

Plugins

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1. Decision Groups

1.1 Overview

The purpose of this plugin is to allow users to define a number of points (the point at which has to calculate it's next to turning movements) in a Paramics network at which vehicles can have their route choice dictated to them by the user, overriding the default assignment style routing algorithms use in Paramics. These points are called "Decision Points" and a collection of such Decision Points that effect similar vehicle types travelling to and from the same zones is called a "Decision Group".

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1.1.1 Defining Decision Groups

When defining a Decision Group the users specifies the vehicle types that the group effects and the origin and destination zones, generating the specified vehicle types, that the group effects. For example a Decision Group 1 may affect vehicle types 1, 2 and 3 travelling from zone 5 to zones 3, 4, 7, and 10.

Each Decision Point defined as belonging to a specified Decision Group inherits the vehicle types and zone definitions of that group. For example if the sample Decision Group described above has 3 Decision Points, each of those points will effect vehicle types 1, 2 and 3 travelling from zone 5 to zones 3, 4, 7, and 10.

For each Decision Point the user can define target turning proportions for any valid turning movement. The user can code percentage figures or actual turning flows that the API should try to match. In actual fact the units used to specify the target turning proportion is not important, as each value will always be relative to the total specified for all turning movements.

For example, the two entries below give the same results:

```
point 1 link 18:2 2 exits
exit 2:5 200
exit 2:8 600
```

and

```
point 1 link 18:2 2 exits
exit 2:5 25
exit 2:8 75
```

The format of each Decision Point defines the link on which the decision is made, and the target turning proportions assigned to each possible exit (see above). In the sample above, when the API selects vehicles fitting the Decision Groups criteria for action, 25% of the selected driver population will be routed from link 18:2 to link 2:5, while 75% will be routed from link 18:2 to link 2:8.

When each new Decision Point entry is read by the API, by default, each of the possible exit records are initialised with a proportion of zero. Following this each new proportion entry read (i.e. "exit 2:8 75") will re-set the target proportion to the specified value. This means that users do not need to specify values for all

possible exits at Decision Points but only those they wish to route traffic to, as by default all others will be assumed zero.

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1.1.2 Input Files

The Decision Groups API uses two input files these are:

- **decision-groups** : this hold the definitions of all the users Decision Groups and associated Decision points
- **decision-groups.cfg**: this defines the Parameters used by the API.

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1.2 Parameters File

To use a parameters file with an API the user must tell Paramics Modeller/Processor to load and read that file. Paramics can be directed to parse a parameters file by adding the following line to the end of the configuration file of the network being used:

```
read parameters file "decision-groups.cfg"
```

This parameters file has the format:

```
api coefficients 4  
  
False "Enable Decision Groups API"  
False "Dump Report File"  
False "Show Decision Groups"  
1 "Decision Group Highlighted" range 1 to 4 precision 0
```

The first line defines the number of Parameters in the file this should not be changed. The next four lines define the API parameters, their initial states, name, and any associated range of values (for slider bars):

Enable Decision Groups API: this parameter is a true/false toggle and must be set to true to enable the API for use, otherwise the API will not be active for use with Paramics Modeller or Processor;

Dump Report File: this parameter is a true/false toggle and should be set to true produce a report file at the end of the simulation period;

Show Decision Groups: this parameter is a true/false toggle and should be set to true to annotate each of the links/exits associated with a particular Decision Group. This option should be used interactively with Paramics Modeller.

Decision Group Highlighted: this parameter is a slider bar and is used in conjunction with the "Show Decision Groups" parameter to specify which Decision Group should annotated in the Paramics Modeller Zoom Window. Note that each Decision Group will be highlighted in a different colour.

1.3 The Data File

The Decision Groups data file can be split into two sections, the header and the Group Definition. The header simply defines the total number for Groups held in the file, for example:

```
1 decision groups
```

While each Group define the vehicle types and zones associated with the group, and each of the associated Decision Points, for example:

```
group 1 with 2 decision points
vehicle types 1
1
origin capture zones 3
1
4
5
destination capture zones 1
2

point 1 link 9:18 2 exits
exit 18:19 10
exit 18:2 90

point 2 link 18:2 3 exits
exit 2:19 0
exit 2:5 250
exit 2:8 750
```

Also, it is possible to define the time period within the model simulation that each Decision Group we be considered "active" for example:

```
group 1 with 2 decision points active from 00:05:00 until 00:10:00
```

or

```
group 2 with 21 decision points active from 00:25:15
```

or

```
group 3 with 5 decision points active until 01:59:59
```

Note the time period definition is optional and, by default, if no time period is defined that Decision Group is assumed to be active at all times.

In General the file structure can be defined as:


```
2
3
origin capture zones 1
2
destination capture zones 3
1
4
5

point 1 link 17:3 1 exits
exit 3:5 100
```

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1.4 Using the Plugin

Plugins are loaded by using a “programming” file. The programming file is text file defined in the data directory that contains the names of the Plugins to use when the network is loaded by Paramics Modeller or Processor.

Plugins are often application specific i.e. a different Plugin file exists for use with Modeller and Processor. To distinguish between Plugins the Programming file can use a post-fix to indicate the Plugins listed in the should be used with either Modeller or Processor, for example:

- **programming.modeller**: will contain a list of Plugins to use when the network is loaded in Paramics Modeller
- **programming.simulator**: will contain a list of Plugins to use when the network is loaded in Paramics Processor

The Plugin exe files are located in the root Paramics directory, for this Plugin the file name is:

- **qpDgroups.dll**

A sample network is provided called **dggroups-plugin-demo** , this illustrates the use of the Plugin with both Modeller and Processor.