

Module Modeling and Analysis course info

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Abstract

This module provides the information about the “Modeling and Analysis” course.

The complete course MA 611TM is owned by Embedded Systems Institute. To teach this course a license from Embedded Systems Institute is required. This material is preliminary course material. The final material and course information can be found at: www.esi.nl/cursus.

July 20, 2011
status: planned
version: 0.2

Modeling and Analysis Overview Content

goal of this module

Provide overview and context for complete course.

Understand and experience the connection between problem and solution.

content of this module

Positioning of Modeling and Analysis (M&A)

Why, what and how of M&A

Program of the complete course

Overview of M&A approach

exercise

Quick scan of one case

Electronic Patient Record, Video on Demand, or Health Care Archive

Modeling and Analysis Overview

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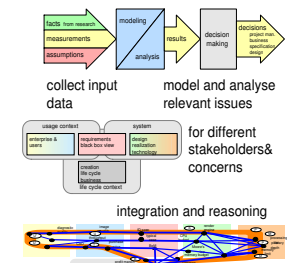
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Abstract

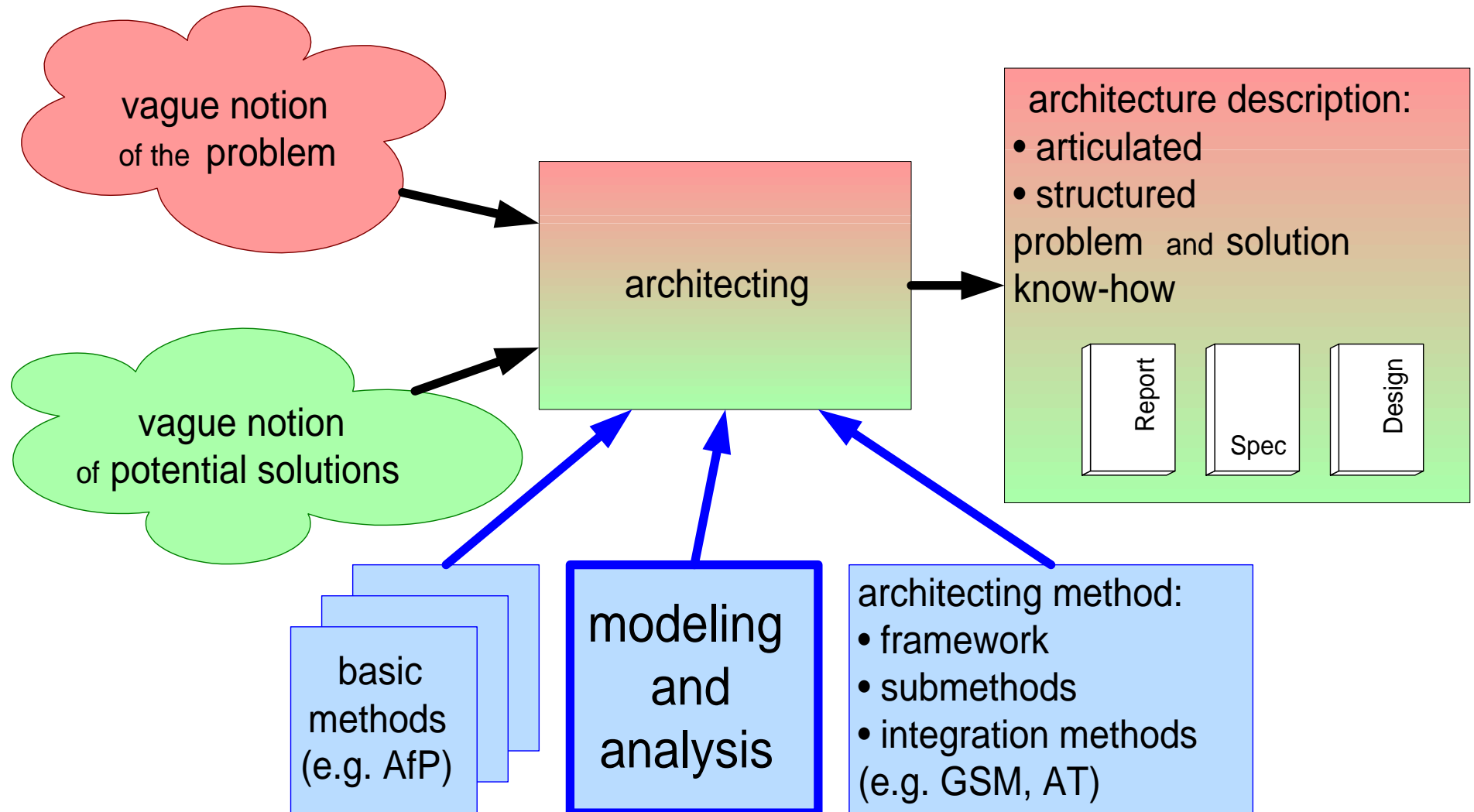
The course Modeling and Analysis is described. The program consists of 10 modules. The course format, iterating theory, illustration and interaction is explained. The course heavily emphasizes the practical application of the method. This presentation shows the overview of the modeling and analysis approach and the methods and techniques that will be elaborated in the rest of the course.

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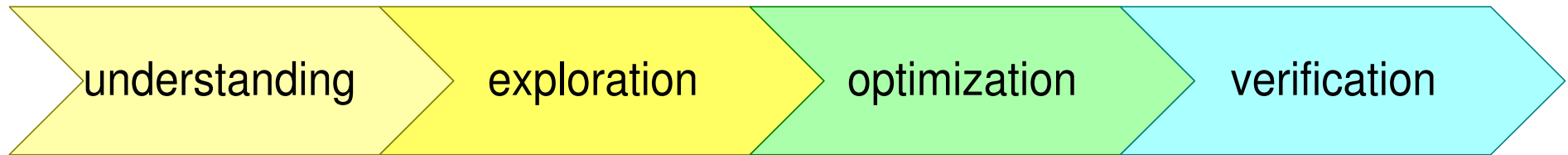
July 20, 2011
status: preliminary
draft
version: 1.0



Positioning Modeling and Analysis in Architecting



Modeling and Analysis supports:



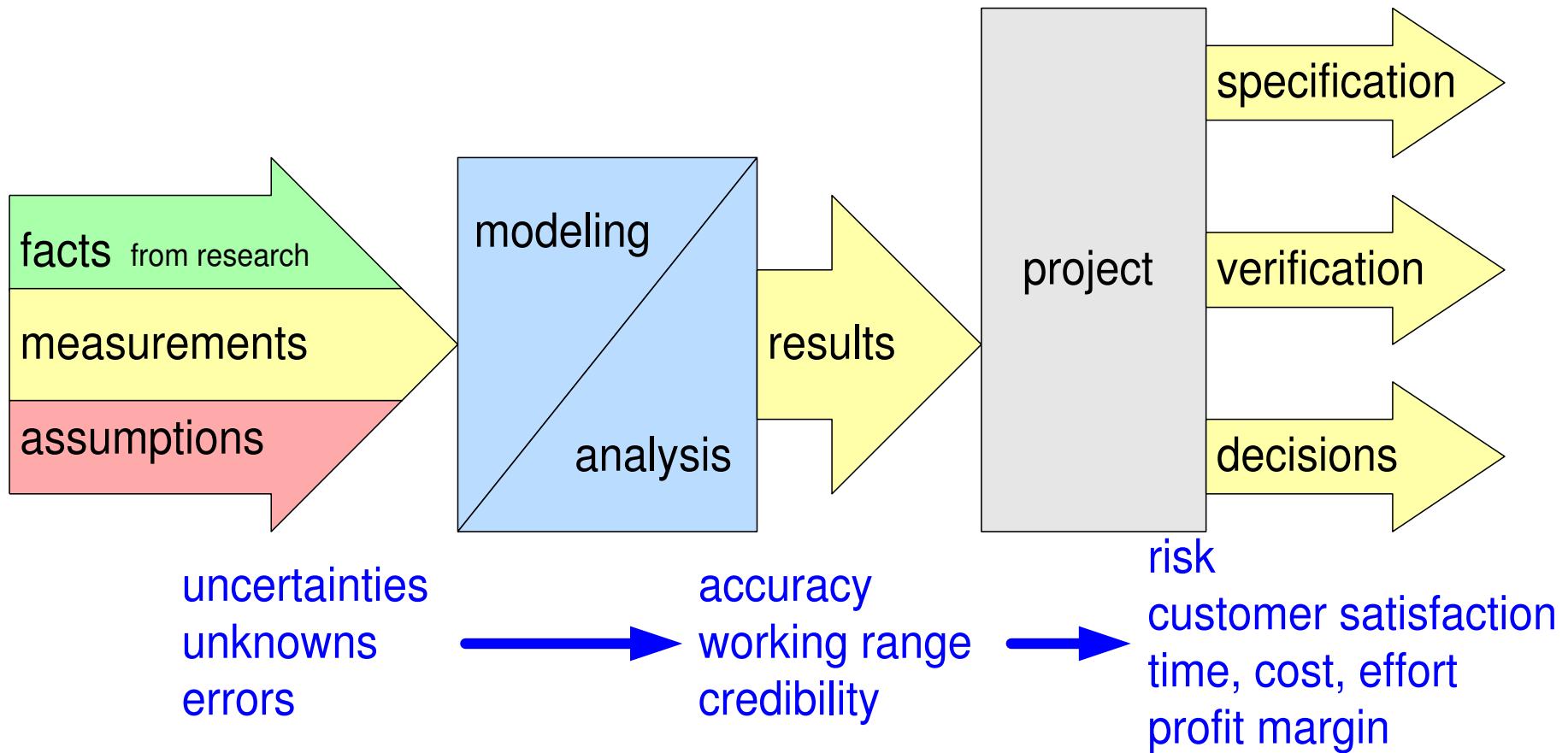
Type of model depends on project phase

Models have a goal

Goals evolve and models evolve

Techniques are used to reach this goal

Purpose of Modeling



What to Model?

business :

profit, etc.
operational costs
stakeholder benefits
workload
risks

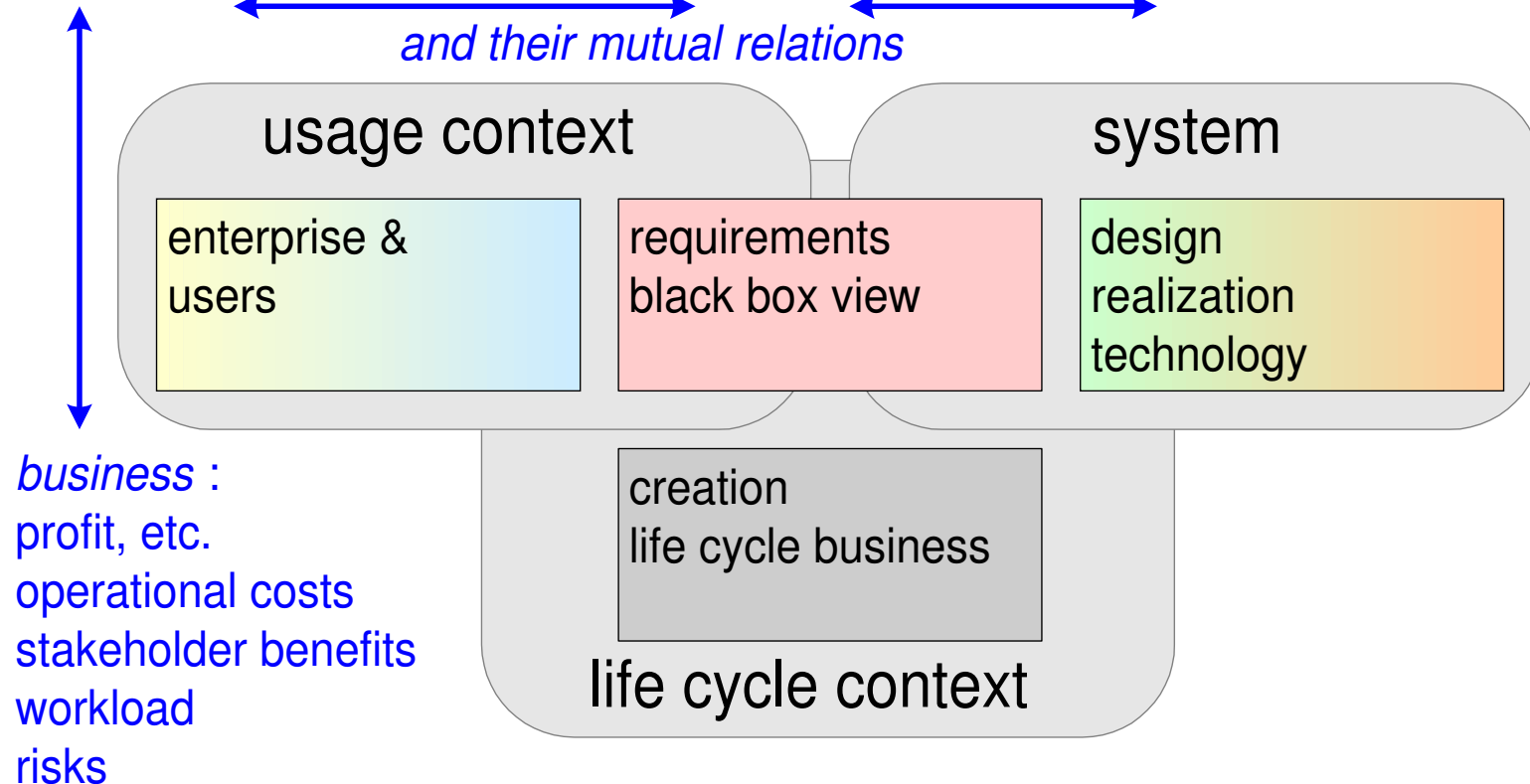
key performance :

throughput, response
reliability
availability
scalability
...

(emerging?) properties :

resource utilization
load
latency, throughput
quality, accuracy
...

and their mutual relations



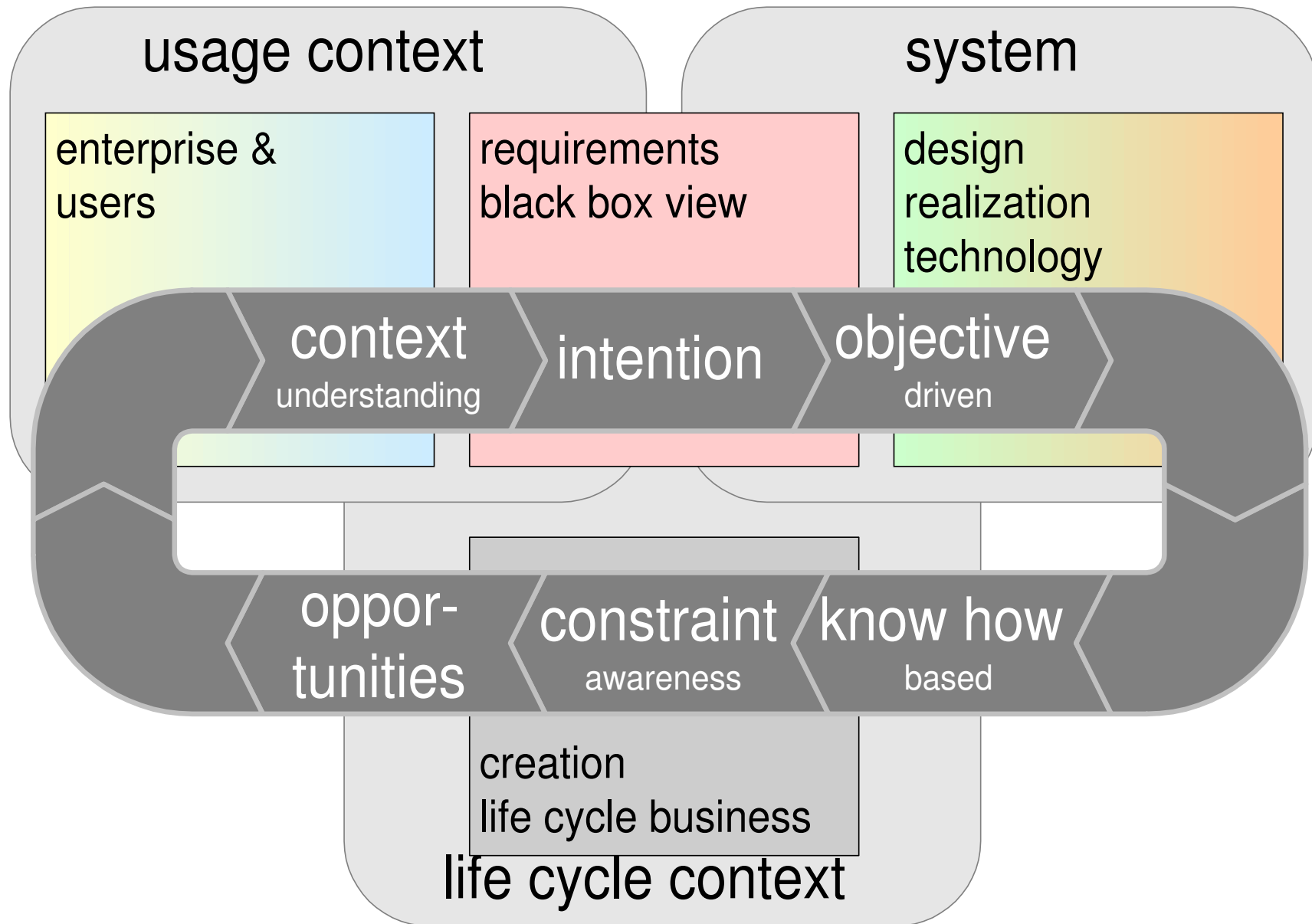
business :

profit, etc.
operational costs
stakeholder benefits
workload
risks

Program of Modeling and Analysis Course

day 1	1. overall approach intro, overall approach, exercise overall approach
	2. input facts, data, uncertainties quantification, measurements, modeling, validation, technology background, lifecycle and business input sources
day 2	3. system modeling purpose, approaches, patterns, modularity, parametrization, means, exploration, visualization, micro-benchmarking, characterization, performance as example
	4. application, life-cycle modeling reiteration of modeling approach (see module 3), applied on customer application and business, and life cycle
day 3	5. integration and reasoning relating key driver models to design models, model based threads of reasoning, FMEA-like approach, modeling in project life-cycle
	6. analysis, using models sensitivity, robustness, worst case, working range, scalability, exceptions, changes

Iteration over viewpoints



Modeling and Analysis: Background of the Course

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Abstract

The background ideas of the Modeling and Analysis course are collected in a number of diagrams. These diagrams are provided solely as background and probably should not be shown during the course itself.

Distribution

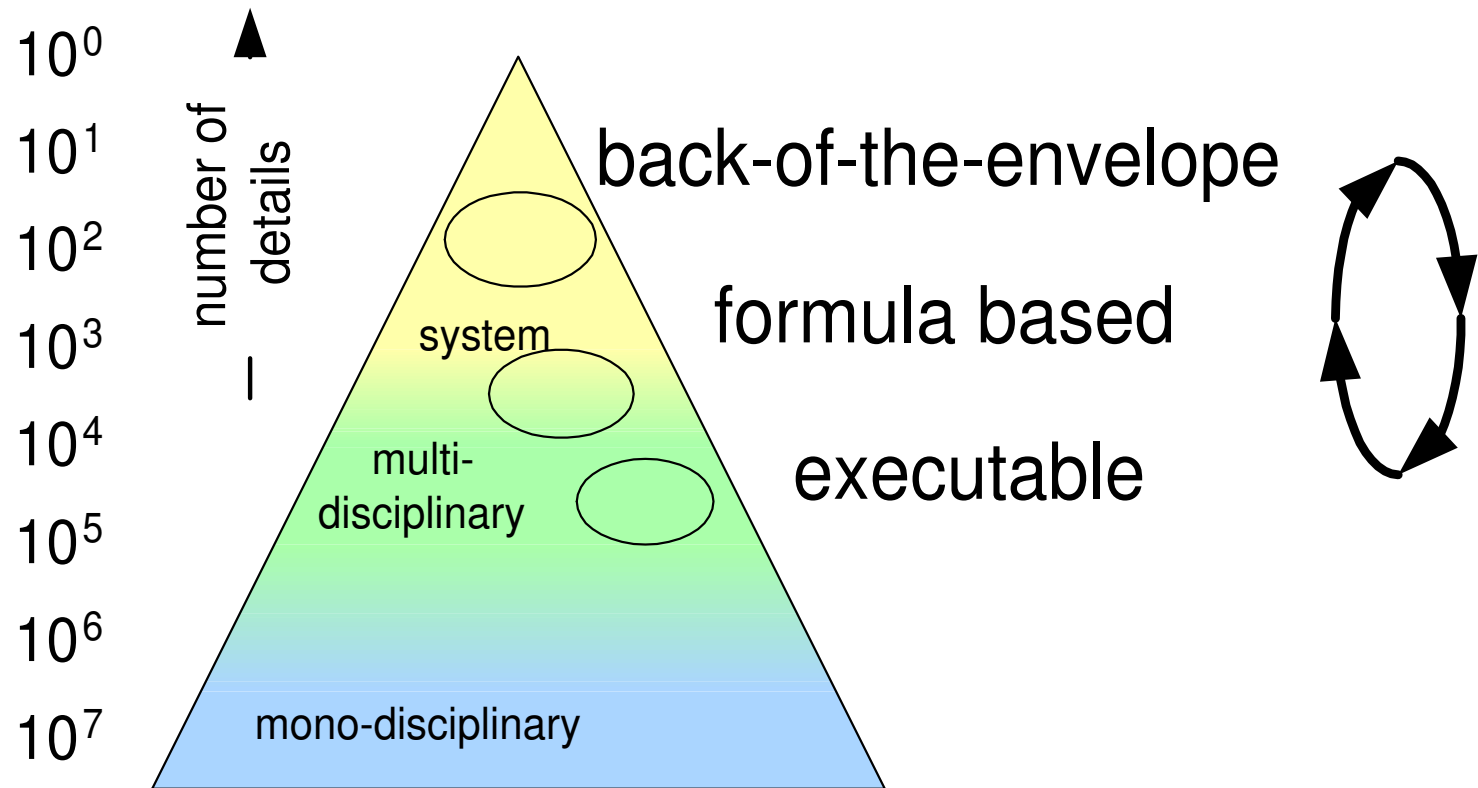
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July 20, 2011
status: planned
version: 0.1

logo
TBD

How to Model?

how

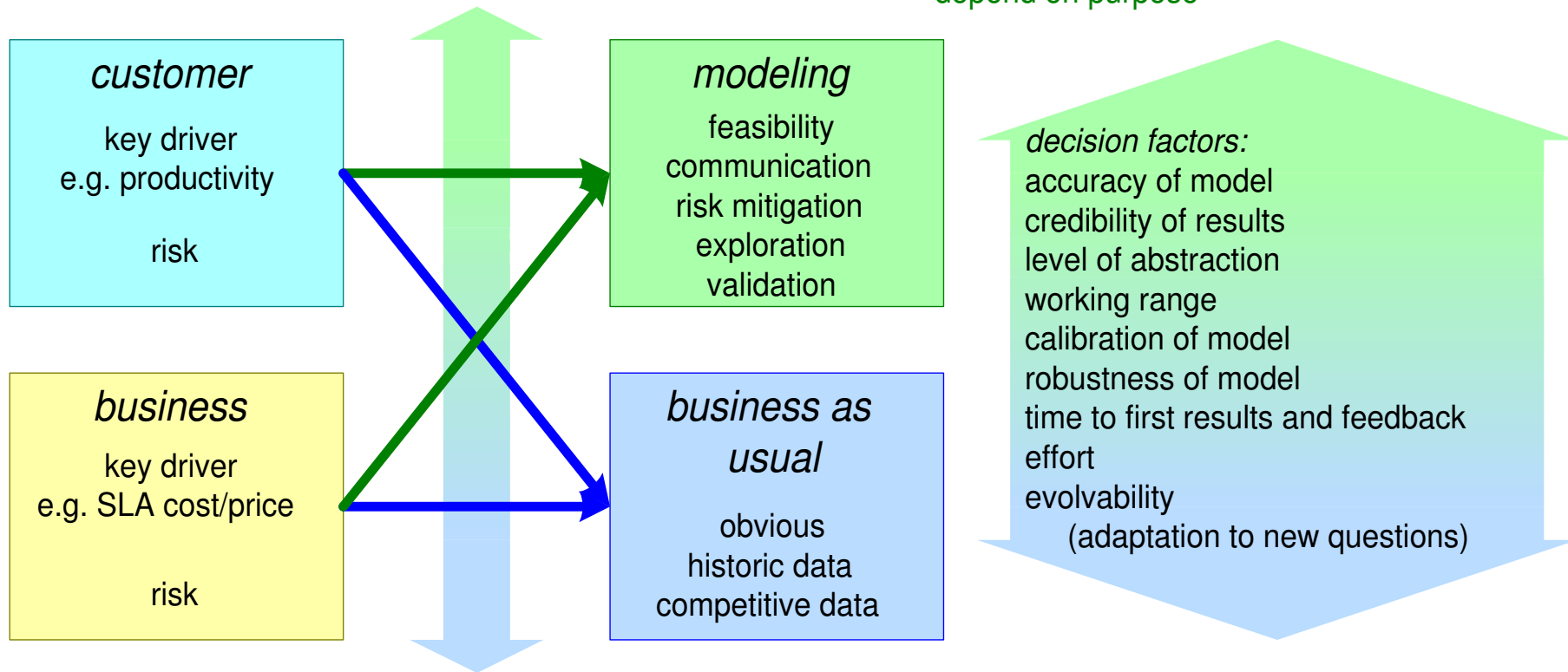


small, simple, goal-driven models

What and Why to Model

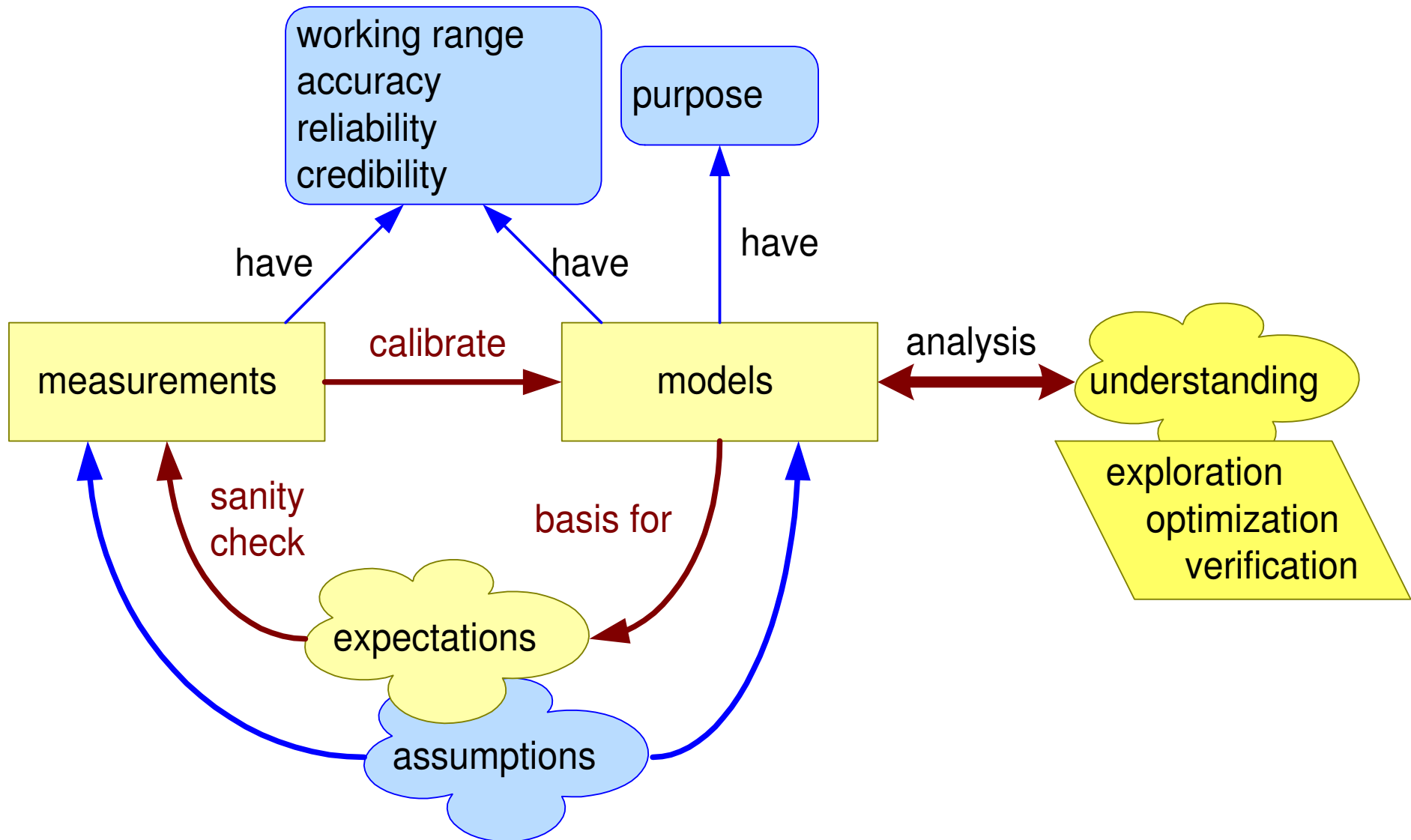
how well is the customer served?
 how credible becomes the solution?
 how much are time and effort reduced?
 how much is the risk reduced?
 how much is the solution improved?

purpose and type of model
 depend on project life cycle
 type of model and views
 depend on purpose



how much effort is needed to create model(s)?
 how much effort is needed to use and maintain model(s)?
 how much time is needed to obtain useful result?

Models, Measurements, Expectations and Assumptions



Unknowns, Uncertainties, ...

usage context

enterprise &
users

requirements
black box view

unexpected use
assumptions
uncertainties
unknowns
dynamics
interference

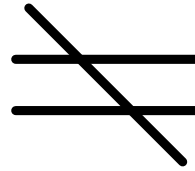
system

design
realization
technology

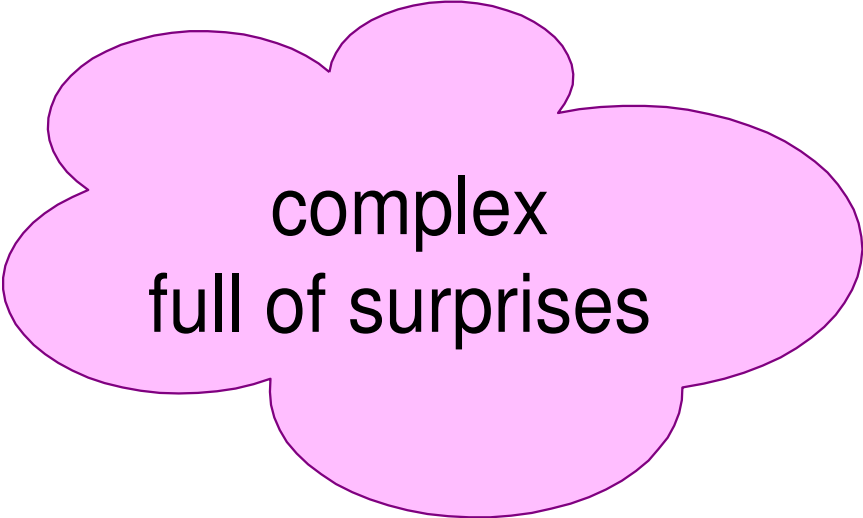
hidden properties
assumptions
unknowns
uncertainties
dynamics
interference

Model versus Reality

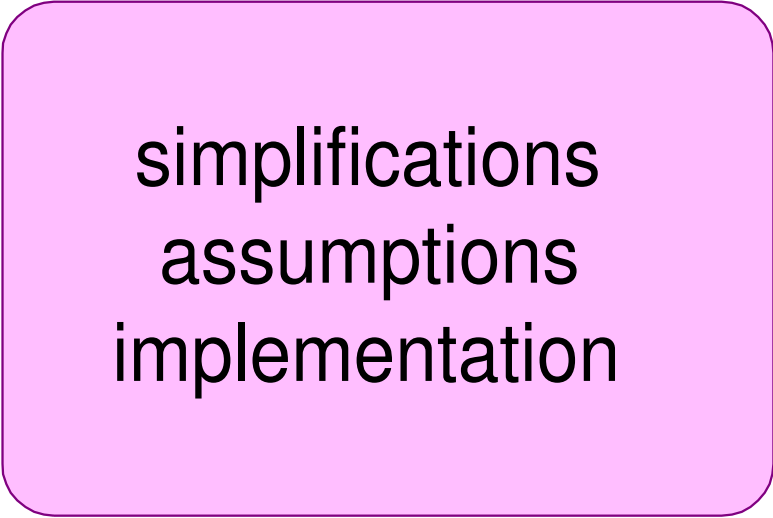
reality



model



complex
full of surprises



simplifications
assumptions
implementation

Starting Points of the Course

practical, immediately applicable in day-to-day work

(inter)active: daily hands-on exercises on case(s)

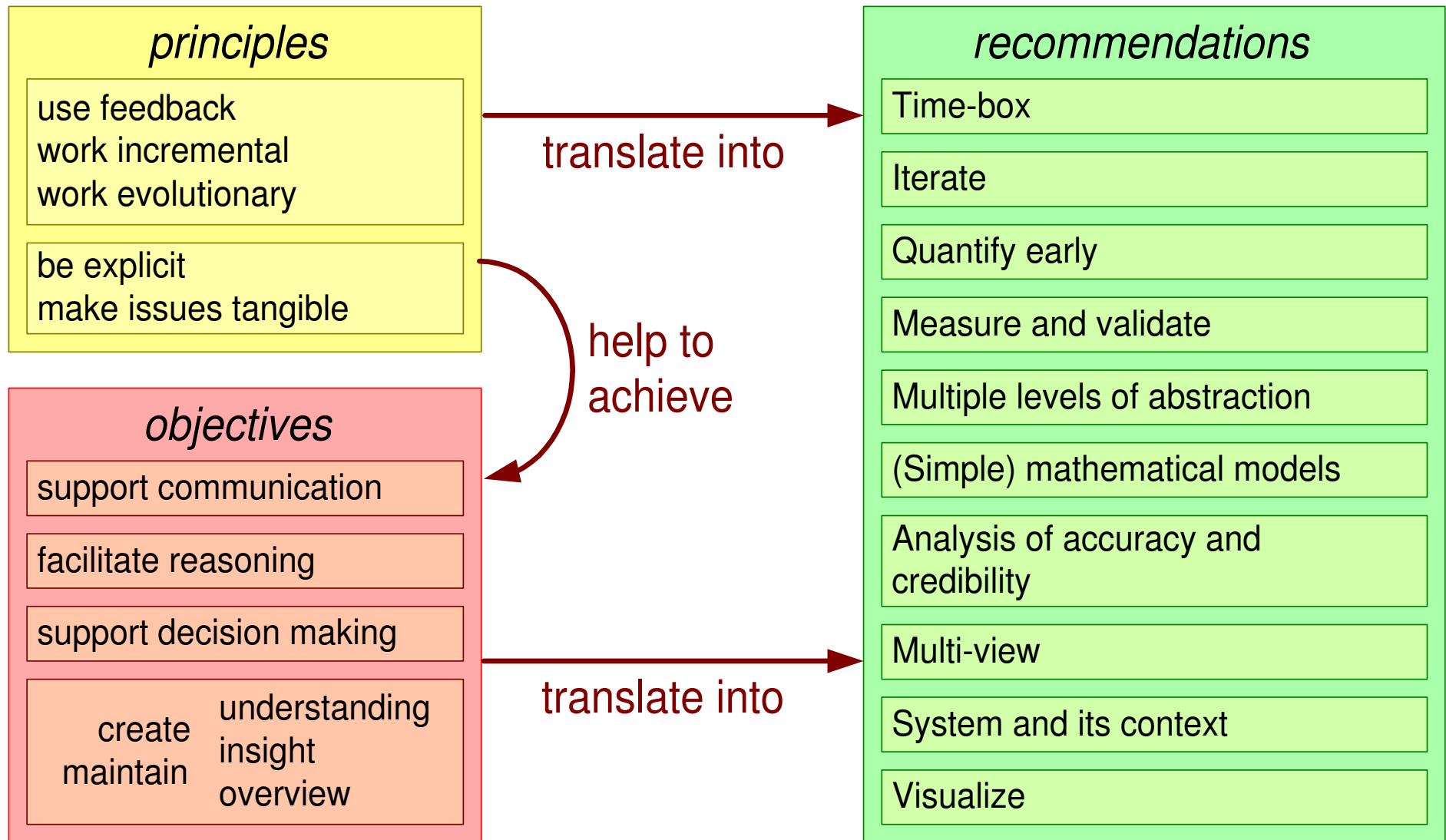
target: understanding, insight; way-of-working

method, tool, language and domain agnostic

Modeling and Analysis Questions

1. Why do we model? - what are indicators that modeling and analysis beyond "business as usual" architecture is needed. What questions trigger M & A.
2. What do we model? - what kinds of views do we need to consider (4+1, IBM GS Method, Zachman, CAFCR)
3. When do we model? - what models are needed at various points in the project lifecycle.
4. What is the appropriate type of model? - formula, visualization, executable, simulation
5. What is the required accuracy of the model? - when do we achieve the desired risk mitigation
6. What is the appropriate level of abstraction? - how much details have to be taken into account, versus how much effort can we afford
7. How to calibrate models? - models are based on facts and assumptions. The model outcome depends strongly on these input data. Note again the tension between effort to make and calibrate versus the value in terms of risk mitigation.
8. How to use models?

Recommendations as Red Thread



Electronic Patient Record:

- + relevant health care related information available at the right place for the right person

Long Term Health Care Archive:

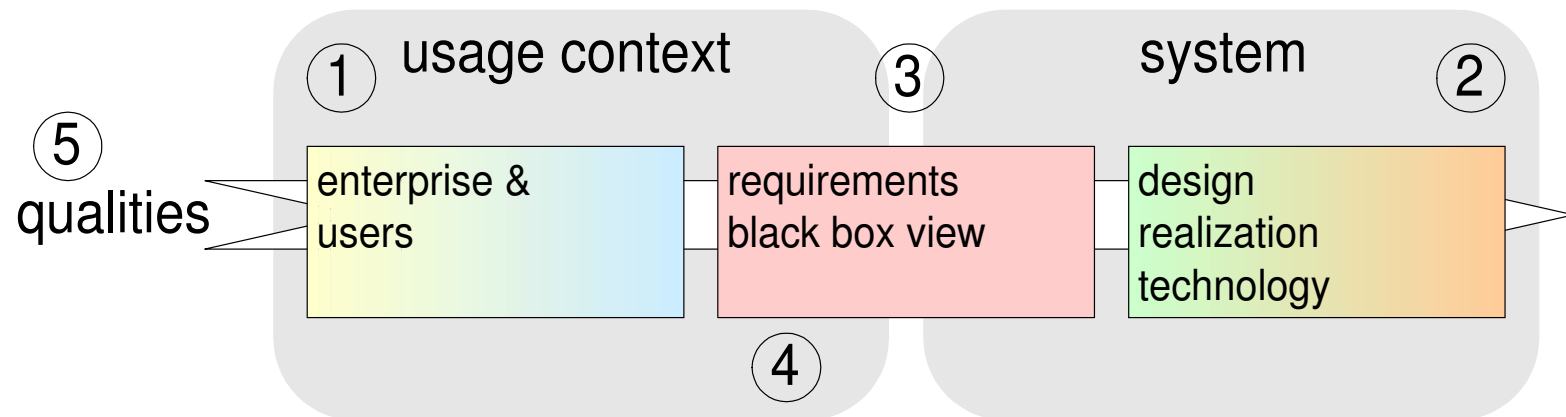
- + extreme robust, persistent, high availability archive for large chain of hospitals

Video on Demand Backoffice:

- + large scale content database with fast response download capability including billing, DRM et cetera

Modeling and Analysis Exercise

- make a quick scan over the following views: ①
 0. what is this exercise about?
 1. context: stakeholders, concerns, application
 2. system design and realization
 3. requirements
 4. operational context
 5. qualities
- use time boxes of 15 minutes per view
- show the most dominant decomposition(s) of that view, as diagram or as a list; quantify whenever possible



- + collectively we know quite a lot
 - + broad overview in short amount of time
 - ~ some "hot" issues appear to be less relevant
 - #questions >> #answers
- baseline for next refining steps

Conclusions

Modeling and Analysis must provide more *in-depth* answers for questions that are *breadth* relevant.

Modeling and Analysis is a means that supports *requirements* management, *architecting* and *project* management.

Modeling and Analysis ranges from *business* aspects to *technical* decisions.

Good models are *small*, *simple* and *goal-driven* .

Techniques, Models, Heuristics of this module

Context viewpoints

Fast iteration based on time-boxing