

# Semiconductor Software Strategy

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## Abstract

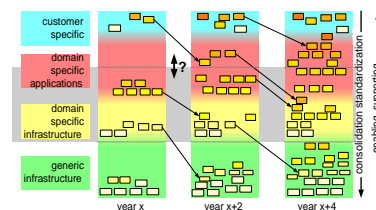
Philips Research is looking for ways to improve the software productivity. The business rationale for this research are the needs of semiconductor customers, the creators of consumer appliances. Technological developments, such as miniaturization and convergence have a strong impact on the form, function and content of consumer appliances. The appliance makers are struggling with the consequences, especially with the exponential increasing SW effort.

The customer and the semiconductor viewpoint are shown. Strategic questions for semiconductors are identified and discussed, such as the need for architecture, legacy and scoping.

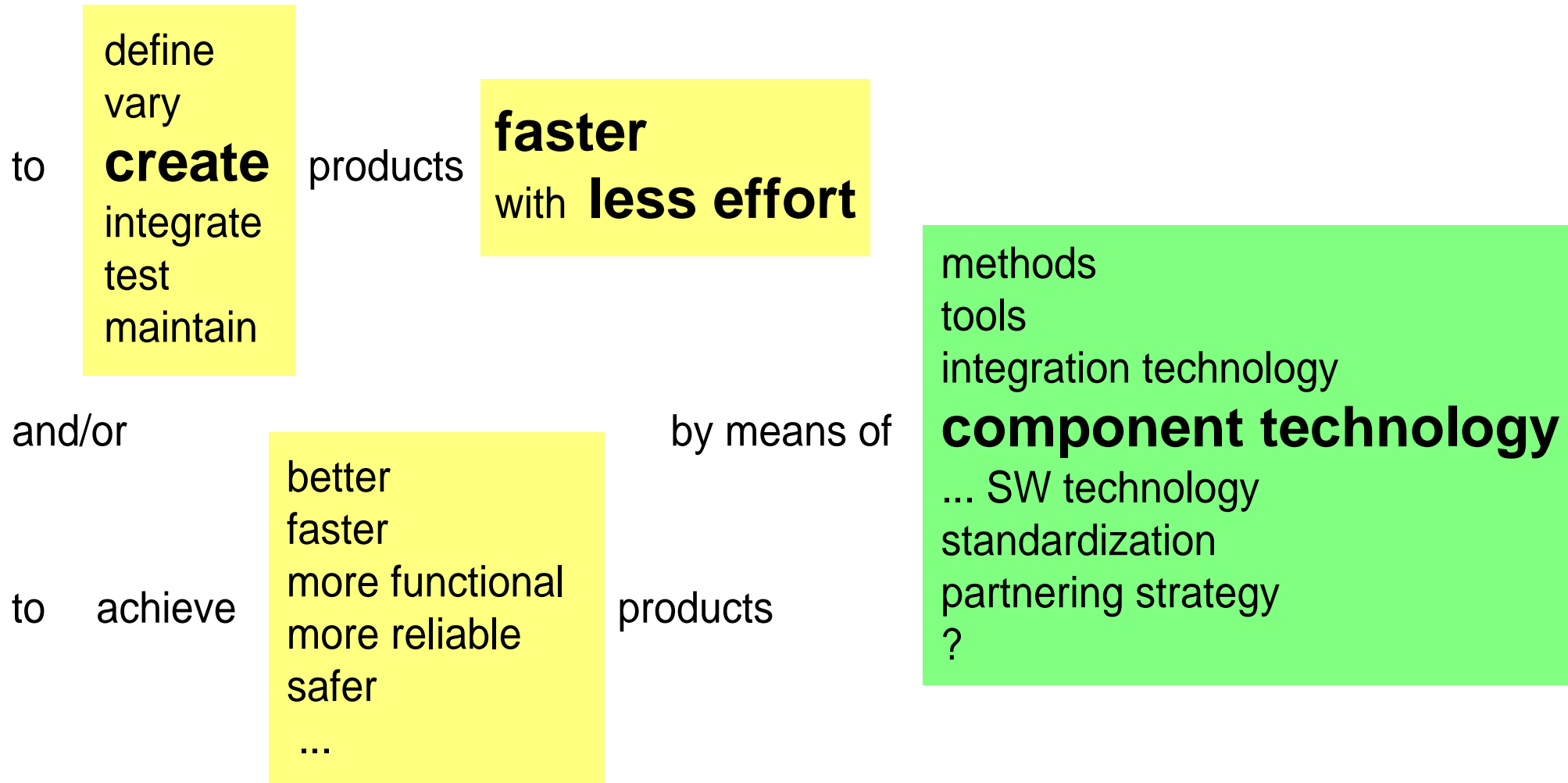
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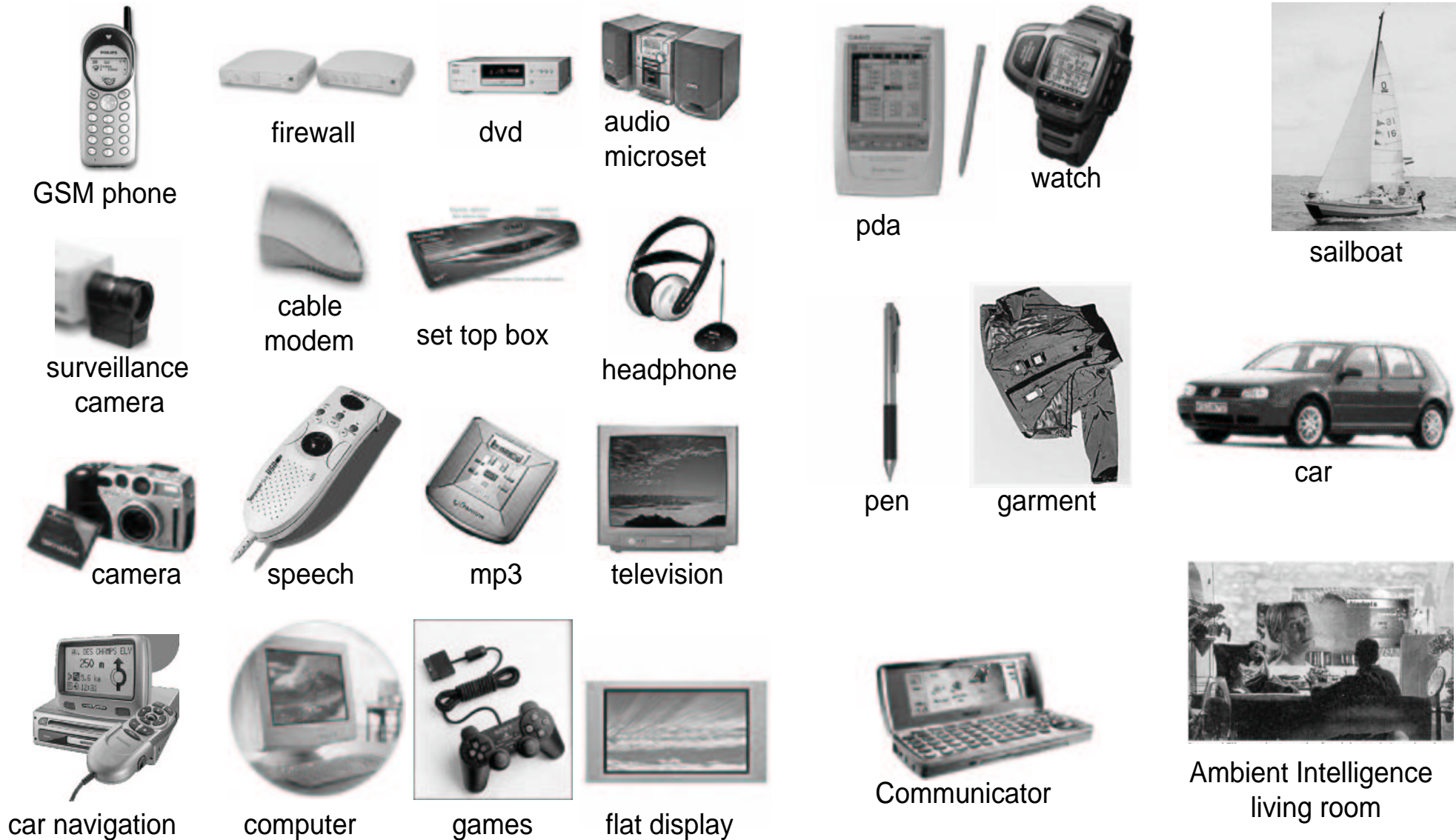
# Software productivity and components research goals



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# Customer viewpoint

# Convergence -> Integration and Diversity

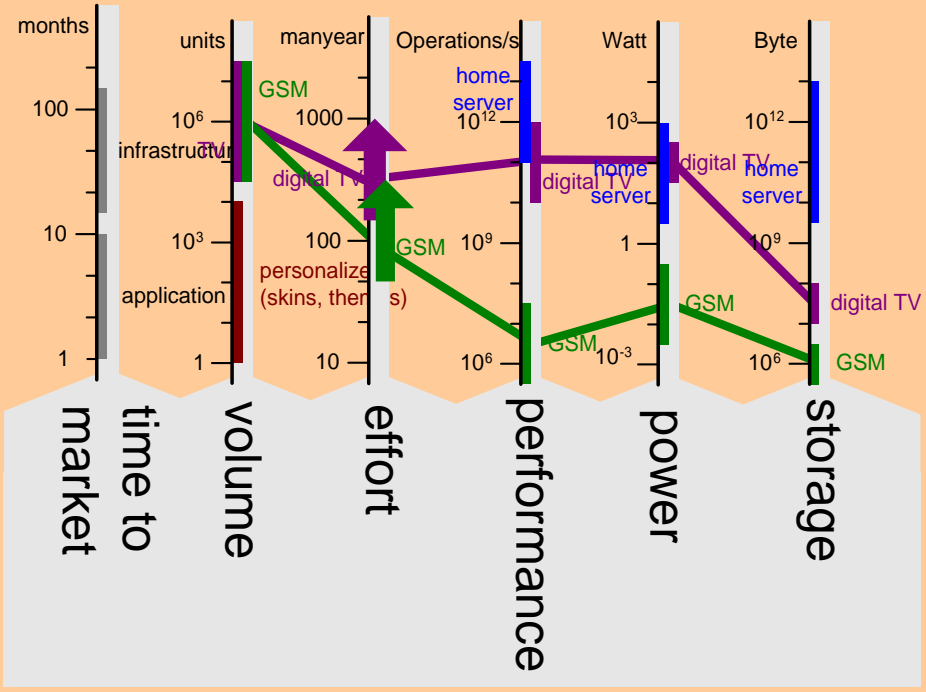


from PSAVAT 2001; "Light Weight Architectures; The way of the future? "



# 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
watch				●	○	○	○	●	○	○	●	○		○
communicator	○	○	○	●	●	●	●	○	●	○	●	○		○
digital TV	●	●	●					○	○	○	●	○	●	
set top box	●	●	●					○	●	○	●	○	●	
pda	○	○	○	●	○	○	○	○	●	○		●		○
camcorder	●	●	●			○	○	○	○	○	●		●	○

Composable Architecture

● required  
○ optional

Family of products

Programmability, flexibility

Increase supplier content

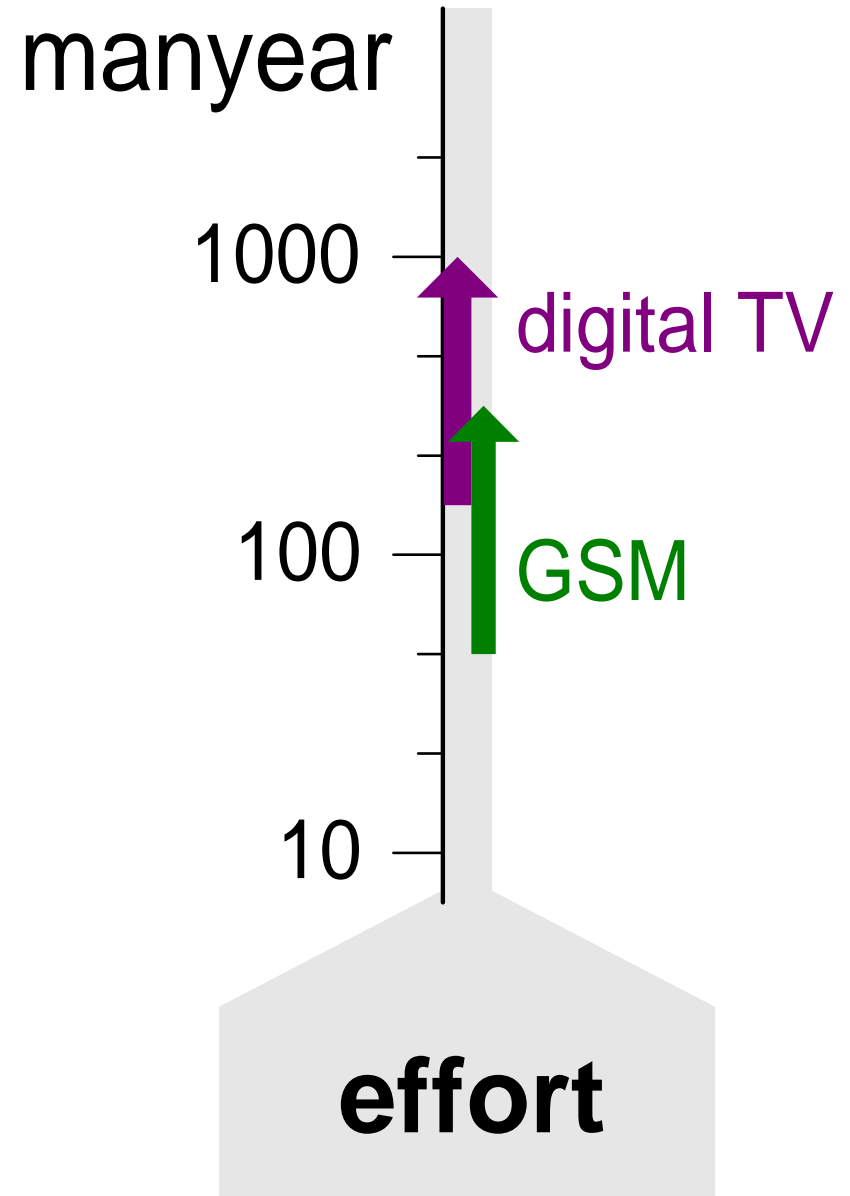
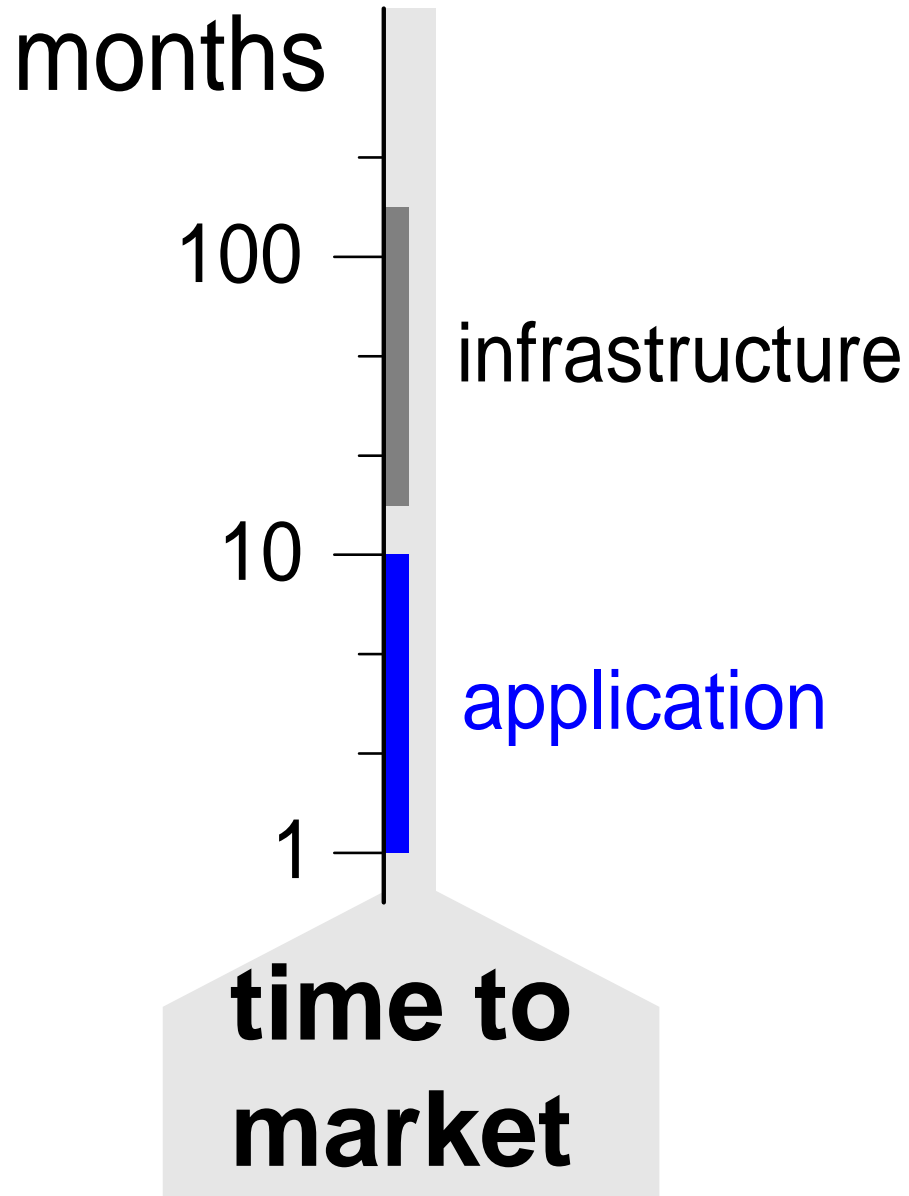
Competitive Performance / cost / power

Solution ingredients

Configurability

from PSAVAT 2001; "Light Weight Architectures; The way of the future? "

# Dominant customer concerns



# Trends in hardware and software

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direct product costs mostly determined by hardware  
how about software license costs?

development costs : software becomes more expensive than hardware

time to market : software is limiting factor

software often synonymous with integration

product value mostly determined by software

SW is integrating technology

SW implements functional behavior



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# Semiconductor viewpoint

# Changes in semiconductor country in the last decade

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analog



digital

single function



multiple functions

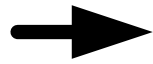
mm<sup>2</sup> Si



"system" solution

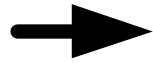
deverticalization  
software ?!

small team



large team

separate  
markets



convergence markets

# Strategic questions for Semiconductor company

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How to protect customers SW investments?

How to enable SW application reuse across domain boundaries?

Which software architecture?

which hardware architecture

Which software to make?

How and with whom to partner?

which hardware IP

How to do all of this fast enough?

Thomson, TI, Intel, Samsung, ...

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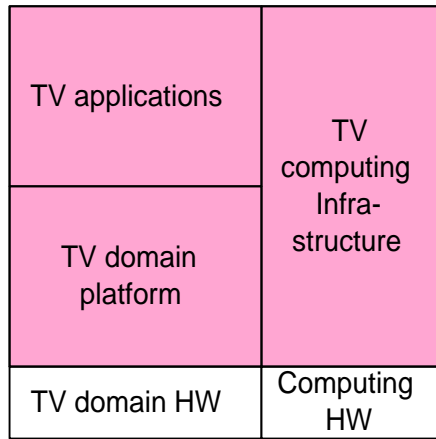
Which architecture?

How to protect customers software investments?

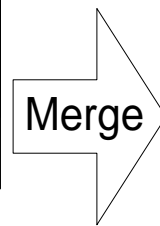
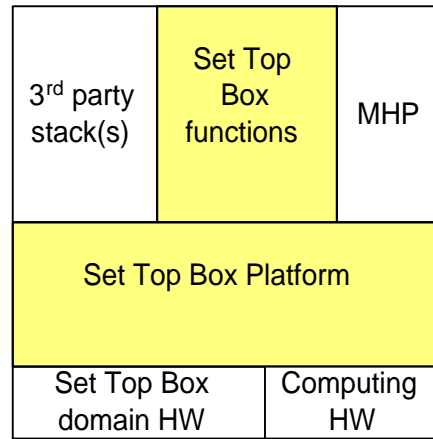
How to enable application reuse across domain boundaries?

# Simplistic Architecting: Digital TV

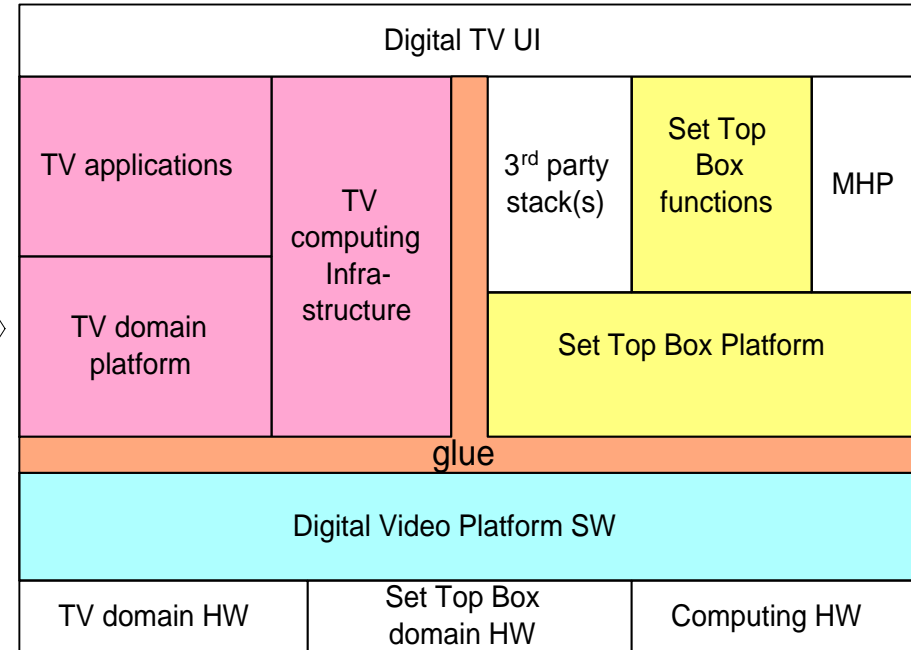
## analog TV



## Set top box

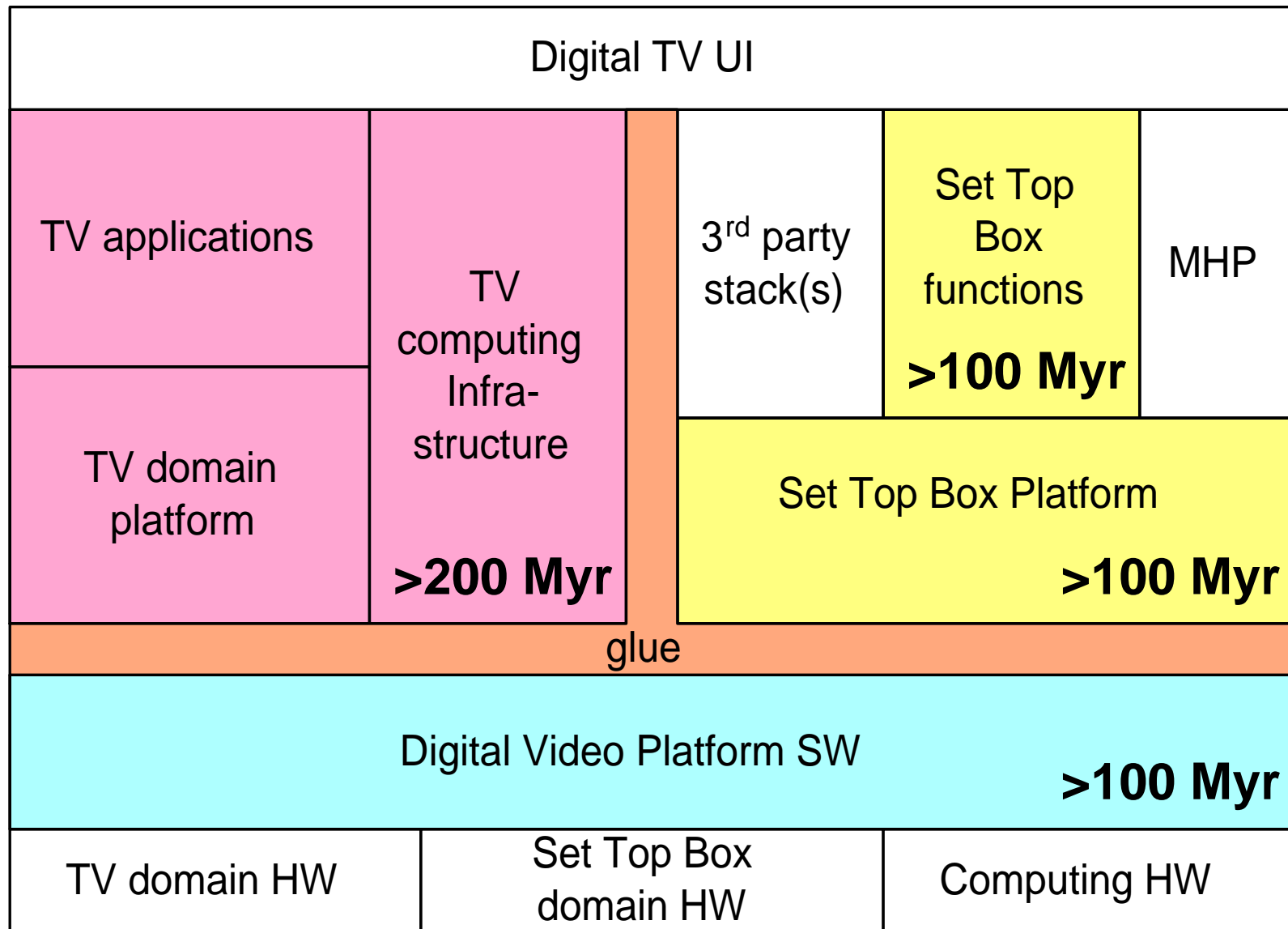


## Digital TV



## Digital Video Platform

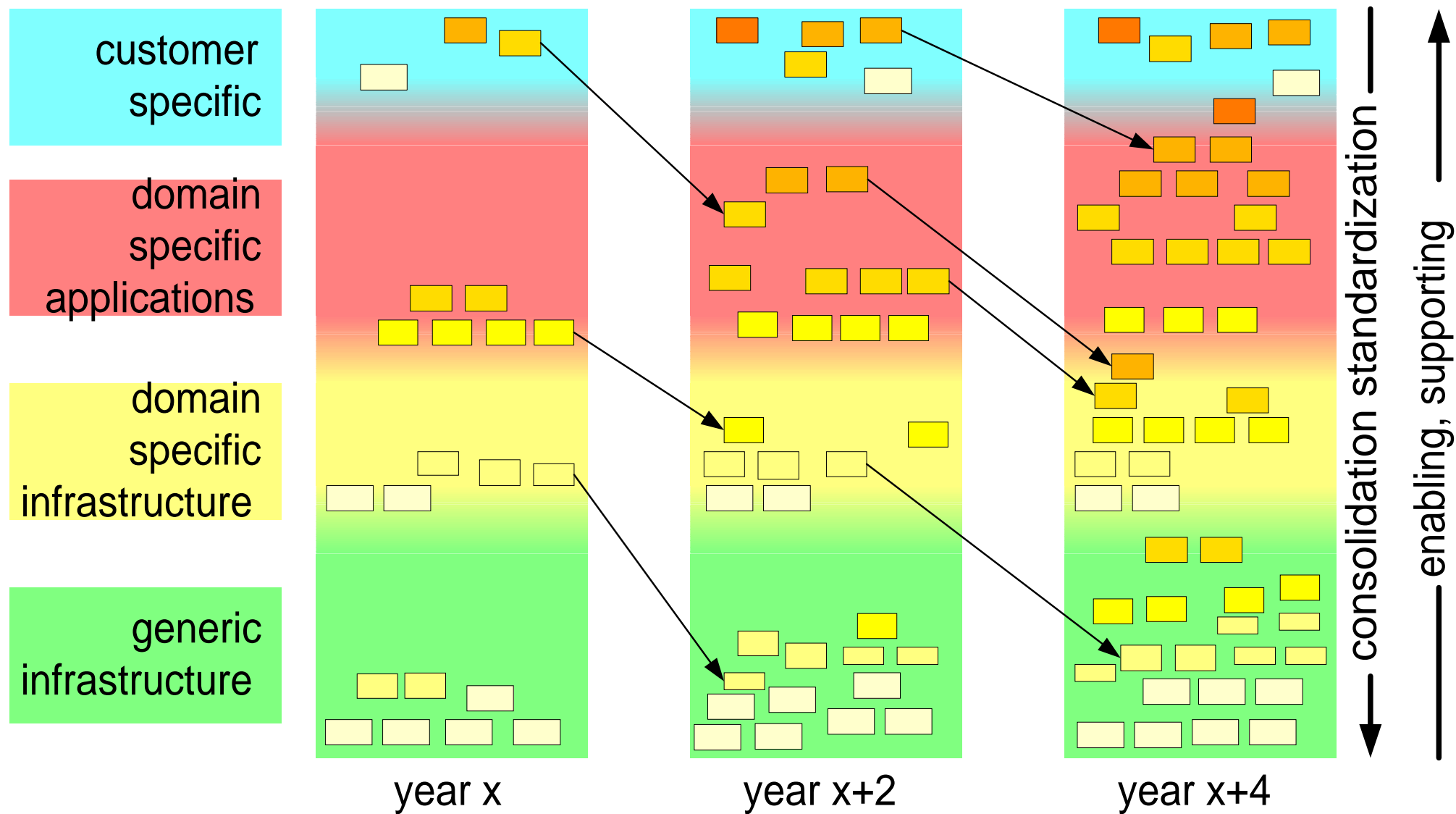
# Available Code Assets



**"Legacy" code > 500 Myr**

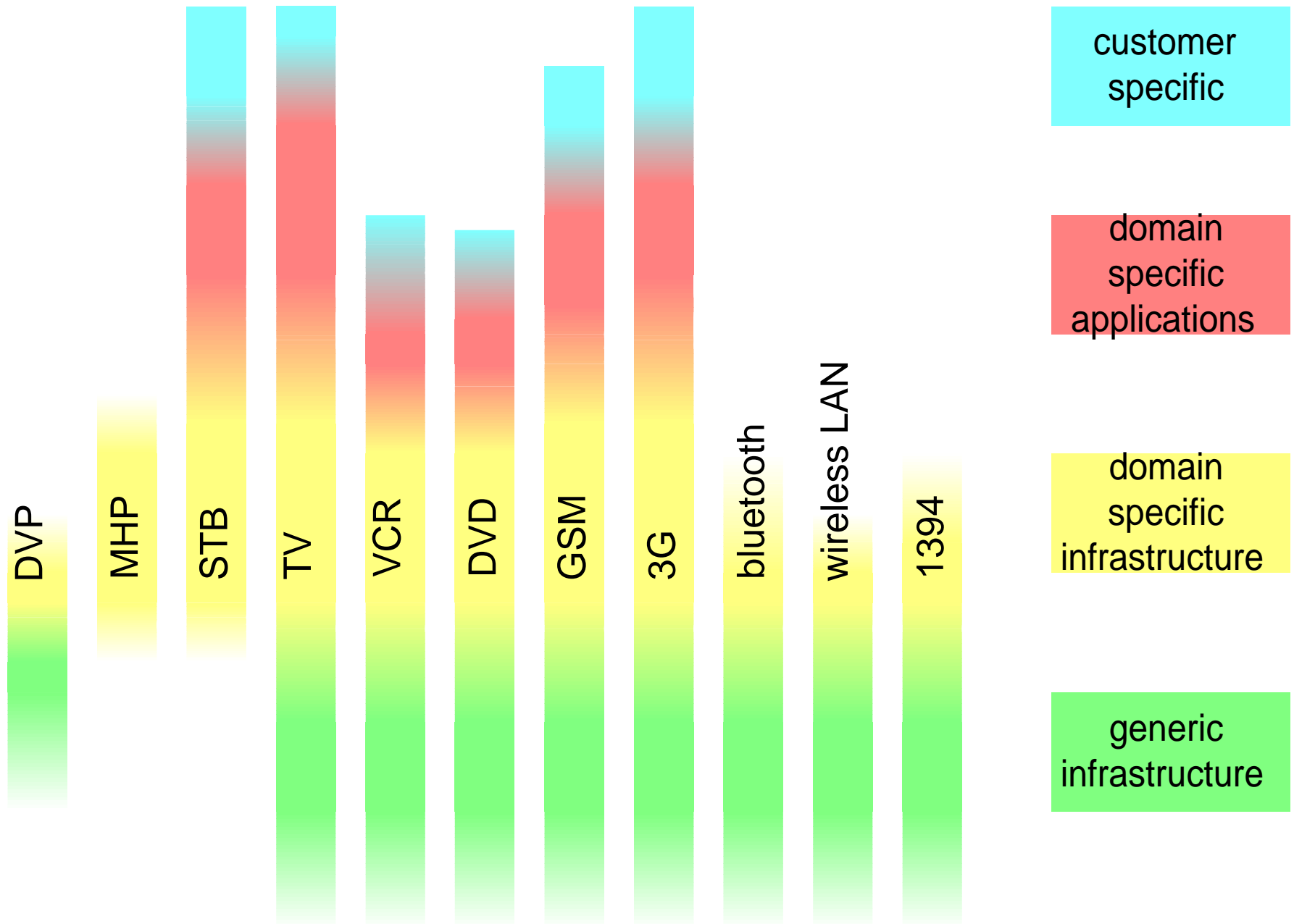


# Evolution of functionality

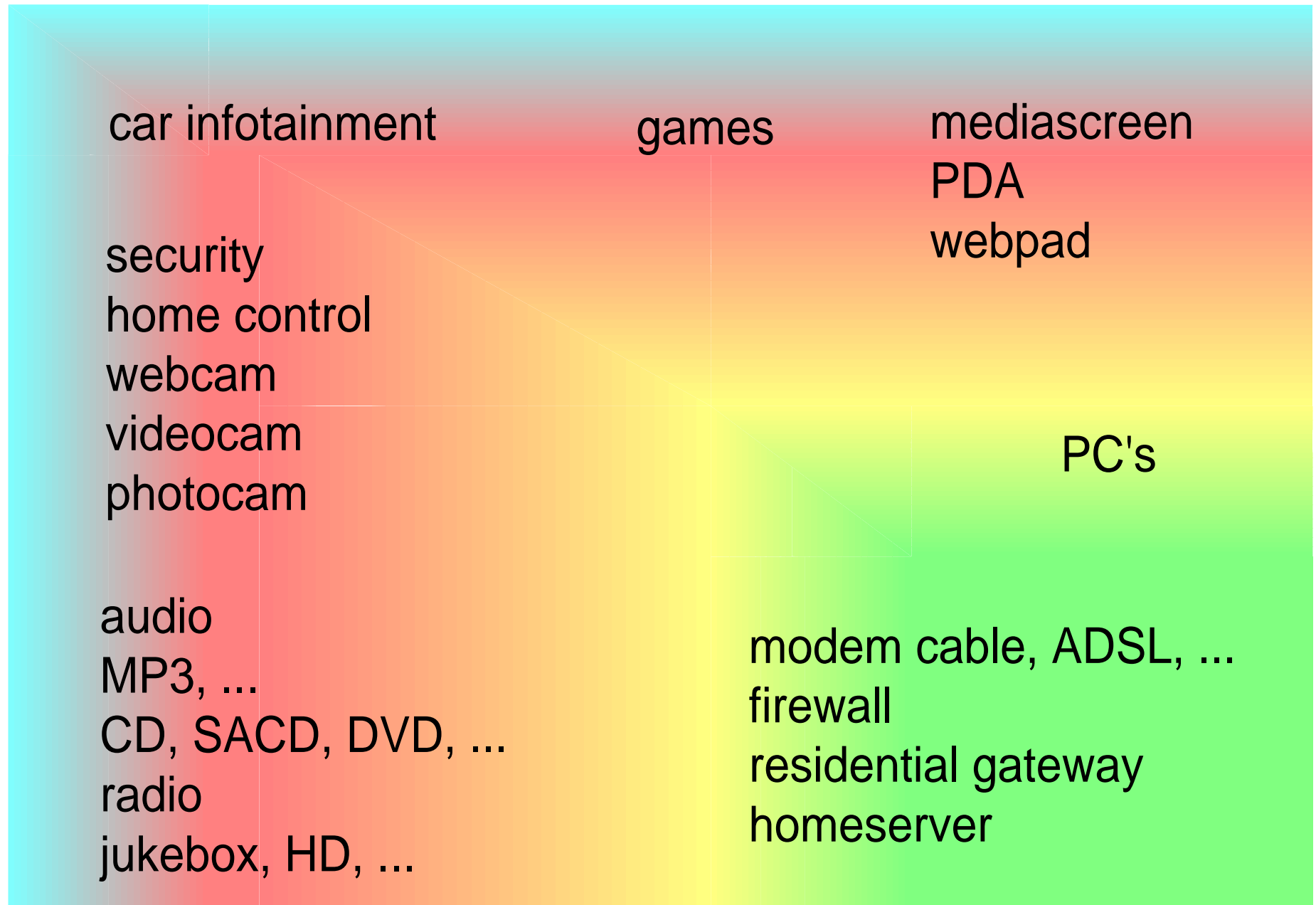




# Existing SW stacks

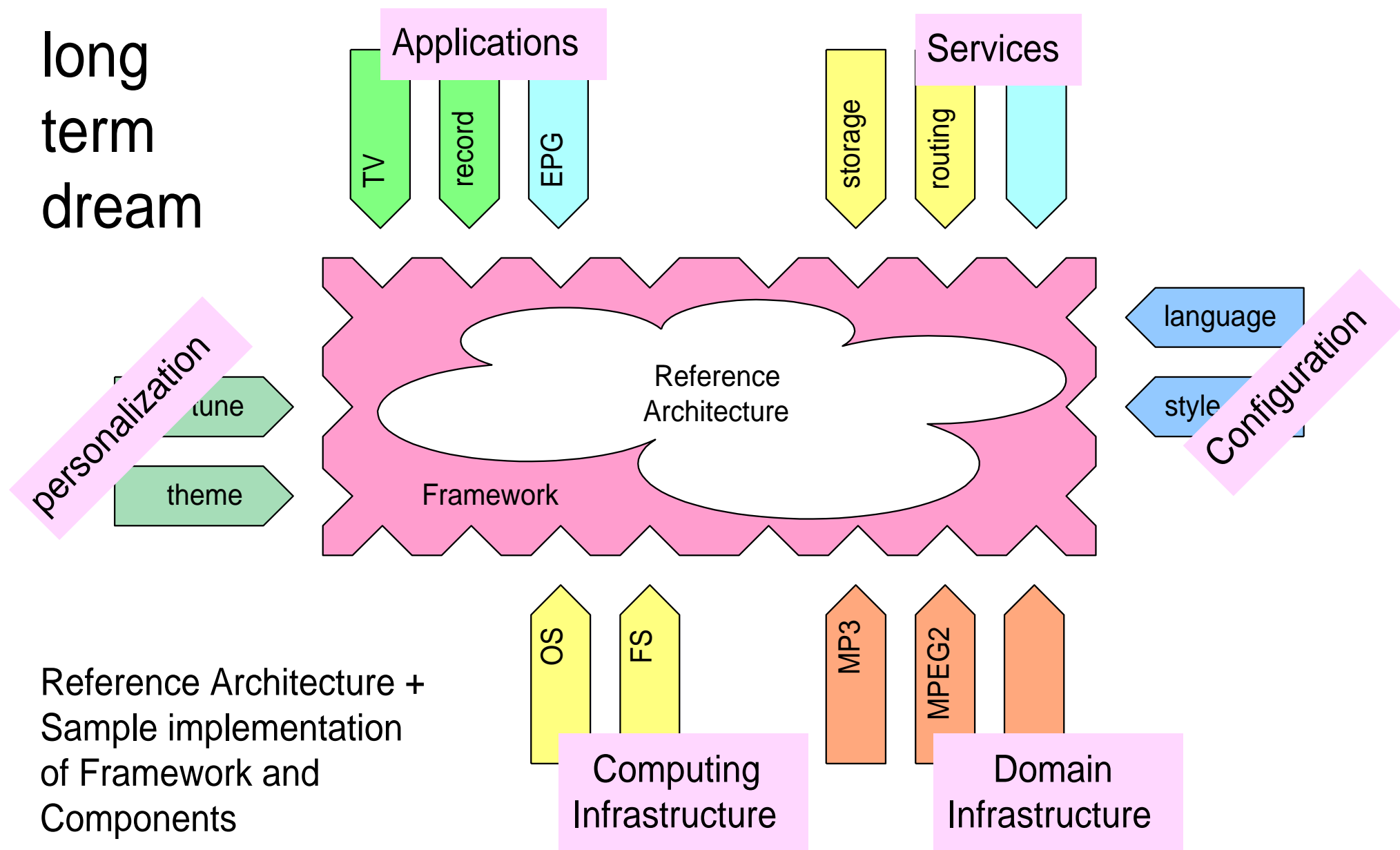


# But there are much more domains and stacks



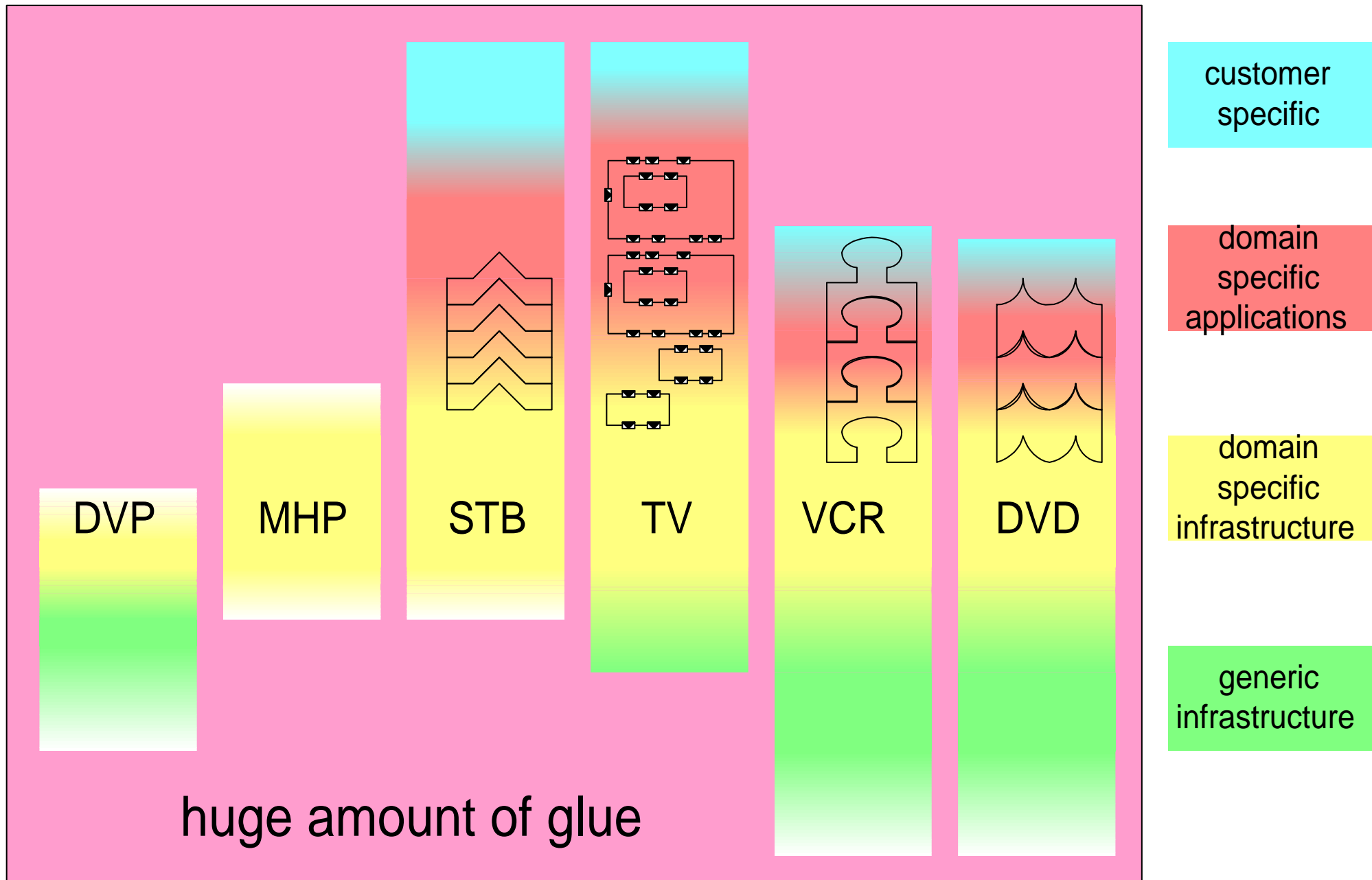
# Ideal homogeneous situation?

long  
term  
dream

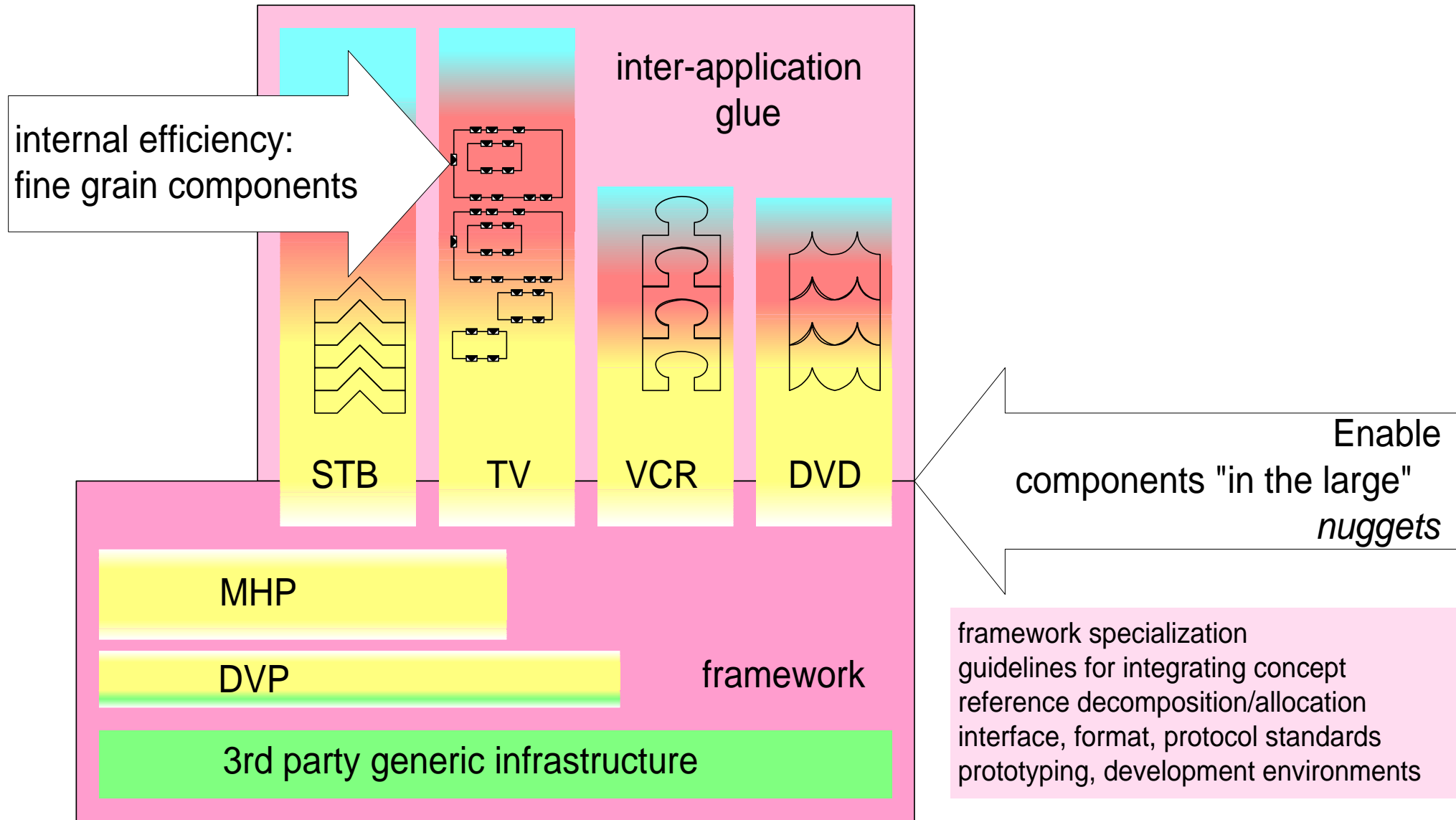


Reference Architecture +  
Sample implementation  
of Framework and  
Components

# Today's reality?



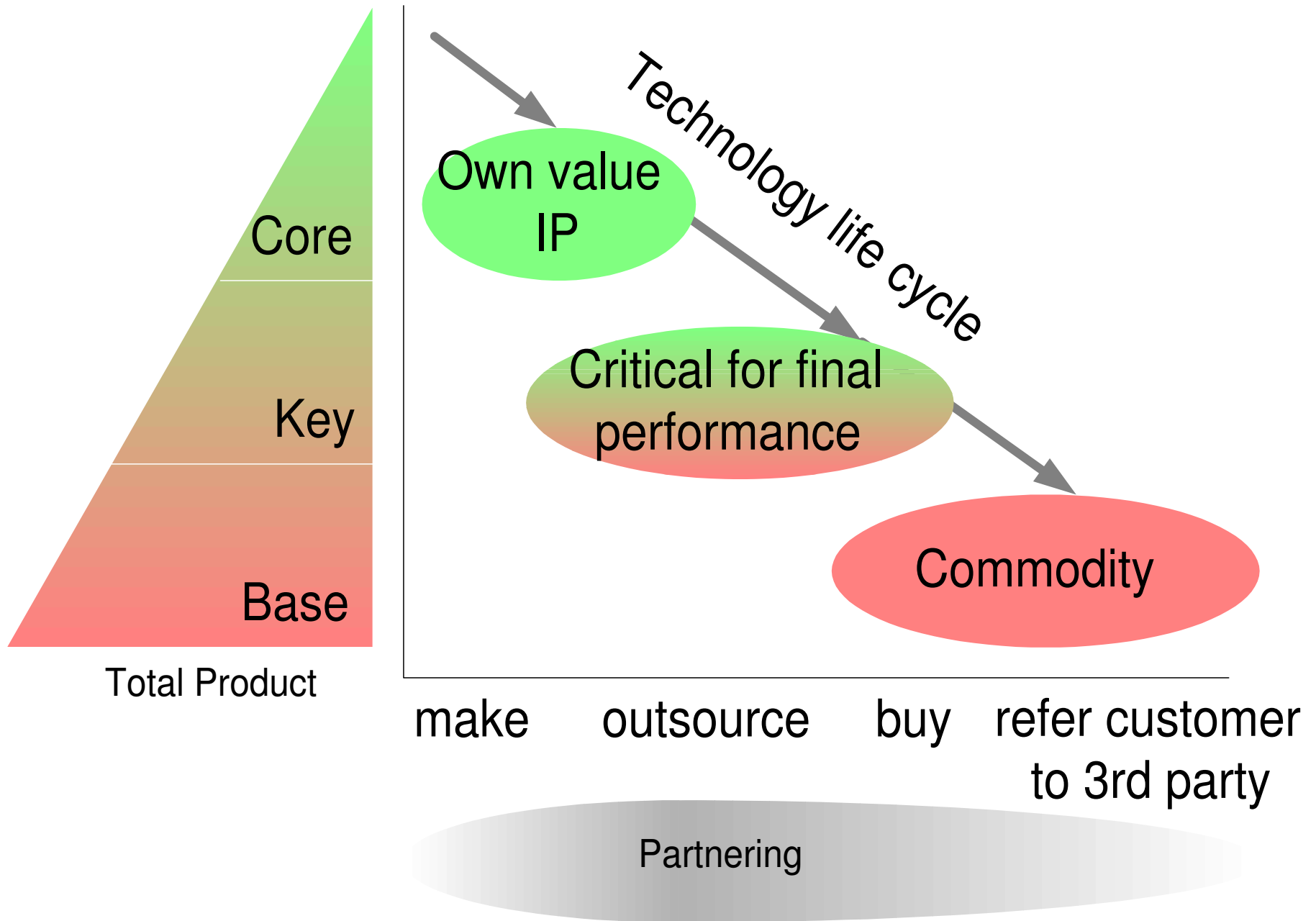
# Achievable solution?



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# Which software to make?

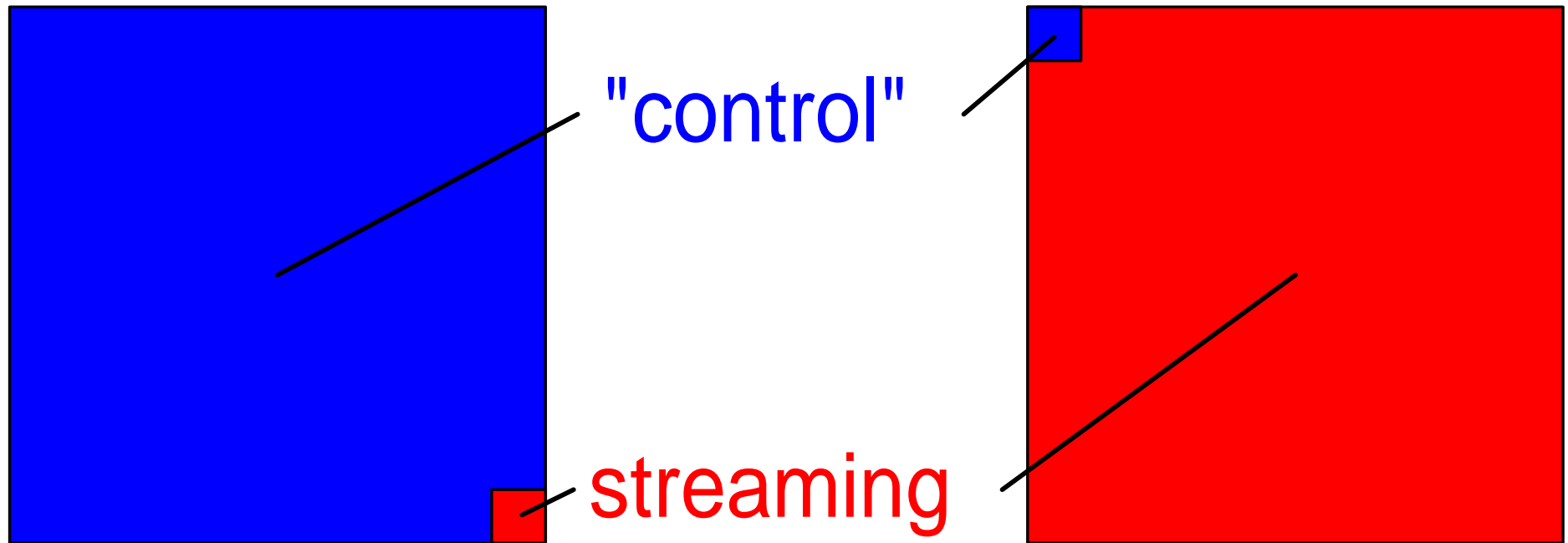
# Core, key or base technology?



# Streaming: one of Philips' core strengths

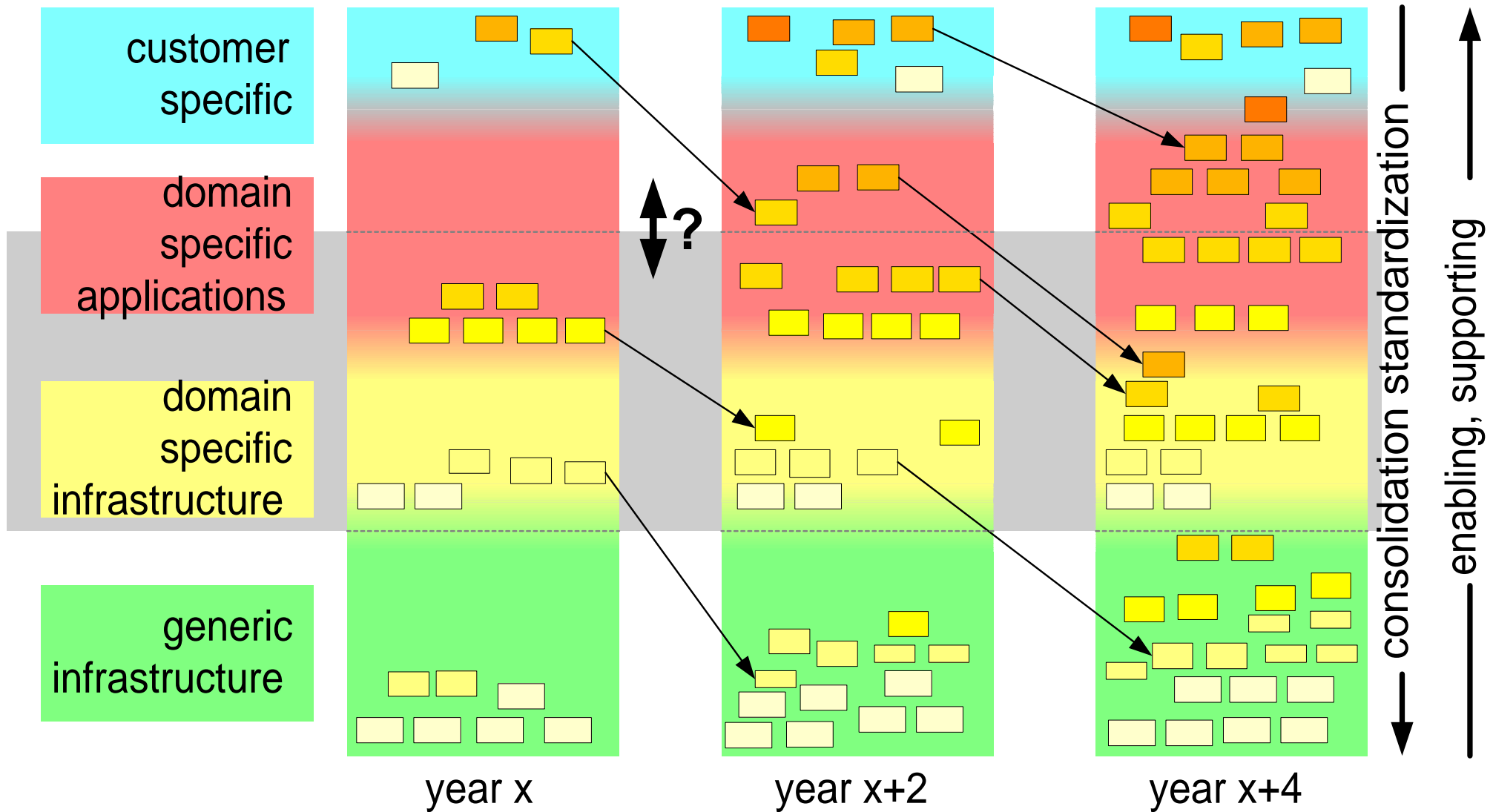
Software size

number crunching  
operations/sec





# Our territory?



# Summary

