

# PTV MobilityPlatform

Advanced Mobility Application Framework





## Advanced “toolbox” for creating profitable new mobility services

**PTV MobilityPlatform is a modular and open software product offering service providers such as car manufacturers, wireless carriers, telematics services providers or mobility portals a component-based application framework. It allows them to quickly and cost-efficiently develop innovative mobility services across different communication channels.**

The software product incorporates all key components which are essential for creating a wide range of mobility services and developing them into a marketable commodity. To offer such mobility services single platform components can be accessed and combined according to the customer's individual needs. At PTV's hosting centre, PTV MobilityPlatform can be accessed by the standard Web Services interface via an XML-based SOAP protocol, or by an AJAX interface via JavaScript. This makes it very easy to integrate every platform

component into external systems independent of any platform technology. Companies such as Allianz, Audi, Motorola, t-info and WirelessCar have been very successful in providing mobility services to literally millions of users by using the technology of PTV MobilityPlatform across mobile and Internet-based communication channels.

They show how easy it is to offer a broad spectrum of mobility services containing valuable information for mobile users with short time-to-market.

# Innovative Mobility Services

## ... for end users

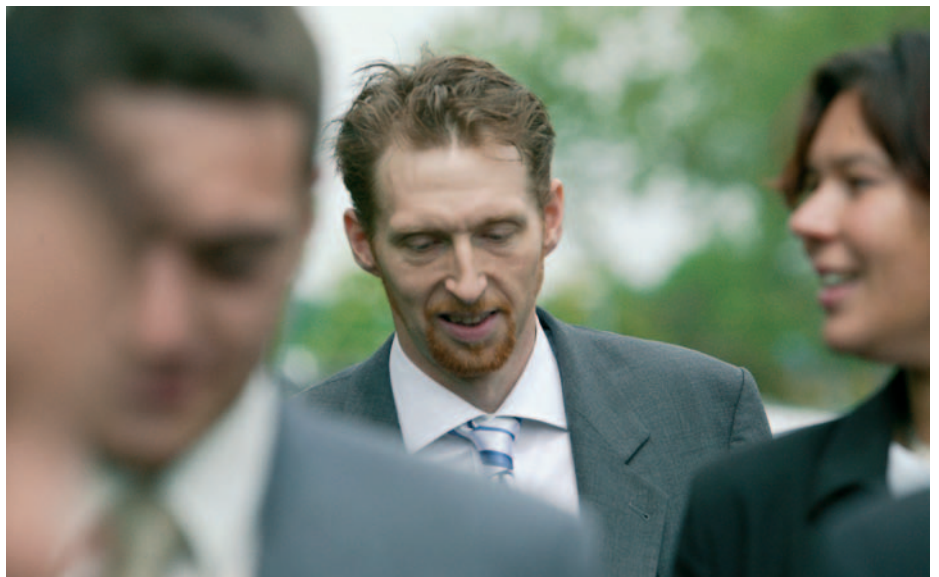
Mobility is the challenge of our modern life concerned with the need for independence and flexibility. On the one hand, people are always on the go, always busy. On the other they require peace, security and comfort. Spatial orientation provided by valuable information at any time anywhere can be helpful to manage our daily life. Mobility services containing location-based information were set up to meet these requirements. PTV provides a technology enabling the user to offer up-to-date traffic information in combination with routing or location services for individual needs. Information can refer to an individual situation where services for the current location are provided on demand. Numerous users may profit from mobility services whenever time-sensitive information is needed, either at home via Internet or by a mobile end-device during the journey.

## ... for service providers

Providing innovative services to mobile end-users means to benefit from a stronger customer relationship. An innovative service portfolio is the key to differentiation from competitors, retaining existing customers, attracting new customers and improving the image. Service providers get a unique selling proposition in this dynamic market positioning the brand name in every mobility service. Offering mobility services to numerous end users allows service providers such as wireless carriers to achieve increasing revenues due to air time and service fees. Especially truck and car manufacturers can profit from mobility services containing dynamic routing or traffic information. They provide location-based and time-referenced information for a target group which is aware of this kind of information in the context of cost-effective processes.

When offering mobility services on a city or country portal, public authorities and governmental institutions improve urban attractiveness to citizens and tourists.

Information services such as city map guides or hotel & restaurant guides support the marketing activities of authorities and institutions. In so doing, tourist inquiries can easily be handled via different communication channels to reduce costs and improve the portal provider's image.



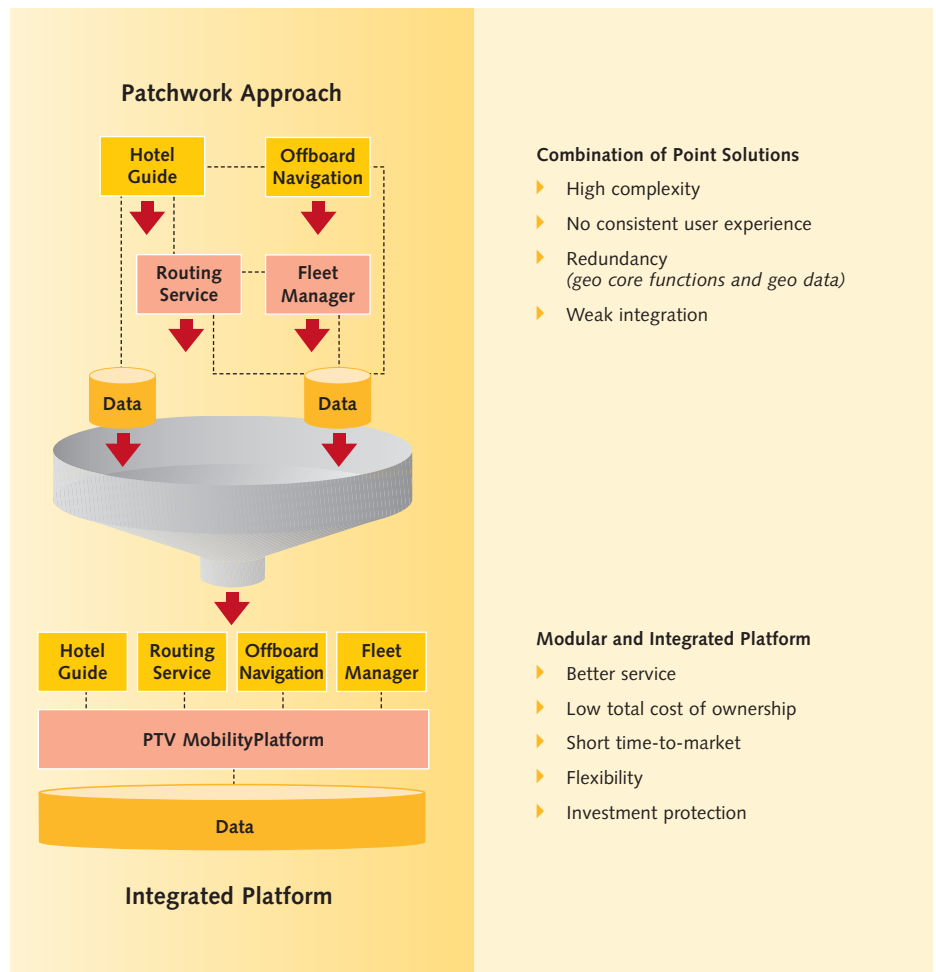
# Mobility Services: Technically Speaking

When developing and deploying mobility services, service providers have to deal with a variety of technical issues.

Services that provide valuable information to a user's individual needs on several end devices meet the current market requirements. These mobility services allow service providers to apply a variety of technologies and data sources across different communication channels.

If single functionalities and valuable information are integrated into a service provider's system using different technologies, time and effort become an incalculable factor. Such patchwork approaches decrease the quality of the services, extend their life cycles and increase the total cost of ownership.

Multi-vendor solutions lead to redundant and inconsistent data management, high complexity and inflexible software solutions.



In contrast to these disadvantages PTV MobilityPlatform offers a cost-effective development. It enables the user to access all platform components via the Web Services interface and to develop and deploy mobility services independent of any other platform technology. By accessing one integrated platform, consistent and dynamic data sources with up-to-date information can be handled across all applications and services. Valuable data and core functionalities of PTV MobilityPlatform generate consistent results.

The software supports a fast development of services by combining all key features in one complex software product. It offers an extensive framework of software components based on one consistent data source. The platform is extremely cost-effective: mobility solutions required to offer an innovative service can quickly be developed and adapted to individual needs. With the platform a corporate service portfolio can be offered to meet the market requirements.

## Advantages of PTV MobilityPlatform:

- ▶ **Better service:** The provision of a unique geo-data source and generic geo core functions across all levels of the platform leads to consistent services across all applications and electronic channels.
- ▶ **Low total cost of ownership:** The integrated software product minimises system integration efforts and simplifies system management.
- ▶ **Cost-efficiency:** When using PTV MobilityPlatform the same features for different mobility services are provided.
- ▶ **Flexibility:** Mobility services based on the platform can easily be adapted and integrated into other platform technologies to meet new business requirements or changing market conditions.
- ▶ **Short time-to-market:** The platform provides single convertible components to create and configure mobility services with readiness for marketing while optimising productivity and reducing project cycles.
- ▶ **Investment protection:** The open, scalable platform, which complies to a widespread standard, minimises financial risk by providing companies with a future-oriented basis for their mobility service initiatives.
- ▶ **Up-to-date content:** The platform provides up-to-date content such as map data or traffic information across all applications.
- ▶ **AJAX for web applications:** Thanks to PTV AJAX Servlets AJAX-functionalities can easily be included in your web application (see brochure insert)



# PTV MobilityPlatform – System Description

**PTV MobilityPlatform provides a complete integrated framework for easy development of mobility services.**

**By using single platform modules, the scalable software product enables service providers to offer a large spectrum of innovative mobility services based on different building blocks.**

The platform incorporates all essential components for mobility service systems such as central geo-components, pre-packaged application modules or ready-to-use applications. Consistent content sources provide all services and applications with valuable static and dynamic data.

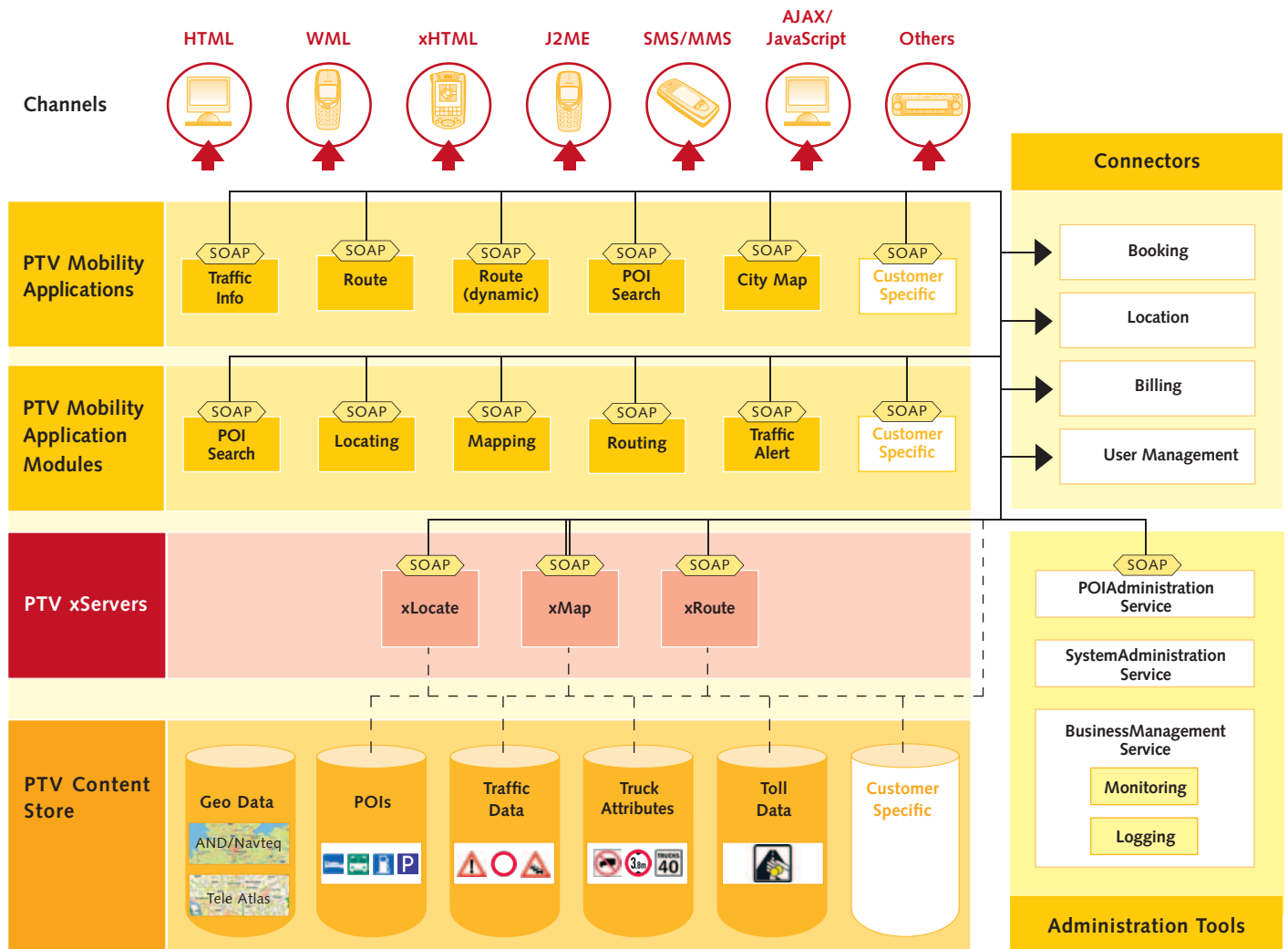
PTV xServers form the basis of PTV MobilityPlatform. PTV xServers are Java-based server components which integrate highly optimized native code engines written in portable C++.

All single platform components can be accessed via the SOAP-based Web Services interface at the PTV hosting centre. Linking all platform components to external systems via one interface speed up the application development process.

Independent of the platform technology, user front-end applications can be developed with technologies such as JSP/servlet, Microsoft.NET or stand-alone Macromedia Flash applications.

## Components of the PTV MobilityPlatform:

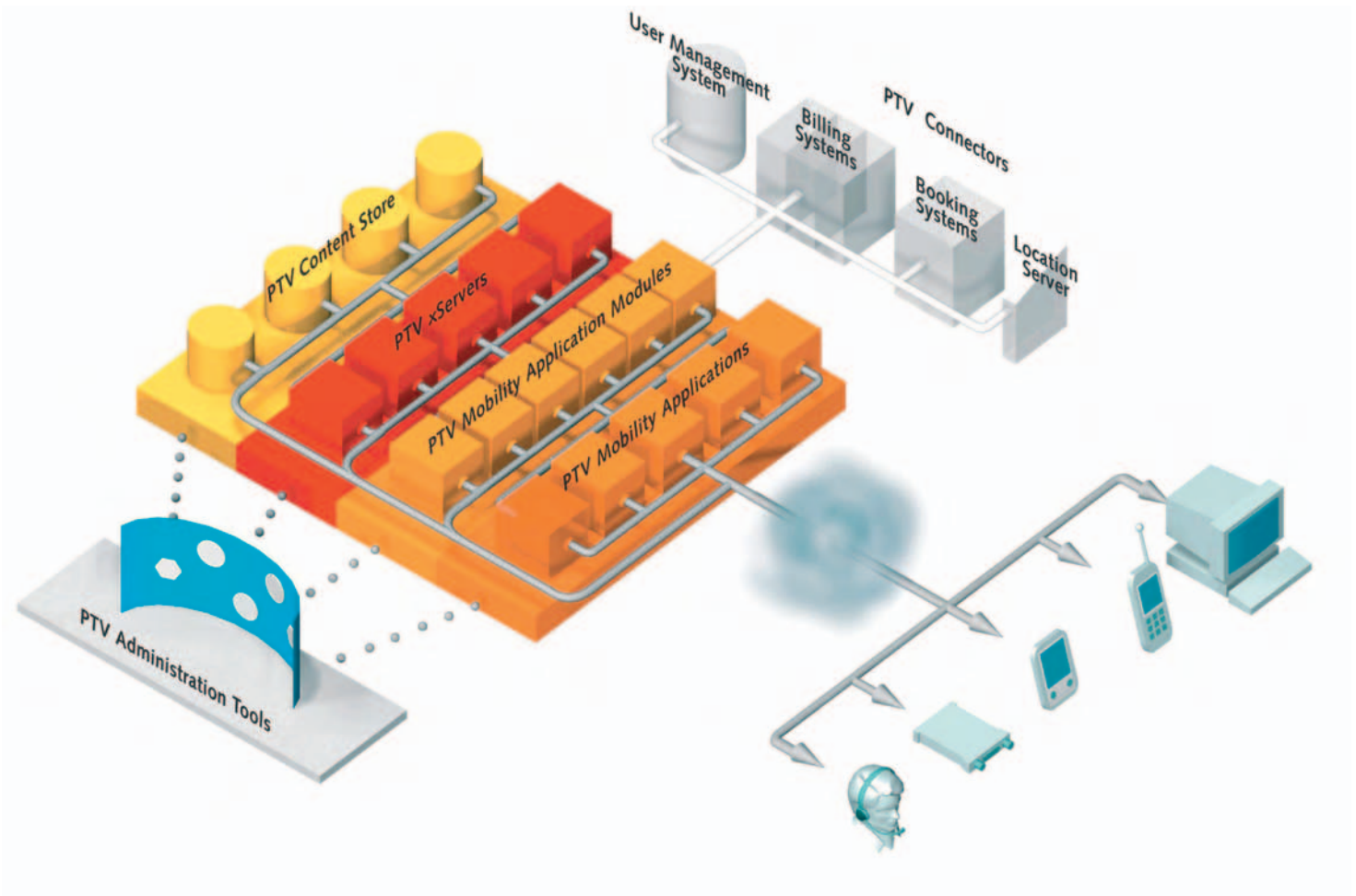
- ▶ **PTV Mobility Applications**  
ready-to-use applications for the most common mobility services such as route planning services or point-of-interest finders.
- ▶ **PTV Mobility Application Modules**  
pre-packaged application modules allowing to create project-specific mobility applications within short time-to-market.
- ▶ **PTV Connectors**  
pre-developed interfaces to specific external systems such as location servers or booking, billing or user management systems.
- ▶ **PTV xServers**  
key components providing all geographical core functionalities such as map display, route calculation or geocoding to create mobility applications. Scalable and optimised for highest performance.
- ▶ **PTV Content Store**  
pre-integrated content sources providing consistent sources of geo data, points-of-interest and traffic information.
- ▶ **PTV Administration Tools**  
administration, monitoring and logging services for fast and simple system administration and configuration.



# Highlights of PTV MobilityPlatform

- ▶ Integrated development application framework
- ▶ Geospatial xServers providing the core functionalities
- ▶ Pre-developed applications and modules for fast application development
- ▶ Pre-developed interfaces to external systems (billing, booking, location)
- ▶ Consistent up-to-date content sources across all platform components (geo data, POI, traffic data, weather)
- ▶ Multi-channel capability
- ▶ Standard Web Services interfaces based on XML via SOAP for easy system integration to external portals and enterprise applications of third-parties and content providers
- ▶ Separation of front-end and business logic for easy front-end design
- ▶ High availability, scalability, security
- ▶ Standard compliance: J2EE, SOAP XML, WSDL, AJAX
- ▶ Standard AJAX-API for the development of Web 2.0-applications

**Use ready-made PTV AJAX Servlets to include exciting AJAX-features in your web application! (see insert)**



PTV Mobility Application Modules are ready-to-use software components allowing the user to develop project-specific mobility applications and integrate them into external enterprise systems with a short time-to-market. They provide the business logic for the most common mobility tasks frequently needed as base functions for mobility applications. All modules are developed as standard Enterprise Java Beans (EJBs) and can be accessed via SOAP XML interfaces for easy integration into external systems. The following application modules are currently available:

# PTV Application Modules



## PTV Location Module

... provides geocoding and reverse geocoding functionalities by using the underlying PTV xLocate Server.

The geocoding process calculates the best matching co-ordinates for a given address while an address is calculated out of a co-ordinate if it is a reverse geocoding process. The module can calculate single addresses or coordinates and generate a list of the results.

Furthermore, the geo-coordinate of a mobile user's location can also be determined by the PTV Location Module.

## PTV Mapping Module

... provides mapping functionalities by using the underlying PTV xMap Server. It allows the user to request a map for a center co-ordinate or a bounding box. The map can also be enriched with additional information like POIs, traffic data, weather data or routes calculated with the PTV Routing Module or PTV xRoute Server. Once the map has been invoked, the user may zoom in and out and

navigate on the interactive map. It is also possible to move around the scalable map. Maps created by the PTV Mapping Module will be provided in the cache within a session for navigating in the history of the map cache.

## PTV Routing Module

... provides routing functionalities by using the underlying PTV xRoute Server. It calculates the shortest, fastest or most economic route by a list of geostations (start and end geo-coordinates, optionally via coordinates).

A route will also be calculated referring to different speed profiles, e.g. routes for fast or slow cars or for pedestrians. With the PTV Routing Module it is also possible to add corridor objects such as POI, traffic, weather data, country lists or toll fees to a route. Additionally, traffic information can be taken into account for dynamic routing. Routing with Soft Via Points is another unique feature. Users can choose whether they want to take a city's bypass or actually pass through the inner city.

### PTV TrafficAlert

... provides traffic observation for defined user profiles. It allows users to subscribe to traffic information for a route, street or region or any combination of these within a defined time slot. According to a user's preferences traffic sections can be monitored and matched with incoming traffic information by using PTV TrafficAlert.

If an alert comes in, PTV TrafficAlert will send a notification to the end user via SMS, MMS or e-mail. If a user has already been notified of this traffic incident, he will not be informed unless the traffic information status changes again.

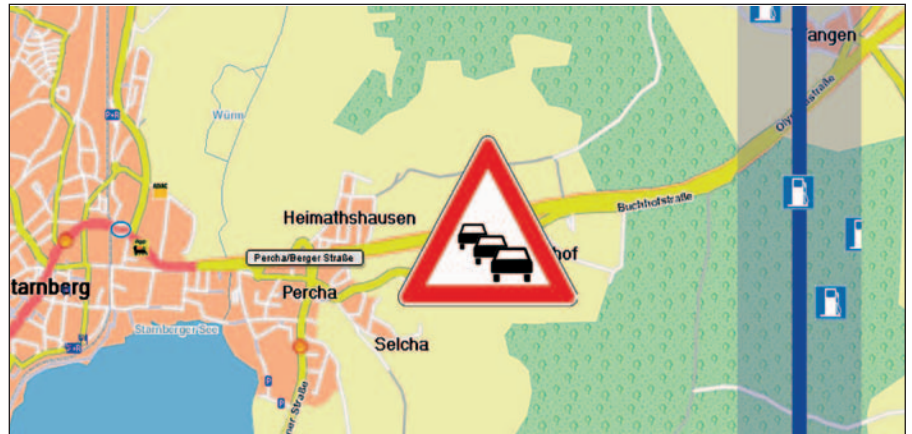
Furthermore, time-slots can be selected for pre-trip and on-trip notifications (e.g. "send me messages hourly").

### PTV POISearch Module

... provides proximity search functionalities. It allows the user to search for all kinds of POIs (e.g. cinemas, fuel stations, events, parking lots, sights, dealers, etc.) as well as for traffic and weather information which are also considered as POIs within the platform. With the PTV POISearch Module it is possible to search for POIs within defined regions or along a route based on route distances or time based route distances. The POI search is based on relational databases, either for standard POIs or for customer-specific POI data provided by the PTV POI administration service. Therefore, it is possible to combine the database on which the POIs will be searched for by using the PTV POI search module.

PTV Mobility Applications are pre-packaged applications for a fast development of the most common Internet or wireless mobility services. They provide the entire business logic for standardized mobility services by using the underlying PTV Mobility Application Modules and PTV xServers. With PTV Mobility Applications service providers can offer services with a very short time-to-market by simply adding the appropriate web frontend to the application code provided by PTV. All applications are implemented as standard Enterprise Java Beans (EJBs) and run on J2EE servers. They provide XML interfaces for easy integration of external applications and portals. Interactive Web 2.0 applications can easily be developed by means of AJAX servlets. Currently, the following PTV Mobility Applications are available:

# PTV Mobility Applications



## PTV CityMap Service

... allows users to request maps for addresses which may be enriched with additional information such as POIs, weather or traffic information. After having selected a map, the user may zoom in and out, move around the map or adjust a map's level of detail.

## PTV Route Service

... allows users to calculate routes for start and destination addresses including via-points. The calculated route can be presented in the form of a list and visualized on a zoomable and scalable map. For dynamic routing up-to-date traffic information as well as traffic hotspots (e.g. where traffic incidents occur regularly) can be taken into account. Route calculation can be based on the shortest or fastest way or on a combination of both options. Furthermore, routes may be enriched with

additional information such as POIs along the route, weather and traffic information or textual input.

## PTV TrafficInformation Service

... allows the user to request lists and maps with up-to-date traffic information for areas (countries, regions or towns) or for roads (e.g. highway X).

## PTV POISearch Service

... enables the user to search for car parks, hotels and other POI data. Proximity search lets the user search for POIs within a radius from a center point specified either by linear distance, driving distance or even by driving time. Corridor search enables the user to search POIs along a driving route within a defined area, also specified either by linear distance, driving distance or by driving time. Furthermore, the user can request directions to or from a POI.



# Connectors and Administration Tools

## PTV Connectors

PTV Connectors are pre-developed interfaces to external systems.

Available connectors are:

### **Connectors to Billing Systems**

to transfer log files to external billing systems via generic interface

### **Connectors to Booking Systems**

to integrate external booking systems into the application

### **Connectors to Location**

#### **Servers of Mobile Operators**

to determine the location coordinate for a mobile communication user by requesting his or her mobile phone number from the location server of a mobile network operator

### **Connectors to LDAP-based**

#### **User Management Systems**

to authenticate users via LDAP-Systems

## PTV Administration Tools

### **PTV POIAdministration Service**

... allows customer-specific POI layers to be stored and configured. After uploading the new POI data by a request or via a csv-file the POI icons will be geocoded and updated automatically. As the service is also provided via web front-end the icons can be displayed on a map where the user may drag and drop the POI icon onto the desired location. The new position may automatically be geocoded and restored. Further information about a POI icon can also be added and stored in the PTV database.

### **PTV BusinessManagement Service**

... provides a detailed overview of the usage of PTV MobilityPlatform. The service can generate the average and total numbers of the usage by single platform components. To get a quick overview of the usage the service provides timeline-charts which are split into single platform components. Moreover, the service provides features for monitoring the service availability and carrying out performance tests.

### **PTV SystemAdministration Service**

... provides functionalities for configuring the system settings and the features available to customers and users. It uses the PTV Preferences Module to retrieve customer-specific preferences.

Use AJAX to speed up your web application based on PTV Mobility Platform! Ready-made PTV AJAX Servlets help you to easily integrate AJAX technology.

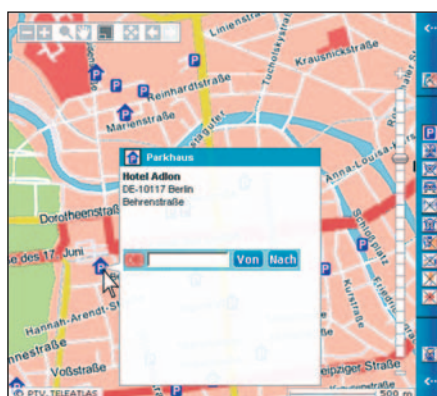
PTV AJAX Servlets control the asynchronous transfer of data between a server and a client, and thus boost the speed of your web applications, offering numerous new functions.

# PTV AJAX Servlets



## Fast, interactive maps

Fast, interactive maps can be embedded into web pages by means of PTV AJAX Servlets. The speed of AJAX maps has given rise to a new level of user interactivity: it allows the users to seamlessly zoom in and out of the map and drag it around. Additionally, POIs and traffic information can be displayed on the map, and the users have immediate access to additional information – just a mouse click away, without page refresh and time delay.



AJAX allows the users to seamlessly zoom in and out of the map and drag it around. POIs are immediately displayed on the map.

## Changing routes via drag'n'drop

With PTV's AJAX maps the users can now drag'n'drop directions at any point in order to reroute according to their requirements, for example by grabbing the route line and dragging it, to choose a new destination point (e.g. a motorway). It is also possible to include new stop-off points or to change the starting point and destination – quickly and seamlessly. The route list will of course be updated as well.



Drag'n'drop directions at any point in order to reroute directions.

## Address Suggest function

The Address Suggest function is another typical AJAX feature. It helps the user to quickly enter address data, such as towns, streets or postcodes. When a user starts typing the first letters or numbers into the search box, a drop-down menu appears with most likely matching address input.



The Suggest function helps users to quickly enter address data.

## More AJAX features

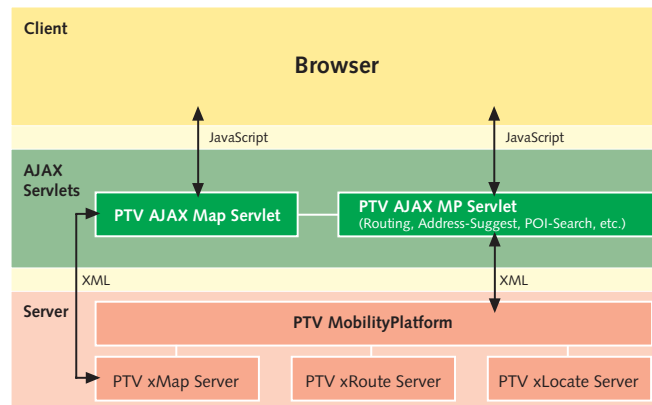
PTV AJAX Servlets allow users to create numerous other AJAX features based on PTV MobilityPlatform:

- Embedding satellite or aerial images
- POI Suggest function
- POI search along the route within a search corridor based on routes or driving time
- Virtually driving along the route on the map
- Selecting traffic news from a list to be displayed on the map

## PTV AJAX Servlets for developers

The ready-made PTV AJAX Servlets help developers to quickly and easily embed AJAX features into their web applications. The PTV AJAX MP Servlet controls the asynchronous data transmission between the browser and

PTV MobilityPlatform: it provides the data which are continuously requested from PTV MobilityPlatform. PTV's AJAX Map Servlet is responsible for the map data. It has direct access to PTV's xMapServer.



## How does AJAX work?

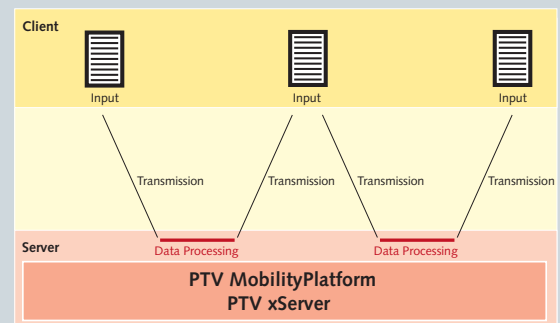
AJAX (Asynchronous JavaScript and XML) stands for an asynchronous data transmission between a server and a client. This means that AJAX-based web applications are much faster than standard client-server communication; they behave like desktop applications and provide the user with exciting real-time results.

AJAX processes the web application behind the scenes: it provides new map or POI data which are continuously requested from the server. New data, which are created by zooming in and out of the map, dragging the map around or requesting POI data, can instantly be reloaded without sending a new request to the server. With AJAX only the changes are reloaded and not the entire page.

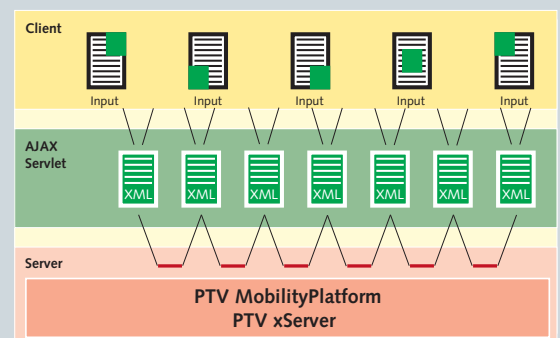
The same applies to AJAX-based Address or POI Suggest features. While entering the data, the web application searches for relevant entries and suggests the possible matches to the user.

Drag'n'Drop routing is also based on AJAX technology: it uses existing route sections so that only the new route sections are reloaded if directions are rerouted.

AJAX applications are controlled by JavaScript which means that all standard browsers support this technology.



Classic client-server communication model



AJAX model: Asynchronous data transmission between the server and the client (input/display). Only new data are exchanged on the client.

## About PTV

The PTV Group provides cutting-edge software technology and consulting to enable customers to meet their mobility needs. It helps people plan and manage traffic and transportation, provides them with the latest traffic reports and assists them in optimising their long-term resource allocation. Since 1979, the independent corporate group has been a leading provider of products and solutions for travel, traffic and transportation planning.

Strong international demand has fuelled dynamic growth: PTV currently has over 700 employees worldwide crafting innovative solutions for our customers.

The Karlsruhe headquarters acts as a development and innovation centre with tight links to research and educational institutions. Additionally, PTV maintains shareholdings and subsidiaries in Germany, Europe and every continent in the world.

Innovative software solutions and map technologies are the **Mobility** business field's stock-in-trade. Its know-how drives a wide range of GPS-based telematics applications, geographic Internet applications and route planning tools.

**Secure your strategy! Stay tuned:**

[www.ptvag.com](http://www.ptvag.com)

