Historisch-Kulturwissenschaftliche Informationsverarbeitung Woche 12

Zusammenfassung

The media server

What are the requirements for a system for media objects?

- Upload
- Storage
- Metadata
- Presentation
- Long term preservation

Will focus on images but equally relevant for other media types

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Database

| Discipline schema 1	Common schema	Discipline schema 2

• image_card
  – media_group_id
  – concent_metadata
• *subject specific tables*
	• media_group
	  – id
	  – process_xml
	  – tech_metadata
	• media_unit
	  – tech_metadata
	  – default {0, 1}
	• schema_setup
	  – process_spec
	  – delete_limit
	• process
	  – process_spec
	  – status {0, 1, 2, 9}
		• image_card
		  – media_group_id
		  – concent_metadata
		• *subject specific tables*

3

Event centric data model

source → recording → result

Media object		Event "recording"		Media object
Types – External – Analogue negative – Analogue positive – Digital photo – Digital copy – ….	Source of	**Types** – Photographing – Repro – Copying – Scanning	Results in	**Types** – Analogue negative – Analogue positive – Digital photo – Digital copy – ….

when — performed by — where

Time span   **Person**   **Place**

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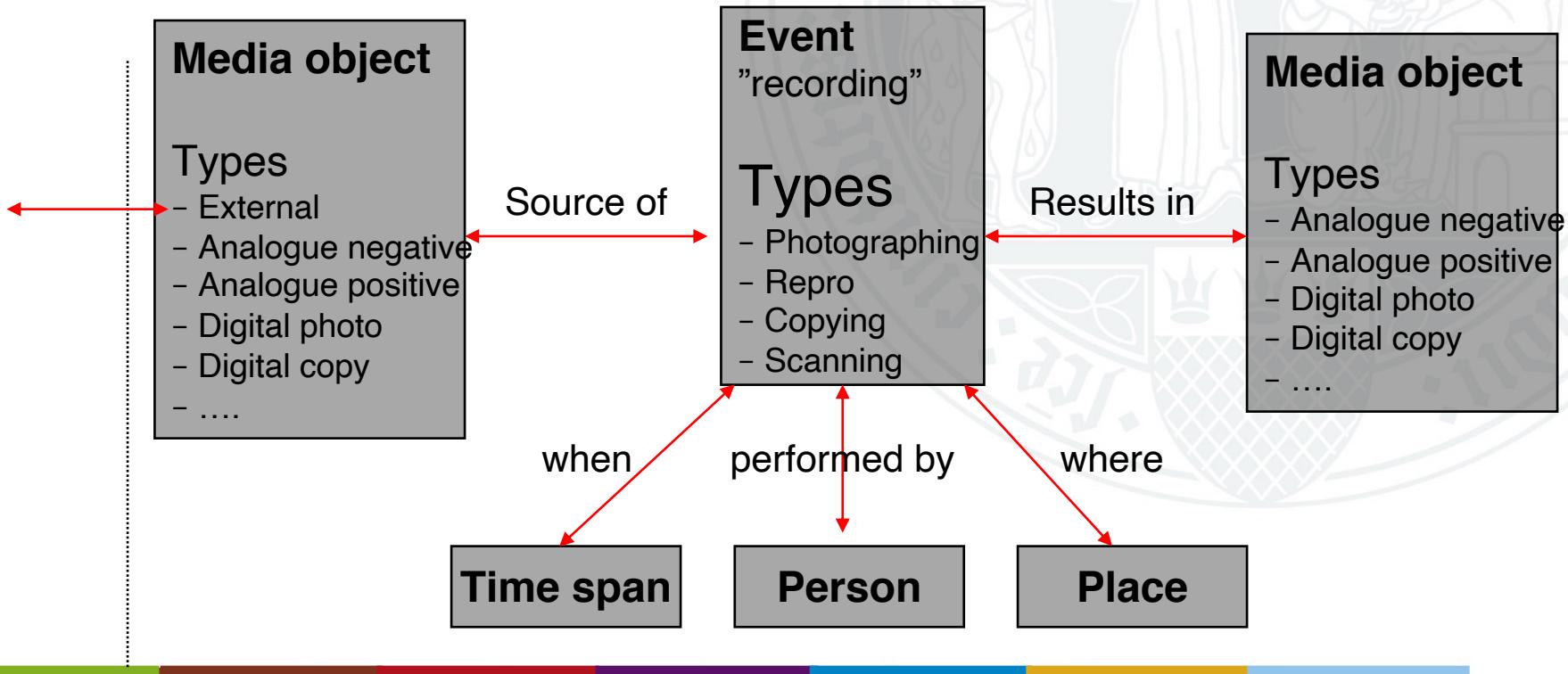
Date model, concepts and things

Conceptual object

Conceptual object

Media group -unit A
Information Object

"Skrik"

Media group - unit B
Information Object

"The Imsdal man"

. . .

Media Object A Based on
Type:
Digital copy

Media Object C
Type:
Digital copy

Media Object B
Type:
Digital copy

Media group -unit C
Information Object

"The Imsdal man Meets Munch"

Physical thing
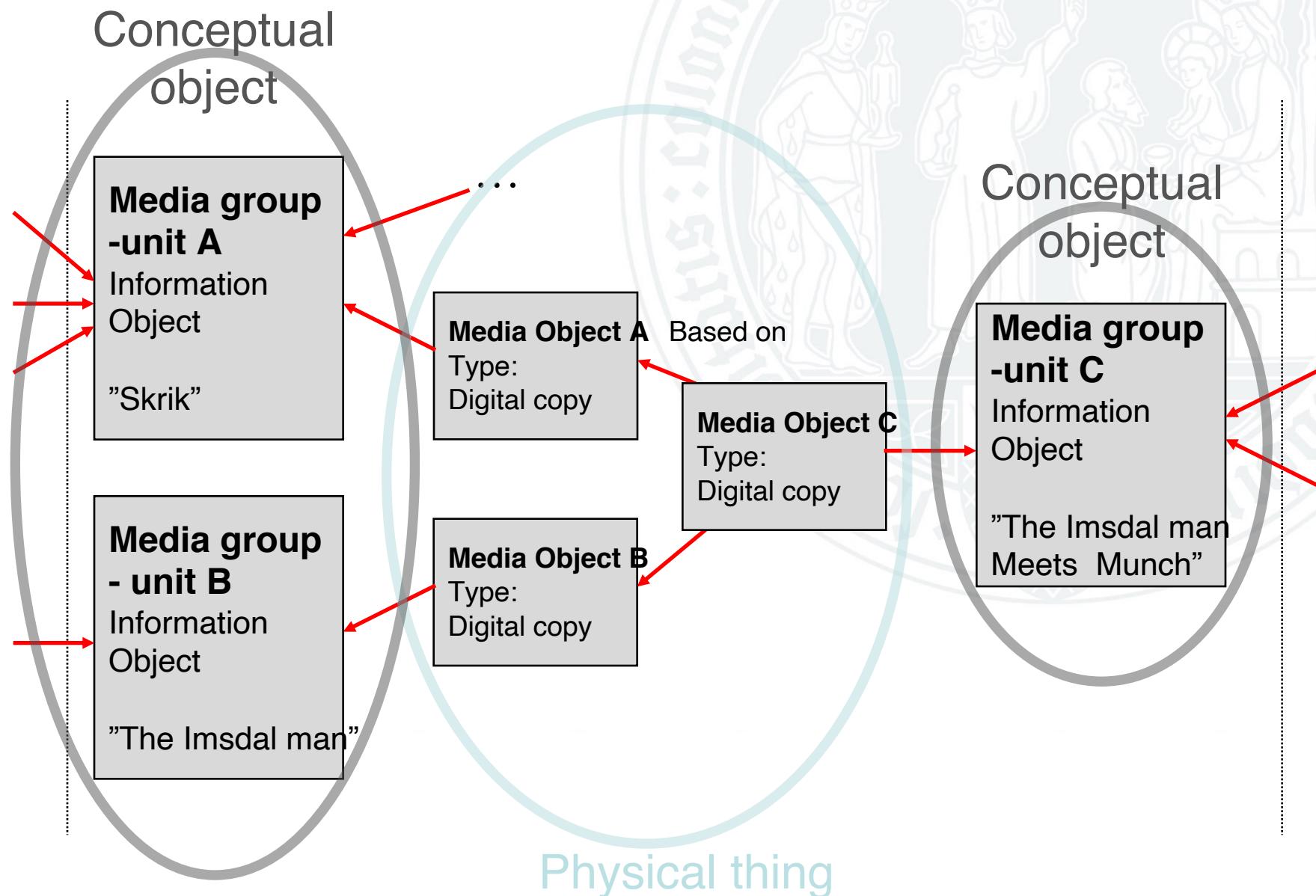
Visual Content and Subject
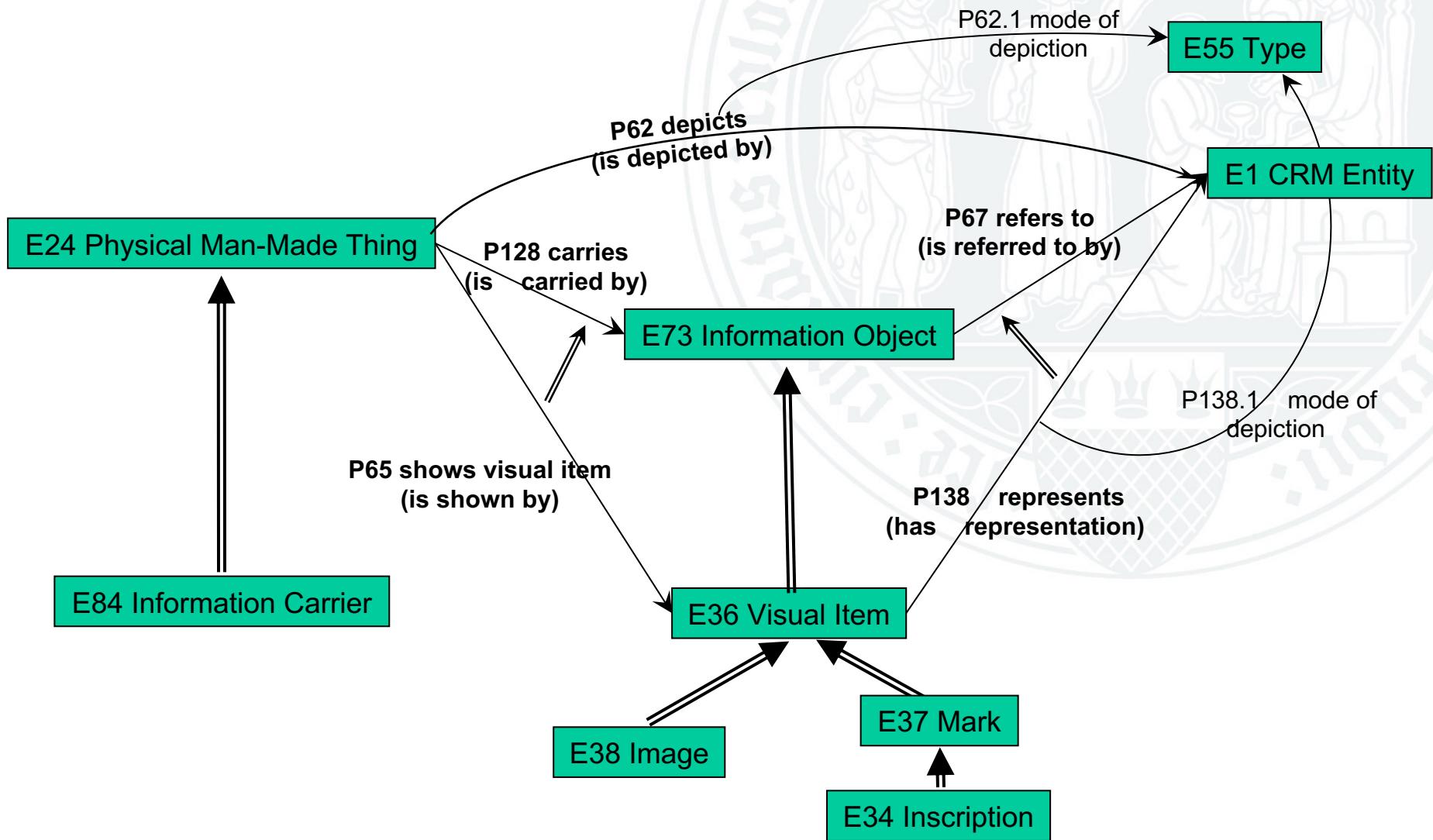
Theoretical model *model for*

comparison *calibration* *verification*

Empirical model *model of*

Deduction?

induction

Generating knowledge

comparison *evaluation*

created object

modelled object

*Thanks to Oliver Nakoinz for inspiration*

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The role of UML
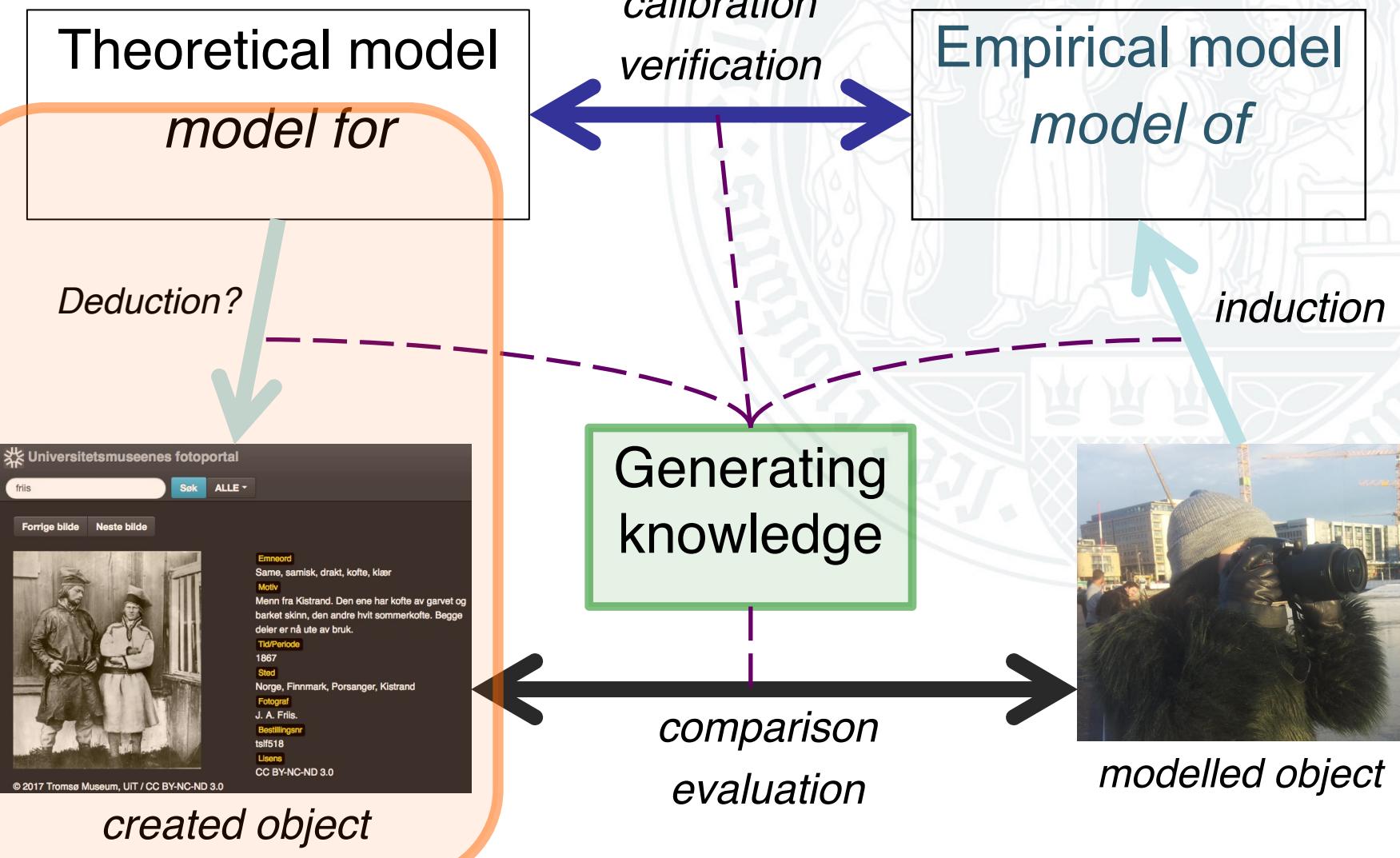
Use case diagram
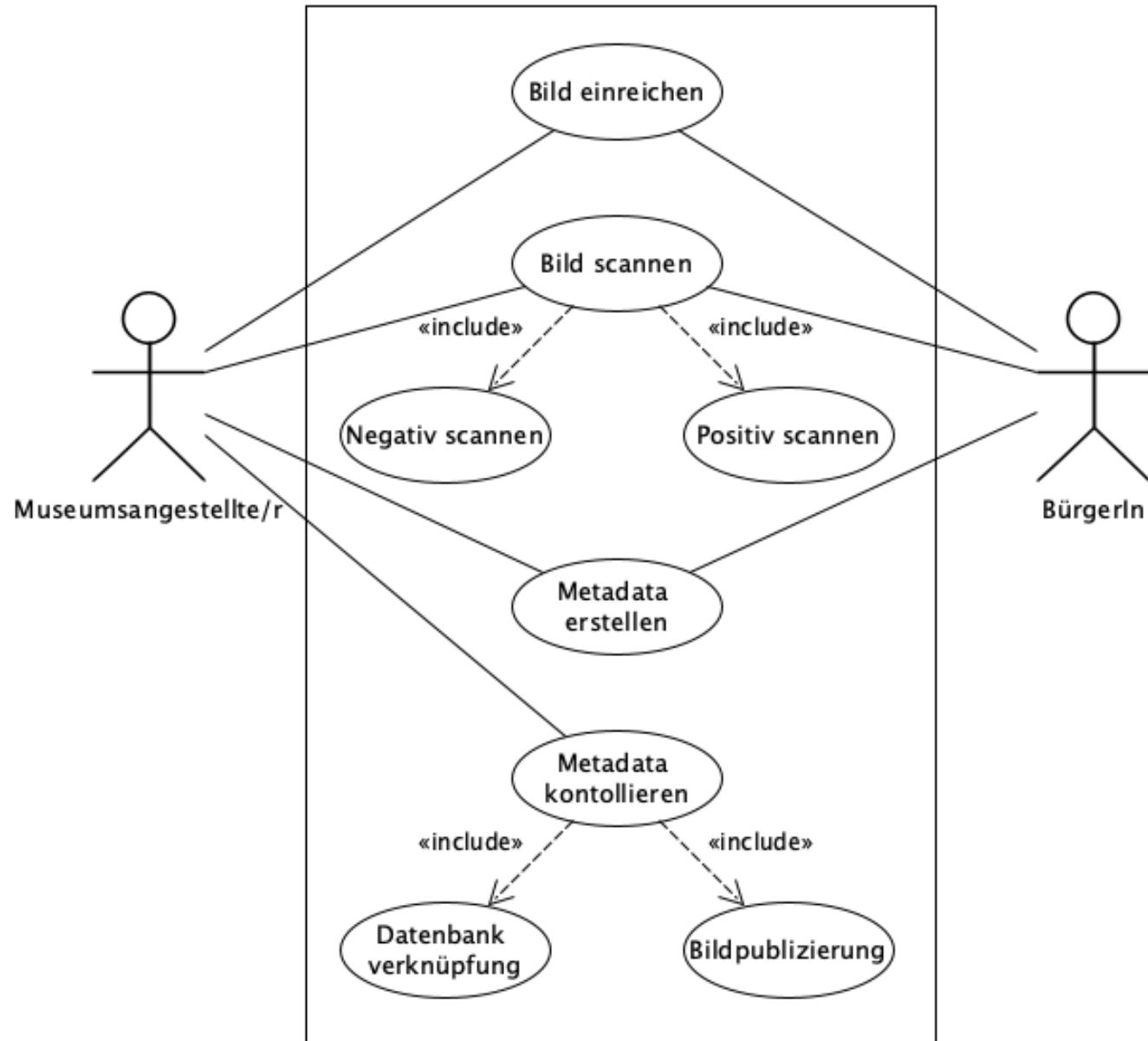
Class diagram
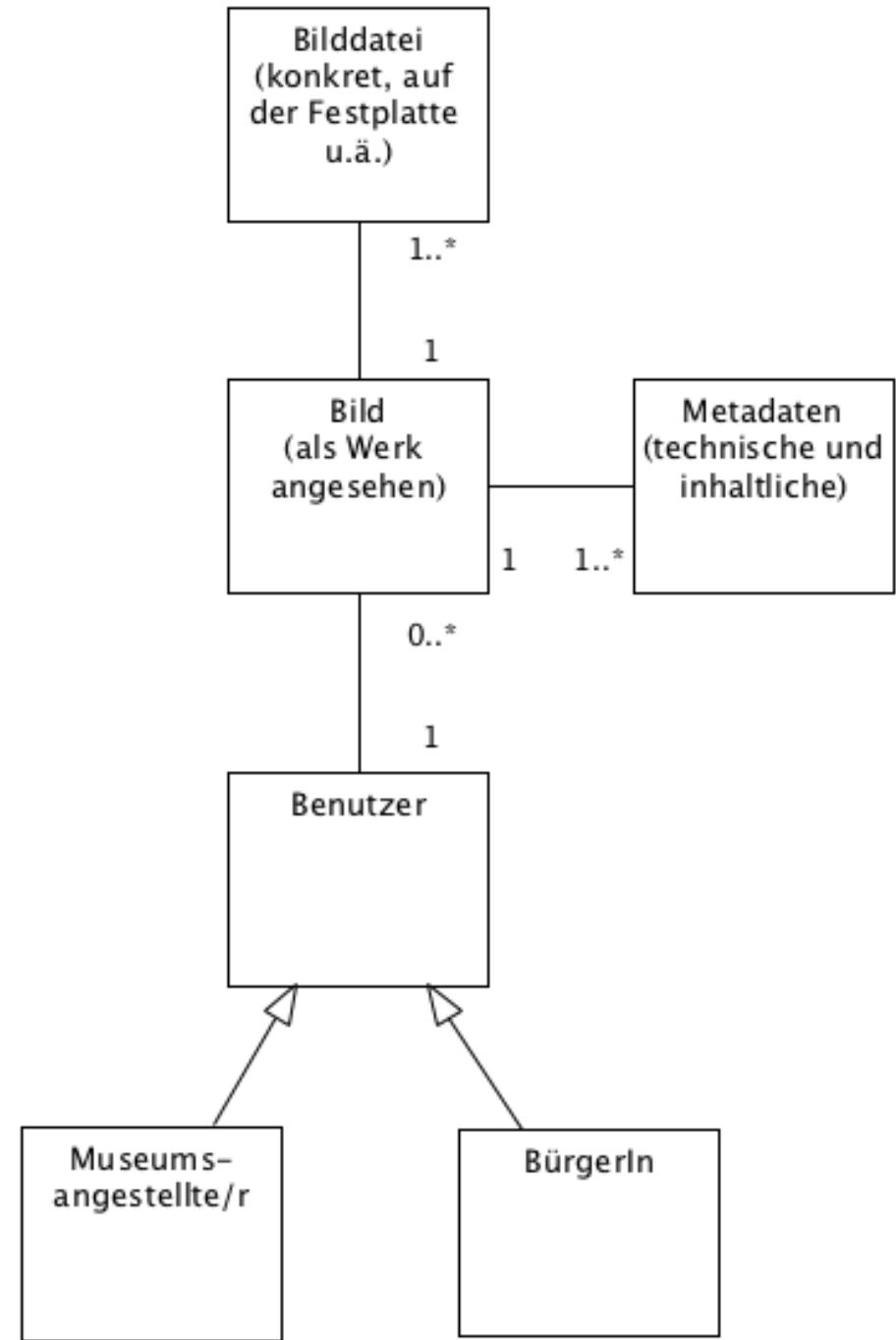
Activity diagram:
enter images with metadata
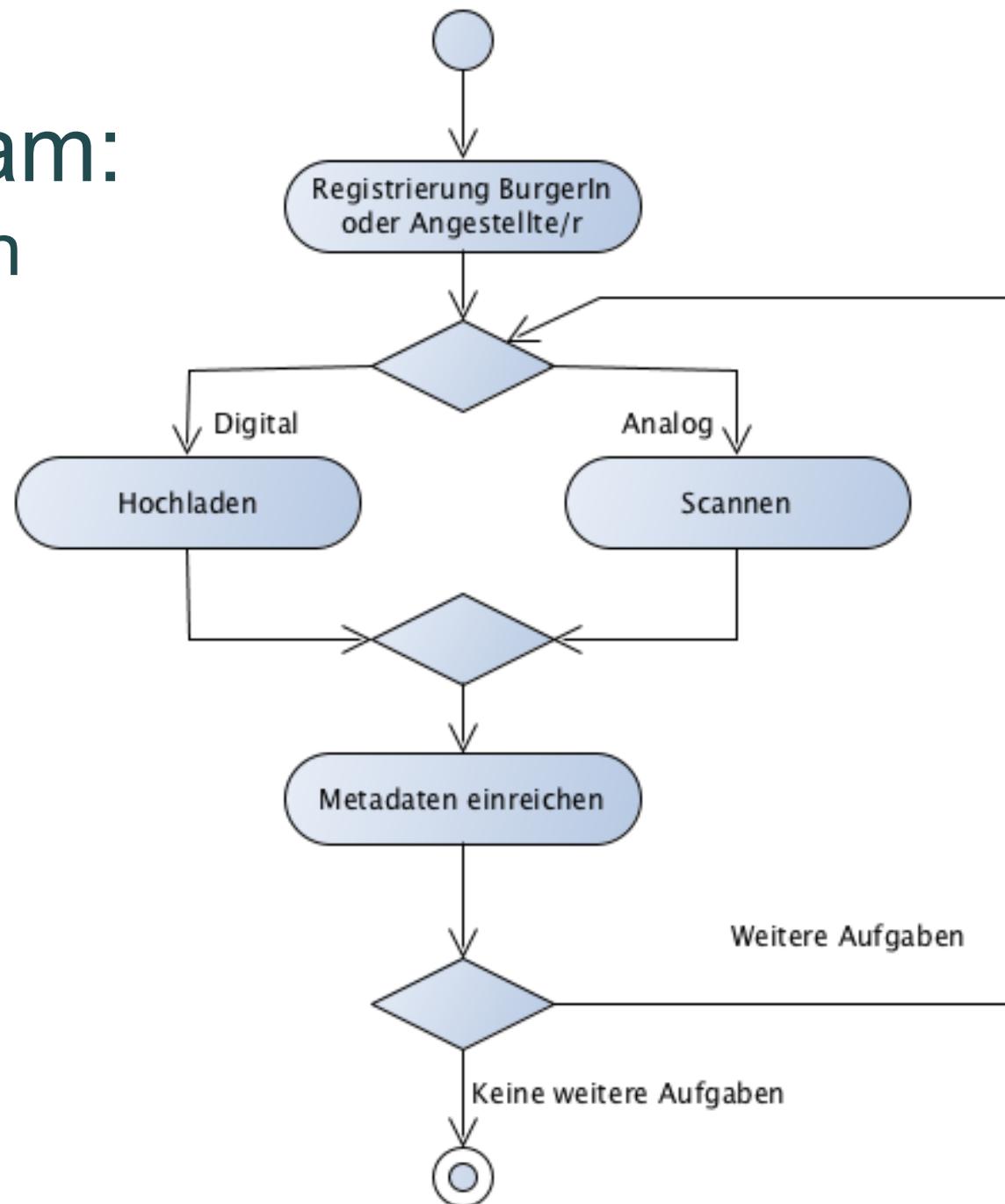
Activity diagram:
metadata control and image publication
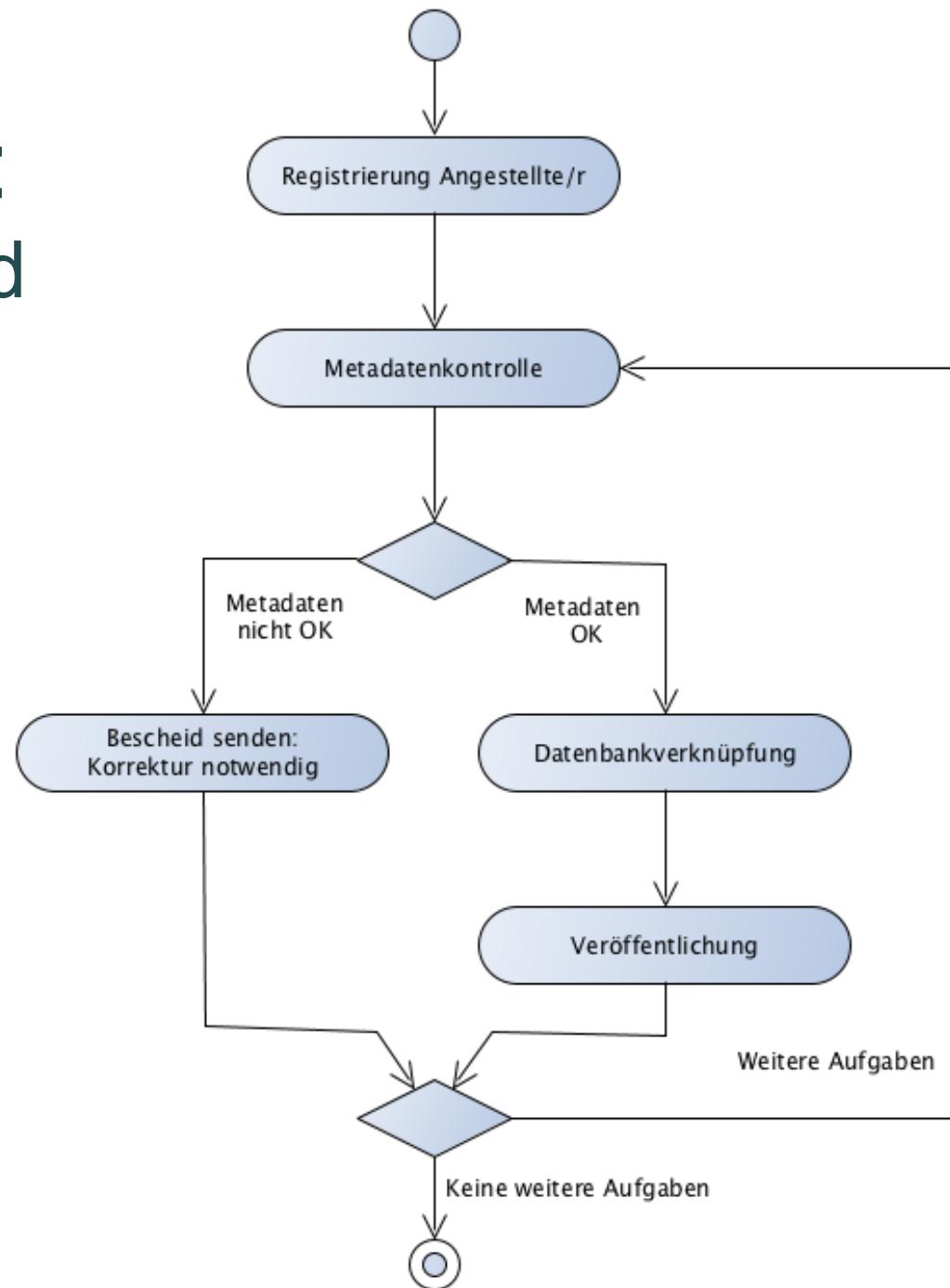
Object Management Group (OMG)

- A modelling language is a formal language for writing models
  - A programming language is a modelling language for computation
- OMG provides modelling language standards for:
  - modelling software designs
  - modelling system architectures
  - modelling business processes
  - ...

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MOF: Meta-Object Facility

- MOF is designed as a four-layered architecture
- A meta-meta model at the top layer: the M3 layer
  - the language used by MOF to build metamodels
- Metamodels: M2-models
  - most important: the UML metamodel
  - the model that describes the UML itself
  - M2-models describe elements of the M1-layer
- M1-models
  - models written in UML
- M0-layer
  - data layer
  - describe real-world objects

The Intellectual Role of the CRM

Conceptualization

CIDOC Reference Model

approximates

abstracts from

explains, motivates

Data structures & Presentation models

organize

refer to

Metadata

World Phenomena

Data bases!!s

Data in various forms

15
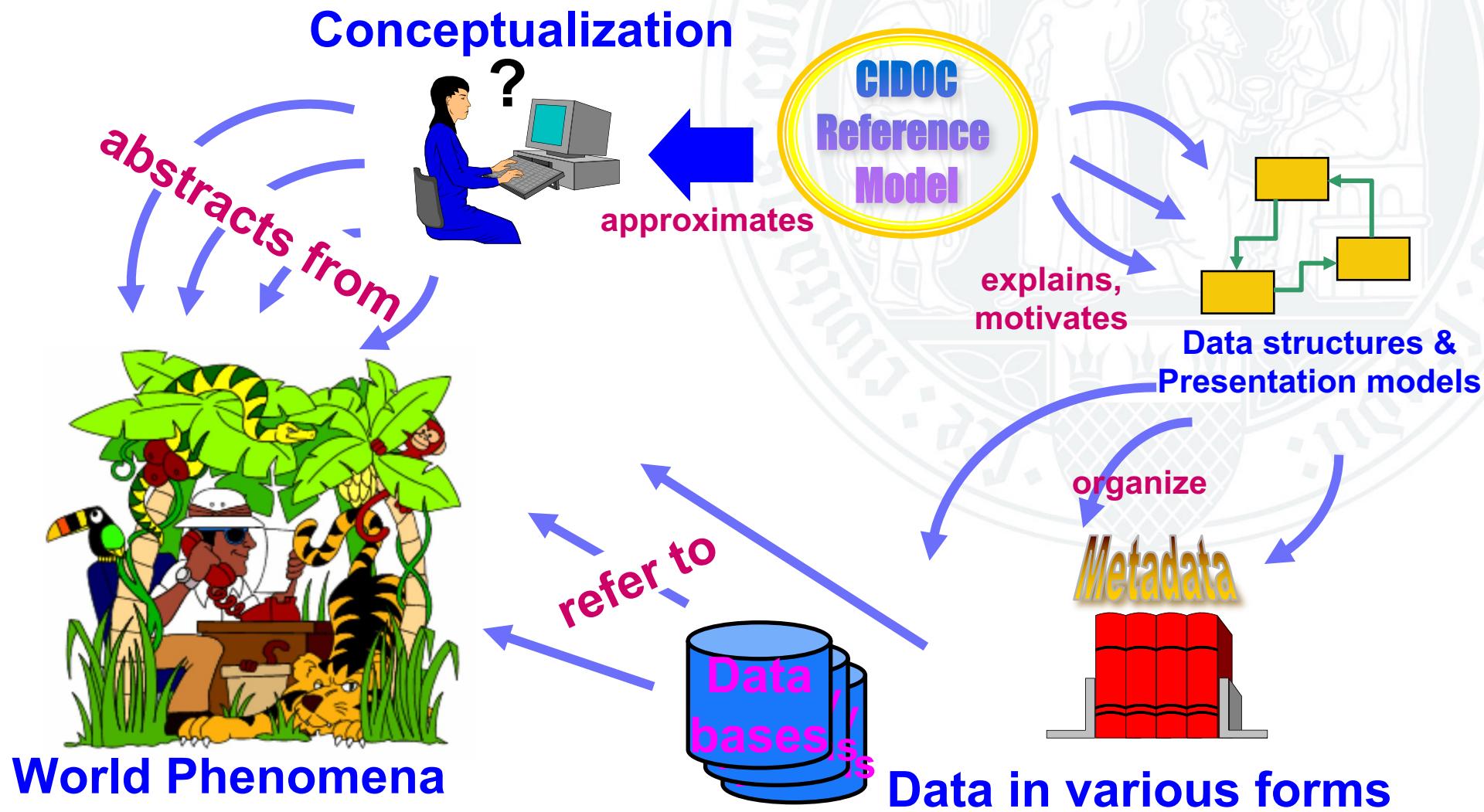
Top-level classes useful for integration

E55 Types

refer to / refine

E41 Appellations

refer to / identify

E39 Actors

E28 Conceptual Objects

E18 Physical Thing

participate in   affect or / refer to

location

E2 Temporal Entities

E52 Time-Spans within

at

E53 Places
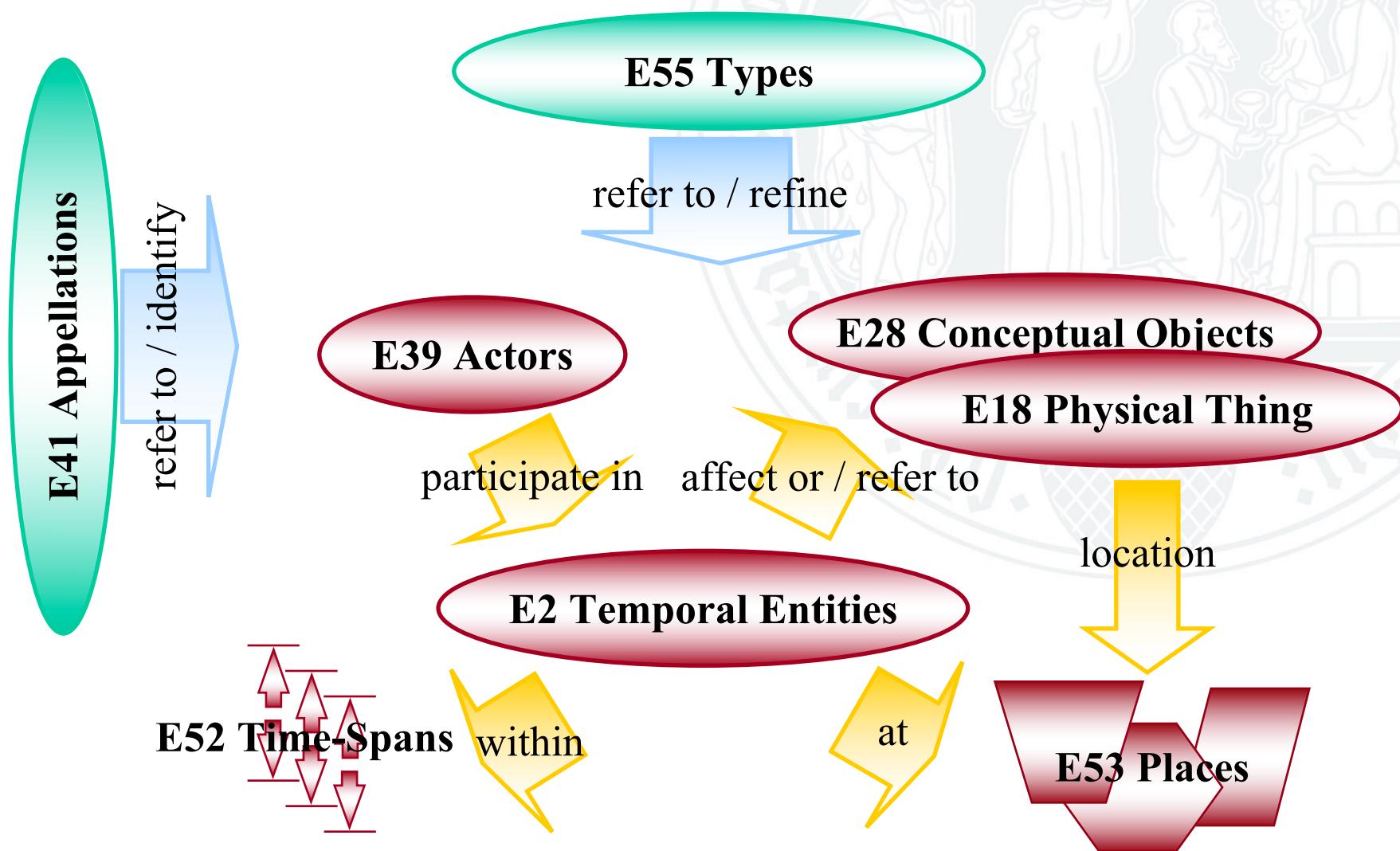
Cultural heritage reality

Heterogeneous sources of cultural heritage information

CRM abstract and extensible
→abstraction

Underlying semantics

CRM objectives

- Enable information exchange
- Enable integration
- Define (and clarify)
  - underlying semantics
  - structures
    - formal ontology
  - no terminology
    - → E55 Type
  - not prescriptive as to what to document
   - but how to document it

CRM objectives

- Enable semantic interoperability
- Not implementation-specific
- Functionalities
  - inform developers
  - common language
    - domain experts + IT developers (~ UML)
    - common formal language
    - associative queries (pattern matching)
   - support NLP
    - not replacing natural language

CRM scope

The curated knowledge of museums

```
                    ┌──────────────┐        ┌──────────────┐
                    │   E39 Actor  │        │  E53 Place   │
                    └──────────────┘        └──────────────┘
                            ↑                      ↑
                  P14 carried out by      P7 took place at

┌──────────────┐        ┌──────────────────┐                                    ┌──────────────────────┐
│ E52 Time-Span │◄─ P4 has time-span ─│ E12 Production   │── P12 occured in the presence of ─►│ E22 Human-Made Object │
└──────────────┘        │   Scanning       │                                    │    Paper photo        │
                        └──────────────────┘                                    └──────────────────────┘

         P186 produced thing of product type        P108 has produced (              P65 shows visual item        ┌──────────────┐       P62 depicts
                                                                                                                   │  E55 Type    │
                                                                                                                   │   Depicts    │
                                                                                                                   └──────────────┘
                                                                                                                     P138.1 mode

┌──────────────────────┐   ┌──────────────────────┐                          ┌──────────────────────┐                    ┌──────────────────┐
│ E99 Product Type     │   │ E22 Human-Made Object │── P65 shows visual item ─►│ E36 Visual Item      │── P138 represents ─►│ E7 Activity      │
│     TIFF             │   │    TIFF file          │                          │  Photography         │                    │   Wedding        │
└──────────────────────┘   └──────────────────────┘                          │ (conceptual object)  │                    └──────────────────┘
                                                                              └──────────────────────┘

                                                     P62 depicts
```

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Working definition of modelling

modelling =

       (modeller+,

       model (mediaProduct+),

       target+)
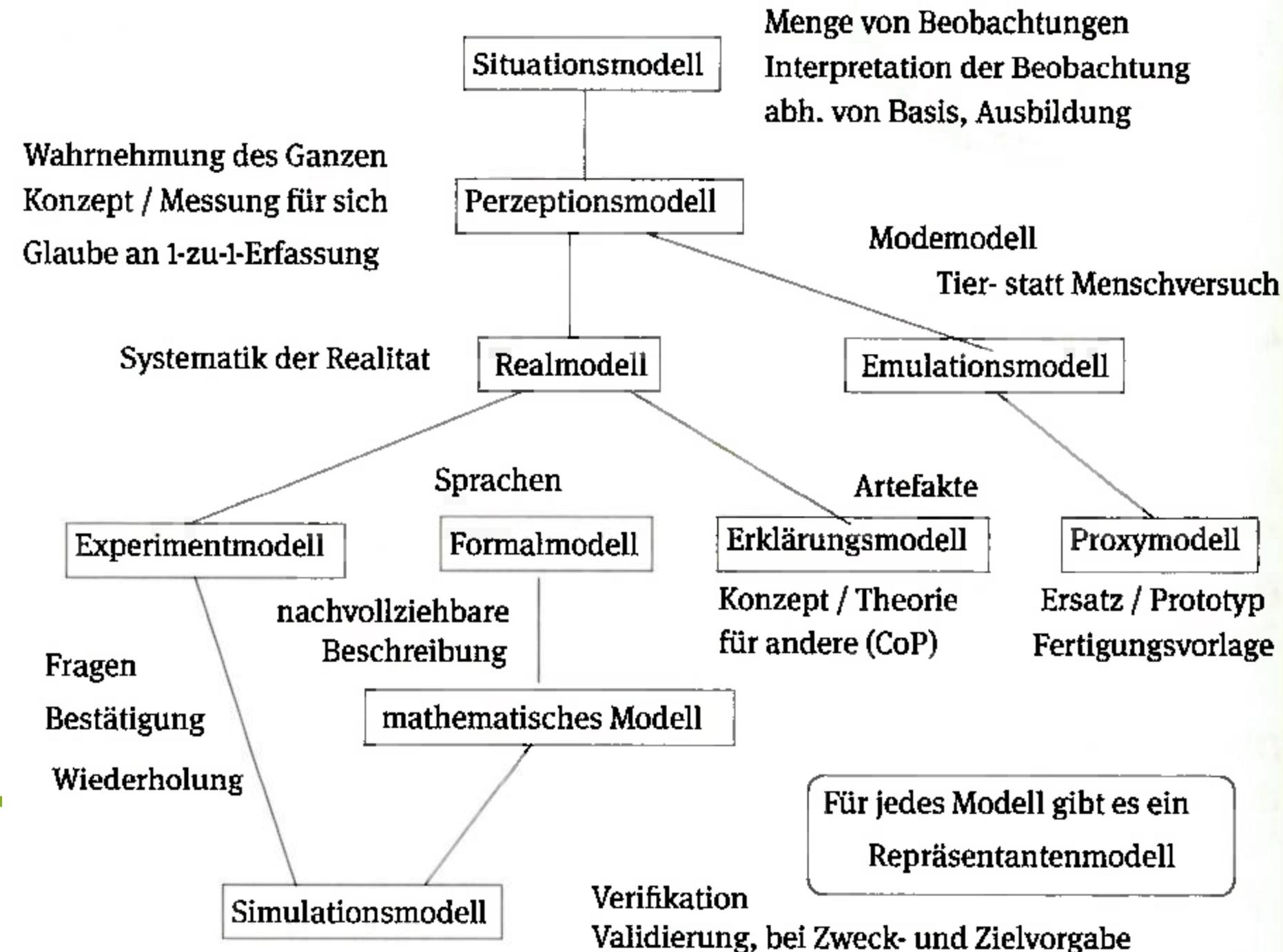
Critical stepwise formalisation

- Creating expressions in one medium based on a source in another medium
- The computer is not in itself rigorous

| Paper text page | | Scanned text page | | Formal model |

| Paper map page | | Scanned map page | |

In computer
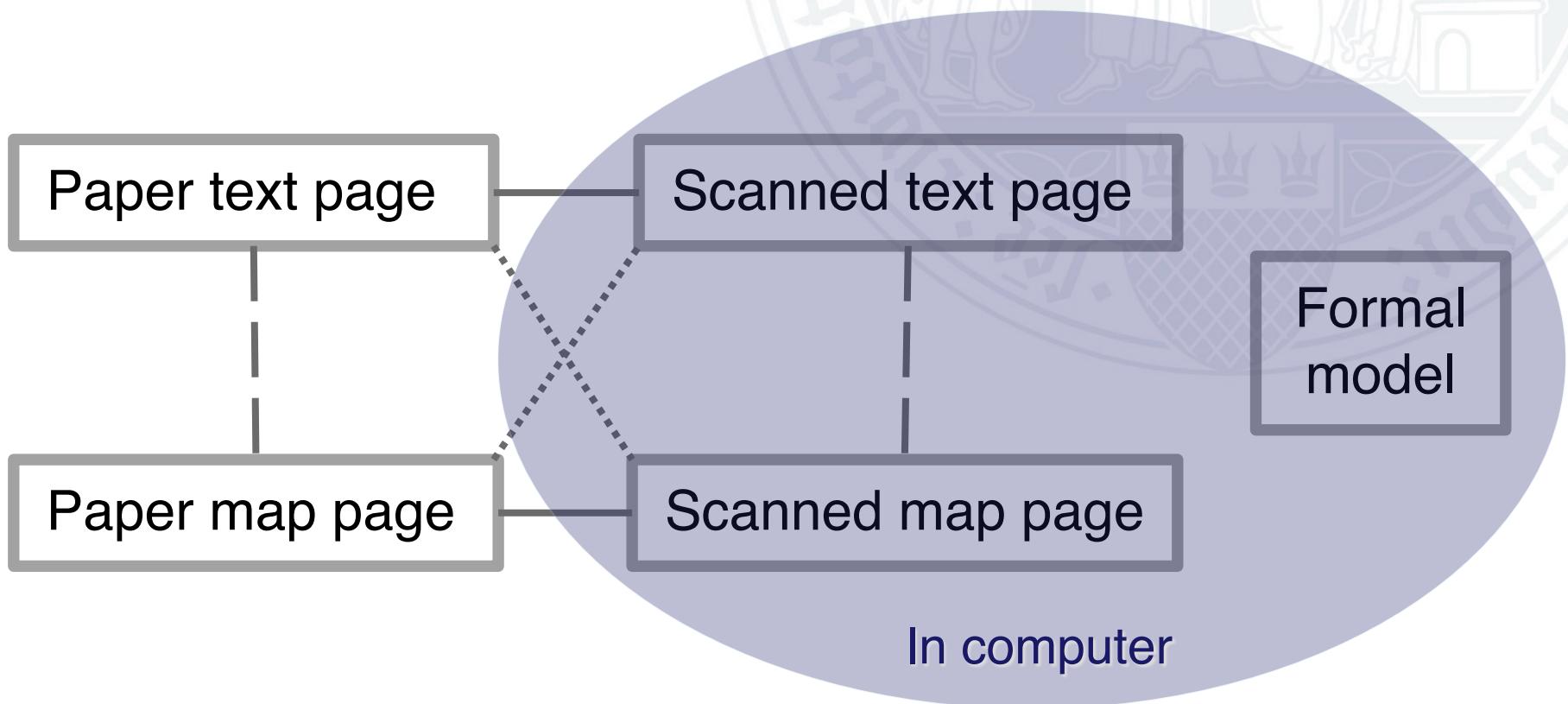
Critical stepwise formalisation

and

Using numerical models
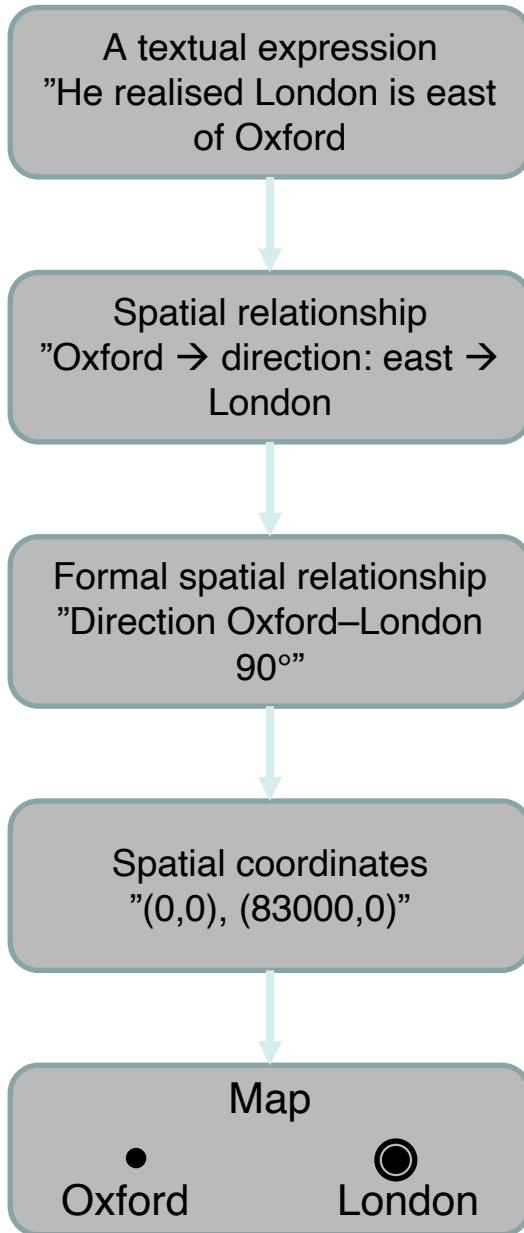
A textual expression "He realised London is east of Oxford	World An earthquake leading to a tsunami
Spatial relationship "Oxford → direction: east → London	Physical model
Formal spatial relationship "Direction Oxford–London 90°"	Mathematical model
Spatial coordinates "(0,0), (83000,0)"	Numerical model
Map ● Oxford ◉ London	Data from simulation Visualisation
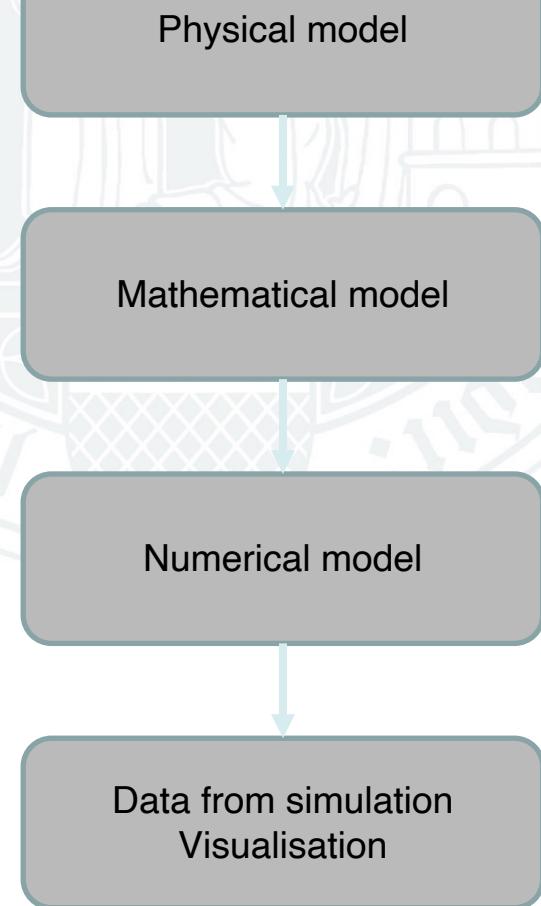
Digital Humanities and Numerical Mathematics

Modelling   *Simulation*

| Astrophysics | Tsunami | | History | Literature |

Numerical mathematics —— Operationalisation of problems
Fall-off / error —— Digital humanities

| Climate | Energy transition | | Archaeology | Games |

Visualisation   *Operationalisation*

Seeing through manipulation

- As programmers we can see through manipulation
  - making the world real by interacting with it (Piaget)
- Tool users
  - response
  - feedback mechanisms

A visualisation problem

- Being a programmer I can "see" the structure
- But how to make it available to the text tool user?
- Why do I see?
  - Seeing through manipulation

Seeing through manipulation

- I see what happens when I change things
- that way I know what the structure is

- …but how can we operationalise object manipulation?
- How can a tool user be enabled to see through manipulation?

Visualising information

- Exploration
  - knowledge discovery
  - question-driven
- Communication
  - can grasp complex and rich data
  - risk of over-reading
- Teaching
- Understanding
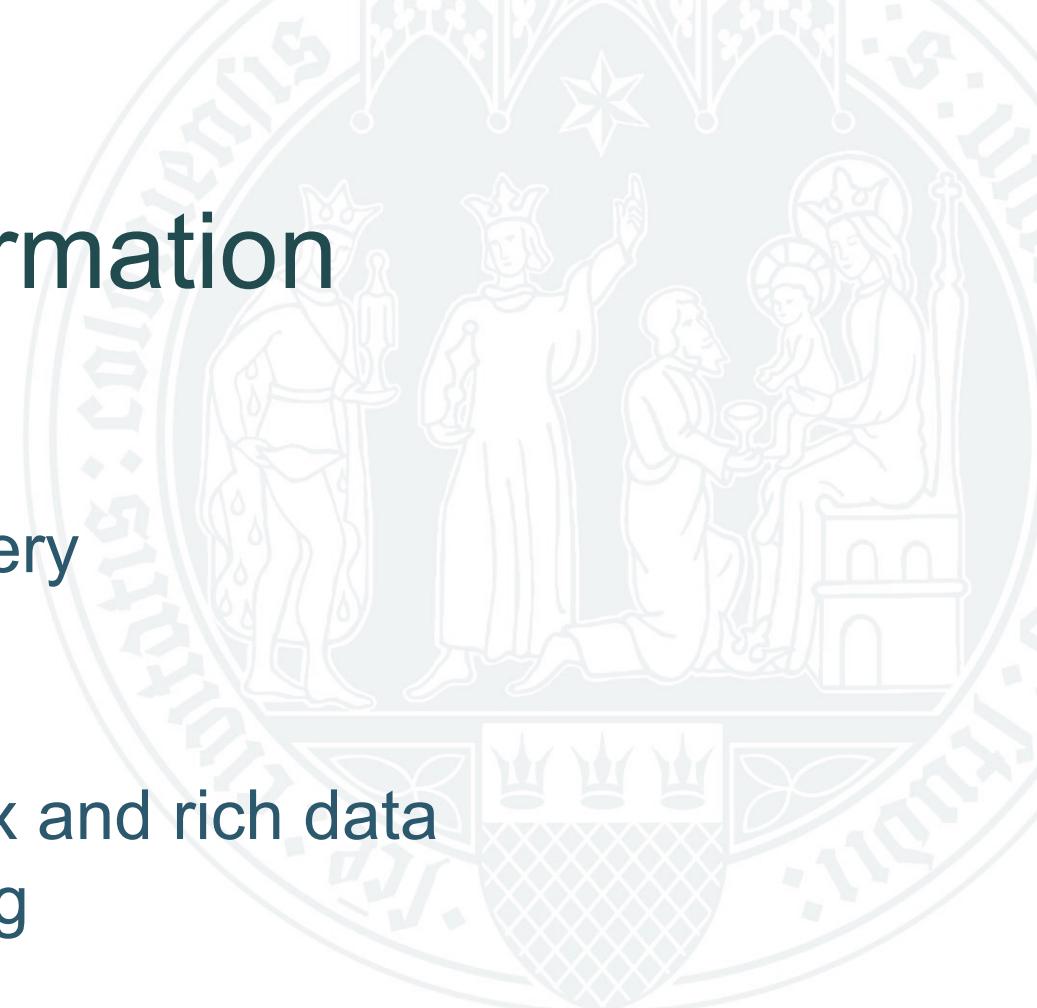
Visualisation is modelling

- Bias

- Visual rhetoric

- Spatial manipulation

- Distillation and omission of information

Bertin's Original Visual Variables

|	
Position changes in the x, y location	
Size change in length, area or repetition	
Shape infinite number of shapes	
Value changes from light to dark	
Colour changes in hue at a given value	
Orientation changes in alignment	
Texture variation in 'grain'	
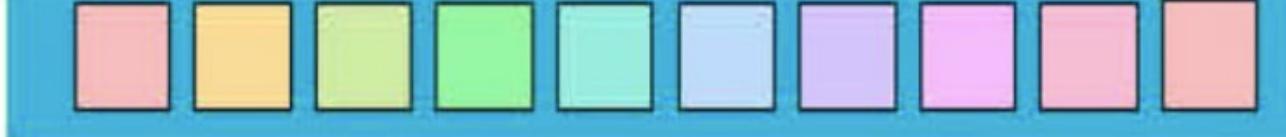
Visual variables: Carpendale, M. S. T.: Considering Visual Variables as a Basis for Information Visualisation, University of Calgary, Department of Computer Science, 2001-693-16, 2003

Data modelling

- A form of modelling
- Formal models in computer science
  - data modelling
  - process modelling (including simulations)
  - system modelling (design of software)
- Metatextual level
- Image annotation
- Metadata

Data model, target, metamodel

- The modelled instance
  - a digital model of a specific entity
  - examples: a document, an art object, an event
- Data model
  - the specific organization of tables, their names, column headings
- Metamodel
  - the concept of the table itself as a structure of rows and columns

https://archive.nytimes.com/artsbeat.blogs.nytimes.com/2010/11/16/digitally-mapping-the-republic-of-letters/