



PTV Visum 2027

New features at a glance



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Imprint

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1 PTV Hub integration

PTV Visum 2027 is integrated with PTV Hub, the cloud-based platform that connects cloud/web apps and desktop applications. New developments in PTV Hub and Visum 2027 expand both worlds equally and include, for example improvements when multiple persons work on the same model together in the form of editing awareness and support for merging and conflict handling.

An overview on the extensions of PTV Hub 2027 can be found through the release communication on PTV Hub - this document here focuses on the highlights which are related to Vissim.

PTV Hub features are only available for PTV Hub-ready desktop licenses and usually require that a Visum model is saved as a cloud model in PTV Hub (e.g. editing awareness).

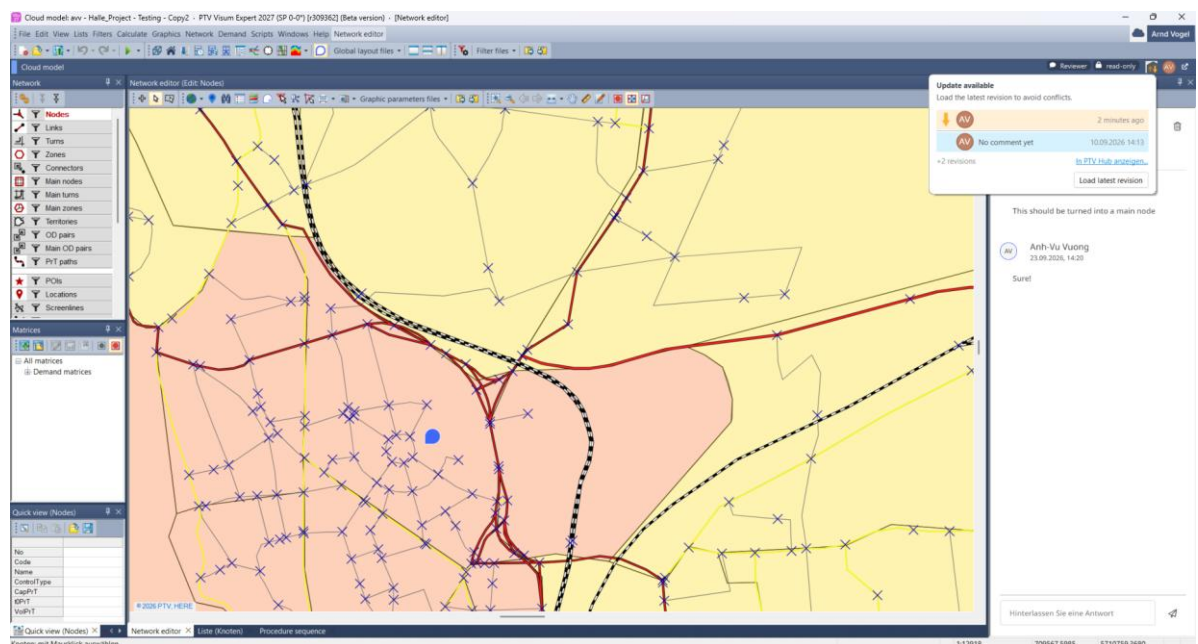
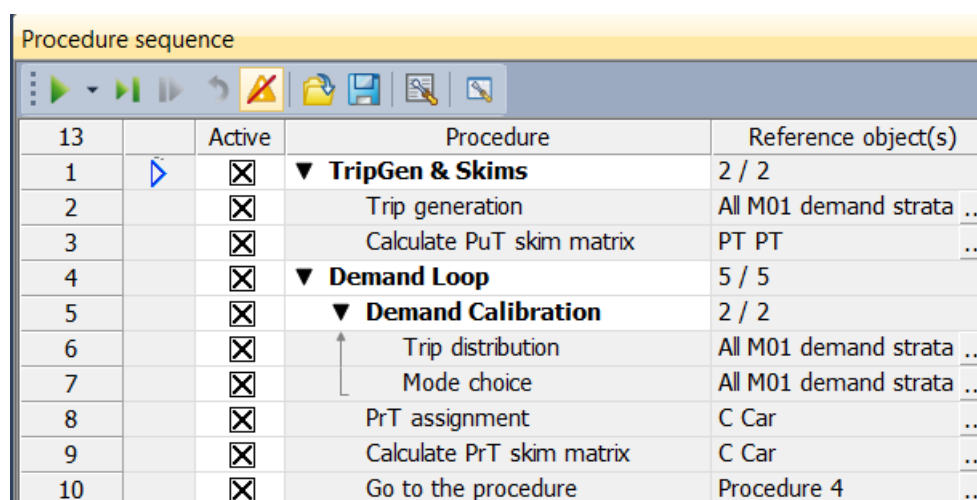


Figure 1: Update to latest model revision with changes from other users

2 Procedures

2.1 Automatic calibration of models

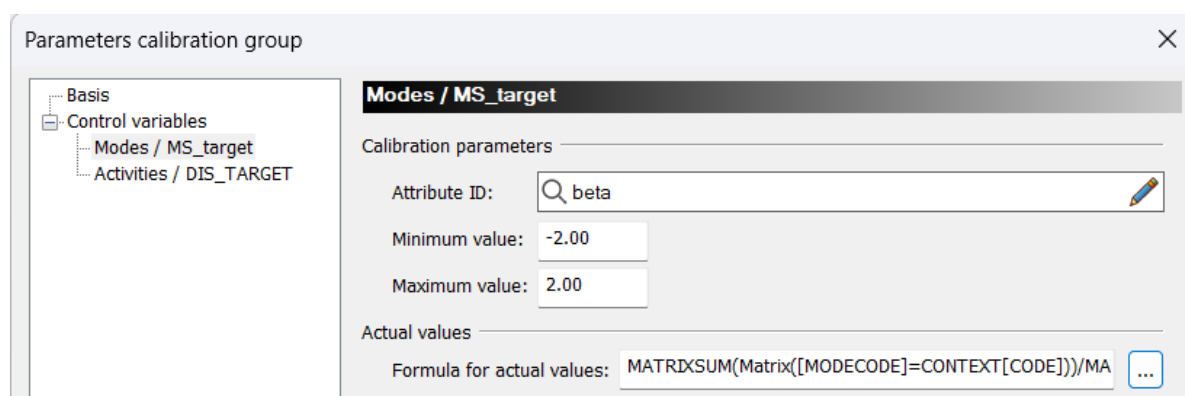
Visum now provides an integrated tool for the automatic calibration of model parameters. Definitions of calibration parameters, target and reference values, and calibration algorithms are stored directly in the model, replacing external spreadsheets and scripts. This increases the transparency and reproducibility of the calibration process. During automatic calibration, selected calibration parameters are adjusted iteratively until specific model results reach the defined target values. The resulting parameter values can then be adopted for subsequent model applications. This integrates model calibration directly into the workflow and particularly supports the regular updating of existing models.



Procedure sequence				
		Active	Procedure	Reference object(s)
13				
1	▶	☒	▼ TripGen & Skims	2 / 2
2		☒	Trip generation	All M01 demand strata ...
3		☒	Calculate PuT skim matrix	PT PT ...
4		☒	▼ Demand Loop	5 / 5
5		☒	▼ Demand Calibration	2 / 2
6		☒	Trip distribution	All M01 demand strata ...
7		☒	Mode choice	All M01 demand strata ...
8		☒	PrT assignment	C Car ...
9		☒	Calculate PrT skim matrix	C Car ...
10		☒	Go to the procedure	Procedure 4 ...

Figure 2: Calibration group in the procedure sequence

A typical application is the calibration of demand models, for example with regard to average trip length or modal split. In the latter case, mode-specific constants can be adjusted until the calculated modal split matches the defined target values. The method can be applied to all types of demand models.



Parameters calibration group

Basis
Control variables
Modes / MS_target
Activities / DIS_TARGET

Modes / MS_target

Calibration parameters
Attribute ID:
Minimum value:
Maximum value:
Actual values
Formula for actual values:

Figure 3: Parameters of a calibration group

In addition to demand models, the tool can be used for other calibration tasks, for example in public transport assignment. Parameters used to evaluate transfers as part of perceived journey

time can be calibrated so that the assignment model reproduces the average number of transfers observed in reality.

Calibration can be performed for individual model components or for the entire model procedure. Statistics provide insights into the progress of the calibration and any deviations from the target values.

2.2 Matrix estimation using grouped objects

The existing matrix estimation functionality in Visum has been extended to allow count values to be considered not only for individual network objects, but also for freely definable groups of network objects. This enables matrix estimation to be performed at a more aggregated level better matching the actual counted entities, for example for main zones instead of individual zones or for groups of stop areas within a city district. Objects are assigned to a group based on a selected attribute: network objects with the same attribute value are treated as one group. Grouping is available for stop areas, zones, links, and turns or main turns.

Figure 4: Dialog of the procedure demand matrix correction with grouping

For matrix estimation, the target value for a group is calculated as the sum of the target volumes of the network objects contained in that group. Accordingly, the tolerances for TFlowFuzzy and the weights for the Least squares variant are aggregated at group level. If standard weights are used for the Least Squares variant, the weights are calculated based on the summed target volume. The extension is available for all variants of matrix estimation.

2.3 Connector-free PT assignment

In macroscopic transport modeling, a suitable connector concept is required. However, even the selection of appropriate stop areas for connecting a zone is very complex. Especially for large zones, the variance of the actual access and egress times is high. A single mean value can only represent

the real conditions inadequately and is often not sufficiently sensitive in scenario analyses. Concentrating demand at a single point makes it more difficult to realistically distribute demand across all stop areas that are accessible from the zone.

The new optional procedure makes the manual creation of connectors for PuT assignment obsolete. The connectors are generated temporarily at runtime of the procedure but are not stored permanently.

The procedure consists of three steps:

1. Disaggregation of zones

The zone area is overlaid with a point grid. Each grid point represents a virtual demand zone. The grid spacing can be configured and determines the number of points within a zone. The demand of a zone is distributed evenly across its grid points.

2. Connection of grid points

Each grid point located within the catchment area of a stop area is connected to the access node of the stop area. Stop areas whose time profiles have already been connected by closer grid points of the same zone are not connected again.

3. Aggregation of grid points

Grid points of the same zone that connect to the same set of stop areas are aggregated. During this step, the mean access and egress time is calculated and the demand shares are added. The aggregated virtual zone retains all relevant connectors. The distribution of demand shares is carried out during assignment.

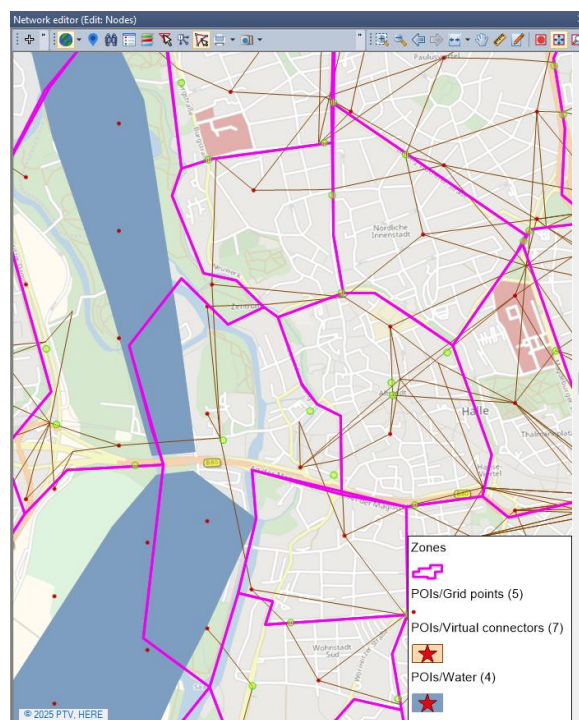


Figure 5: Visualization of virtual grid points and connectors

The grid is generated starting from the respective zone centroid, ensuring that each zone receives at least one grid point. For grid points that are not located within the catchment areas of stop areas, a network setting can be used to specify whether the corresponding demand is not assigned or is distributed to the served areas. If no grid point of a zone is served, the stored demand remains unassigned.

The procedure is available for timetable-based and headway-based PuT assignment as well as for the calculation of skims. Both the conventional line-based PuT supply and optional PT Aux are taken into account. The procedure is activated via a corresponding option in the network settings. When this option is selected, existing PuT connectors in the network become invalid. The number of generated virtual zones is not restricted by the licensed network size. All objects are used exclusively during runtime of the procedure and the network remains unchanged. For better traceability, the virtual objects and can optionally be stored in the model as POIs.

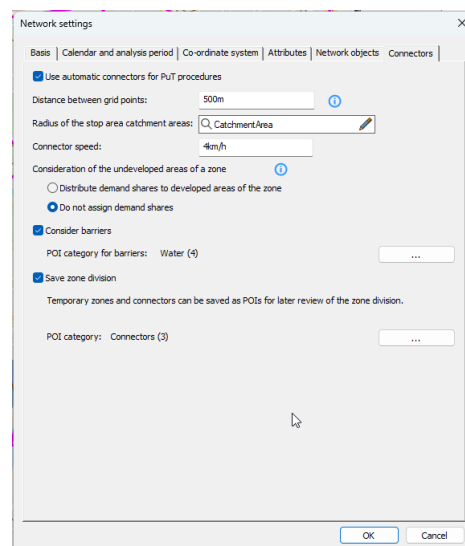


Figure 6: Network settings for activating the connector free assignment

2.4 Impedance calculation based on Rooftop method (PuT)

The Rooftop method is a procedure for measuring the PuT supply quality of an OD pair. It is described in the English Passenger Demand Forecast Handbook and is used by many railway operators as a reference. Unlike other procedures, the method ensures that the level of service does not decrease when additional, less attractive connections are added to the timetable.

The search for connections within an OD pair is initially carried out as usual. As a result, all feasible connections are identified. For each of these connections, the perceived journey time, the fare, and the impedance resulting from crowding are used as support points at the respective departure time of the connection. Starting from these support points, the impedance is increased piecewise linearly along the time axis in order to represent the passenger's adaption time. This step is performed for all connections. The area below the graph represents the impedance and therefore the supply quality for this OD pair. The impedances are weighted according to the demand at the respective point in time. The resulting shape of the area gives the procedure its name.

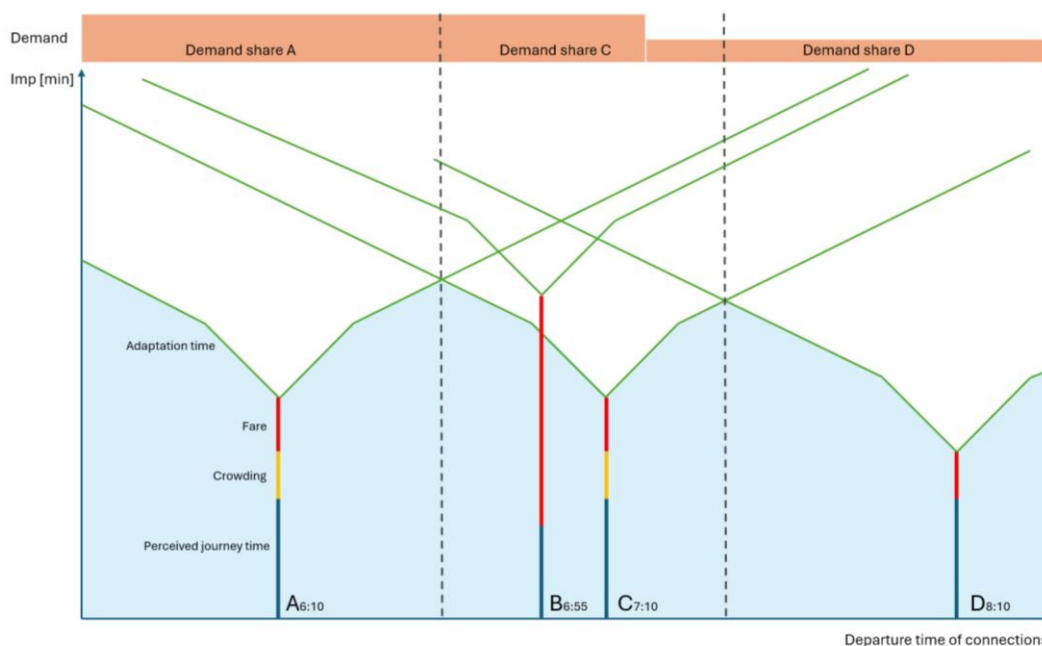


Figure 7: Visualization of the Rooftop method

The output are skim matrices containing the OD-pair-specific impedances. As usual, these can also be output by analysis time interval.

Demand is not distributed on the basis of this impedance calculation. Optionally, however, the user can output the number of passenger trips of the paths that would result from such a distribution. On this basis, the user could determine further skims, such as the mean journey time or the number of transfers, based on the Rooftop method.

2.5 Headway factor α in Optimal Strategies

The headway-based assignment in the “Optimal Strategies” variant¹ assumes not only a random arrival distribution of passengers (Poisson distribution), but also of vehicles. The headways specified for the lines therefore correspond to the expected waiting time for the arrival of a vehicle journey.

In public transport, however, vehicles operate according to a timetable and only in very rare cases arrive randomly. As a result, passenger waiting times are overestimated by a factor of two.

To represent regular headway-based operation while still using “Optimal Strategies,” the algorithm already considers a headway factor α . This factor reduces the specified line headway during search and route choice. A factor of $\alpha = 0.5$ approximates perfectly regular headway-based operation. Factors between 0.5 and 1.0 globally represent the degree of irregularity in headway-based operation.

This factor is available in Visum 2027 when using the Optimal Strategies variants in headway-based assignment. Changing the factor has no effect on the calculation of service frequency.

2.6 Temporal restriction in path choice

In timetable based PuT assignment, path choice is calculated for each OD pair, each path, and each time interval, considering the adaption time for the passenger of the connection. As the assignment period increases, the number of connections and time intervals to be considered rises significantly - especially for multi-day assignment periods or very small time intervals.

With the new parameter, path choice can be restricted in time. Connections that are too far after the desired departure time are no longer considered in path choice. This reduces the number of alternatives to be checked and, at the same time, prevents undesired effects where passengers are assigned to connections on a later day. Such shifts across days should already be represented in demand modeling.

The parameter defines the maximum time span after the desired departure time within which connections are considered for path choice. The default value is 24 hours. All later connections are ignored. If no connections are found for an OD pair within this time span, the corresponding demand is not assigned.

2.7 Extensions for Ride Pooling Services

The procedure that links generated trip requests with the available fleet and creates tour plans from them has been reimplemented. This applies both to the Tour Planning procedure and to the simulation of ride pooling within timetable based PuT assignment. On this basis, several functional extensions for demand-responsive services have been implemented.

Service areas can now be defined in the model for ride pooling services. Trip requests are then restricted to internal traffic within these service areas. The vehicles themselves, however, are not restricted to a single service area and can still move between service areas. This allows to model multiple independent ride-pooling services operating in the same area.

The generation of trip requests has also been improved. Due to the disaggregation of demand and the random selection of origin and destination nodes, unrealistically short trip requests could previously occur, particularly at the boundaries of zones. This is now prevented by a configurable minimum distance between the assigned pick-up and drop-off points.

Within timetable-based PuT assignment, a ride pooling service now acts exclusively as a feeder to line-based PuT. Trips between two line-based path legs are excluded. This results in more realistic connections and reduces the runtime of the procedure.

2.8 Extension to assignment with ICA – use of public transport lanes

The assignment with ICA has been extended by an additional option for estimating the effects of private transport vehicles using public transport lanes. A typical application is the use of bus lanes by taxis.

As part of the assignment with ICA, the proportion of permitted private transport that uses the public transport lane instead of the regular private transport lanes is determined. The calculation is based on separate volume-delay functions for the public transport lane and the regular private transport lanes of the link. Shifting private transport volume to the public transport lane results in a convergence of travel times. Volume is shifted until either the travel times are equal or no further volume can be shifted.

In a similar way, private transport volume is shifted at the outbound turns of links with public transport lanes. The calculation of shifted private transport vehicles takes place after the subordinate

assignment, meaning that the resulting reduction in volume on the regular private transport lanes affects both the ICA calculation at the downstream node of the link and the blocking back calculation.

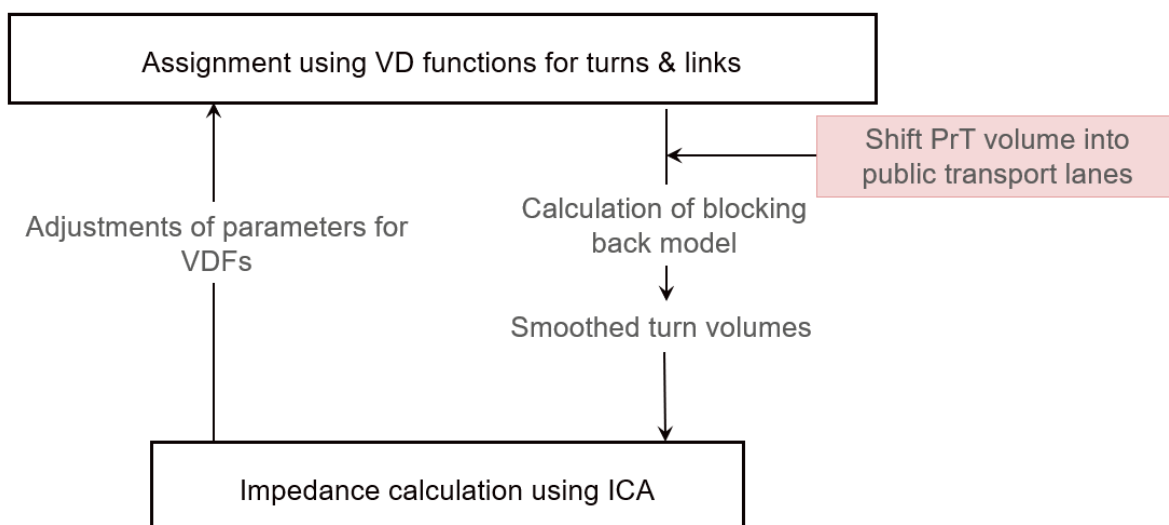


Figure 8: Flow chart of assignment with ICA with the option 'Use of public transport lanes'

Additional output attributes are provided for links, turns, and main turns, containing the shifted volume and the travel times on the public transport lane.

The option can only be used if either the conventional equilibrium assignment or the equilibrium assignment Bi-conjugate Frank-Wolfe (BFW) is selected as subordinate assignment.

2.9 Emissions calculation: Update of COPERT

COPERT has been updated to version 5.9.

The new version includes an update of the fleet data based on the latest available statistics. In addition, the following changes have been made:

- Revision of consumption of light duty vehicles (LDV) running in liquid fuels
- Updated emission factors of diesel VOC & CH₄ of LDVs
- Updated emission factors of diesel VOC, CH₄, N₂O, CO, NO_x, EC, NH₃, PM, SPN₂₃ of Heavy duty trucks (HDT) & coaches
- Revision of PM & PN emission factors from brake wear
- Revision of NMVOC compounds of LDVs

3 Interfaces

3.1 Import of travel times from PTV Flows

With the new import functionality, measured travel times from PTV Flows can be imported into a Visum model and used to calibrate speeds within the Visum model.

PTV Flows is a web-based SaaS application designed to support mobility authorities in monitoring the condition of road networks. For a PTV Flows subscription, a specific network area is defined. The user sets up so-called KPIs. These include relevant road segments for which travel time data is continuously collected. Depending on the selected type of subscription, the collected data is available for different time periods. Within PTV Flows, this data is presented both in tabular form and graphically as a time-space diagram.

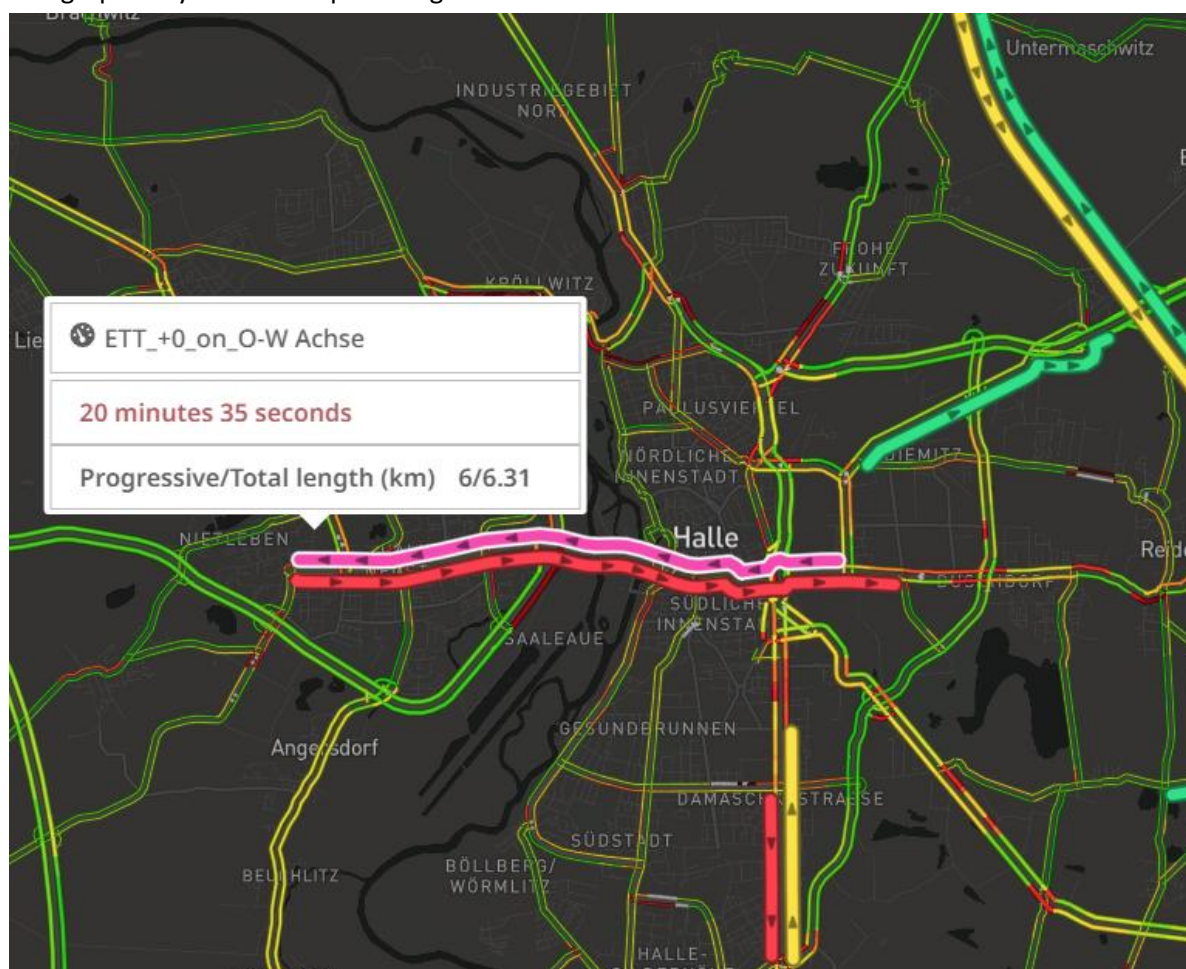


Figure 9: Network area in PTV Flows with selected road section ('KPI')

Travel times are available in different forms. Current and average travel times per weekday and time interval for the past 24 hours can be imported into Visum. The current values represent the data measured within that period. The average travel times are calculated based on the measured data from the past six weeks for a specific weekday and the corresponding time interval.

A prerequisite for importing the data is having a PTV Flows subscription and being logged in. For the selected subscription, a set of KPIs to be imported can be chosen.

In Visum, a KPI is imported via map matching as a user-defined PrT path along with associated metadata (including name, length, and WKT string). The travel times themselves are stored as user-defined attributes (UDA) of PrT path and PrT path items.

During the initial import, these UDA are created for PrT paths and PrT path items. For a model without a weekly calendar, UDA are generated for each weekday and type of travel time (current or average) using a specified base name. For subsequent imports covering other weekdays, these UDA can be reused.

The granularity of the time intervals can be selected. For models with a calendar, the UDA are created in advance and then selected within the dialog.

Measured run times from link sequences (PTV Flows)

Basic settings | Routing | Data transfer

Target PrT path set: 1 FlowsKPI Import travel times Generate path set

☐ Empty path set before import

POI category for the course of imported paths

Category: FlowsKPI (1) ...

☐ Delete existing POIs

Weekday-based target attributes for KPI values

For each day of the week, attribute identifiers for paths and path items are generated from the specified base name as follows: 'Current-Basename-Weekday(TI)' or 'Average-Basename-Weekday(TI)'. If the attributes do not exist, they are generated. If they already exist, the values are extended or overwritten with imported data.

Base name for target attributes: TravelTime

☐ Retain time interval division for existing attributes, no new attributes

☐ Use time interval division of import data

☒ Use existing time interval set for time division

Time interval set: 1 24h hourly

☐ Generate new time interval set for time division

Time interval: 3600s

Save parameters Open parameters Reset OK Cancel

Figure 10: Import dialog 'Data transfer' for models without calendar

The relation between links and PrT path items allows you to analyze time profiles of the imported data on links within the model. To verify the map-matching results, the KPI can optionally also be inserted as a point of interest (POI).

4 Usability and visualizations

4.1 Code completion for script editor

Following the introduction of the new script editor in Visum 2026 last year, script development has been further enhanced with intelligent code completion. It supports both the COM interface and the Python API while taking the exact configuration of the current working environment into account. Import statements and inserted sample code are automatically adapted to the selected environment.

For objects identified from the imported Visum COM API or Visum Python API, the corresponding methods and properties are offered as code completion suggestions. In addition, for parameters representing an attribute ID, the attribute IDs available for the respective object are offered for selection.

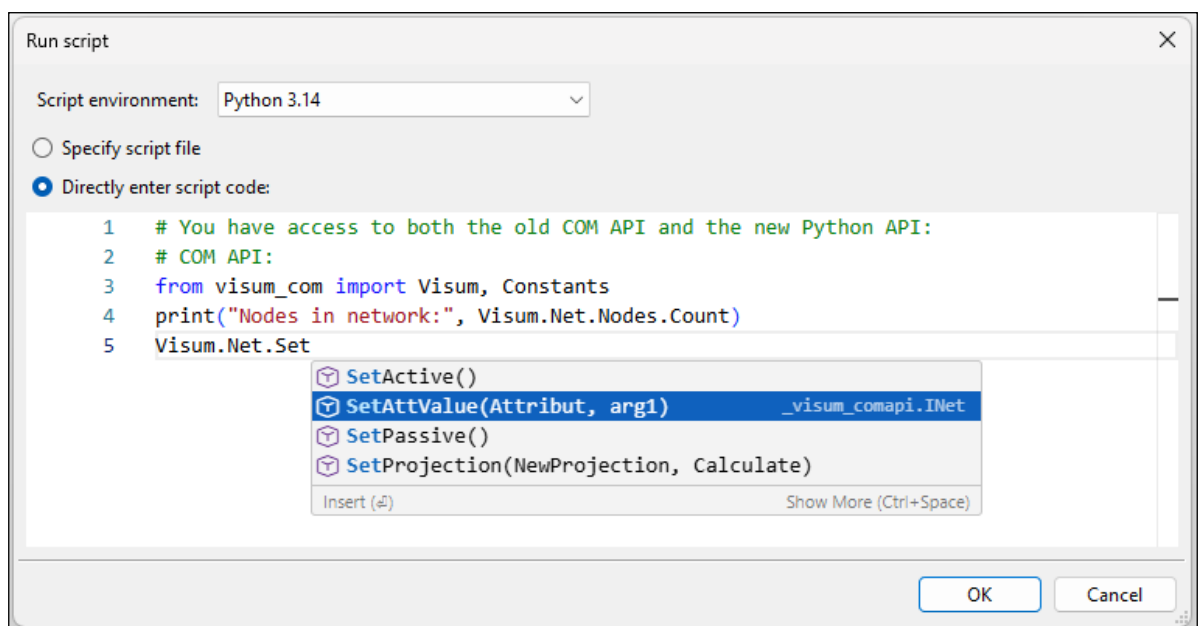


Figure 11: Code completion in the script editor

4.2 Improvement for matrix comparison in pairs

The enhancements to the pairwise matrix comparison enable a standardized comparison of matrix values between two matrices within the same model.

Additional graphic parameters have been introduced for matrix comparison and can be stored in the existing matrix editor graphics parameter file (.gpm).

Furthermore, it is now possible to define the visible area of the display explicitly. These settings are stored in the matrix editor layout file (.mly). However, the absolute axis ranges are not saved, as restoring them in a window of a different size could result in a distorted display. Instead, the matrix values of the lower-left corner and the scaling factors, expressed as 'matrix value per mm' for both the X- and Y-axes, are stored.

When the layout is reopened, these values are restored. While the visible area of the image may change, the display remains undistorted and preserves its correct proportions.

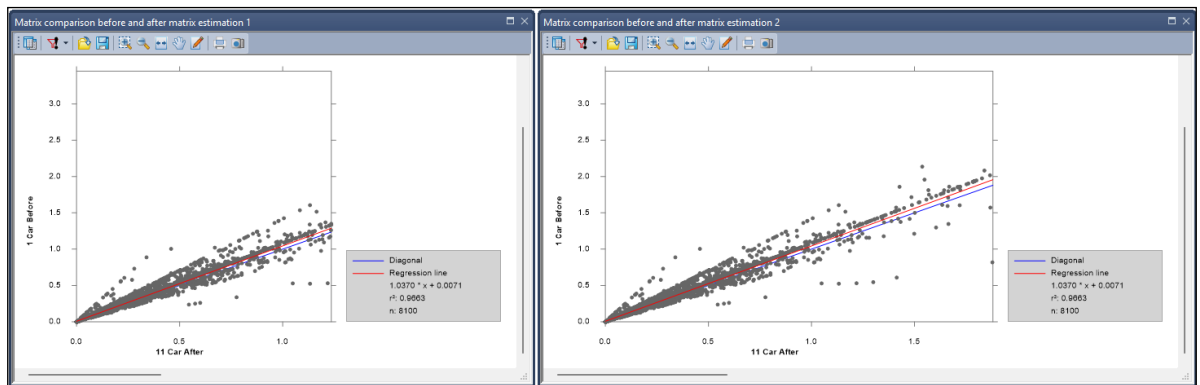


Figure 12: Matrix comparison layout applied in two windows of different sizes

4.3 Flexible file names in the procedure sequence

For all files read or written within a procedure sequence, additional attributes can now be used in the path or file name, allowing files to be stored, for example, in subfolders of a planning scenario, a version, or the specific project.

If you already use procedures in your procedure sequence where a file name is defined as the reference object, those file names will automatically be interpreted as formulas when opened in Visum 2027. For the common use case of simply selecting a file nothing changes in Visum 2027.

Note when entering a file name directly in the field under 'Variant/file' you are editing a formula in which strings must be enclosed in quotation marks (e.g. "KA.ver").

In addition, it is now possible to use more sophisticated formulas to define file names. The option to create a formula can be accessed via the context menu.

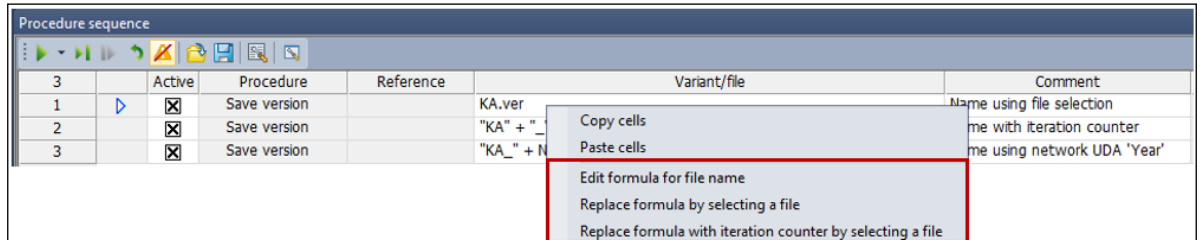


Figure 13: Extended options for defining file names in the context menu

Using the 'Edit formula for file name' entry, you can open the formula editor and, for example, use the values of network attributes to construct the file name.

The 'Replace formula with file selection using the iteration counter' entry provides an easy way to create a file name that includes the iteration counter. Previously, this option was available only in the procedure 'Save version'. It is now available for all file types.

When you hover over the 'Variant/file' column with the mouse pointer, a tooltip displays the file name formula, the resulting file name generated from that formula, and the file name resolved relative to the project directory.

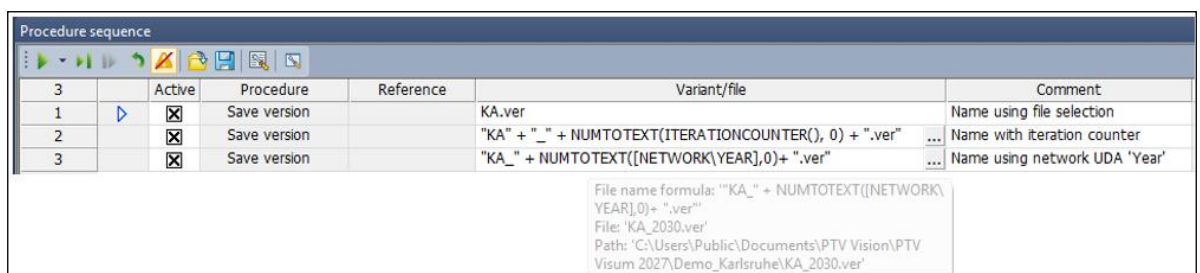


Figure 14: Tooltip showing the file name and path generated from a file name formula

4.4 Modernization of network drawing

The drawing methods used in the Network Editor have been modernized. As part of this work, the underlying graphics library has been replaced. Drawing the network, e.g. when panning and zooming is no more fluent. Slight differences in the graphical display may occur.

Text sizes are now specified consistently in points [pt], as is common in many other applications. Existing graphic parameters that still contain text sizes in millimeters are automatically converted to points when they are read and rounded to one decimal place. The previous scaling factor for on-screen text sizes has been removed.

The SVG export has also been adapted. It now once again generates an HTML document containing both the SVG file and the JavaScript function for layer control. The previous option “Export function to separate file” has been removed.

4.5 Impedances as floating point numbers

Visum now outputs private transport impedances as floating-point values. Previously, impedances were displayed as integers even though floating-point values were used internally for calculations. The resulting rounding could lead to implausible discrepancies, for example when impedances were summed in path lists.

This change improves the transparency and accuracy of the results displayed. It affects, among other things, impedance attributes of network objects and private transport paths, assignment quality lists, the interactive shortest-path search, and impedance indicators.

Assignment procedures that continue to use integer impedances are not affected by this change (Stochastic Assignment, TRIBUT, and DUE).

5 Technical adaptations and other changes

5.1 Provision of software updates

When service packs are provided, update packages (e.g. Update_VISUM_2027.00-01_x64.exe) are no longer offered. Instead, only setup packages (e.g. Setup_VISUM_2027.00-01_x64.exe) are provided. This change is necessary to ensure a clearly defined installation state after an update, including the ability to remove files from the Visum installation directory if required.

5.2 Python environment

The private Python environment used by Visum has been updated to version 3.14. At the same time, several libraries have been updated to newer versions.

5.3 Changes to the COM-API

The following section lists changes to the COM-API for Visum 2027 compared to Visum 2026, which may require adjustments to your custom scripts. Please refer to the Release Notes for a full list of changes.

- **Obsolete attributes:** Some attributes in the procedure parameters have been marked as obsolete. They can still be set, but can no longer be read, and may be removed in a future program version.
PuTSkimMatrixSettings: The settings for defining the discomfort measure (*DiscomfortParaA* and *DiscomfortParaB*) have been moved to the timetable-based assignment parameters (new class *TimetableBasedSpecialSkimsPara*).
PuTSkimMatrixSettings: The settings for defining the path leg attribute measure (*PathLegAggregateType* and *PathLegAttribute*) have been moved to the parameters of the timetable-based assignment, headway-based assignment, and direct assignment (new classes *TimetableBasedSpecialSkimsPara*, *HeadwayBasedSpecialSkimsPara*, and *DirectAssignmentSpecialSkimsPara*).
- *SaveVersionPara:* Due to the change to using a formula for the file name, the option to append the iteration counter to the file name (*AppendGoToCounter*) is no longer necessary. The same effect is now achieved by using the *IterationCounter* function within the formula.
- **Impedance as a floating-point value:** As a result of changing impedance to floating-point values, *IDemandSegment::GetPathImp* now returns a floating-point value instead of an integer.
- **Aliases when copying to the clipboard:** For all list objects (*I...List*), the *SaveToClipboard* method has a new parameter, *UseAliases*, which determines whether aliases should be applied.
- **Removal of deprecated methods:** The access method *IOperation::ReadSurveyDataParameters* has been removed. Its functionality has been provided by the *IOperation::ReadRidershipDataParameters* method for several program versions already.

5.4 Discontinued functionality

The following functions have been removed:

- Add-In Trip Generation Balancing...

The add-in has been removed from the installation. The functionality is already available as part of the demand models.

- Scenario management projects prior to Visum 2020 and Visum Safety projects prior to Visum 2024

The database (MS SQL Server Compact) used for storing legacy scenario management projects and Visum Safety data is no longer maintained and has been replaced in earlier releases of PTV Visum already. Old data could still be read. With PTV Visum 2027, also the reading support for such legacy databases is dropped and the unsupported component is no longer installed on the system.

- Export of graphics to DXF vector format

The export of graphics (e.g. network editor) to DXF vector format was removed as it used an outdated software library which is no longer maintained

5.5 Discontinuation of functionality in future releases

The following functionality will be removed in future versions:

- Dynamic User Equilibrium (DUE)
The private transport assignment procedure DUE is no longer supported and will be removed from Visum in a future release.
- Add-Ins Demand Calibration und Demand Calibration Preparation
Model calibration is performed using calibration groups within the procedure sequence. Therefore, the two add-ins will be removed in a future release of Visum.
- Reading of non-english text files
In future versions, the support for reading text-based file formats such as *.net, *.att, *.tra, *.dmd will be disabled. The support for writing such files in other languages was already removed in PTV Visum 2024
- Matrix formats
Exporting matrices to rarely used legacy formats like \$E, \$S, \$V etc. and reading from these formats will be disabled in future releases. Future versions will continue to support the binary format, the OMX-format and the text-based \$O format. Please adapt Your processes soon if they use one of the legacy formats.
- VBA for internal scripting
The VBA scripting language is no longer supported by Microsoft. Therefore, support for scripts written in VBA will also be discontinued in future releases of Visum.