From Industrial Experience to System Architecting Know-how

by *Gerrit Muller* Embedded Systems Institute
e-mail: gerrit.muller@embeddedsystems.nl
www.gaudisite.nl

Abstract

The system design process in an industrial setting is illustrated by the development flow of a Medical Imaging Workstation. The role of the architect and the architecting method is explained.

The goals of the Gaudí project are elaborated. In summary the goal is to develop systems architecting as a discipline. Questions addressed are: How to do research in this field? What are the challenges to do the research in a scientific way. The education of architects is also part of the development of this discipline. Although a lot of activity has already been done in related fields a lot still has to be done to develop the discipline Systems Architecting.

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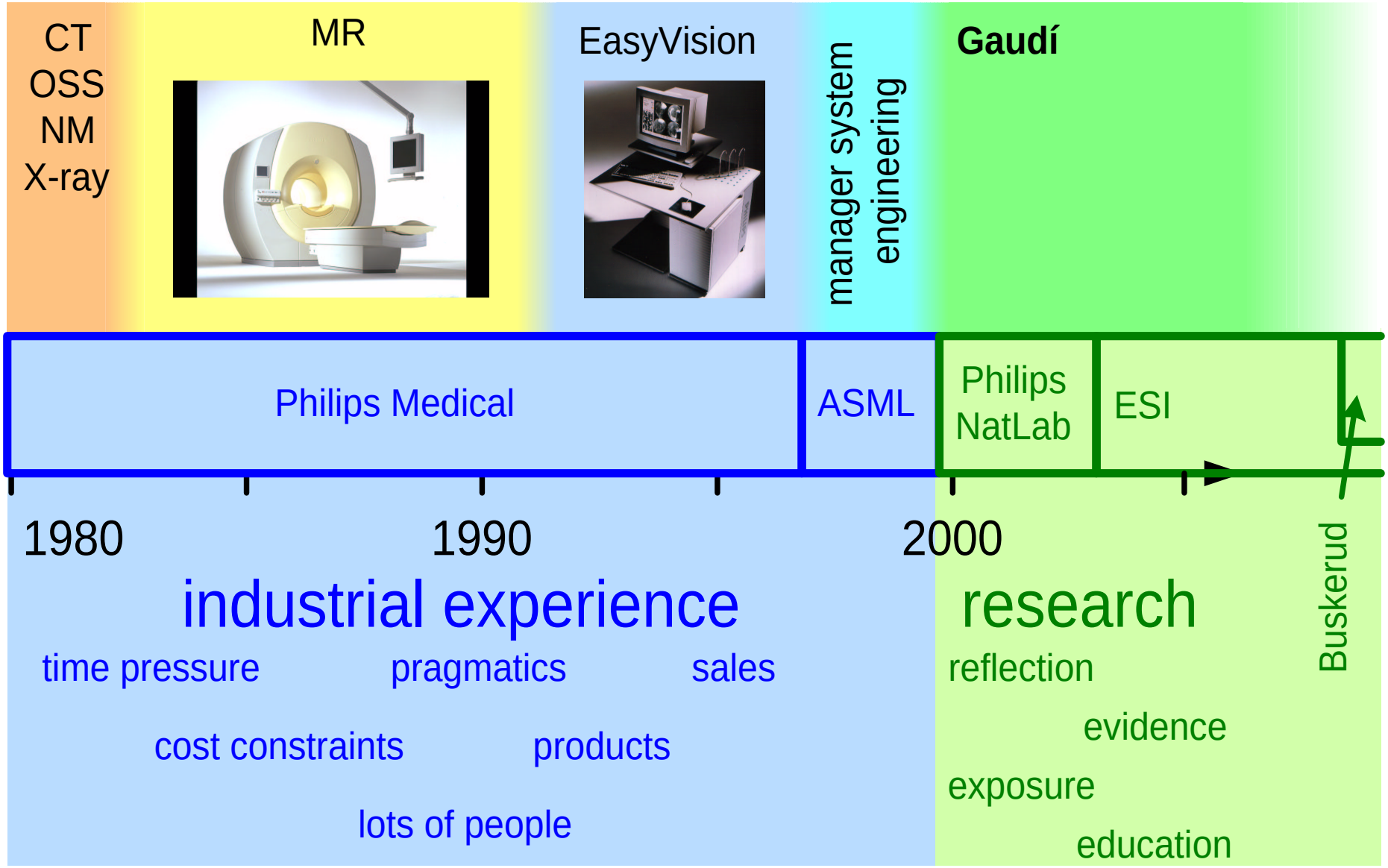
version: 0.3

logo
TBD

From Industry to Research



Gaudí Project Goals

- Consolidate existing Systems Architecting Methods

  evaluate, reflect, generalize

- Make the Systems Architecting art more accessible

  case descriptions

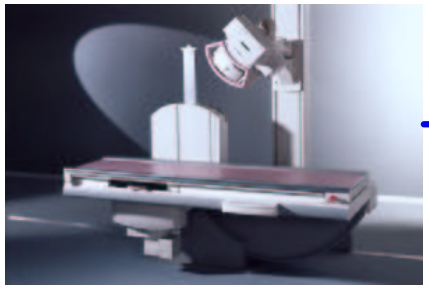
- Enable the education of (future) System Architects

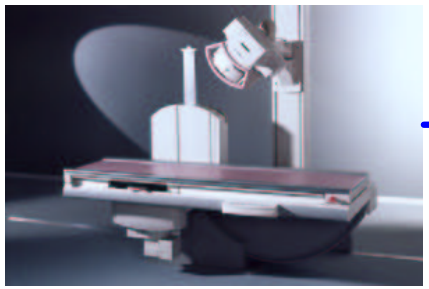
  curriculum, course material

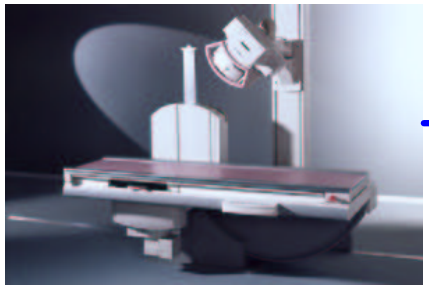
- Research new or improved Systems Architecting Methods

  industry as laboratory

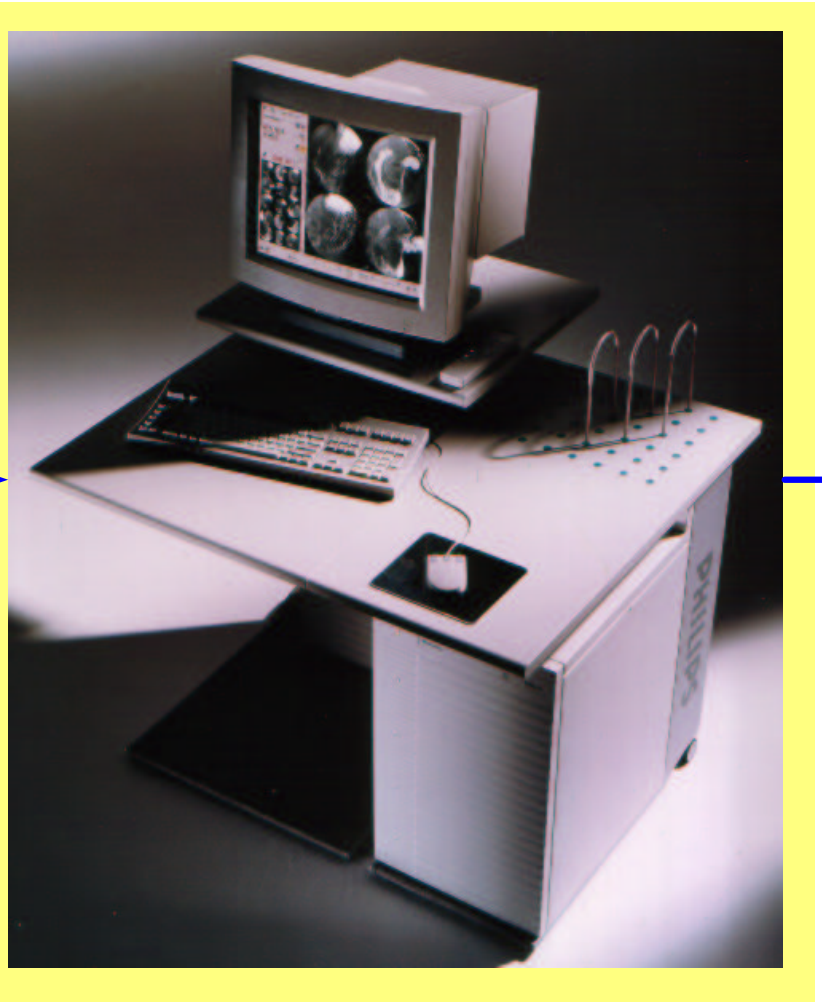
Easyvision serving three URF examination rooms







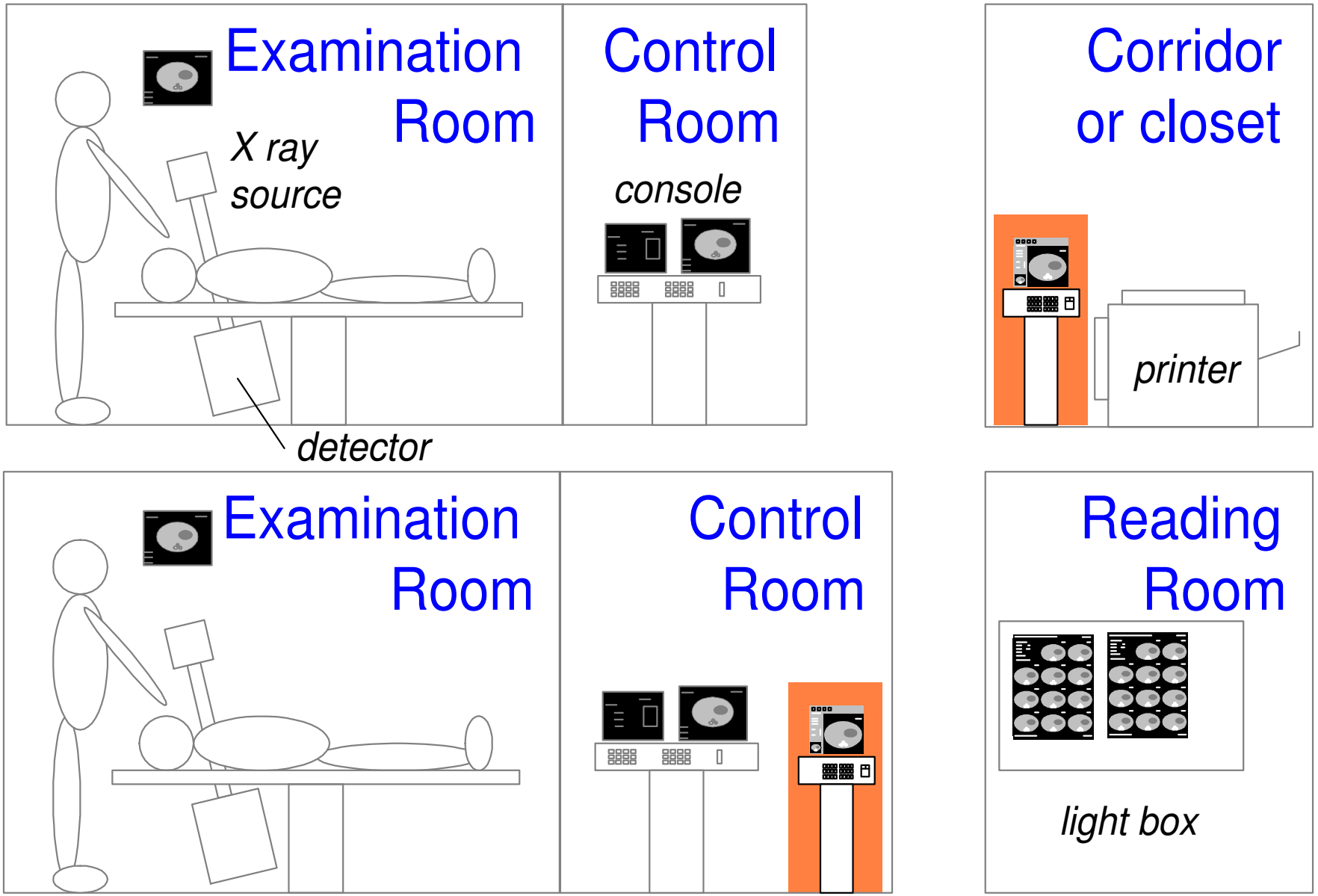
URF-systems



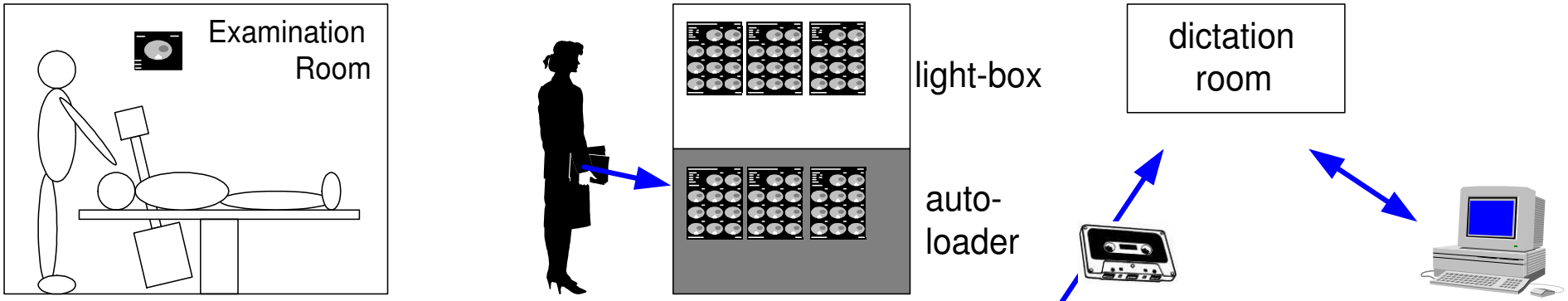
EasyVision: Medical Imaging Workstation

typical clinical image (intestines)

X-ray rooms with Easyvision applied as printserver



Radiologist workspots and activities



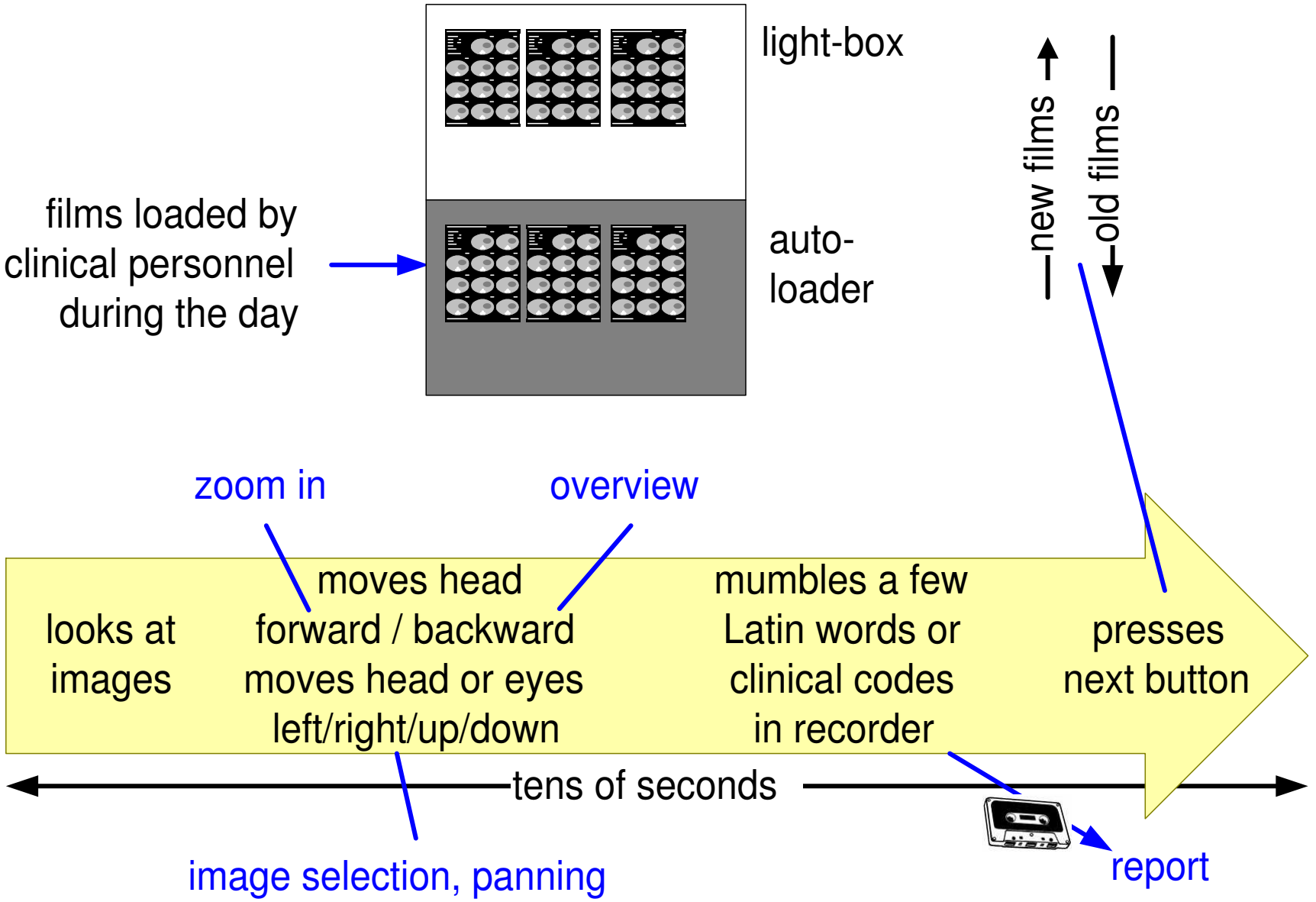
supervision of the examination

view and diagnose, dictate report

verify and authorise report

activities of the radiologist

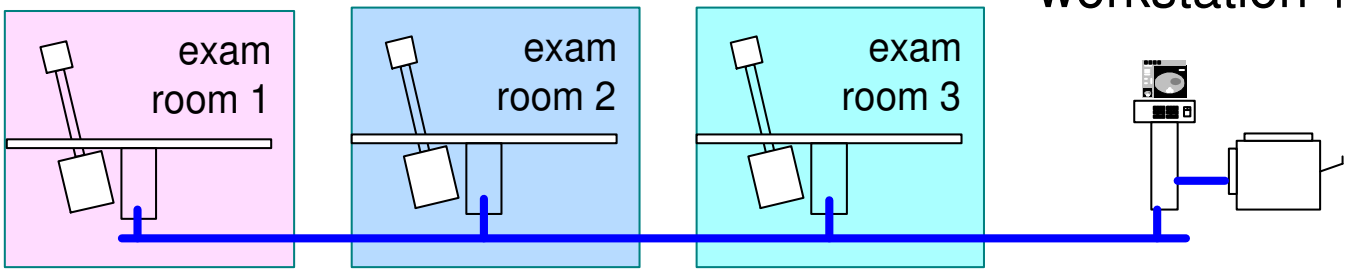
Diagnosis in tens of seconds



Typical case URF examination

3 examination rooms connected to

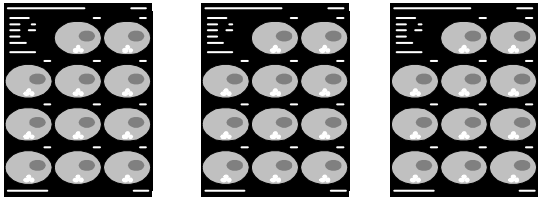
1 medical imaging workstation + printer



examination room: average 4 interleaved examinations / hour

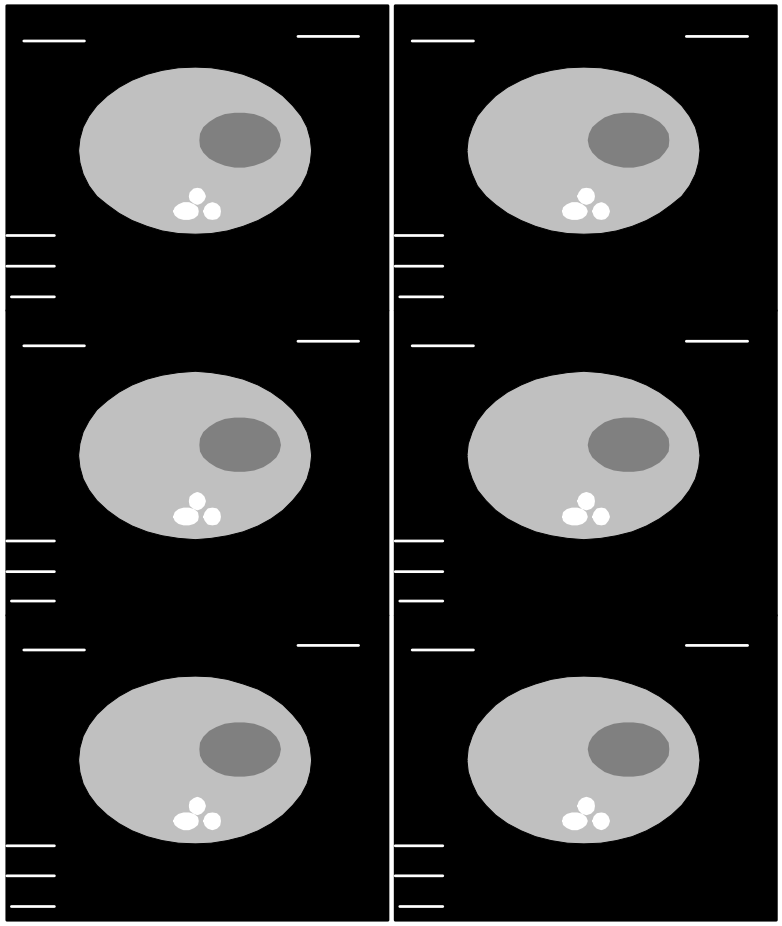
image production: 20 1024 ^{2} 8 bit images per examination

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

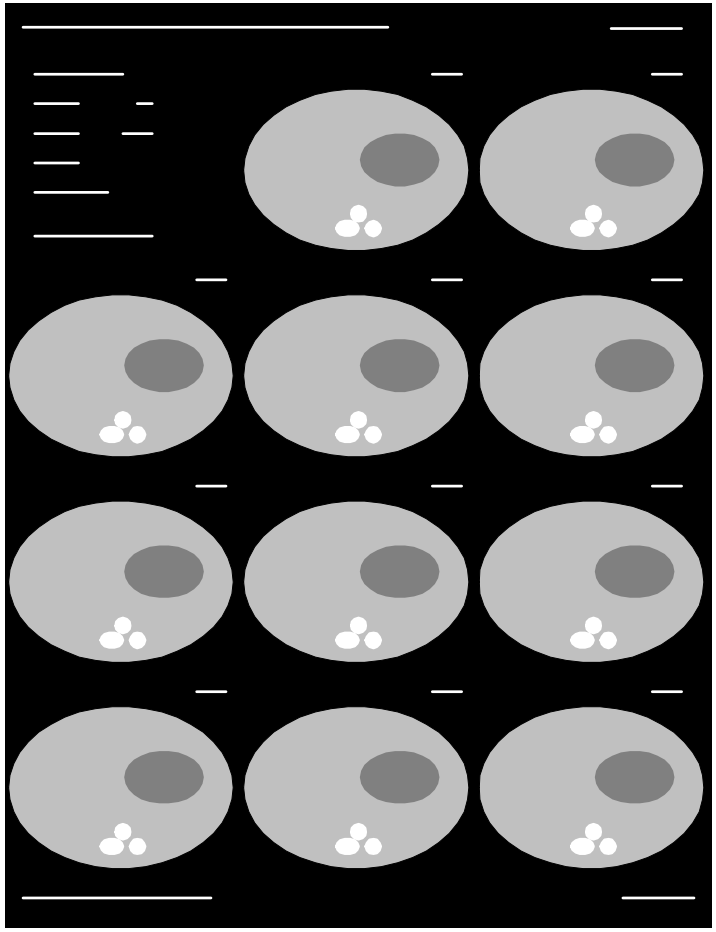


high quality output
(bi-cubic interpolation)

Comparison screen copy versus optimized film



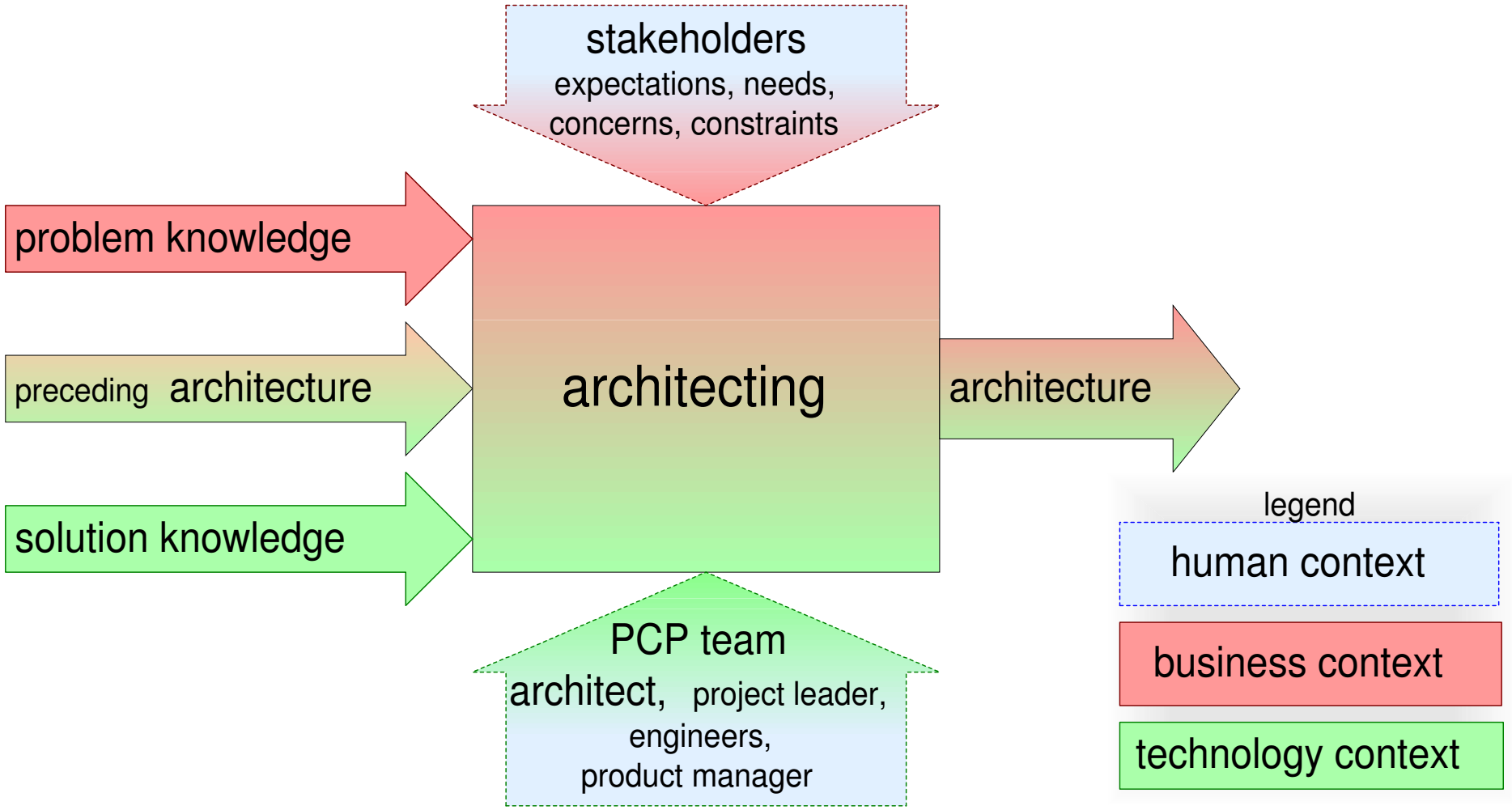
old: screen copy



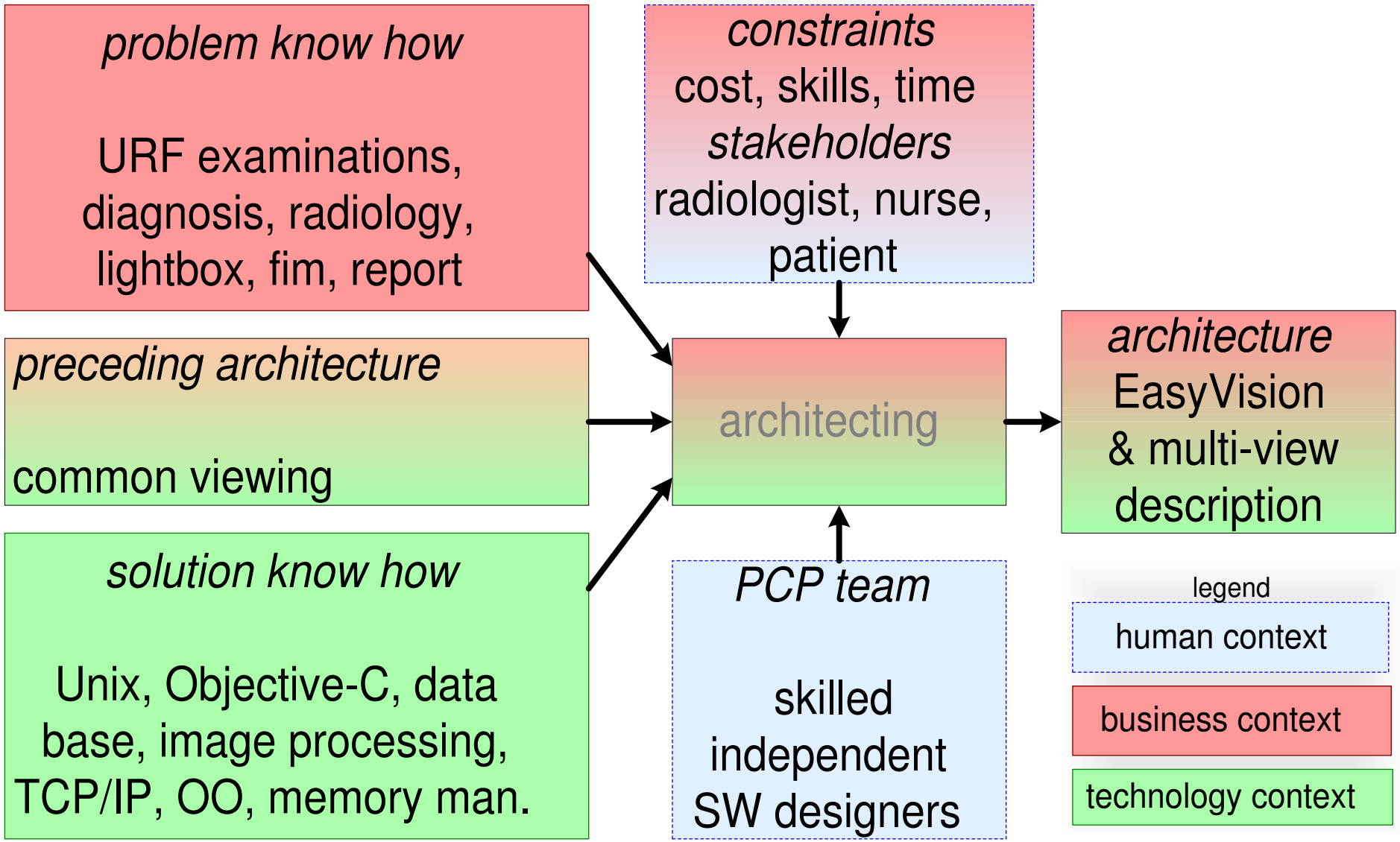
new: SW formatting

20 to 50% less film needed

Architecting = creating an architecture



Architecting EasyVision



Architecture = tangible (internal) + intangible (external)

external

performance *behaviour* *functionality*

the perception of,
experience with,
the system by all stakeholders in all phases of
the system life-cycle

structure *construction*

internal

EasyVision Architecture

external

3 exam rooms *3 films/exam* *contrast* *autoprint* *autostorage*

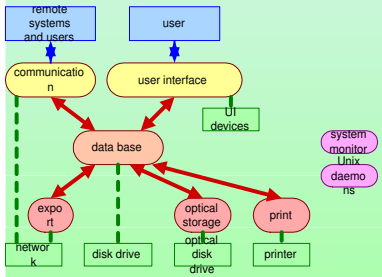
clinical details

the perception of,
experience with,
the system

by all stakeholders

in all phases of
the system life-cycle

SW processes



construction decomposition

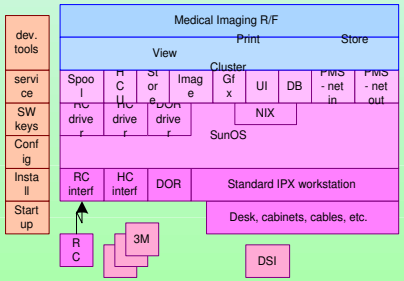
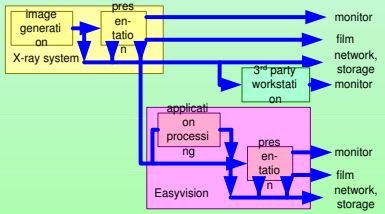
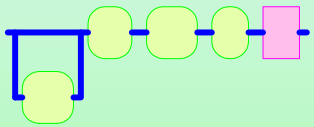


image quality context



processing pipeline

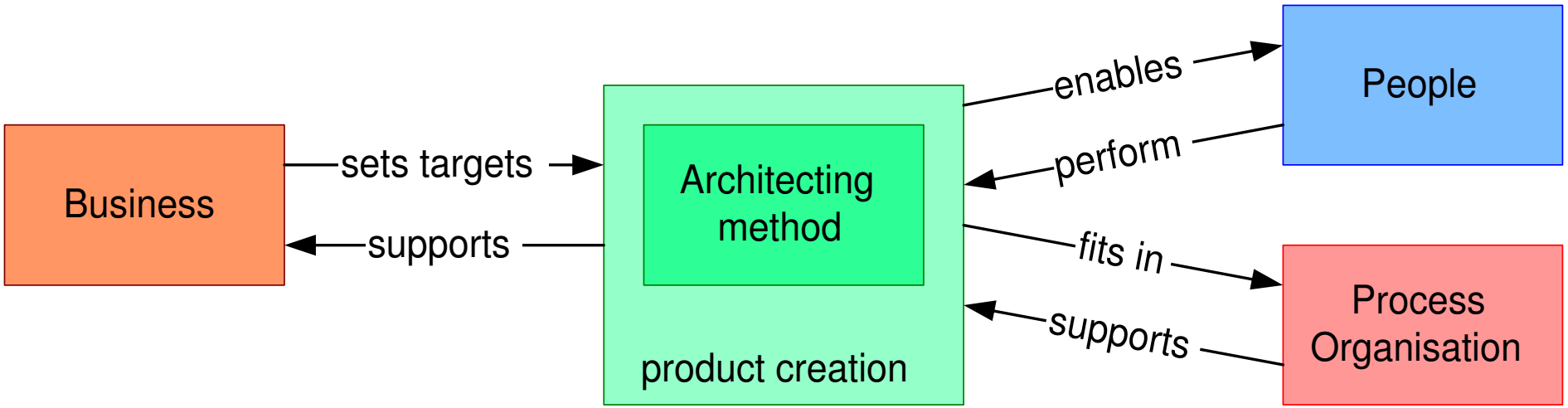


internal

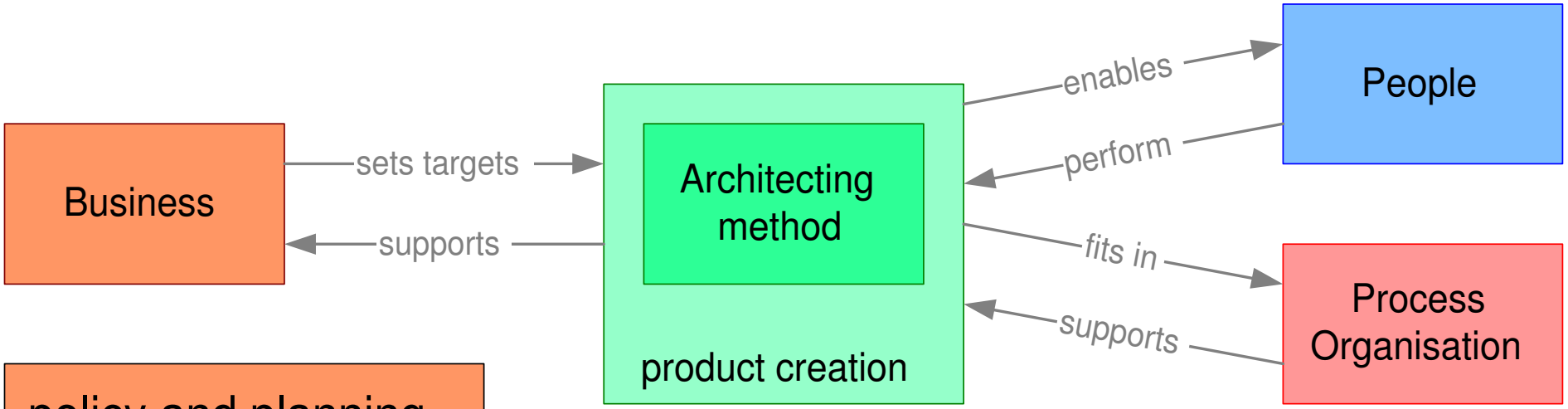
memory budget

memory budget in Mbytes	code	obj data	bulk data	total
shared code	11.0			11.0
UI 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
DOR 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
ASW total	13.4	12.6	35.0	61.0
UNIX Solaris 2.x				10.0
file cache				3.0
total				74.0

The business context of architecting methods



Internal stakeholders



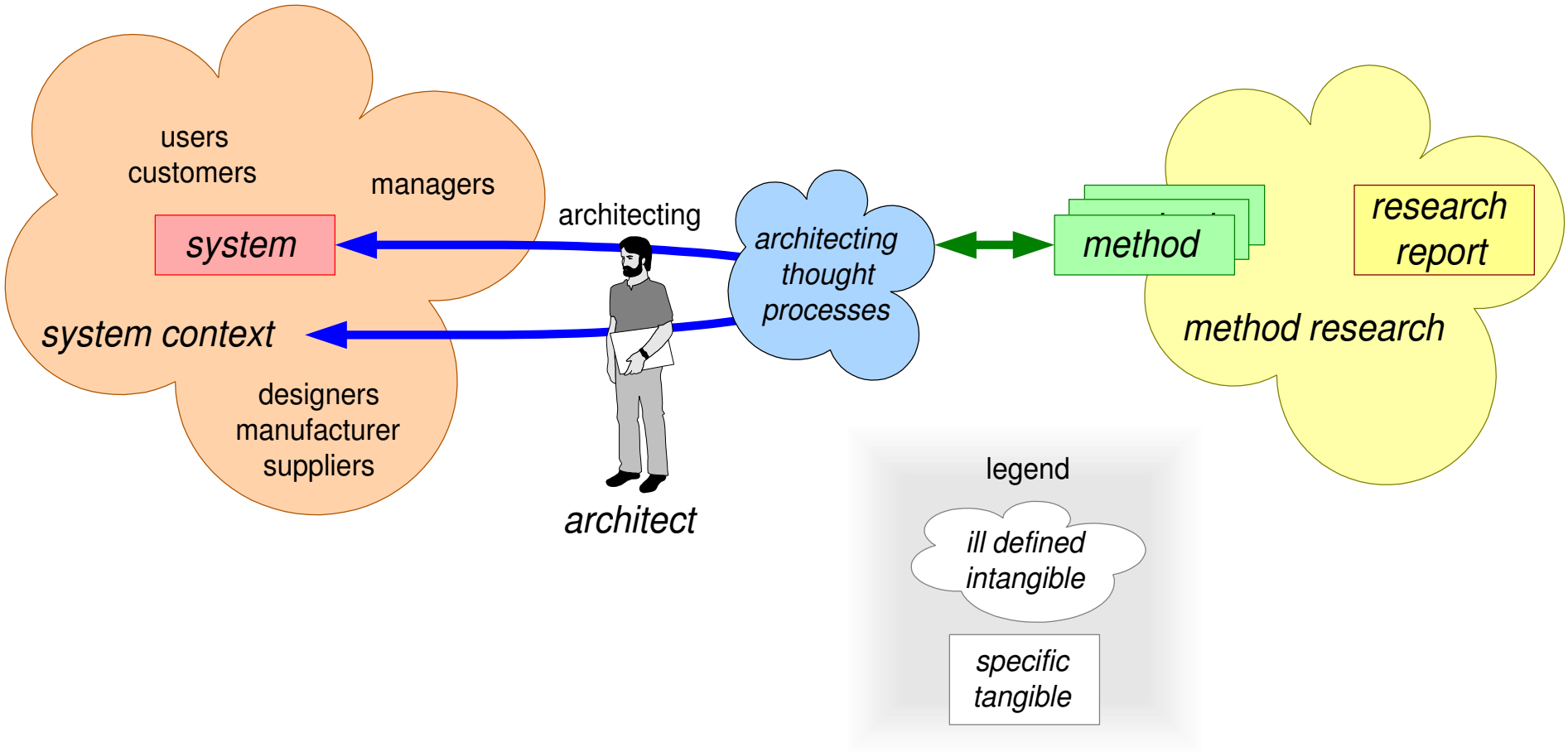
policy and planning
business, marketing, operational managers

customer-oriented
sales, service, production, logistics

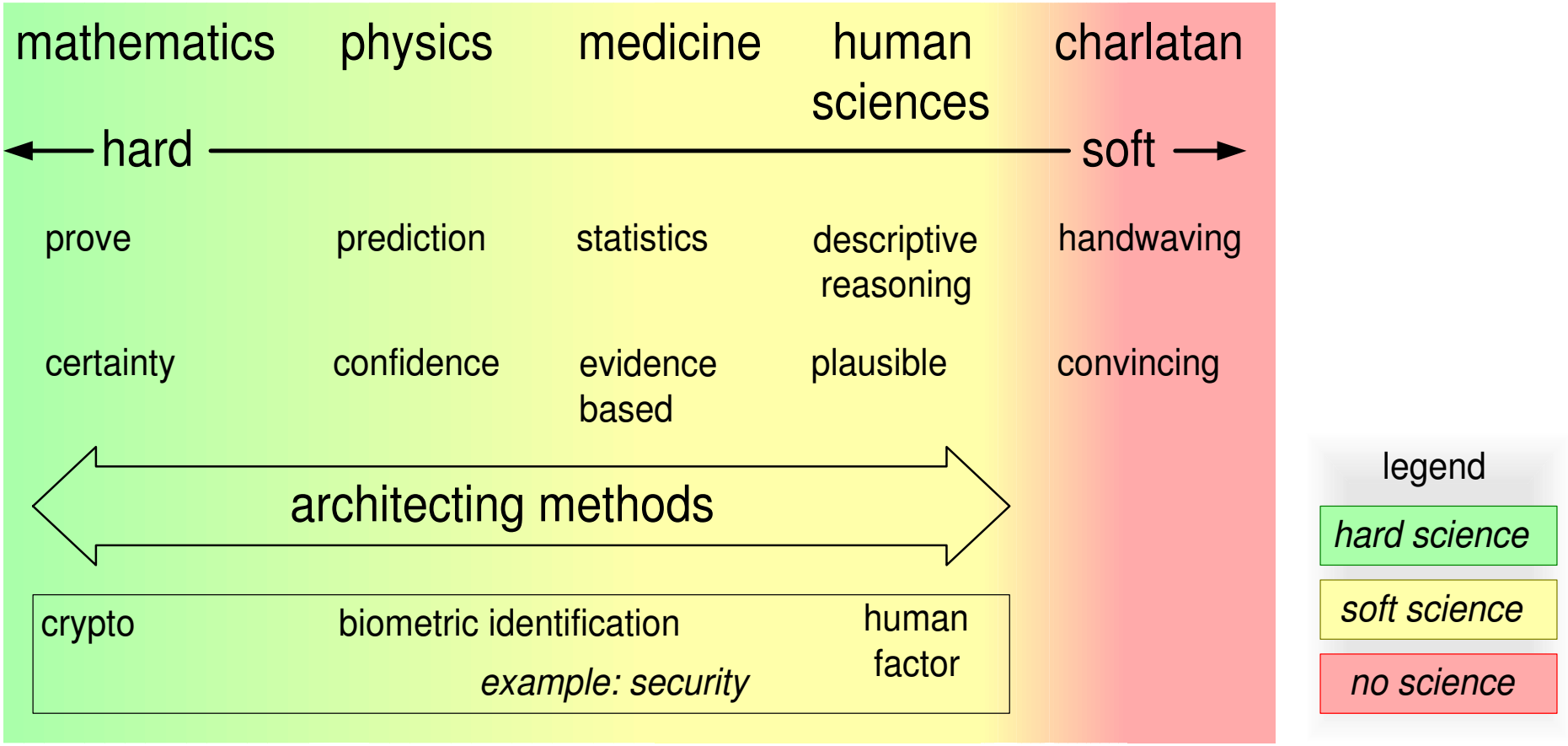
product creation
project leader, product manager, engineers, suppliers

people, process, and technology
capability managers, technology suppliers

Context of Architecting Method Research

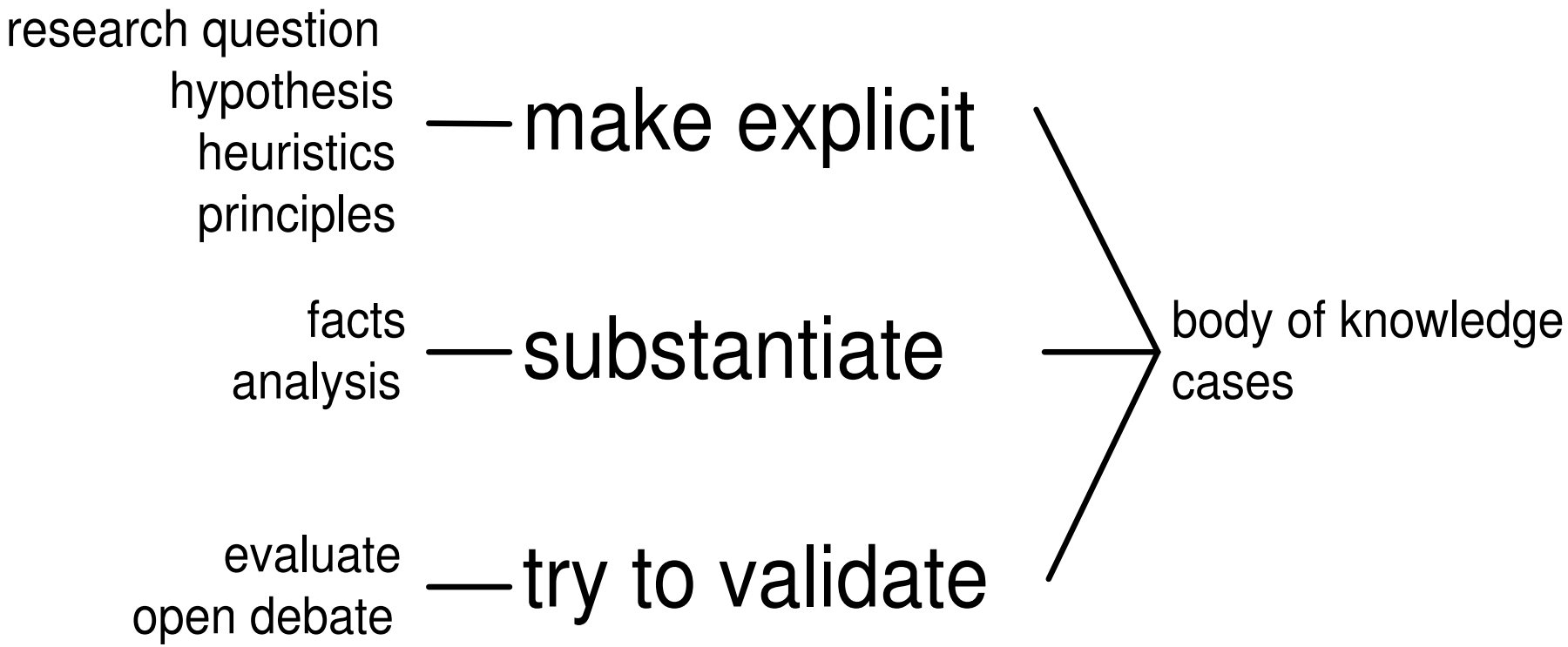


Spectrum of sciences

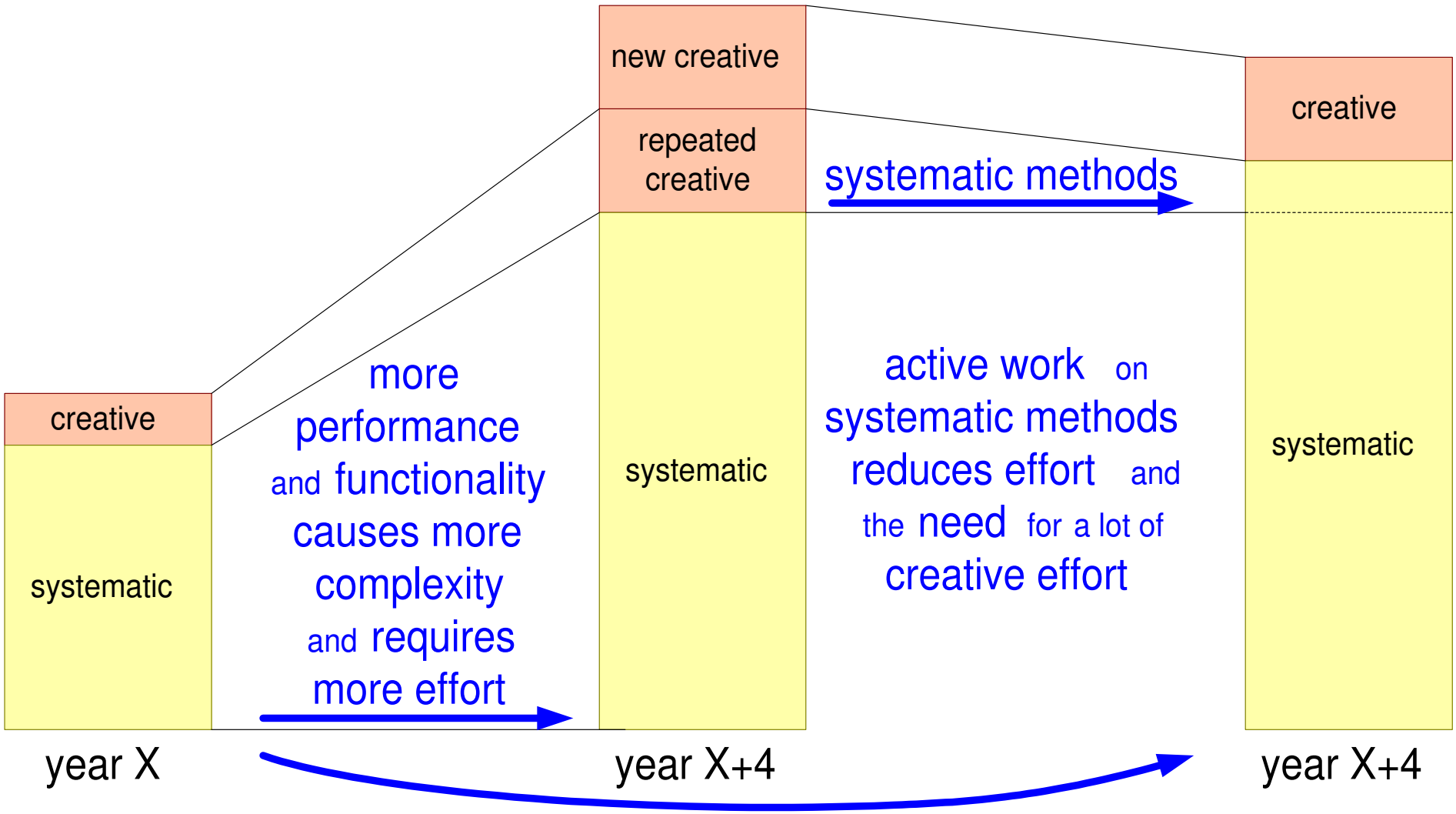


Soft problems can be approached with a scientific attitude

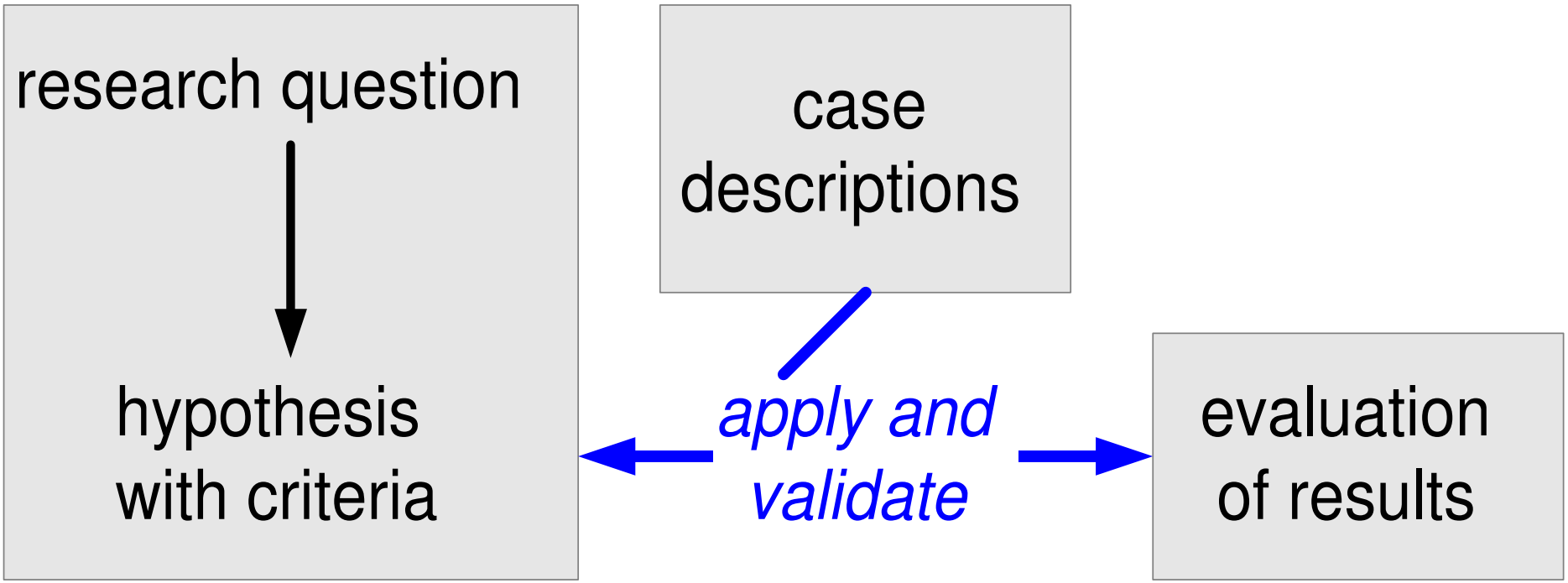
soft is not in conflict with scientific attitude



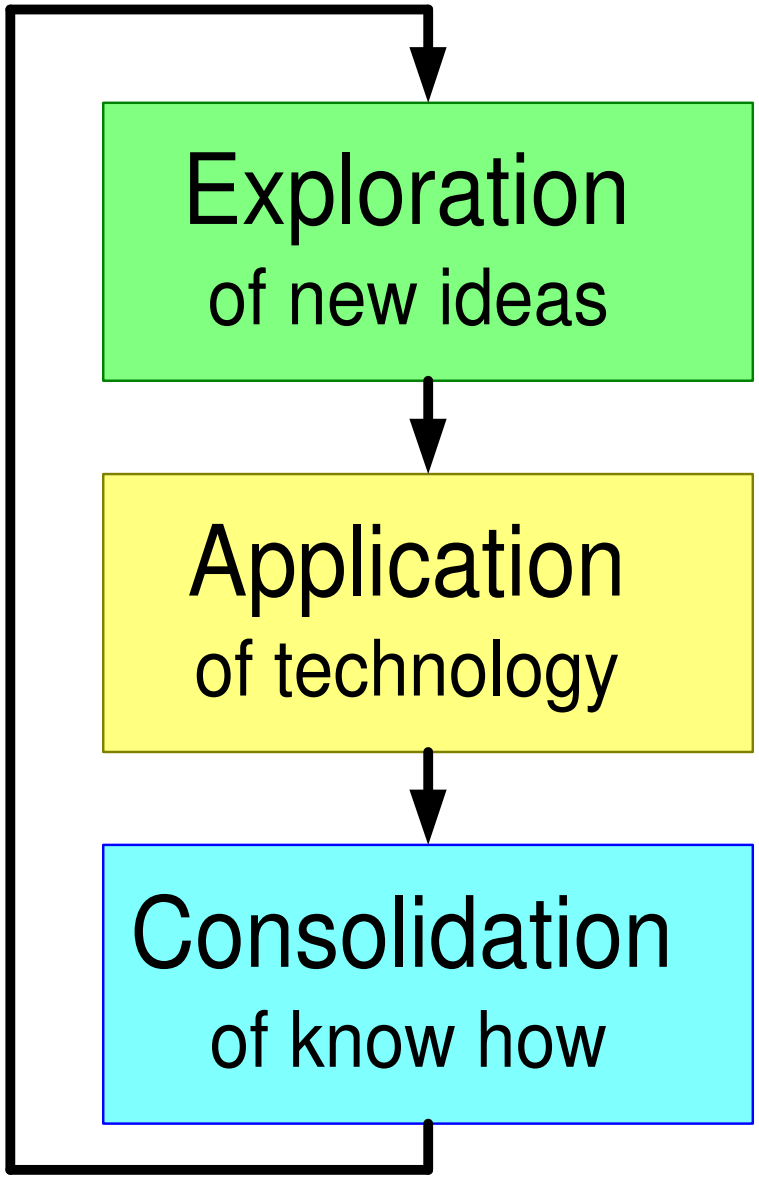
Systematic Know-how to cope with Growing Complexity



Research of Architecting Methods



Technology Management Cycle

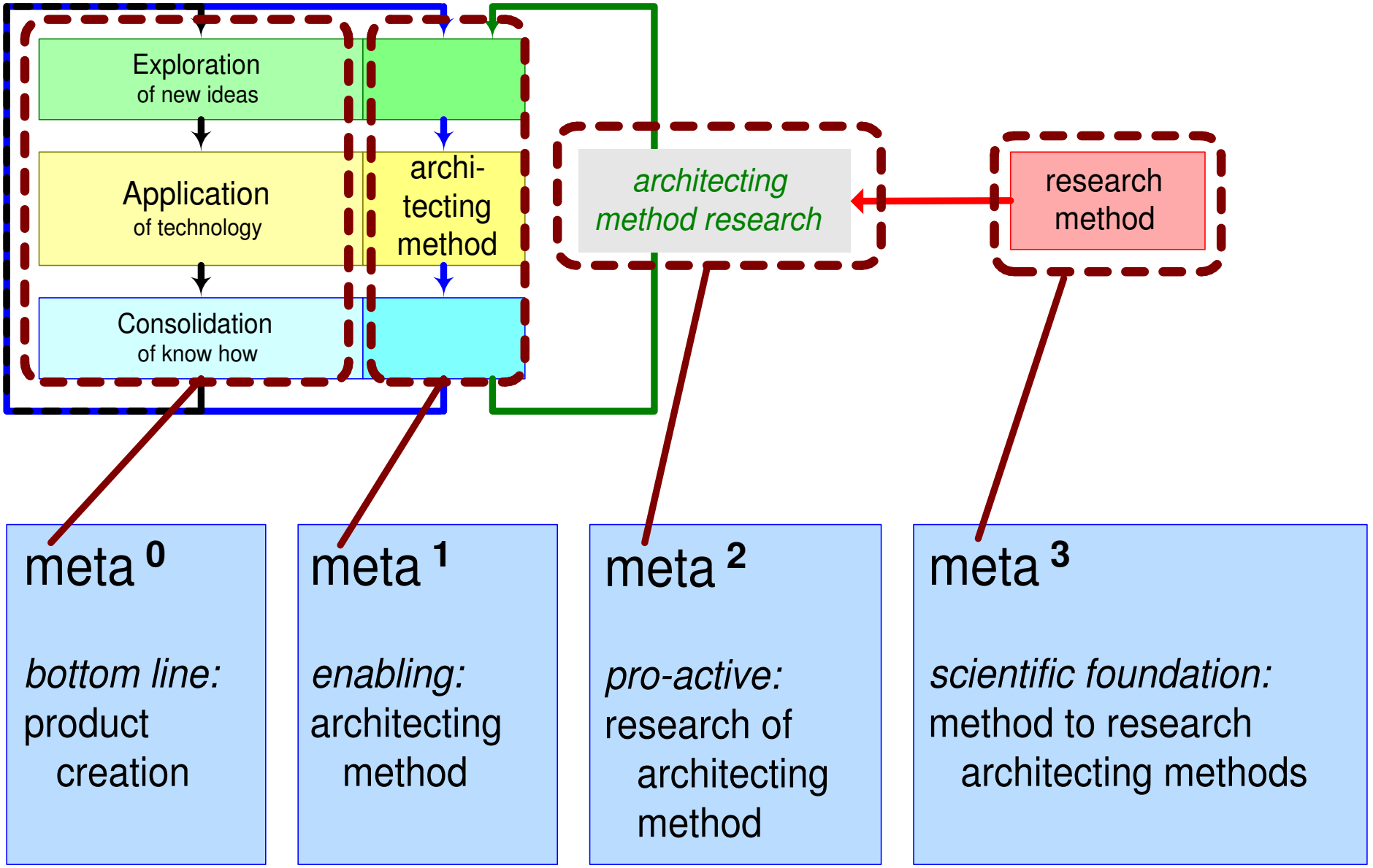


Literature search
Creative option generation
Try out

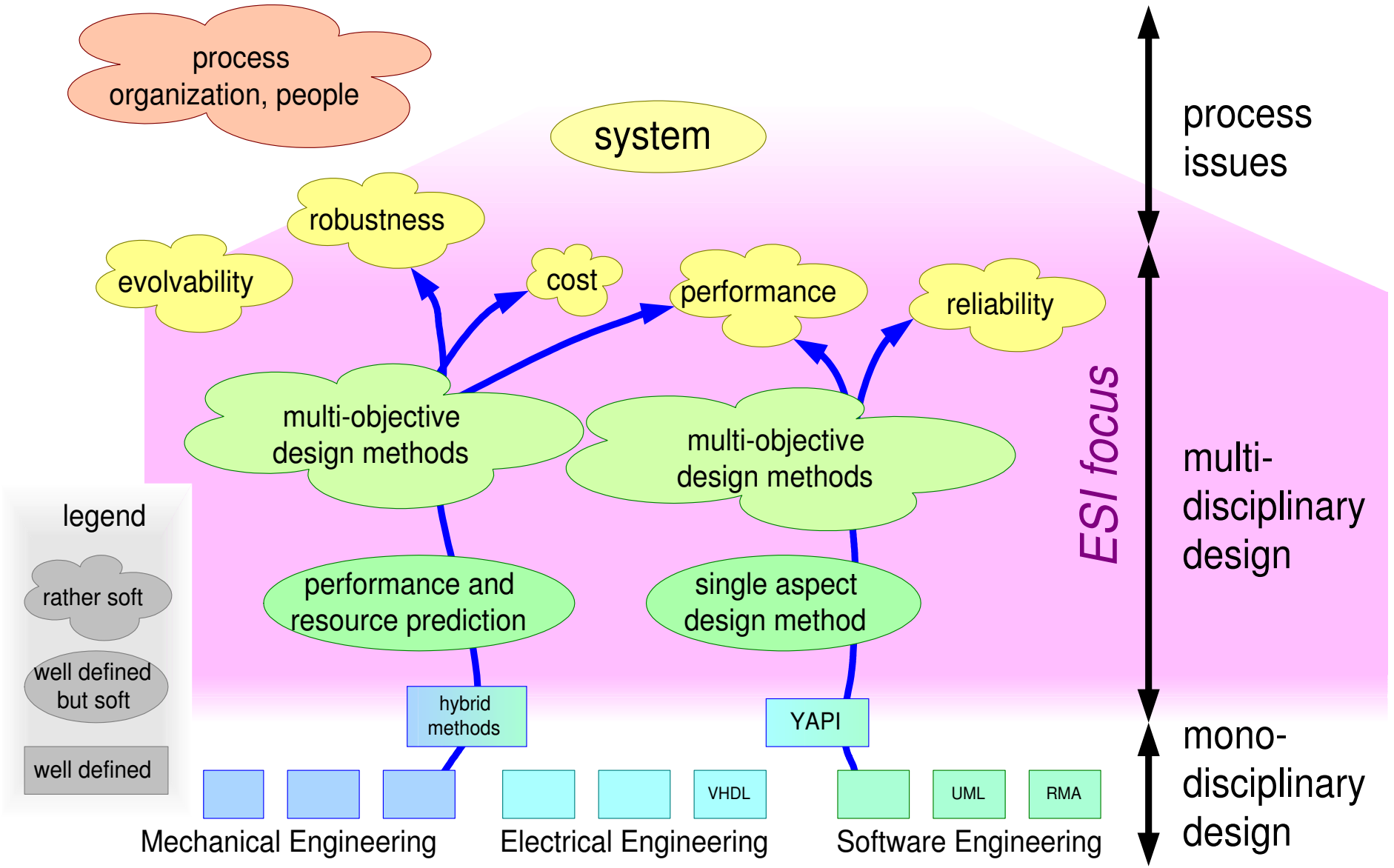
Industry as laboratory

Reflection
Write articles
Create courses

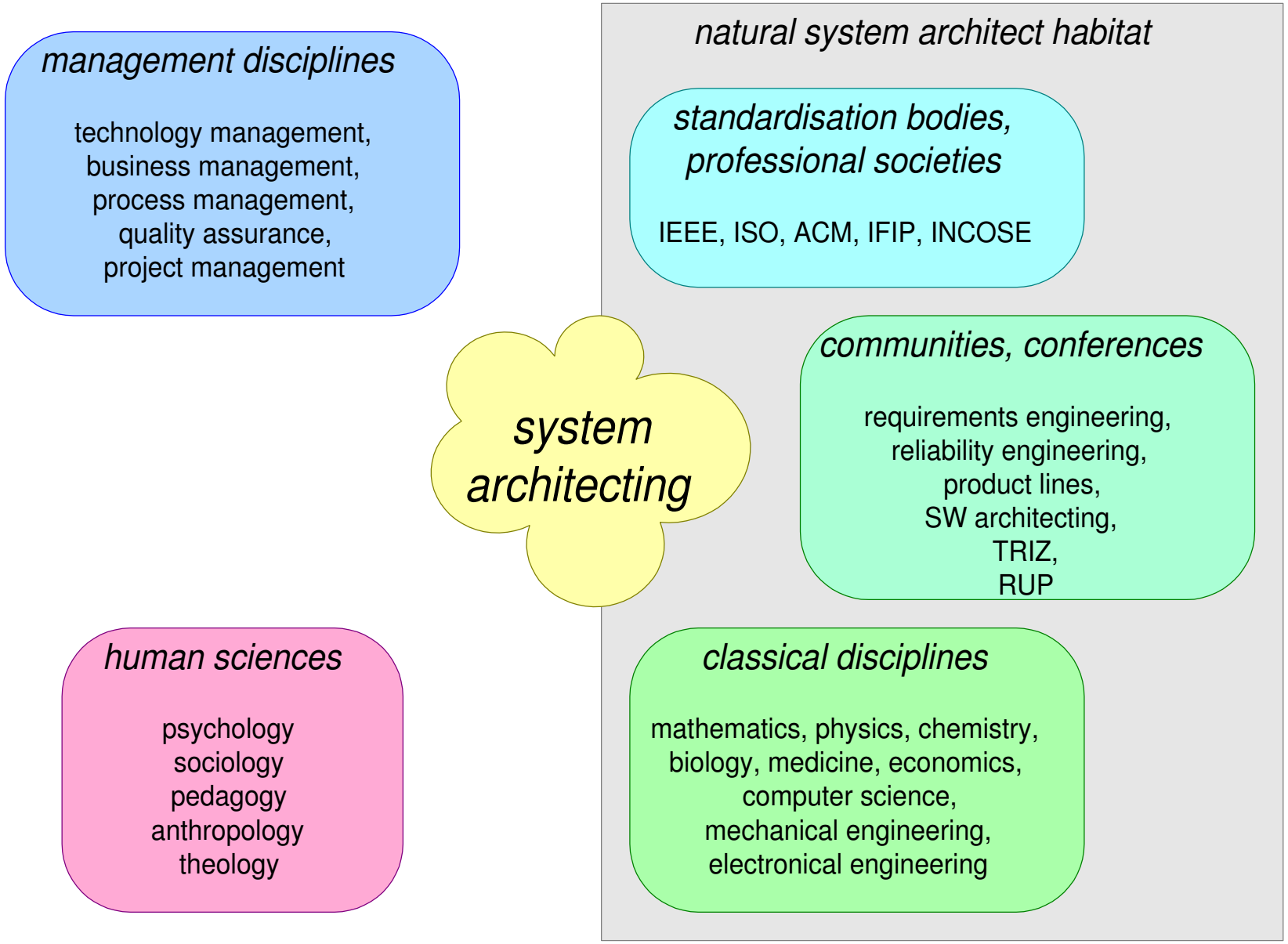
Moving in the *meta* direction



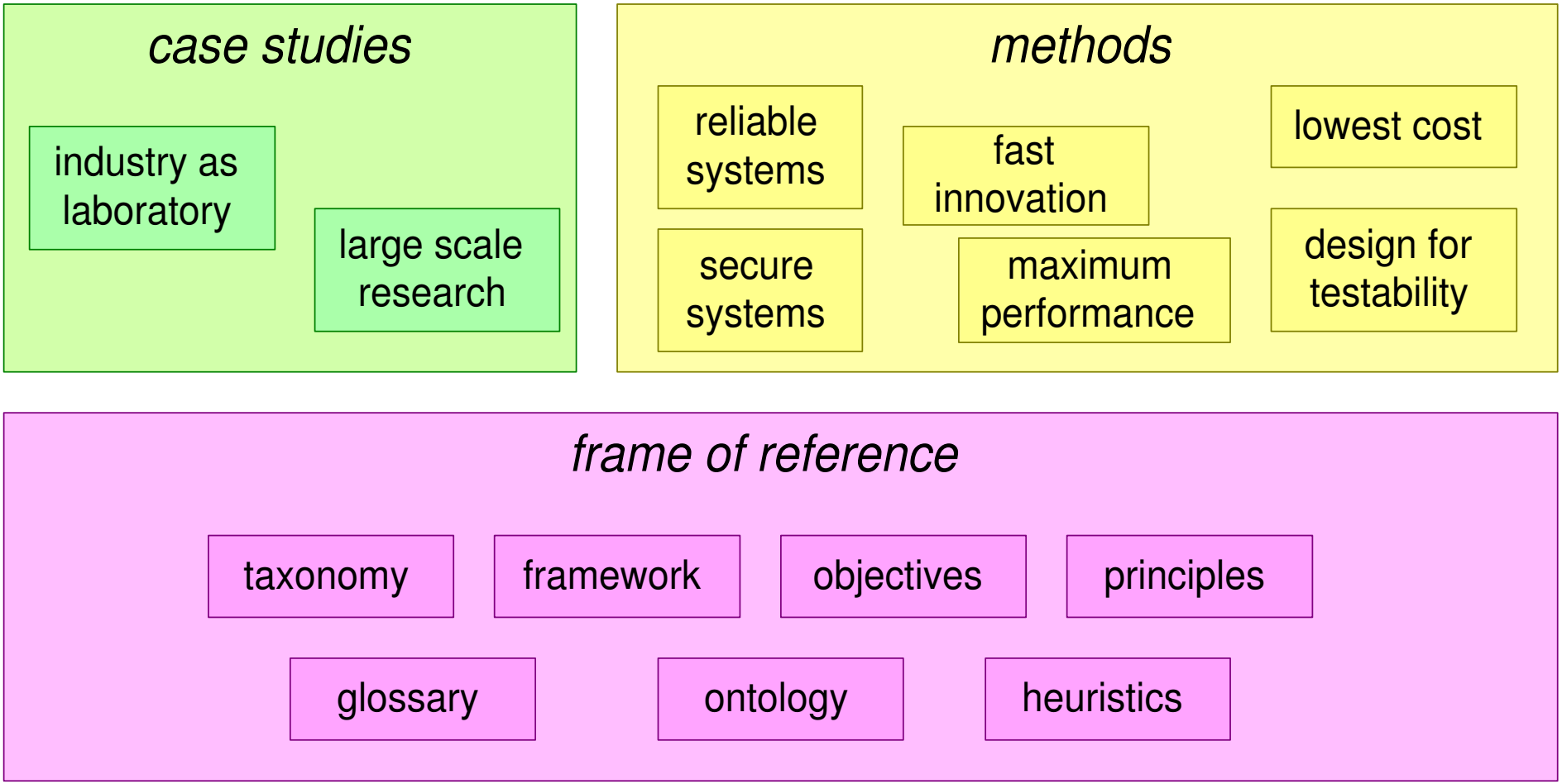
System ?= Multi-disciplinary



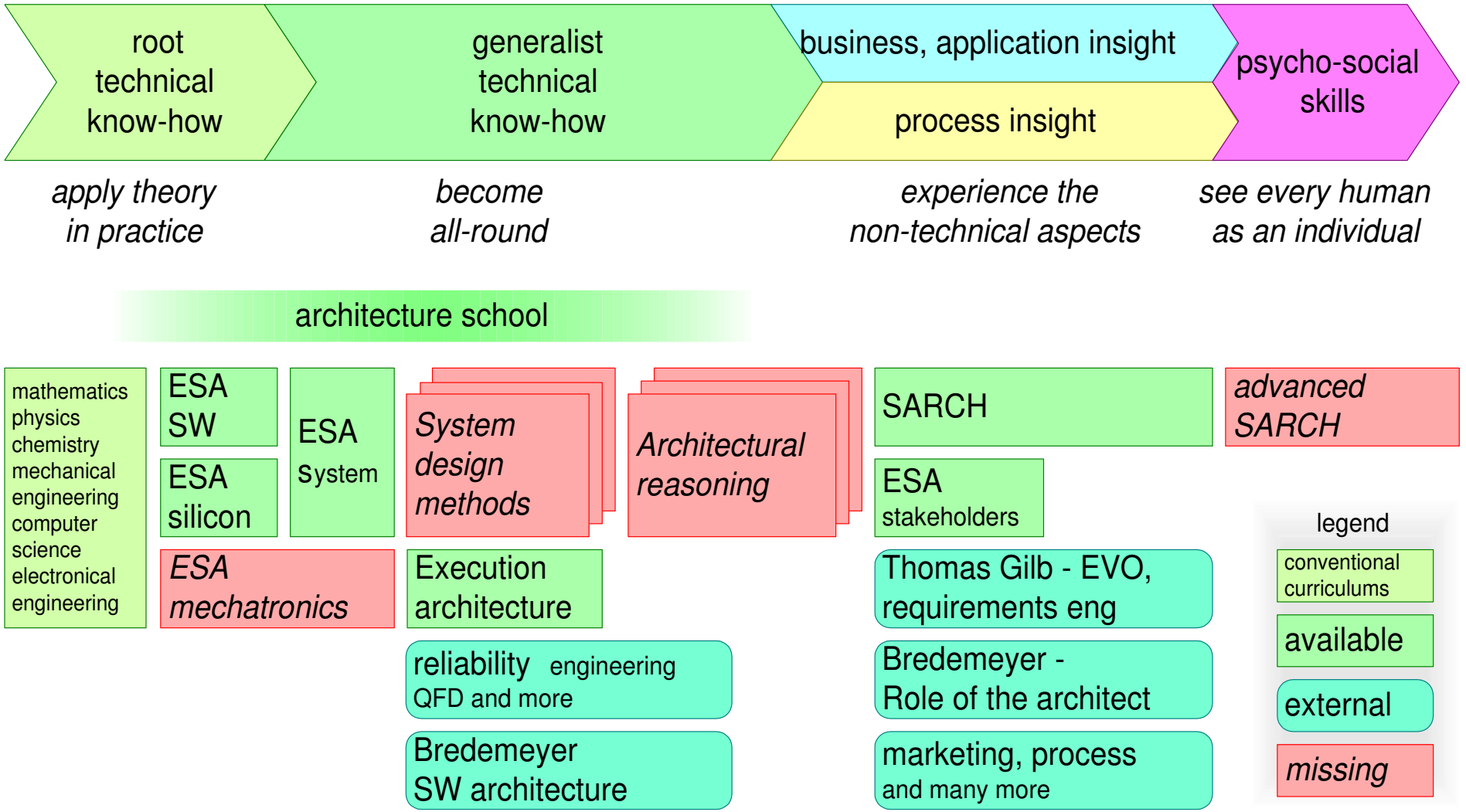
The context of architecting



System architecting research: to do



Curriculum system architecting



Courses based on Gaudí Material

Course	Abbreviation	Duration (in days)	Participants per course	Target audience
System Architecture	SARCH	5	16	architects stakeholders of architects
Management SARCH	MSARCH	2	16	management teams
Embedded Systems Architecting; Stakeholders	ESA	3	16	potential architects
Requirements Engineering as part of OOTI curriculum	OOTI	5	12-18	post-doctoral students
Embedded Systems context	EScontext	4	30	masters students
Execution Architecture (with Ton Kostelijk)	EXARCH ASP	4..5	16	SW designers architects
Multi-Objective System Architecting and Design	MOSAD	3..5	16	designers architects
System Modeling and Analysis	MA611	3..5	16	designers architects

Status of Courses

Course	Abbreviation	number of courses upto March2008	appr. total participants
System Architecture	SARCH	44	660
Management SARCH	MSARCH	7	72
Embedded Systems Architecting; Stakeholders	ESA	20	300
Requirements Engineering as part of OOTI curriculum	OOTI	7	125
Embedded Systems context	EScontext	3	90
Execution Architecture (with Ton Kostelijk)	EXARCH ASP	11	160
Multi-Objective System Architecting and Design	MOSAD	3	36
System Modeling and Analysis	MA611	2	16

Gaudí Systems Architecting

http://www.gaudisite.nl/index.html