

On the role of models and modularity in the design and development of Digital Humanities tools

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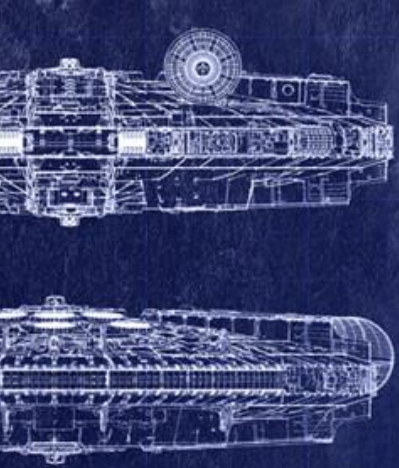
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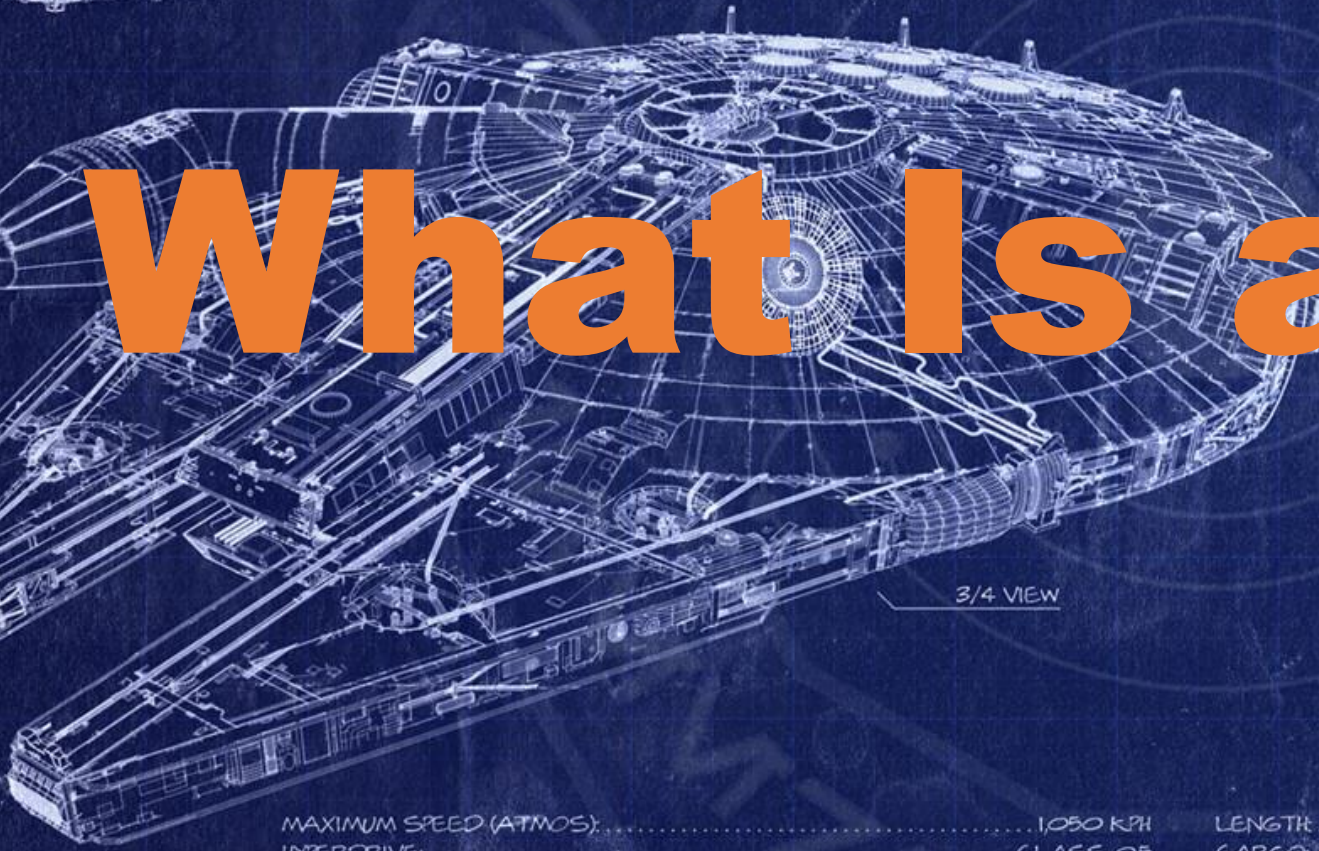
Introduction

- The **availability of tools** is important for Digital Humanities research
- A **large amount of tools** has been already developed
- There is a problem of **obsolescence** for such tools
- There are **multiple reasons**
 - Rapid obsolescence of **technology**
 - **Long term** hardware **maintenance** and **availability**
- We discuss how models helps **mitigate the problem** of rapidly changing technology

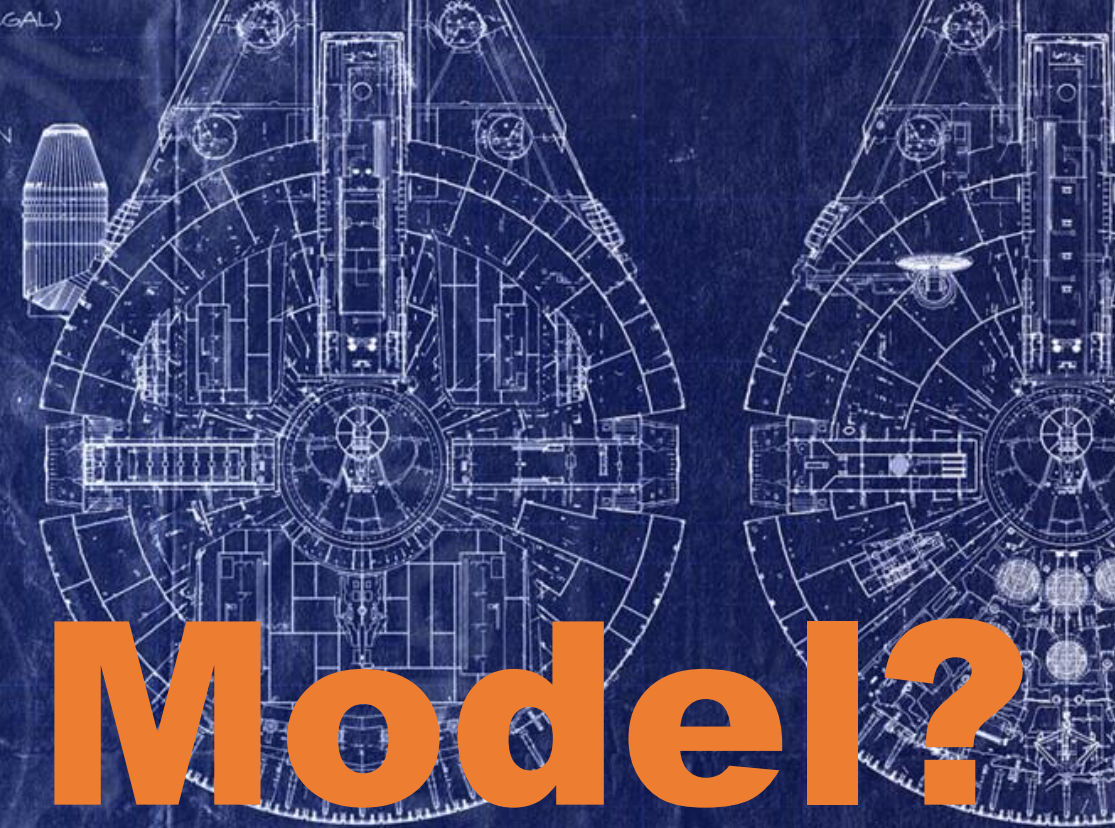


LONG HISTORY OF SEVERAL OWNERS, SUBSTANTIAL UPGRADES (SOME ILLEGAL) AND, UNDER ITS CURRENT OWNER, WANTED FOR SMUGGLING AND HIGH TREASON BY THE IMPERIAL NAVY. HER OWNER AND CO-PILOT ARE SUSPECTED OF AIDING AND ABETTING MEMBERS OF THE REBELLION. THIS INCLUDES TRANSPORTING HIGHLY SENSITIVE DOCUMENTS THAT PERTAIN TO THE DEFENSIVE CAPABILITIES OF THE IMPERIAL NAVY'S LATEST BATTLESTATION.

THE "FALCON" IS HIGHLY MANEUVERABLE AND INFAMOUS FOR BEING ABLE TO OUTFRAN AND ELUDE IMPERIAL STARDESTROYERS. SHE HAS ALSO BEEN RUMOURED TO HAVE DONE THE KESSEL RUN IN LESS THAN 12 PARSECS, SOMETHING CONSIDERED PHYSICALLY IMPOSSIBLE WITH ANY SHIP. IF TRUE, IT SAYS MUCH ABOUT HER MODIFICATIONS AND THE SKILL OF HER CREW.

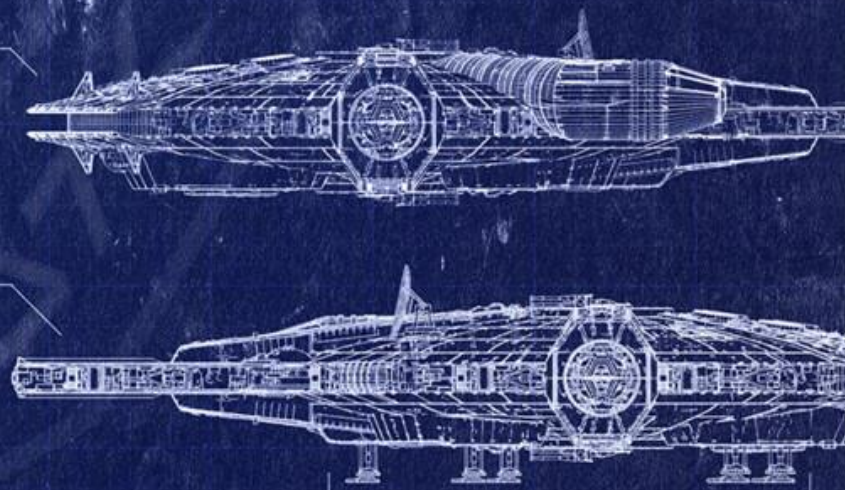


3/4 VIEW



STARBOARD VIEW

PORT VIEW



LANDING GEAR EXTENDED

What Is a Model?

MAXIMUM SPEED (ATMOS): 1,080 KPH
HYPERDRIVE: CLASS 05
BACKUP HYPERDRIVE: CLASS 10
ENGINES: 1SU-SIM SSPO5 HYPERDRIVE GENERATOR (HEAVILY MODIFIED)
2 GIRODYNE SRB42 SUBLIGHT ENGINES (HEAVILY MODIFIED)
SHIELDING: MILITARY-GRADE DEFLECTOR SHIELD GENERATORS

LENGTH: 34.37 METERS
CARGO: 100 METRIC TONS
CREW: 2 (MINIMUM)
PASSENGERS: 6
CONSUMABLES: 2 MONTHS

Models

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A representation of something that is useful to explore and understand better the nature of a target object or system

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A representation of something that is useful to explore and understand better the nature of a target object or system

- Several definitions
- Depends on the context
- A blueprint for the tool

Focus on

- Software systems
- A set of core principle

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How to use a model

- Validate the correctness:
 - Does it precisely and unambiguously describe every concept?
 - Is it understood by both humanists and computer scientists?
- Derive a software implementation:
 - The model is not bounded to a specific technology
- Document the tool
 - Useful in an hardly axiomatizable field such as the Humanities
 - Addresses the possibility of people turnover
 - As a mean to explain the tool
 - Trace extensions and changes to the requirements

Understand the domain

- Building a model implies an attempt to understand the domain
- Solve a language and communication problem
- Need to share a common language
 - in Domain Driven Design is the ubiquitous language
- Tacit knowledge needs to become explicit
- The digital humanist is a mediator between domain experts and computer scientists

Core principles for a Model

Clarifies the structure and functionalities of the tool

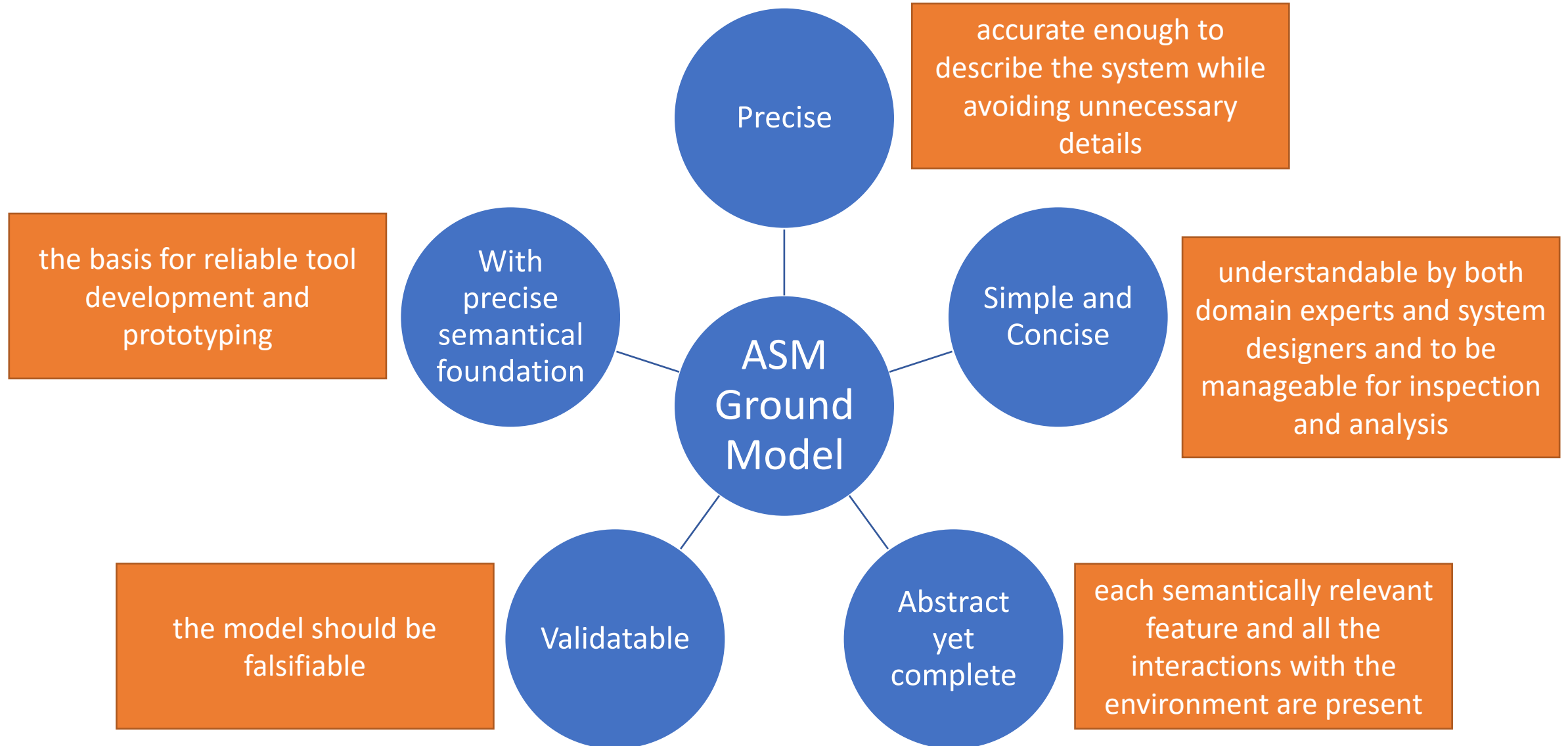
Provides the needed documentation

Is machine actionable

Is generic enough to be applied at different aspects of the tool

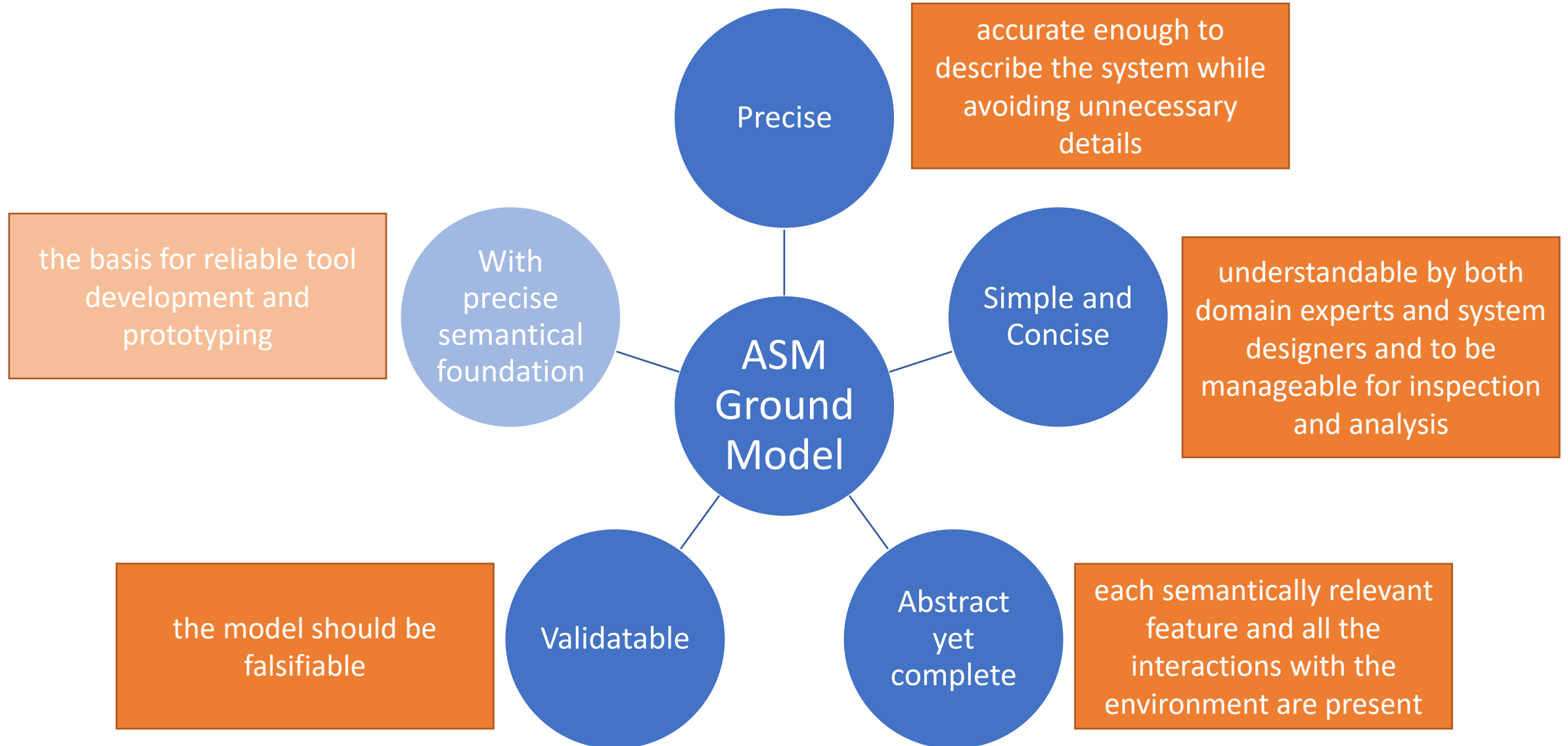
Ref: E. Boerger, The abstract state machines method for high-level system design and analysis. Springer, 2010.

The ASM ground model



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The ASM ground model



Multilevel models

- Models are not meant to be fixed (especially in the preliminary phases)
- There is no need to get a single model of the whole domain
- A set of models might tackle different aspects of the tool (e.g. architecture, data, business logic, etc.)
- Describe clear interfaces of communication between models
- Keep models as orthogonal as possible

Modularity

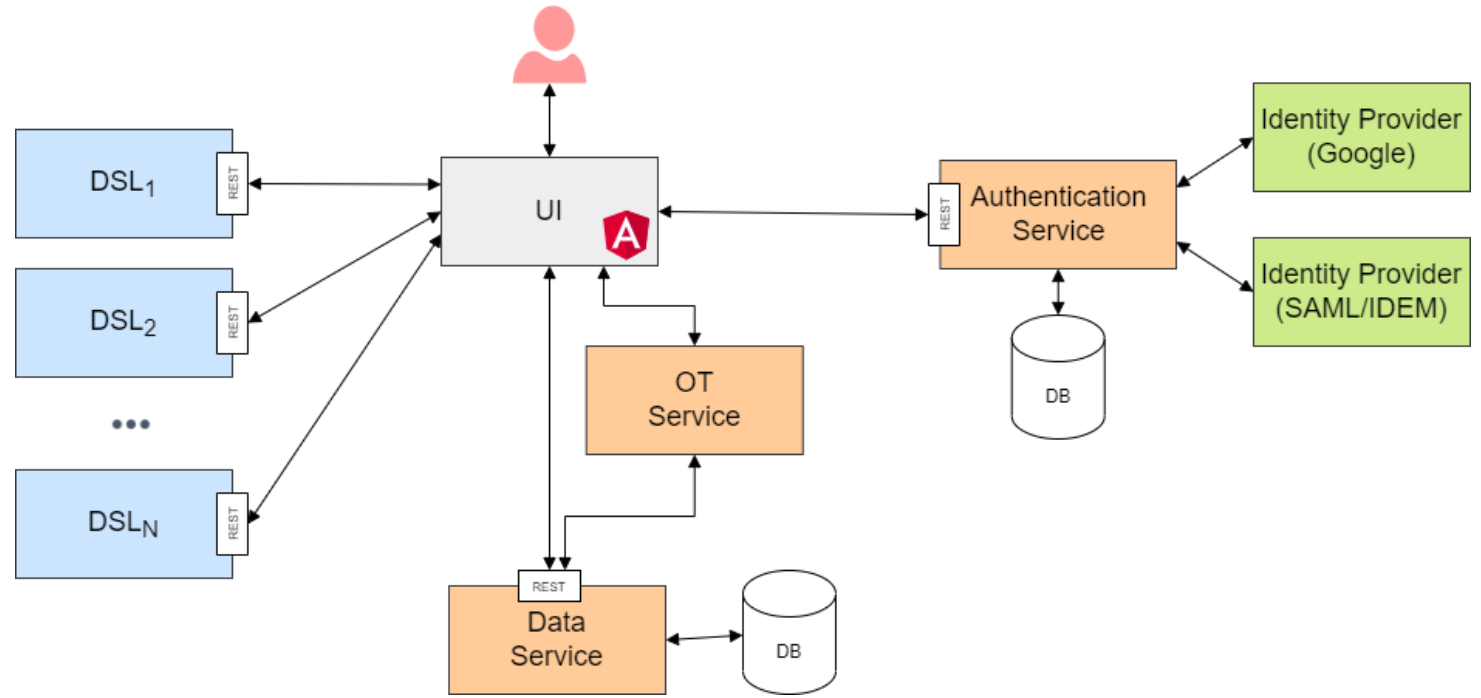
- Parnas' notion of information hiding
- Strive for identification and isolation of sets of features independent of each other
- Decompose the domain into smaller components
- Compositionality to built models upon each other
- Open to extensions to address changes to the requirements
- Easier upgrade of the technology if made module by module

CoPhi Editor

- Web-based collaborative and cooperative authoring platform for Digital Scholarly Editions (DSE)
- Born as part of the ERC Adg 885222- GreekSchools project
- Developed to support the editorial process for the papyrology DSE of the Philodemus of Gadara's arrangements of the Philosophers
- Domain agnostic
- Based on Domain Specific Languages (DSL-based DSE)
- Compliant with XML/TEI
- Designed to be as close as possible to the established editorial conventions

The Architecture of CoPhi Editor

- CoPhi Editor software is derived from a set of models
- Micro service architecture
- Modules:
 - UI
 - DSLs
 - Data Service
 - OT Service
 - Authentication Service



Drawbacks of using models

- Building a model requires expertise
- A model is rarely the result of a linear process, rather of several iteration
- Making sure that the model and the implemented software mach is critical
- Hard to define clear interfaces for the communication between models

Conclusions

- Models are beneficial to every aspect of a Digital Humanities tools
- Models brings:
 - Better understanding of the domain
 - A shared language
 - Documentation
 - A starting point for the software implementation
- Modularity is a desirable feature to couple to models
- CoPhi Editor as an example of application of models
- Creating effective models is hard

Contacts

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