

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.

Distribution

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October 20, 2017

status: preliminary

draft

version: 1.1

Story How To

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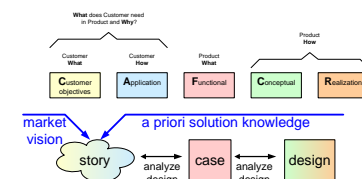
Abstract

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.

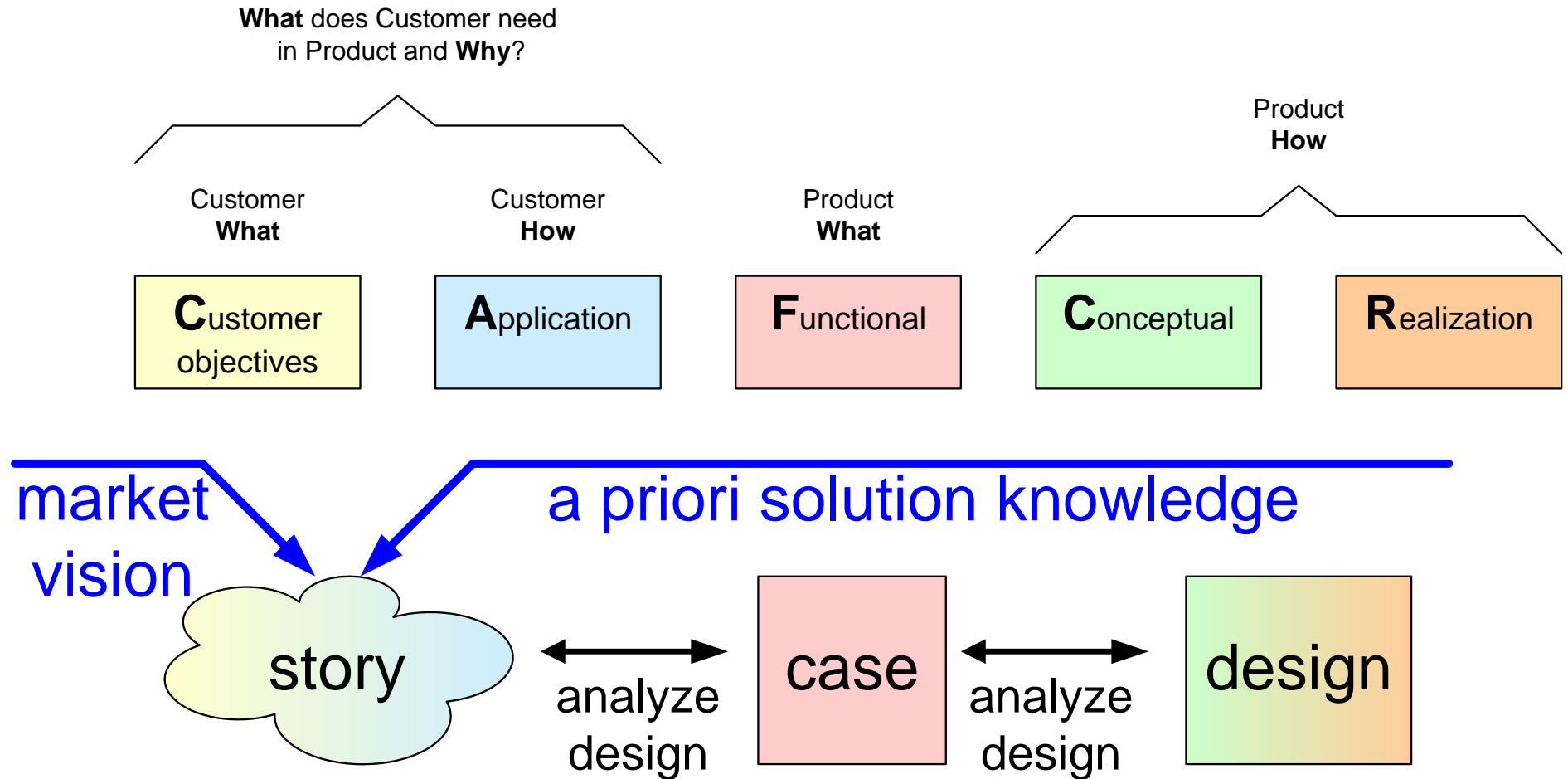
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From story to design



Example story layout

ca. half a page of plain English text

A day in the life of Bob

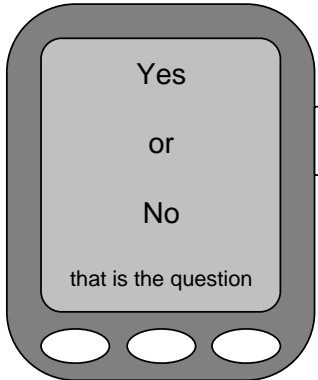
bla blah bla, rabarber music
bla bla composer bla bla
qwwwety30 zeps.

nja nja njet njippie est quo
vadis? Pjotr jaleski bla bla
bla brree fgfg gsg hrg

mjmm bas engel heeft een
interessant excuus, lex stelt
voor om vanavond door te
werken.

In the middle of the night he
is awake and decides to
change the world forever.

The next hour the great
event takes place:



This brilliant invention will change the world foreverbecause it is so unique and valuable that nobody believes the feasibility. It is great and WOW at the same time, highly exciting.

Vtables are seen as the soltution for an indirection problem. The invention of Bob will obsolete all of this in one incredibke move, which will make him famous forever.

He opens his PDA, logs in and enters his provate secure unque non trivial password, followed by a thorough authentication. The PDA asks for the fingerprint of this little left toe and to pronounce the word shit. After passing this test Bob can continue.

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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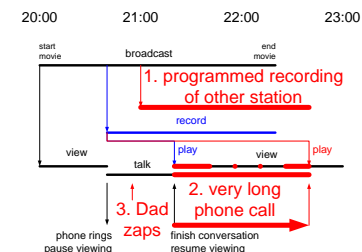
Abstract

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?

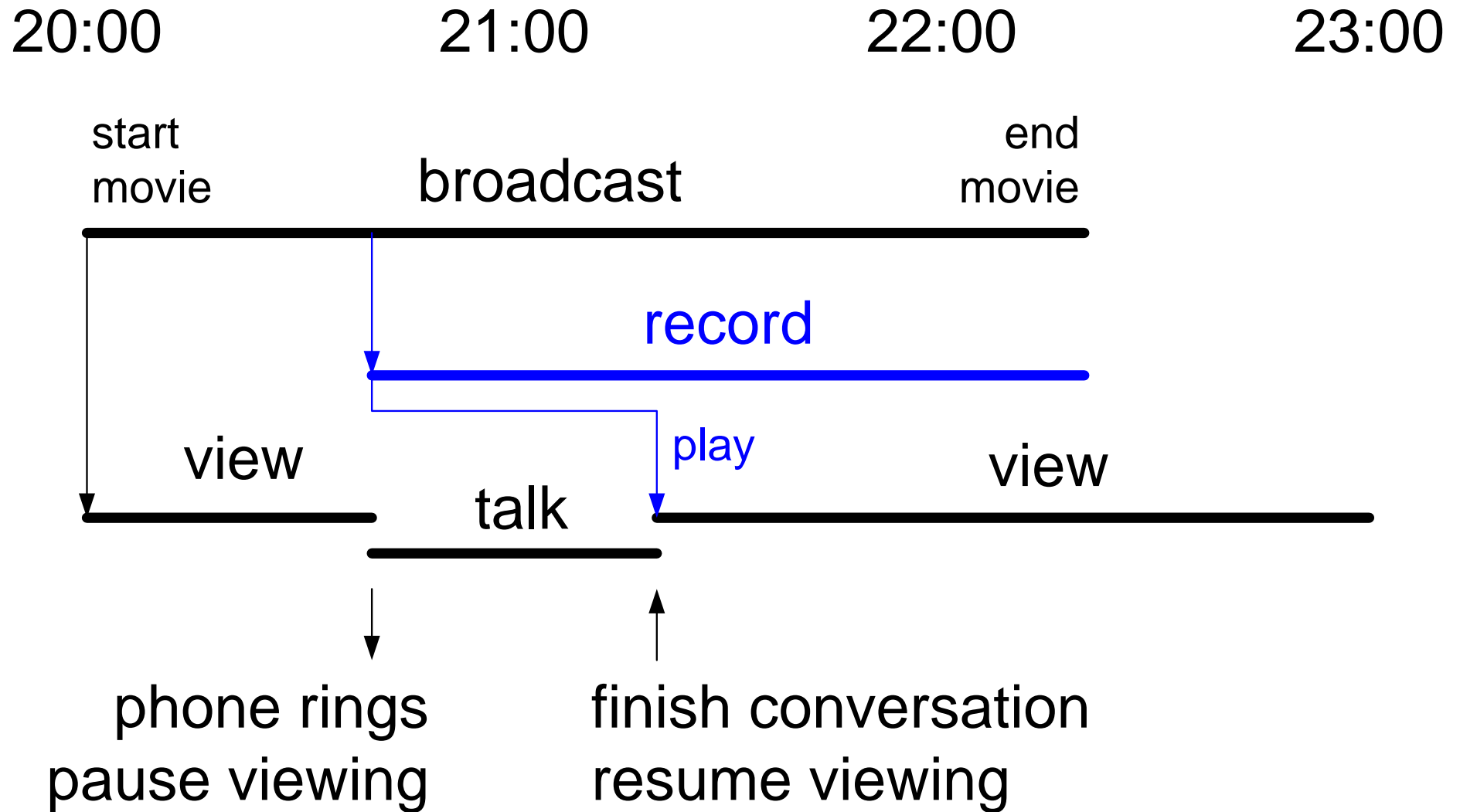
Supports or is part of specification

by providing specific data in user perspective

Facilitates analysis and design

Facilitates verification and testing

Example Time Shift recording

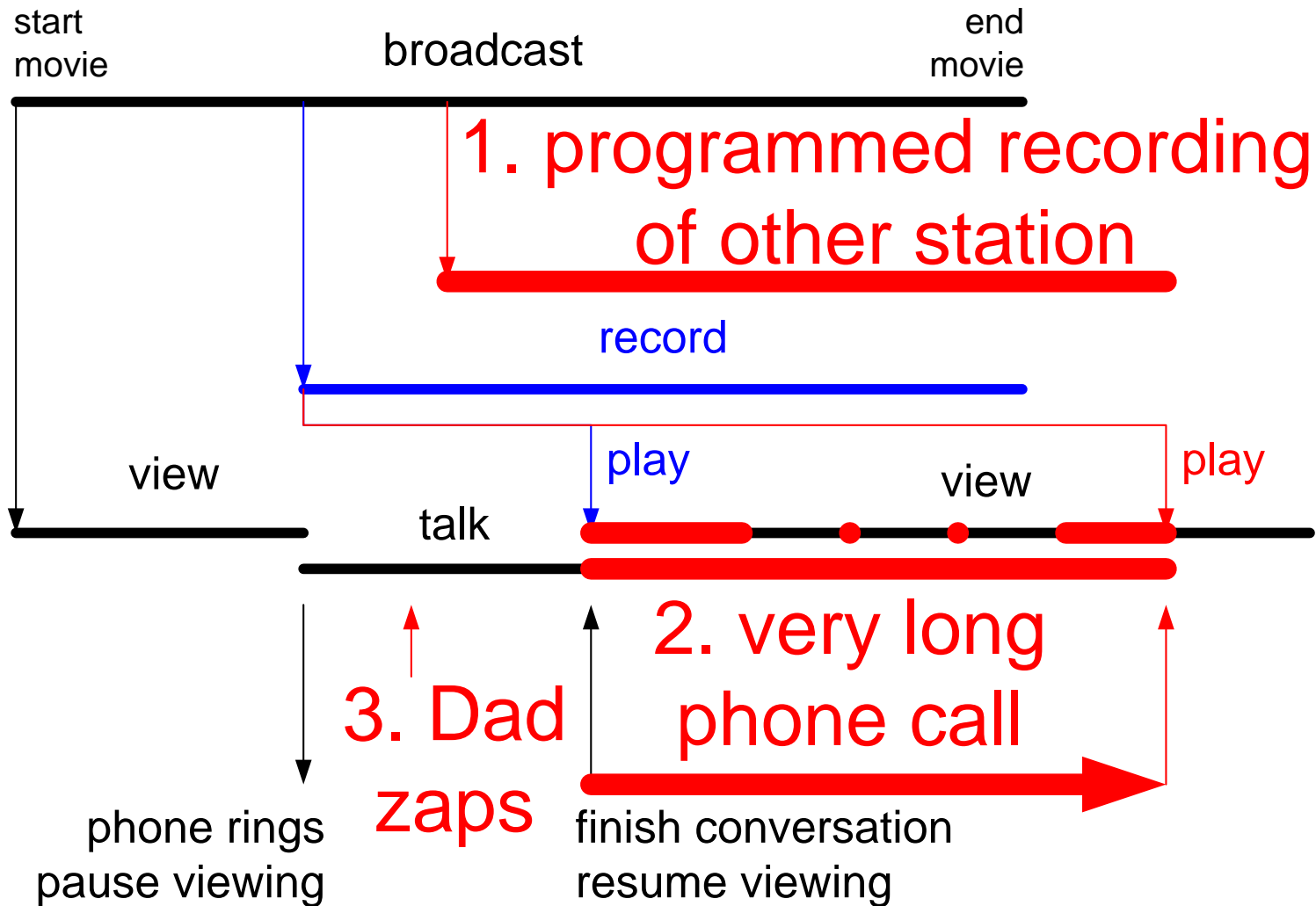


Construction limits intrude in User Experience

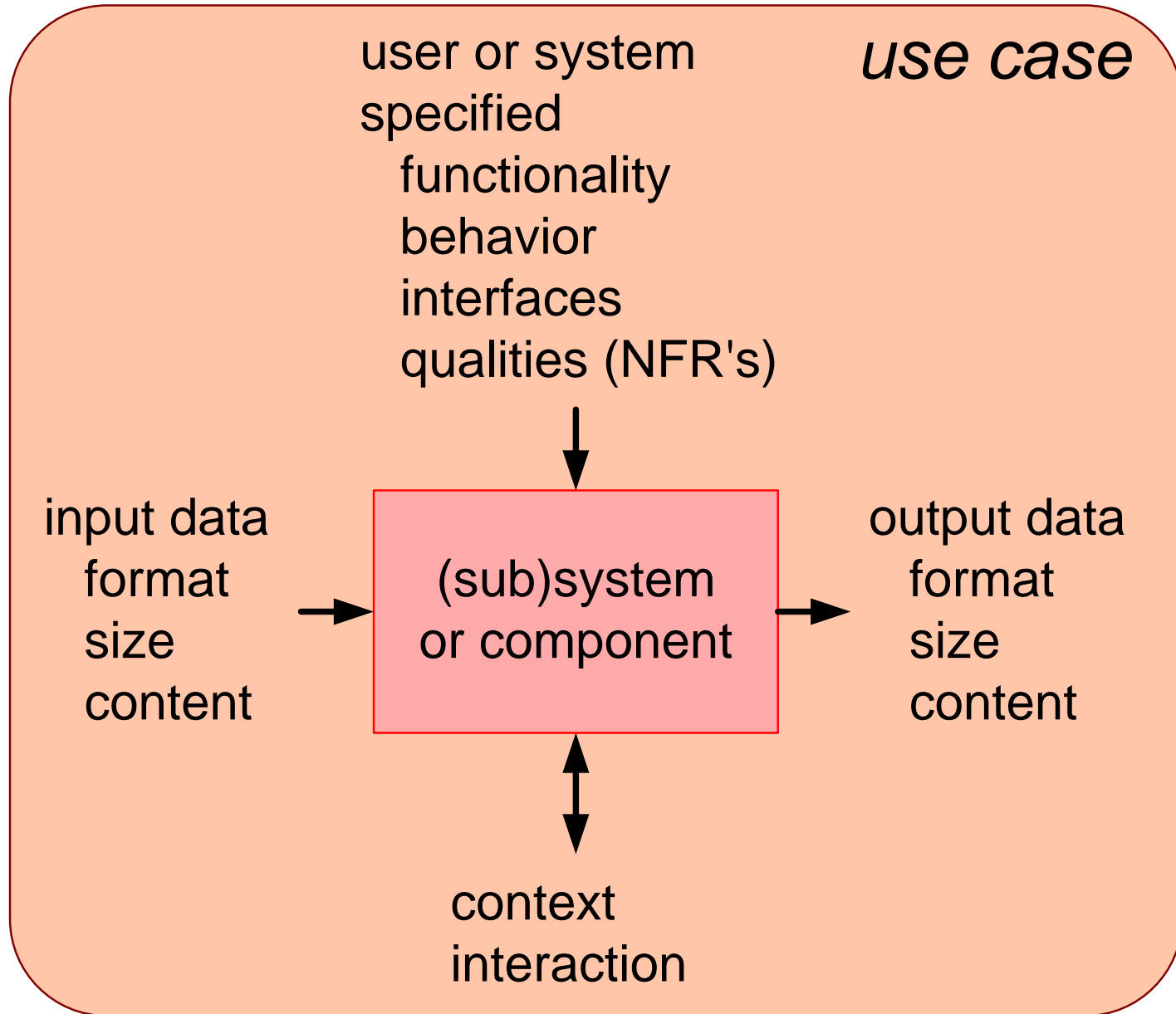
- number of tuners
- number of simultaneous streams (recording and playing)
- amount of available storage
- management strategy of storage space

What if?

20:00 21:00 22:00 23:00



Content of a Use Case



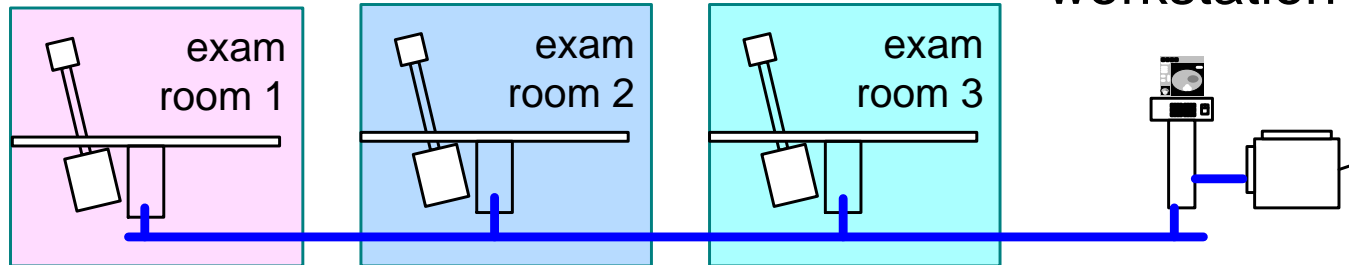
Example personal video recorder use case contents

typical use case(s)	worst case, exceptional, or change use case(s)
<p data-bbox="201 505 953 553">interaction flow (functional aspects)</p> <ul data-bbox="247 565 905 805" style="list-style-type: none">select movie via directorystart moviebe able to pause or stopbe able to skip forward or backwardset recording quality	<p data-bbox="1125 505 1331 553">functional</p> <ul data-bbox="1171 565 1755 753" style="list-style-type: none">multiple inputs at the same timeextreme long moviedirectory behaviour in case of extreme many short movies
<p data-bbox="201 849 877 954">performance and other qualities (non-functional aspects)</p> <ul data-bbox="247 966 936 1154" style="list-style-type: none">response times for start / stopresponse times for directory browsingend-of-movie behaviourrelation recording quality and storage	<p data-bbox="1125 849 1430 898">non-functional</p> <ul data-bbox="1171 909 1934 1146" style="list-style-type: none">response time with multiple inputsimage quality with multiple inputsinsufficient free spaceresponse time with many directory entriesreplay quality while HQ recording

Example of Quantification of Typical Use Case

3 examination rooms connected to

1 medical imaging workstation + printer

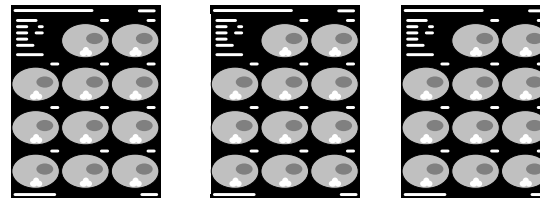


examination room: average 4 interleaved examinations / hour

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

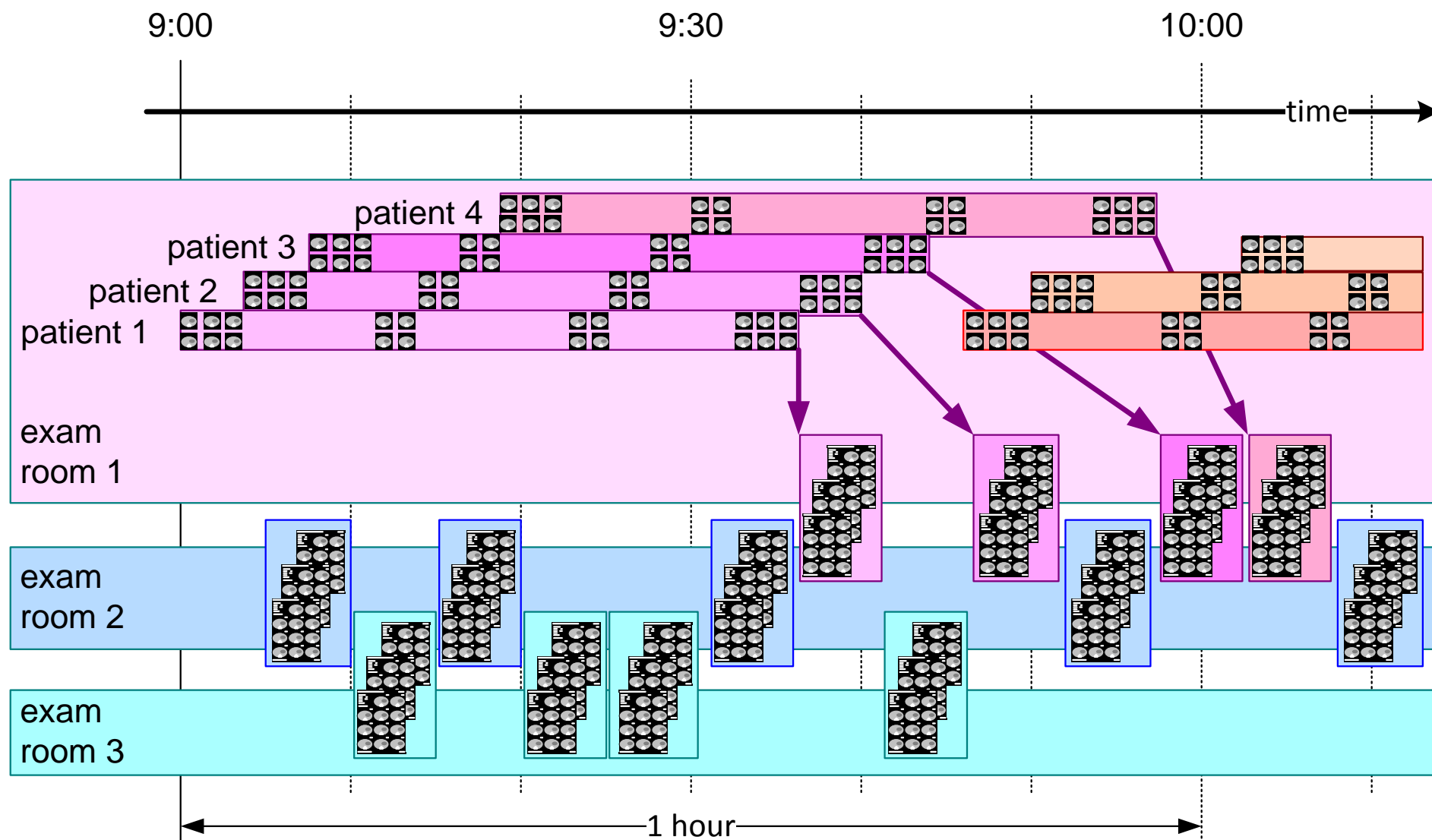


film production: 3 films of 4k*5k pixels each



high quality output
(bi-cubic interpolation)

Timing of this Use Case



Recommendations for working with use cases

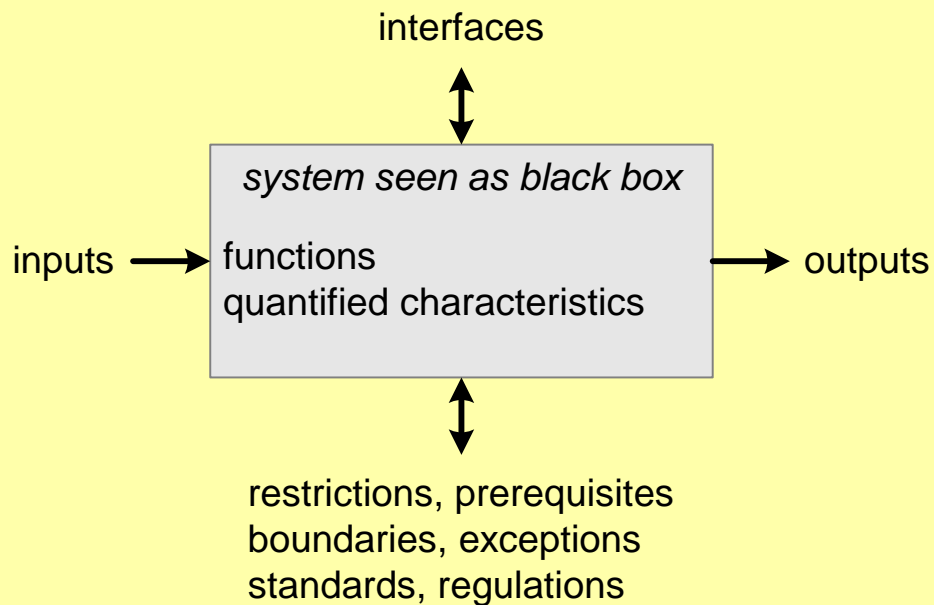
- + combine related functions in one use case
- do not make a separate use case for every function
- + include non-functional requirements in the use cases

- + 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

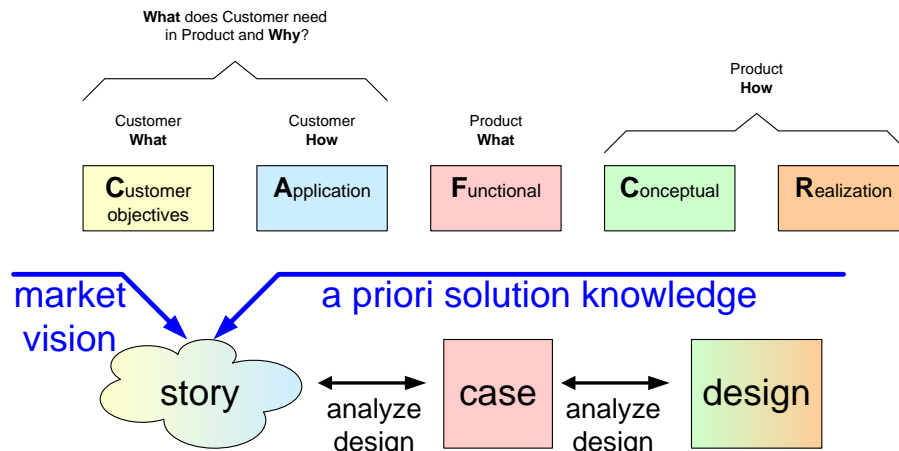


use case
typical use with relevant
context data (quantified!)

- **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

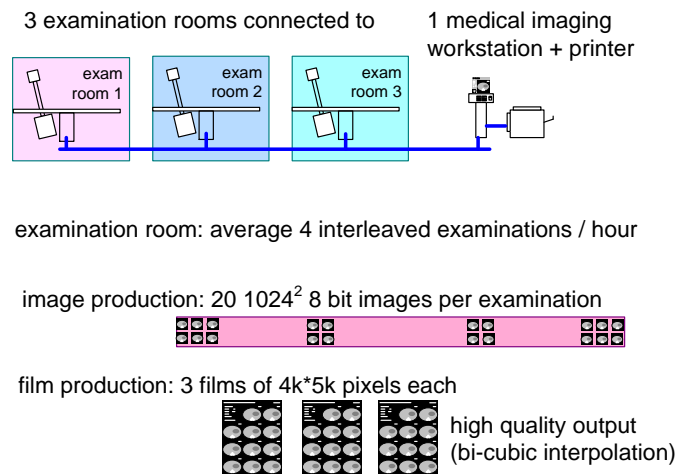
Customer Language



Accessible 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)
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