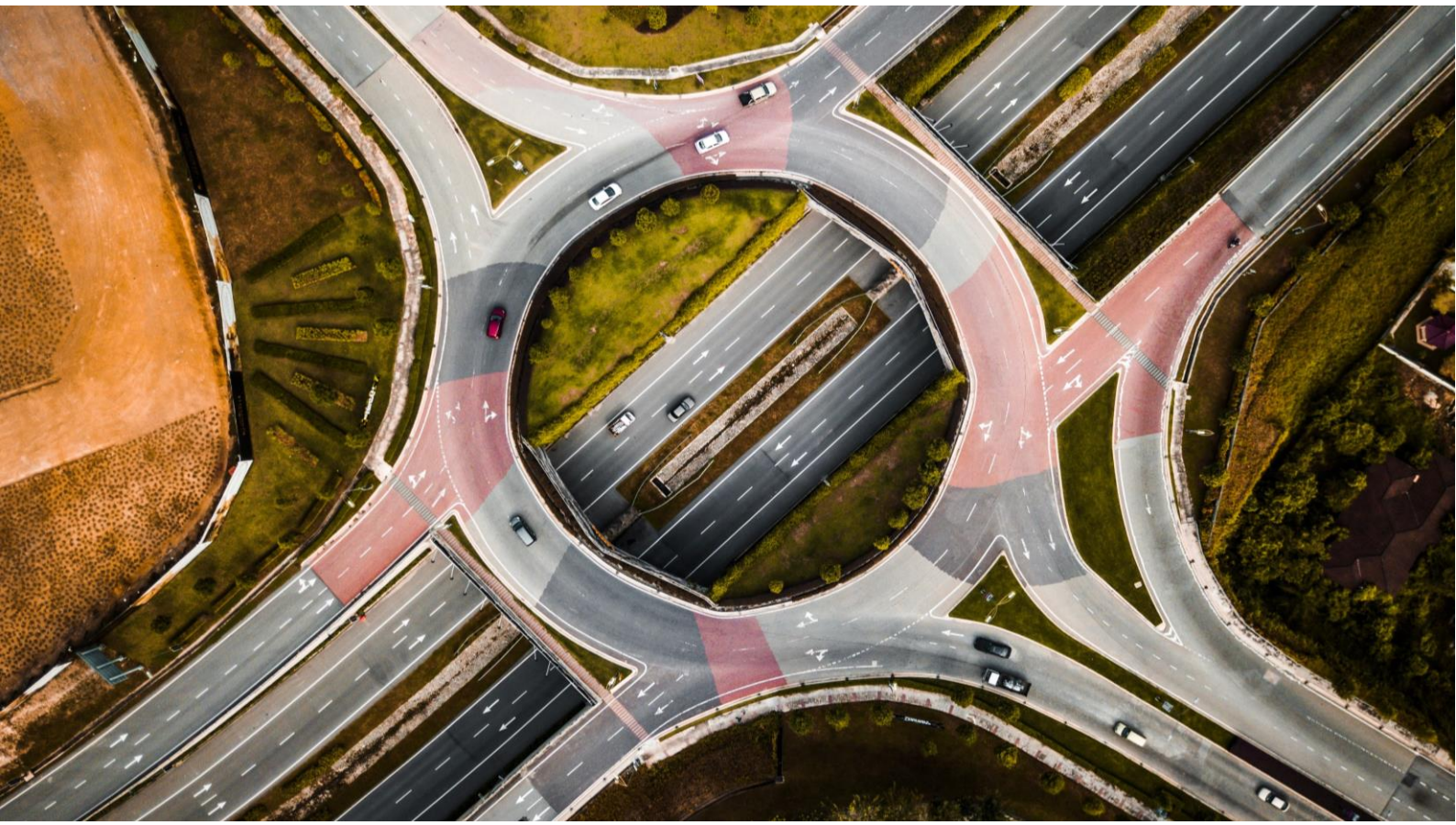
PTV GROUP

DATA DESCRIPTION

# PTV Validate Germany

## Release R2022_V1.0



Karlsruhe, 16.01.2023

# Contents

# 1 Introduction

The Traffic Volume Model Germany is based on the nationwide traffic model Validate developed by PTV GmbH and can be linked to the road network of the product Digital Data Streets. The data is based on model calculations in which traffic demand (journeys with origin and destination of cars and trucks) is derived from structural data in the first step. In a second step, this traffic is distributed ("rerouted") to the road network using proven algorithms. Procedures of this type are common in the transport industry worldwide and are widely used for transport planning in federal, state and local governments. The availability of powerful computers, high-resolution digital traffic networks and the know-how gained by PTV in this field over the last 15 years make applications of this kind possible today.

The average daily traffic volume is available directionally for all routes of category 1 to 6 of the Digital Data Streets' road network.

The traffic volume data are not based on traffic counts, but were calculated with special algorithms and are therefore to be understood as model values. The model calculation also includes data such as population figures, workplace data by sector or commuter movements. Due to the modelling, implausibilities may occur in individual cases. In exceptional cases, there are segments for which a classification could not be carried out.

The model values have been validated with the help of numerous counting points. This was done with

- Count values from more than 2500 official permanent counting stations of the Federal Highway Research Institute (Bundesanstalt für Straßenbau – BASt) from 2019.
- Data from numerous cities and regions collected within the framework of various PTV projects.

Data status:

The Traffic Volume Model R2022_V1.0 refers to Digital Data Streets' road network Version R2021_V2.0 and Validate Version 7.5.

# 2 Determination of the data

## 2.1 Traffic cells and traffic demand

In order to achieve a meaningful mapping of traffic flows in Germany, the study area must be divided into so-called traffic cells. A total of about 20700 traffic cells are used, with about 280 cells covering other European countries. The traffic cells in Germany represent an average of about 4,000 inhabitants.

The traffic cells are supplemented and refined by approx. 80000 market cells with information on inhabitants and business size classes. The market cells thus represent a finer division of the traffic cells (about 8 market cells per traffic cell) and support a positionally accurate, percentage feed of the traffic of the traffic cells into the network.

From a variety of data sources, such as the officially available structural data of the municipalities and market cells as well as population group-specific traffic behaviour data, the traffic flows are calculated as a model with the help of a PTV traffic model. This takes into account typical travel distance distributions for the different trip purposes such as shopping, work, holiday trips, etc. Empirical data such as the commuter data of the Federal Employment Agency, which contains the commuter relations between all municipalities in Germany, calibrates and improves the matrix of transport relations.

## 2.2 Road network

The basis for the network creation is the deep-digitised navigation network from the Digital Data Streets, which are based on the street data from HERE (formerly NAVTEQ). From this, the superordinate roads are selected which absorb the main traffic volumes (road categories 1-6). Most of the secondary roads of the subordinate traffic network, which have a purely developmental character (category 7 to 8), are not taken into account. This results in a network with approx. 6.4 million directed routes. It contains all routes on which significant traffic flows occur.

The network is digitised nationwide at the same depth, but can be refined for regional applications by adding further levels.

## 2.3 Attribution of the routes

In order to be able to carry out a model calculation on the network, the routes must be enriched with traffic data. In particular, the capacity and speed at free flow must be known for all routes. For this purpose, each route is typified on the basis of a series of characteristic features (e.g. speed limit, number of lanes, connection function, construction type) and attributed accordingly.

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## 2.4 Consideration of European through traffic

In order to be able to map through traffic, the German network is connected to the European network. This network has approximately the same resolution near the border as the German network and becomes thinner with increasing distance (a total of approx. 1.5 million routes).

## 2.5 Connection of the traffic cells

In order for demand to be distributed on the network, a connection between the traffic cells and the network must be established. These so-called connections are generated, among other things, with the help of the market cells. The known traffic volume of a traffic cell is thus fed proportionally into the subordinate network based on the population figures and jobs of the individual market cells. This achieves a finer distribution of traffic that corresponds to the origins and destinations.

## 2.6 Rerouting and calibration

The traffic flows of the origin-destination matrix (traffic demand) are distributed to the traffic network using the traffic reallocation method. I.e. for each origin-destination relationship, the best routes are searched for, taking into account the traffic load. This traffic reallocation is calculated for trucks and cars. As the traffic load increases, the travel times on the different routes change, which leads to new route choices and ultimately to an even, realistic distribution of traffic in the network. The apportionment is carried out with the proven PTV Visum Software by PTV GmbH. Existing measurement data of road loads (e.g. official counting data from permanent counting points) are used to adjust the calculated results to the real measured ones. The calibration methodology used here also allows the real measurement errors and daily fluctuations in traffic to be taken into account in the equalisation calculations.

The result is that for each of the approx. 5.5 million network routes in Germany, there are direction-related load values for the average working day for trucks and cars.

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# 3 General information on the data record

| | |
|---|---|
| Product name: | PTV Validate Germany |
| Content of the data record: | Average daily traffic volume for the interurban road network from the PTV Digital Data Streets Germany |
| Coverage: | Germany |
| Subset possible: | Yes |
| Source: | HERE; microm GmbH, Neuss;<br>PTV Planung Transport Verkehr GmbH, Karlsruhe |
| Data type: | Factual data |
| Release: | R2022_V1.0 |
| Number of data records: | 2.971.528 |
| Standard data format: | MS Access, MapInfo TAB |
| Language: | German |

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# 4 Content and field description

## 4.1 Standard specification

| Specification | Column name | Content | Description | Data type |
|---|---|---|---|---|
| Standard | ID | Unique identification number for the object | Corresponds to the ID from the "Strassen" layer of the Digital Data Streets | Integer |
| Standard | TypHin | Road type in direction From → To regarding the nodes.<br>The type stands for the driving speed that can be achieved on the respective road, not for the actual road type.<br>The type is differentiated according to 15 characteristics. | 1 = Highway fast<br>2 = Highway medium<br>3 = Highway slow<br>4 = Federal Highway fast<br>5 = Federal Highway medium<br>6 = Federal Highway slow<br>7 = Country Road fast<br>8 = Country Road medium<br>9 = Country Road slow<br>10 = City Road fast<br>11 = City Road medium<br>12 = City Road slow<br>13 = Ferry<br>14 = is not assigned<br>15 = Special cases such as zone 30, zone 10, pedestrian zones, forest roads (often these roads are not passable) | Short Integer |
| Standard | TypRueck | Road type in direction To → From regarding the nodes.<br>See column TypHin. | See column TypHin. | Short Integer |

| | | | | |
|---|---|---|---|---|
| Standard | Kat | The category reflects the importance of the street. The smaller the number, the more important the street.<br>Traffic data is available for categories 1 to 6, in some cases also for other categories. | 1 = Category 1 (highest importance)<br>2 = Category 2<br>3 = Category 3<br>4 = Category 4<br>5 = Category 5<br>6 = Category 6 (lowest importance) | Short Integer |
| Standard | Von | Initial node | Corresponds to the From-node from the "Strassen" layer of the Digital Data Streets | Integer |
| Standard | Nach | End node | Corresponds to the To-node from the "Strassen" layer of the Digital Data Streets | Integer |
| Standard | kfz_dido_hin | Absolute traffic volume of all vehicles per day.<br>Direction From → To | Sum of pkw_dido_hin and lkw_ges_dido_hin | Integer |
| Standard | pkw_dido_hin | Absolute traffic volume of cars per day.<br>Direction From → To | | Integer |
| Standard | lkw_ges_dido_hin | Absolute traffic volume of all trucks per day.<br>Direction From → To | | Integer |
| Standard | lkw_s_dido_hin | Absolute traffic volume of class S trucks per day.<br>Direction From → To | S Lkw < 3,5t | Integer |
| Standard | lkw_m_dido_hin | Absolute traffic volume of class M trucks per day.<br>Direction From → To | M Lkw 3,5 to 7,5t | Integer |
| Standard | lkw_l_dido_hin | Absolute traffic volume of class L trucks per day.<br>Direction From → To | L Lkw 7,5 to 12t | Integer |

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|---|---|---|---|---|
| Standard | lkw_xl_dido_hin | Absolute traffic volume of class XL trucks per day.<br>Direction From → To | XL Lkw > 12t | Integer |
| Standard | kfz_dido_rueck | Absolute traffic volume of all vehicles per day.<br>Direction To → From | Sum of pkw_dido_rueck and lkw_ges_dido_rueck | Integer |
| Standard | pkw_dido_rueck | Absolute traffic volume of cars per day.<br>Direction To → From | | Integer |
| Standard | lkw_ges_dido_rueck | Absolute traffic volume of all trucks per day.<br>Direction To → From | | Integer |
| Standard | lkw_s_dido_rueck | Absolute traffic volume of class S trucks per day.<br>Direction To → From | S Lkw < 3,5t | Integer |
| Standard | lkw_m_dido_rueck | Absolute traffic volume of class M trucks per day.<br>Direction To → From | M Lkw 3,5 to 7,5t | Integer |
| Standard | lkw_l_dido_rueck | Absolute traffic volume of class L trucks per day.<br>Direction To → From | L Lkw 7,5 to 12t | Integer |
| Standard | lkw_xl_dido_rueck | Absolute traffic volume of class XL trucks per day.<br>Direction To → From | XL Lkw > 12t | Integer |

## 4.2 Further specifications

In addition to the standard specification, the following specifications are available:

| **Validate Germany, Specification** |
|---|
| • Daily values DiDo (standard specification)<br>• Average daily traffic volume, 1 value per 24h<br>• 1 day category: Tue-Thu on average |
| • Daily values - all weekday types<br>• Average daily traffic volume, 1 value per 24h.<br>• 5 day categories: Mon, Tue-Thu, Fri, Sat, Sun |
| • Daily values and peak hours DiDo<br>• Average traffic volume, 1 value per 24h + hourly individual values for morning and evening peak (6 – 9 a.m. and 4 – 6 p.m. respectively)<br>• 1 day category: Tue-Thu on average |
| • Daily values and peak hours - all weekday types<br>• Average traffic volume, 1 value per 24h + hourly individual values for morning and evening peak (6 – 9 a.m. and 4 – 6 p.m. respectively).<br>• 5 day categories: Mon, Tue-Thu, Fri, Sat, Sun |
| • Hourly values DiDo<br>• Average traffic volume, 24 values per 24h<br>• 1 day category: Tue-Thu on average |
| • Hourly values - all weekday types<br>• Average traffic volume, 24 values per 24h<br>• 5 day categories: Mon, Tue-Thu, Fri, Sat, Sun |

## Examples: Contents of the specifications Daily Values DiDo, Hourly Values DiDo as well as Daily Values and Peak Hours DiDo in Comparison

| Specification | Column name | Content | Description | Data type |
|---|---|---|---|---|
| • Daily values DiDo<br>• Hourly values DiDo<br>• Daily values and peak hours DiDo | ID | Unique identification number for the object | Corresponds to the ID from the "Strassen" layer of the Digital Data Streets.<br>The IDs have duplicates because values are given for outward and return. | Integer |
| • Daily values DiDo<br>• Hourly values DiDo<br>• Daily values and peak hours DiDo | Von | Initial node | Corresponds to the From-node from the "Strassen" layer of the Digital Data Streets | Integer |
| • Daily values DiDo<br>• Hourly values DiDo<br>• Daily values and peak hours DiDo | Nach | End node | Corresponds to the To-node from the "Strassen" layer of the Digital Data Streets | Integer |
| • Hourly values DiDo<br>• Daily values and peak hours DiDo | Binnenverkehr | Car frequencies within a district | Number of traffic density of cars that do not exceed their district (one district corresponds to an average of approx. 8000 inhabitants) | Integer |
| • Daily values DiDo<br>• Hourly values DiDo<br>• Daily values and peak hours DiDo | PKW_DiDo_24h | Car traffic load on weekdays (Tuesday-Thursday) Average | Average traffic density of cars on a working day | Integer |
| • Daily values DiDo<br>• Hourly values DiDo<br>• Daily values and peak hours DiDo | LKW_DiDo_24h | Truck traffic load on weekdays (Tuesday-Thursday) Average | Average traffic density of trucks on a working day | Integer |
| • Daily values and peak hours DiDo | PKW_DiDo_h6-8 | Car traffic load on weekdays (Tuesday - Thursday 6-8 a.m.) | Average traffic density of cars on a working day (Tuesday - Thursday) each at 6, 7 and 8 a.m. | Integer |
| • Daily values and peak hours DiDo | PKW_DiDo_h16-18 | Car traffic load on weekdays (Tuesday - Thursday 4 - 6 p.m.) | Average traffic density of cars on a working day (Tuesday - Thursday) each at 4, 5 and 6 p.m. | Integer |
| • Daily values and peak hours DiDo | LKW_DiDo_h6-8 | Truck traffic load on weekdays (Tuesday - Thursday 6 - 8 a.m.) | Average traffic density of trucks on a working day (Tuesday - Thursday) each at 6, 7 and 8 a.m. | Integer |

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|---|---|---|---|---|
| • Daily values and peak hours DiDo | LKW_DiDo_h16-18 | Truck traffic load on weekdays (Tuesday - Thursday 4 - 6 p.m.) | Average traffic density of trucks on a working day (Tuesday - Thursday) each at 4, 5 and 6 p.m. | Integer |
| • Hourly values DiDo | PKW_DiDo_h0 - PKW_DiDo_h23 | Car traffic load Tuesdays - Thursdays in 24-hour cycle | 24 columns with number of traffic density cars per hour on a working day | Integer |
| • Hourly values DiDo | LKW_DiDo_h0 - LKW_DiDo_h23 | Truck traffic load on Tuesdays - Thursdays in a 24-hour cycle | 24 columns with number of traffic density trucks per hour on a working day (24 columns) | Integer |

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