White Paper

# Route Optimisation Software

## HOW IT WORKS, WHO BENEFITS FROM IT, AND HOW TO FIND THE RIGHT ONE

PTV LOGISTICS

## FOREWORD

The logistics industry is facing major challenges: A shortage of skilled workers, fierce competition and increasing customer demands. “We need more digitisation”, is what business and industry experts regularly say. But what is behind this often-used buzzword? What concrete solutions are there that will actually help logistics companies be more efficient and competitive? In this white paper, we introduce you to one such solution: route optimisation software. On the following pages we will show how it works, what advantages it can bring, and what to look for when choosing the right software solution for your needs.

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## How to distribute orders to the drivers? And which customers should be supplied first?

Even today, these questions are often answered with pin boards, papers, and manual lists. The planner relies on their experience and use standard routes. With a manageable number of drivers and recurring orders, this method can work quite well. However, this manual method reaches its limits if you want your routes to be more efficient, and take into account customer wishes, legal requirements, vehicle restrictions and traffic conditions.

This is where the route planning software comes into play. It supports the planner's decision-making processes, ensures all restrictions and specifications are adhered to and optimises the use of all resources.

To do this, the route planning software needs the order and customer data, along with information about depots and warehouses. The integrated trip planner links the delivery and collection points with the depots and creates matrices with the respective distances between all these locations. Next, the planner feeds the system with restrictions and specifications that are relevant to the route calculation.

**What is the difference between a transport management system and a route planning software?**

Many logistics companies use a transport management system (TMS) to manage, control and track their orders. Some of these systems have an integrated planning tool that can make simple route calculations. However, if all routes are to be created simultaneously, for all vehicles and considering all restrictions and specifications, proper route planning software is necessary. The two systems can be connected to each other via an interface and complement each other.

**Route planning software as part of the IT architecture**

The route optimisation software is part of the logistics chain. It can be connected via interfaces to external computer systems (e.g. ERP, CRM, WMS, TMS, Telematics), driver apps and on-board units, so that data can be imported and results quickly exported without errors.


These include, for example, business hours of customers, areas in which the drivers are deployed, or vehicles' size and equipment. The planner also specifies the criteria according to which routes are optimised, for example costs, number of vehicles used, $CO_2$ emissions or mileage. Within minutes, the software calculates all possible route scenarios and creates an optimised plan for all drivers and orders.

## THESE ARE THE ADVANTAGES

Optimising routes with software has many benefits. It saves time for the planner, which can then be dedicated to other tasks. In addition, it increases the efficiency of transport and saves mileage, time, and costs.

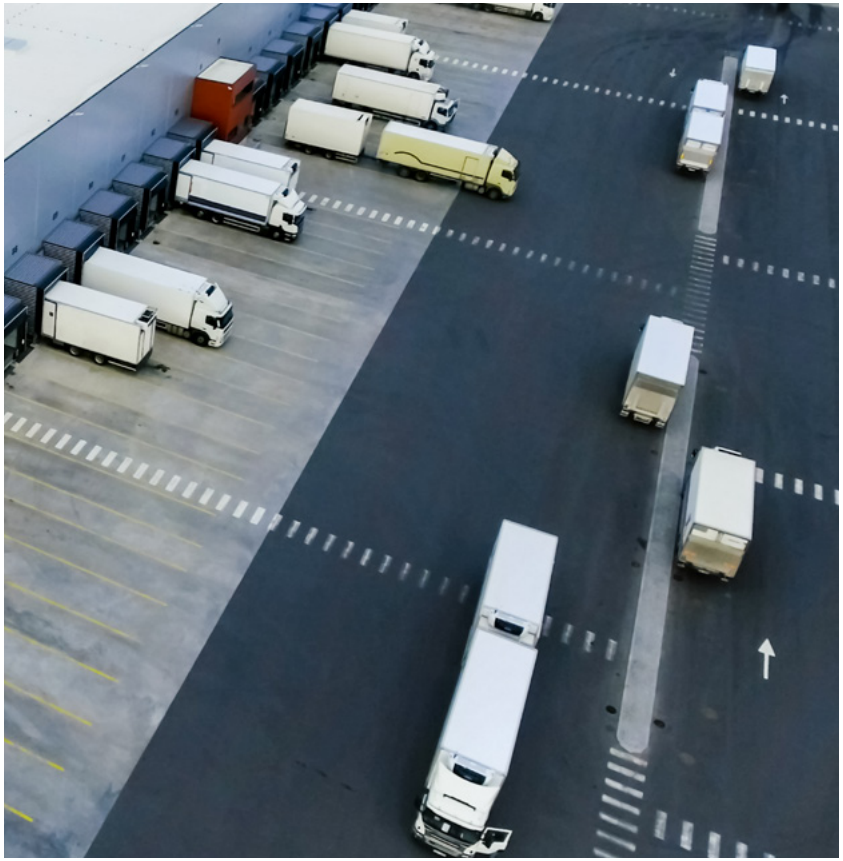
### REDUCED COSTS

Purchasing a new software solution is an investment. But after a few months it usually pays off and saves money for logistics companies. Savings of 15% or even 20% are not uncommon. The automatic and optimised distribution of orders to available vehicles means they are better utilised and avoid empty runs. With optimised routes, not a mile is driven unnecessarily, saving fuel as well as $CO_2$ emissions.

### SATISFIED CUSTOMERS

A customer that wishes not to receive deliveries during lunch break? Drivers that are instructed to enter the yard only through the back gate? No problem. The route planning software can take into account numerous customer wishes and requirements. In addition, automated notifications informing your customers and partners about the expected arrival times increase customer service. Instead of hours, route planning with a software solution only takes minutes. This allows the planner to shift cut-off times to the benefit of the customer. The software also ensures consistent service quality, even when the person in charge is absent.


> "Better customer experience, less mileage, lower fuel consumption, shorter working hours and reduced costs. It's a win-win all around."
>
> **James Taylor**
> ANC Delivers (Australia)



> "The planning time has been drastically shortened and the punctuality significantly improved."

**Armand Schuffelers**
GVT Transport & Logistics
(Netherlands)

**HUGE TIME SAVING**

Manual route planning takes up most of the day for the planners. A software solution, on the other hand, completes these tasks in a few minutes and relieves the planners of time consuming and draining activities. This leaves them more time for strategic and economic tasks that require their full attention and expertise. Thanks to the software's reports and analyses, they have an overview of all key figures, can check the profitability of the routes, and make informed decisions for the company. There is also more spare time for spontaneous changes and adjustments, such as a broken truck or a last-minute customer request.

**REGULATORY COMPLIANCE**

A route planning software automatically takes into account legal and industry requirements. These include, for example, driving and rest times, company and contractual agreements, hazardous goods regulations, truck driving bans and environmental protection obligations.

**REDUCING CARBON FOOTPRINT**

Another positive side effect of an optimised route is that $CO_2$ emissions are reduced. That's because the most environmentally friendly route is chosen for the vehicles - the one with the lowest fuel consumption per mile.

According to the International Energy Agency[7], route optimisation can lead to energy savings of 5-10 % in inner-cities, and 1 % in non-urban areas. When calculating emissions ($CO_2$, pollutants), the planning software should consider the vehicle characteristics and special features of the route.

**CALCULATING REAL-TIME ETA's**

Informing customers in real-time about the estimated time of arrival (ETA) of a delivery - this is also possible with a route planning software. This additional service is of high value for your customers: more precise information on delivery times helps save costs and coordinate processes. With an ETA which is constantly recalculated, you can track your routes dynamically and in real-time, and intervene in case of deviations or malfunctions. The result: better service quality and customer satisfaction.

**EMPLOYEE SATISFACTION**

In the logistics industry, it is often challenging to find and retain employees for years. But satisfied employees do stay longer in the same company. You can contribute to that with an optimisation software that creates realistic and feasible routes. This reduces stress and overtime, and increases driver satisfaction, leaving them more time for family and hobbies. Planners are supported by a software solution enabling them to devote more time to their other tasks.

**SHORTAGE OF SKILLED LABOR**

The industry is finding it increasingly difficult to attract qualified personnel:

Every tenth logistics company in Germany has up to 10 % loss of turnover due to lack of skilled workers (drivers, dispatchers, IT specialists).[5]


21 % of jobs for drivers remain unfilled in Europe.[3]

**10.000**

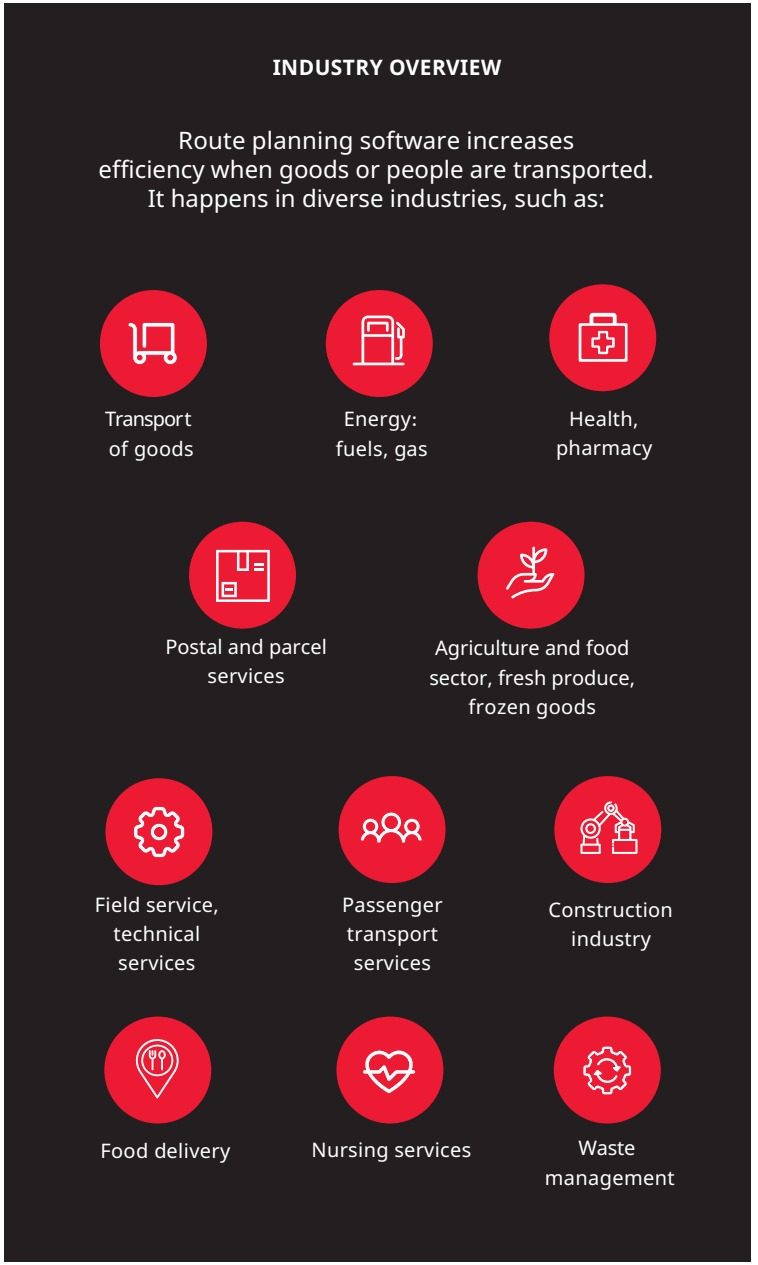
In Germany alone there is a shortage of around 10,000 truck drivers.[4]


The average age of drivers in the UK is 55 years.[3]

**NOT JUST FOR THE BIG ONES!**

You often hear that route planning software only makes sense for the big players in the logistics industry. But it pays off even for small companies, with just several vehicles and just a few stops per route.

For small companies, manual planning is becoming more and more challenging: Restrictions, special customer requests and legal requirements make it confusing, time-consuming, and inefficient. This was also recognised by Dutch company Stella Fietsen, which locally sells and delivers electric bicycles: “The number of orders has grown so much, that manual planning was simply no longer possible”, explains Managing Director Patrick Bouwens. Investing in optimisation software is particularly beneficial for shippers who want to minimise fleet transport costs. It is also beneficial for logistics service providers, increasing their competitiveness through low costs and better service.



But route optimisation isn't just a matter for transport logis-tics. It is also relevant for industrial companies and service pro-viders of all sizes and in all sectors. PTV's software solution, for example, is used to plan routes for technical service staff, medical teams, and food delivery services. Take Central Manchester University Hospitals of the NHS Foundation Trust, which relies on our route planning software. "PTV Route Optimiser was the perfect fit for our fleet size", explains Operations Manager Selton Smith. "It allows a scalable solution that can grow to match the size of our fleet in the future without the large outlay that other companies were asking for."

> "The ease with which we can now plan our routes is really a game changer. It allows the team to focus on more strategic tasks for the company instead of tedious administrative tasks."
>
> **Jason Hinkle**
> City Country Foodservice
> (Australia)

**DOES THE SOFTWARE REPLACE THE PLANNER?**

"The best planning still results from the interaction of intelli-gent algorithms and experienced dispatchers", explains Harm Roelofsen, operations manager at logistics service provider Rotra Forwarding B.V. He is absolutely right, because IT solutions do make work easier. However, they cannot replace the planners. The planner still has the final decision in route planning. And if unforeseen events occur, such as a vehicle breakdown, it is the planner who intervenes and solves the problem – supported by the software. Integration of optimisation software is ultimately in the interest of the planners – because for them it means increased productivity. Moreover, they are no longer mere executors, but strategists who can significantly influence the economic success of their company.

**INVESTING TO GENERATE PROFIT**

Should we invest to remain competitive, or be more careful and reduce costs? Many companies ask themselves this question. The law of the market and economic reality often force them to combine the two options. A route planning software addresses both points.

Investing? The acquisition and maintenance costs can be clearly quantified. However, there are also indirect costs, such as project and change management, which are more difficult to calculate. They depend on how quickly the solution can be set up and implemented.

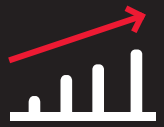
Reducing costs? Once route planning software is installed, the improvement is reflected in performance indicators, such as transport and logistics costs. The ROI can then be easily determined.

For companies considering to buy an optimisation solution the cost of the software should not be the only parameter. They should also be mindful of how much time will be needed to set up the system. Therefore, when selecting a solution, it is important to know the software provider's experience, know-how and level of customer support.

**DIGITISATION IN THE LOGISTICS SECTOR**

Logistics companies embrace digitisation, according to major recent surveys:

84% of supply chain leaders in the UK have invested in digital technologies with 92% planning to moving forward[2]



39% of European logistics companies will dedicate more than 3 % of their investment budgets in digitisation, over the next five years.[1]

**$5,07 billion**

The global route optimisation software market is on the rise with an annual growth rate of over 11%. In 2023 it will be worth around $ 5.07 billion.[6]

**HOW HIGH IS YOUR SAVINGS POTENTIAL?**

Fleet size, number of customers, industry - how much a company can save by introducing a route optimisation software depends on many factors. We would be happy to create a non-binding and free demo for your company, showing your individual savings potential.

**Request a demo now!**



There are numerous solutions for route planning, which – at first glance – hardly differ from each other. After all, route planning is route planning, right? Well, not exactly. With a closer look, you will discover some significant differences in the scope, service and quality of these products. These differences determine if you will plan good routes – or the best ones; how long it will take to implement the new solution; and how much cost-saving it will be. So what should you pay attention to when choosing a route planning tool? How would you recognise a good route planning software?

## HIGH-QUALITY MAPS AND DATA

In a route planning software, a high-quality map is required to have not just excellent coverage, high precision, and reliable data. It also needs to have a readable display, and graphics that provide added-value. The maps should also be enriched with specific information for its target group – in this case the road network, administrative areas, truck traffic, etc.

Of course, information on the traffic situation is essential for optimised route planning. There are two types of traffic information, and a good route planning software uses both:

**Real-time data**

This includes information on traffic jams, road works, accidents, closed roads, etc. The information can be displayed on a digital map or integrated directly into the route planner, so to avoid traffic jams or to recalculate the expected arrival time.

**Statistical or historical information**

These are traffic patterns that show the traffic flow in the form of static speed profiles for specific road sections. An example: If on a road section with permitted speed of 60mph, trucks drive much slower during rush hours due to heavy traffic, this information is included in route planning and the delays are avoided.

Whenever possible, you should choose a provider with proven experience in digital cartography or who works closely with established map providers.

**Technology and Algorithms**

Is the software state-of-the-art and provides reliable results? It's hard to tell before buying it. Checking the underlying code will hardly help. However, there are several factors that can help you judge the quality of the technology used in the software. For example, ask in advance which criteria and restrictions can be considered during planning.

> "To bring order and method into complex activities always pays off, but it must be done with the right tools."
>
> **Stefano Gorini**
> Consorzio Agrario del Nord Est (Italy)

Also check if the software can create a weekly schedule for the entire fleet, and how long it will take to do so. A powerful optimisation engine will have no problem processing many parameters at once.

Another important quality factor is the so-called geocoding. The software should be able to convert addresses quickly and accurately into coordinates, both for individual locations and for extensive address databases. The precision of geocoding greatly affects route optimisation calculations, the quality of service – and your operating results. Reverse geocoding (coordinate becomes address) should also be possible.

Another advantage is incremental planning: the ability to dynamically fix route plans and add additional orders. You should also check whether the technology is from your vendor itself, or whether third-party components have been integrated. If the software is not autonomous, this can have effects on its reactivity and adaptability. It is advisable to conduct tests with the same data sets in the pre-sales phase. This allows you to compare the results of different tools and make an informed decision.

**EASE OF USE**

If the software is too comprehensive, your teams won't like working with it and may not use it at all. So the user interface should be both ergonomic and user-friendly: clear menus and readable windows customised to your needs. In addition, the user must be given enough leeway to intervene and correct the route plans in case of unexpected events or emergencies.

**IT INTEGRATION**

Route optimisation is part of the logistics chain. Therefore, the software has to function as a link, i.e.. it must have interfaces to both upstream databases and downstream mobile applications. The link to other existing software programs (e.g.. ERP, TMS, or WMS) is needed to process route data. The optimisation software should also synchronise with on-board navigation solutions or mobile apps. This way, planned routes can be transferred and data about driven routes can be collected. Ideally, the planning software and the navigation program communicate in real-time, so routes can be adjusted during the actual drive.

**A CUSTOMISED SOLUTION**

The process of introducing a route optimisation tool needs to be closely supported by the software vendor. When the vendor is experienced in managing such projects, the customer can implement the software swiftly, its teams receive competent support

and can quickly put the tool into action. Above all, the vendor should customise the software to the specific industry using it, activate the necessary interfaces and train future users.
It is also helpful to choose a vendor who only provides you with the functions you need. When you have the option to integrate standard APIs and embed them into your existing system, you don't need to work with the entire solution. This way, you can save time and money, and create a customised solution by integrating only some of the available features – for example route calculation, route optimisation, load optimisation, digital maps or geocoding.

**CUSTOMER SPECIFIC AND INTERNAL RESTRICTIONS**

The decisive difference between a good and an optimised route is the number of restrictions taken into account during calculation. When more parameters are included, the plan reflects more accurately the reality, and schedules will be kept more often. This also minimises the risk of over- and underloading and empty runs; and it optimises the number of vehicles used.

So when choosing a software solution, pay attention to which and how many customer specifications and internal restrictions it can consider.

> "Our dispatchers are very satisfied with PTV Route Optimiser, both in terms of the precise and informative data, as well as the user-friendliness and support."
>
> **Patrick Kox**
> Air Liquide (Germany)

- Potential customer requirements such as fixed or customised dates, specific time windows, obligatory dispatch notifications, unloading times, on-site height and weight restrictions, need to unload equipment (forklift trucks, lift trucks, etc.).
- Potential internal restrictions: Vehicle loading capacity, fixed or variable loading time, type of vehicle (refrigerated, hazardous goods, heavy loads, electric), vehicle availability and number of vehicles in operation, individual transport or combined transport, opening hours and locations of warehouses and depots.

Since the restrictions vary from industry to industry, it makes sense to turn to a vendor who has already worked with companies in the same industry and is familiar with industry-specific challenges. That way you can benefit from software that has been tested by similar companies. This helps to shorten the implementation and amortisation period.

## LEGAL REGULATIONS

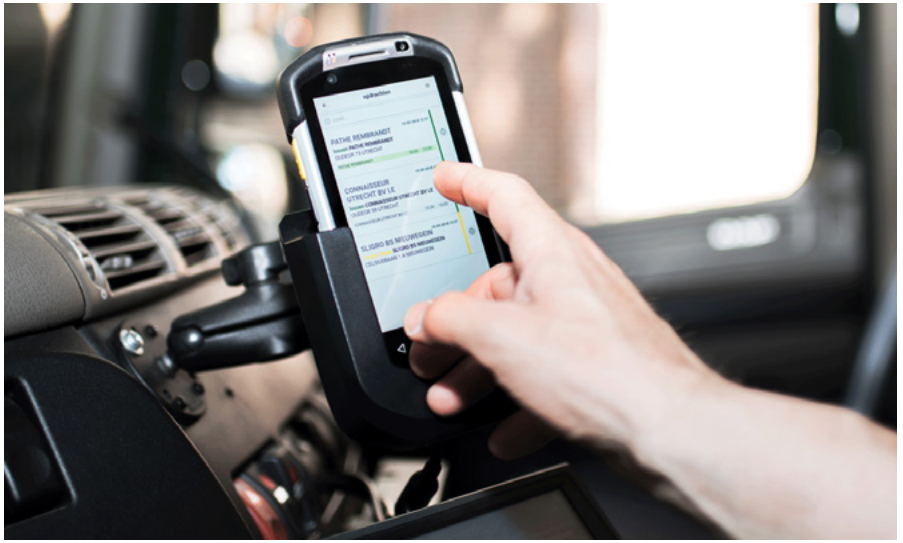
There are many legal requirements to consider during route planning: Driving times and rest periods, environmental protection regulations, working time regulations, emissions regulations, and so on. Therefore, make sure the software you choose is capable of creating a route plan that fully complies with legal and environmental requirements.

## CUSTOM REPORTS AND DASHBOARDS

A good software solution eases the analytical work of planners by creating customised reports and a clear overview of processes and figures. This enables planners to analyse the entire supply chain, keep an eye on resources and identify potential savings. Ideally, the software has a tool for a plan/actual comparison, so the planners can identify optimisation potential.

## PROJECT SUPPORT AND MANAGEMENT

The introduction of a route optimisation software is not trivial. It requires that the vendor has not only technical expertise, but also experience in change management. After all, the implementation will change processes and the entire transport management system. A good vendor will therefore involve the affected teams in the run-up to the project and keep their interests and concerns in mind when introducing the solution. Only then will employees make the most out of the software and successfully continue to work with it.



> "Dispatchers can only plan well if they have a good overview."

**Bob Lammers**
Rensa (Netherlands)

# 7 things to consider when choosing route planning software

## Industry knowledge

Can the software consider industry-specific restrictions? Does it use your technical terminology? Ask for references from a customer in your industry.

## Quality of algorithms

Does the technology come from the provider itself? Does it provide regular software updates? Perform a comparison test of different tools with the same data sets.

## Customer support

Has the vendor experience in introducing new solutions? Will the vendor assist you with both technical support and change management?

## User-friendliness

Is the software easy to learn and use? Can it be adapted to your needs? Is it possible to use only selected modules or APIs? Is the software scalable?

## Interfaces

Can the software be easily connected to your existing systems (ERP, CRM, TMS, telematics)? Is real-time communication with your navigation solution possible?

## Reports and analyses

Does the software help the planners with their analytical work? Can you create customised reports? Are processes and key figures clearly displayed? Is a plan/actual comparison possible?

## Quality of data and maps

Does the vendor have experience with digital maps, and works with an established map provider? Does the software use historical and real-time traffic data? Can the vendor explain to you what reverse geocoding is?

## CONCLUSION

Implementing route planning software can quickly result in a positive return on investment.

However, the following aspects should be considered:

- Determine the savings potential in advance and set a realistic goal.
- Inform your teams of the planned changes so they can adapt.
- Choose the right solution with up-to-date maps, a powerful engine and an ergonomic and user-friendly interface.
- Customise the software to your needs, including restrictions relevant to your industry and business.
- Connect the software to your other IT tools – from CRM systems to on-board navigation.

## PTV ROUTE OPTIMISER – THE LEADING SOFTWARE FOR ROUTE SCHEDULING AND OPTIMISATION

Are you looking for a powerful and reliable route planning software? Then PTV Route Optimiser is exactly what you need. Choose the version that best suits you:

| PTV ROUTE OPTIMISER ST | PTV ROUTE OPTIMISER CL |
|---|---|
| Desktop-based | Cloud-based – accessible everywhere |
| Can be used by multiple users at different locations | No upfront investment |
| In- and output interface to telematics systems | Output interface to telematics systems |
| Target/actual-comparison | |
| ETA calculation and notification service | |
| Freight cost calculation | |

## PTV XSERVER – APIS FOR ROUTE PLANNING

Do you need only an API, and not a complete software solution? PTV xServer's developer components cover all route optimisation use cases: from route planning and geocoding to ETA calculation. You can integrate these APIs into your own system or use them to extend TMS software solutions, for example, which you can then sell to your customers.

**We are happy to help you find the right solution.**

**Just get in touch!**

## REFERENCES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## ABOUT PTV GROUP

Recognised as a global market leader, PTV Group develops intelligent software solutions for transport logistics, traffic planning and traffic management. Cities, companies and people save time and money, enhance road safety and minimise the impact on the environment. PTV plans and optimises everything that moves people and goods in more than 2,500 cities worldwide – it's the central idea which has accompanied PTV since its foundation in 1979.

ptvlogistics.com