

PTV XSEQUENCE SERVER

MIGRATION GUIDE

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1 General

This guide describes how to migrate from the PTV xSequence to the PTV xTour Server. As the PTV xSequence Server is discontinued on 01.05.2013 we recommend to execute the necessary steps as soon as possible. Furthermore this makes sense because the sequence optimisation engine has been completely redesigned and integrated in the PTV xTour Server.

This migration guide is based on the PTV xSequence Server 2.1.0.4 and on the PTV xTour 1.14.1.3. Please note that in the first place the description should give an overview of the necessary steps. So there is no detailed specification of every object and every attribute. Therefore the guide should also be valid for slightly different versions than the above declared.

2 Service method level

On service method level the PTV xSequence Server offers 9 methods:

```

<< xservice >>
XSequence

+planTour(stops:Stop[],planningParams:PlanningParams,inputTour:InputTour):Plan
+planTimewindowTour(stops:TimewindowStop[],planningParams:TimewindowPlanningParams,inputTour:InputTour):Plan
+planTransportTour(stops:TransportStop[],planningParams:TransportPlanningParams,inputTour:InputTour):Plan
+planFieldServiceTour(stops:FieldServiceStop[],planningParams:FieldServicePlanningParams,inputTour:InputTour):Plan
+planOrienteeringTour(stops:OrienteeringStop[],planningParams:OrienteeringParams,inputTour:InputTour):Plan
+calcTour(stops:Stop[],planningParams:PlanningParams,inputTour:InputTour):Plan
+calcTimewindowTour(stops:TimewindowStop[],planningParams:TimewindowPlanningParams,inputTour:InputTour):Plan
+calcTransportTour(stops:TransportStop[],planningParams:TransportPlanningParams,inputTour:InputTour):Plan
+calcFieldServiceTour(stops:FieldServiceStop[],planningParams:FieldServicePlanningParams,inputTour:InputTour):Plan
    
```

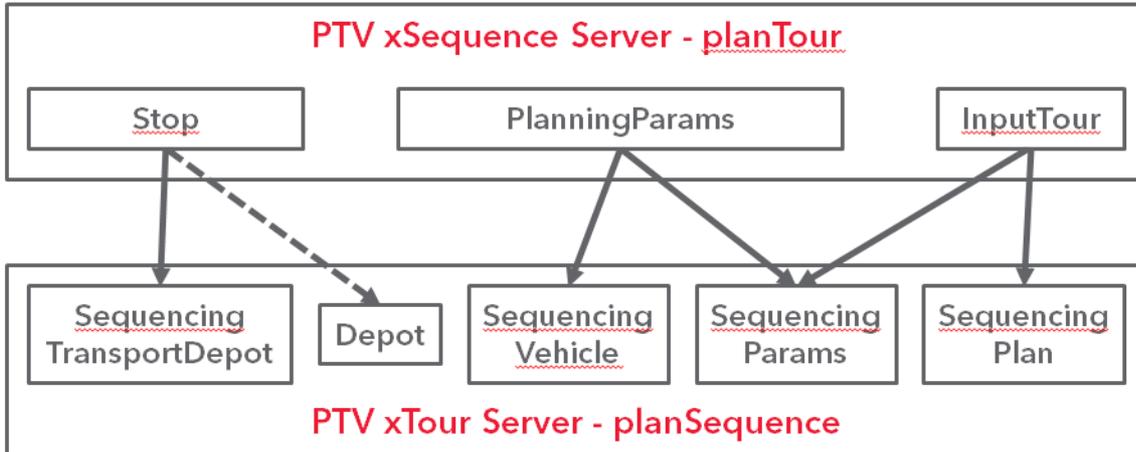
All of these methods are concentrated in one method of the PTV xTour Server called **planSequence**. That means that for all your use cases only one method is necessary including all possible objects and attributes. If you use only parts of the API, the unused objects and attributes have default values. So you don't have to take care of them.

The service methods can be divided in two groups. The **plan** service methods do the real sequence optimisation and their migration is described in the following chapters. The **calc** service methods calculate the tour attributes of a given tour. To represent this in the PTV xTour Server you also use the **planSequence** method, but you have to fix the whole tour for optimisation (attribute **fixedStartTransportPoints**). Then you get the given tour with all tour attributes without changing the sequence.

As the **plan** methods have a hierarchical structure only the new components are described in each chapter. Therefore please read all chapters from the beginning till arriving at the relevant service method. Please note that the **planOrienteeringTour** method is not available in the PTV xTourServer.

3 Service method *planTour*

The following diagram compares the main objects between the method *planTour* in the PTV xSequence Server and the method *planSequence* in the PTV xTour Server:

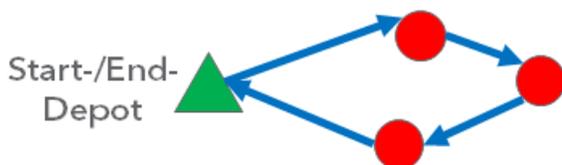


3.1 Object *Stop*

One of the main differences between PTV xSequence Server and PTV xTour Server is the modelling of the fundamental planning object **Stop**. Until now you have to use this object for the customer locations as well as for a fixed start and end location including the corresponding fixing.

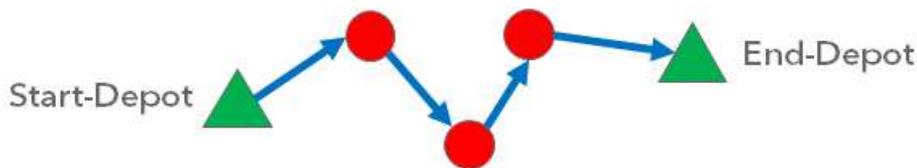
In the PTV xTour Server the customer location is typically modelled by the object **SequencingTransportDepot**. This object represents an order transporting goods between depot and customer (pickup and delivery possible). So the PTV xTour Server works depot-orientated. A depot is a location where the goods are stored and the vehicle (represented by the object **SequencingVehicle**) usually starts and ends. You can even set two depots in case you want to end at a different location as started. Moreover it is possible to consider no start or end depot. There are different use cases possible:

3.1.1 Use case 1 - Round tour



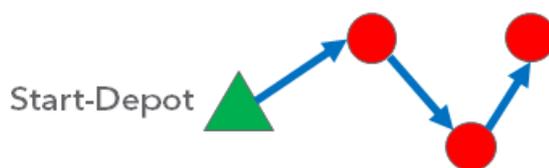
- Description: My vehicle starts and ends at my home location.
- Solution: Use one object **Depot**, set in the object **SequencingVehicle** the attribute **depotIDStart** and **depotIDEnd** to the depot ID.

3.1.2 Use case 2 - Open tour



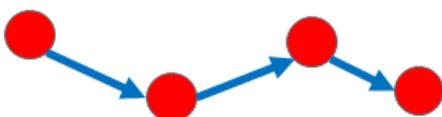
- Description: My vehicle starts and ends at different locations.
- Solution: Use two objects **Depot**, set in the object **SequencingVehicle** the attribute **depotIDStart** and **depotIDEnd** to the corresponding depot ID.

3.1.3 Use case 3 - Start-depot-free tour



- Description: My vehicle starts at my home location, but I do not care where it ends (the same applies to end-depot-free tours).
- Solution: Use one object **Depot**, set in the object **SequencingVehicle** the attribute **depotIDStart** to the depot ID and the attribute **depotIDEnd** to -1.

3.1.4 Use case 4 - Depot-free tour



- Description: I do not consider depots at all (e.g. because the trip from or to the depot is not paid).
- Solution: Use no object **Depot**, set in the object **SequencingVehicle** the attribute **depotIDStart** and **depotIDEnd** to -1.

3.2 Object **PlanningParams**

The PTV xSequenceServer summarizes in the object **PlanningParams** real parameters for the optimisation but also vehicle specific parameters. As already mentioned in the PTV xTour Server you have now the new object **SequencingVehicle** separating the corresponding attributes.

The cost values of the object **PlanningParams** of the PTV xSequence Server have no direct equivalent in the PTV xTour Server, but you can use the object **VehicleCosts** of

the object **SequencingVehicle**. Please note that these costs have no impact on the optimisation.

Regarding the distance matrix calculation there are some differences between both PTV xServers. Conform to all PTV xServers the coordinate format in the PTV xTour Server is specified as a property of the caller context. The use of geometric distances (attribute **directVelocity**), road distances (object **DistanceMatrixByRoad**) and the reference point method (object **DistanceMatrixByReference**) is furthermore possible, but the use of external distances is not. The attributes controlling the distance matrix calculation in the PTV xSequence Server (**optimization**, **vehicleType** and **speedProfile**) are now summarised in a complete vehicle profile (attribute **profileName**).

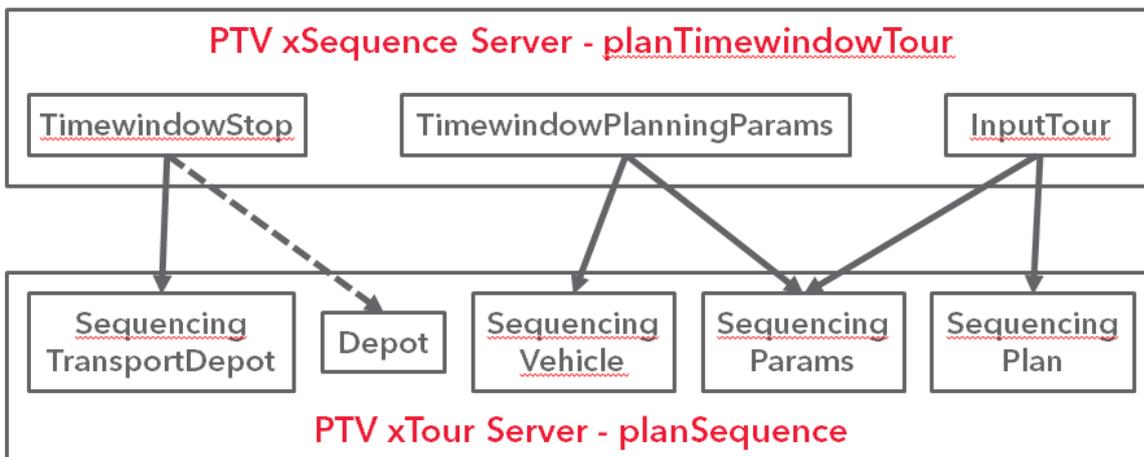
3.3 Object InputTour

To import an already planned tour you can use the object **SequencingPlan** of the PTV xTour Server. Please note that this object is used for both import and export. The export objects are marked with the name **result**. So the important objects for the import are **SequencingTour** and **SequencingTourPoint**.

To control the subset of the tour to be rearranged in the object **SubSequence** of the PTV xSequence Server you can use the attributes **fixedStartTransportPoints** and **fixedEndTransportPoints** of the object **SequencingParams**. As already mentioned if you model a fixed start and end location as an object **Depot**, there is no longer fixation necessary.

4 Service method planTimewindowTour

The following diagram compares the main objects between the method **planTimewindowTour** in the PTV xSequence Server and the method **planSequence** in the PTV xTour Server:



4.1 Object *TimewindowStop*

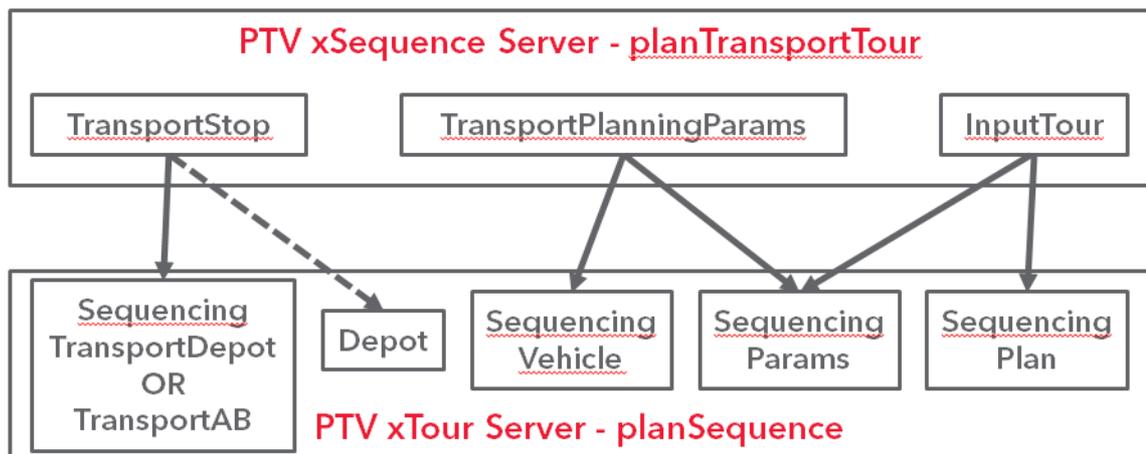
You can find the additional time window attributes from the PTV xSequence Server in the object *TransportPoint* part of the object *SequencingTransportDepot*.

4.2 Object *TimewindowPlanningParams*

Most of the additional time window attributes attributes from the PTV xSequence Server are represented in the object *SequencingVehicle* with two exceptions. The object *LimitValues* correspond to the object *Restrictions* in the *SequencingParams*. And for the object *StopGroup* there is no comparable concept available in the PTV xTour Server.

5 Service method *planTransportTour*

The following diagram compares the main objects between the method *planTransportTour* in the PTV xSequence Server and the method *planSequence* in the PTV xTour Server:



5.1 Object *TransportStop*

The concept of partner relations between two stops in the PTV xSequence Server is represented by a second kind of order in the PTV xTour Server. Two *TransportStops* connected with a partner relation correspond now to one *SequencingTransportAB* containing two objects *TransportPoint*.

The attribute *score* corresponds to the attribute *priority* in the object *SequencingTransportDepot* and *SequencingTransportAB* respectively.

5.2 Object Transport*PlanningParams*

The attribute ***scoreAsPrio*** with the value true correspond to the way the PTV xTour Server interpret the priorities. The alternative usage of this attribute with the value false raising the attractiveness to insert stops is not available in the PTV xTourServer.

6 Service method *planFieldServiceTour*

If you plan tours for field service employees lasting several days, it is also possible to use the method ***planSequence*** in the PTV xTour Server. But for special features in this method like fixing the last visited location different to the start location (attribute ***lastLoc***) or avoiding an overnight stay (attribute ***homeDistanceRadius***), there is no direct equivalent in the PTV xTour Server.

7 Additional benefit of the method *planSequence*

As the PTV xTour Server is continuously developed further there are some new features at your disposal not available in the PTV xSequence Server:

- ▶ **TourSection**: Possibility to define different tour sections for the transport points (e.g. an order has to be planed as one of the first three tour points in a tour).
- ▶ **AllowServiceSplit**: Possibility to control the service period splitting of a transport point on different opening intervals.
- ▶ **CoDriver**: Possibility to demand a co driver at the transport point and thereupon to influence the loading periods.
- ▶ **SiteId**: Possibility to identify transport points belonging together (e.g. all in one premises) and thereupon to consider the service period only once (e.g. the security check at the gate).
- ▶ **LoadingFunctions**: Possibility to define uploading and unloading functions at transport points, depots and vehicles.
- ▶ **Restrictions**: Additional tour restrictions like the maximum distance between consecutive tour points.
- ▶ **Analyse**: Possibility to analyse reasons why orders are unscheduled