PTV GROUP

WHAT'S NEW

in PTV Vissim/Viswalk 2024

Imprint

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Content

Preamble

This document provides an overview of PTV Vissim/Viswalk's important changes from version 2023 to version 2024 regarding handling and program behavior. Features which have already been added in service packs of version 2023 are only partially covered in this document. Please see the version 2023 service pack release notes for more of these features. The release notes for versions 2024 SP xy include additional new features which are also not included in this highlights document.

Detailed descriptions of how to use the new functionality can be found in the Vissim 2024 online help and in the document VISSIM 2024 - MANUAL.PDF.

1 Vehicle Simulation

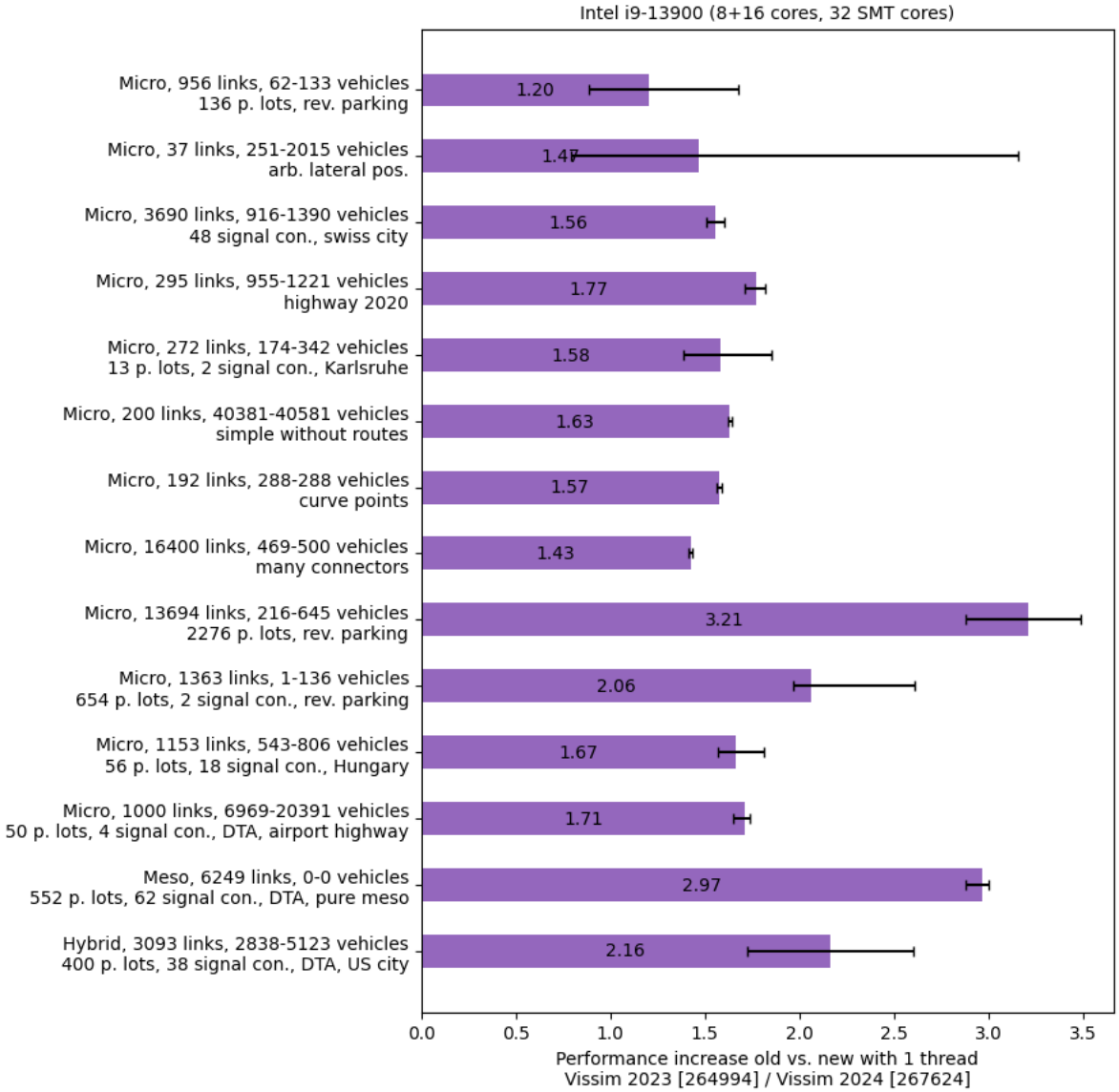
1.1 Performance Optimization

The performance of primarily the microscopic vehicle simulation has been improved significantly for Vissim 2024. The optimizations focused on two different aspects:

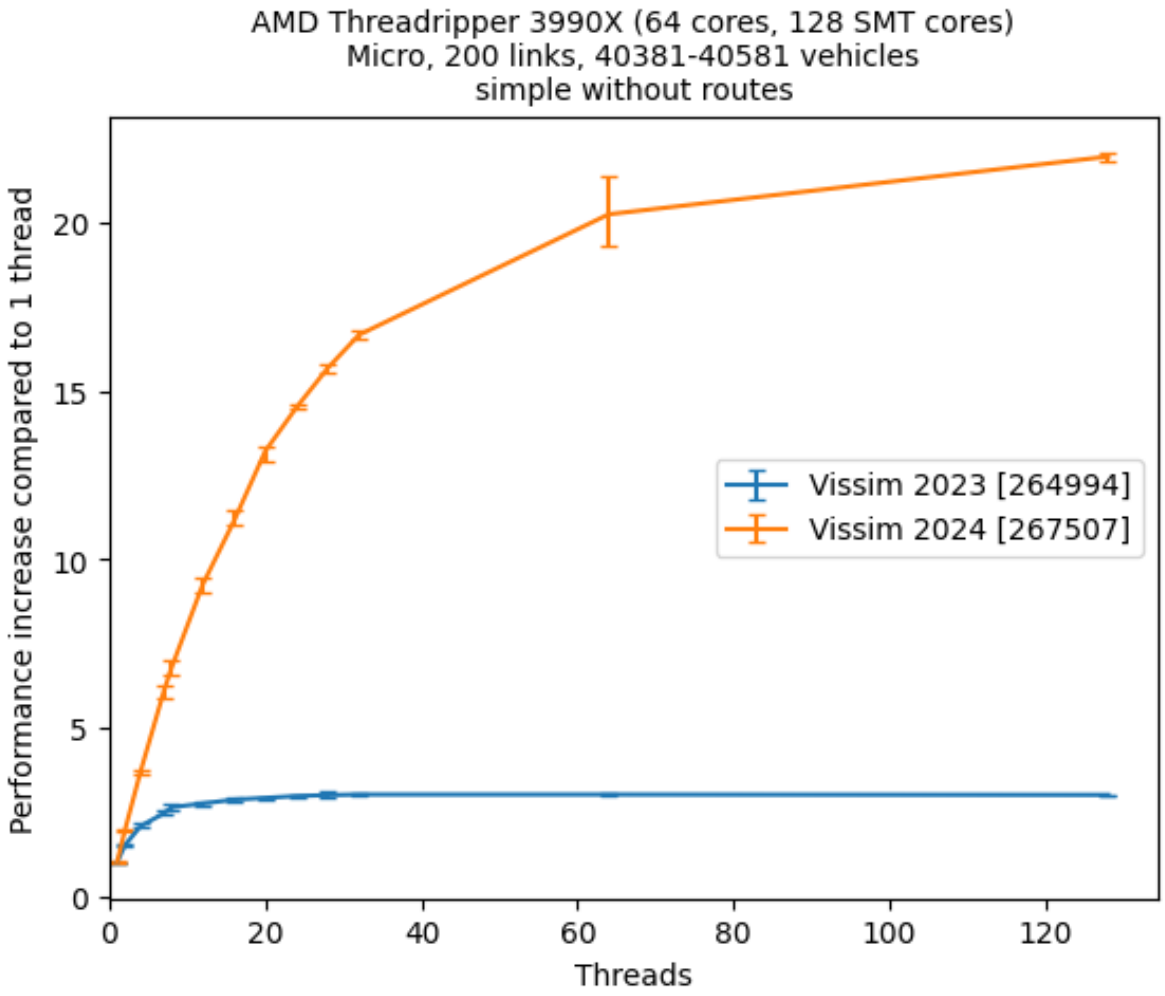
1. Single core performance
   (See figure below) For some of our test networks Vissim 2024 is in the range of three times as fast as Vissim 2023 – for calculations on a single core Vissim 2024 can be typically expected to run 1.5-2 times faster than Vissim 2023.
2. Parallelization / better scaling when using multiple cores
   (See figure below) Vissim 2024 has a much better utilization of multiple cores. With Vissim 2023 there was typically no relevant speed up when using more than 4 cores. With Vissim 2024 the scaling can be 3 times as good as it was with Vissim 2023.

When using 8 cores, the overall speed-up of both aspects means that Vissim 2024 is around 2-3 faster than Vissim 2023. More cores increase the speed-up even further.

Please not that, the impact of the optimization is influenced by the used CPU and is highly dependent on the overall model – the size of the network, the number of links and connector links, conflict areas, the number of simulated vehicles, the mix of meso, micro and pedestrians, type of signal controllers …



(Above) Performance improvements single Core Vissim 2024 in comparison to Vissim 2023 for various test networks. On single core Vissim 2024 is in the range of 1.20 to 3.21 times faster than Vissim 2023.



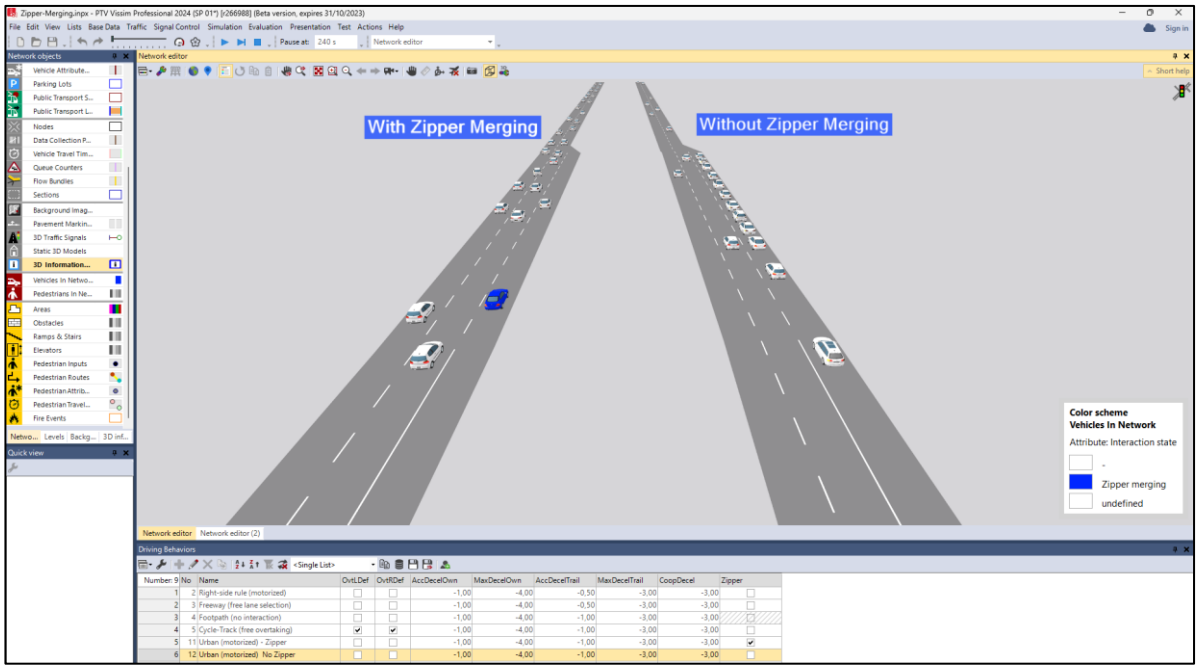
(Above) Performance improvements parallelization Vissim 2024 (orange) and Vissim 2023 (blue) performance improvements when using more threads vs single thread for the nework „40381-40851 vehicles". This means that for example with 8 threads the network scales almost 3 times better with Vissim 2024 and with 64 threads the scaling is around 8 better (increase vs single thread of 2.5 with Vissim 2023 and around 20 with Vissim 2024).

1.2 Zipper Merging

The new option **Zipper merging** in the **Driving Behavior** dialogue in the **Lane Change** tab activates a special cooperation mode. This mode is a specific behavior designed for merge or end lane situations e.g. on ramps and the adjacent lanes. Vehicles look ahead and can synchronize by creating suitable gaps through braking even while there is still a barrier (no lane change allowed) between the two lanes. This reduces the number of unwanted stops at the end of the ramp and leads to a smoother merging process.

Two parameters specify the behavior. **Minium speed** defines the minimum speed for vehicles to participate in the synchronized braking process – if the speed of a vehicle is lower than this value, then **Zipper merging** will not have an impact, as breaking in a congested situation does not result in a better merging. **Overtaking time distribution** allows to define the time distribution which is used for drawing the maximum time that an overtaking vehicle requires to finish overtaking a slower downstream vehicle on an

adjacent lane – if overtaking takes less time than this value, then the overtaking vehicle will not brake for **Zipper merging**.



1.3 Generic ACC Car Following Behavior (Under Development)

[This feature is still under construction and will be available in an early service pack.]

New car following behavior which allows to model cars equipped with adaptive cruise control (ACC). The regulator for longitudinal control intends to keep a user-defined time gap to the leading vehicle. Special handling is included for lane-changing vehicles and stop-and-go traffic. This behavior provides a more realistic representation of autonomous vehicles than the previously used behaviors based on the Wiedemann car-following models.

The new behavior will be available as a new choice for the **Car following model** in the **Driving Behavior** dialogue.

2 Pedestrian Simulation - Reengineering of Major Parts of the Pedestrian Simulation

A major share of routines of the pedestrian simulation has been reimplemented with newest technology and adapted to employ a newly developed activity stack. This enables now for example for a better parallelization of the calculation with multiple threads in situations, where formulas are used for route decisions, attribute modifications, or attribute decisions.

3 Signal Control

3.1 RBC Enhancements

For Vissim 2024, we worked intensively to enhance the capabilities of the new and faster Ring Barrier Controller (*.PRBC), which was introduced with Vissim 2022. We added several functionalities to it.

3.1.1 Delay Green / Leading Pedestrian Interval (LPI) [2023 SP 09]

Upon popular request we added the Delay Green or Leading Pedestrian Interval (LPI) functionality to the new Ring Barrier Controller. This functionality has been requested time and time again even for the old Ring Barrier Controller.

A row **Delay Green (LPI)** has been added to the table **Basic** in **Base Timing** below **Flashing Don't Walk**. If applied, the pedestrian signal group turns green before its vehicle signal group turns green to allow pedestrians to walk early.

3.1.2 Vehicle Omits [2023 SP 09]

The option to set vehicle omits for signal groups was added. Signal groups flagged for **Veh Omit** in a pattern will not turn green while that pattern is used. For example, this parameter can be used to enable a protected left-turn signal group only during peak traffic periods.

3.1.3 Transit Priority [2023 SP 06]

Transit Priority allows modifying traffic signal timing or phasing when transit vehicles are present either conditionally for late runs or unconditionally for all arriving transit. This allows to implement preferential treatment of public transport vehicles, while maintaining coordination as far as possible.

3.1.4 Preemption [2023 SP 06]

Preemption allows overriding the normal operation of traffic lights to shut down the intersection to clear it. This allows a specific movement (of e.g. an emergency vehicle or a transit vehicle) to traverse the intersection unimpeded upon arrival.

3.2 Vissig - Fixed Time Signal Control

3.2.1 Reengineering

The signal controller type **Fixed Time** (Vissig) has been reengineered. The reason for this is to enable this controller type for the Vissim Kernel for Linux build. Within the reengineering several minor bugs have been fixed. These fixes can result in minor changes in the initial timings and states for signals or cycle seconds for example when using daily signal program lists in combination with specific simulation **start times**.

3.2.2 With Vissig for Linux

The Vissim Kernel for Linux now supports the signal controller type **Fixed Time** (Vissig). Up until then, only the **Fixed Time (simple)** signal controller with basic modelling capabilities and the simple traffic-actuated signal controls, that you find in the vertical bar of the network editor, could be used. With the new release it is possible to run models with signal-group and stage-based signal programs using single signal programs or daily signal program lists.

The Vissim Kernel for Linux can be invoked as a command-line simulation calculation engine or used with the Driving Simulator interface.

4 Visualization

4.1 Updated 3D Vehicle Models

We are not only updating the software under the hood – but to keep up with the evolution of the real-world fleets and vehicle models, we also updated the 3D models of the vehicles. We added more than 40 new 3D vehicle models for newer car generations (2013-2023). The selection reflects current top selling vehicles for Europe, USA, China, Japan, and other parts of the world. It includes a range of vehicle types, for example including light goods vehicles, and incorporates vehicles with combustion engines as well as models with alternative propulsion systems.

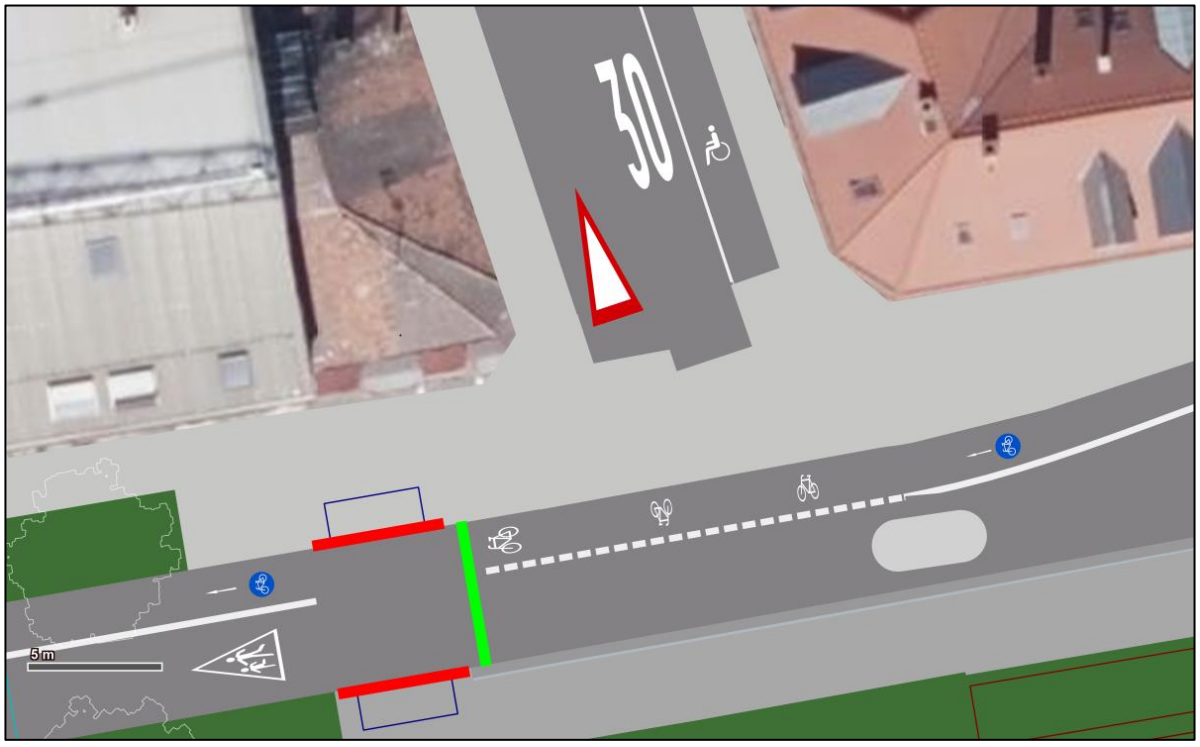
The new 3D vehicle models can be found in \EXE\3DMODELS in the proprietary .U3DM file format, which does not allow usage in external 3D tools. If you need the models for external usage, then these can be obtained by the supplier (Hum3d). Please get in touch with support if more information is required.

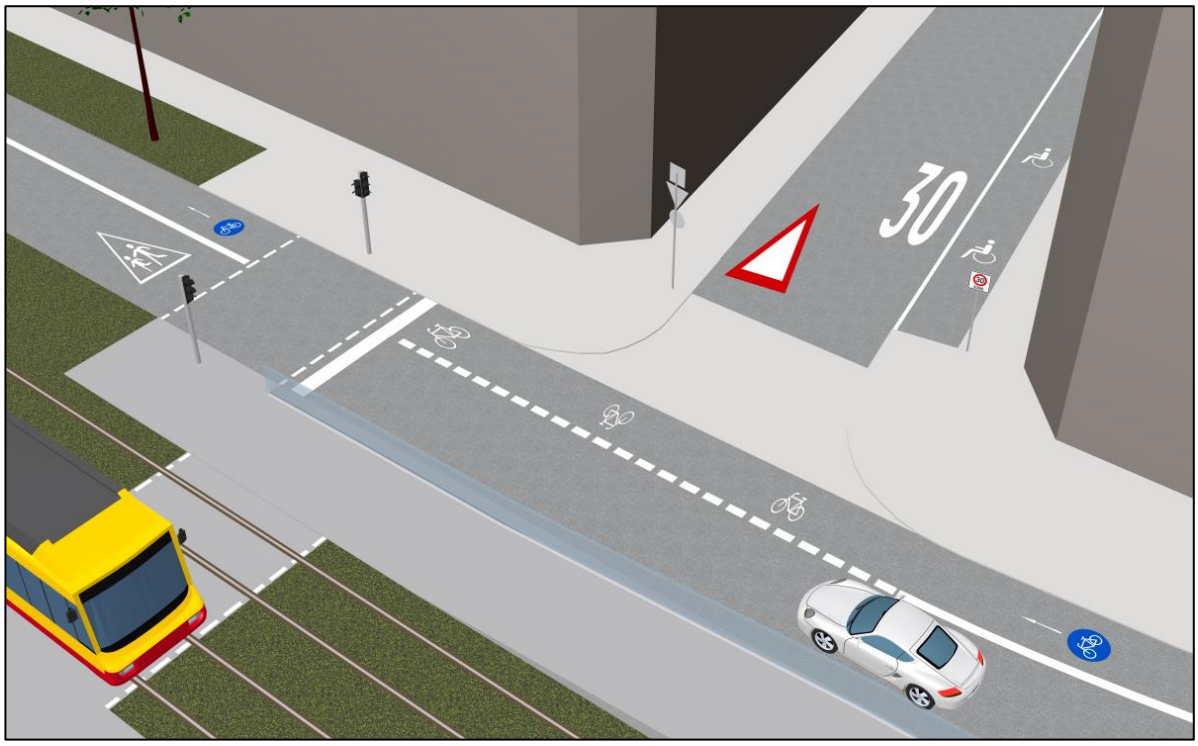
The old 3D vehicle models are still available. 3 outdated Models have been moved to the \EXE\3DMODELS_LEGACY (FILES WILL NOT BE DISTRIBUTED WITH FUTURE VERSIONS).

The DEFAULTS.INPX has been updated and references more than 10 of the new 3D models in the default settings.

4.2 User-Defined Pavement Markings (2D & 3D Graphics)

In addition to lane markings, you can now also place user-defined **pavement markings** such as traffic signs on **links**. Any image in PNG format can be used and placed as a **pavement marking** within a **lane**. The width of the marking can be set, too – it's just limited by the lane width. The **pavement marking** then is visible both in 2D and 3D graphics mode.

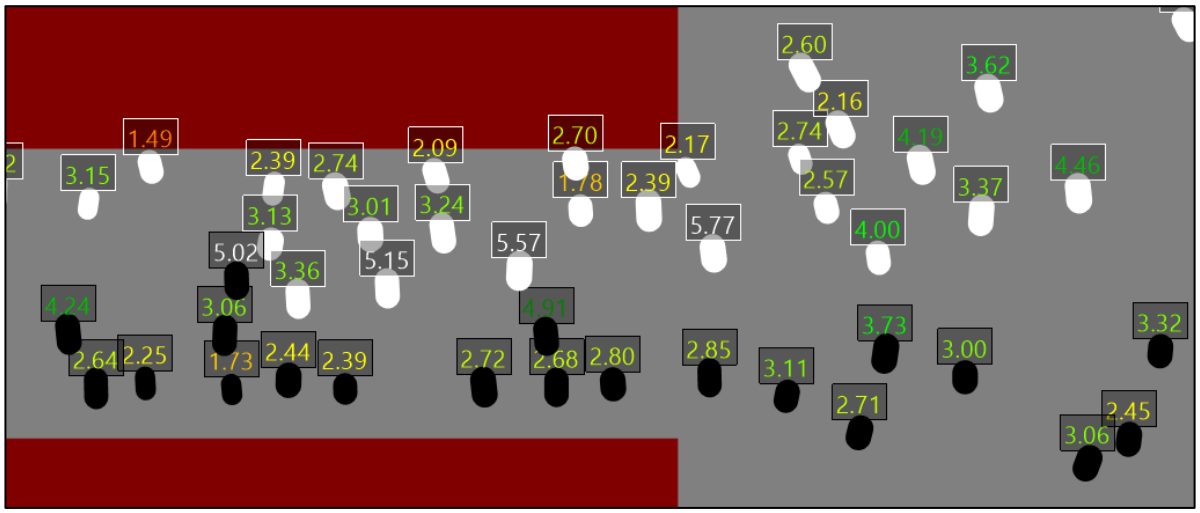




For your convenience, Vissim comes with a selection of 30+ predefined markings which can be loaded from the \TEXTURES\PAVEMENT MARKINGS directory. Also, the library of traffic signs (\TEXTURES\SIGNS) was extended and contains now almost 100 signs for use in Vissim, e.g. as texture for a 3D traffic sign.

4.3 Labels for Pedestrians in 2D Mode

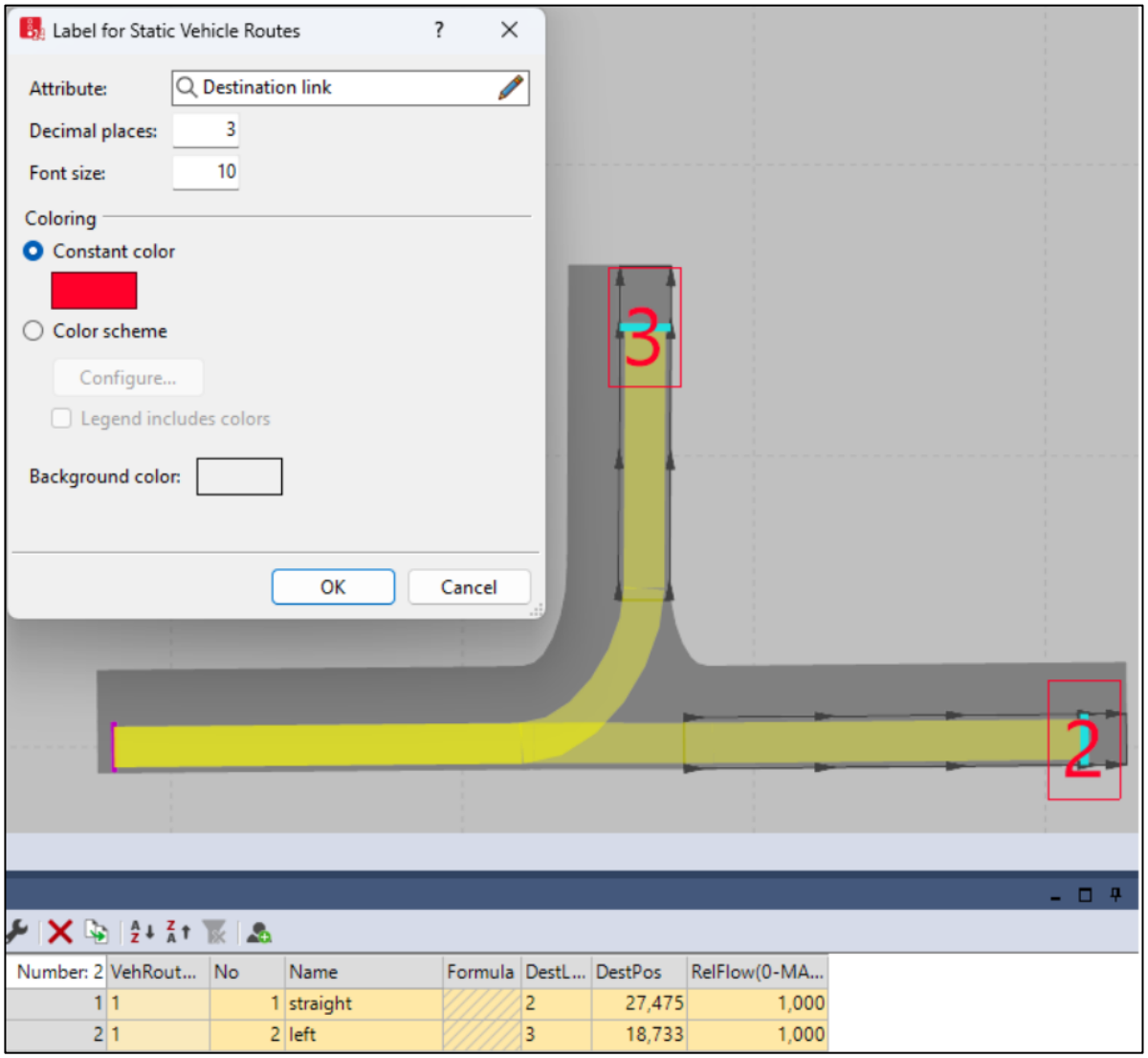
Previously, labels could be shown in 2D graphics mode for **vehicles** only. Now it is also possible to show labels for **pedestrians** in 2D mode. As with all other labels, they can display static or dynamic content from the entire range of **pedestrian** attributes. There is also an option to hide labels if they overlap with another one.



4.4 Labels for Child Objects

So far labels were available only for geometric objects (like **links** and **areas**), and objects directly located on these (like **routing decisions** or **vehicle inputs**). Now it is also possible to show labels for 'secondary' objects which are part of another object (= 'child objects'), such as **routes**, intermediate route locations and **doors** of **elevators**.

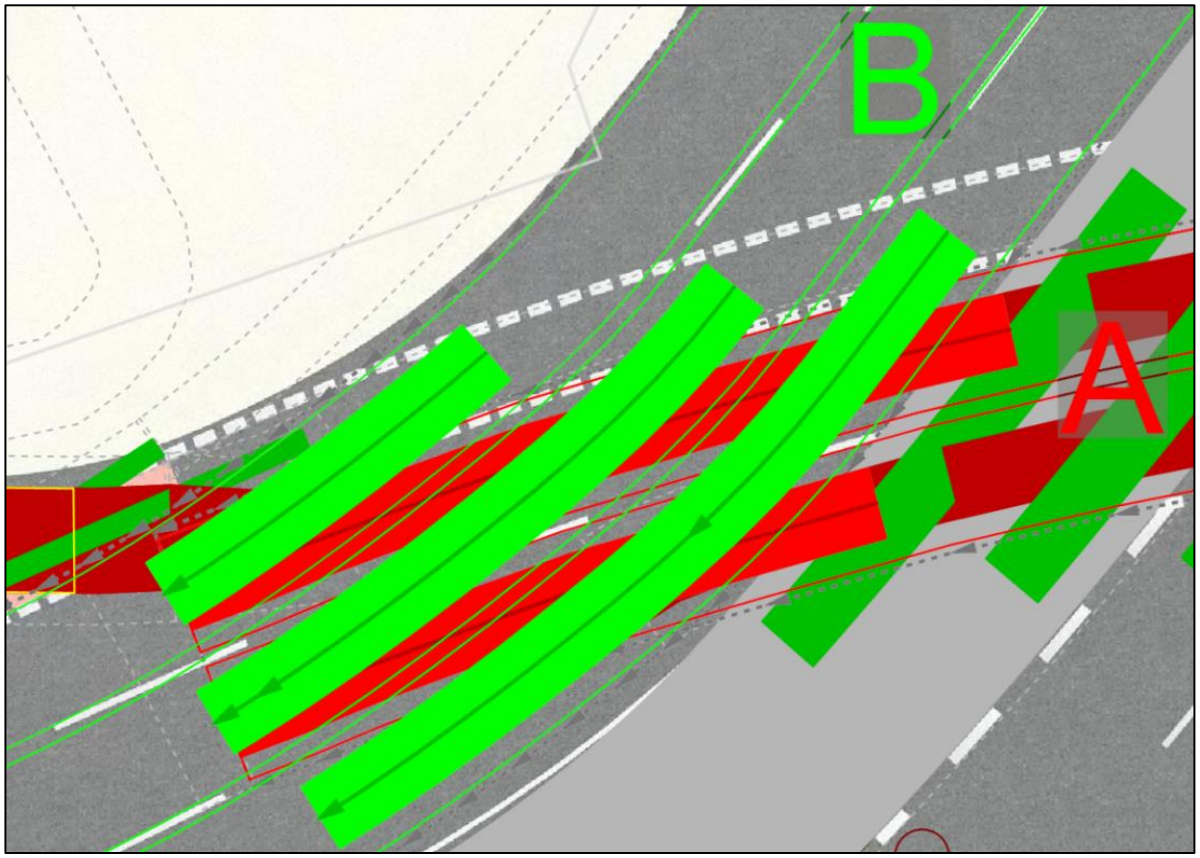
For that reason, the label configuration was improved for all labels: Now all label settings are contained in a single dialog rather than in a (long) list of graphics attributes which makes it easier to identify those attributes which are relevant for labels.



4.5 Improved Labelling of Conflict Areas

When setting the state of **conflict areas**, formerly they were referenced by **link 1** and **link 2**, but there was no indication to identify the links in the network. Hence it was mere guesswork getting the desired priority right away.

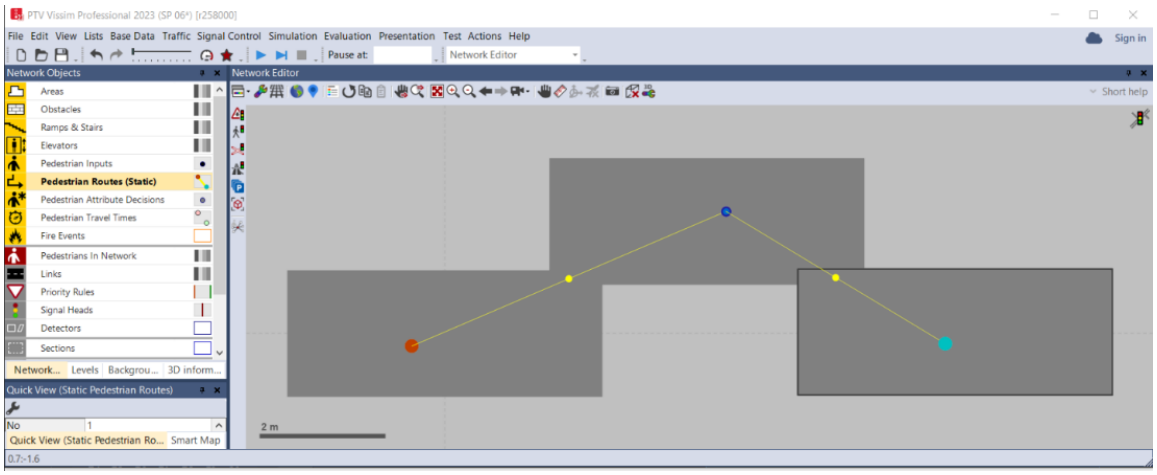
Now, the two links of a **conflict area** are labelled 'A' and 'B' instead of '1' and '2' and these labels are shown in the network for a selected **conflict area**. In addition, the link direction is also depicted for each lane conflict.



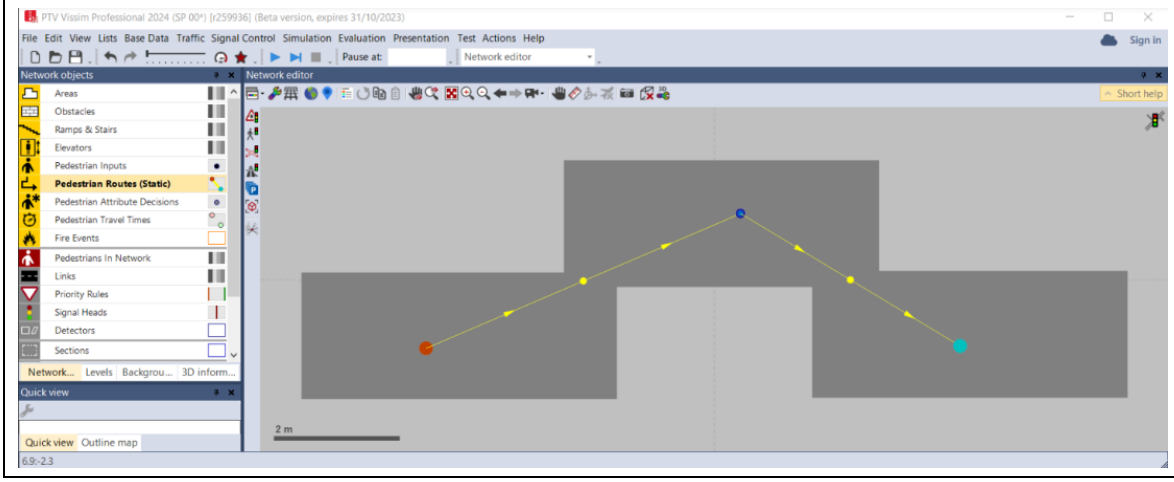
4.6 Directional Indicators at Pedestrian Routes

The line which indicates a **pedestrian route** (default color is yellow) now shows small arrows indicating the direction of movement along the route. This helps in close-up view, especially when both the **routing decision** and **route destination** are outside the current view.

PTV Vissim 2022



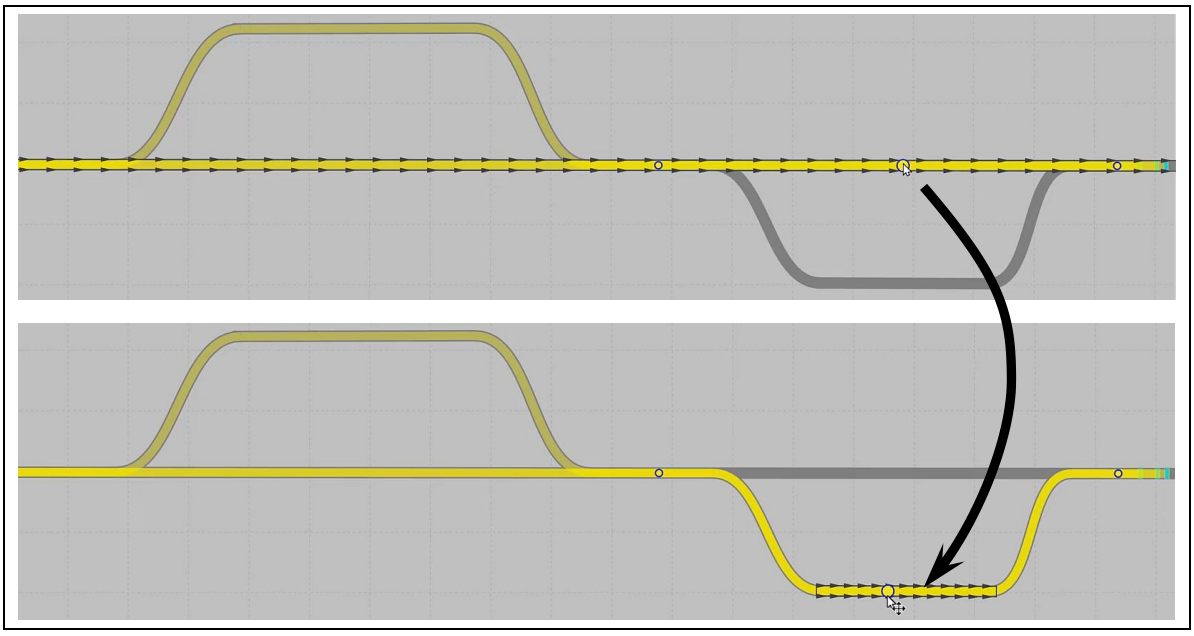
PTV Vissim 2023



5 Usability

5.1 Multi-Edit of Routes Including Intermediate Points

It is now possible to select multiple **routes** at once to set an intermediate point on a common route part and move it to another **link** to change all selected **routes** in one operation. Setting multiple intermediate points to fix a part of the **route** is possible even for multiple **routes**. The network editor always provides a preview of the result in real-time. **Routes** of different **route decisions** can be edited simultaneously as well.



5.2 Backup Copy / Auto Save

Vissim now offers the possibility to active automatic backups to prevent unintended loss of data. It is possible the frequency of the automatic backup and the folder location. To activate and configure this feature go to **Edit**, **User preferences**, **Files**, **Backup copy**.

5.3 Data Type Color for User-Defined Attributes

The new data type **color** for user-defined attributes can be used to conveniently select colors. These values can be used to set color attributes like **vehicle-color1**. Up until then it was only possible to use the integer representation of a color value for this, which would not show the actual color in a way a human can see it.

In the following example '**Pax1Color**…' are all user-defined attributes of the type **color**.

Pax1Type	200
Pax1Color1	(255, 255, 128, 64)
Pax1Color2	(255, 128, 64, 0)
Pax1Color3	(255, 255, 255, 255)
Pax1Color4	(255, 0, 0, 55)

5.4 Function Color(a;r;g;b)

Up until now it was required and difficult to correctly calculate the integer representation of a color value. This was required for example when changing colors using **attribute modifications**.

The new function **Color(a,r,g,b)** allows to conveniently calculate color values. It accepts the values for alpha (transparency), red, green and blue in the range of [0..255] and simply calculates the corresponding integer value. It is available in the formula editor which is for example used by **attribute modifications** or **user-defined attributes** and can be used to set the value of color attributes like **vehicle-color1**.

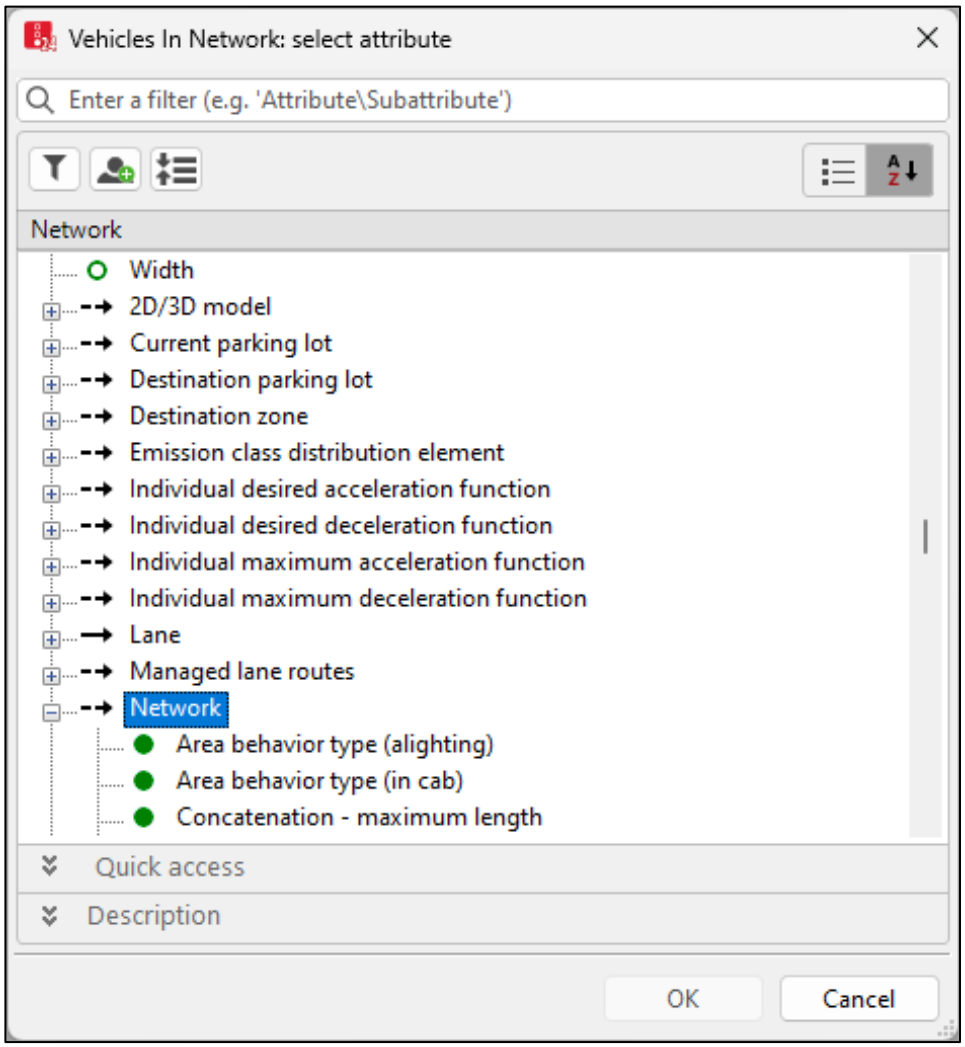
The color blue for example can be set as follows:

```
COLOR(255;0;0;255) = -16776961
```

Calculating or knowing the value -16776961 is not required anymore.

5.5 All Objects Have Relations to and From the Network Object

With Vissim 2024 all objects have a reference to and from the **Network** object. This allows to simplify formulas for **attribute modifications** or **user-defined attributes** by reducing occasions where previously the **TableLookup** function was required. Furthermore, this allows to use the aggregation of attributes of all objects from the network object for example the average **height** of all **pedestrians**.



6 Technical Changes

6.1 CodeMeter Runtime

The CodeMeter runtime version deployed with PTV Vissim has been updated to CodeMeter 7.60c.

6.2 Python

The Python version delivered with PTV Vissim has been updated to 3.11.