

Status of IEC 61499 Maintenance and Further Development

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<Work in Progress>

IEC 61499 has been accepted by IEC as a standard in 2005. It consists of 4 parts, three of which are normative (part 3 “Tutorial Information” was published as an informative technical report). Since then a number of issues has been revealed. These were taken into account by the Working Group 15 (TC 65/ SC 65B) of IEC when preparing new edition of the standard.

The addressed issues can be separated onto 3 groups:

1. Minor corrections of typos, omissions and inconsistencies;
2. Major corrections of standard’s ambiguities;
3. Further improvements based on the experiences of standard’s applications.

Most of the issues from the first two groups were addressed by suggesting modifications to the parts 1 and 2 of the standard. The issues from the group 3 were addressed by composing a draft of new non-normative part 5 of the standard named “Technical Specification”.

Removing Ambiguities of ECC execution Semantics and Consequences

Execution rules (or *semantics*) of function blocks is defined in the section 5.2.2 for Basic FBs.

It has been spotted in a number of publications that the definitions of the standard are ambiguous and allow for multiple interpretations, leading to the situation when the same FB application may produce different results when executed on different platforms all compliant with the standard.

In order to eliminate the ambiguities from the FB semantics, the IEC group working on the standard’s maintenance in 2009 has proposed the following correction to the semantics of basic FBs (which, in turn, will also impact on the semantics of FB networks).

The IEC Working Group 15 has discussed this issue and developed the following fix to change the table 1 as illustrated below:

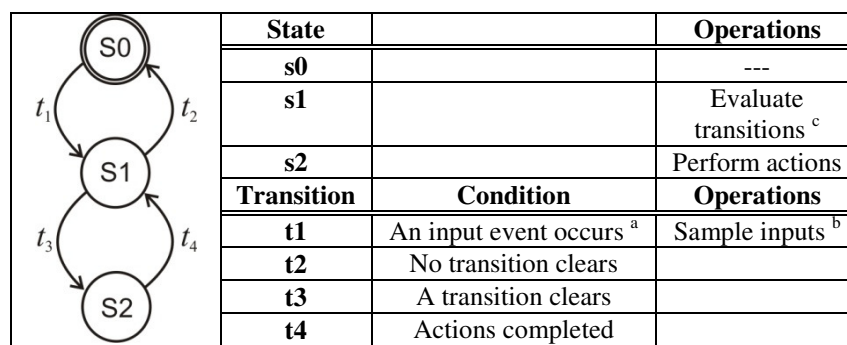


Figure 1. Table 1 from IEC 61499, 5.2.2, defining the ECC operation state machine (ECC OSM).

(a) The resource shall ensure that no more than one input event occurs at any given instant in time.

(b) This operation consists of sampling (or its functional equivalent) of the input variables associated with the current input event by a WITH declaration as described in 2.2.1.1.

(c) This operation consists of evaluating the transition conditions at the EC transitions following the active EC state and clearing the first EC transition (if any) for which a TRUE guard_condition as defined in Annex B.2.1 is found, according to the following rules:

1. "Clearing the EC transition" shall consist of deactivating its predecessor EC state and activating its successor EC state.
2. The order in which the transition conditions are evaluated shall correspond to the order in which the transitions are declared as defined in Annex B.2.1, or equivalently in the XML syntax defined in IEC 61499-2.
3. If state s1 was entered via t1, only transition conditions associated with the current input event via its event_input_name as defined in B.2.1, or transition conditions with no event associations, shall be evaluated.
4. The guard_condition of a transition condition containing only an event_input_name shall have the default value TRUE.
5. If state s1 was entered via t4, only transition conditions with no event associations shall be evaluated.