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15.00-04 [100998] 2015-09-20

+ New Features and Changes

Add-Ins

- + Accelerated Add-In u"";Nested Demand Modelu"";: The AddIn u"";Nested Demand Modelu""; was accelerated for models containing many Demand segments. **(15295)**

Miscellaneous

- + Visum icon with release number: For a better distinction of different Visum installations the PTV Visum icon includes now the release number. **(15263)**

Network Editor

- + Drawing of networks: Drawing of huge networks has been accelerated. **(14640)**
- + Undo of creating or deleting POI categories: Undo and redo can now be used for the creation or deletion of POI categories without deleting the last actions. **(15212)**

PuT Assignment

- + Shortest path search within a stop: The default for shortest path search within a stop was changed to 'Search without restrictions'. This will lead to different assignment results, when an assignment procedure with the new default parameters is applied to existing public transport data. Background: The other options may violate basic rules of the shortest path search and may lead to artefacts in the assignment result. **(15341)**

Timetable Editor

- + Paste vehicle journeys from clipboard: So far pasting vehicle journeys from the clipboard could not be reversed, if they included coupled vehicle journeys. Now it is possible to also use undo for this special case. **(15352)**
- + Usability improvements: Several improvements of the timetable editor have been made:
 - The tool window u"";timetable linesu""; opens with the line selection instead of an empty dialog.
 - Via Icons the graphical and tabular timetable can be accessed from the tool window u"";timetable linesu""; without modifying the line selection or stop sequence.
 - Activating u"";Group by service trip patternsu""; will automatically show the table header containing the service pattern information
 - If the tabular timetable is displayed in the u"";group by service trip patternsu""; mode, new journeys will be displayed in additional groups, in order to identify them. **(13998)**

Timetable Editor, Lists

- + In the drop-down menus of attributes From time profile item index, To time profile item index, From time profile item identifier, and To time profile item identifier of a vehicle journey section only those time profile items are shown where the vehicle journey section can start or end. **(15375)**

Visum files

- + Reading PrT paths from network files: PrT paths referencing more than two successive path items within the same main node could not be read from a network file. This is now possible, intermediate path items within the main node are ignored and warning messages are produced in the message window. **(15288)**

✓ Fixed Bugs


Add-Ins, Demand Procedures

- ✓ Infinite Values in the u"";Nested Demand Modelu"";: If infinite values (infinite large and small) occur during calculation, the procedure continued using u"";0u"";. This issue is solved. **(15298)**

COM-API

- ✔ IVehicleJourneys.RemoveAllItems: The program does not crash anymore if the method RemoveAllItems of the IVehicleJourneys-Object is called. **(15336)**
- ✔ Infinite loop during program start via COM: It could cause an infinite loop if Visum was started via COM and no license were available or no license were chosen. This issue is solved. **(15304)**
- ✔ Start via COM: If Visum was started using COM and license information was out of date, a message was displayed interrupting the program start. This error has been fixed. **(15379)**

Data Model

- ✔ The relation from a turn to its lane turns did not show all lane turns if several lane turns with the same From lane but different To lanes of the same link existed. If there are several outgoing links from a main node to the same To node, then this relation showed also lane turns which did not belong to this turn. This error has been fixed. **(15350)** 

Dialogs

- ✔ 'Selection Off' in filter for lines: If one defines a filter using the button 'Selection OFF' in Tabs Line, Line route, Line route item, Time profile or Time profile item, respectively, the selection is lost after closing the filter dialog for PuT lines. This error has been fixed. **(15293)**

Formulas

- ✔ Initialize formula matrices: Formula matrices cannot anymore be initialized. 'Initialize' can only be applied to data matrices and changes their values to zero. So far the initialization of a formula matrix resulted in the deletion of the formula itself. **(14807)**

Graphical Procedures

- ✔ Flow bundle with vehicle journey section conditions: Visum won't crash if a graphic parameter is imported, which contains a flow bundle condition of a vehicle journey section, which won't exist in the network. **(15321)**

Graphics

- ✔ Diagrams of Enumerations: It's possible to display attributes containing enumerations. **(15331)**
- ✔ End label in route course display: At contiguous segments, which contains the same aggregation but no joint route course, the end label was displayed. This issue is solved. Beside that the calculation of the route course view is accelerated. **(15092)**
- ✔ File based backgrounds: File based backgrounds couldn't be processed, if they were stored in the project folder. This error has been fixed. **(15326)**
- ✔ Graphic parameters and deleting POI categories: After undo of a deletion of a POI category, the original graphic parameters haven't been applied, but the default parameters. This error has been fixed. **(15317)**

I/O Interfaces

- ✔ Storage of travel times and length attributes from GPX data: The length and time derived from GPX data is stored at the path element, which represents the current section, where the data was collected. A user defined path attribute is introduced which represents the time and length offset between the first imported trackpoint and first path item. **(15283)**
- ✔ Synchro import: If in the input Synchro network two nodes are connected by multiple links with intermediate nodes (of Type 'Bend'), the data could not be imported. This is now possible. **(15314)**

Lists

- ✔ Abort calculation of PuT path lists: Visum could crash if the calculation of a PuT path (-legs) list was aborted by the user. This issue is solved. **(15346)**
- ✔ Aggregation results when writing version files: If lists with aggregation results existed, the aggregated values became occasionally invalid. This error has been fixed. **(15266)**
- ✔ PuT path legs: During the creation of a PuT paths leg list the program could crash in certain circumstances. This error has been fixed. **(15328)**

Matrix Editor

- ✔ Filter in matrix view options: To set a filter in the view options of the matrix editor could take a long time. This functionality has been accelerated. **(15277)**

Matrix Estimation

- ✔ Missing paths for TFlowFuzzy: TFlowFuzzy cannot work, if routes are not saved during the assignment prior matrix estimation. An error message is shown if the matrix estimation procedure fails because of missing routes. **(14508)**
- ✔ Progress statistics of TFlowFuzzy: If no directory has been specified for the output of the progress statistics, the file has not been saved in the corresponding folder for other output data in the project directory settings. This error has been fixed. **(14757)**
- ✔ Use of filter matrix in TFlowFuzzy: The program does not crash anymore if a filter matrix is used to only update active OD relations (option 'Adjust only active OD pairs'). **(15290)**

Miscellaneous

- ✔ Behaviour when dongle is not found: If more than one license is selected for usage and the first checked license is not available (e.g. due to a non-accessible dongle), the user was prompted to select a different license instead of checking the other selected entries first. This error has been fixed. **(15310)**
- ✔ Localization of messages for license management: Some messages with respect to license management were not localized. This was fixed. **(15265)**
- ✔ Multiple licenses on the same dongle: When multiple licenses are hosted on the same dongle, and the modules of one license are a subset of the modules of another license, the license with the smaller set of modules could not be used. This was fixed. **(15334)**

Network Comparisons

- ✔ Formula attributes in networks loaded in the background: The network comparison with networks loaded in the background didn't consider the values of formula attributes. This issue is solved. **(15320)**

Network Editor

- ✔ Editing zones: The program does not crash anymore when editing zones. This could happen when a calculation result of the procedure P+R lot choice exists and the dialog of 'User-defined attributes' was opened. **(15296)**
- ✔ Rotate text objects: It's now easier to access the rotate functionality. **(15148)**
- ✔ Shifting of zone or main zones: The program does not crash anymore when shifting zones or main zones. This was the case when labels or in a diagram attributes of matrix row or matrix column sums have been used. **(14975)**

PrT Assingment

- ✔ Node Impedance calculation at signalized nodes: Visum won't crash during the node impedance calculation at signalized nodes if the cycle time isn't an integer. **(15377)**

Procedure Sequence

- ✔ Go to the operation: Visum no longer crashes when two 'Go to' procedures in the procedure sequence have the same procedure as the jump target. **(15345)**

Procedure Sequence, Scenario Management

- ✔ Too many Visum instances: When calculating several scenarios or applying the distributed execution of procedures the number of instances started was not in line with the settings in the user preferences. This was the case for using several cores of one machine as well as for using several computation nodes. This error has been fixed. **(15311)**

Scenario Management

- ✔ Alias for scenario indicators: The entered scenario indicators were not considered in the scenario list in the scenario tab. This error has been fixed. **(15300)**
- ✔ Opening a network during rerouting a line route: Visum won't crash if a network is loaded while a line route is rerouted. This is possible during editing a modification, while leaving the modification without finishing the routing or focussing a list and using the u"";Open versionu""; in the u"";fileu""; menu. **(15276)**

Schematic line diagram

- ✔ Reading of layout file: Opening of a layout file or interactiv changes of the layout in the schematic line diagram could lead to instable results, e.g. different edge courses could be generated for identical changes using the same data. This error has been fixed. **(15303)**
- ✔ Translation of special entries in the legend: The two special entries 'Kantenverläufe (Takt)' (English: Edge courses (headway)) and 'Kantenverläufe (Linie)' (English: Edge courses (Line)) have not been translated into the language of the Visum instance. This error has been fixed. **(15355)**

Timetable Editor

- ✔ Copy and paste of vehicle journeys: If vehicle journeys coupled among themselves were copied it could happen that after pasting these vehicle journeys in the same version file the original coupling information was modified. This error has been fixed. **(15351)**
- ✔ Extending/shortening vehicle journey sections: If vehicle journey sections have been shortened or extended by selecting a From/To time profile item or identifier in the tabular timetable, it was possible to also select time profile items at which boarding or alighting was not allowed. This error has been fixed. **(15371)**

Visum Files

- ✔ Graphic parameter file in XML: In the XML format of the graphic parameter file the size of the arrow and the selection of the transport system was missing. This error has been corrected. **(15376)**
- ✔ Writing model transfer files: After writing a model transfer file the loaded network was considered as changed. This error has been corrected. **(15368)**
- ✔ Writing model transfer files: If the option 'Hide attribute with default values' was active all attributes have been compared and written to the file, also those which were not selected by the user. This error has been fixed. **(15367)**

❗ Breaking Changes

Data Model

- ❗ The relation from a turn to its lane turns did not show all lane turns if several lane turns with the same From lane but different To lanes of the same link existed. If there are several outgoing links from a main node to the same To node, then this relation showed also lane turns which did not belong to this turn. This error has been fixed. As a consequence the results of the ICA calculation change as well as the results of an assignment with ICA. Furthermore, the lane turns are correctly treated also when executing an ANM export. **(15350)** ✔

15.00-03 [100236]

2015-08-24

+ New Features and Changes

Add-Ins

- + Add-In 'Balance matrix': The Add-In allows now to use matrices of all object reference types including main zones and stop areas. **(15156)**

Main Window

- + Transfer graphic parameters, filters and list layouts: Graphic parameters, filters and list layouts can now be transferred from one Visum instance to another. Next to the corresponding drop-down menu there are new icons allowing copy to and paste from the clipboard of the corresponding data. **(8013)**

Network Editor

- + Less dialogs: Some seldom used dialogs are not any longer shown during network editing. Some other dialogs have been improved to make the relevant information and options easier accessible. This has been done e.g. for inserting stop points of deleting nodes. In the user preferences the user can define some defaults for this. **(15014)**

Scenario Management

- + Lock project: It is now possible to lock select components of a project (e.g. individual scenarios or modifications) from being edited. Setting and releasing the lock works by entering a user-defined password. If project files are fraudulently modified outside of the project context, the changed objects are listed for inspection when the project is opened again. **(13053)**

Schematic Line Diagram

- + Attribute 'Number of departures per hour' and variants: The calculation of the different variants of the attribute 'Number of departures per hour' now reflect the pass-through times more precisely. Analogous to the time table editor and the PuT operating indicators, pass-through times are now interpolated based on link-lengths, instead of simply carrying the time of the preceding time profile item forward. Thereby, frequencies are displayed accurately for time profiles with varying stops when the aggregation mode is per line routes etc.. **(14951)**

- Consistent arrival- and departure times: New attributes for directed edges in a schematic line diagram allow to apply a consistent labeling across all transfer nodes for all edges representing the same underlying objects. The attributes provide the arrival- and departure times per hour for the first complete vehicle journey (traversing the entire time profile). Thereby, all labels refer to the same vehicle journey, even in constellations with multiple vehicle journeys per hour. **(14638)**
- Distinguish edges traversed multiple times: A new layout option allows to display and distinguish multiple traverses of the same section between two nodes by a single vehicle journey in opposite directions. If the new option "consider line route direction" is selected, the two directions of the vehicle journey will appear as separate edges. This also works for undirected aggregation levels. **(14459)**

✔ Fixed Bugs

ANM

- ✔ Broken data at nodes with identical coordinates: When two nodes connected by a link have identical coordinates, the ANM export would eventually produce broken data. The link was missing completely, and turns were only present for the first node, leading also to routes using the link being broken. This error was fixed. **(15197)**

COM

- ✔ Checking complex object keys in SetMultipleAttributes and SetMultiAttValues: When setting attribute values through SetMultipleAttributes or SetMultiAttValues for object types with complex composed keys (e.g. line routes), the check for existing objects with the same key did not work properly. This was fixed. **(14472)**

COM, Scenario Management

- ✔ Export partial project via COM: When exporting a partial project from a scenario management project via COM all scenarios instead of only active scenarios have been exported. This error has been fixed. **(15272)**

COM-API

- ✔ Dialog for selecting licence during start via COM: If PTV Visum was started via COM and no Licence was setup, the dialog for selecting a licence blocked the starting procedure till a manual intervention. This behaviour has changed. COM will provide an exception in this case. **(15291)**

Dialogs

- ✔ Editing flow bundle term: In the dialog 'Edit flow bundle term' of Active lines the options 'Active vehicle journeys' and 'Active vehicle journey sections' under Tab 'Filtering' have been colored in yellow even if the selection was unchanged compared to the moment when the flow bundle was last executed. This error has been fixed. **(15248)**

Filter

- ✔ Undo for group filters: For group filters (Stops, Lines, PrT-Paths, OD pairs), changing the set of affected network object types was not undoable. This has been adapted. **(15180)**

I/O Interfaces

- ✔ Import of PuT supply from Visum: So far the import settings allowed to define the attribute 'Number' for the comparison attribute in the source network. The import could fail when several stop points must be created from one stop point or a stop point with this number already exists in the target network. To avoid this cause of failure the selection of 'Number' is not possible anymore. **(14188)**
- ✔ railML export: The .xml file could be invalid, when warnings appeared during the railML export process. This error has been fixed. **(15203)**
- ✔ railML import: The corresponding vehicle section could not be inserted, if at the first or at the last operation control point of a 'trainPart' element boarding and alighting, respectively, is not permitted. Now boarding or alighting will be permitted and a corresponding message is issued. **(15223)**

Junction Editor

- ✔ Leaving the signal timing view: PTV Visum won't crash if the signal timing view is left to another view in the junction editor and there was no signal timing has been applied to the node. **(15287)**

Miscellaneous

- ✔ Starting PTV Visum as a service: PTV Visum won't crash if used in a service environment and no licence has been set up or a licence hasn't been updated on an available hardlock in the network. **(15292)**

Network Comparisons

- ✔ Modifying user-defined attributes: If user-defined attributes are used in a version comparison with attributes these attributes were removed when changing their properties. The user-defined attributes now remain part of the version comparison if the changes are not essential, e.g. concern Code or name (not the ID). **(14766)**

Network Editor

- ✔ Aggregate line routes: The program does not crash anymore when aggregating line routes if line routes without time profiles exist. **(15213)**
- ✔ Join blocked links: When adding links of a link type having the default speed for any PuT transport system set to 0km/h, the t-PUTTSys was set to the maximum value of 6.000.000min. But such a link could no longer be joined with another link in the network editor, because the added t-PUTTSys values exceeded the maximum. This was fixed, t-PUTTSys of the joined link is now also set to the maximum value. **(15217)**

PrT Assignment

- ✔ Assignment with ICA using Lohse: The memory consumption for Assignment with ICA using the Equilibrium Lohse as the underlying assignment was reduced. **(15297 🚩)**
- ✔ Connector shares with and without MPA: Visum no longer crashes, when assignment results exist for some demand segments and connector shares for zones are calculated once with and once without using MPA **(15282)**
- ✔ Matrix time series and connectors by share: If a PrT demand segment uses a matrix time series and if there are zones with multiple connectors using shares for total trips, the demand used within the PrT assignment could be too high. This bug has been fixed. **(15218)**
- ✔ Procedure Route import: The program does not crash anymore during the procedure 'Route import' if the imported routes contained cycles. **(14983)**
- ✔ Warm start in Assignment with ICA: Warmstarting and assignment with ICA did not work when multiple demand segments were assigned simultaneously. In this case, the existing assignment result was always discarded. This bug was fixed. **(15230 🚩)**

Procedure Sequence

- ✔ Load version when the procedure sequence is visible: Visum no longer crashes when loading a version file if the procedure sequence is visible and the user preferences for the window configurations are set to 'Always keep' or 'Read from version file, otherwise retain'. **(15210)**

PuT Assignment

- ✔ Capacity-restrained assignment and circle lines: The program does not crash anymore if in a timetable-based PuT assignment the walk time is 0s and the PuT supply contains circle lines. **(15247)**
- ✔ Capacity-restrained assignment with connection import: If in a timetable-based assignment with capacity restriction and without MPA the routes from a connection file are used, and this file was exported with MPA, the connection file could not be imported correctly. This error has been fixed. **(15222)**
- ✔ Timetable-based assignment with MPA: The timetable-based assignment could not be executed properly, if through the use of MPA more than 65535 virtual zones were generated. This error has been fixed. **(15214)**

Scenario management

- ✔ Cancellation of 'Edit modification': If the process of reading the base version or related modifications is cancelled by the user when editing a modification, Visum did not return to the 'Edit Project' dialog of the scenario management. This error has been fixed. **(15215)**

Schematic Line Diagram

- ✔ Delete line: When deleting a line the entire selection of vehicle journeys was lost in the schematic line diagram if the level 'Vehicle journeys' has been used and the level 'Line and direction' has not been used before. **(15199)**
- ✔ Delete vehicle journeys of an edge: If vehicle journeys of a marked edge are deleted from the selection of vehicle journeys via the context menu, the selection of vehicle journeys was only changed temporarily when the level was set to 'Lines and directions'. The deleted vehicle journeys appeared again after the version was saved and opened again. This error has been fixed. **(15183)**
- ✔ Set window section: When using the icon Set window section to enlarge the rectangle remained until the next drawing action. This error has been fixed. **(15189)**

Timetable Editor

- ✔ Tabular time table: Visum no longer crashes when the regular services attributes are displayed in a layout grouped by service trip patterns. **(15208)**

Visum Files

- ✔ Reading detectors from network and model transfer files: When reading network or model transfer files, the association of detectors to lanes at main nodes did not correctly account for the leg orientation of the cordon links. This was fixed. **(15286)**

❗ Breaking Changes

PrT Assignment

- ❗ Assignment with ICA using Lohse: The memory consumption for Assignment with ICA using the Equilibrium Lohse as the underlying assignment was reduced. Due to the changes, assignment results may change. **(15297 ✔)**
- ❗ Warm start in Assignment with ICA: Warmstarting and assignment with ICA did not work when multiple demand segments were assigned simultaneously. In this case, the existing assignment result was always discarded. This bug was fixed. Therefore, the Assignment with ICA will now regard the existing assignment result for warm starting, leading to different final assignment results. **(15230 ✔)**

15.00-02 [99341]

2015-07-24

+ New Features and Changes

COM-API

- + Multi-delete nodes: The new method `INodes.RemoveNodes` allows to delete multiple nodes at once based on their properties. The criteria for identifying the nodes to be deleted are defined in analogy to the operation available in the network editor. They are passed to the method as attributes of an `IRemoveNodesPara`-object. **(9640)**
- + VDV452-Export in COM: The method `IVisum.ExportVDV452Data` now uses a parameter object for providing the export parameters instead of individual arguments. A template `IExportVdv452Para`-object can be created through `INet.CreateExportVdv452Para`. **(15033 ❗)**

Demand Procedures

- + 'P+R lot choice': The procedure 'P+R lot choice' now expects the utility term to be specified as utilities instead of costs (larger numbers result in higher attraction of the lot). Therefore, it will usually be required to apply negative coefficients to skim matrices (costs). **(15174 ❗)**

Dialogs

- + Deleting multiple POI-categories: Multiple POI-categories can now be deleted at once in the 'Edit POI-categories' dialog. **(11825)**
- + Editing formulas: Errors in formulas are now already signaled when editing the formula, instead of rejecting the formula just when the dialog is closed. **(13675)**
- + Supply selection of the flow bundle: On the 'Supply' tab of the 'Edit flow bundle term' dialog, a shortcut menu has been added with the entries 'Select all', 'Remove selection for all', and 'Select marked items exclusively'. **(14268)**

Graphics

- + Zooming by mouse wheel: The zooming by mouse wheel works faster now. **(15176)**

I/O Interfaces

- + Couplings in railML-Export: Vehicle journey sections starting or ending in coupled sections can now be exported to railML. This results in extra "trainParts" in the exported data compared to previous versions. If the start- or terminal point of a coupled section is not a stop point, the coupled section is shortened to the best matching section between stop points. **(14979)**
- + Import chained trips from GTFS: If chained trips are present in the input GTFS data (defined through the `Block_ID` field in `trips.txt`), those are now considered when importing to Visum. **(14441)**

Installation

- ⊕ Operation as CodeMeter network license server: If the setup is executed on a computer which is already operating as a CodeMeter network license server, this is now detected and it is offered to cancel the setup. This shall allow to assure troubleless work. Because the installation procedure updates the CodeMeter runtime, this disrupts the license server operation. Therefore, the installation should be done when the license server is not accessed by software users. **(15168)**

Junction Editor

- ⊕ Vissim-Preview: The Vissim-Previewer is now based on PTV Vissim 8. **(15152)**

Miscellaneous

- ⊕ Runtime fallback to different license: When the license used in a PTV Visum session becomes unavailable (e.g. due to network connection breakdown), Visum now tries to fall back to any (equal or superior) of the other licenses selected in the license manager. The license number does no longer need to be identical to the license used at startup. **(15191)**

Other Procedures

- ⊕ Signal offset optimisation: The procedure 'Signal offset optimization' is now also available in 64-Bit installations of PTV Visum. **(14935)** 🚫

PuT Assignment

- ⊕ Assignment with MPA: The combination of the volumes after an assignment with MPA has been accelerated. **(15080)**
- ⊕ Capacity-restricted timetable-based assignment: The timetable-based assignment with capacity restriction has been accelerated. **(15145)**

Scenario Management

- ⊕ Integrate project: The inverse operation to 'Export partial project' is now available in scenario management. Components of another project can be integrated into the currently loaded project. Of course, this only works if the projects share at least some common features, e.g.. Using both, the 'export partial project' and 'integrate project' jointly supports workflows for distributing project work to across several contributors or organisations. **(14987)**

Timetable Editor

- ⊕ Improvements: The tabular timetable editor got some small improvements. The attributes at pass-through stops are shown in tooltips. Attribute values are generally centered. The selection in the vehicle journey items is synchronized with the global stop point selection. Settings for service trip patterns in the regular services mode can be altered directly from the grid. **(15177)**
- ⊕ Repeatedly traversed stops, Opening from search windows: If a stop of a line route is traversed repeatedly and the respective line route items are allocated to the same item of the stop sequence, in the tabular timetable, this is indicated by appending '...' to the output. The tooltip displays the attribute values of all traversings. Moreover, both timetable editors as well as the block editor can now be opened directly from different search windows, e.g. for links, stop points, or blocks, via new shortcut menu entries. The object selection is automatically adjusted to the selected search hit. **(13784)**
- ⊕ Scrollbars and scrolling behaviour: The upper horizontal scroll bar was removed from the tabular timetable editor in order to gain extra space. The vehicle journey are now scrolled in live mode when moving the scrollbar, not only when the bar is released. **(13912)**

🟢 Fixed Bugs

Add-Ins

- 🟢 CalculateMatrix: If string comparisons were used for the expression in "changing cells only if", the calculation was canceled with an error message. This bug was fixed. **(15193)**

Data Model

- 🟢 String length of indirect attributes: The maximum string length for attributes under Network settings can be exceeded if the aggregate function Dictinct or DistinctActive is used for indirect attributes of at least two relations. **(15167)**

Demand Procedures

- ✔ P+R leg split without demand: If the procedure 'P+R lot choice' was executed without input demand (e.g. in the first iteration of a feedback loop), the input demand of the following 'P+R leg split' procedure got multiplied. This bug was fixed. **(15158)**

Dialogs

- ✔ Edit POI-Categories: The Undo-function did not work properly after adding, editing or deleting POI categories. The command history was reset without warning, and in some situations Visum crashed. A messagebox now warns about the reset of the command history when adding or deleting POI categories (this can be switched off) **(15065)**
- ✔ railML-Export: Visum no longer crashes when the attribute selection in the dialog 'Export to railML' is changed after the dialog was already opened before for another network loaded in the same Visum session. **(15155)**

Formulas

- ✔ Data type for indirect attributes: The data type for indirect attributes of matrices used in formulas (e.g. through the 'Context' keyword) was not always determined correctly. This could lead to unjustified error messages, warning that an operator is not applicable to the data. This was fixed. **(15157)**

I/O Interfaces

- ✔ Couplings in railML-Import: When 'commercial trains' (with couplings) were imported as multiple vehicle journeys due to alternative route courses on different valid days, only the first resulting vehicle journey was coupled. This bug was fixed. **(15159)**
- ✔ GPX import: The import of GPX tracks no longer leads to a crash if a track point is allocated to a path item without a time and if the journey time at the path item is determined on the basis of the track point. **(15133)**
- ✔ Messages during export to database: When errors occur during the export of lists to databases, it was not possible to suppress further similar messages ('No further warnings'). This is now possible. **(15166)**
- ✔ SATURN-Import with empty rows: When a row in a *.dat-file only contained blanks, the SATURN-Import would get tracked in an infinite loop. This bug was fixed. **(15206)**

Junction Editor

- ✔ Vissim-Preview for roundabouts: The ANM-export from the junction editor to the Vissim-Preview did not contain some link attributes relevant for roundabouts. This error has been fixed. **(15200)**

Lists, Junction Editor

- ✔ Deleting via DEL-Key: When pressing the DEL-key the currently selected network objects in the network editor were unintentionally deleted while working in lists of network objects which cannot directly be selected. The same applied to the junction editor if none of the objects were selected. Now the selected network objects in lists and the junction editor, respectively, are deleted, if that is possible, but selected objects in the network editor are unaffected. **(14538)**

Matrix Editor

- ✔ Pan mode in matrix comparison. The pan mode could not be toggled using the space key in the matrix comparison window. This was fixed. **(15050)**

Network Editor

- ✔ Creating POIs with restricted category selection: If the network editor was restricted to one POI category and its subcategories and this category had both one parent category and at least one subcategory, no categories could be selected when creating a POI. This error has been fixed. **(15175)**
- ✔ Creating profile points: The Multi-edit special function 'Create profile points for line route items' used to permit boarding and alighting at the new profile points if they were located at a stop point. This error has been fixed. **(14928)**
- ✔ Marking of linear POIs: In the network, it was sometimes difficult to mark linear POIs, i.e. polygonal POIs with an open polygon, with the mouse. This error has been fixed. **(15103)**
- ✔ POI-allocations when splitting links: When a link with POI allocations was split, the relative positions of the POI-allocations got shifted. This no longer occurs. **(15035)**
- ✔ Special multi-edit functions for POIs: When calling special multi-edit functions from the context menu of the network object toolwindow, the function was always applied to POIs of all POI categories. If the click sensitivity in the network editor was restricted to some POI categories, this restriction was not respected. The error was fixed. **(15085)**

PrT Assignment

- ✔ Formula and data matrices: A crash no longer occurs in different PrT assignment procedures if a data matrix is allocated to one of the demand segments to be assigned while, in the same step, a formula matrix is allocated to a different demand segment. This applied to the procedures LUCE, TRIBUT-Equilibrium_Lohse, Stochastic assignment and Dynamic stochastic assignment. **(15124)**
- ✔ Proportional connector shares and negative demand: The PrT assignments ignore relations with negative demand. But these relations were still considered when calculating capacities for connectors with proportional shares (only for option 'Total trips', not for MPA). As a result, t_cur for such connectors could take very large values. This error was fixed. **(14969 🚩)**

PuT Assignment

- ✔ Memory consumption in capacity restrained timetable-based assignment: The memory consumption for calculating a timetable-based assignment with capacity constraint on systems with many cores was reduced significantly. **(15181)**

PuT Passenger Survey, Lists

- ✔ A crash no longer occurs if a non-trivial path status filter is set in the PuT paths list and imported yet not plausibilized survey data exist. **(15151)**

Scenario Management

- ✔ Comparison patterns and export of partial projects: When exporting project parts to a partial project, list layouts stored in a comparison pattern were not exported. This bug was fixed. **(15196)**
- ✔ Key conflicts for POIs: When new POIs of the same POI-Category were added in separate modifications, key conflicts could occur in scenarios using combinations of these modifications. This is now avoided for new modifications, except when identical key values are used explicitly. **(15164)**

Timetable Editor

- ✔ Cell selection in the tabular timetable: When a cell selection by mouse was started in a cell containing a symbol, the selection could not be extended to other cells. This is possible now. **(15201)**
- ✔ Creating vehicle journeys: The tabular timetable as well as the 'Vehicle journey items' list were not refreshed when creating a new vehicle journey. This error has been fixed. **(15083)**

Visum Files

- ✔ Quotes in \$O-format matrix files: When quotes were used in zone names stored in matrix files in \$O-format, these files could not be read. This bug was fixed. **(13134)**

🚩 Breaking Changes

COM-API

- 🚩 VDV452-Export in COM: The method IVisum.ExportVDV452Data now uses a parameter object for providing the export parameters instead of individual arguments. A template IExportVdv452Para-object can be created through INet.CreateExportVdv452Para. Existing scripts using ExportVDV452Data must be adapted. **(15033 ➕)**

Demand Procedures

- 🚩 'P+R lot choice': The procedure 'P+R lot choice' now expects the utility term to be specified as utilities instead of costs (larger numbers result in higher attraction of the lot). Therefore, it will usually be required to apply negative coefficients to skim matrices (costs). **(15174 ➕)**

Other Procedures

- 🚩 Signal offset optimisation: The procedure 'Signal offset optimization' is now also available in 64-Bit installations of PTV Visum. The results of the procedure may differ from calculations done in previous versions also in 32-Bit installations. **(14935 ➕)**

PrT Assignment

- 🚩 Proportional connector shares and negative demand: The PrT assignments ignore relations with negative demand. But these relations were still considered when calculating capacities for connectors with proportional shares (only for option 'Total trips', not for MPA). As a result, t_cur for such connectors could take very large values. This error was fixed. Due to this change, assignment results might change when proportional connector shares are used in conjunction with option 'Total trips'. This can occur even if no relation with negative demand exists. **(14969 ✔)**

+ New Features and Changes

Formulas

- + TableLookup: The TableLookup functionality has been accelerated significantly. **(15141)**

Installation

- + Improved check for matching installation: The check verifying whether the installation can be updated successfully when updating an existing installation has been improved. It particularly checks whether the basic installation is too old. **(15077)**
- + Python library numpy: The version of the numpy library supplied with PTV Visum within the scope of the Python installation has been upgraded to version 1.9.2. **(14800)**

Lists

- + Percentage format: It is now possible to enter percentage values in lists for all numerical dimensionless attributes, independent of the current display format. This also allows to read attribute files (*.att) containing columns with percentage values. **(15038)**

PrT Assignment

- + Number of CPU cores for LUCE Assignment: The LUCE assignment procedure now determines the number of available physical CPU cores directly from the system information. The calculation will be restricted to this number of threads in order to avoid usage of slower virtual cores. **(13335)**

PuT Assignment

- + Wait time at circle line transition (headway-based): During the headway-based assignment, the circle line transition used to be treated as stochastic wait time. However, as a stay on board is modelled here, a deterministic wait time of 0s is now assumed. **(15069** 🚫)

Timetable Editor

- + Copy&Paste vehicle journeys: It is now possible to copy and paste vehicle journeys. This works even in different Visum networks and in different Visum instances. If required, Visum will create the required objects such as lines and line routes. **(14023)**

Visum Files

- + Data with a calendar reference during additive network reading: If you selected the 'Overwrite' mode for the calendar period when additively reading a network file, so far, data depending on the calendar falsely entered the target network if the calendar period of the network did not match the calendar period of the network file since all references to calendar days are specified as index referring to the calendar period. This applies to, for example, valid days, block versions, and chained up vehicle journey sections. These data are now adjusted when reading in the network file so that they keep the actual calendar day. **(15102)**

✔ Fixed Bugs

Add-Ins

- ✔ Buffers around PuT lines: In the Add-In 'Buffers around PuT lines', so far, the buffer size did not consider the projection set in the network. This error has been fixed. **(14973)**
- ✔ Nested Demand Model: Errors could occur when evaluating models with complex model structures (multiple nesting, alternative-specific lambdas on lower levels as common in WebTAG models). This was fixed. **(15123)**

Data Model

- ✔ Editing durations: Wrong values could be stored when editing duration values in the format m:s (minutes:seconds). This was fixed. Additionally, the evaluation of decimal places for durations was restricted to situation when either pure seconds or full durations with hours, minutes and seconds are entered. **(15042)**

- ✔ Special characters in AddIn parameters: Until now, special characters were rejected when setting values for the attribute AddInParameters. However, the parameters of add-ins usually contain such characters. As a result, users could neither set add-in parameters via the respective dialog nor read in XML procedure parameter files with add-in parameters. This error has been fixed. **(15058)**

Dialogs

- ✔ Dialog 'TSys/Modes/DSeg': A crash no longer occurs if you create a transport system while the licenses for PrT and PuT are switched off or if you create a demand segment yet no license (PrT or PuT) is available for any of the existing modes. **(14992)**
- ✔ Improvement of the 'Demand data' dialog: When finishing the entry of a start time on tab 'Demand segments' of the demand data dialog, this entry was not displayed in time format, but the numbers were displayed as entered. Further updates were missing in the dialog. The error has been fixed. **(14993)**
- ✔ Special characters in message windows: The character '&' which is frequently used in formulas was not displayed in message and warning windows. This was fixed. **(15079)**

Dialogs, Demand Procedures

- ✔ Matrix references and P+R procedures: If you edit one of the matrix references in the procedure parameters dialog of the procedure 'P+R lot choice' or 'P+R leg split', the formula was converted to capital letters, including the contained string literals (e.g for a DSeg code). The string comparison, which considers case sensitivity, subsequently produced different results. This error has been fixed. **(15140)**

Formulas

- ✔ Changes to BDA definitions and Undo: If you changed the definition of a user-defined attribute and later undo it, the necessary adjustments at formula matrices were not reset to the previous state. This error has been fixed. **(15046)**
- ✔ Column and row numbers of formula matrices: The calculation of the column and row sums of a formula matrix could yield false and ever-changing values if they were simultaneously called from a parallelized context, for example by calculation of the summation rows in lists. This error has been fixed. **(15128)**
- ✔ Numbers in matrix references: If a number occurred in the first place of a matrix reference which did not exclusively contain numbers (e.g. 'Matrix (3 = [ATTRIBUTE])'), the reference was not resolved correctly. This error has been fixed. **(14878)**
- ✔ Procedure 'Edit attribute' and string formulas: So far, in procedure 'Edit attribute', you could use numerical attributes in a formula even if the target attribute was a text attribute. The value was then implicitly converted into a string. This is no longer permitted. You now have to use the operator 'NumToStr' which explicitly performs the conversion. Furthermore, unnecessary brackets were inserted via the dialog when adding the Concatenate operator to a string formula and brackets in string formulas were not evaluated correctly. Both errors have been fixed. **(15056)** 🚫

Graphical Procedures

- ✔ Evaluating PrT flow bundles: The evaluation of a PrT flow bundle was slowed down unnecessarily when using multiple cores, in fact all the more so the more cores were used. This error has been fixed. **(14835)**

Graphics

- ✔ Turn volumes at main nodes: When drawing turn volumes at main nodes with option 'At the cordon nodes' checked, the smooth color transition did not work. This error has been fixed. **(15001)**

I/O Interfaces

- ✔ Add-In GTFS-Import: When importing files containing some special characters, the Add-In would stop the import. This was fixed and the messages during the import were improved. **(14892)**

Installation

- ✔ 'Silent' installation: Even if a 'silent' installation was required by command line parameter, the user was queried in specific cases. This error has been fixed. **(14374)**

Junction Editor

- ✔ Switching the node in the Vissim preview: If you switched to another node in the junction editor while the Vissim preview was open, the program sometimes issued an error message instead of displaying the newly selected node. This error has been fixed. **(14677)**

Lists

- ✔ PrT path lists: A crash no longer occurs if a procedure sequence is run while the PrT path list is open with a set origin zone filter after deleting the zone used for the filter. **(15024)**
- ✔ Response to network changes: Several analysis lists, i.e. those which do not list network objects directly, did not respond to changes to network objects and furthermore displayed the outdated data in this case. This applied to: all path lists (PrT and PuT), shortest path PrT and PuT, network statistics, all passenger transfer lists, goodness lists, and emissions. This error has been fixed. **(15121)**
- ✔ Territory PuT detail list: Visum no longer crashes when editing the network if the Territory PuT detail list displays projected user-defined attributes in the procedure 'PuT operating indicators' beforehand and the display is grouped by at least one column. **(15078)**
- ✔ Timetable Editor: Jump to the top (Ctrl + Pos1): If you jump to the top using the shortcut Ctrl + Pos1, the list did not scroll up if it contained an analysis row. Similarly, in the tabular timetable, the focus only jumps to the first column yet without scrolling the timetable. This error has been fixed. **(15013)**

Main Window

- ✔ Message window: The message window also displayed messages of the current network in gray. Furthermore, if several messages regarding network objects of the same type were marked, only the first network object was marked in the network editor instead of all. Both errors have been fixed. **(15139)**

Miscellaneous

- ✔ Chinese demo version: The demo version of PTV Visum ran in an infinite loop if it was started in Chinese. This error has been fixed. **(15052)**

Network Editor

- ✔ 'Edit category' for POIs: If the Multi-edit special function 'Edit category' for POIs was called for all (active) POIs via the shortcut menu in the tool window 'Network', it had no effect so far. This error has been fixed. **(15067)**
- ✔ Deleting nodes, connecting links: When deleting a node with two legs and connecting the two adjacent links, the data of the same link was always used, regardless of the user's selection. This error has been fixed. **(15068)**
- ✔ Moving point objects: If two point objects (or points of point/polygonal objects) were located closely enough, the other object was sometimes moved when clicking one object and trying to move it with the mouse. This bug has been fixed. **(15010)**
- ✔ Moving stop points: When moving a link stop point (directed or undirected) along the same link, values of user-defined attributes of line route items were lost, even if the order of all stop points on the link remains unaltered. This error has been fixed. **(14962)**
- ✔ Splitting a link: When splitting a link, the new node was placed at the position 0/0 at first. Only after moving the mouse, the mouse position was used. This bug has been fixed. **(15109)**
- ✔ Swapping line routes: So far, even profile points which were not located at a stop point could be selected as connection point when swapping line routes. The connection, however, does not succeed in this case because vehicle journey sections must not start or end here. Therefore, only profile points at stop points can now be selected as connection point. **(15060)**

PrT Assignment

- ✔ Analysis time intervals in dynamic assignment: When executing a dynamic PrT assignment DUE with option 'Use time intervals as analysis time intervals' deactivated, the current time interval was set back to the first analysis time interval. This error has been fixed. **(15093)**
- ✔ Dynamic stochastic assignment: A crash no longer occurs in the dynamic stochastic assignment if paths which used to be valid become invalid due to the continuous preselection. Furthermore, the independence of paths was not calculated correctly if the search was done for more than one time interval. The error has also been fixed. **(15130)**
- ✔ ICA calculation: So far, slightly different results could occur when repeatedly executing the ICA calculation. This error has been fixed. **(15016)**
- ✔ Parallel execution of the assignment: Creating PrT paths in the context of a PrT assignment calculated with multiple cores no longer causes a crash. **(15107)**
- ✔ Path-dependent impedance components in stochastic assignments: A crash no longer occurs in the dynamic stochastic assignment if impedance components exist per path. Moreover, in stochastic and dynamic assignments, volumes were lost for a transport system if the coefficient for the general impedance was 0 for all demand segments of one transport system and if it was not equal to 0 for at least one other demand segment. This error has been fixed as well. **(15131)**
- ✔ Stochastic and dynamic stochastic assignment: So far, the detour test in the context of the stochastic or dynamic stochastic assignment failed to compare the run times of all links of the mesh distinguishing the paths. This error has been fixed. **(15115)**

Procedure Sequence

- ✔ 'Open' icon for files: Clicking the Open icon in the File column of a procedure step with reference to a file did not always open the right directory (i.e. the project directory of the file type or, if an absolute path was specified, the absolute path). This error has been fixed. **(15027)**

PuT Assignment

- ✔ PuT-Aux in headway-based assignment: In headway-based assignments, paths were sometimes not found if they were covered with PuT-Aux transport systems only. This error has been fixed. **(14926)**

Scenario Management

- ✔ Suppressing the GUI: If Visum was started with the add-on NO_UI so that no user interface is displayed, the admin dialog of the scenario was still displayed after loading a scenario management project. This error has been fixed. **(15066)**
- ✔ Write protection warning: A warning concerning a possibly existing write protection of the respective file is no longer issued when finishing the edit of a modification or when opening the base version. It is not required as the file is only read in both cases. **(15126)**

Subnetwork Generator

- ✔ Transfer of the tour-based freight model: Cutting a subnetwork failed if a demand model of the type 'Tour-based freight' was contained in the network which ought to be transferred to the subnetwork. This error has been fixed. **(15063)**
- ✔ Transfer of tour-based demand model: The generation of a subnetwork with option 'Include the demand model in the subnetwork' activated failed if the network contained a demand model of the type tour-based model including an activity pair with a reference to a time series. This error has been fixed. **(15084)**

Timetable Editor

- ✔ 'Divergence' of the tabular timetable: In specific cases, the tables for vehicle journeys and vehicle journey sections diverged, i.e. columns belonging together were not displayed one below the other any more. This error has been fixed. **(14959)**
- ✔ Marking in the tabular timetable: If you used the arrow buttons of the middle or the lower scroll bar to scroll the tabular timetable, the marking was sometimes lost. This error has been fixed. **(14914)**
- ✔ Optimum column width in the tabular timetable: If you set the optimum column width in the tabular timetable by double-clicking one of the separators in the column header of the items grid, the separators and the column header diverged. This error has been fixed. Furthermore, the calculation of the optimum column width no longer considers the column header but the column width is exclusively adjusted to the content of the cells. **(14209)**

Visum Files

- ✔ 'Effective control type' at nodes and main nodes: After reading in a version file, the attribute 'Effective control type' could display a false value in case of signalized (main) nodes with external control of the signal control (Vissig) if the associated sig file did not contain a signal program. This error has been fixed. **(14977)**
- ✔ Compared attributes in model transfer files: If the compared attributes should also be saved to file when generating a model transfer file, so far, the program only saved attributes of tables which contained at least one object with deviating data. This error has been fixed. **(15087)**
- ✔ Saving matrix data files: A crash no longer occurs if option 'Save matrix data as separate matrix data file' is checked and the version and the matrix file are then saved under a different name for the first time. **(15055)**

❗ Breaking Changes

Formulas


- ❗ Procedure 'Edit attribute' and string formulas: So far, in procedure 'Edit attribute', you could use numerical attributes in a formula even if the target attribute was a text attribute. The value was then implicitly converted into a string. This is no longer permitted. You now have to use the operator 'NumToStr' which explicitly performs the conversion. Furthermore, unnecessary brackets were inserted via the dialog when adding the Concatenate operator to a string formula and brackets in string formulas were not evaluated correctly. Procedure sequences which use the implicit conversions cannot be executed any more without an adjustment of the formula. **(15056)** ✔

PuT Assignment

- ❗ Wait time at circle line transition (headway-based): During the headway-based assignment, the circle line transition used to be treated as stochastic wait time. However, as a stay on board is modelled here, a deterministic wait time of 0s is now assumed. Assignment results of the headway-based assignment change accordingly if circle lines exist. **(15069)** ➔

+ New Features and Changes


ANM

- + Export of certain POI categories: The ANM export of certain POI categories as detectors is no longer possible. (13774 )


Add-Ins

- + Import Google Transit Feed: The import takes walk times between stop areas into account. (12965)
- + Preprocess Balance/Epics: There is a new Add-In, which prepares a Visum network for the application within PTV Balance/Epics (<http://vision-traffic.ptvgroup.com/en-uk/products/ptv-balance/>). (14739)
- + Reporting PrT Counts: The existing Add-In has been extended for validating travel times. It is now possible to compare observed and modelled travel times. This can be done on the level of PrT path level (one value per path) or using detailed time-space-diagrams. (12436)

COM-API

- + Add-Ins via COM: It is possible to execute Add-Ins via COM with a given parameter object. (13948)
- + DocumentName in scenario management: When a scenario management project is open the DocumentName can be retrieved via COM. (14846)
- + Licence information: Various information about the licence can now be retrieved by COM. (14008)
- + Saturn Importer: There is a new COM-function ImportSATURNData for the saturn importer. (13946)
- + Script code in script menu: For new entries in the script menu the script code can now be directly entered. (13340)
- + Set run and dwell times: The XML and COM interface of the procedure Set run and dwell times has been changed. (3877 )
- + The methods Get-/SetMultipleAttributes available for all network object collections can now optionally be applied only to active network objects. The Set-method matches the values to the active network objects by their order and ignores missing or surplus records. (11042)
- + Transforming Coordinates: There is a new COM-function TransformCoordinates, which transforms coordinates between different coordinate systems. (13463)
- + Two new COM-methods allow to perform pairwise checks of the compatibility of modifications
 - IModification.DoesNotOverlapWith() checks if both modifications are completely independent and do not affect the same network objects
 - IModification.CanBeCombinedWith() checks if the modifications can be applied sucessively without any conflicts. This also accepts a list of modifactions or numbers for the check.
 Both methods return a boolean flag indicating the compatibility (14588)

Data Model

- + Conversion of RBC controllers: When converting RBC controllers into signal group-based or stage-based control the information about signal times is largely maintained. (11888)
- + Coupling on vehicle journey level: Couplings represent portions of multiple vehicle journeys (of rail vehicles) conducted in common, which is done e.g. to provide higher capacities on the central trunk of a line, while separating into different breaches in the outer parts. Although the concept is usually applied to individual trips, the Visum data model covered this on the level of time profiles. Actions taken on the vehicle journey level were synchronized back to the time profiles by complex tools and mechanisms. In PTV Visum 15, couplings are now truly modelled on the vehicle journey level. This facilitates the management of the couplings and makes the concept more robust. Furthermore, some limitations of the modelling capabilities are now eliminated, e.g. vehicle journeys can now end within coupling sections. The user interface was adapted to the new data model, e.g. from the timetable editor, it is now possible to define couplings between an arbitrary number of vehicle journeys with shared course sections. (13485 )
- + Evaluation of connections: There are new calculated attributes for stops to evaluate the number of connections that can be reached or are missed. Additionally, in the data model corresponding relations have been introduced for vehicle journey items that enable the evalauation of connections at the arrival stop. (14021)
- + New relations from matrix toll: With the new relations from matrix toll it is possible to access links traversed and nodes. (12907)
- + New signalization type: There is a new signalization type "Epics/Balance local", which can be used to prepare the network for PTV Balance / PTV Epics. (13627)

- + Passenger trip chains: Passenger trip chains are situations in a time-table where two successive vehicle journey of different lines are served by the same physical vehicle. Thus, the passengers can stay seated while the line signs of the vehicle change. While similar concepts exist with ring lines and forced chainings, it was not fully possible to model this situation in Visum up to now. The concept of forced chainings was extended now in order to also cover the passenger perspective on the chaining. If two trips are connected by a passenger trip chaining, the public transport assignment and skimming procedures will not count the connection as an interchange. The connection time is accordingly attributed to the riding time. The shortest path search, fare calculation, public transport indicators etc. have been adapted accordingly. Also, the importers for HAFAS and railML have been extended in order to cover passenger trip chains provided through these formats. **(4181)**
- + Share of bypass volume: The default value for the leg attribute "Share of bypass volume" has been changed to 1.0. **(14130 🚫)**
- + The calculation for overlapping time series items with time intervals has been improved. **(14703 🚫)**
- + Time series in the demand description: In favor of a simplified model several attributes of time series have been removed. The attributes Start interval index and End interval index of time series items have been renamed in Start time and End time, respectively. **(14156 🚫)**
- + Time series items: The attribute Value of time series items has been renamed in Weight. **(14162 🚫)**
- + Time series types in the demand description: The network object Time series types has been removed. The two still existing time series types are available as domain types of time series with the values Shares and Matrices, respectively. **(14717 🚫)**
- + Formular matrices as part of time series of matrix numbers: Formula matrices can now be assigned as matrices for time series of matrix numbers. **(14065)**

Demand Procedures

- + Modelling of Park+Ride: Two new procedures for modelling Park+Ride, namely P+R parking lot selection and P+R leg split, are available. The first procedure calculates for each relation possible P+R lots and distributes the Park+Ride demand. Additionally, skim matrices for Park+Ride are calculated by this procedure which consider the cost of corresponding legs. The capacity of Park+Ride is taken into account and the volume-capacity dependent costs are also included in of the skim matrix values. Based on the distribution of demand across selected Park+Ride lots the procedure P+R leg split generates two matrices that reflect the demand for each of the legs for the corresponding assignment. **(9003)**
- + Tour-based freight model: This new addon module is specifically targeted to modelling commercial traffic. The special characteristics of commercial traffic are mainly brought into the model by a second procedure for freight trip generation. This procedures allows to model the common practice of grouping multiple services into a single tour of a vehicle in an aggregated, macroscopic manner. Please read the overview document for more details. **(14259)**
- + Tour-based model - Combined trip distribution/mode choice: The message for faulty (transformed) utility calculation has been improved. **(10264 🚫)**
- + Utility functions of the Standard-4-Step model: Formulas can be used for the utility function in the demand procedures Trip distribution and Mode choice. This results in a change of the XML format of the procedure parameters and of the COM interface. Access to the utility function is possible through AttValue of the classes IModeChoiceDStratModePara und ITripDistributionDStratPara. **(13736 🚫)**
- + Visem: The tour-based demand model can now calculate the mode choice using a nested choice model. **(12716)**

Dialogs

- + 2D display / isochrones PrT: The settings for the 2D display have been fully redesigned and improved. Also, the settings for the isochrones PrT are now available at the graphic parameters of links. For details please read the overview document. **(1270)**
- + Attribut selection dialog: When selected attributes are moved up or down using the arrows the grid scrolls so that the selected attributes are always visible. **(13092)**
- + Classified display: Dialogs for the classified display have been standardized further. **(14055)**
- + Default value for walk times in stops: A default value for walk times within a stop can be defined in the user preferences. This value is being used when a stop area is added interactively or when a stop area is allocated to a different stop. **(12448 🚫)**
- + Entering dates: PTV Visum has now a modern, more convenient control to enter dates, which allows among other things copy & paste. **(13366)**
- + Formula editor: The options for editing formulas have been extended. There are new entries and buttons which facilitate the definition of formulas. When editing formulas, e.g. by double click of its parts the access to operands and operators are better supported. **(13987)**
- + Point of Interests (POI): POIs are now shown and ordered consistently in all dialogs. **(12694)**
- + RailML and Hafas import dialogs: The grid of the dialogs have been rebuilt to allow for copy & paste of multiple selection. **(10823)**
- + Settings for completing line routes: The settings for the Dialog Completing the courses of line routes are kept beyond one Visum session. **(12927)**

- + Walk times of stops: When editing walk times of stops marked stop area relations in the dialog Edit stop are highlighted in the network editor. **(11750)**

Filters

- + Comparison of numbers with decimal places: To avoid imprecision when comparing numbers with decimal places an epsilon neighborhood is used to examine the filter condition. **(12717)**
- + Editing of filter conditions: Editing, activating and deactivating of filter conditions can now be changed using the Undo and Redo buttons. **(9226)**

Formulas

- + Formula attributes: For numeric formula attributes the data type can be defined like for other user-defined attributes. **(14122)**
- + GEH Statistics: The GEH statistics is now available as function in formulas. The GEH is often used for comparing model and count data, see http://en.wikipedia.org/wiki/GEH_statistic. **(14062)**
- + New functions for demand matrices: Flow bundle matrices, total demand matrices, assigned volume matrices and assigned volume matrices considering the filter for network volumes are available as functions for formulas. **(14778)**
- + TableLooUp: With the new function Table Look-up it is possible to assign values from other network objects or use them in a formula. For example, one can use different factors in a formula depending on the type of the object. **(3343)**
- + Working with strings in formulas: The possibilities of using strings in formulas have been extended. For example, string comparison, concatenation of multiple strings, conversion of strings into numbers and vice versa are possible. **(14104)**

Graphical Procedures

- + Automatic generation of flow bundle matrices: By default demand matrices from flow bundle calculations are saved as formula matrices in the Visum model. Therefore, the procedure Save demand matrices from route volumes is redundant and has been removed. **(12393)**

Graphics

- + Bars for main turns: There is a new option in the graphic parameters for turn volumes that allows for drawing of bars for main turns starting at the cordon nodes. Consequently, volume bars can be displayed continuously in a network with main nodes. **(11265)**
- + Color settings for flow bundle: The graphic parameters to select the color of flow bundle objects have been modified. The color can directly be selected via the button. **(12600)**
- + Display of charts: The display of charts has been substantially improved and several shortcomings have been removed. **(7399)**
- + Display of route courses: The graphic parameters for the display of route courses have been redesigned. In particular, for links commonly used by several lines it is now possible to visualize bars of all objects depending on the aggregation level. **(5878)**
- + When loading graphics parameter, the network viewport is now also set when it's outside the area of the current network **(14444)**

I/O Interfaces

- + GPS Tracking: The GPS Tracking is no longer available. You can use the new GPX importer (11399) to import recorded GPS tracks. **(13494)**
- + GPX-Importer: PTV Visum 15 brings new possibilities for importing data from the GPX format as it is produced by GPS devices etc. Such data usually represents routes or tracks, so they are a combination of the spatial course with timestamps of the waypoints. The importer for PTV Visum offers two different approaches when importing tracks and track segments - both can be applied simultaneously. In the more simple approach, the exact geographical course of the tracks is converted into linear POI objects. This is useful for visualizing the original data. In the more complex approach, the tracks are matched onto the road network already loaded in Visum. The matched course are represented by PrT path objects. **(11399)**
- + GTFS Export: Timetables can now be exported to the GTFS format. **(11170)**
- + GTFS Import: It is now possible to import GTFS data directly from a zip-file. **(14440)**
- + NEMA signal controllers: Older data files which incorporate NEMA controllers cannot be read anymore. **(13493)**
- + RailML Import with ambiguous stop point allocation: Operation control points for which several stop points in the target network can be found are not ignored anymore. Under certain conditions a shortest path search is used to select one of the candidate stop points. **(10836)**

- + RailML import: If there are conflicts of run times between stop and passage points then passage points will not get the flag as profile points. **(14168)**
- + RailML operatingPeriod-element: All attributes that are included in the railML schema for operatingPeriod-elements are available for the import into attributes of PuT valid days. **(14541)**
- + RailML version 2.2: The railML importer can now import railML data version 2.2. The updated list of attributes, which can be imported, is shown in the import dialog (tab attributes). **(13660)**
- + TModel import: The import of TModel files is no longer available. **(13492)**

Lists

- + Attributes with alias: When using an alias for an attribute now the tool tip shows the original attribute name. **(14186)**
- + Conditional formatting: Is now possible to define color schemes, which define the background and text color of each cell. **(11999)**
- + Display of demand segments in path lists: Demand segments from a single assignment can be displayed in separate columns in the same path list. A subattribut for demand segments is introduced for path attributes like OD trips, fare, number of fare points and number of fare zones. **(13486)**
- + Empty values for attributes of type bool: The visibility of empty values for user-defined attributes of type bool in lists has been improved. **(14422)**
- + Export of PrT path lists: The export of PrT path lists have been sped up. **(10791)**
- + Export of lists: It is now possible to save grouped lists to attribute files, into the clipboard and to databases. **(9701)**
- + Formatting of numbers: The possibilities to format numbers have been extended by the thousand separator. There are new options in the user preferences under Formats, Lists and Matrix editor. **(11424)**
- + Paste content from clipboard: After pasting from clipboard the range of cells in which the content was pasted is marked. **(10089)**


Main Window

- + Quick access to filters: Filter files *.fil can now be opened and saved quickly using a dropdown list in the main window (similar to the graphic parameters). **(9348)**
- + Zoom using the mouse wheel: Zoom using the mouse wheel is now possible without explicit selection of the tool window. **(14657)**

Miscellaneous

- + Information about maintenance contracts is now displayed in the license dialog **(12633)**
- + Progress bar on taskbar icon: PTV Visum shows now for long-lasting processes (e.g. reading version files) in the taskbar using different colours the status of the process. **(14281)**
- + The About-Dialog has been redesigned. **(14749)**
- + The Help-menu has been aligned for all products of the Vision Traffic Suite. The COM documentation can now be accessed through a seperate menu entry. **(15015)**
- + Windows Messenges: The number of entries for messages can be increased in the settings for user preferences. **(13135)**

Network Comparisons

- + Model transfer file: It is now possible to choose any version file as base network (not only the currently used network), when creating a model transfer file. **(10507)**
- + Overview comparison: It is possible to compare two Visum version files without saving the corresponding model transfer file. None of the selected version files must correspond to the currently loaded version file. Furthermore, the comparison can be restricted to input attributes. **(10354)**
- + Version comparison for PuT paths: The version comparison for PuT paths has been removed. **(14567)** 

Network Editor

- + Connect line routes: The combination parameters have been extended by an option for the dwell time at the connection point. **(14010)**
- + Copy of line routes: When copying line routes the selection of the new line can optionally be restricted to active lines. **(12901)**
- + DWG 2013 files can now be used as background images. **(13963)**
- + Editing surfaces: When editing surfaces additional information of key combinations are displayed in the status line of the network editor. **(11336)**
- + Hover-effects: When working in the network editor, the user now gets a direct feedback what will happen, if the currently desired action will be executed. E.g. when hovering over an object in the edit mode, this object will be highlighted. In the graphic parameters the user can define the transparency of this marking. **(14452)**

- + In selection for lines and line routes: There are new options to apply the attribute In selection to other objects of the line hierarchy. These options can be accessed through the context menu of the dialog Lines / Line routes. **(10831)**
- + Less dialogs: Some seldom used dialogs are not any longer shown during network editing. Some other dialogs have been improved to make the relevant information and options easier accessible. This has been done e.g. for inserting stop points of deleting nodes. In the user preferences the user can define some defaults for this. **(14447)**
- + Measure distances: Measurement can now be completed with double-click (before: right-mouse click). **(14742)**
- + Mouse pointer: The mouse pointer reflects now the current mode (insert, edit, spatial selection and graphic tools). **(13305)**
- + Network check: There is a new option, which checks the viability of the network for the usage in PTV Balance/PTV Epics. **(14727)**
- + Roundabouts: The default value for the attribute HasBypass has been changed. The attribute is now deactivated. **(14560 🚫)**
- + Scale network: It is now possible to scale networks during the transformation of network coordinates in the network settings (so far only rotation and shifting). **(14301)**
- + Set run and dwell times: The procedure and special function for time profiles have now the same label Set run and dwell times. **(14057)**
- + Shorten lineroute: Line route can now be shortened in the line route dialog (in addition to current possibility of interactive editing in the network editor). In the tab 'Items and time profiles' there is a new icon, which allows choosing the start and end stop points. **(5879)**
- + Stop points on nodes: The attribute directed is deactivated for stop points on nodes from now on. **(14243 🚫)**
- + Swap branches of line routes: It is now possible to swap branches of two line routes at a selected stop point. The departure and arrival times of affected vehicle journeys are maintained. **(13357)**
- + User-defined attributes: There are new types for user-defined attributes available, namely area, speed, or currency, **(14348)**
- + Editing of surfaces and polygon lines: Editing of surfaces and polylines has been simplified. More specifically, it is not anymore necessary to change in a state for editing shapes. The corresponding floating dialogs have been abolished. **(14448)**

Other Procedures

- + Creation and calculation of multiple matrices with ForEach: The syntax for the creation and calculation of multiple matrices has been changed. It is now possible to iterate over one or several types of network objects using a loop variable allowing more intuitive access to network objects and their attributes. **(14368 🚫)**
- + MSA: The procedures Method of successive averages (MSA) for attributes and Method of successive averages (MSA) for matrices were replaced by new functions in formulas. This allows to combine them with other formula functionality for attributes and matrices. The MSA algorithm is provided through a function MSA() which implements the common averaging between iterations with weights $1/N+1$ and $N/N+1$. Custom averaging algorithms can be realized using another new function IterationCounter(). This function returns the current iteration counter of the procedure sequence and thus gives full flexibility about data and weights. When reading legacy procedure parameters, MSA procedures are automatically converted into the equivalent formulas. **(13986 🚫)**
- + Usage of matrix references: It is possible to use matrix references for the selection of matrices in the procedures TFlowFuzzy, Estimate gravitation parameters (KALIBRI), and Go to the procedure. **(13852)**

PrT Assignment

- + Convergence criteria for assignment with ICA: The convergence criteria for assignment with ICA have been extended by two link attributes. Additionally, the list of PrT ICA assignment quality data contains further results. **(13537)**
- + ICA calculation for two-way stop nodes: The upper limit for the capacity calculation of turns of two-way stop nodes has been removed. **(14630 🚫)**
- + Impedance with path level attributes: The stochastic and dynamic stochastic assignments can now consider path-level attributes during the impedance calculation used for calculating the shares for each found route. These stochastic assignments are in particular interesting for the assignment of freight and bicycles, as they can find several paths even if capacity/VD-functions have only limited effect on route choice. **(13766)**
- + Network check: The functionality check network consistency has been extended. The additional options can be accessed through the button Parameters. **(9558)**

Procedure Sequence

- + Attribute selection: An attribute selection dialog is now available for the procedure sequence. **(10193)**

PuT Assignment

- + Coordination in headway-based assignment: If lines are split into several coordinated lines with the same overall headway, the assignment result is now (almost) identical to the uncoordinated scenario. Remaining differences are due to (too) tight cutoff criteria only. **(14240 !)**
- + Headway-based assignment: The procedure has been substantially improved by the systematic removal of dominated transfer options from the search graph. This particularly optimizes
 - * the robustness of results when modifying network or parameters slightly,
 - * the correctness of path choice in the case of multiple transfer options between a pair of line routes, and
 - * computation time. **(14510 !)**
- + Parallel vehicle journeys: Parallel vehicle journeys can result in inconsistencies. Therefore, a warning is triggered. Additionally, a Network-check function has been introduced to find parallel vehicle journeys with the same time profile. **(14514)**
- + PuT transfers: Now the list PuT transfer objects contains the passenger transfers per analysis time interval. **(13318)**
- + Search impedance for the timetable-based assignment: The calculation of the search impedance in the timetable-based assignment has been adapted to the definition of the perceived journey time. The coefficients in the search parameters can be directly transferred to the perceived journey time using the corresponding button. **(14796)**
- + Search parameter in the headway-based assignment: There is an additional search parameter, which determines the number of alternatives at which the exact calculation method is replaced by an approximation. **(14511)**
- + Speed up of headway-based assignment: A significant speed up of path saving during the headway-based assignment could be achieved for cases when the cut-off factor for the maximum share is smaller than 1. **(8052)**
- + Timetable-based assignment with capacity restriction: There is a new function called "DGITM - CGSP (France)" for the calculation of the volume/capacity ratio-dependent impedance. The formula follows french guidelines. **(13761)**
- + Timetable-based assignment: The default coefficients for the calculation of the perceived journey time (PJT) have been adjusted to be more consistent with those from the headway-based assignment. This does not have any impact on already defined assignments. **(14938)**
- + Transfer passengers: A speed up has been achieved by changing the data structures for transfer passengers. The speed up can be observed in the assignment, but also e.g. the OD pair filter is executed faster. **(14488)**

PuT Line Blocking

- + Line blocking with vehicle interchange: The calculation has been accelerated significantly. **(14552 !)**

Scenario Management

- + A new function allows to extract selected project items (the base version plus modifications, scenarios and parameter sets) into a new Visum project. If modifications are common to all exported scenarios, they can optionally be merged into the new base version. This allows to base the new project on a consolidated status. **(13054)**
- + Floating dialogs: The floating dialogs that appeared when editing the base version or modifications have been replaced by an information bar which is integrated in the main window. **(12111)**
- + Log entries: For a selected number of edit operations in the project log entries are automatically generated which include the change and user. **(13123)**
- + Save tra-files: The internal processes when saving tra-files has been optimized. Now existing tra-files are only overwritten, when the new tra-files has been successful generated. **(14948)**
- + Save while editing: When editing the base version or modifications it is now possible to save the current state of editing without exiting the editing mode. **(12877)**
- + Status activ for scenarios: Scenarios have a new attribute called active. The calculation of scenarios and scenario indicators is automatically done for scenarios for which this attribute is switched on. **(12875)**

Schematic Line Diagram

- + Legend: It is now possible to show both the outer level (e.g. frequency) and the inner level (e.g. line name) of classified edge courses in the legend in the schematic line diagram **(12988)**

Subnetwork Generator

- + Demand based on formula matrix: A subnetwork can also be generated if demand matrices are defined using formula matrices. **(13874)**

Timetable Editor

- + Selection of vehicle journeys: It is possible to automatically select all vehicle journeys of a marked line, line route or time profile. To do this, an additional context menu entry has been introduced in the tool window Timetable lines. **(14011)**
- + Symbols for stops: The graphic parameters of the timetable editor now include options to flexibly change the symbols of stops. **(13829)**

- + The layout settings (view port, 24h display,...) which are not part of the graphics parameters can now be saved and restored in layout files (*.tlgt) **(14793)**

Visum Files

- + Precision for number with decimal places: Numbers with decimal places are written to files (.net, .dmd, .att, .tra) according to the parameter for precision under Network settings. **(14017)**
- + Procedure parameter files: When reading procedure parameter files in XML now empty attribute values are set. **(14839)**

Breaking Changes

ANM

- ! Export of certain POI categories: The ANM export of certain POI categories as detectors is no longer possible. **(13774)**

COM-API

- ! Set run and dwell times: The XML and COM interface of the procedure Set run and dwell times has been changed. The new interface UpdateTimeProfileTravelTimesPara has been added. **(3877)**

Data Model

- ! Share of bypass volume: The default value for the leg attribute "Share of bypass volume" has been changed to 1.0. This can lead to differences when opening version or network files, which had been saved with PTV Visum 12.5 or earlier. **(14130)**
- ! The calculation for overlapping time series items with time intervals has been improved. This reduces the possibility of errors. **(14703)**
- ! Time series in the demand description: In favor of a simplified model several attributes of time series have been removed. The attributes Start interval index and End interval index of time series items have been renamed in Start time and End time, respectively. This results in a change of the .dmd file. **(14156)**
- ! Time series items: The attribute Value of time series items has been renamed in Weight. **(14162)**
- ! Time series types in the demand description: The network object Time series types has been removed. The two still existing time series types are available as domain types of time series with the values Shares and Matrices, respectively. This results in a change of the .dmd file **(14717)**

Demand Procedures

- ! Tour-based model - Combined trip distribution/mode choice: The message for faulty (transformed) utility calculation has been improved. The procedure is aborted when trips get lost due the faulty calculation. **(10264)**
- ! Utility functions of the Standard-4-Step model: Formulas can be used for the utility function in the demand procedures Trip distribution and Mode choice. This results in a change of the XML format of the procedure parameters and of the COM interface. Access to the utility function is possible through AttValue of the classes IModeChoiceDStratModePara und ITripDistributionDStratPara. **(13736)**

Dialogs

- ! Default value for walk times in stops: A default value for walk times within a stop can be defined in the user preferences. This value is being used when a stop area is added interactively or when a stop area is allocated to a different stop. **(12448)**

Formulas

- ! Formula attributes: For numeric formula attributes the data type can be defined like for other user-defined attributes. **(14122)**
- ! The unit of attributes was not correctly considered in expressions used in matrix references. This could lead to wrong results and was fixed. Existing matrix reference expressions using attributes with units (e.g. Link[Length]) will now possibly return diverging sets of matrices. **(14929)**
- ! Units of speeds: If speeds and attributes of type short length were used in formulas speeds were converted into m/s and ft/min, respectively. This has been changed. The output of speeds is now always in km/h and mph, respectively. **(14589)**

Graphical Procedures

- ❗ Automatic generation of flow bundle matrices: By default demand matrices from flow bundle calculations are saved as formula matrices in the Visum model. Consequently, COM access to the flow bundle matrix has been changed. The procedure Save demand matrices from route volumes is redundant and has been removed. **(12393 +)**

I/O Interfaces

- ❗ GPS Tracking: The GPS Tracking is no longer available. Sie können jedoch den neuen GPX-Importer (11399) nutzen, um aufgezeichnete GPS Tracks zu importieren. **(13494 +)**
- ❗ NEMA signal controllers: Older data files which incorporate NEMA controllers cannot be read anymore. **(13493 +)**

Network Comparisons

- ❗ Coupling on vehicle journey level: Deleted couplings on time profile level in old model transfer files will not have any impact, as coupling does not exist any more on time profile level. **(13485 +)**
- ❗ Version comparison for PuT paths: The version comparison for PuT paths has been removed. **(14567 +)**

Network editor

- ❗ Roundabouts: The default value for the attribute HasBypass has been changed. The attribute is now deactivated. **(14560 +)**
- ❗ Stop points on nodes: The attribute directed is deactivated for stop points on nodes from now on. **(14243 +)**

Other Procedures

- ❗ Creation and calculation of multiple matrices with ForEach: The syntax for the creation and calculation of multiple matrices has been changed. It is now possible to iterate over one or several types of network objects using a loop variable allowing more intuitive access to network objects and their attributes. Procedure sequences saved in Visum 14 which contain the procedure Combination of matrices and vectors with ForEach are not automatically adapted to the new syntax. **(14368 +)**

PrT Assignment

- ❗ ICA calculation for two-way stop nodes: The upper limit for the capacity calculation of turns of two-way stop nodes has been removed. The calculation of capacity follows now the HCM formulas. **(14630 +)**

PuT Assignment

- ❗ Branch&Bound-Search in timetable-based assignment: The concept of dominance among connections plays an important role in the connection search and thereby impacts the assignment result. The dominance was not consequently applied when special transfer times were defined for stops, resulting in dominated connections remaining part of the choice set. This behaviour was corrected. Assignment results may change slightly in networks containing these rather rare cases. **(14512)**
- ❗ Coordination in headway-based assignment: If lines are split into several coordinated lines with the same overall headway, the assignment result is now (almost) identical to the uncoordinated scenario. Remaining differences are due to (too) tight cutoff criteria only. **(14240 +)**
- ❗ Fare points on circle lines: Fare points on circle lines have not been considered correctly in the fare calculation. This error has been fixed. **(14791)**
- ❗ Farepoints for passing through: When using fare points for the impedance in the headway-based assignment the number of fare points for passing through was not correctly taken into account. This error has been fixed. **(10790)**
- ❗ Headway-based assignment with choice model "Optimal Strategies": The computation of route shares now works correctly even in the case that so many alternatives are considered that some of them are assigned a share below the path share threshold defined in the procedure parameters. Assignment results will change accordingly. **(14430)**
- ❗ Headway-based assignment: The procedure has been substantially improved by the systematic removal of pointless transfer options from the search graph. This particularly optimizes
 - * the robustness of results when modifying network or parameters slightly,
 - * the correctness of path choice in the case of multiple transfer options between a pair of line routes, and
 - * computation time.This modification causes assignment results to change, particularly in the area of transfer flows. **(14510 +)**
- ❗ Preselection in timetable-based assignment: In the preselection step, the treatment of connections partially lying outside of the assignment interval was flawed under certain circumstances, and has been corrected in Visum 15. The error relates to the two preselection options for deleting connections departing before, or arriving after, the assignment period. The temporal comparison between the assignment period and the respective connection interval did not consider day changes correctly, and worked on absolute times instead. This could cause feasible connections to be deleted. The assignment result may change if any of the two affected preselection options is set. **(14306)**

PuT Line Blocking

- ❗ Line blocking with vehicle interchange: The calculation has been accelerated significantly. Calculation results may differ slightly compared to earlier versions. **(14552 +)**

Visum Files

- ❗ Procedure parameter files: When reading procedure parameter files in XML now empty attribute values are set. They are not anymore replaced by default values. **(14839 +)**
- ❗ Invalid control characters: Invalid control characters written to xml files could cause an abortion when reading these files. This error has been fixed. **(14847)**

COM-API

- ❗ Some deprecated functions were finally removed:
 - Visum.Net.CalcPartNet --> use Visum.CalcSubNetwork instead
 - Visum.Net.GetNearestLink --> use Visum.Net.CeateMapMatcher().GetNearestLink instead
 - Visum.Net.GetNearestLinkCache --> use Visum.Net.CeateMapMatcher().GetNearestLink instead, Cache is automatically applied if the same MapMatcher-instance is used for successive calls
 - Visum.Net.GetNearestNode --> use Visum.Net.CeateMapMatcher().GetNearestNode instead
- IVehicleJourney.RemoveItems --> not required anymore **(13752)**

Other Procedures

- ❗ MSA:
The procedures Method of successive averages (MSA) for attributes and Method of successive averages (MSA) for matrices were replaced by new functions in formulas. Therefore, the corresponding COM-class MSAPara and the access functions AttributeMSAParameters, ODMatrixMSAParameters and SkimMatrixMSAParameters at IOperation were removed. Scripts using these functions will no longer work and must be adopted. When reading legacy procedure parameters, MSA procedures are automatically converted into the equivalent formulas. **(13986 +)**