15422)**
- + HCM-calculation: The default node impedance calculation has been set to HCM 2010 (formerly HCM 2000). This only affects new networks, old version files are not changed. **(16173)**
- + Vissim-Preview: The Vissim-Previewer is now based on PTV Vissim 9. **(15991)**

Lists

- + Grouping and aggregating within path lists: It is possible to group and aggregate attributes within PrT and PuT paths lists. **(12382)**
- + Irrelevant attributes: Cells with attributes, which are currently not relevant due to other parameters or settings, are now hatched. The attributes can still be edited. **(13381)**

Main Window

- + Layout of tool windows: The layout of tool windows (e.g. Network, Marking, Matrices, Quick view) is now treated separately from the layout of other views (e.g. Lists, Editors). Consequently, it is possible to save and apply the configuration for tool windows independently. **(8684)**
- + Operating modes of the network model: The Insert mode, Edit mode and Spatial selection mode are now directly available in the network editor. **(15795)**
- + Synchronisation of windows: The synchronisation of windows has been redesigned and unified throughout the software. The new concept covers more windows (e.g. editors, lists, special views) and all network object types, independent of their presence and selectability in the network editor. Selected objects are registered globally, and each window individually decides how to react to changes of this selection. The available options (highlight, highlight and move,...) differ between the view types. **(13033)**
- + Taskbar notification: If errors or warnings occur when another program has the focus, the Visum taskbar icon indicates the need for user action by blinking several times. **(14282)**

Matrix Editor

- + Random round of matrices: A new function 'Random round' is available in formulas. This function can be used to round matrices to a pre-defined number of decimal places while the total matrix sum remains approximately equal. The matrix attribute 'Random round' and also the option 'Random round' for writing matrices to file were abolished. **(5070)**
- + Reading .cod files: Reading of files with the extension .cod is not supported anymore. **(15692)**

Miscellaneous

- + Command line switch for selecting the license cache file: The license cache file used for managing the license selection may now be defined through a new command line switch '-L'. This allows e.g. to predefine different license configurations through different desktop shortcuts. **(15452)**
- + Messages for several network objects: Now messages can have a true relation to several network objects. If such a message for several network objects is marked in the messages view then all related network objects are marked. **(14872)**
- + Usage tracking: Visum can optionally collect diagnostics and usage data which can be used for improving the user interfaces or to prioritize development of new features. This data does not contain any personal information and is sent anonymously to our servers. Thus, it cannot be traced back to you. The collection of diagnostics and usage data can be enabled or disabled through the user preferences at any time. **(13567)**

Network Comparisons

- + Values for 'current time interval' in version comparisons: Both variants within the version comparison will now always consider the same time interval in both networks when performing network comparisons on subattribute 'current time interval'. Before, the 'current time interval' in the comparison network was only set initially and not synchronized with the user-interface thereafter. Thus, different time spans were compared eventually, resulting in misleading values. Now, the comparison will be based on the correct values, if a time interval having the same start time as the current time interval exists in the comparison network. If this is not the case, the value will be 'undefined'. **(15114)**

Network Editor

- + Automatic generation of links between groups of nodes: Between selected nodes and active nodes links of a specific link type are generated. Doing this the amount and maximum length of generated links can be defined. **(8294)**
- + Creating new network objects: By default dialogs to edit new network objects are not shown anymore. This option can be changed in the user preferences. Newly created network objects can be edited in the Quick view window directly after they have been created. **(11961)**
- + Interactive manipulation of the print area: Along with the redesign of the print tools, also the workflow for defining the print area has been tweaked. It is now easier to simply draw and drag the print area in the network window, without needing to go through additional dialogs. **(8317)**
- + More flexible re-numbering: Re-numbering of network objects can now be restricted to active objects. A starting number as well as an increment can optionally be defined. **(8358)**

- + Network check: The network check, which checks the viability of the network for the usage in PTV Balance/PTV Epics, has been extended. **(15799)**
- + Network settings for turn types: The initial allocations of turn types has been reduced to two options. Option 1 uses types 1 to 4 according to the angle. In Option 2 the turn types for open turns are defined according to the requirements of ICA and for the simulation-based assignment, otherwise type 0 is used. **(15864)**
- + Rerouting line routes: If an existing line route is rerouted from one stop point to another, the attributes of the previous and subsequent time profile item can be transferred to the new course by pressing the shift key. **(8238)**

Other Procedures

- + Intersect: The procedure 'Intersect' can now be used for the calculation of several attributes simultaneously. The new dialog for this procedure is also being used for 'Multi-edit' in the network editor. 'Multi-edit' allows only one attribute at a time to be intersected. **(13131)**
- + New Add-In 'Accessibility': A new Add-In facilitates analysis of zone accessibility. The destination potentials can be derived from attributes of zones and the contained POIs. The spatial impedance can be selected from all the available skins for public transport and private transport or as a derived value, e.g. from a formula matrix. This allows for a very flexible design of the analysis. **(11685)**
- + Procedure 'Matrix operation' & multi-log-files: The procedure 'Edit Matrix' has been removed. Subsequently, multi-log-files cannot be used within PTV Visum anymore. When reading files from previous release versions the procedure 'Combination of matrices and vectors' is created, which then needs to be edited by the user manually. **(14034 ⚠)**
- + Procedure 'Matrix operation': The procedure 'Matrix operation' has been removed because the functionality is fully covered by formulas. When reading files from previous release versions the procedures are converted to formulas. **(13980 ⚠)**
- + Working with big matrices: The import and calculations using big matrices has been accelerated. **(8408)**

PrT Assignment

- + Assignment with ICA after other PrT assignments: A warning is shown if assignment with ICA is to be executed but an assignment result from another assignment method exists. This practice is not recommended because the blocking back cannot be calculated separately for demand segments. **(15784)**
- + New dynamic assignment method (SBA): A new dynamic simulation-based assignment (SBA) method that takes detailed junction modeling into account is offered. Temporary changes for both the supply and demand side are considered. **(14263)**

Procedure Sequence

- + Saving floating point numbers: When saving the procedure sequence parameters floating point numbers are always saved with maximum precision. **(15986)**
- + Window 'Procedure sequence': The window 'Procedure sequence' is no longer automatically activated if the execution of active procedures was triggered using the corresponding button in the toolbar 'Functions'. **(8231)**

PuT Assignment

- + Capacity restriction for vehicle journeys: If the option 'Merge the results of the 1st search and 2nd search' is active connections which are found in the second search cannot be dominated by connections of the first search using the volume/capacity ratio dependent impedances. The reason is that this impedance component is not comparable in the first and second search. **(16015 ⚠)**
- + Dominance between equivalent connections: If dominance between equivalent connection is allowed it is optional possible to also consider the priorities of stop areas for transfers. **(15275)**
- + New computation time-optimized headway-based assignment: A new computation time-optimized headway-based assignment for the option without passenger information has been implemented. This variant is based on the Optimal Strategies approach as published by Spiess/Florian (1989). **(13871)**


PuT Line Blocking

- + Refactoring and speed-up: The code of the line blocking procedures was refactored, leading to a speed-up, mostly of the simple line blocking without vehicle exchange. **(15739 ⚠)**

PuT Operating Indicators

- + Consideration of passenger trip chains with in the service time: The time needed for passenger trip chains is now considered in the calculation of the following indicators '(Section-) Service-time', '(Section-) Operating time', 'seat-hours', 'capacity hours'. In addition all dependent indicators like the average speed time-related costs and therefore the total costs are influenced by passenger trip chains. **(14931)**

PuT Passenger Survey

- + Definition of departure day in date format: The definition of the departure day of the survey path leg was expected as the index referenced to the assigned calendar. The departure day can now also be defined by the attribute 'InputStopDepDate' in date format. This date will be matched during the import process to the assigned calendar. **(15659)**
- + Detailed description for plausibilization quality: The status IDs for plausibilization quality were extended by plain text. The status of the path leg after validation is immediately apparent. The identifiers for the path list export (short names) remains unaffected. **(15841)**
- + Forced boarding or alighting at the survey path leg edges: So far, within the plausibilization the passenger can decide either to transfer or to continue the trip at the edges of a survey path leg. If it is verified by the survey that the passenger has changed boarding or alighting can be forced using the attributes 'EnforceBoardBeforeSurveyLegAttr' and 'EnforceAlightAfterSurveyLegAttr', respectively. **(15922)**
- + Parallelization of plausibilization: The 'Plausibilization of survey data' procedure has been parallelized and thus accelerated. **(14205)**
- + Plausibilization quality: If walking path legs before the pre- survey leg or after the post- survey leg are missing, but the according PuT path legs are plausible, the overall path status will be set to 'Unplausible: Required walk link not found (10)'. **(15505)**
- + Specification of survey line: The specification of the survey line name is optional for the single- and multi- row format. Assigned direct connections will be assessed with 1 ('according to specification'). The input of the survey line name causes a preference to connections using this line. **(15642)**
- + User-defined Attributes in Survey data: Beside the existing attributes for PuT Passenger Survey data it's possible to import user-defined attributes on path level. Therefor a dialog is introduced which allows to assign and create attributes during the import process. **(11321)** 
- + Vehicle journey number as alternative key for survey leg: The survey leg may now be specified more precisely by a known vehicle journey number instead of being indicated by line, departure time etc. **(10124)**

Safety

- + Integration of PTV Visum Safety: PTV Visum Safety has been fully integrated in Visum. **(15329)**
- + Translation to Italian: The Safety user-interface is now available in Italian. **(16234)**

Schematic Line Diagram

- + Alignment of centered labels: Via the context menu entry 'Arrange centered labels ...' several of these labels can be aligned together. **(8579)**
- + Display of partial vehicle journeys: It is now possible to restrict the schematic line diagramm to selected sections of vehicle journeys. This is achieved through non-zero values in a (user-defined) attribute of vehicle journey items. The respective attribute can then be selected in the layout parameters for controlling which sections are displayed. **(8837)**
- + Information on contained items: Vehicle journey items and vehicle journey now provide information about the schematic line diagrams containing them through the new boolean attribute 'In schematic line diagram' with subattributes for each opened schematic line diagram. Schematic line diagrams are referenced in layouts through a new editable attribute 'number'. **(8838)**
- + Positioning of transfer node labels: In addition to controlling position and orientation, transfer node labels can now also be shifted vertically and horizontally. **(8528)**
- + Preserve edge courses when inserting and deleting transfer nodes: If edges need to be split when additional nodes are inserted into a schematic line diagram, the size and slot allocation is now optimized in order to preserve the courses of the edges which get split by the new node. Before, new nodes were always inserted using a minimal size, which could mess up the edge layout. When deleting transfer nodes, the course of the merged edges is adapted to reflect the original course. **(14171)**
- + Preserve layout when inserting transfer nodes: The layout is now largely preserved when additional transfer nodes are inserted. The transfer nodes are positioned on existing edges and sized in a way which allows to preserve the straight course of the edges. **(14276)**
- + Prevent multiple occurrences of identical value in labels: when labels are rendered based on evaluations about multiple hours (e.g. 'Most frequent two-hourly departure times') and labeling variants for even and uneven hours, identical values were preinted several times. This can now be preserved by using the new attributes (e.g. 'Most frequent two-hourly departure times without duplicates') and the new labeling variant for 'several hours'. **(8674)**
- + Preview in vehicle journey selection: The vehicle journey selection for the schematic line diagram now has a preview button. The allows to preview effects of changes on the overall layout. **(8859)**

- + Print area and print frame: The print area can be defined with a fixed aspect ratio. Additionally, the view can also be set to the print area. **(8805)**
- + Refresh: The action 'Refresh' now also triggers a recalculation of edges. **(15573)**
- + Shifting several edges at the same time: If several marked edges have the same transfer nodes they can be shifted together using drag&drop. **(8823)**


Signal Control

- + PTV Epics:
 - Added detector synchronization from PTV Visum to the signal controller for the type "Epics/Balance-Local". **(16282)**

Timetable Editor

- + Chained up vehicle journey sections in legend: The legend of the graphical timetable editor has been extended to also display chained up vehicle journey sections. **(15674)**
- + Deleting passive stops from stop sequence: During the calculation of the stop sequence optionally only active stops are considered. Besides passive stops can be deleted from the stop sequence via the context menu. **(15522)**
- + Display reached and missed connections in graphical Timetable Editor: In the Timetable Editor a new window can be opened, which displays the reached and missed connections of the selected vehicle journey. The selection of this connections is synchronized with other windows. **(8071)**
- + Hide column with symbol: The column with the symbol can optionally be hidden in the graphical timetable editor. **(14952)**
- + Main Window: Default view for line selection: The tool windows for editing the line selection and stop sequence is now initially opened in the line selection mode. **(15020)**
- + Show only vehicle journeys relevant to the current stop sequence: Using the option 'Show only vehicle journeys relevant to the current stop sequence' (default) it is possible to hide vehicle journeys in the tabular time table, which do not operate along any stop of the stop sequence. **(8067)**

Visum Files

- + Binary procedure parameter files: Procedure parameters can only be saved in XML format. Saving binary files in .par format is not supported anymore. Reading of existing .par files is still possible. **(13483)** 
- + Completing line routes: When completing line routes optionally it is possible to skip line route elements with unknown reference to the network (e.g. missing node or stop point). Any time table data referring to these elements are omitted, but all other data are read. **(8403)**
- + Procedure 'Assignment analysis' : The procedure parameters can now be loaded/saved to/from XML-files. **(3843)**
- + Procedure 'Demand matrix calibration': The procedure parameters can now be loaded/saved to/from XML-files. **(3876)**
- + Procedure 'HBEFA-based emission calculation': The procedure parameters can now be loaded/saved to/from XML-files. **(2460)**
- + Procedure 'NCHRP 255': The procedure parameters can now be loaded/saved to/from XML-files. **(15135)**
- + Procedure 'PuT Interlining matrix': The procedure parameters can now be loaded/saved to/from XML-files. **(3871)**
- + Procedure 'Time-of-day choice' : The procedure parameters can now be loaded/saved to/from XML-files. **(3868)**
- + Procedure TSys-based PuT assignment: The procedure parameters can now be loaded/saved to/from XML-files. **(3858)**
- + Random round of matrices: A new function 'Random round' is available in formulas. This function can be used to round matrices to a pre-defined number of decimal places while the total matrix sum remains approximately equal. The matrix attribute 'Random round' and also the option 'Random round' for writing matrices to file were abolished. **(5070)**
- + Reading .cod files: Reading of files with the extension .cod is not supported anymore. **(15692)**
- + Save version with backup copy: The option 'Save version with backup copy' in the user preferences has been removed. PTV Visum saves versions now always with backup copy. **(15301)**
- + TRIBUT assignment procedures (equilibrium and Lohse): The procedure parameters can now be loaded/saved to/from XML-files. **(3863)**

Breaking Changes

COM-API

-  Acces to legacy matrix editor: The method IVisum.MatrixEditor, which provided an instance of the legacy ScriptMuuli matrix editing library has been removed. ScriptMuuli can now only be used as a detached COM-object created using the ProgID 'VISUM16.ScriptMuuli.1' (e.g. in VBA with CreateObject("VISUM16.ScriptMuuli.1"). When using Python, we recommend to rewrite ScriptMuuli-based code into new forms using the numpy-library for high performance numerics. **(15726)**

- ❗ Final removal of deprecated methods: Some methods which have been flagged as 'obsolete' if former releases have been removed definitely. Scripts using these methods need to be adapted.
 - Visum.ImportHafasProject: Functionality is provided through Visum.IO.ImportPuTProject.
 - Visum.Net.AggregateActiveZones: Functionality is now in Visum.Net.Zones.AggregateSurfaces. **(14481 +)**
- ❗ I/O-Operations: In order to provide a clearer structure to the COM-API, several functions related to reading and writing of files have been relocated from IVisum to the new object IVisum.IO. Scripts using these functions may need to be adjusted. The more frequently used functions related to version files and network files are supplementary still available at the old location in order to preserve compatibility **(14986 +)**
- ❗ Removal of obsolete functions of IVISEMDGroupActivityDistributionPara: Due to the usage of formulas for the utility terms, the functions NumItems, ItemByKey, AddItem and RemoveItem used for accessing individual parts of the utility function have become disfunctional and got removed. In order to define the utility function, please now set the attribute 'UtilityFunction' to the utility function formula string. **(15492)**
- ❗ Return value for indirect attributes when no related object exists: Indirect attributes now always return an empty value if no related objects exists. Previously, some attributes returned empty strings etc. **(15417 +)**

Data Model

- ❗ Changes of volume attributes for flow bundle calculation: The flow bundle volume attributes 'Volume flow bundle (PrT/PuT)' and 'Volume flow bundle-TSys(TSys)' have been replaced with the new attributes 'Volume flow bundle PrT [veh] (AHPI)', 'Volume flow bundle PuT [Pers] (AHP)', 'Volume without PuTWalk flow bundle PuT [Pers] (AHP)', 'Volume flow bundle-TSys [veh] (AHPI)', and 'Volume flow bundle-TSys [Pers] (AHP)'. For zones and main zones the attribute 'Origin traffic flow bundle (PrT/PuT)' and 'Destination traffic flow bundle (PrT/PuT)' have been replaced with 'Origin traffic flow bundle PrT [veh] (AHPI)', 'Destination traffic flow bundle PrT [veh] (AHPI)', 'Origin traffic flow bundle PuT [Pers] (AHP)', and 'Destination traffic flow bundle PuT [Pers] (AHP)'. The display of flow bundle results may need adjusting. **(15630 +)**
- ❗ Consideration of PuT-Walk for attributes Volume PuT: The link attributes 'Volume PuT [Pers]', 'Volume-DSeg [Pers]' and 'Volume flow bundle PuT [Pers]' now considers the Volume of PuT-Walk. This is consistent with attributes for volumes of connectors. The previous calculation of volumes is covered by the link attributes 'Volume without walk PuT [Pers]', 'Volume without walk-DSeg [Pers]' and 'Volume without walk flow bundle PuT [Pers]'. The turn attributes were renamed accordingly. Hence, where required assignment results must be evaluated using different attributes. **(15712 +)**
- ❗ Usage of enumeration types: The internal representation of enumeration types (Enums) which are used to define the discrete values allowed for specific attributes or as arguments to COM methods (e.g. ShortestPathCriterionT ShortestPathCriterion_LinkLength) has been refactored and unified. The unification requires some changes to type and value names, but the numerical values and their semantics remain unchanged. As another consequence of the unifications, almost all Attributes and methods using these enumeration types will now return their numerical values, whereas formerly there was a mixture of numerical values and string literals being returned by different items. Therefore, some scripts may eventually need to be adapted to the new return values or type names. **(16006)**

Demand Procedures

- ❗ Procedure 'Nested mode choice': The procedure 'Nested mode choice' has been removed. Hierarchical options in mode choice can be modelled using the new procedure 'Nested demand' (see also ID 14131). Data read from previous versions must be adjusted manually. **(15946 +)**

Network Comparisons

- ❗ Values for 'current time interval' in version comparisons: Both variants within the version comparisons will now always consider the same time interval in both networks when performing network comparisons on subattribute 'current time interval'. Before, the 'current time interval' in the comparison network was only set initially and not synchronized with the user-interface thereafter. Thus, different time spans were compared eventually, resulting in misleading values. Now, the comparison will be based on the correct values, if a time interval having the same start time as the current time interval exists in the comparison network. If this is not the case, the value will be 'undefined'. Thus, analysis being based on such comparisons may now return different - while more plausible - results than with previous versions. **(15114 +)**

Other Procedures

- ❗ Procedure 'Matrix operation' & multi-log-files: The procedure 'Edit Matrix' has been removed. Subsequently, multi-log-files cannot be used within PTV Visum anymore. When reading files from previous release versions the procedure 'Combination of matrices and vectors' is created, which then needs to be edited by the user manually. **(14034 +)**
- ❗ Procedure 'Matrix operation': The procedure 'Matrix operation' has been removed because the functionality is fully covered by formulas. When reading files from previous release versions the procedures are converted to formulas. The use of formulas can change results in some cases because the user preferences for 'Matrix editor' are considered in formulas. **(13980 +)**

PrT Assignment

- ❗ Determination of opposing volume according to HCM2000: The determination of the opposing volume of left turning vehicles (right-side traffic) for the HCM2000 was incorrect if the corresponding oncoming traffic has only one mixed lane and all vehicles turning in a direction different from straight. This error has been fixed. This leads to changes in the assignment results. **(16138)**
- ❗ ICA calculation for All-way stop nodes: The ICA calculation produced meaningless results in case the calculation of departure headways did not converge. This error has been fixed. This leads to changes of the ICA calculation and of results of an assignment with ICA. **(16185)**
- ❗ ICA calculation for two-way stop and two-way yield nodes: Under certain circumstances (volumes are close to the saturation flow or greater than the saturation flow) was the calculation of delay at two-way stop and two-way yield controlled nodes incorrect. This error has been fixed. This results in changes of the ICA calculation for such nodes and subsequently in changes of assignment results of an assignment with ICA. **(16260)**

PuT Assignment

- ❗ Capacity restriction for vehicle journeys: If the option 'Merge the results of the 1st search and 2nd search' is active connections which are found in the second search cannot be dominated by connections of the first search using the volume/capacity ratio dependent impedances. The reason is that this impedance component is not comparable in the first and second search. This lead to changes in the assignment results. **(16015 +)**
- ❗ Numerical instabilities in capacity-constrained PuT assignment: When computing capacity-constrained PuT assignments on multi-threaded systems, numerical instabilities could result in non-reproducible results. This was fixed by using higher precision data types for internal computations. Therefore, final outputs of the procedure might change slightly. **(15490)**
- ❗ Shortest path search for PuT Aux: The shortest path search has been adopted. Now it always finds the shortest path. This potentially leads to changes in the assignment results. **(15143)**

PuT Line Blocking

- ❗ Refactoring and speed-up: The code of the line blocking procedures was refactored, leading to a speed-up, mostly of the simple line blocking without vehicle exchange. This may result in changed results of the detailed line blocking procedure with vehicle exchange. **(15739 +)**

PuT Passenger Survey

- ❗ Attributes in survey data: The attributes SurveyLineDepDay, SurveyLineDepTime, BoardStopDepDay and BoardStopDepTime are obsolete since Visum 10. Data which includes such Attributes won't be imported anymore. **(11321 +)**

Visum Files

- ❗ Binary procedure parameter files: Procedure parameters can only be saved in XML format. Saving binary files in .par format is not supported anymore. Reading of existing .par files is still possible. **(13483 +)**

COM-API

- ❗ Interface for graphics parameters: The internal representation of graphics parameters has been revised. Now all graphics parameters and the printing parameters are accessible through COM. This redesign includes many changes to the related COM-API and the structure of the graphics parameters XML files (*.gpax). Scripts using these functions may need to be adjusted to the new API structure and signatures. **(13776)**