# ISSUE 483 transitivity check HW CEO

21.05.2020

## Martin’s comments

Note that P46,P165 has not been declared as transitive in the text, in contrast to P5, P86, P89,P106,P127,P73,P10,P9,P148

P134, P122, P133,P152 is not transitive. P139,150 has been marked as “not transitive”

P69 has association with (is associated with) , P130 shows features of, P189 approximates should not be transitive

Temporal Primitives:

P173,174 are not transitive.

P175, P182,P184 are not transitive when a fuzzy boundary exists

when dealing with declarative time-spans they can/may be transitive.

the idea is that the fuzziness of the boundary breaks the transitivity.

either we make it an issue and decide on their transitivity or \*generally not transitive because of fuzzy boundaries\* on the scope note.

## Decision 11.05.2020

Christian Emil to check these three properties and then decide whether it is to be sent out for a vote.

## CEO HW

### Fuzzy borders

The three properties I was asked to check are clearly not transitive when we allow for fuzzy borders.

Note that transitivity is defined with implicit universal quantifiers. That is: R is transitive iff if for all x,y,z such that xRy and yRz then xRz.

If we restrict the domain and range to instances of E2 Temporal Entity with non-fuzzy/strict boarders, the three properties are transitive. Is it possible to formalize this? In CRMgeo there are two subclasses for each of the classes E53 Place, E92 Spacetime Volume and E52 Time-Span. The classes E53 Place and E52 Time-Span are leaves in CRMbase and has two new subclasses in CRMgeo. For E92 Spacetime Volume, we see that the SP1 Phenomenal Spacetime Volume is put in between so that the entire hierarchy under E4 Period are phenomenal. There is no declarative activity. [also note that CRMGeo is not in harmony with CRMbase since E19 Physical Thing is still a subclass of E92 STV].

In the actual case of the possible transitivity of P175, P176 and P182 we could extend CRMbase with two new subclasses Exx Declarative Temporal Entity and Eyy Phenomenal Temporal Entity and then declare that P175, P176 and P182 are transitive when restricted to Exx Declarative Temporal Entity. This is a big apparatus for a small gain. It may be better to say that P175, P176 and P182 are not transitive because the model does not differentiate between declarative and phenomenal temporal entities.

|  |  |  |
| --- | --- | --- |
| E1 | CRM Entity |  |
| E53 | - |  Place |
| SP2 | - | - |  Phenomenal Place |
| SP6 | - | - |  Declarative Place |
| E92 | - | Spacetime Volume |
| SP1 | - | - |  Phenomenal Spacetime Volume |
| E4 | - | - | - |  Period |
| E18 | - | - | - |  Physical Thing |
| SP7 | - | - | Declarative Spacetime Volume |
| E52 | - | Time-Span |
| SP13 | - | - | Phenomenal Time-Span |
| SP10 | - | - | Declarative Time-Span |

### Adjustments in the text

I checked all properties in CRMbase. The properties marked with green comment are ok as they are. The ones with yellow comments needs adjustment of the scope note.

**P5 consists of (forms part of) E3 Condition State E3 Condition State**

Transitive ok, marked in text

**P9 consists of (forms part of) E4 Period E4 Period**

Transitive ok, marked in text

**P10 falls within (contains) E92 Spacetime Volume E92 Spacetime Volume**

Transitive ok, marked in text

**P46 - is composed of (forms part of) E18 Physical Thing E18 Physical Thing**

Transitive ok, add ‘This property is transitive.’ in the scope note

### **P69 has association with (is associated with)**

is not transitive, added in 7.0

**P73 has translation E33 Linguistic Object E33 Linguistic Object**

Transitive ok, marked in text

**P86 falls within (contains) E52 Time-Span E52 Time-Span**

Transitive ok, marked in text

**P89 falls within (contains) E53 Place E53 Place**

Transitive ok, marked in text

**P106 is composed of (forms part of) E90 Symbolic Object E90 Symbolic Object**

Transitive ok, marked in text

**P122 borders with E53 Place E53 Place**

Is not transitive, add ‘This property is not transitive’ in the scope note.

**P127 has broader term (has narrower term) E55 Type E55 Type**

Transitive ok, marked in text

**P130 shows features of (features are also found on) E70 Thing E70 Thing**

Is not transitive, add ‘This property is not transitive’ in the scope note.

**P133 is separated from E92 Spacetime Volume E92 Spacetime Volume**

Is not transitive, add ‘This property is not transitive’ in the scope note.

**P134 continued (was continued by) E7 Activity E7 Activity**

Is not transitive, add ‘This property is not transitive’ in the scope note.

**P139 has alternative form E41 Appellation E41 Appellation**

Is not transitive and is marked as such in the text.

NB: Equivalence as a relational operator is transitive, consider change: “The equivalence applies to all cases of use of an instance of E41 Appellation.”

**P148 has component (is component of) E89 Propositional Object E89 Propositional Object**

Transitive ok, marked in text

**P150 defines typical parts of (defines typical wholes for) E55 Type E55 Type**

Is not transitive, adjust text, delete in general ‘This property is in general not transitive’ in the scope note. A property is transitive or not transitive for the selected domain and range (in case of subclasses)

**P152 has parent(is parent of) E21 Person E21 Person**

Is not transitive, adjust text, delete in general ‘This property is in general not transitive’ in the scope note. A property is transitive or not transitive for the selected domain and range (in case of subclasses)

**P174 starts before the end of (ends after the start of) E2 Temporal Entity E2 Temporal Entity**

Is not transitive, add ‘This property is not transitive’ in the scope note.

**P175 starts before or with the start of (starts after or with the start of) E2 Temporal Entity E2 Temporal Entity**

In a model with fuzzy borders, this property will not be transitive.

**P176 starts before the start of (starts after the start of) E2 Temporal Entity E2 Temporal Entity**

Transitive ok, add ‘This property is transitive.’ in the scope note

**P182 ends before or at the start of (starts after or with the end of) E2 Temporal Entity E2 Temporal Entity**

In a model with fuzzy borders, this property will not be transitive.

**P183 ends before the start of (starts after the end of) E2 Temporal Entity E2 Temporal Entity**

Transitive ok, add ‘This property is transitive.’ in the scope note

**P184 ends before or with the end of (ends with or after the end of) E2 Temporal Entity E2 Temporal Entity**

In a model with fuzzy borders, this property will not be transitive.

**P185 ends before the end of (ends after the end of) E2 Temporal Entity E2 Temporal Entity**

Transitive ok, add ‘This property is transitive.’ in the scope note

**P189 approximates E53 Place E53 Place**

Is not transitive, add ‘This property is not transitive’ in the scope note.

## Possible candidates for transitive properties

A necessary condition for a property to be transitive is that the domain and range is the same class. In the table below are listed all properties that may have identical domain and range when restricted to subclasses of the original domain or range. For example, P1 can be restricted to a P1’ with E41 Appellation as domain and range. Most of the properties in the table are clearly not transitive. Some may be. I have added a column with question mark for the ones that could be considered.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | is identified by (identifies) | E1 CRM Entity | E41 Appellation |  |
| P2 | has type (is type of) | E1 CRM Entity | E55 Type |  |
| P15 | was influenced by (influenced) | E7 Activity | E1 CRM Entity | ? |
| P17 | was motivated by (motivated) | E7 Activity | E1 CRM Entity | ? |
| P39 | measured (was measured by) | E16 Measurement | E1 CRM Entity |  |
| P41 | classified (was classified by) | E17 Type Assignment | E1 CRM Entity |  |
| P48 | has preferred identifier (is preferred identifier of) | E1 CRM Entity | E42 Identifier |  |
| P49 | has former or current keeper (is former or current keeper of) | E18 Physical Thing | E39 Actor |  |
| P50 | has current keeper (is current keeper of)  | E18 Physical Thing | E39 Actor |  |
| P51 | has former or current owner (is former or current owner of) | E18 Physical Thing | E39 Actor | ? |
| P52 | has current owner (is current owner of) | E18 Physical Thing | E39 Actor | ? |
| P62 | depicts  (is depicted by)  | E24 Physical Human-Made Thing | E1 CRM Entity | ? |
| P70 | documents (is documented in) | E31 Document | E1 CRM Entity |  |
| P71 | lists (is listed in) | E32 Authority Document | E1 CRM Entity |  |
| P101 | had as general use (was use of) | E70 Thing | E55 Type |  |
| P102 | has title (is title of) | E71 Human-Made Thing | E35 Title |  |
| P103 | was intended for (was intention of) | E71 Human-Made Thing | E55 Type |  |
| P107 | has current or former member (is current or former member of) | E74 Group | E39 Actor |  |
| P140 | assigned attribute to (was attributed by) | E13 Attribute Assignment | E1 CRM Entity |  |
| P141 | assigned (was assigned by) | E13 Attribute Assignment | E1 CRM Entity |  |
| P165 | incorporates (is incorporated in) | E73 Information Object | E90 Symbolic Object | ok |
| P166 | was a presence of (had presence) | E93 Presence | E92 Spacetime Volume | ? |

Table 1 candidates for transitive properties restricted to subclass in domain or range.

**Ratification of decisions by editorial group/ vote:**

**Result**: In favor 15, none against.

**DECISION**: accept