

# Understanding And Validating Value

by *Gerrit Muller* Buskerud University College

e-mail: `gerrit.muller@embeddedsystems.nl`

`www.gaudisite.nl`

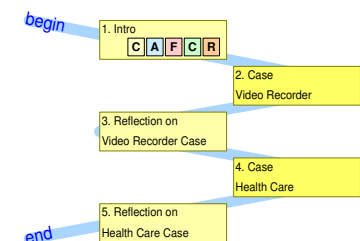
## Abstract

Value of a system is determined by the value of the product for the customer. To create a valuable system we need to understand our customer. However, value is also impacted by the way we realize the system. Poor realizations degrade the value of a product, while ingenious realizations can boost the value. We use the CAFCR model to illustrate this for two cases: a video recorder and a health care system.

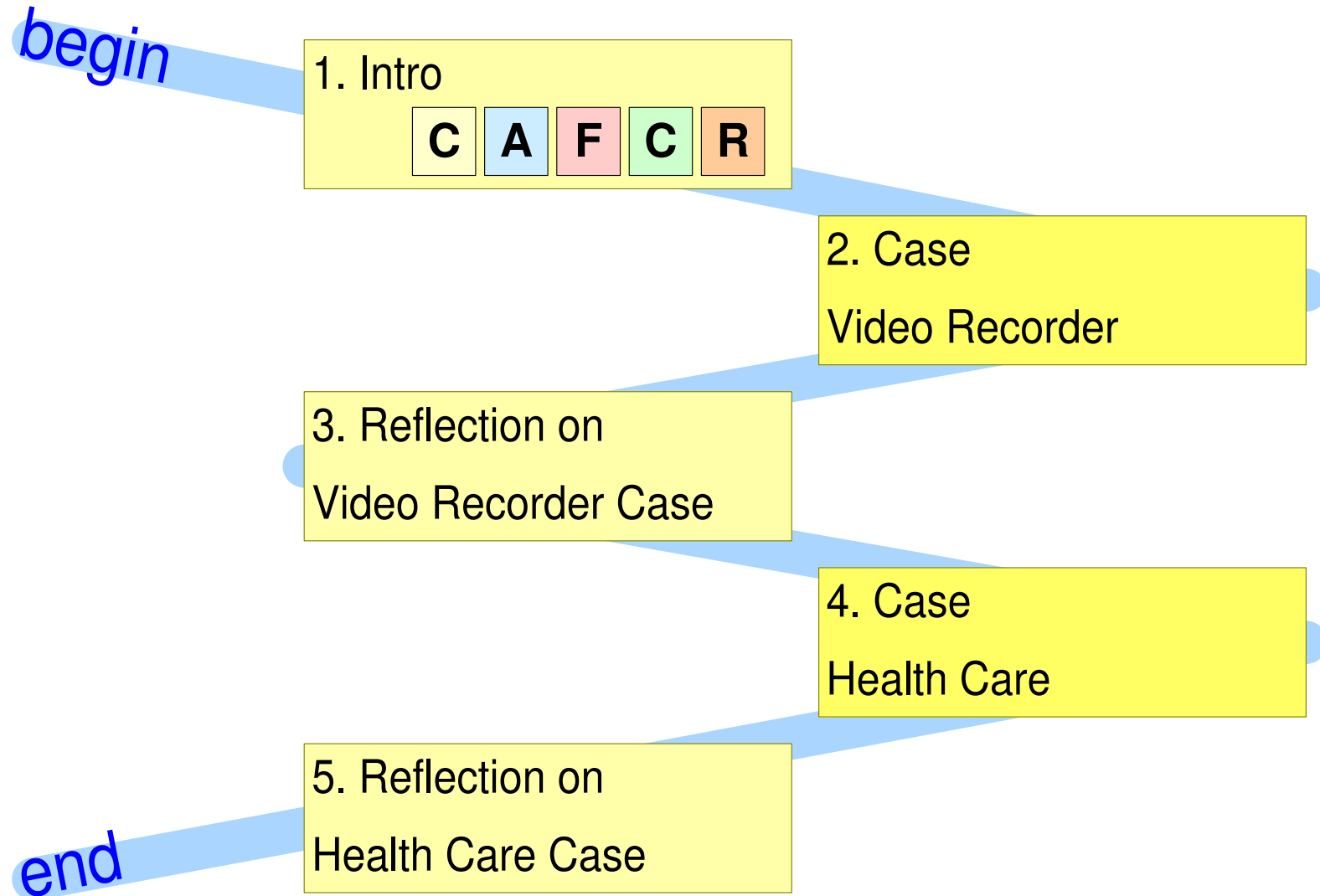
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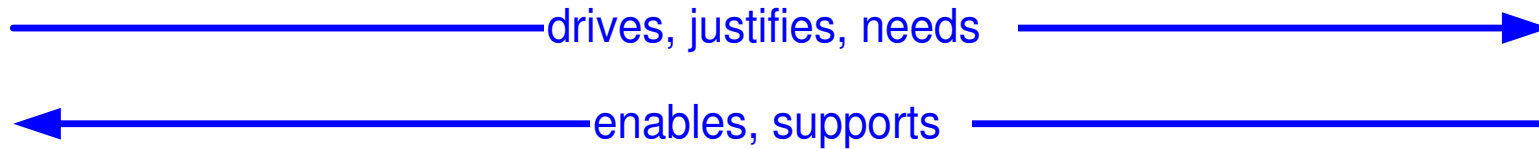
July 1, 2011  
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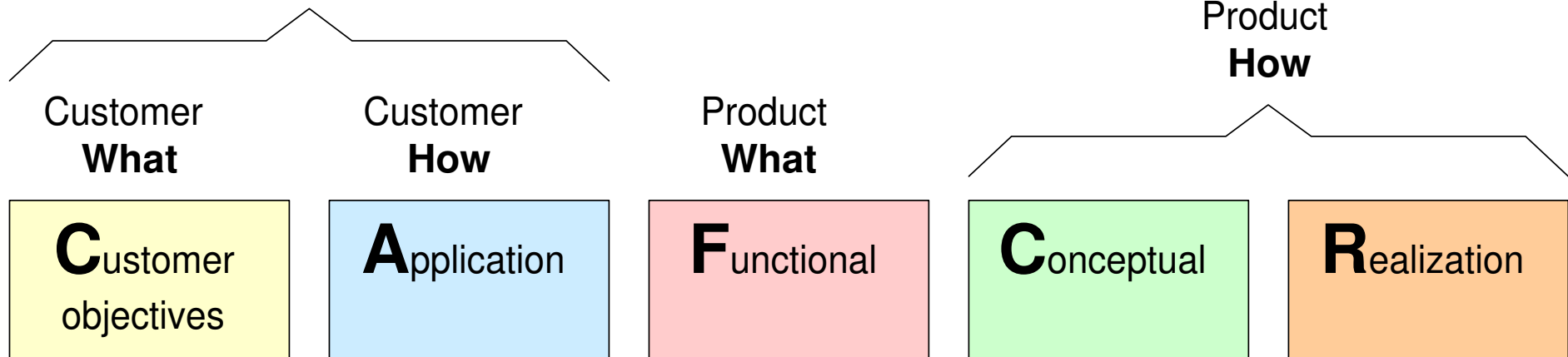
# Figure Of Contents™



# The "CAFCR" model

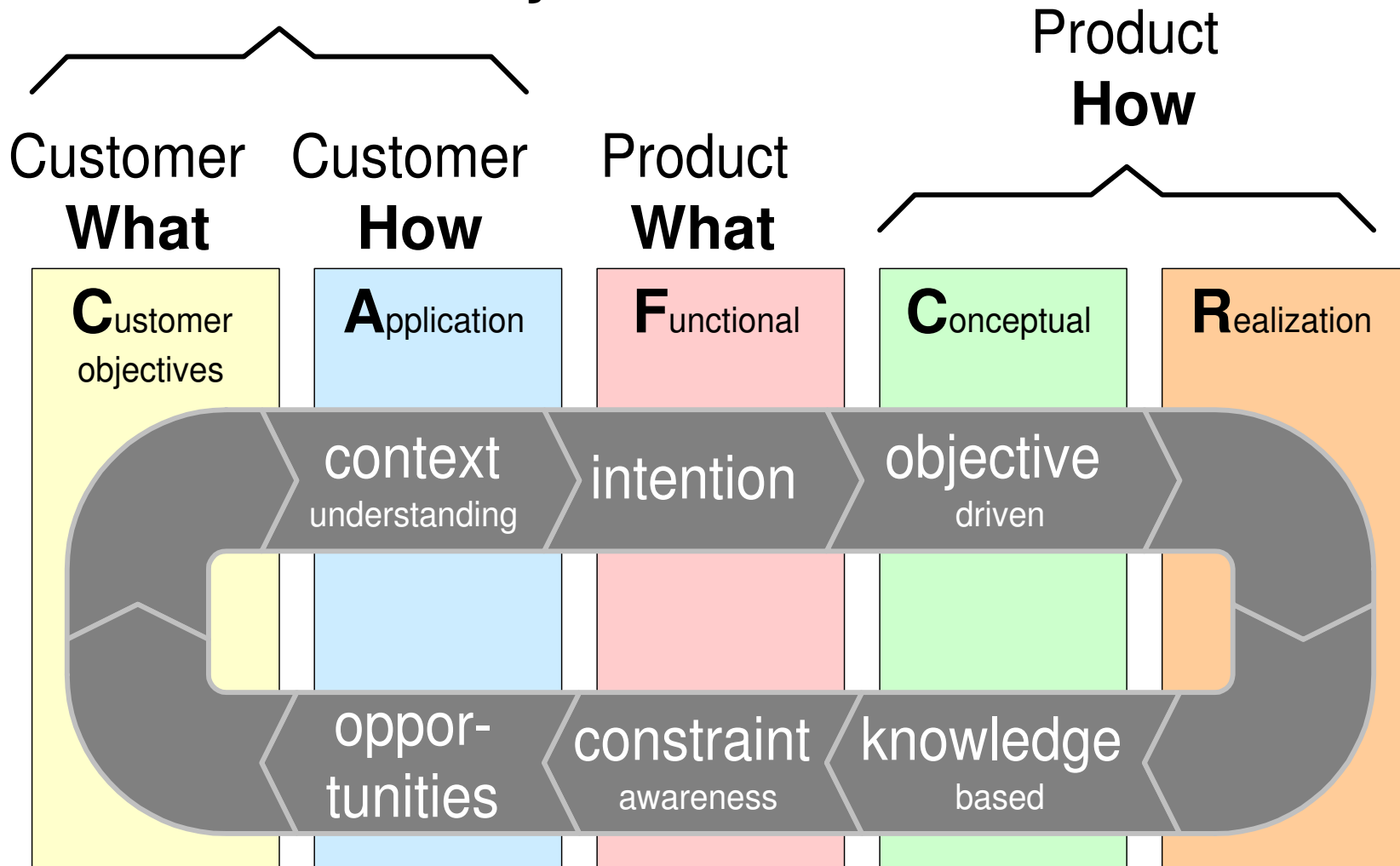


**What** does Customer need  
in Product and **Why?**

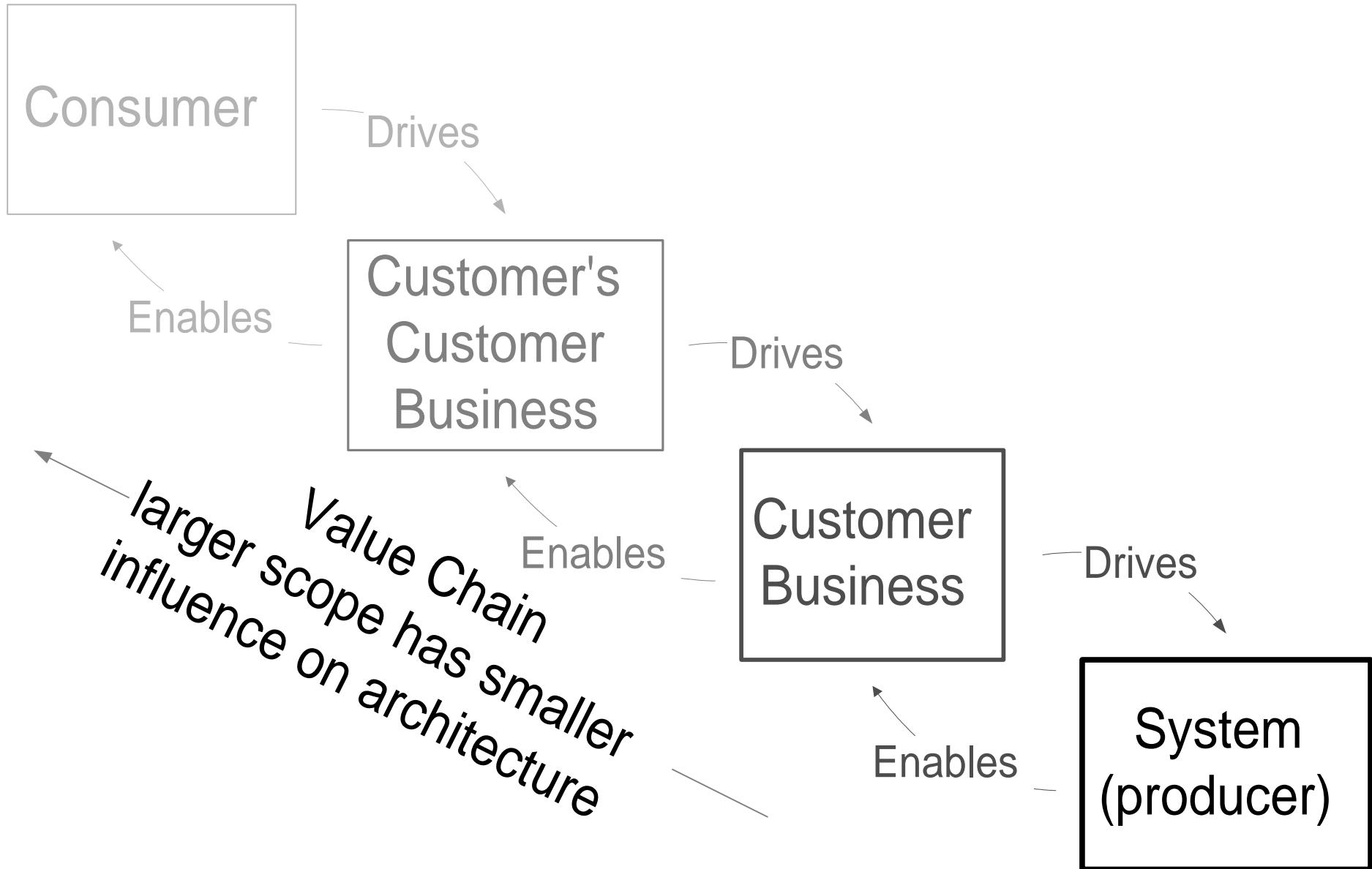


# Integrating CAFCR

**What** does Customer need  
in Product and **Why?**

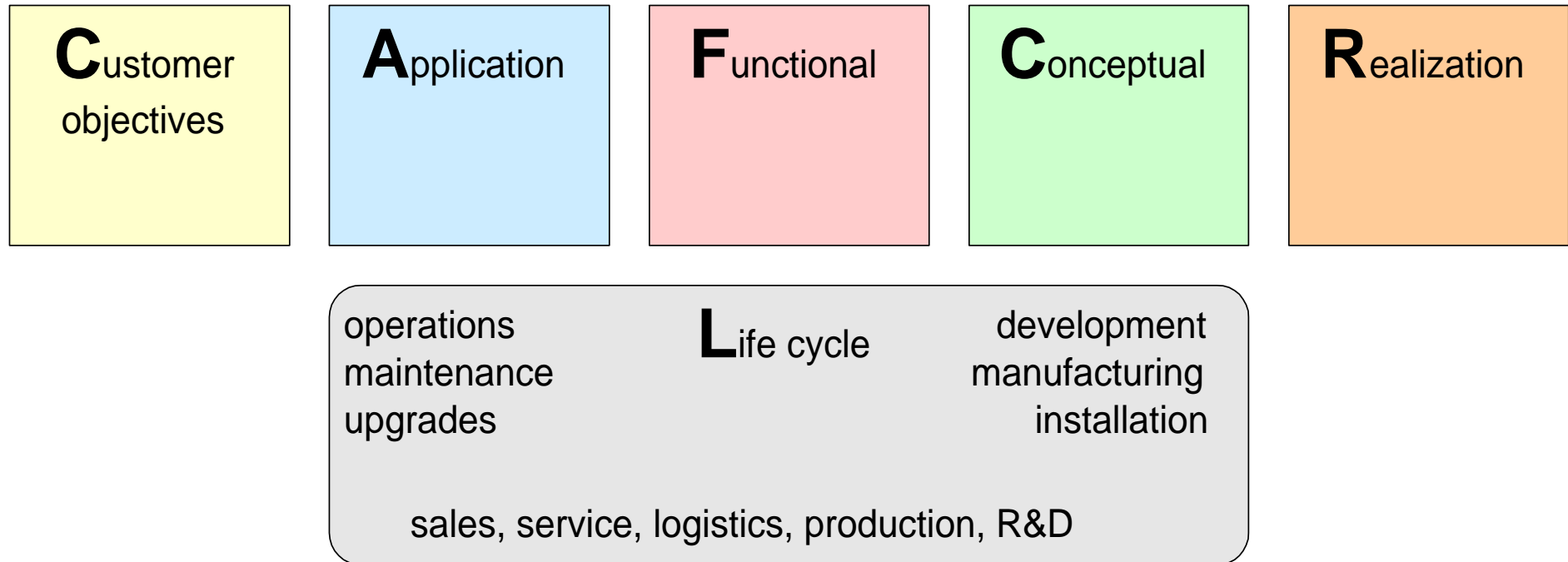


# CAFCR can be applied recursively



# CAFCR+ model; Life Cycle View

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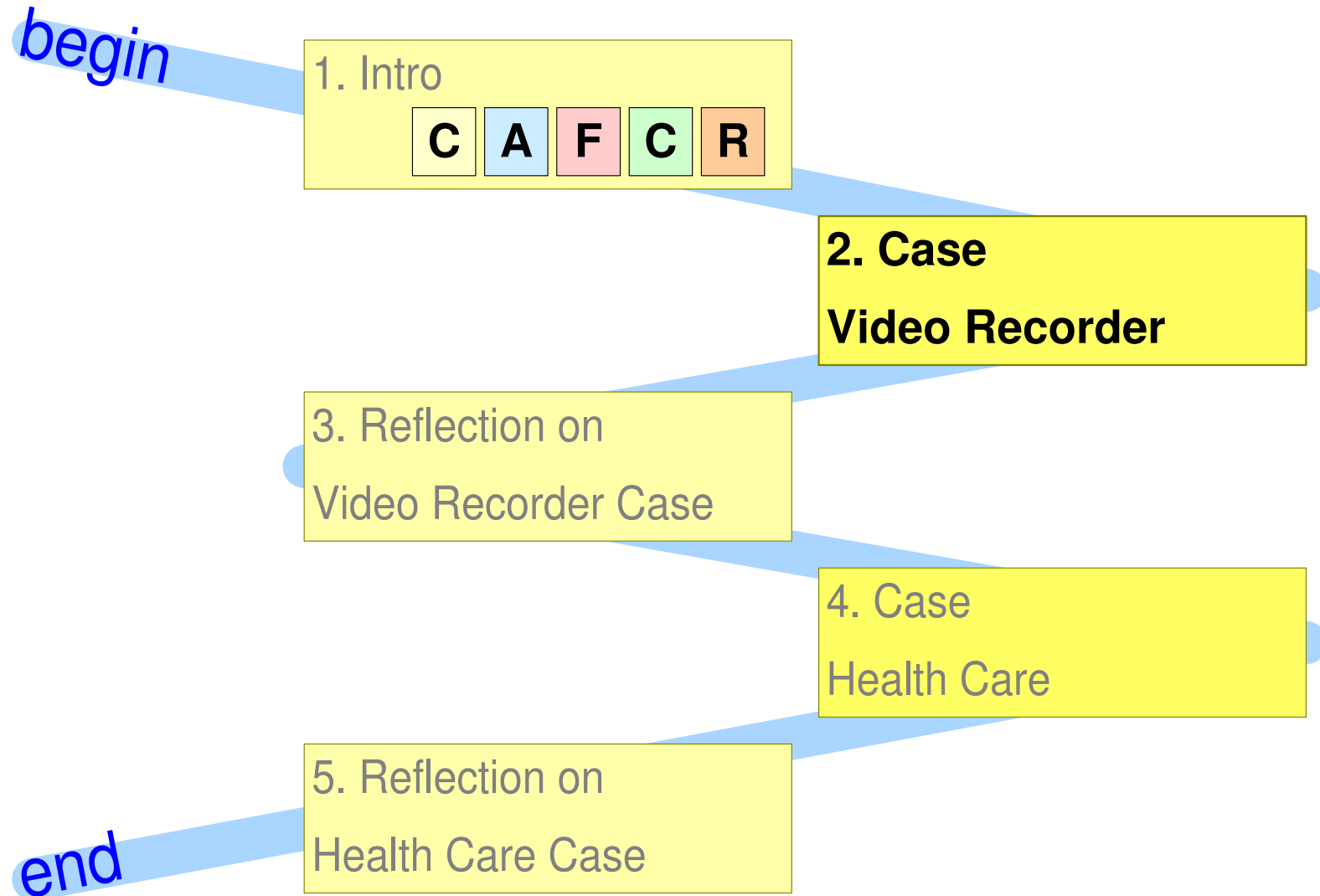
## 2001 Course Requirements Engineering for OOTI

### Post Master Education Technical Informatics

Group assignment for circa 16 students

Write a requirements specification for a hard-disk based video recorder

# Video Recorder Case



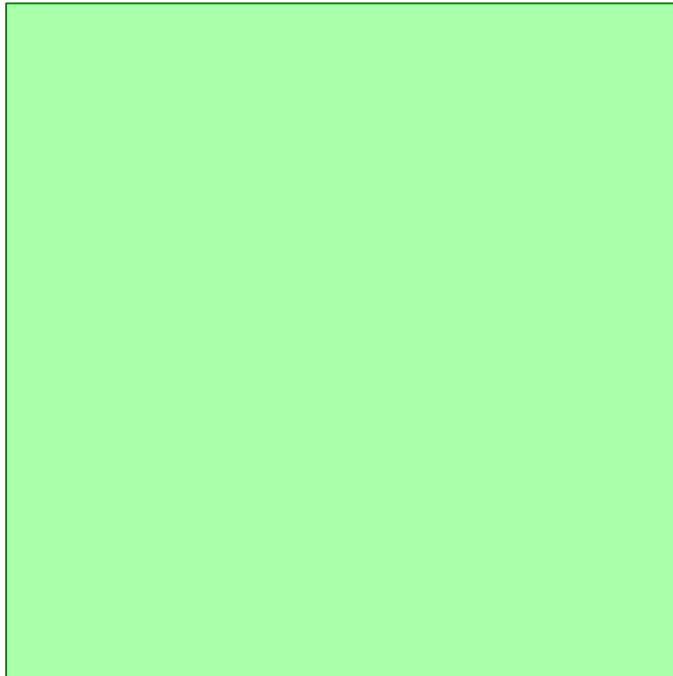
# Original Question

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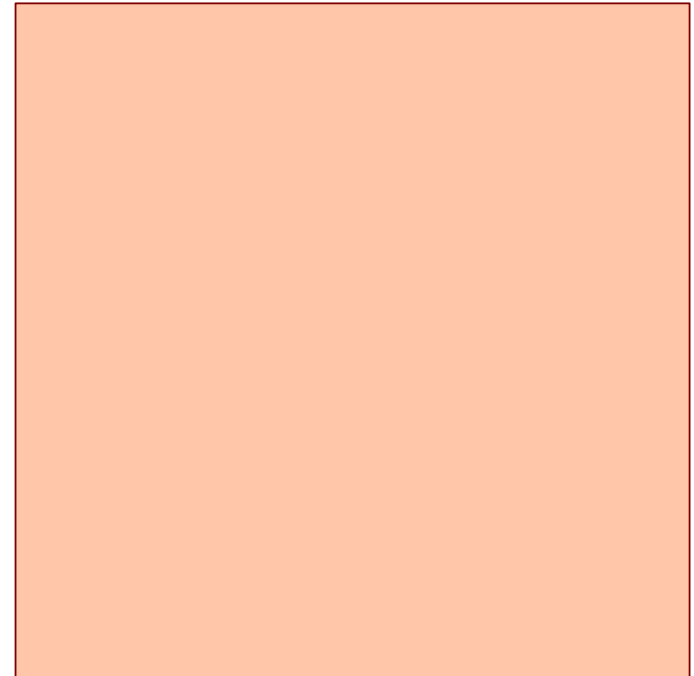
Late nineties

*the question:* "I want a hard disk based video recorder"

*What are the actual needs?*



*What are the possible solutions?*



# What are the Needs

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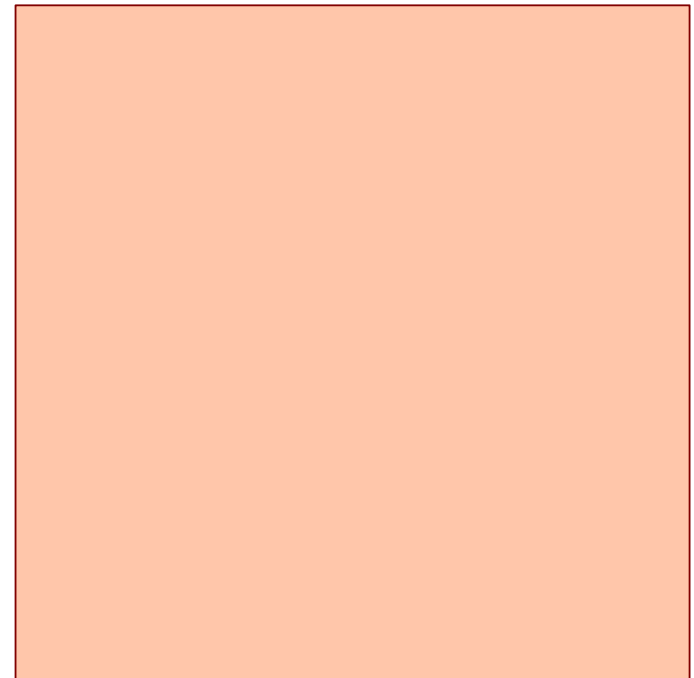
Late nineties

*the question:* "I want a hard disk based video recorder"

*What are the actual needs?*

no hassle with tapes  
high reliability  
high capacity  
time shifting  
portable device  
skipping commercials  
...

*What are the possible solutions?*



# What are Potential Solutions

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Late nineties

*the question:* "I want a hard disk based video recorder"

*What are the actual needs?*

no hassle with tapes  
high reliability  
high capacity  
time shifting  
portable device  
skipping commercials  
...

*What are the possible solutions?*

hard disk  
optical disc  
optical tape  
flash memory  
DRAM memory  
network  
...

# Did you ever program a VCR?

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A



depressed

B



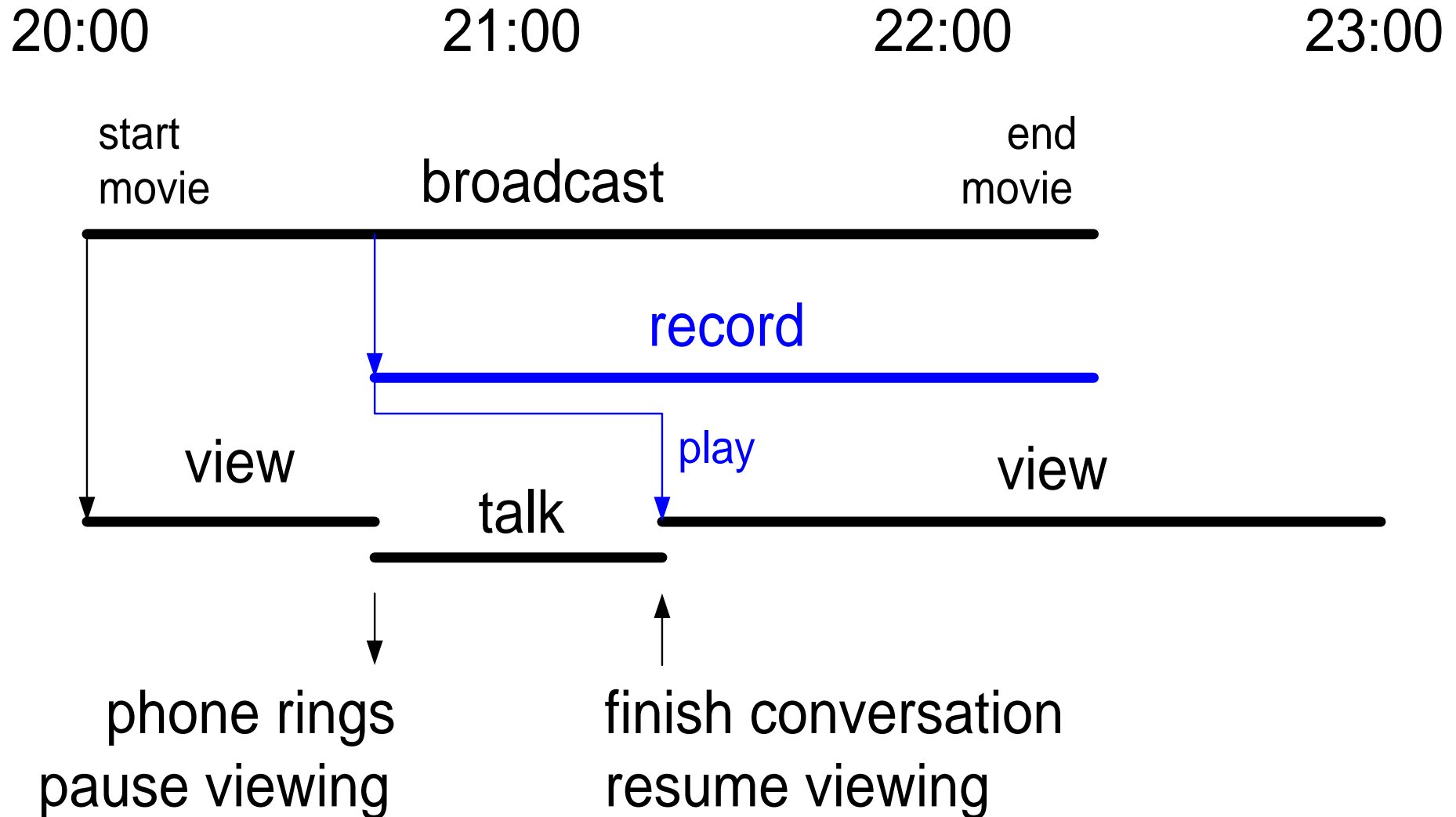
desperate

C

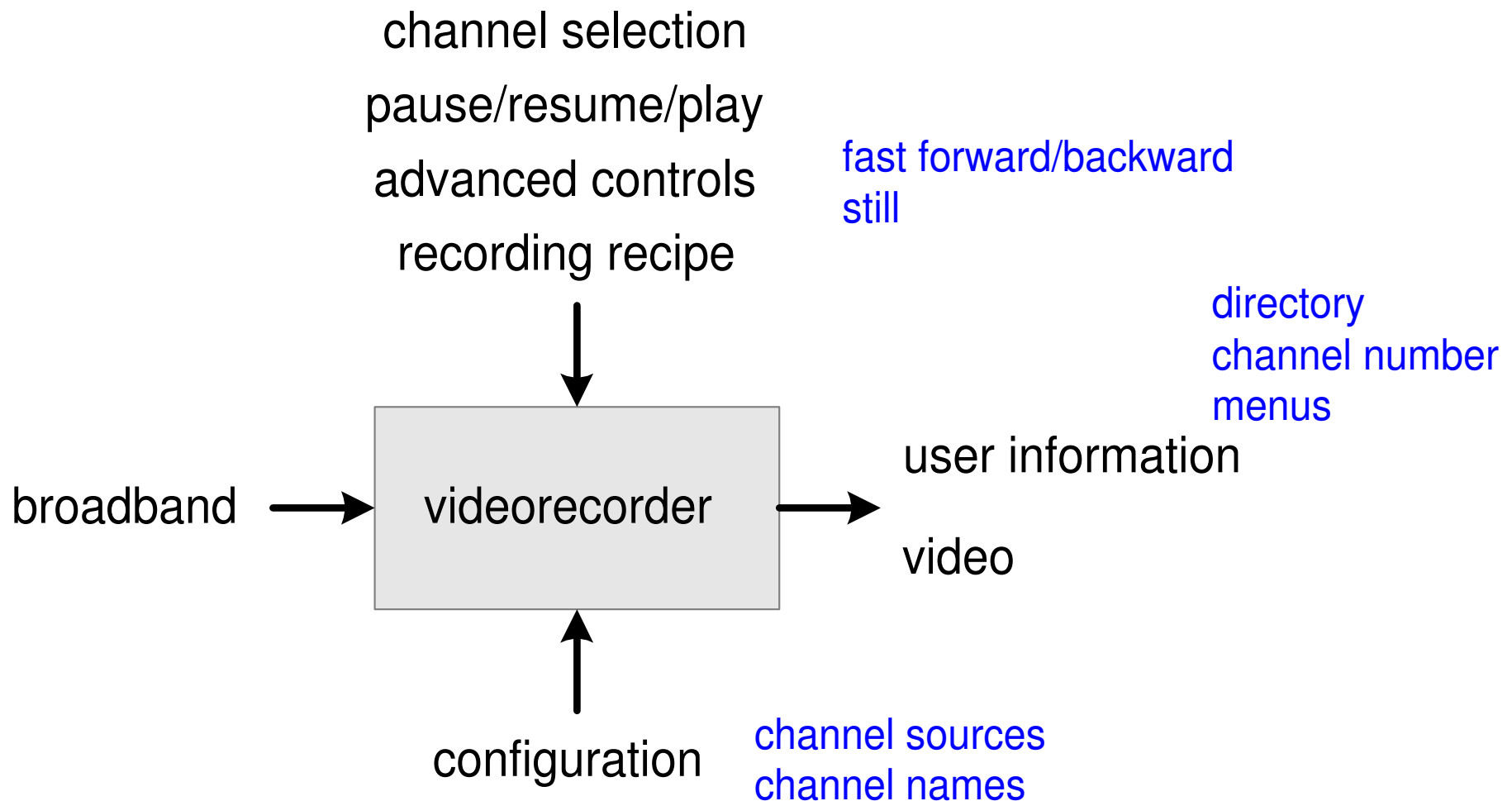


hysteric

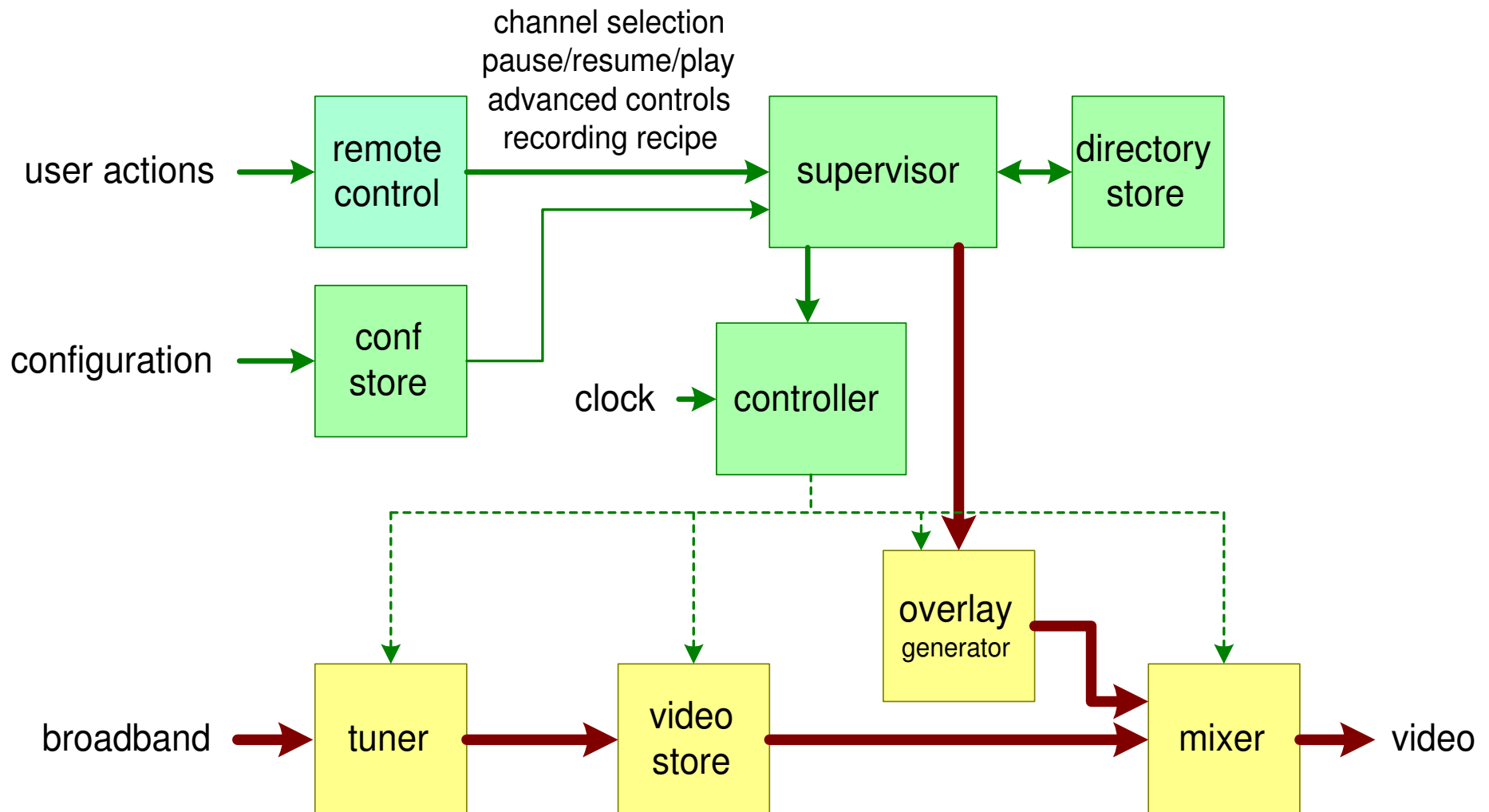
# Example Time Shift recording



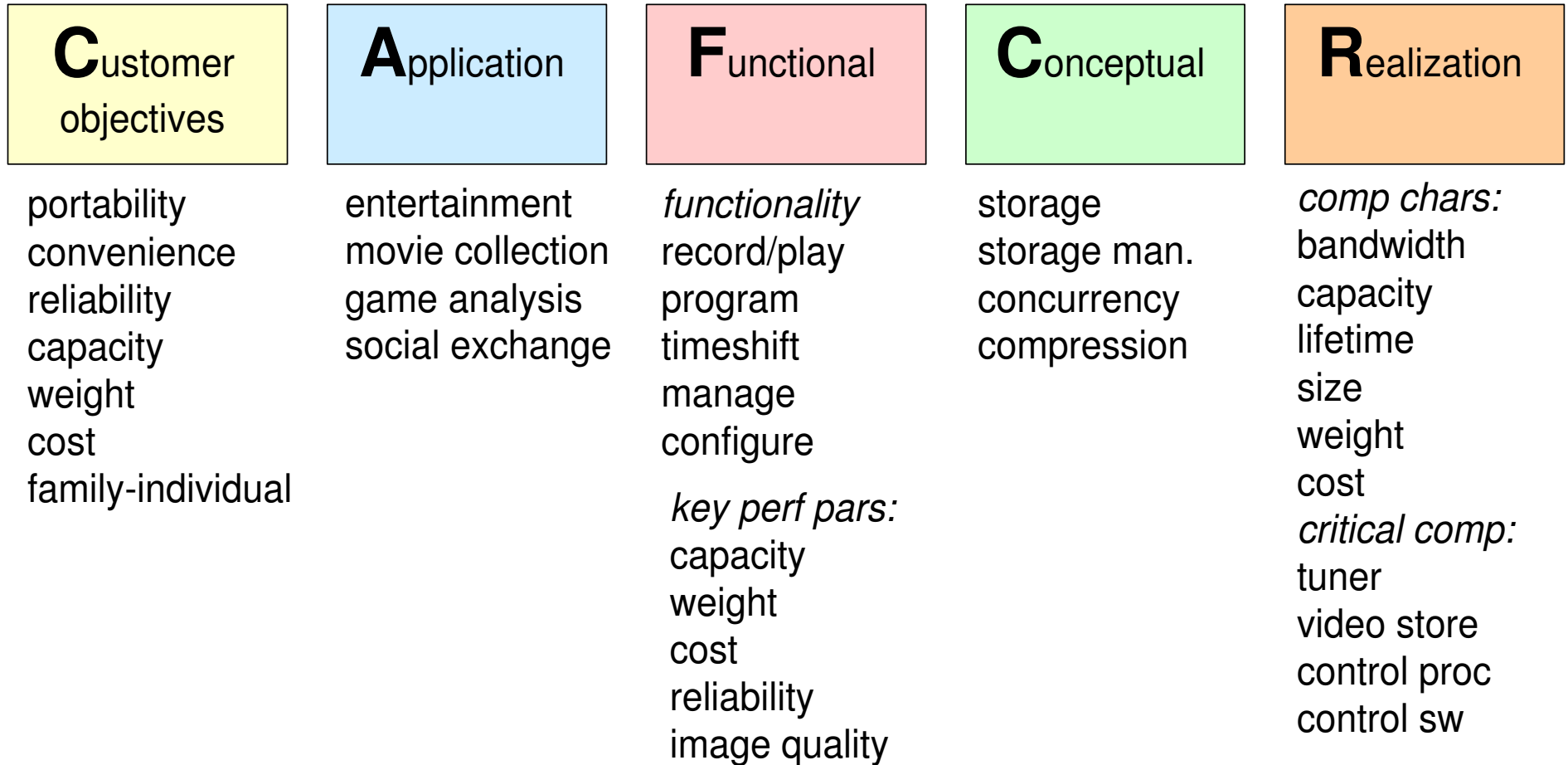
# Black Box view on Video Recorder



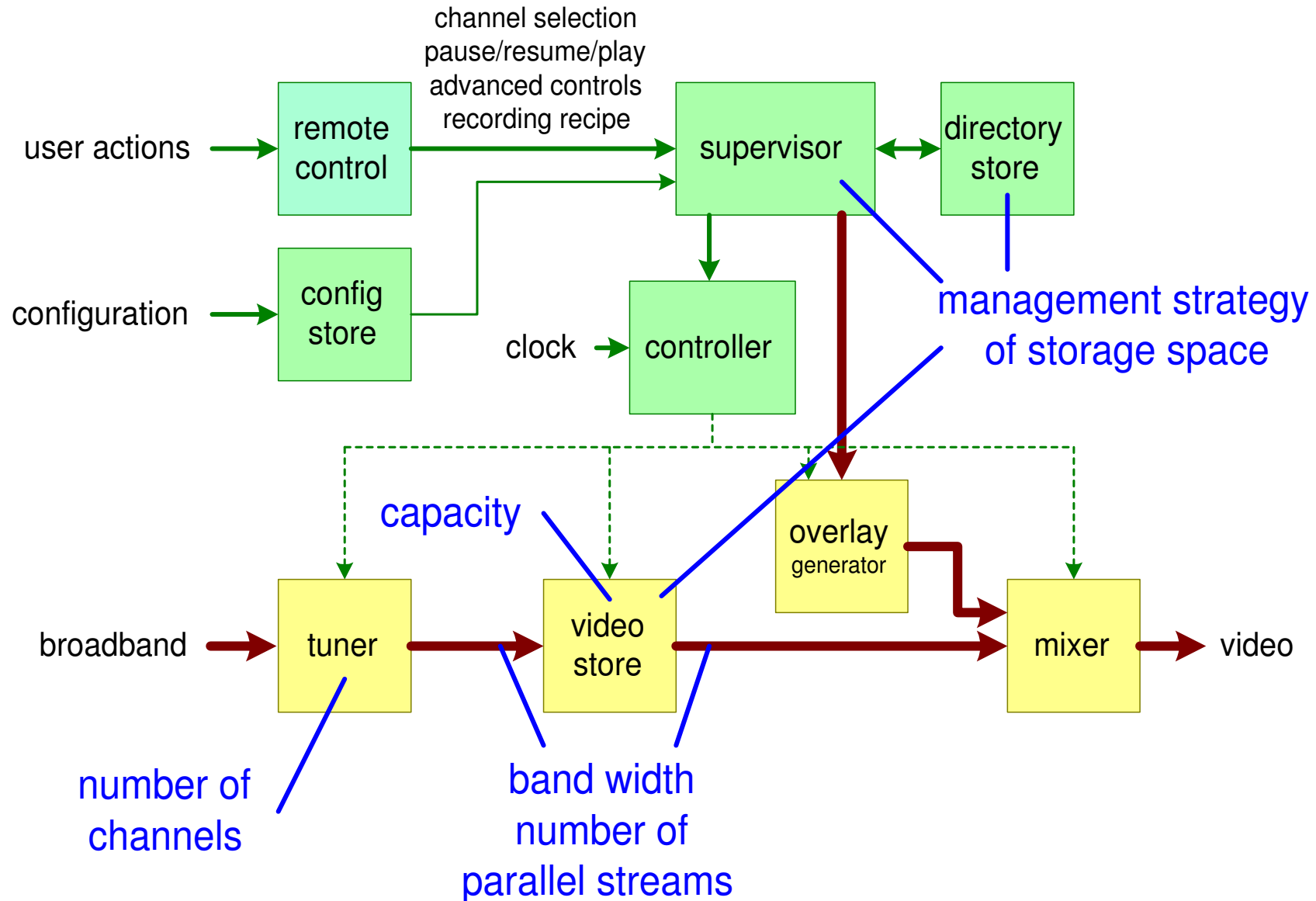
# Functional Model of Video Recorder



# Video Recorder Mapped on CAFCR

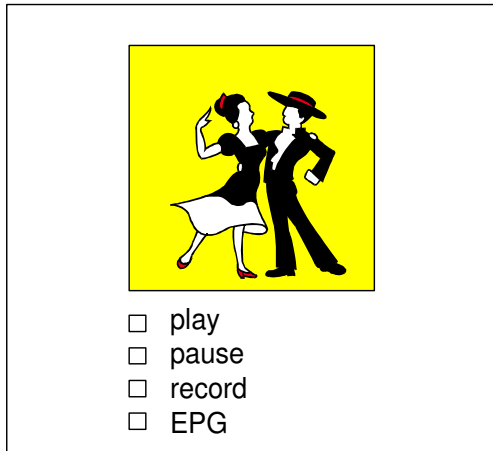


# Construction limits intrude in User Experience





Visual Basic Prototype:  
enables "experiencing"



Requirements specification  
Many tables, mostly addressing details

2.1.1 Real-time data requirements

2.1.2 Implementation detail

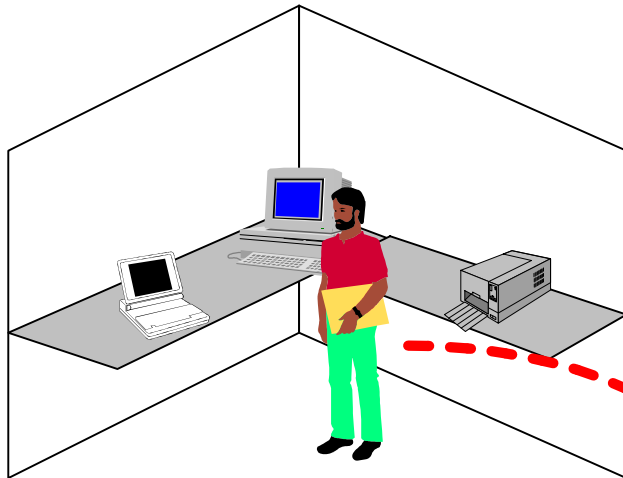
2.1.3 Non-real time data requirements

1.1 Software Requirements	
1.1.1 Real-time data requirements	<p>1.1.1.1 Access to the non-real-time data must be done in such a way that it does not interfere with the real-time data</p> <p>1.1.1.2 There must be no disruptions in output of video signal during the operation of VCR</p> <p>1.1.1.3 Responsiveness for non real-time data is less than 150ms (the time for writing a block on HDD) for 2KB of non-video data</p>
1.1.2 Implementation detail	<p>1.1.2.1 Management of HDD content must only be possible through the TOC in order to prevent unauthorized access to content of HDD</p> <p>1.1.2.2 Visual feedback is provided to the user via On-Screen Display</p> <p>1.1.2.3 User input is provided via the RC</p>
1.1.3 Non-real time data requirements	<p>1.1.3.1 User must be able to pause and unpause a title, played from HDD, while (s)he is watching it</p> <p>1.1.3.2 User can jump forward and backward in a title, from HDD, during watching of this title</p> <p>1.1.3.3 Names of titles should be derived from the information from the EPG (name of the program to be recorded, time and date of registration)</p>

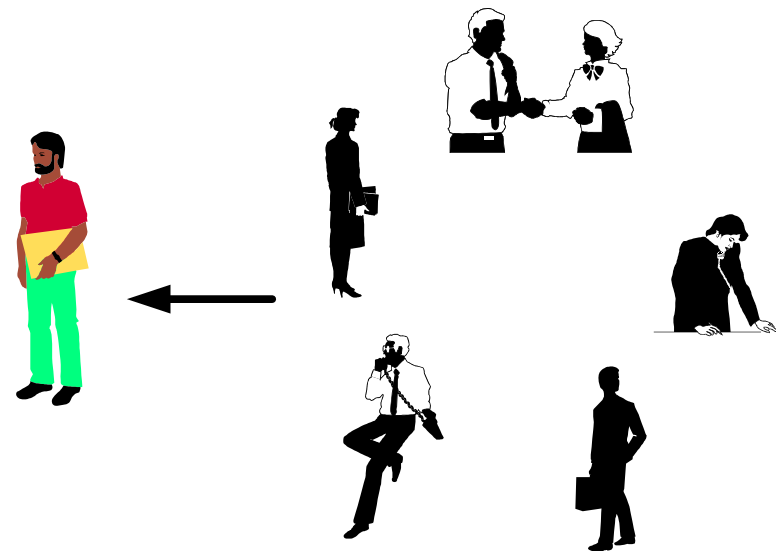
# Key Success Factor: Feedback

Obtain feedback from real users:

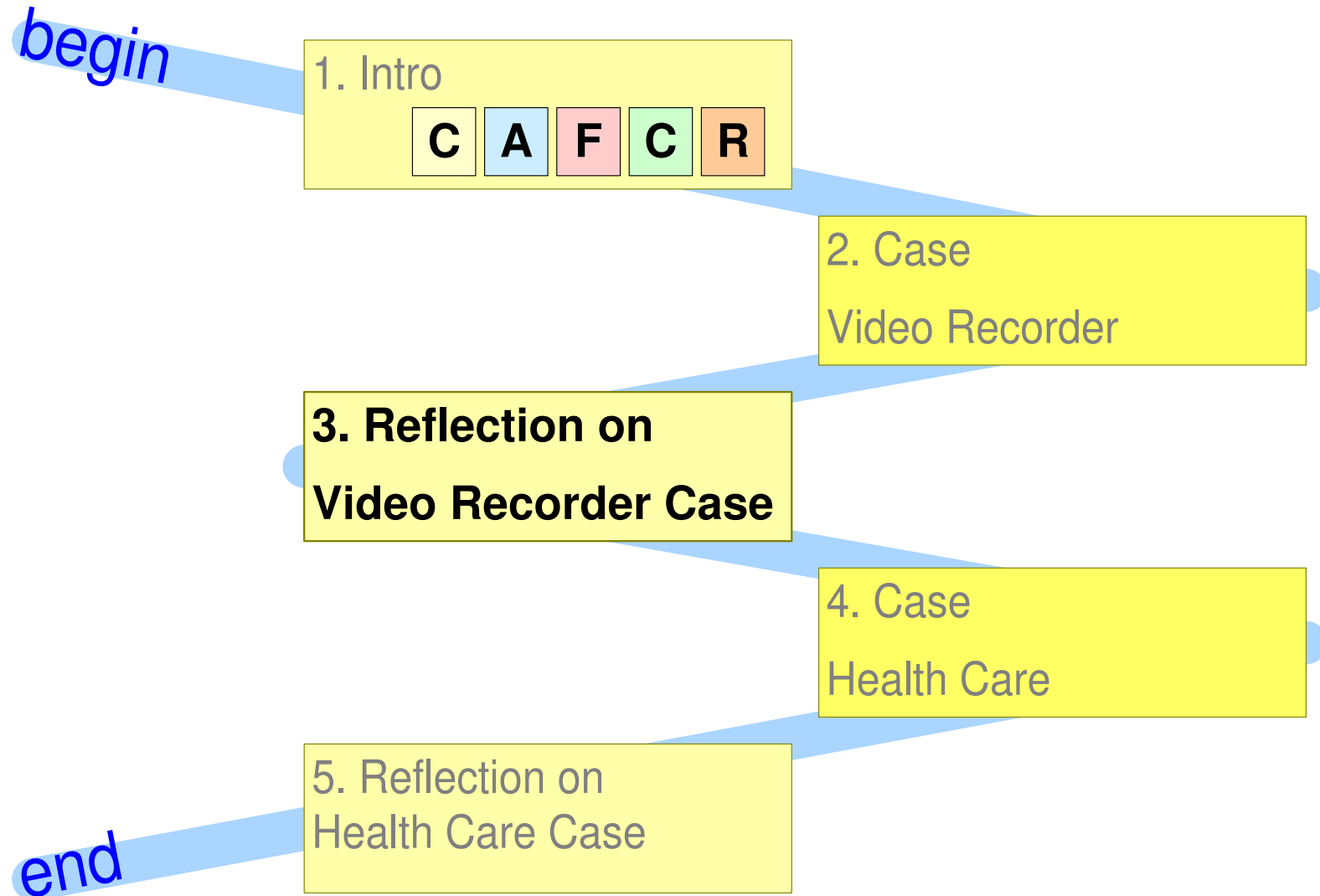
- Observe
- (Dare to) Listen
- Experiment
- Use short development cycles



Don't stay in the development lab

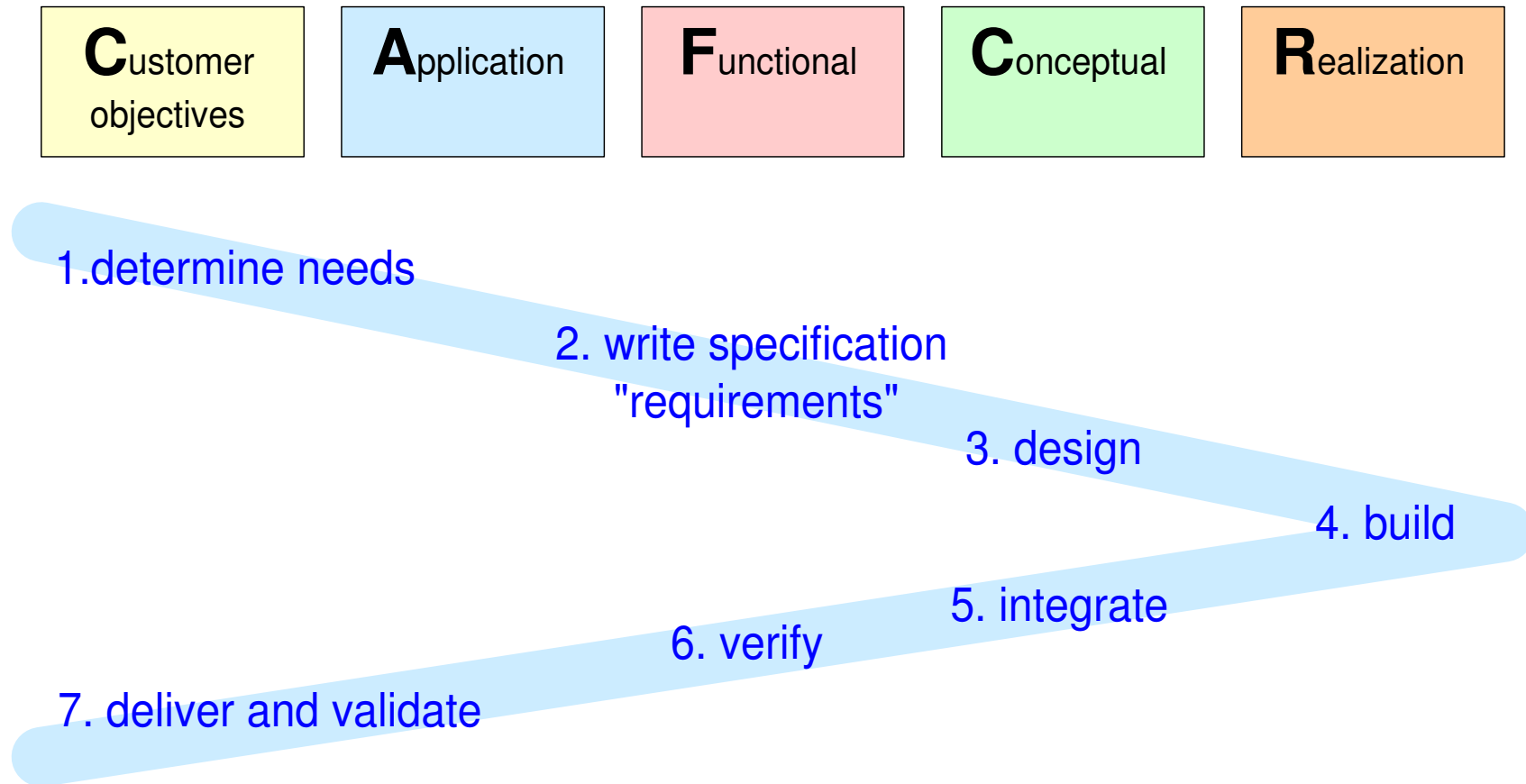


# Reflection on Video Recorder Case

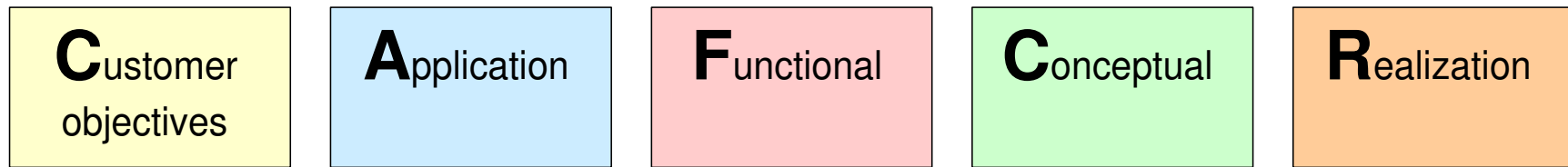


# The Conventional Waterfall Approach

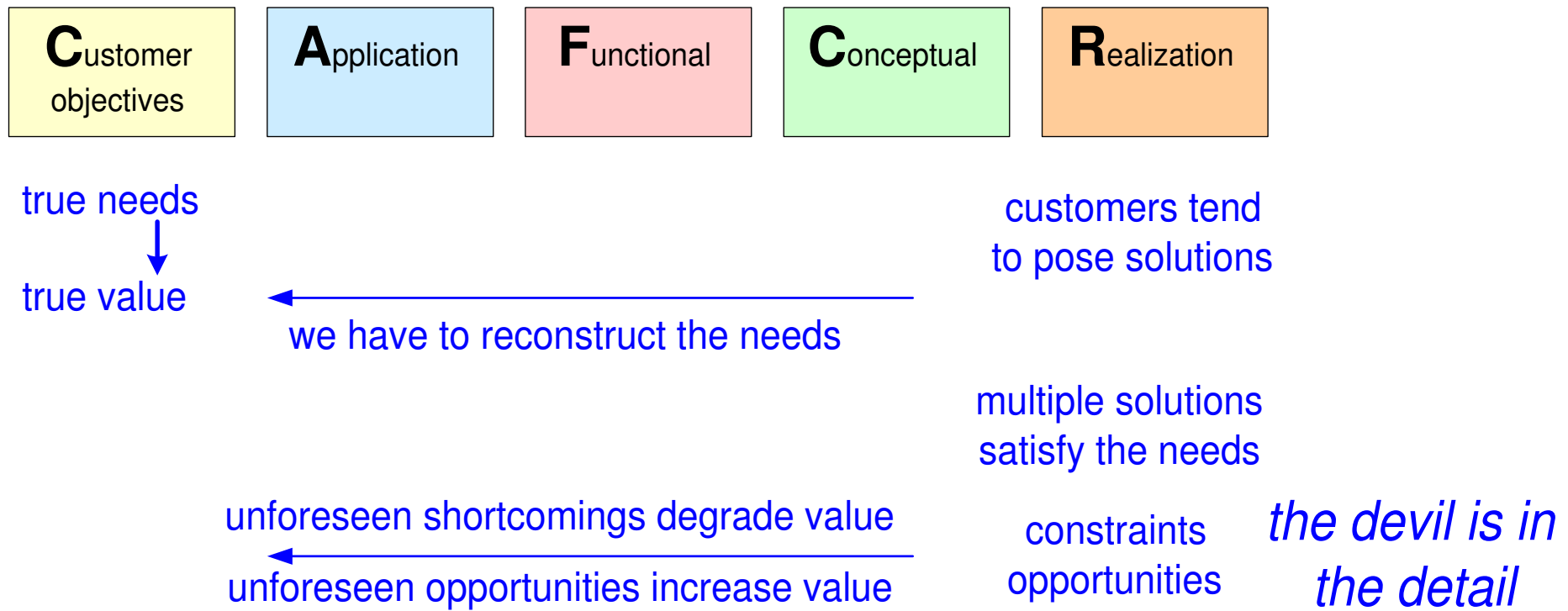
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# Iterative Approach Using CAFCR



# Reflection on CAFCR and Iteration

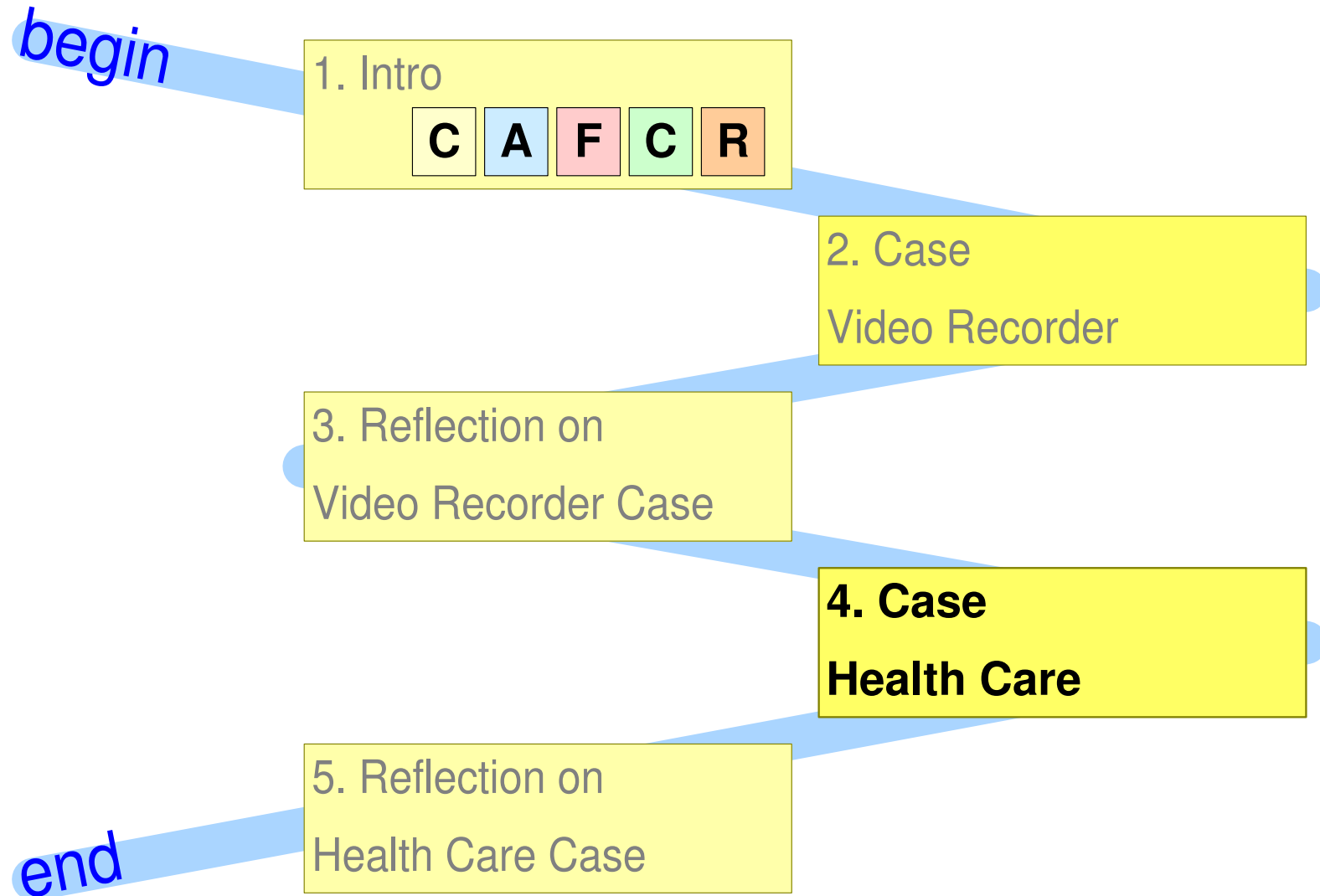


*We learn faster when we iterate faster,  
but learning requires critical evaluation and reflection*

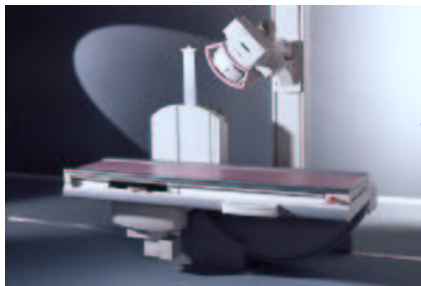
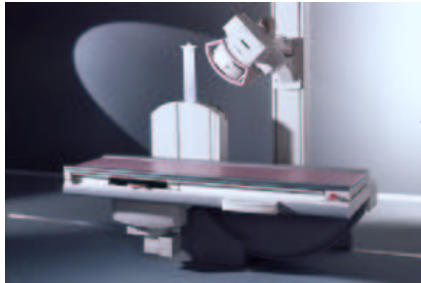
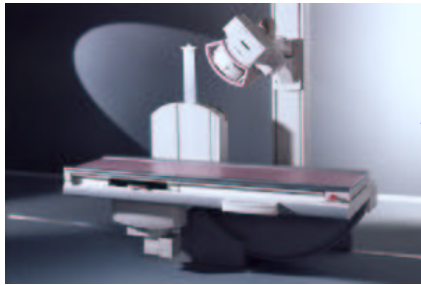
Stakeholders tend to respond on actual deliverables.

Prototypes are useful, but we have to switch to delivery in time to get feedback

# Health Care Case



# Easyvision serving three URF examination rooms



URF-systems

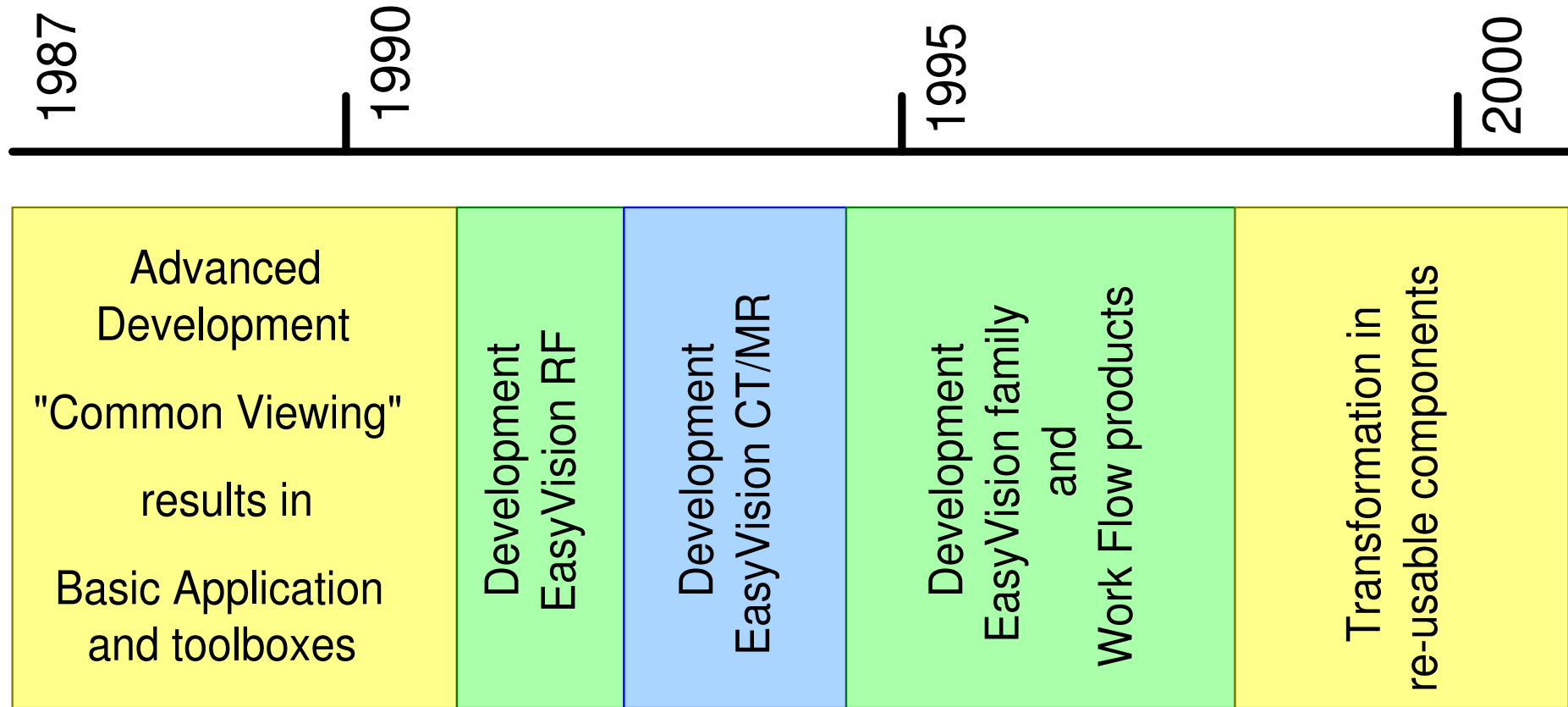


EasyVision: Medical Imaging Workstation

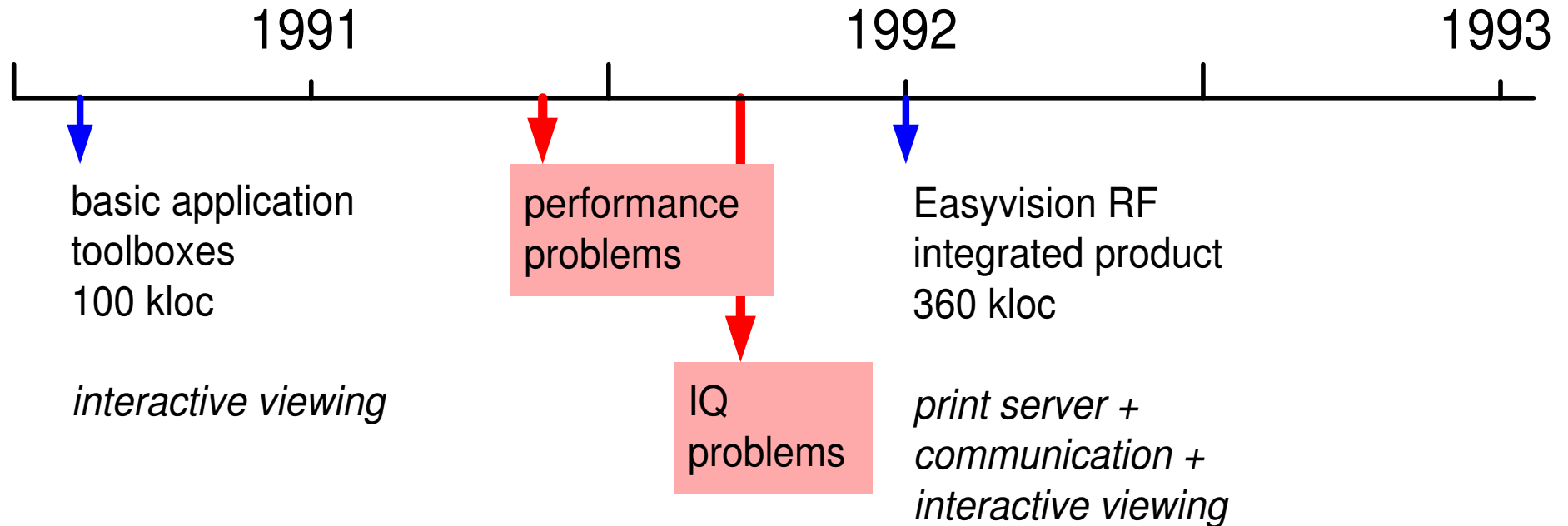


typical clinical image (intestines)

# Time line of Viewing Products

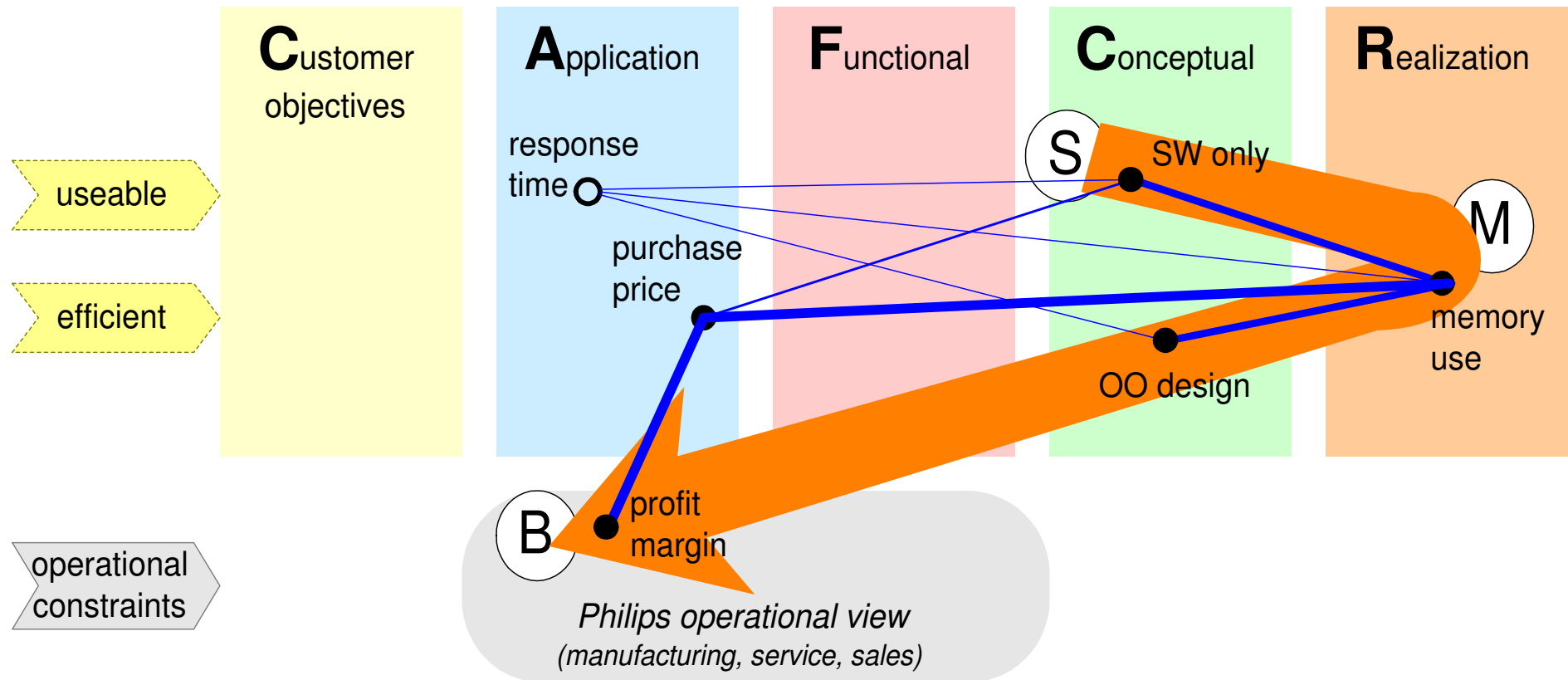


# Chronology of Easyvision RF R1 development



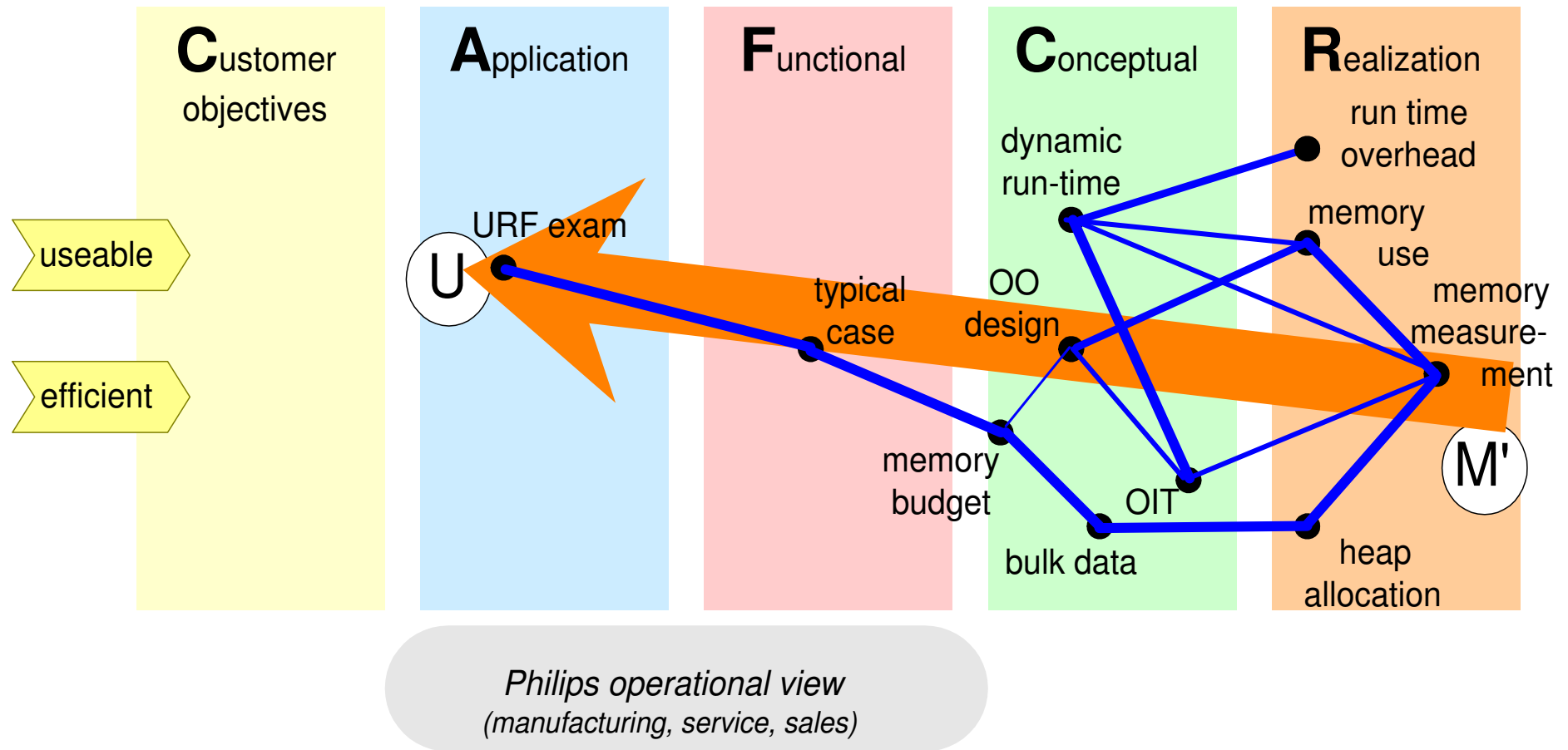
marketing opinion:  
"All the functionality is available,  
we only have to provide a clinical UI"

# Thread of reasoning; introvert phase



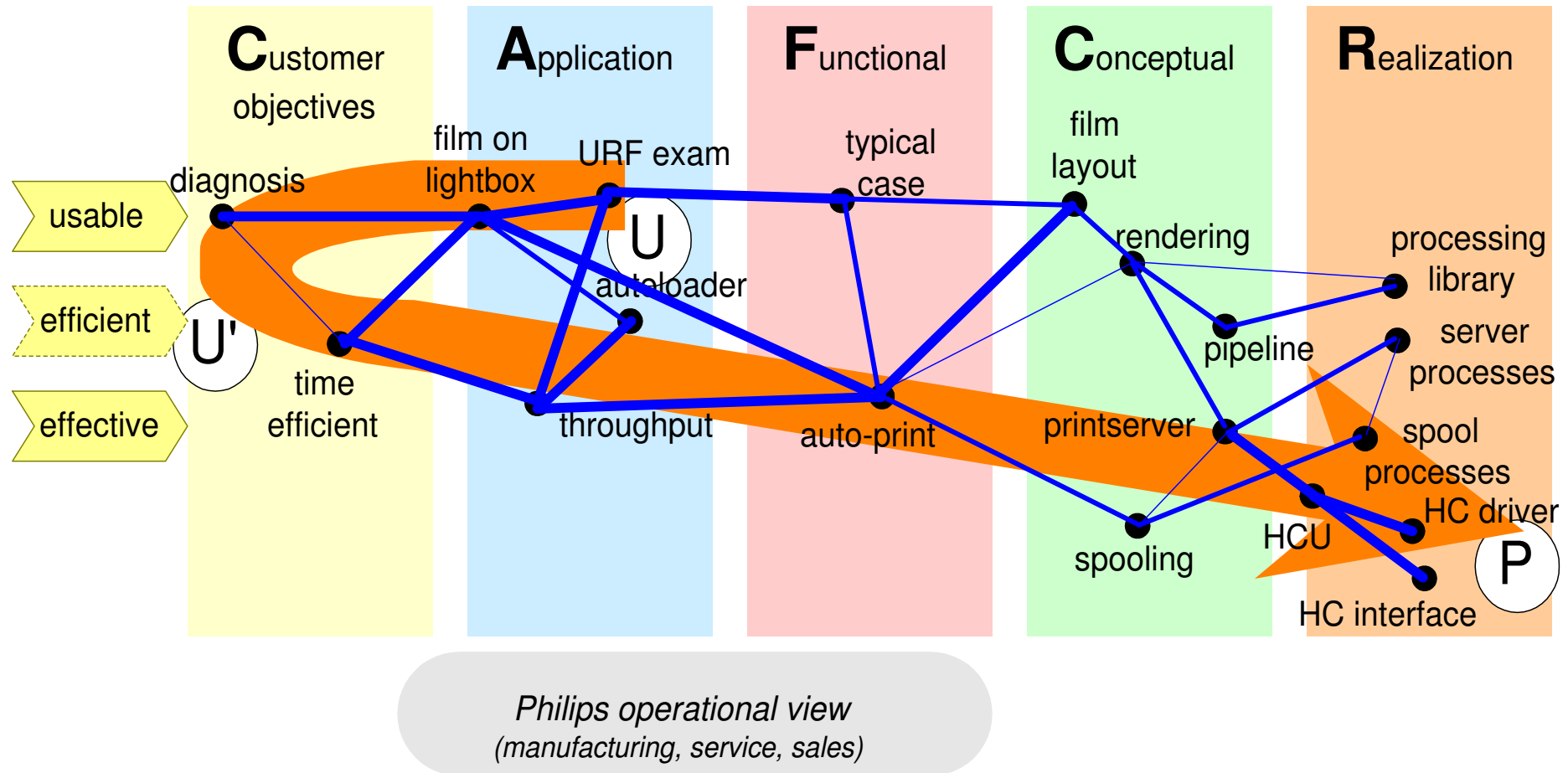
Introvert view: cost and impact of new technologies

# Thread of reasoning; phase 2



How to measure memory, how much is needed?  
from introvert to extrovert

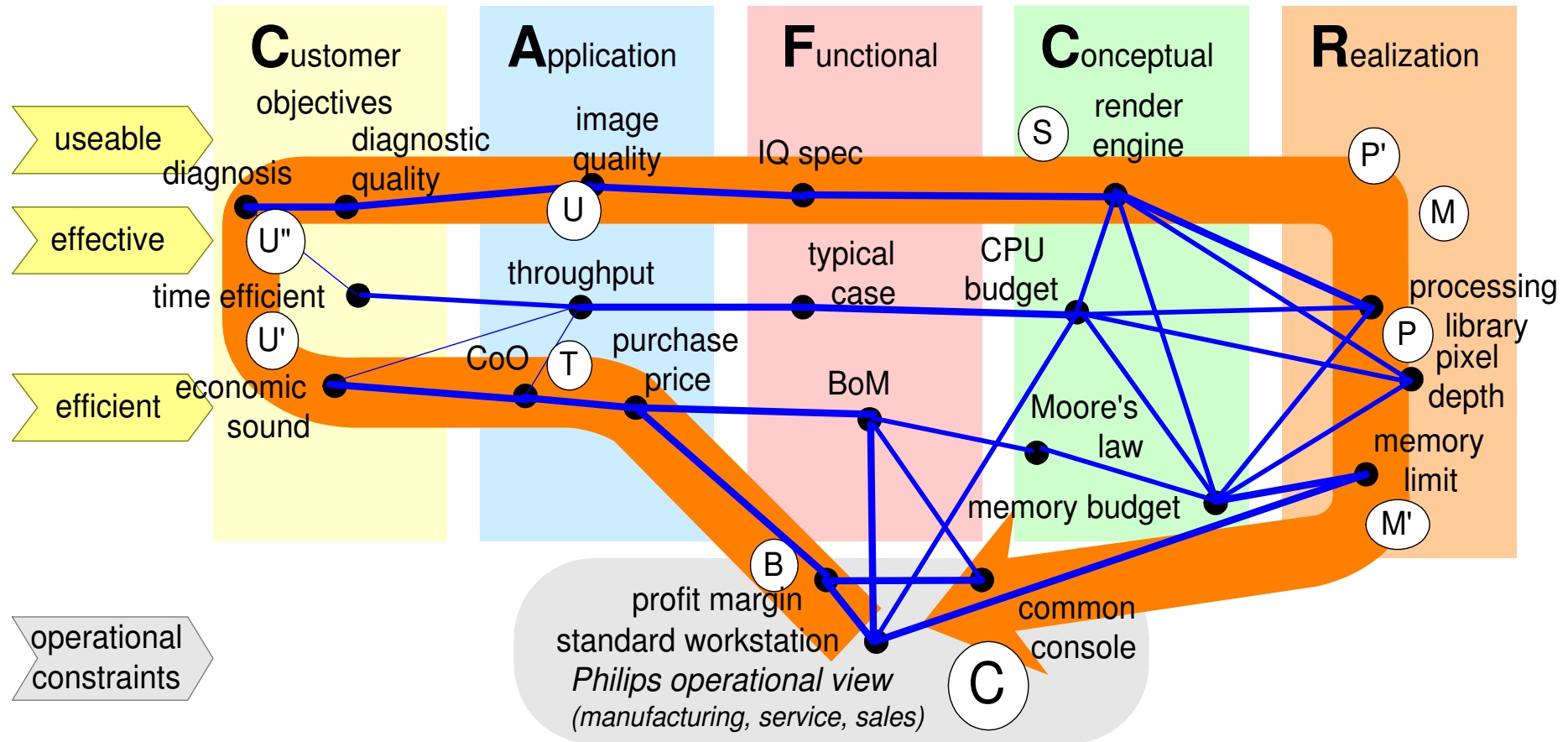
# Thread of reasoning; phase 3



Radiologists diagnose from film, throughput is important  
 Extrovert view shows conceptual and realization gaps!

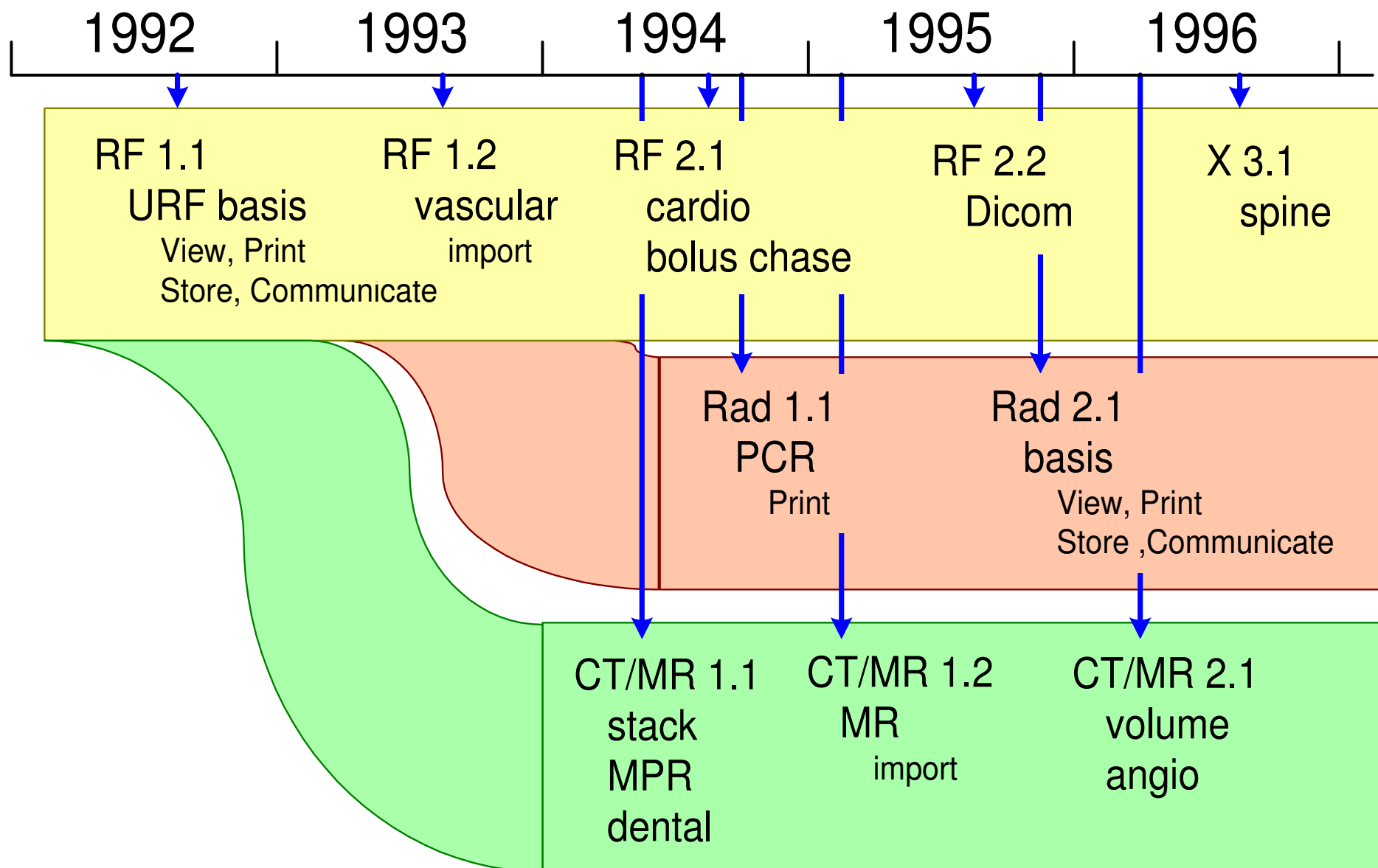


# Thread of reasoning; phase 5

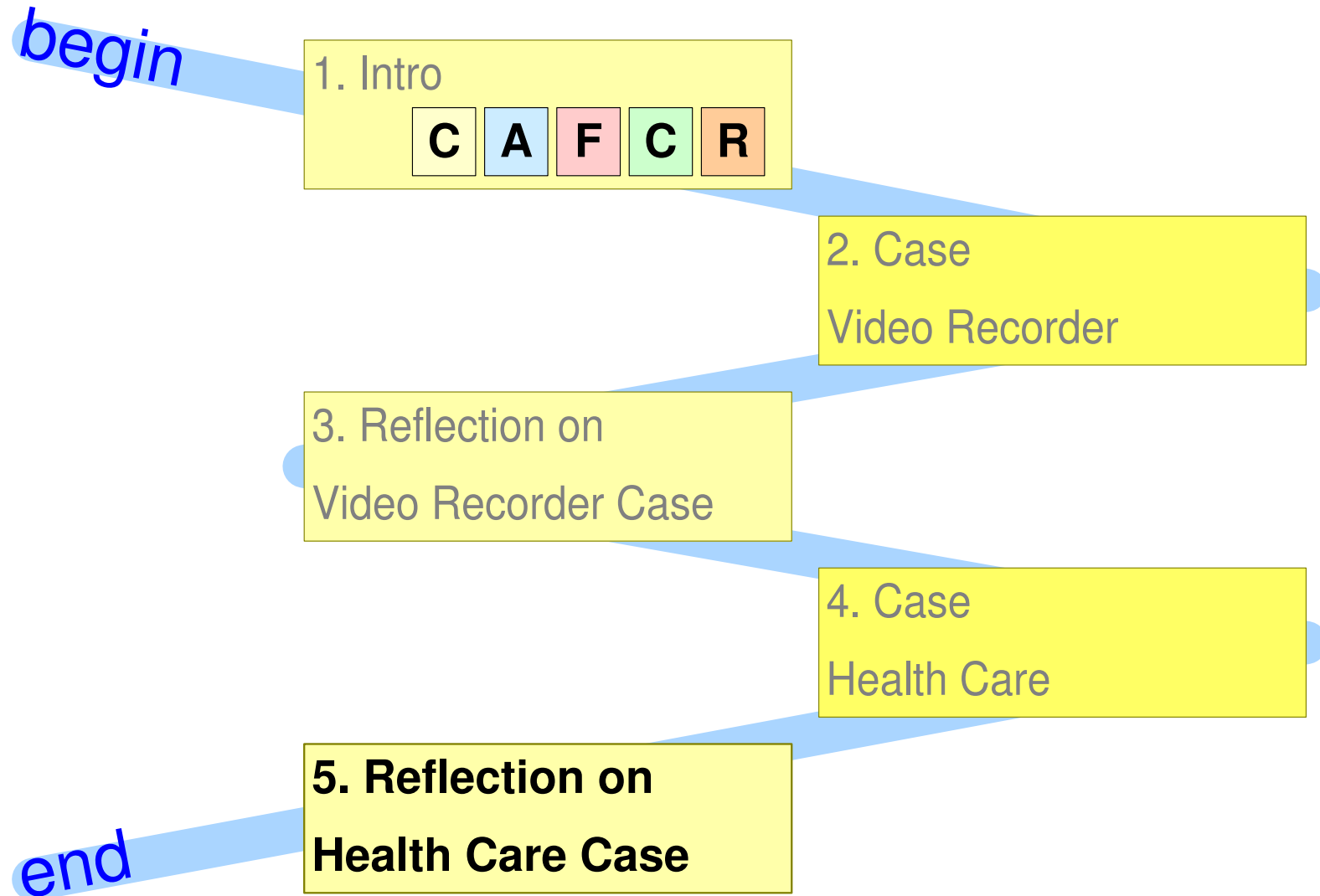


cost revisited in context of clinical needs and realization constraints; note: original threads are significantly simplified

# Retrospective functionality roadmap

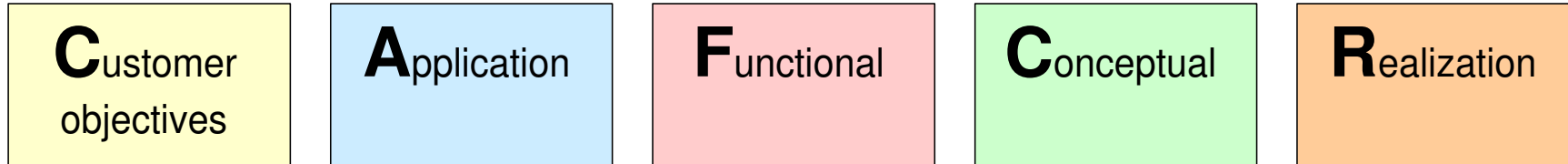


# Reflection on Health Care Case



# Reflecting on the Health Care Case

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Many customers <sup>1</sup> are conservative for valid reasons:

*"Do not disturb our volume production"*

Every delivery means change, change means risk of disturbance

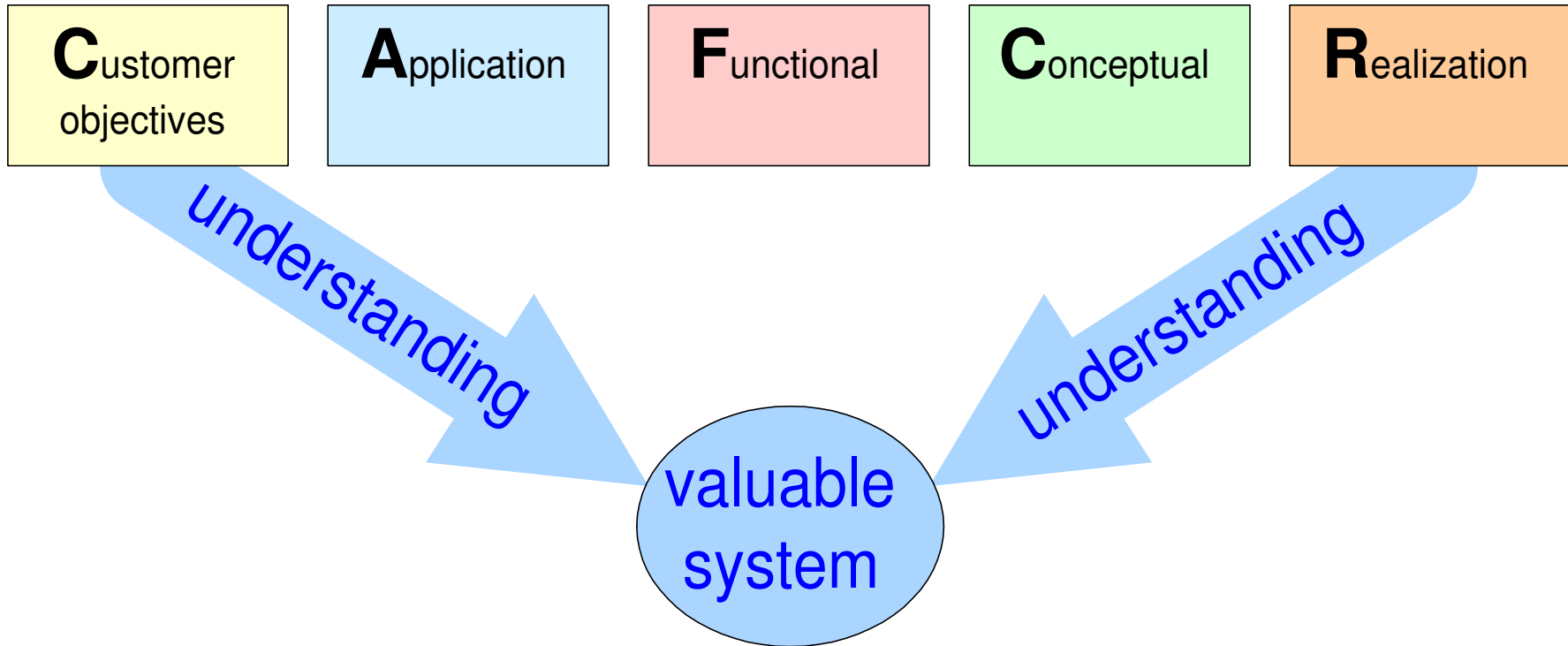
application models and prototypes are *proxies* for deliveries

An active and close relation with demanding customers is required to obtain timely feedback

<sup>1</sup>Not only in health care, but also in manufacturing, defense, oil and gas, ...

# Summary

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*Chicken and Egg:  
Understanding is created by Delivering Value*