WP09

From Models to Views

Design of Software Architectures

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Role of the software architecture

to provide

solution direction

for

most important properties

that are

the most difficult to realise

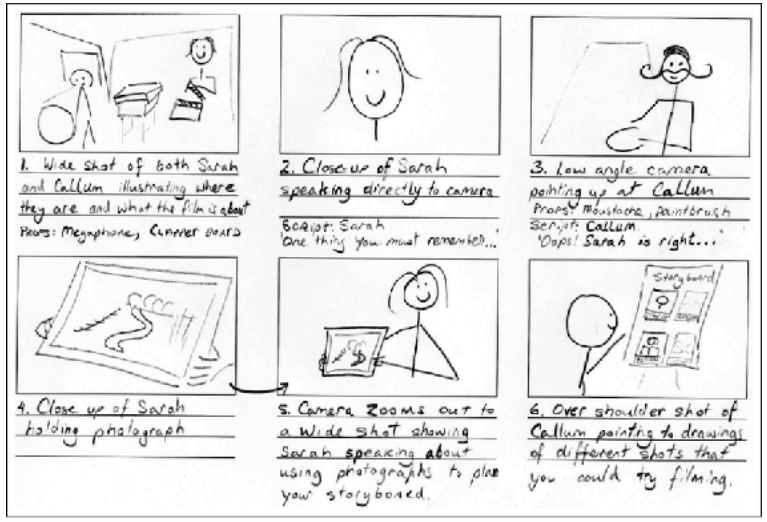
All models are wrong

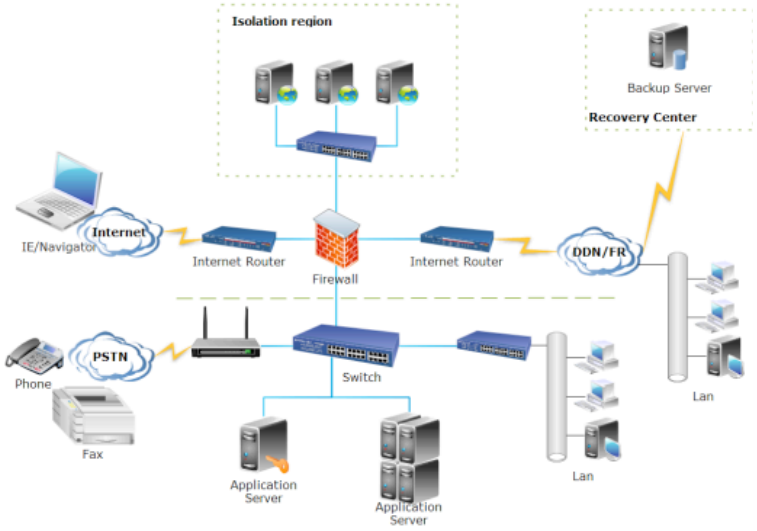
I

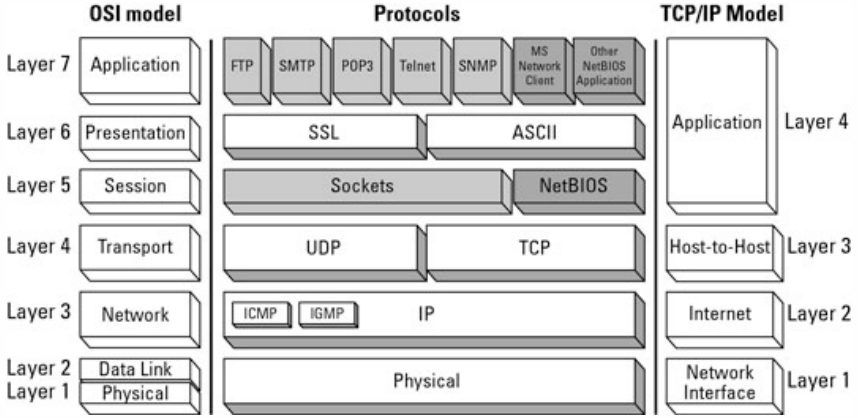
View

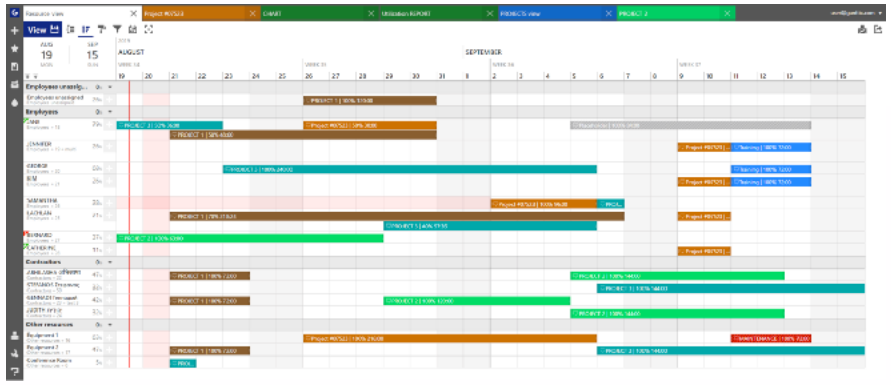
- Representation of
  - a system
  - its environment
  - their relation
- from the perspective of
  - a set of related concerns
- used by an architect
  - to define/explain/reason

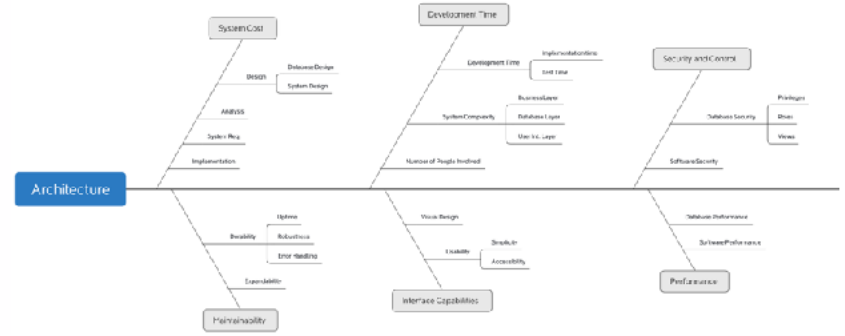
Views

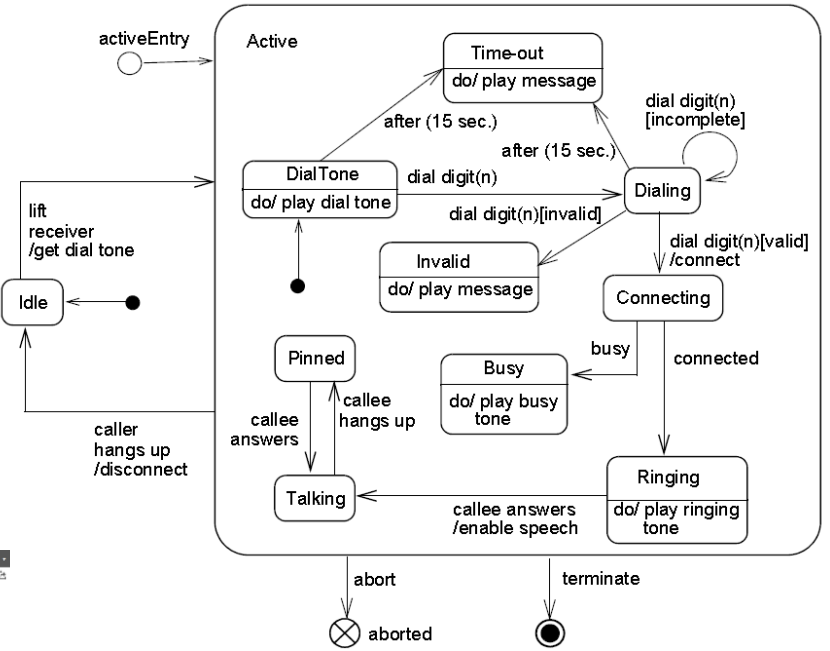


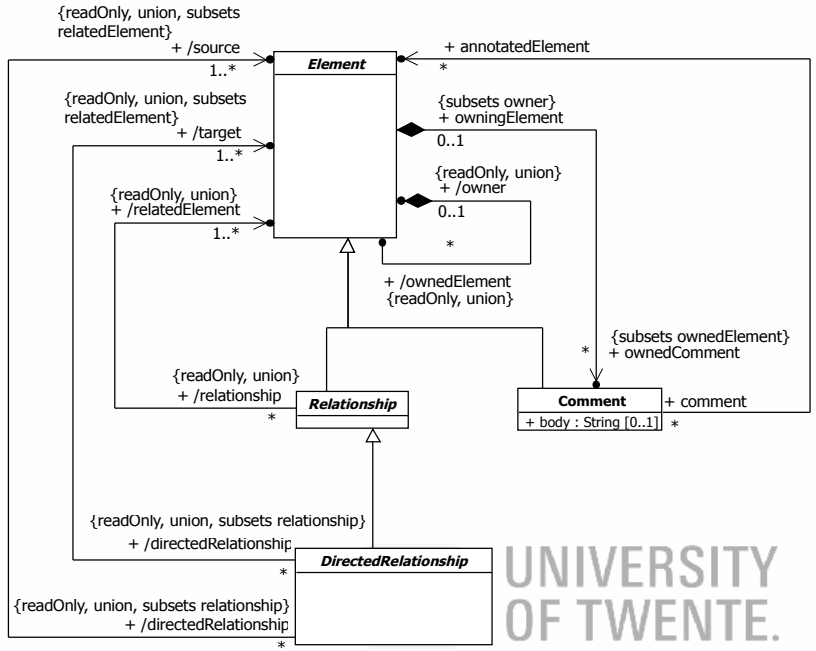












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View == model? View ≠ model?

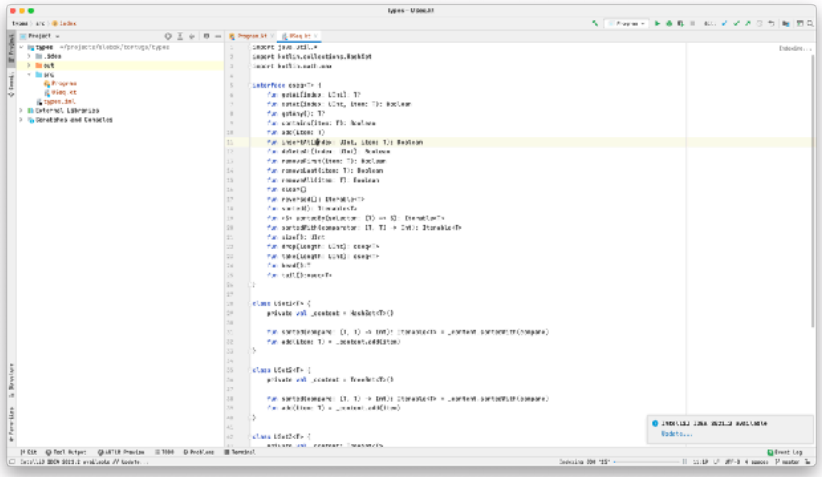
I

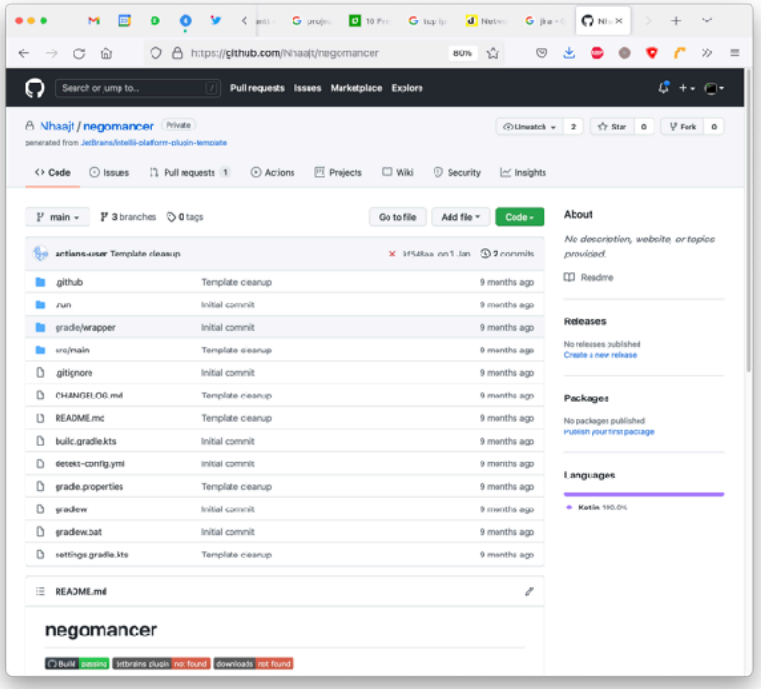
Model

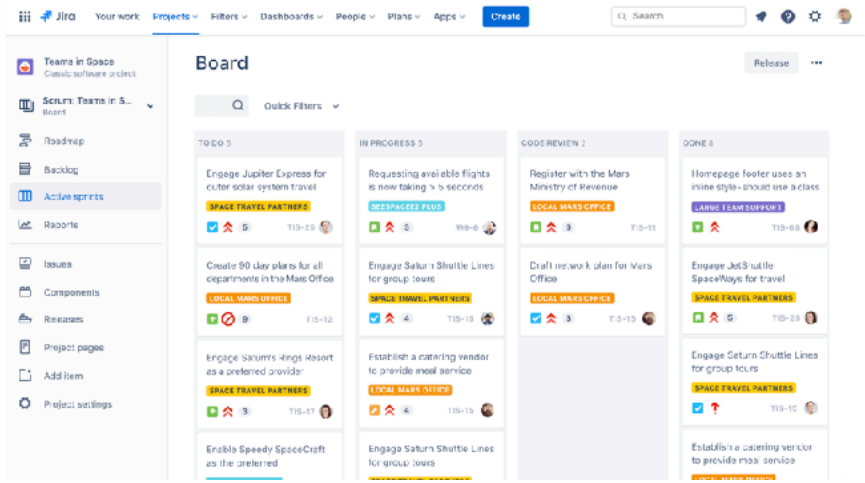
- *A model is*
  - *a simplified representation*
  - *of a part of the world*
  - *from a particular view*
- Architecture model
  - source specification
  - for one or more views

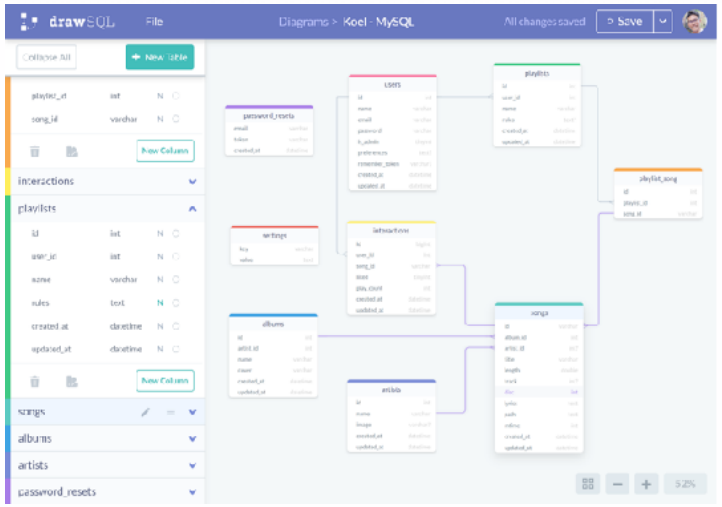
H. Stachowiak, *Allgemeine Modelltheorie*, 1973

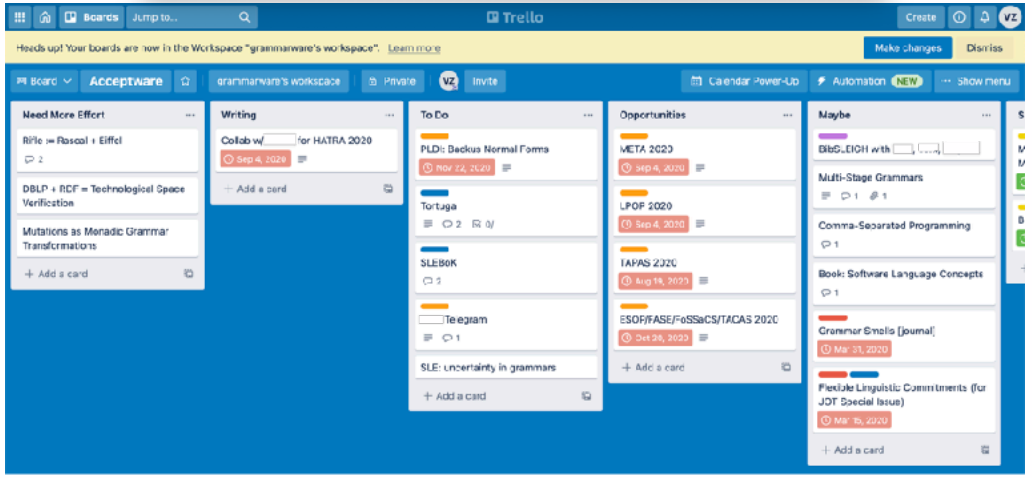
Models

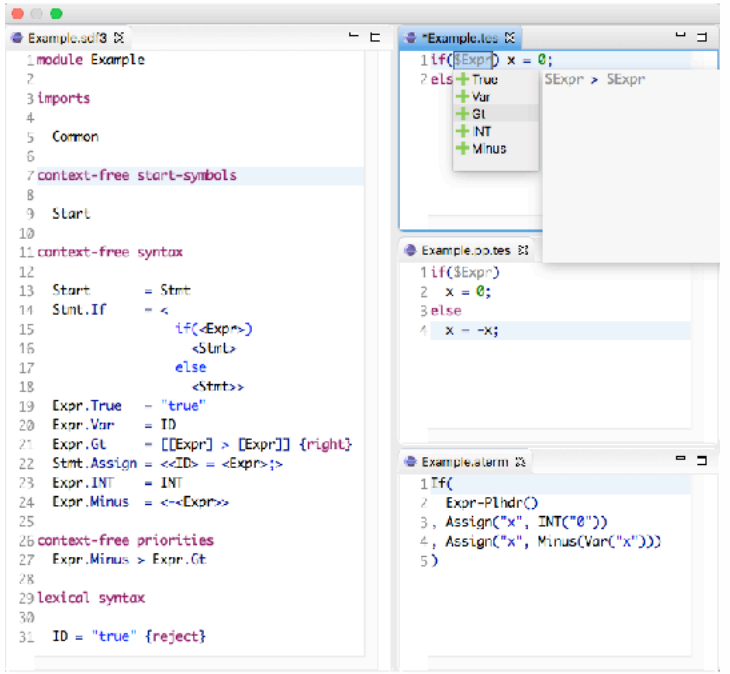












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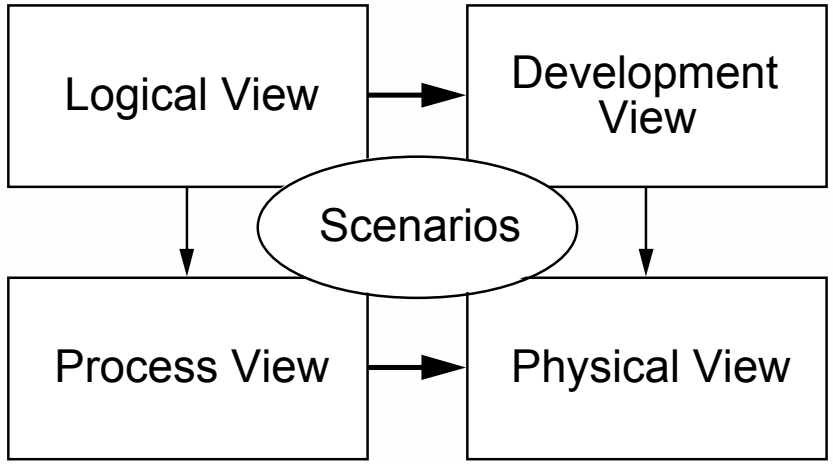
Viewpoint

- Way of looking at
  - system
  - environment
- from the perspective of
  - stakeholder
  - concern
  - aspect

End-user
Functionality

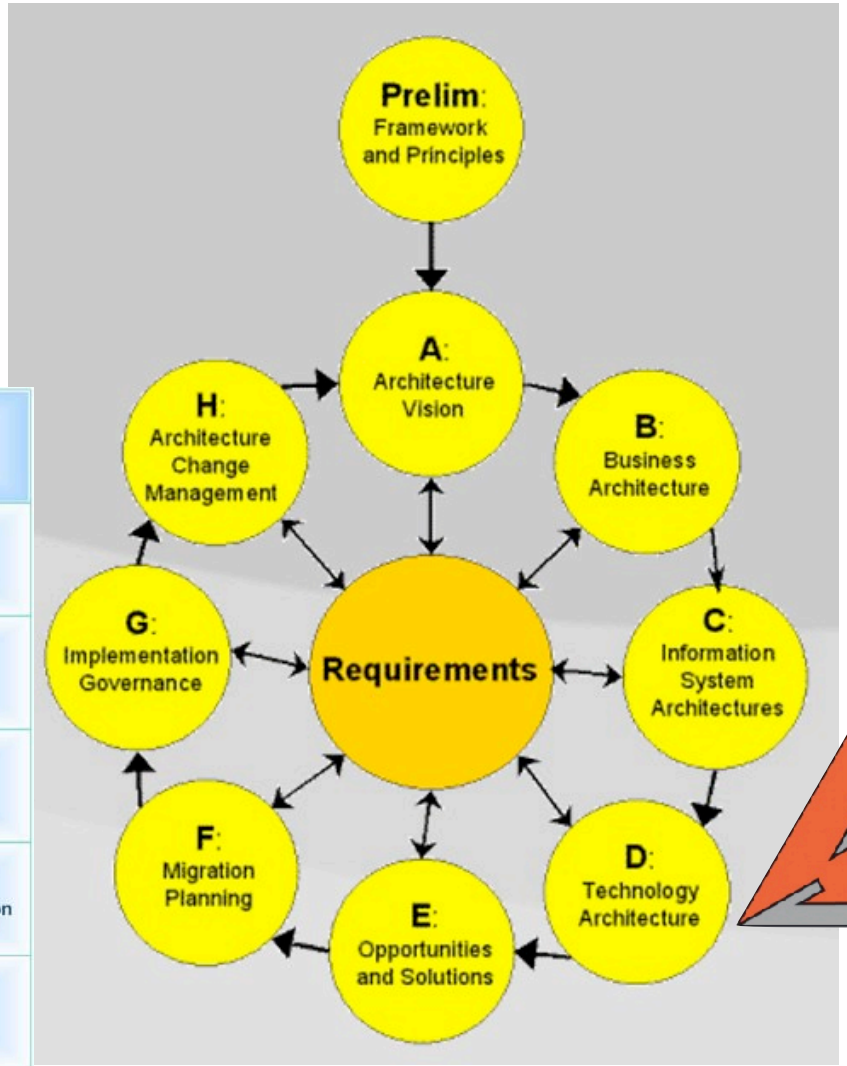
Programmers
Software management

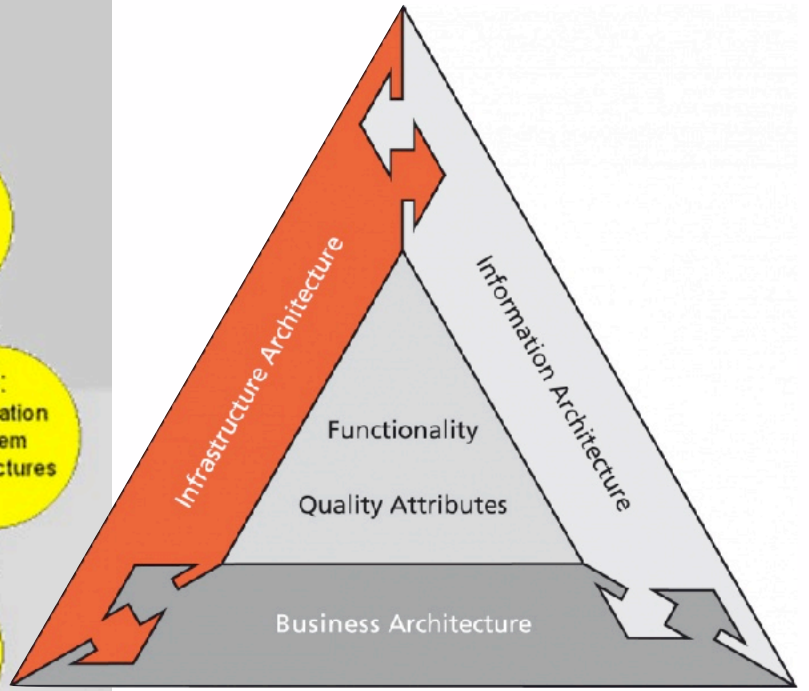


Integrators
Performance
Scalability

System engineers
Topology
Communications

	Why	How	What	Who	Where	When
Contextual	Goal List	Process List	Material List	Organisational Unit & Role List	Geographical Locations List	Event List
Conceptual	Goal Relationship	Process Model	Entity Relationship Model	Organisational Unit & Role Relationship Model	Locations Model	Event Model
Logical	Rules Diagram	Process Diagram	Data Model Diagram	Role Relationship Diagram	Locations Diagram	Event Diagram
Physical	Rules Specification	Process Function Specification	Data Entity Specification	Role Specification	Location Specification	Event Specification
Detailed	Rules Details	Process Details	Data Details	Role Details	Location Details	Event Details





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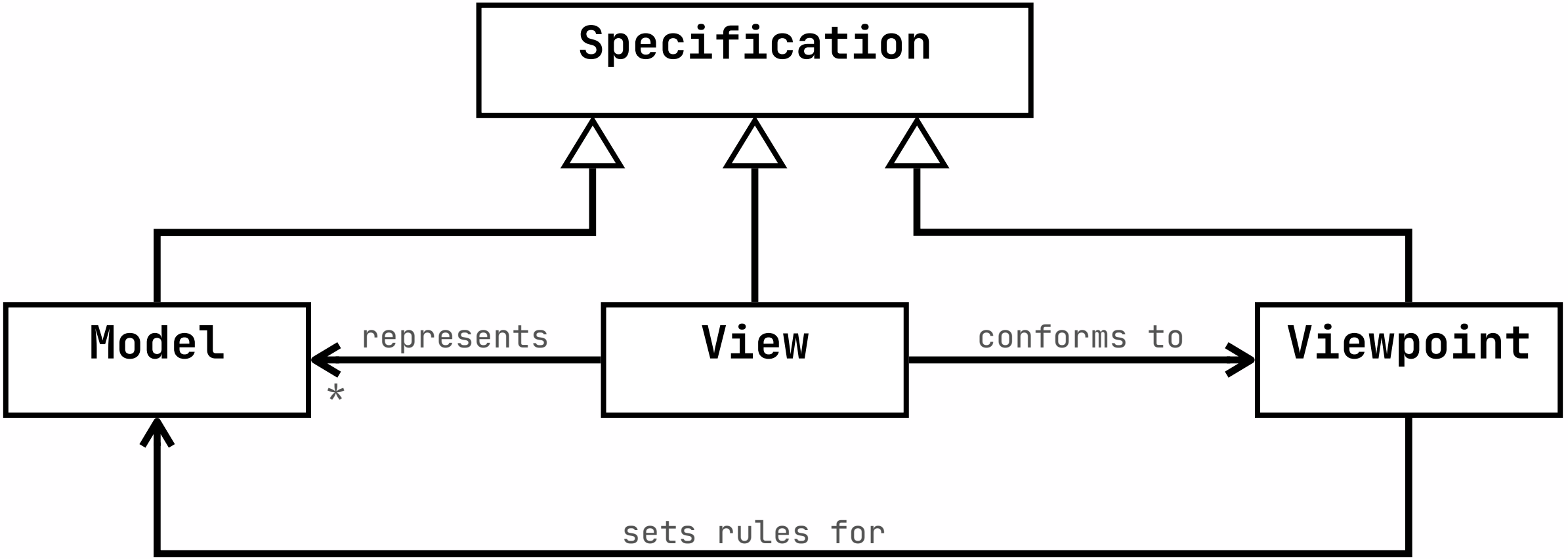
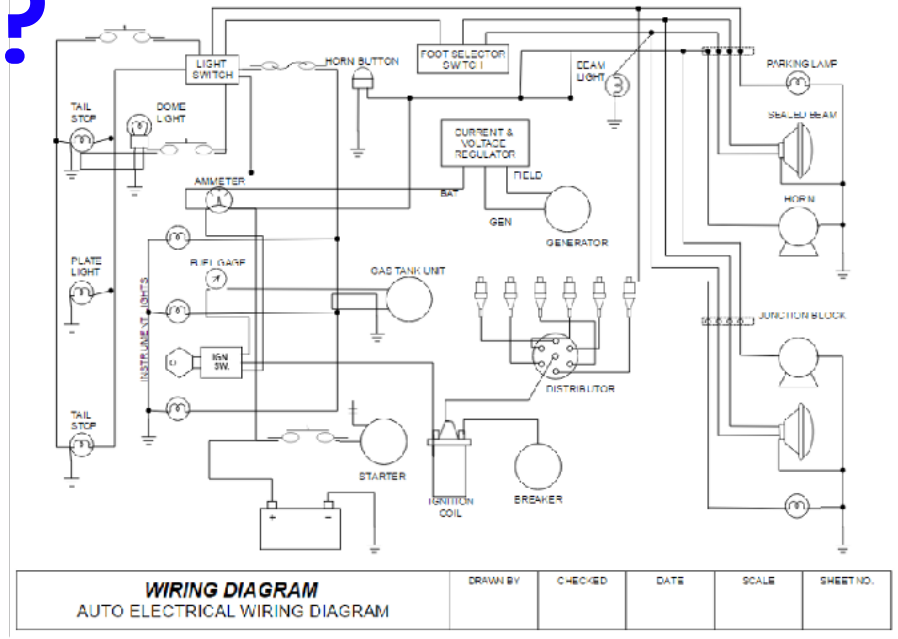
Viewpoints from a framework

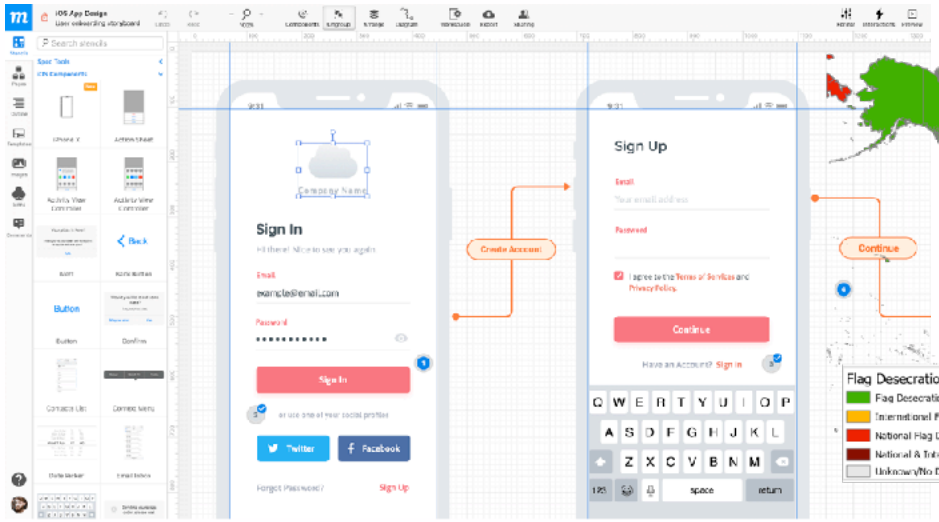
- 4+1 model…
- TOGAF…
- DYA…
- Zachman…
- Standard framework does not cover unique properties
  - Use specific viewpoints
- Views can be related via the architecture domain model.

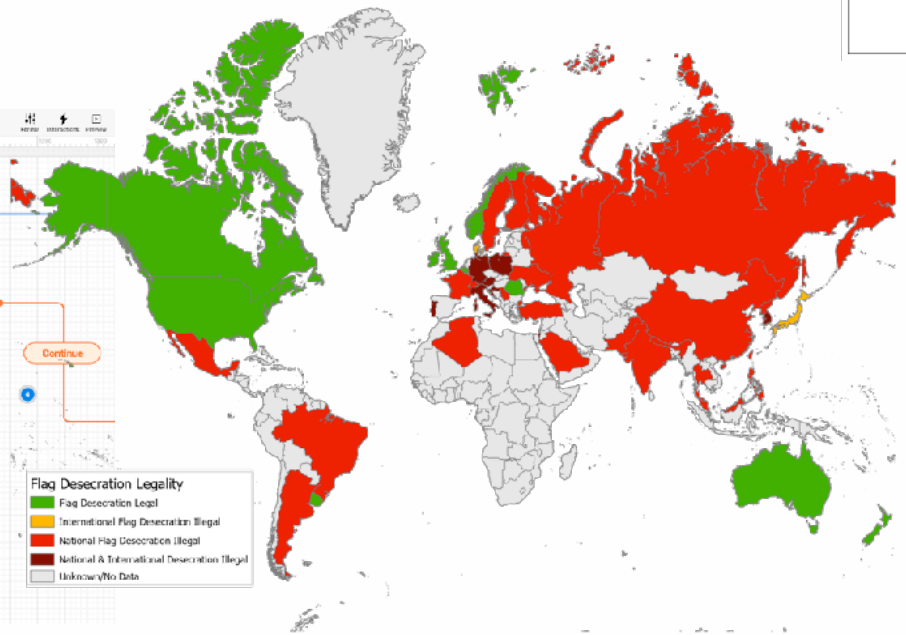
Model ← View → Viewpoint

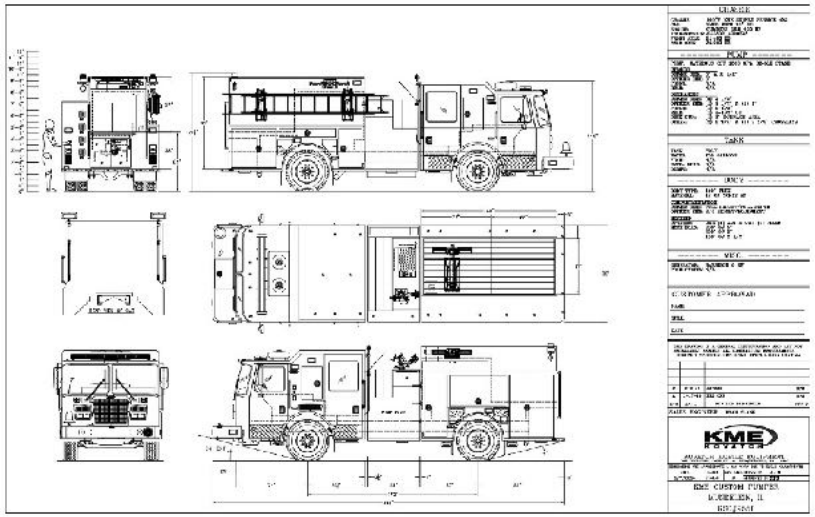


Model? View? Viewpoint?









Select viewpoints, clean up views

- Which stakeholder(s)? Which concerns?
- Decide on the language:
  - Concepts and notation
  - Visualisation (depends on communication context)
- Specify how to translate the model(s) into a view.
- Pitfalls:
  - Too little views (e.g., just the decomposition)
  - Overloaded views (everything in one picture)

Remember!

- *An architecture description shall include each architecture viewpoint used therein.*
- *An architecture description shall include exactly one architecture view for each architecture viewpoint used.*
- *Each concern shall be framed by at least one viewpoint.*

ISO/IEC/IEEE 42010