

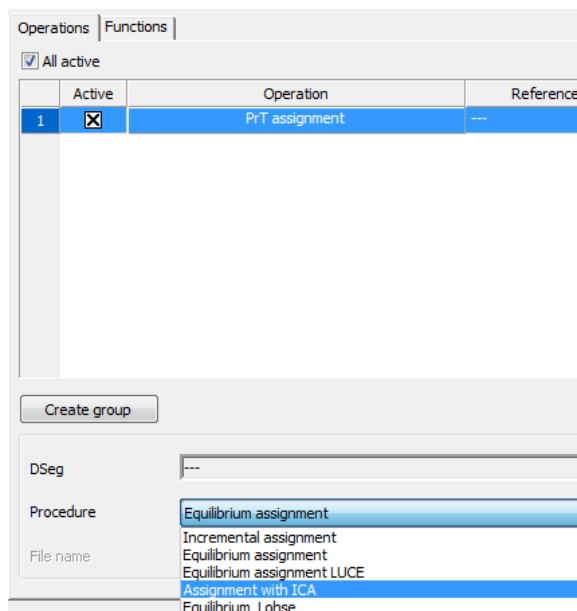
## ICA-Assignment, Blocking Back

Ever since we introduced ICA node impedance calculation in VISUM, we received requests from users who would like to replace turn volume-delay functions (VDFs) in static assignment by the more detailed ICA calculation, in order to capture the effect of priority or signal control. If substituted directly, ICA-calculated delays will lead to slow convergence of the assignment (or none at all), because the cost function is no longer separable, e.g. turn delays of permitted or minor movements depend also on the volumes of conflicting movements.

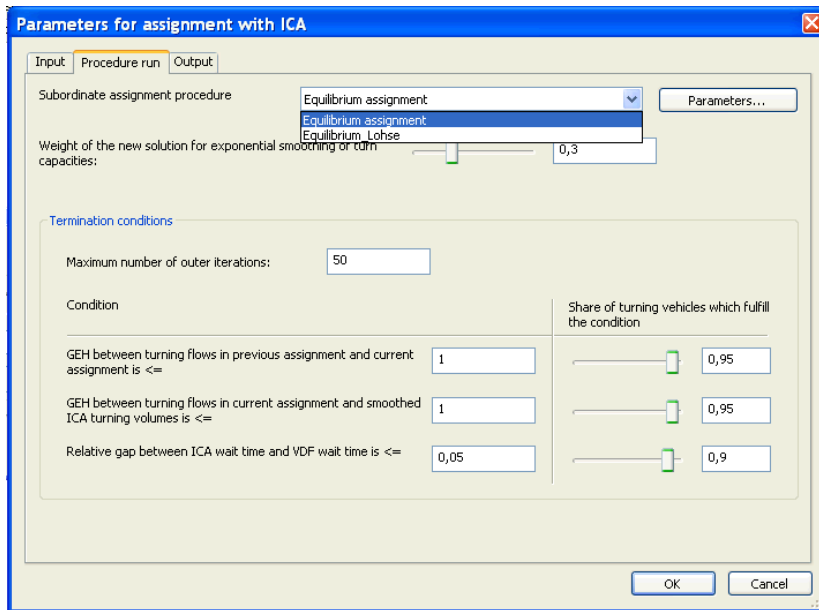
Over the last two years PTV adapted a previously existing assignment method for use within VISUM. The iterative method runs a few iterations of a conventional equilibrium assignment with turn VDFs, evaluates turn delays according to ICA, then re-calibrates the turn VDFs (turn by turn) to fit the ICA delays, before continuing with the next few equilibrium iterations. It was piloted in collaboration with Transport for London and is described in detail in the document `Examples\IntersectionCapacityAnalysis\Readme_ICAConvergence.pdf` inside the VISUM installation directory. The solution was initially implemented as a Python script.

In VISUM 11.5 we incorporated our experience with the script prototype into a native implementation in VISUM. The new method is listed as a new variant *Assignment with ICA* within private transport assignment.

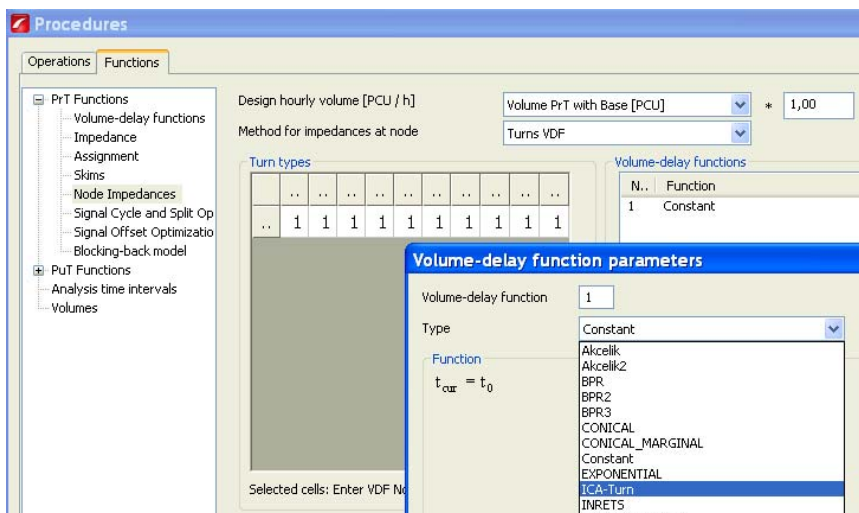
In effect, *Assignment with ICA* is an iterative wrapper for an equilibrium assignment, blocking back, ICA, and the re-calibration of VDFs. The parameter settings for these operations have to match each other, and to help you avoid mistakes, we simplified and assembled all of them in a single tabbed dialog.



The screenshot shows one page of this dialog. Here you choose the underlying assignment method; currently either equilibrium assignment or equilibrium Lohse can be used, and LUCE will be added once warm-start is implemented. The dialog also shows the termination criteria for the new assignment. In addition to convergence of the underlying assignment we require that the flows for the VDF-recalibration stabilize and delays from ICA and from the VDFs converge.



Calculation times for an assignment with ICA are by necessity longer than in an ordinary static assignment, because the changes to the VDFs and the effects of blocking back repeatedly throw off the convergence process. We expect that in a project the need may arise to calculate a base case assignment with ICA followed by several build scenario assignments in which the flow patterns are fairly similar to the base case in most of the network. For this use case you can warm-start the assignment with ICA as a whole, starting not only from the flows, but also from the re-calibrated turn VDFs from the last run. It is even possible to turn off ICA and the VDF re-calibration completely, and only use the final calibrated turn VDFs in a standard static assignment. In this case specify Turn VDF as the calculation method for node impedances and specify ICA-turn as the functional form.



To complete the workflow, VISUM 11.5 includes an improved importer for SATURN buffer and simulation networks which correctly interprets and maps priority markers and other SATURN attributes at the junction level.