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12.52-02 [73443]

2012-10-13

## + New Features and Changes

### Add-In:

- + The Add-In *Nested Demand Model GAP Calculation* enables the calculation of the demand/supply gap for demand models which have been calculated using the Add-In *Nested Demand Model*. The formula of the calculation follows the UK WebTAG guidelines. **(10725)**

### Data Model:

- + Relations of system routes: A new relation has been established from the system route item to the link carrying the link stop point at which the system route item is located. The relation will be empty if the system route item is located at a node. Another relation from the system route itself to links lists up all traversed links. Links which are traversed consecutively due to a stop point on this link are listed only once. **(11582)**

### Foreign Formats:

- + Messages during EMME Import: Optionally, issuing these messages can be switched off now ("No further messages"). **(11588)**
- + RailML Import: A vehicle journey section's number of valid days can be output to a vehicle journey section attribute now. This is particularly useful for the import into a target network without calendar. **(10922)**

### Graphics, Schematic line diagram:

- + Both the Transfers display of regular services and also the attribute bars visualizing the number of transfers in the Schematic line diagram now provide the flow bundle evaluations for all volume-representing attributes (volume, number of transfers, through passengers). **(11632)**

### Listings, Graphics:

- + Even for formula attributes which return floating-point values, a format can be selected in lists and in the graphic parameters now. **(11648)**

### Network Editor:

- + Copy line route: By default, the selection list in the dialog provided for copying line routes now highlights the name which is associated with the copied line route. If another line is selected the name will be retained - even if it has already been modified by an entry. **(11627)**
- + Line aggregation and couplings: If couplings are separated when aggregating lines, because a coupled time profile and an uncoupled one are aggregated to a time profile in common, for example, then each separated coupling is traced to the log file now. After one or more separated couplings, a message will be issued. **(11289)**

### Timetable Editor:

- + Stops without stop event: The option 'Hide stops without stop event' does no longer work in the tabular timetable only, but also in the graphical timetable now. **(11563)**

## ✓ Fixed Bugs

### COM:

- ✓ Map Matching algorithm: If the Map Matcher in the incremental mode matches exactly the coordinates of a node as start or end of the matched sequence of points, then this node will no longer be displayed as the end of an additional and actually useless link at the start ('A->B, 1.0'), or as the start of an additional link at the end ('Y->Z, 0.0') respectively. This node is now allocated to the closest required link ('B->C, 0.0' bzw. 'X->Y, 1.0'). With ID 11255, this modification has already been implemented in the global algorithm. **(11699)**

### Data Model:

- ✔ Shortening a line route with activity protocol output: The program will no longer crash if a line route is made shorter while the activity protocol option is active (at least level 2 "All activities"). **(11669)**
- ✔ Strict link types: Allocating a strict link type though there is a transport system with a code starting with a lower case character will no longer cause a program crash. **(11745)**
- ✔ Transfer walk times: Using the relation from the stop to the transfer walk times for access to the sum (or other aggregate functions) of the transfer walk times between stop areas in a network that contains stops without stop areas will no longer cause a program crash. **(11711)**

### Demand operations:

- ✔ The AddIn 'Nested Demand Model' calculated invalid results (even for passive zones) when the option 'Active zones only' was selected. This bug was fixed. **(11725)**

### Dialogs:

- ✔ Background objects administration: The synchronization of the "Draw" state between the two dialog views did not work correctly: This bug was fixed. **(11090)**
- ✔ Parameter dialog for the headway-based assignment procedure: The assignment could not be calculated if the open parameter dialog was closed via the OK button while the default parameter settings for the weighted origin wait time were active. This bug was fixed. **(11690)**

### Filters:

- ✔ Filter logic in hierarchical filters: If a condition is defined on a lower level of the hierarchy, sub-ordinate objects are required on the level of the defined condition which satisfy this condition. Otherwise an object on the higher level cannot be active. In previous versions, even without any sub-ordinate object on the filtered level the object could be active. Furthermore, the hierarchical filter was not always evaluated correctly when the filter conditions of a level were switched on or off. This bug was also fixed. **(10607)**
- ✔ Initialize filter: Initializing filters works much faster now, especially with networks storing numerous Points of interest. **(11342)**

### Foreign Formats, VISUM Files:

- ✔ Shortest path searches with one origin and one destination each work much faster now. This especially affects reading a network additively and the railML import. **(11507)**

### Graphics:

- ✔ Autotexts in the printing frame: In the printing frame headline, autotexts were not replaced by the correct values if a line break was included in the text. This bug was fixed. **(11228)**
- ✔ Backgrounds from OpenStreetMap: Loading OpenStreetMap backgrounds for zoom levels greater than 15 was possible in previous versions, though no map service was provided for that. Now, only zoom levels up to 15 are available. **(11164)**
- ✔ Column charts: In networks with the imperial unit system, the separate column charts windows in the network editor now always use imperial units for the display of length and speed values. **(11656)**
- ✔ Internet maps: The program will no longer crash if internet maps are downloaded as backgrounds. **(11718)**
- ✔ Overlapping sections in legend: In previous versions, the scale and the class symbols used to overlap if the latter were small-sized. Furthermore, classes in the lower section used to be drawn outside the legend if the symbol height was too small. Either bug was fixed. **(10751)**
- ✔ Placing SVG backgrounds: In previous versions, backgrounds originally created via SVG Export from Visum were not placed correctly. This bug was fixed. **(11606)**
- ✔ PuT line bars: After changes to the order of drawing in the graphic parameter settings for line bars, sometimes the graphic parameters for individual objects of the line hierarchy used to disappear. This bug was fixed. **(11573)**
- ✔ Shortest path search and print output: The print output did not completely draw the shortest path. This bug was fixed. **(11689)**
- ✔ Transfers display of regular services: The transfers display of regular services shows vehicle journeys (i.e. arrivals and departures) now even if a calendar is active and if for the time slot to be visualized a calendar day different from the first day of the calendar is selected. **(11720)**

### Installation:

- ✓ Explorer entries: After the installation of PTV Visum 12.5, the Explorer no longer showed entries for 'Open version file' with previous Visum versions. Also the 'Open with...' entries used to be incorrect. Either bug was fixed. **(11618)**

### Listings:

- ✓ Line block items list: The program will no longer crash if the line blocking procedure is started though the list of line block items is open with an active line block filter. **(11576)**

### Main Window:

- ✓ Mode of the 'Analysis time intervals' toolbar: The 'Analysis time intervals' toolbar mode (visible / invisible / automatic) is stored in the Registry now and will be restored when the next Visum session starts. **(11295)**

### Miscellaneous:

- ✓ Activity protocol: No more crash when inserting a node whilst the activity protocol is active. **(11751)**

### Network Editor:

- ✓ Autozoom: In previous versions, Visum did not redraw the screen if the network editor as a separate window was moved out of the Visum main window and if the network section was shifted by clicking the 'Autozoom' button in the 'Find' dialog. Thus, the marking was placed in the screen center but did not fit into the displayed network. This bug was fixed. **(11598)**
- ✓ Create stop point on link: In previous versions, couplings could have been separated under certain circumstances if a stop point was created on a link in a coupling section. This bug was fixed. **(11524)**

### Other Procedures:

- ✓ Cutting a sub-network: Cutting a sub-network will no longer fail if the file property 'Load matrix data from version file at the time when required' is set. **(11408)**

### PrT Assignment:

- ✓ ICA calculation: If ICA is calculated for a set of nodes though ICA is not to be calculated for some of them, then the ICA results (LOS, LOS average delay) calculated for these nodes will be initialized. This may only be the case if ICA has already been calculated for a node. **(11594)**
- ✓ ICA, signalized, HCM 2000: The calculation of the factor  $G_f$  for lane groups did not regard the stage's loss time by mistake. It is now considered as the total summed up from the stage's Amber and All-red times if the intergreen determination is not based on the intergreen matrix, but on Amber and All-red. Thus, an assignment with ICA might return deviating results. **(11723)**
- ✓ Node impedance calculation (ICA): In previous versions, the flow distribution to the lanes did not always take the correct number of straight lanes into account. Furthermore, the special case of shared left/straight lanes with 'split phasing' was not regarded at all. Either bug was fixed. **(11733)**

### PuT Assignment:

- ✓ Capacity-restrained assignment: Various problems have been solved which arose during the capacity-restrained timetable-based assignment. Most of them occurred if several demand segments were assigned simultaneously. **(11667)**

### Timetable Editor:

- ✓ Coupling in pairs in the Timetable editor: The route course section offered for coupling in pairs in the Timetable editor used to be shorter than necessary, if the course of one of the two line routes exceeded the maximum coupling section either at its start or at its end. **(11664)**
- ✓ Regular services mode: When the regular services display mode is active in the tabular timetable view, the program will no longer crash if in the graphical timetable the context menu is called for a set of vehicle journeys which differs from a set of columns in the aggregated view of the tableau. **(11728)**

### VISUM Files:

- ✓ ANM Import: The detector attribute 'Length' is correctly imported now. **(11660)**
- ✓ Open attribute file: In the allocation dialog which appears when reading attributes from file, the attribute name used to be translated into English if the attribute with the given ID was not defined for the target network object but for a different network object. This bug was fixed. **(9757)**

- ✓ Reading attribute file for PuT lines: It is no longer possible to read an attribute file which contains the 'transport system' attribute if the file stores an empty string for the TSys attribute. **(11629)**
- ✓ Restoring windows: Using Visum 12.5, files which were saved with PTV Visum 12 and in which a matrix editor was open without matrix could not be opened. This bug was fixed. **(11702)**
- ✓ Warnings when reading a version: Certain warnings, referring to invalid link orientations, for example, could not be suppressed in previous versions, though the issue of warnings of the same priority was switched off. **(11619)**

## ! Breaking Changes

### Demand operations:

- ! The AddIn 'Nested Demand Model' calculated invalid results (even for passive zones) when the option 'Active zones only' was selected. This fix will cause new results (even for active zones) to differ from previous calculations. **(11725)**

### Filters:

- ! Filter logic in hierarchical filters: If a condition is defined on a lower level of the hierarchy, sub-ordinate objects are required on the level of the defined condition which satisfy this condition. Otherwise an object on the higher level cannot be active. In previous versions, even without any sub-ordinate object on the filtered level the object could be active. Furthermore, the hierarchical filter was not always evaluated correctly when the filter conditions of a level were switched on or off. This bug was also fixed. **(10607)**

### PrT Assignment:

- ! PrT Assignment: ICA, signalized, HCM 2000: The calculation of the factor  $G_f$  for lane groups did not regard the stage's loss time by mistake. It is now considered as the total summed up from the stage's Amber and All-red times if the intergreen determination is not based on the intergreen matrix, but on Amber and All-red. Thus, an assignment with ICA might return deviating results. **(11723)**

12.52-01 [73346]

2012-10-11

## + New Features and Changes

### Data Model:

- + Relations of POIs: New relations have been established from POIs to the allocated POIs of a category. Analogous to the relations of nodes, links, etc., there is a special relation per POI category. **(11241)**

### Demand operations:

- + A new powerful demand model based on the nested logit approach is offered through the Add-In *Nested Demand Model*. Besides other features, the model allows the flexible definition of model structures and alternatives, either absolute or incremental calculation, time of day choice and production-demand-balancing across multiple demand strata. **(10724)**

### Dialogs:

- + Fonts: In the 'Font' dialog provided with numerous schematic line diagram graphic parameter dialogs (the separate dialog for edge course labels, for example), two decimal places are displayed, since the data does not refer to [mm], but to raster units [re] in this case. **(11474)**
- + Read graphic parameters additionally: Now, the size of the dialog can be edited. Furthermore, the sort order is correct now. **(11510)**

### Listings:

- + List of (main) OD pairs: Either list now also provides the 'Aggregate' and 'Group' functionalities. **(11505)**
- + Sorting: In an ascending sort, empty values are placed on top now. **(11490)**

### Matrix Editor:

- + List view: Alternatively, matrices can now be displayed in tabular form in the matrix editor. **(9224)**

### Network comparisons:

- + Version comparison: If some objects are not 'in selection' in the comparison network, an improved warning message will be returned. Additionally, the list of concerned objects is included now. **(11514)**

### PrT Assignment:

- + ICA, signalized: For RBC controllers, the calculation of the critical path has been improved. Now only the lane groups of those signal groups (stages) are marked as 'critical', which belong to the same ring in a pair of barriers. **(10892)**

### Schematic line diagram:

- + Connecting edges when running through without stop event: Now, edges can no longer be connected only to those transfer nodes, where the vehicle journey stops for the passengers (= boarding and/or alighting permitted), but edges can now be connected to any transfer node in the line network. Optionally, a filter can additionally be used, thus the connectors use transfer nodes which either represent a stop event or satisfy the user-defined filter criterion, i.e. the specified attribute value. **(11561)**
- + Selection of vehicle journeys: The dialog for changes to the vehicle journey selection within a time slot provides a new option, which can reduce the current selection to only those vehicle journeys which satisfy the time condition. Different from the 'Select exclusively' option, this option will not add additional vehicle journeys to the selection. **(11483)**

### User interface:

- + All toolbars now display a "Continuation"-control (small '>>' at the right border), whenever toolbar buttons are hidden due to space limitations. Clicking this control displays a Popup-menu containing the hidden buttons. **(7370)**

### Fixed Bugs

#### Add-In:

- ✔ Error messages from numpy: Visum 32bit will no longer return a message notifying of calculation errors in the numpy package (division by 0, for example) as it used to in previous versions. Regardless of the message, numpy will continue the calculation in a defined way, which means that this is not really a bug. **(11500)**
- ✔ Multi Edit: The mathematic functions (math) in this add-on work correctly now. **(11595)**

#### AddIn:

- ✔ Google Maps: Slight deviations occur when converting co-ordinates with the version of the python library 'PyProj' used so far. They have an effect if you want to display the node via the GoogleMaps AddIn. The error does not occur in combination with all projections. The error has been fixed by an exchange of the library version. **(11506)**

#### ANM:

- ✔ Signalized nodes: Now, the ANM Export includes the signalization data of a node only if the control type 'signalized' has been selected for this node. **(11434)**

#### COM Interface:

- ✔ IGraphic.MaximizeNetWindow: The method MaximizeNetWindow at IGraphic used to place the open windows next to each other in the main window in 12.5 instead of maximizing the network window. This behavior has been corrected as follows: All windows are arranged as tabs (like clicking "Arrange windows as tabs") and the network window will be activated. If the network window is not available, a COM error will be returned. **(11628)**
- ✔ Map Matching: Map Matching was significantly accelerated for large networks with adjacent coordinate points being located close to each other. **(11279)**

#### COM:

- ✔ Changing the focus when running scripts: If you run a script or AddIn in Visum, especially in the context of procedures, the Visum window used to get the focus, if Windows permitted it. This behavior is disadvantageous when working with a different application in parallel and has thus been changed. **(11560)**
- ✔ Method Show() at listings: Repeatedly calling the method Show() at the same listing object (I...List) opens the listing in the same list window instead of opening a new window each time. **(11484)**

#### Data Model:

- ✔ Headway: The program will no longer crash if the headway pattern is to be calculated for a service trip pattern consisting of just one or two vehicle journeys. The crash used to occur in the tabular timetable and also in the schematic line diagram. **(11539)**
- ✔ Matrix of a demand segment: If a different matrix is allocated to a demand segment Visum now checks for the matching network object type reference. **(11620)**
- ✔ Renaming attributes: If attributes are changed, the components that use these attributes are now updated, for example filters or lists. Such changes of an attribute could be the modification of the definition of a formula attribute, but also the renaming of a network object which emerges as subattribute in the attribute ID. **(11317)**
- ✔ User-defined attributes: If a UDA (user-defined attribute) was referenced in a formula attribute, renaming the UDA used to fail and a message saying that no attribute with this new name could be found was returned. This bug was fixed. **(11605)**

#### **Demand Procedures:**

- ✔ "Parameters: EVA trip generation" dialog: In this dialog, the grid sometimes appeared empty by mistake. This bug was fixed. **(11587)**

#### **Dialogs:**

- ✔ Graphic parameters of the schematic line diagram: The size of the grid provided on the 'Transfer nodes' tab in the graphic parameters dialog ('Uniform display' only) will be scaled accordingly now if the size of the dialog is modified. **(11458)**
- ✔ Grids with numerous entries: In certain dialogs (example: Calculate menu - General procedure settings - Analysis time slots) a program crash could be caused by a huge number of entries (>1800) in previous versions. This bug was fixed. **(11498)**
- ✔ Inactive cells in graphic parameter dialogs: In the classification grids in various graphic parameter dialogs, the gray gradient will no longer include the inactive cells. Now, two different gray tones are used for inactive cells. Thus, it is easier to distinguish between inactive cells and active cells with a gray-shaded background. **(11550)**
- ✔ Linear combinations in various dialogs: Marking a row - in the context of numerous procedures - in the "Utility definition" dialog and confirming 'Delete' used to ignore the currently marked row but always removed the last row instead. This bug was fixed. **(11617)**
- ✔ Procedure parameters dialog Kalibri: The input of values in the grid of the procedure parameters dialog of the procedure 'Estimate gravitation parameters' (Kalibri) was not saved reliably so far. This error has been fixed. **(11501)**
- ✔ PuT Operating Indicators: Now the color of the 'Infrastructure cost' tab changes as soon as a check box is edited in this tab. If a value is calculated it will immediately turn red. **(11515)**

#### **Filters:**

- ✔ Filter status of dependent filters: The filter status of objects was not updated under certain circumstances in case of dependencies on other filters. This error has been fixed. **(11553)**

#### **Graphics:**

- ✔ Bar scaling: Automatic bar scaling does not take the network maximum into account, but the maximum absolute value of the attribute values is regarded. Example: For values in the range from - 200 to 150, the value 200 is used. Drawing in the network window used to work correctly, only the faulty display in the bar dialog was corrected. **(11391)**
- ✔ Internet maps: Calling maps in great quantities in one request could lead to a crash during the next request. This error has been fixed. **(11591)**

#### **Junction Editor:**

- ✔ Export ICA report to Excel: This functionality is provided again. **(11657)**

#### **Listings:**

- ✔ Vehicle journey sections: The new settings used to be ignored if the selection was changed to "All". Instead, one of the vehicle journeys had to be selected and then the selection via "All" used to work correctly. This bug was fixed. **(11520)**

#### **Main window:**

- ✔ In various views, the Page-up/Page-down keys zoom analogous to the network editor now, which means an easier handling via keyboard. In previous versions, the view was moved via scroll bars. These are the concerned views: Schematic line diagram, Line block display, Graphical timetable, Signal time-space diagram, and Matrix comparison. **(11631)**
- ✔ Response to user interaction: Visum could no longer be operated after the following steps: Maximize Visum window (e.g. a list or the procedure sequence) and click "Lock computer", then select "Switch user" and log-on again with your (still active) account. This bug was fixed. **(11549)**
- ✔ Hot keys: The hot keys 'Ctrl + Tab' and 'Ctrl + Shift + Tab' can be used again to switch between different views. **(11610)**

#### Miscellaneous:

- ✔ Transfers display of regular services: When drawing this plot, the display of passive service groups now differs from the display of active service groups. Furthermore, the display now responds to edited filter settings even if "only active" vehicle journeys are selected. **(11596)**

#### Network Editor:

- ✔ Hand mode with Space bar: If the current window section is shifted by pressing the space bar in the line mode or system route / PrT paths modes accordingly, the focus used to switch to the data input row in the associated (line / system route / PrT paths) selection dialog as soon as the space bar was released. This bug was fixed. **(11517)**
- ✔ Specifying the line route course: In previous versions, even a fixed profile point could be lost when specifying line route shapes. This only occurred when a node or stop point was traversed repeatedly. This bug was fixed. **(11383)**

#### PrT Assignment:

- ✔ Assignment with ICA: By mistake, the assignment with ICA always applied the method HCM 2000 to nodes with control type 'Yield', even if the option HCM 2010 had been selected in the general procedure settings. This bug was fixed. Thus, another assignment with ICA might produce different results. **(11578)**
- ✔ Minimum number of LUCE iterations: Due to the 5 preset warm start iterations with reduced demand, the number of iterations had been set to 6 as the minimum for the calculation. This bug was fixed. Furthermore, the assignment result will no longer be discarded if the calculation is cancelled during the first 5 iterations. **(11647)**
- ✔ MPA: The Student version of Visum sometimes crashed during an assignment using MPA. This bug was fixed. **(11532)**

#### PuT Assignment:

- ✔ Capacity-constrained timetable-based assignment: Under certain circumstances, the iteration used to terminate too early if a second search was run. This bug was fixed. **(11555)**

#### PuT Line Blocking:

- ✔ Short turning and turning during vehicle journey: If - from a vehicle journey section - both a regular short turning (i.e. to a vehicle journey section of a different vehicle journey with shorter layover times) as well as a short turning to a subsequent vehicle journey section of the same vehicle journey are possible, an unnecessary number of required vehicles used to be calculated. The same applies to the results that used to be calculated if different types of incoming turnings from preceding vehicle journey sections were possible. This bug was fixed. **(11526)**

#### PuT Operating Indicators:

- ✔ Projection of user-defined attributes: The program will no longer crash if for the projection of user-defined attributes inappropriate attributes are used which cannot easily store values such as the vehicle journey section number, for example. **(11470)**
- ✔ Service kilometers and service time in case of coupling: The indicators service kilometers and service time were not calculated correctly at links if couplings existed. This error has been fixed. **(11556)**

#### Scenario Management:

- ✔ Indicators: The program will no longer crash when creating scenario indicators, if several indicators exist with an attribute ID that only differs in the numbers (0-9). **(11542)**
- ✔ Project Directories: Project directories were not set correctly when creating a project. The opening of an existing project was not affected. The error has been fixed. **(11530)**

- ✔ SQL Server Compact installation: If the component SQL Server Compact is not installed properly, Visum now issues an improved error message asking the user to re-install Visum or to manually install this component. **(11412)**

#### **Schematic line diagram:**

- ✔ "Direction" attribute: When aggregating explicitly by direction, the attribute always returned the 'ahead' direction value by mistake, i.e. from FromPoint to ToPoint for directed edges. This bug was fixed. **(11508)**
- ✔ Circle lines: With circle lines, access to volume attributes could have caused a program crash. This bug was fixed. **(11531)**
- ✔ Closing the View: This process has been accelerated. **(11518)**
- ✔ Coupled vehicle journeys: Any attribute describing the frequency regards coupled vehicle journeys (i.e. the coupled time profiles depart simultaneously) as just one vehicle journey. This also applies to the calculation of headway patterns. **(11497)**
- ✔ Labelling transfer nodes: In previous versions, switching off selected label components for transfer nodes did not always work correctly. This bug was fixed. **(11604)**
- ✔ Setting a window when reading a version from file: Now, the visible window (virtual bounding box) is correctly restored in the schematic line diagram when a version is read from file. In previous versions, the visible window used to be considerably shifted. **(11511)**
- ✔ SVG Export: Even when taking a scaling factor into account, the SVG Export for Illustrator or Inkscape places the labels correctly now. Arrow heads along edges are no longer mirrored. The display of vertical bar labels is no longer displaced to the bottom. Even vertical 'ToNode' labels of edges are displayed correctly. **(11489)**
- ✔ SVG Export: For each class of a classification a group tag used to be opened for the SVG export. By mistake, the group tag IDs used to be identical, thus the level control did not work. This bug was fixed. **(11551)**
- ✔ Time slot-specific selection of vehicle journeys: With time slots stretching over midnight into the new day, some of the vehicle journeys used to be ignored. This bug was fixed. **(11554)**
- ✔ Transfer bars: The transfer bars are placed on the appropriate side now. **(11552)**

#### **Timetable Editor:**

- ✔ Context menu: Some commands used to be missing in the context menu of the tabular timetable if the timetable editor did not have the focus. This bug was fixed. **(11533)**
- ✔ Editing in cells: Now, the direct text entry is also possible if the cell is selected by means of the arrow keys or using the "TAB" key. **(11466)**

#### **VISUM Files:**

- ✔ Attribute files: Attribute files saved from the list of system route items can now be read from file again. Using the clipboard also works correctly now. **(11601)**
- ✔ Model transfer file: Directed stop points can be converted to undirected stop points now. **(11548)**
- ✔ Network file, user-defined attributes: Reading a file that stores the standard value 'empty' for a user-defined attribute used to set the object values to '0' if this attribute was not listed in the table of the particular object. This bug was fixed. **(11482)**
- ✔ Network files and attribute files: In either file (as well as in lists) the number 2147483647 used to be replaced by MAX by mistake when used as a network object ID. This bug was fixed. **(11540)**
- ✔ Read line routes additionally: If - when reading network data additionally or reading model transfer data from file - stop points were modified in a way that line routes were automatically adjusted, then the values of internal indices used to differ from the actual index values. If subsequently a line route course was read which was in topological accordance with the adjusted course then these original indices used to be kept by mistake. In a time profile items table which was read then, referenced line route items with incorrect internal indices could not be found. This bug was fixed. **(11602)**

#### **❗ Breaking Changes**

#### **PrT Assignment:**

- ❗ Assignment with ICA: By mistake, the assignment with ICA always applied the method HCM 2000 to nodes with control type 'Yield', even if the option HCM 2010 had been selected in the general procedure settings. This bug was fixed. Thus, another assignment with ICA might produce different results. **(11578)**

12.52-00 [72431]

2012-09-09

## + New Features and Changes

### Add-in:

- + The names of English Add-ins follow now the same notation. **(10776)**
- + Add-ins in general: Invalid parameters return a message now (Cannot find matrix with the specified ID, for example). **(10719)**
- + Additionally, the HTML Help files are available in PDF format now. **(1944)**
- + An new Add-in for PrT assignment reports has been added. The Add-in can be directly linked to a PrT assignment and produces an Excel file and/or a PDF document that contains a summary of assignment results. **(10766)**
- + Isoc2POI: The grid has been redesigned. **(10282)**
- + Isoc2SHP: The calculation runs much faster now. **(10126)**
- + Matrix convolution: A new option is provided, now the Via zone matrix can be either input or output data. **(9002)**
- + New add-in: With the new add-in it is now possible to add the correct paths for the PythonModules folder to the paths stored in the sys.path file. **(10158)**
- + Switching languages: Switching to another language in Visum will no longer cause data loss of saved Add-in parameters. **(10333)**
- + The user interface of the Add-In 'Trip Generation Balancing' has been optimized. **(10014)**
- + VisumPy.Matrices: If the destination main zone number is zero for a zone, it will not be aggregated. **(10436)**

### COM-API:

- + As a side effect of the changes to logging and tracing (10811), the Visum.Messages container now contains ALL messages of the appropriate priority, not only those suppressed on the user interface. **(7212)**
- + Classified line bars: Now, also the COM interface supports the line bar classification. Furthermore, the classification settings can be adjusted via an 'Edit' button like any other settings. **(10178)**
- + Empty attribute values are now returned as empty Variants. **(10423)**
- + GetNearestLink: The COM interface has been extended. Now, a cache can be activated for the execution of the method GetNearestLink. Using this cache will significantly accelerate the method execution if it is called repeatedly. **(2346)**
- + GetNearestLink: The method regards the current projection. **(10896)**
- + Histogram, reading interval data: Changes to the interval limits affect all matrices now, not just a single one. **(6160)**
- + IExecuteScriptPara: An access method from Ioperation to IExecuteScriptPara has been added. In this way, access to the 'FileName' attribute is provided. **(10284)**
- + The COM-API now provides a new functionality which facilitates the development of custom importers for proprietary data. To achieve this, Visum features a new configurable MapMatcher-object which allows to map point sequences (representing e.g. PuT trips, GPS positions or edges of an external network) to the network currently loaded in Visum. The IDs and relative positions of the best matching objects of the Visum net can then be retrieved. The MapMatcher is created through *Visum.Net.CreateMapMatcher*. **(10306)**
- + The matrix includes an empty formula now if a formula matrix is initialized. **(10656)**
- + The Method Visum.CalcPartNet was renamed to Visum.CalcSubNetwork for better matching the user interface. For downward compatibility, the old method is still available as 'deprecated'. **(10279)**

- ⊕ The name of the print job can be defined through a new optional argument of the method `Visum.Graphic.Plot()`. **(10657)**
- ⊕ The parameters of the procedure 'Init assignment' can now be accessed through a new method `IOperation.AssignmentInitParameters` **(10681)**
- ⊕ When adding new network objects through COM, it is for most network object types no longer necessary to provide a valid key value for the new object. Instead, when passing a 0 as the key value to the *Add*-method, Visum generates a valid key value internally. This works for all network object types with keys composed of a single integer. **(5463)**

#### Data model:

- ⊕ It is now possible to analyse data across multiple analysis time intervals. New 'virtual' analysis time intervals can be defined and associated with an arbitrary set of regular time intervals and an aggregation function for the underlying data. **(10447)**
- ⊕ Line routes can now be shifted to lines associated to a different transport system. The line selection in the *Edit line route* dialog is now longer restricted to lines with the same transport system. Links, stops etc. are opened for the new transport system if necessary. **(8610)**
- ⊕ Link types can now be defined as 'strict' which will serve to keep the link attributes consistent with the link type defaults. When the link type of a link is changed to a link type having this flag set, the attributes of the link are automatically set to the link type defaults. **(8123)**
- ⊕ Polygon length of the PrT paths: The object 'PrT path' has a new attribute 'Length polygon' which is based on the correspondent attribute of links and the attribute 'Length direct' of the optionally existing connectors. **(11223)**
- ⊕ PuT paths can now have user-defined attributes. These attributes can be displayed (not edited!) in lists and for example be used in filters such as the new filter on PuT paths. The values for these attributes can currently not be edited in the Visum user interface, but only be provided through connection files (\*.con) generated by external applications. **(6081)**
- ⊕ The data model for RBC controllers has been fully integrated into the Visum-data model **(10486)**
- ⊕ The data model for roundabouts was adapted in order to allow passing the data directly to PTV Vissim for visualisation and simulation. The new attributes *Roundabout circulating lane width*, *Exit radius* and *Roundabout circulating speed* were added to nodes. The attributes *Inscribed Circle Diameter*, *Entry Radiu*, *Entry Width*, *Approach Half Width*, *Flare Length*, *Entry Angle*, *Grade Separation* and *KimberHollis c-factor* were moved from links to node legs. **(10347)**
- ⊕ A new relation exists between Valid Days and all Vehicle Journey Sections using this Valid Day. **(10071)**
- ⊕ Additional aggregate functions 'distinct' and 'DistinctActive' are available for 1:N-relations. These provide a listing of the unique attribute values, similar to the 'frequency' aggregate function, but without the actual frequencies. **(594)**
- ⊕ Detectors can now be located within an intersection through their leg/lane/distance to stopline as an alternative to link/lane/relative position. New attributes allow to associate such detectors with a signal control and maintain additional data such as transport systems or channel number. The data is edited in Visums node editor. Thereby, data required for microsimulation or traffic ITS applications can fully be maintained in the Visum model. **(7734)**
- ⊕ For PuT path legs, a new relation to the fare zones used and counted on a path leg is available. **(2092)**
- ⊕ Formula matrices: The calculation of totals and diagonal sums works faster now. **(10521)**
- ⊕ Initial- and transfer fares are now defined between fare systems instead of between fare systems and ticket types as before. **(4073)**
- ⊕ It is now possible to toggle profile points within coupled sections when editing time profiles. **(10055)**
- ⊕ Network statistics: The network statistics give access new indicators which are of particular interest for scenario evaluation. The matrix sums for individual matrices are provided as calculated attributes. If demand models are defined and mode choice matrices are calculated, the demand shares for all modes with respect to total demand are also provided as attributes of the network. **(3574)**
- ⊕ New 1:1-relations between network statistics and network provide bidirectional access to the respective attributes. This allows to show user defined network attributes in the network statistics list and to access the network statistics through COM. **(11043)**

- ⊕ POI category: A POI category is called 'active' only if it contains active POIs. Especially, you can save a network storing just the data of the active POIs and their category definitions by means of a filter for the POIs of certain categories. **(10857)**
- ⊕ Propagation: The propagated link volumes without regard to count values can now be output. **(10451)**
- ⊕ Relations to POIs: Parallel to the existing relations to POIs (from links, for example) additionally new relations to the POIs of a category are now provided. **(2339)**
- ⊕ Stop points: The new attribute 'IsTerminalForVehicleJourneySection' indicates the final stop points in terms of line blocking. **(10289)**
- ⊕ System routes: Even if either the start stop point or the end stop point is a directed stop point on a link, the opposite direction of a system route can now be created in the same way as the opposite direction of a line route. **(9386)**
- ⊕ The access for the relation from a network object to a POI has been accelerated. **(10784)**
- ⊕ The attributes 'Number of lanes' and 'Lane' of detectors have been renamed to 'Number of lanes on link' and 'Lane on link'. **(10914)**
- ⊕ The attributes 'Use origin/destination connector shares PrT' for zones and 'Has PrT' for connectors have been associated with the module 'User interface PrT' and are now listed in the attribut selection in groups 'Input PrT'/'Ouput PrT'. **(1314)**
- ⊕ The attributes "IsInterlining" for line routes and "Toll-PrTSys" for link types are obsolete and get removed from the data model. **(4534)**
- ⊕ User defined attributes can now contain empty values. **(10560)**
- ⊕ Vehicle journey adjustment due to line route lengthening: Optionally, the dimensions of the vehicle journeys can now be retained. In previous versions, a vehicle journey from the line route start and/or to the line route end used to be lengthened accordingly from the new line route start and/or to the new line route end automatically when the line route was lengthened. **(10122)**
- ⊕ When converting from double numbers to integers, Visum now consistently (e.g. in the COM interface) rounds the values. **(10256)**

#### **Demand operations:**

- ⊕ The operation *Tour-based model - combined distribution/mode choice* now allows to save the distribution utilities (logsums) calculated internally to normal matrices for later use. **(11071)**
- ⊕ The procedure *Tour-based model - combined trip distribution / mode choice* can now produce demand amtrices for arbitrary combinations of persons groups, modes, origin and destination activities and multiple time intervals in one single run. The output matrices are now defined in the procedure parameters dialog instead of the demand model settings. **(10591)**
- ⊕ Saving of weight matrices to file from the procedure 'EVA weighting' is now optional an can be controled through a new check box. **(11169)**
- ⊕ The procedure 'Tour-based model - Combined trip distribution / mode choice' has been optimized for multithreaded evaluation, resulting an much shorter run times on multi-core machines. **(10111)**

#### **Dialogs:**

- ⊕ 'Create vehicle journey' window: The focus is now in the 'Name' entry field, when the window is opened. It used to be in the 'Number' field. **(10459)**
- ⊕ 'HAFAS import' dialog, 'Transport systems' tab: For sorting, any of the columns provided in the TSys list can be selected now. **(10418)**
- ⊕ Default styles for line and path bars: It is now possible to define a default style for line and path bars and to set whether they should be drawn by default. New line routes, time profiles and such which are not covered by the graphic parameters (e.g. when loaded from file) will use this default setting. **(1317)**
- ⊕ HAFAS import settings, "Files" tab: You can now adjust the column width for the paths. **(10921)**

- + In some dialogs the display of tabular data was upgraded to modern grid controls. These now provide extended functionality such as Copy&Paste and simultaneous editing of multiple selected cells. This relates to the dialogs
  - Edit zone/main zone (page Demand)
  - Edit connector (page 'Transport Systems')
  - Parameters of procedure 'Edit attribute'
  - Parameters of procedure 'PuT interlining matrix'
  - Parameters of procedure 'Direct assignment'
  - Parameters of procedure 'Assignment analysis'
  - Parameters of procedure 'Calculate PrT skim matrix'
  - Parameters of procedure 'Calculate PuT skim matrix'
  - Edit user defined attribute formula **(2035)**
- + In the dialog 'Edit line route', page 'Items and time profiles', active and passive time profiles are now visually distinguished in the right area by printing the name of passive time profiles on the tab in italics. Also, the tooltips provide information on the filter status of the time profiles. **(3243)**
- + Inactive cells in parameter grids are now indicated visually. **(11356)**
- + Line blocking parameters window, Transport systems. The dialog is noticeably faster and the memory usage much lower. **(9579)**
- + Multi-edit, transport systems, allocate constant value to attribute. Two buttons were added to this window. Use them to open (or close) the concerned network objects for all transport systems simultaneously. **(10179)**
- + On the dialog *PuT Fares*, the page *Demand segments* now also shows the name of the fare system (e.g. for sorting). The dialog for associating lines with a newly created fare system is now omitted when no lines are defined in the network. **(10683)**
- + Overview dialog for Aliases: In the Network menu, an Overview dialog is provided now for Alias Management in the network. **(8277)**
- + Parameter dialogs for demand modeling procedures, EVA weighting: The sub-window 'Define assessment types' now provides the option 'None'. **(10599)**
- + Procedure parameters windows: The parameter windows for the demand modeling procedures (4 stage model, VisEVA and Tour-based model) were updated. Now, the data of all demand strata is displayed simultaneously. Aggregation in the list makes it possible to compare the settings by demand stratum easily. **(6202)**
- + The attribute selection tree in the *Multi-edit* dialog can now be toggled between classical, alphabetical and hierarchical view. **(9384)**
- + The category of new POIs can now also be selected in the category management dialog. **(10750)**
- + The denotations of buttons in several dialogs and context menus has been standardized on the German GUI. **(10853)**
- + The dialog for selecting attribute groups when saving a network file now supports multi-select of attribute groups for quicker configuration. **(10399)**
- + The dialog for setting graphic parameters is now scalable. If the dialog is reduced to a smaller size than required, scrollbars give access to hidden controls. **(4262)**
- + The layout of the procedure parameter dialogs for skim matrix calculation (both PrT and PuT) has been optimized to give more room to the matrix list. **(3819)**
- + The parameter dialogs of the timetable-based and headway-based PuT assignments have been modified. Descriptions for the entries under Origin and Destination zones, respectively, and Analyzed OD pairs have been added to clarify the effects in the calculations. **(10720)**
- + The references to networks in the dialogs for model transfer files and for network merge mode are changed to network 1 and network 2. **(10708)**
- + The user interface for defining combinations of matrices and vectors (procedure parameters and other places) was upgraded to modern grid controls. These now provide extended functionality such as Copy&Paste and simultaneous editing of multiple selected cells. **(3232)**
- + The user interface for defining graphic parameters for line objects (links, connectors,...) has been refurbished. The most important settings can now directly be modified in the overview grid, which also allows simultaneous editing of multiple entries and supports *Copy&Paste*. **(6352)**

- ⊕ The user interface for defining graphic parameters for point and area objects has been refurbished. The most important settings can now directly be modified in the overview grid, which also allows simultaneous editing of multiple entries and supports *Copy&Paste*. **(7753)**

#### Filters:

- ⊕ It is now possible to specify filter conditions on PuT paths in the OD pair filter dialog. These conditions apply in the PuT path list and when filtering network volumes. **(9973)**
- ⊕ The possible filter conditions for indirect attributes which represent a 1:N-relation have been extended. The extended conditions are true if either all or alternatively at least one of the objects on the other side of the relation fulfill it. Thereby, queries like selecting all zones connected to a specific nodes are easily created now. The functionality is also available through the COM-API. Please also refer to the example shipped with the installation. **(3242)**

#### Graphical Operations:

- ⊕ Besides the usual 'AND THEN' concatenation of network objects in flow bundle query terms, it is now possible to query on alternative objects combined by 'OR' to be used by the paths in the flow bundle. Brackets are used to group the alternative objects to be included in a condition. The COM-interface was extend by methods for setting these brackets in a flow bundle condition. **(1831)**
- ⊕ When adding a condition term to a flow bundle query, also transport systems of type PuT-walk or PuT-aux are now considered by default in the supply. **(10901)**

#### Graphics:

- ⊕ Auto zoom in the page preview: If 'Auto zoom' is called for an object which is located outside of the currently displayed area, the query 'Would you like to close the page preview for map section display?' will appear. **(10473)**
- ⊕ Background imagery from SVG and DXF/DWG is now supported on 64-Bit-Systems to the same degree as on 32-Bit-Systems. **(10988)**
- ⊕ Drawing POI connections: Via a new option, drawing can be reduced. Only the connections of active POIs are drawn in this case. **(10464)**
- ⊕ Internet maps as backgrounds: Internet maps can also be included for geographic projections, now. **(10569)**
- ⊕ Tables in labels can now be positioned more flexible at nine different positions on the object. The positions are combinations of top/center/bottom in vertical direction and left/center/right in horizontal direction. **(2732)**
- ⊕ Visum now features a graphical display of connections at a stop in form of a new clock-like view, including the display of transfer flows similar to node flows in the Node Editor. Please also refer to the overview section and the documentation. **(2249)**
- ⊕ Walktimes and transfers between different stop areas of a stop can now be visualized in the Network Editor through bars similar to desire lines. Please also refer to the overview section and the documentation. **(2246)**

#### IO interfaces:

- ⊕ 'Parameters: railML import': The special option 'no selection' is now provided for attribute selections in this window. **(9893)**
- ⊕ A new importer allows to directly import data from the signal optimization tool *SYNCHRO*. **(10893)**
- ⊕ A new importer allows to generate networks from parts of the OpenStreetMap database. Visum import the nodes and links including link types and important attributes as well as turn and accessibility restrictions. A flexible configuration system allows to customize the import process. Please also refer to the description in the overview section and the documentation (provided as separate PDF) **(5904)**
- ⊕ Access database format accdb: In VISUM, also the accdb database format of Access 2007 is supported for data import and export. **(9147)**
- ⊕ An export procedure for data in railML 2.1 format has been implemented. **(10446)**
- ⊕ An import procedure for data in railml format (version 2.0 and 2.1) has been implemented. **(9362)**
- ⊕ Error messages during the import of shapefiles now appear only once. **(11488)**
- ⊕ HAFAS-Import: Information about "main masts" in the file "Connections between stops" is now evaluated correctly. **(3239)**

- ⊕ HAFAS import: Destination coaches are now included in the import. **(9338)**
- ⊕ railML import, modifying valid days: If a new variant is created from an existing valid day, then the name of the new variant will indicate the modification. **(10864)**
- ⊕ railML import: For length data, the import of data provided in the scheme version railML 2.0 no longer assumes the unit [m], but [km]. For the following reason, the scheme version railML 2.1 is not concerned: In scheme version 2.0, the length data unit is undefined, whereas the standard provider system FBS stores length data in [km]. Since railML 2.1, the unit [m] has been defined for length data, and any data-supplying system has to use this length unit. **(10917)**
- ⊕ railML import: Time profiles are now numbered without a suffix. A suffix is not required, because there is always just one time profile within a line route. **(10983)**
- ⊕ SATURN Import: The SATURN importer can read the free SATURN-FORMAT in "Section 5555" and considers the parameter "XYUNIT". **(10313)**
- ⊕ SATURN, reading PuT line data: Now, the import can also handle data with parameter EZBUS set to TRUE. **(10405)**
- ⊕ SATURN: Also right-hand traffic networks can now be imported. **(10539)**
- ⊕ SATURN: Now, U-turns are closed by default. **(10404)**
- ⊕ SATURN: The split logic for links and connectors has changed. Now splitting a link does no longer modify the geometries of adjacent SATURN nodes. **(10082)**
- ⊕ Shape file import: If polygons are normalized this will be logged to the trace file. **(10555)**
- ⊕ The importer for data from CUBE was refurbished and is now accessible as a regular Add-In in the script menu without requiring separate installation. **(10753)**
- ⊕ The importer for data from TransCAD was refurbished and is now accessible as a regular Add-In in the script menu without requiring separate installation. **(11192)**

#### Junction Editor:

- ⊕ Create signal controller: A new SC used to be switched off by default, even if the 'Switched off' check box was not enabled in the dialog window. Now a new SC is not automatically switched off. **(10516)**
- ⊕ The 'Switched off' check box in the 'Geometry' tab now appears as 'Unchecked' or 'Checked', as applicable. **(10515)**

#### Lists:

- ⊕ Cross-section functions for indirect attributes: The color of the column header and tooltip now indicates, that "cross-section" means the total sum calculated for indirect attributes. **(7199)**
- ⊕ Deleting a multi-selection: In those lists whose objects can be deleted, now multiple selected objects can be deleted at once via 'Delete' in the context menu. **(10703)**
- ⊕ Display of Enums with concatenation: If a sign other than the default sign (comma) is selected for the concatenation in the network parameters window, then the concatenated strings of attributes of the discrete value type will be displayed correctly now. **(10609)**
- ⊕ If attribute IDs are renamed, due to changes to the subattribute code, for example, the list columns of these attributes will no longer be dropped. Now, these list columns are renamed accordingly. **(10094)**
- ⊕ If in an already sorted list another column is selected for sorting, the order of rows according to the first criterion is stable now, i.e. the given order of rows will be retained if the entries in the column which was selected later show identical values. **(7054)**
- ⊕ In the list PuT path legs the description of the attributes From stop number and To stop number has changed to clarify the source of the attribute values. The relations StartStop and EndStop have been renamed to SurveyDataStartStop and SurveyDataEndStop. **(11010)**
- ⊕ Lists in the 'Extended input options' mode: Attributes of the 'demand segment' value type (e.g. for matrices) can now be edited in a combo box. **(8644)**
- ⊕ Many additional lists can now be synchronized with the network editor. This relates to lists which are only indirectly related to network objects (e.g. Line route items), therefore only synchronization from the list to the network editor is enabled, not from the network editor to the lists. Depending on the list type, the corresponding network objects are either selected or just highlighted. **(6402)**
- ⊕ Network object lists are no longer automatically updated after changes to the procedure parameter settings. **(10400)**

- ⊕ Reading data for object types with numerous sub-attributes from attribute files or pasting data from clipboard is much faster now. **(10388)**
- ⊕ The buttons for sorting a list now also work when only a single cell is selected. They used to be enabled only when a complete column was selected. **(7677)**
- ⊕ The lists for line route items, time profile items, vehicle journey items and system route items now provide an alternative section-centric view. In this view, the last item/row of each object is omitted. **(9358)**
- ⊕ The special network object filters for the lists 'Line route items', 'Time profile items', 'Vehicle journey items', 'Vehicle journey sections', 'System route items', 'Line blocks', 'Line block items' and 'Toll matrices' are now saved with the list layout. **(10438)**
- ⊕ Transport systems. All 'Multi-edit TSys' queries now provide the 'Yes for all' button. **(10247)**

#### **Matrix Editor:**

- ⊕ Create matrices: The 'Create matrix' dialog window has been extended. Now, several matrices with identical properties can be created at the same time. **(5744)**
- ⊕ Editing matrix values: Now, data matrices can still be edited if formula matrices and data matrices are dealt with simultaneously. **(10552)**
- ⊕ Matrix tree context menu, common arithmetic operations: In the matrix tree view, the context menu now provides access to various simple computation methods. These functions work similar to the usual function call via 'Open matrix' - 'Select function from the arithmetic operations bar'. **(5137)**
- ⊕ Scrolling along diagonal in matrix editor: Now the shortcuts Alt-PgDown and Alt-PgUp can be used to scroll into both directions simultaneously (i.e. diagonal scrolling). **(5534)**
- ⊕ Totals in formula matrices: In the status bar, the sum is no longer displayed for formula matrices since the computation requires too much time. **(10341)**

#### **Miscellaneous:**

- ⊕ A new options allows to control whether U-turns on new links shall by default be opened for the transport systems common for both links or closed for all transport systems. **(11130)**
- ⊕ Check add-ons: The order of checks for whether an add-on has been purchased or activated was corrected. **(10855)**
- ⊕ Command line options: There are new command line options for 'load version, execute procedures' and for 'load version, execute procedures, save version'. **(9544)**
- ⊕ The Addon-module 'Modal split for standardized assessment' is now longer marketed. The functionality is still available for use with existing licenses. **(11014)**
- ⊕ The default parameters for digitizing line routes (e.g. search criterion) can now be set in the options on page 'Network->Lines'. **(10401)**
- ⊕ The logging of procedures and errors has been revised and the related files haven been reorganized and renamed. The former trace file 'Trace.txt' ins now the log file 'log.txt' an mainly contains a log of the procedure execution with start- and end times of the procedures. The former error file 'Error.txt' is now the message file 'message.txt' and contains error messages, warnings and information including all messages posted on the user interface. **(10811)**
- ⊕ The name of the product has been changed to PTV Visum. **(11017)**
- ⊕ The student version of PTV Visum, which is offered for download for free without registration now exhibits the following regulations:
  - Network size is limited to 30 zones as before.
  - The software is usable for one year after publication. Please upgrade to the current release afterwards.
  - Data written with the student version of PTV Visum is flagged by a water mark and can ONLY be opened by the student version.
  - The student version has a run time restriction of 45 minutes per session. After this time, Visum will ask to save the current data and then shut down. It can be restarted immediatly. **(9015)**

#### **Network comparisons:**

- ⊕ The attribute set of existing version comparisons can now be altered through the new Button *Edit*. **(9430)**

- + Version comparisons can now operate in two different modi. In the existing version comparisons, the attributes to be compared were copied from the comparison version to the working version once. In the new operation mode, the comparison versions stays opened in the background. This allows for example to use indirect attributes based on the object relations in the comparison version in filter conditions and graphics parameters. **(1830)**

#### Network editor:

- + A new special function *Delete enclaves* is offered for all network object types with area geometry. The function deletes 'holes' in the areas. When the 'holes' are shared between multiple objects (of different types), Visum asks for confirmation. **(634)**
- + A new special function allows to generalize very detailed link polygons with many vertices. The generalization saves storage space and accelerates network drawing. The functionality is available through *Generalize link polygons* on page *Polygons* in the *Multi-edit* dialog for links. Visum then tries to eliminate vertices without changing the general shape of the link polygon within a choosable tolerance. **(8411)**
- + Multi-delete time profile items: Now, multi-delete can be applied to all (or all active) time profile items. **(10616)**
- + The special functions for time profile items and the procedure *Set run and dwell times were extended*. *It's now easily possible to set times for profile points not used by vehicle journeys or to delete such profile points from the time profiles.* **(9361)**
- + 'Edit line route shape' from the timetable editor: The 'Edit shape' button in the 'Edit line route' window is also provided if this dialog window is called from the timetable editor. In this case, the program automatically switches to the network window. This also applies if 'Edit line route shape' is called from the open list. After line route course editing, the program will automatically switch to the 'Edit line route' window again. **(10672)**
- + Connecting line routes: For connected line routes with more than one time profile, too many of these used to be deleted. Now, time profiles with identical names are connected to each other and will no longer be deleted. **(3108)**
- + Model transfer file display: POIs are displayed in separate tables by category. Hierarchical display shows the matrix entries not only via tooltip, but also in the tree. The whole tree can be copied to the clipboard. **(9897)**
- + The operation 'Recalculate the centroids' for zones or other area objects now calculates the true geometrical centroid of the polygon. **(1599)**
- + Transfer times between time profiles are now preserved when aggregation line routes. In case of multiple different values, the maximum transfer time is used. **(7214)**

#### Other Operations:

- + For the procedure Edit attribute a new operation sign has been added that allows calculations 'raise to the power of'. **(10786)**
- + Network check, option 'Viability for ICA': Warnings which refer to pure PuT lane turns will no longer appear, since these lane turns are not relevant to ICA calculations. **(4540)**
- + The algorithm used for determining service trip patterns in the procedure 'Calculate service trip pattern' and within the timetable editor has been revised and unified. It is now capable of detecting irregular trip patterns (such as 6/7/7). The procedure now offers the same options as the timetable editor, allowing to define whether to respect the spatial extent of vehicle journey and to chose between maximising the number of trips or the temporal extent of the service trip patterns. **(11070)**
- + The calculation of linear combinations of matrices and vectors has been optimized for multithreaded execution. This will usually speed-up the procedures 'Combination of matrices and vectors', other procedures using the functionality (e.g. demand procedures) and the interactive calculation in the matrix editor on multicore systems. **(10690)**
- + The procedure and multi-edit-operation 'Intersect' are now also applicable for string attributes as target and source. Aggregate functions like 'Concatenate' and 'Frequency' can be used in these cases. **(3244)**
- + Updating node impedances: Too many 'faulty' nodes used to be recorded, when the Multi-edit special function 'Update impedances at node' was applied to nodes and/or main nodes. This bug was fixed. **(10715)**

#### Passenger surveys:

- + Plausibilization: During plausibilization, specific walk times are now also taken into account when switching from one path leg to the next. So far, they were only effective within the connection search. **(10808)**

#### **Procedure sequence:**

- + Read xml file: When reading procedures from XML-files, it is now possible to insert the imported procedures at an arbitrary position in the exiting procedure sequence. Analogous to reading from binary \*.par files, it is now possible to choose between reading only the procedure sequence, only the general procedure setting or both. **(3227)**
- + The procedure sequence has two new columns Evaluation and Evaluation configuration. They allow to link reporting Add-ins to specific procedures. The Add-in are executed directly after the procedure. **(10977)**

#### **PrT assignment:**

- + In the ICA-calculation for two-way stops right-turns of the major flow (left-turns in left-hand traffic) are no longer blocked by pedestrians. The assumed priority rule has been reversed. This leads to changes in the results when calculating wait times at turns and node legs of the major flow. It can also lead to changes in the results when calculating assignments with ICA. **(11273)**
- + The LUCE assignment procedure was optimized. The new revision brings better performance and improved convergence even with steep VD functions. Furthermore, the procedure has been modified to make use of multithreading. In order to guarantee stable results across systems with different numbers of cores, the number of cores to be used by a LUCE procedure can be set independent from the global settings in Visum. **(10238)**
- + Due to the accelerated impedance calculation, the equilibrium assignment is faster now. **(9466)**
- + Equilibrium assignment: Now, even 0 outer iterations are permitted. Thus, only the route volumes have to be adjusted to the new matrix when starting from an initial solution. When not starting from an initial solution, the procedure works like an incremental assignment. **(10293)**
- + ICA, two-way stops: If the turn types in the major flow are inconsistent, an error message will appear (instead of a warning in previous versions), and the calculation will not be executed. **(10426)**
- + Impedance calculation at node (ICA): For the 'all-way' control type, the computation could be sped up. This also affects the assignment with ICA. **(9645)**
- + LUCE procedure: If for a mesh a user-defined VDF is used which does not calculate in [PCU], no longer TSys-comprehensive balancing will be performed to reach the proportionality. **(9830)**
- + PrT functions: The option for reproduction of results until VISUM version 11.02 with acceptance of an instable shortest path search is no longer available. Now, always the new and stable shortest path search is used. **(10296)**
- + UserVDF: The calculation of user-defined VD functions has been accelerated. **(10469)**

#### **PuT assignment:**

- + Capacity-restraint timetable-based assignment: Connections found by the connection search during the first iteration will not be discarded by the connection search during the second iteration. **(11281)**
- + Fares can now optionally be stored and loaded to/from connection files (\*.con) per demand segment. **(10448)**
- + In the headway-based assignment it is optional possible to use fares based on the fare model as a component of the impedance. **(10228)**
- + Skim calculation: For the calculation of skim data, a time series is required with weights which sum up to a value > 0 within the assignment time interval. If this condition is not satisfied, a warning will be returned now. **(10996)**
- + A new variant of the timetable-based PuT assignment is available which allows to reflect the effects of crowding and capacity constraints on connection choice. Please also refer to the description in the highlights section, the Visum documentation and the example for capacity constraint assignment shipped with the installation. **(3500)**
- + Fare calculation: The calculation was speeded-up in networks with numerous fare systems. **(1590)**
- + Skim 'Fare': For the 'Fare' skim, the PuT skim matrix calculation runs much faster now. **(10812)**
- + The parameter 'B' in the definition of the skim 'Discomfort' has a new default value in newly generated models, which allows to interpret it as a percentage. **(7154)**

### **PuT Line Blocking:**

- ⊕ It is now possible to automatically generate system routes where required for routing of empty trips. The system routes are generated from a shortest path search. The functionality is also available through the context menu 'Create for pairs of stop points' of system routes. The existing menu item 'Create' is renamed to 'Create from Time profiles' **(4612)**
- ⊕ Layover time within a vehicle journey: Optionally (via a line block version attribute), taking the minimum layover time (pre and post processing times) into account can be disabled for the transitions between the vehicle journey sections of the same vehicle journey. **(10509)**
- ⊕ When using volumes in line blocking with vehicle exchange, it's now possible to control per vehicle journey item whether total capacity or seat capacity shall be used or to exclude the item from the evaluation. This is achieved by providing special toggle values (positive -> use total capacity, negative -> use seat capacity, 0 -> exclude) in an attribute of vehicle journey items and choose this switchover attribute instead of the also available global options to always use total/seat capacity. **(10796)**

### **PuT operating indicators:**

- ⊕ The behaviour of the procedures *PuT operating indicators* and *Territory indicators* in case of deletion or geometry changes of territories has been overhauled and warning messages were added. **(11231)**
- ⊕ Include territory-based indicator calculation: Optionally, the procedure can now return PuT-related indicators which had to be calculated by the territory-based indicator calculation procedure in previous versions. **(10328)**

### **Scenario Management:**

- ⊕ Closing the 'Procedure sequence' view: The window is closed before the scenario calculation is saved. Thus, the network window will appear immediately when the result version is loaded. **(10371)**
- ⊕ Floating window: If the user switches to a different language while the window is open, the dialog entries are adjusted immediately. **(10897)**
- ⊕ In addition to procedure sequences from \*.par or \*.xml-files, it is now possible to use Python or VBS scripts as procedure parameter sets for the calculation of scenarios. When editing such parameter sets, the script files are opened in an editor which can be configured per script file type in the Visum options. **(11066)**
- ⊕ Project directories can now be set to arbitrary folders relative to 'SharedData' or the scenario folder. This allows a cleaner organisation of additional project files. **(10189)**
- ⊕ Skim aliases: When aliases are defined for skims, the attribute name entry field is now automatically preset. **(10377)**

### **Schematic line diagram:**

- ⊕ Branching events: Optionally, the 'Branching' icon can only be displayed for branchings which are either the start or the end of a coupled section of at least one underlying vehicle journey. **(11283)**
- ⊕ The Timetable-Network-Graph has been completely revised and is now called 'Schematic Line Diagram'. Please refer to the description in the overview section, the Visum documentation and the example shipped with the installation. **(4532)**

### **Signal time-space diagram:**

- ⊕ The same background colour as in the screen view is now used in the SVG export and in screenshots. **(9575)**

### **TFlowFuzzy:**

- ⊕ The procedure now optionally generates additional diagnostic outputs, which are helpful for debugging problems when the procedure terminates without finding a solution. The Visum-Log-file contains several new indicators about conflicts between count values and an indicator on the influence of the individual counts on the solution. Furthermore, it is possible to generate a separate statistics file documenting the trend of assignment and demand matrix values over the iterations. **(6353)**
- ⊕ The set of potential input counts has been extended by an option for total traffic. If this value is provided, the sum of the demand matrix sums of the considered demand segments with respect to their shares is adapted to this value. In particular, this allows to fix matrix sums to the current value during matrix correction. **(10769)**
- ⊕ When using skim distributions as constraints, the calculation can now optionally be limited to the active zone relations. **(10073)**

## Timetable editor:

- + A new context menu item allows to directly open the dialog for editing line route and time profile of a selected vehicle journey. **(9738)**
- + Changes to the graphics parameters of the timetable editor (and the signal time-space diagram) can now be reverted using the UNDO function. **(9682)**
- + In the graphical timetable editor it is now possible to hide stops which are not served by any vehicle journey **(10603)**
- + It is now possible to copy a marked Vehicle journey. The duplicated vehicle journey is inserted after the marked one. The function is accessible through the context menu if regular service mode is off. **(5533)**
- + The tabular and graphical timetable now offer a search function (press STRG+F3) for vehicle journeys coupled with the current vehicle journey. The coupled vehicle journey are marked, vehicle journey not displayed in the timetable editor can optionally be added. **(3246)**
- + The target item of line block items with forced chainings can now quickly be added to the line block view through a context menu item. In detailed line blocking, line blocks can now be fixed by a context menu item in the line block view. The fixation is achieved through adding forced chainings from all line block items of the line blocks to their successors. Thereby, the line block will not be altered in successive line blockings. **(9048)**
- + 'Find vehicle journey' returns a message: The user now can disable the current filter settings if the vehicle journey in question is not visible in the timetable editor due to the current filter settings. **(10608)**
- + A new context menu item in the line selection of the timetable editor allows to show time profile coupled with of the selected timeprofile, if such exists. **(3236)**
- + Double-clicking a vehicle journey in the tabular timetable now opens the dialog 'Edit vehicle journey'. **(3248)**
- + It is now possible to create vehicle journeys via the line selection tree. On the level of time profiles one can access the dialog "Create vehicle journey(s)" from the context menu. **(11020)**
- + ITimetableEditor: Via the COM interface, the new option 'Hide stops without stop event' in the timetable editor's sequence of stops is now available as method HideUnservedStops. **(10424)**
- + Line block display - system route in the tooltip: For items of empty vehicle journeys, also data describing the used system route will be displayed, if applicable. **(10624)**
- + Non-served stops: Now, served stops are only those where passengers may board or alight. **(10640)**
- + One or more selected vehicle journeys can now be deleted by pressing the DEL-key. **(3247)**
- + Opening the timetable editor after multi-selection of line routes: Similar to the single-selection behavior, the marked line routes are checked in the tree view. The tree also includes those line routes (unchecked) which have not been marked though they belong to the same line as any marked one. **(9853)**
- + Sequence of stops: With a new option in the timetable editor, stops which are not served (i.e. non-profile points of the selected time profiles) can be excluded from the sequence of stops view. **(9345)**
- + Shifting a vehicle journey to another PuT line: Now, the option 'Show only active lines' is provided. **(10551)**
- + Subtrees of the line selection tree can now be expanded and reduced using the context menu. **(1233)**
- + The settings of the timetable editor are now saved to the version file. An open timetable editor is fully restored when reading the version file. **(3581)**
- + The time profile corresponding to the selected vehicle journey is now highlighted in the selection tree view. **(10207)**
- + The Timetable Editor can now be reached from the Line/Line route dialog even when it is already opened. The line selection in the Timetable Editor can thereby optionally be replaced or extended. **(1239)**
- + When changing the line route or time profile of a vehicle journey, the original start and end stop points of the vehicle journey are now preserved instead of using start and end stop points of the item. If the start or end stop points are not apart of the new line route/time profile, the old behaviour is applied. **(3245)**

## User interface:

- ⊕ It is now possible to define an aggregation function (sum, average, concatenation,...) for each attribute displayed in the Quick View window. This aggregation function is used to combine the values when multiple objects are selected. **(1259)**
- ⊕ Menus: The functions 'Print', 'SVG export' and 'Screenshot' for views (timetable editor, signal time-space diagram, schematic line diagram, transfers display of regular services) are now provided in the view-specific menu (rightmost) and, if possible, on a view-specific toolbar. For the network editor, these functions are provided in the 'File' menu, as there is no view-specific menu. **(11257)**
- ⊕ The menus now contain icons for those entries which are also available as toolbar buttons. **(5838)**
- ⊕ The toolbar *Analysis time intervals* can now be hidden, even if analysis time intervals are defined. The menu *View-->Toolbars-->Analysis time intervals* allows to toggle between three states *Visible, Invisible* and *Automatic*, where *Automatic* matches the mode from previous versions. **(6159)**
- ⊕ The window management in PTV Visum was modernized. All windows like lists, node editor, matrix browser or quickview are initially displayed as tabs in certain areas of the main window. From there, they can be dragged out and be docked at other areas of the main window in arbitrary groups. It is also possible to drag these (groups of) windows outside of Visum's main window and place them on secondary displays. For fast access to the most important functions, these have been moved to toolbars on the different windows. The main toolbar now only contains global functions. **(7800)**

#### Visum files:

- ⊕ If a value equals the Minimum or maximum value of a specific data type, it is now written to the \*.net-file as the literal 'MIN' or 'MAX', respectively. **(10730)**
- ⊕ The additional attributes *Code, Executed, Success, StartTime, EndTime, Duration* of the procedures and the messages raised during and at the end of the execution are now saved to the version file. Thereby, they are accessible for analysis after batch runs etc. **(10691)**
- ⊕ The ANM-export now also writes roundabout data. **(10382)**
- ⊕ .rbc files are read into Visum when importing data. The RBC data are now integrated in Visum, i.e. external files are not anymore required. **(10925)**
- ⊕ All matrices of a model can now be saved to an external binary file (extension \*.vmx) besides the version file. This speeds-up saving of large models containing many matrices, because only the modified matrices need to be stored when writing a version file. The external storage is controlled through an option in the File properties and is only available when the matrix cache is active. **(7321)**
- ⊕ It is now possible to import networks exported from PTV Vissim into PTV Visum through a new importer for the ANM file format generated by PTV Vissim. The importer reads basic network and signalization data, Public Transport data and routes are currently not imported. **(4845)**
- ⊕ The ANM export now creates .rbc files because the data of RBC controllers have been integrated in Visum. **(10979)**
- ⊕ ANM: The length of detectors is now written to ANM-files. **(11426)**
- ⊕ The layout files for the quick view window (\*.qla) can now be loaded/saved with custom file names through items in the file menu or buttons in the quick view window. **(7149)**
- ⊕ Database export Access: Now the export also works with the 64 bit version of Access. **(10743)**
- ⊕ Read network data additionally: Reading old network or demand data no longer creates a fare system and allocates it to the PuT lines automatically. **(4624)**
- ⊕ Reading network / model transfer file: Warnings used to be recorded in the error.txt file and did not appear on the screen. Now, these warnings are stored in the trace.txt file. Thus, no irritating error messages will be displayed in the scenario management. **(10368)**
- ⊕ The parameters for the procedures 'Stochastic assignment' and 'Dynamic stochastic assignment' can now be loaded/saved to/from XML-files. A new COM-interface is provided for manipulating these parameters. **(3862)**

#### ! Breaking Changes

##### Calculation results:

- ! The algorithm used for determining service trip patterns has been revised. It is now capable of detecting irregular trip patterns (such as 6/7/7) offers additional options. Therefore, the calculation results may differ from previous versions. **(11070)**

- ❗ The calculation of linear combinations of matrices and vectors has been optimized for multithreading. This can cause small deviations in calculation results from previous versions in the operations 'Combination of matrices and vectors', other procedures using the functionality (e.g. demand procedures) and the interactive calculation in the matrix editor. **(10690)**
- ❗ The procedure 'Tour-based model - Combined trip distribution / mode choice' has been optimized for multithreaded evaluation. This may eventually lead to small deviations from previous results. **(10111)**
- ❗ The PrT assignment LUCE was optimized and now makes use of multithreading. Assignment results can therefore differ from previous versions. **(10238)**

#### COM-API:

- ❗ As a side effect of the changes to logging and tracing (10811), the Visum.Messages container now contains ALL messages of the appropriate priority, not only those suppressed on the user interface. **(7212)**
- ❗ As an implication the new window management system, the method *IGraphic::ArrangeWindows* has become obsolete has been removed. **(6030)**
- ❗ Empty attribute values are now correctly returned as empty Variants. **(10423)**
- ❗ In conjunction with the extensions of version comparisons, the method *Visum.CreateVersionComparison* was renamed to *Visum.CreateVersionComparisonBasedOnAttributes*. **(1830)**
- ❗ Methods creating a new network: Calling methods which create a new network and thus will initialize the procedure sequence is no longer permitted in the context of a procedure sequence. These are the concerned methods:  
*IVisum.LoadVersion*  
*IVisum.LaodNet* (only, if not additively)  
*IVisum.LoadAccessDatabase* (only, if not additively)  
*IVisum.LoadFromMsSQLServerDatabase* (only, if not additively)  
*IVisum.ImportShapefile* (only, if not additively)  
*IVisum.ImportEmmeProject*  
*IVisum.ImportHafasProject*  
*IVisum.ImportPuTProject* (HAFAS projects only)  
*IVisum.ClearNet* **(11249)**
- ❗ The interface for the balancing parameters of the different PrT assignment procedures 'INetBalancingPara' has changed. So far, individual rows of the balancing parameters could be retrieved and manipulated through 'NetBalancingItemParameters()'. Rows could be added/removed through 'AddNetBalancingItem' and 'RemoveNetBalancingItems'. The new interface is designed to retrieve and set all balancing parameters at once. The new methods 'GetItems' and 'SetItems' use two variant arrays to return or set the parameters for the numbers of outer and inner balancing iterations. **(3862)**
- ❗ The Method *Visum.CalcPartNet* was renamed to *Visum.CalcSubNetwork* for better matching the user interface. For downward compatibility, the old method is still available as 'deprecated'. **(10279)**
- ❗ The table *NetParameters* has been renamed to *Net*. The COM-Object *Visum.Net.Netparameters* has been removed and the functionality relocated to *Visum.Net*. Therefore, instead of *Visum.Net.Netparameters.AttValue*, *Visum.Net.AttValue* must be used to access the net parameters. **(10258)**

#### Data model:

- ❗ The attributes *Inscribed Circle Diameter*, *Entry Radiu*, *Entry Width*, *Approach Half Width*, *Flare Length*, *Entry Angle*, *Grade Separation* and *KimberHollis c-factor* were moved from links to node legs. **(10347)**
- ❗ Attribute Transfer wait time: The calculation of the attribute 'Transfer wait time' at stops and stop points is changed in such a way that it includes not only the wait time of direct transfers but also the wait time of indirect transfers with precedent walk links. **(11323)**
- ❗ Initial- and transfer fares are now defined between fare systems instead of between fare systems and ticket types as before. The attribute "InitialFare" is moved from ticket type to fare system. The attribute "TransferFare" of ticket type is replaced by a new network object "TransferFare" with the attributes "FromFareSystemNo", "ToFareSystemNo" and "u',';Fare". When reading old data, these are adapted to the new scheme. Potential conflicts due to fare systems with multiple ticket types having different initial or transfer fares are handled by only preserving the fare last read. **(4073)**

- ❗ The attributes 'Number of lanes' and 'Lane' of detectors have been renamed to 'Number of lanes on link' and 'Lane on link'. **(10914)**
- ❗ The attributes "IsInterlining" for line routes and "Toll-PrTSys" for link types are obsolete and get removed from the data model. **(4534)**
- ❗ The signal control data is now also preserved when the control type of the node is set to a different value than 'signalized' **(10909)**
- ❗ User defined attributes can now contain empty values. So far, such values were replaced by 0 when written to user defined attributes by operations like multi-edit. **(10560)**
- ❗ When converting from double numbers to integers, Visum now consistently rounds the values instead of truncating as was done in some places before. This can result in return values diverging from previous versions, e.g. in the COM interface. **(10256)**

#### **Demand Operations:**

- ❗ The procedure 'EVA weighting' no longer saves weight matrices to file by default. Saving of these matrices is now optional and the corresponding option is set to 'NO' by default. Therefore, no matrices are written if the procedure is inserted into a procedure flow. When reading existing procedure flows from former versions, the option is activated, so that matrices are written as before. **(11169)**

#### **Graphical Operations:**

- ❗ When adding a condition term to a flow bundle query, also transport systems of type PuT-walk or PuT-aux are now considered by default in the supply. These were deselected before. This change affects the interactive editing of conditions in the dialog as well as the diverse 'CreateConditionXXX' COM methods of the FlowBundle object. **(10901)**

#### **Miscellaneous:**

- ❗ Miscellaneous: U-turns for new links (also links created through COM or by reading network files) are no longer generally opened for the transport systems common to both links but may be closed for all transport systems instead. The behaviour is controlled by a new program option. Thereby, depending on the machine settings scripts and network reading may lead to deviating results. **(11130)**
- ❗ The Addon-module 'Modal split for standardized assessment' is now longer marketed. The functionality is still available for use with existing licenses. **(11014)**
- ❗ The logging of procedures and errors has been revised and the related files have been reorganized and renamed. The former trace file 'Trace.txt' is now the log file 'log.txt' and mainly contains a log of the procedure execution with start- and end times of the procedures. The former error file 'Error.txt' is now the message file 'message.txt' and besides the error messages now also contains warnings and information including all messages posted on the user interface and the user reaction. The message kind is indicated in the file in order to allow filtering. Handling of file names, file locations, project directories and command line options have been adapted, but the old options are preserved for backward compatibility. The COM-Interfaces has also been adapted to the new naming of the protocol files, but the old methods are also preserved and forwarded to the new functions. Empty file names are no longer accepted by the new methods and raise an error. **(10811)**

#### **PrT assignment:**

- ❗ ICA, two-way stop: Right-turns of the major flow (left-turns in left-hand traffic) are no longer blocked by pedestrians. The assumed priority rule has therefore been reversed. This leads to changes in the results when calculating wait times at turns and node legs of the major flow. It can also lead to changes in the results when calculating assignments with ICA. **(11273)**

#### **PuT assignment:**

- ❗ Using stored connections for path calculation. If the assignment is based on stored connections for demand segment X instead of a new connection search, then connections with volume = 0 for DSeg X will be ignored. (Those connections can only exist if DSeg X was assigned together with other DSegs in the first place.) **(11134)**
- ❗ The parameter 'B' in the definition of the skim 'Discomfort' has a new default value in newly generated models, which allows to interpret it as a percentage. Therefore, the value should eventually be adjusted in new models in order to match established experience. **(7154)**

#### **PuT Line Blocking:**

- ❗ When using volumes in line blocking with vehicle exchange, the optional vehicle journey item filter gets replaced by an extended mechanism allowing to specify per vehicle journey item whether to use total capacity, seat capacity or to exclude the item from evaluation. When reading existing parameters, the settings are converted correspondingly, but the previously possible combination of using seat capacity and the filter attribute is no longer viable. In this case, only the filter attribute is read. Therefore, in contrast to the old settings the procedure will not always consider seat capacity, but switch depending on the former filter value. **(10796)**

#### **TFlowFuzzy:**

- ❗ TFlowFuzzy: The parameter 'max. correction factor' was incorrectly applied in exponential for, whereby it was almost never exceeded. The correction will likely result in more frequent cancelations due to this criteria. Also, existing procedures from previous versions which used to pass will eventually now fail due to this correction. Instead of an error, this is now treated as a warning. **(10662)**

#### **User interface:**

- ❗ The behaviour for zooming using the mouse wheel in network editor, graphical time table, line blocking view, matrix comparison, schematic line diagram and smart map was changed. By default, zooming now centers on the mouse pointer position. When pressing STRG simultaneously, zooming centers on the screen center. **(11163)**

#### **Visum files:**

- ❗ If a value equals the Minimum or maximum value of a specific data type, it is now written to the \*.net-file as the literal 'MIN' or 'MAX', respectively. **(10730)**