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.
One Architecture Facilitates many Solutions

single cardio vascular X-ray architecture

many designs
many variants

flat detector C/V

cardio

vascular
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

System Specification
What does customer get?
What is the system-of-interest that we deliver?
functions
qualities (e.g. quantified performance)
interfaces
costs, 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 models and budgets
concept and technology selection

Engineering
Getting all details right for all business functions.
technical product documentation
Functional Model for System Creation

- architecting
  - stakeholder needs
  - business objectives
  - architecture guidelines
    - top-level design rationale
- design
  - specification
    - design
      - partitioning
        - interfaces
          - functions
            - allocation
  - engineering
    - documentation
      - system and parts data
        - procedures
- procurement
- production
- installation
- quality assurance
- lifecycle support
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

- **parts**
- **characteristics**
- **dynamics**

**interact** results in **prime interest** of **organization**

**prime interest** of **customer**

**prime system responsibility**

**functionality**
Our Primary Interest

developing organization

architect

system of interest
Context, Zoom-out and Zoom-in

- Customer organization
- Developing organization
- Architect
- Supplier organization
- Super system
- System of interest
- Subsystems
Adding the Time Dimension

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Based on TRIZ

Architect and Design Fundamentals

Gerrit Muller
Architect, Architecture, Architecting

past

past super system

past subsystems

future

future super system

future subsystems

past

past super system

past subsystems

current

super system

supplier organization

past subsystems

based on TRIZ

architecture

architecting

architect

customer organization

developing organization

supplier organization