Module 32, Architectural Reasoning Customer Space Sampling

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Abstract

This module introduces Customer Space Sampling as part of the course Architectural Reasoning using Conceptual Modeling.

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Story How To

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Abstract

A story is an easily accessible story or narrative to make an application live. A good story is highly specific and articulated entirely in the problem domain: the native world of the users. An important function of a story is to enable specific (*quantified, relevant, explicit*) discussions.

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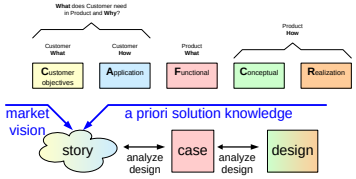
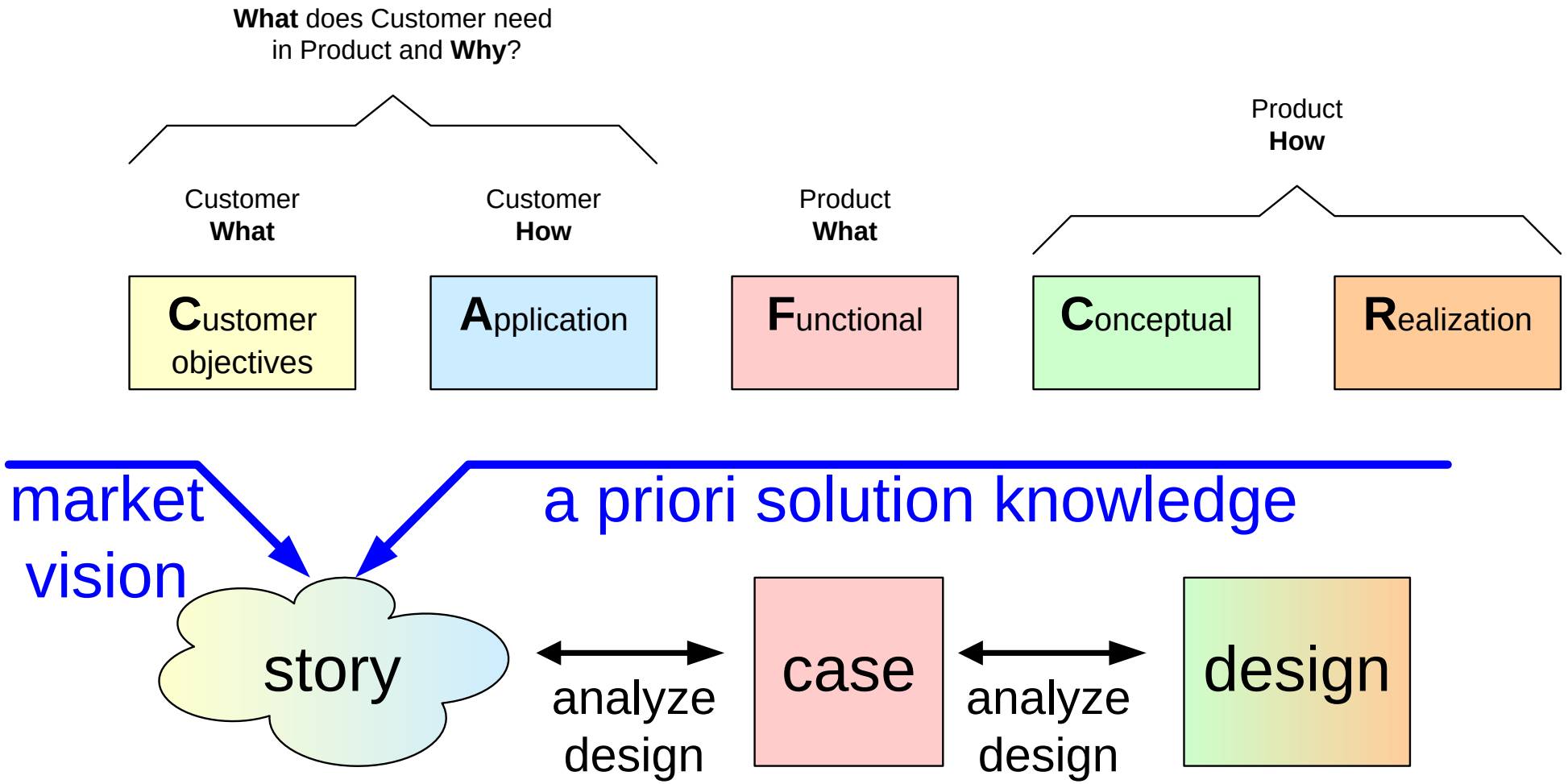
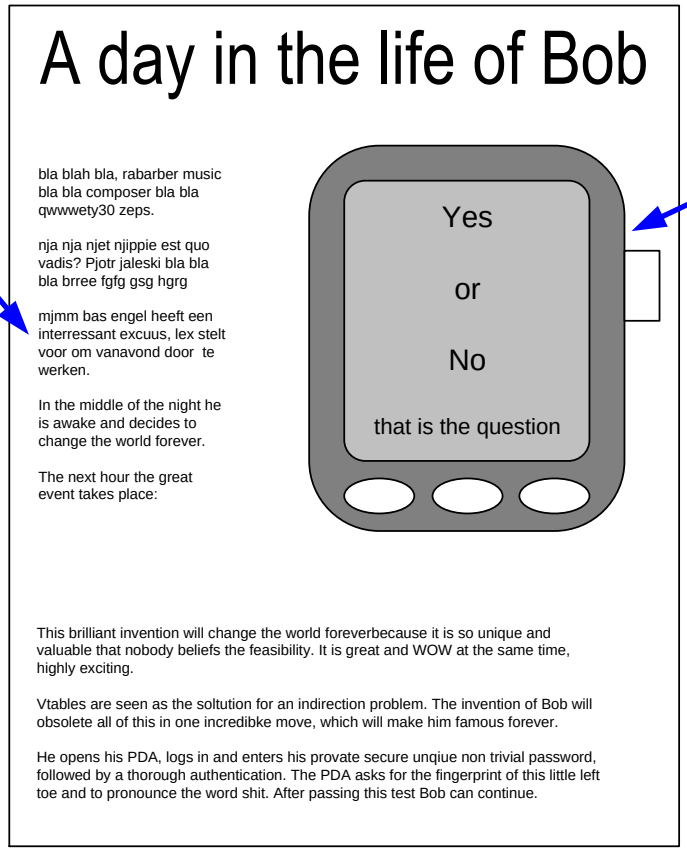


From story to design



Example story layout

ca. half a page of plain English text



draft or sketch of some essential appliance

Points of attention

- purpose — What do you need to know for specification and design?
- scope — “umbrella” or specific event?
- viewpoint, stakeholders — Define your stakeholder and viewpoint f.i. user, maintainer, installer
- visualization — Sketches or cartoon Helps to share and communicate ideas
- size (max 1 A4) — Can be read or told in few minutes
- recursive decomposition, refinement

Criteria for a good story

Customer objectives
Application

- accessible, understandable

"Do you see it in front of you?"

Customer objectives
Application

- valuable, appealing

attractive, important
"Are customers queuing up for this?"

Conceptual
Realization

- critical, challenging

"What is difficult in the realization?"
"What do you learn w.r.t. the design?"

Application

- frequent, no exceptional niche

"Does it add significantly to the bottom line?"

Application
Functional

- specific

names, ages, amounts, durations, titles, ...

Example of a story

Betty is a 70-year-old woman who lives in Eindhoven. Three years ago her husband passed away and since then she lives in a home for the elderly. Her 2 children, Angela and Robert, come and visit her every weekend, often with Betty's grandchildren Ashley and Christopher. As so many women of her age, Betty is reluctant to touch anything that has a technical appearance. She knows how to operate her television, but a VCR or even a DVD player is way to complex.

When Betty turned 60, she stopped working in a sewing studio. Her work in this noisy environment made her hard-of-hearing with a hearing-loss of 70dB around 2kHz. The rest of the frequency spectrum shows a loss of about 45dB. This is why she had problems understanding her grandchildren and why her children urged her to apply for hearing aids two years ago. Her technophobia (and her first hints or arthritis) inhibit her to change her hearing aids' batteries. Fortunately her children can do this every weekend.

This Wednesday Betty visits the weekly Bingo afternoon in the meetingplace of the old-folk's home. It's summer now and the tables are outside. With all those people there it's a lot of chatter and babble. Two years ago Betty would never go to the bingo: "I cannot hear a thing when everyone babbles and clatters with the coffee cups. How can I hear the winning numbers?!". Now that she has her new digital hearing instruments, even in the bingo cacophony, she can understand everyone she looks at. Her social life has improved a lot and she even won the bingo a few times.

That same night, together with her friend Janet, she attends Mozart's opera The Magic Flute. Two years earlier this would have been one big low rumbly mess, but now she even hears the sparkling high piccolos. Her other friend Carol never joins their visits to the theaters. Carol also has hearing aids, however hers only "work well" in normal conversations. "When I hear music it's as if a butcher's knife cuts through my head. It's way too sharp!". So Carol prefers to take her hearing aids out, missing most of the fun. Betty is so happy that her hearing instruments simply know where they are and adapt to their environment.

source: Roland Mathijssen
Embedded Systems Institute
Eindhoven

Value and Challenges in this story

Customer objectives

Application

Value proposition in this story:

quality of life:

active participation in different social settings

usability for nontechnical elderly people:

"intelligent" system is simple to use

loading of batteries

Conceptual

Realization

Challenges in this story:

Intelligent hearing instrument

Battery life — at least 1 week

No buttons or other fancy user interface on the hearing instrument, other than a robust On/Off method

The user does not want a technical device but a solution for a problem

Instrument can be adapted to the hearing loss of the user

Directional sensitivity (to prevent the so-called cocktail party effect)

Recognition of sound environments and automatic adaptation (adaptive filtering)

source: Roland Mathijssen, Embedded Systems Institute, Eindhoven

Exercise StoryTelling

Create a story

as text + sketch or as cartoon

Use the criteria

be highly specific!

envision the future value proposition

Enjoy!

Use Case How To

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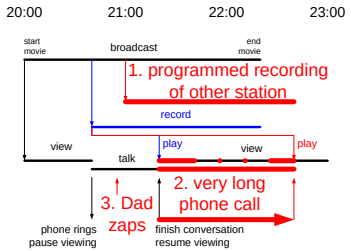
Abstract

Use cases are frequently used in Software Engineering. Use cases support specification and facilitate design, analysis, verification and testing. Many designers, unfortunately, apply use cases in a rather limited way. This presentation provides recommendations for effective use cases.



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Why Use Cases?

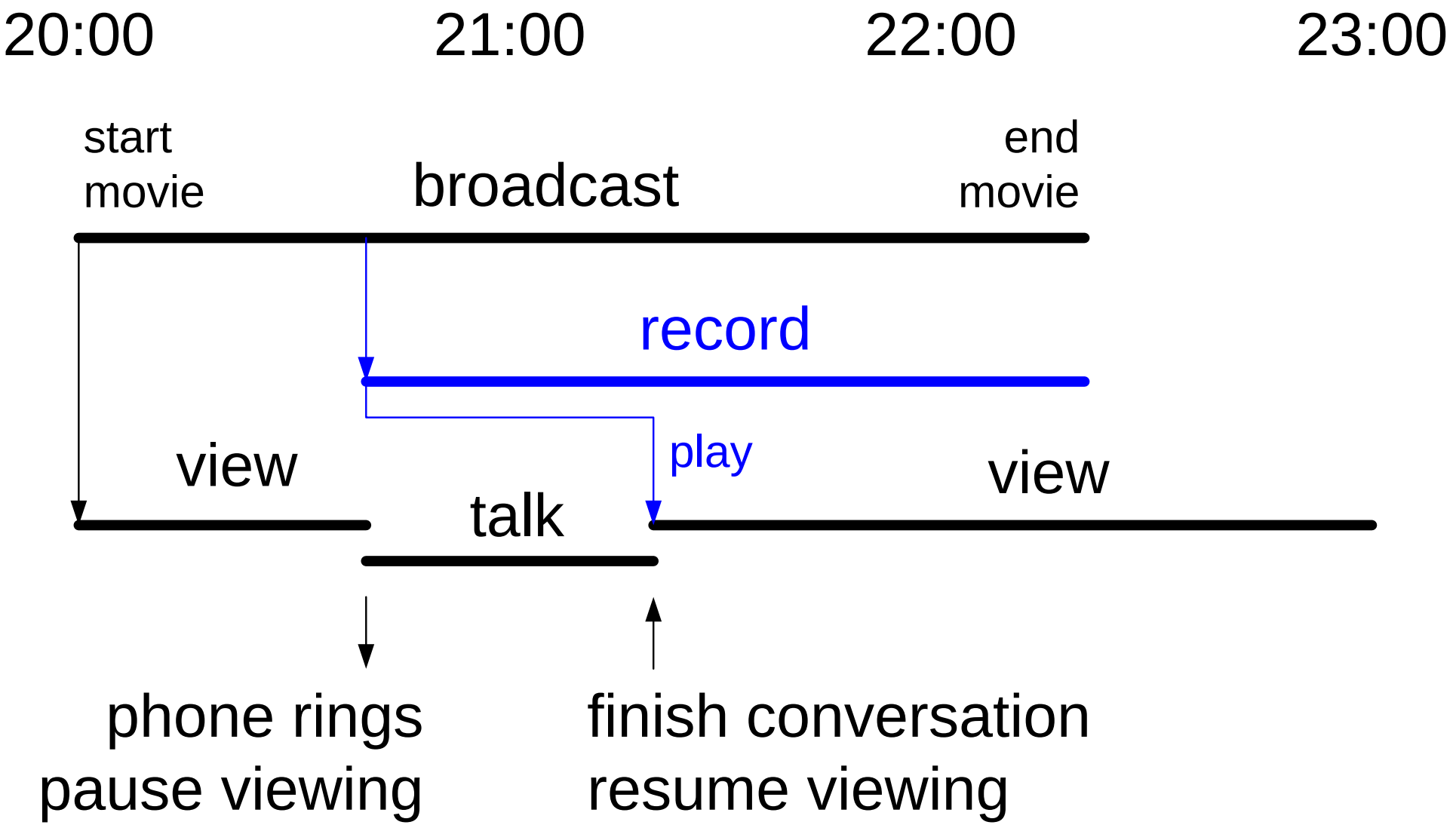
Supports or is part of specification

by providing specific data in user perspective

Facilitates analysis and design

Facilitates verification and testing

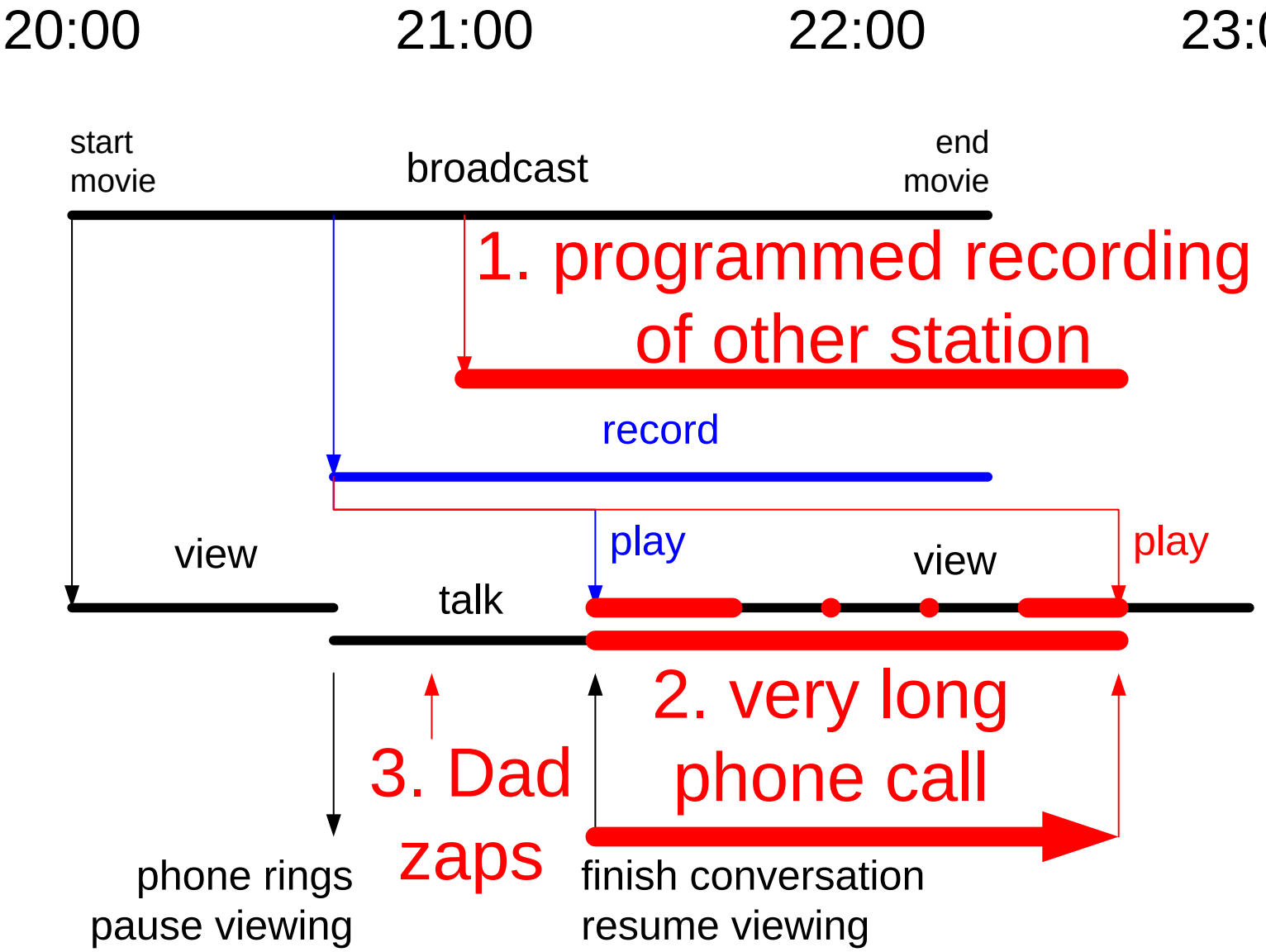
Example Time Shift recording



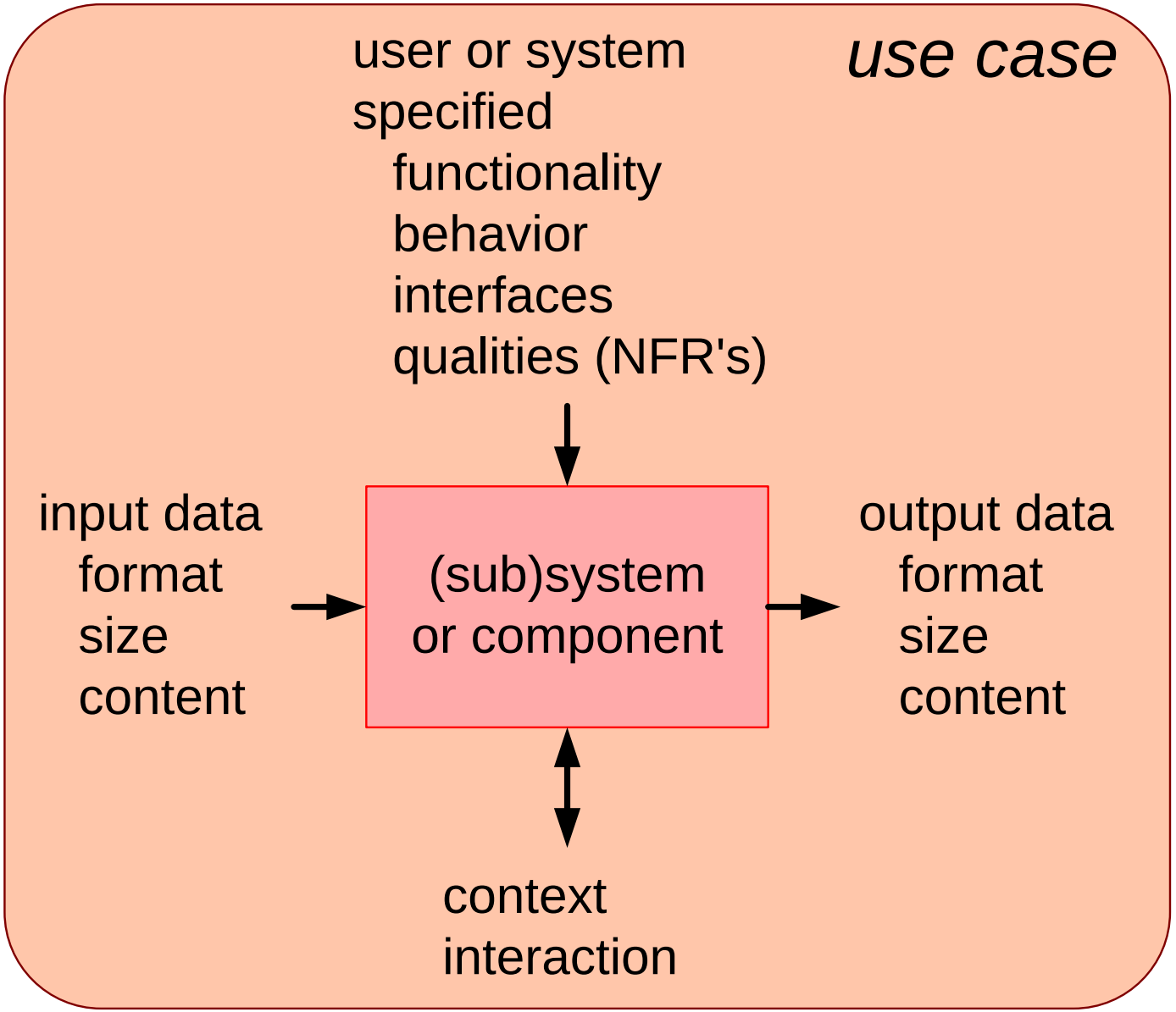
Construction limits intrude in User Experience

- number of tuners
- number of simultaneous streams (recording and playing)
- amount of available storage
- management strategy of storage space

What if?


20:00
21:00
22:00
23:00
start movie
broadcast
end movie
1. programmed recording of other station
record
view
play
view
play
talk
2. very long phone call
3. Dad zaps
phone rings
pause viewing
finish conversation
resume viewing

Content of a Use Case

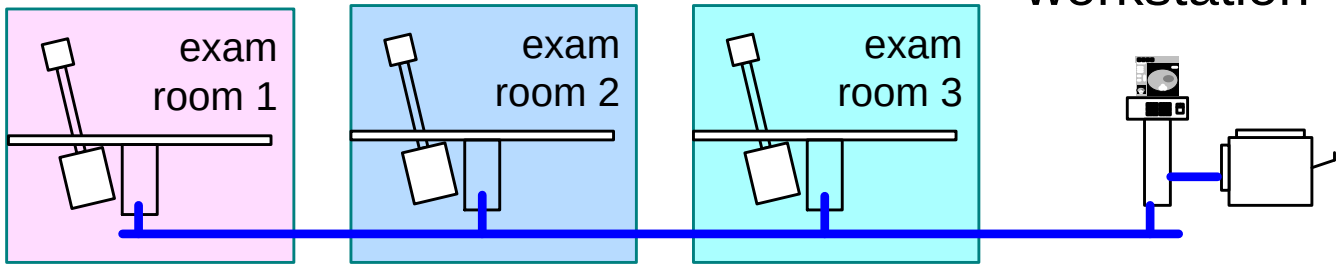


Example personal video recorder use case contents

typical use case(s)	worst case, exceptional, or change use case(s)
interaction flow (functional aspects) select movie via directory start movie be able to pause or stop be able to skip forward or backward set recording quality	**functional** multiple inputs at the same time extreme long movie directory behaviour in case of extreme many short movies
performance and other qualities (non-functional aspects) response times for start / stop response times for directory browsing end-of-movie behaviour relation recording quality and storage	**non-functional** response time with multiple inputs image quality with multiple inputs insufficient free space response time with many directory entries replay quality while HQ recording

Example of Quantification of Typical Use Case

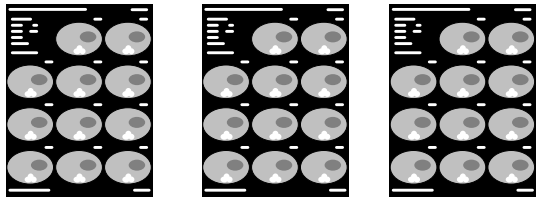
3 examination rooms connected to 1 medical imaging workstation + printer



examination room: average 4 interleaved examinations / hour

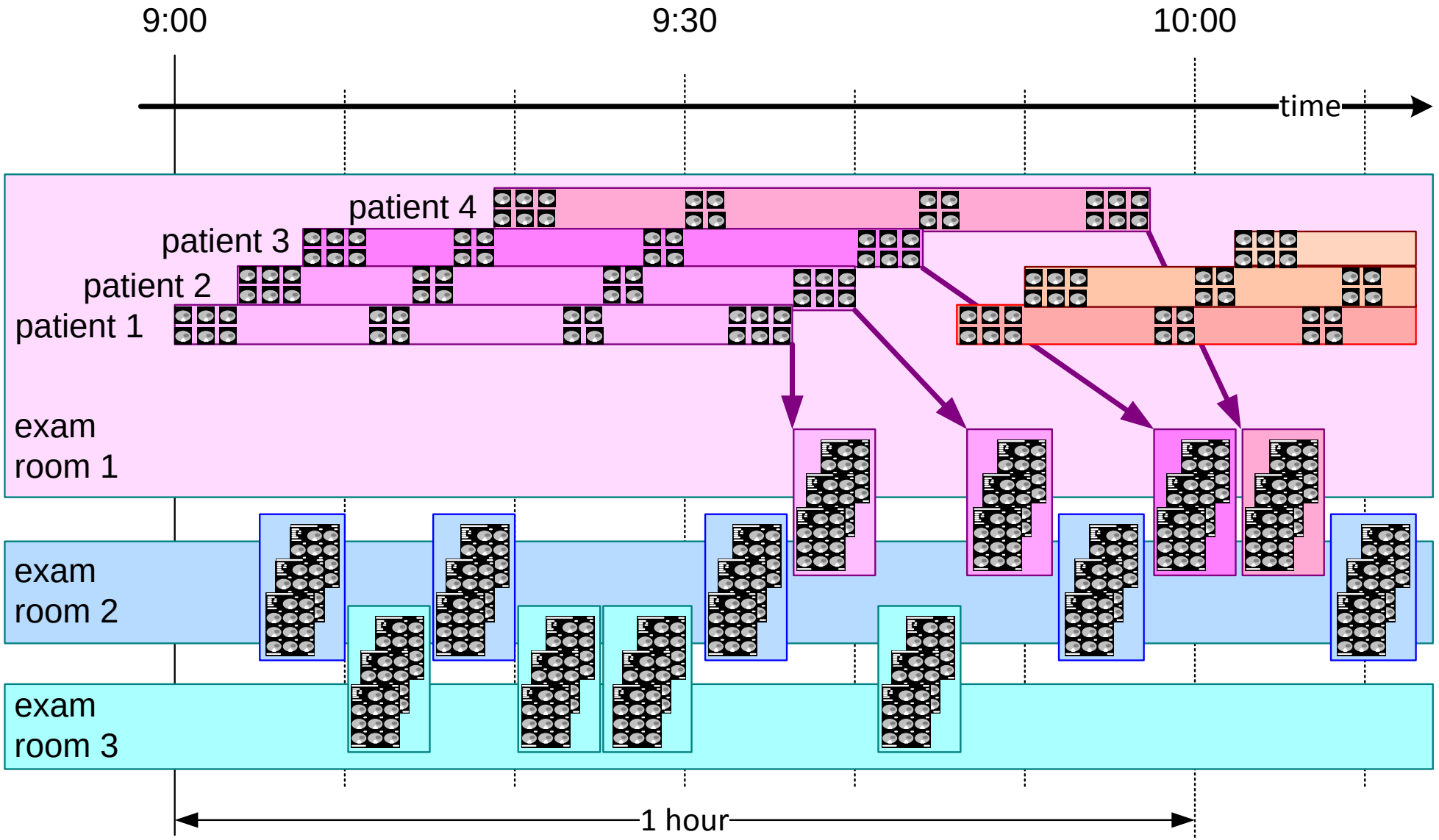
image production: 20 1024^2 8 bit images per examination

film production: 3 films of 4k*5k pixels each



high quality output
(bi-cubic interpolation)

Timing of this Use Case



Recommendations for working with use cases

+ combine related functions in one use case

- do not make a separate use case for every function

+ include non-functional requirements in the use cases

+ minimise the amount of required *worst case* and *exceptional use cases*

- excessive amounts of use cases propagate to excessive implementation efforts

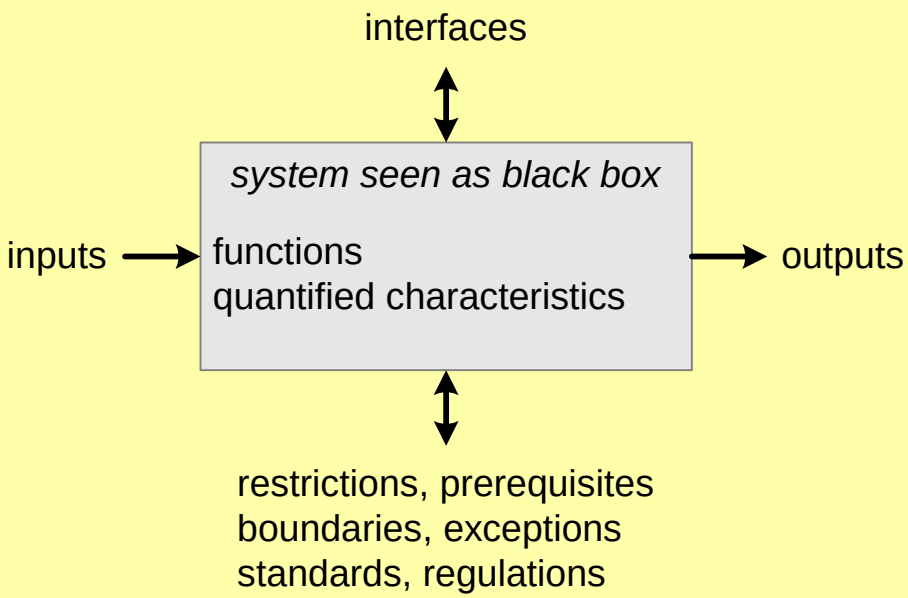
+ reduce the amount of these use cases in steps

- a few well chosen *worst case* use cases simplifies the design

Use Case Exercise

Make specification overview with ~10 **SMART** Key Performance Parameters (or functions or interfaces)

determine at least one use case

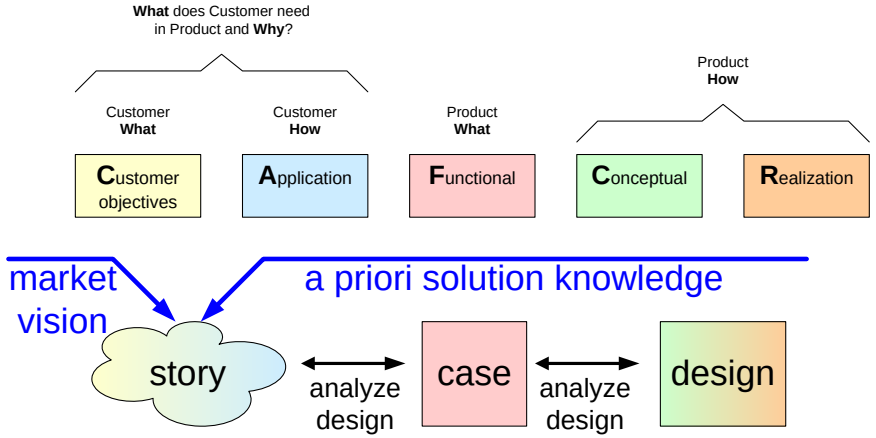


use case
typical use with relevant context data (quantified!)

- **S**pecific quantified
- **M**easurable verifiable
- **A**chievable (Attainable, Action oriented, Acceptable, Agreed-upon, Accountable)
- **R**ealistic (Relevant, Result-Oriented)
- **T**ime-bounded (Timely , Tangible, Traceable)

Story and Use Case Summary

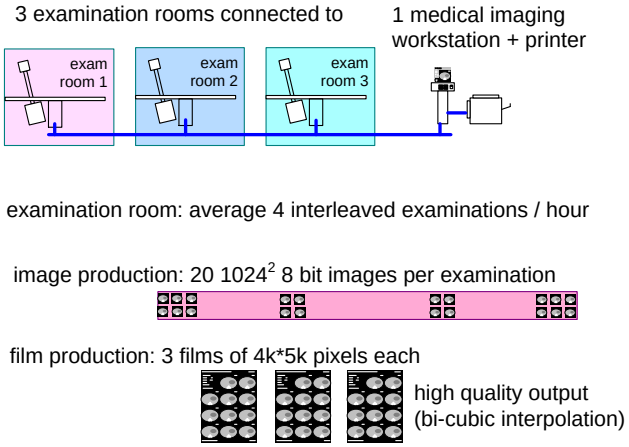
Customer Language



Accesible and Specific to Learn

- Customer objectives / Application • accessible, understandable
  "Do you see it in front of you?"
- Customer objectives / Application • valuable, appealing
  attractive, important
  "Are customers queuing up for this?"
- Conceptual / Realization • critical, challenging
  "What is difficult in the realization?"
  "What do you learn w.r.t. the design?"
- Application • frequent, no exceptional niche
  "Does it add significantly to the bottom line?"
- Application / Functional • specific
  names, ages, amounts, durations, titles, ...

Use Cases include Quantification



Typical and Worst case

typical use case(s)	worst case, exceptional, or change use case(s)
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