

# Guidelines for Visualization

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## Abstract

This document gives a number of concrete guidelines for visualizations, such as block diagrams, flow diagrams, graphs, decompositions, et cetera.

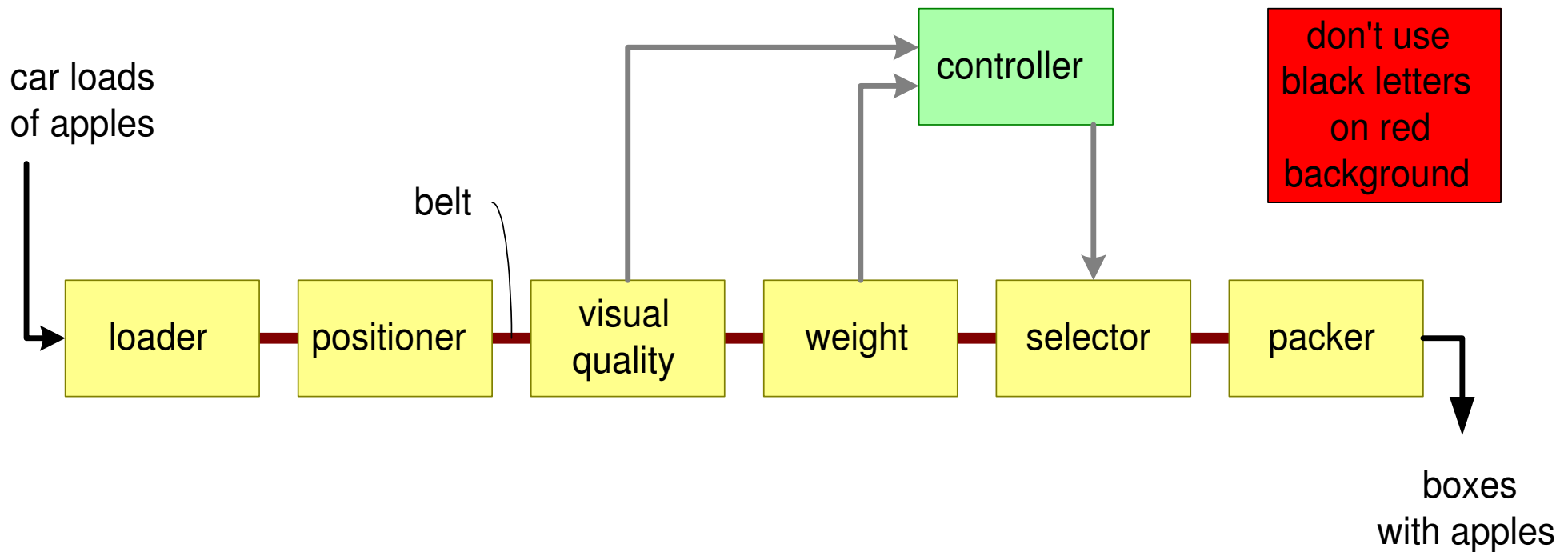
### Distribution

This article or presentation is written as part of the Gaudí project. The Gaudí project philosophy is to improve by obtaining frequent feedback. Frequent feedback is pursued by an open creation process. This document is published as intermediate or nearly mature version to get feedback. Further distribution is allowed as long as the document remains complete and unchanged.

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logo  
TBD

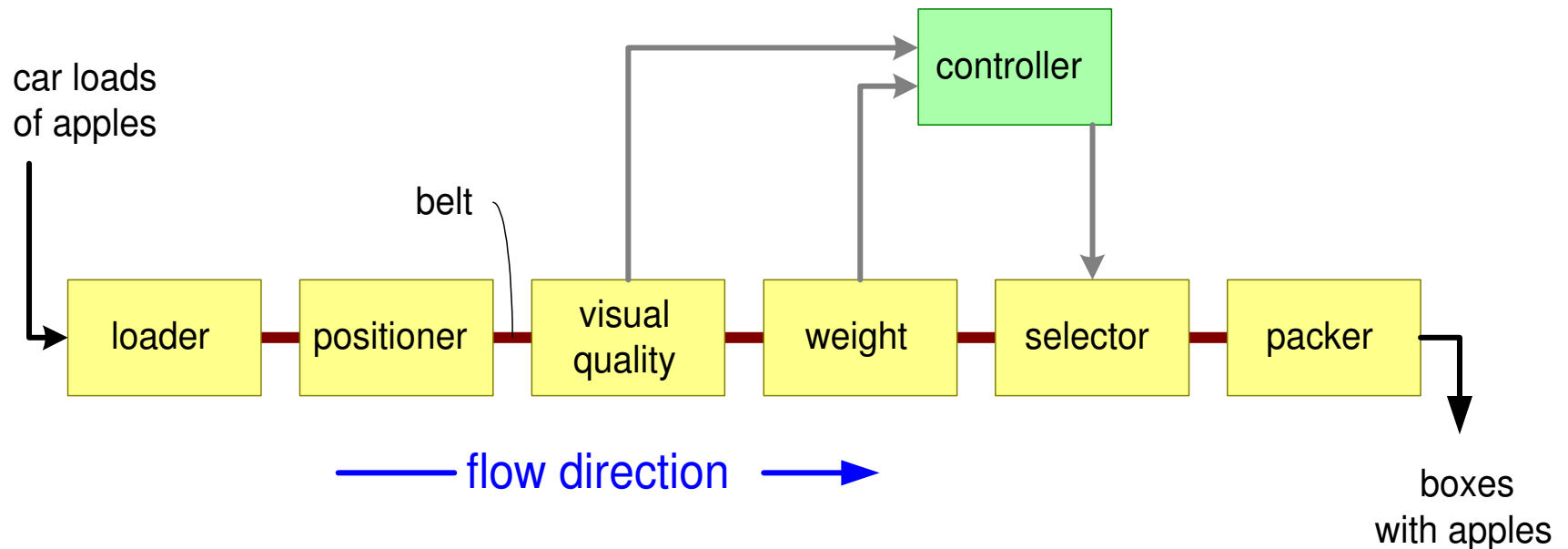
# Readability



Texts should be readable, in PowerPoint minimum font size 14 pt  
(or if you print a slide on A4, put the paper on the floor,  
then you should be able to read the text)

Text and background should have sufficient contrast  
(black letters on red background tend to be unreadable)

# Layout



Boxes (ellipses, rectangles, triangles, et cetera) should have the same size, unless the size has a clear meaning ;

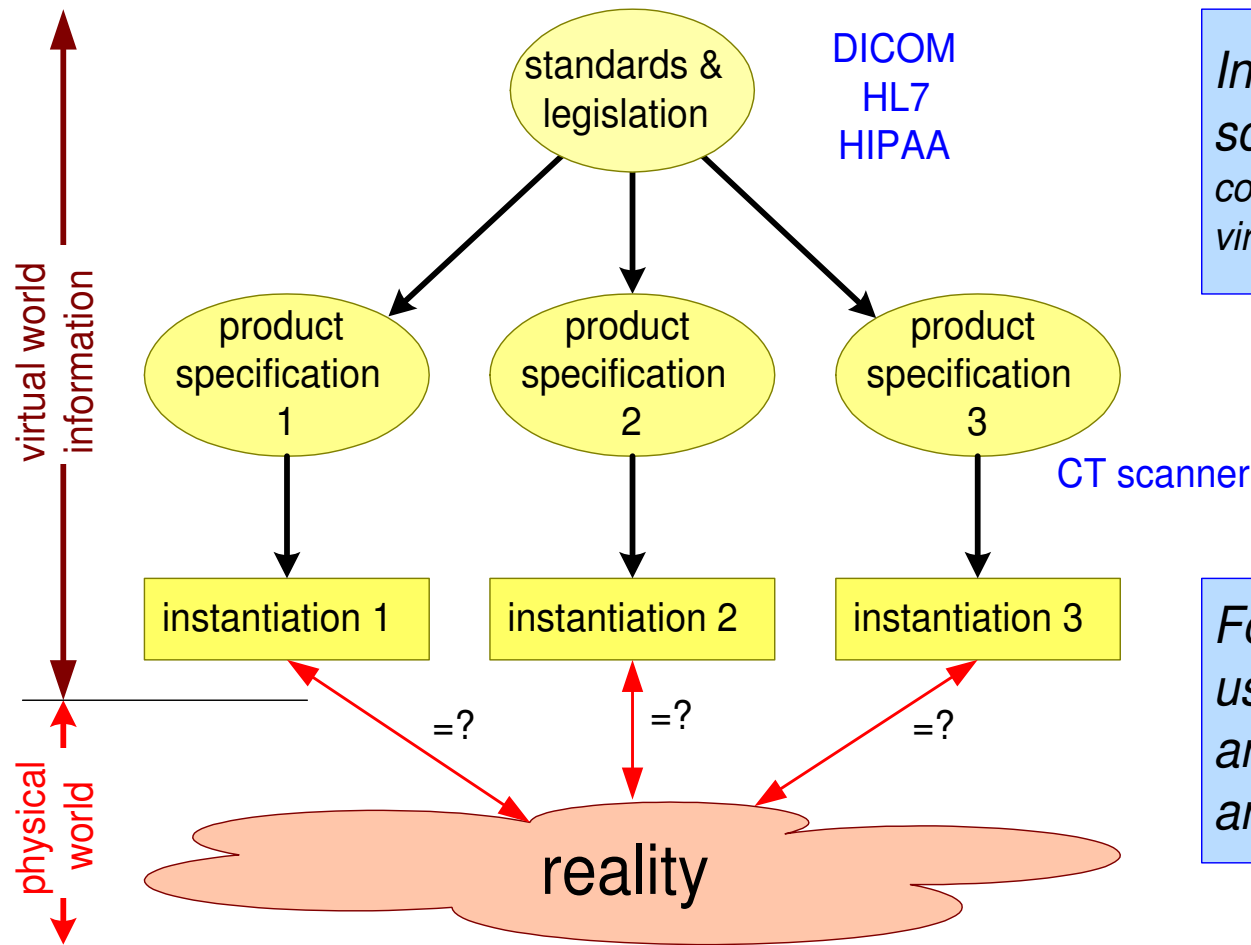
don't size the box to the text, since readers might interpret size in a way that you did not intend.

use the layout (left-right, up-down, close-remote) to support the message of the diagram; e.g. flow from left to right or from top to bottom.

design the layout such that there are few crossing lines;

this is often kind of puzzle.

# Color



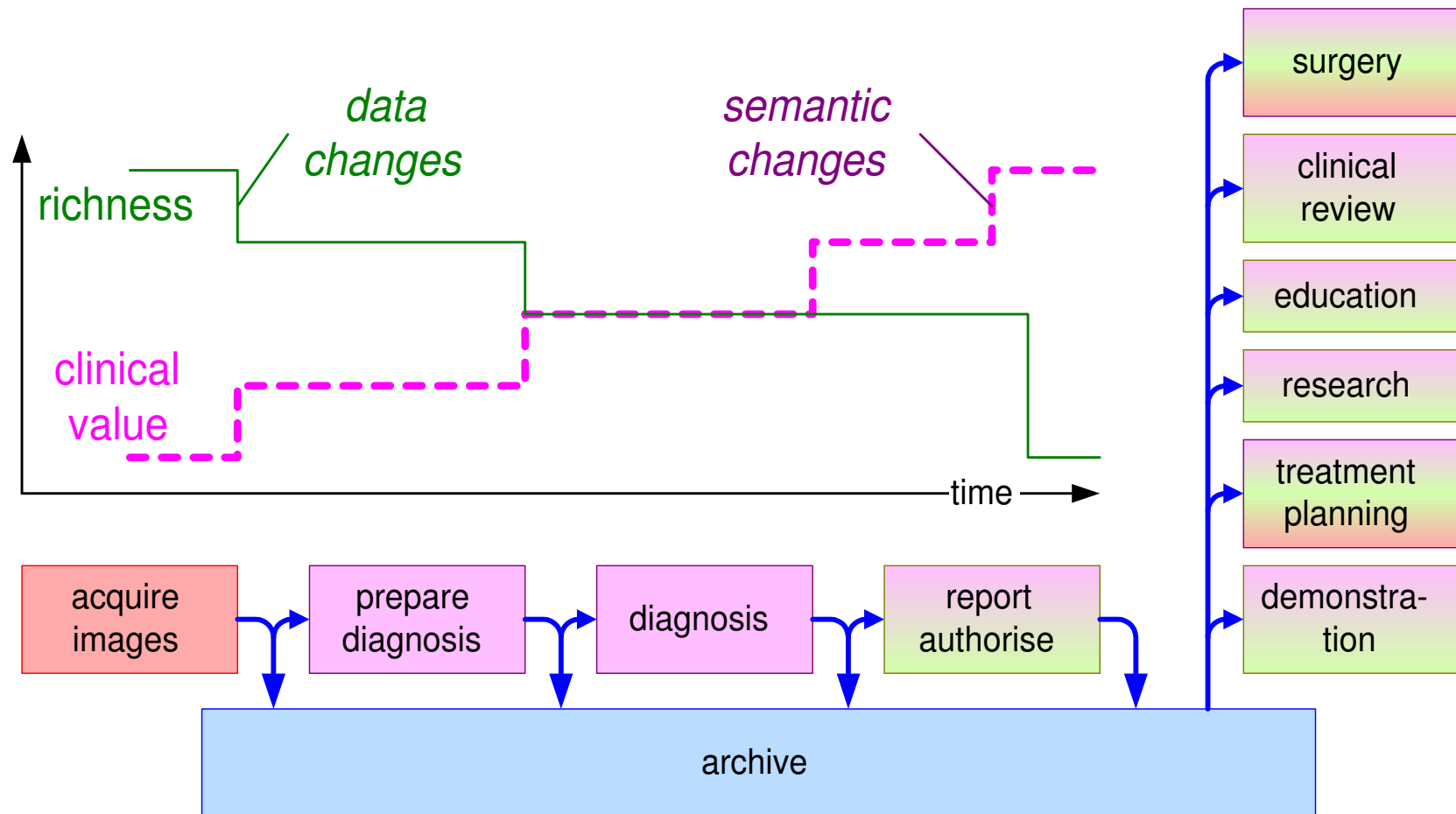
*In this example the color scale is used functionally; the color indicates the "degree of virtuality"*

*For readability the Gaudi site uses light background colors and darker colors for text and lines*

Use colors, but limited.

Try to use additional visual support to keep the diagram usable when printed black and white or for color-blind people. Alternate means to add meaning are shape (e.g. rectangles with rounded corners), line thickness, dotted lines, alternate end points or connectors.

# Information



Limit the amount of information in one diagram.

Two or three types of information can be combined in one diagram. For example a block diagram that also shows effort, risk or complexity as size of the boxes. Or a flow diagram with annotations where the functions are allocated.

# Generic and Specific

integrating **multiple**

applications

clinical analysis  
clinical support  
administrative  
financial  
workflow

in **multiple**

languages

cultures

USA, UK,  
China, India,  
Japan, Korea  
France, Germany  
Italy, Mexico

delivered by **multiple**

vendors

Philips  
GE  
Siemens

based on **multiple**

media, networks

DVD+RW  
memory stick  
memory cards  
bluetooth  
11a/b/g  
UTMS

and **multiple**

standards

Dicom  
HL7  
XML

and **multiple**

releases

R5  
R6.2  
R7.1

Annotate generic diagrams with specific examples; A generic diagram often captures some valuable insight, however, the examples help readers in understanding the diagram.

Use font size and type to visually differentiate main generic message and supportive specific examples

# Attractiveness

..~1985

autonomous subsystems:

Geo

Acquisition

Imaging

X-ray generation

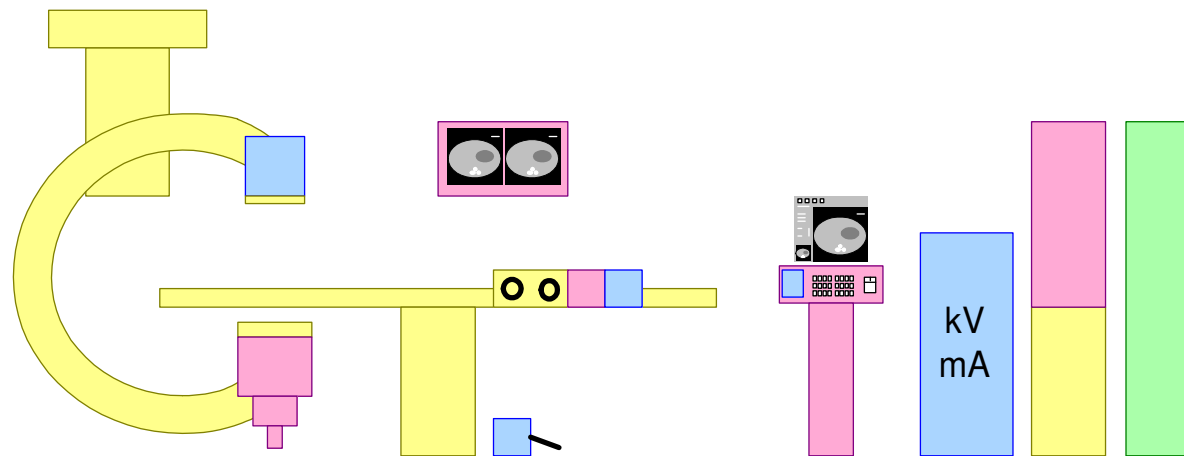
sales: preferred configurations; arbitrary configurations are more expensive

system integration (SI) in R&D

SW in all subsystems

SI is electro mechanical *and configuration parameters*

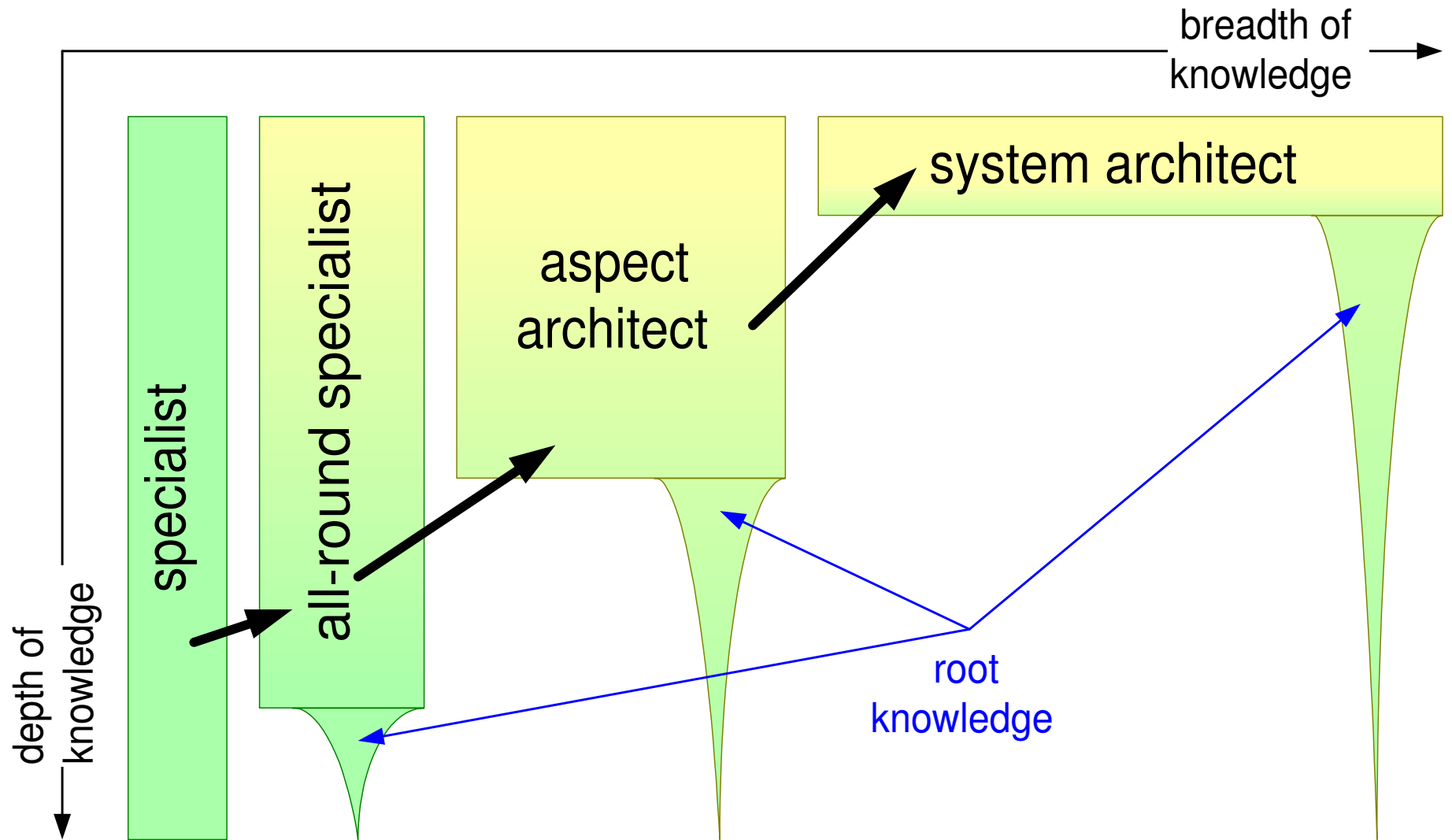
innovation elapsed time several years (f.i.,2 years for digital imaging chain)



in some cases 2D/3D drawings or photos help to make a diagram more accessible (less abstract). However, it also "clutters" the diagram. So use these "real" objects sparsely

Use animations sparsely. Animations can be very powerful to visualize processes or flows. However, animations cannot be printed. Avoid animations that only make the presentation more sexy.

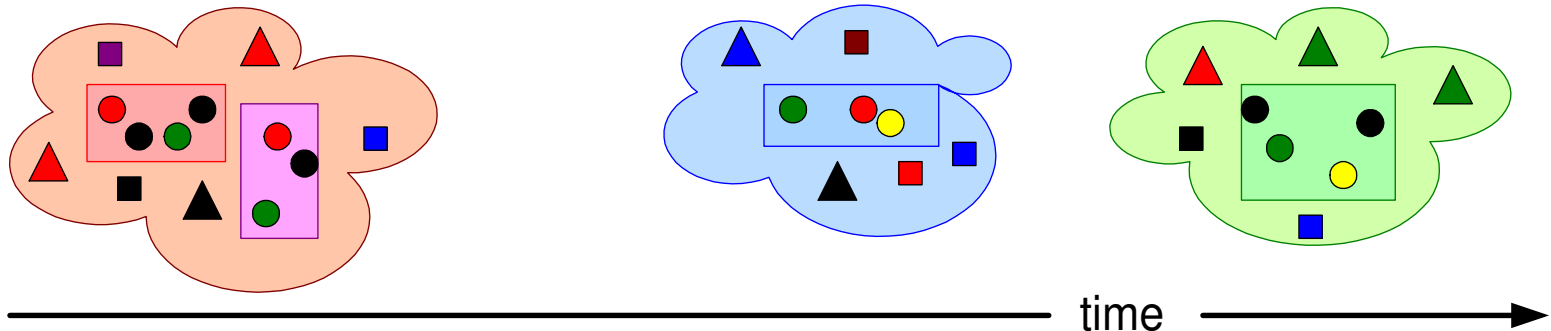
# Message



Good visualization bring and clarify a message. What is the take away of this visualization for your audience?

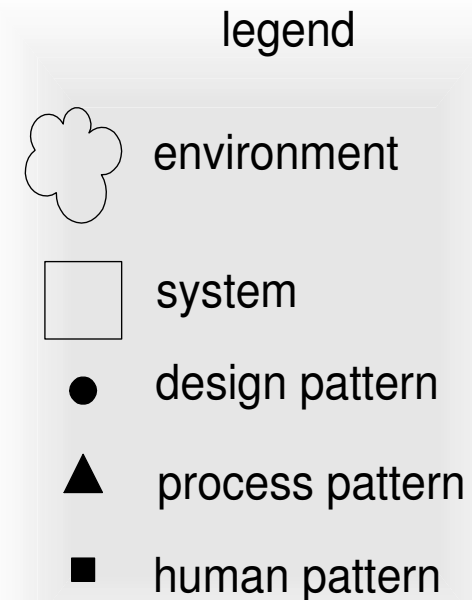


# Legend



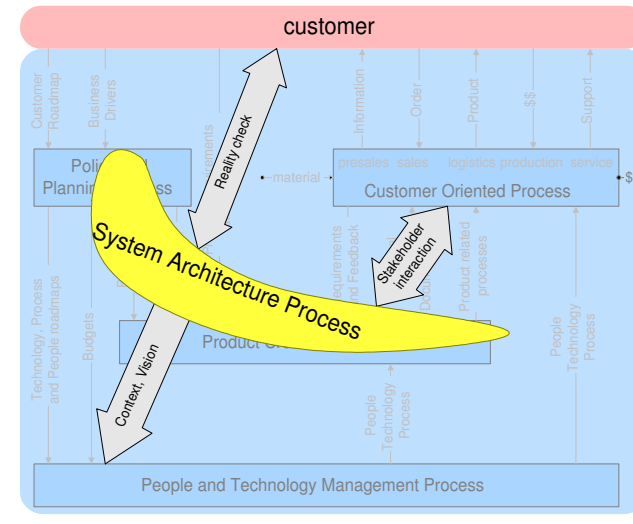
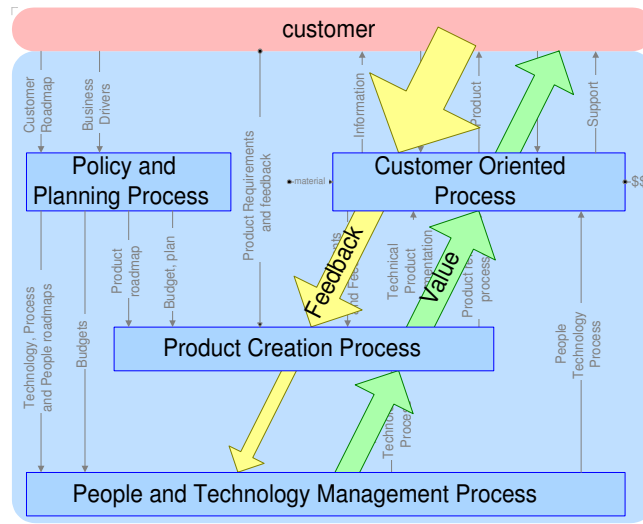
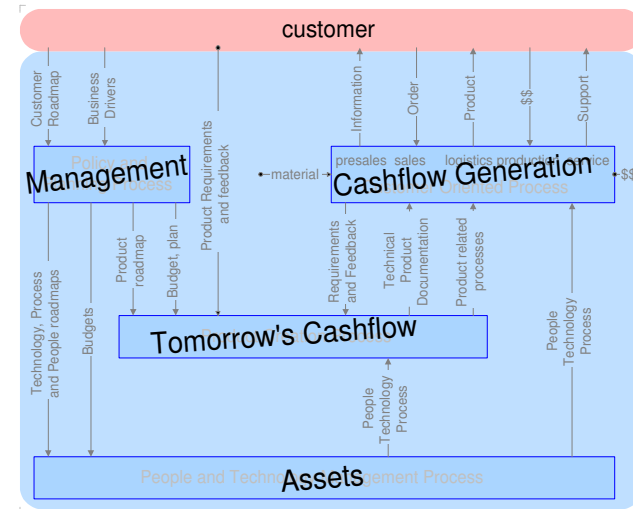
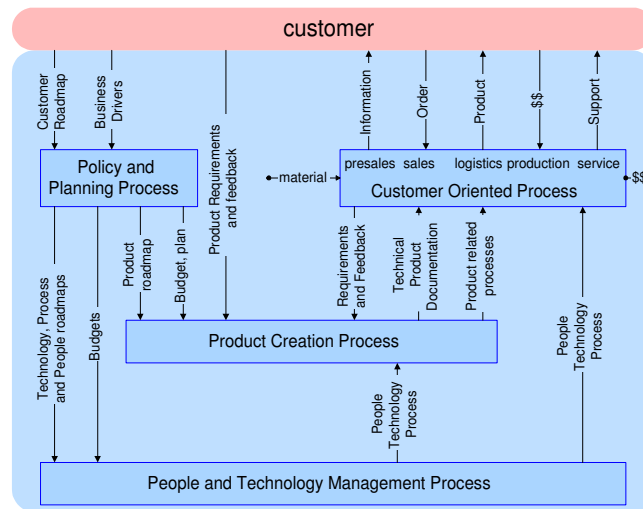
architects move from:  
product to product  
environment to environment

architects experience:  
thousands of patterns  
*design* patterns in systems  
*process* patterns in environments  
*human* patterns in environments



Add a legend for shapes, lines, or colors when the meaning is essential for the figure.

# Separate information, prevent overload



Don't overload diagrams; if you have tens of boxes then consider simplification or divide in multiple slides plus one overview slide.

Consider to add one overview slide when dividing over multiple slides

# Summary

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Texts should be readable: use sufficient font size.

Text and background should have sufficient contrast.

Shapes, such as boxes, should have the same size.

Use the layout (left-right, up-down, close-remote) to support the message of the diagram.

Design the layout such that there are few crossing lines.

Use colors, but limited.

Design the diagram such that it still works when printed in black and white.

Limit the amount of information in one diagram.

Two or three types of information can be combined in one diagram.

Annotate generic diagrams with specific examples; use font size and type to visually differentiate generic from specific.

Use 2D/3D drawings or photos limited.

Ensure that the message of the visualization is clear.

Add legend to explain shapes, colors, line types, axes, etc.