# From Techno-nerd to Stakeholder Representative

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**Abstract**

Architects in the high-tech world are from origin often splendid technologists. Breadth of know-how enables them to design technically balanced systems. Unfortunately not every technically balanced system is also good and useable. Design for useability requires quite some context know-how especially application know-how.

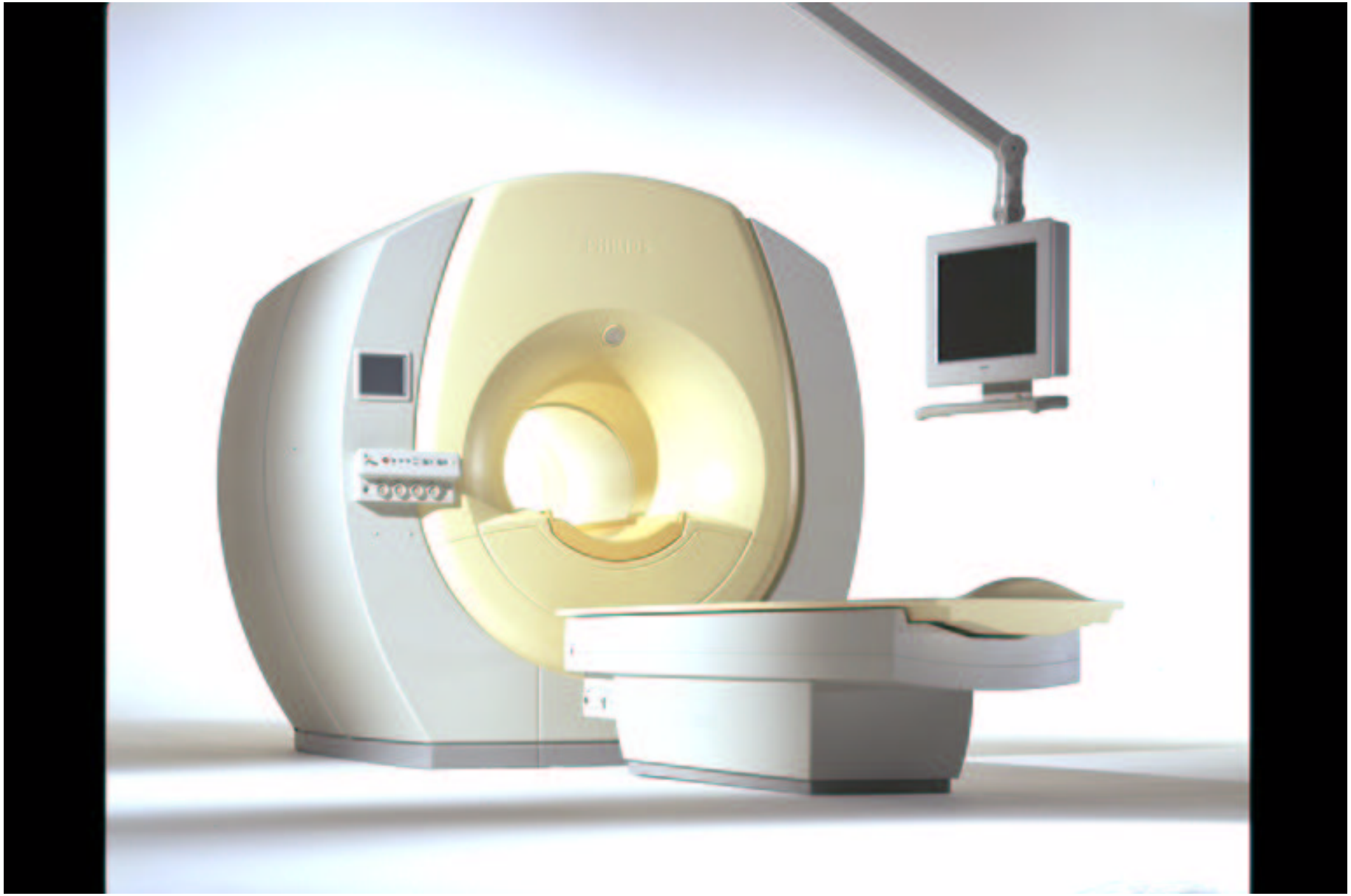
This presentation positions the architecture discipline as a means to create good, useable and technically balanced systems. The system architect fulfils a central role. More than ever the system architect needs business and application insight to give direction to the technical design process.

25th February 2002
status: finished
version: 0.7

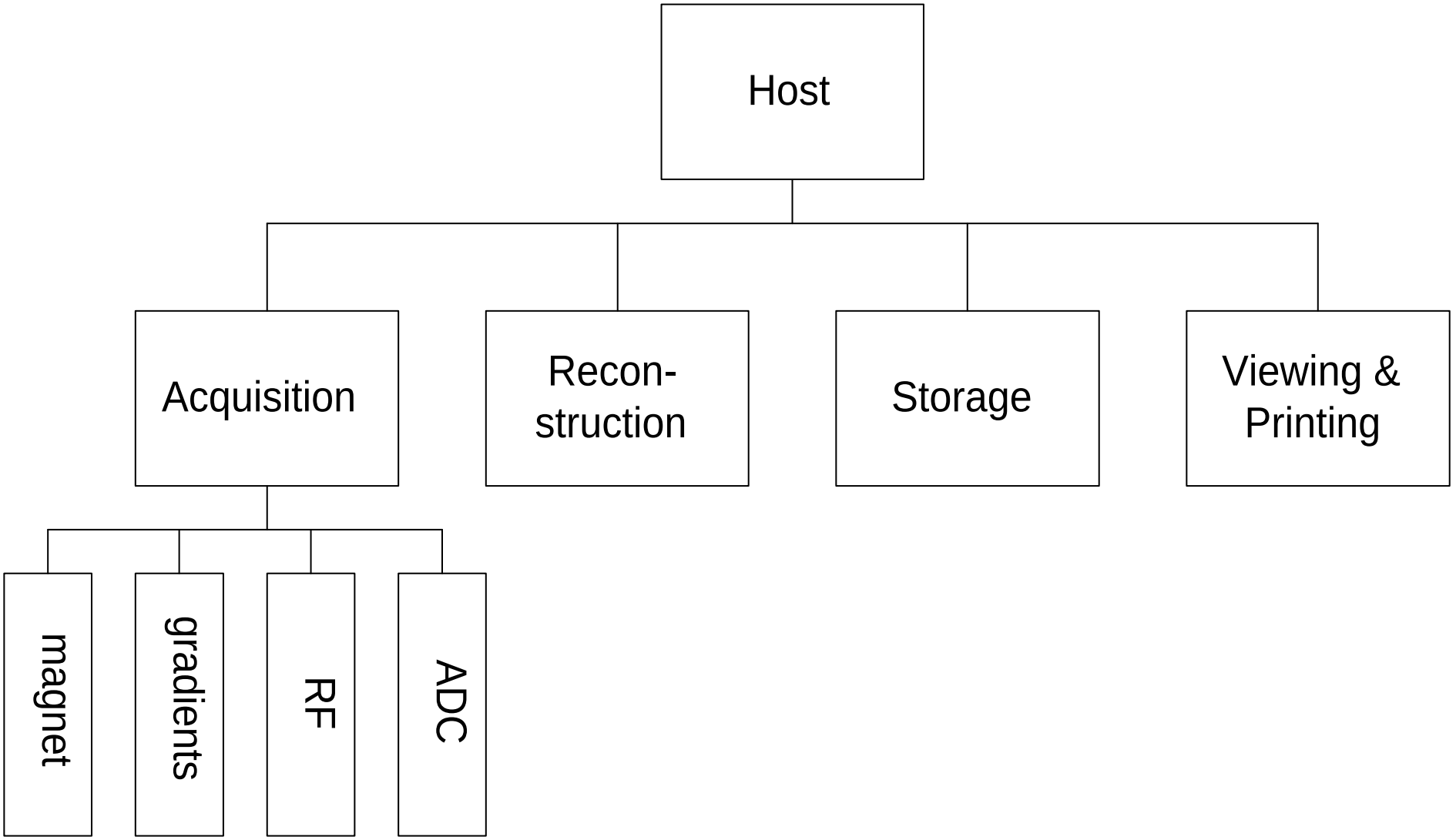
# Presentation flow

- Case: MRI scanner
- Follow the system architect bottom up through the MRI scanner
- ”CAFCR” framework
- The role of the system architect
- How does a system architect work?
- Conclusion

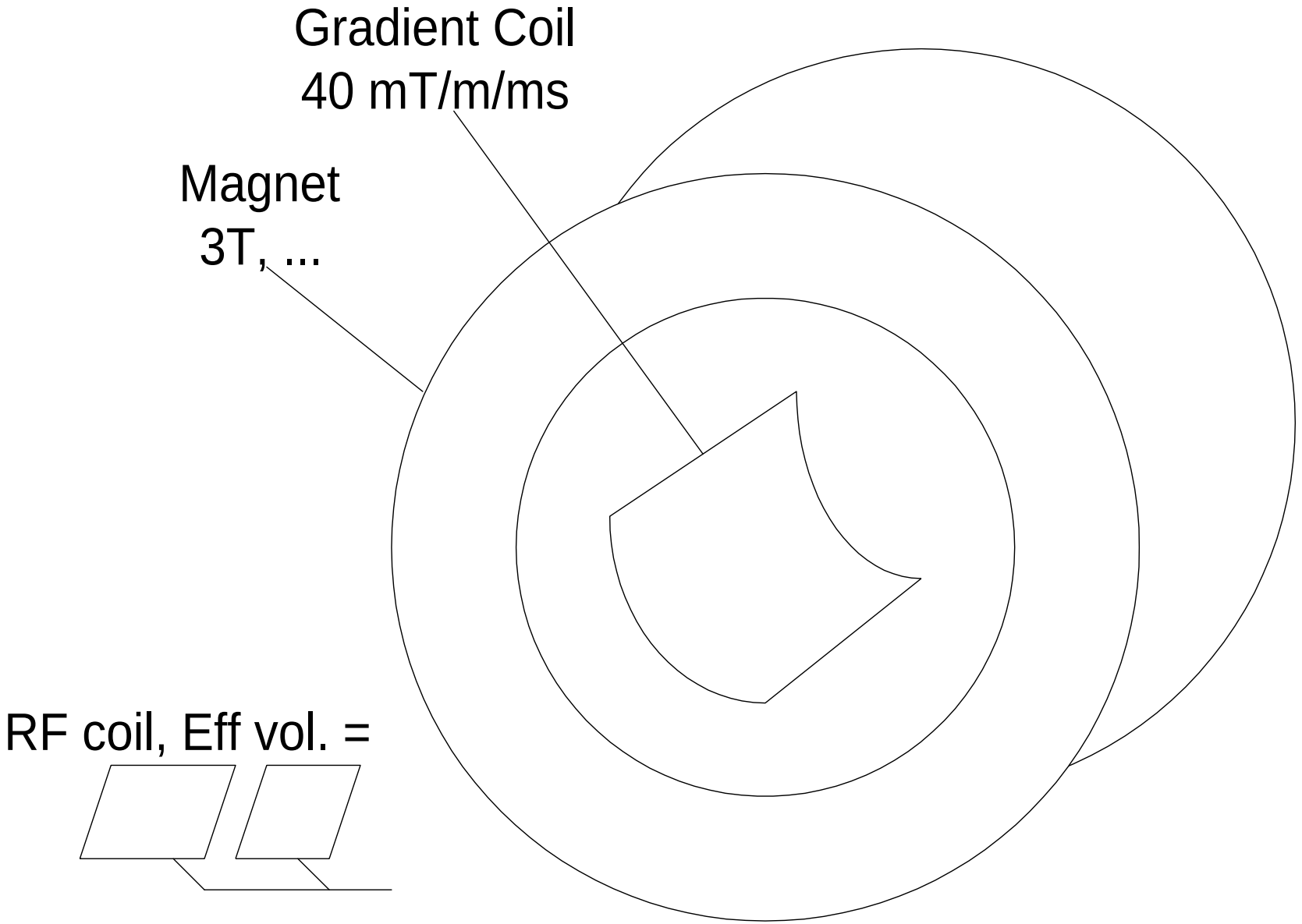
# Illustration case: MRI scanner



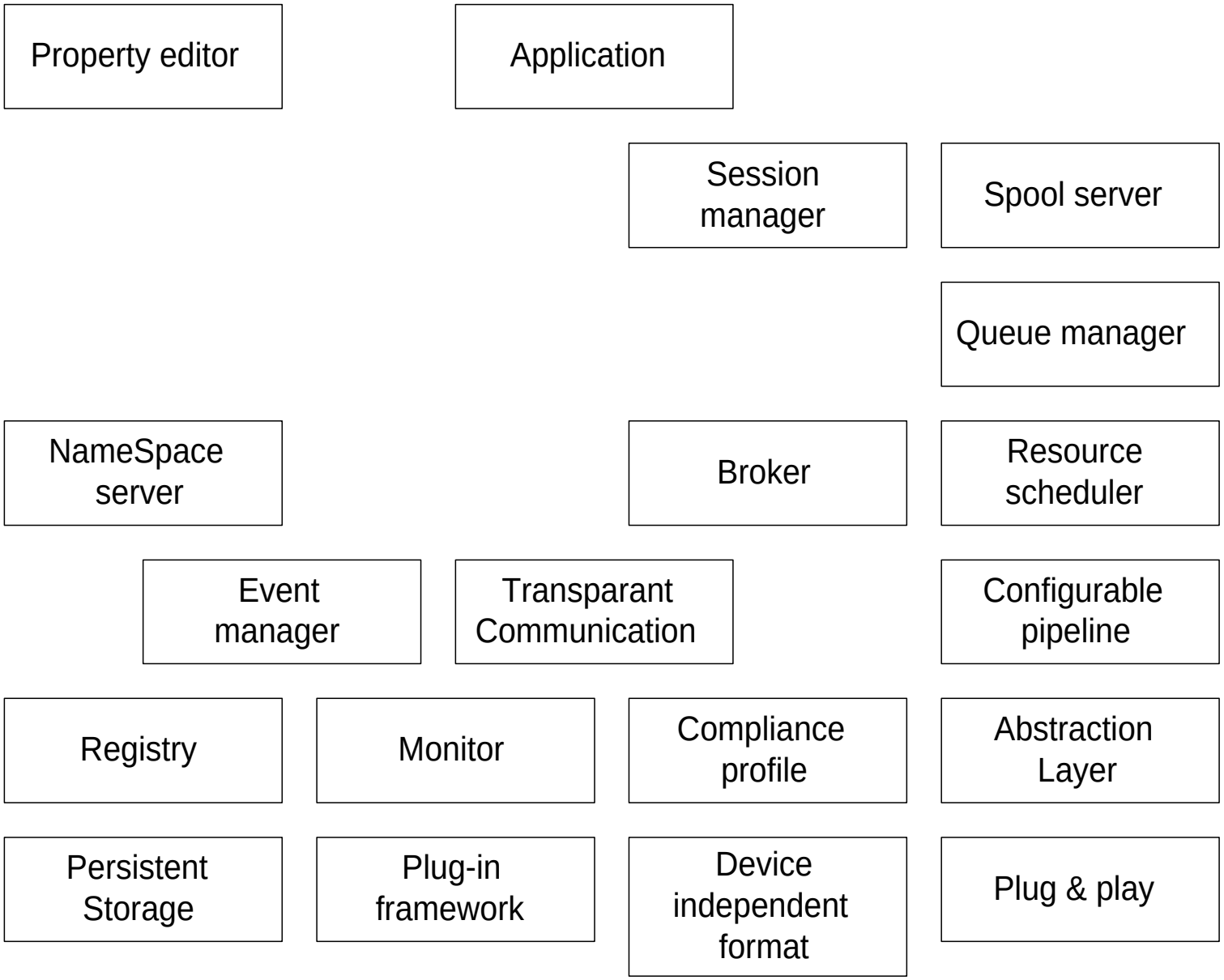
# Block diagram view



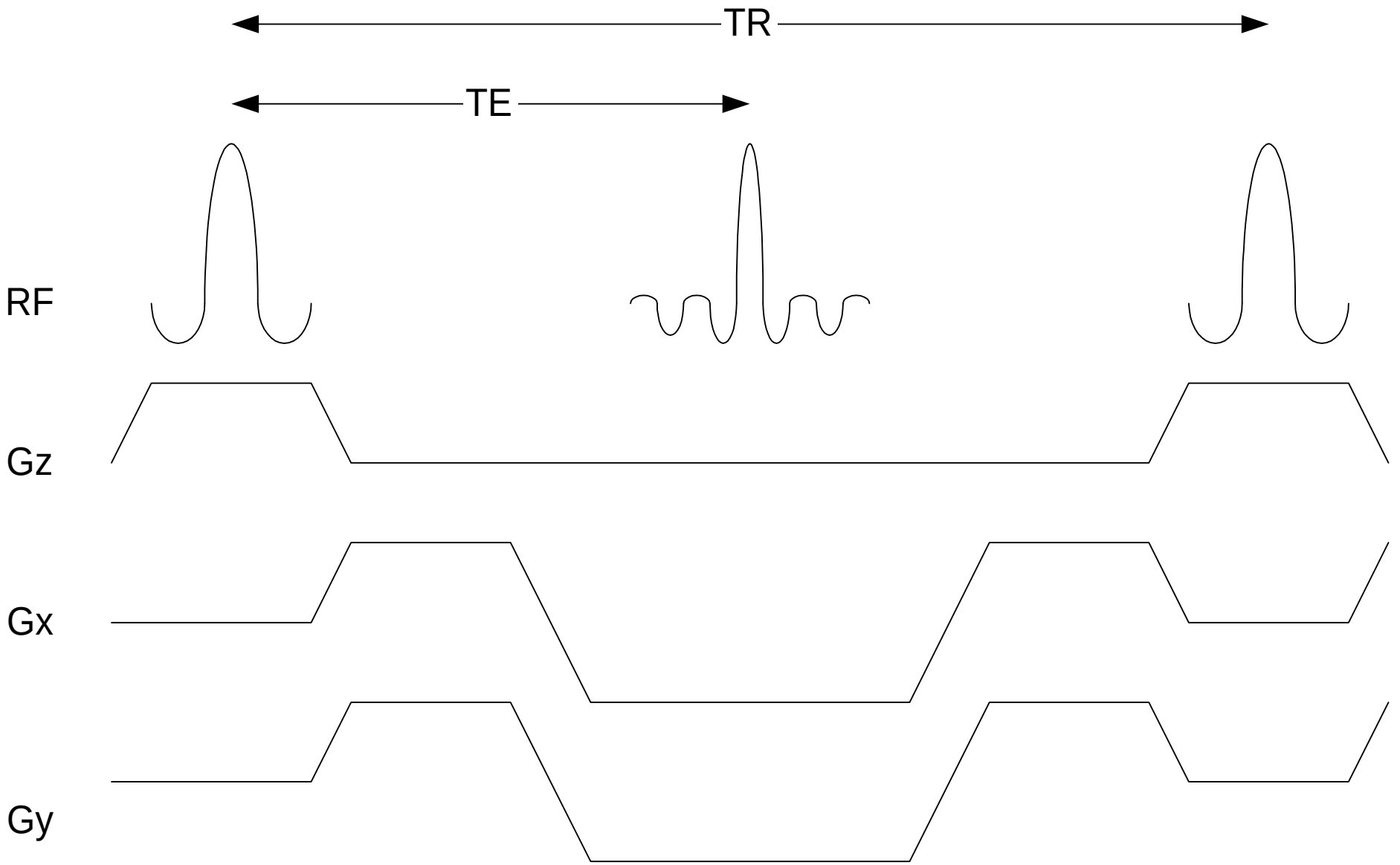
# Physics view



# Software architecture view



# MR imaging methods view



# Conceptual Work by the architect

- Most disciplines require multiple views, for instance circa 4 views in SW [Kruchten, Soni]
- Only a subset of disciplines has been shown (not shown are a.o. mechanics, logistics, project management)

The **system architect integrates** the **complementing disciplinary views**

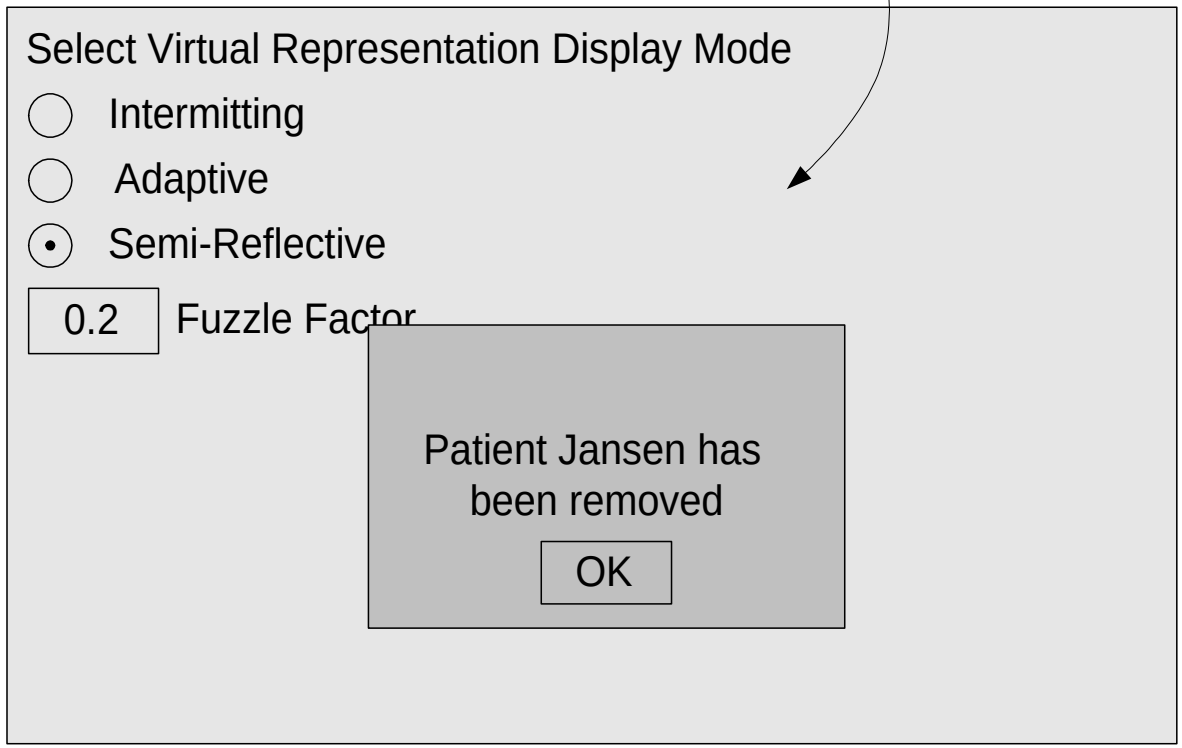
However

Decisions and trade-offs in the **conceptual view** are driven by **application**, **business** and **operational** inputs

# Useability and main stakeholders

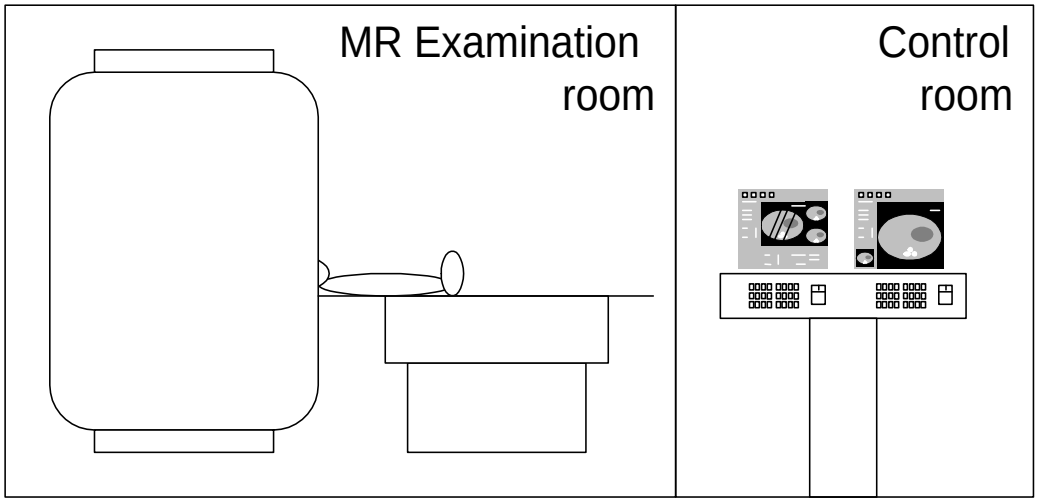
The engineer creates a technological UI...

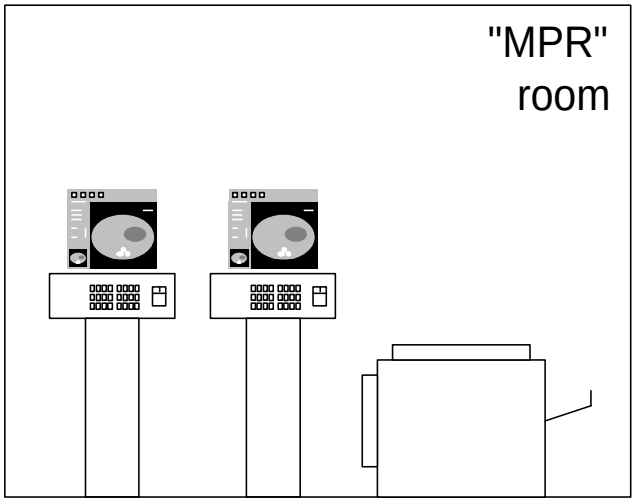
without imagining the clinical reality

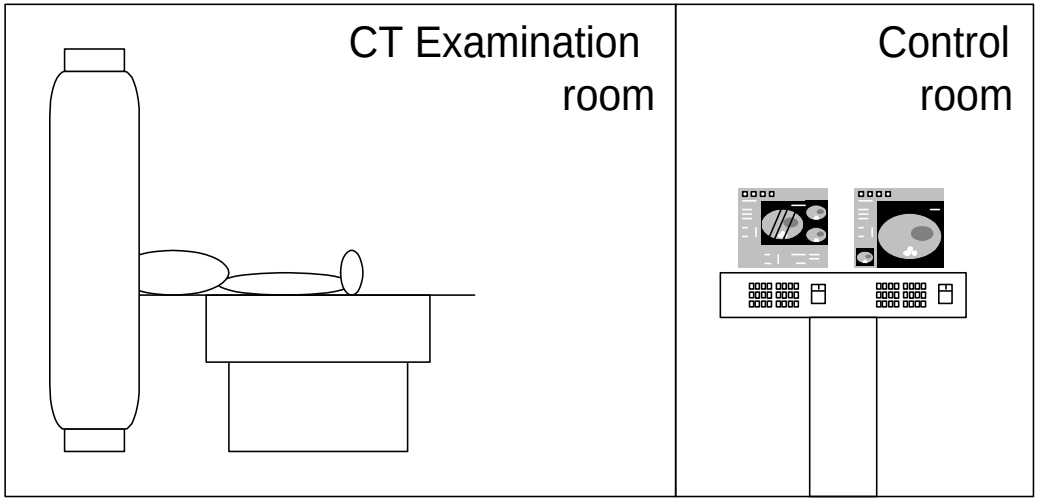


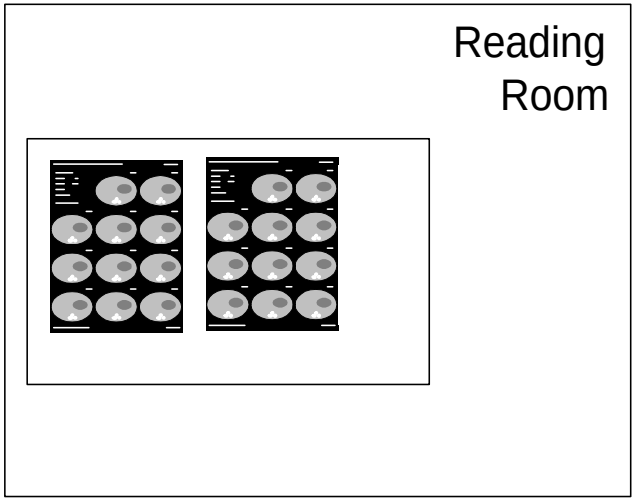

"In the meantime the patient is horrified by the intimidating system, the weird cage around his body and the EKG leads attached to his breast..."

# Radiology department view

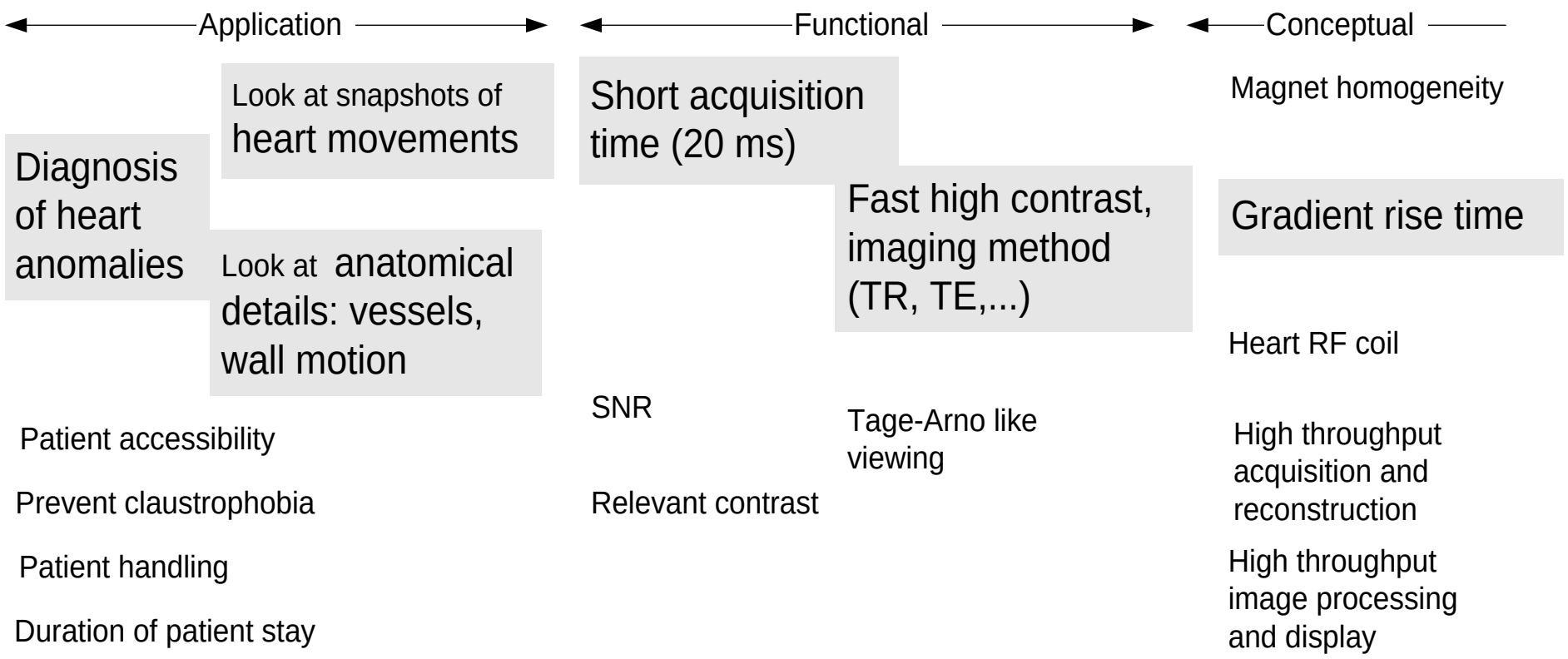


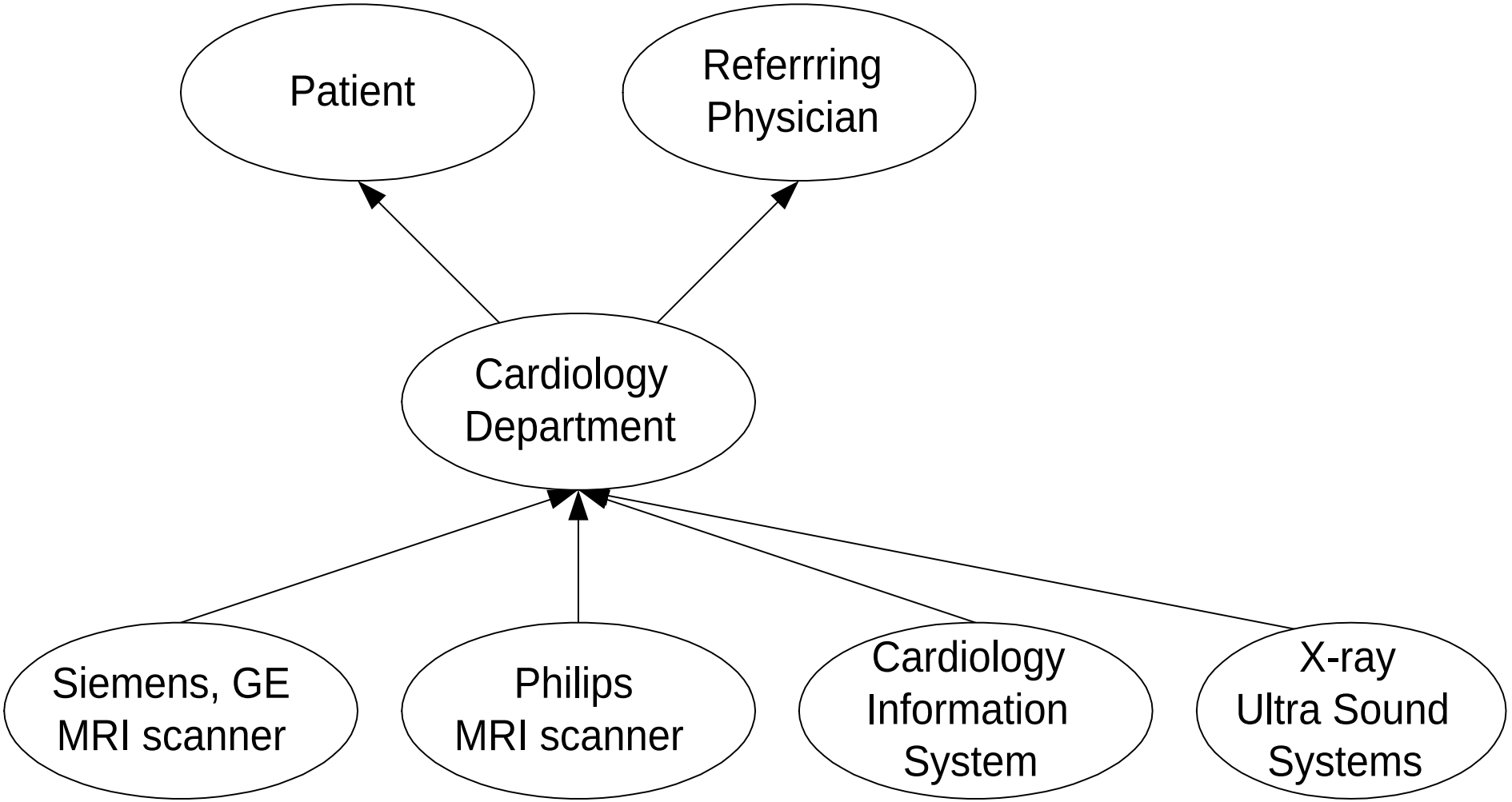



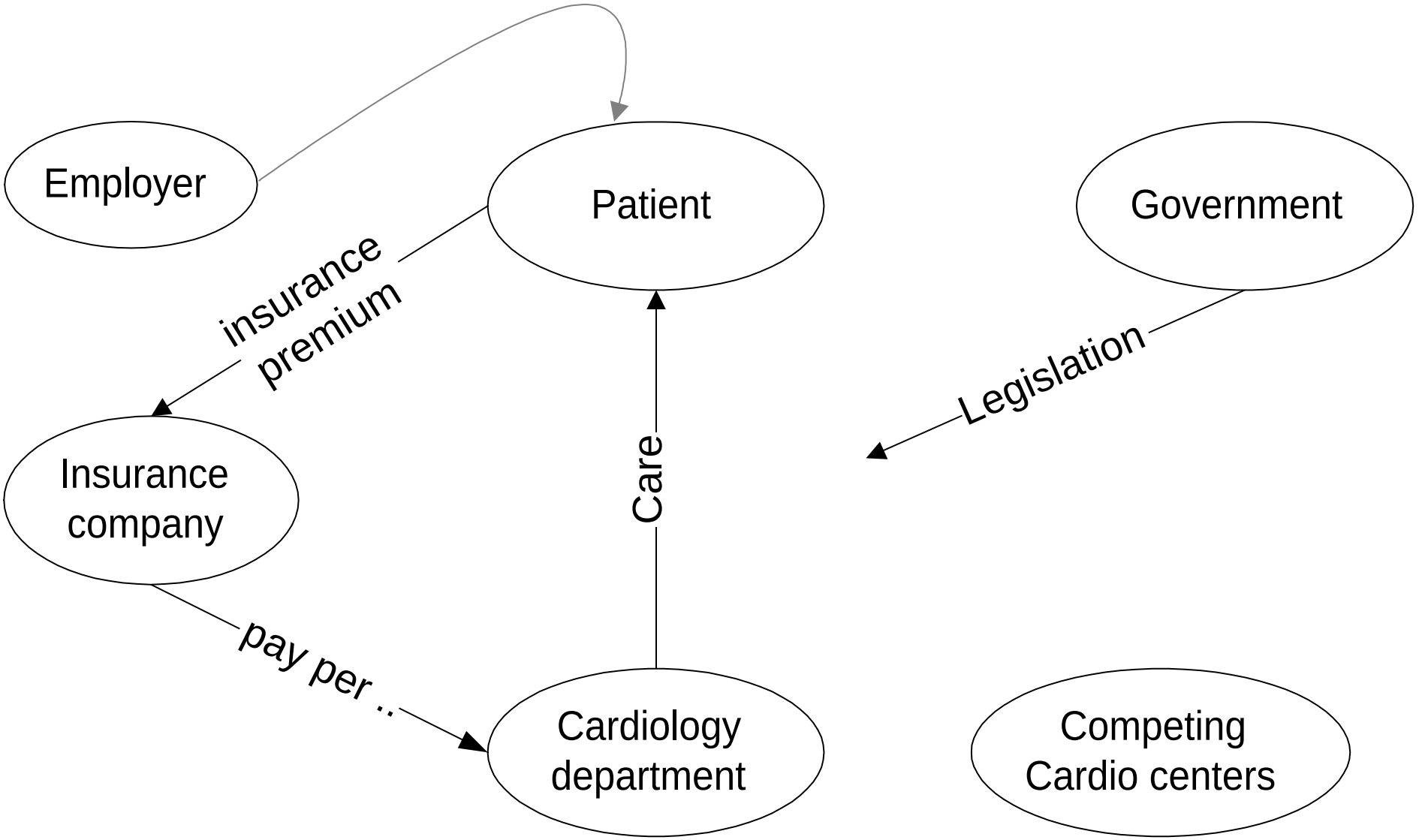
# Cardio application drivers and related features



# Cardio Market Model



# Cardio Business Model



# Cardiology business drivers

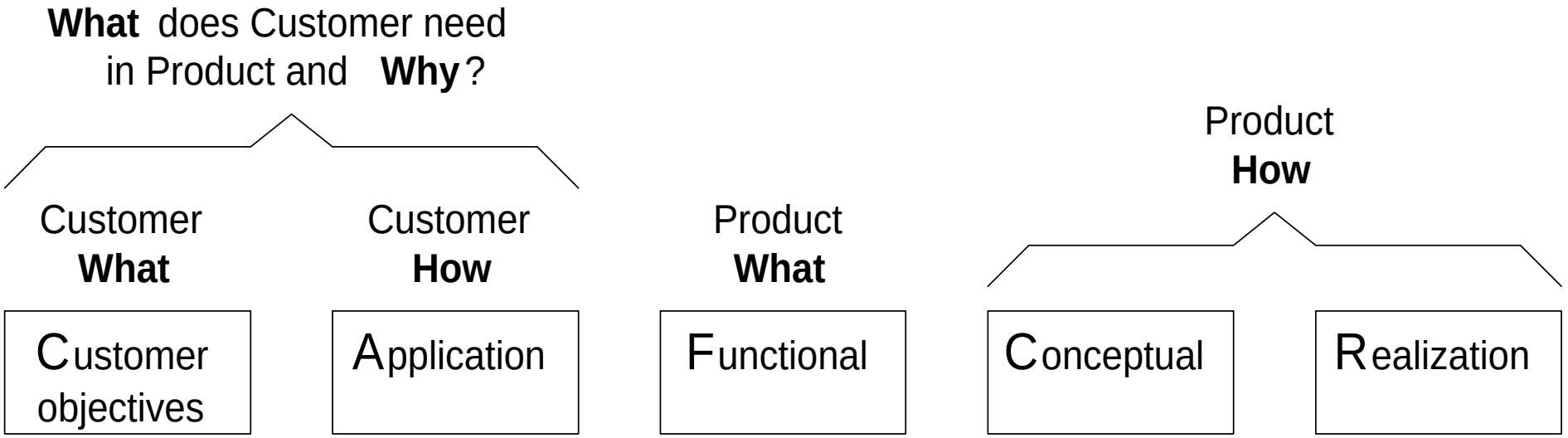
| Key Business drivers → | Derived Application drivers | |
|---|---|---|
| Recuperation rate | Diagnosis of heart anomalies | |
| Mortality rate | Patient Accessibility | Interventional support |
| | Duration of patient stay | Prevent claustrofobia |
| Cost/treatment | Patient emergency access | |
| | Patient monitoring capabilities | Patient handling |
| Attractiveness | Department image | |
| | Clinical workflow | |
| | Integration with information systems | |

# Business and application understanding by the architect

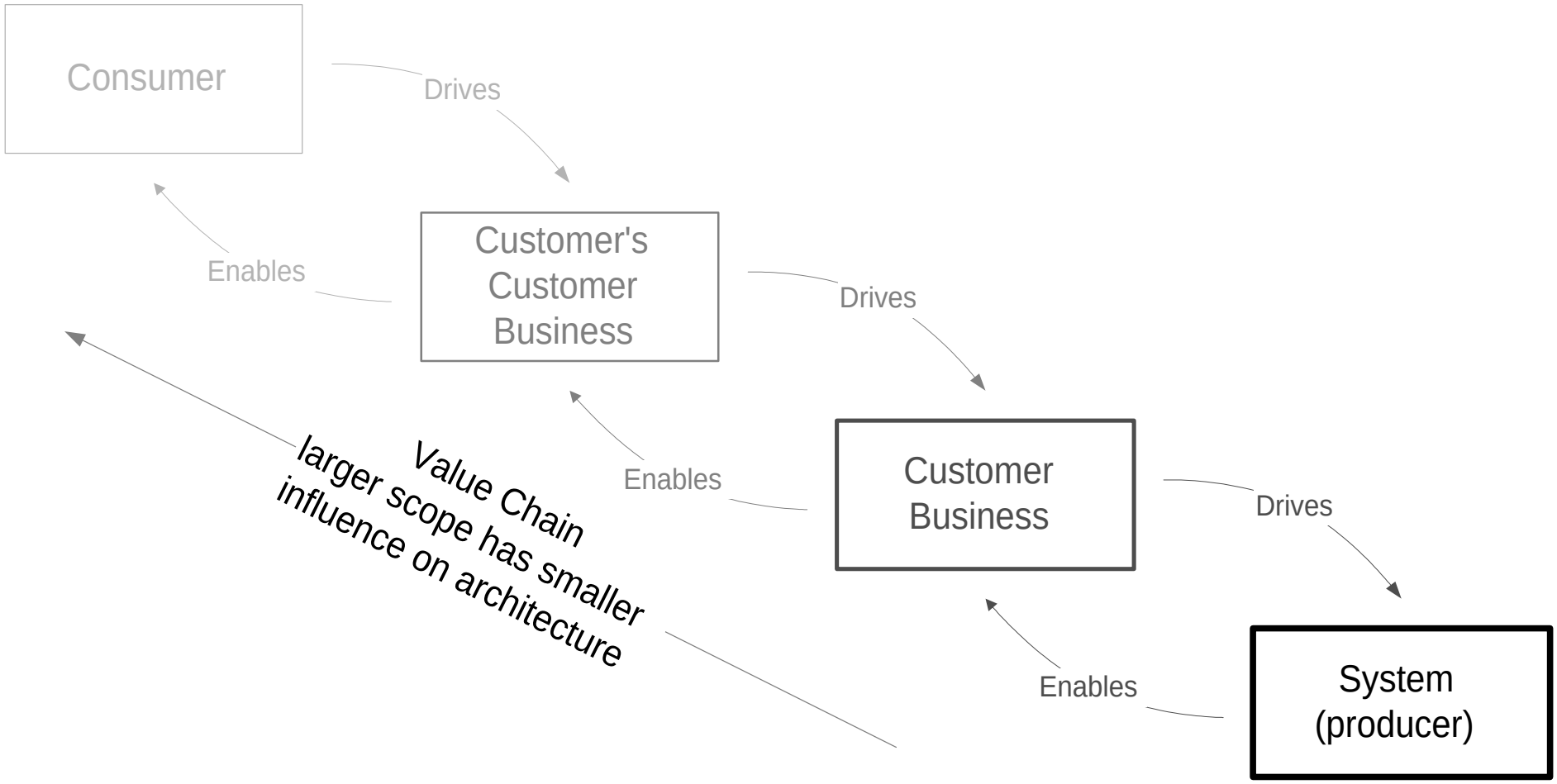
- Only a subset of required views has been shown (not shown are a.o. information model, workflow, stakeholders and stakeholder concerns)
- Marketing and application specialists are the primary owners

**The system architect needs to understand the context to make a good and useable design**

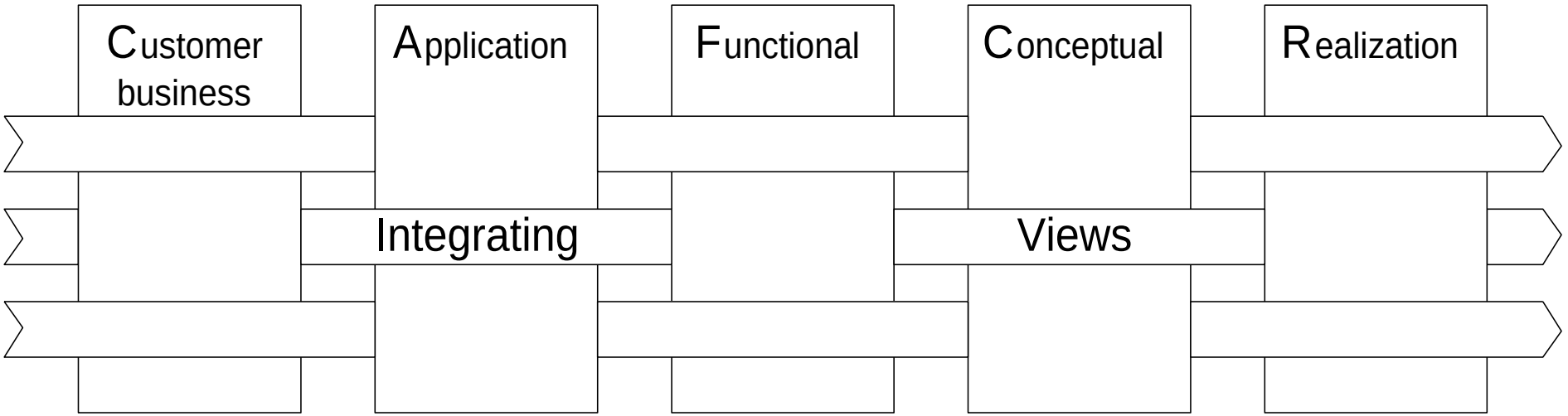
# System Architect integrates 5 viewpoints



# Context of the context



# Integration of 5 views




High margin Cardiology market

Cost per examination model

Patient throughput features

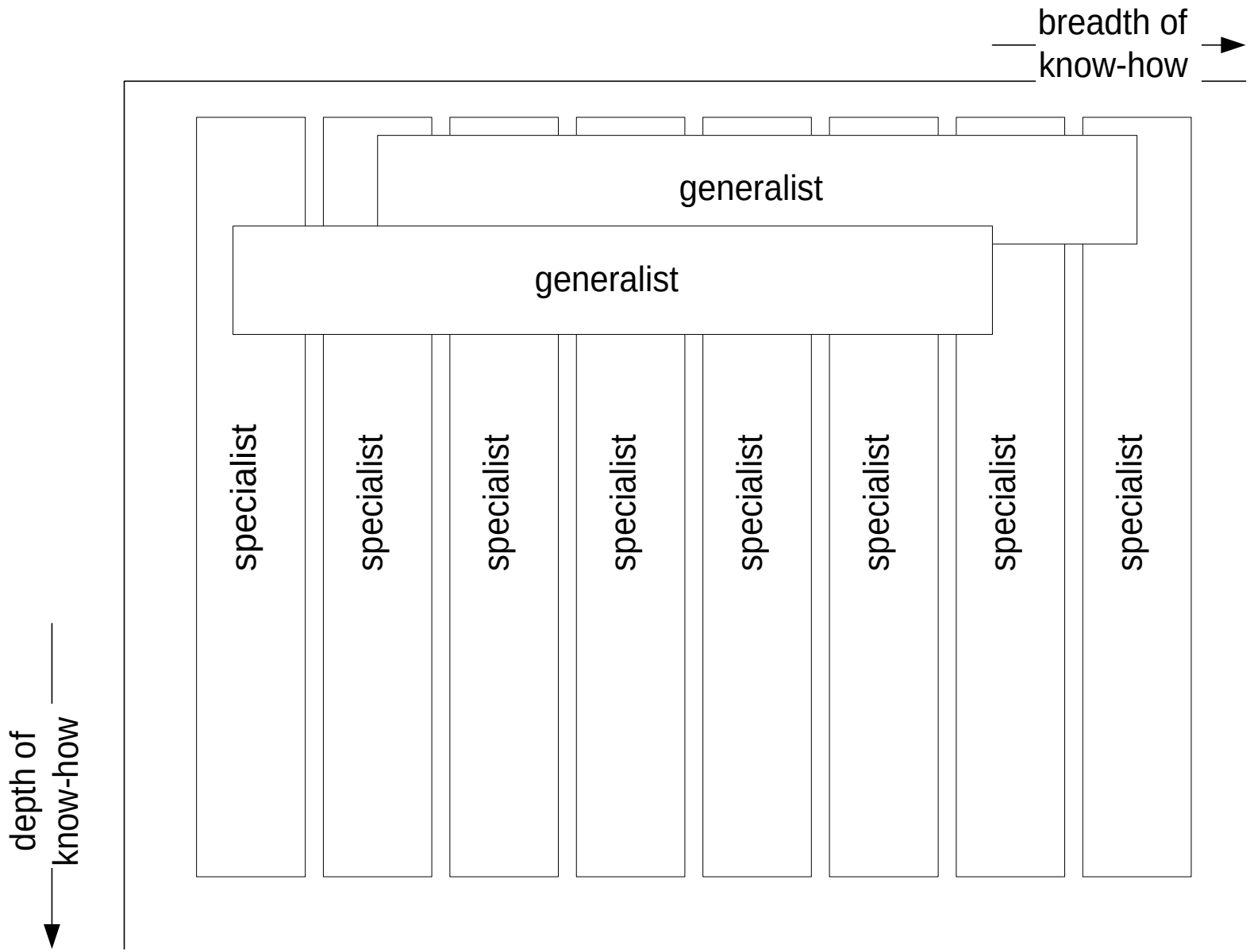
System throughput model

Budget in seconds

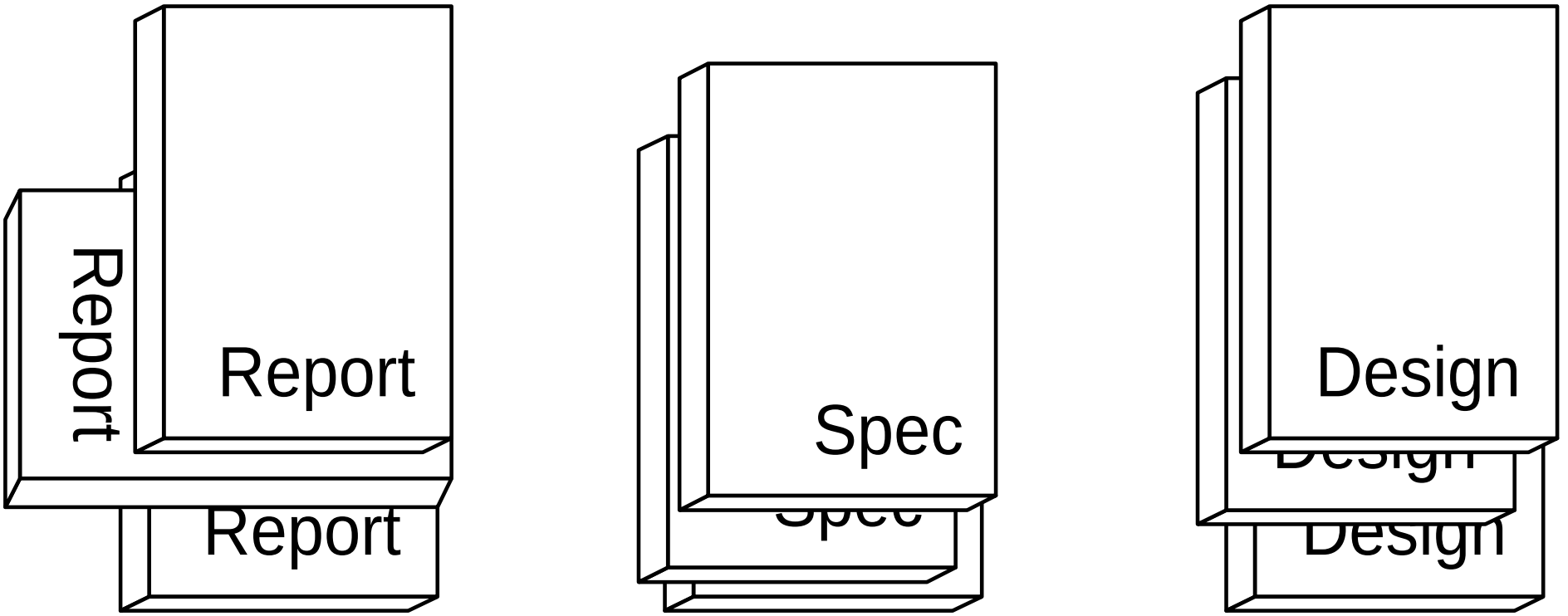
# Organizational questions w.r.t. the System Architect

- Who is this system architect?
- What is his task?
- What are his responsibilities?
- What is his role?
- Where does he fit in the organization?

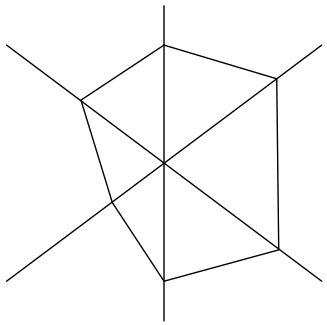
# The System Architect is the generalist of the team



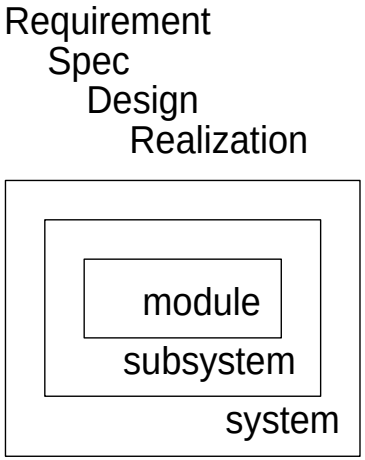
# Deliverables of a System Architect



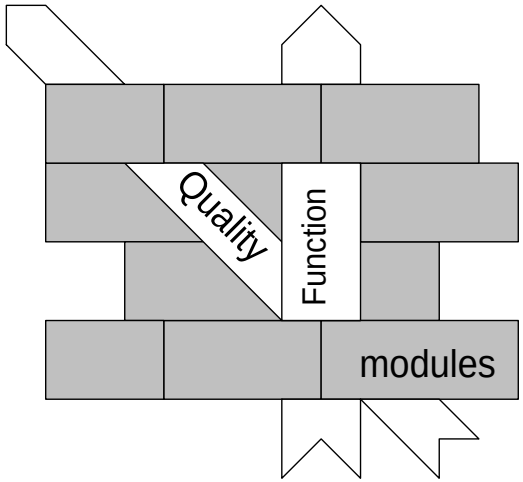
# Responsibilities of a System Architect



Balance




Consistency

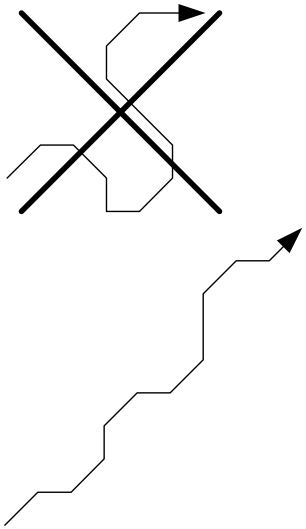



Decomposition
Integration

Overview

KISS

Elegance
Simple

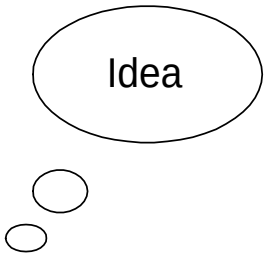


Integrity

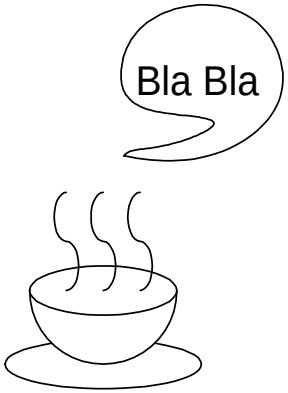
# Examples of Secondary Responsibilities

| responsibility | primary owner |
|---|---|
| business plan, profit | business manager |
| schedule, resources | project leader |
| market, salability | marketing manager |
| technology | technology manager |
| process, people | line manager |
| detailed designs | engineers |
| useability | application manager |

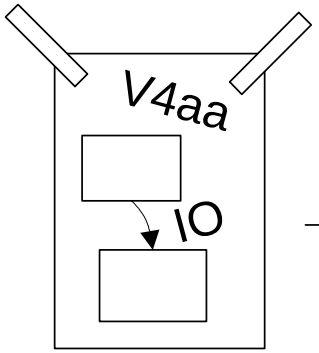
# What does the System Architect **do**?



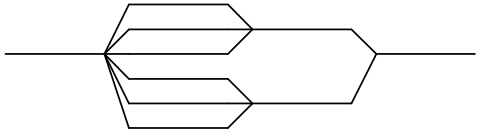

think,
analyse



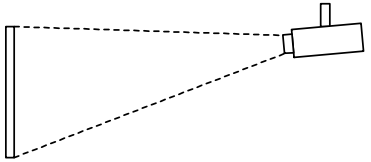

listen, talk,
walk around



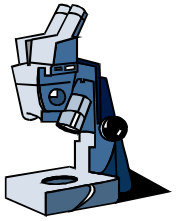

design,
brainstorm,
explain



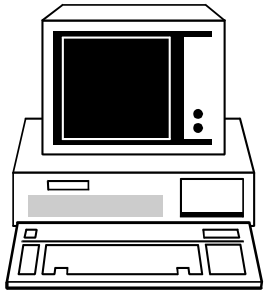
assist project leader
with work breakdown,
schedule, risks



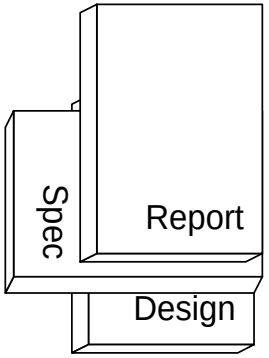
present,
meet, teach,
discuss



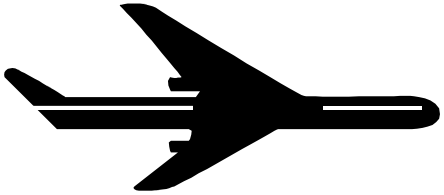
test,
integrate



write,
consolidate,
browse

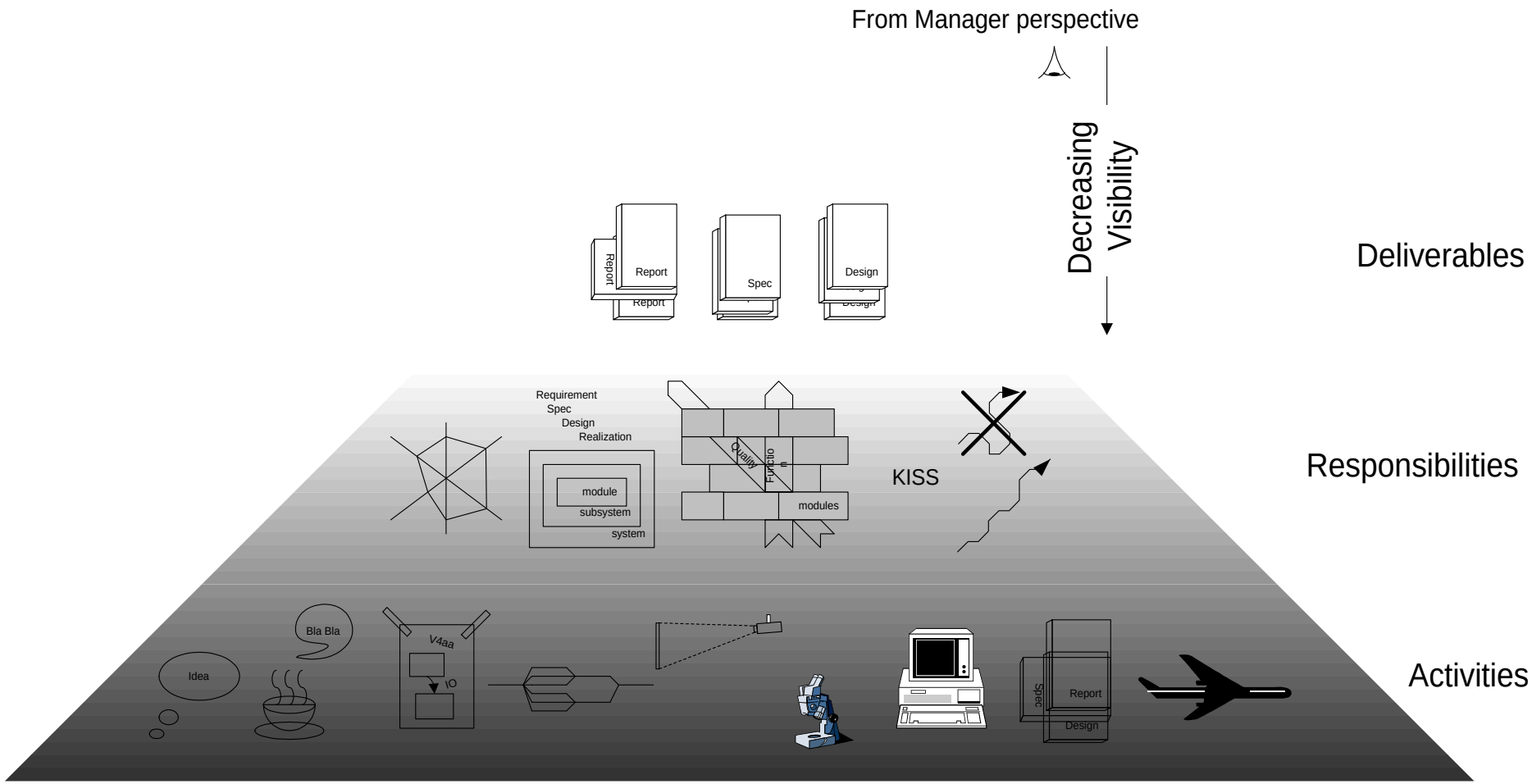



read,
review

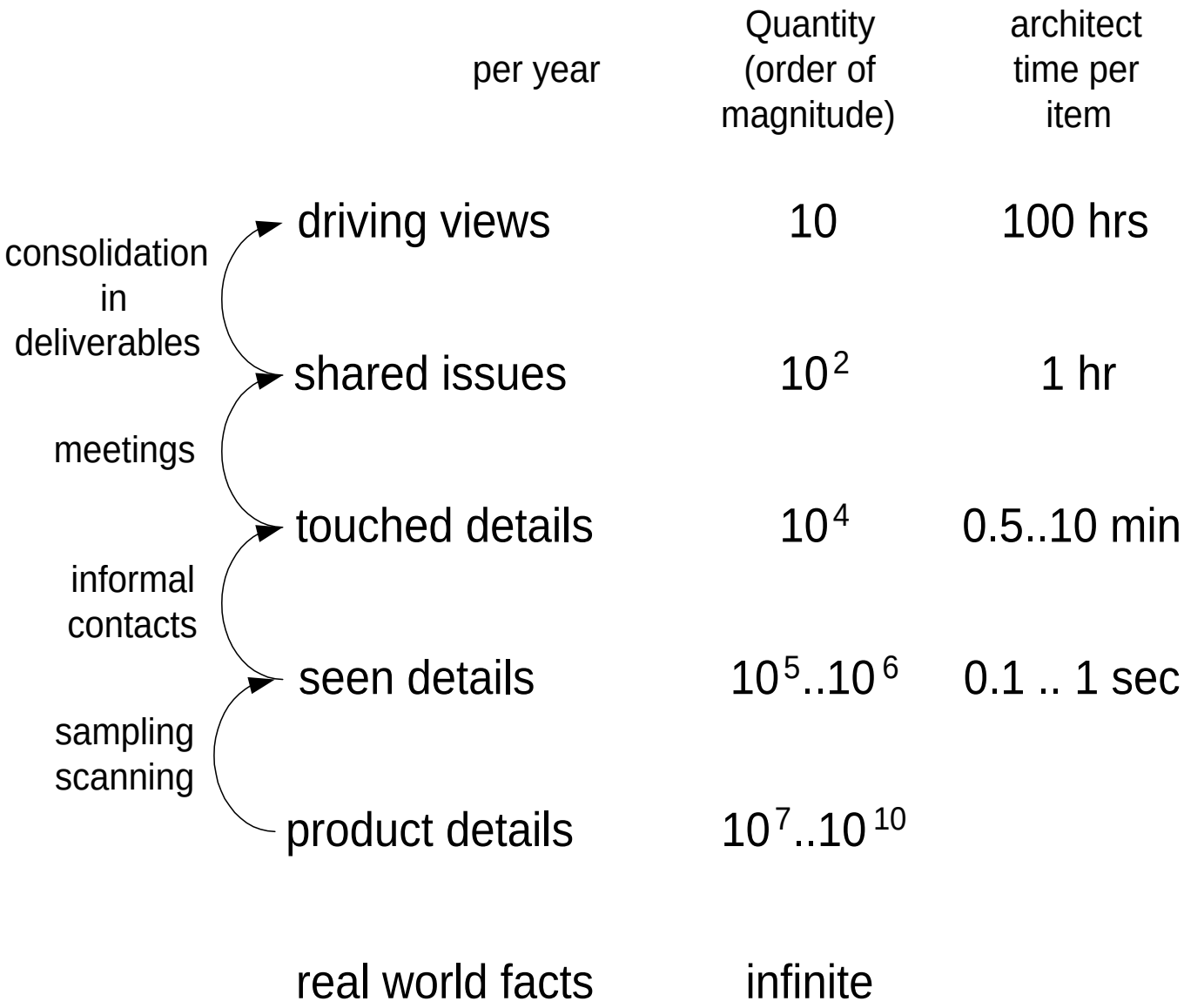


travel to
customer,
supplier,
conference

# Visible output versus invisible work



# Bottom-up elicitation of system characteristics

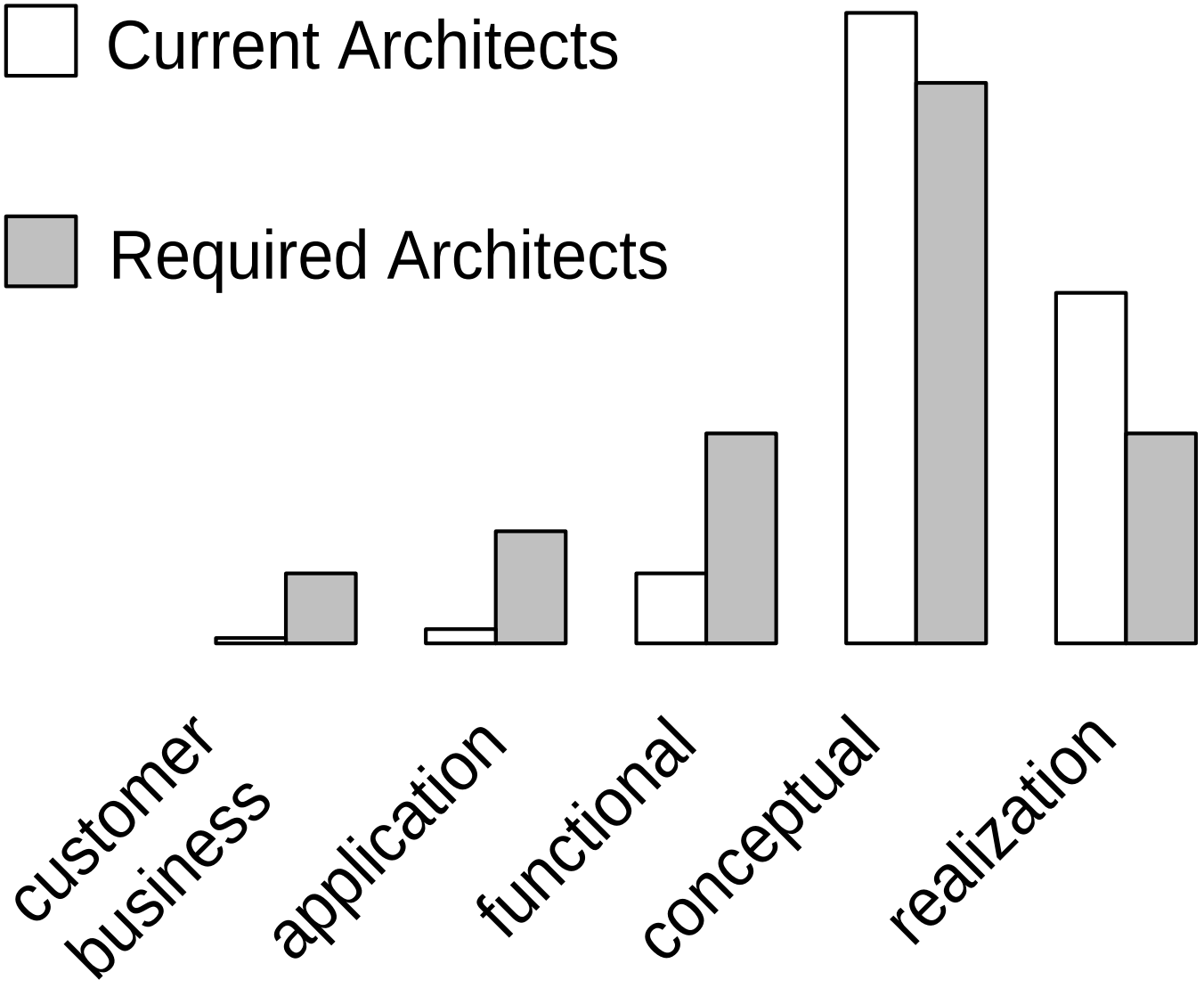


# From scenario to budget

| Customer business | Application | Functional | Conceptual | Realization |
|---|---|---|---|---|
| Scenario: | | Typical Case: | Models | Technical estimates |
| **Accessible** story, clearly outlining a **frequently** occuring situation with a **valuable** , but **challenging** solution | | Functions and Quantification of **frequently** occuring **important** and **critical** case | Functional and Performance | |

Several iterations are required. In later iterations worst cases and exceptional cases are taken into account. The technical estimates are then transformed in budgets.

# Architects must increase customer side contribution



# Acknowledgements

The term ”Techno-nerd” is gracefully adapted from ”Enginerds” by Kees van Overveld. The drive towards human oriented architecting is stimulated by interaction with **Kees van Overveld** and **Dieter Hammer** as a subgroup of the working group ”Human values & IT”, see:

www.it4humans.org