

Software Productivity for Consumer Appliances

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Abstract

Technological developments, such as miniaturization and convergence have a strong impact on the form, function and content of consumer appliances. The appliance makers are struggling with the consequences, especially with the exponential increasing SW effort.

The trends and the impact on consumer appliances are discussed. Then the software effort problem is analyzed and solution directions for the SW productivity problems are explored.

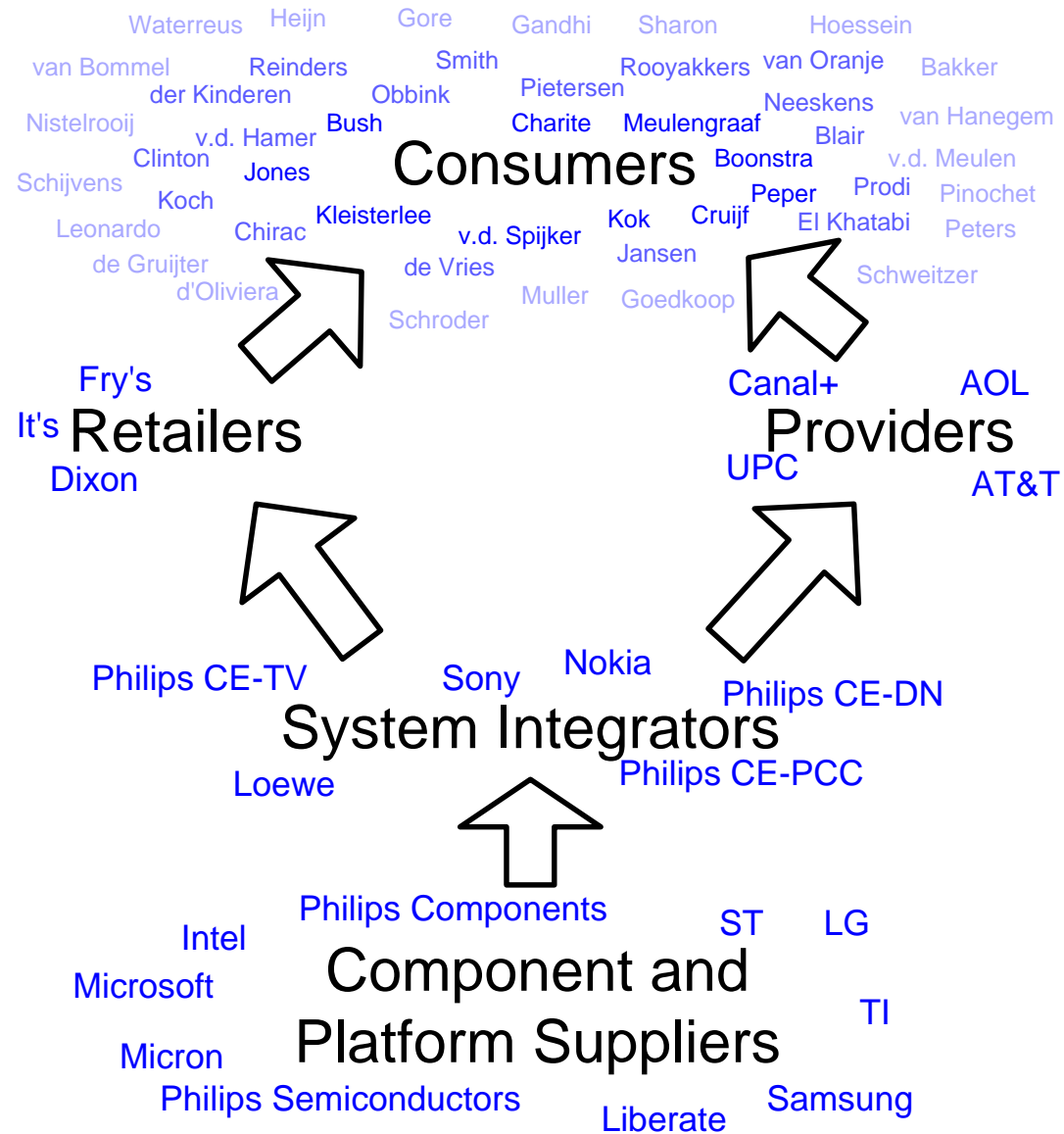
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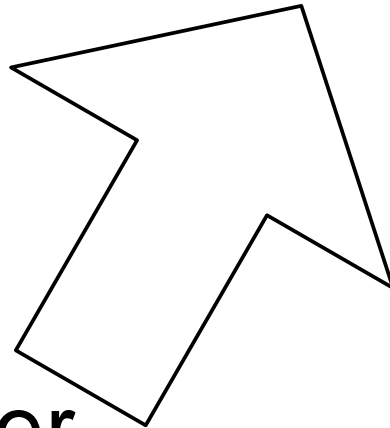
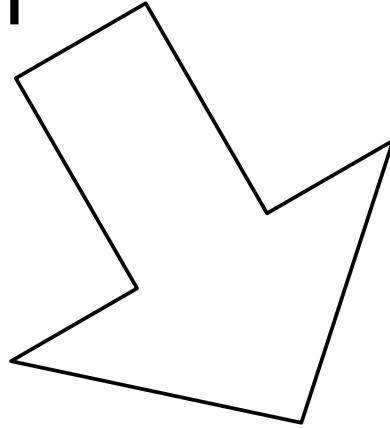
logo
TBD

Value chain

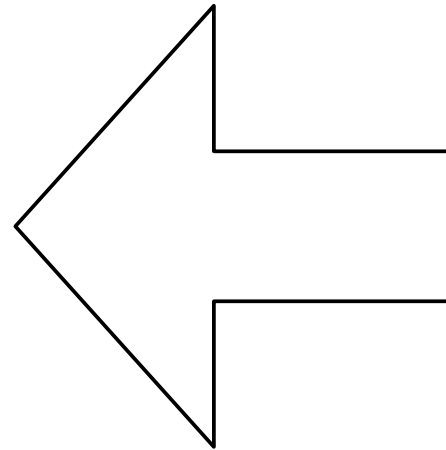


Convergence

Telecom



Consumer



Computer

Integration and Diversity



GSM phone



firewall



dvd



audio
microset



pda



watch



sailboat



surveillance
camera



cable
modem



set top box



headphone



pen



garment



car



camera



speech



mp3



television



Communicator



Ambient Intelligence
living room



car navigation



computer



games



flat display

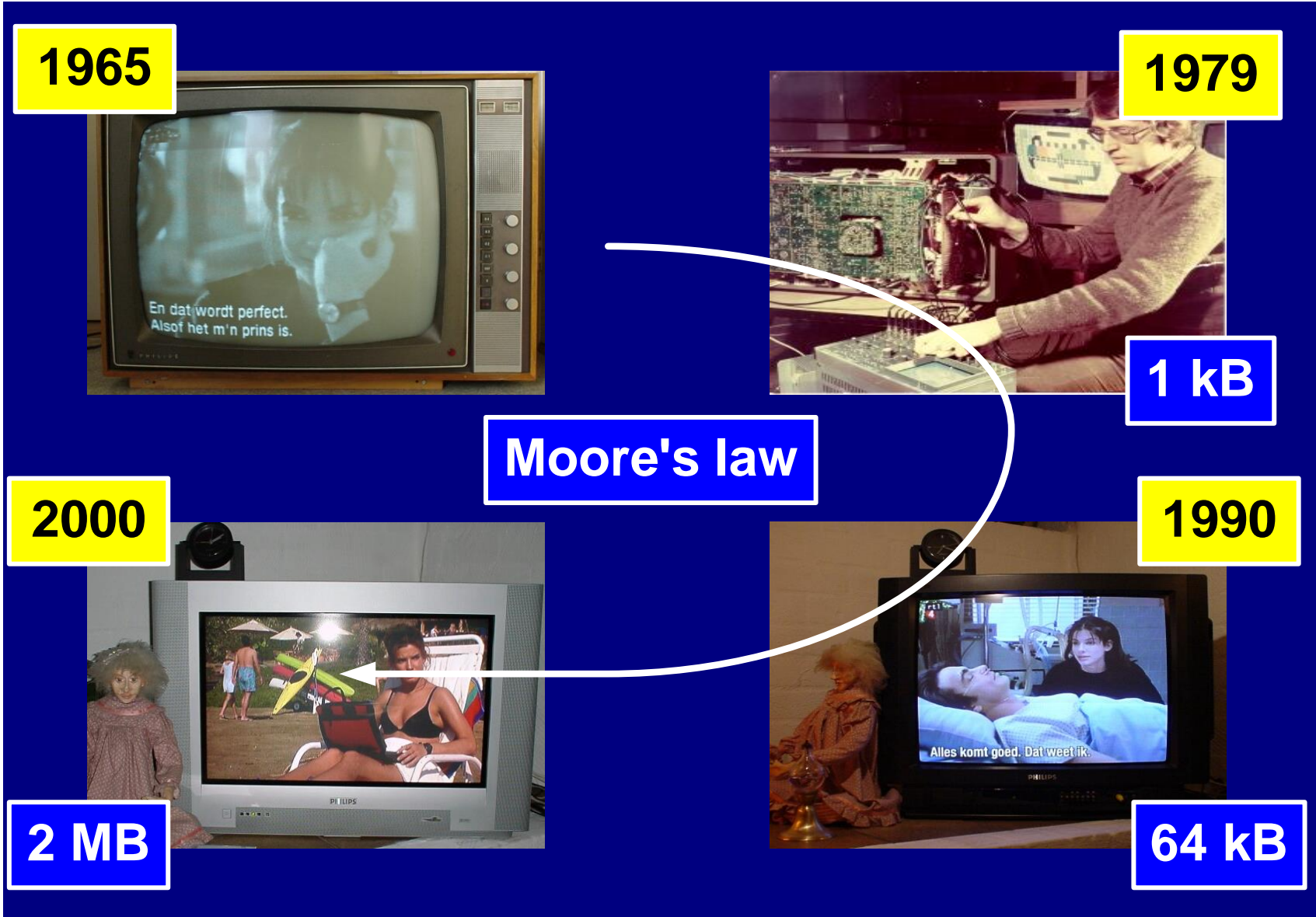
Uncertainty (Dot.Com effect)



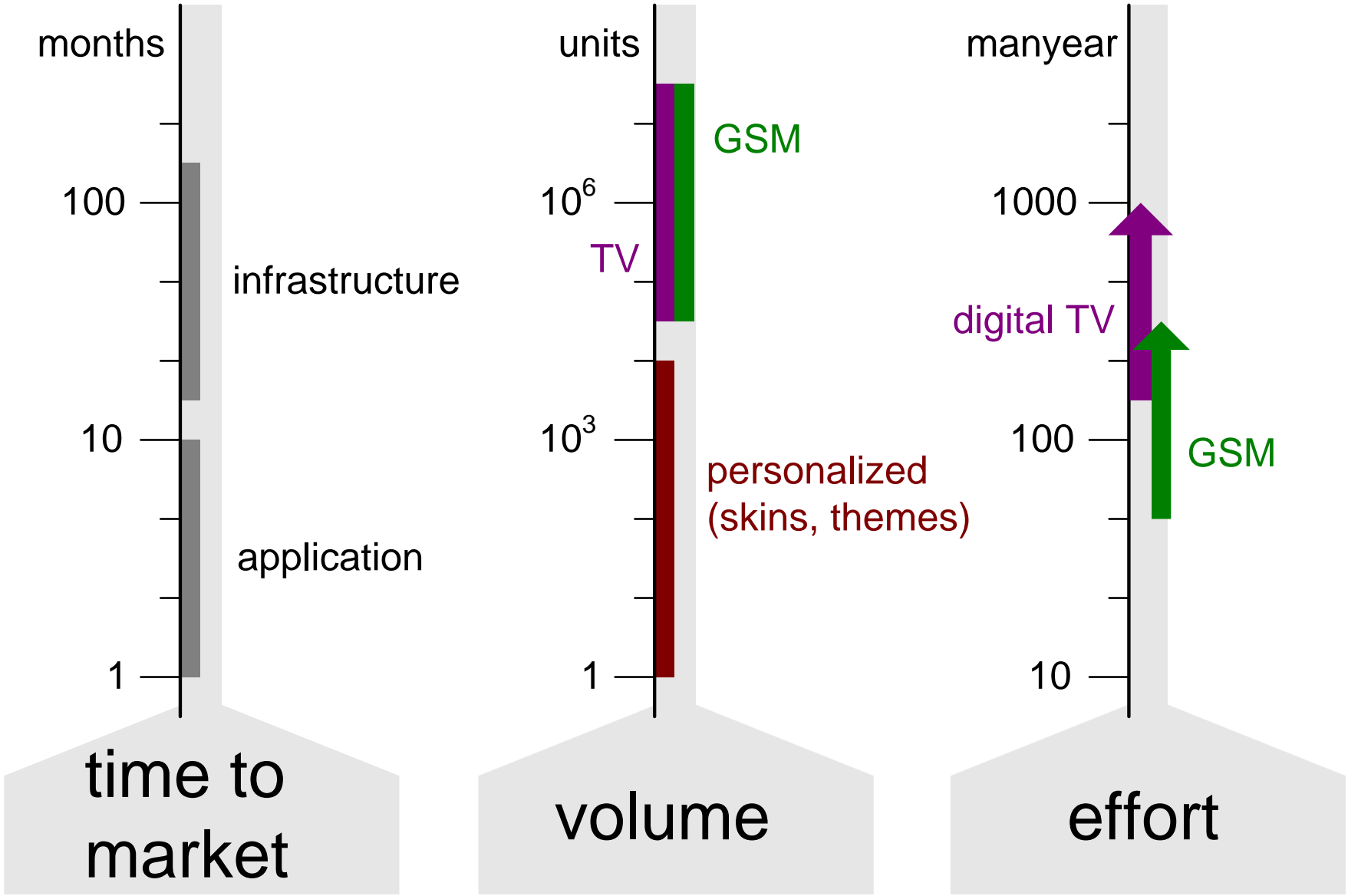
source: BigChart.com
dd march 19, 2001

Moore's law

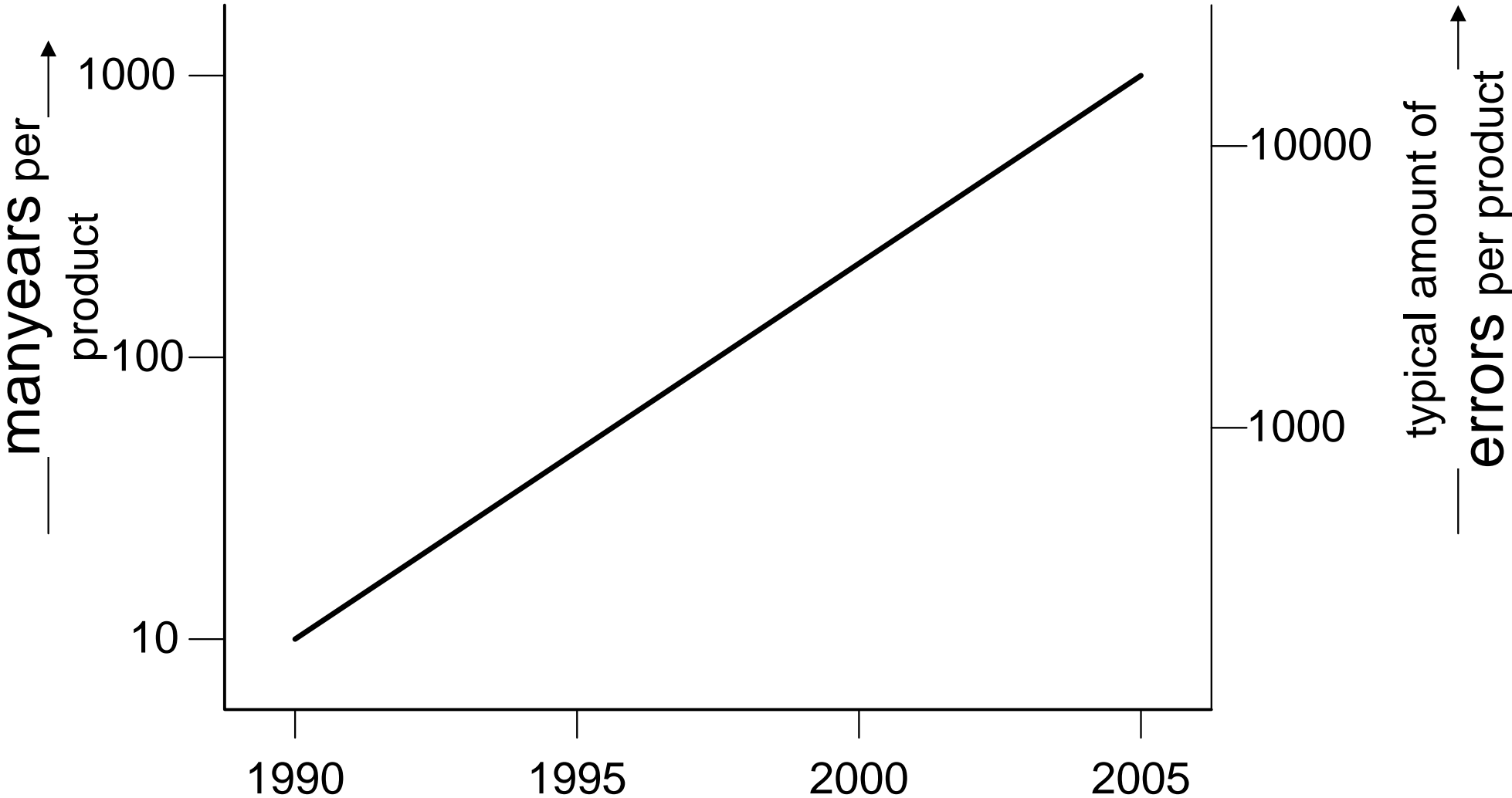
From: COPA tutorial, Rob van Ommering



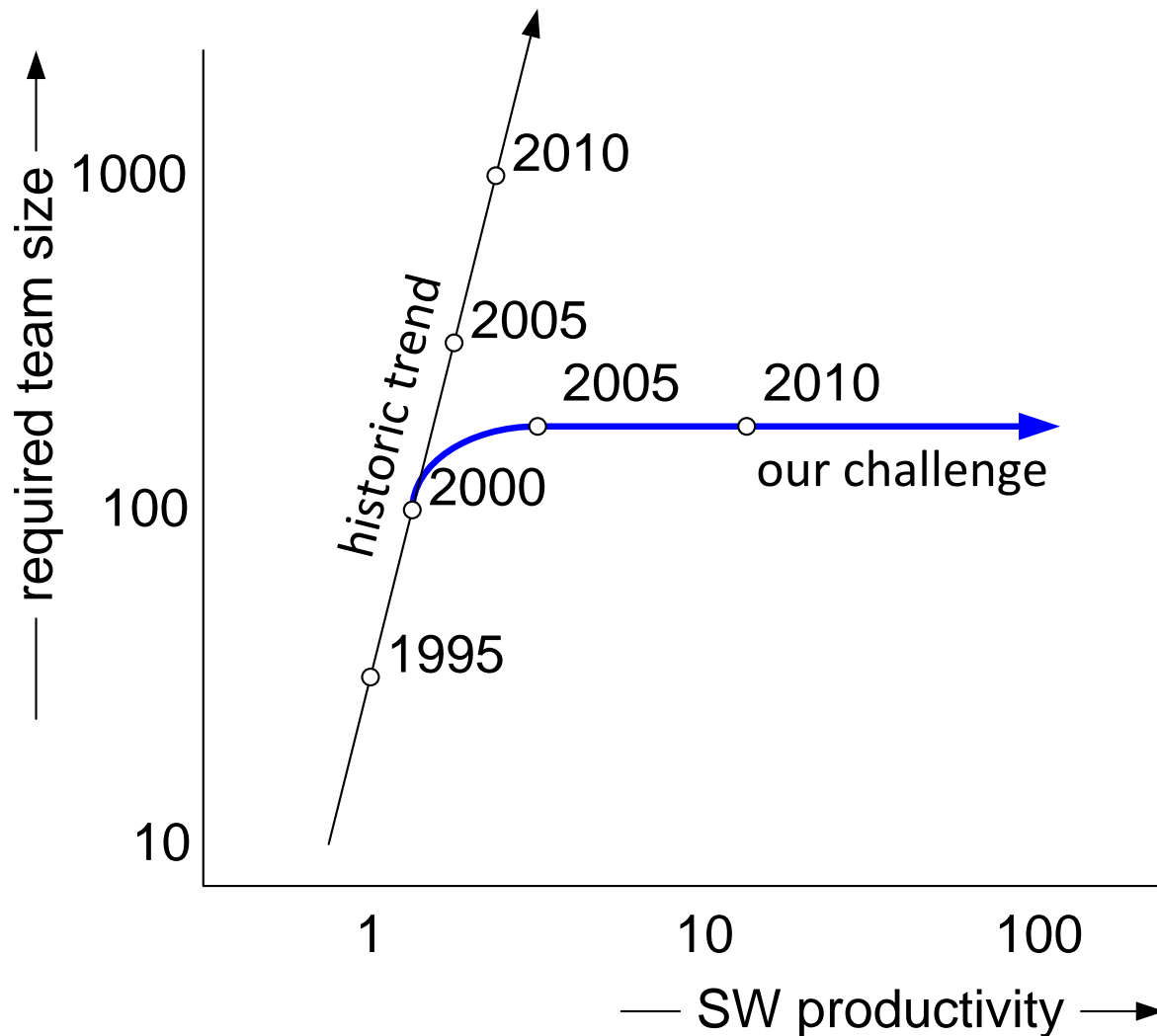
System Integrator Problem Space - Business



Problem: increasing SW size, decreasing reliability?



System Integrator size of workforce



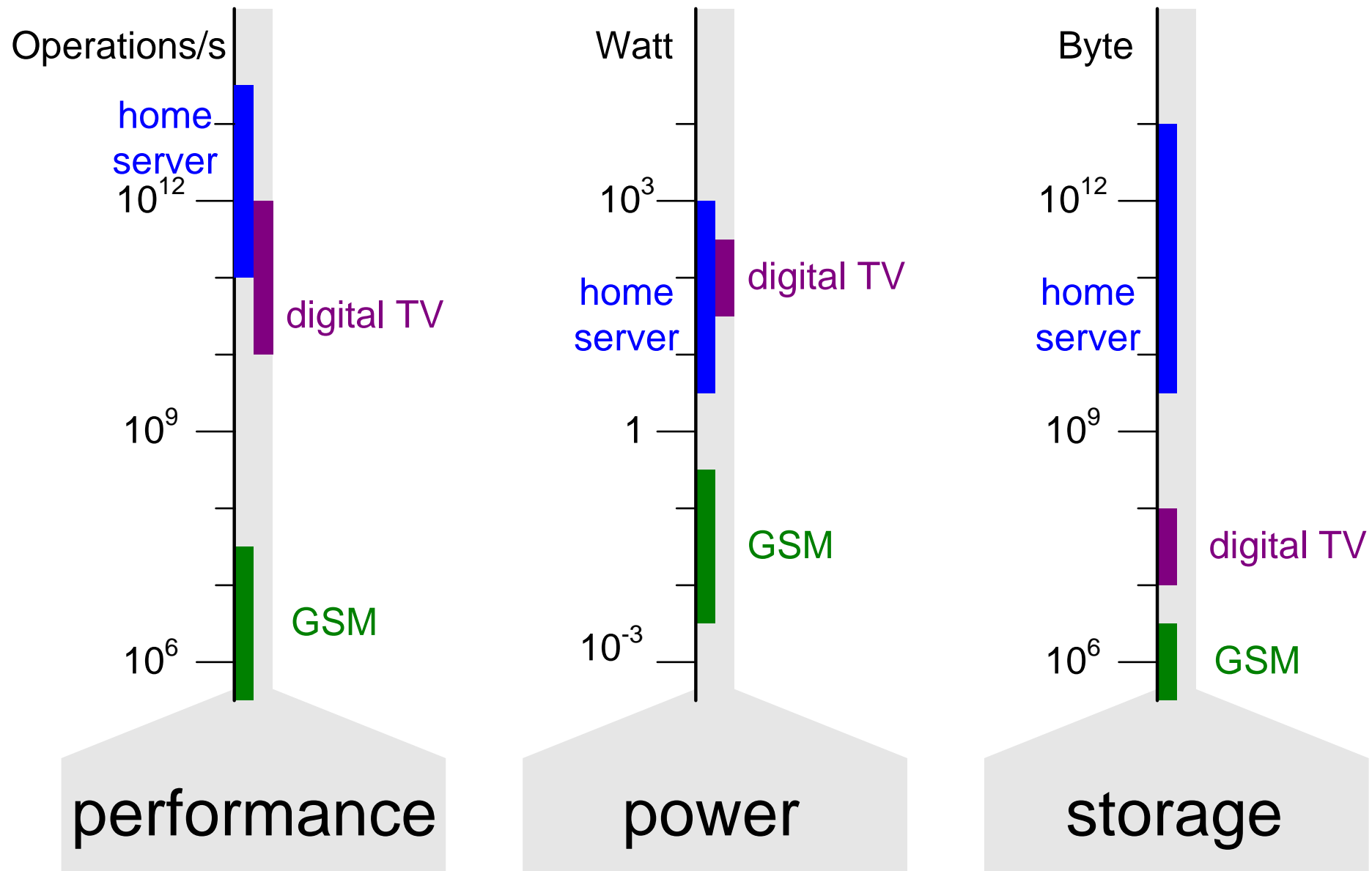
Manage large PCP
teams of > 1000 people

or

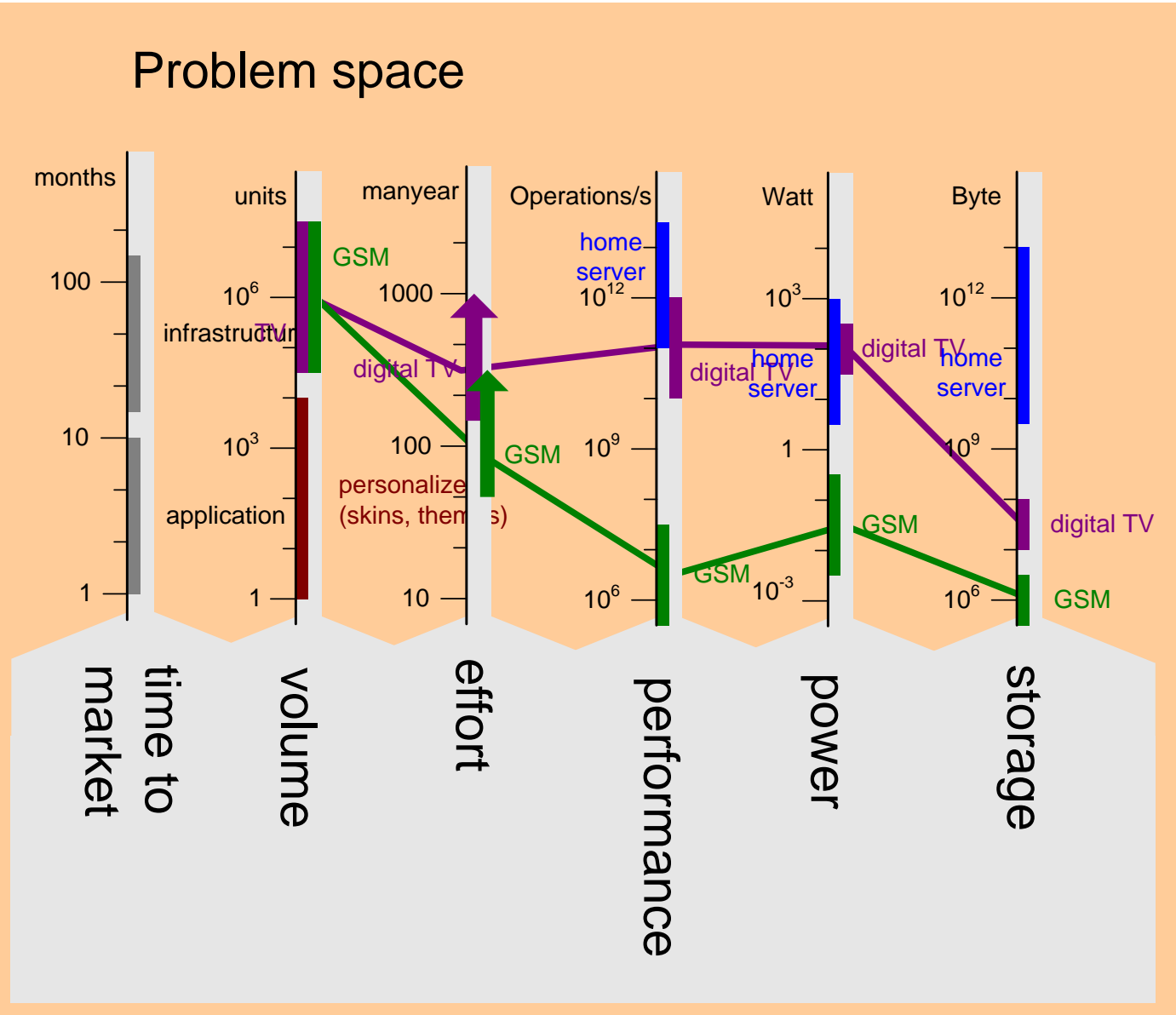
Significantly increase
SW productivity

from: Ad Huijser
Philips Software Conference 2001

System Integrator Problem Space - Technology



System profile



Partial Solution: Configurable Component Platform

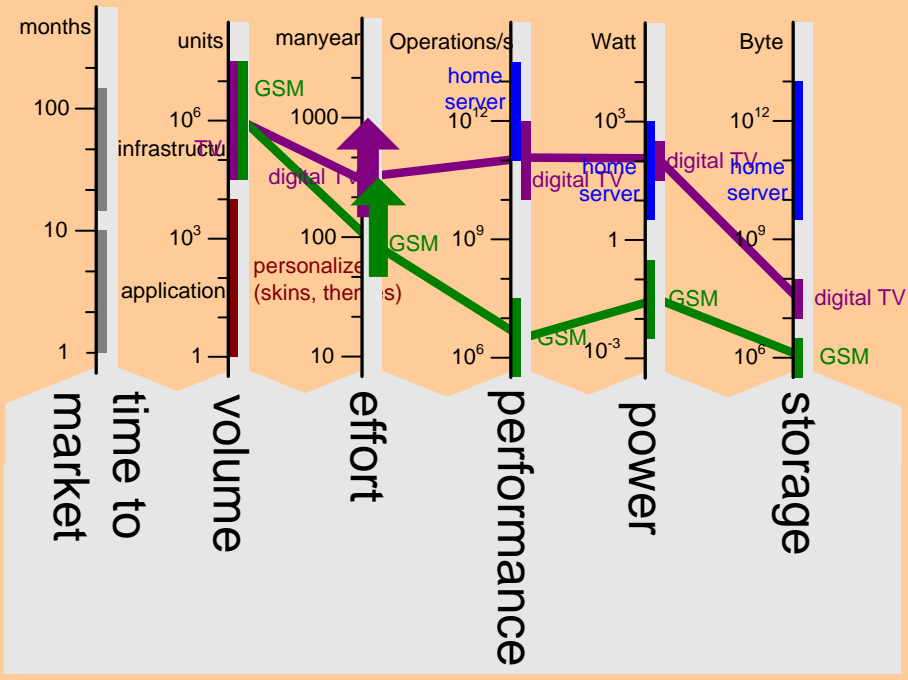
Technologies \ Systems	Technologies														
	MIPS	TriMedia	MPEG decoder	ARM	Real	GSM	RF amp	Bluetooth	TCP/IP	MP3	pSOS	WinCE	1394	GPS	
watch				●	○	○	○	●	○	○	●	○		○	
communicator	○	○	○	●	●	●	●	○	●	○	●	○		○	
digital TV	●	●	●					○	○	○	●	○	●		
set top box	●	●	●					○	●	○	●	○	●		
pda	○	○	○	●	○	○	○	○	●	○		●		○	
camcorder	●	●	●			○	○	○	○	○	●		●	○	

● required

○ optional

Exploring problem space and solution ingredients

Problem space



Technologies	MIPS	TriMedia	MPEG decoder	ARM	Real	GSM	RF amp	Bluetooth	TCP/IP	MP3	pSOS	WinCE	1394	GPS
Systems														
watch				●	○	○	○	●	○	○	●	○		○
communicator	○	○	○	●	●	●	●	○	●	○	●	○		○
digital TV	●	●	●					○	○	○	●	○	●	
set top box	●	●	●					○	●	○	●	○	●	
pda	○	○	○	●	○	○	○	○	●	○		●		○
camcorder	●	●	●			○	○	○	○	○	●		●	○

● required
○ optional

Composable Architecture

Family of products

Solution ingredients

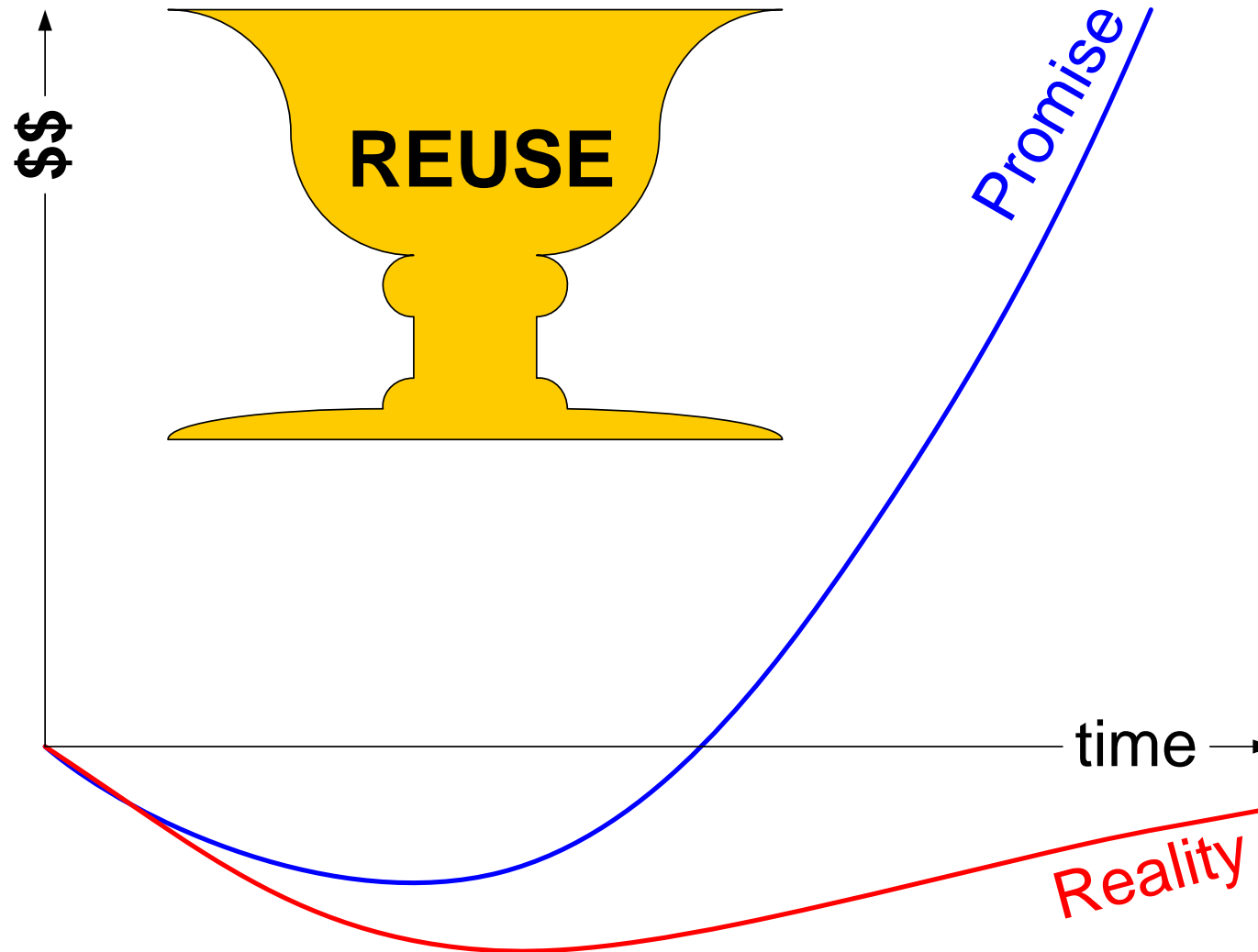
Configurability

Programmability, flexibility

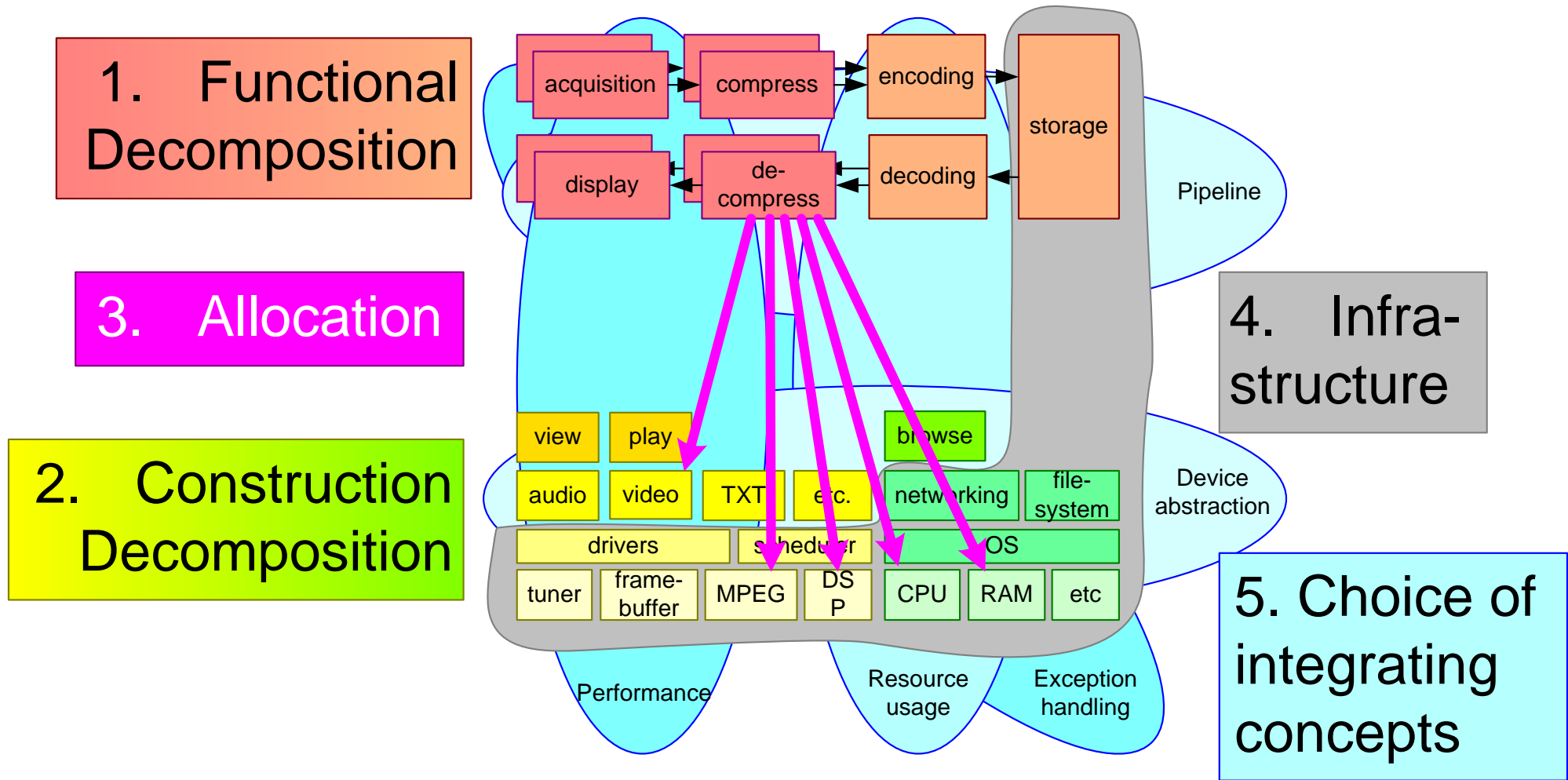
Increase supplier content

Competitive Performance / cost / power

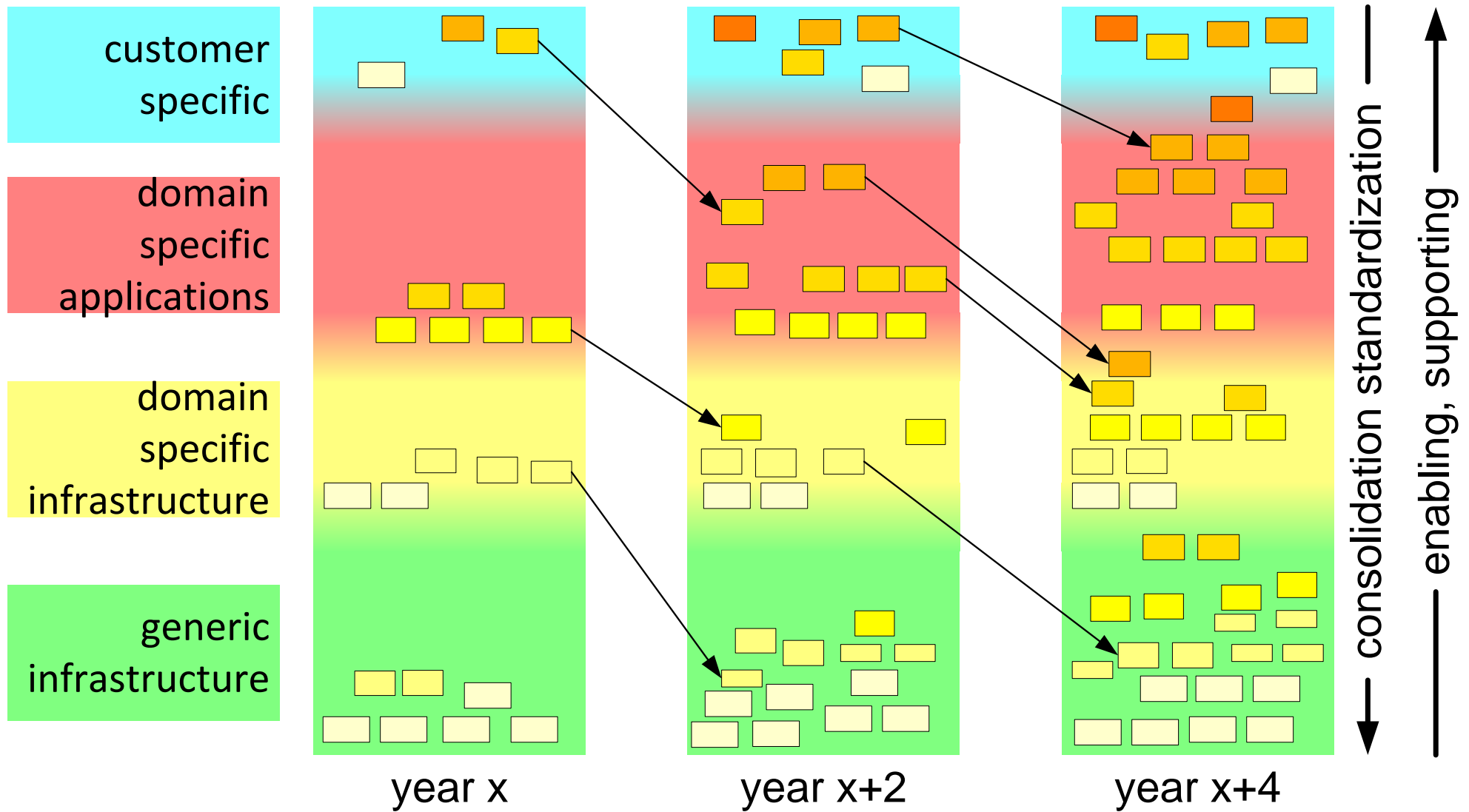
The Holy Grail: Reuse



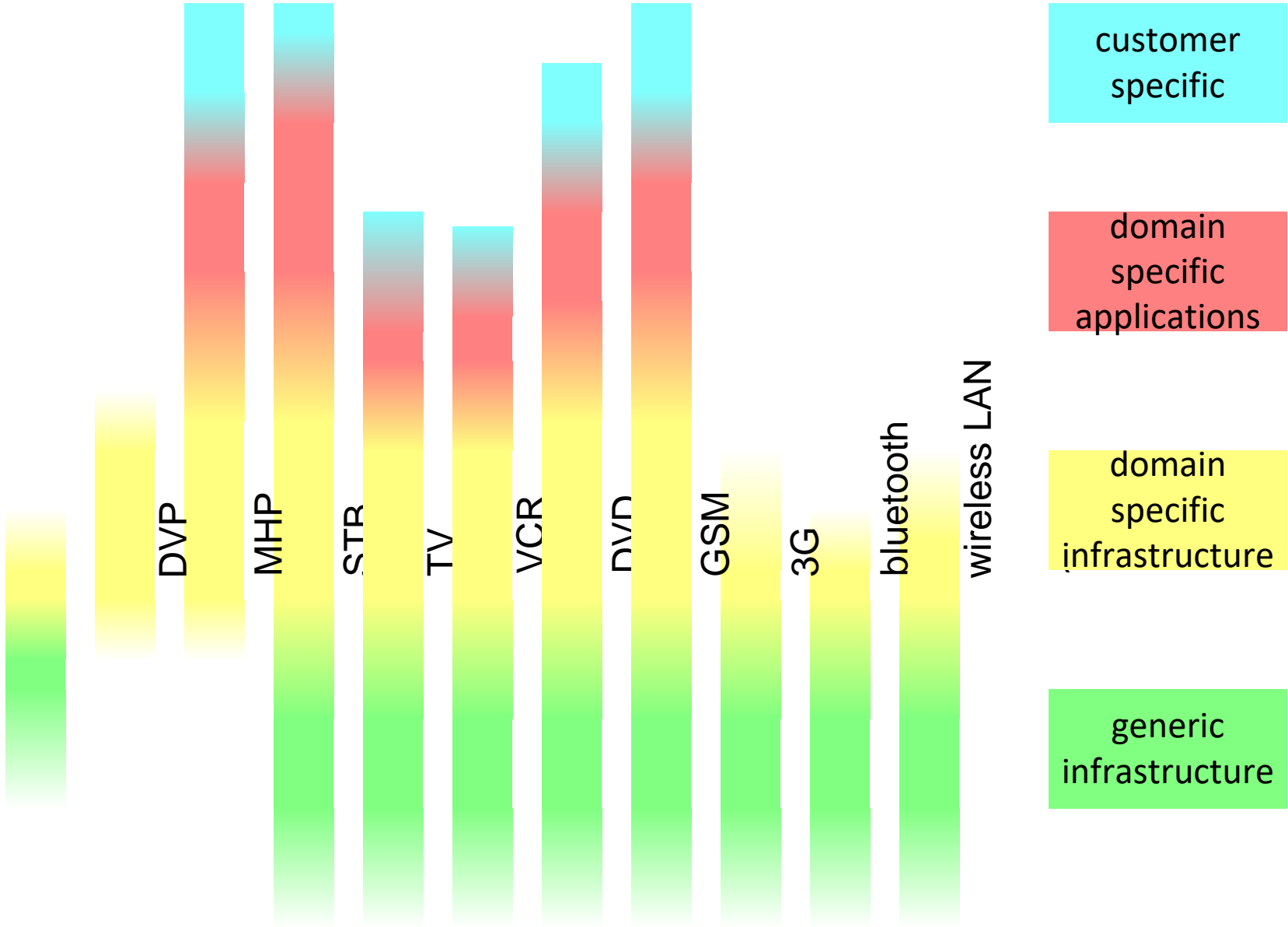
"Guiding How" by providing rules for:



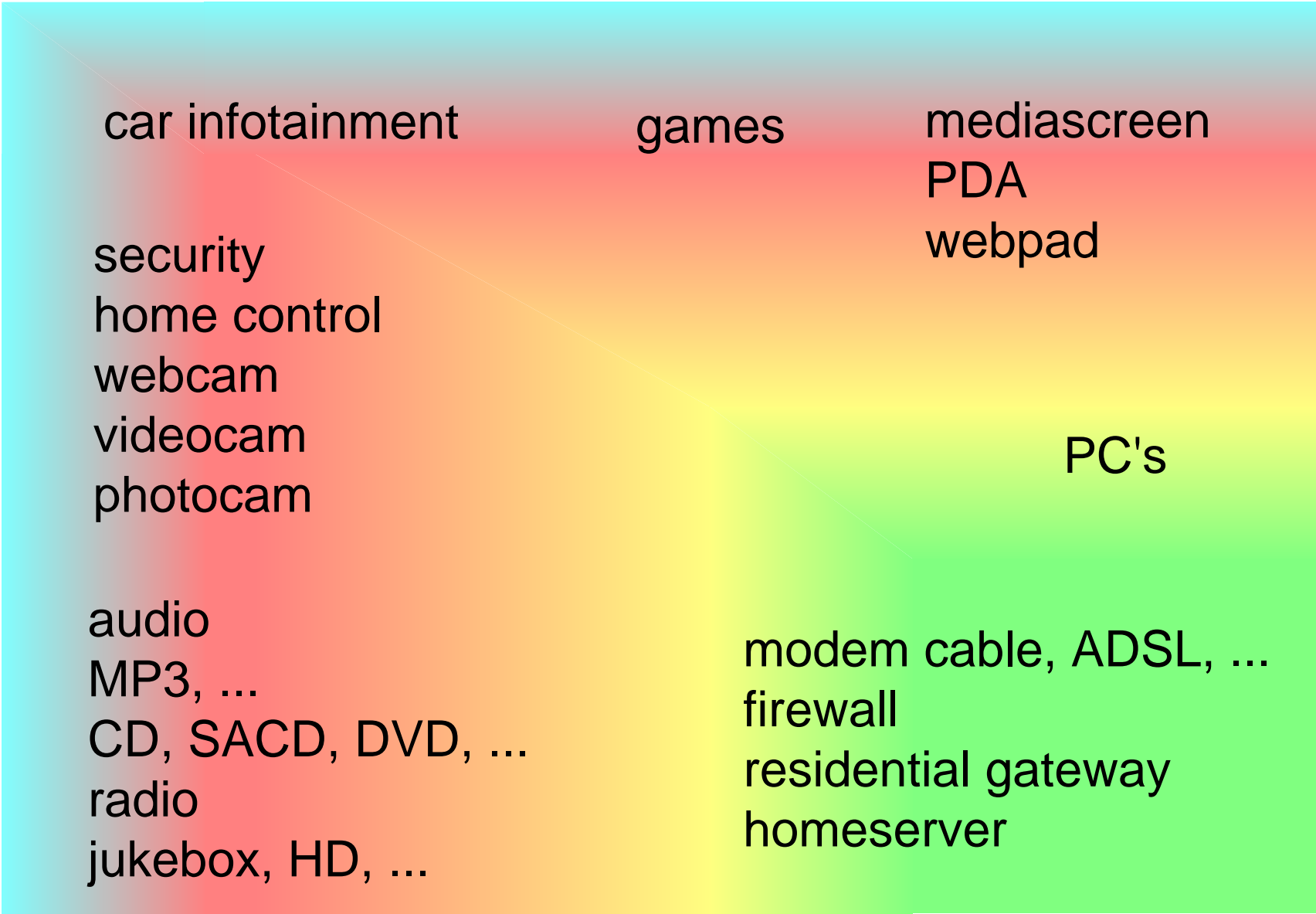
Evolution of functionality



Existing SW stacks

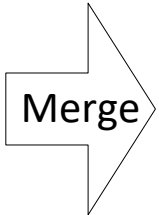
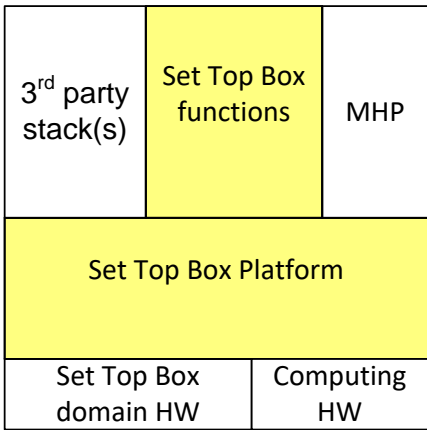
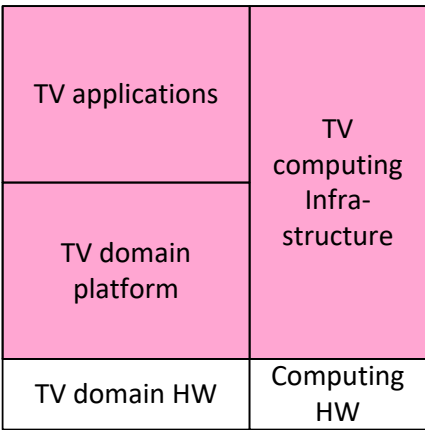


But there are much more

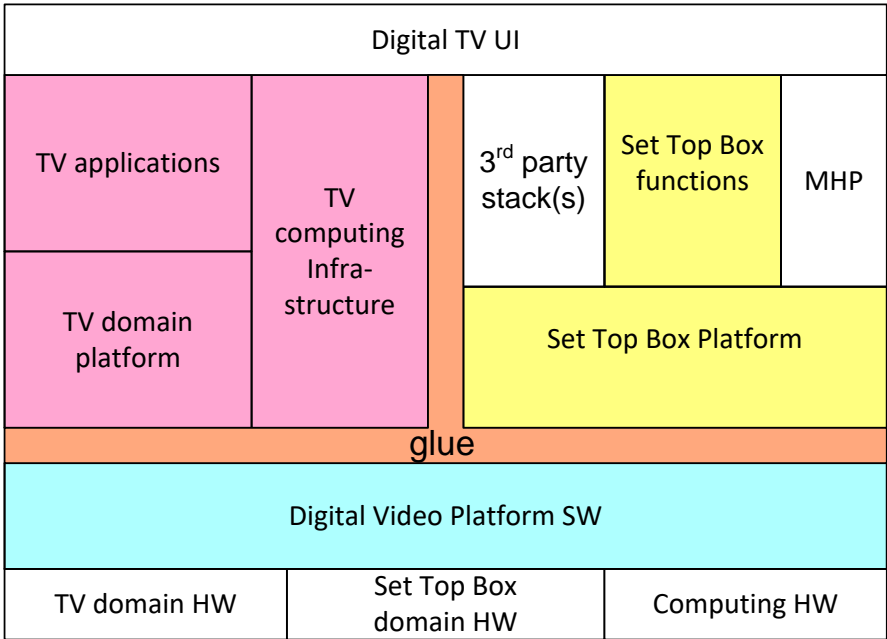


Simplistic Architecting: Digital TV

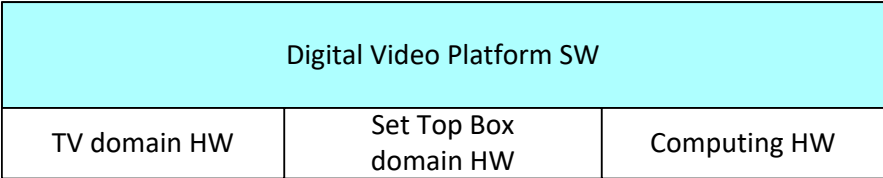
analog TV Set top box



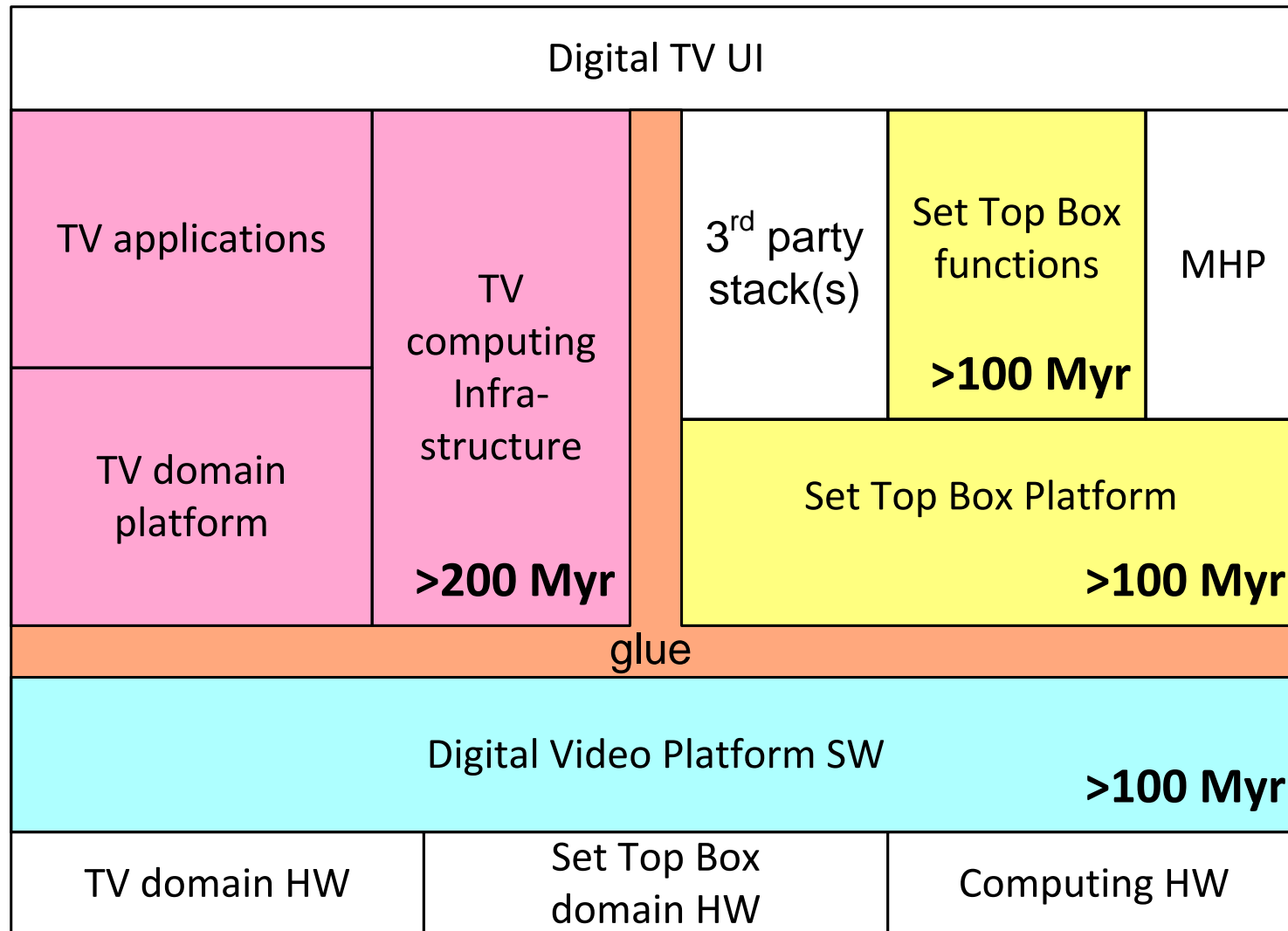
Digital TV



Digital Video Platform



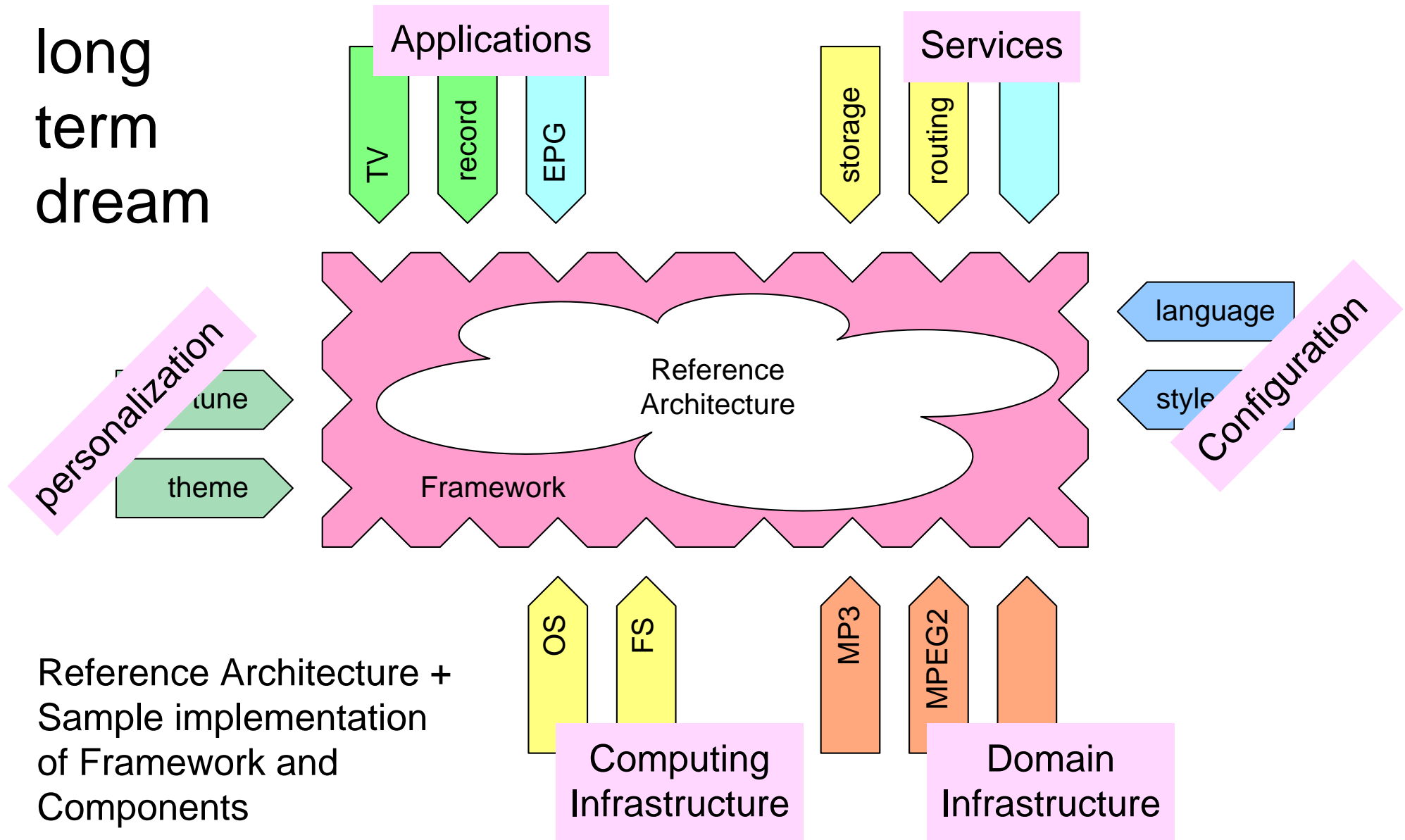
Available Code Assets



"Legacy" code > 500 Myr

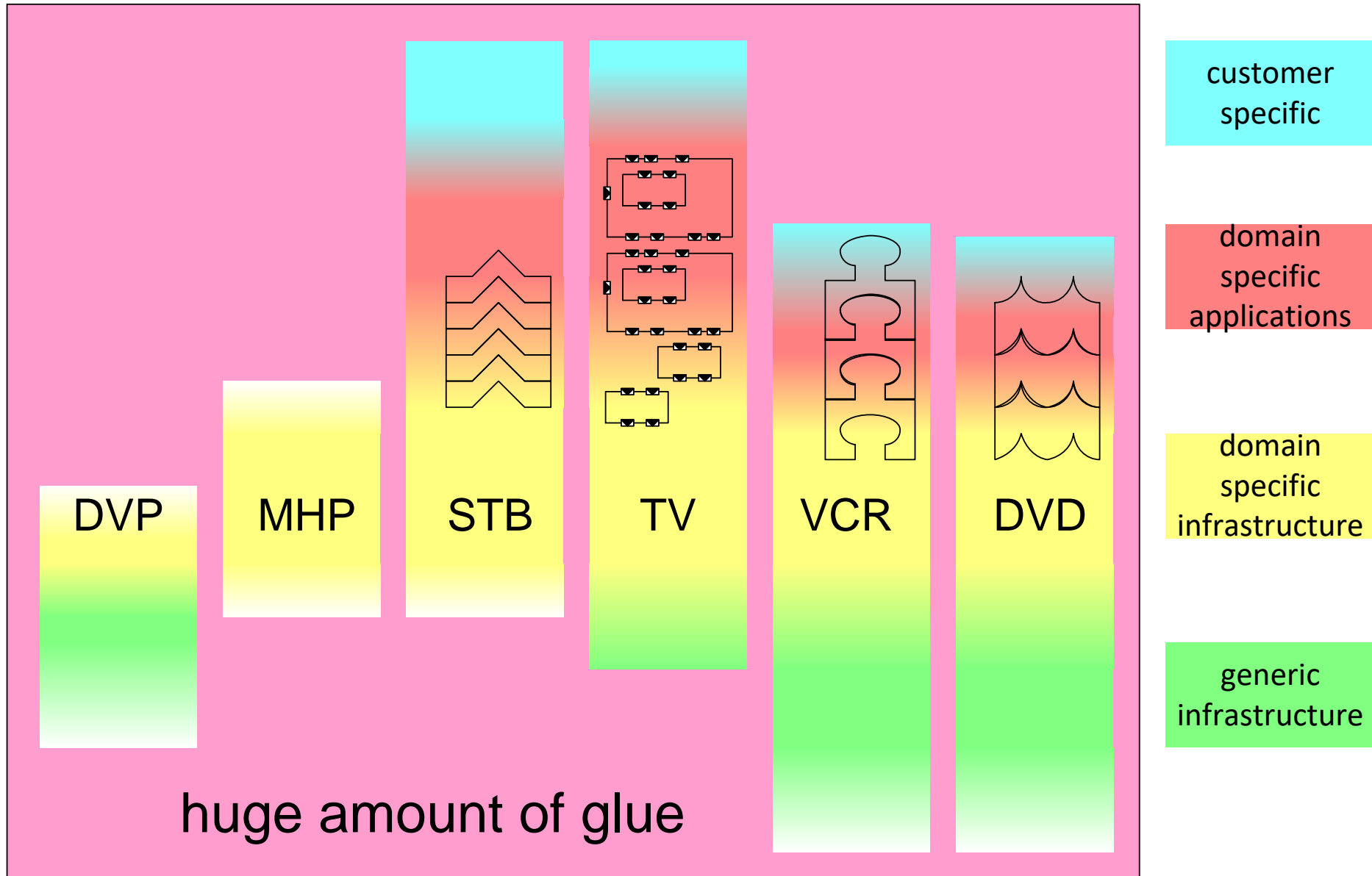
Ideal homogeneous situation?

long term dream

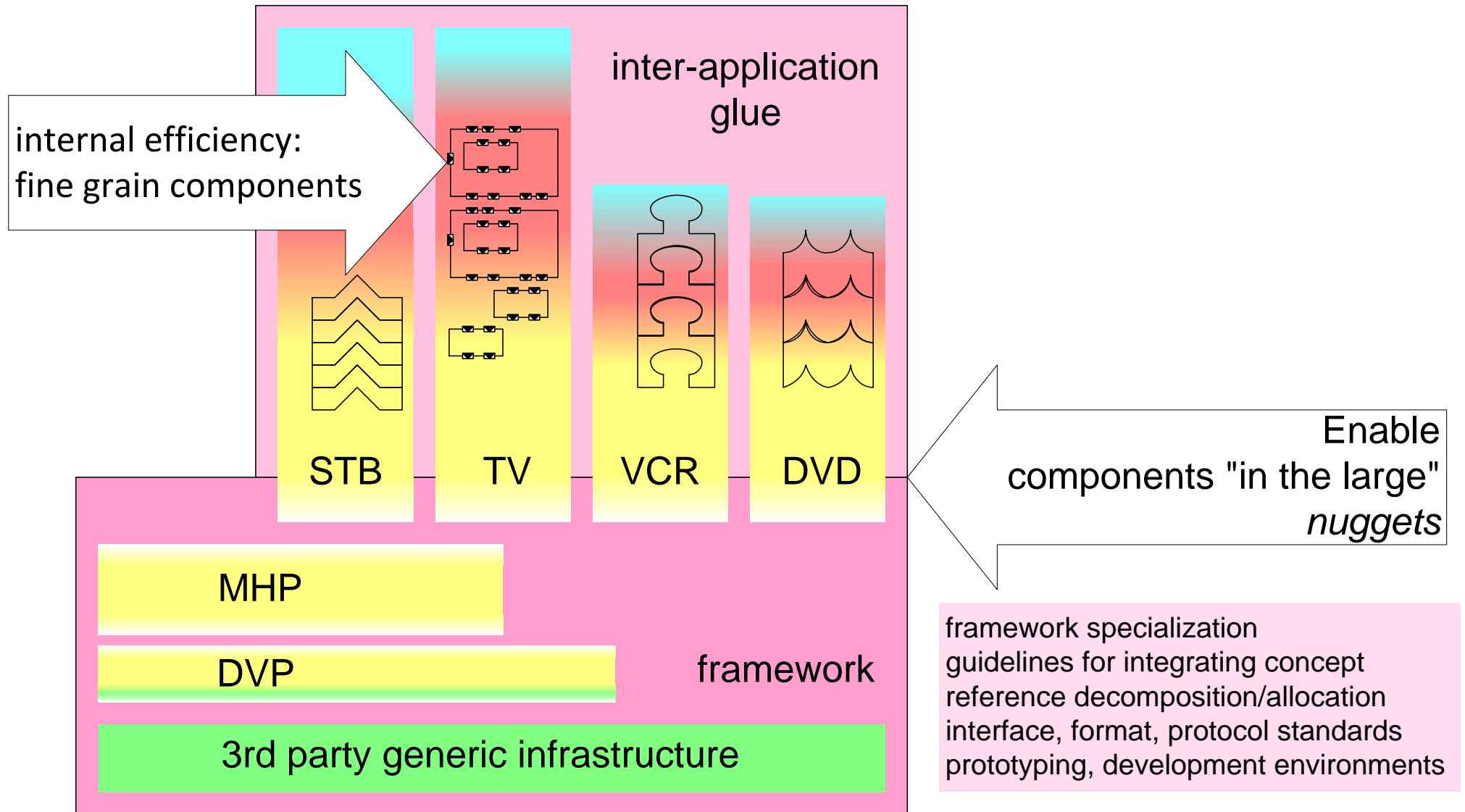


Reference Architecture +
Sample implementation
of Framework and
Components

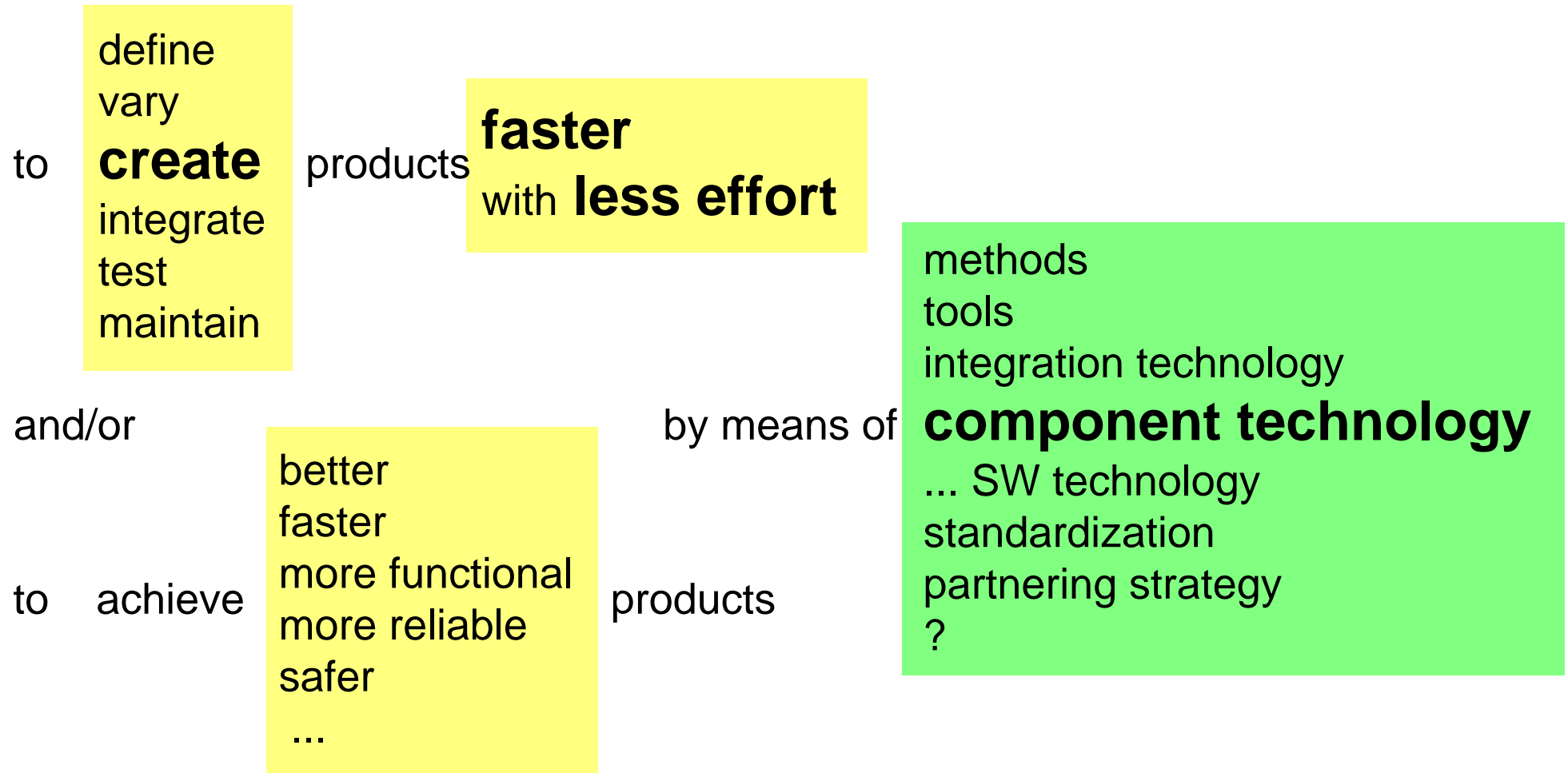
Today's reality?



Achievable solution?



Software productivity research goals



Coarse research plan

