

Architecture and Design Fundamentals

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Abstract

Defining and illustrating architectures. Architectures go beyond system structure (parts, interfaces, functions, allocation). Architectures connect design to the context, by capturing customer value proposition, and the business proposition.

Distribution

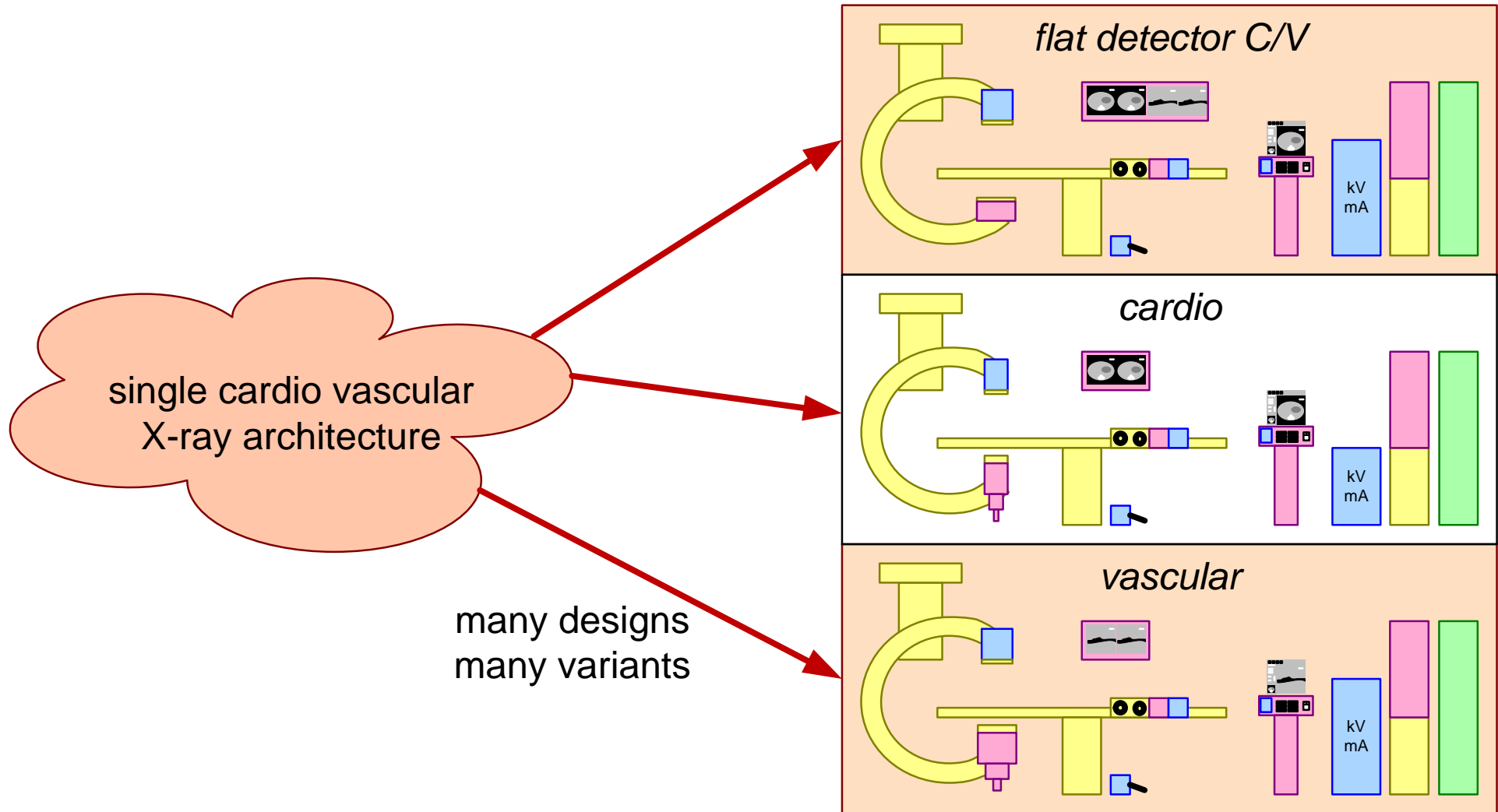
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One Architecture Facilitates many Solutions



Architecture Description

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
work flow or ConOps
et cetera

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

Why

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

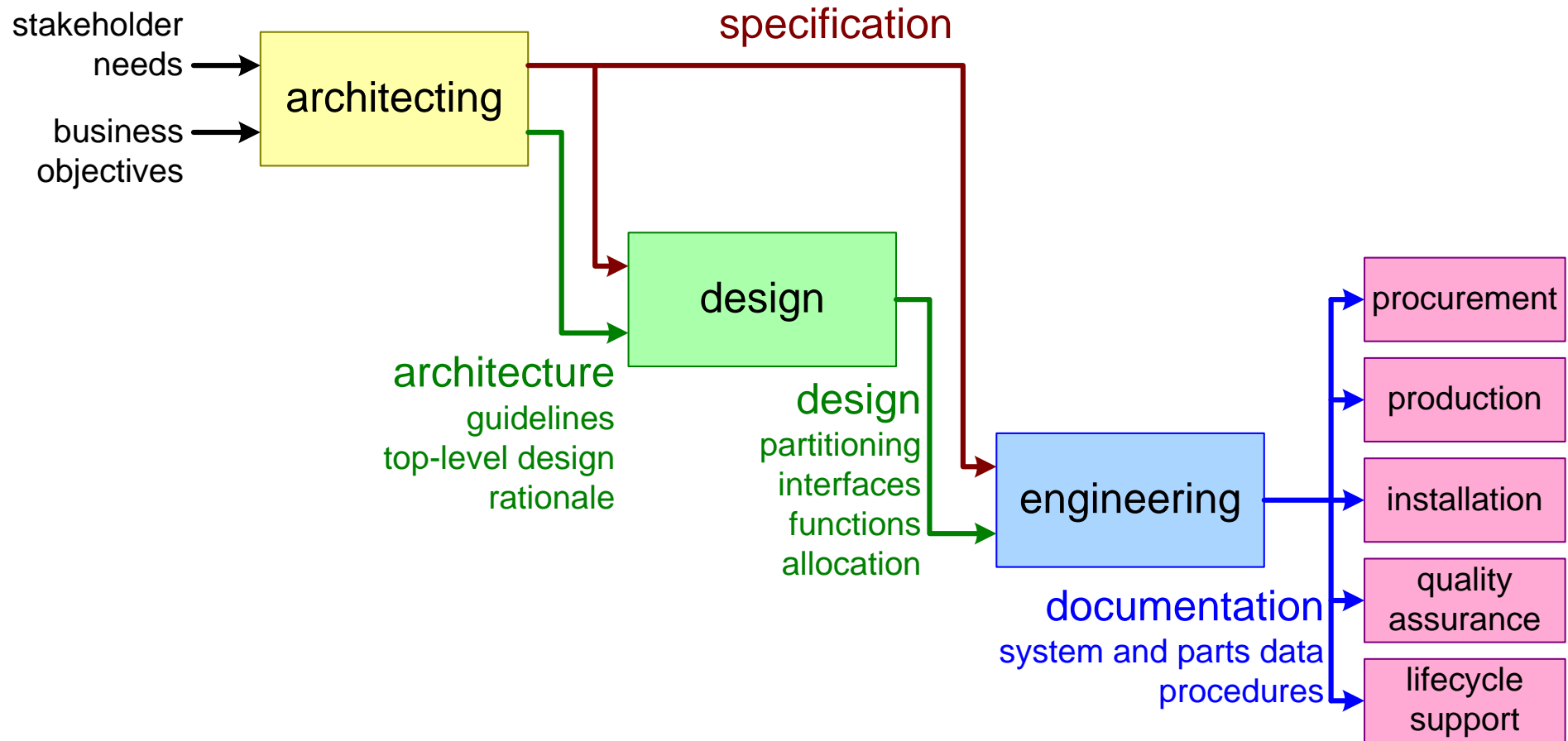
What

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 models and budgets
concept and technology selection

How

Engineering
Getting all details right for all business functions.
technical product documentation

Functional Model for System Creation



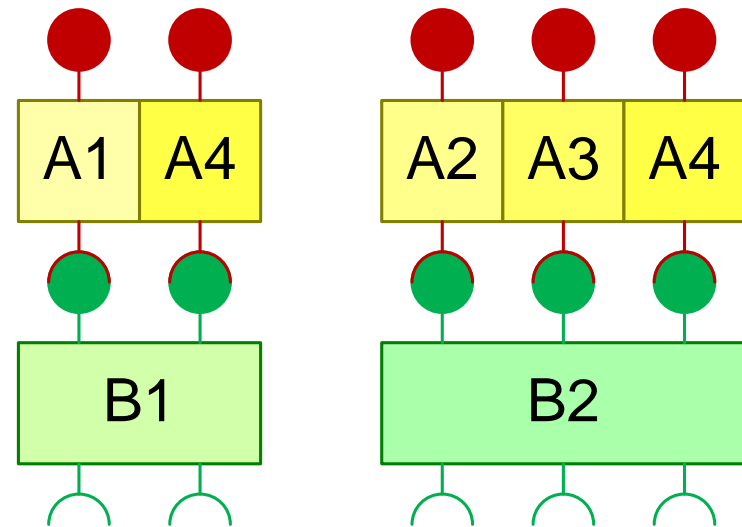
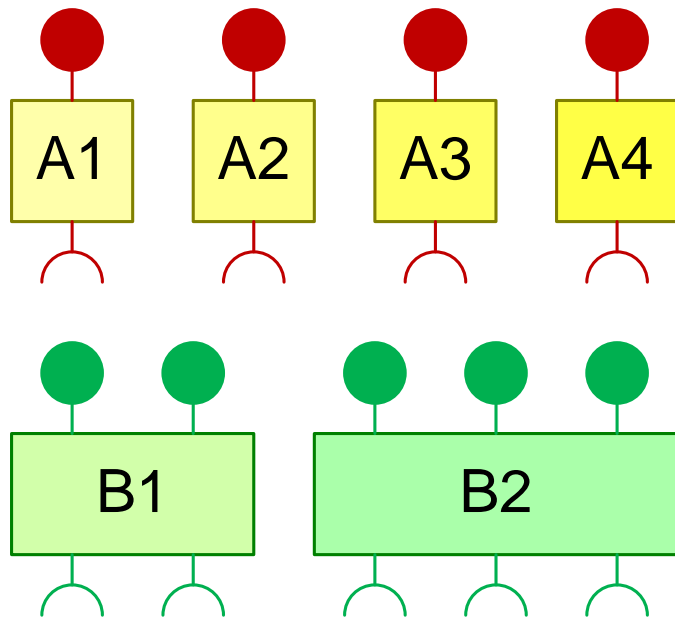
Structure = Parts + Interfaces + Configuration

ultimate goal:

- modular component catalogue
- well-defined interfaces
- independent testable

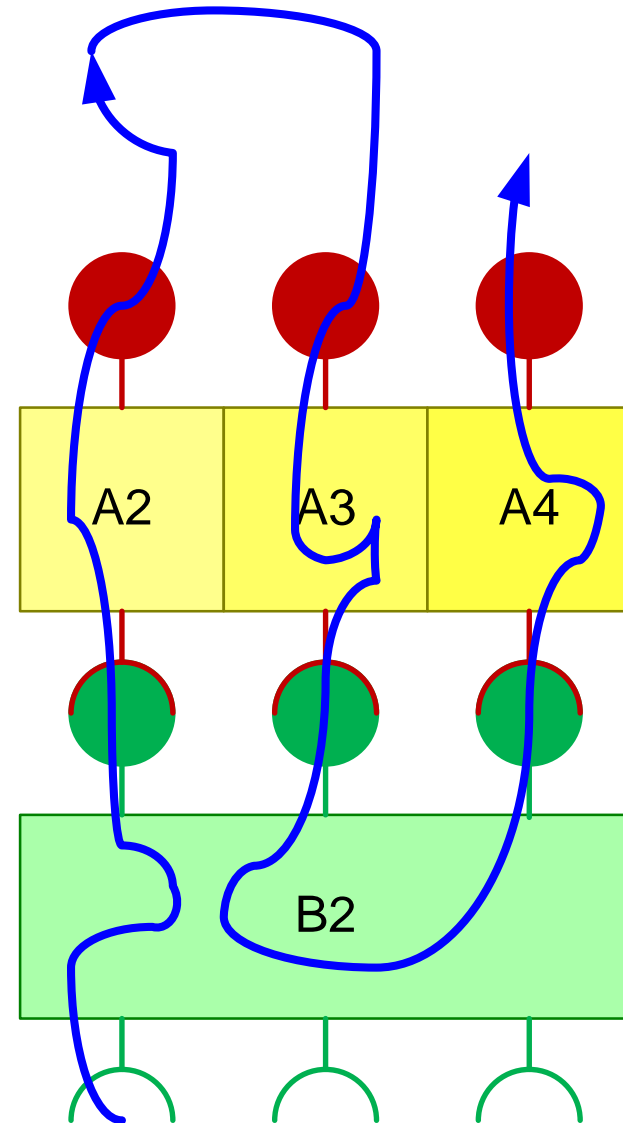
to facilitate:

- fast creation of solutions
- concurrent engineering
- logistics and production
- variations and changes

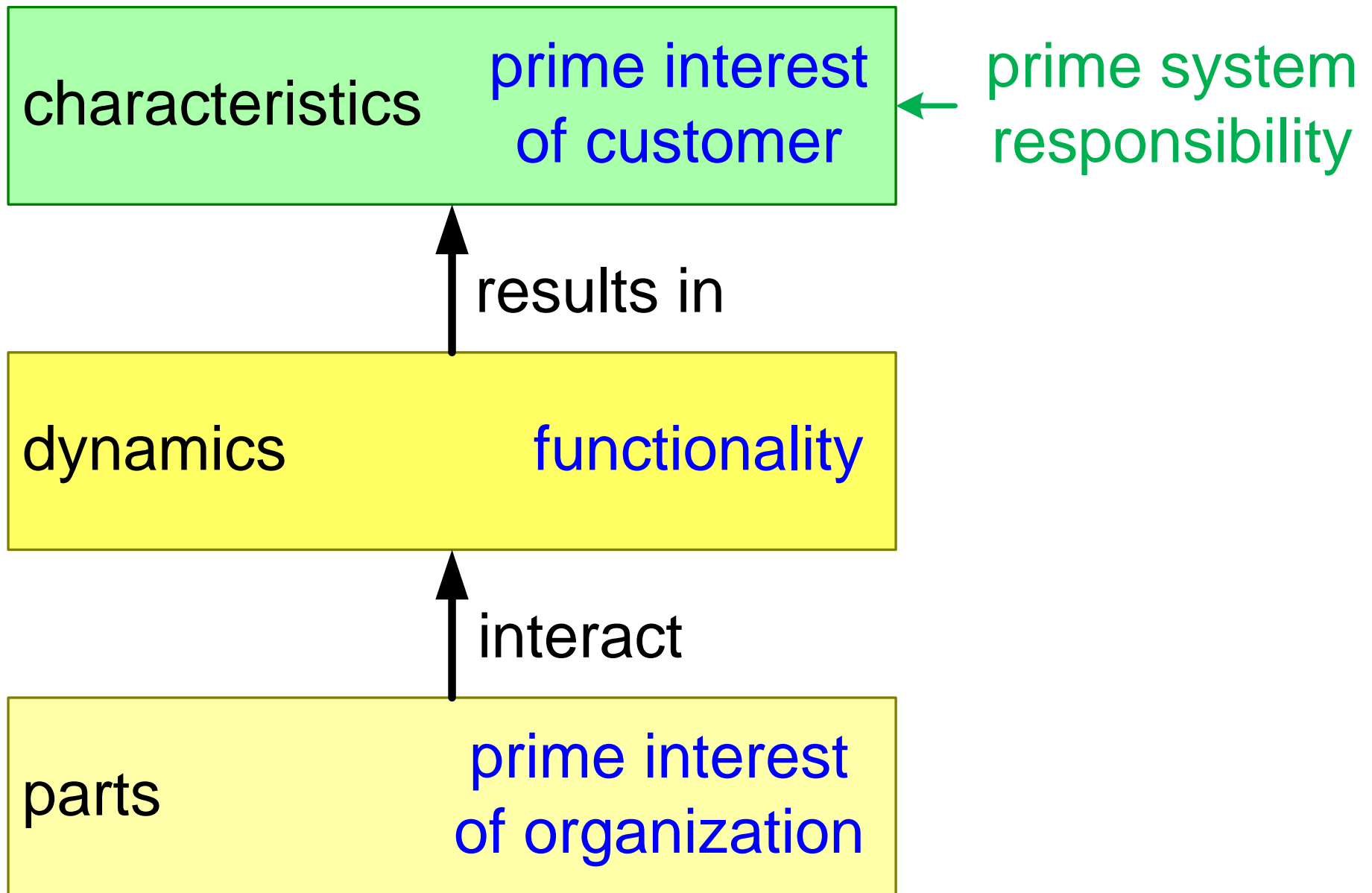


Designing Desired Qualities and Behavior

- How do parts interact to create desired dynamic behavior?
 - allocate functions
- How do desired qualities and performance emerge from the interaction?
 - dimension and configure parts and functions



Design = Structure + Dynamics + Quantification



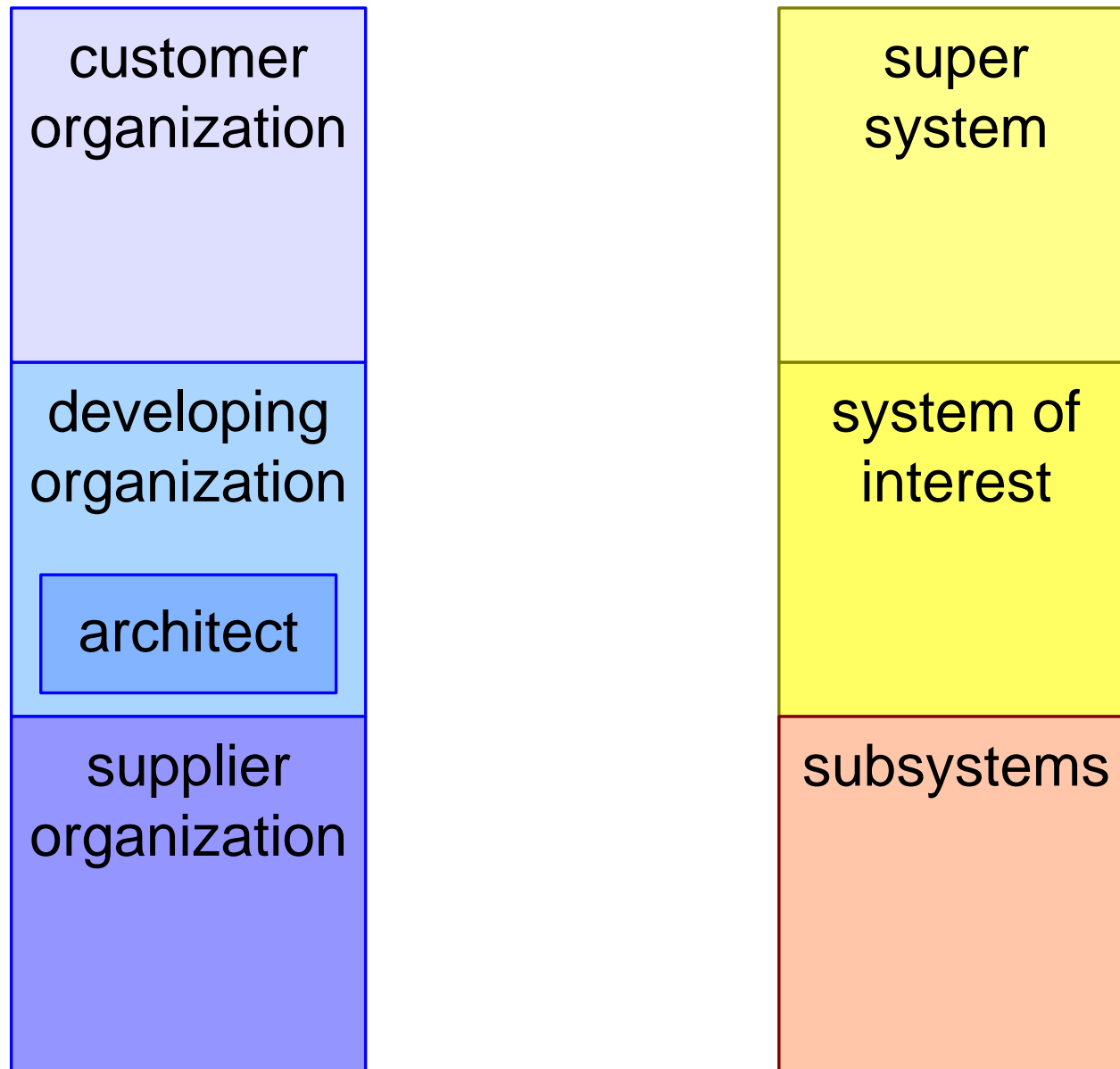
Our Primary Interest

developing
organization

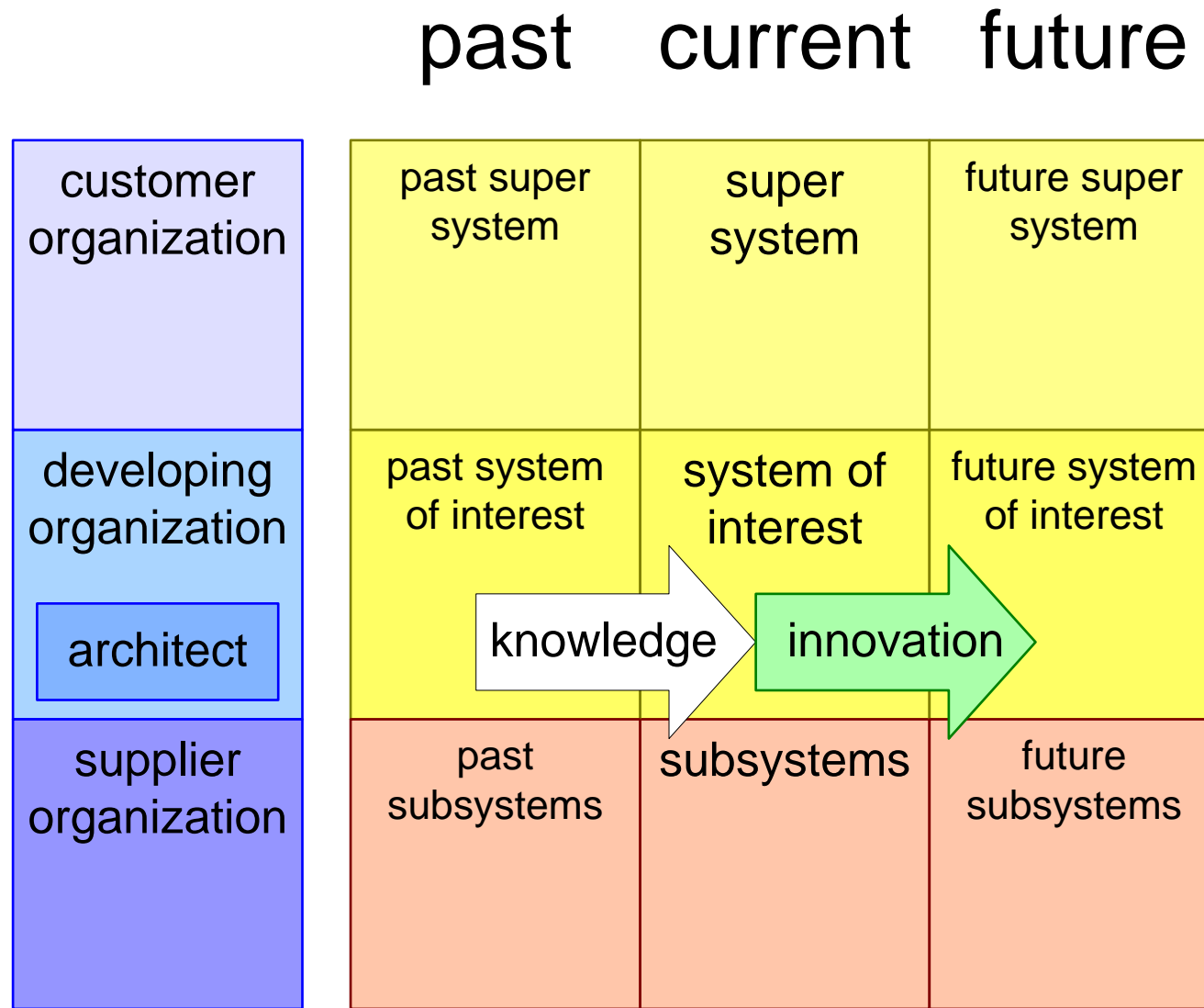
architect

system of
interest

Context, Zoom-out and Zoom-in



Adding the Time Dimension



based on TRIZ

Architect, Architecture, Architecting

