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## + New Features and Changes

### Data Model

- + Synchronization of connecting journey with vehicle journeys: If a connecting journey is marked and the current view cannot mark connecting journeys but vehicle journeys (e. g. the tabular or graphic timetable), it now marks the two vehicle journeys involved in the connection when synchronization is activated. **(18019)**

### Graphical Procedures

- + Selected network objects for shortest path search and isochrones: In the tool window 'Graphics tools' on the dialog pages for isochrones and shortest path search, the selected network objects are now displayed in a table where they can be edited as well, analogous to the flow bundle. In order to increase the analogy of the different dialog pages, some existing controls have also been rearranged. **(13602)**

### Graphics

- + Editing bar labels in the print preview: Bar labels can now be moved in the print preview within the Print dialog of the network editor. **(16929)**

### Graphics 3D

- + Improvements in Storyboard editor: Several improvements regarding the usability have been made in the Storyboard editor, which can optionally be displayed in the 3-D network view. **(16950)**

### Installation

- + Optional installation of CodeMeter-Runtime: You can now optionally disable the installation of CodeMeter-Runtime during an update or setup. This is useful if CodeMeter-Runtime already exists and a new installation could damage the existing installation. **(18091)**

### Junction Editor

- + Update of the Vissim node preview: The Vissim node preview in the Junction editor now uses the program version PTV Vissim 10.00-03. **(18094)**

### PrT Assignment

- + Avoidance of cycles (gridlocks) in SBA: Optionally, simulation-based dynamic assignment (SBA) can be calculated while avoiding cyclic dependencies (so-called gridlocks). In many cases, situations in which a vehicle can no longer drive because it waits moving in circles for another vehicle are detected and resolved. **(17679)**

### Schematic Line Diagram

- + Multiline texts: The freely positionable texts in the schematic line diagram can now also be multiline, that is, they can contain and display line breaks. **(17404)**
- + Selecting vehicle journeys from a vehicle journey context: In the context of a vehicle journey, e. g. for marked vehicle journeys in the timetable editor or in a list, you can now include this vehicle journey directly in the vehicle journey selection of a schematic line diagram. The same applies to lines and directions if the vehicle journey selection of the schematic line diagram is defined at this level. **(16600)**

### Timetable Editor, Network Editor

- + Number of vehicle journeys of the line: In the line selection of the tool window 'Timetable lines' as well as in the 'Lines / Line routes' floating dialog in the network editor, the respective number of vehicle journeys of the line or line route is now displayed. **(17652)**

## Transfers display of regular services

- Marking of connecting journeys: If one or more connecting journeys are part of the global marking, a synchronized transfers display of regular services will now mark the arriving service group containing the From-vehicle journey item of the connecting journey and the departing service group containing the To-vehicle journey item, as far as they are visible. **(18097)**

## ✓ Fixed Bugs

### COM

- ✓ Table 'Info signs' in 'Frequent cases: Graphics & presentation': Previously, the table 'Info signs' was not included in the template 'Frequent cases: Graphics & presentation' when saving and reading network files. This also applied to the COM method 'AddCommonUseCaseGraphicAndPresentation'. This error has been fixed. **(18052)**

### Data Model

- ✓ Network check - vehicle journey items without a vehicle journey section: If the 'Check network' function 'vehicle journey items without vehicle journey sections' finds such vehicle journey items, you can delete them using the 'Repair' function. If there is a query about dependent objects, which must also be deleted (e. g. couplings), and the user cancels the operation, a crash occurred when the 'Repair' function was executed again. This error has been fixed. **(18067)**
- ✓ Origin/destination traffic flow bundle at main zones: No more crashes when evaluating one of the attributes 'Origin traffic flow bundle' or 'Destination traffic flow bundle' at a main zone. **(18085)**

### Dialogs

- ✓ Conflict avoidance for frequent cases when reading networks additively: The 'conflict handling' column in the 'Read network data additively' dialog was not always updated according to the settings made after exiting the 'Use cases for additive network reading' dialog (accessible via the 'Frequent cases' button). This error has been corrected. **(18080)**
- ✓ Creating mode nodes in the procedure parameters dialog of 'Nested Demand': In the dialog for the mode selection tree, which is opened from the parameters dialog of the 'Nested Demand' procedure, no mode nodes could be created if the tree already had more than 2 levels. This error has been fixed. **(18025)**

### Filters

- ✓ Effect of filter conditions on subordinate POI categories: In the POI filter, filter conditions defined at the level of a POI category optionally also affect the subordinate POI categories. If the filter conditions were then changed, this change only affected the POIs of their own category, not those of the subordinate POI categories. This error has been corrected. **(18030)**

### Graphical Procedures

- ✓ Flow bundle term of type 'Line selection': If for a flow bundle term of the type 'Line selection' any property is subsequently changed in the dialog, the line selection has been reset to all lines. This error has been fixed. If the network object type is changed, all objects of the new type are still transferred to the selection. **(18089)**

### Graphics

- ✓ Volume bars in case of changes to the OD pair filter: When changing the OD pair filter, the volume bars did not update immediately if the 'Filter network volumes' option was selected. This error has been fixed. **(18027)**

### Graphics 3-D

- ✓ Crash on virtual machines: No more crashes when opening the 3-D network view on a virtual machine (VM). However, the 3-D network view still cannot be opened on virtual machines. Trying to do so will just no longer cause a crash. **(17998)**
- ✓ Height information in height bands display: Correction factors for the calculation of height bands were not applied correctly in the display of height bands. In particular, a set network scale did not take effect in networks without a coordinate system, but distortions were also not taken into account when using coordinate systems. **(18098)**

### I/O Interfaces

- ✓ Information during Shapefile import: During the Shapefile import, the progress information and possible messages have been improved. In particular, the network objects affected by errors can now be clearly identified. **(17949)**

- ✔ Memory consumption during HAFAS import: The memory consumption during the HAFAS import has been significantly reduced. **(18083)**
- ✔ Nodes without demand for MaaS export: When exporting to MaaS Modeller, warnings are only issued for From- and To-nodes of zones in service areas for which there are no PUDO nodes if this From- or To-node belongs to at least one zone with demand. Only nodes with demand are now exported. **(18047)**
- ✔ Output of unassigned Ocps during railML import: In the course of the extended output of unassigned Ocps during railML import, not all found Ocps were issued as a message. This error has been corrected by listing all affected Ocp elements at least in the message window. Ocps that are not specified as transport-relevant and that occur only as a pass through in the route course of vehicle journeys are shown separately. **(18038)**
- ✔ Passenger trip chains after midnight when importing railML: During the railML import, passenger trip chains were not created if both the origin and the destination vehicle journey sections begin after midnight and the departure time of the destination vehicle journey section is after the departure time of the origin vehicle journey section. This error has been fixed. **(17976)**
- ✔ PuT valid days of through coaches in the HAFAS Import: When importing HAFAS data with through coaches it could happen that the corresponding vehicle journey of the through coach does also run at other calendar days on which the pulling train does not run if this pulling train consists of several vehicle journey sections with different PuT valid days. This error has been fixed. **(17251)**
- ✔ Shapefile export of line routes: During the shapefile export of line routes, the issued z-coordinates were shifted in relation to the x- and y-coordinates. This error has been fixed. **(17948)**
- ✔ Unreachable candidates when importing PuT supply from Visum: No crash when importing PuT supply from Visum ('public transport updater') if the option 'Run detour test' is activated for the routing and if there are possible locations for a line route item in the destination network that cannot be reached by an imported route. **(18039)**

## Junction Editor

- ✔ Procedure execution with open signal times view: No more crashes when executing a procedure sequence when a junction editor is open in the signal times view. **(17594)**

## Junction Editor

- ✔ Handling of the [Del] key: If the delete key ([Del]) is pressed while the junction editor has the focus but no object is selected in the junction editor, the delete command is passed to the network editor, i. e. any selected objects that are not visible in the junction editor are deleted. This error has been fixed. **(15703)**
- ✔ Invalid results from the Node impedance calculation ICA: In certain cases the node impedance calculation ICA produced results with invalid numbers, which cannot be used in subsequent calculations. This error has been fixed. **(17938)**

## Lists

- ✔ Crash when deleting filtering network objects: If a local filter was active in a list that used a network object as filter condition (for example a demand segment in a path list, a toll system in a matrix toll list, or a line route in a line route item list), and this network object was deleted, a crash could occur u'-'; especially if the command history was switched off. This error has been fixed. **(17873)**
- ✔ Restoring lists with analysis rows: Restoring certain lists while opening a version file no longer causes a crash if analysis rows are enabled in the list (minimum, maximum, average, sum). **(17858)**

## Main Window

- ✔ Long message texts in the message window: If very long message texts were displayed in the message window, Visum froze when displaying the complete text as a tooltip. This error has been fixed. **(18064)**
- ✔ Zooming in the Smart map: In the Smart map you could no longer zoom using the keyboard (picture up/down buttons) as long as the Smart map was docked to other windows. This error has been fixed. **(18024)**

## Matrix Editor

- ✔ Saving an external matrix under a new file name: When saving an external matrix under a new file name, the title of an open matrix editor that displayed this external matrix did not adapt. This error has been fixed. **(17328)**

## Matrix Estimation

- ✔ Messages for invalid tolerances: When executing the 'TFlowFuzzy' variant of the 'Demand matrix correction' procedure, a separate message was issued for each count value with invalid tolerance, without the possibility of suppressing messages of the same type in the further execution of the procedure. This error has been fixed. **(18099)**

## Network Comparisons

- ✔ Update version comparison and graphical timetable: No more crashes after updating a version comparison with a network loaded in the background if a graphical timetable is open or opened later in the 'front' network. **(17910)**

## Network Comparisons, Scenario Management

- ✔ Stop area walk times when reassigning a stop area: If a stop area is assigned to a different stop area than before, and if this change is displayed as a model transfer file or as a modification in a scenario management project, already existing transition walk times from or to the reassigned stop area were lost when reading the model transfer file or applying the modification. This error has been corrected. **(18062)**

## Network Editor

- ✔ Default allocation t\_PuTSys for routes: In the case of the default allocation of links with the run time per public transport system (attribute t\_PuTSys), links were previously excluded if they had a length of 0m or if the link type for the transport system had a speed of 0km/h. This error has been corrected. Links with a length of 0m now also get a run time of 0s. In case of a speed of 0km/h at the link type, the link run time is set to the maximum possible value. **(16238)**
- ✔ Flickering of marked objects when moving the mouse: If the network editor shows a marked object whose geometry could change (e. g. because interactive editing of geometries is activated), movements of the mouse pointer caused unpleasant flickering of these marked objects. This error has been fixed. **(17768)**
- ✔ Inserting connectors with dialog display: No more crashes when inserting connectors if the user setting 'Show dialogs when inserting objects' is activated. **(18044)**
- ✔ Undo aggregation of line routes by attribute: No more crashes when restoring, if aggregating of line routes with additional conditions has been executed before and this action has been undone. **(18032)**

## Other Procedures

- ✔ Allocation to vehicle journey sections in Spatial PuT analysis: In the 'Spatial PuT analysis' procedure, values from attributes were not entirely distributed in the 'Allocation per calendar day in AP' distribution rule, i.e. the share for days in the analysis period not served by any vehicle journey section was lost. This error has been corrected. **(18051)**
- ✔ Setting run and stop times 'from link run time': In the 'Set run and dwell times' procedure, the factor from the 'From link attribute' option was used when the 'Update run times from link run time' option was set. This error has been fixed. **(18053)**

## PrT Assignment

- ✔ SBA deletes paths with low volumes: The simulation-based dynamic assignment (SBA) previously deleted paths with positive, albeit very small volumes. This could lead to new paths being found, especially when starting from an initial assignment with only one iteration, i. e. when all paths of the origin-destination relation had very low volumes. This error has been corrected. **(18078)**

## PrT Assignment

- ✔ Invalid results from the Node impedance calculation ICA: In certain cases the node impedance calculation ICA produced results with invalid numbers, which cannot be used in subsequent calculations. This error has been fixed. **(17938)**
- ✔ Lost demand in Tribut-equilibrium assignment: If there are several demand segments in the network that use the same PrT transport system, demand may not be completely assigned in the Tribut-equilibrium assignment, i. e. the volumes on the routes of an origin-destination relation is lower than the demand for this relation. This error has been fixed. **(18029)**
- ✔ Maximum wait time in SBA: In simulation-based dynamic PrT assignment (SBA), the maximum wait time at nodes has not been taken into account correctly in many cases. This error has been fixed. **(18086)**

## PuT Assignment

- ✔ Skim matrices for fare and number of fare zones in headway-based assignments: When calculating PuT skim matrices for the fare or the number of fare zones with the headway-based assignment, they used to have value 0 for all relations at all times if 'min. PJT connection' was selected as aggregation type. This error has been fixed. **(17999)**

## PuT Line Blocking

- ✔ Printing the line block view with page margin: If you set a left and/or right margin when setting up the printing page for the line block view, a completely incorrect printout was created so far. This error has been corrected. **(16582)**

## Visum Files

- ✔ Messages when aborting the network file import: If the import of a network file is aborted while table line route item, time profile item or system route item is read in, all line routes, time profiles or system routes that have already been read in have no course. The messages that indicate this have not yet offered an option 'No more messages of this type'. This error has been fixed. **(18036)**
- ✔ Coupling sections in omitted network references from network file: If the 'Ignore line route item with unknown network reference' option is active when reading a network file additively, and if the conflict handling option 'Overwrite object' is selected for vehicle journey items and vehicle journey sections, in certain cases coupling sections from the network file could not be read in successfully. This error has been fixed. **(18033)**
- ✔ Method for impedance calculation at node: The method selected for the impedance calculation according to ICA was represented differently in procedure parameter files of PTV Visum 16 and PTV Visum 17 ('HCM 6th Edition' vs. 'HCM 2015'). As a result, the setting was lost when reading procedure parameters in the respective other main version. This error has been fixed: both program versions can now also read and apply the 'other variant'. **(18017)**
- ✔ Reading network files with surfaces while 3-D view is open: No more crashes when reading a network file additively if data of surface objects is changed and the 3-D network view is open during import. **(18093)**
- ✔ Table 'Info signs' in 'Frequent cases: Graphics & presentation': Previously, the table 'Info signs' was not included in the template 'Frequent cases: Graphics & presentation' when saving and reading network files. This also applied to the COM method 'AddCommonUseCaseGraphicAndPresentation'. This error has been fixed. **(18052)**

## ❗ Breaking Changes

### Assignment PrT

- ❗ Maximum wait time in SBA: In simulation-based dynamic PrT assignment (SBA), the maximum wait time at nodes has not been taken into account correctly in many cases. This error has been fixed. This changes the results of the simulation-based dynamic assignment. In many cases, the change also accelerates convergence. **(18086)** ✔

### PrT Assignment

- ❗ SBA deletes paths with low volumes: The simulation-based dynamic assignment (SBA) previously deleted paths with positive, albeit very small volumes. This could lead to new paths being found, especially when starting from an initial assignment with only one iteration, i. e. when all paths of the origin-destination relation had very low volumes. This error has been corrected. Due to the changed allocation, changes in the procedure results can occur in rare cases because individual vehicles are assigned a different path. **(18078)** ✔

### PrT Assignment

- ❗ Lost demand in Tribut-equilibrium assignment: If there are several demand segments in the network that use the same PrT transport system, demand may not be completely assigned in the Tribut-equilibrium assignment, i. e. the volumes on the routes of an origin-destination relation is lower than the demand for this relation. This error has been fixed. Since the calculation logic had to be changed, the assignment result changes in the case of several demand segments per transport system. **(18029)** ✔

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## ⊕ New Features and Changes

### Data Model

- ⊕ Fallback language for attribute descriptions: The fallback language is now used for attribute descriptions, which are for example displayed in the tooltips of list headers or in the attribute selection dialog. The attribute description is thus displayed in the fallback language if no description exists in the currently set language. **(17883)**

### Dialogs

- ⊕ Stop identifiers in coupling dialogs: The dialogs for coupling and separating vehicle journeys now use the name of the stop as identifier if it is not empty. **(17915)**

### I/O Interfaces

- ⊕ From- and To-node in MaaS export: The export to MaaS Modeller now also contains From-node and To-node for trip requests, which can be different from the pickup and dropoff nodes. **(17771)**

- ⊕ Non-allocated 'ocps' in railML import: When importing railML, 'ocp' elements, which cannot be allocated clearly to a stop point in the network, are now also issued in a warning if their property 'propService' is not set but at least one 'trainPart' with a commercial stop exists at this 'ocp'. **(17925)**

## I/O Interfaces, Other Procedures

- ⊕ Walk times in MaaS export: The execution of the export to MaaS Modeller as well as the 'Tour planning' procedure are now rejected if multiple demand segments shall be handled, whose respective allocated transport systems contain different PuT-Walk transport systems, because the different walk times per demand segment cannot be mapped in the MaaS Modeller. In this case, export and tour planning need to be run separately for each demand segment. **(17966)**

## Other Procedures

- ⊕ HBEFA update to version 3.3: The calculation of emissions according to HBEFA has been adjusted to the version HBEFA 3.3. In order to be able to use HBEFA, it is essential to install the new version of the HBEFA data package. Calculations according to HBEFA 3.1 are no longer possible. **(16002)**

## ✓ Fixed Bugs

### ANM

- ✓ ANM export of a subnetwork is not imported in PTV Vissim: Even though data was prepared for an ANM export of a subnetwork, the data was not imported automatically in PTV Vissim. This error has been fixed. **(17977)**

### COM-API

- ✓ Error message for IFlowBundle::CreateCondition with invalid parameter: No useful error message was issued when calling IFlowBundle::CreateCondition (in its different variants) if parameter 'NetElem' was invalid. This error has been fixed. **(17997)**

### Data Model

- ✓ Access node number at sharing stations: The attribute 'access node number at sharing stations' could not be edited even though you could edit the node by entering a number. This error has been fixed. **(17712)**

### Dialogs

- ✓ Sum of the times of the 'Edit line route' dialog: The total of the run and dwell times shown in the 'Edit line route' dialog was not correct. This error has been fixed. **(17951)**

### Filters

- ✓ Filtered volume matrix: Function FILTEREDASSIGNEDVOLUMEMATRIX() in matrix-valent formulas, which delivers the volume matrix of the demand segment filtered by the OD pair filter, did not update its values when deactivating the filter for OD pairs. This error has been fixed. **(17981)**

### Formulas

- ✓ Filtered volume matrix: Function FILTEREDASSIGNEDVOLUMEMATRIX() in matrix-valent formulas, which delivers the volume matrix of the demand segment filtered by the OD pair filter, did not update its values when deactivating the filter for OD pairs. This error has been fixed. **(17981)**

### Graphical Procedures

- ✓ Sporadic crashes when calculating a flow bundle: Sporadic crashes no longer occur when calculating flow bundles with multiple cores. **(17956)**

### Graphics

- ✓ Direct editing of the legend: Directly editing the legend no longer causes a crash if the mouse pointer leaves the legend after opening a shortcut menu and then reappears in order to select an entry from the shortcut menu. **(17947)**
- ✓ License confirmation in case of disabled OpenStreetMap maps: When loading a version file for which an OSM map had been set as background map, license terms were queried even if the loading of background maps was disabled in the user preferences. This error has been fixed. **(17957)**
- ✓ Text is drawn at hidden point object: Even though the 'Draw point object' option was not checked, text was drawn at point objects if the 'Avoid overlapping when drawing' option was deselected. This error has been fixed. **(17959)**

## I/O Interfaces

- ✔ 'trainParts' without vehicles in railML import: When a 'trainPart' element referenced a formation element, which in turn did not reference any vehicles, no vehicle journey section was generated in Visum for this 'trainPart'. When a 'train' consisted of just one 'trainPart', the respective vehicle journey was thus not imported either. This error has been fixed, i.e. a vehicle journey section is now also generated in this case, yet without indication of vehicle information. Furthermore, a warning is now issued in this case. **(17851)**
- ✔ Database connection with MS SQL server: A crash no longer occurs during a database export to MS SQL server when you enter an incorrect connection string. **(17965)**
- ✔ railML import accelerated: The railML import has been accelerated. The effect is particularly significant if a filter is active in the target network. **(17807)**

## Installation

- ✔ Network size CN not working: The network size CN could not be licensed. This bug has been fixed. **(18012)**

## Matrix Editor

- ✔ Filtered volume matrix: Function FILTEREDASSIGNEDVOLUMEMATRIX() in matrix-valent formulas, which delivers the volume matrix of the demand segment filtered by the OD pair filter, did not update its values when deactivating the filter for OD pairs. This error has been fixed. **(17981)**
- ✔ Incomprehensible message for matrix swap file: The error message, which is issued when activating the matrix swap file while a network with matrices is loaded, was not very meaningful and has been improved. **(17724)**
- ✔ Projection of matrices: When projecting matrices to target values from zone attributes, any type of attribute used to be provided for the labeling of external zones. However, when running the procedure, only attributes of the type Bool were accepted. Now all numerical attributes of the zone can be used (especially AddValues) whose contents are interpreted as truth values. **(15061)**


## Network Comparisons

- ✔ Network merge mode and stop points with different characteristics: A crash no longer occurs when starting the network merge mode for two networks, which contain a link stop point with the same number on the same link, but one is directed and the other one is undirected or both are directed but in opposite direction. In this case, the networks cannot be merged and the network merge mode is now rejected. **(17971)**

## Network Editor

- ✔ Aggregating lines with additional conditions: When aggregating lines with an additional condition for an attribute, under certain circumstances, too many lines could be generated, i.e. certain possible aggregations were not carried out. This error has been fixed. **(17885)**
- ✔ Cancelling the deletion of connected nodes with two legs: When deleting nodes with two legs via the Multi delete dialog without the option 'Exclude connected nodes from deletion', so far, a query used to be displayed for connected nodes. When you rejected the deletion at this point (button 'No' or 'No for all'), the two links connected by the node were merged, but the node itself was not deleted. It remained in the network as an isolated node. This error has now been fixed: if the command history is active during the deletion, the original state is restored. If it is not active, the query is suppressed. **(17993)**
- ✔ Moving boundary points of surfaces in case of shared edges: When you moved a point A onto a different point B of the same surface editing a surface in the network editor, both points were merged into one point. However, if point A was also used by other surfaces, it was deleted there instead of being replaced by the new shared point. This error has been fixed. **(16104)**
- ✔ Renumbering marked matrices: In the Matrices tool window and in the matrix list, only the currently selected matrices were renumbered instead of all matrices, when calling the 'Renumber' function. This error has been fixed. **(17988)**

## Other Procedures

- ✔ Messages during procedure 'PuT spatial analysis': So far, exceptions that occurred while running procedure 'Spatial PuT analysis' were not issued as error messages. This error has been fixed. **(17195)**
- ✔ Vehicle hours in assignment analysis: When calculating the assigned and observed vehicle hours in the course of the 'Assignment analysis' procedure, so far, calculations were based on the travel time in the uncharged network t0. This error has now been fixed: the program now uses a travel time averaged over the volumes of the individual transport systems in the charged network tCur, assuming that the distribution of the volume to transport systems with different maximum speeds is similar to the distribution in the assignment result for the observed values. **(17764)** 

## PrT Assignment

- ✔ Executing an assignment while a path is marked: A crash no longer occurs when running a PrT assignment while a path is marked in the PrT path list. **(17854)**

## PuT Assignment

- ✔ Headway-based assignment with irregular headways: In headway-based assignments, Visum calculated a faulty distribution if time profiles with irregular headways (in seconds) existed. If coordinated time profiles with irregular headways existed on top of that, certain paths were sometimes not found. This particularly occurred when the coordinated time profiles had different headways. This error has been fixed. **(17961 🚫)**
- ✔ Too many progress dialogs when reading in connection files: If you read in connections from files for a timetable-based assignment, so far, a separate progress dialog used to be opened for each file with the effect that the main window was displayed in the foreground again and again. This error has been fixed. **(17974)**

## PuT Line Blocking

- ✔ Finish calculating iteration during line blocking with vehicle interchange: When canceling an assignment with vehicle interchange during the iteration phase, users could no longer decide whether to finish the running iteration and output the interim result or cancel the procedure without a result. This error has been fixed. **(17983)**

## PuT Passenger Survey, Graphical Procedures

- ✔ Shortest path search at stop areas with long walk links: Paths that require a long walk link were not found in the shortest path search from/to stop areas, neither in interactive PuT path searches nor in the course of the plausibilization of survey data. This error has been fixed. **(17941 🚫)**

## Timetable Editor

- ✔ Crash when deleting a line: Under certain circumstances, the program used to crash when deleting a line, line route, or time profile while the associated vehicle journeys were displayed in the tabular timetable. This has been fixed. **(17919)**

## Visum Files

- ✔ Reading in matrices from \$O files: Reading in matrices from \$O files was too slow, especially when running the OD relations in an unfavorable order. This error has been fixed. **(17973)**

## 🚫 Breaking Changes

### Other Procedures

- 🚫 Vehicle hours in assignment analysis: When calculating the assigned and observed vehicle hours in the course of the 'Assignment analysis' procedure, so far, calculations were based on the travel time in the uncharged network t0. This error has now been fixed: the program now uses a travel time averaged over the volumes of the individual transport systems in the charged network tCur, assuming that the distribution of the volume to transport systems with different maximum speeds is similar to the distribution in the assignment result for the observed values. This changes the results of the assignment analysis for the assigned and observed vehicle hours. **(17764 ✔)**

### PuT Assignment

- 🚫 Headway-based assignment with irregular headways: In headway-based assignments, Visum calculated a faulty distribution if time profiles with irregular headways (in seconds) existed. If coordinated time profiles with irregular headways existed on top of that, certain paths were sometimes not found. This particularly occurred when the coordinated time profiles had different headways. This error has been fixed. This leads to changes in the results of the headway-based assignment, particularly in connection with coordination. Small deviations also occur without coordination. **(17961 ✔)**

### PuT Passenger Survey, Graphical Procedures

- 🚫 Shortest path search at stop areas with long walk links: Paths that require a long walk link were not found in the shortest path search from/to stop areas, neither in interactive PuT path searches nor in the course of the plausibilization of survey data. This error has been fixed. This leads to changes in the results of the procedure 'Plausibilisation of survey data' in the affected networks. **(17941 ✔)**



## + New Features and Changes

### Data Model

- + Modification of Passenger trips unlinked calculation: The meaning and thus the values of the 'Passenger trips unlinked' and 'Passenger trips unlinked' DSeg attributes of lines, routes and operators have been changed. A path that uses multiple vehicle journeys of the same line, the same line route or the same operator is only counted once and not once every time. At the level of the travel time profiles and vehicle journeys, the same procedure has already been used. **(11626 !)**

### Add-Ins

- + Time series analysis of accident data: A new Add-In enables a time series analysis of accident data. The Add-In requires an existing installation of JAGS (<http://mcmc-jags.sourceforge.net>). **(16172)**

### Demand Procedures

- + Use of multimodal paths in P+R: The procedures 'P+R lot choice' and 'P+R leg split' now exclusively use multimodal paths to save and output P+R relations. This reduces memory consumption and the distribution of the demand of a relation to the P+R lots can be retraced. **(17286 !)**

### Graphics

- + OSM Cycle Background Map has been removed: The OpenStreetMap (Cycle Map) map service has been removed from the installation, due to the introduction of API keys for personal authentication at the provider [thunderforest.com](http://thunderforest.com). **(17880 !)**

### I/O Interfaces

- + Connecting to a Personal Geodatabase with 64bit: The connection to a Personal Geodatabase can now be established with the 64bit version of PTV Visum in order to display objects as GIS objects. **(6308)**
- + Export to MaaS Modeller impossible: If the export to MaaS Modeller is not possible because predictable conditions are violated, the parameters dialog does not open. Instead, the circumstance, which prevents the export, is pointed out directly. **(17842)**

### Main Window

- + Drag & drop files on start page: You can now use drag & drop on the start page. **(17801)**
- + Main menu for lines, PrT paths, and system routes: The 'Edit' menu has been restructured for objects of the PuT line hierarchy as well as for PrT paths and system routes. **(17758)**
- + Start page: At startup, PTV Visum now provides a start page with current information. **(15306)**
- + Window menus: The menus belonging to a specific window (list, timetable, matrix editor, etc.) have been unified, means that the selection and sequence of recurring entries have been brought into line. **(17181)**

### Miscellaneous

- + Settings for completing the course of line routes or system routes: The settings for completing the course of line routes or system routes in the context of reading a network additively can now be saved in the user preferences under Network > Lines. **(16456)**

### Network Editor

- + Cancel via progress dialog when normalizing surfaces and when merging points with equal co-ordinates: Normalizing surfaces and merging points with the same co-ordinates can take a long time. Therefore, you can now cancel both operations via a progress dialog. **(15869)**

### PrT Assignment

- + Handling of special values in the demand: In PrT and PuT assignments, Visum not only checks the demand of each relation for negative values but also handles special values like #inf (infinite) or #nan (not a number) now, which are sometimes generated during matrix calculations. Affected relations are issued as warnings and a demand of 0 is assumed. **(17810)**

### PuT Assignment

- ⊕ Handling of special values in the demand: In PrT and PuT assignments, Visum not only checks the demand of each relation for negative values but also handles special values like #inf (infinite) or #nan (not a number) now, which are sometimes generated during matrix calculations. Affected relations are issued as warnings and a demand of 0 is assumed. **(17810)**
- ⊕ Modelling of roundtrip systems: The modelling of roundtrip systems with in Vehicle Sharing is now possible. The calculation of the load dependent impedance on picked up vehicles is analogously to the calculation on stations. An attribute is introduced to model the minimum dwell time in the zone. The load dependent network impedance and the balance factor on zones were removed. **(16893** 🚫)
- ⊕ Modification of Passenger trips unlinked calculation: The meaning and thus the values of the 'Passenger trips unlinked' and 'Passenger trips unlinked' DSeg attributes of lines, routes and operators have been changed. A path that uses multiple vehicle journeys of the same line, the same line route or the same operator is only counted once and not once every time. At the level of the travel time profiles and vehicle journeys, the same procedure has already been used. **(11626** 🚫)

## Schematic Line Diagram

- ⊕ Direct editing of legend: The legend of the schematic line diagram and the graphical timetable can now be edited directly, just like the one in the network editor (see ID 16595). **(17541)**

## Timetable Editor

- ⊕ Direct editing of legend: The legend of the schematic line diagram and the graphical timetable can now be edited directly, just like the one in the network editor (see ID 16595). **(17541)**

## Visum Files

- ⊕ Display area in global layout: The global layout file now also contains the current display area of the network editor. **(17678)**
- ⊕ Layout for timetable lines and line block selection in global layout: The layouts of the tool windows 'Timetable lines' and 'Line block selection' are now part of the global layout, i.e. the contents of these tool windows are restored when saving and later reading in a global layout. **(17747)**

## 🟢 Fixed Bugs

### Data Model

- 🟢 Additive network reading and applying model transfer files: Additive network reading with the options 'Overwrite object' or 'Overwrite attributes' as well as applying model transfer files did not work for path sequence sets and path sequence activities. This error has been fixed. **(17830)**
- 🟢 Messages during building meso graph: Messages generated during the building of the meso-graph because certain attributes, which requires the calculation of the graph, for example, are displayed in a list are now no longer interrupt the procedure, but only creates entries in the message window. **(17798)**
- 🟢 Transport systems with invalid default values: If a transport system was created with program version 16.01-00 to 16.01-05 or a network from previous versions of the program was opened and saved as a version file, the new or transferred transport systems could not be edited via the dialog. This error has been corrected. **(17616)**

### Demand Procedures

- 🟢 Overflow in Multi procedure and Furness procedure: If you left the value range for floating-point numbers while executing a Multi or Furness procedure in the context of an 'EVA distribution/mode choice', 'Combined tour-based model - trip generation/mode choice' or 'Tour-based freight trip generation' operation, invalid entries could occur in the result matrices. The procedure is now canceled (with a warning) in this case and the values of the last iteration with valid values are issued. **(15893)**
- 🟢 Weight for P+R vol/cap ratio: The skim calculation and the distribution of the demand now consistently consider the factor for the weight for P+R vol/cap ratio. So far, a factor of -1 was assumed for the distribution. This error has been fixed. **(17358)**

### Dialogs

- 🟢 'Hidden' buttons for formulas: In some dialogs in which you can enter a formula, some buttons to insert formula components were hidden depending on the current size of the dialog. In such cases, a graphical message now appears with the option to reach the hidden buttons anyway. **(16952)**
- 🟢 Activating a route point without a time profile: A crash no longer occurs if, in the 'Edit line route' dialog, you activate a route point for an element of a line route that has no time profile. **(17862)**

- ✔ Dropdown list for network object references with blank values: When editing attributes which represent an optional reference to a network object (for example, operator number), the empty reference can now be selected directly dropdown list when using the extended input options. **(17929)**
- ✔ Floating-point numbers in link dialog: In the 'Edit link' dialog, Visum always rounded floating-point numbers (for example speeds) to whole numbers instead of using the number of decimal places specified in the network settings for the given attribute type. This error has been fixed. **(17855)**

## Filters

- ✔ Deleting and restoring a user-defined attribute: If a filter condition applied to a user-defined attribute and this attribute was first deleted and then restored, the corresponding filter condition was not also restored. This error has been fixed. **(17426)**

## Graphical Procedures

- ✔ Button for the calculation of flow bundles: Sometimes the button for the calculation of the flow bundle was falsely grayed out. This error has been fixed. **(17828)**

## Graphics

- ✔ Drawing link bars while executing a script: A crash no longer occurs when parallel calculations are carried out for the drawing of the bars during script execution. **(17539)**
- ✔ Hovering uses attributes of marked objects: If network objects were highlighted because the mouse pointer hovered over them, attributes of a different, marked network object were displayed if the table was activated for the network object type in the 'Marked' graphic parameters. This error has been fixed. **(17773)**
- ✔ Line filter in legend: The line filter was not taken into account so far when displaying line bars in the legend, i.e. bars were also displayed for inactive objects in the legend. This error has been fixed. **(17576)**

## Graphics 3-D

- ✔ Extended markings in 3-D network view: By mistake, instead of activating or deactivating the extended markings in the 3-D network view, a screenshot used to be created when running the respective command. This error has been fixed. **(17861)**

## Main Window

- ✔ Collapsing a group in message window: Visum could not be used any more when collapsing a group in the message window and then clicking this group. This error has been fixed. **(17848)**
- ✔ Continued display of start page when loading a version file: If, in the user preferences under 'GUI - General', you set option 'Load from version file' for windows and 'Keep configuration' for tool windows and then loaded a version file with more than one window, the previously displayed start page remained open in a separate tab group instead of being replaced by the windows found in the version file. This error has been fixed. **(17875)**
- ✔ Menus and tooltips in case of focus on another program: If the focus was on a program other than PTV Visum, several tooltips were no longer displayed (e.g. of the list of recently used files) and buttons of the tool windows were no longer highlighted, even though they could still be used. This error has been fixed. **(17912)**

## Network Editor

- ✔ Changing allocations of nodes to main nodes with PrT paths: If a user-defined PrT path existed, which passed through a main node and, in the course of this, used two different cordon nodes to enter and exit the main node, it was not deleted (nor adjusted) when removing the allocation of one of the cordon nodes to the main node. This error has been fixed. **(17881)**
- ✔ Closing the network editor while editing a line route: If you closed the network editor while editing the course of a line route, system route, or PrT path, you could not exit this mode any more. The error has been fixed by permitting the user to reopen the network editor in this situation in order to finish or cancel the modification of the course. **(17906)**
- ✔ Connecting nodes with links: A crash no longer occurs when connecting nodes with links in certain specific cases. **(17833)**
- ✔ Parameters dialog for 'Connect nodes via links' does not open: The parameters dialog for the operation 'Connect nodes via links' remembers the settings during a Visum session. If you repeated this operation in a network with fewer target nodes than the required minimum number of links, the dialog did not open but a message indicated that fact. This error has been fixed. **(17769)**

## Procedure Sequence

- ✔ Warning when overwriting skim matrices: When calculating PuT skim matrices, a warning that matrix files will be overwritten will only be issued if data is actually overwritten. **(17816)**

## PuT Assignment

- ✔ Headway-based assignment with PuT-Aux and specific origin start time: A crash no longer occurs when calculating a headway-based PuT assignment if one of the demand segments includes a transport system of the type PuT-Aux and a specific origin wait time is defined in the perceived journey time. **(17911)**
- ✔ Ride distance at zone and PuT assignment statistics: The 'mean ride distance' and 'total ride distance' (including variants) at the zone and in the PuT assignment statistics was based on ride distance within the timetable based PuT, but not on PuT-Aux or Vehicle Sharing trips. This bug has been fixed. **(17656)**

## Schematic Line Diagram

- ✔ Indication of units: The units in the graphic parameters of the schematic line diagram were not indicated correctly. This error has been fixed. **(17767)**

## Subnetwork Generator

- ✔ Path sequence sets and path sequence activities: The generation of a subnetwork used to fail in networks that contained path sequence sets and path sequence activities. This error has been fixed. **(17832)**

## Visum Files

- ✔ External matrices in version file: Occasionally, external matrices that were open in the matrix editor were saved to file when saving a version file. This led to the generation of version files that could not be read in again. This error has been fixed by skipping such external matrices that were saved by mistake when reading in version files. **(17887)**
- ✔ Version files with matrix histogram: Reading in version files that contained an opened matrix histogram failed if no classification matrix was selected in the histogram. This error has been fixed. **(17864)**

## ❗ Breaking Changes

### Demand Procedures

- ❗ Use of multimodal paths in P+R: The procedures 'P+R lot choice' and 'P+R leg split' now exclusively use multimodal paths to save and output P+R relations. This reduces memory consumption and the distribution of the demand of a relation to the P+R lots can be retraced.  
In the 'P+R leg split' procedure, the updated demand from mode choice is no longer redistributed, but the demand matrices are derived from the path sequences generated during 'P+R lot choice'. Volumes are thus balanced yet stem from the last iteration of the demand model. If the demand model is converged, theoretically this should not make a difference; de facto, different procedure results are produced. To update the volume, a second lot choice procedure must be inserted right before the leg split procedure (and after mode choice). In this case, you do not have to save path sequences in the first lot choice procedure, because this is executed only to calculate the skim matrices for the mode choice. In return, the volumes and the distribution to the different P+R lots are then in equilibrium. **(17286 +)**
- ❗ Weight for P+R vol/cap ratio: The skim calculation and the distribution of the demand now consistently consider the factor for the weight for P+R vol/cap ratio. So far, a factor of -1 was assumed for the distribution. This error has been fixed. The results of the distribution of P+R lots change if the default value -1 for the factor is changed. **(17358)**

### Graphics

- ❗ OSM Cycle Background Map has been removed: The OpenStreetMap (Cycle Map) map service has been removed from the installation, due to the introduction of API keys for personal authentication at the provider [thunderforest.com](http://thunderforest.com).  
Version files that refers to this map service start without a background map. The map service can still be used if added manually (manual 24.7.1) and corresponding personal registration at <http://www.thunderforest.com/docs/apikeys/> **(17880 +)**

### PuT Assignment

- ❗ Modelling of roundtrip systems: The modelling of roundtrip systems with in Vehicle Sharing is now possible. The calculation of the load dependent impedance on picked up vehicles is analogously to the calculation on stations. An attribute is introduced to model the minimum dwell time in the zone. The load dependent network impedance and the balance factor on zones were removed. If a assignment under consideration of Vehicle Sharing System has been calculated, the results will now change. **(16893 +)**

- ❗ Modification of Passenger trips unlinked calculation: The meaning and thus the values of the 'Passenger trips unlinked' and 'Passenger trips unlinked' DSeg attributes of lines, routes and operators have been changed. A path that uses multiple vehicle journeys of the same line, the same line route or the same operator is only counted once and not once every time. At the level of the travel time profiles and vehicle journeys, the same procedure has already been used. The modification will change the values of these attributes. For technical reasons, the affected attributes contain the value 0 after loading a version file written with PTV Visum 16 or earlier. In order to obtain the correct values, the PuT assignment with PTV Visum 17 must be executed again. **(11626 +)**
- ❗ Ride distance at zone and PuT assignment statistics: The 'mean ride distance' and 'total ride distance' (including variants) at the zone and in the PuT assignment statistics was based on ride distance within the timetable based PuT, but not on PuT-Aux or Vehicle Sharing trips. This bug has been fixed. In networks with such traffic systems, this changes the values of the zone attributes as well as the PuT assignment statistics. **(17656)**

## Data Model

- ❗ Modification of Passenger trips unlinked calculation: The meaning and thus the values of the 'Passenger trips unlinked' and 'Passenger trips unlinked' DSeg attributes of lines, routes and operators have been changed. A path that uses multiple vehicle journeys of the same line, the same line route or the same operator is only counted once and not once every time. At the level of the travel time profiles and vehicle journeys, the same procedure has already been used. The modification will change the values of these attributes. For technical reasons, the affected attributes contain the value 0 after loading a version file written with PTV Visum 16 or earlier. In order to obtain the correct values, the PuT assignment with PTV Visum 17 must be executed again. **(11626 +)**

## 17.00-03 [123950]

2017-08-29

### + New Features and Changes

#### Lists

- + Create new network objects: Lists in which the creation of new network objects (e.g. Path sequence sets, Storyboards) is possible have got new buttons and menu entries, respectively, for the creation, editing and deletion of objects. **(17677)**
- + Grouping and aggregate functions for path sequences: Grouping with the corresponding aggregate functions is now available in lists of path sequences and path sequence items. **(17815)**
- + Sorting in lists 'Path sequences' and Path sequence items': The lists 'Path sequences' and Path sequence items' can now be sorted for arbitrary columns. **(17760)**

#### Main Window

- + View-specific menu for the network editor: If the network editor is the active view, in the menu the view-specific menu 'Network editor' is shown. Entries in this menu refer to functionality which is available via icons in the network editor too. **(11291)**

#### Timetable Editor

- + Sorting in the tabular timetable editor: The tabular timetable editor maintains its sorting of displayed vehicle journeys as long as the number is reduced either by changing the line selection or by other changes of the data. If the number of displayed vehicle journeys increases, the new vehicle journeys are added at the end and all other vehicle journeys remain in sorting order. **(17649)**

### ✔ Fixed Bugs

#### Dialogs

- ✔ Edit valid day when using an annual calendar: The dialog 'Edit valid days' did not show vacation days when the dialog were displayed for an annual calendar. This error has been fixed. **(17753)**
- ✔ Labels in the parameter dialog of line blocking: In the parameter dialog of the procedure 'Line blocking' some labels could not be read completely in some languages. This error has been fixed. **(17781)**
- ✔ Pocket lane length within ICA calculation: The option 'Use the pocket length for the determination' in the 'General procedure settings' under 'Node impedance calculation (ICA)' - 'Signalized' was not greyed out when the selected calculation method did not consider this option. This error has been fixed. **(17762)**
- ✔ Procedure parameter dialog 'EVA weighting': The subdialog 'Define assessment types' of the EVA weighting parameter dialog did not show correctly when changing size, in particular with regard to the buttons 'Create' and 'Delete'. This error has been fixed. **(17732)**

## Graphics

- ✔ Classified display for control types: When using the classified display for the node attribute 'Control type' the automatic setting of symbols for each class did not work anymore. This bug has been fixed. **(17823)**
- ✔ Display of turn volumes for main nodes: The program does not crash anymore when for the display of turn volumes the alignment is set to 'Sum per bar'. **(17797)**

## I/O Interfaces

- ✔ Infinitive loop when importing SATURN data: The SATURN import does not end in an infinitive loop when a sector appears in section 5 of the import data. **(17755)**
- ✔ Infinitive loop when importing SATURN data: The SATURN import does not end in an infinitive loop when comments of less than 6 lines exist in section 1 of the import data. **(17819)**
- ✔ Permitted transport systems for railML export with infrastructure: The railML export with infrastructure exports all PuT line transport systems of the link as 'AllowedCategories' and not only those with an actually exported vehicle journey of the link. **(17785)**
- ✔ Using 'PuT supply from Visum ..' with filter: Line routes with line names similar to a name of a line in the target network were not imported If the option 'Only transfer active vehicle journey sections (and corresponding basic data) from source network' is used for the import and a filter is applied in the source network which directly or indirectly contains a condition in relation to the Line-Name. This error has been fixed. **(17696)**
- ✔ railML Import: Invalid data structures could arise if several consecutive OPC of a 'train' in the railML data cannot be allocated to stop points. As a consequence the railML import was aborted or the program could crash. This error has been fixed. **(17800)**

## Matrix Editor

- ✔ Undo and restore: The program does not crash anymore when zones are aggregated followed by undo and restore actions while the matrix editor is open. **(17700)**

## Network Editor

- ✔ Merge points of the same coordinates: Merging points with the same coordinates did not work when coordinates were of huge numerical values. This error has been fixed. **(17704)**

## Other Procedures

- ✔ Procedure 'Edit attribute' with subattribute: If in the procedure 'Edit attribute' the target attribute is a subattribute this information was lost when closing the dialog. As a consequence the procedure could not be executed. This error has been fixed. **(17751)**

## PrT Assignment

- ✔ Approach capacity for Kimber roundabouts: Within the assignment with ICA the definition of the minimum capacities for turns was ignored when the approach capacity of the link for Kimber roundabouts was defined. This error has been fixed. **(17794)** 🚫
- ✔ Reset attributes when initializing assignment with ICA: If there is no result of 'Assignment with ICA' procedure in the network, nevertheless some attributes of net objects depending on assignment with ICA were not set to default values. This bug has been fixed. **(17737)**

## Procedure Sequence

- ✔ Messages from procedure sequence execution: If a procedure is executed in single step mode, messages were not replaced but appended to those from the previous execution. Consequently, the number of messages in the procedure sequence dialog did not match the number of visible messages in the message window. This error has been fixed. **(17701)**

## PuT Operating Indicators

- ✔ Calculation of transport performance of territories for analysis time intervals: The program does not crash anymore when calculating transport performance for territories per analysis time interval if a link is traversed twice and the first crossing is outside the analysis time interval considered. **(17752)**

## Schematic Line Diagram

- ✔ Crash when changing between pages of the graphic parameter dialog: The program does not crash anymore when changing from the dialog page 'Labeling forms' to the dialog page 'Labeling variants' and one is editing a cell of the 'Labeling forms' table. **(17572)**

## Subnetwork Generator

- ✔ Crash after Subnetwork generation with a matrix: The program does not crash anymore when opening a new network after a subnetwork with a matrix for at least one demand segment has been generated. **(17750)**

## Timetable Editor

- ✔ Synchronization and sorting: When sorting objects in the tabular timetable editor and then e.g. a vehicle journey item is marked, the synchronization of that element was incorrect. This error has been fixed. **(17395)**

## ❗ Breaking Changes

### PrT Assignment

- ❗ Approach capacity for Kimber roundabouts: Within the assignment with ICA the definition of the minimum capacities for turns was ignored when the approach capacity of the link for Kimber roundabouts was defined. This error has been fixed. Assignment results of assignment with ICA can change if Kimber roundabouts are included in the network. **(17794)** ✔

17.00-02 [123159]

2017-08-04

## + New Features and Changes

### Data Model

- + Relations of PuT path and PuT path leg to connecting journeys: New relations of PuT path permit access to all connecting journeys used by the path. Furthermore, you can use a new relation to access the corresponding connecting journey of a PuT path leg. The relations only provide results if assignment results are saved as connections and the respective connecting journey objects exist (i.e. the maximum transfer times for connecting journeys are long enough). **(17610)**
- + Simultaneous allocation of detectors to nodes and count locations: A detector can now be allocated to both a node as well as a count location (and thus indirectly to a link). A consistency of the two allocations is not required. **(15847)**

### I/O Interfaces

- + Sharing stations in OpenStreetMap import: Some of the provided configurations now also import Sharing stations during OpenStreetMap imports (Car sharing and Bike sharing). **(15963)**

### Main Window

- + Country setting for regionalized start page: The contents of the start page may differ depending on the country, for example regarding event information. A country setting in the user preferences now allows an explicit selection of the region. (However, the start page does not feature regional differences during the beta test.) **(17711)**

### Procedure sequence

- + Finishing an iteration step before 'Cancel': Some iterative procedures allow to complete the running iteration when canceling the procedure to issue a consistent (yet possibly not converged) result. This option is now provided directly in the process dialog of the procedure, alternatively to canceling without completing the current iteration step. **(17673)**

### Safety

- + Calculation of accident rate for main nodes: Accident rates for historical accident data can now also be calculated for main nodes, consistent with the Accident Prediction Model APM. **(16045)**

## Subnetwork Generator

- + Aliases in the subnetwork generator: Aliases are now included when exporting a subnetwork, i.e. they are also available in the subnetwork after the export. **(17560)**

## ✔ Fixed Bugs

## Add-Ins

- ✔ Message in case of non-existent file selection: If, for an Add-In, no file was selected as input or output file, a detailed error message is now issued indicating the input error. **(17708)**
- ✔ Possible crash in 'Generic Accident Model': A crash no longer occurs when running the add-in 'Generic Accident Model'. **(17744)**

## COM-API

- ✔ Academic program version via COM: The academic program version of PTV Visum can now be started via COM again. **(17085)**

## Data Model

- ✔ Deleting a zone allocated to a POI: If you deleted a zone that was allocated to a node, the data model did not react correctly. As a consequence, amongst other things, version files could not be saved any more. **(17713)**
- ✔ Skims of paths and relations with Sharing: The skims Ride time, Journey time, Journey distance, and PuT Aux distance at PuT paths and PuT relations, as well as in the complete statistics and the zone statistics (not all of them at every object) did not properly take into account the path legs traveled by Sharing transport systems. **(17614)**

## Dialogs

- ✔ Fill style for marked point-polygonal objects: In the graphic parameters dialogs for marked point-polygonal objects (e.g. zones), the control for the fill style was in the wrong place, so that it looked like it belonged to the 'Draw chart' option. This error has been checked. **(17716)**
- ✔ Focus on input field in modal search dialog: The modal variant of the search dialog (e.g. used for local filters in lists) now also provides a direct focus on the input field when opened, so that you can enter the search criterion right away. **(17534)**
- ✔ Initial column widths in filter dialog: The 'Edit filter' dialog displayed column widths that were not in accordance with the size of the dialog when opened for the first time. This error has been fixed. The modification takes effect with a new installation or when executing function 'Reset table settings' from the View menu. **(17699)**
- ✔ Labeling formats for bars: The 'Label' tab of the graphic parameters dialog for single bars ('Edit bar') used to display control elements for the display format that did not match the type of the selected attribute. This error has been fixed. **(17717)**

## Graphics

- ✔ Invalid values for class limits of classified graphic parameters: So far, classified graphic parameters could be generated with invalid values in different ways. This is now reliably prevented. **(17749)**


## Main Window

- ✔ Message bars for scenario management and stop sequence in case of high DPI: If a high DPI setting is used, the message bars for scenario management and the stop sequence are dimensioned incorrectly, so that some buttons might not be displayed. This error has been fixed. **(17725)**

## Network Editor

- ✔ Aggregating line routes by a vehicle journey attribute: When aggregating line routes and grouping the line hierarchy by a vehicle journey attribute in the course of this, canceling a disaggregation or aggregation step (either by the user or due to a coupling that could not be restored) could cause a crash. This error has been fixed. **(17739)**

## PrT Assignment

- ✔ Message regarding the blocking back model with no network object reference: If the blocking back model could not be executed because the remaining capacity of a network object was too low, the message provided contained the wrong network object number in some languages. This error has been fixed. **(17754)**
- ✔ Reset attributes when initializing assignment with ICA: If there is no result of 'Assignment with ICA' procedure in the network, nevertheless the link attribute 'Approach capacity for assignment with ICA' was not set to default values. This bug has been fixed. **(17714)** 

## PuT Assignment

- ✔ Skim matrix calculation after renaming a transport system: A crash no longer occurs when calculating a PuT skim matrix if you used a skim with subattribute transport system (e.g. In-vehicle time TSys or In-vehicle distance TSys) and renamed the transport system after setting the parameters. **(17554)**



## PuT Passenger Survey

- ✔ Stay on board in case of blocked walk links at stop areas: If two path legs existed in multiline survey data format between which a stay on board was possible (i.e. the transition turned into a passenger trip chain) and the transition time at the respective stop area was 24h (i.e. the transition was blocked), the total path received the status 'Unplausible: Required walk link not found', even though the transition at the stop area was not used because of the onward journey. This error has been fixed. (17721)

## Schematic Line Diagram

- ✔ Edit course in connection with shortened vehicle journeys containing several vehicle journey sections: No more crash when editing the course of a line route, if one of its time profiles contains a shortened vehicle journey that has two vehicle journey sections and that is currently depicted in a schematic line diagram. (17710)

## Timetable Editor

- ✔ Changing the status of an item in the line or line block selection tree via the space key: If you pressed the space key while an item in the line selection tree was marked (both in the 'Base line selection' dialog and the tool window 'Timetable lines'), the tick in the box was removed, yet the actual line selection did not change. Above all, the change did not affect subordinate elements. The same applied to the tool window. The error has been fixed. (17686)
- ✔ Restoring a tabular timetable with switched-off symbols: A crash no longer occurs when restoring a tabular timetable from a version file if all symbols are switched off in the graphic parameters of this tabular timetable. (17742)
- ✔ Sorting in tabular timetable: Running the procedure no longer leads to a crash if the vehicle journeys in the tabular timetable were previously sorted. (17709)

## Visum Files

- ✔ Empty values in user-defined attributes: If you read in version files saved with Visum 16 or earlier, which included user-defined attributes of a type that does not allow empty values (e.g. text of file), empty values contained in the file were set to the default value. If this default value was not the empty string, the behavior changed, because so far, empty values of these types were implicitly interpreted as empty strings. Now, empty values of such types found in the version file are always turned into empty strings, independently of the default value set for the user-defined attribute. (17715)

## ❗ Breaking Changes

## PrT Assignment

- ❗ Reset attributes when initializing assignment with ICA: If there is no result of 'Assignment with ICA' procedure in the network, nevertheless the link attribute 'Approach capacity for assignment with ICA' was not set to default values. This bug has been fixed. This affects the result of an assignment with ICA using the option 'Use current assignment result as initial solution', if a former assignment with ICA has been initialized. (17714 ✔)

17.00-01 [122203]

2017-07-11

## + New Features and Changes

### COM-API

- + Loading and saving global layouts: You can use new methods at IWorkbench and IVisum to load or save global layout files. (17469)

### Data Model

- + Relation from PuT transfers to stops and stop points: A new relation has been added from the object PuT transfers (visible in the 'Passenger transfers stops / time profiles' list) to the From- and To-stop as well as to the From- and To-stop point. (17644)

### Main Window

- + 'Edit' menu always the same: The 'Edit' menu of the main window of PTV Visum now always offers access to the available functions of all network object types, independently of the network object type currently selected for editing. (17120)

- + Drop-down list for global layouts: The toolbar of the main window provides a drop-down list that enables users to load existing global layout files from the current project directory and to save the current layout as global layout file, analogous to the existing drop-down lists, e.g. for graphic parameter files and filter files. **(17468)**

## PuT Assignment

- + Output attributes for Sharing at PuT paths and OD pairs: At PuT paths, new attributes are provided, which output the total of the egress penalties and access penalties of all Sharing path legs. These attributes and Sharing travel time and Sharing distance were also added at OD pairs. **(16761 🚫)**

## Visum Files

- + Specific list settings in global layout: In the global layout file, specific list settings are now also saved. They go beyond the general specifications (such as column selection, aggregation, and analysis rows), i.e. in case of some lists, individual filters and further options will be saved. **(17617)**

## ✔ Fixed Bugs

### Data Model

- ✔ Delete transport system when there are time-varying attributes: If an attribute of type 'transport system set' is marked as being time-varying and if there are concrete time-varying values for this attribute, then deleting a transport system damages the data model in a way that no version file can be saved any more. This bug has been fixed. **(17577)**

### Dialogs

- ✔ Access to Graphic parameters dialog via 'Network' tool window: If you opened the Graphic parameters dialog via a shortcut menu entry in the shortcut menu of the network objects of the 'Network' tool window, in most cases, the Graphic parameters dialog did not open at the corresponding page but at any other page. This error has been fixed. **(17620)**
- ✔ Crash in 'Alias' dialog: Selecting a network object type in the 'Alias' dialog no longer causes a crash. **(17683)**
- ✔ Crash in graphic parameters dialog for lane allocations: A crash no longer occurs when opening page 'Lane allocation > Display' in the graphic parameters dialog of the network editor. **(17676)**
- ✔ Cross-section logic for user-defined attributes: If you changed the cross-section logic for one of the network object types occurring in pairs (such as links and connectors) in the 'Edit user-defined attribute' dialog, the changed value was not saved. This error has been fixed. **(17585)**
- ✔ Editing a sharing station deletes results of assignment: If you closed the 'Edit sharing station' with OK, an existing PuT assignment result would be deleted even if no changes were made in the dialog. This error has been fixed. **(17567)**
- ✔ Editing the name of a line route from Timetable lines: If you called the Edit dialog for a line route from the line selection of tool window 'Timetable lines' and changed the name of the line route first, subsequently clicking the 'Edit course' button closed the dialog but did not lead to the display of the dialog to edit the course. This error has been fixed. **(17550)**

### Graphics

- ✔ Overlapping labels of line bars: The labels of line bars were all drawn at the same position, so that they overlapped. This error has been fixed. **(17637)**

### Lists

- ✔ Path lists with origin zone filter: If you saved a version file with an open path list for which an origin zone filter has been set, this filter was not restored correctly when reading in the version file and restoring the list view, i.e. it was displayed on the button but had no effect on the contents of the list. This error has been fixed. **(17630)**

### Main Window

- ✔ Window title of the schematic line diagram: The window title of the schematic line diagram was displayed incorrectly when restoring the schematic line diagram during a version file import, yet was updated during later actions. This error has been fixed. **(17623)**

### Network Editor

- ✔ Editing surfaces in case of very large surfaces with shared points and edges: Moving a polygon point of a surface also used to be very slow if the surface shared a polygon point or an entire edge with a different very large surface but not the moved point or edge on which it was located. This error has been fixed. **(17579)**

- ✔ No progress when renumbering zones: When renumbering zones in a way that the order of zones is changed in a network containing several matrices, there was no progress information, although the action taking a while to complete. As a consequence the PTV Visum application seemed to have crashed. This error has been fixed. **(17692)**

## PuT Operating Indicators

- ✔ OD pair filter in transport performance per territory: When calculating the transport performance for territories in the context of the 'PuT Operating Indicators' procedure, the OD pair filter had no effect on the indicator 'PTripUnlinked'. If indicators were calculated additionally for analysis time intervals, the OD pair filter had no effect on passenger kilometers, passenger hours, and variations thereof either. This error has been fixed. **(17059)**

## Timetable Editor

- ✔ Tabular timetable too slow: The tabular timetable responded too slowly to changes of the line selection. This error has been fixed. **(17688)**

## Visum Files

- ✔ Image section of graphical timetable and global layout: The image section of the graphical timetable was not restored when reading in a global layout file. **(17654)**
- ✔ Reading attribute files deletes ticket types: Reading an attribute file containing attributes of lines (or pasting data into the 'lines' list) deleted certain ticket types. This bug has been fixed. **(17655)**
- ✔ Version files with a cycle time smaller than the green time start/end: You could edit the data of stage-based signal controls in such a way that the cycle time of the SC was smaller than the green time start or the green time end of a stage. Version files could be saved in this condition, but not be read in again. This error has been fixed. **(17586)**

## ❗ Breaking Changes

### PuT Assignment

- ❗ Output attributes for Sharing at PuT paths and OD pairs: At PuT paths, new attributes are provided, which output the total of the egress penalties and access penalties of all Sharing path legs. These attributes and Sharing travel time and Sharing distance were also added at OD pairs. **(16761** [+](#))

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## + New Features and Changes

### ANM

- + New attribute ANM node number: The attribute shows the node number that is used in ANM for a node and main node, respectively, and that is used as a reference for the ANM import in Vissim. **(17355)**

### Add-Ins

- + General Transit Feed Import: If the date filter is active for the import, the dialog is set per default to the first entry of the calendar.txt file. **(16534)**
- + General Transit Feed Import: In addition to the traffic system defined in the standard, a mode 'PuT' and a demand segment 'PuT' are also created and linked during the import. **(16533)**
- + OD- Import: The Add-In 'OD- Import' reads csv files and import OD based datasets. The given data will be summarized in demand and skim matrices and is immediately available within PTV Visum. **(16390)**

### COM-API

- + Aggregating Zones or Territories: Zones and Territories can be aggregated by any given attribute. The COM Interface is extended by the method 'AggregateSurfacesByAttribute' at IZones and ITerritories. **(16604)**
- + Create connectors: Under INet a new method for creating connectors for multiple OD pairs ('CreateODConnectors') is offered. **(14957)**
- + Deprecated methods for matrices removed: The methods AddODMatrix, AddSkimMatrix, RemoveODMatrix, RemoveSkimMatrix were marked as deprecated in Visum 16 and are removed now. **(15724** [❗](#))
- + Extensions to COM for multimodal applications: COM access is available to lists of objects for multimodal applications, to graphic parameters and to the definition of skim matrices for path sequences. **(17304)**

- ⊕ Filename of the version file: The full filename of the currently loaded version file can now be determined through the new readonly property `Visum.IO.CurrentVersionFile`. This information was so far accessible through `Visum.UserPreferences.Document` name. This property will be preserved parallel to the new one. **(16809)**
- ⊕ Filtering objects by expression: A new generic property `FilteredBy(<formula>)` available on all container objects returns a subset of the container containing all objects for which the passed formula (string value, same syntax and semantics as in the formula editor for user-defined attributes) results in true (if bool) or non-zero (if numerical). **(17291)**
- ⊕ In VBA, the command "Option base 1" (to use 1-based Arrays) works now correctly for the methods `GetMultipleAttributes`, `SetMultipleAttributes` and `SetMultiAttValues`. (The command still doesn't affect `GetMultiAttValues` - here, the Array is always 0-based.) **(16674 🚫)**
- ⊕ New Identifiers for procedure and commands: The procedure 'Demand matrix correction (TFlowFuzzy)' is renamed to 'Demand matrix correction'. The COM class 'ITFlowFuzzyPara' is renamed in 'IDemandMatrixCorrectionPara'. This also includes their derivations. The method 'TFlowFuzzyParameters' co-exists with the new method 'IDemandMatrixCorrectionPara', but is marked as deprecated and won't be available in the next releases. **(17227 🚫)**
- ⊕ New option when reading general procedure settings: A new option 'Reset general procedure settings prior to reading' is available when reading general procedure settings. If this option is active, values are set to their defaults prior reading. For reading the general procedure parameters with the new parameter a new COM method 'OpenXmlWithOptions' has been added. **(17141 🚫)**
- ⊕ Specification of column layout for saving various file types: Various functions used for exporting data from Visum to external files now allow to configure the tables and columns exported directly through the COM-interface instead of requiring to use layout files. This facilitates e.g. to include project-specific POI-categories or UDAs in the exports. The functionality is exposed through new methods such as `Visum.IO.SaveNetUsingLayout`, `Visum.IO.SaveDemandFileUsingLayout`, `Visum.IO.SaveAccessDatabaseUsingLayout`, `Visum.IOSaveToMsSqlServerDatabaseUsingLayout` and similar functions for version comparisons. All these methods require to pass a `ITableAttrSelection`-object which describes the table and column layout. Create a new empty object through `Visum.IO.CreateTableAttrSelection` and then use its methods to configure the layout. **(17220)**
- ⊕ Update of the Python libraries: The Python libraries installed with PTV Visum in Folder `PythonModules` were updated to the most recent compatible versions. The new versions are
  - omx
  - dateutil 2.6.0
  - matplotlib 1.5.3
  - yparsing 2.2.0
  - numexpr 2.6.2
  - numpy 1.12.0
  - osgeo
  - pyproj 1.9.5.1
  - pytz 2016.10
  - tables 3.3.0
  - pandas 0.19.2
  - wyPython 2.9
 Custom scripts should be checked for compatibility with these versions. **(16220)**

## Data Model

- ⊕ Attribute 'File extension' for skims: The attribute 'File extension' for skim matrices has been renamed in 'Code'. **(17071)**
- ⊕ Extension for multimodal application: The Visum data model has been extended for multimodal applications. Consequently new objects are available such as path sequence sets, path sequences, path sequence items and path sequence activities. These objects are accessible via corresponding lists. Synchronization and graphic parameters have been extended too. **(16343)**
- ⊕ Operating periods: When using the annual calendar, it is possible to enter an operating period. This period divides the calendar in individual time periods (e.g. school holidays, summer, winter,...) Now, not only valid days (e.g. weekdays), but also operating periods can be specified for vehicle journey sections. This allows a massive reduction in valid days. Additional functionality provides the conversion of existing valid days in introduced operating periods. **(16416)**
- ⊕ Serving Vehicle Journeys: At stop points, a new relation to serving vehicle journeys is established. Serving vehicle journeys are defined as journeys, which allows boarding or alighting at the stop point. With this relation it is easy to calculate the number of active journeys at one stop point. **(16448)**
- ⊕ User defined Attributes: For non-persistent network objects formula-based user defined attributes can be created. Non-persistent network objects a for instance PrT paths, PuT path legs, path sequences, connecting journeys or OD pairs. Because this objects not always exists, only the formula definition of the user defined attribute is stored. **(17297)**
- ⊕ User-defined Attributes: When creating a number- or bool based user defined attribute, it's possible to allow or prohibit the usage of empty values. **(16597)**

- + Line blocking: The Attributes 'ScheduledBlockAndBlockingDay' and 'ScheduledBlocksAndBlockingDaysWithinBlockingPeriod' combines the Attributes BlockNumber and BlockingDay. This enables the identification of a single vehicle without usage of user defined attributes. **(17292)**
- + Network check: If a vehicle journey section is shortened or deleted, that journey items are no longer covered by a journey section, the network check 'vehicle journey items without vehicle journey sections' will find those and correct them if necessary. **(16615)**
- + Qualification of values of time-restricted attributes: The individual values of time-restricted values can now be qualified by two additional properties 'Name' and 'AddVal'. Thereby the meaning of the values can be documented. **(16939)**

## Demand Procedures

- + Calculation of demand matrices from path sequences: A new procedure has been implemented for the calculation of demand matrices from path sequences. **(16980)**
- + Optional output of P+R paths as path sequences: The result of the procedure P+R lot choice can optionally be saved as path sequences by demand strata and direction. Once the results are stored in a path sequence set the entire paths can be visualized. **(16984)**
- + Distribution of doubly-constrained across demand strata: In the tour-based demand model, for the doubly-constrained calculation, multiple demand strata (e.g. different person groups with the same trip purpose) can compete for the same attraction and exhaust them collectively. Consequently, the distribution of the attraction potential in a zone is a result of the calculation and not anymore implicitly given. The option 'Couple DStrata together' can be set in the demand model Tab 'Activities'. **(12715)**

## Dialogs

- + Couple / Separate vehicle journey: The identifiers for the vehicle journeys, which will be coupled / separated now contains the name instead of the number. This will simplify the reference. **(16447)**
- + Demand data: The order of the tabs are changed in the dialog 'OD demand data'. It now starts and open with the tab 'demand segments'. **(16492)**
- + Dialog network settings: The dialog network setting have been reorganized and the numbers of tabs is reduced. The clarity has been improved. **(13694)**
- + Display of main activity for rubberbanding: A new column 'Activity chain with main activity' is displayed in the procedure dialog for the Tour-based model - Combined trip distribution/mode, Tab 'Rubberbanding'. The cells are colored if the main activity is not defined for the activity chain. **(17397)**
- + Edit / Create Link: Modifications via the dialog 'Create Link' or 'Edit Link' can be automatically applied to the opposite direction. Only edited attributes will be modified on the opposite direction. **(16714)**
- + Edit flow bundle term: In the dialog 'Edit flow bundle term' on the register 'supply' the buttons 'select all', 'select active ones', 'reset selection' and 'invert selection' provides an easy way to adapt the considered supply. **(16618)**
- + Edit line routes: The marking in the dialog u';'Edit Line routes' has been improved. In addition it displays the sum of the marked run times and length. **(16161)**
- + Edit surfaces: The functionality for editing surfaces has been removed from the 'Network settings' dialog. The corresponding entries for editing surfaces can now be found under Menu 'Edit'. **(13695)**
- + Fuzzy surface alignment: The dialog 'Fuzzy surface alignment' contains to additional options to normalize surfaces and merge all points with identical co-ordinates after execution. Both functionalities are not part of the step 'fuzzy alignment'. **(17138)**
- + Graphic parameter dialog of the 3D network view: In order to improve the understanding of the settings, some identifiers were renamed. In addition, it is possible to transfer the settings of classes between classified display and the height bands in the prism display. **(16932)**

## Graphical Procedures

- + Flow Bundle Analysis: It's possible to duplicate marked terms in the flow bundle definition. In addition, multi selected terms can be deleted in one step. **(16451)**
- + Flow Bundle: Multiple new stop and stop point attributes are available to assess the flow bundle calculation. 'Passengers boarding (- at origin) flow bundle', 'Passengers alighting (-at destination) flow bundle', 'Passengers transferring total flow bundle' and 'Passengers transferring direct flow bundle' base their calculation on the current flow bundle. **(16594)**
- + PrT- Isochrones: It can be selected whether the selected network objects are origins or destination of the IV isochronous calculation. If the new option 'reference objects are destinations' is selected, the isochrones specifies the locations from which the network object can be reached at the same time. **(10592)**
- + PuT- Flow Bundles: The calculation of PuT u'-'; Flow Bundles have been accelerated. **(17467)**

## Graphics

- + Information signs: Information signs are displayed in the 3D network view. These signs depicts user defined text or attributes of the attached network objects. Storyboard actions can dynamically show or hide information signs. **(15898)**
- + Legend: The parameters for displaying the legend are now directly editable within the network editor. For instance, Headings, Font sizes as well as margins and spacing can be interactively adapted. **(16595)**
- + Line bars: If some line bars can't be depicted, cause their width is less a pixel, a substitute bar can display the sum of all bars, not depicted and thus guarantee, that the total width is correct. **(16450)**
- + Link bars: Graphic parameters for link bars and link bar labels are accessible directly from the network editor. Hovering with the cursor above a bar highlights it and after a short delay, a button appears which grants access to the graphic parameters for the highlighted element. **(16596)**
- + Point objects: Drawing of point objects (e.g. nodes or stop points) can be turned on or off independently from drawing tables or charts. If the drawing option is selected in the dialog 'table' or 'diagram', this is activated in the 'Display' dialog if it was previously deactivated **(16616)**

## I/O Interfaces

- + Routing parameters in railML import: The import from railML now offers the same options for the routing of items through the existing network as in network reading etc. **(16449)**
- + railML-Export: The infrastructure export now takes different modes for link selection into account: Export all links; export all links needed for active vehicle journey sections; export all links, needed for active vehicle journey sections and active links additionally. **(17171)**
- + railML-Export: The railML- Export supports the makrosopic representation of the infrastructure in railML 2.2. **(16693)**
- + railML-Import: The railML-Import is able to import line blocks. In this case, the import expects datasets including line blocks as well as vehicle journeys. **(4868)**
- + Import of ferries from OpenStreetMap: The OSM import now also imports ferry connections into Visum networks. **(16543)**

## Installation

- + CodeMeter Runtime: The CodeMeter Runtime is updated to the most recent version 6.50a. **(17574)**
- + Support for Windows Vista ends: PTV Visum 17 officially does not support Windows Vista anymore. **(17393)**

## Junction Editor

- + Vissim-Preview: The Vissim-Previewer is now based on PTV Vissim 10. **(17405)**

## Lists

- + New aggregation functions: New aggregation functions are available: 'First' / 'FirstActive' returns the first element of a concatenation. 'Last' / 'LastActive' returns the last element. The function works within grouped lists as well as for indirect attributes. **(16501)**
- + Path lists: The search for paths in path lists is improved. The entry of the origin zone in the search dialog is synchronized with the origin zone filter of the list. The lists PrT Path, PrT path on link level, PuT OD pairs, PuT paths and PuT path legs are benefit from this. **(16453)**
- + Selection in Combo- Boxes: It's possible to select an element within a combo box using the keyboard. The according element is marked after the swift entry of the first characters. **(16593)**

## Main Window

- + Help Menu: In the help menu two new entries appears. 'Introduction to the Visum COM-API' u'-'; This document gives a quick start in using the COM Interface. 'Open documents directory' u'-'; This links to helpful documents, like an overview document or release notes, which comes with every installation. **(17115)**
- + Menu bar: In the menu bar item 'Edit' the entry 'Matrices' gives access to insert and edit matrices. It also insert, create and open external matrices. **(11828)**
- + Menu bar: The entry 'Print' and 'Export graphic' is always located in the menu bar item 'File'. It refers to the current active window and is named accordingly. **(12175)**
- + Menu bar: The items set window section, zoom, previous window section, display entire network are now always visible in the menu 'View' and greyed out if not available. The functionality next section, refresh, set section to print area, measure distance mode, move window section mode, as well as the column chart functionality are exclusively available in the toolbars. **(17064)**

- + Menu bar: The items to open the views procedure sequence, 3-D network view, Timetable ( tabular, graphical, both) line block editor, schematic line diagram, transfer display of regular services, signal time-space diagram have been moved from the menu 'Edit' to 'View'. Additional items to open the matrix editor, matrix histogram and matrix comparison have been created und replace the item matrix editor in the menu 'Edit' **(16908)**
- + Messages and warnings: The handling and output of messages and warnings has been revised. The messages are now grouped by their source (e.g. procedures, file import) in the message window, and only the relevant messages from the last action are displayed. All other outputs are still listed chronologically in the log files. Where possible, multiple message dialogs shown during a single action have been replaced by a single link to the message window displayed at the end of the action. **(15720)**
- + New file for global layout of a model: It is now possible to save the global aspects of a model in a new file type called global layout and transfer them to another version file. This global layout file contains window positions, filter settings as well as graphic parameters and layouts of all open windows in a version file. **(10104)**
- + Notification about new Service Packs: With the program start, it is checked whether a newer program version is available. If this is the case, a notification appears in the main window and on the start page. This provides direct access to the download area. This functionality is only available with internet access. **(17563)**

## Matrix Editor

- + Copy to Clipboard: It's now possible to copy the data to the clipboard even if multiple matrices are depicted in the editor. **(9771)**
- + External matrices: Searching for identifiers is enabled also in external matrices. **(16455)**
- + Multidimensional evaluation in matrix histogram: When creating a matrix histogram it is possible to add multiple classification matrices (e.g. journey time and number of transfers). In the graphical display one can change between the corresponding displays. In the list display of the histogram there is an additional list that contains all possible combinations of classes and the corresponding evaluations. **(16454)**

## Matrix Estimation

- + Calculation of flow matrix: The calculation of the flow matrix has accelerated considerably. The flow matrix serves as the basis for matrix estimation. **(16769)**
- + Method of least squares: For the procedure 'Demand matrix correction' an alternative solution algorithm has been implemented. It is the method of least squares which in contrast to TFlowFuzzy always produces a solution. **(6725)**
- + New Identifiers for procedure and commands: The procedure 'Demand matrix correction (TFlowFuzzy)' is renamed to 'Demand matrix correction'. The COM class 'ITFlowFuzzyPara' is renamed in 'IDemandMatrixCorrectionPara'. This also includes their derivations. The method 'TFlowFuzzyParameters' co-exists with the new method 'IDemandMatrixCorrectionPara', but is marked as deprecated and won't be available in the next releases. **(17227 ⚠)**

## Miscellaneous

- + Transfer display of regular services: The synchronization of the transfer display has been improved. The selection of the service groups now marks the according vehicle journey elements and not the vehicle journeys anymore. **(15748)**
- + Transfer display of regular services: The transfer display of regular services has been improved by multiple enhancements. Among other things it's now possible to unify the scaling of bars across multiple layers; new attributes for labelling the service groups are available; through passenger edges and a new transfer display mode as well as the functionality to switch to the next time interval has been introduced. **(16599)**
- + User preferences: The option 'Use AP as preset analysis time slot for attribute selection' is now activated by default after installing the application. **(16928)**

## Network Comparisons

- + Load comparison networks: Only the comparison networks of the current version files are loaded, but not their comparison networks. This prevents circular references and shortens loading times. **(16273 ⚠)**

## Network Editor

- + Aggregate line routes and time profiles: The conditions for aggregating line routes and time profiles have been extended by considering any given attribute. PuT Supply with the identic attribute values is summarized to a selected higher level. **(16457)**
- + Aggregating Zones or Territories: Zones and Territories can be aggregated by any given attribute. The COM Interface is extended by the method 'AggregateSurfacesByAttribute' at IZones and ITerritories. **(16604)**
- + Allocation of POIs to network objects: The user interface for managing allocations of POIs to other network objects has been refurbished. The network objects are now selected using the standard search dialog with many search and filter functions. Furthermore, POIs can now also be allocated to zones. **(11504)**

## Other Procedures

- + Blocking back: Iterations at the start of blocking back are calculated together as long as the limiting capacities are not reached. **(17004 🚫)**
- + Special function for creating lane turns: The Special function 'Create missing lane turns' generates lane turns for two-leg nodes in such a way that for each incoming lane at least one outgoing lane turn exists and each outgoing lane has at least one incoming lane turn. This is recommended for networks where SBA is used. **(17440)**
- + Multimodal assignment: A new assignment procedure has been implemented. The assigned demand can use several different modes for the entire paths. **(16342)**

## PUT Operational Indicators

- + Number of vehicle journey section journeys: For links, line route items and vehicle journey items a new calculated attribute Number of section service trips is available, which contains the number of vehicle journey sections using an object. This facilitates to evaluate multiple unit tractions. **(16614)**

## PrT Assignment

- + BFW in Assignment with ICA: The newly implemented PrT assignment procedure Bi-conjugate Frank Wolfe (BFW) is available as subordinate assignment procedure within Assignment with ICA. **(16740)**
- + Control type 'unknown' in SBA: In SBA crossing now conflicts at nodes of control type 'unknown' are neglected. **(17437 🚫)**
- + Modeling different speed limits in SBA: For certain link types, e.g. freeways, the effect of different speed limits of transport systems can be approximated using the option 'Use only outermost lane' for the corresponding transport systems. **(17042)**
- + Multimodal assignment: A new assignment procedure has been implemented. The assigned demand can use several different modes for the entire paths. **(16342)**
- + New PrT assignment BFW: The new PrT assignment procedure Bi-conjugate Frank Wolfe (BFW) has been implemented. **(16463)**
- + Warmstart for SBA: For the simulation-based assignment (SBA) it is possible to use an existing assignment result as initial solution for a new simulation-based assignment. **(17041)**

## PrT Assignment, PuT Assignment

- + Calculation of skim matrices for path sequences: A new procedure has been implemented for the calculation of skim matrices from path sequences. **(16983)**

## Procedure Sequence

- + New group 'Multimodal' for procedures: A new group 'Multimodal' has been added In the dialog for the selection of procedures. In this group all procedures making use of path sequences can be found. Also P+R procedures have been moved to this group. **(17140)**
- + New option when reading general procedure settings: A new option 'Reset general procedure settings prior to reading' is available when reading general procedure settings. If this option is active, values are set to their defaults prior reading. For reading the general procedure parameters with the new parameter a new COM method 'OpenXmlWithOptions' has been added. **(17141 🚫)**
- + Skim matrices for path sequences: In the General procedure settings a new entry for the definition of skim matrices for path sequences has been added. Skim matrices for path sequences can be defined. It is also determined e.g. which skim matrices of subordinate demand segments are considered in the calculation. **(16976)**

## PuT Assignment

- + Fare calculation: The fare calculation has been further accelerated. The attribute 'Number of fare zones' returns a blank value if the fare structure of the used ticket type is not a zone-based fare. **(16402 🚫)**
- + Multimodal assignment: A new assignment procedure has been implemented. The assigned demand can use several different modes for the entire paths. **(16342)**
- + PuT relations analysis: The PuT relations analysis is introduced as a procedure. It derives demand and skim stop area matrices based on the active PuT supply. **(8678)**
- + PuT- Aux: The route search in big networks, which contains links that are open for PuT- Aux have been accelerated. **(17347)**
- + Runtime timetable- based Assignment: The timetable- based Assignment have been accelerated, if tariff systems with multiple demand segments were used. **(17184)**
- + capacity restricted time table based PuT assignment: The convergence of the procedure is now based on shifts in connection volumes. That applies to smoothing and the terminations condition. The smoothing method is limited to MSA. It is mandatory to merge the results of the first and second connection search. **(16695 🚫)**




- + filter PuT network volumes: The calculation of the filtered PuT network volumes has been accelerated. **(17403)**

## PuT Line Blocking

- + Line Block Editor: The line block editor can be synchronized by the marking of vehicle journey items in other windows like the tabular or graphical timetable editor. **(17335)**

## PuT Operating Indicators

- + Distribution of values proportional to capacity: Different options are now available for the distribution of person kilometers/hours to vehicle journey sections when vehicle combinations are used. It can be chosen between
  - equal distribution (as before)
  - weighted by seat capacity
  - weighted by total capacity **(16446)**
- + Number of Service Trips: The indicator 'Number of Service Trips', 'Service kilometers' and 'Service time' considers multiple passages of the same vehicle journey. If one journey pass the same link, turn or main turn multiple times, it will also be counted multiple times. **(12421)** 
- + PuT Operating Indicators only for active territories: The PuT Operating Indicators optional consider only the active territories. Indicators of passive territories will be set to '0'. **(16452)**

## Safety

- + Error messages during data import: The error messages during the import of accident data from CSV with empty column headers have been improved. **(16970)**
- + Generation of Accident Prediction Models: A new Add-In allows to estimates parameters for log-linear Accident Prediction Models (APM). Segmentizing variables can be used to generate model variants for all combinations of values. **(16171)**

## Scenario Management

- + Duplicate of elements: While duplicating scenarios, modifications, procedure parameter set and comparison patterns the entry in code is appended by '-Copy'. **(17076)**



## Schematic Line Diagram

- + Passenger trip chains: The schematic line diagram is able to display passenger trip chains as well as forced chainings. **(16437)**
- + Text: It is now possible to display user defined texts within the schematic line diagram. **(11443)**

## Timetable Editor

- + Adjustable time range for relevant connections: The time range, which defines relevant connections for a vehicle journey item is now adjustable via the network settings. **(16680)**
- + Connecting Journeys: Connecting Journeys connects two vehicle journey items and are represented by logical network objects. This allows depicting reached and missed connecting journeys in lists and including them into synchronisation. **(16465)**
- + Selection in Combo- Boxes: It's possible to select an element within a combo box using the keyboard. The according element is marked after the swift entry of the first characters. **(16593)**
- + Tabular timetable: The attributes time profile and line route are editable via a drop down selection direct in the tabular timetable. **(14888)**

## Visum Files

- + Accelerated reading and writing of version files: The reading and writing of version files, especially with many demand strata, has been accelerated **(17263)**
- + Import of path sequences: Path sequences can be imported into a Visum model from external sources. The format corresponds to an attribute file of path sequence items in which certain columns are mandatory. **(16986)**
- + List layouts: List layouts (\*.lla), that have been created with Visum 10.2 or less can no longer be loaded. This layout files have to be imported in Visum 16 or less and can be saved again to preserve their content. **(14724)** 
- + Matrices: Loading and saving of matrices has been accelerated by using a faster method of compression. **(16737)**
- + New option when reading general procedure settings: A new option 'Reset general procedure settings prior to reading' is available when reading general procedure settings. If this option is active, values are set to their defaults prior reading. For reading the general procedure parameters with the new parameter a new COM method 'OpenXmlWithOptions' has been added. **(17141)** 

- ⊕ Skim matrices for path sequences: In the General procedure settings a new entry for the definition of skim matrices for path sequences has been added. Skim matrices for path sequences can be defined. It is also determined e.g. which skim matrices of subordinate demand segments are considered in the calculation. **(16976)**

## ❗ Breaking Changes

### COM-API

- ❗ Deprecated methods for matrices removed: The methods AddODMatrix, AddSkimMatrix, RemoveODMatrix, RemoveSkimMatrix were marked as deprecated in Visum 16 and are removed now. **(15724 ⊕)**
- ❗ Final removal of deprecated methods: Some methods which have been flagged as 'obsolete' if former releases have been removed definitely. Scripts using these methods must be adapted.
  - 
  - IVISEMDGroupModeModeChoicePara.NumItems
  - IVISEMDGroupModeModeChoicePara.ItemByKey
  - IVISEMDGroupModeModeChoicePara.AddItem
  - IVISEMDGroupModeModeChoicePara.RemoveItem **(17161)**
- ❗ In VBA, the command "Option base 1" (to use 1-based Arrays) works now correctly for the methods GetMultipleAttributes, SetMultipleAttributes and SetMultiAttValues. (The command still doesn't affect GetMultiAttValues - here, the Array is always 0-based.) **(16674 ⊕)**
- ❗ Removal of deprecated methods: Some deprecated methods were finally removed from the COM-interface. These are:
  - Visum.Net.ODMatrices, Visum.Net.SkimMatrices, Visum.Net.AddSOdMatrix, Visum.Net.AddSkimMatrix, Visum.Net.RemoveOdMatrix, Visum.Net.RemoveSkimMatrix
  - Visum.CreateMatrixTable, Visum.CreateMatrixTableListMode und - Visum.CreateMatrixHistogram (--> Visum.Workbench)
  - Visum.WriteToTrace, Visum.WriteToError
  - Visum.WriteToMessageFile, Visum.WriteToLogFile
  - Flowbundle.Save

Please adapt scripts using these methods. **(16272)**

### Matrix Estimation

- ❗ New Identifiers for procedure and commands: The procedure 'Demand matrix correction (TFlowFuzzy)' is renamed to 'Demand matrix correction'. The COM class 'ITFlowFuzzyPara' is renamed in 'IDemandMatrixCorrectionPara'. This also includes their derivations. The method 'TFlowFuzzyParameters' co-exists with the new method 'IDemandMatrixCorrectionPara', but is marked as deprecated and won't be available in the next releases. Users have to adjust their scripts until the next major release accordingly. **(17227 ⊕)**

### Network Comparisons

- ❗ Load comparison networks: Only the comparison networks of the current version files are loaded, but not their comparison networks. This prevents circular references and shortens loading times. Comparison networks of comparison networks are not loaded anymore. **(16273 ⊕)**

### Other Procedures

- ❗ Blocking back: Iterations at the start of blocking back are calculated together as long as the limiting capacities are not reached. These changes in the calculation can result in slightly different results of the blocking back calculation. **(17004 ⊕)**

### PrT Assignment

- ❗ Assignment with ICA: Numerical problems could result in negative averaged volumes. This bug has been fixed. Consequently, assignment results can change. **(17421)**
- ❗ Control type 'unknown' in SBA: In SBA now crossing conflicts at nodes of control type 'unknown' are neglected. This changes the results of SBA. **(17437 ⊕)**
- ❗ Determination of ranks for major flows with turn types 1 and 3: The determination of ranks for two-way stop nodes where the turn types of the major flow directions are 1 and 3, respectively, takes the existence of other legs next to the major flow approaches into account. This changes ranks, and consequently, also the conflicts between turn movements can change. This leads to changes of the ICA calculation. Also, the results of an Assignment with ICA and of the simulation-based assignment (SBA) can change. **(15516)**

- ❗ ICA calculation for roundabouts: The leg attribute 'ICA Share of bypass volume' has been evaluated also for roundabouts without bypass. This error has been fixed. As a consequence, the ICA calculation results can change as well as the results of Assignment with ICA. **(17283)**
- ❗ Initial saturation flow rate for Assignment with ICA: The parameter for the initial saturation flow rate in Assignment with ICA has been ignored so far, instead a value of 1800 was used. This error has been fixed. When reading version files of previous release versions a value of 1800 is set, because calculations are based on this value. **(16822)**
- ❗ Pocket lanes of different length: The simulation-based assignment (SBA) takes now also pocket lanes into account where the nearer to the origin lane defined pocket is shorter than the one further away. So far, the length of the nearer to the origin lane defined pocket lane has been adjusted. This error has been fixed. Consequently, SBA assignment results can change. **(16561)**
- ❗ Share of Bypass volume: The turn volume share which does not use a bypass, but the roundabout has been neglected for the calculation of conflict volumes. This error has been fixed. Consequently, the ICA calculation of roundabouts for which a bypass is defined can change. **(17364)**

## Procedure Sequence

- ❗ New option when reading general procedure settings: A new option 'Reset general procedure settings prior to reading' is available when reading general procedure settings. If this option is active, values are set to their defaults prior reading. For reading the general procedure parameters with the new parameter a new COM method 'OpenXmlWithOptions' has been added. The default behaviour when reading can change. So far, the general procedure settings were reset when the procedure sequence and the procedure settings were read together and the procedure sequence replaced. **(17141 +)**

## PuT Assignment

- ❗ Connections influencing preselection in capacity-restrained assignment: The evaluation of connections in the preselection of the second search in capacity restrained assignment is now restricted to only such connections which are only found in this second search. Connections also found in the first search are now longer considered when calculating indicators. This can lead to the selection of different connections and thereby to different assignment results. **(16775)**
- ❗ Dominance in Headway- based Assignment: If multiple different 'PuT Aux' - Transport Systems are used and connections exists, which only differ by the usage of these PuT Aux- TSys on the same path leg, the path is dominated by the other one and has been deleted. This error has been fixed. This will lead to different path sets as well as different assignment results in these rare occasions. **(17193)**
- ❗ Fare calculation: The fare calculation has been further accelerated. There might be minimal numeric deviations to previous results. The attribute 'Number of fare zones' returns a blank value if the fare structure of the used ticket type is not a zone-based fare. So far, a '0' has been output. **(16402 +)**
- ❗ capacity restricted time table based PuT assignment: The convergence of the procedure is now based on shifts in connection volumes. That applies to smoothing and the terminations condition. The smoothing method is limited to MSA. It is mandatory to merge the results of the first and second connection search. This changes lead to differing connection sets and volumes for user of the capacity restricted time table based PuT assignment **(16695 +)**

## PuT Operating Indicators

- ❗ Number of Service Trips: The indicator 'Number of Service Trips', 'Service kilometers' and 'Service time' considers multiple passings of the same vehicle journey. If one journey pass the same link, turn or main turn multiple times, it will also be counted multiple times. In former PTV Visum versions one journey was counted just once. **(12421 +)**

## Visum Files

- ❗ List layouts: List layouts (\*.lla), that have been created with Visum 10.2 or less can no longer be loaded. This layout files have to be imported in Visum 16 or less and can be saved again to preserve their content. **(14724 +)**

## COM-API

- ❗ Global variables in internally executed Python scripts: Global variables created by Python scripts executed from within Visum (e.g. procedures) used to be preserved beyond the execution of the actual script. Thus, they could still be evaluated in successive calls. This behaviour was changed, all variables and their contents are now deleted when the script terminates. Scripts which rely on the previous behaviour may need to be adapted. **(17284)**
- ❗ New Identifiers for procedure and commands: The procedure 'Demand matrix correction (TFlowFuzzy)' is renamed to 'Demand matrix correction'. The COM class 'ITFlowFuzzyPara' is renamed in 'IDemandMatrixCorrectionPara'. This also includes their derivations. The method 'TFlowFuzzyParameters' co-exists with the new method 'IDemandMatrixCorrectionPara', but is marked as deprecated and won't be available in the next releases. Users have to adjust their scripts until the next major release accordingly. **(17227 +)**

- ❗ New option when reading general procedure settings: A new option 'Reset general procedure settings prior to reading' is available when reading general procedure settings. If this option is active, values are set to their defaults prior reading. For reading the general procedure parameters with the new parameter a new COM method 'OpenXmlWithOptions' has been added. The default behaviour when reading can change. So far, the general procedure settings were reset when the procedure sequence and the procedure settings were read together and the procedure sequence replaced. (17141 [+](#))

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- ❗ New option when reading general procedure settings: A new option 'Reset general procedure settings prior to reading' is available when reading general procedure settings. If this option is active, values are set to their defaults prior reading. For reading the general procedure parameters with the new parameter a new COM method 'OpenXmlWithOptions' has been added. The default behaviour when reading can change. So far, the general procedure settings were reset when the procedure sequence and the procedure settings were read together and the procedure sequence replaced. (17141 [+](#))