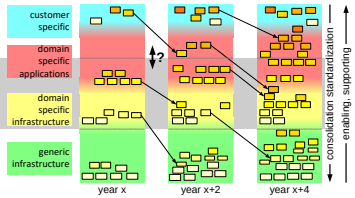
Semiconductor Software Strategy

by *Gerrit Muller* University of South-Eastern Norway-NISE
e-mail: gaudisite@gmail.com
www.gaudisite.nl

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.

September 6, 2020
status: planned
version: 0



Software productivity and components research goals

to define / vary / **create** / integrate / test / maintain products **faster** with **less effort**

and/or

to achieve better / faster / more functional / more reliable / safer / ... products

by means of
methods
tools
integration technology
component technology
... SW technology
standardization
partnering strategy
?

Customer viewpoint

Convergence -> 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

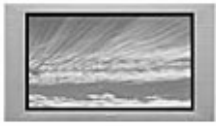

television


Ambient Intelligence living room


car navigation


computer

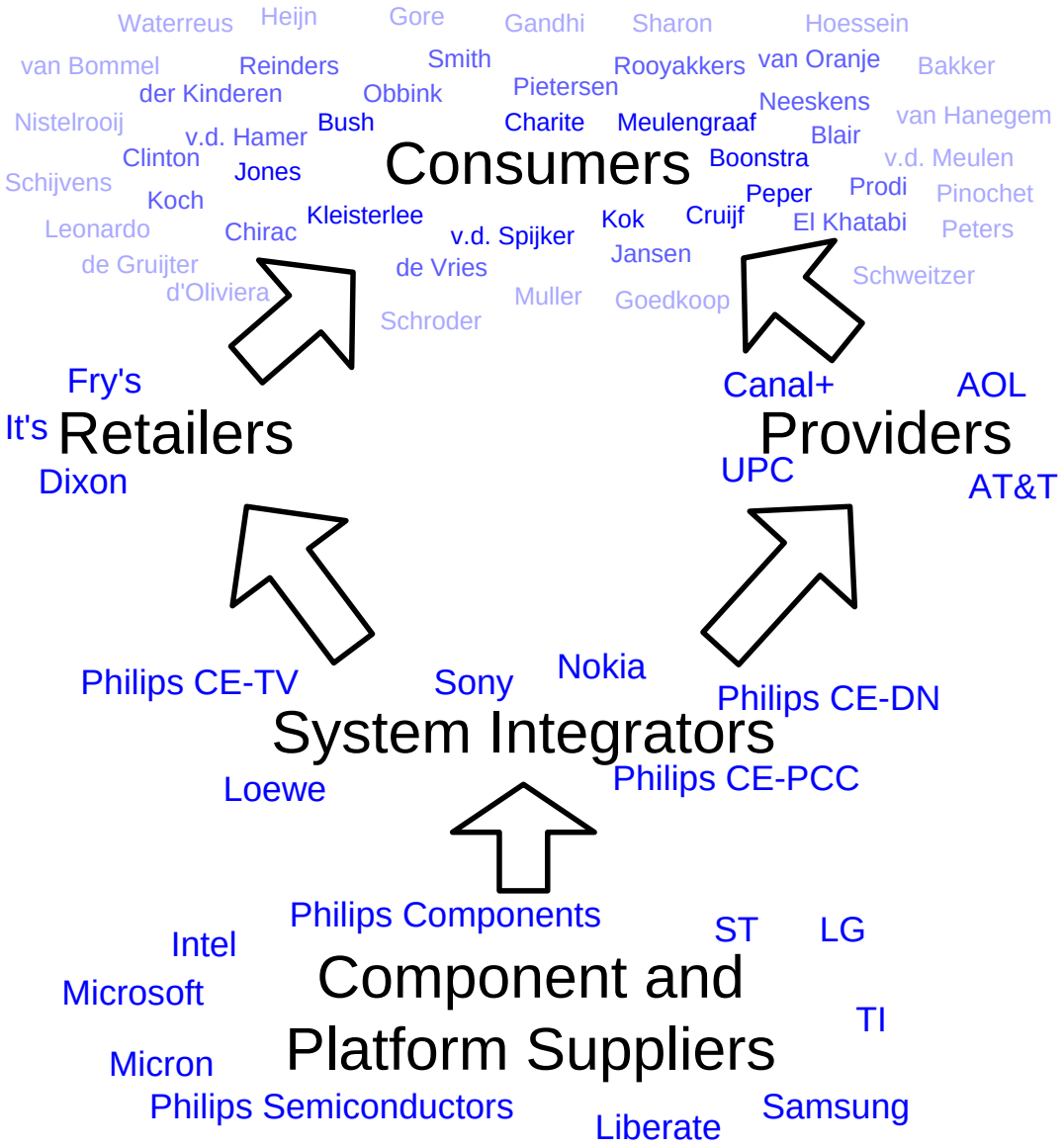

games


flat display

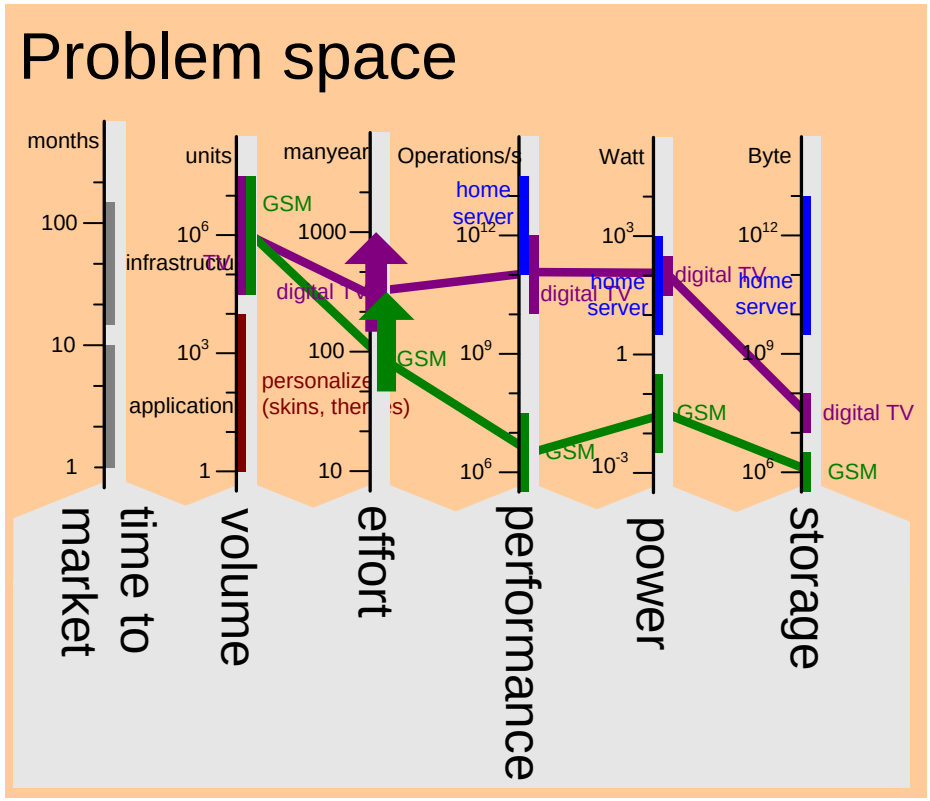

Communicator

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

Value chain


Waterreus
Heijn
Gore
Gandhi
Sharon
Hoessein
van Bommel
Reinders
Smith
Rooyakkers
van Oranje
Bakker
der Kinderen
Obbink
Pietersen
Neeskens
Nistelrooij
Bush
Charite
Meulengraaf
van Hanegem
v.d. Hamer
Blair
Clinton
Consumers
Boonstra
v.d. Meulen
Schijvens
Jones
Peper
Prodi
Pinochet
Koch
Kleisterlee
Kok
Cruijf
El Khatabi
Leonardo
Chirac
v.d. Spijker
Peters
Jansen
de Gruijter
de Vries
Schweitzer
d'Oliviera
Muller
Goedkoop
Schroder
Fry's
Canal+
AOL
It's
Retailers
Providers
Dixon
UPC
AT&T
Philips CE-TV
Sony
Nokia
Philips CE-DN
System Integrators
Loewe
Philips CE-PCC
Philips Components
Intel
ST
LG
Microsoft
Component and
Platform Suppliers
TI
Micron
Philips Semiconductors
Samsung
Liberate

Exploring problem space and solution ingredients



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

Composable Architecture

Family of products

Configurability

Solution ingredients

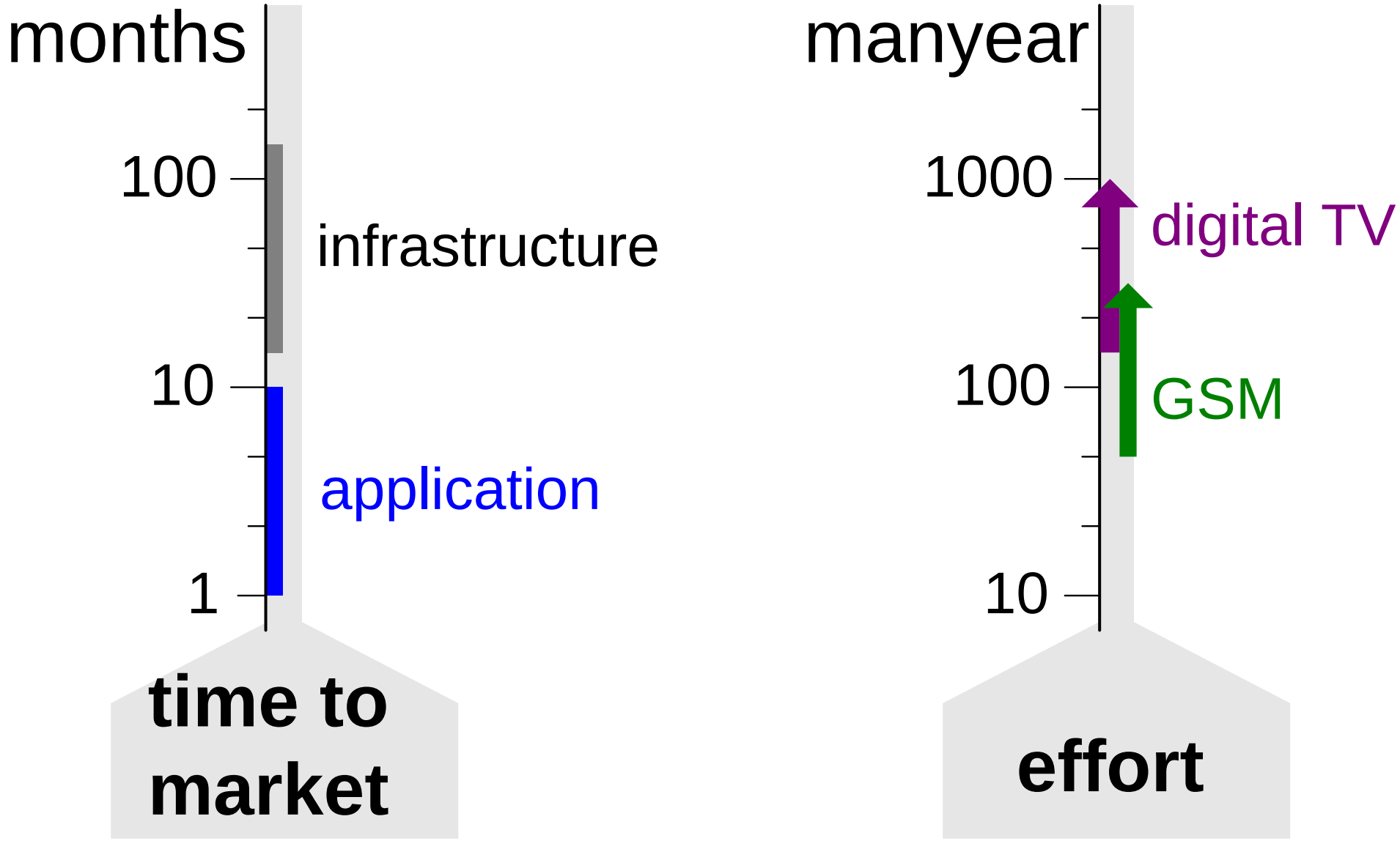
Programmability, flexibility

Increase supplier content

Competitive Performance / cost / power

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

Dominant customer concerns



Trends in hardware and software

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

Semiconductor viewpoint

Changes in semiconductor country in the last decade

analog	→	digital
single function	→	multiple functions
mm^2 Si	→	"system" solution
small team	→	large team
separate markets	→	convergence markets

- "system" solution
  - deverticalization
  - software ?!

Strategic questions for Semiconductor company

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?

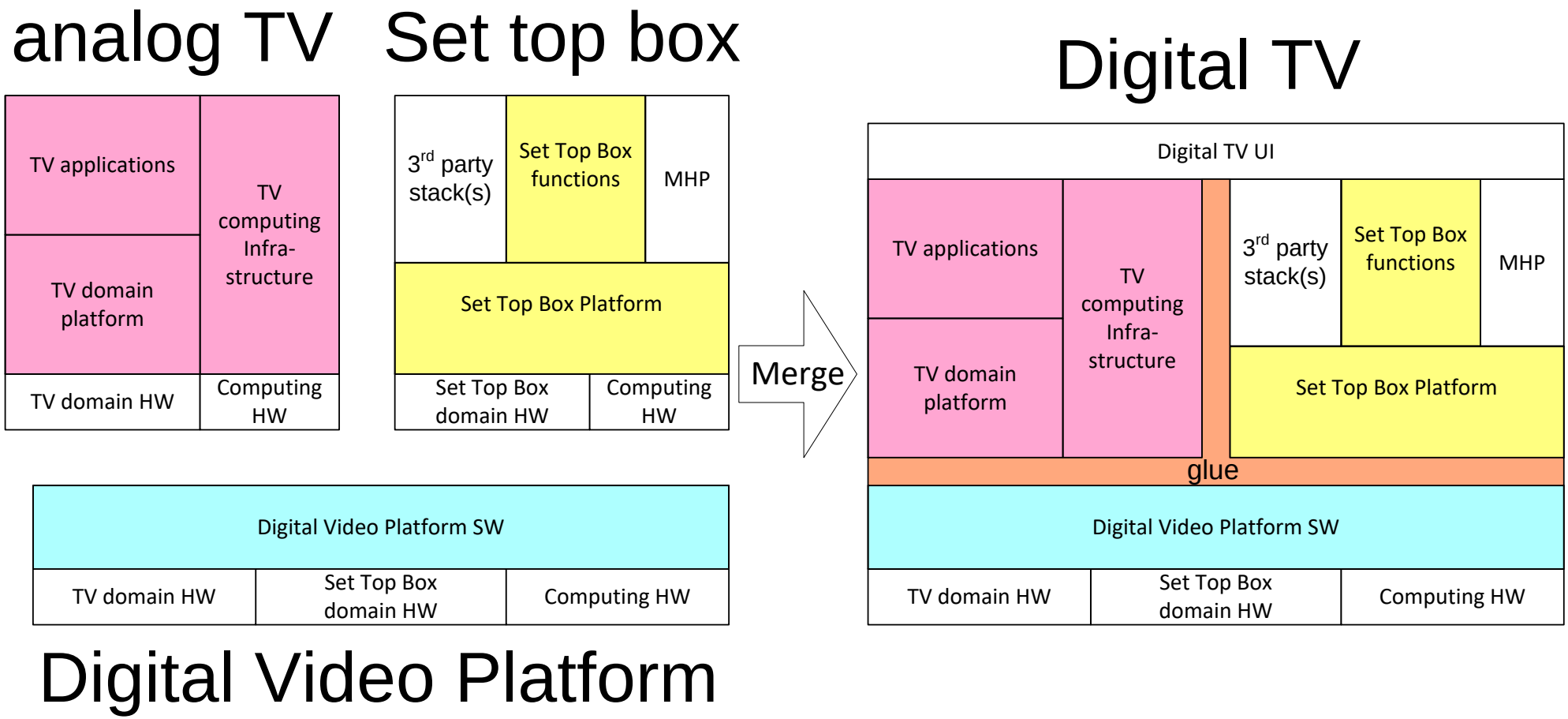
Thomson, TI, Intel, Samsung, ...

Which architecture?

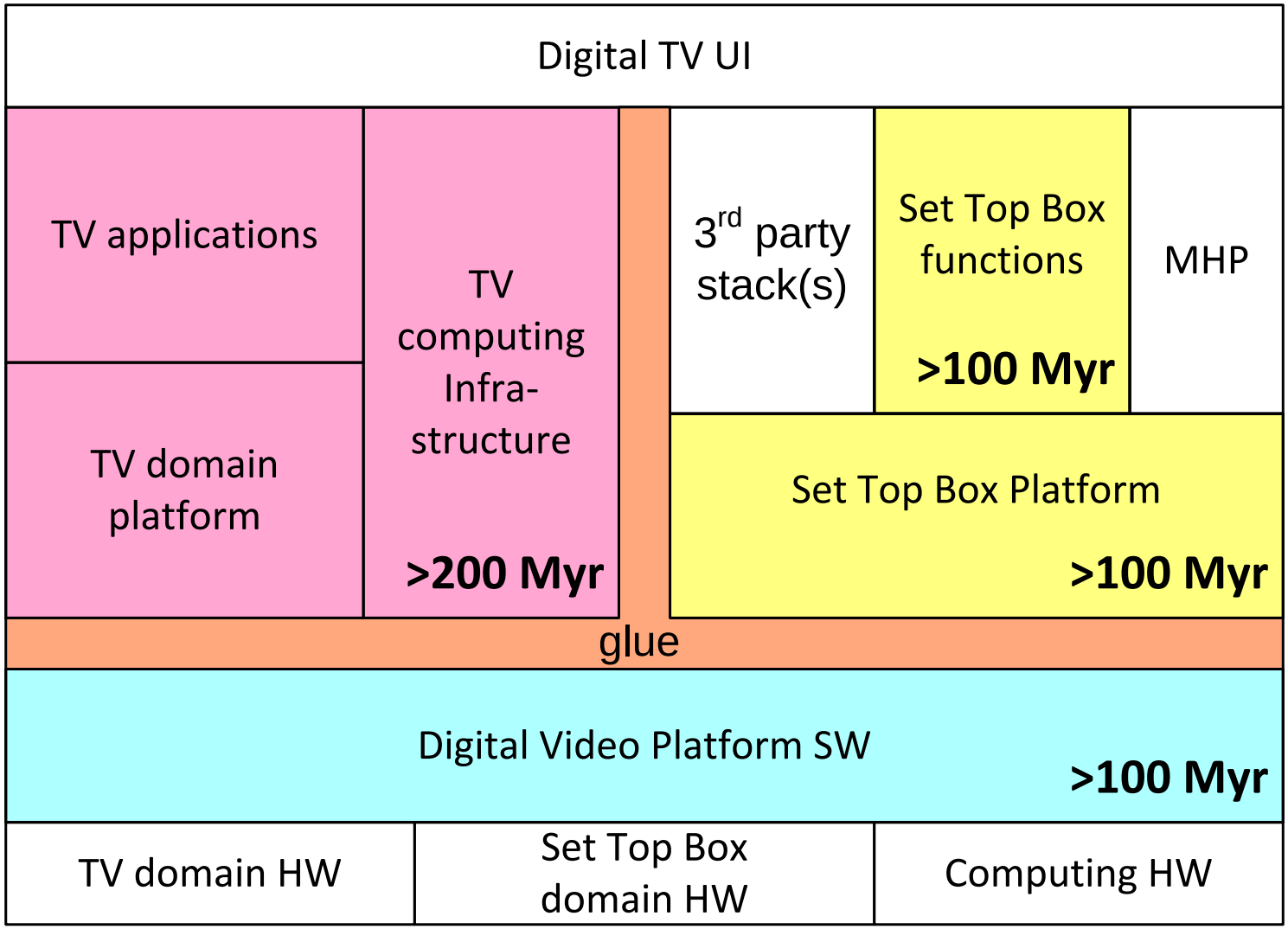
How to protect customers software investments?

How to enable application reuse across domain boundaries?

Simplistic Architecting: Digital TV

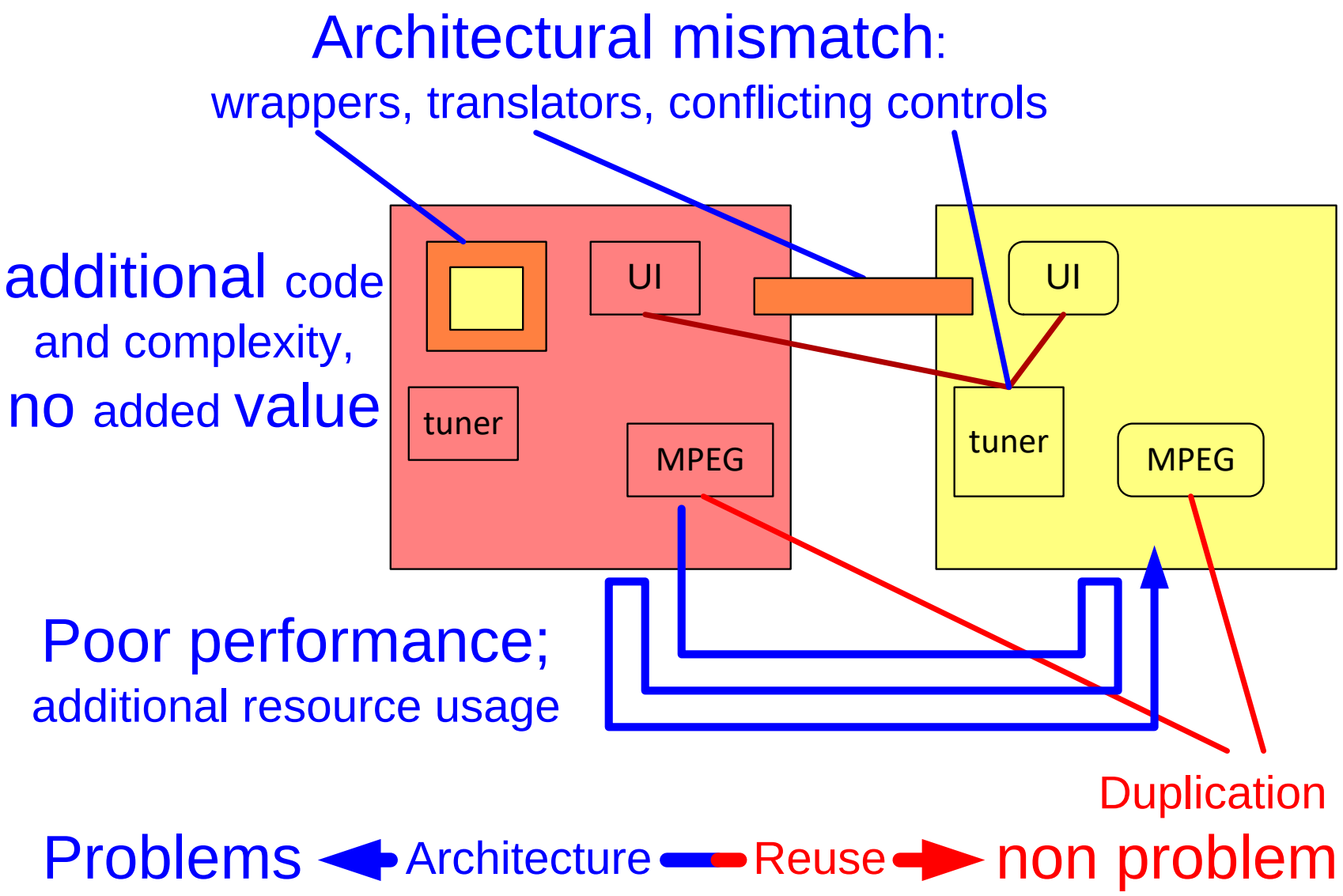


Available Code Assets

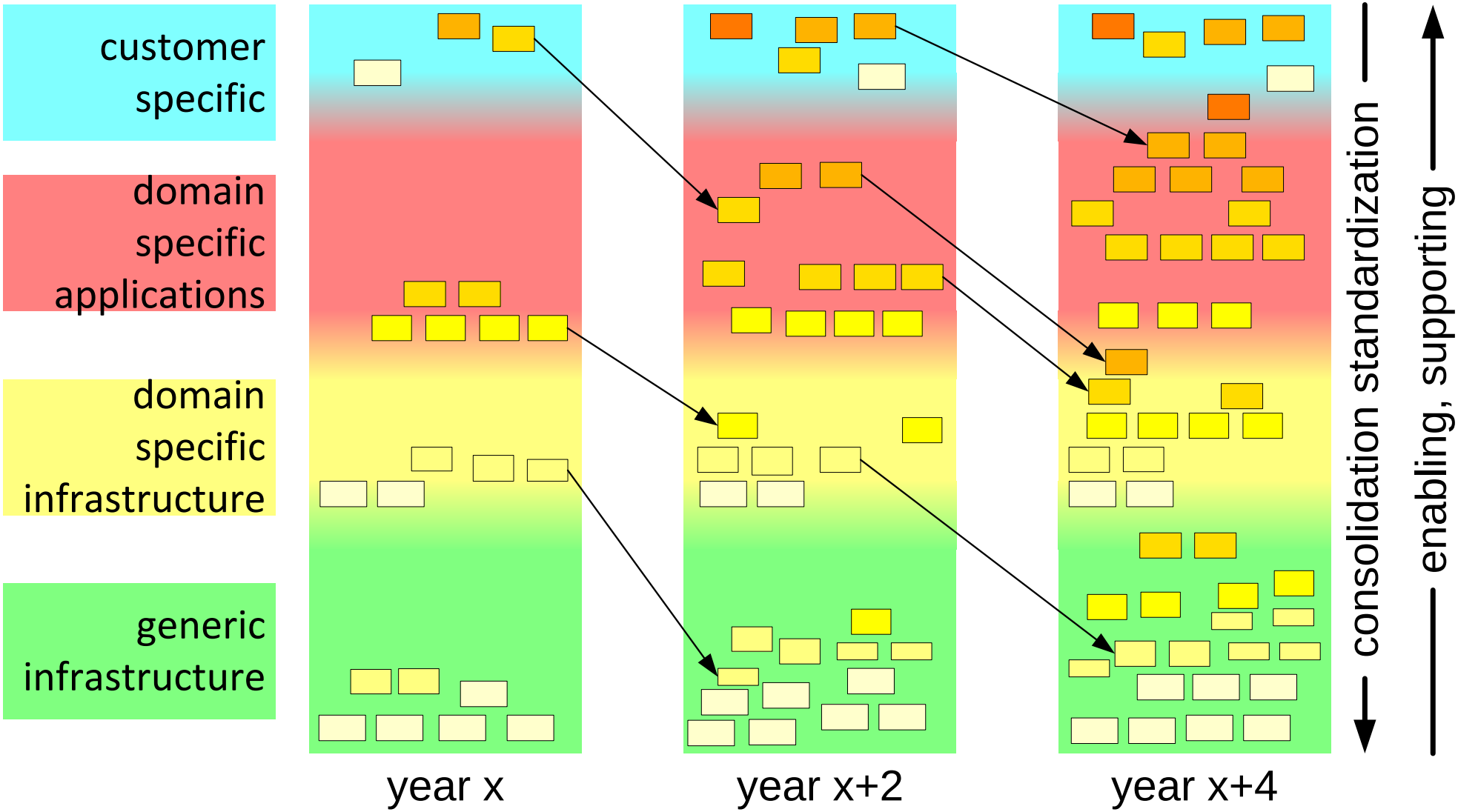


"Legacy" code > 500 Myr

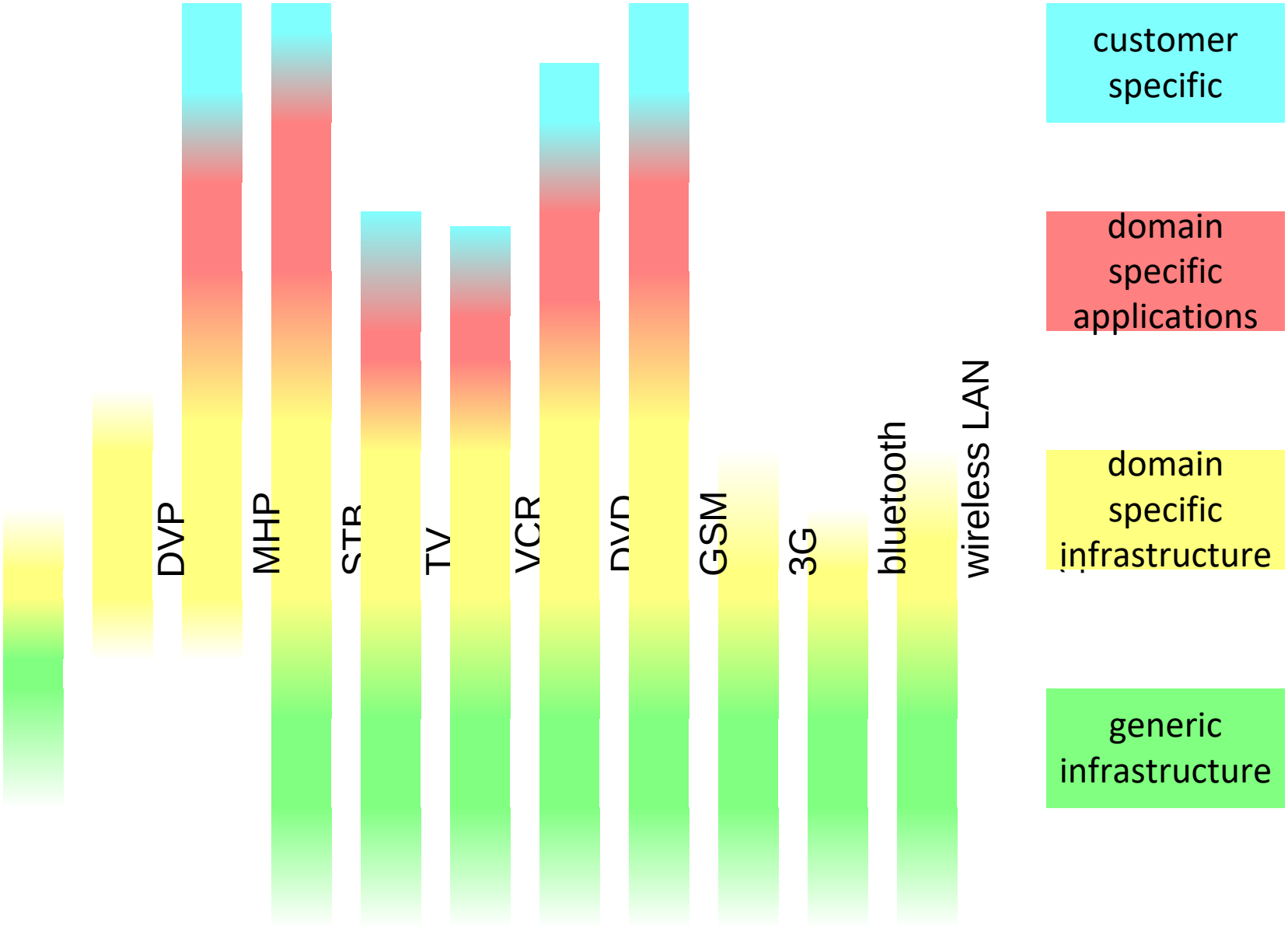
Merge problems



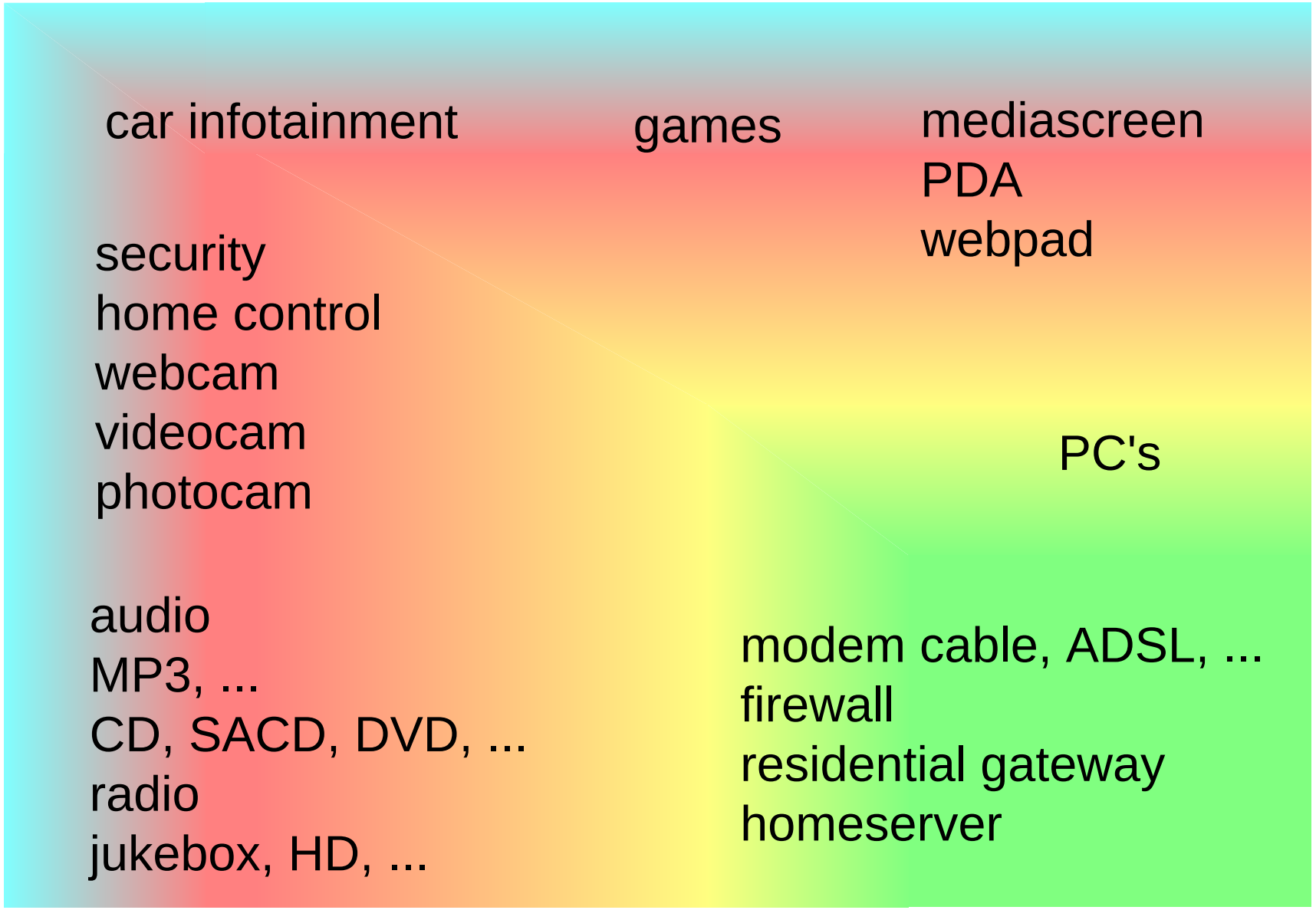
Evolution of functionality



Existing SW stacks

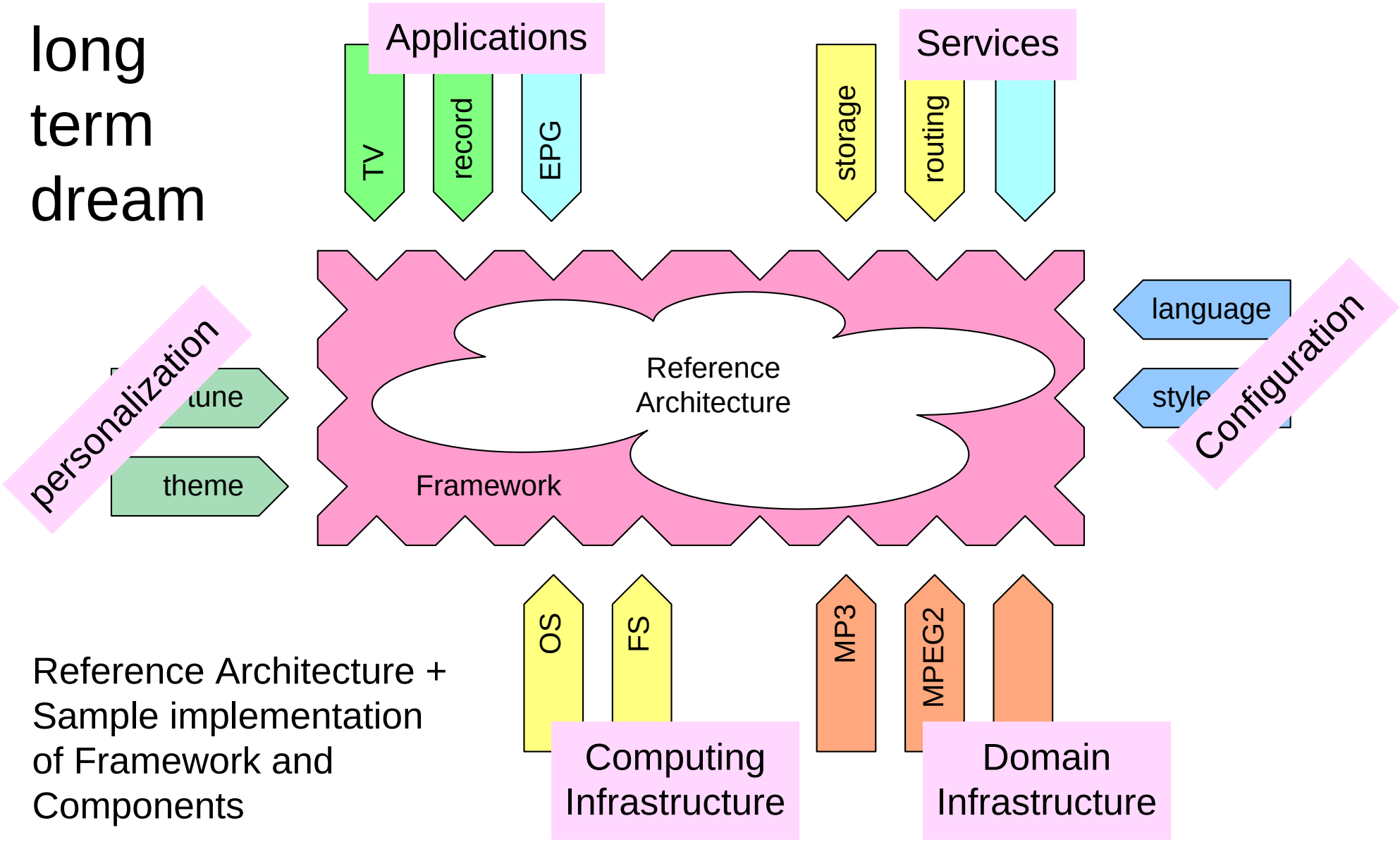


But there are much more domains and stacks



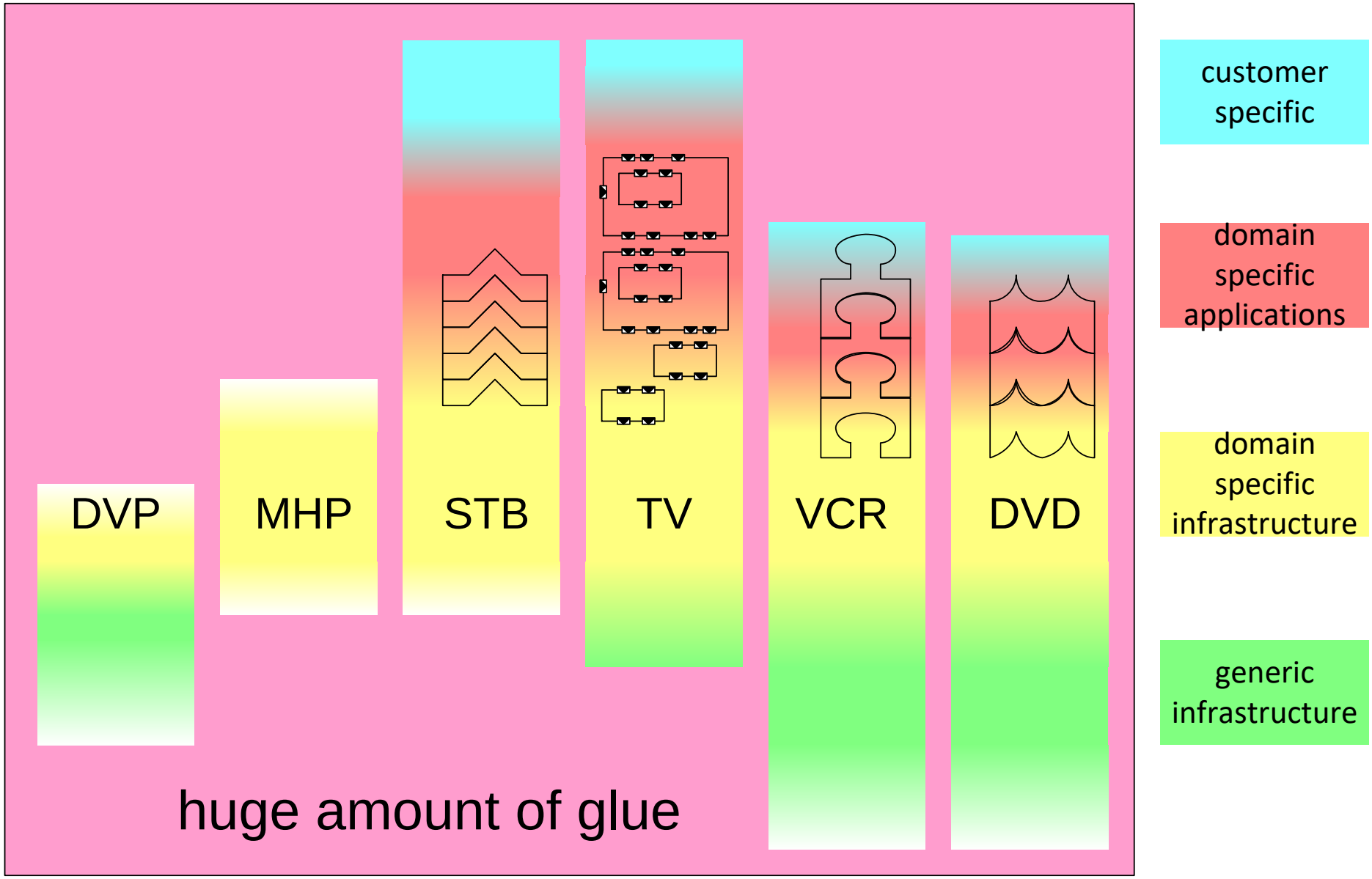
Ideal homogeneous situation?

long
term
dream

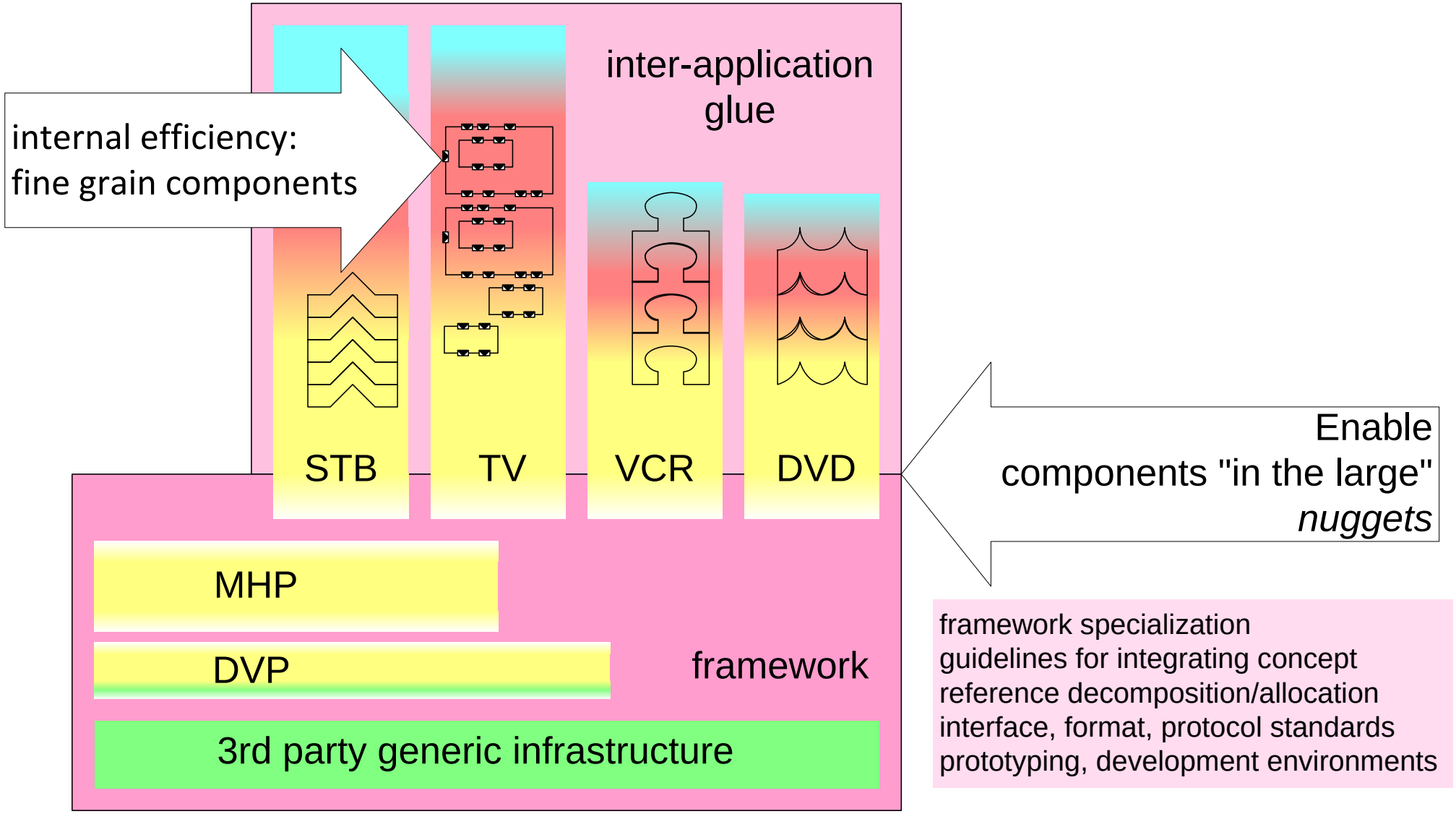


Reference Architecture +
Sample implementation
of Framework and
Components

Today's reality?

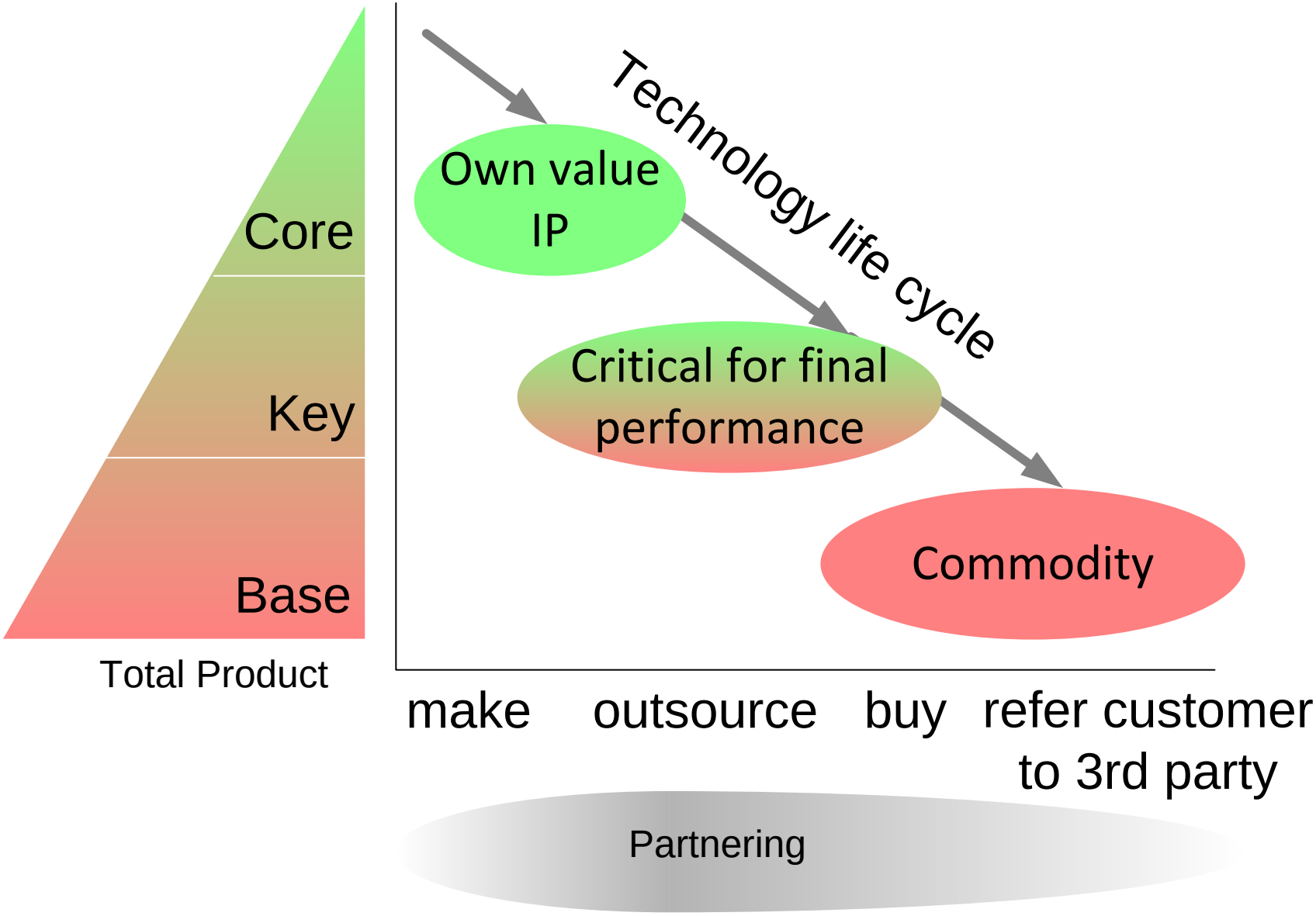


Achievable solution?



Which software to make?

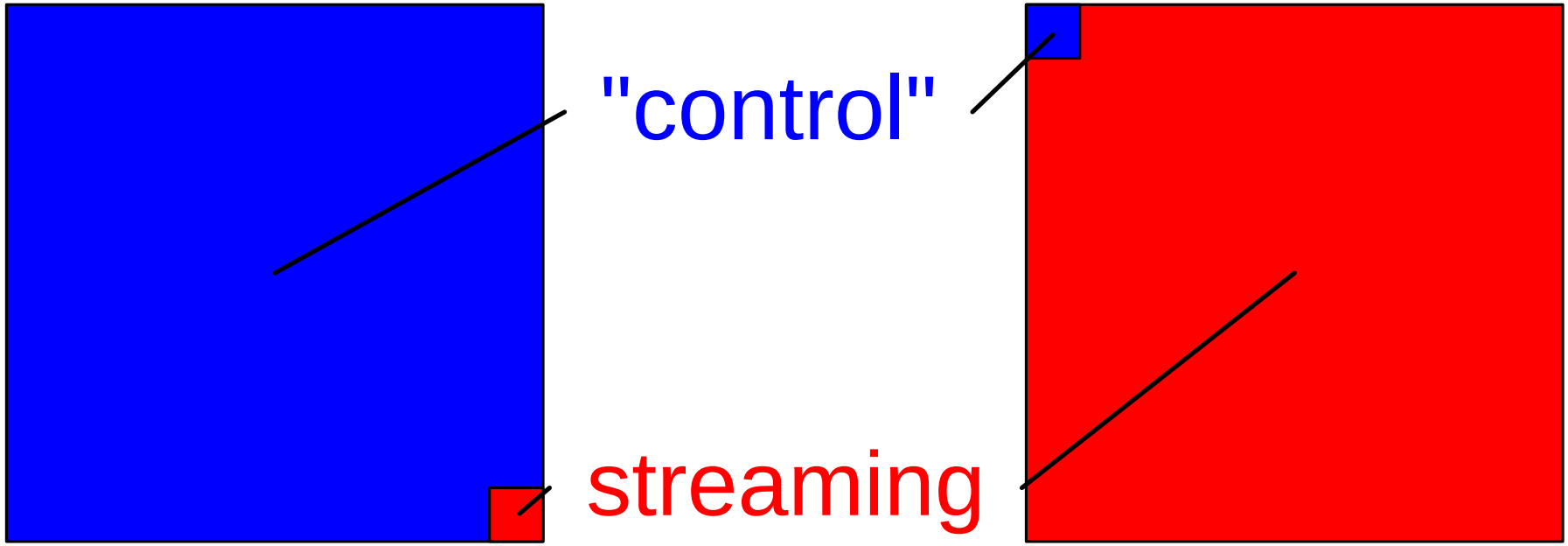
Core, key or base technology?



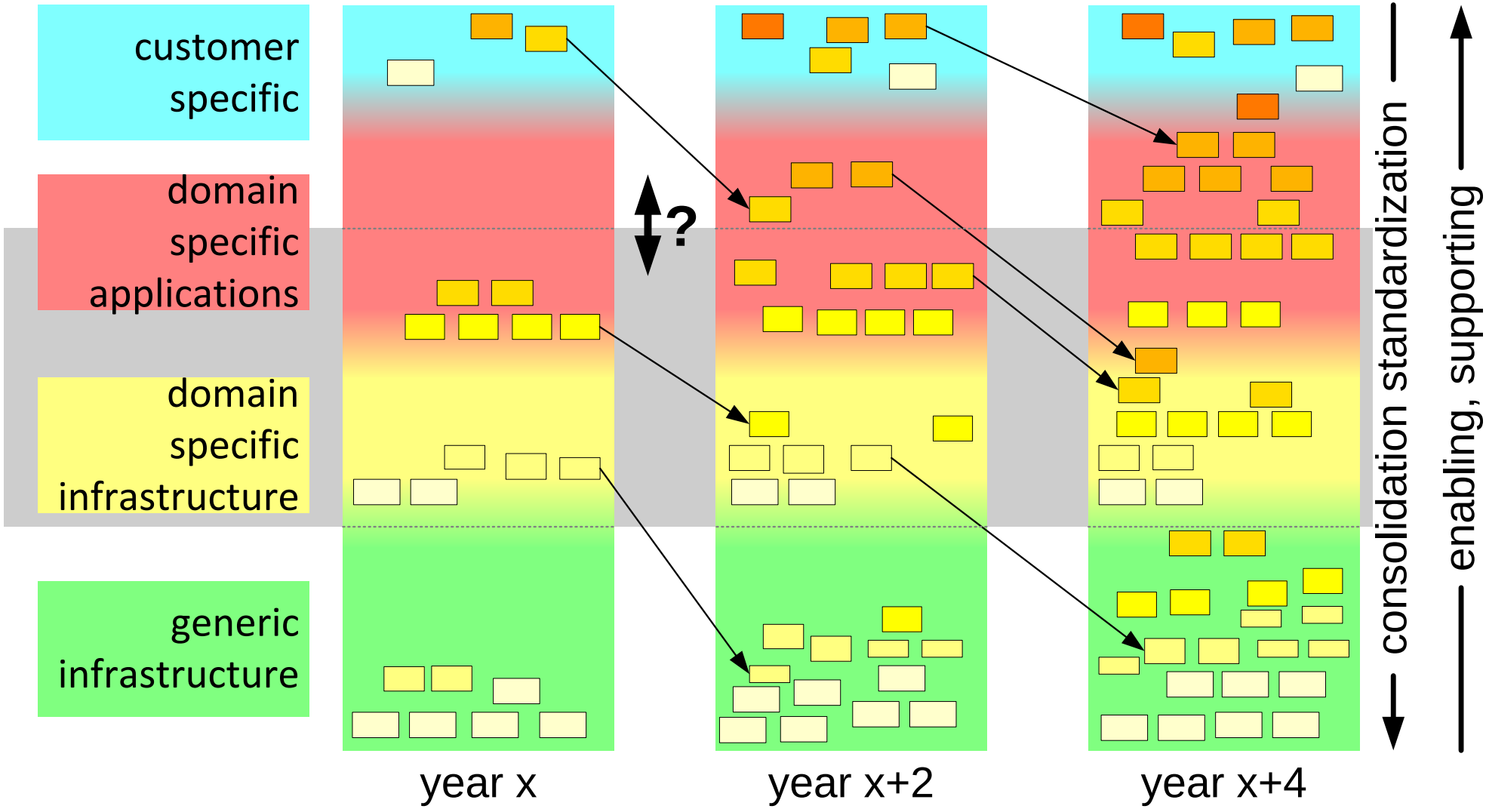
Streaming: one of Philips' core strengths

Software size

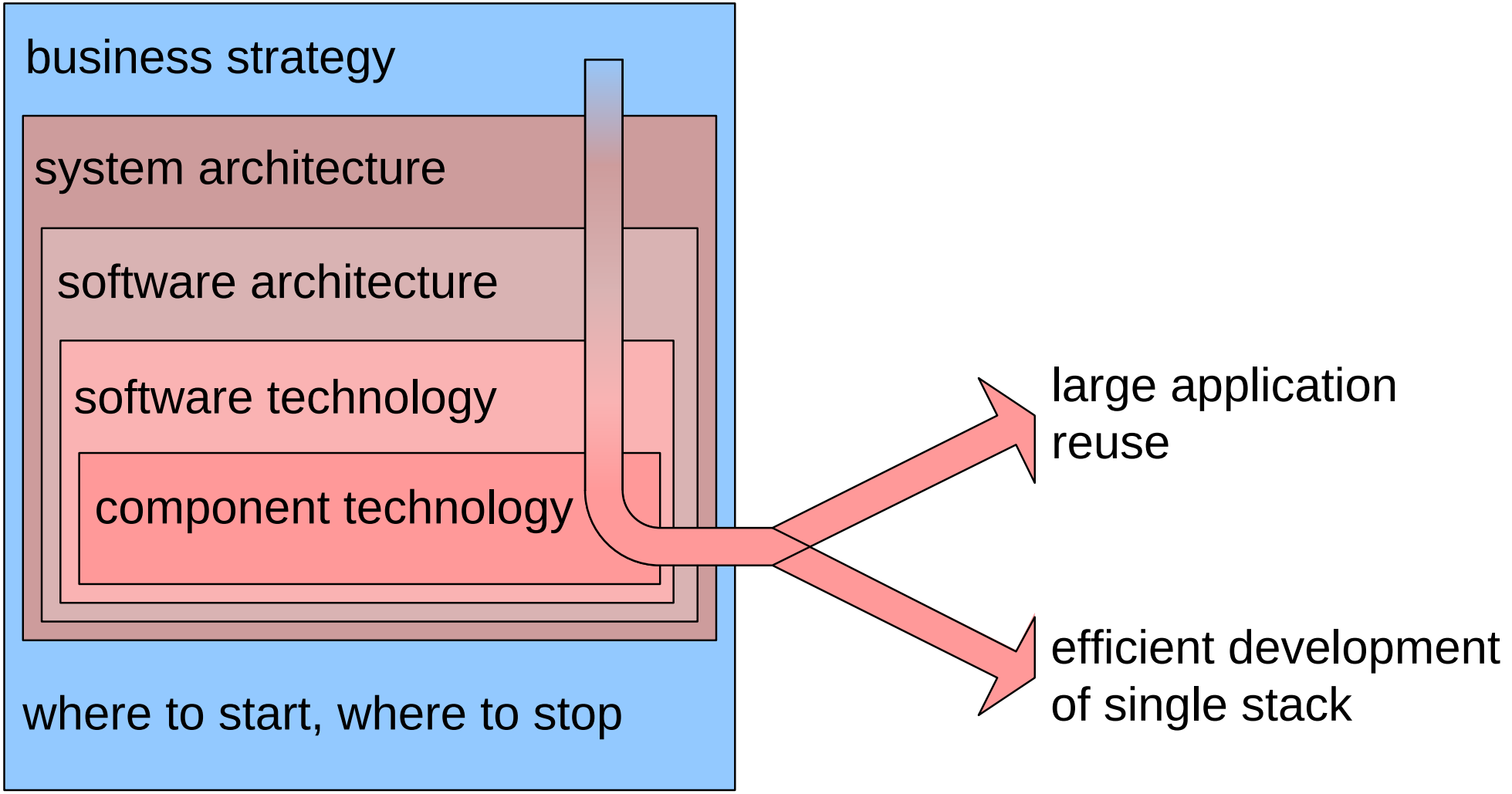
number crunching operations/sec



Our territory?



Summary


business strategy
system architecture
software architecture
software technology
component technology
where to start, where to stop
large application reuse
efficient development of single stack