

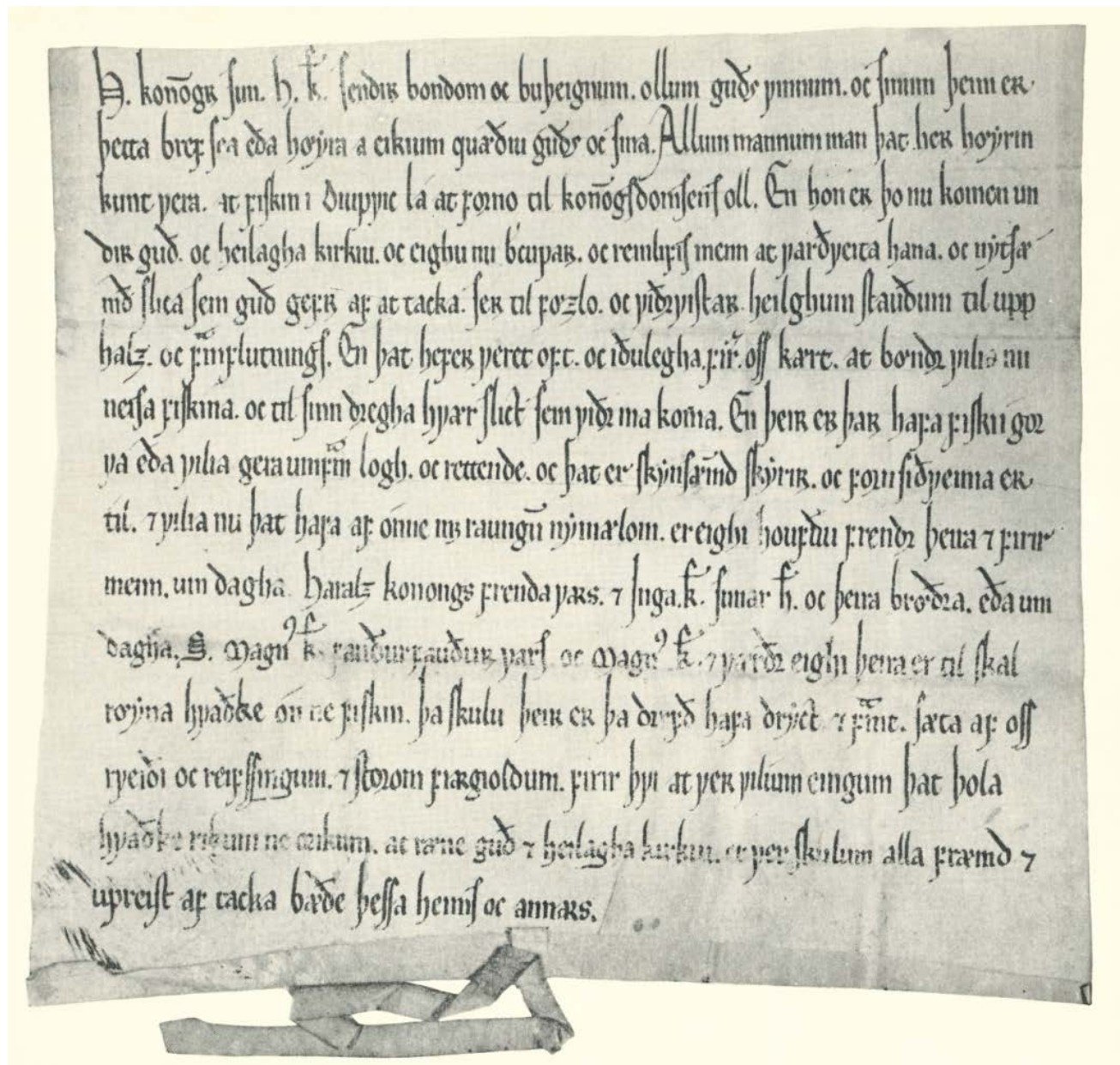


# Issues in Spatio-Temporal Technologies for the Humanities and Arts

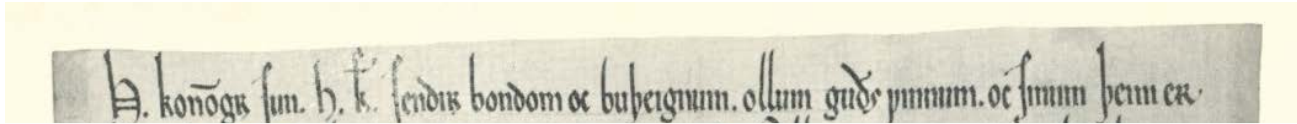
## Event Chronology & Conceptual modelling

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# Charter by king Hákon Hákonsson 1225



# Charter by king Hákon Hákonsson 1225



There are no dates in the text. Dating of the document is based on the facts:

There exists another charter written in the same hand in the castle of the Bishop of Oslo. This charter has an explicit dating: “Gregores mœsso degði ... Anno ab incarnatione. m<sup>o</sup>. cc.xx.iiii.”

Incarnatio domini – *annuntiatio Mariae*: March 25th, year 1 BC

Gregory mass: March 12th

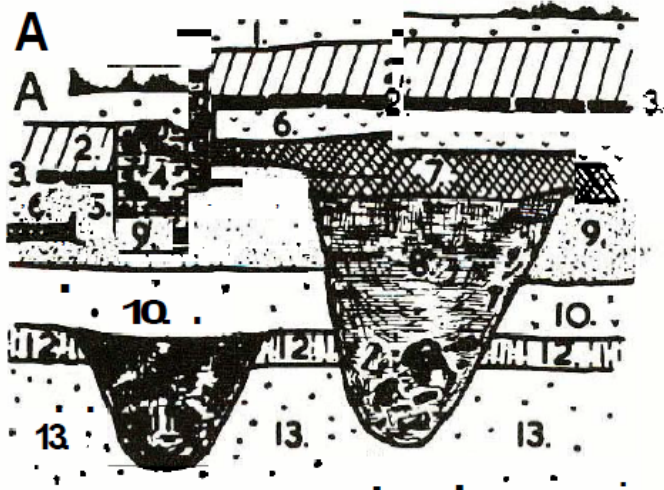
implies 12.03.1225

On that basis the charter is dated to “around 1225”





# Archaeology: Section and Harris matrix I



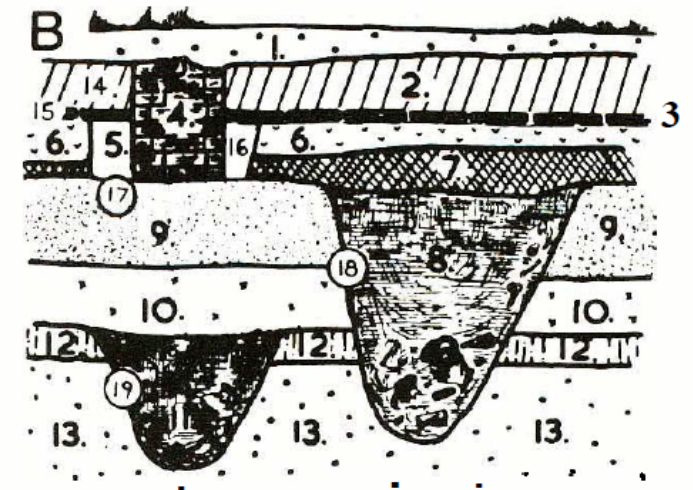
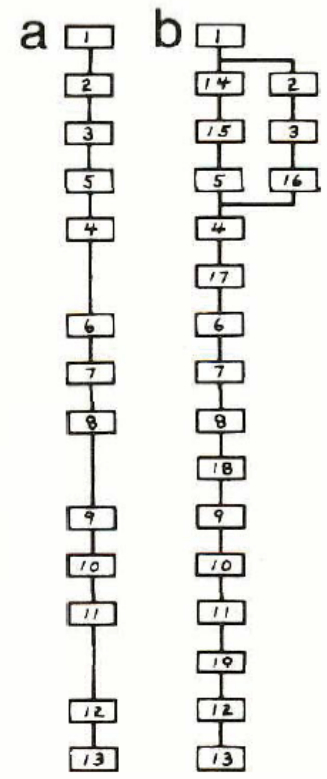
Specimen section through soil strata of a frequently inhabited site.

**KEY**

1. Modern top soil.
2. Debris from seventeenth century building destroyed by fire.
3. Tile floors of burnt house.
4. Foundation of internal house wall.
5. Building trench for wall.
6. Sixteenth century made soil.
7. Made soil containing fifteenth century pots-herds.
8. Fourteenth century rubbish pit.
9. Late Saxon or early mediaeval accumulated soil.
10. Third to fourth century Roman levels.
11. Second century Roman rubbish pit.
12. Soil disturbed during first century inhabitation.
13. Natural gravel.

Scale: 1 inch = 1 foot.

COMPARISON OF THE STRATIGRAPHIC SEQUENCES



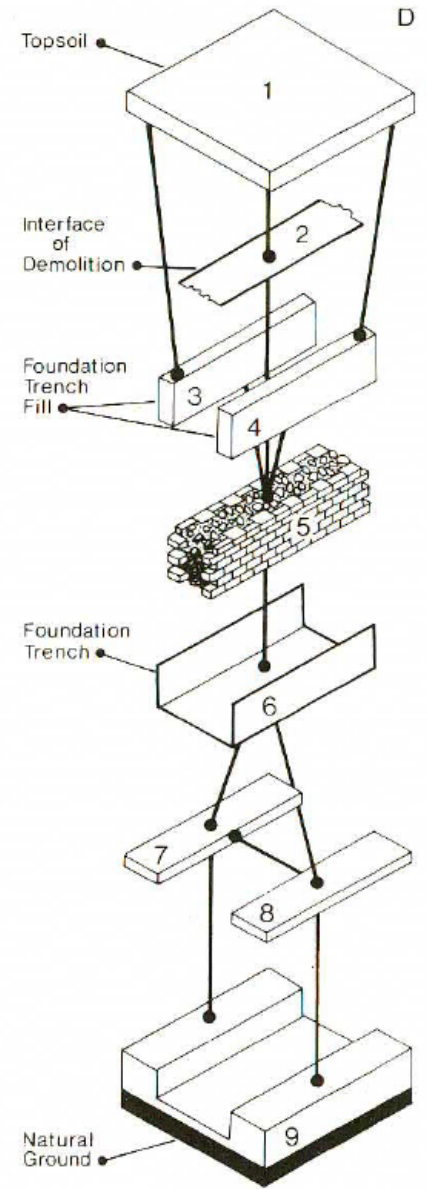
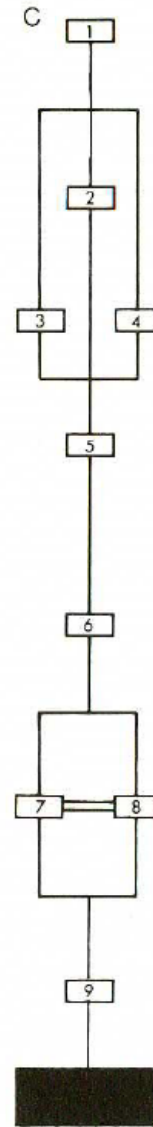
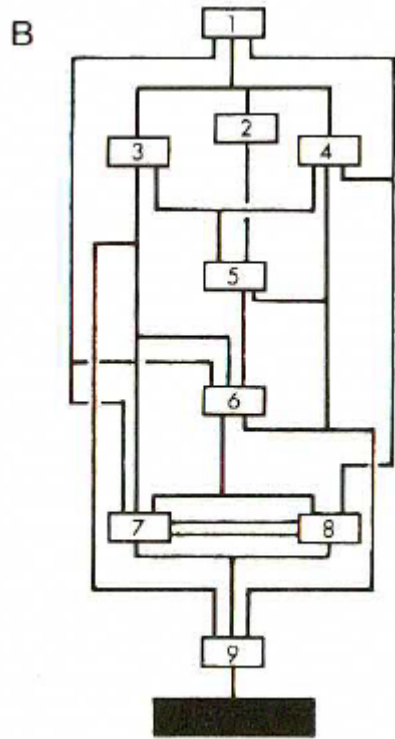
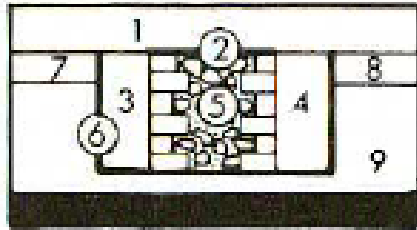
REVISED KEY

1. Modern top soil.
2. Debris from seventeenth century building destroyed by fire.
3. TILE FLOOR OF BURNT HOUSE
4. Foundation of internal house wall.
5. INFILLING OF BUILDING TRENCH FOR WALL
6. Sixteenth century made soil.
7. Made soil containing fifteenth century pots-herds.
8. FOURTEENTH CENTURY RUBBISH DEPCGIT
9. Late Saxon or early mediaeval accumulated soil.
10. Third to fourth century Roman levels.
11. SECOND CENTURY RUBBISH DEPOSIT
12. Soil disturbed during first century inhabitation.
13. Natural gravel.
14. DEBRIS FROM SEVENTEENTH CENTURY BUILDING DESTROYED BY FIRE
15. TILE FLOOR OF BURNT HOUSE
16. INFILLING OF BUILDING TRENCH FOR WALL
17. BUILDING TRENCH FOR WALL
18. PIT OF FOURTEENTH CENTURY OR EARLIER
19. PIT OF SECOND CENTURY OR EARUER

(Hume, I N 1953 *Archaeology in Britain*. Fig. 1 )

(Alterations and additions. E. C. Ham. 1975 I

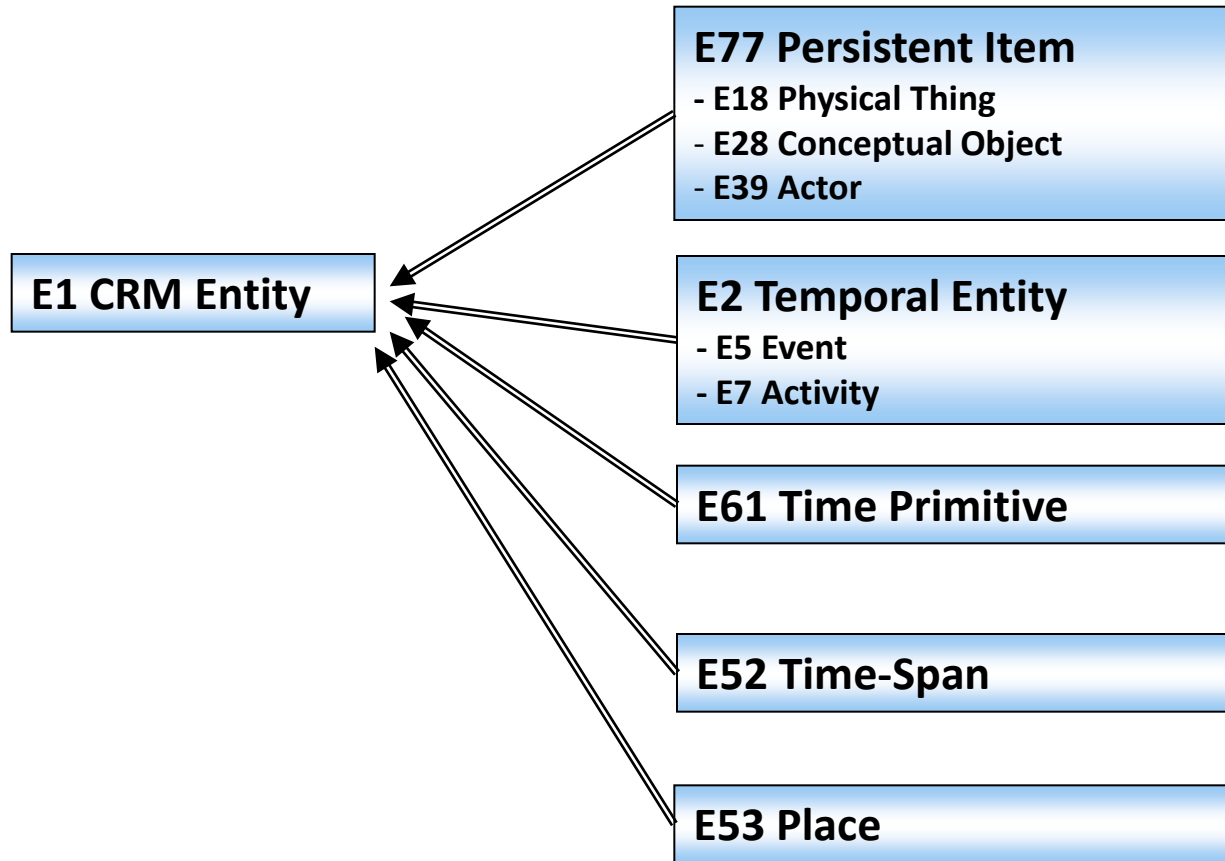
# Archaeology: Sections and Harris matrix II



# Ontology

- *An ontology is a conceptual model, that is, a formally defined model resulting from an analysis of (practice) in specific field*
- not necessarily a data model in the computer science sense.
- Core ontologies with universals
- General ontologies with particulars (thesauri/authority systems)

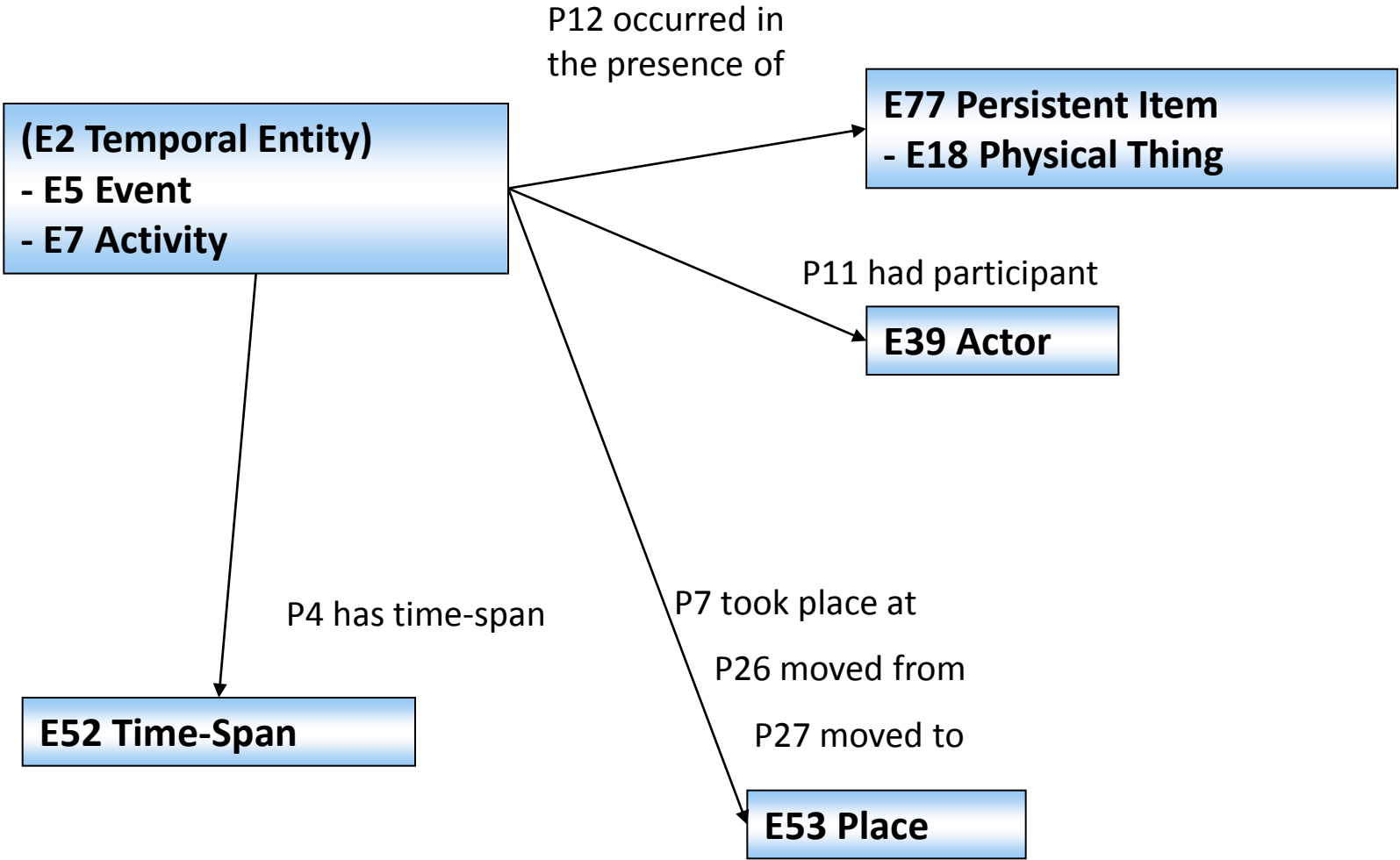
# CIDOC CRM: some relevant classes



Definition: [www.cidoc-crm.org](http://www.cidoc-crm.org)

OWL implementation: [www.erlangen-crm.org](http://www.erlangen-crm.org)

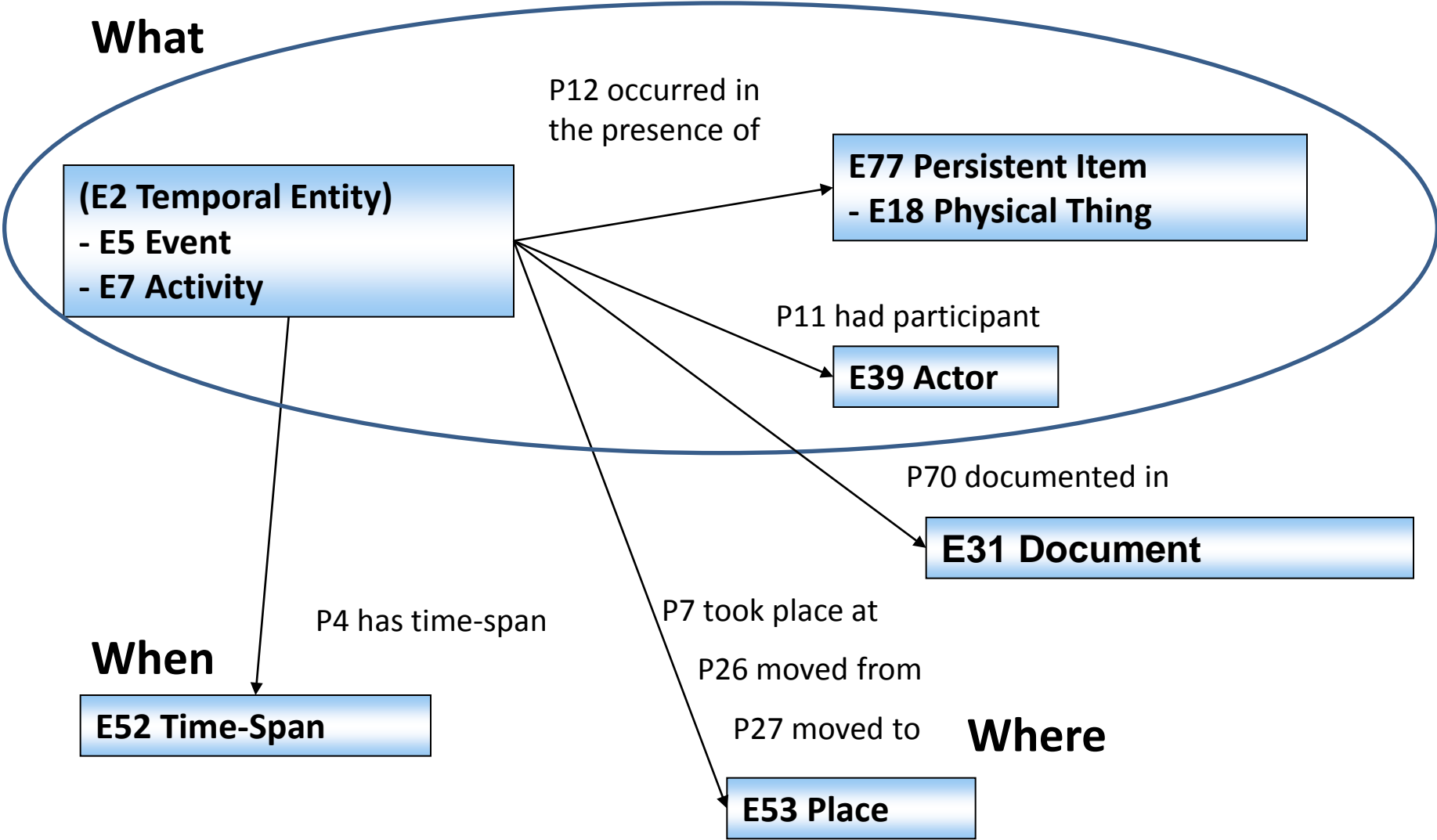
# CIDOC CRM





# CIDOC CRM: What, when, where

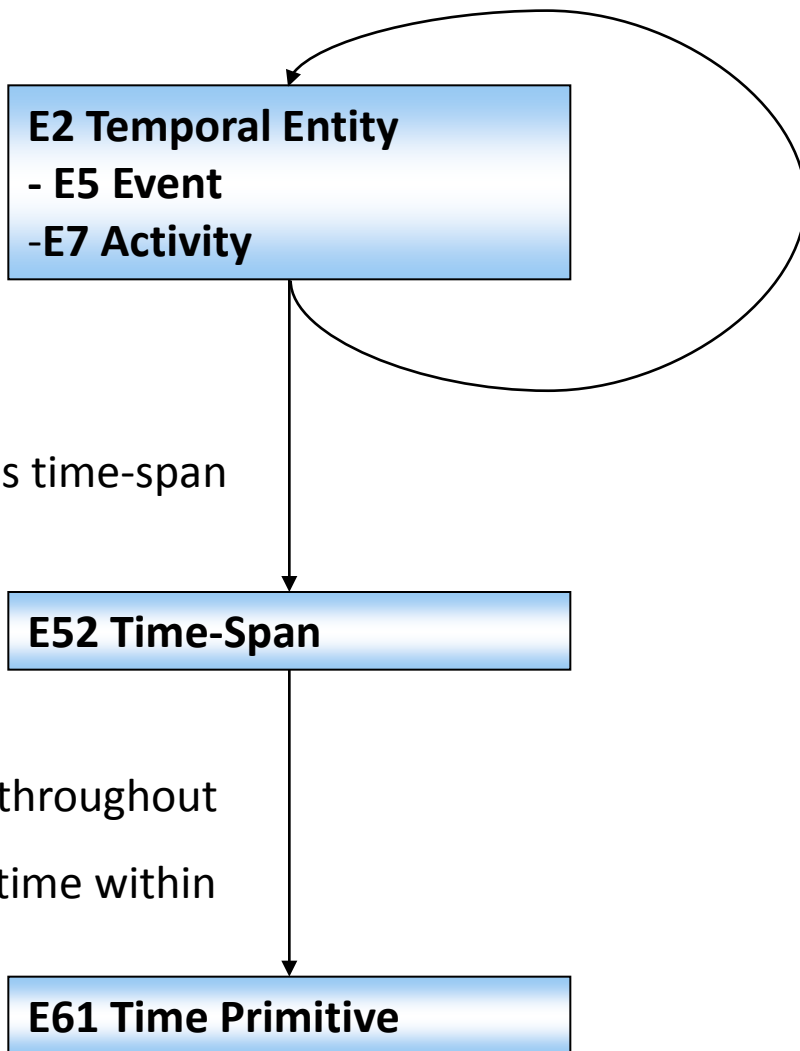
## What



## When

## Where

# CIDOC CRM: temporal entities and time



Allan operators:

P114 is equal in time to

P115 finishes

P116 starts

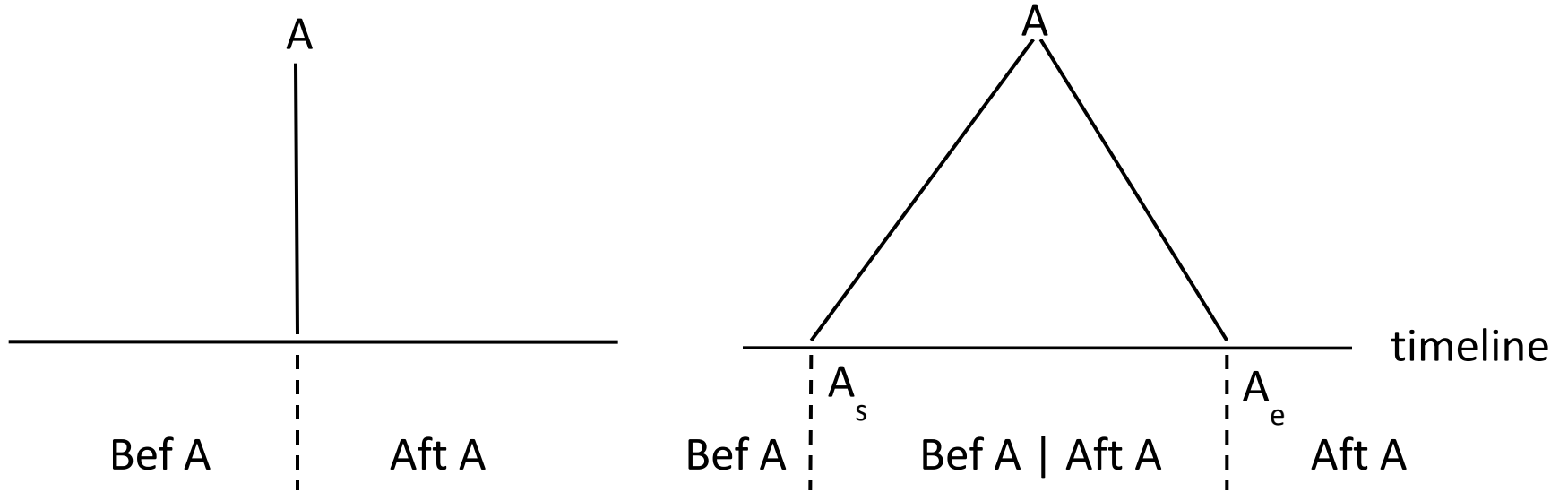
P117 occurs during

P118 overlaps in time with

P119 meets in time with

P120 occurs before

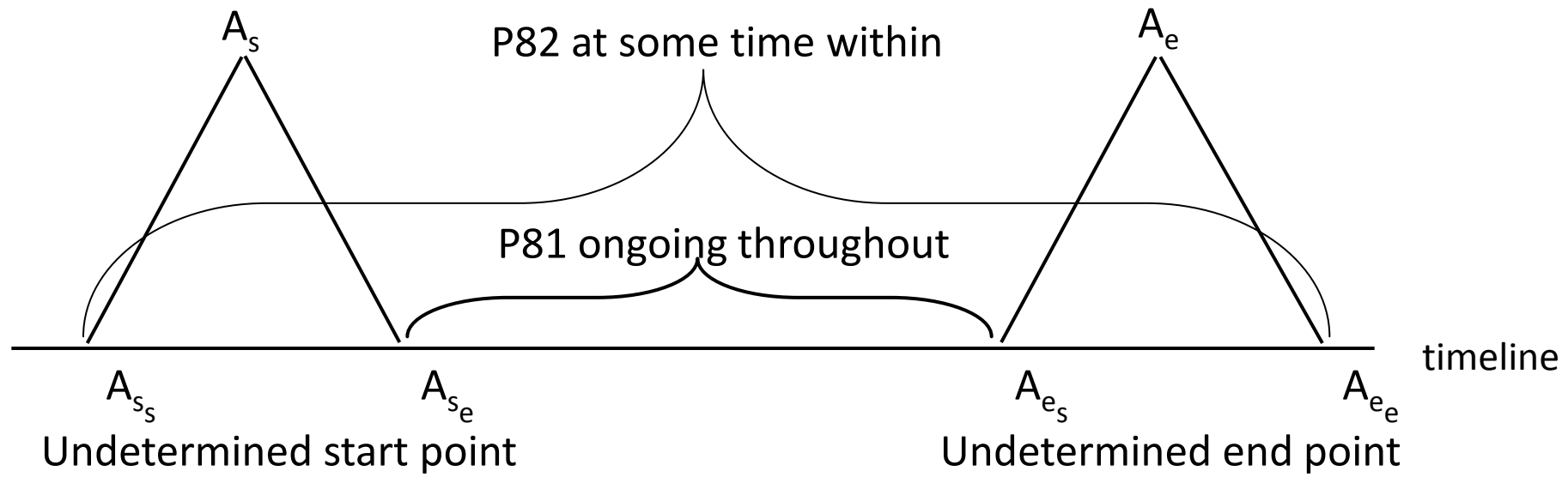
# Determined and undetermined points in time



Possible states of information



# Interval $(A_s, A_e)$ on the timeline for temporal entity E



$A_{s_s}$  : E must have started after

$A_{s_e}$  : E must have started before

$A_{e_s}$  : E must have ended after

$A_{e_e}$  : E must have ended before

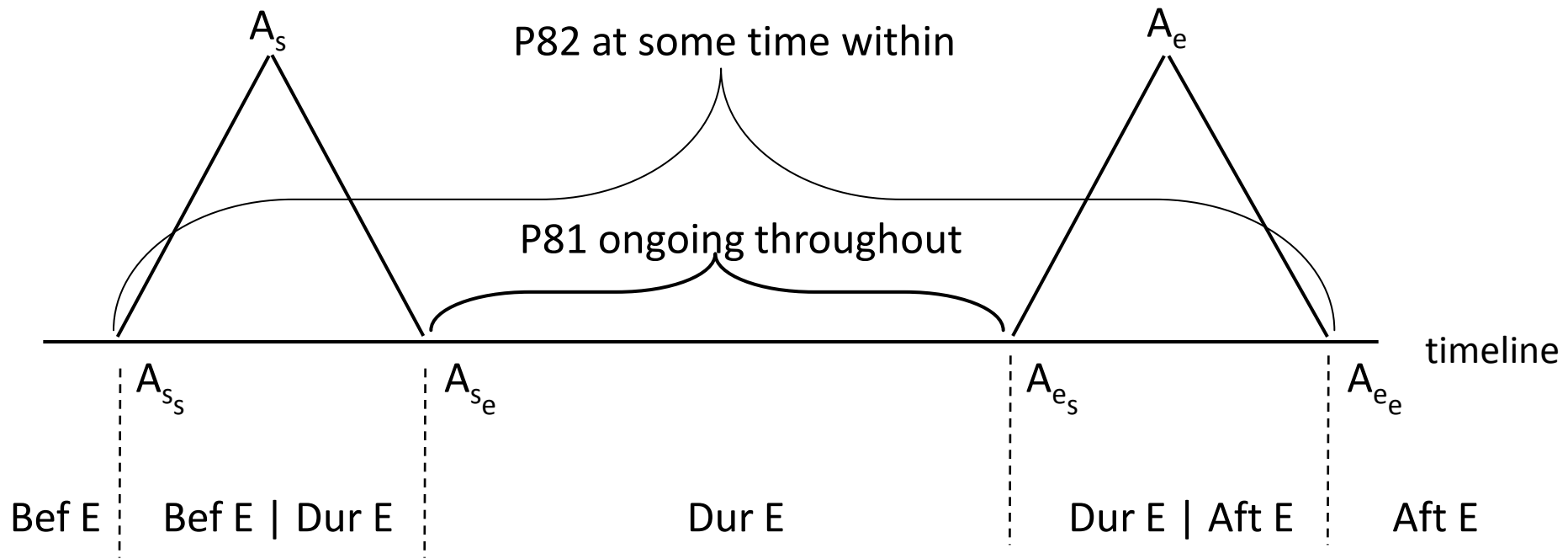
Validity conditions:

$$A_{s_s} < A_{s_e} < A_{e_e}$$

$$A_{s_s} < A_{e_e} < A_{e_s}$$

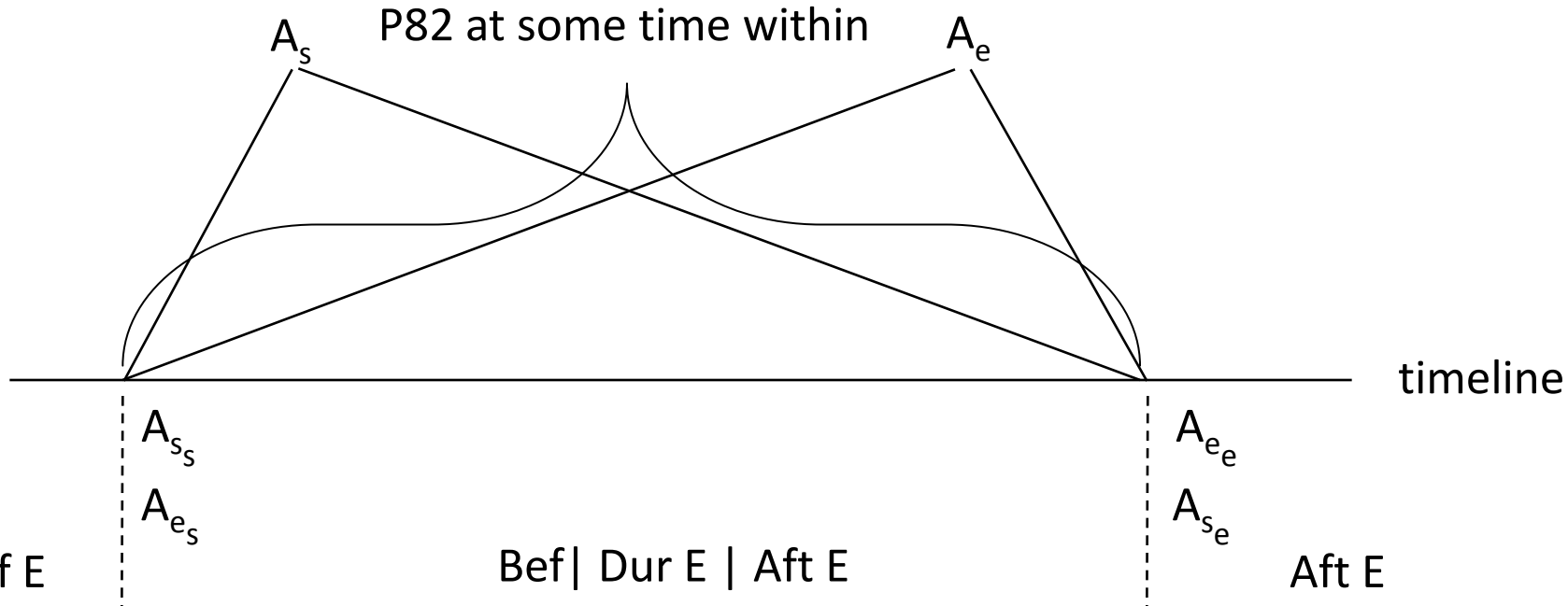


# Interval $(A_s, A_e)$ on the timeline for temporal entity E

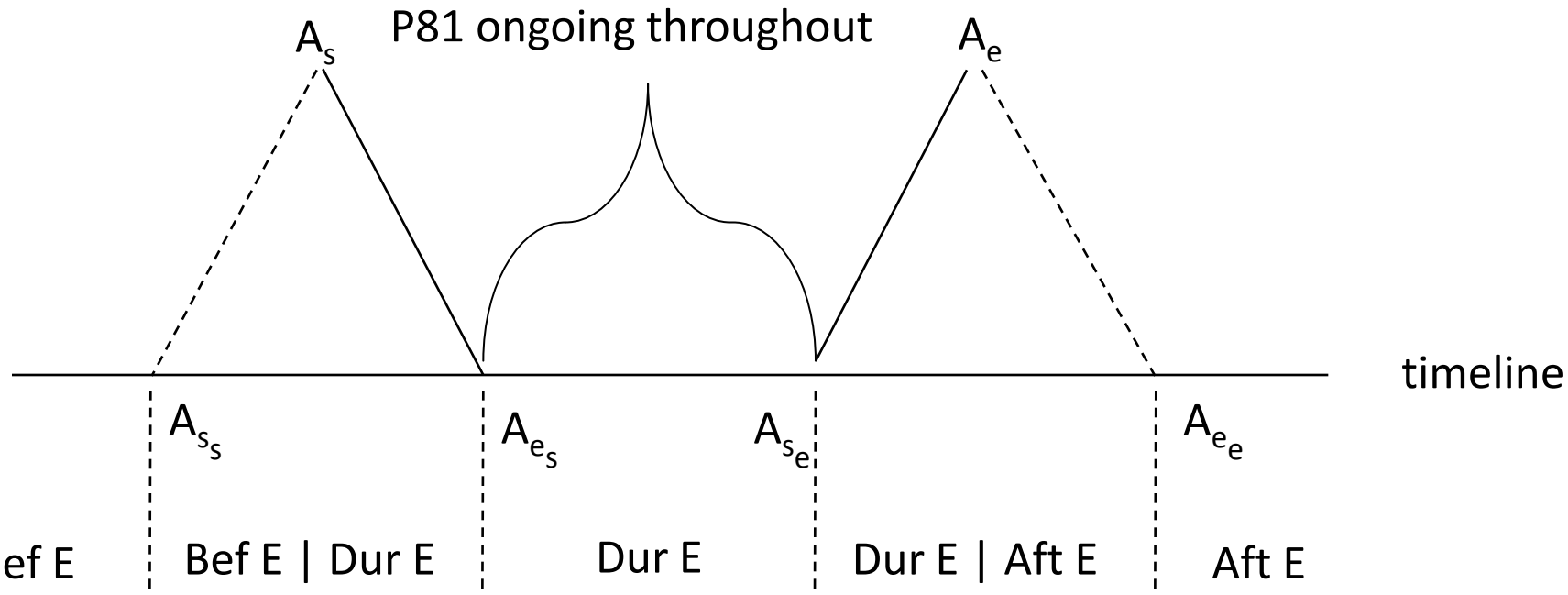




# Example – only TPQ and TAQ is known



# Example – flourit known, lifespan unknown



# Summing up

- CIDOC – CRM is a useful tool for design of information architecture
- Events / temporal entities are central in documentation
- Relative chronology of events can be expressed by the “Allan” operators (relations)
- Timespans can be expressed as four values on a timeline
- A deduction system for event chronology can be given an efficient implementation based the quadruples on the timeline

Thank you

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