

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.

Distribution

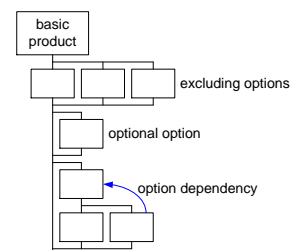
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draft

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Example personal video recorder use case contents

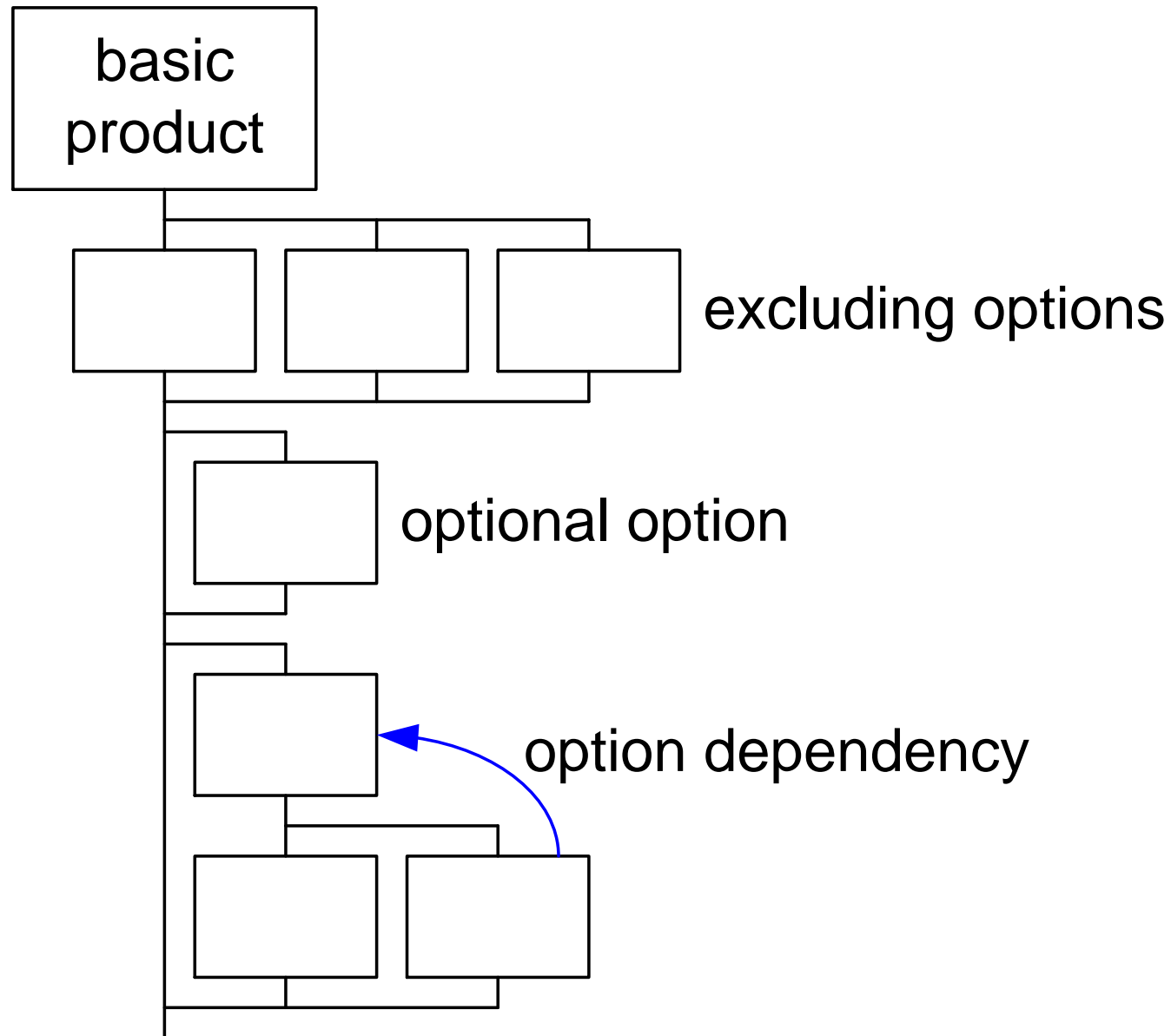
typical use case(s)	worst case, exceptional, or change use case(s)
<p>interaction flow (functional aspects)</p> <ul style="list-style-type: none"><li>select movie via directory<li>start movie<li>be able to pause or stop<li>be able to skip forward or backward<li>set recording quality	<p>functional</p>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

Recommendations for working with use cases

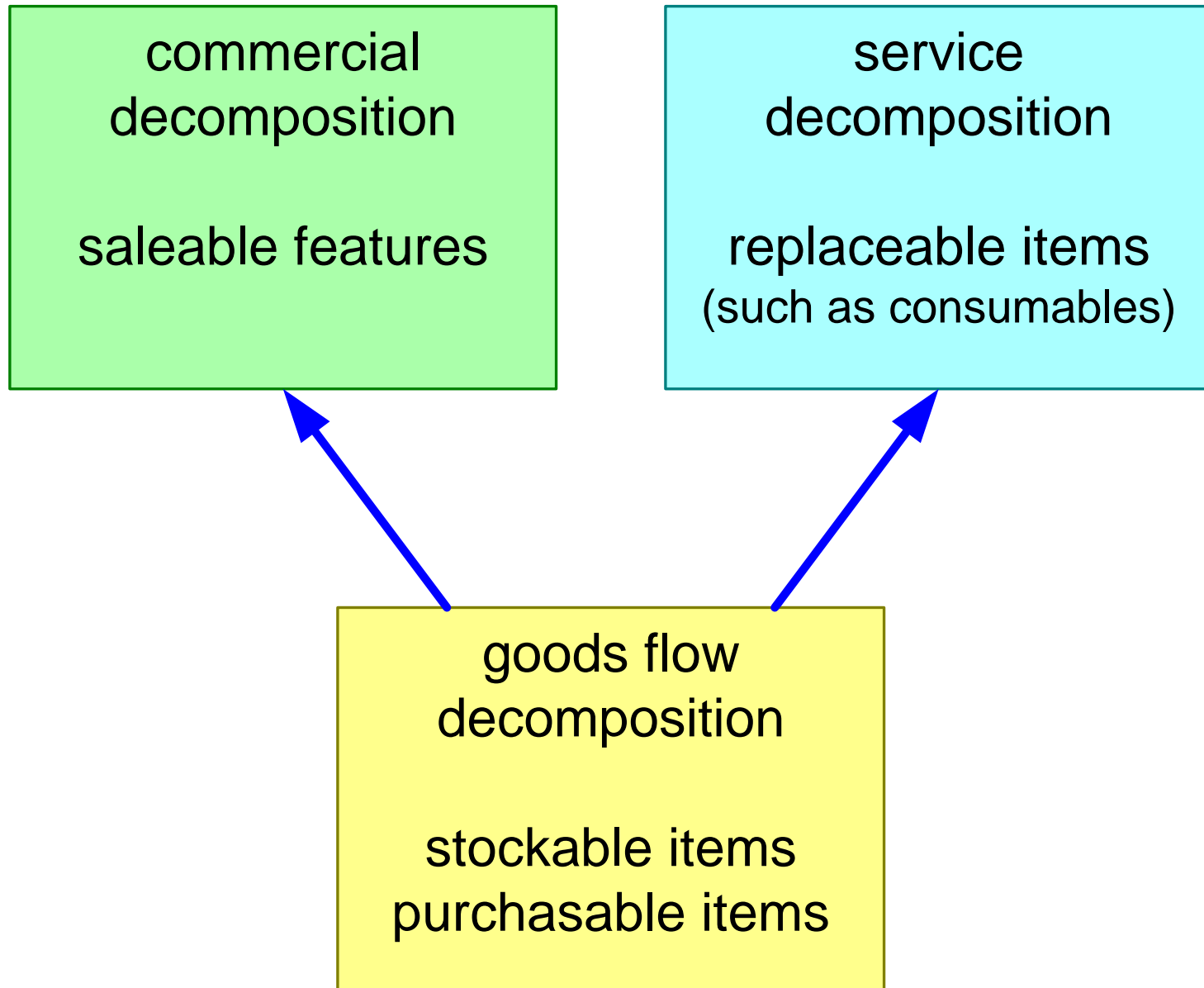
- + combine related functions in one use case
- do not make a separate use case for every function
- + include non-functional requirements in the use cases

- + 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

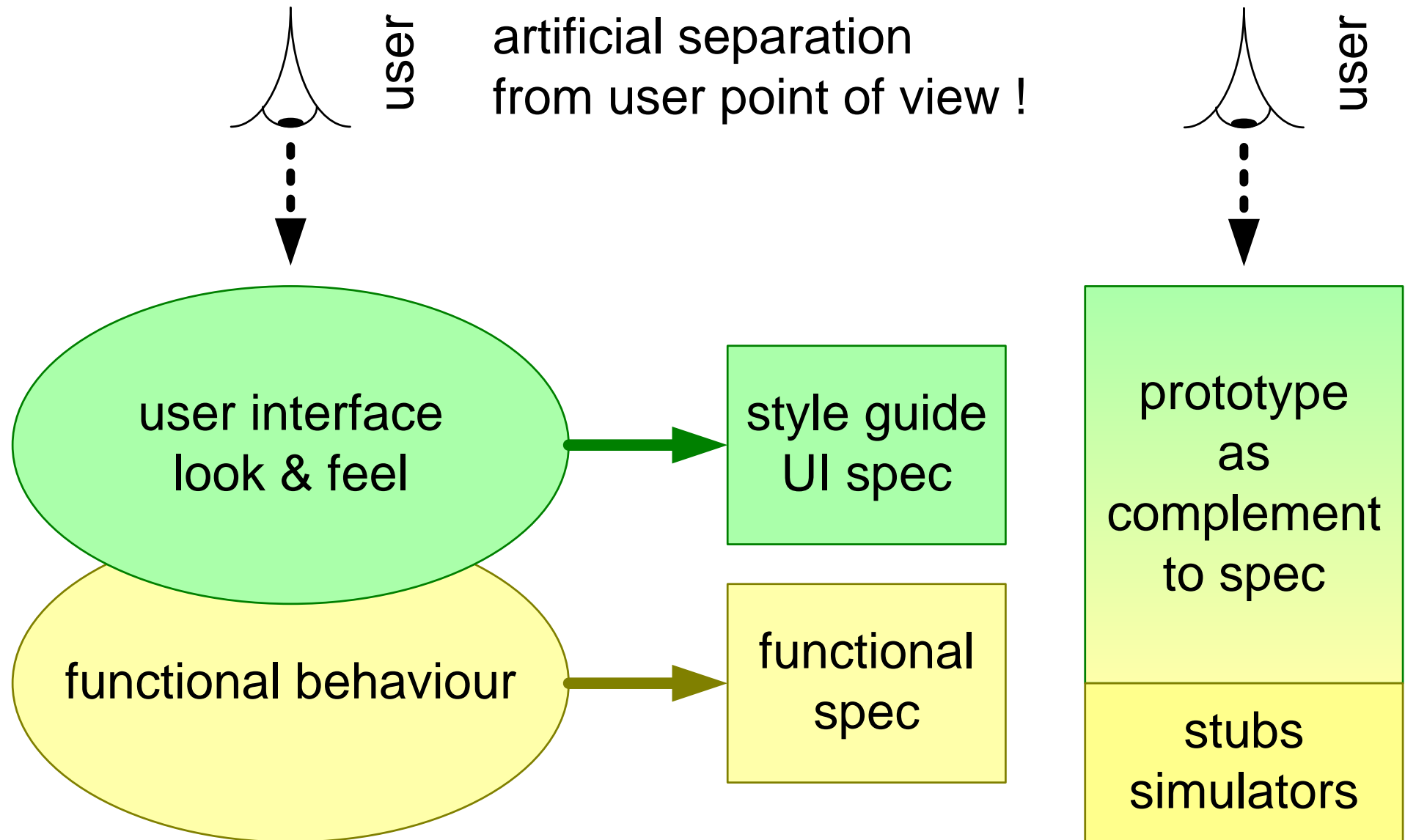
<i>technical functions</i>	<i>products</i>	home cinema system	flat screen cinema TV	bedroom TV
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HD display	+	+	-
SD->HD up conversion	+	+	-
HD->SD down conversion	+	+	0
HD storage	0	-	-
SD storage	0	-	0
HD IQ improvement	+	+	-
SD IQ improvement	+	+	+
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



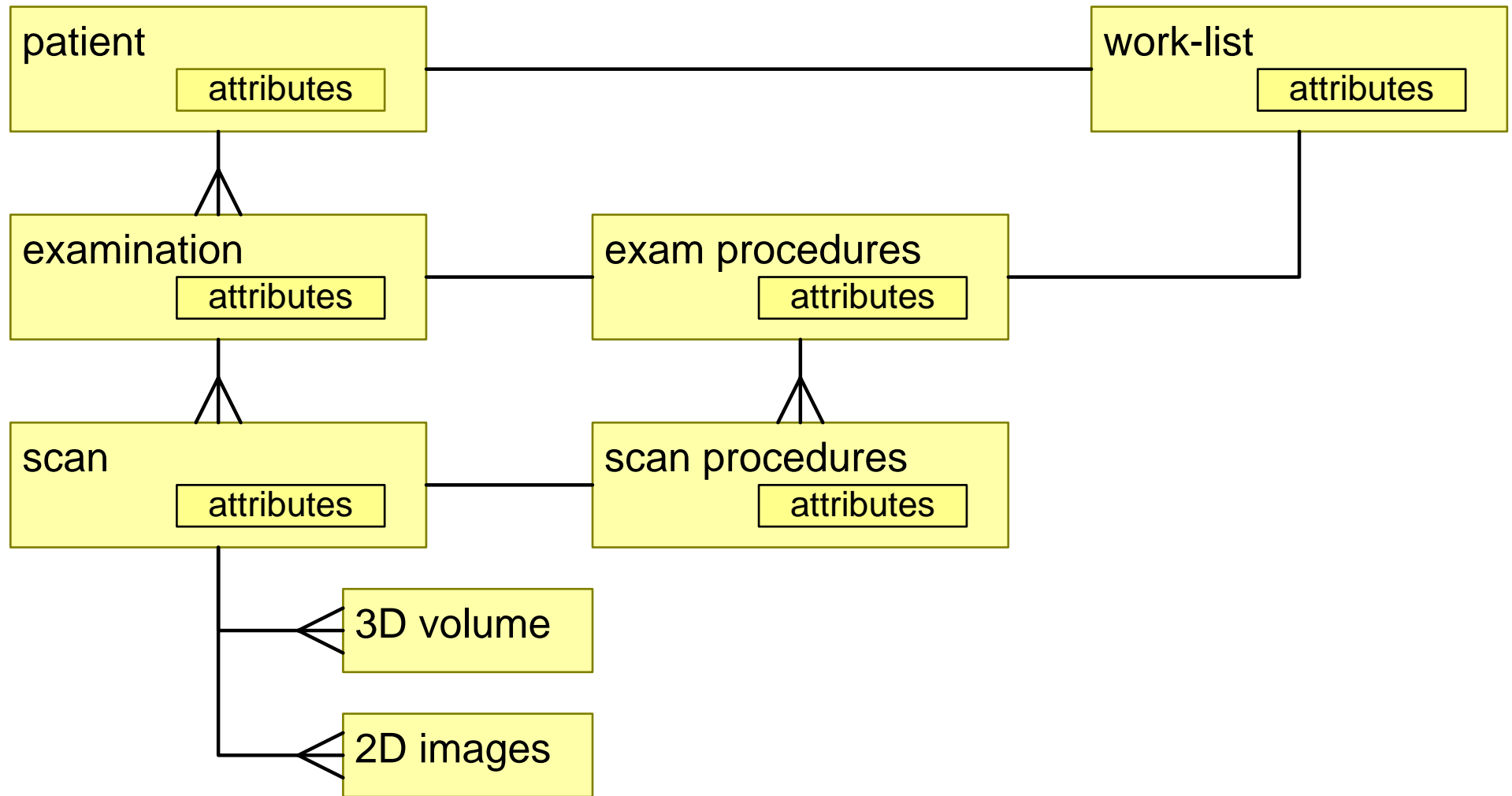
Layering of information definitions

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]

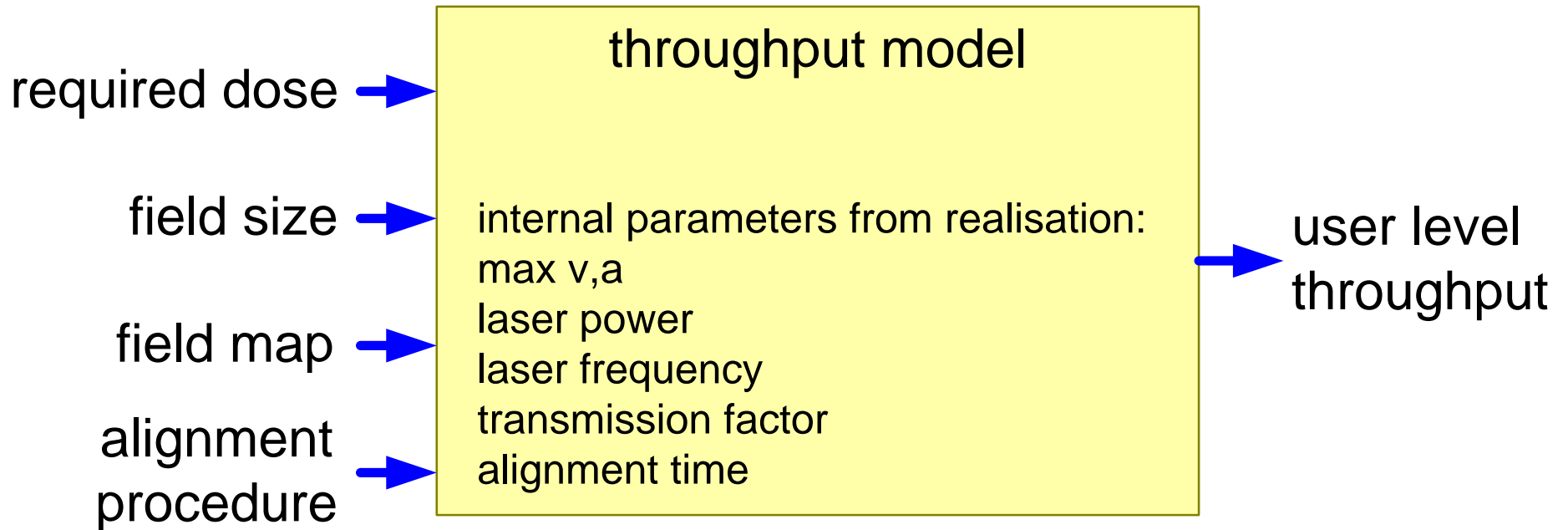
16 bit Image:

nx: 16 bit unsigned integer

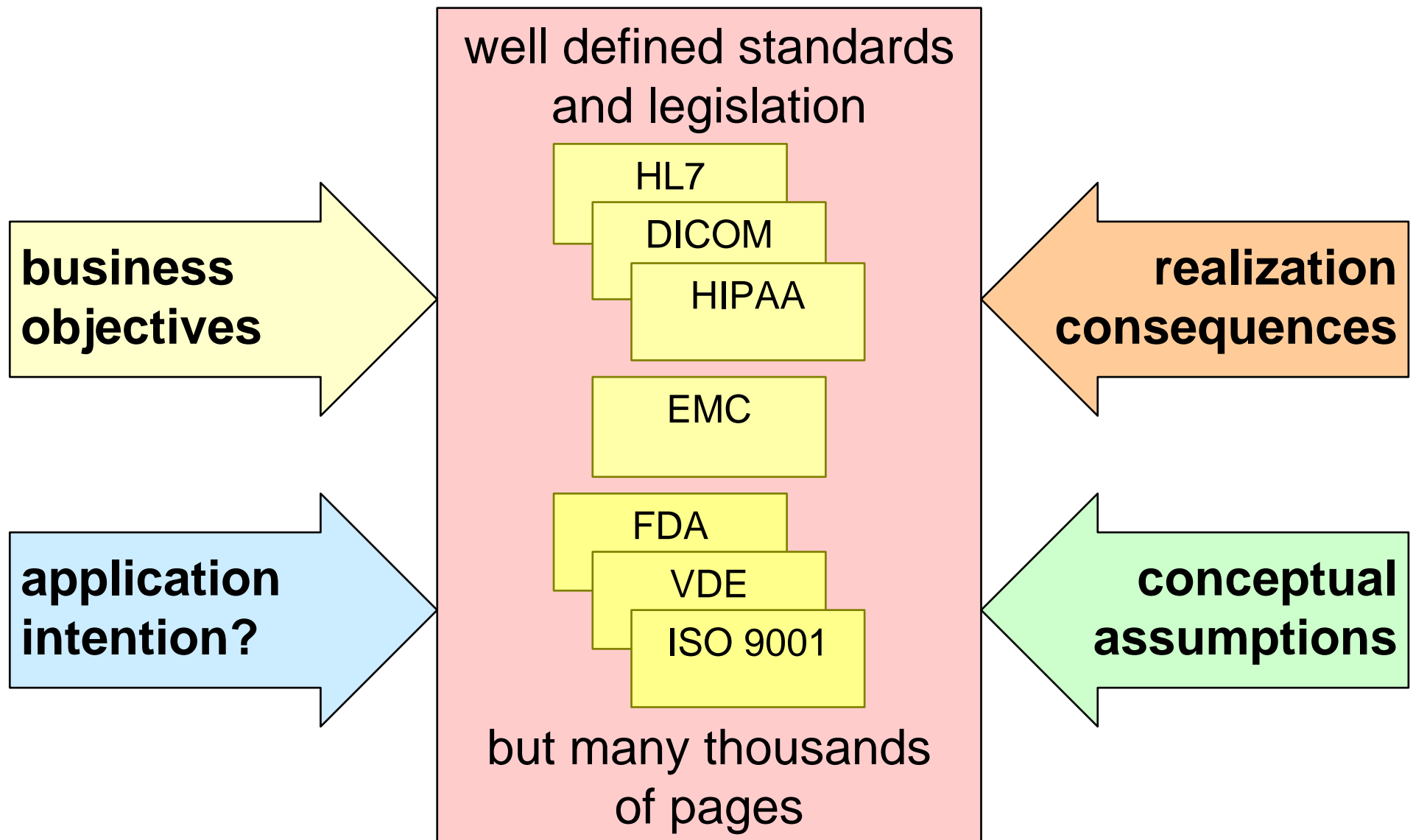
ny: 16 bit unsigned integer

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

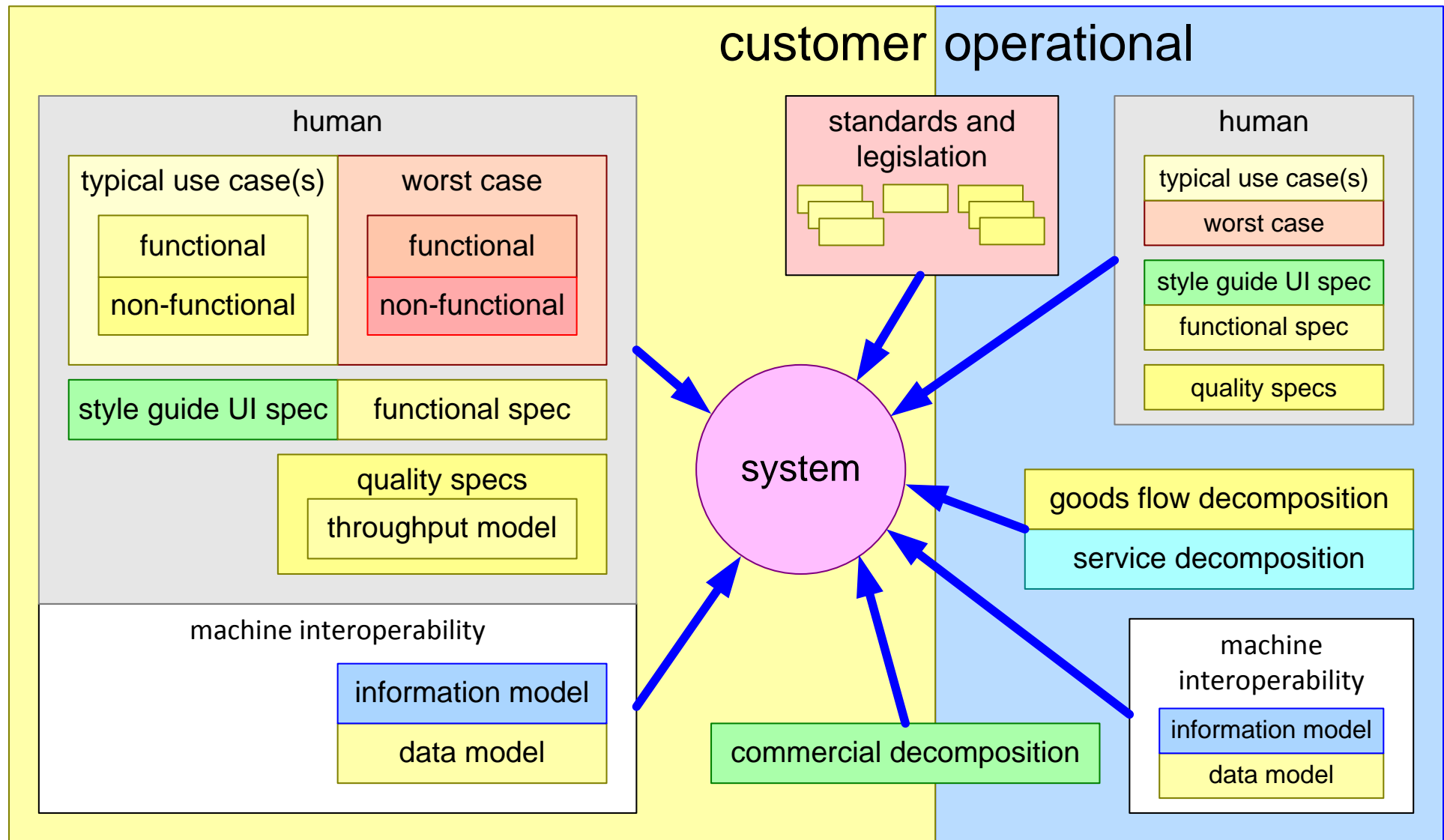
Example of performance modelling



The role of standards



Functional view summary



Functional view = What: externally observable