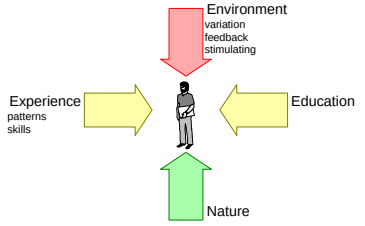
Decomposing the Architect; What are Critical Success Factors?

by *Gerrit Muller* HSN-NISE
e-mail: gaudisite@gmail.com
www.gaudisite.nl

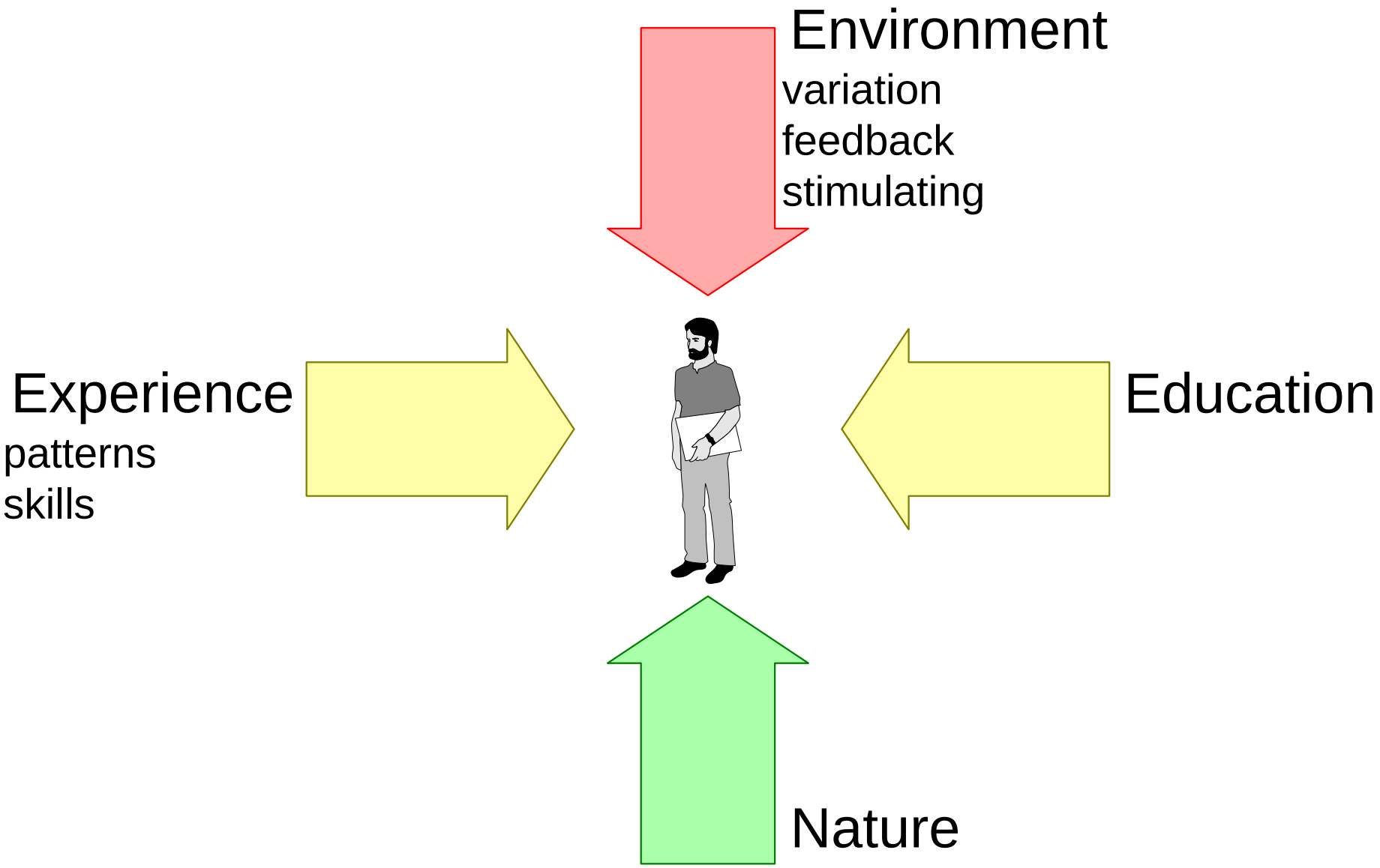
Abstract

System architects are scarce. If we want to search or educate potential system architects, then it is useful to know factors that determine the success of system architects. In this presentation we look at 4 areas: nature, education, environment and experience. We will make these areas more specific by quantification and illustration.

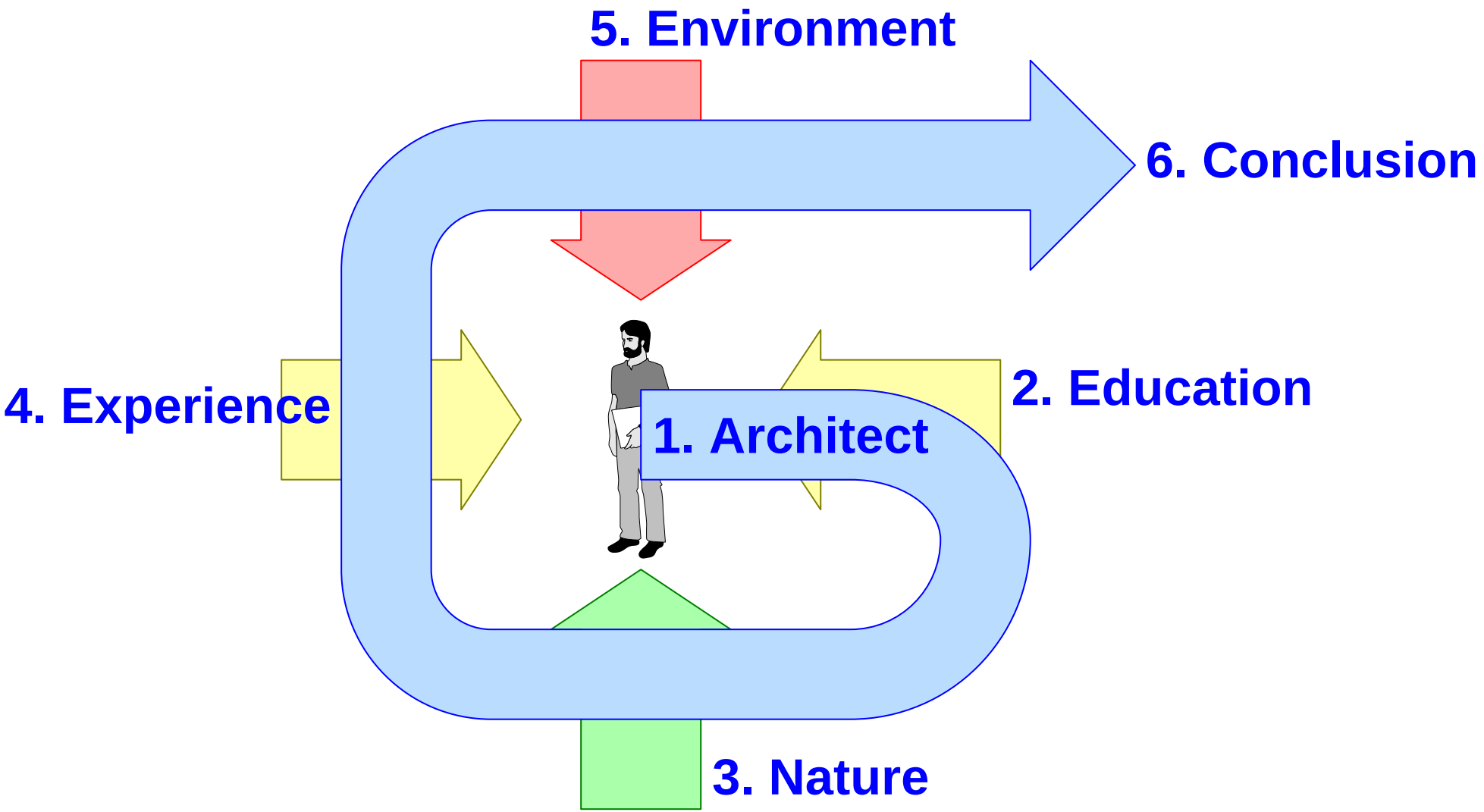
January 21, 2022
status: draft
version: 1.3

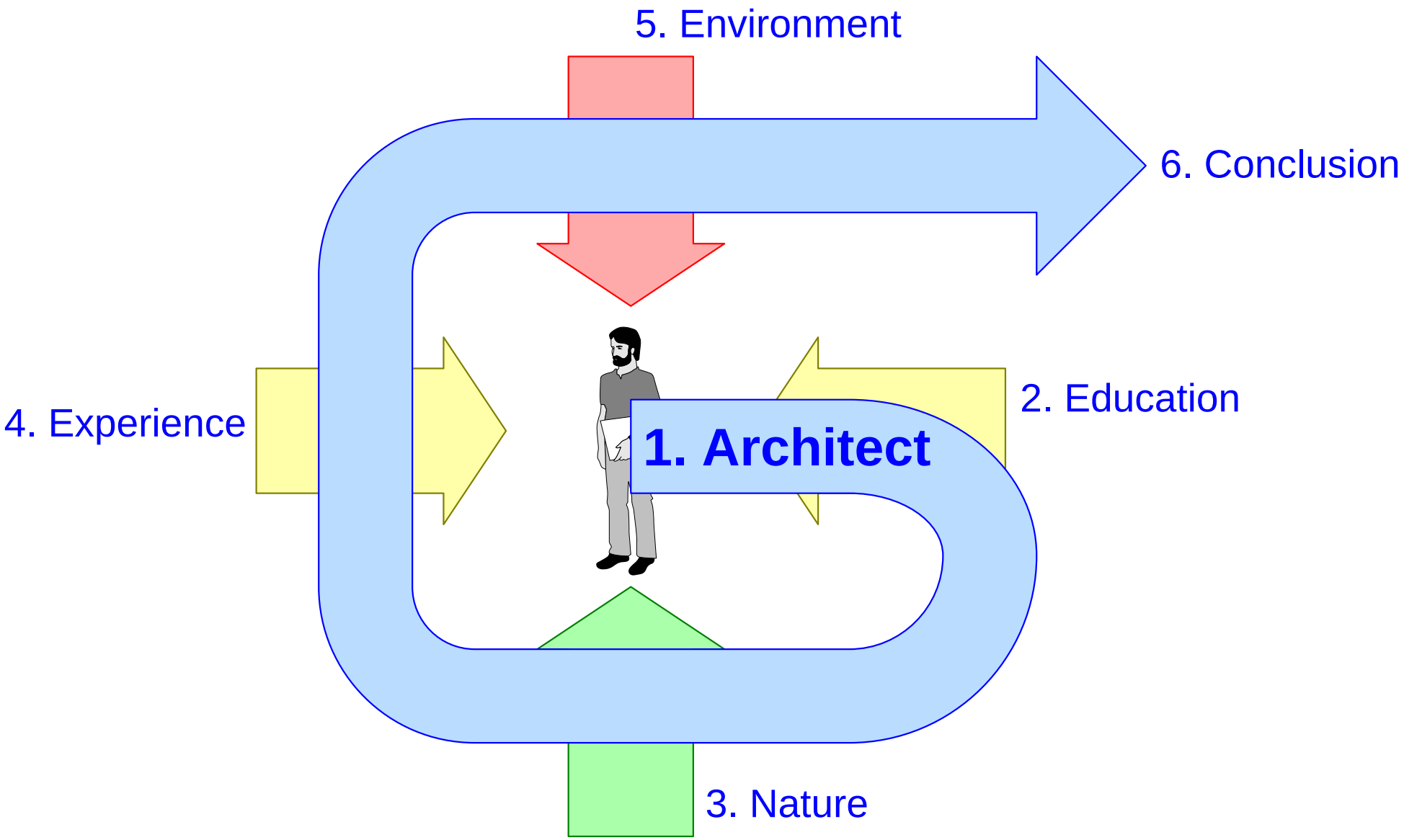


Decomposing Contributing Factors

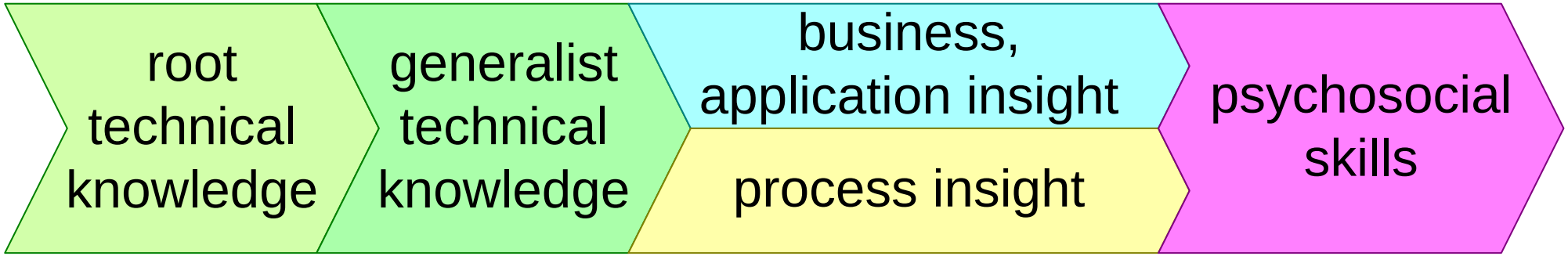


Structure of this Presentation

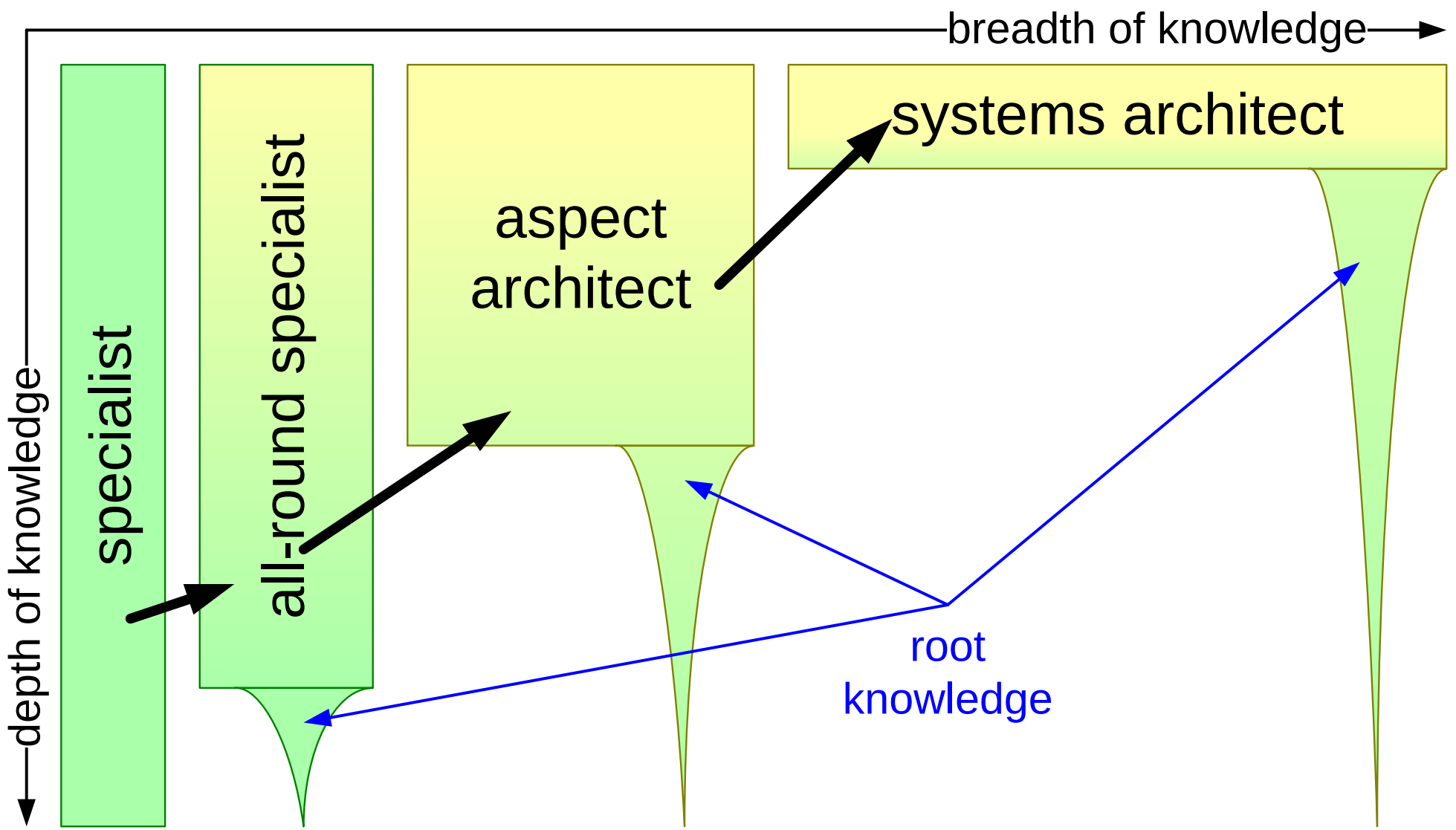



5. Environment
6. Conclusion
4. Experience
2. Education
1. Architect
3. Nature

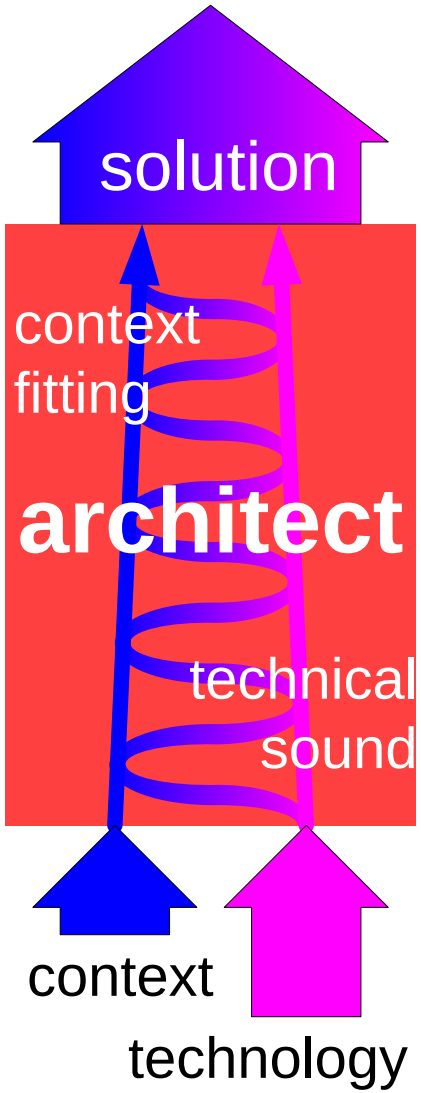
Observed Typical Growth of System Architects



From Specialist to Generalist



Different Architecting Scopes

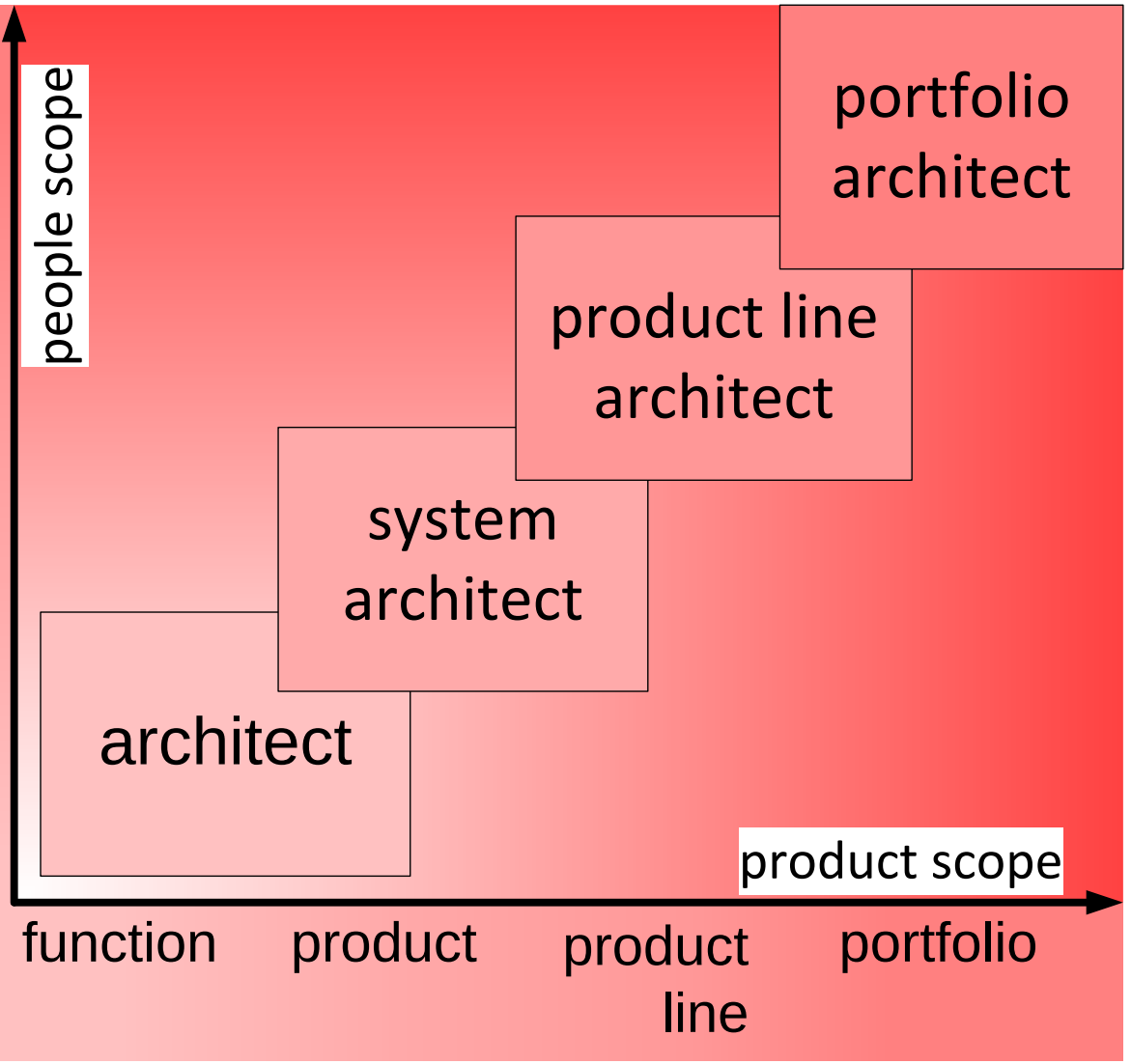


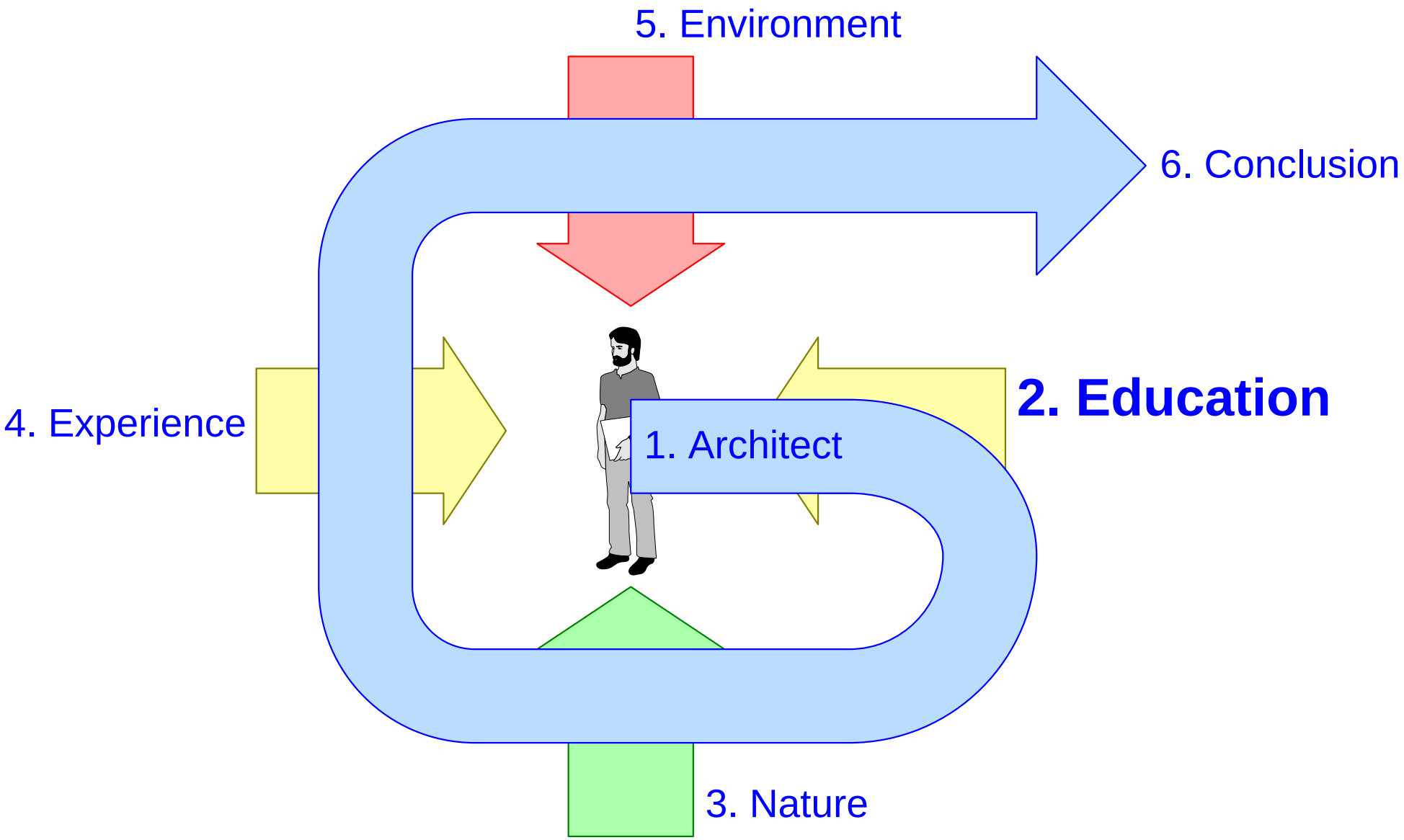
including
individuals
(human factors)

including
stakeholders

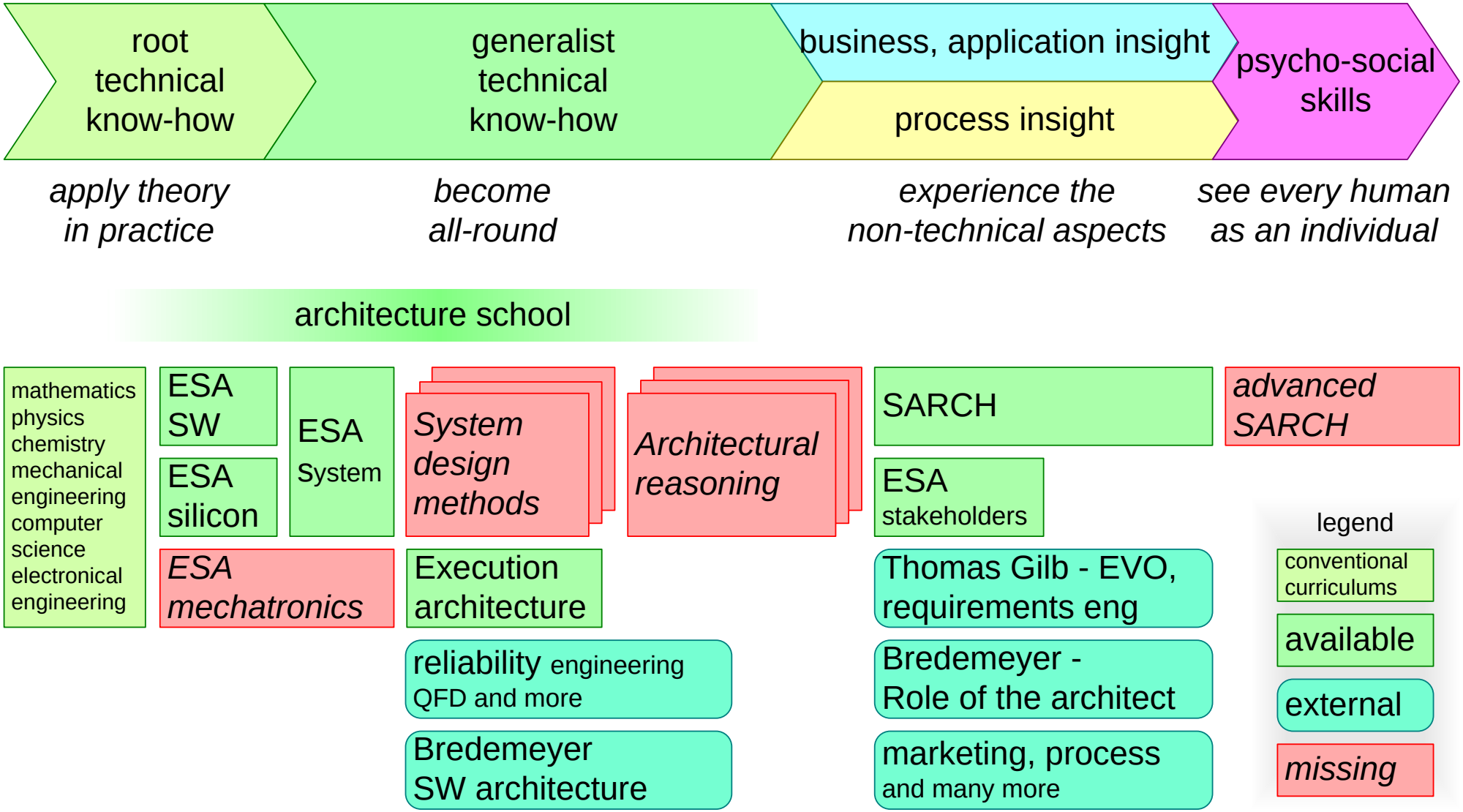
including
designers
(process)

technology
only




5. Environment
6. Conclusion
4. Experience
2. Education
1. Architect
3. Nature

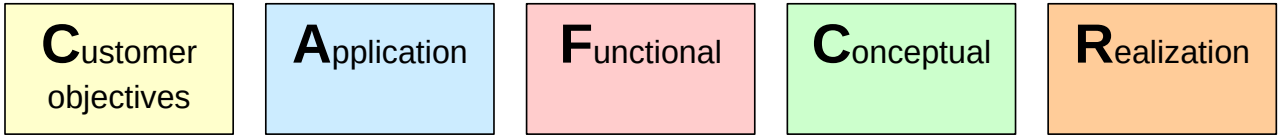
Proposed Curriculum for System Architects



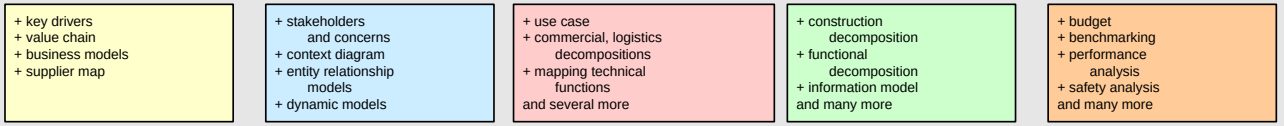
Overview of CAFCR framework

method outline *method visualization*

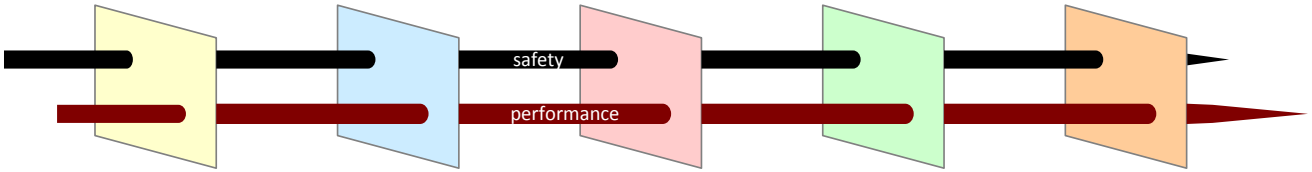
framework



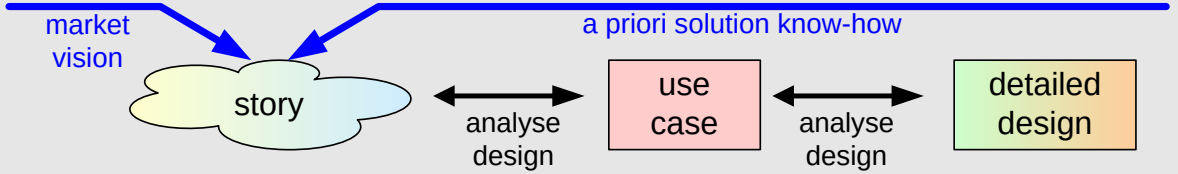
submethods



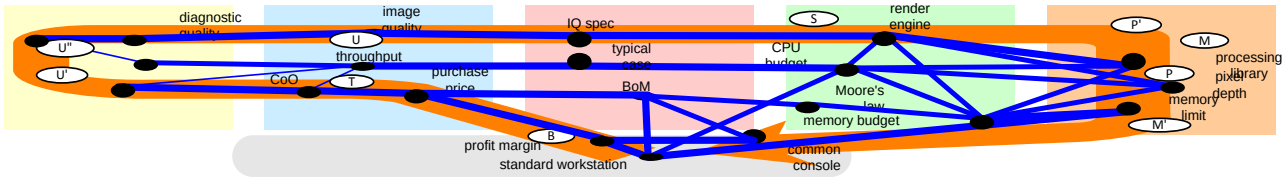
integration via qualities



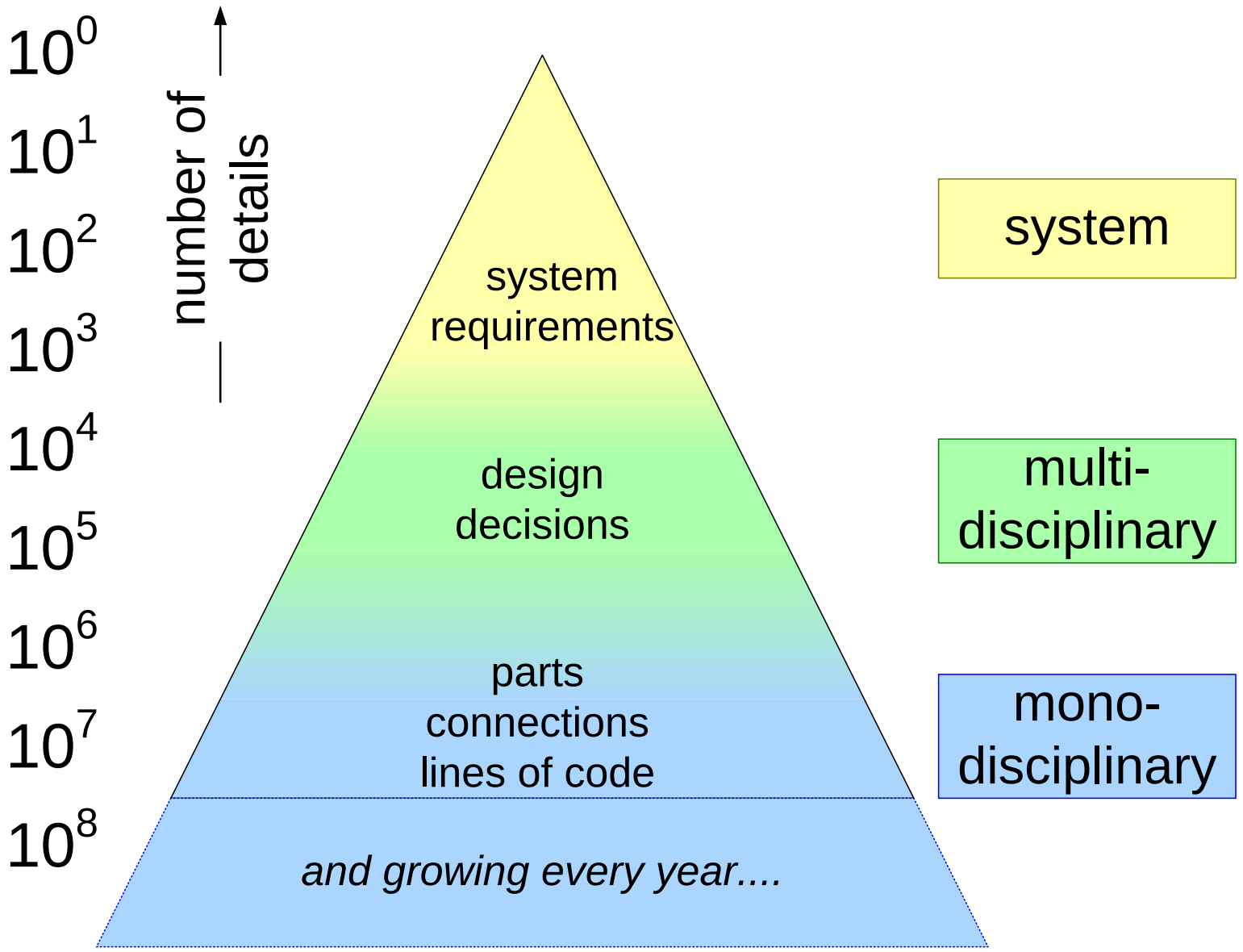
explore specific details



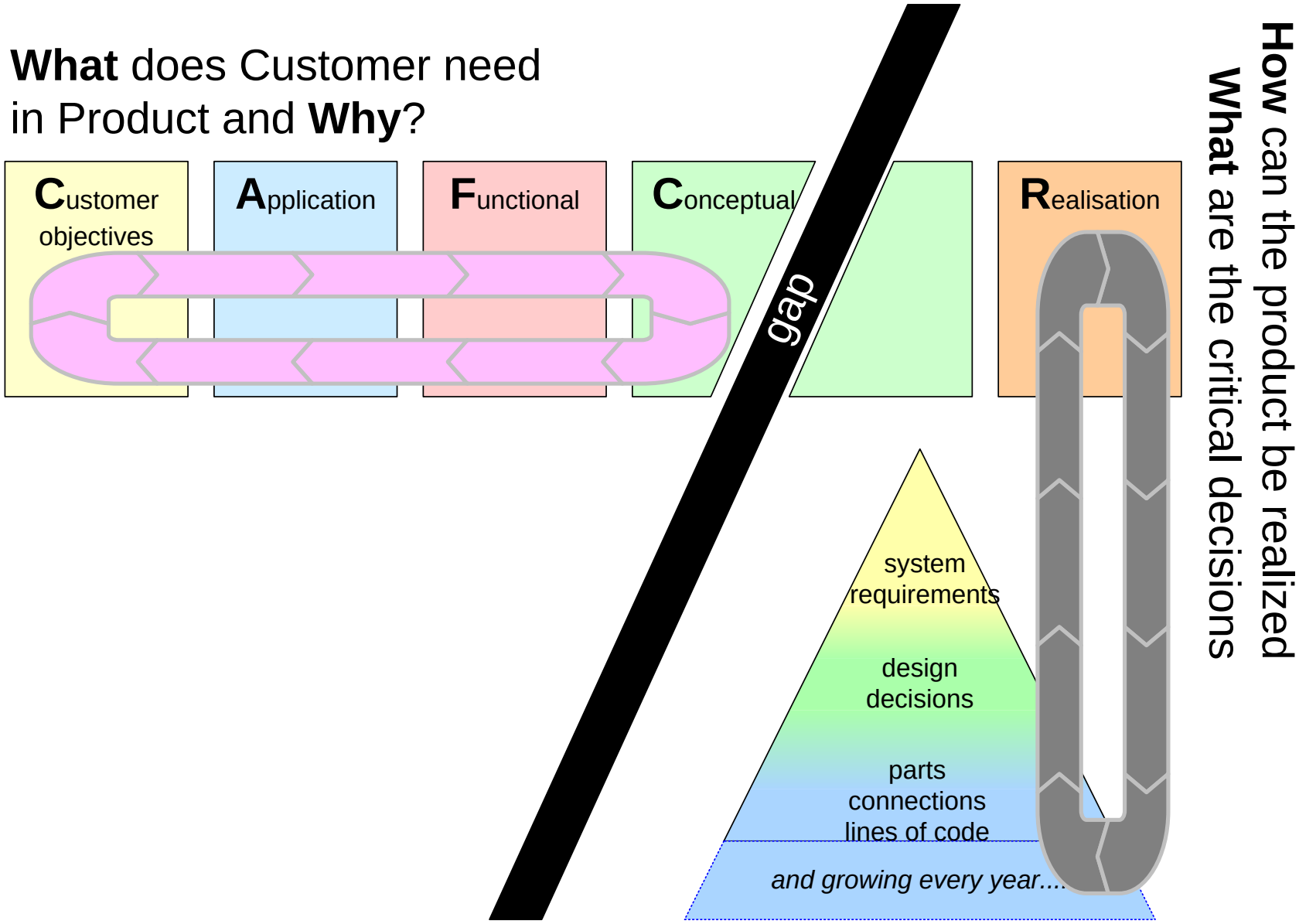
reasoning



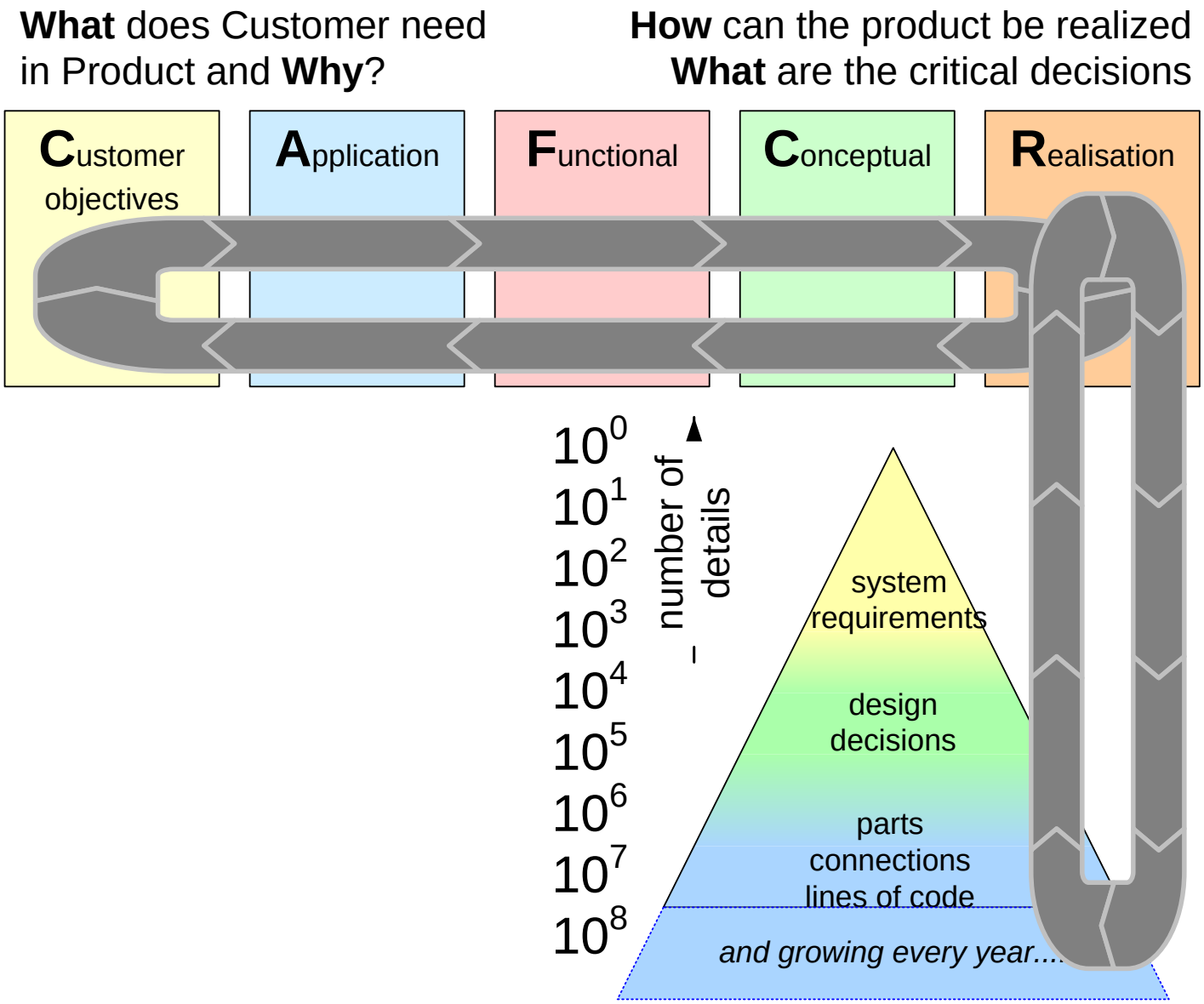
Connecting System Design to Detailed Design



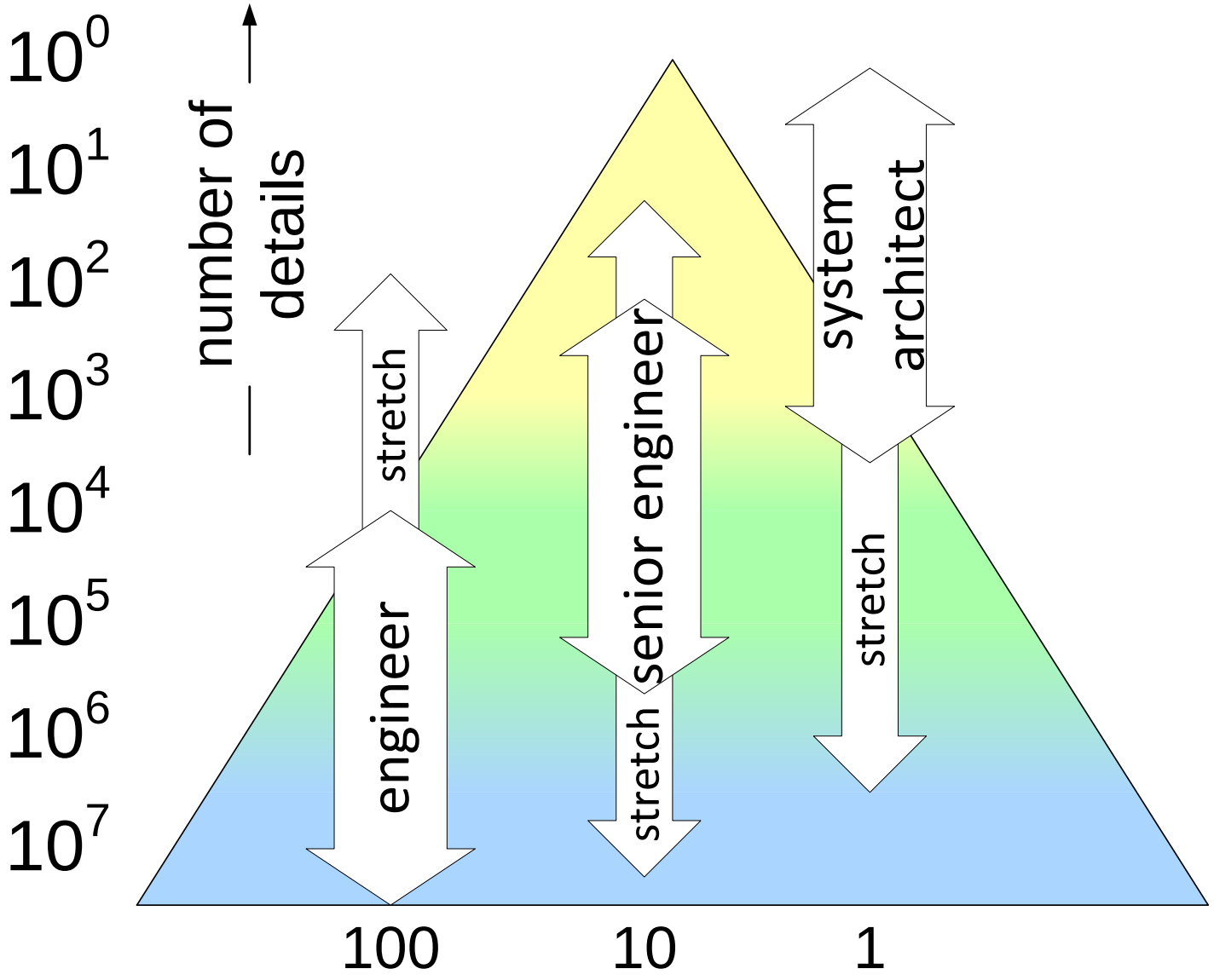
Organizational Problem: Disconnect

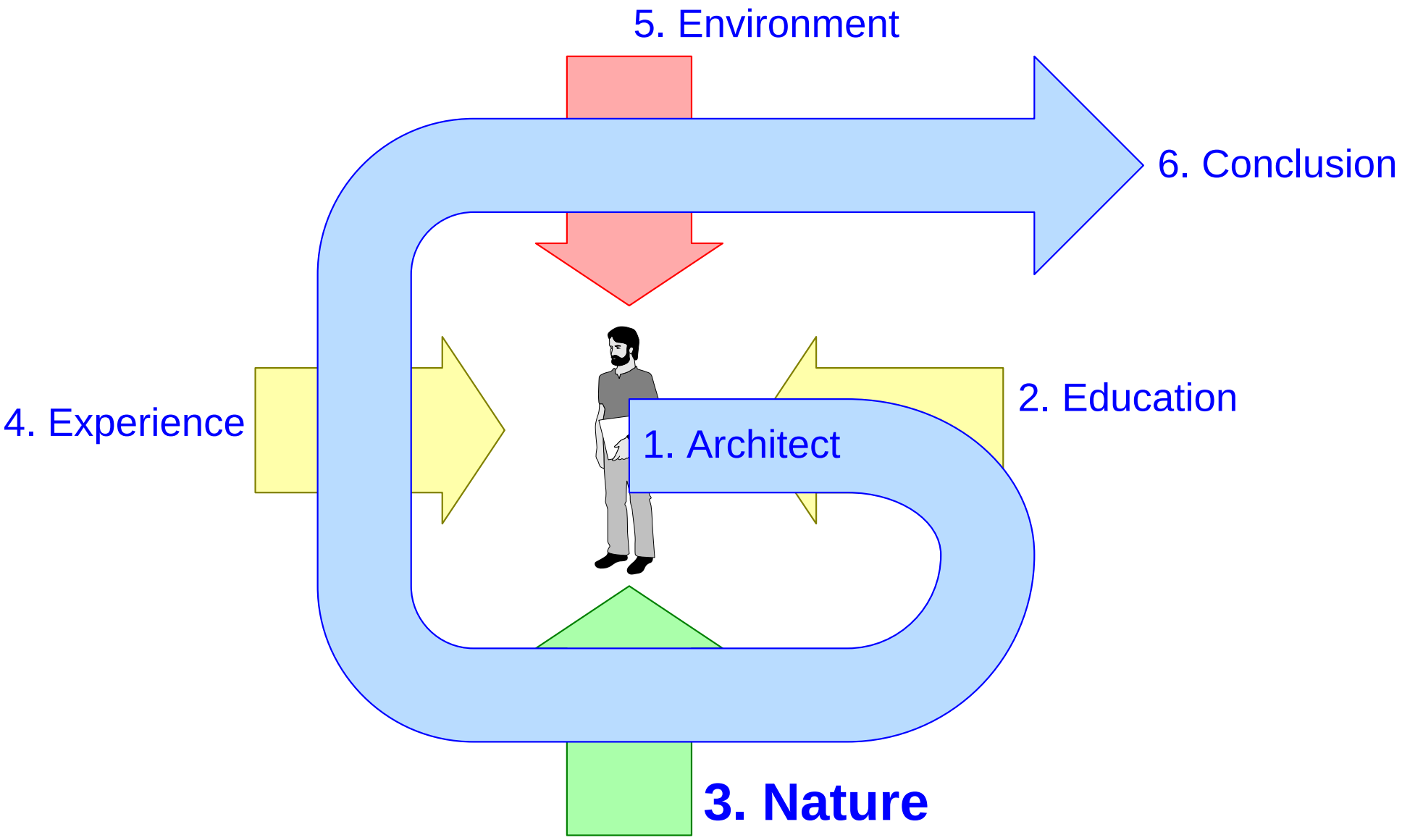


Architect: Connecting Problem and Technical Solution

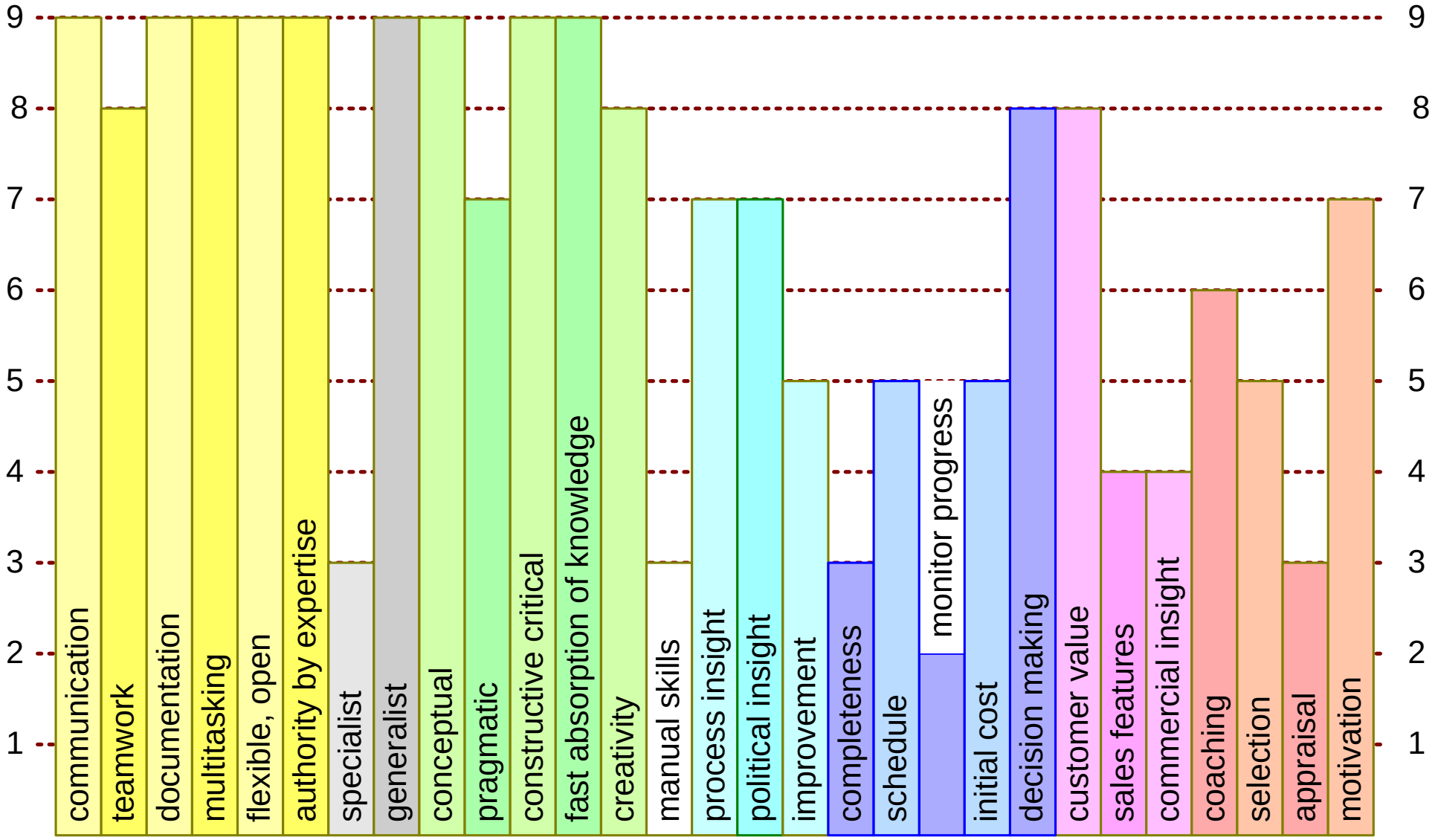


Major Bottleneck: Mental Dynamic Range

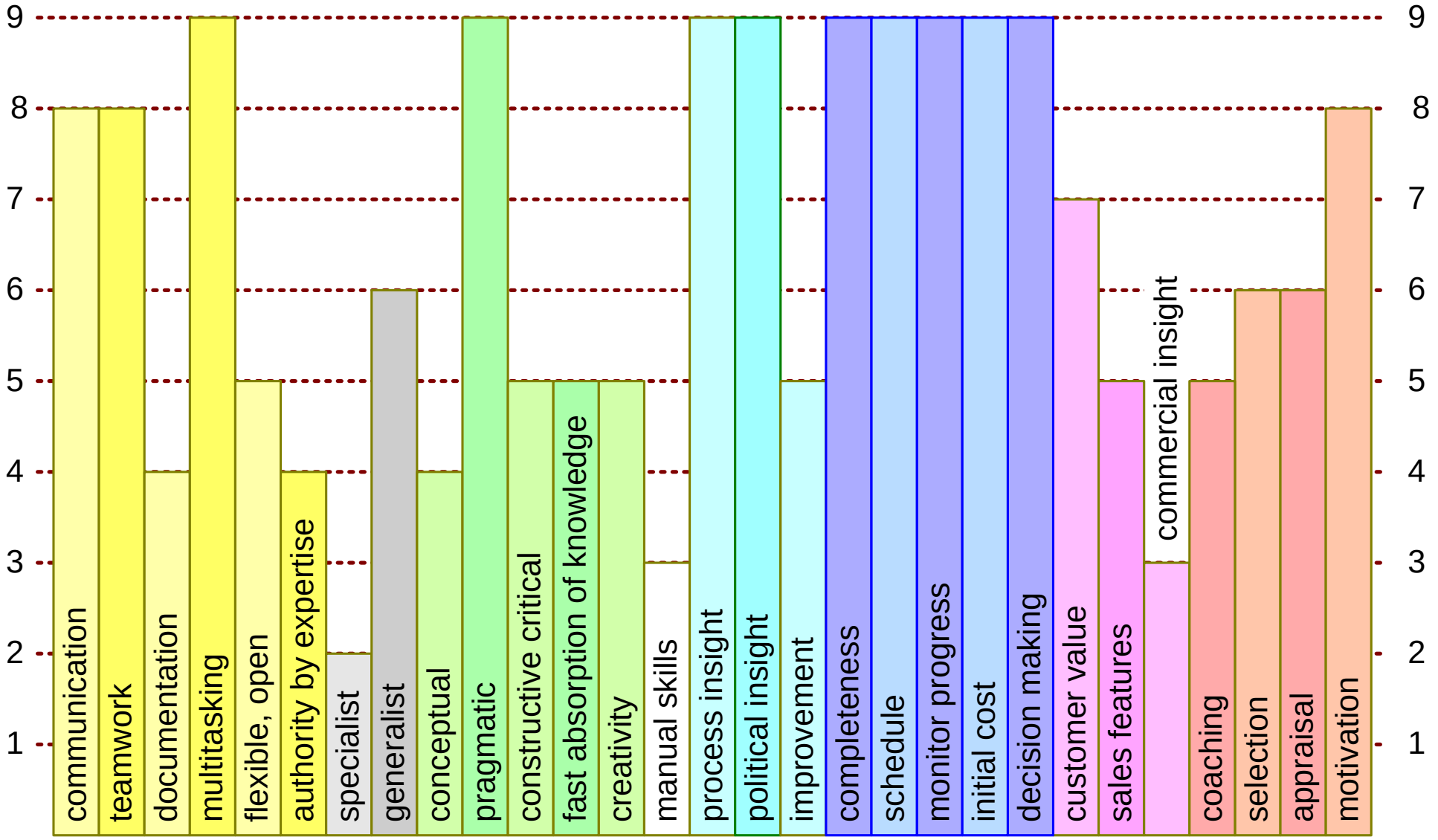



5. Environment
6. Conclusion
4. Experience
2. Education
1. Architect
3. Nature

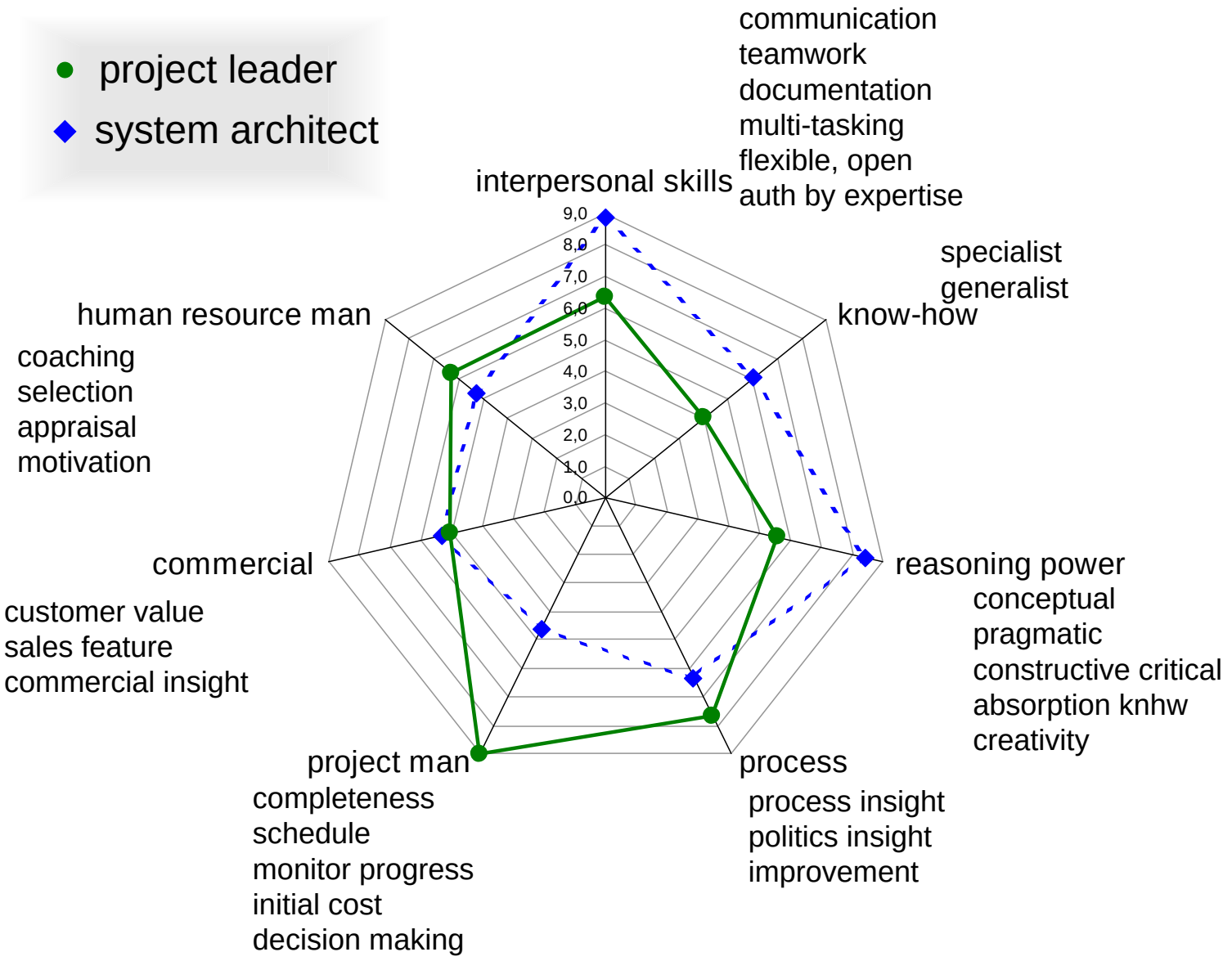
Profile of an ”Ideal” System Architect



For Comparison: Profile of a Project Leader

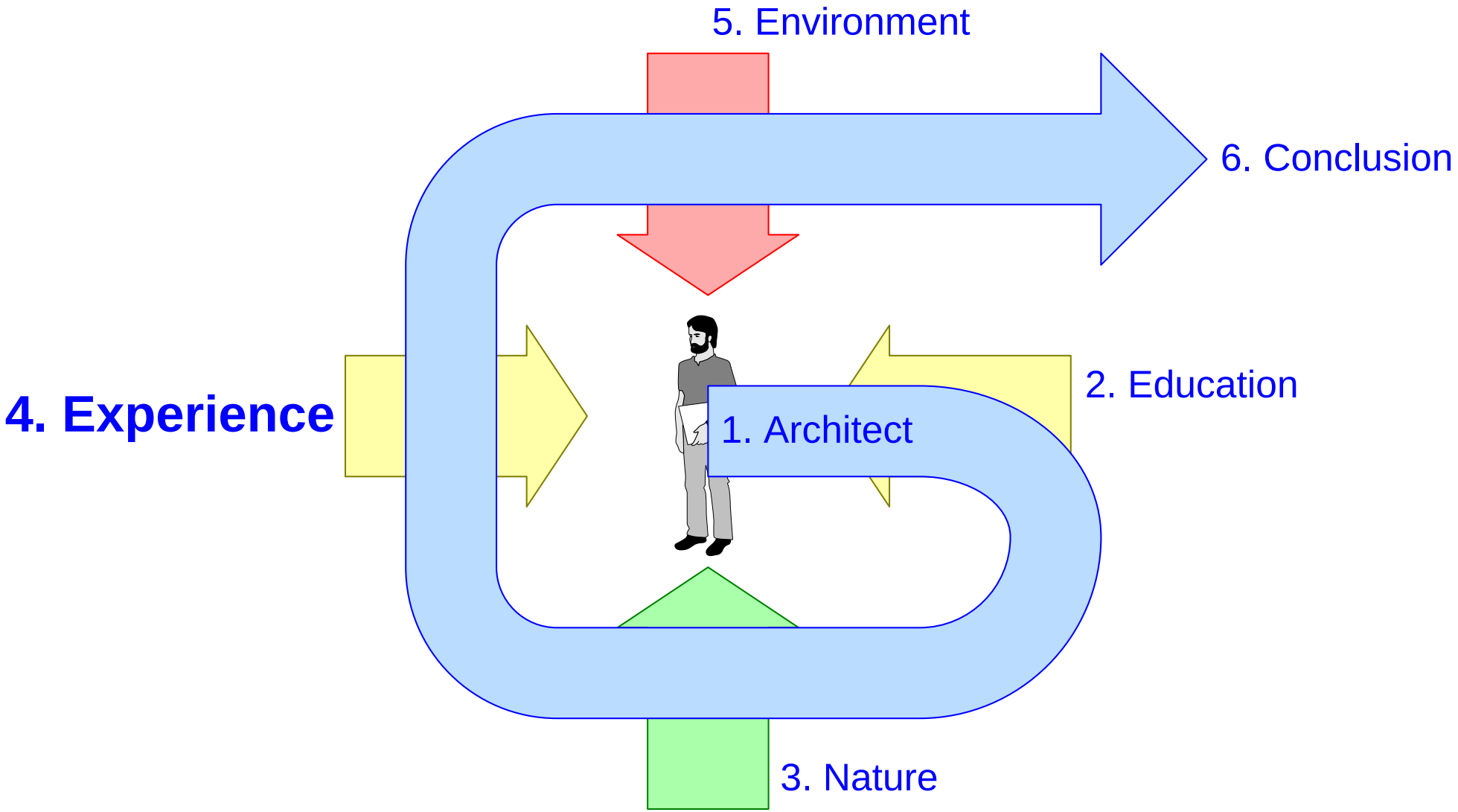


Project Leader vs System Architect



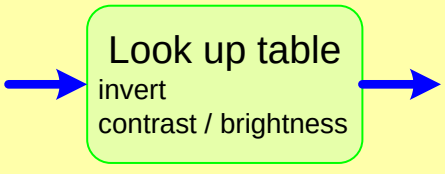
Most Discriminating Characteristics

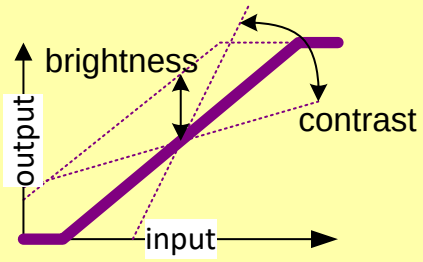
- Generalist
- Multi-tasking
- Authority by expertise
- Constructive critical
- Balance between conceptual and pragmatic

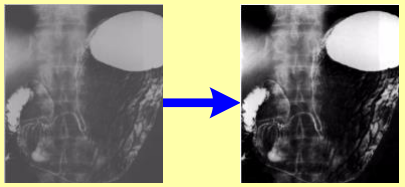

5. Environment
6. Conclusion
4. Experience
2. Education
1. Architect
3. Nature

Example: Trapezoid Pattern

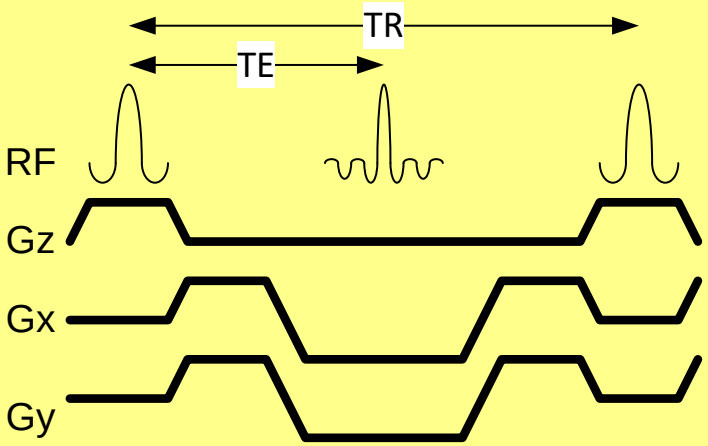
grey level mapping



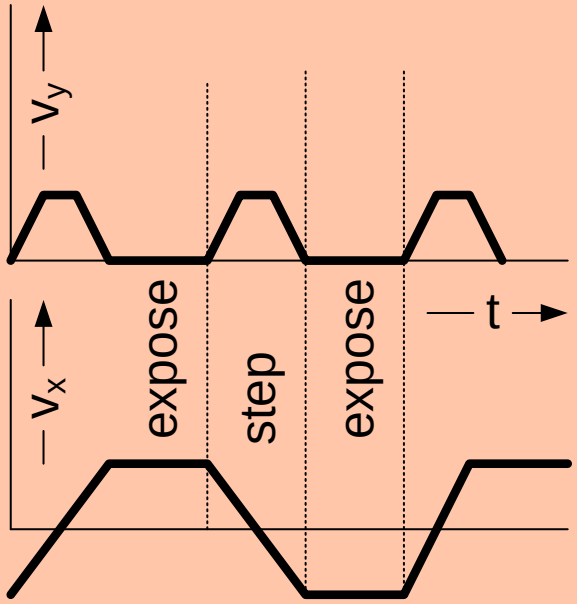




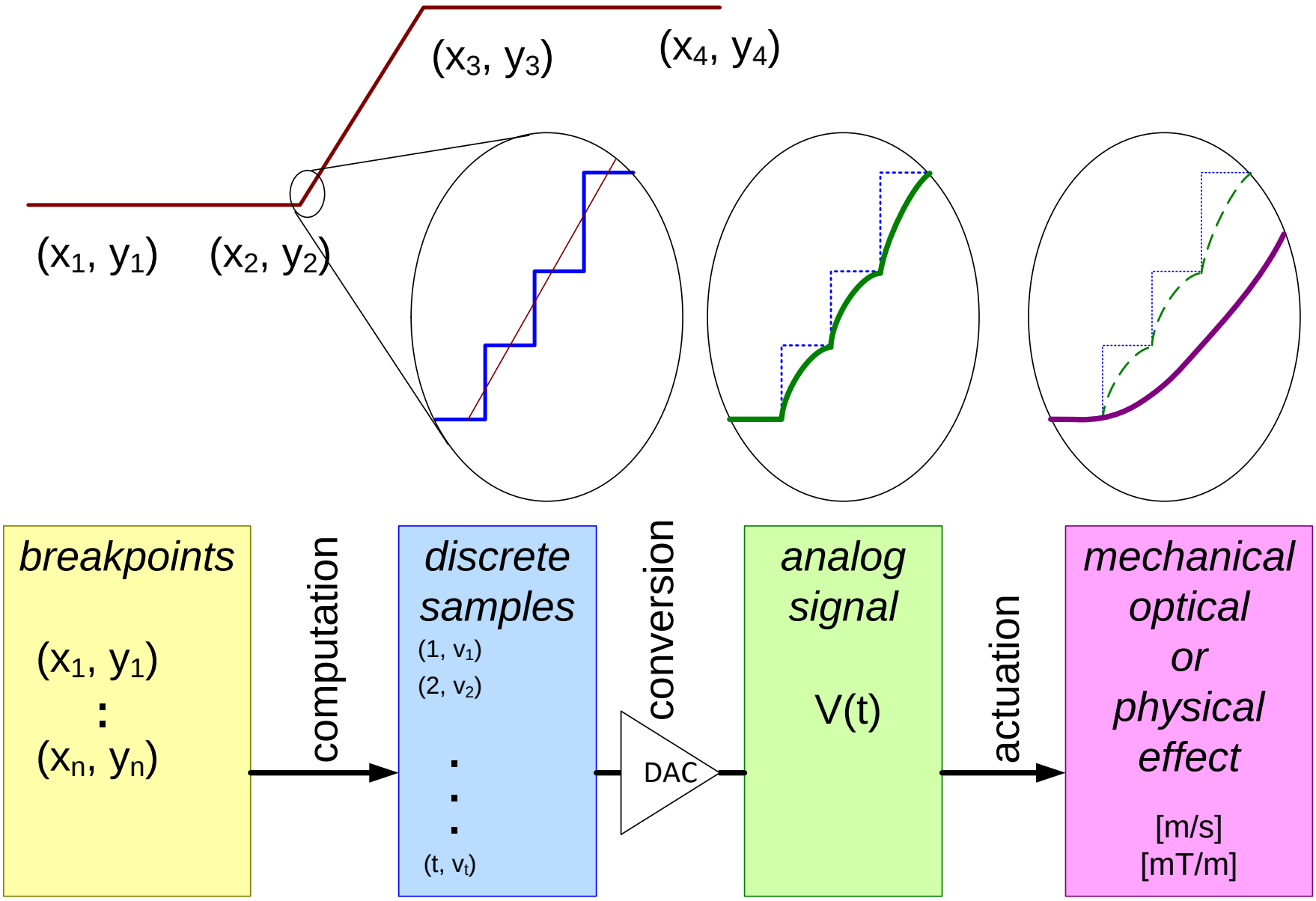
gradient field generation



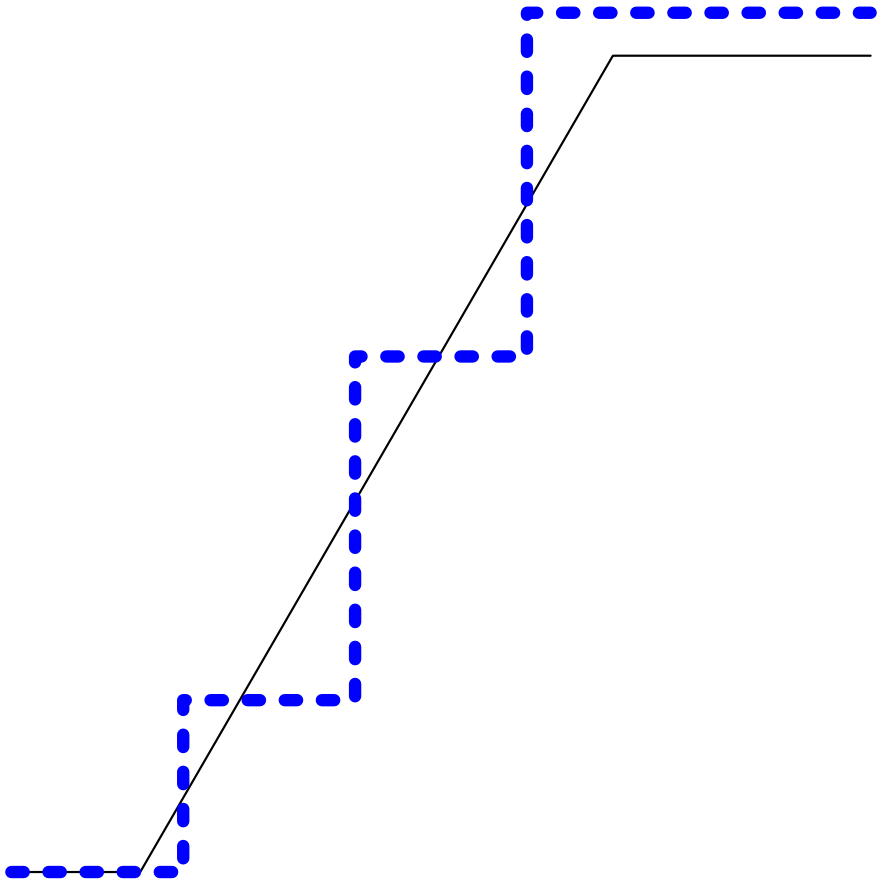
wafer stage movement



From SW input to physical Effect



Discretization effects

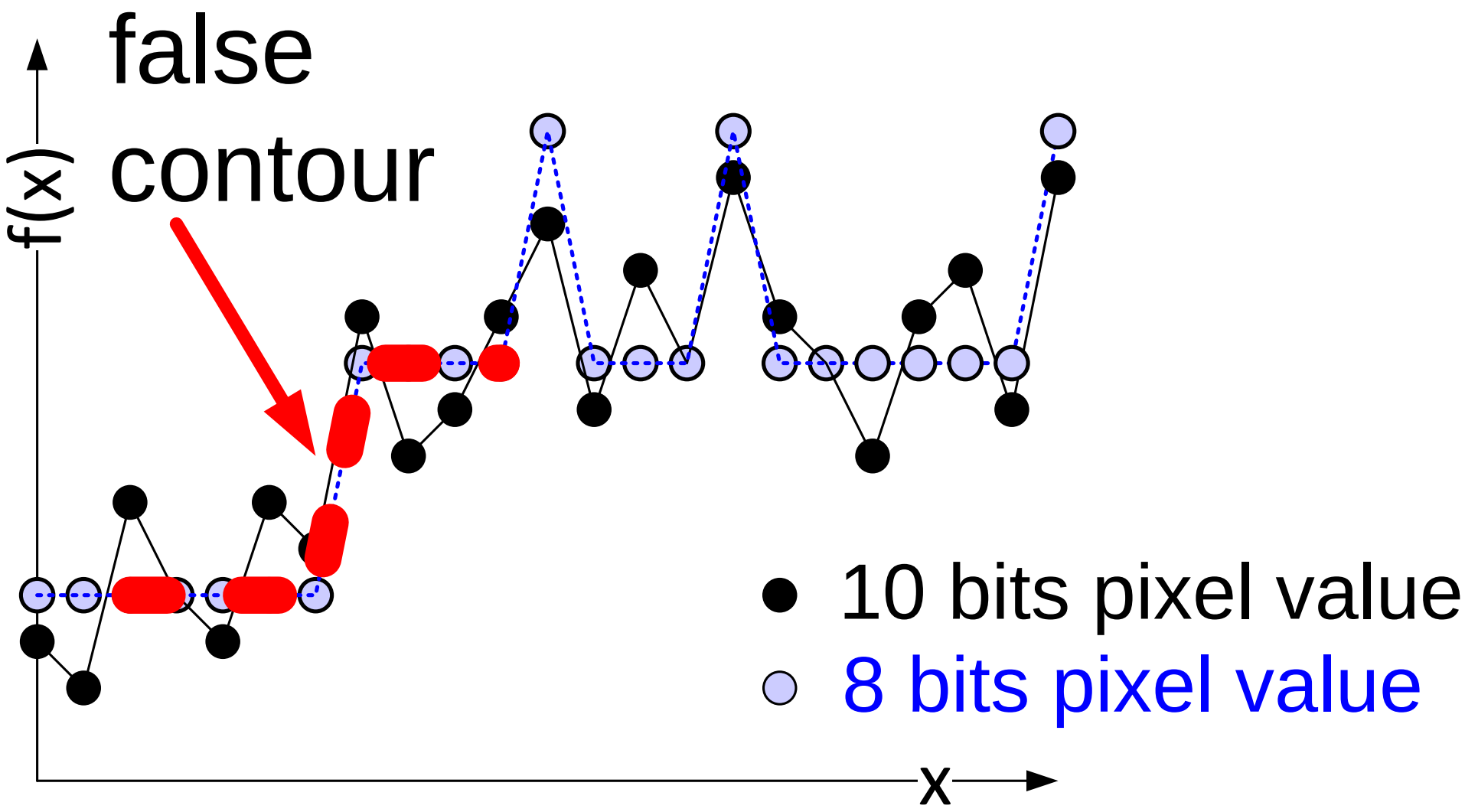


input is discrete
output is discrete

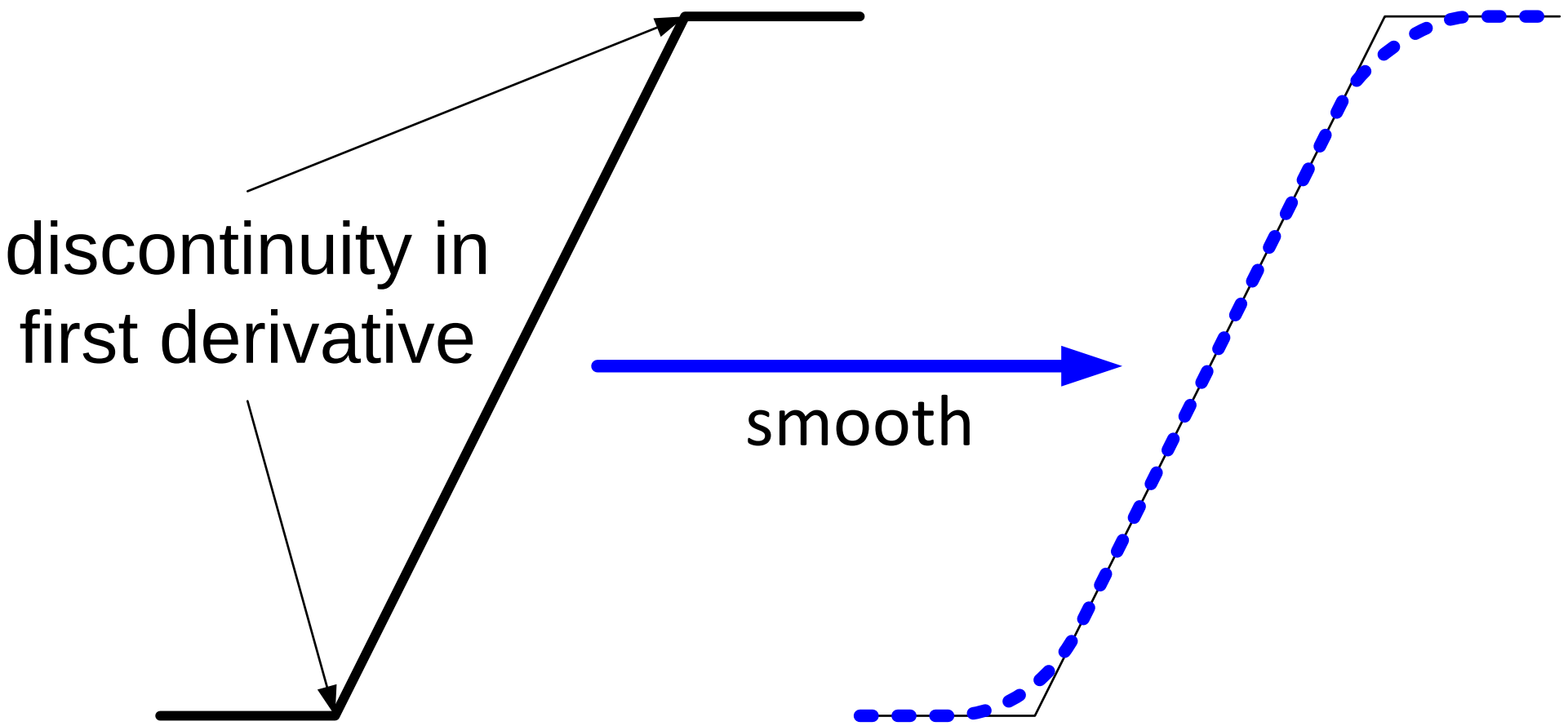
potential problems:
staircase effects
not all values can be reached
impact on frequency domain
broken invariants (surface)

potential benefits:
optimized algoritms (fixed point)

Example of Discretization Problem

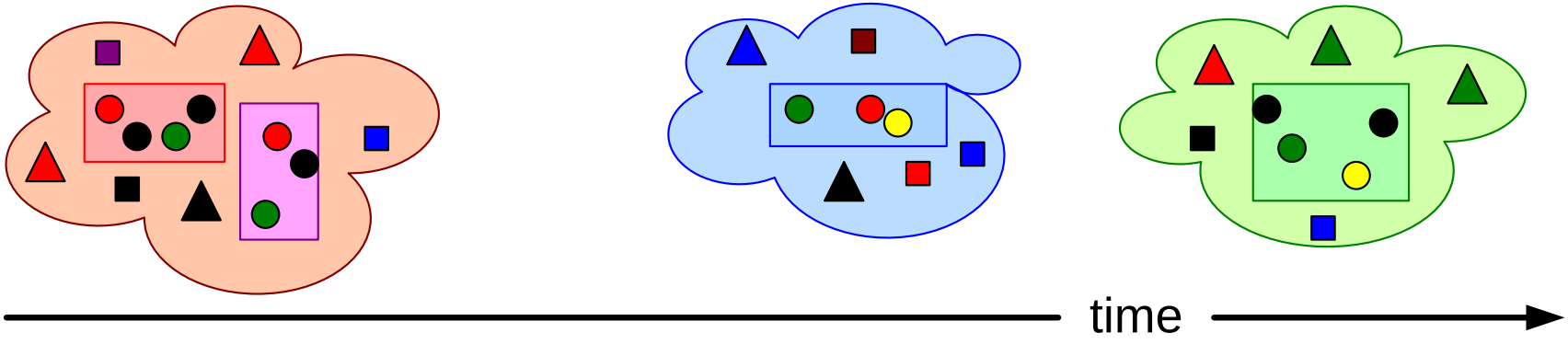


Example of Generic Smoothing Consideration



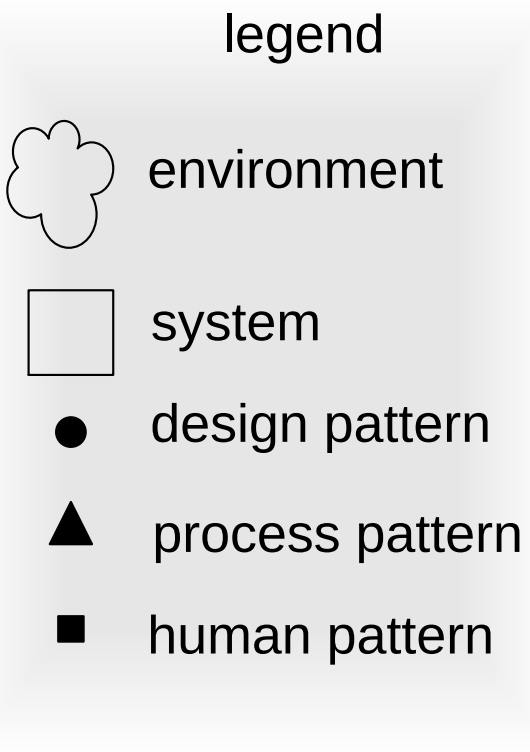
smooth curves prevent artefacts
(vibration, image, clipping)

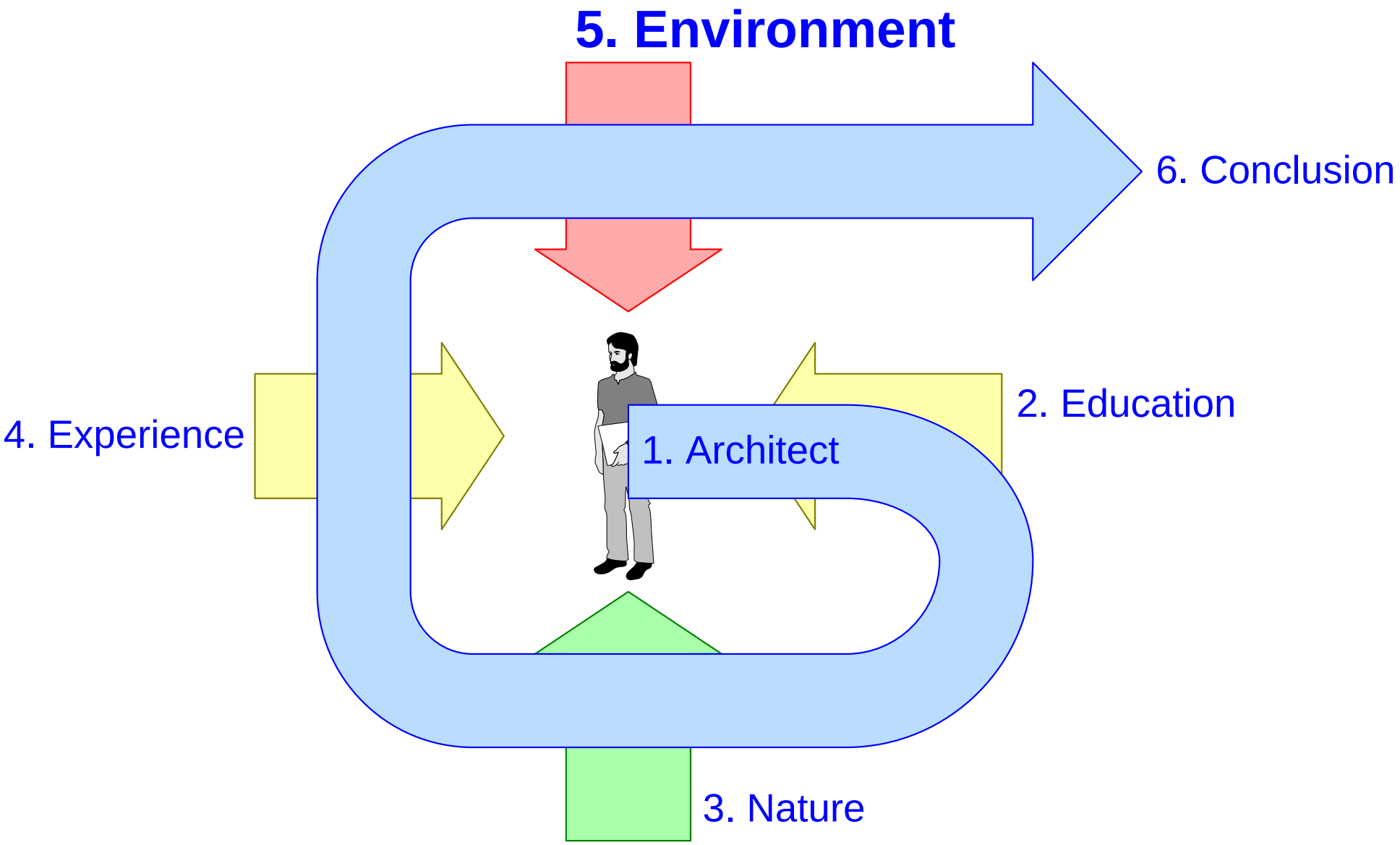
Architects Collect a Rich Set of Patterns



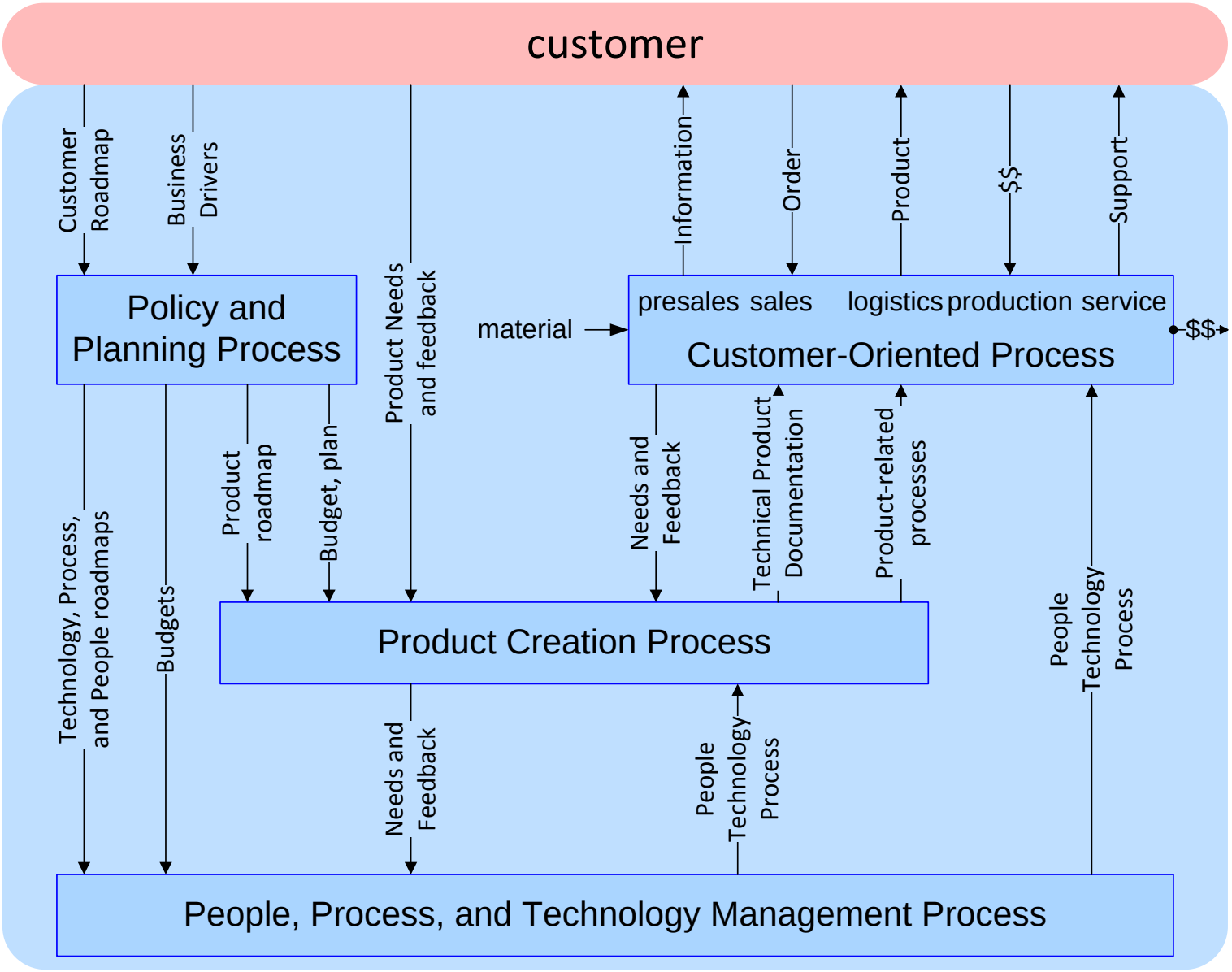
architects move from:
- product to product
- environment to environment

architects experience:
- thousands of patterns
- *design* patterns in systems
- *process* patterns in environments
- *human* patterns in environments

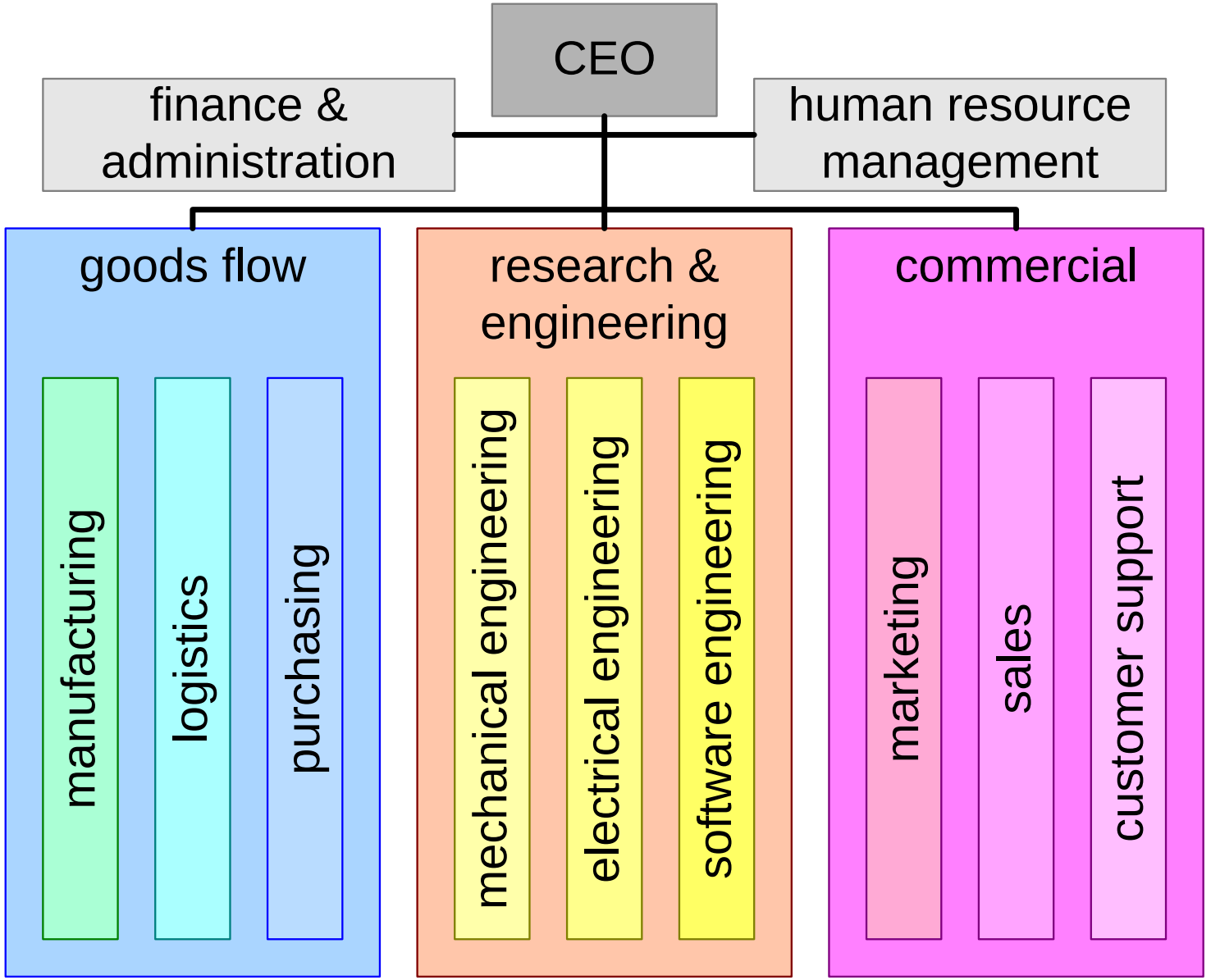



5. Environment
6. Conclusion
4. Experience
2. Education
1. Architect
3. Nature

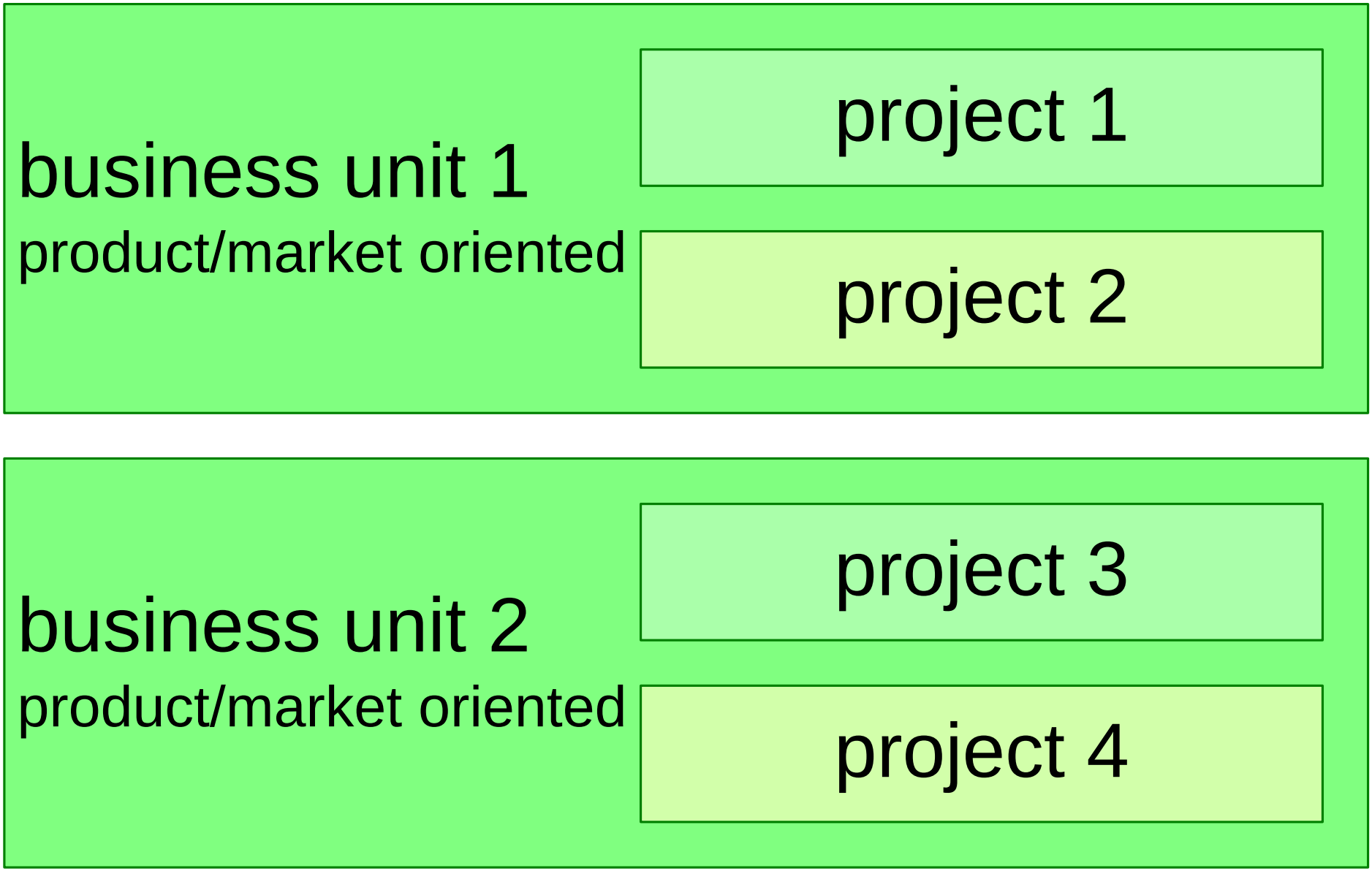
Simplified Decomposition of the Business



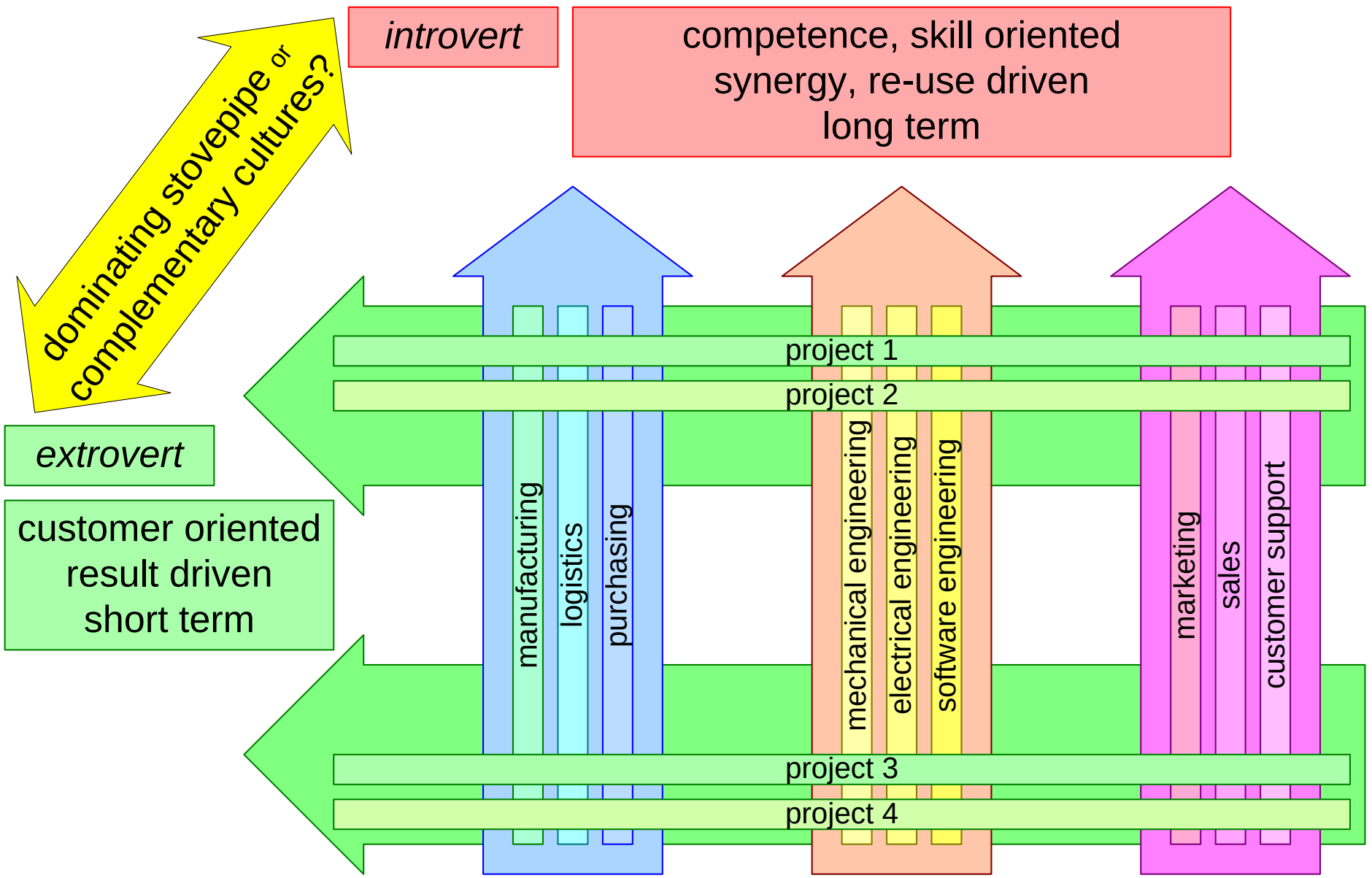
Line Organization Stovepipe



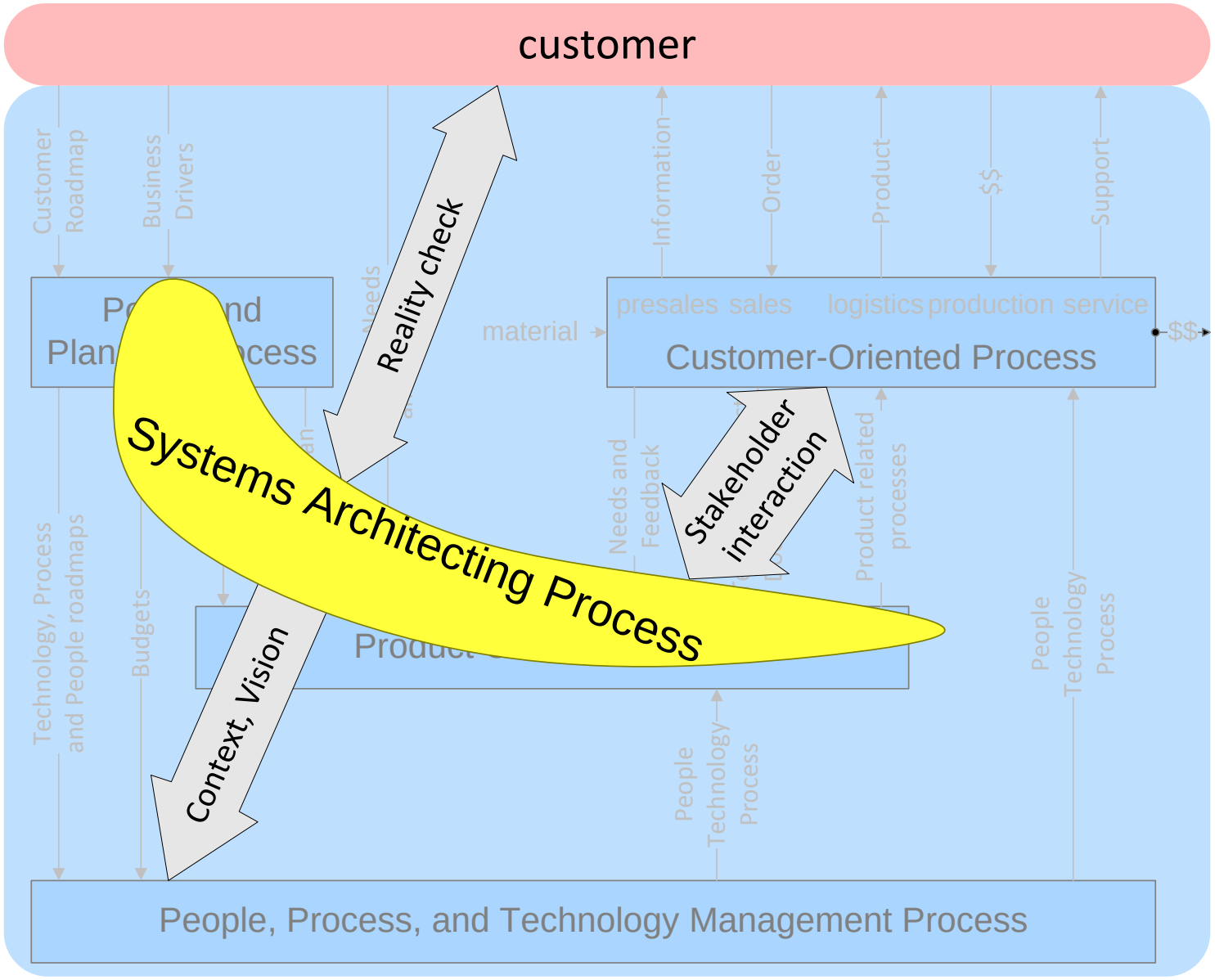
Business Organization Stovepipe



Different Concerns



Positioning System Architecting



What Can We Do to Improve the Environment?

systems engineering as discipline

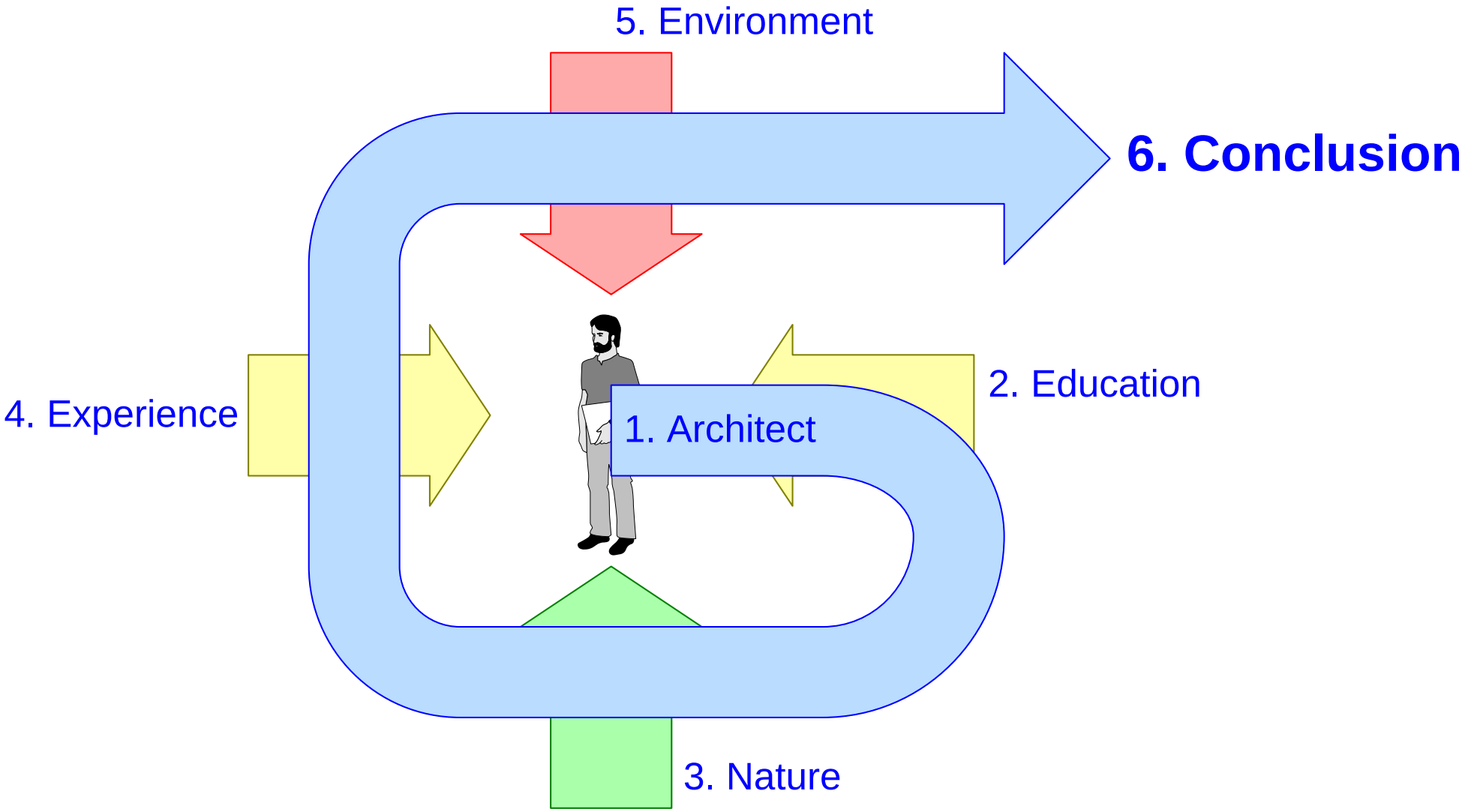
job rotation

stimulate architect exposure

stretch all engineers

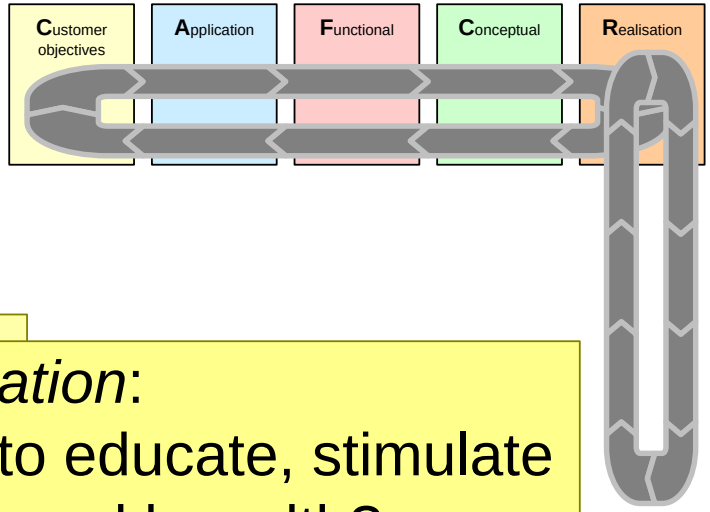
cultivate customer & market oriented culture

share and invest in future exploration and vision


5. Environment
6. Conclusion
4. Experience
2. Education
1. Architect
3. Nature

Conclusion

Environment:
stimulate job rotation
expose engineers
recognize multi-disciplinary



Experience:
>1000 design patterns
and process patterns

Education:
How to educate, stimulate
depth and breadth?

Nature:
Foster engineers with
architect potential