## ISSUE 380: Qualified properties P79 beginning is qualified by & P80 end is qualified by

The sig reviewed MD’s proposed definitions.

DECISION: The definition for P79 was accepted and the definition of P80was accepted as a working definition.

P80 end is qualified by poses a problem for CRM in that there is no way to model time intervals that are ongoing at the time of documentation (or time intervals that are possibly ongoing at the time of the documentation –i.e. time intervals of situations for which it is not known whether they have ended).

A summary of the discussion that followed is given below:

MD proposed to distinguish among three separate conditions:

1. knowing that a situation has come to an end by the time of the documentation–but not knowing the right boundary of its designated time interval.
2. not knowing whether it has ended at the time of the documentation –the right boundary of the designated time interval might fall prior to the time of documentation or after it.
3. knowing that it has not ended at the time of the documentation –the right boundary of the designated time interval will necessarily follow the time of the documentation.

Given that time intervals have fuzzy boundaries, and that endpoints are likewise represented as intervals with outer and inner boundaries –the former being fuzzy –we need two values to represent the end-time of a time interval (occupied by a situation/phenomenon). With that in mind, the abovementioned distinct conditions can be represented as follows:

1. inner bound: ∅ AND outer bound: set to “NOW” (i.e. documentation time).
2. inner bound: ∅ AND outer bound: set to “infinite” (this is extremely underinformative though).
3. inner bound = outer bound = “infinite”

It was observed (MZ) that if the outer bound is arbitrarily set to “NOW” (documentation time), then cases (1) and (2) above become indistinguishable.

CEO suggested that condition No. 2 should be treated as “Unknown” (in a 3 valued logic) and possibly omitted altogether. He mentioned that this is an implementation issue and should not be dealt with in the definition of the property.

MD agreed, but considers it important, hence proposed to add a clause regarding “modelling open intervals” in the scope note, to serve as a guideline.

**PROPOSAL**: time spans could be cast like types, in which case we need the following types (roughly corresponding to 3 separate conditions above). Typed properties over time intervals need to find their way in the CRM definition, despite dealing with an implementation issue.

1. Known that it ended (prior to the documentation time)
2. Unknown if ended
   1. Ongoing at documentation time
   2. Possibly ongoing at documentation time

As a closing remark MD mentioned that Dimitris Plexousakis has specialized in temporal reasoning and the sig could approach him regarding how to make inferences with ongoing properties/phenomena.

**DECISION**: GB is to contact DP on the subject.