Threads of Reasoning

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Abstract

A method of reasoning is described, which addresses cross-cutting issues. The basis is fast iteration in the problem and solution space.
A thread of reasoning is a set of highly relevant related issues, which are addressed by articulating the problem in terms of tension and analyzing it in the CAFCR framework.
Overview of the reasoning approach

1. select starting point:
   ! actual dominant need or problem

2. create insight:
   + submethod in one of CAFCR views
   + qualities checklist

3. deepen insight via facts:
   + via tests, measurements, simulations
   + story telling

4. broaden insight via questions:
   + why
   + what
   + how

5. define and extend the thread:
   ? what is the most important / valuable
   ? what is the most critical / sensitive
   ! look for the conflicts and tension

continuously

consolidate in simple models
communicate to stakeholders
refactor documentation
From starting point to insight

step 1 starting point

C: Customer objectives
A: Application
F: Functional
C: Conceptual
R: Realization

slow response
Creating Insight

step 2 creating insight

Customer objectives
Application
Functional
Conceptual
Realization

performance
response
time model
Deepening Insight

Customer objectives

Application

Functional

Conceptual

Realization

specific needs

step 3 deepening insight

specific facts

story

simulations, test, measurements

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TORdeepeningInsight
Broadening Insight

Customer objectives

Application

Functional Conceptual Realization

why?

what?

how?

why?

what?

how?
Problem identification and articulation

**Need and Problem Selection Criteria**

- **Customer Objectives**
- **Application**
- **Functional**
- **Conceptual**
- **Realization**

**Important**

- Valuable

**Critical**

- Difficult
- Sensitive
- Vulnerable

**Definition in Terms of Tension**

- Throughput
- Cost
- Safety

- High Performance Sensor
- High Speed Moves

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TORproblemIdentification
Iteration during the analysis

- Iteration during the analysis
- Detect mismatch
- Architect intuition
- Intuition
- Objective
- Criteria
- Objective
- Ranking
- Intuitive ranking
- Improve solution
- Adjust intuition
- Solution
- Problem
- Objective criteria
- Improve criteria
- Improved solution understanding
- Improved problem understanding

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TORanalysisIteration

USN ESI
Thread of related issues

Customer objectives
Application
Functional
Conceptual
Realization

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TORnetworkedIssues