### Issue 492: Spatiotemporal formalization about the presence of parts.

**WS** walked the SIG through his [HW](https://cidoc-crm.org/sites/default/files/492%20homework.pdf) that explores the spatiotemporal relations of E79 Part Addition/E80 Part Removal (plus the relevant set of properties) with parthood through E93 Presence.

E79/E80 stand as the long forms for shortcuts used to state that one thing is composed of another thing, an instance of either E79/E80 should imply the existence of a parthood relation (P46 between the added/removed part and the whole it augmented/was removed from).

This inference is warranted by the scope note of P46, which explicitly states that a thing that forms part of another thing does not have to be present for the entirety of the containing thing’s existence (it could have been added later on or removed at some point).

The existing axiom for parthood

(P46(x,y) ⇒ (∃uzw)[E93(u) ∧ P195i (x,u) ∧ E52(z) ∧ P164(u,z) ∧ E93(w) ∧ P195i (w,y) ∧ P164(w,z) ∧ P10(w,u)])

defines the relation of parthood through the relevant timespan for which it holds that the E93 Presence (w) of E18 Physical Thing (y) falls within the E93 Presence (u) of E18 Physical Thing (x).

WS suggested that the axiom for P46(x,y) can probably be re-expressed in a more concise manner (but that can be done at a later stage) but the relation between the time that the E79 Part Addition took place and the time that the contained thing's E93 Presence falls within the E93 Presence of the containing thing still remains implicit.

His suggestion was to render this relation through P182, or a more suitable property

E79 Part Addition. P182 ends before or with the start of: the time span of the E93 Presence (of the contained thing in the containing thing)

The axioms proposed are in functional notation, WS will provide one that’s consistent with the one used in the specification document. He asked the SIG for feedback regarding whether the axiom should be added in E79 (which is conceptually right, but goes against practices for class declarations) or P46.

**Discussion points:**

The SIG needs to reflect some more on the identity conditions of instances of E18 that were added/removed for both E79 and E80.

* For something to count as an instance of E79 Part Addition, the added part needs to have existed prior to becoming part of another thing.
* Also, it is often the case that a thing comes into being when 2+ other things come together. This would be a production event, for which we can claim parthood, but would not qualify as an E79 Part Addition. The shortcut for E79 should not hold in this case.
* Instances of E80 Part Removal can involve removing a part that either has or hasn’t had an independent ontological existence before its removal from the containing thing. Removing a part of an object might create a new object as well. There are more scenarios to be considered before allowing the parthood to stand invariably as shortcut for all instances of part removals/destructions.
* Once the SIG has concluded on their form, the axioms should appear under P46 not the classes mentioned in the long path.

**How to proceed:** WS will continue working on that, taking into consideration the SIGs feedback.