3 Localization and delay robustness

The localized supervisors, as well as the files used for the delay robustness check are given in Folder 3. The files in this folder are discussed in this section.

3.1 Folders *Loc1* and *Loc2*

The sets of localized supervisors for each cluster are given in the folders *Loc1* and *Loc2*. Each folder contains a local supervisor and a file for the observer components. *Observers2.cif* is empty as local supervisor 2 does not contain any observers. *loc1.cif* contains the set of localized supervisors of Sup 1-8 of Figure 2.1, which is local supervisor 1. *loc2.cif* contains the set of localized supervisors of Sup 1 and 9-13, which is local supervisor 2.

3.2 Folder *Delay_robustness_check*

The localized supervisors can be used to check for delay-robustness. First, $\mathbf{SUP}'$, as defined in Section V, is created in the file *delay check.tooldef2*. This is done by merging the local supervisors and the channels defined in *channels.cif*. The resulting $\mathbf{SUP}'$ is given in file *delayedsup.cif*. Next, the developed delay-robustness check is used to identify delay-critical event combinations. The set of delayed events is defined in *delayed events.txt*. The set of delay-critical event combinations is printed to the console, in the following format:

Event Pumpcellars_MiddlePumpcellar_Mode_c_store and
event Pumpcellars_Traffictube1_Observer_c_emergency are neither independent nor mutually exclusive

In total, a set of 66 event combinations is identified. If the original versions (i.e. not the observer events) of an event combination are observed and controlled by the same local supervisor, the event combination can be considered not delay-critical. This is the case, because communication delays do not occur within a local supervisor. Therefore, the order in which these events occur can never change due to communication delay. Moreover, as communication channels are considered as FIFO buffers, no other local supervisor can observe this event combination in a changed order. The relevant event combinations are removed and a set of 36 delay-critical event combinations remains.