From story to design illustrated by medical imaging

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Abstract

The medical imaging workstation is used as printserver for multiple X-ray examination rooms. A quantified story is used to understand the use of the system, and to analyse specification and design.

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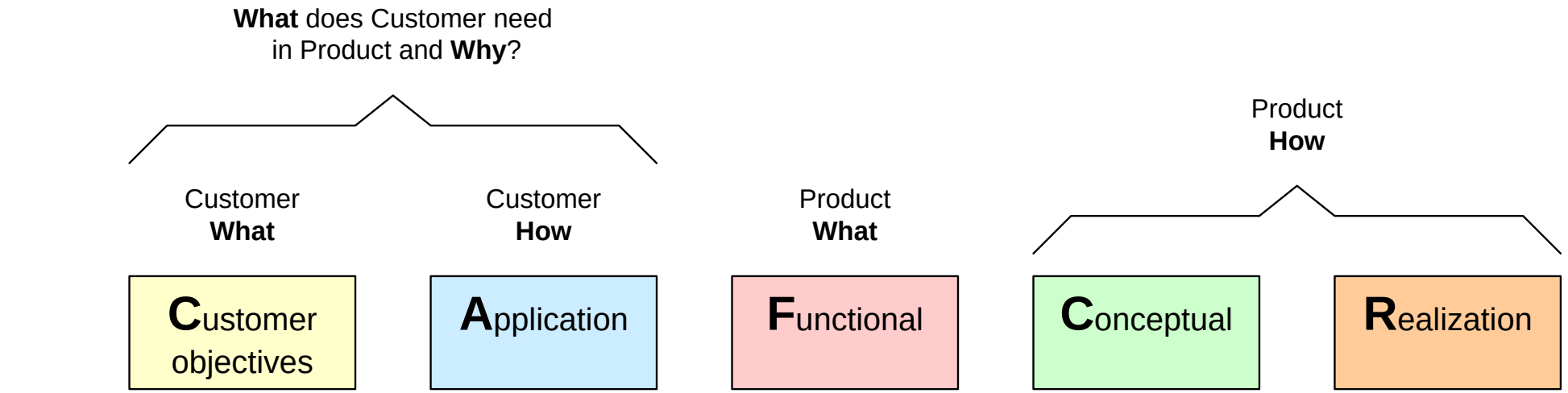
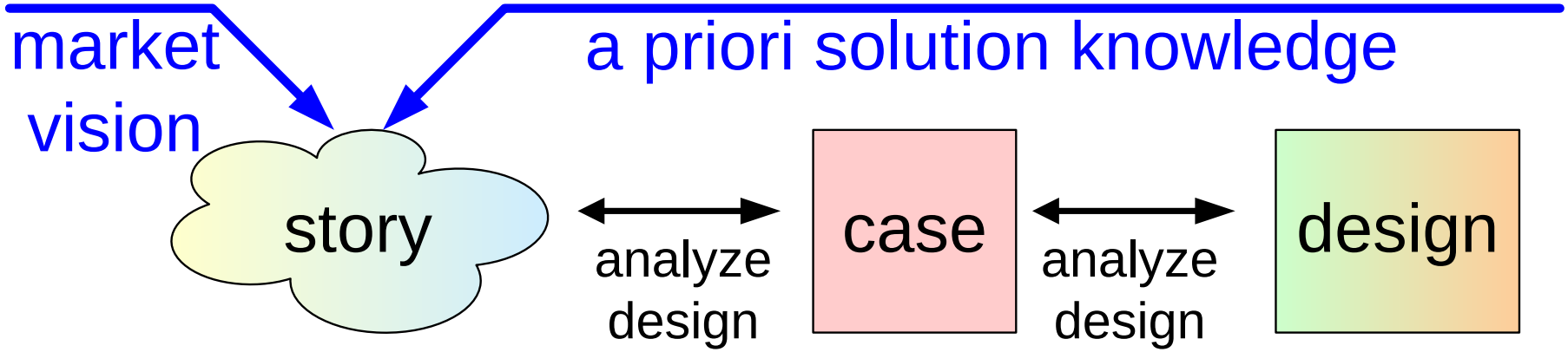
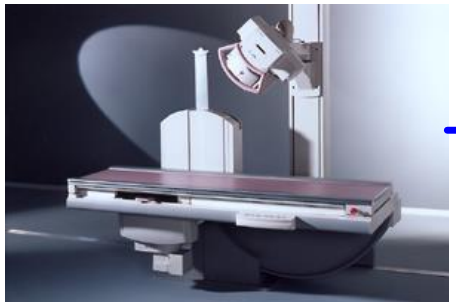
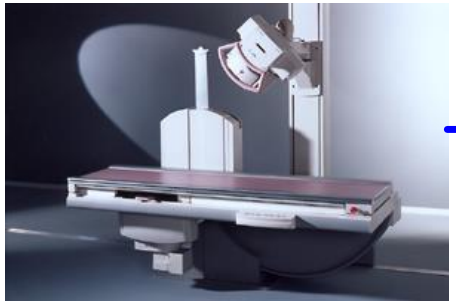
From story to design

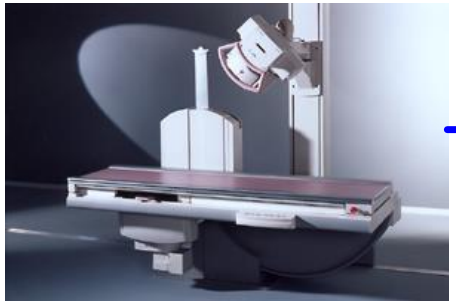




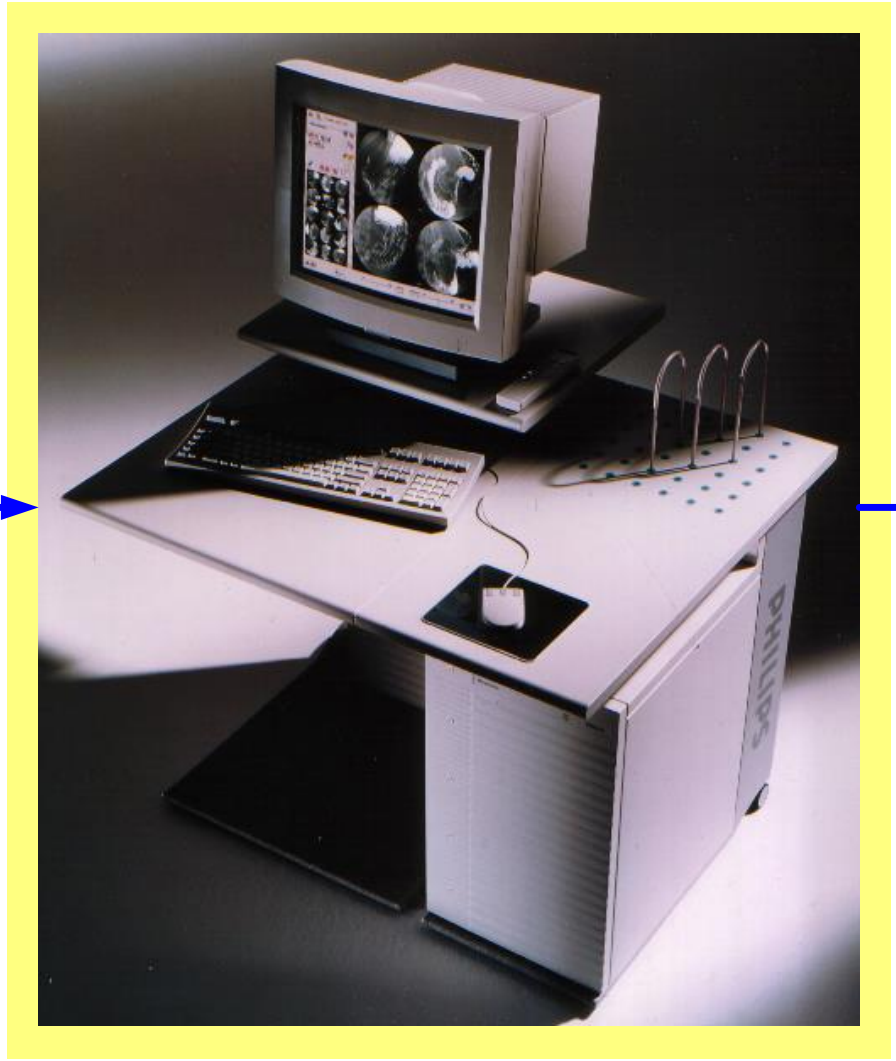
Easyvision serving three URF examination rooms







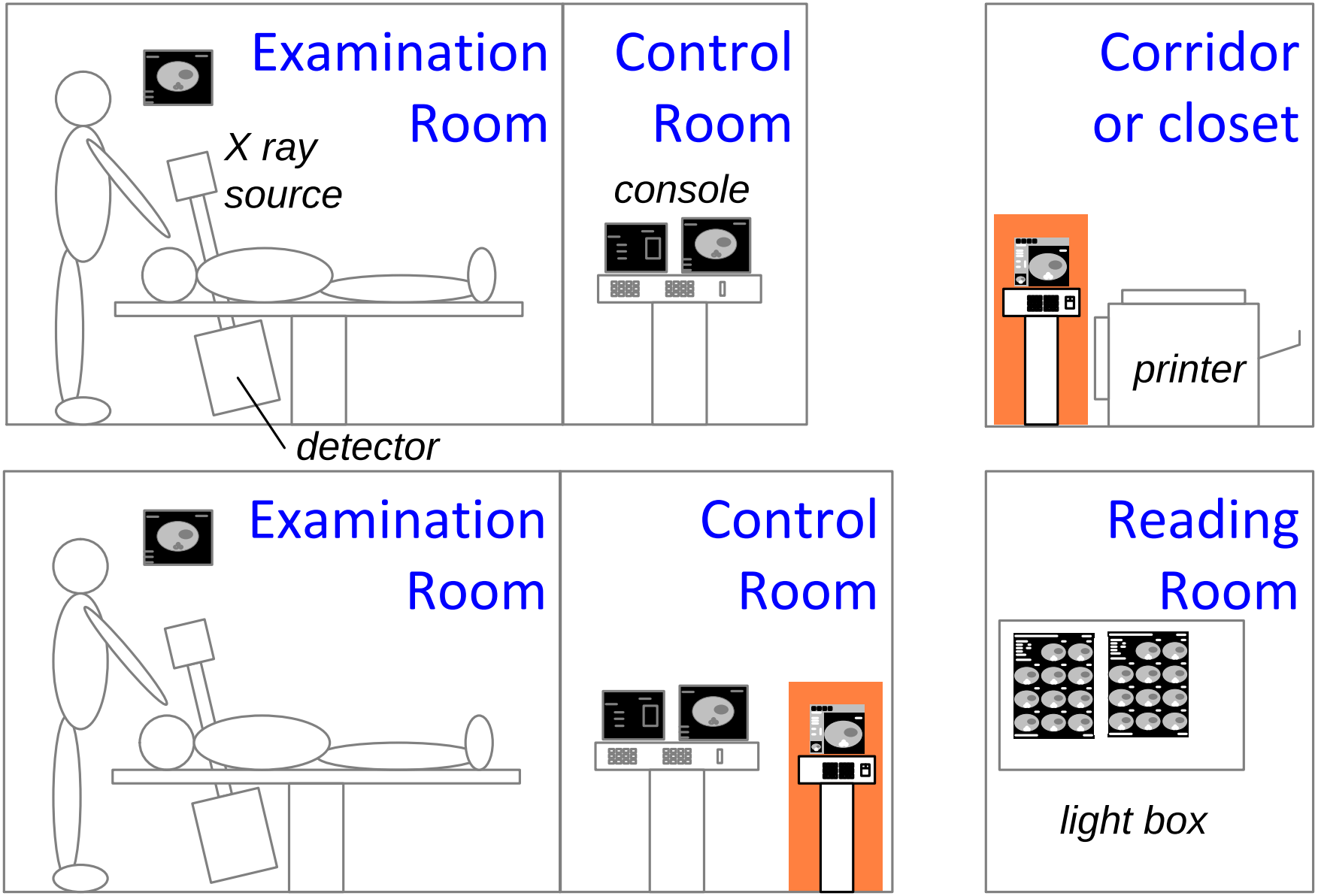
URF-systems



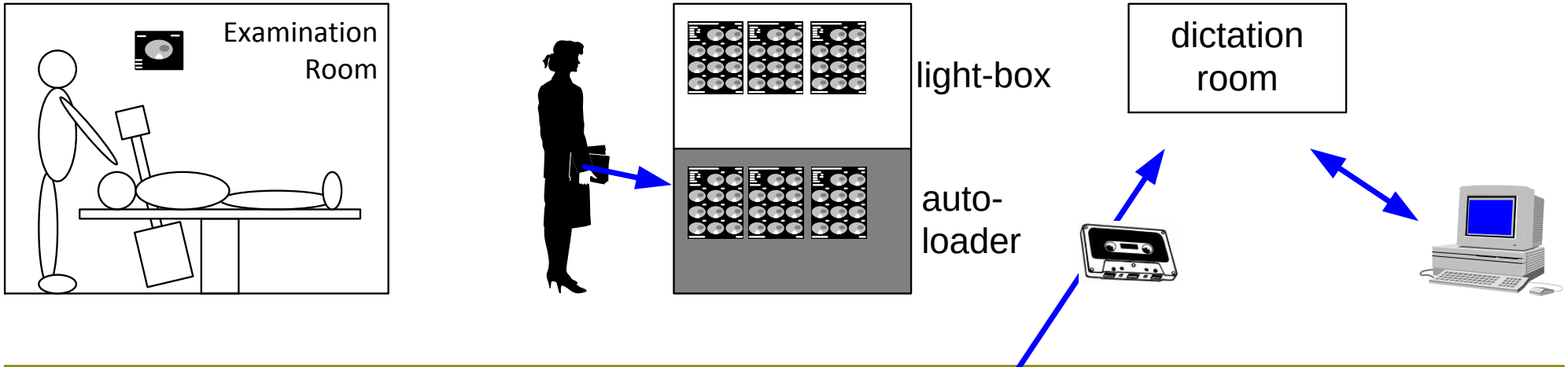
EasyVision: Medical Imaging Workstation

typical clinical image (intestines)

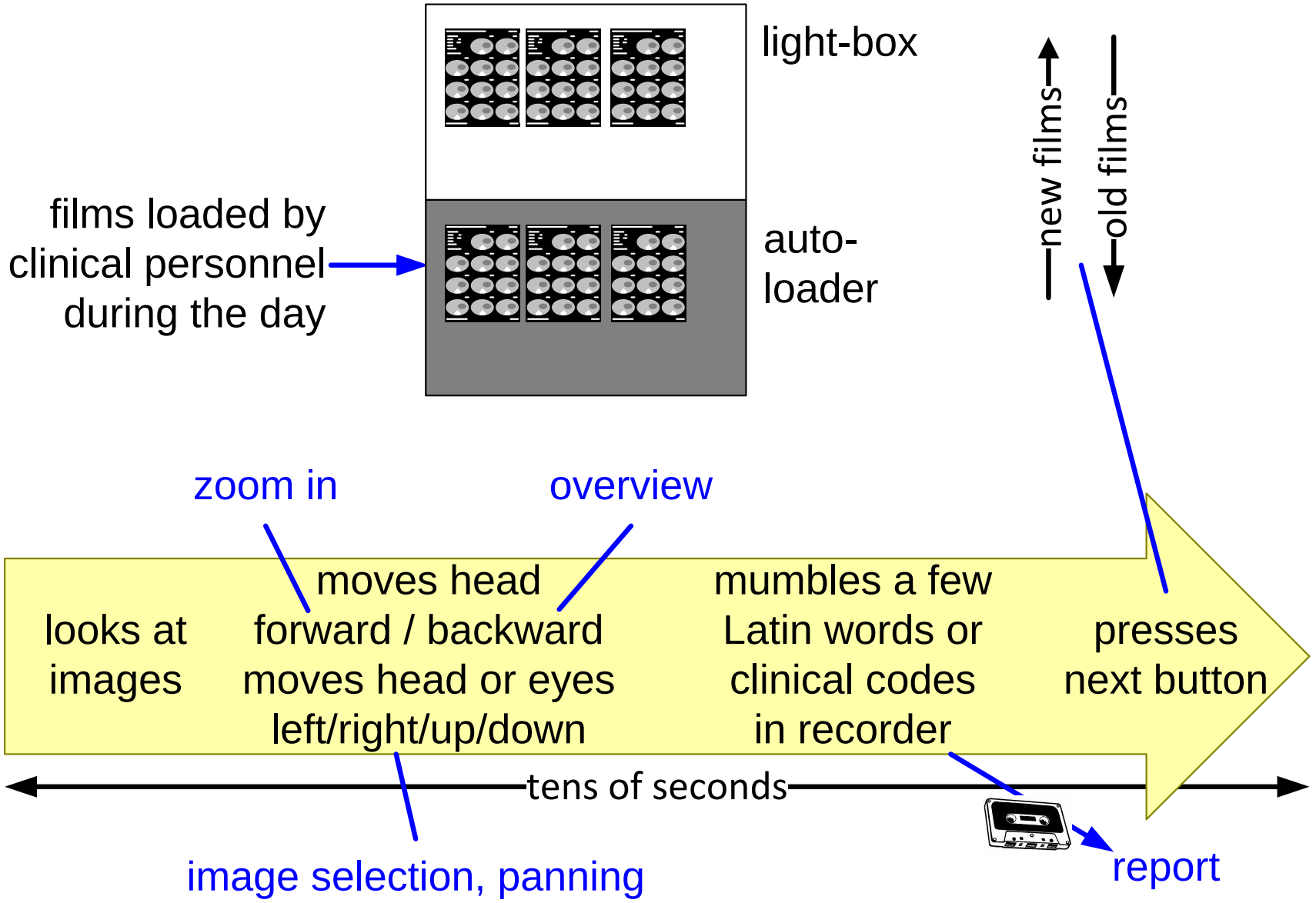
X-ray rooms with Easyvision applied as printserver



Radiologist workspots and activities

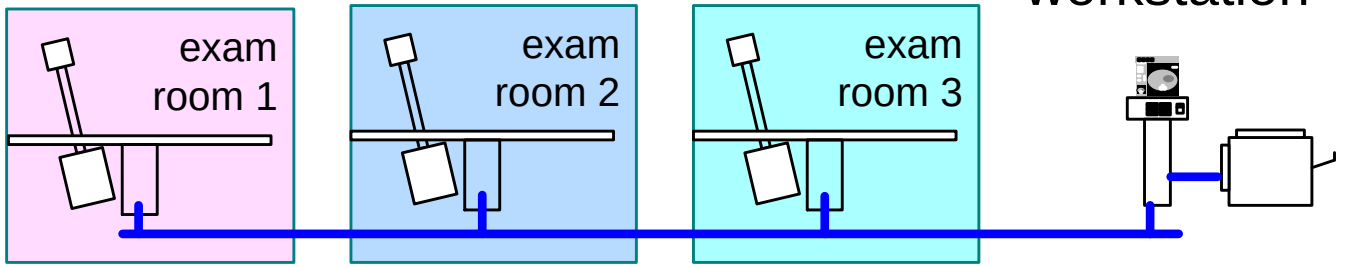


Diagnosis in tens of seconds



Typical case URF examination

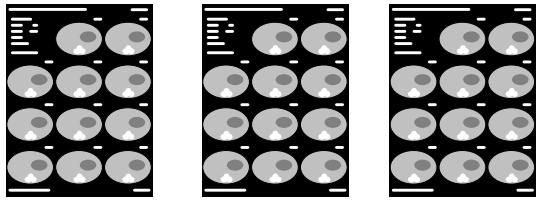
3 examination rooms connected to 1 medical imaging workstation + printer



examination room: average 4 interleaved examinations / hour

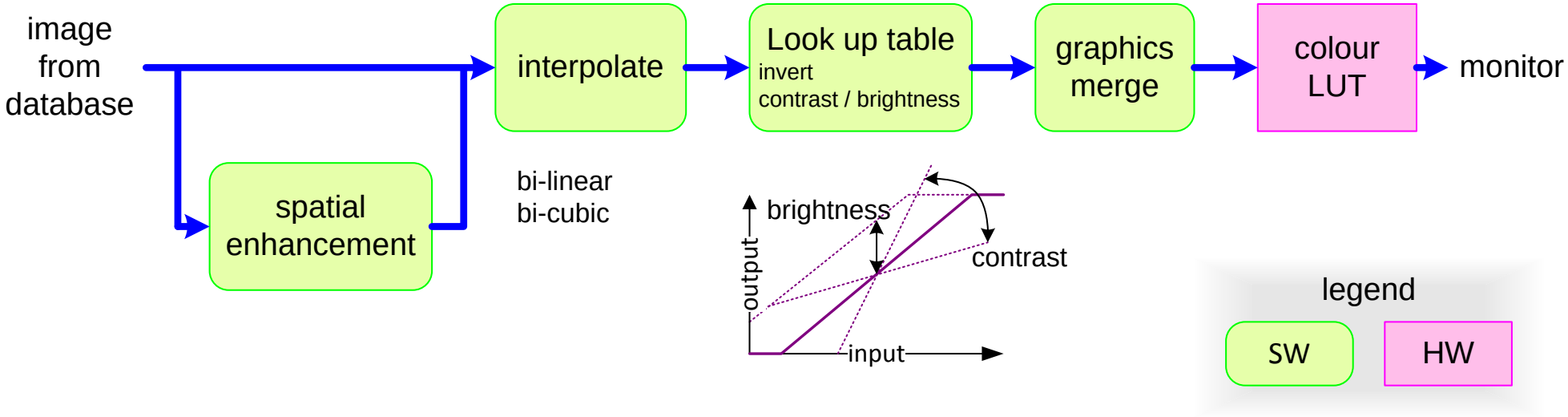
image production: 20 1024^2 8 bit images per examination

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



high quality output
(bi-cubic interpolation)

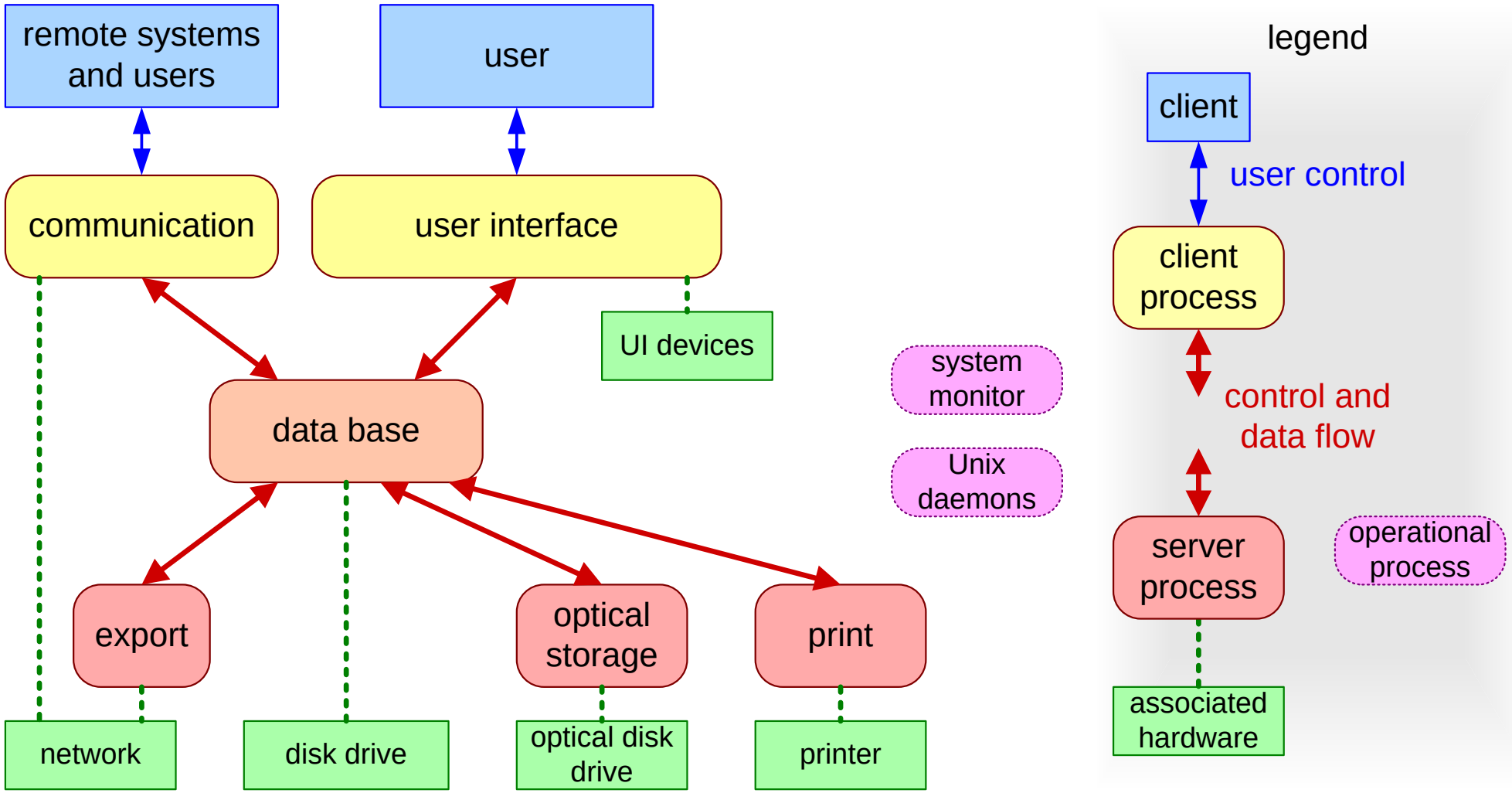
Presentation pipeline for X-ray images



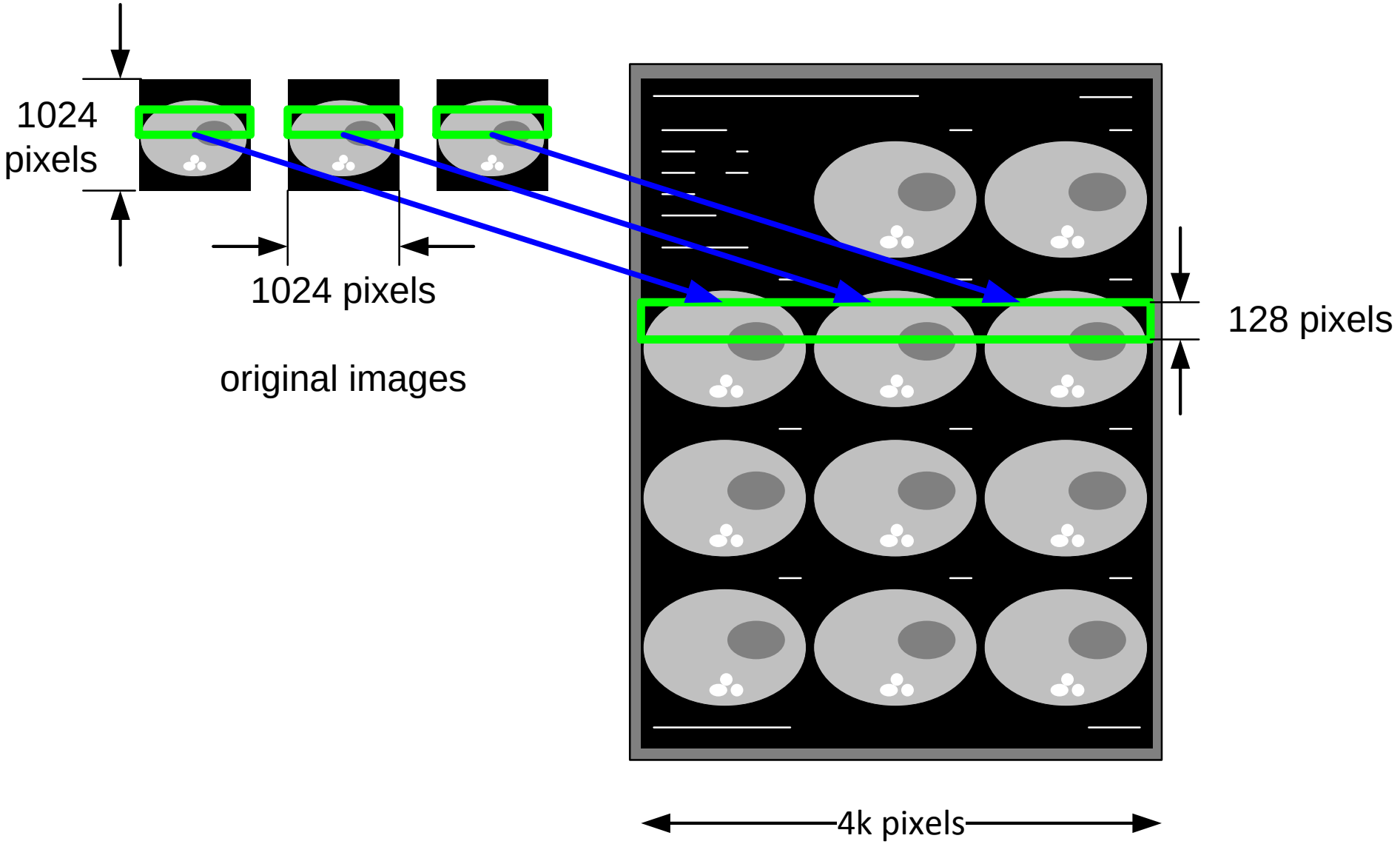
Example of a memory budget

memory budget in Mbytes	code	obj data	bulk data	total
shared code	11.0			11.0
User Interface process	0.3	3.0	12.0	15.3
database server	0.3	3.2	3.0	6.5
print server	0.3	1.2	9.0	10.5
optical storage server	0.3	2.0	1.0	3.3
communication server	0.3	2.0	4.0	6.3
UNIX commands	0.3	0.2	0	0.5
compute server	0.3	0.5	6.0	6.8
system monitor	0.3	0.5	0	0.8
application SW total	13.4	12.6	35.0	61.0
UNIX Solaris 2.x				10.0
file cache				3.0
total				74.0

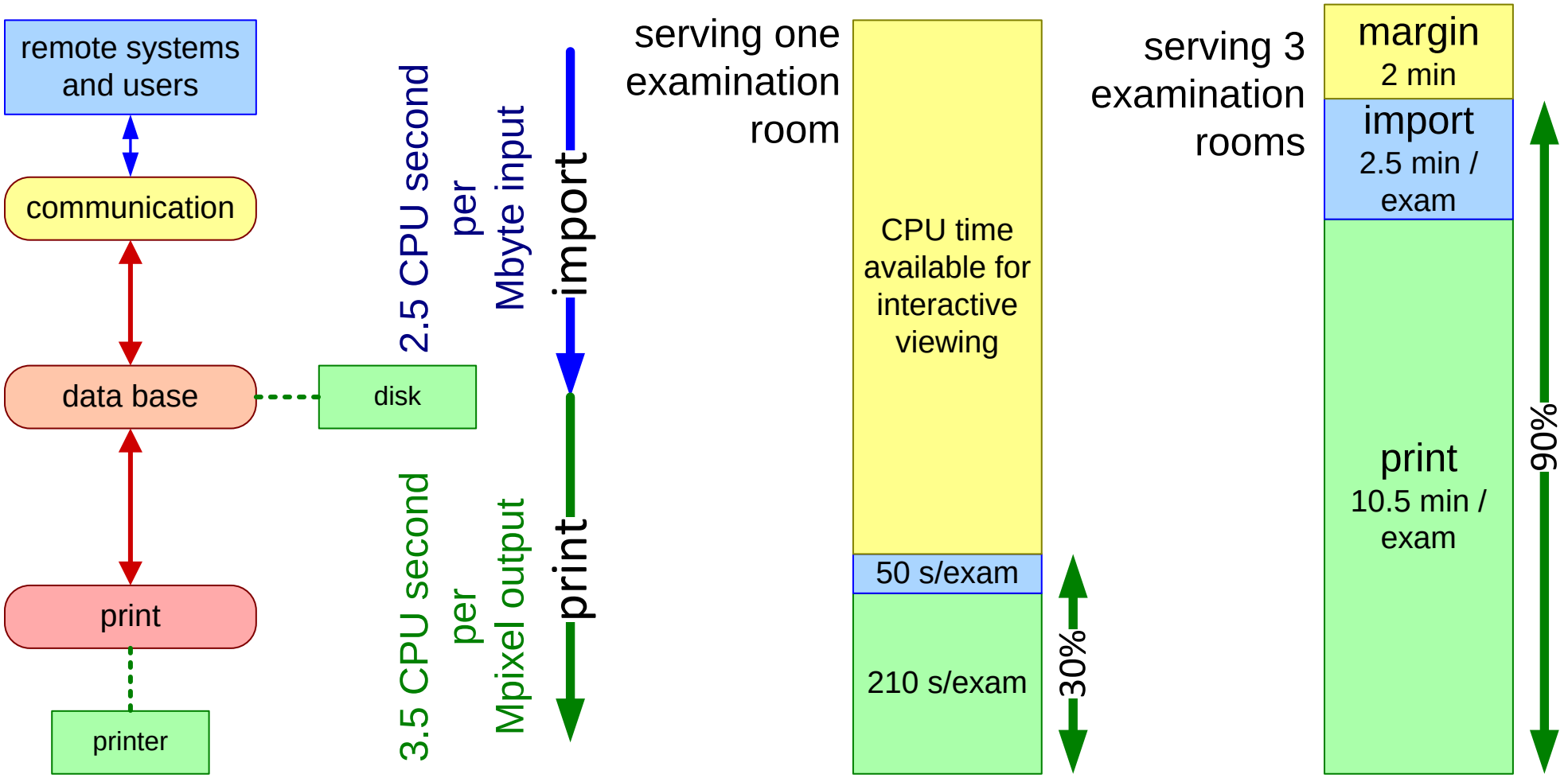
Concurrency via software processes



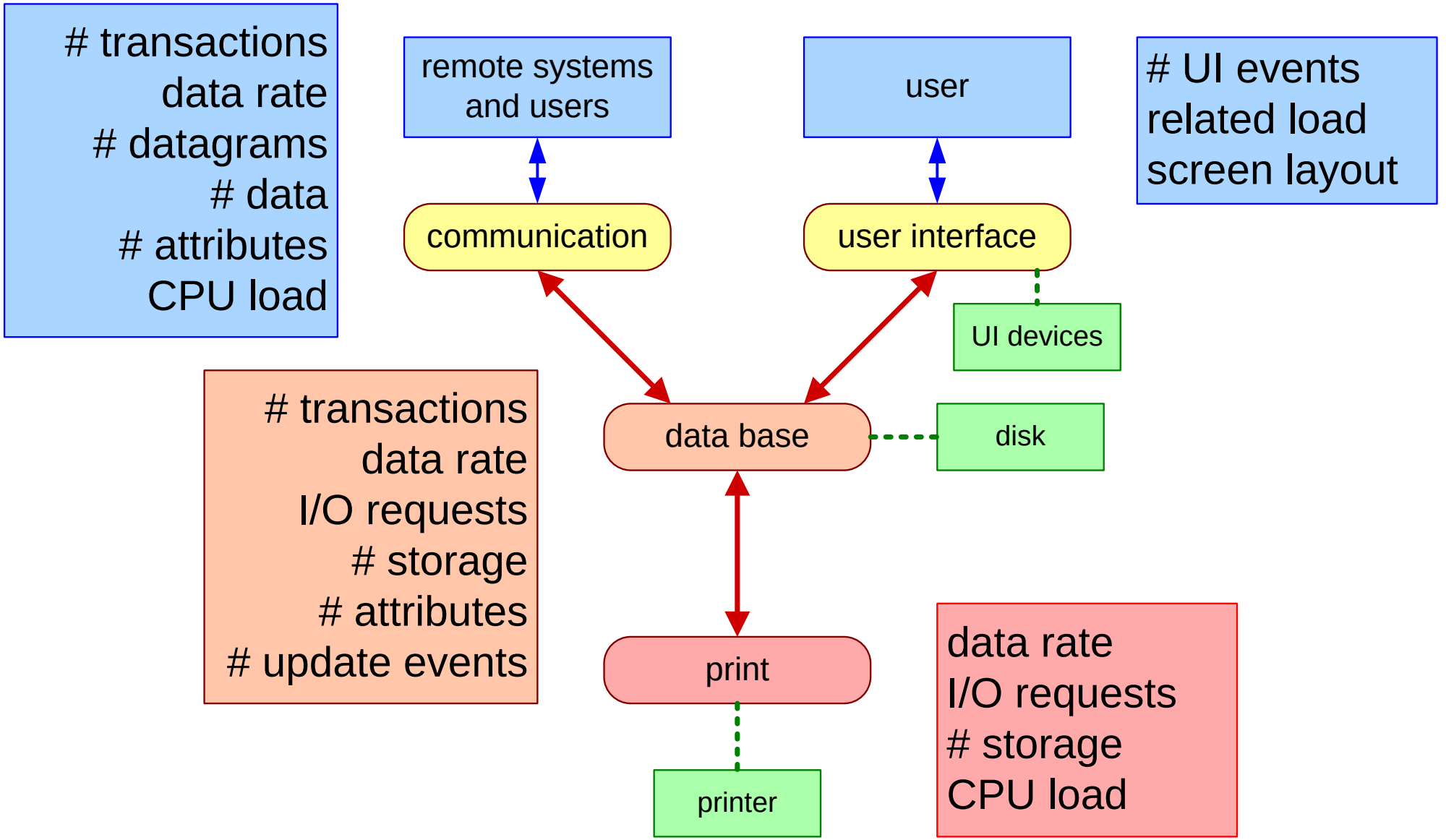
Print server is based on banding



Server CPU load



Analysis in realization view



Criterions 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, ...