

# The functional view

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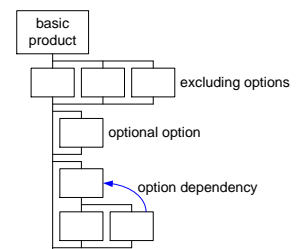
## Abstract

The purpose of the functional view is described. A number of methods or models is given to use in this view: (use) case descriptions, commercial decomposition function and feature specifications performance models and specifications, information models. The role of standards is discussed.

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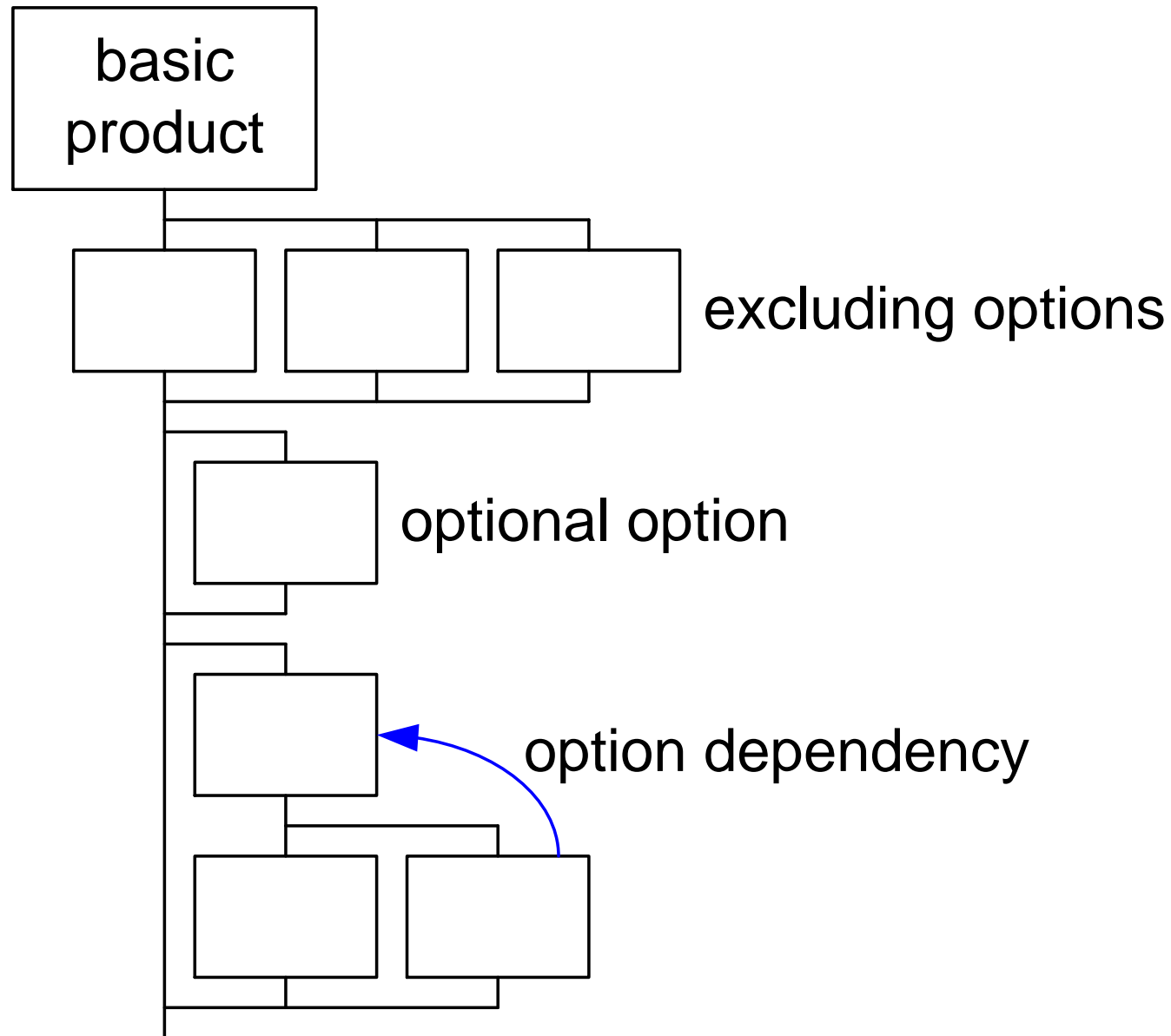
# Example personal video recorder use case contents

typical use case(s)	worst case, exceptional, or change use case(s)
<p><b>interaction flow (functional aspects)</b></p> <ul style="list-style-type: none"><li>select movie via directory</li><li>start movie</li><li>be able to pause or stop</li><li>be able to skip forward or backward</li><li>set recording quality</li></ul>	<p><b>functional</b></p> <ul style="list-style-type: none"><li>multiple inputs at the same time</li><li>extreme long movie</li><li>directory behaviour in case of</li><li>extreme many short movies</li></ul>
<p><b>performance and other qualities (non-functional aspects)</b></p> <ul style="list-style-type: none"><li>response times for start / stop</li><li>response times for directory browsing</li><li>end-of-movie behaviour</li><li>relation recording quality and storage</li></ul>	<p><b>non-functional</b></p> <ul style="list-style-type: none"><li>response time with multiple inputs</li><li>image quality with multiple inputs</li><li>insufficient free space</li><li>response time with many directory entries</li><li>replay quality while HQ recording</li></ul>

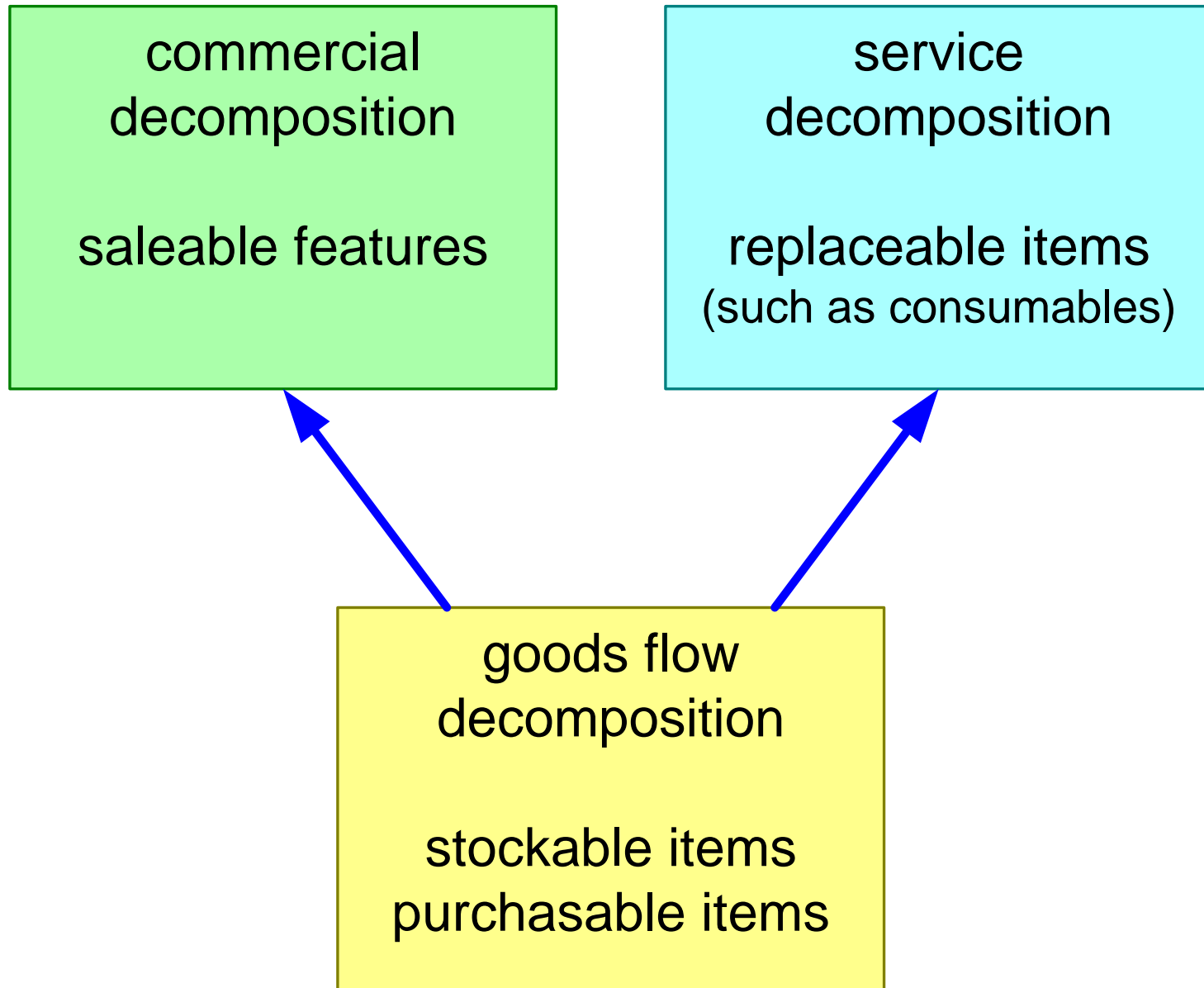
# Recommendations for working with use cases

- + 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

# Commercial Decomposition



# Logistic decompositions for a product



# Mapping technical functions on products

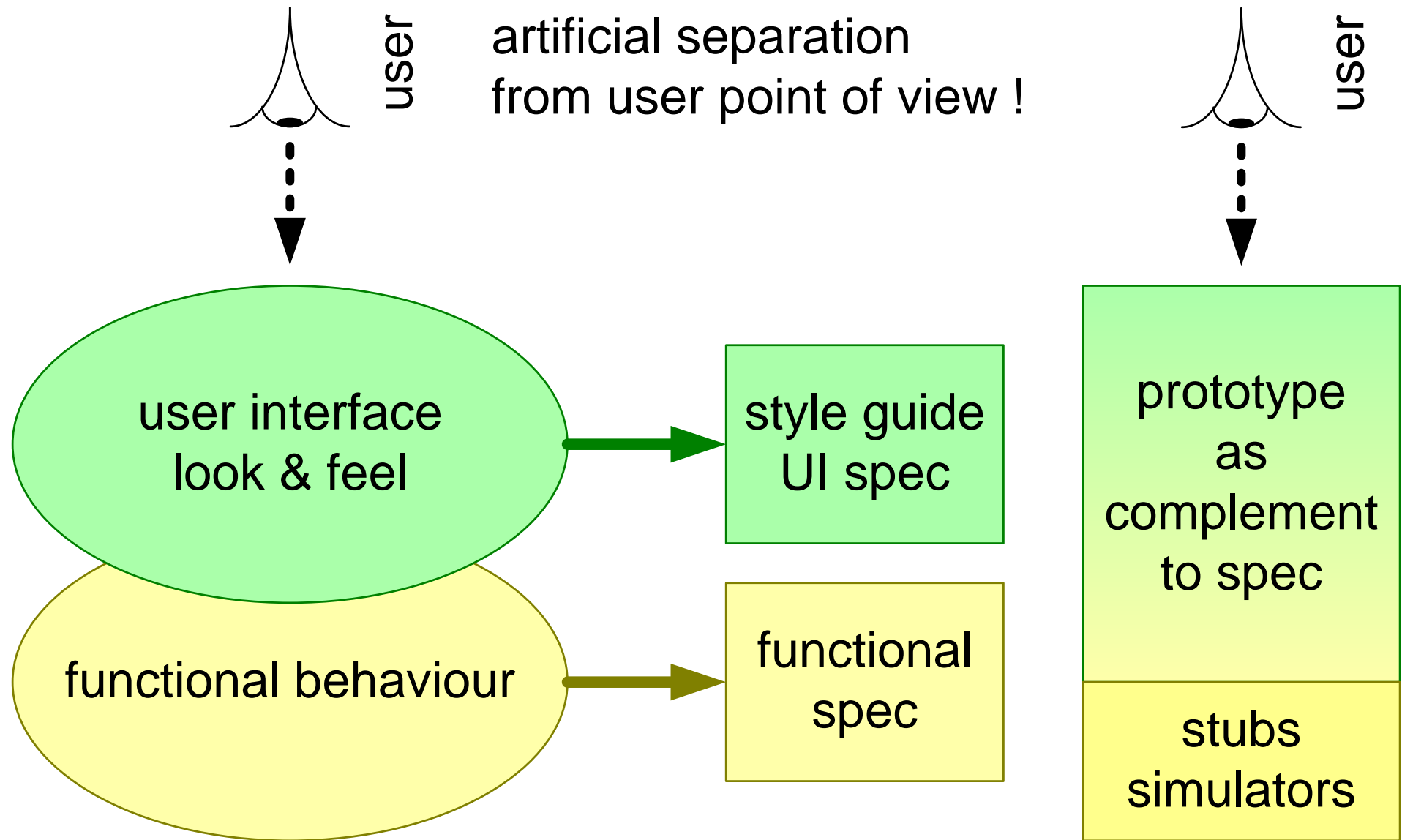
<i>technical functions</i>	<i>products</i>	home cinema system	flat screen cinema TV	bedroom TV
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HD display	+	+	-
SD->HD up conversion	+	+	-
HD->SD down conversion	+	+	0
HD storage	0	-	-
SD storage	0	-	0
HD IQ improvement	+	+	-
SD IQ improvement	+	+	+
HD digital input	+	+	0
SD digital input	+	+	0
SD analog input	0	+	+
6 HQ channel audio	+	0	-
2 channel audio	-	+	+

## legend

+	present
0	optional
-	absent

# Relation between user interface and functional specification



# Layering of information definitions

human understanding  
and interpretation  
of the information

information model, semantic defined in  
terms of:

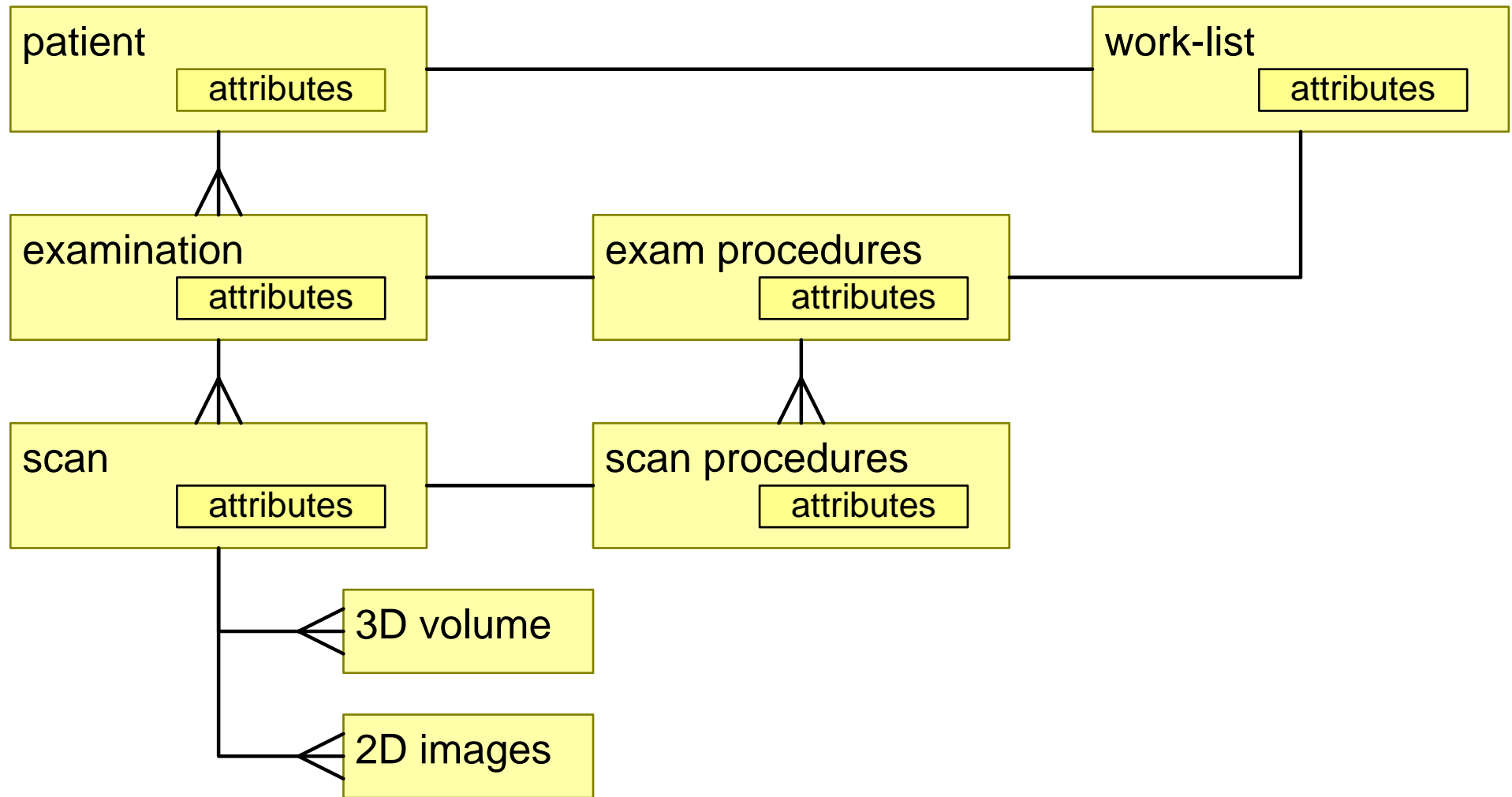
entities  
relations  
operations

data model or data dictionary

identifiers  
types  
ranges



# Example partial internal information model



## 12 bit Image:

nx: 16 bit unsigned integer

ny: 16 bit unsigned integer

pixels[nx][ny]: 16 bit unsigned integers [0..4095]

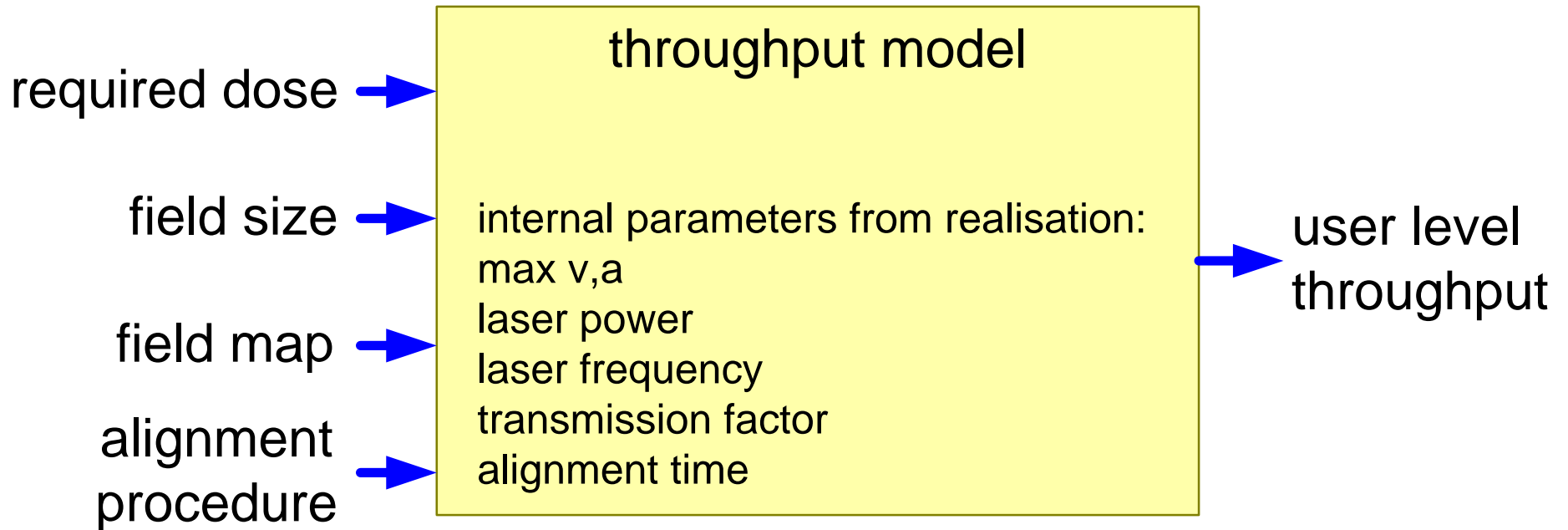
## 16 bit Image:

nx: 16 bit unsigned integer

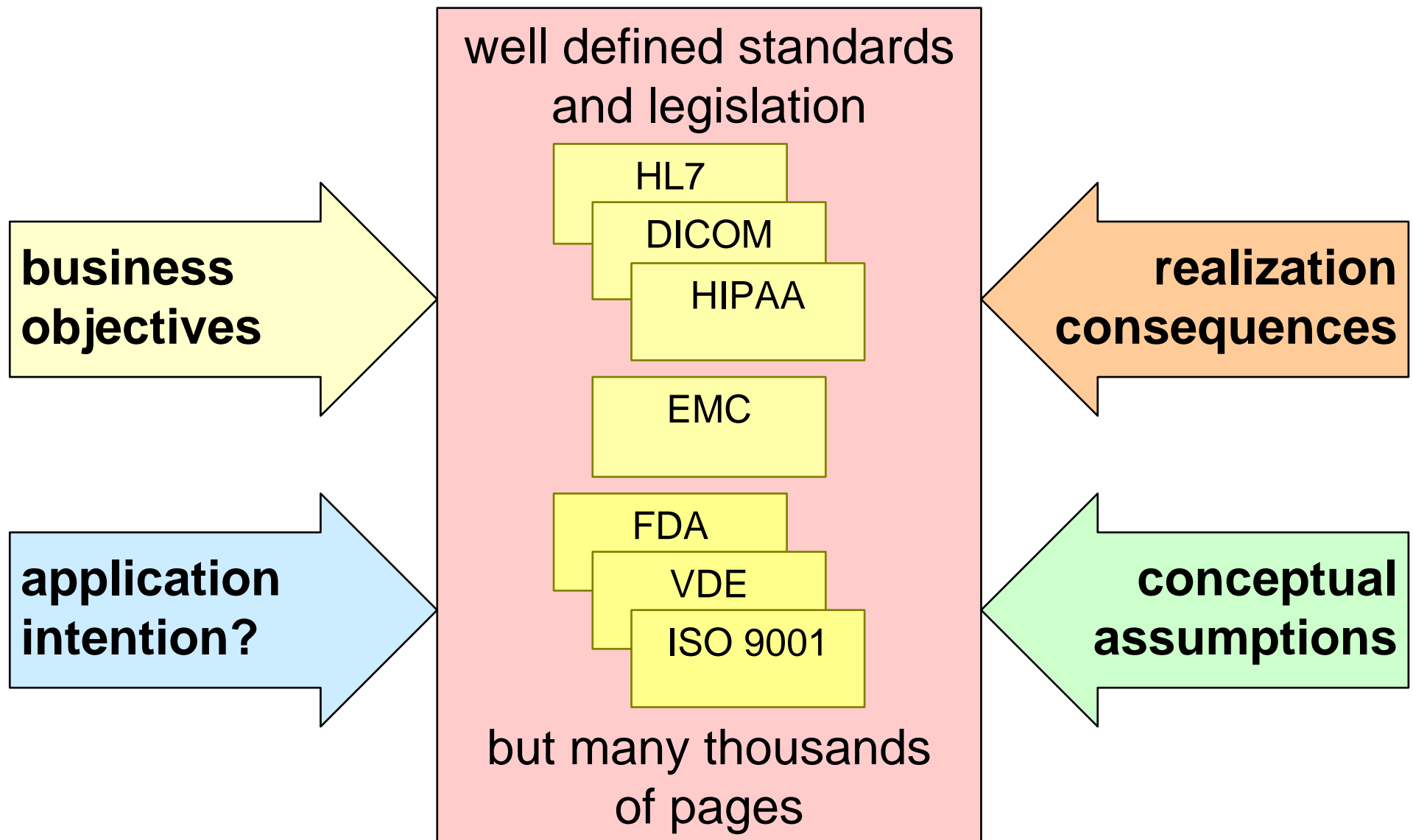
ny: 16 bit unsigned integer

pixels[nx][ny]: 16 bit unsigned integers

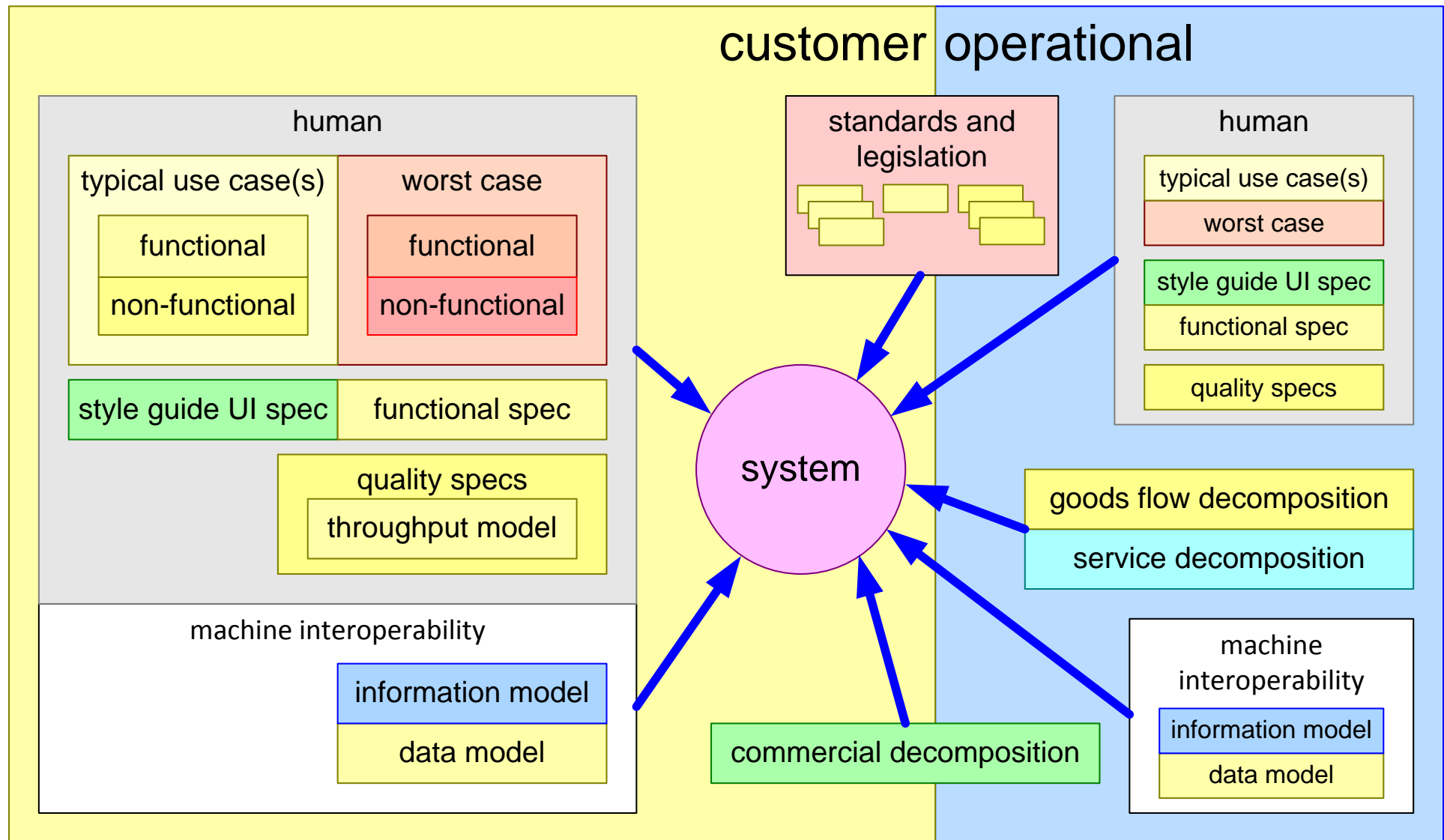
# Example of performance modelling



# The role of standards



# Functional view summary



Functional view = What: externally observable