## Preference Overview

Using this preference, you can control the level of disruption to staff during a schedule change and indeed use it in stages to move from the supplied schedule to a fully optimized schedule.

Optibus OnSchedule uses two criteria of similarity. The new schedule is similar to the previous one if either one of the following hold:

* Trip ID similarity: Consecutive trip IDs are substantially maintained

A new schedule is similar to an existing schedule with respect to Trip ID if the Trip IDs of any two consecutive trips is maintained.

Specifically,

* Means is followed by

Trip ID similarity: If Trip ID X-> Trip ID Y in the current schedule remains

Trip ID X-> Trip ID Y in the new schedule, this is considered to be similar and no penalty is imposed

Trip ID non similarity: If Trip ID X-> Trip ID Y in the current schedule becomes Trip ID X-> Trip ID Z in the new schedule then a penalty will be imposed

There will always be penalties for Trip ID similarity violations.

Note: The optimization takes the vehicles schedule trips pairwise but no more.

* Trip start time similarity: Consecutive Trip start times are substantially maintained

A new schedule is similar to an existing schedule with respect to Trip Start Times if

Suppose that:

1. Trip ID X is followed by Trip ID Y in the current schedule
2. Trip Y starts at 09:30
3. We allow trip start time deviations of no more than 10 minutes to maintain trip start time similarity
4. For Trip Start Time Similarity, we require that the trip following Trip ID X in the new schedule commences no earlier than 09:20 and no later than 09:40 and the route is the same as that of Trip Y. This does not impose a penalty.
5. A penalty will be imposed if any one of the following conditions hold:
   1. If the route of the trip following Trip X has changed from the route of the original Trip Y
   2. If the route of the trip following Trip X remains the same as the original Trip Y but commences earlier than 09:20 or later than 09:40

The idea of "substantially" is implemented by applying a cost penalty for deviations from the original schedule. Thus, if you impose a low penalty, you are effectively saying, "I would like the new schedule to be similar, but similarity is less important than my other preferences." In this case, The optimized schedule may be quite different from the original. If on the other hand, you impose a high penalty for deviations, you are effectively saying, "I would like the new schedule to be similar to the original, if necessary at the expense of my other preferences ." In this case, the optimized schedule may not look very different from the original.

More specifically:

To demonstrate the concept, we will use the fourth template below, Schedule Similarity - by trip id. It is the simplest to understand: It sets out to maintain Trip ID similarity. Its only parameter is the penalty. Here are results of setting increasing penalties as expressed by several KPIs: