Architect as Content Leader

by *Gerrit Muller* University of South-Eastern Norway-NISE
e-mail: gaudisite@gmail.com
www.gaudisite.nl

Abstract

Systems architects play a complementary role to managers, such as project leaders, marketing managers, line managers. They struggle often with their recognition, contributuon, and role. In this presentation, we advocate that systems architects are content leaders. We look at past projects to see how far they are recognized, and how they contributed. How can we ern and live up to the proposed role?

January 10, 2021
status: preliminary draft
version: 0

What do we teach?	context system multi-disciplinary stretch
Why, what do we assume?	connect breadth and depth abstraction levels roles
Why, what to achieve?	content leadership integral, holistic, big picture good system fitting context
Past, where were companies?	system level ill understood context ill connected lacking effectiveness and efficiency
Today, where are companies?	that is the question ☺
Why are we in this state?	
Future what and how to teach?	

Figure of Contents™

What do we teach?	context system multi-disciplinary stretch
Why, what do we assume?	connect breadth and depth abstraction levels roles
Why, what to achieve?	content leadership integral, holistic, big picture good system fitting context
Past, where were companies?	system level ill understood context ill connected lacking effectiveness and efficiency
Today, where are companies?	that is the question ☺
Why are we in this state?	
Future what and how to teach?	

What do we teach bachelor students?

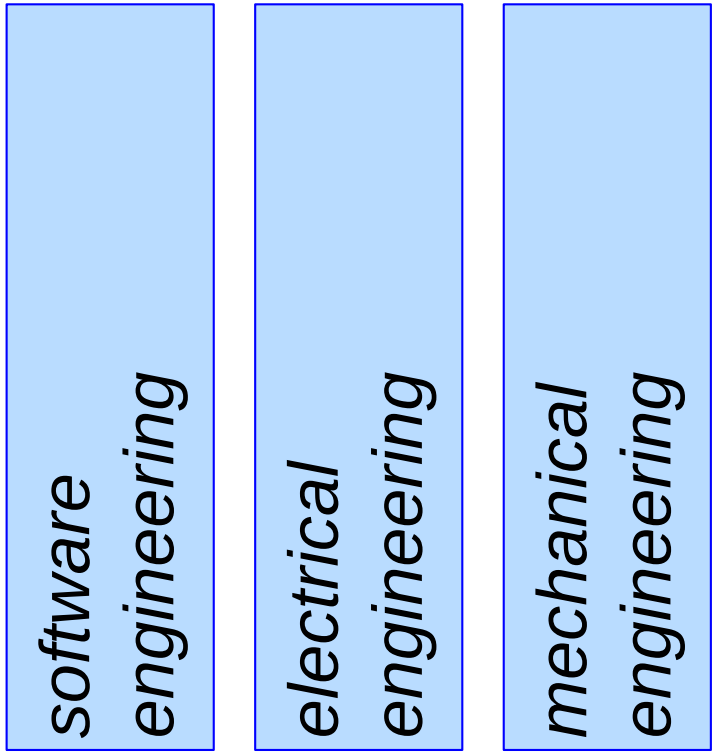
Teaching 2nd year bachelor students

Goal: create awareness of what is beyond engineering

And now, the first 6 slides of their course

Mono-disciplinary engineering

mono-disciplinary engineering



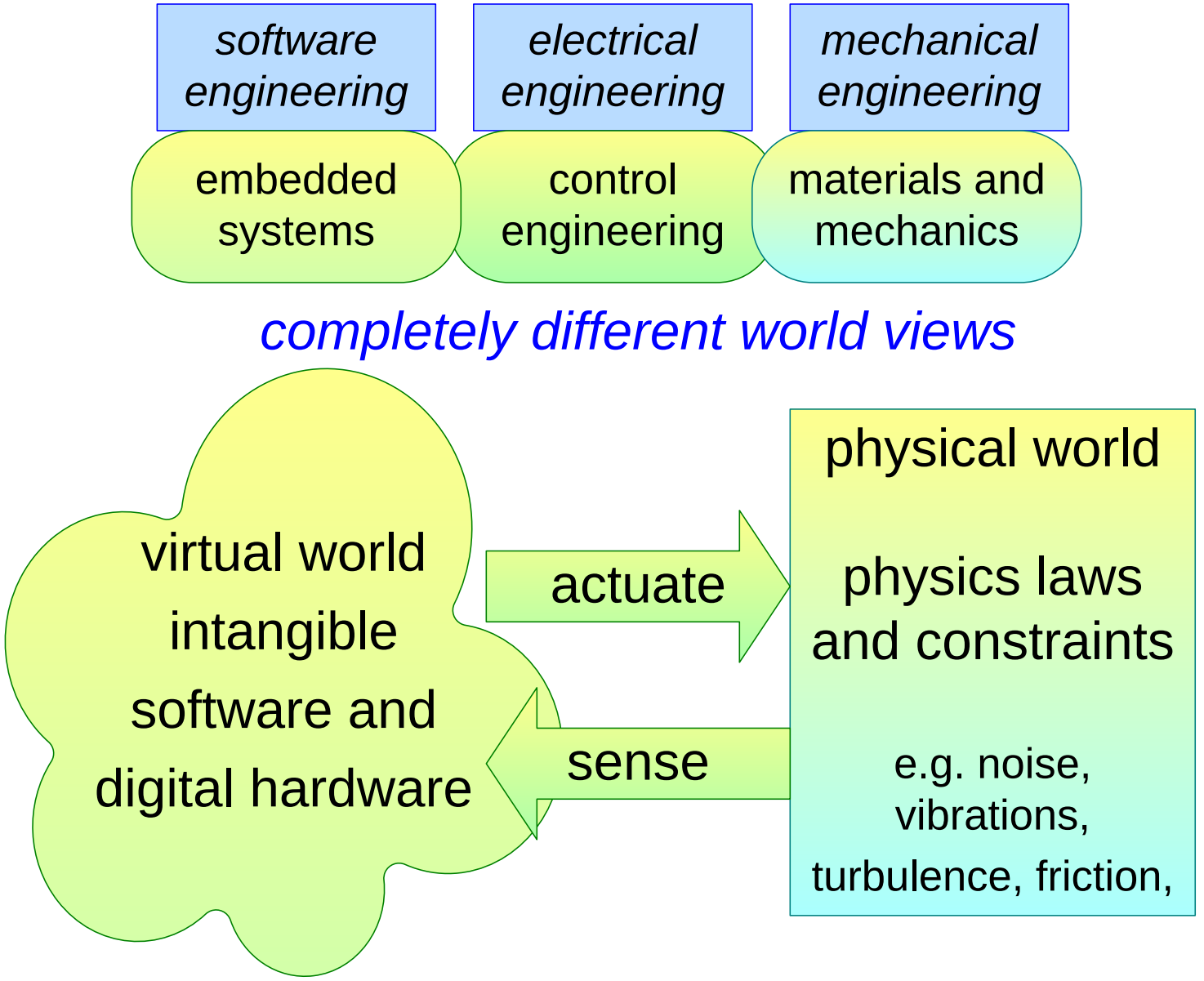
specify

design
model, analyse,
partition, interfaces, etc.

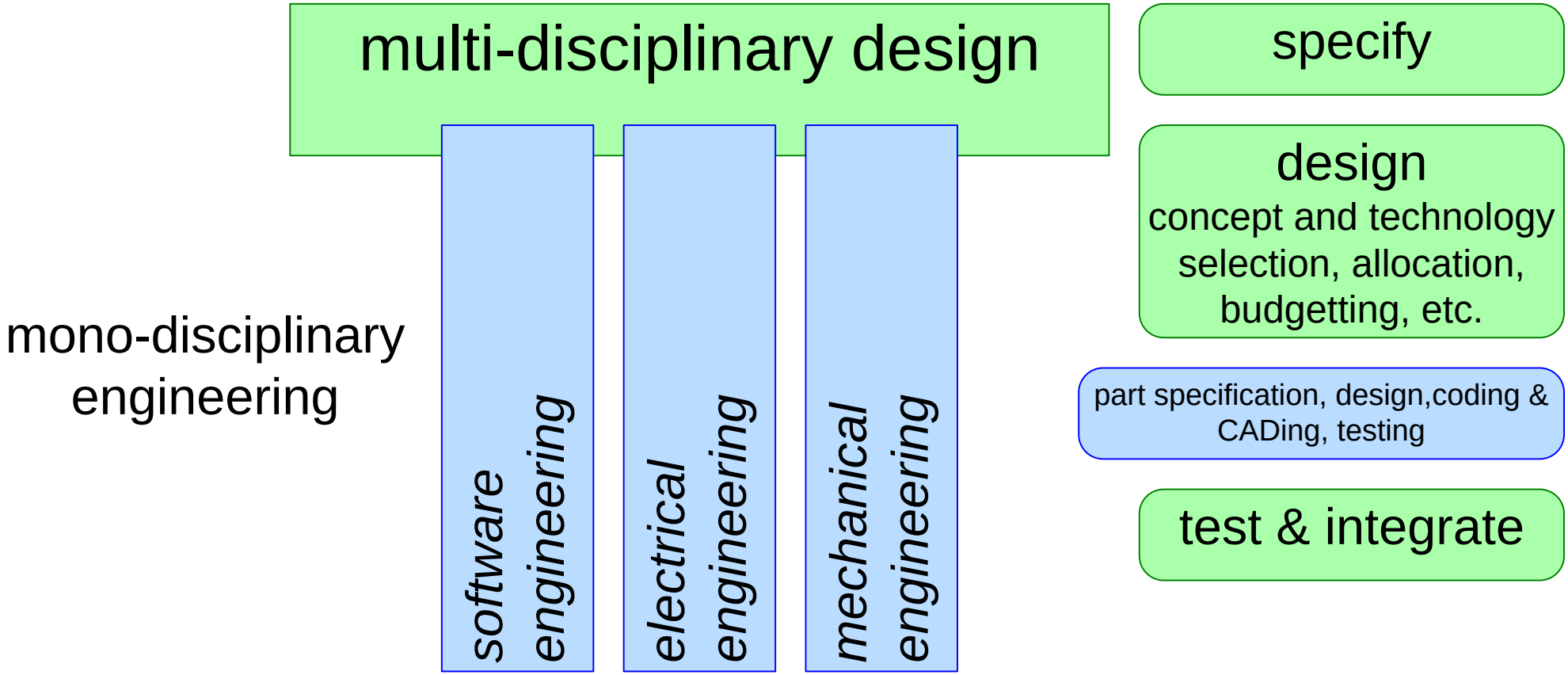
coding & CADing

testing

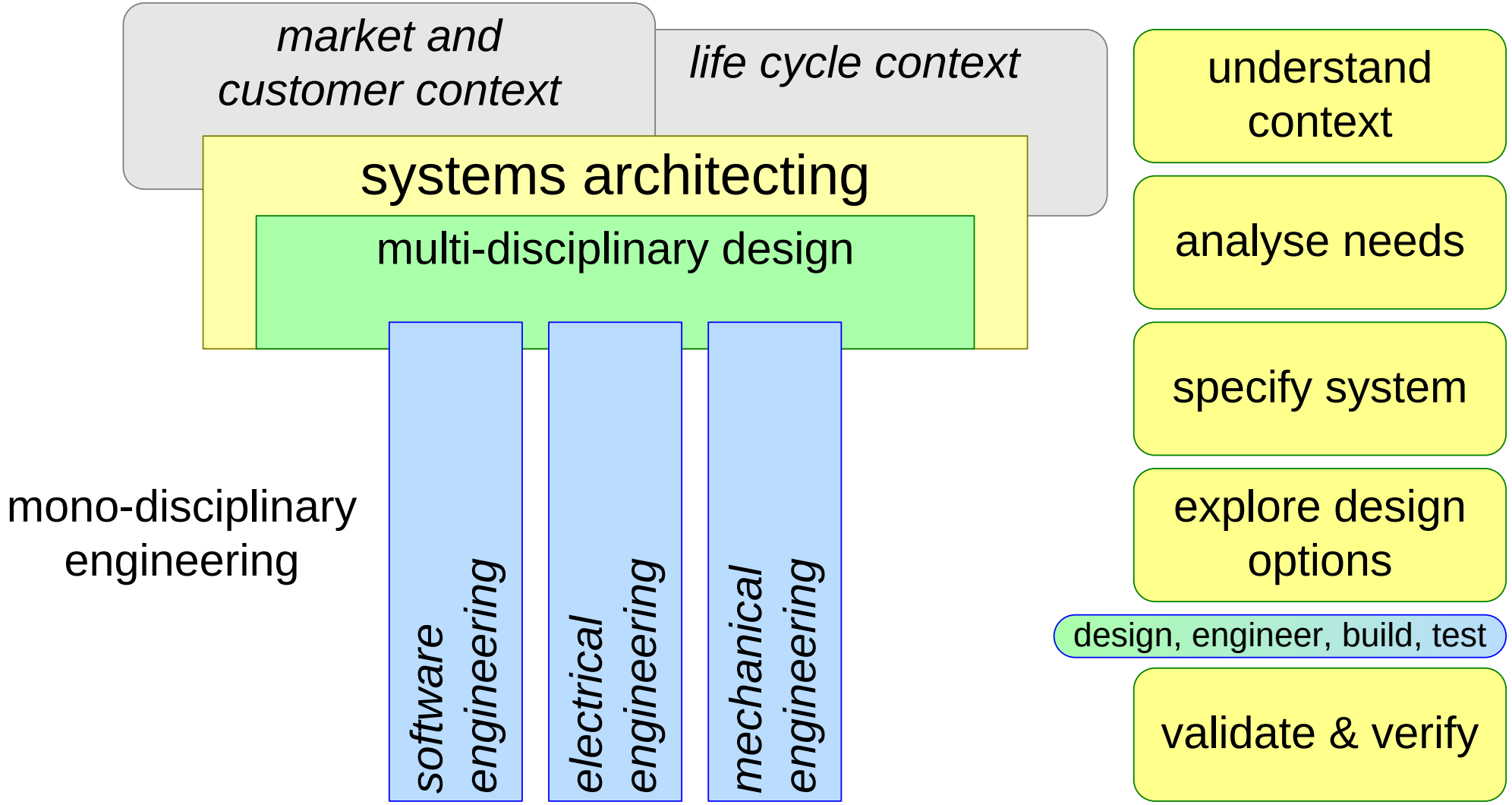
Huge differences in language and way of thinking



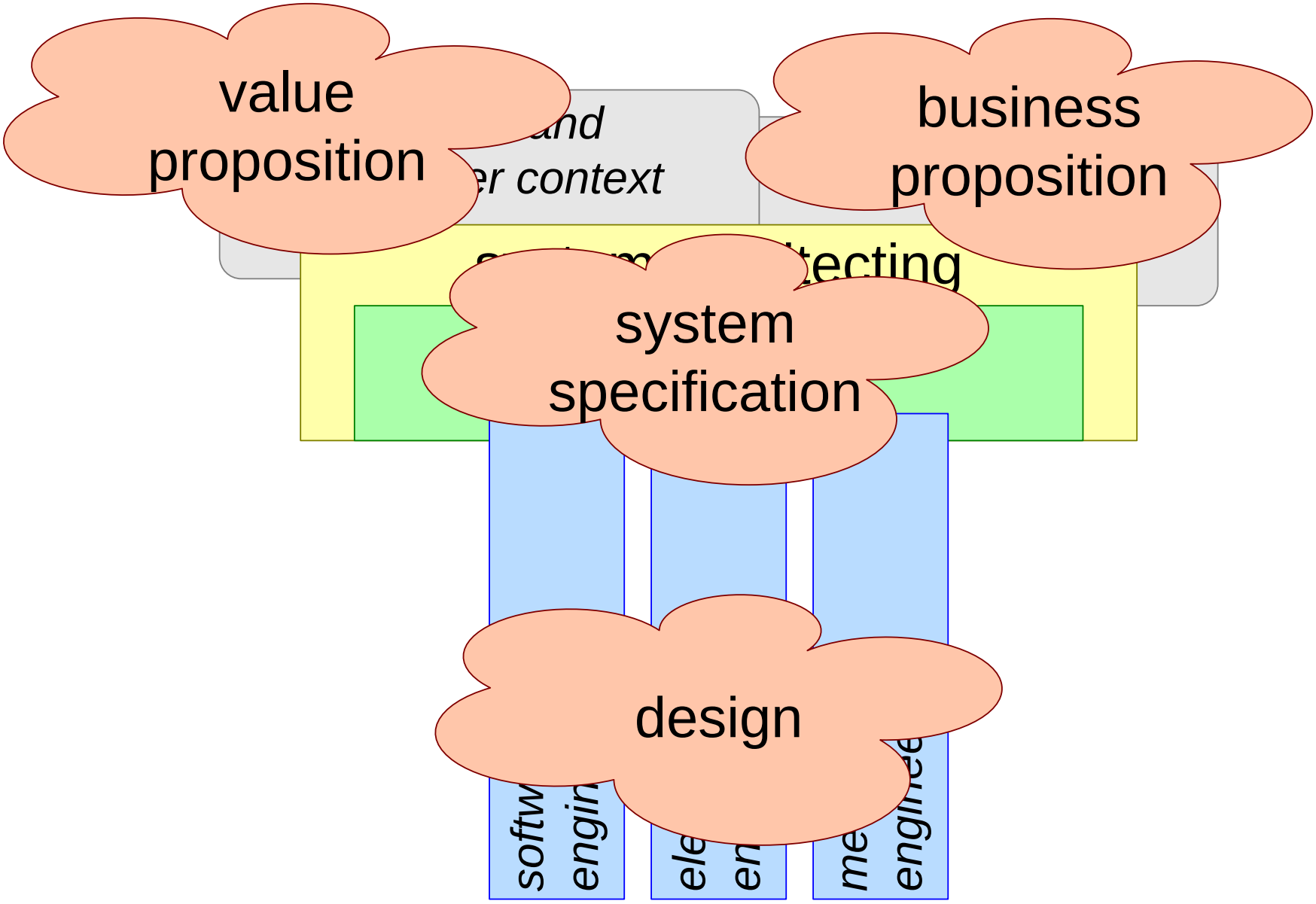
Multi-disciplinary design and engineering



Architecting: Fit-For-Purpose



Delivery at the end of this module



More specific deliveries

Value Proposition
Why does customer want to buy?
Why do users like to use the system?

- customer key drivers
- cost of ownership
- customer business analysis
- customer stakeholders and concerns
- story or scenario
- context diagram
- work flow or ConOps

Business Proposition
How do we earn money?
How do we run a healthy business?

- life cycle key drivers
- business model
- cash flow analysis
- life cycle stakeholders and concerns
- life cycle model
- supply chain
- organization chart
- plan

System Specification
What does customer get?
What is the system-of-interest that we deliver?

- functions
- qualities (e.g. quantified performance)
- interfaces
- constraints, standards, regulations

Design
How will we realize this specification?
How do we ensure performance, safety, robustness, etc.?

- partitioning and interfaces
- dynamic behavior, e.g. functional model
- performance budgets
- concept and technology selection
- make or buy, supplier selection

Teaching master students in systems engineering

Goal: provide a foundation to become a systems engineer

Teaching experienced designers and architects

Goal: help them to step in leadership role

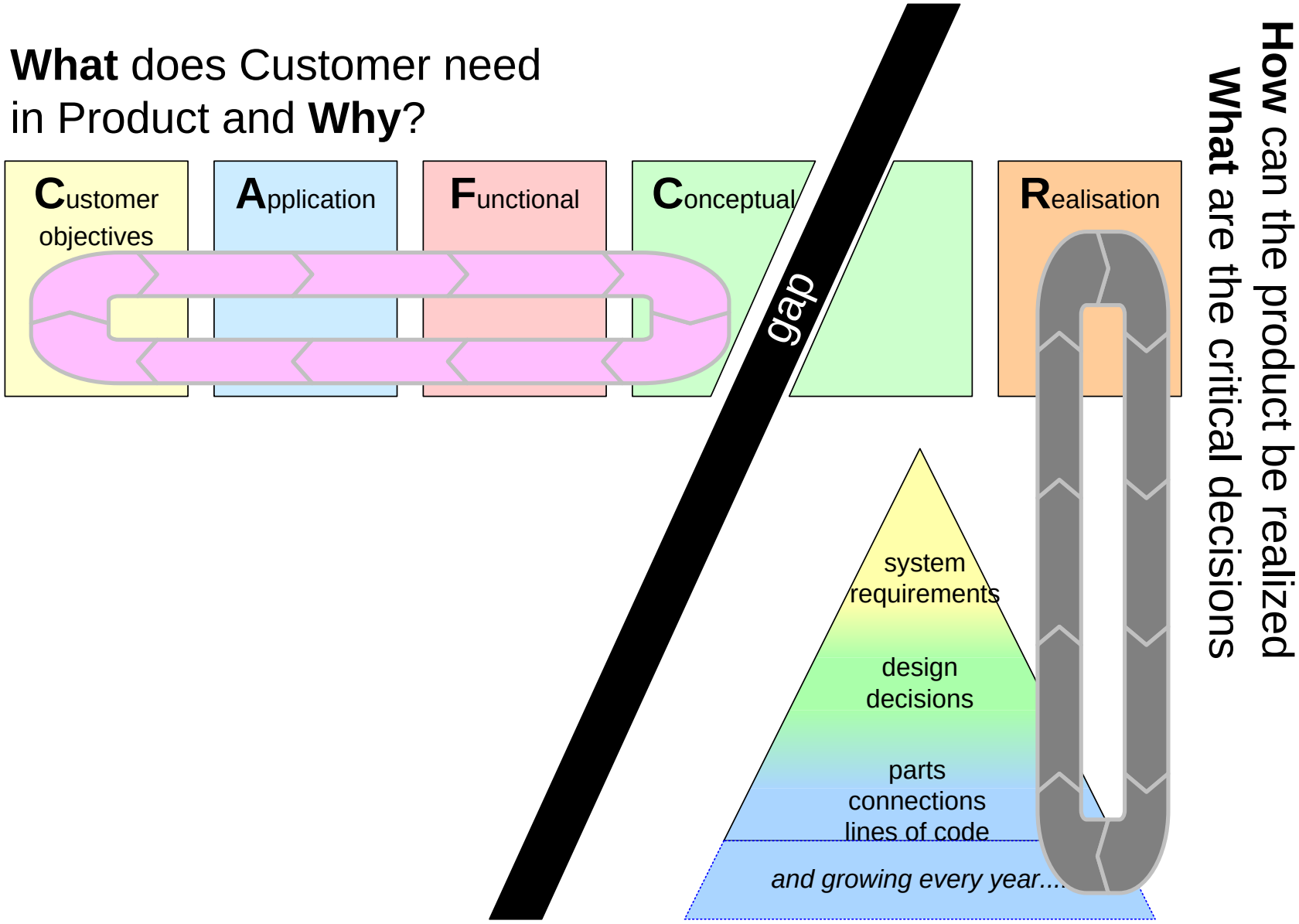
Content: nearly the same…

However, different didactic process

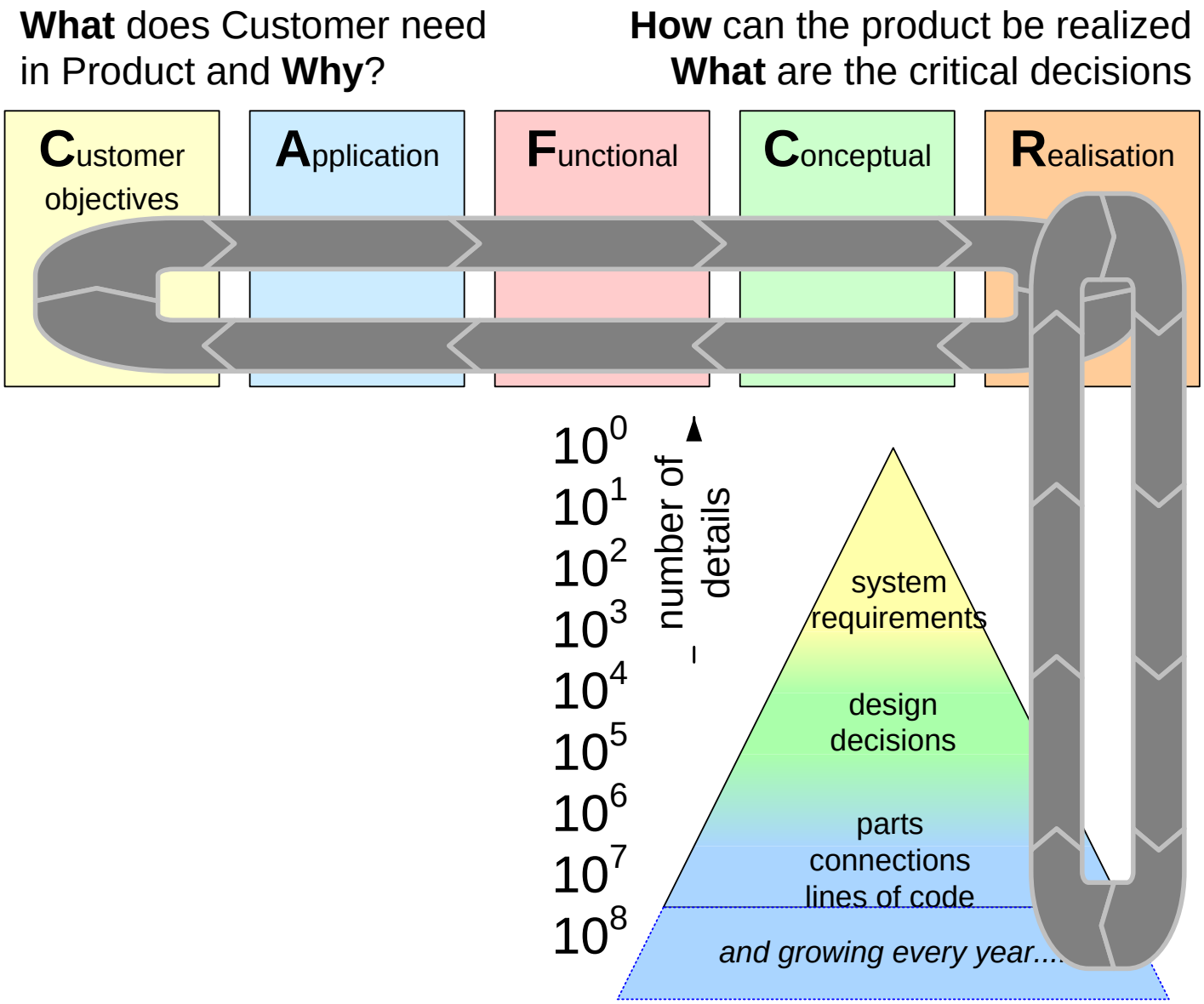
Why, what do we assume?

What do we teach?	context system multi-disciplinary stretch
Why, what do we assume?	connect breadth and depth abstraction levels roles
Why, what to achieve?	content leadership integral, holistic, big picture good system fitting context
Past, where were companies?	system level ill understood context ill connected lacking effectiveness and efficiency
Today, where are companies?	that is the question ☺
Why are we in this state?	
Future what and how to teach?	

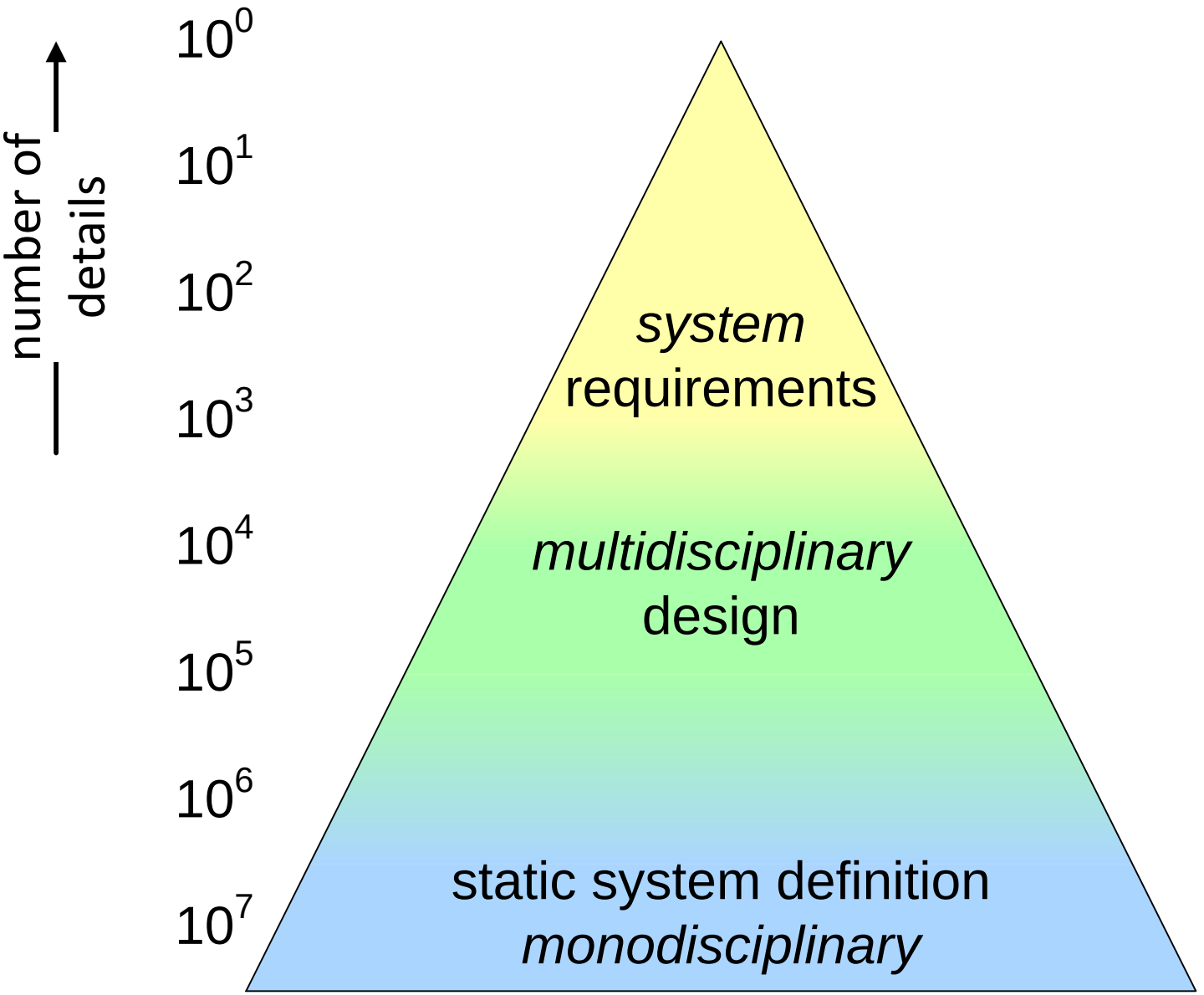
Problem: Disconnect between Breadth and Depth



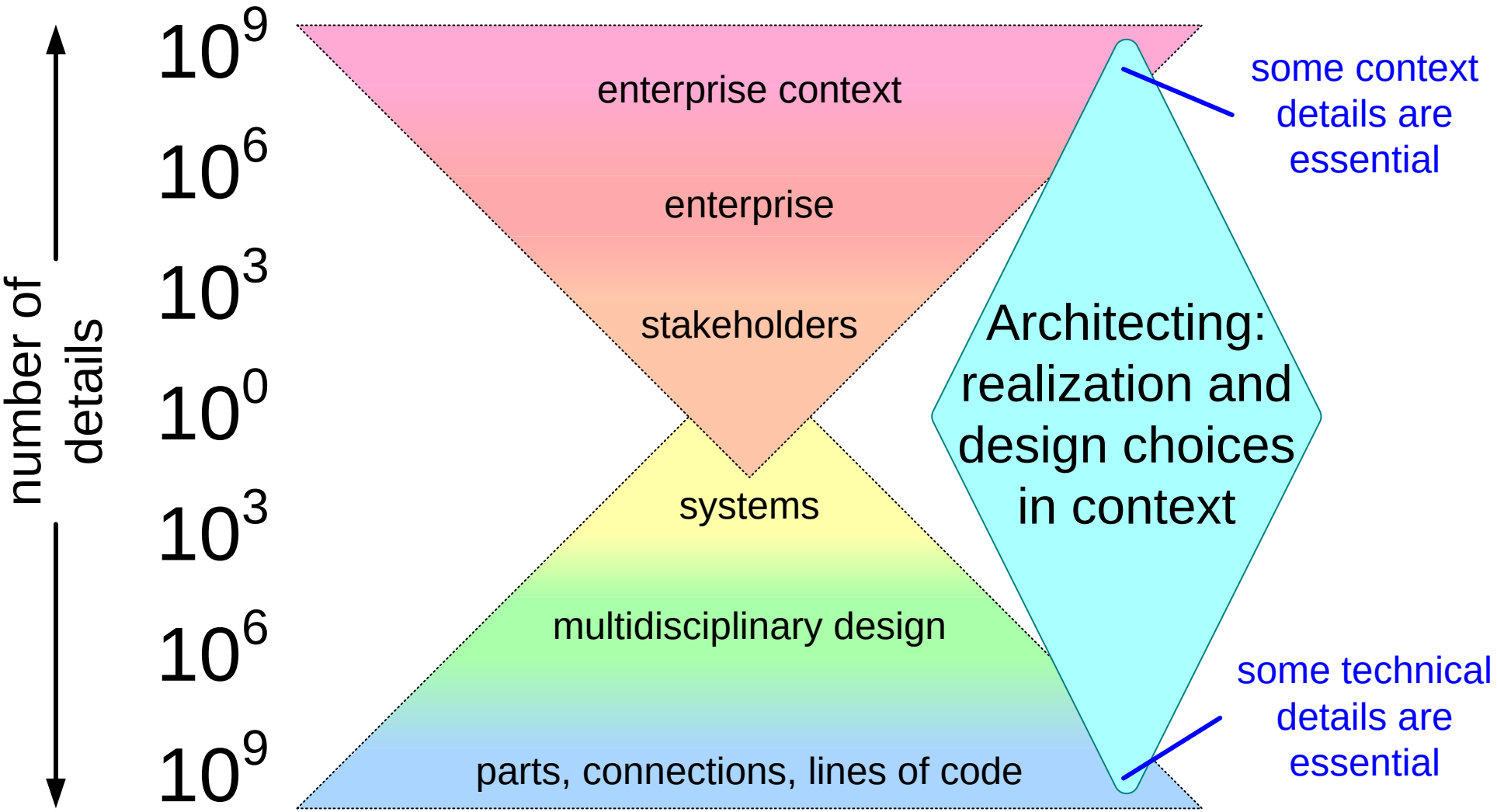
Assumption 1: Architects form the Hinge



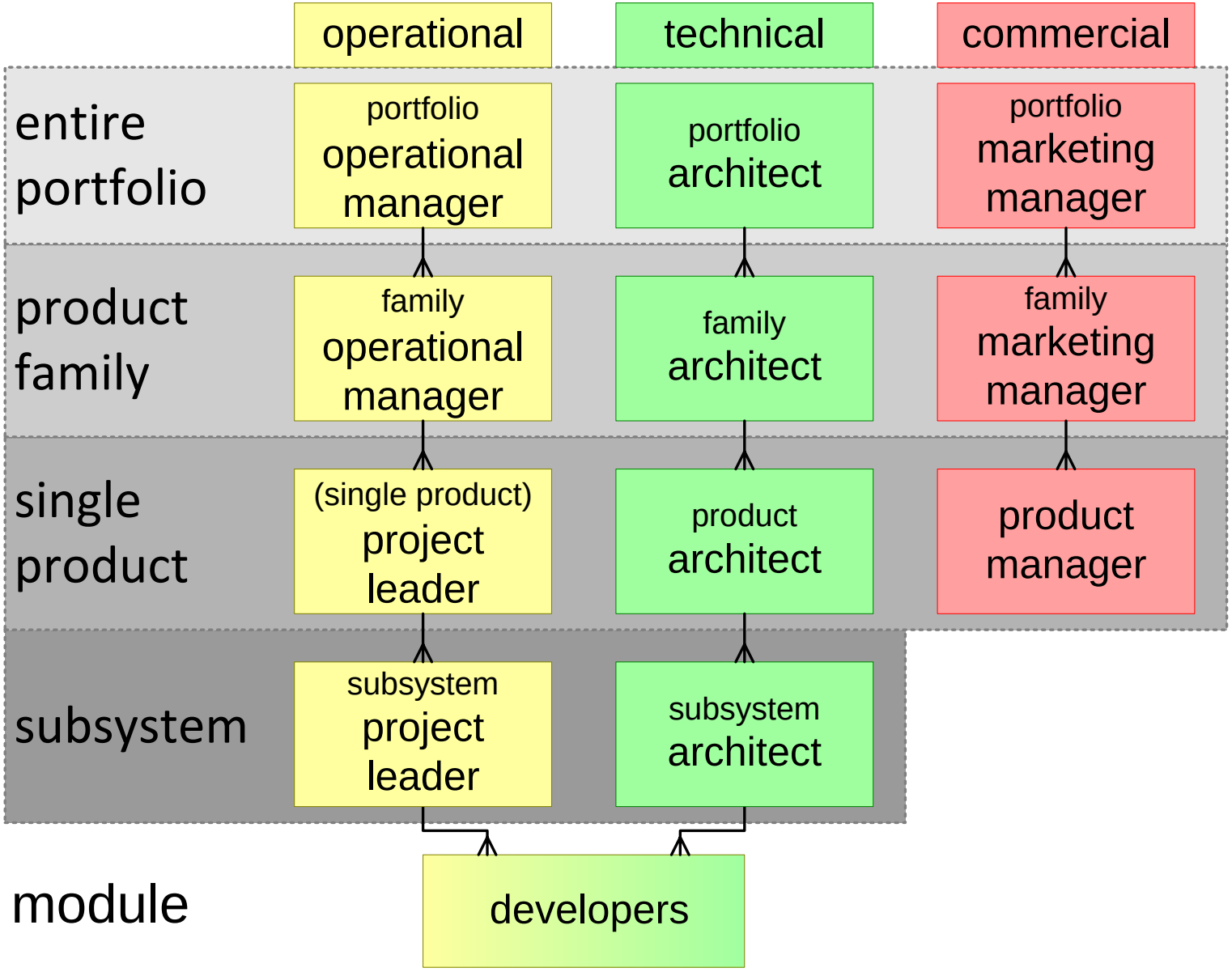
Level of Abstraction Single System



Assumption 2: Architecting at Multiple Levels of Abstraction



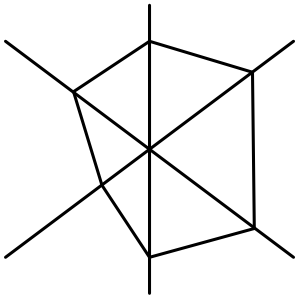
Assumption 3: Main Roles in Product Creation



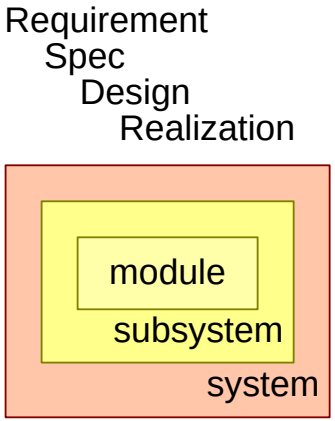
Why, what to achieve?

What do we teach?	context system multi-disciplinary stretch
Why, what do we assume?	connect breadth and depth abstraction levels roles
Why, what to achieve?	**content leadership** **integral, holistic, big picture** **good system fitting context**
Past, where were companies?	system level ill understood context ill connected lacking effectiveness and efficiency
Today, where are companies?	that is the question ☺
Why are we in this state?	
Future what and how to teach?	

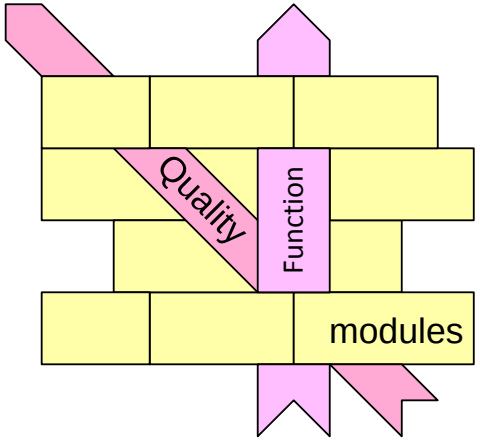
Responsibilities according SARCH course



Balance

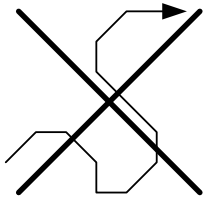


Consistency



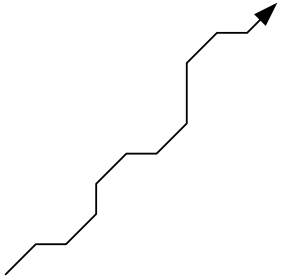
Decomposition
Integration

Overview

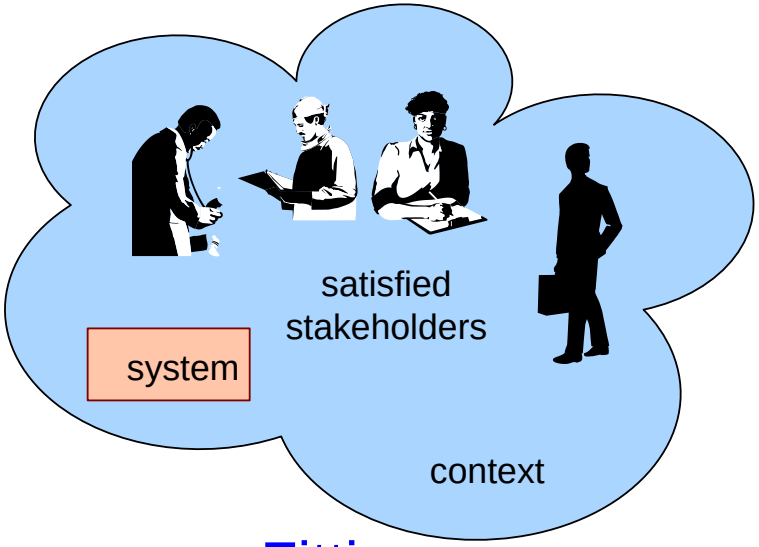


KISS

Elegance
Simple

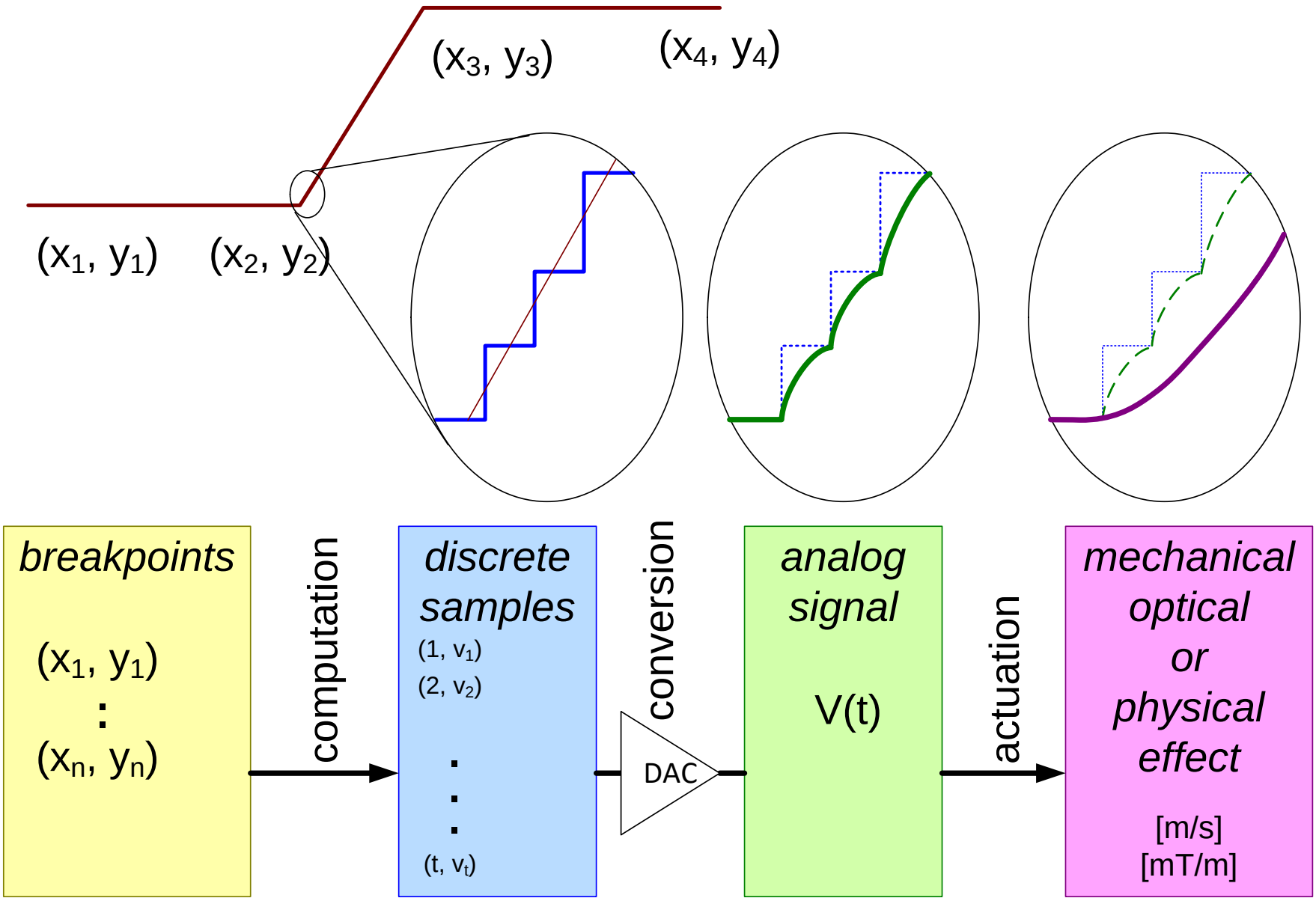


Integrity

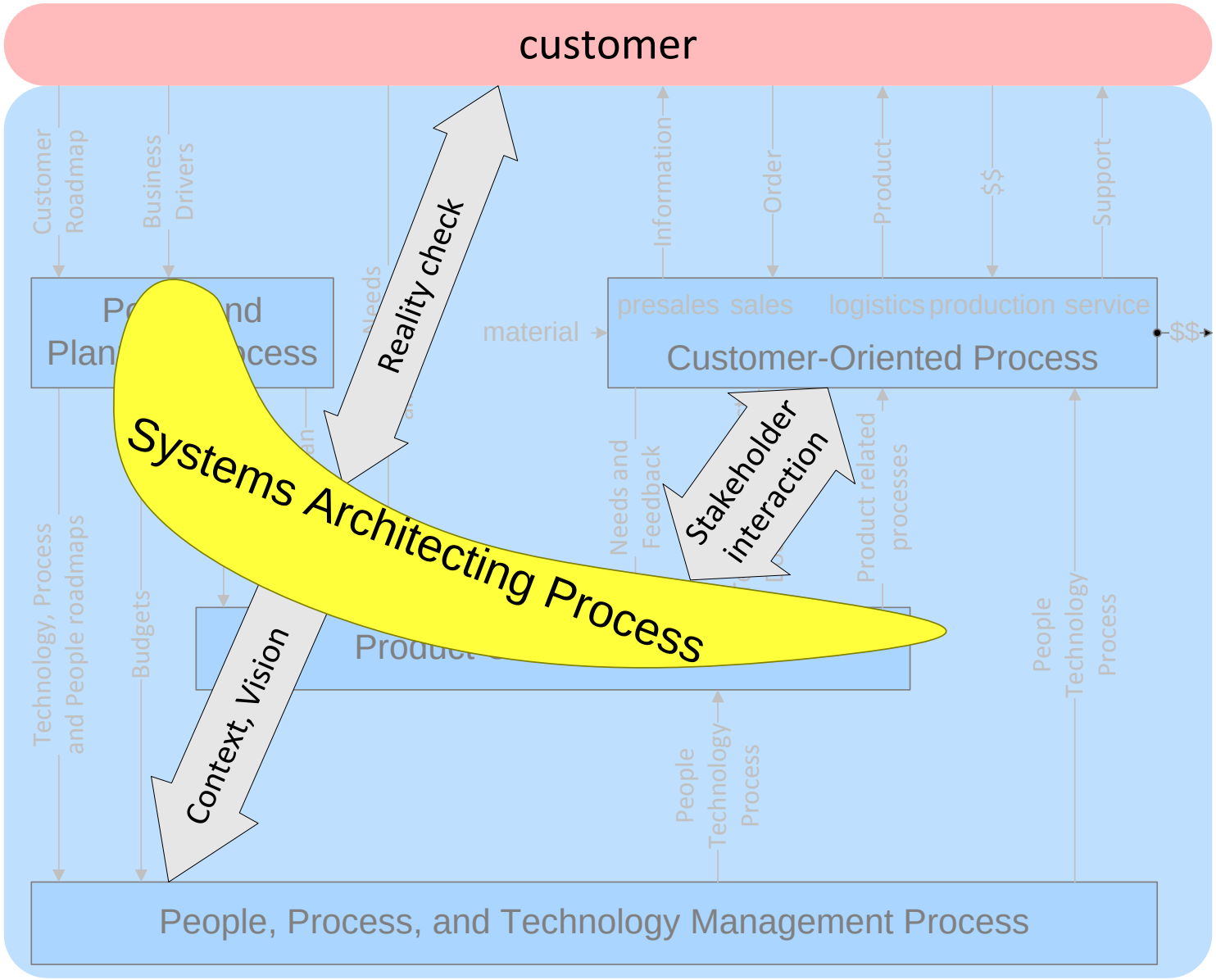


Fitting

Ability to go Deep where needed



Participating in Product Creation and Strategy



Past, where were companies?

What do we teach?	context system multi-disciplinary stretch
Why, what do we assume?	connect breadth and depth abstraction levels roles
Why, what to achieve?	content leadership integral, holistic, big picture good system fitting context
Past, where were companies?	system level ill understood context ill connected lacking effectiveness and efficiency
Today, where are companies?	that is the question ☺
Why are we in this state?	
Future what and how to teach?	

Disclaimer

The following analysis is absolutely subjective,

based on the opinion of a single person.

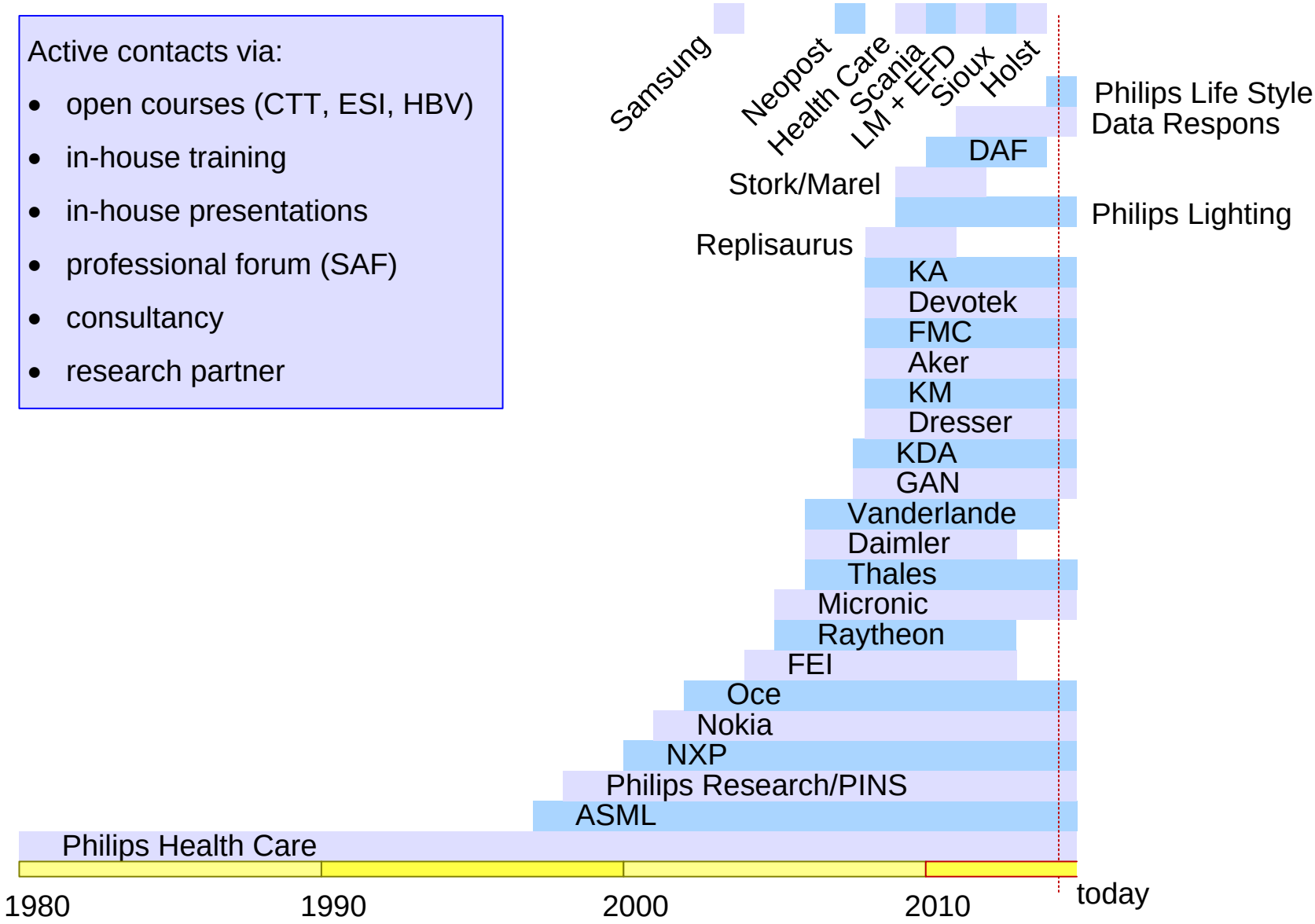
No academic conclusions can be based

on the presented data.

Observations Based on Actual Contacts

Active contacts via:

- open courses (CTT, ESI, HBV)
- in-house training
- in-house presentations
- professional forum (SAF)
- consultancy
- research partner



Status in the Past

mostly missing marketing:

- market research
- strategy

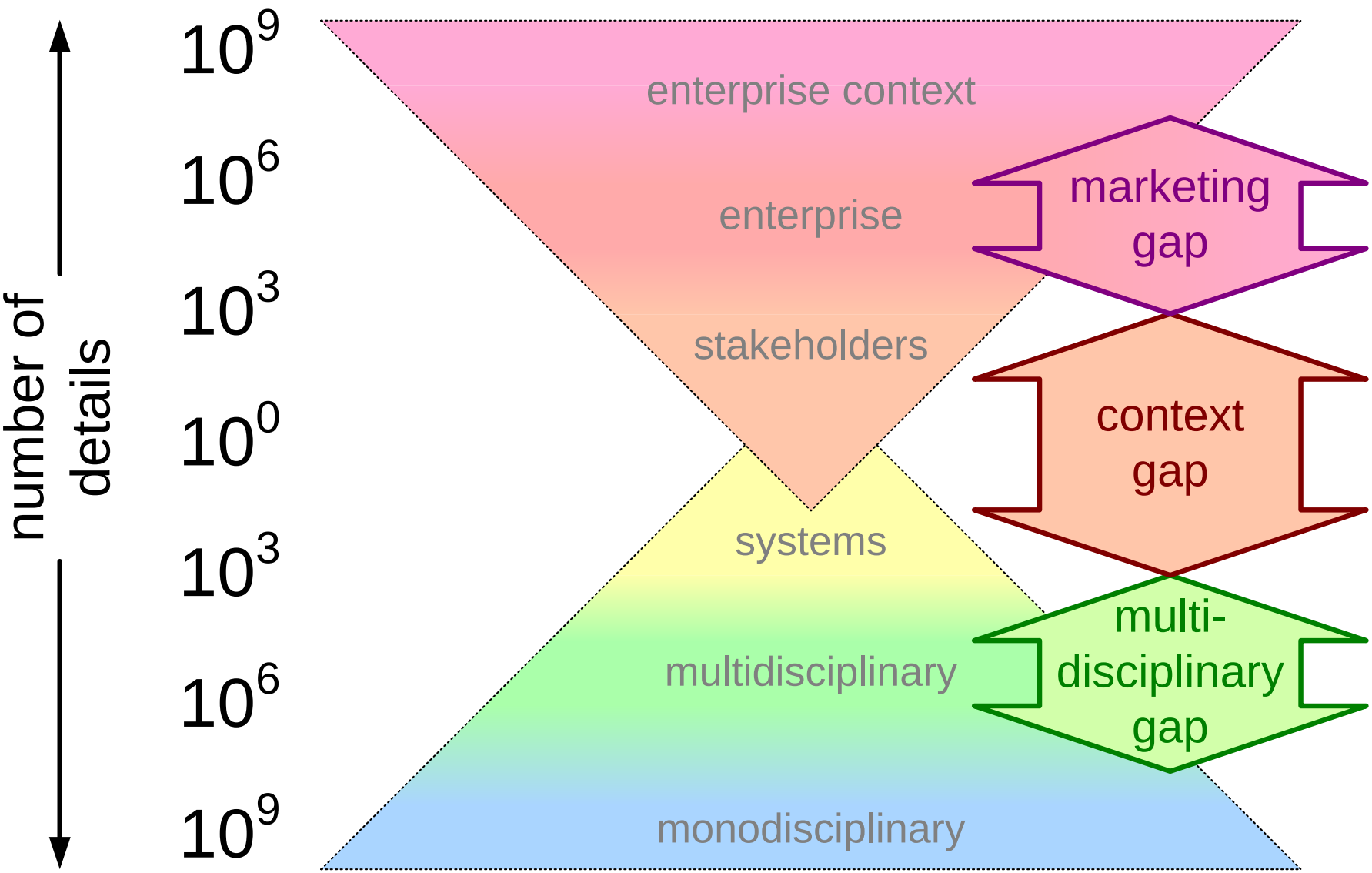
ill-understood systems architecting:

- confused with requirements engineering
- confused with project management
- confused with best mono-disciplinary engineer

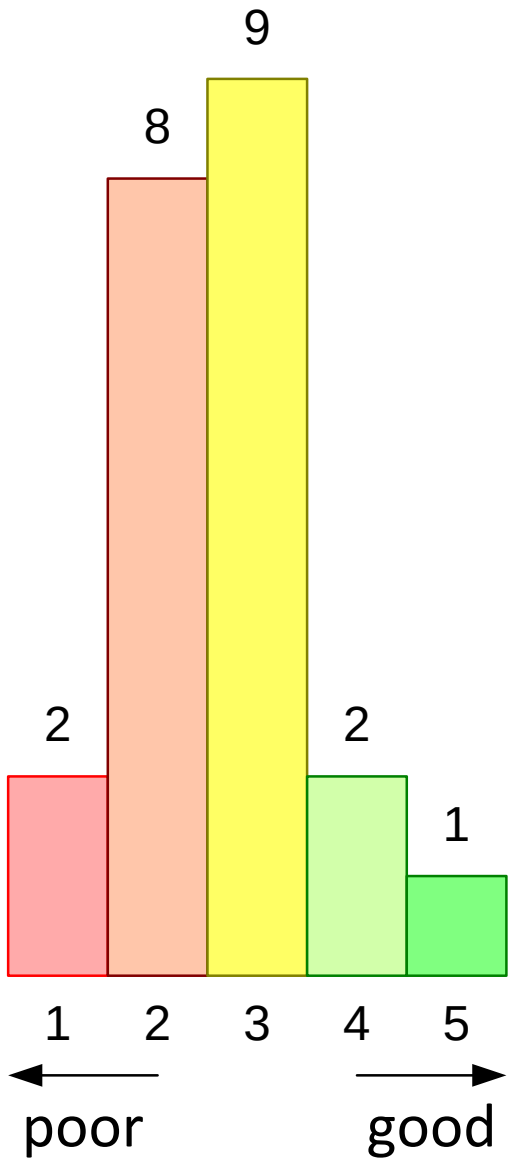
dominant engineering management

- project management
- monodisciplinary engineering
- specification, product data, configuration, changes, problems management

Frequently observed gaps



The Data behind the Statements

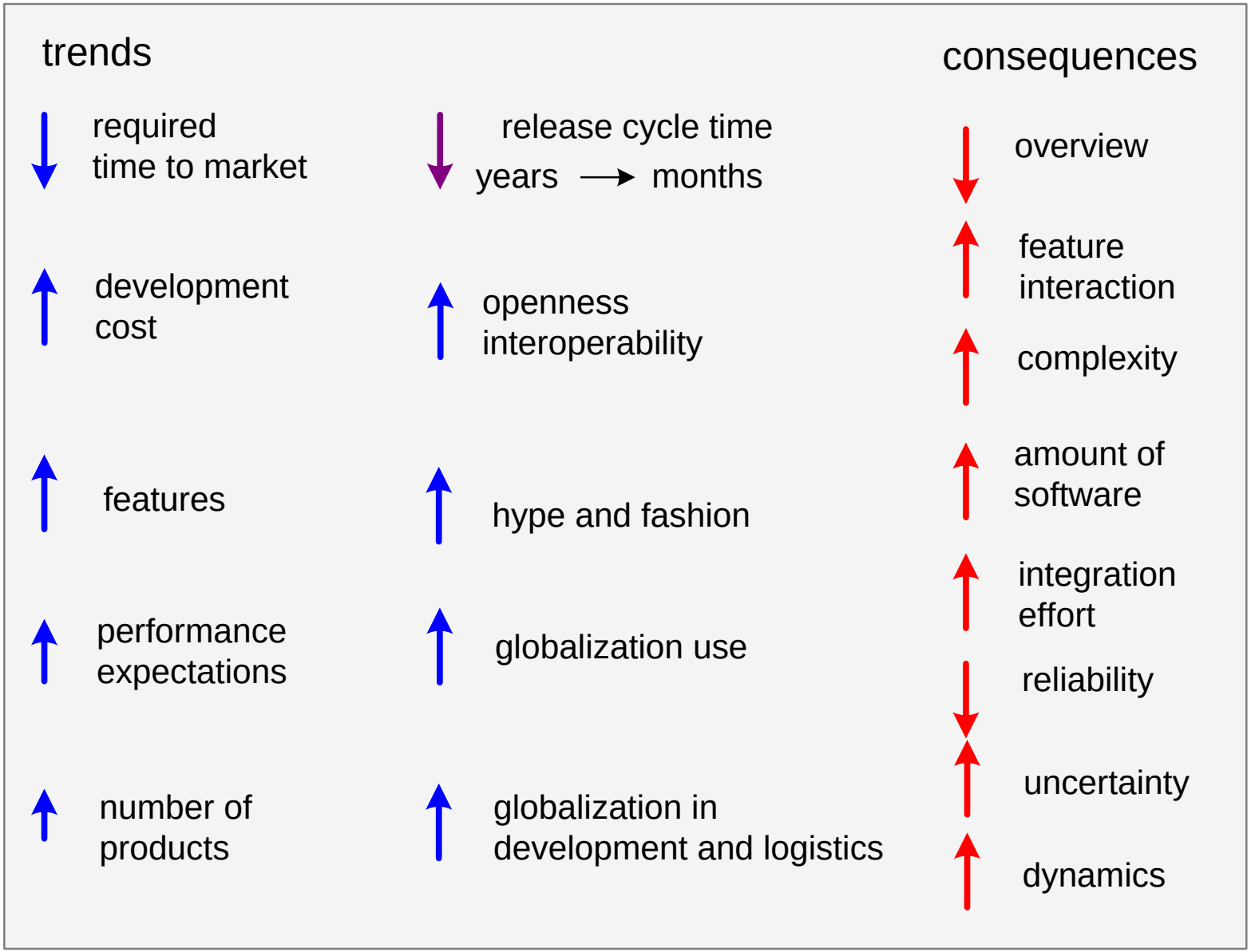


1:
focus on components or mono disciplines; no understanding of “system”

3:
there are individuals fulfilling the systems role, and being effective despite the organization. Organization mostly blind for “system” needs and value

5:
systems architects at key position, recognized in organization, effective in leading development

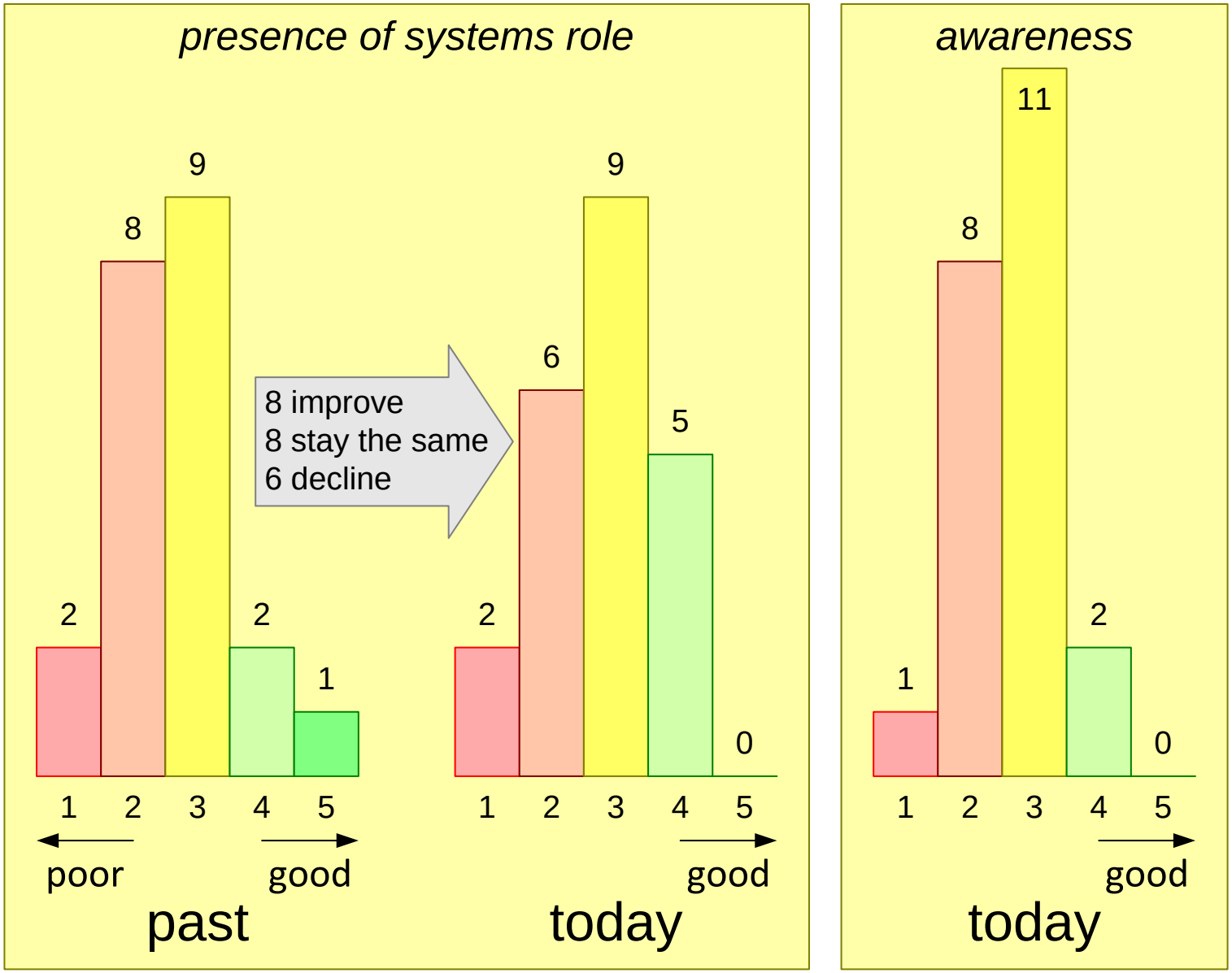
Need for Architecting is Increasing!



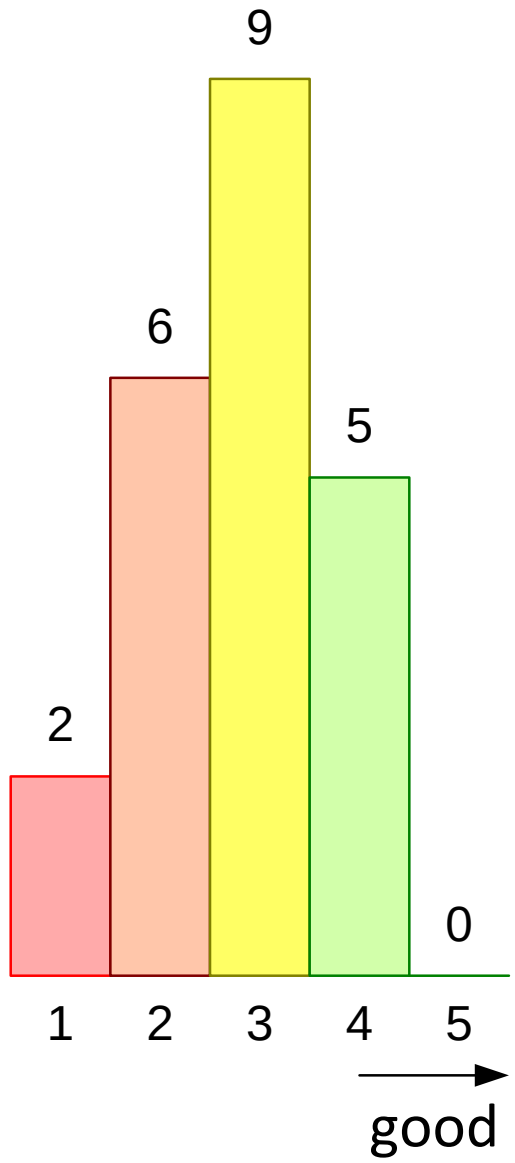
Today, where are companies?

What do we teach?	context system multi-disciplinary stretch
Why, what do we assume?	connect breadth and depth abstraction levels roles
Why, what to achieve?	content leadership integral, holistic, big picture good system fitting context
Past, where were companies?	system level ill understood context ill connected lacking effectiveness and efficiency
Today, where are companies?	that is the question ☺
Why are we in this state?	
Future what and how to teach?	

Presence and Awareness of Systems Role



Some Observations



- product-oriented companies score higher than project-oriented companies (~½ point)
- Dutch companies (dominatingly product) score better than Norwegian (where projects dominate) (~½ point)
- There seems to be a slight correlation with size large, e.g. 1000+ engineers, score ~0.4 better than medium size, which score ~0.4 better than small, e.g. 100- engineers

Why are we in this state?

What do we teach?	context system multi-disciplinary stretch
Why, what do we assume?	connect breadth and depth abstraction levels roles
Why, what to achieve?	content leadership integral, holistic, big picture good system fitting context
Past, where were companies?	system level ill understood context ill connected lacking effectiveness and efficiency
Today, where are companies?	that is the question ☺
Why are we in this state?	
Future what and how to teach?	

Some Reasons for Stagnation

architects typically are INTPs:

- their Introverted nature limits them
- their analytical skills limit them
- the need for solid answers limits them

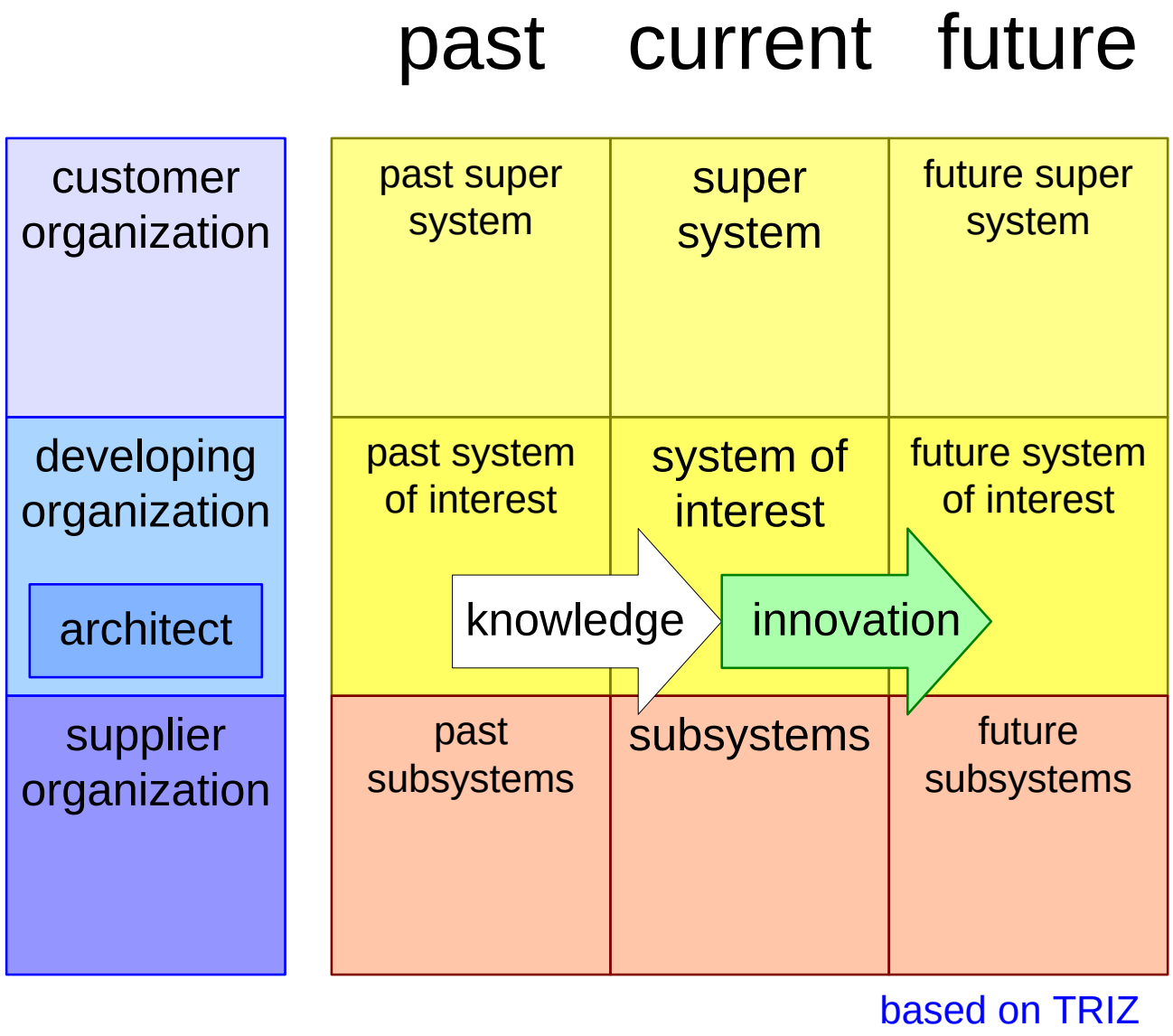
managers live in a control world:

- with an anglosaxon short-term culture
- a belief in KPIs (derived from “measuring is knowing”)
- and a political context

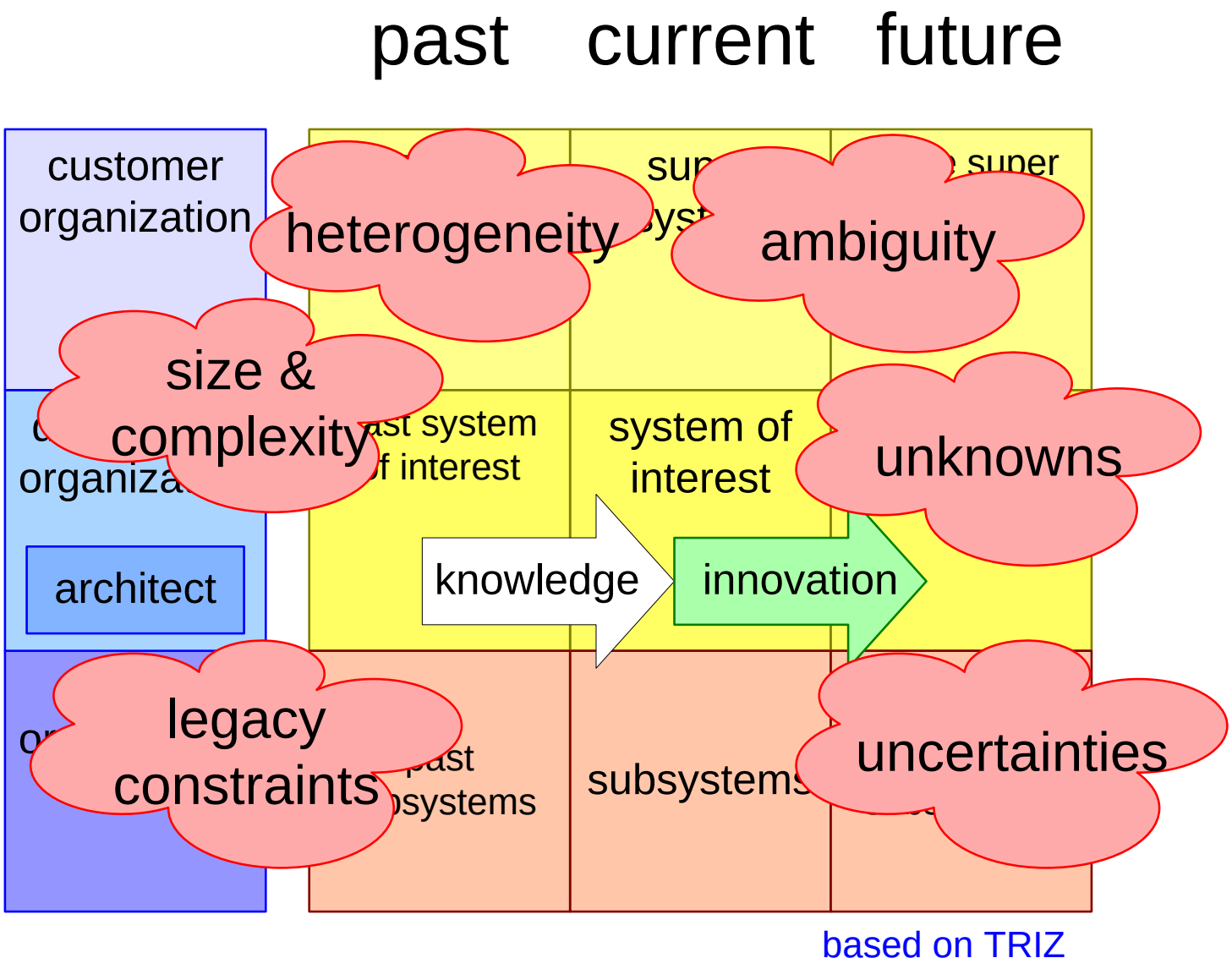
How can we

- help architects to become more visible and confident?
- help managers to understand architecst, architecting, and architectures so that they can coach (potential) architects?

The Playing Field



and its Main Challenges



Future what and how to teach?

What do we teach?	context system multi-disciplinary stretch
Why, what do we assume?	connect breadth and depth abstraction levels roles
Why, what to achieve?	content leadership integral, holistic, big picture good system fitting context
Past, where were companies?	system level ill understood context ill connected lacking effectiveness and efficiency
Today, where are companies?	that is the question ☺
Why are we in this state?	
Future what and how to teach?	

What is Competence?

Attitude (perseverance, faith, critical, constructive, etc.)

train

Ability (know when to use what skill and knowledge)

apply/use often, experience

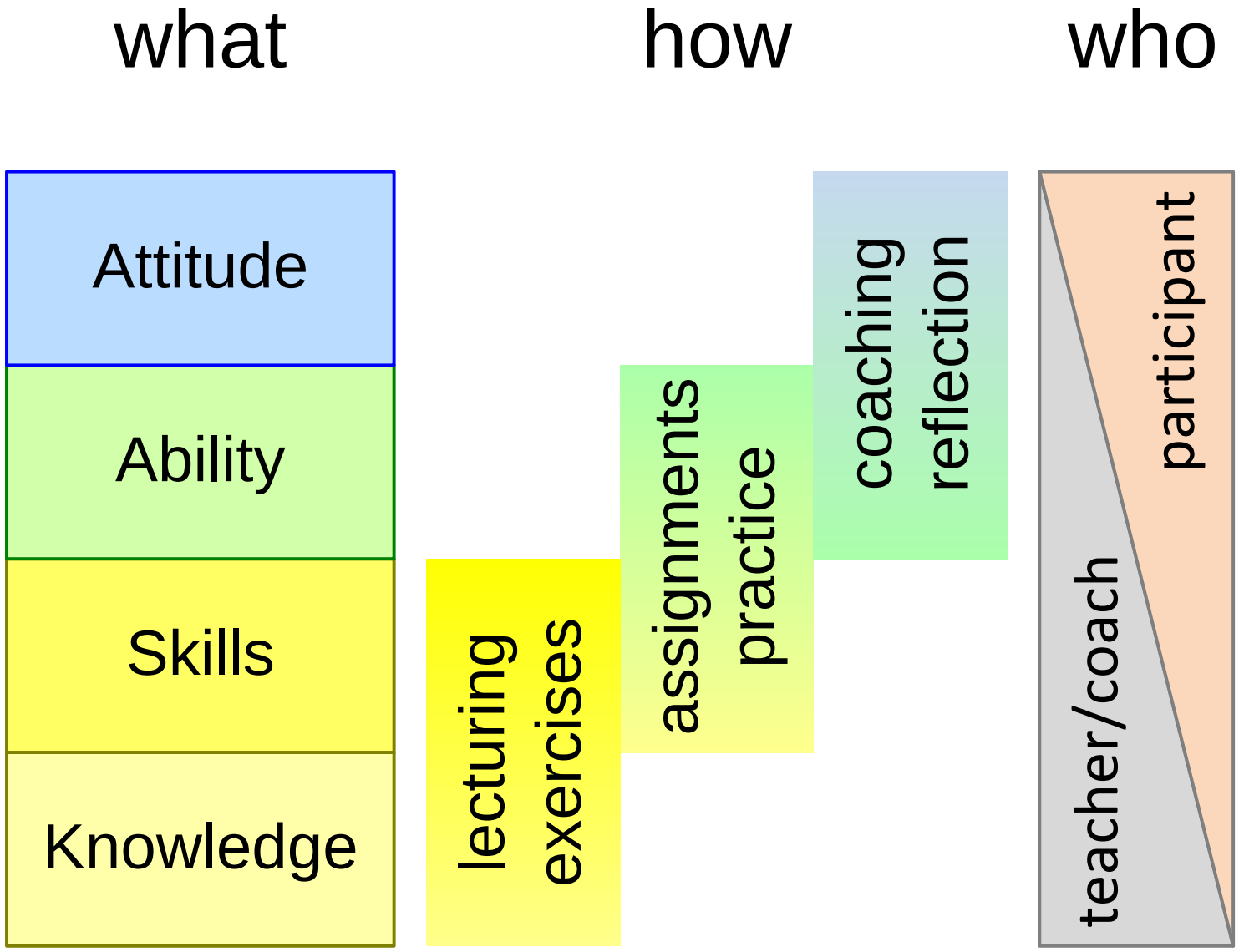
Skills (calculate missing angle, calculate hypothenusa)

exercise

Knowledge (triangle has 3 corners, sum of angles is 180 degrees, Pythagoras $c^2 = a^2 + b^2$)
learn

Competence = Knowledge + Skills + Ability + Attitude

Competence Program Partitioning



Flows

“hard” technical

lectures, courses, workshops

case

practice, management involvement

“soft” psycho social

workshops

What do we teach?	context system multi-disciplinary stretch
Why, what do we assume?	connect breadth and depth abstraction levels roles
Why, what to achieve?	content leadership integral, holistic, big picture good system fitting context
Past, where were companies?	system level ill understood context ill connected lacking effectiveness and efficiency
Today, where are companies?	small improvement “good” 3 → 5 (of 22)
Why are we in this state?	architect profile managerial context
Future what and how to teach?	balance of “hard” and “soft” teaching, doing, reflecting

learning to cope with

- legacy constraints
- size & complexity
- heterogeneity
- ambiguity
- unknowns
- uncertainties