Basic Working Methods of a System Architect

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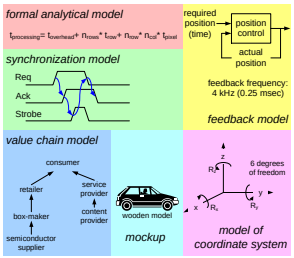
Abstract

The challenge for the architect is to cover a wide range of subjects, with many unknowns and uncertainties, while decisions are required all the time.
The basic working methods, such as viewpoint hopping, modelling, handling uncertainties and WWHWWW questions are described.



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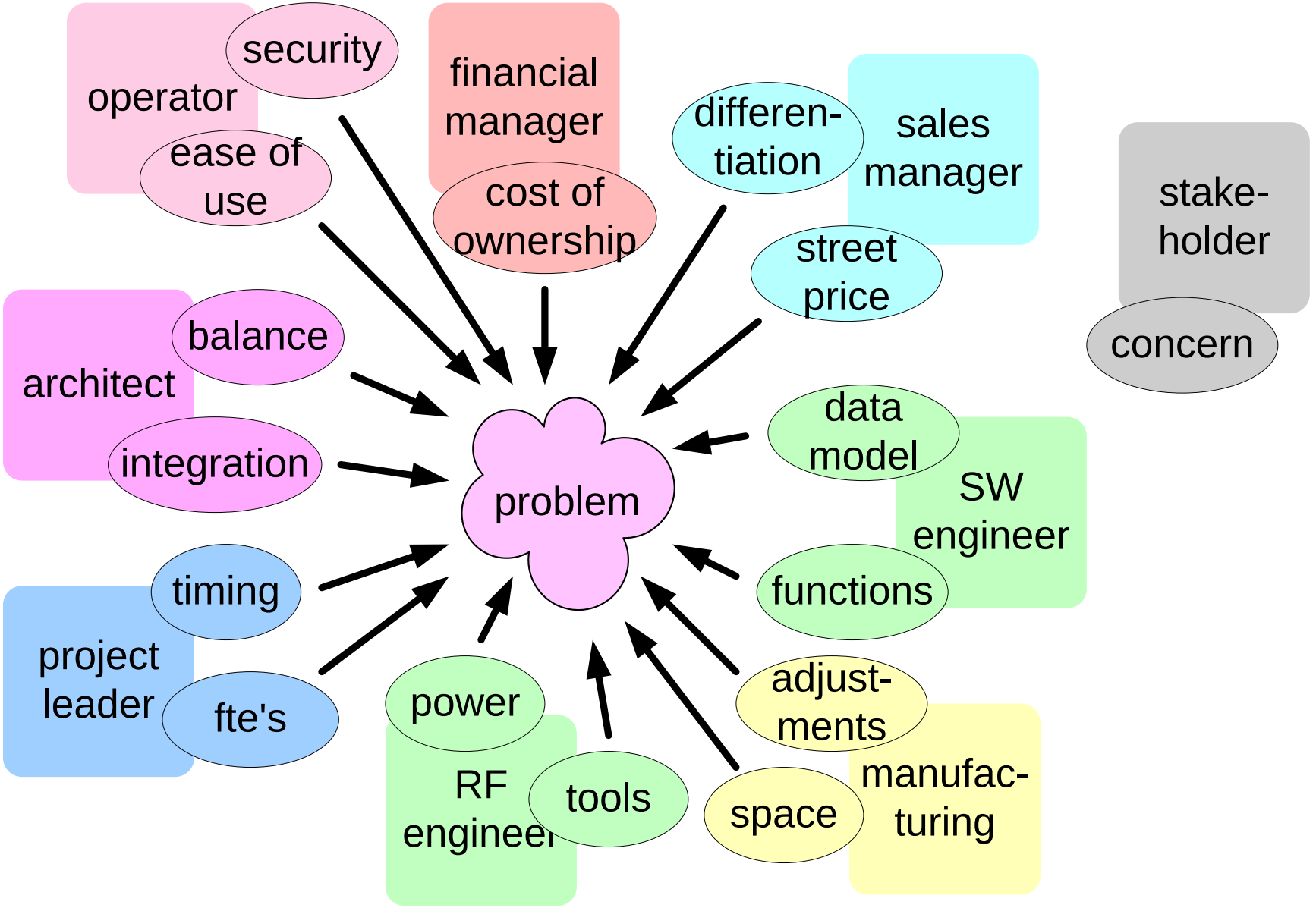
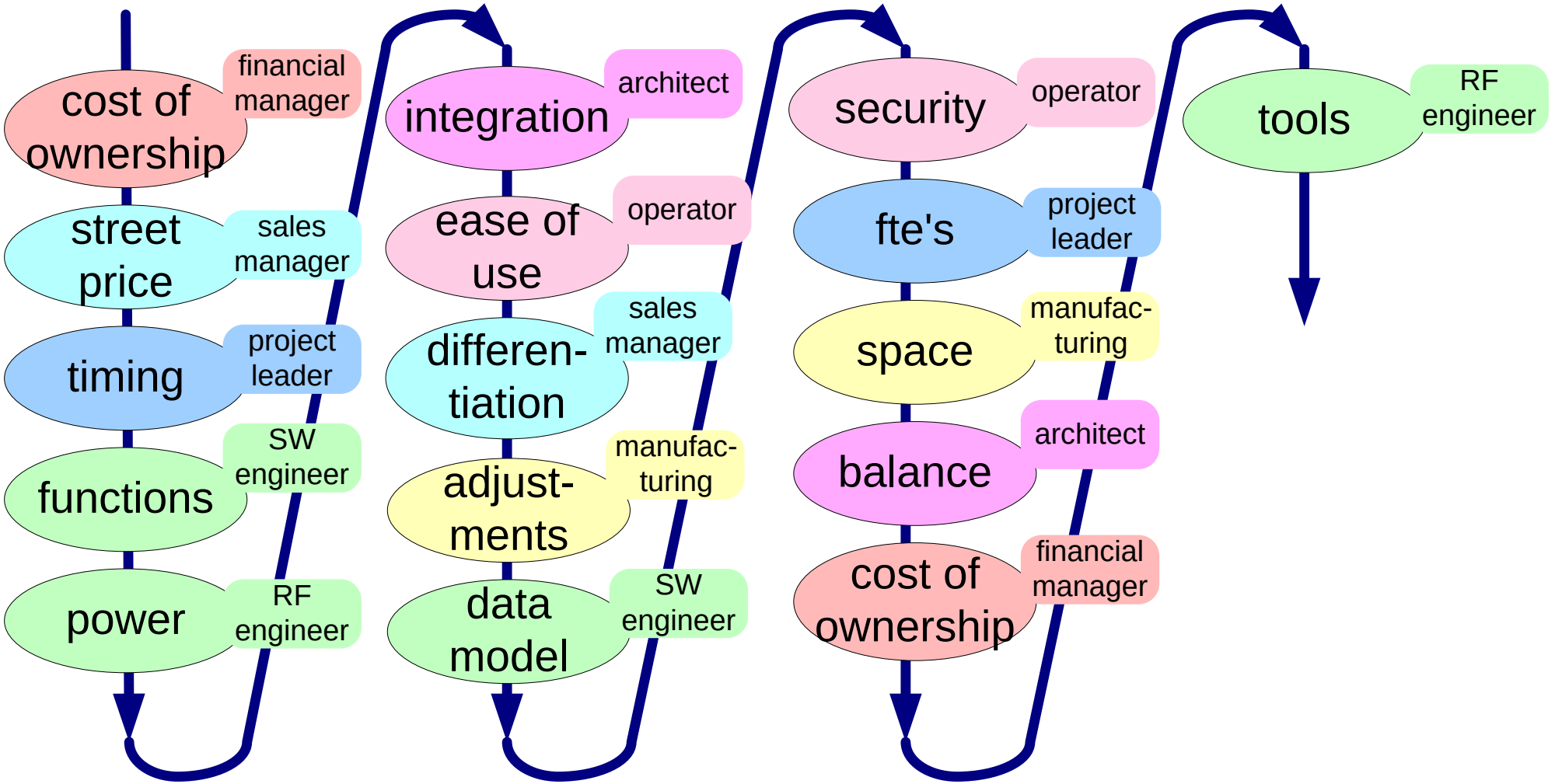
version: 1.5

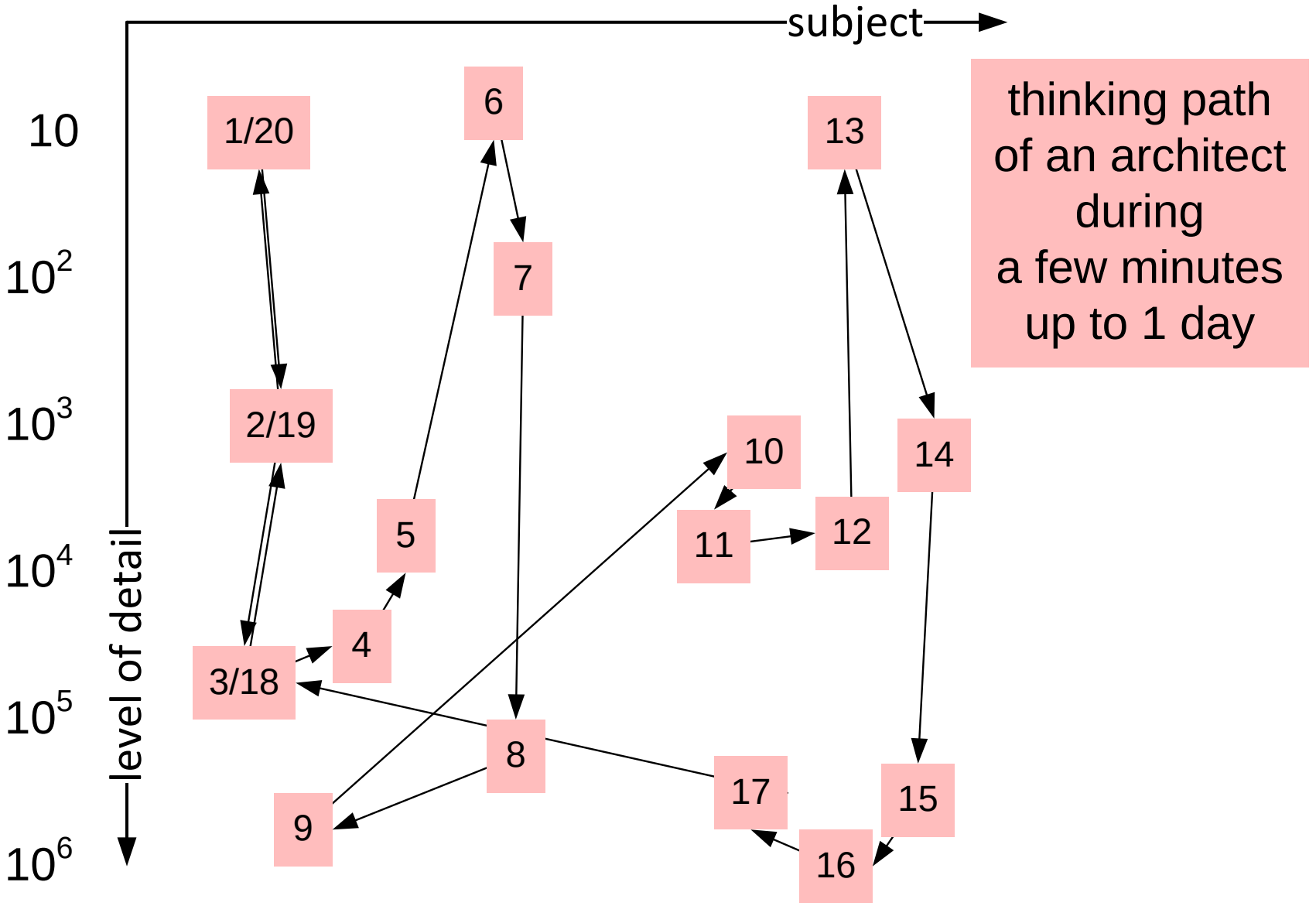
Many viewpoints



Viewpoint Hopping

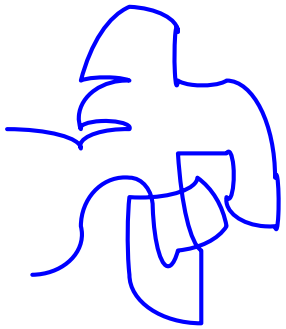


The seemingly random exploration path



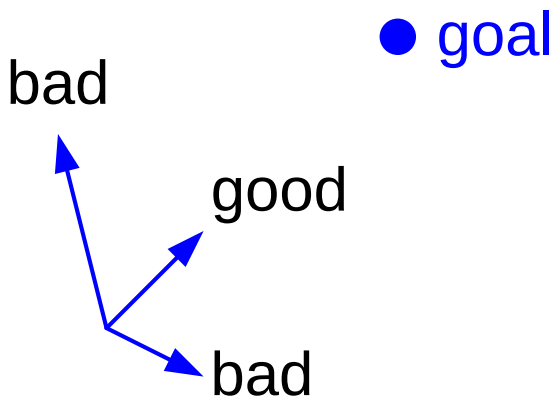
Scanning modes of the architect

open
perceptive
scanning



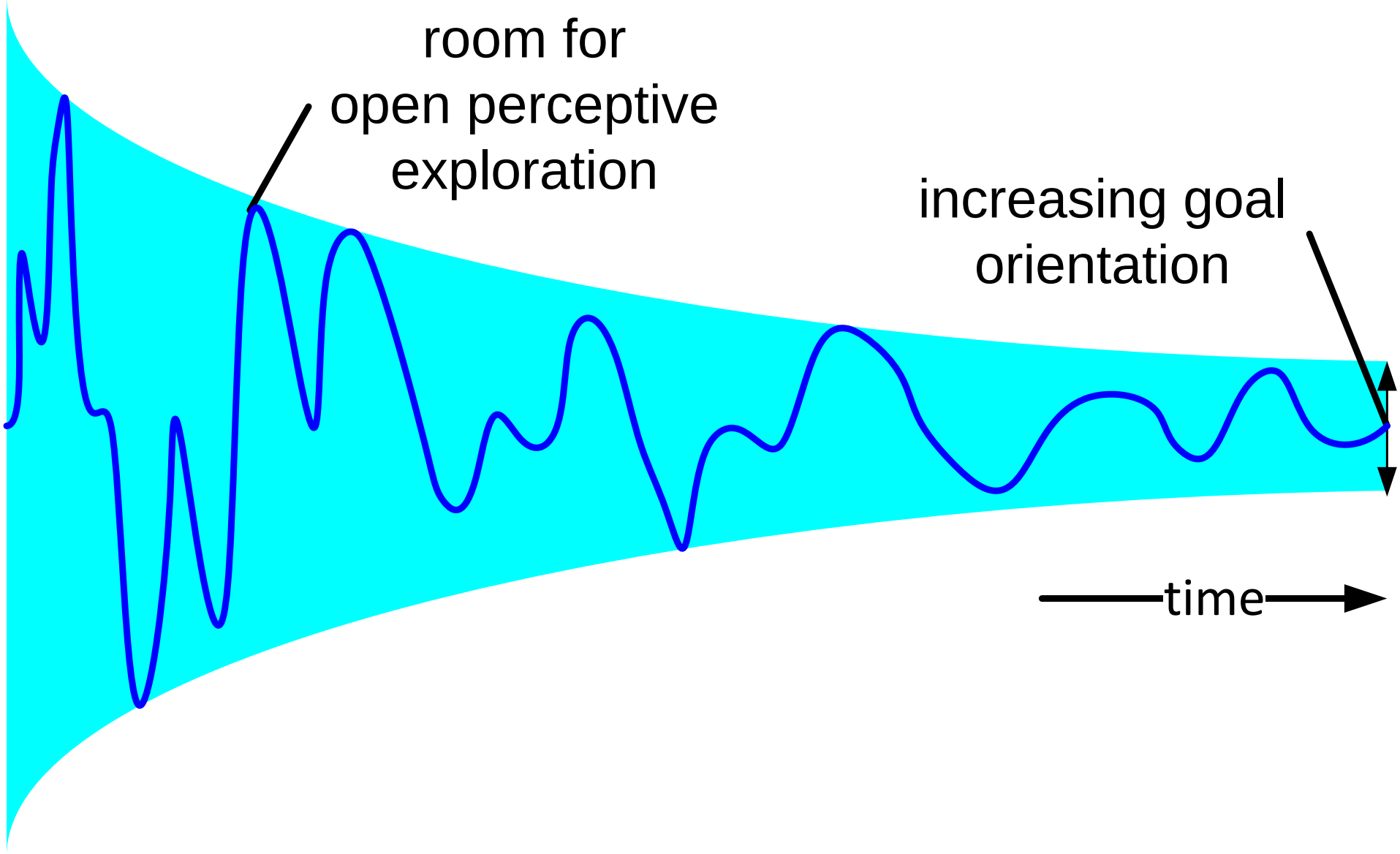
drunkard's walk
the world is full
of interesting
needs, technologies, ...

scanning
while
structuring
and judging

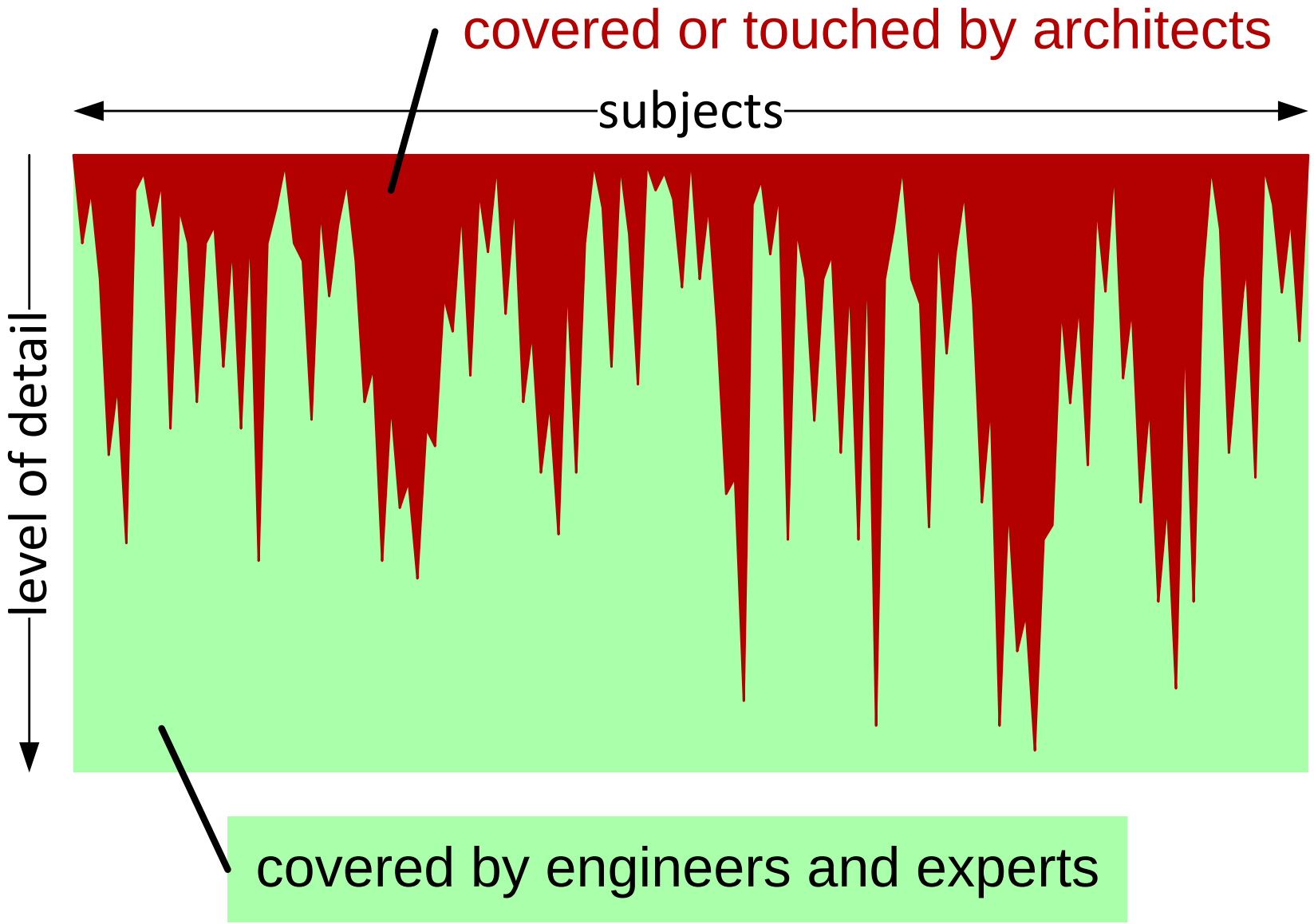


straight for the goal
ignore everything
that is not contributing
directly to the goal

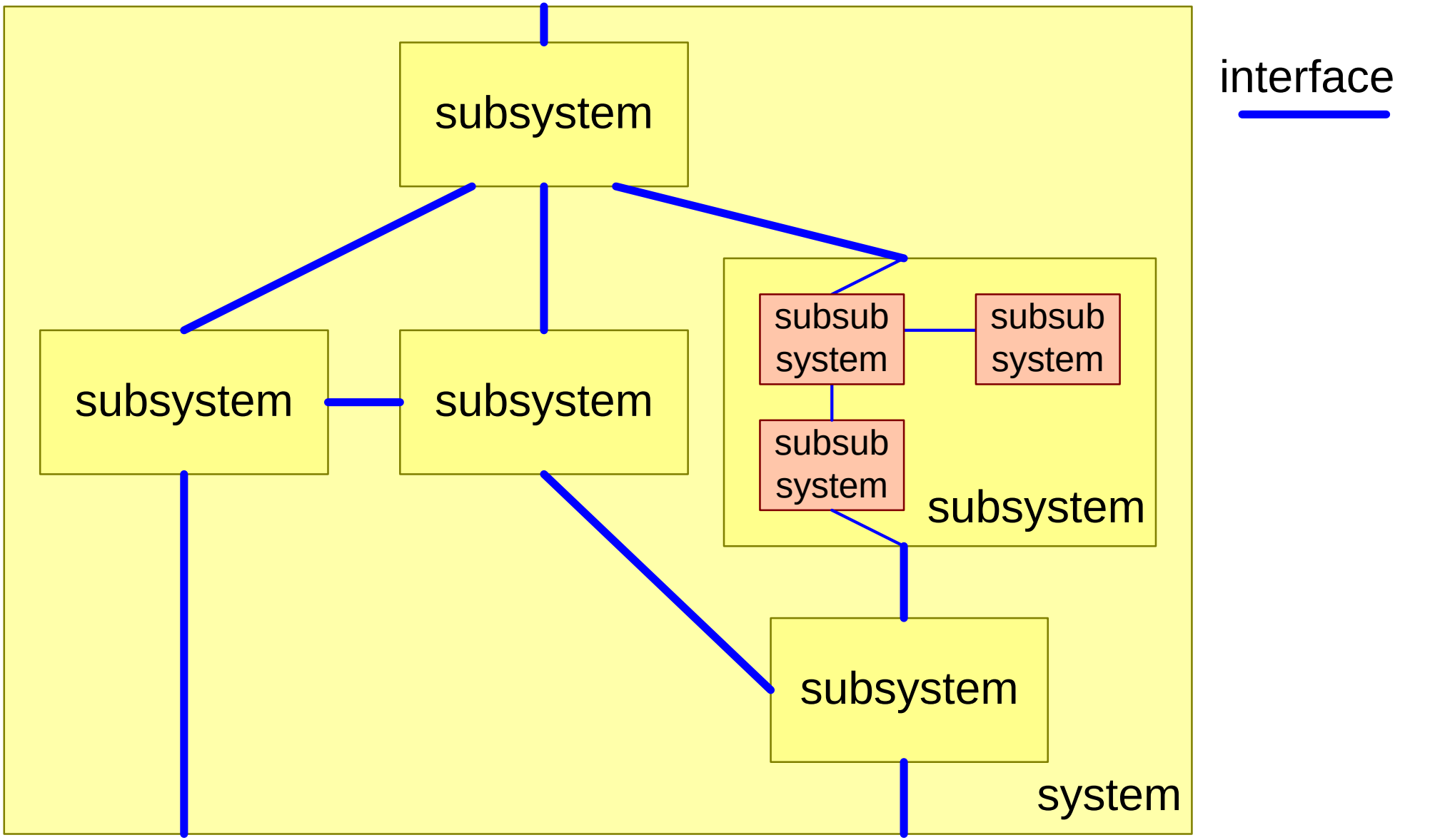
Combined open perceptive and goal oriented scanning



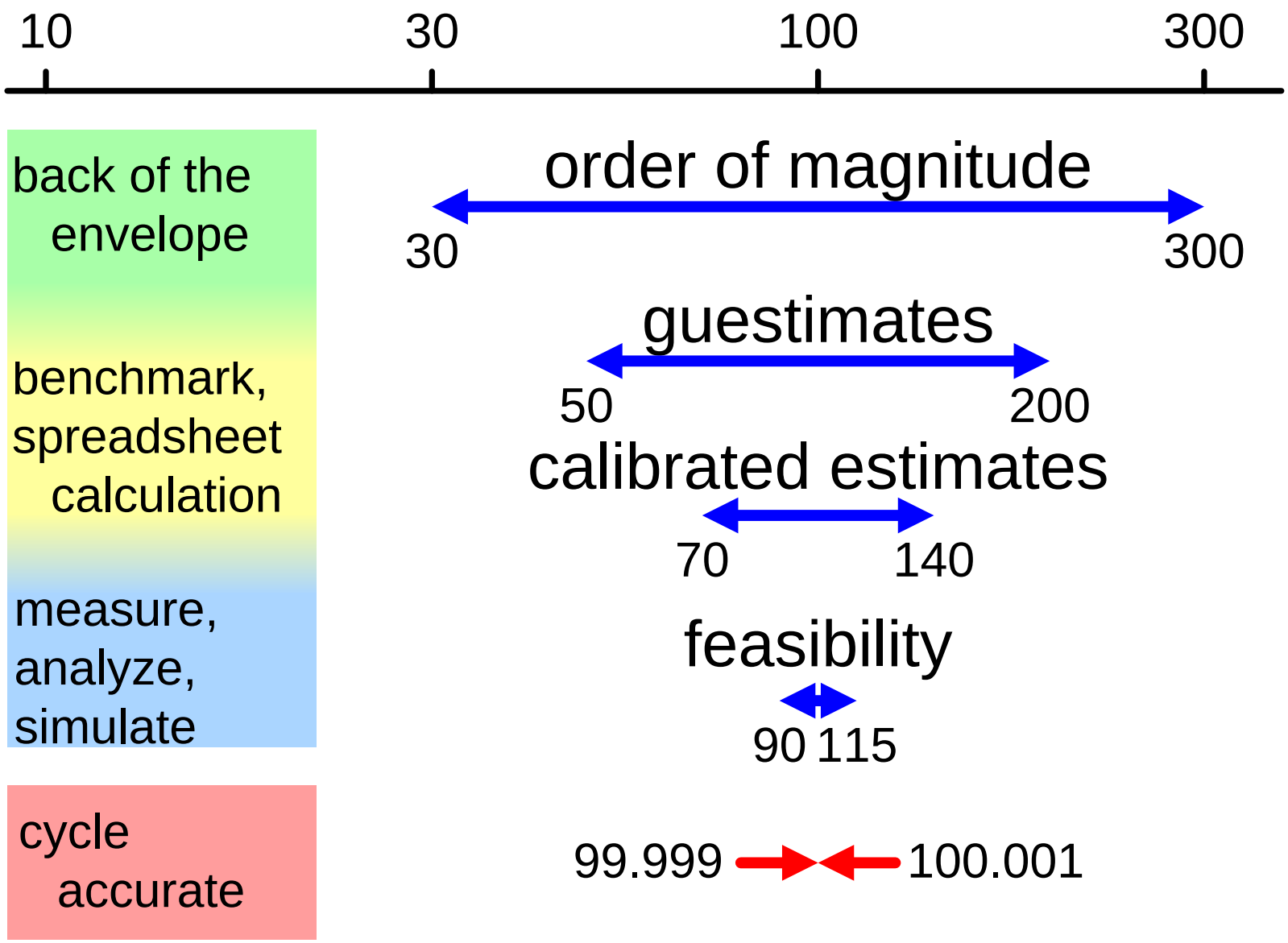
Coverage of problem and solution space



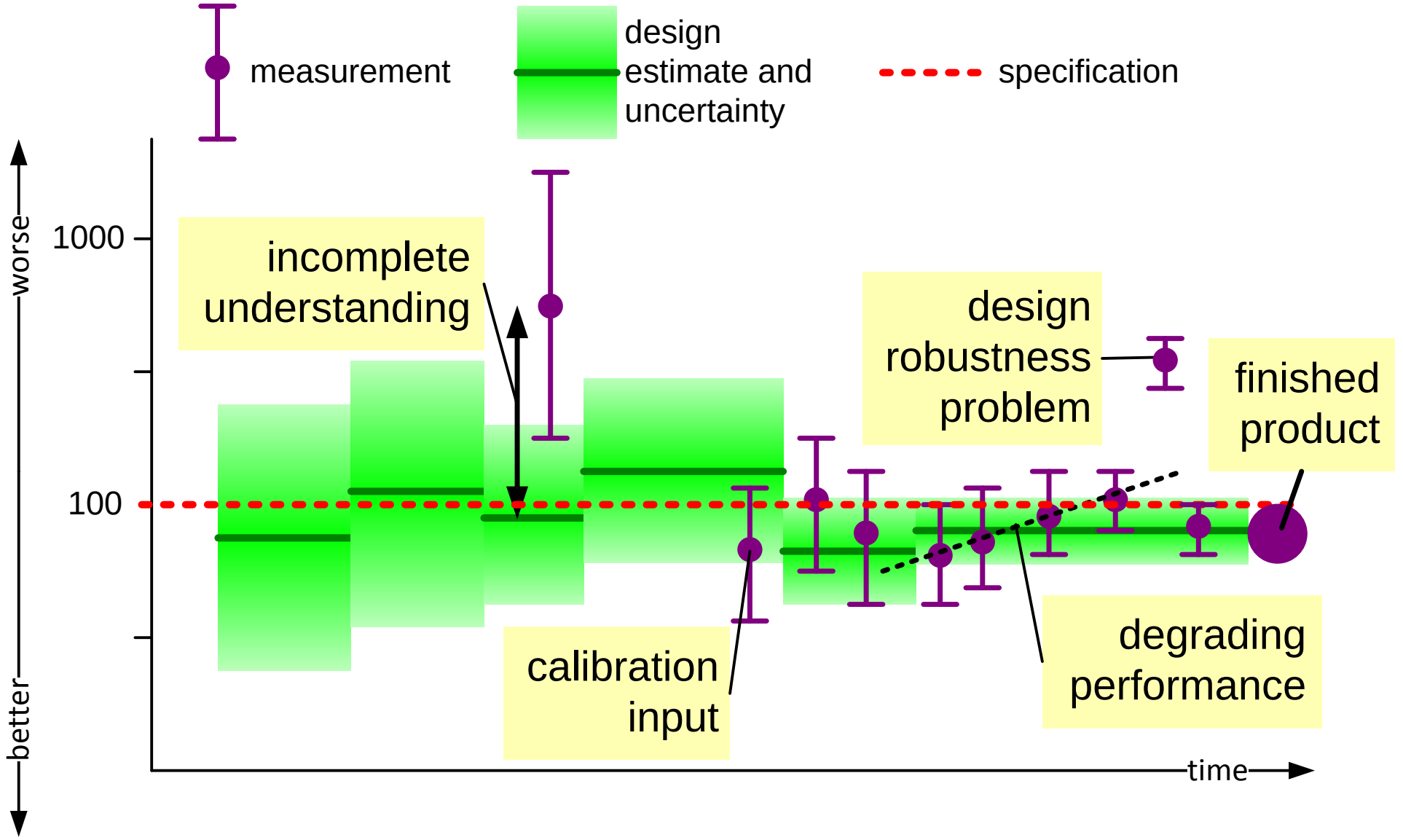
Decomposition, interfaces and integration



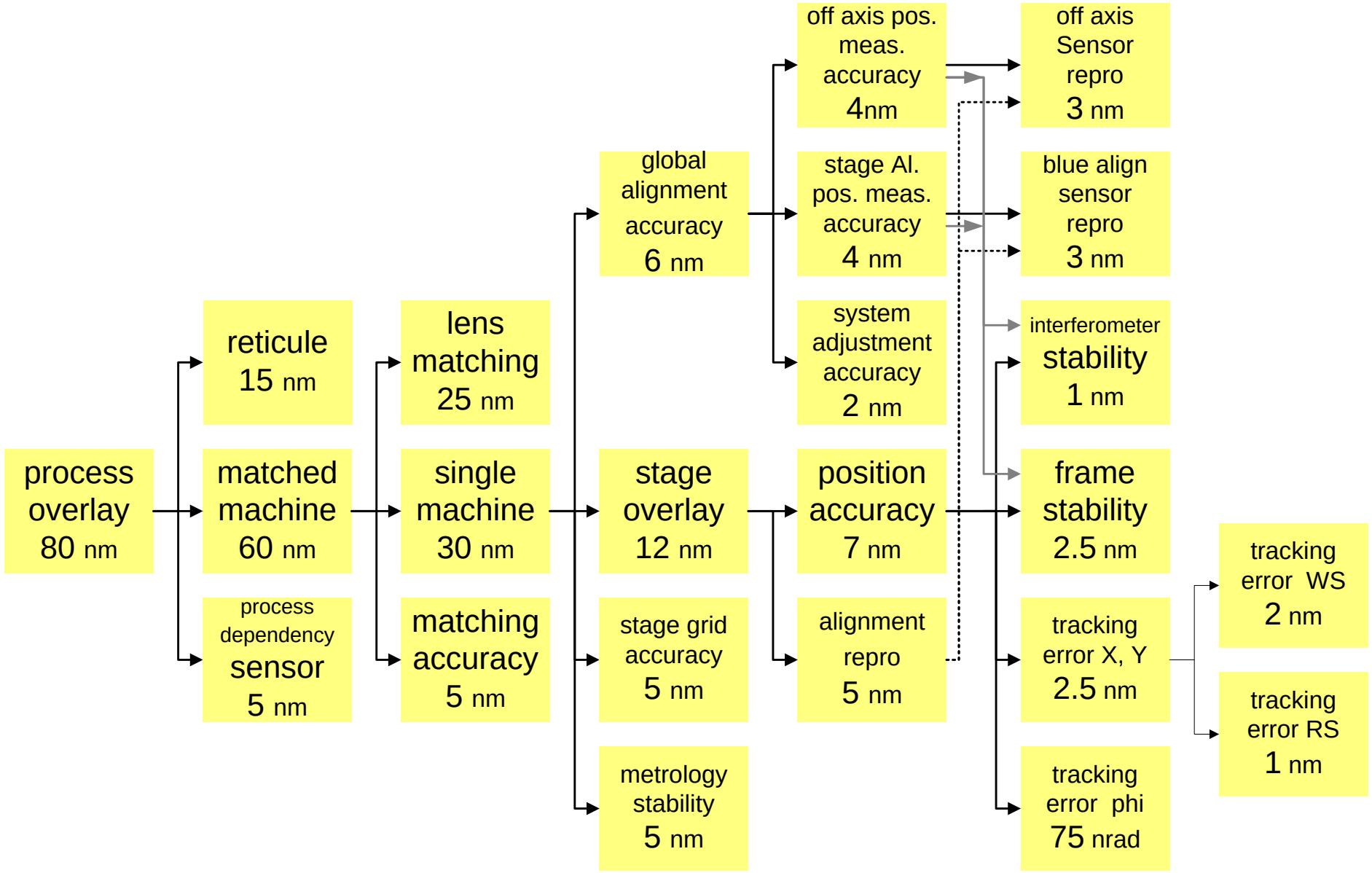
Successive quantification refinement



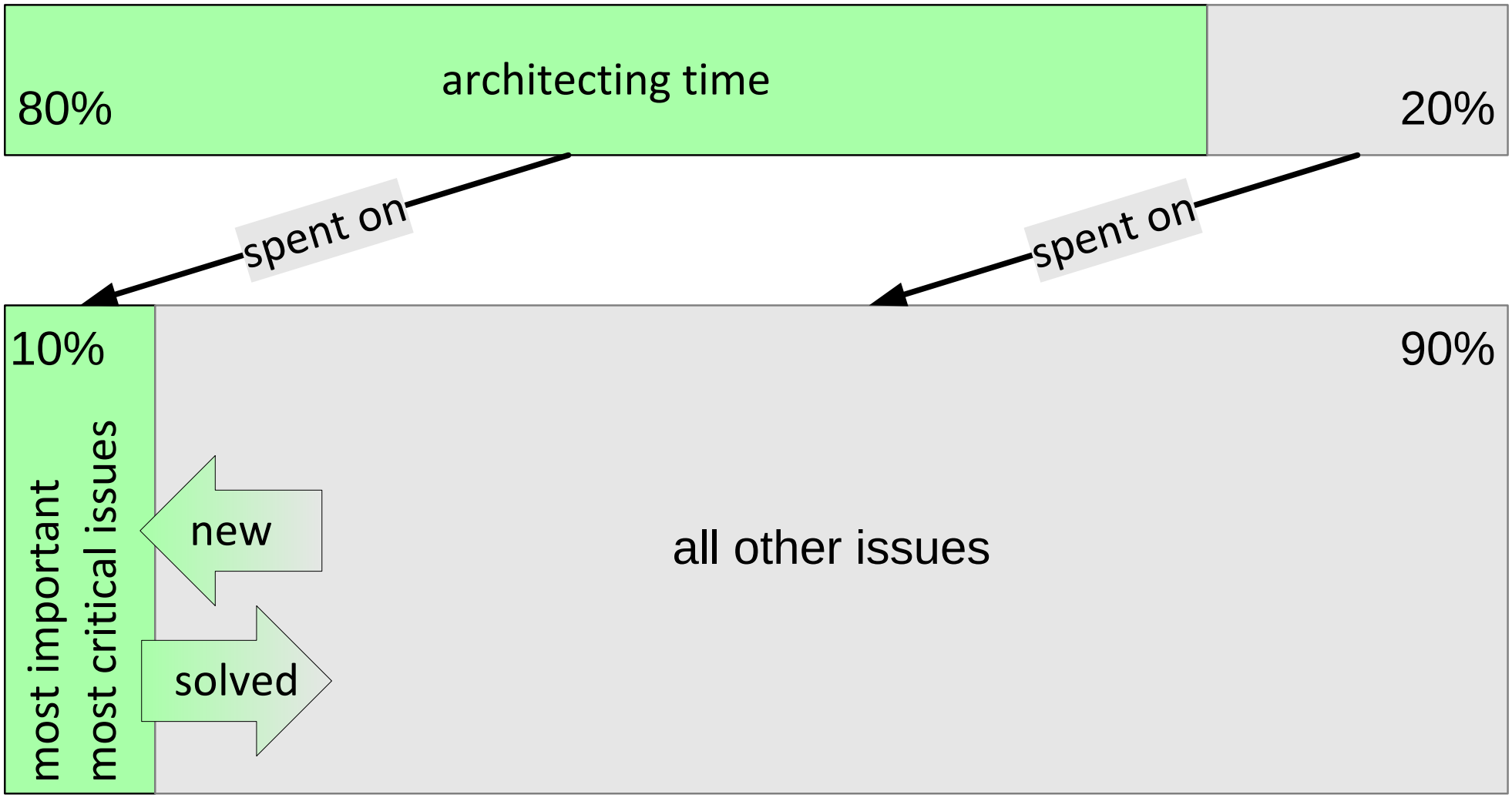
Example evolution of quantification



Quantified understanding of waferstepper overlay



Architect focus on important issues



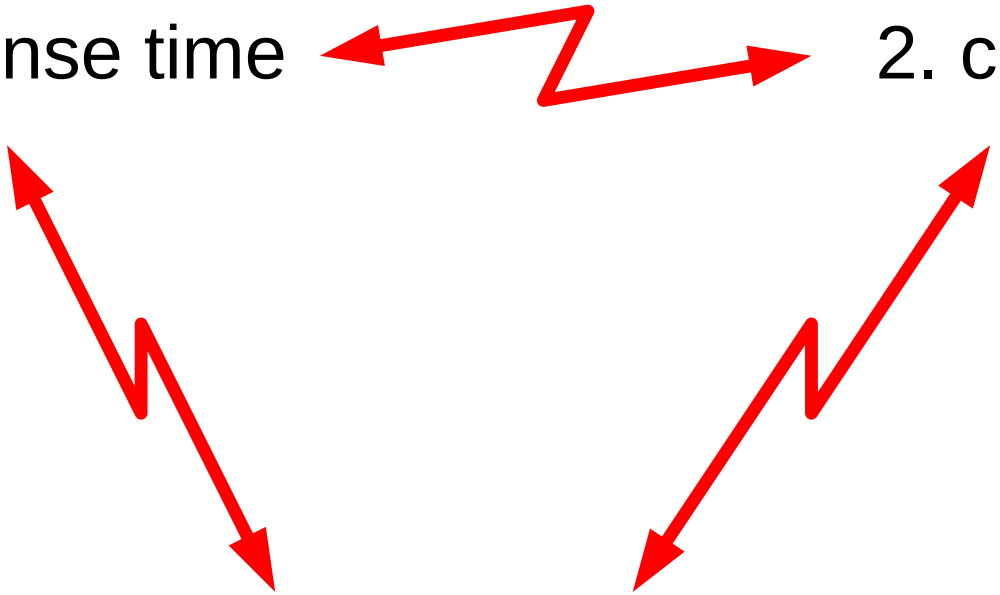
Architect “worry” list

1. response time

from key press
until first image
on display

2. cost price

resource budgets



3. layering to separate

separation of concerns
self sustained
life-cycle separation
robust: paranoia validations

4. reliability of storage
5. database redesign
6. integration schedule
7. movement artefact
8. standby power
9. weak signal handling
10. location-based twiddle

A **model** is

a **simplified** representation of

part of the **real world** used for:

communication, documentation

analysis, simulation,

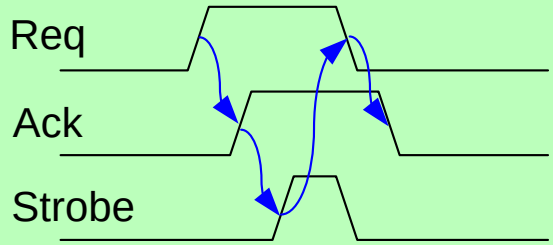
decision making, verification

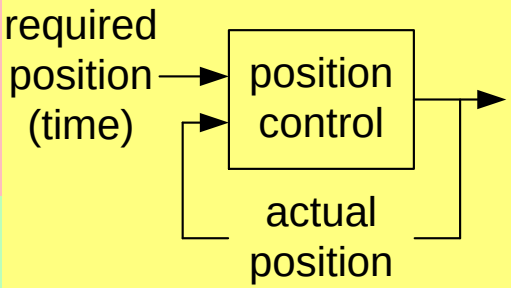
Some examples of models

formal analytical model

$t_{processing} = t_{overhead} + n_{rows} * t_{row} + n_{row} * n_{col} * t_{pixel}$

synchronization model

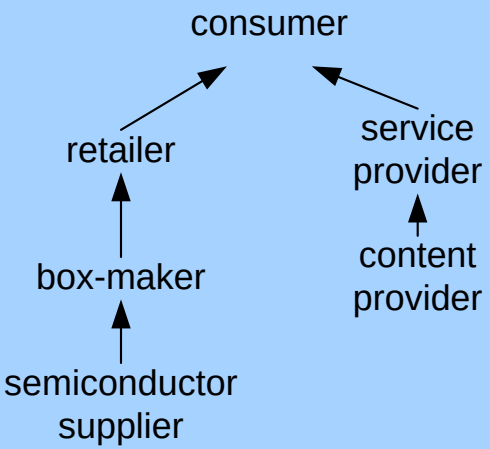




feedback frequency:
4 kHz (0.25 msec)

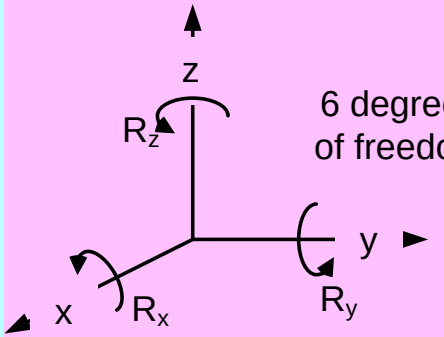
feedback model

value chain model



wooden model

mockup



model of coordinate system

Types of models

mathematical linguistic	visual
formal	informal
quantitative	qualitative
detailed	global
concrete	abstract
accurate	approximate
executable	read only

←rational—— ——intuitive→

Questions

Why

Who

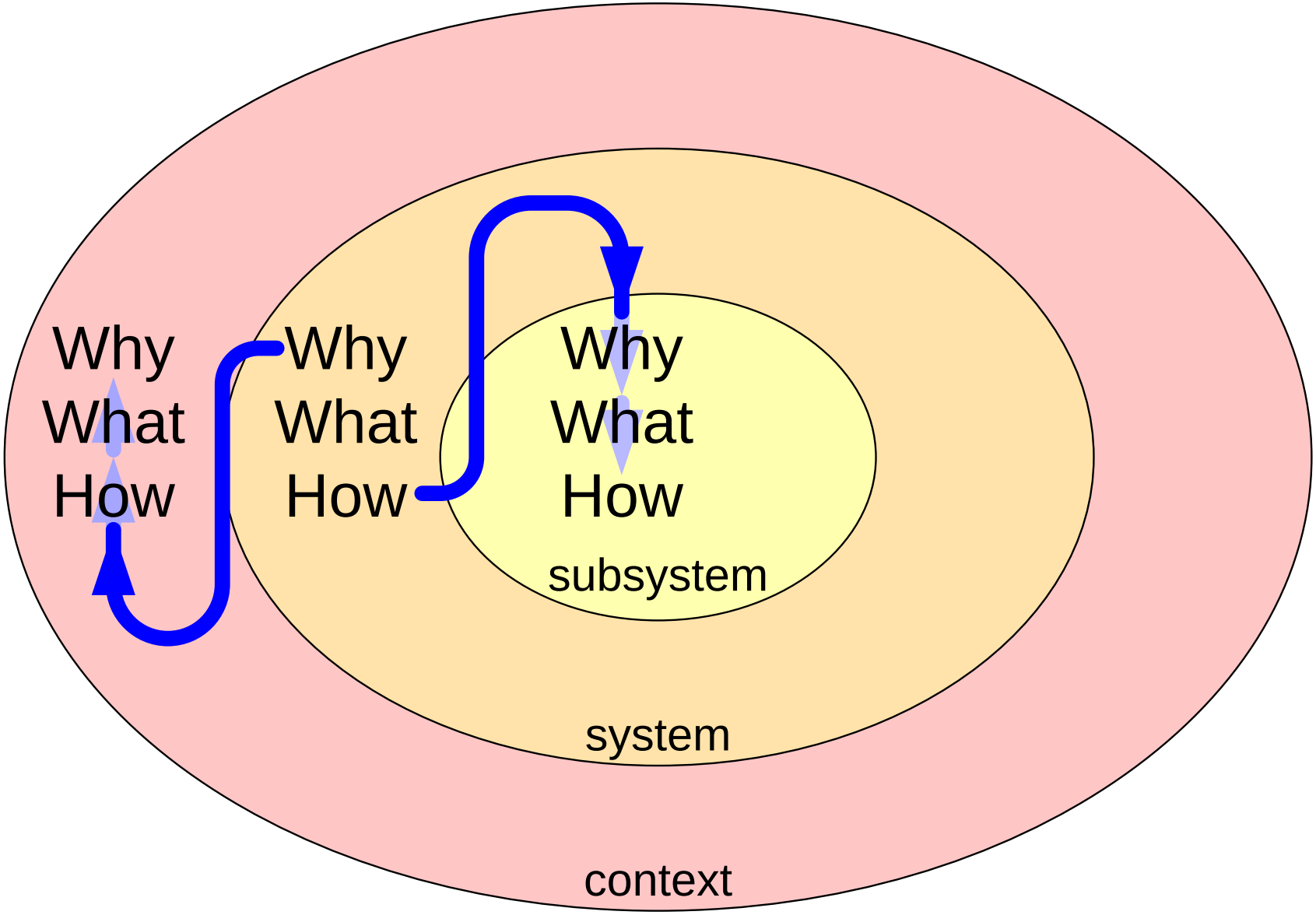
What

When

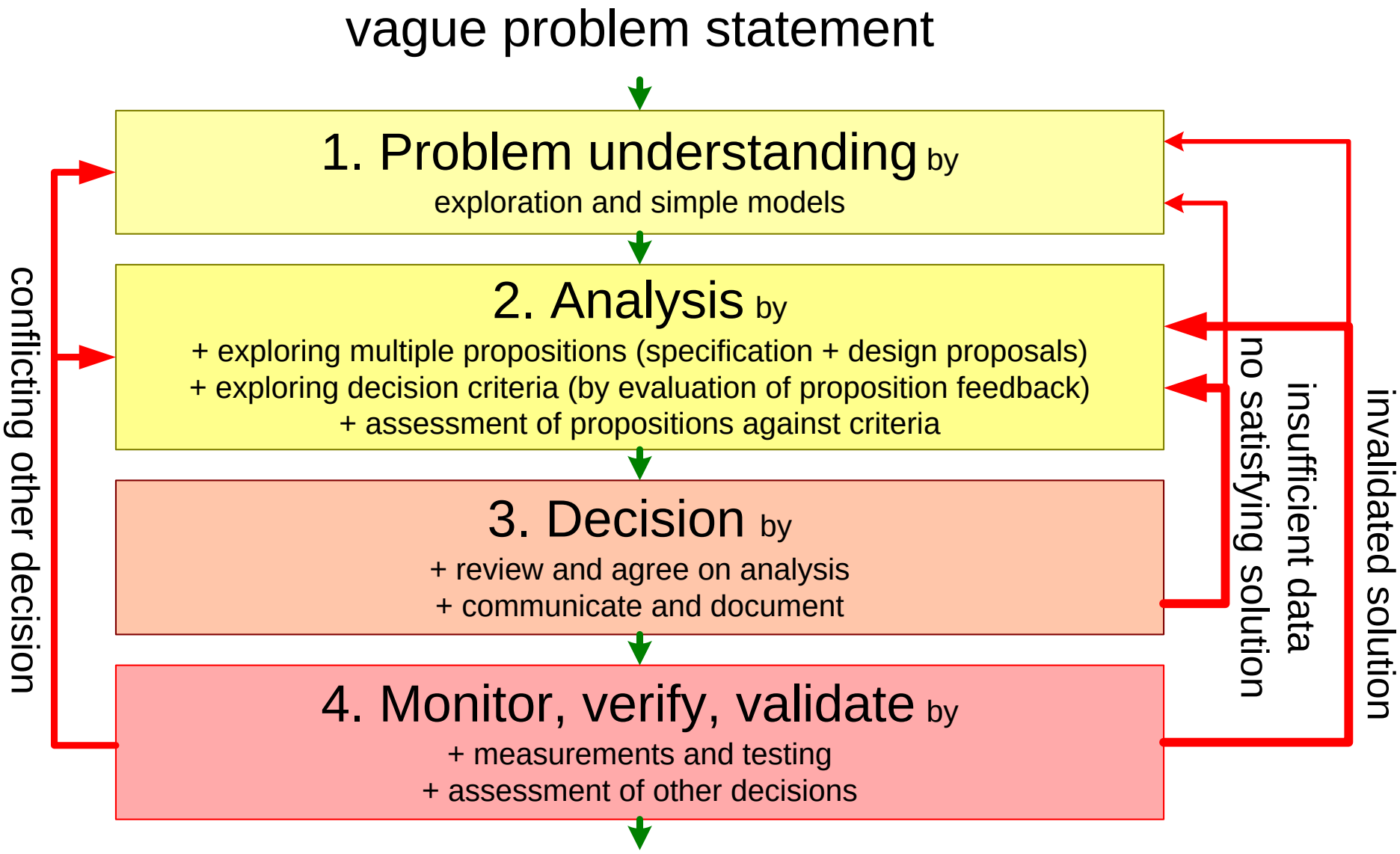
How

Where

Why broadens scope, How opens details



Flow from problem to solution



Multiple propositions

throughput	20 p/m	high-performance sensor	350 ns
cost	5 k$	high-speed moves	9 m/s
safety		additional pipelining	

low cost and performance 1

throughput	20 p/m	high-performance sensor	300 ns
cost	5 k$	high-speed moves	10 m/s
safety			

low cost and performance 2

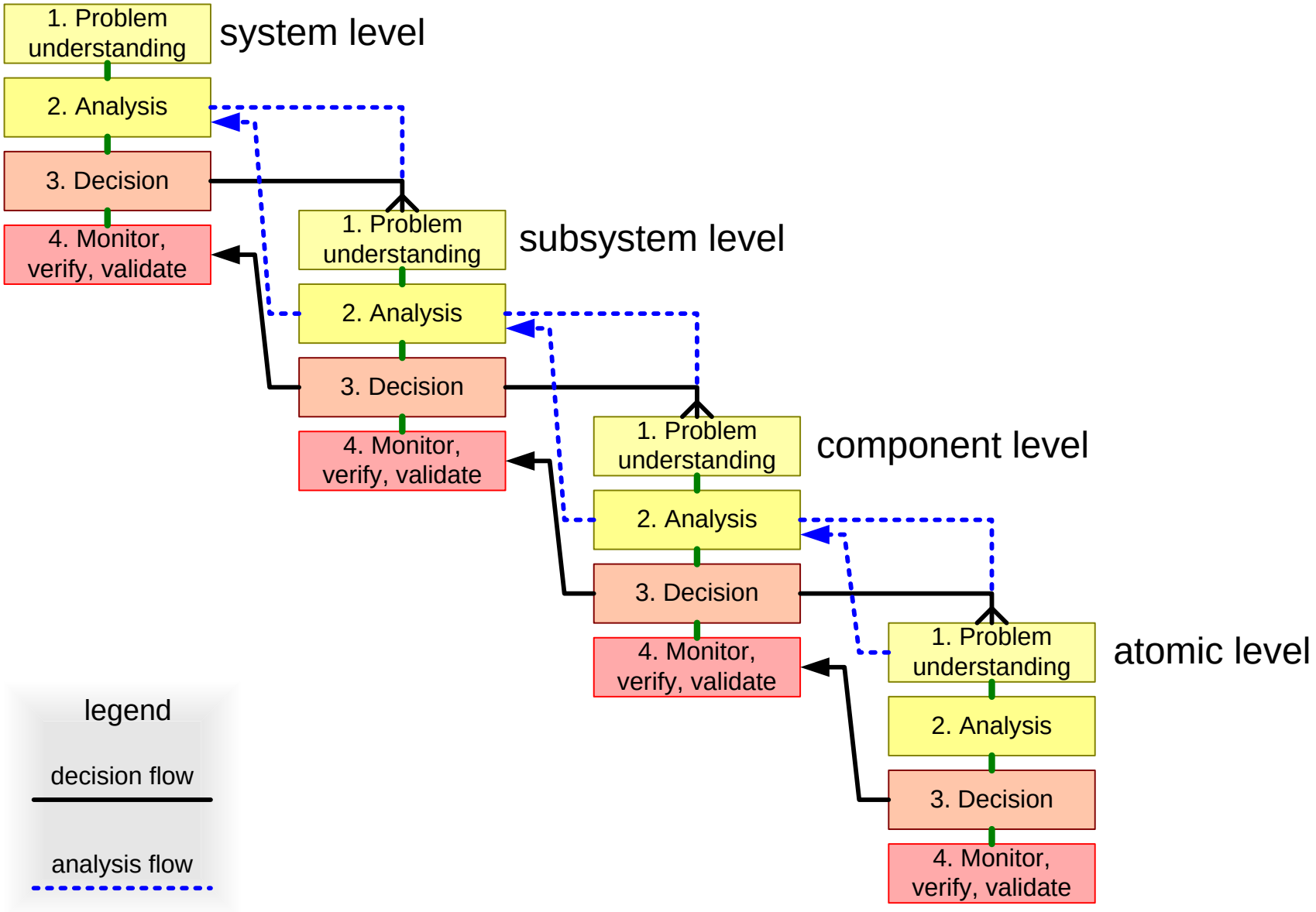
throughput	25 p/m	highperformance sensor	200 ns
cost	7 k$	high-speed moves	12 m/s
safety		additional collision detector	

high cost and performance

Assessment of propositions

criterions	*criterion weight*	*low cost and performance 1*	*low cost and performance 2*	*high cost and performance*
throughput	5	2	2	3
cost	5	3	3	2
safety	5	5	5	5
future proof	2	2	3	3
effort	4	5	4	4
dev. time	5	5	4	4
risk	4	4	3	3
maintenance	3	2	3	3

Recursive and concurrent application of flow



Exploration by rapid iteration