

Architectural Refactoring; illustrated by MR

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Abstract

The market of medical appliances shows a fast increasing diversity. Manufacturers must be able to combine existing functions and new applications in a short time frame. A large amount of accumulated SW code (legacy) has to be reused in new ways.

The architecture(s) must be adapted to these new ways of working. Revolutionary adaptations have proven to be extremely risky. Opportunistic extension and integration decrease the quality of the code base, making it increasingly more difficult to continue. Architectural refactoring is a feedback based method to evolve an architecture.

Distribution

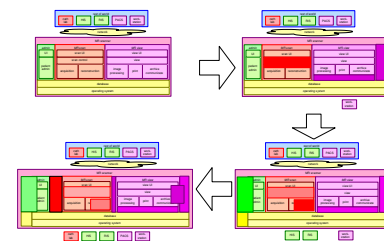
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June 23, 2016

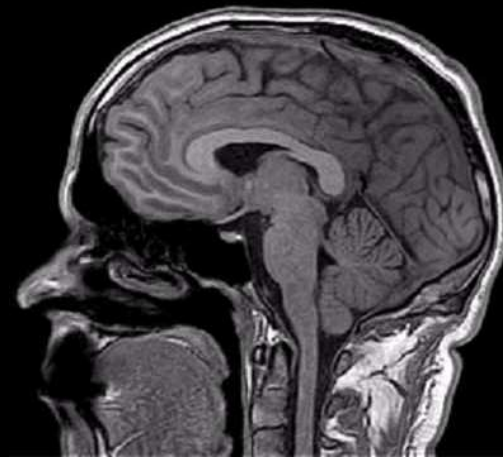
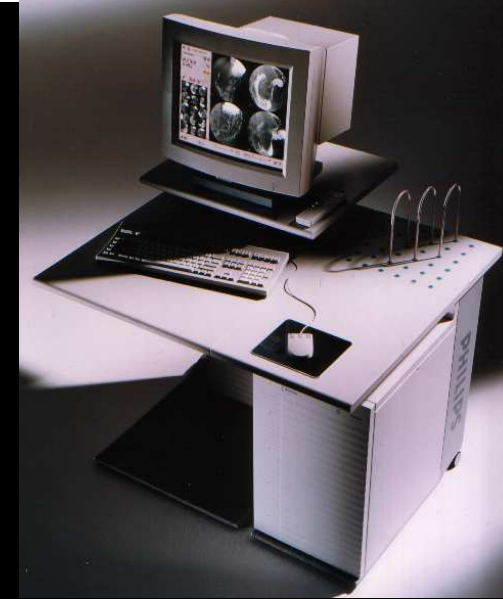
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version: 0.1

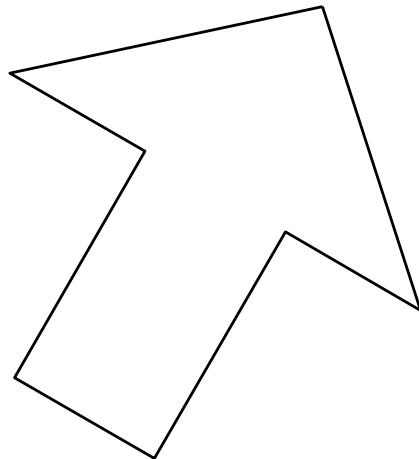
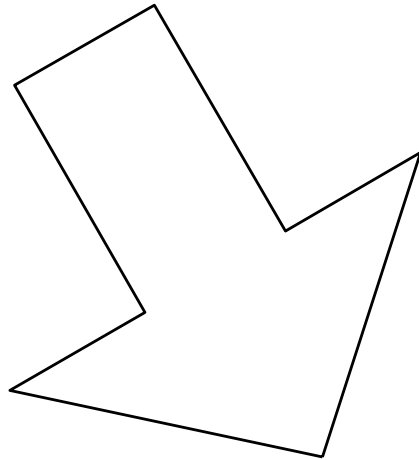


Today's Medical Products

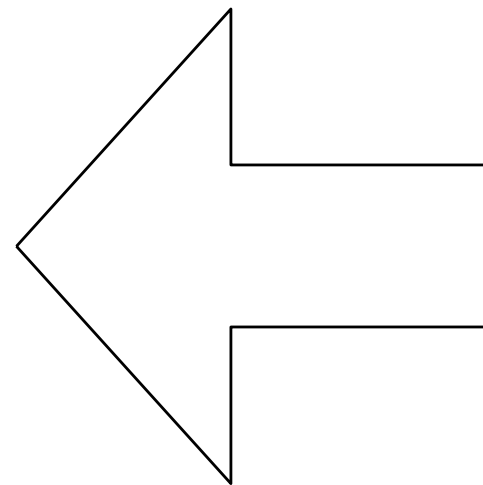


Trend: Convergence of separate worlds

Telecom

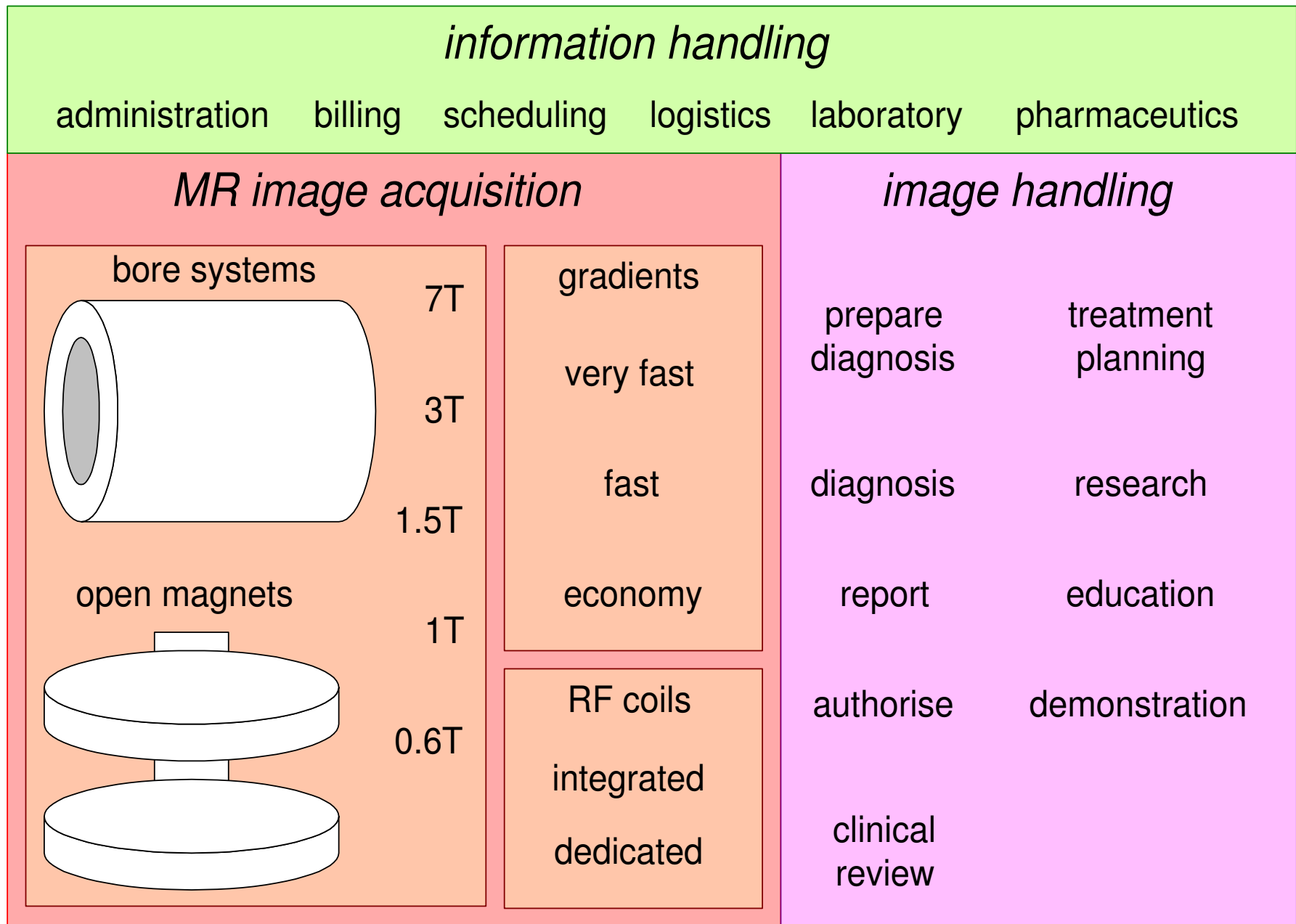


Medical

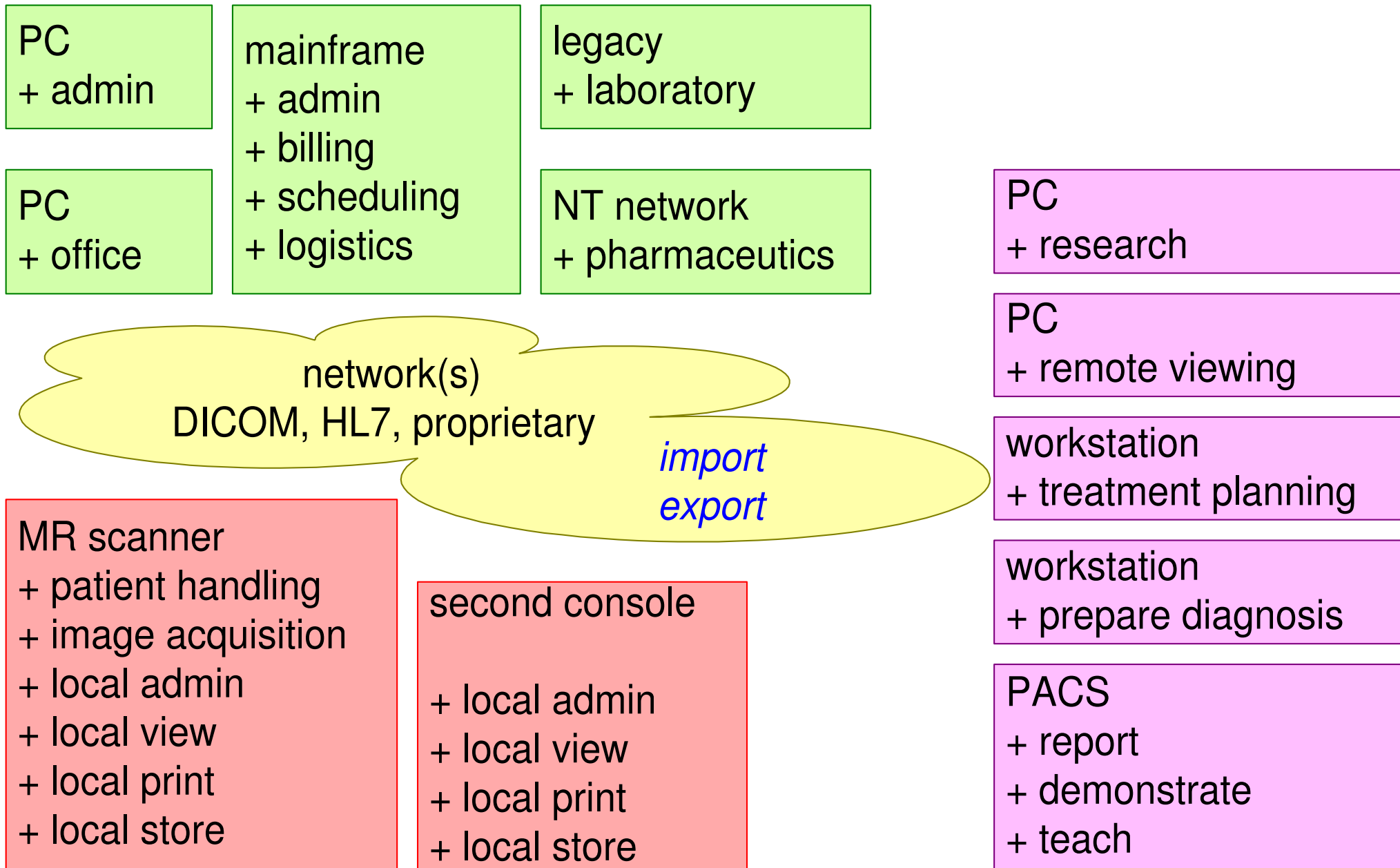


Computer

Integration and Diversity

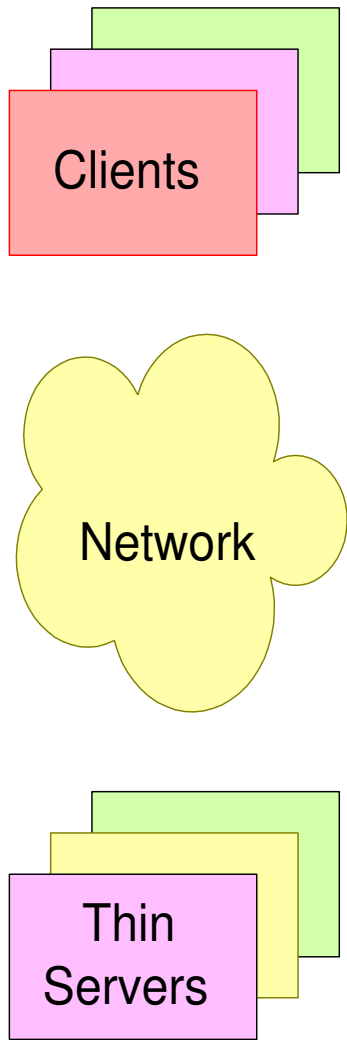


Today's Medical Products

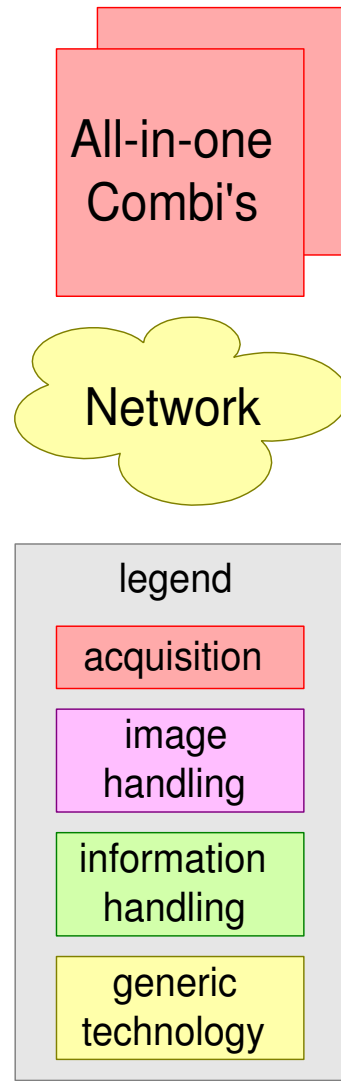


Distribution Scenario's

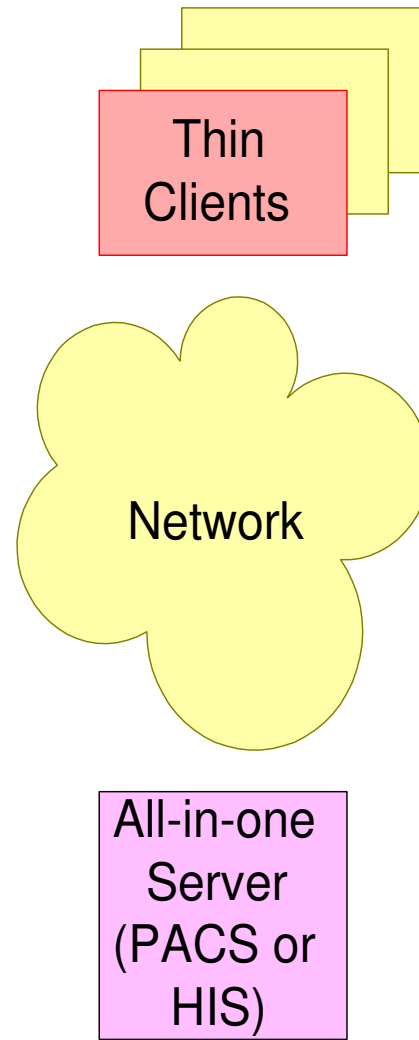
A "Thin Servers"



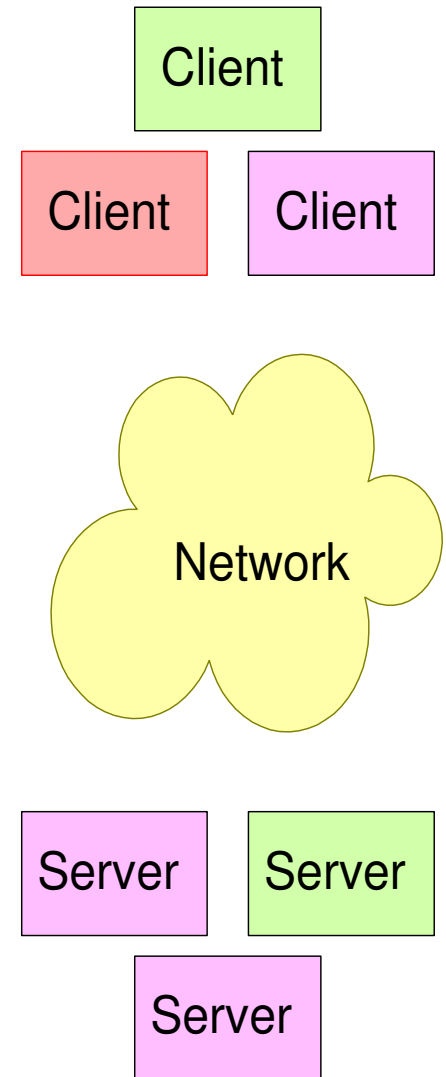
B "All-in-one" Combi's



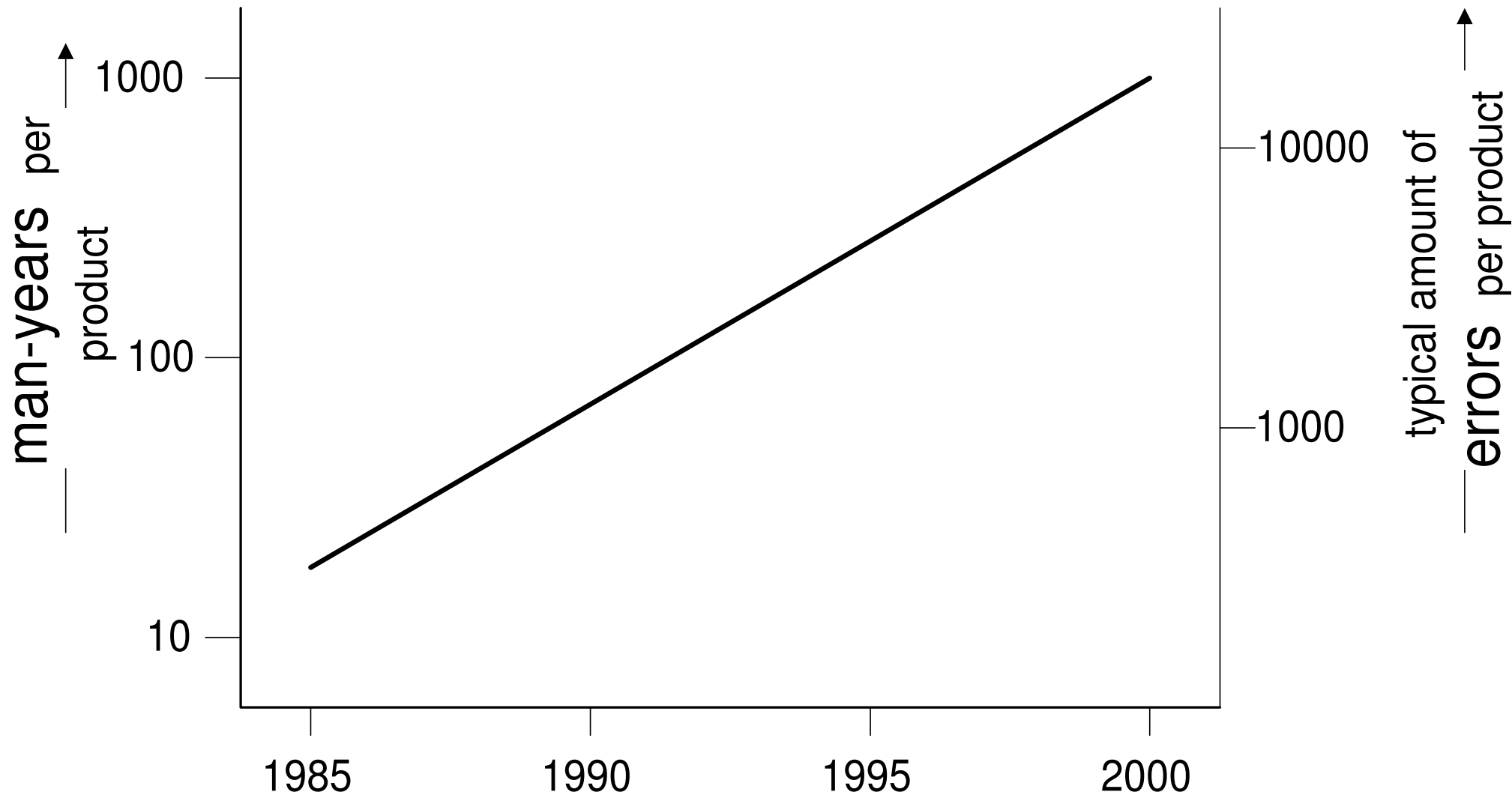
C "All-in-one" server



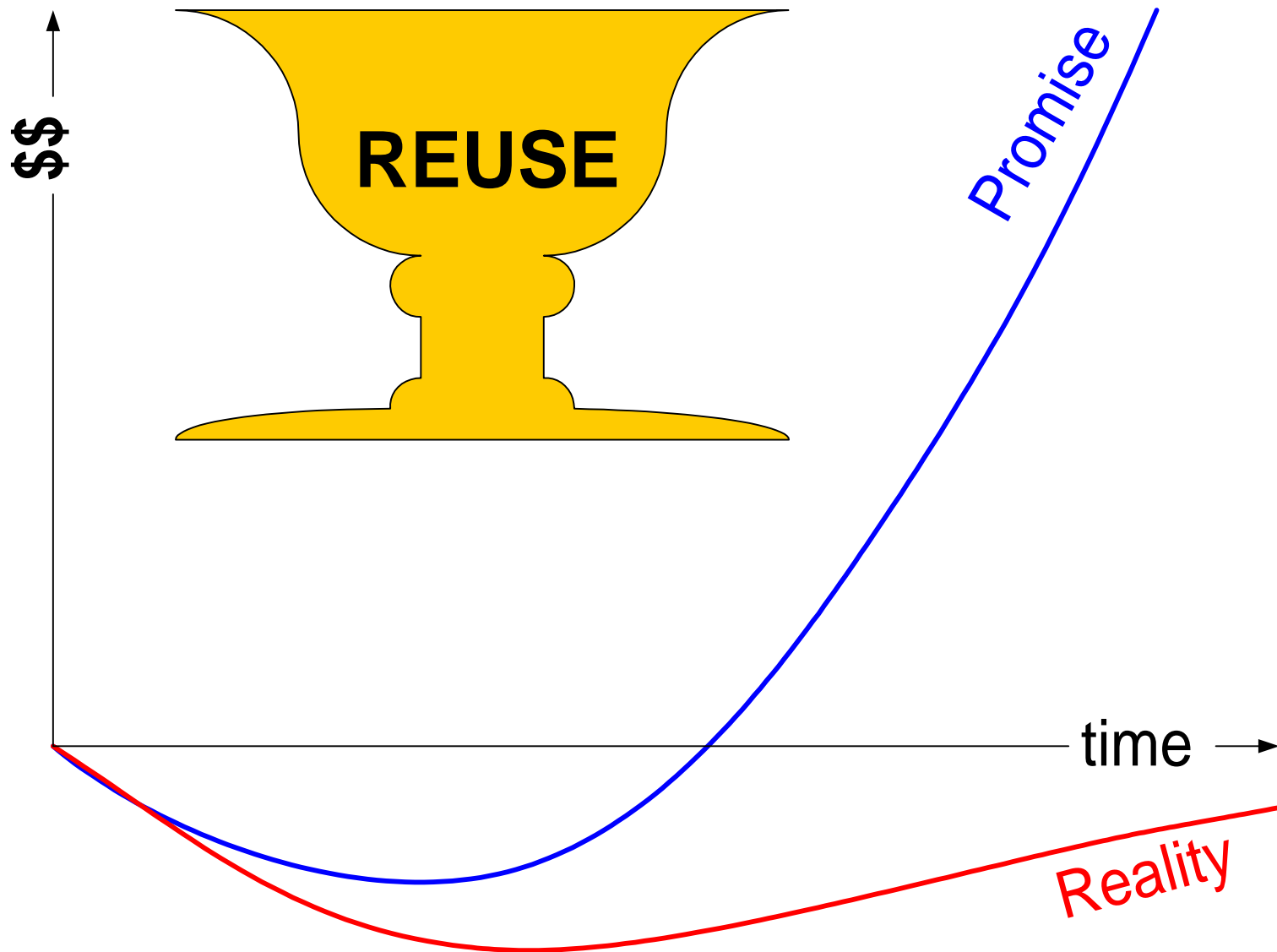
D "Modular"



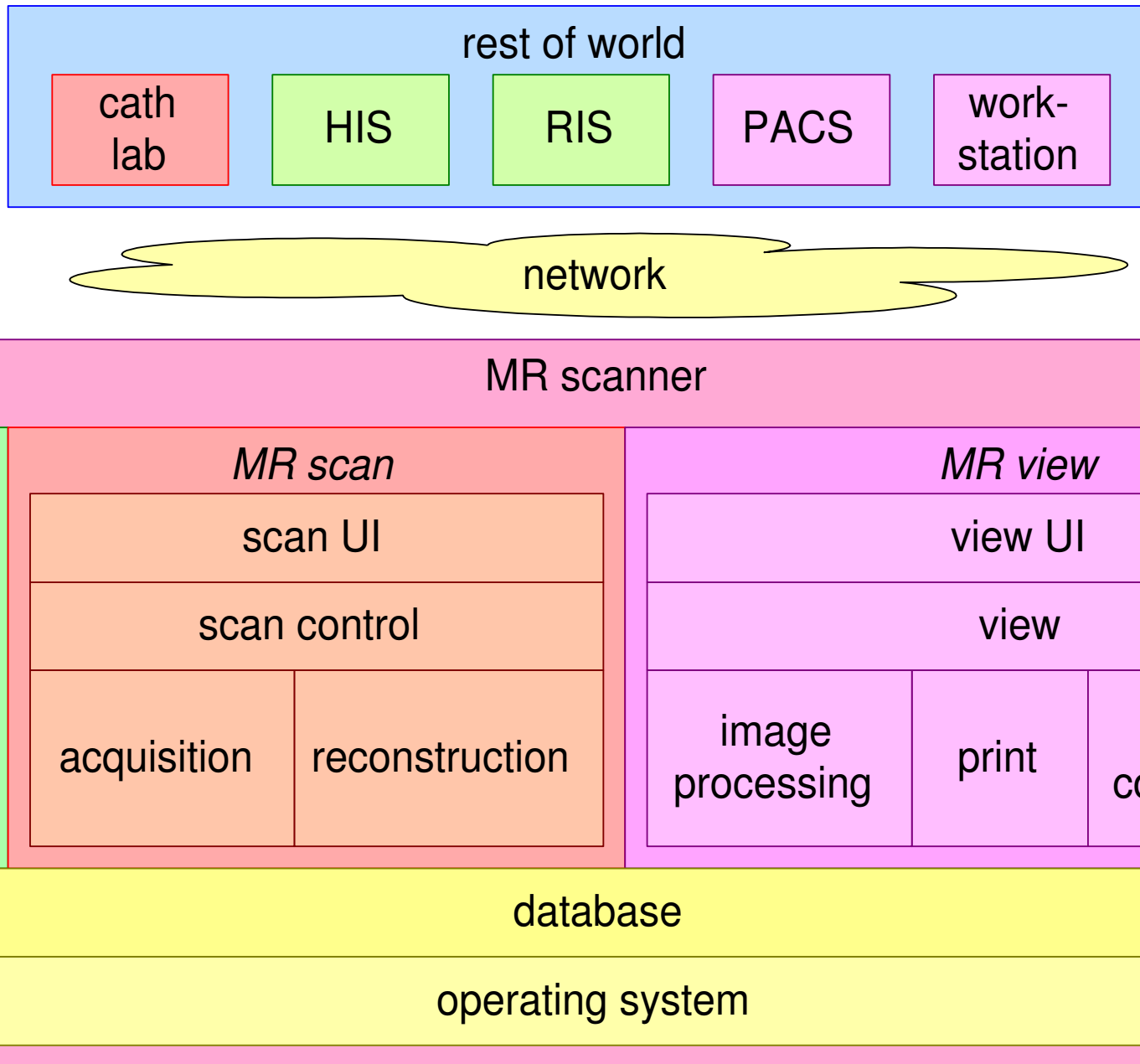
Problem: increasing SW size, decreasing reliability?



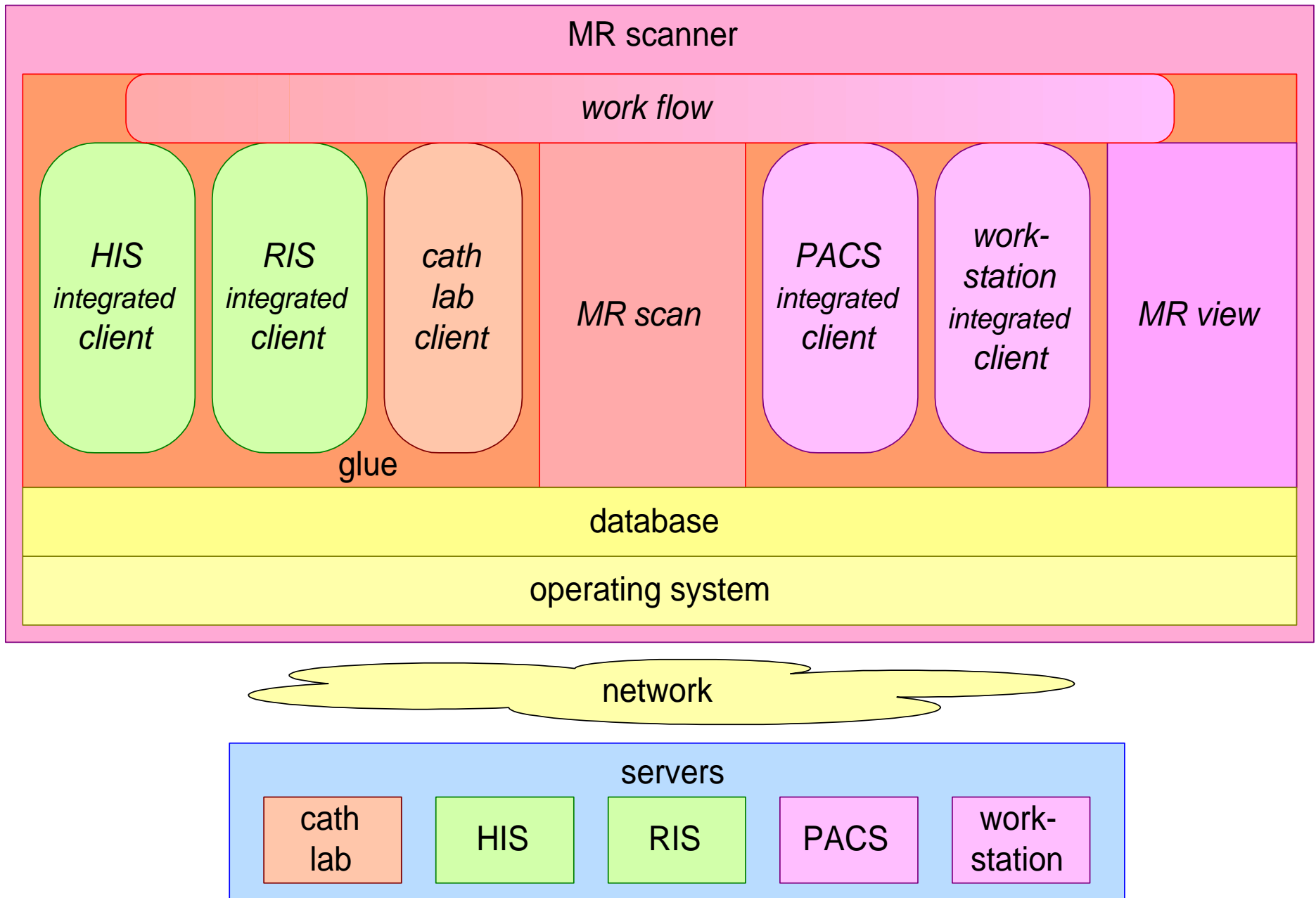
The Holy Grail: Reuse



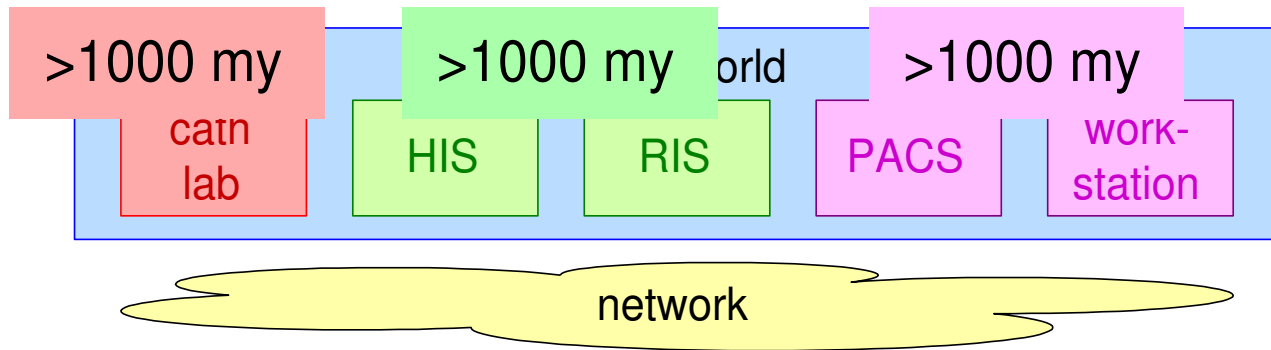
Simplistic Architecture



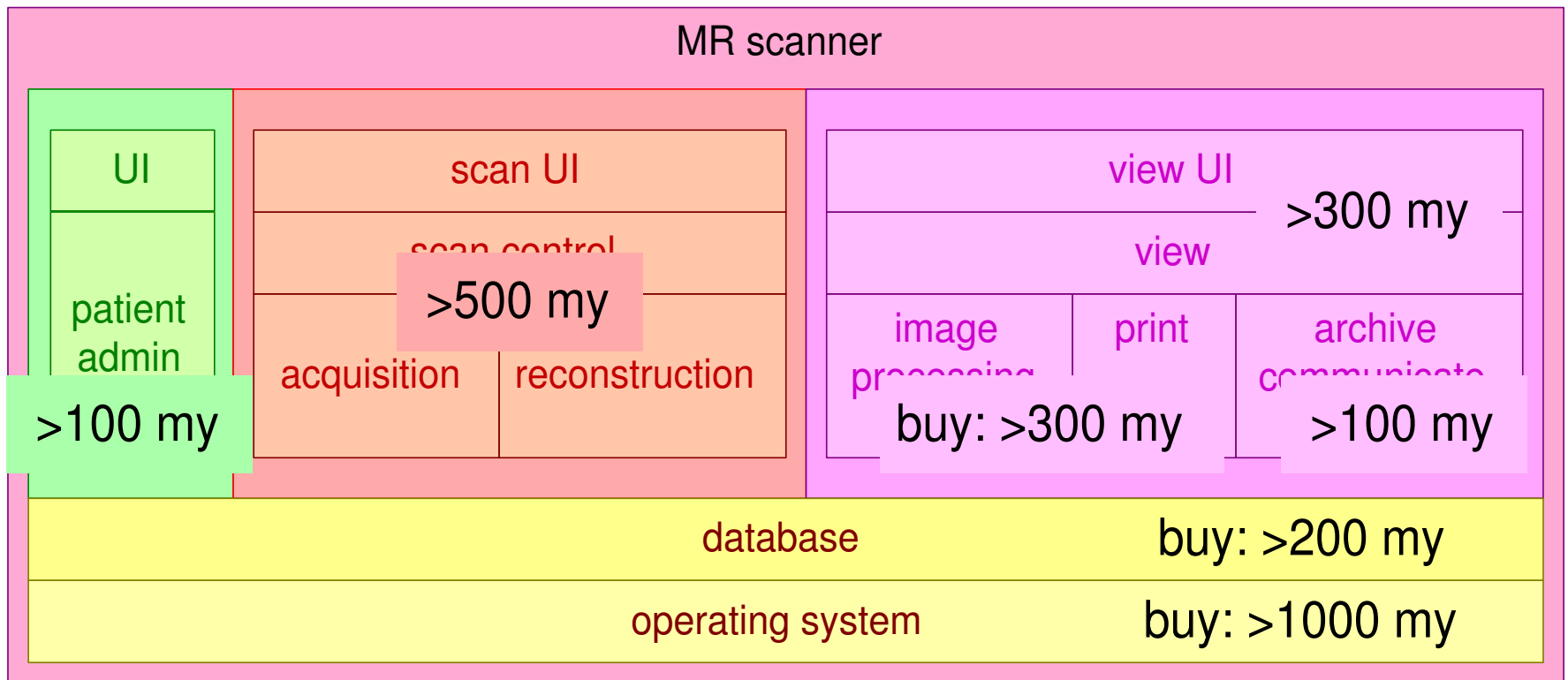
Future Simplistic Architecture



Available Code Assets



total ROW:
>3000 my



total make: >1000 my

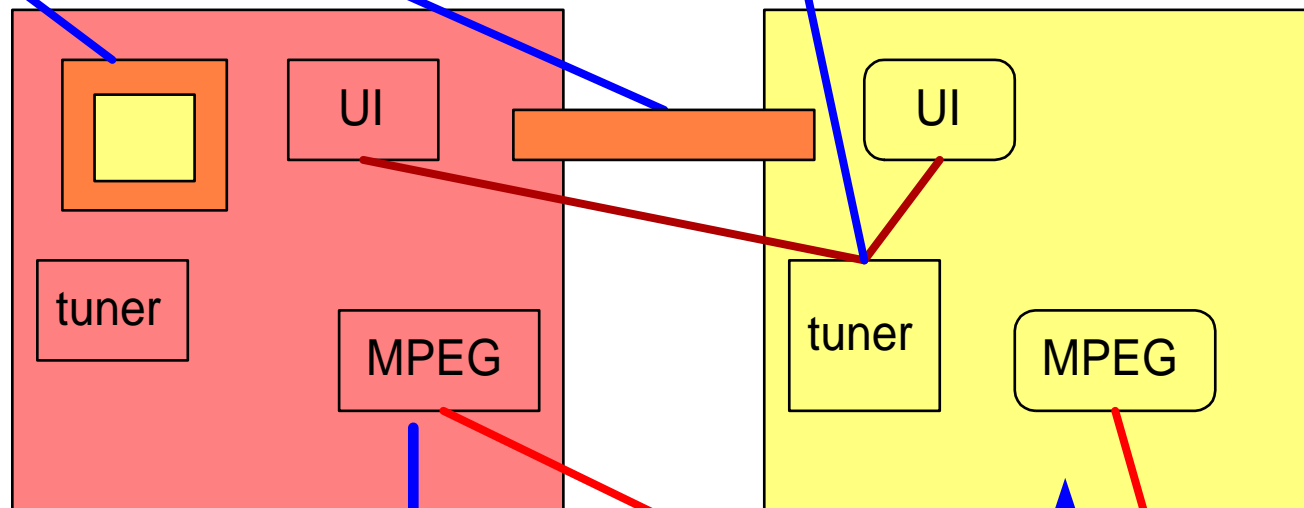
total buy: >1500 my

Merge problems

Architectural mismatch :

wrappers, translators, conflicting controls

additional code
and complexity,
no added value

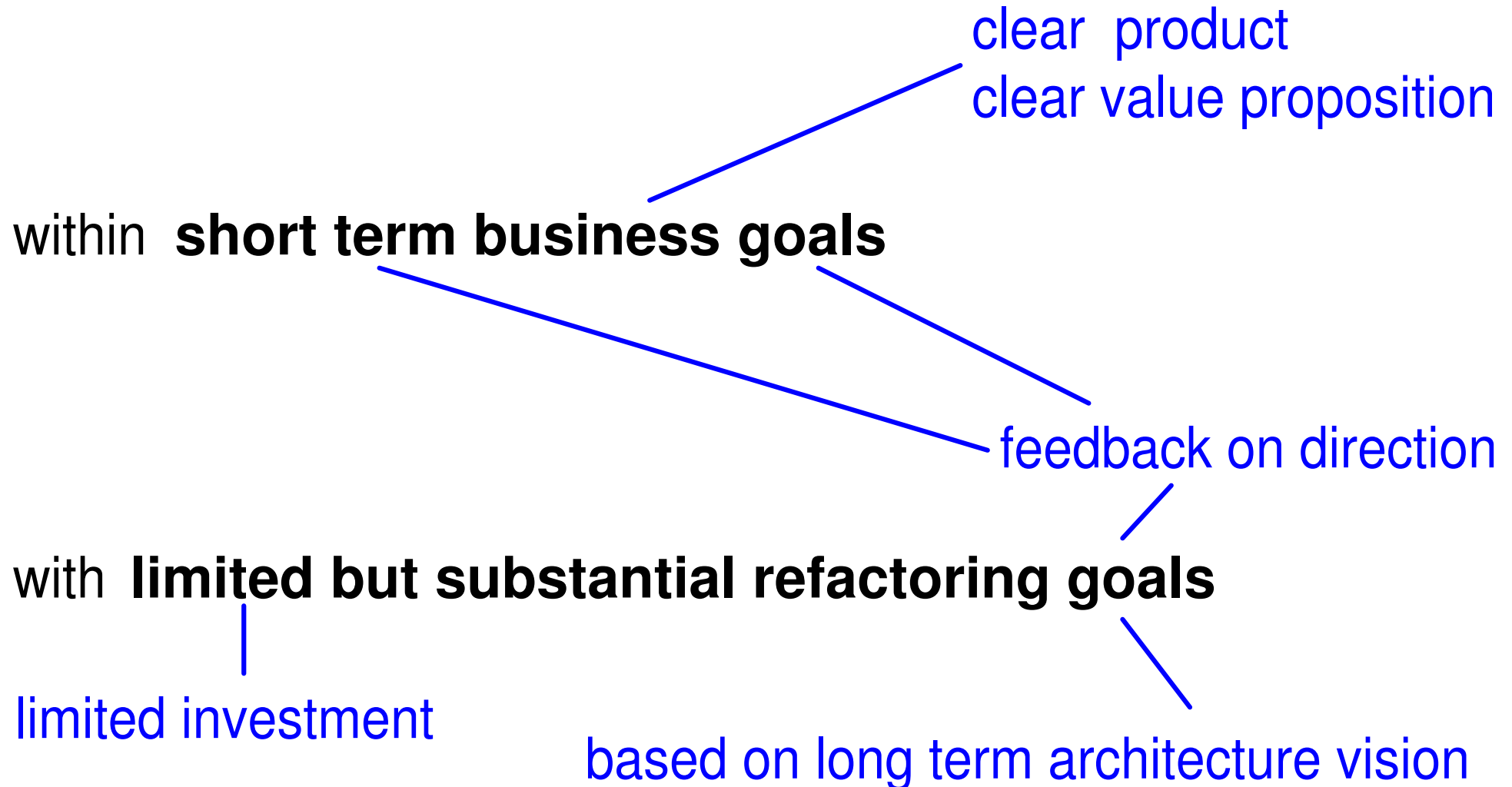


Poor performance;
additional resource usage

Duplication

Problems ← Architecture — Reuse → non problem

Refactoring



Example of Refactoring Goals

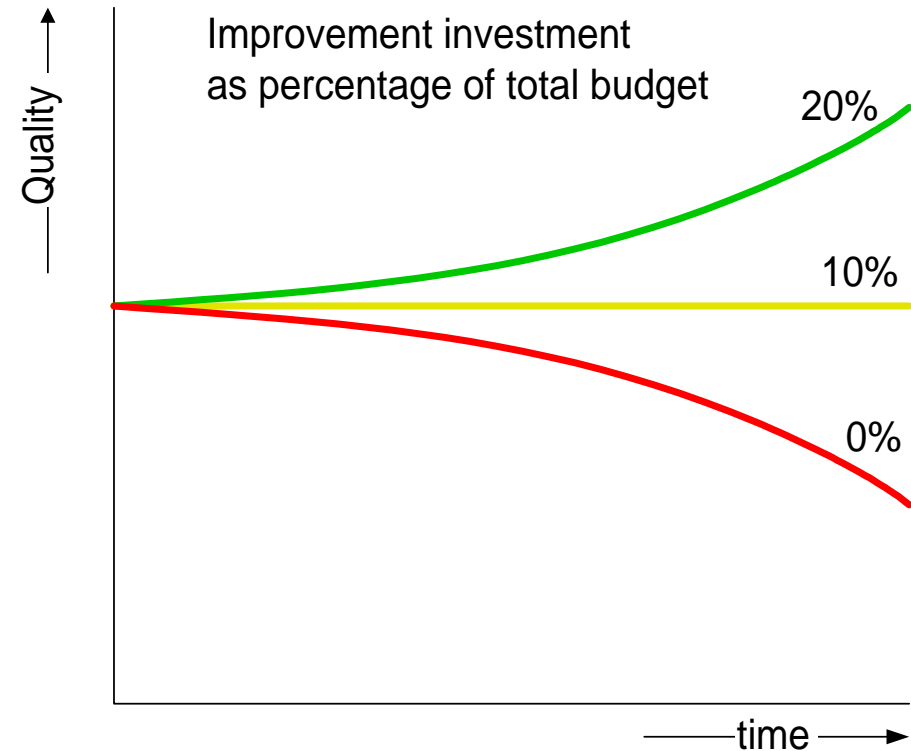
+ Decrease Code Size

+ Decrease Resource Usage

- * power
- * memory
- * silicon area

+ Increase Performance

- * response time
- * throughput



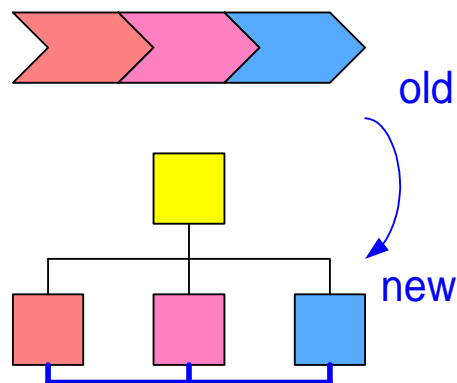
+ Increase quality

- * decrease fault density

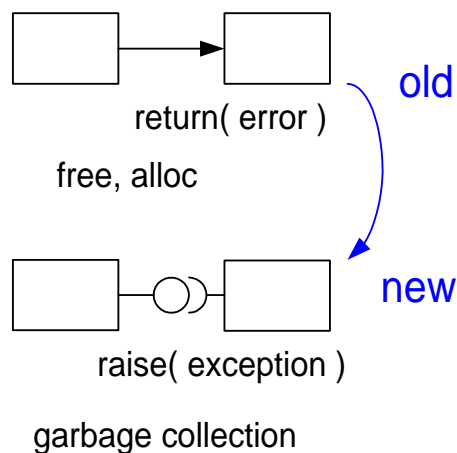
Architectural vs Code refactoring

Architectural Refactoring

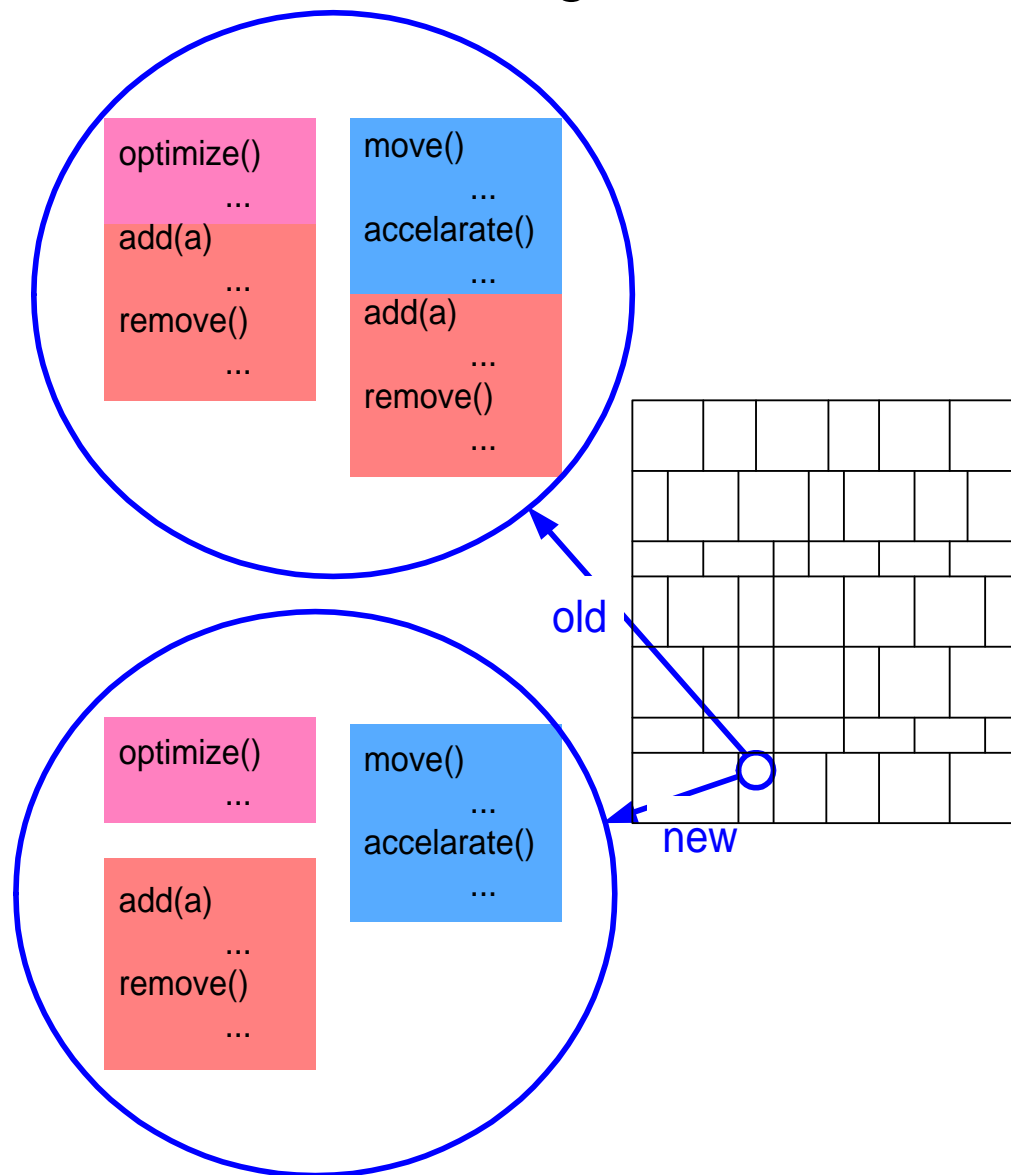
Function, Structure, Rationale



Mechanisms, Technologies



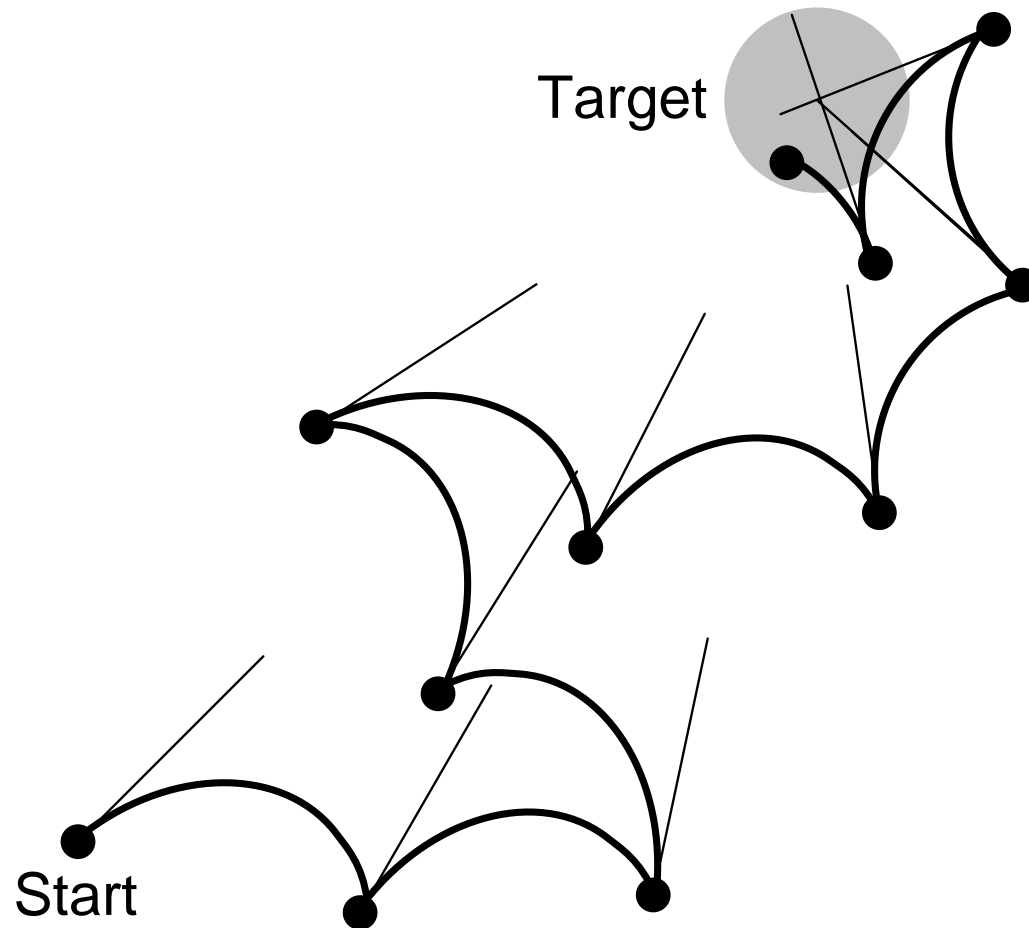
Code Refactoring



Frequent feedback

Feedback

stepsize: 3 months
elapsed time: 25 months

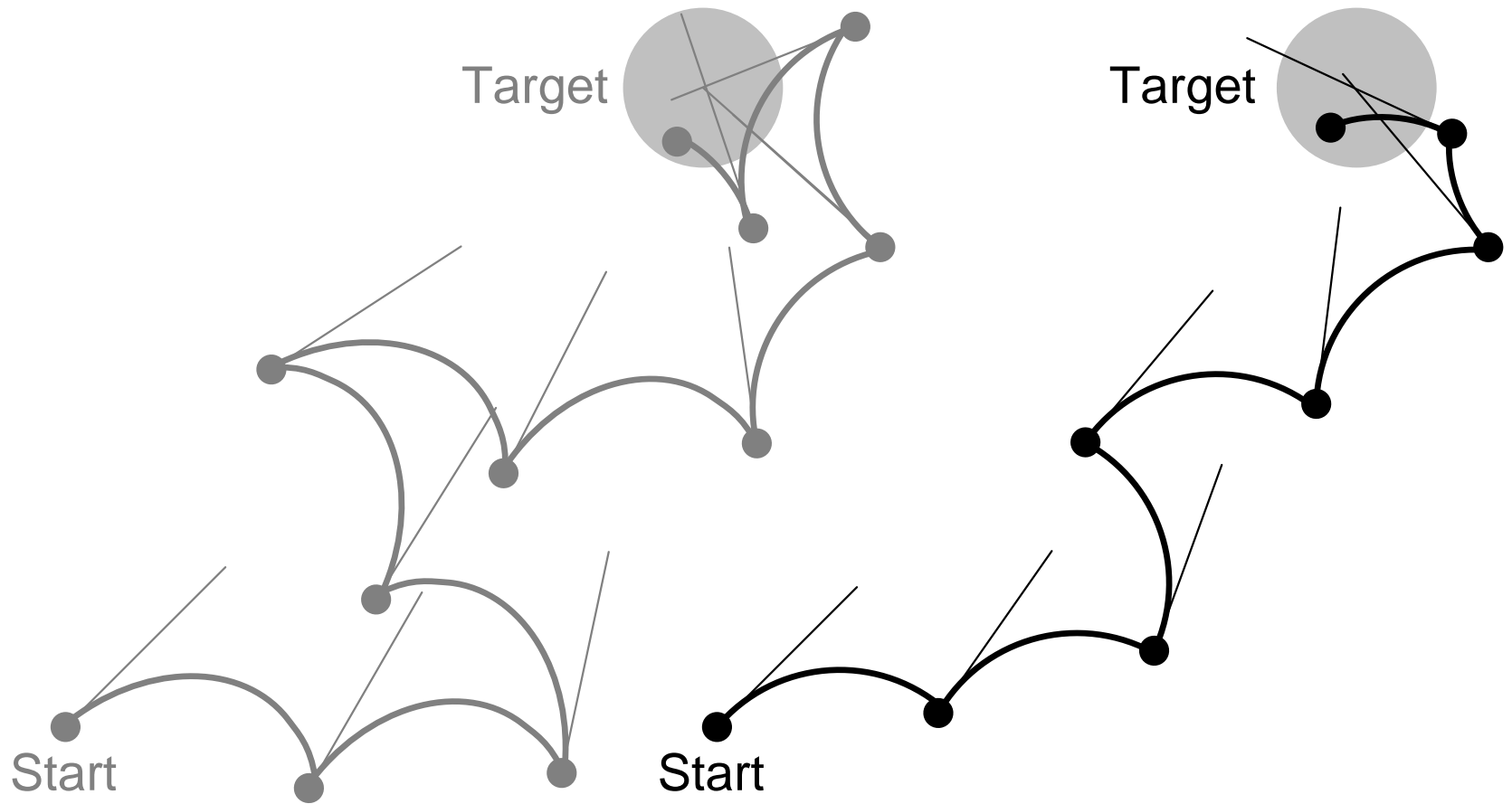


Feedback (2)

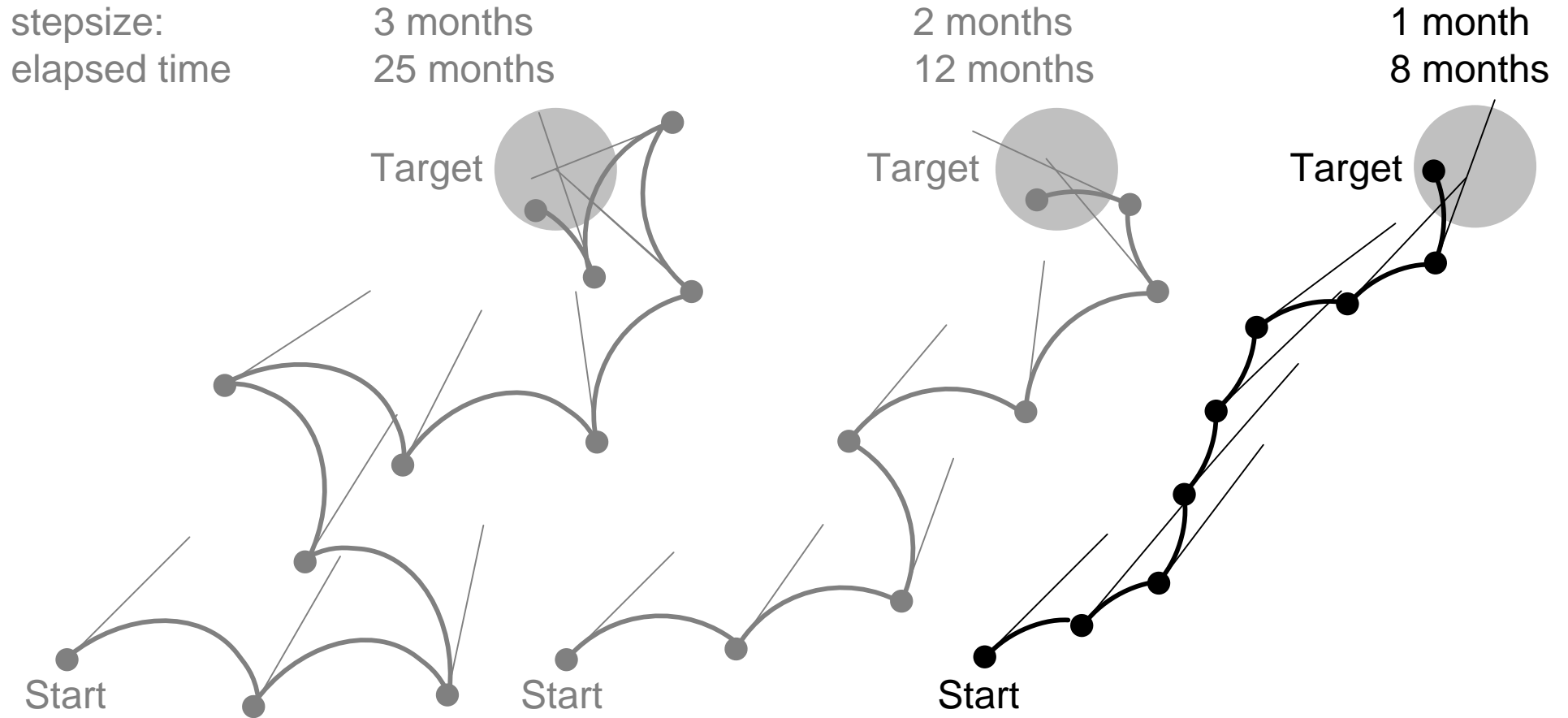
stepsize:
elapsed time

3 months
25 months

2 months
12 months



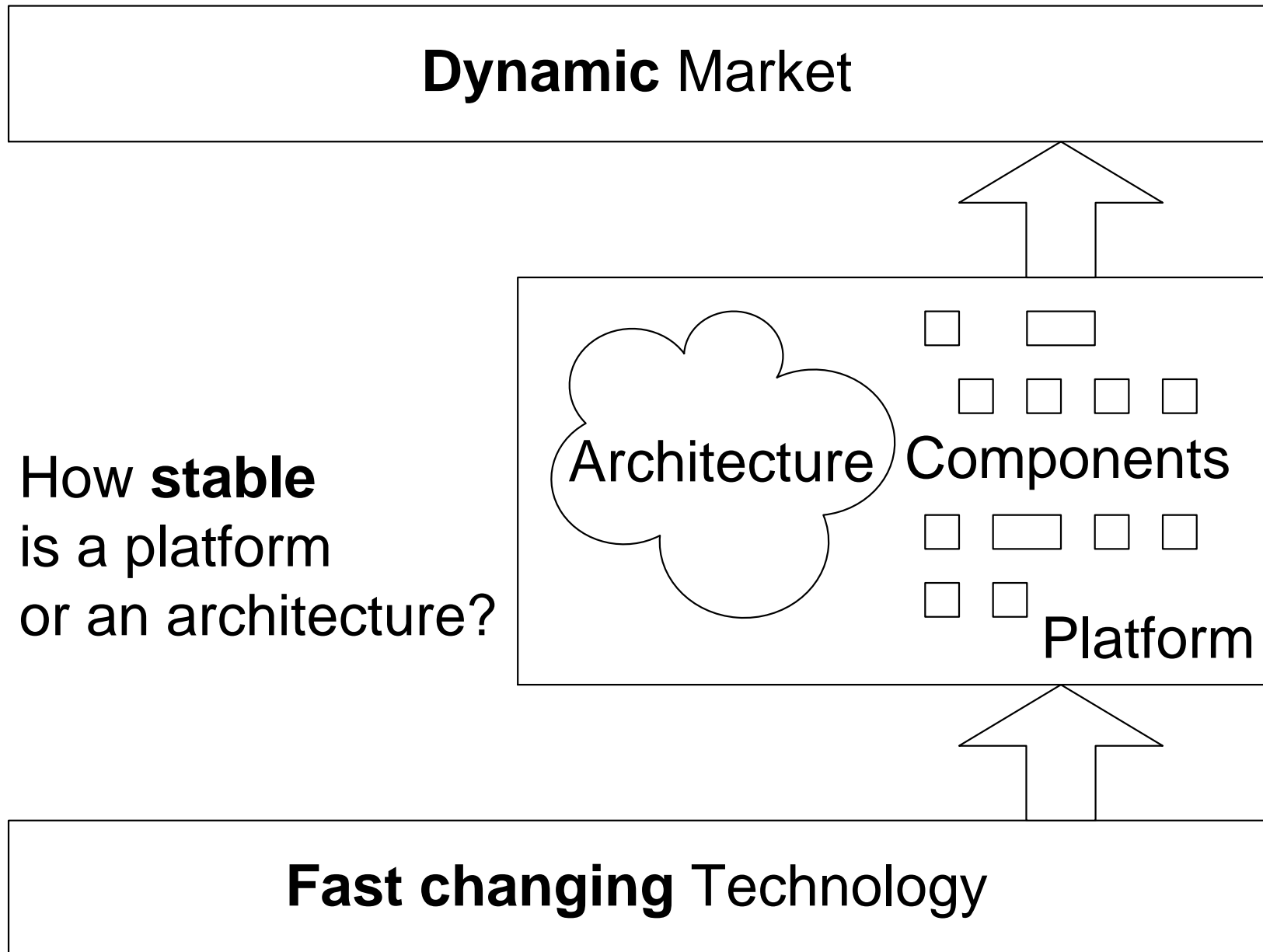
Feedback (3)



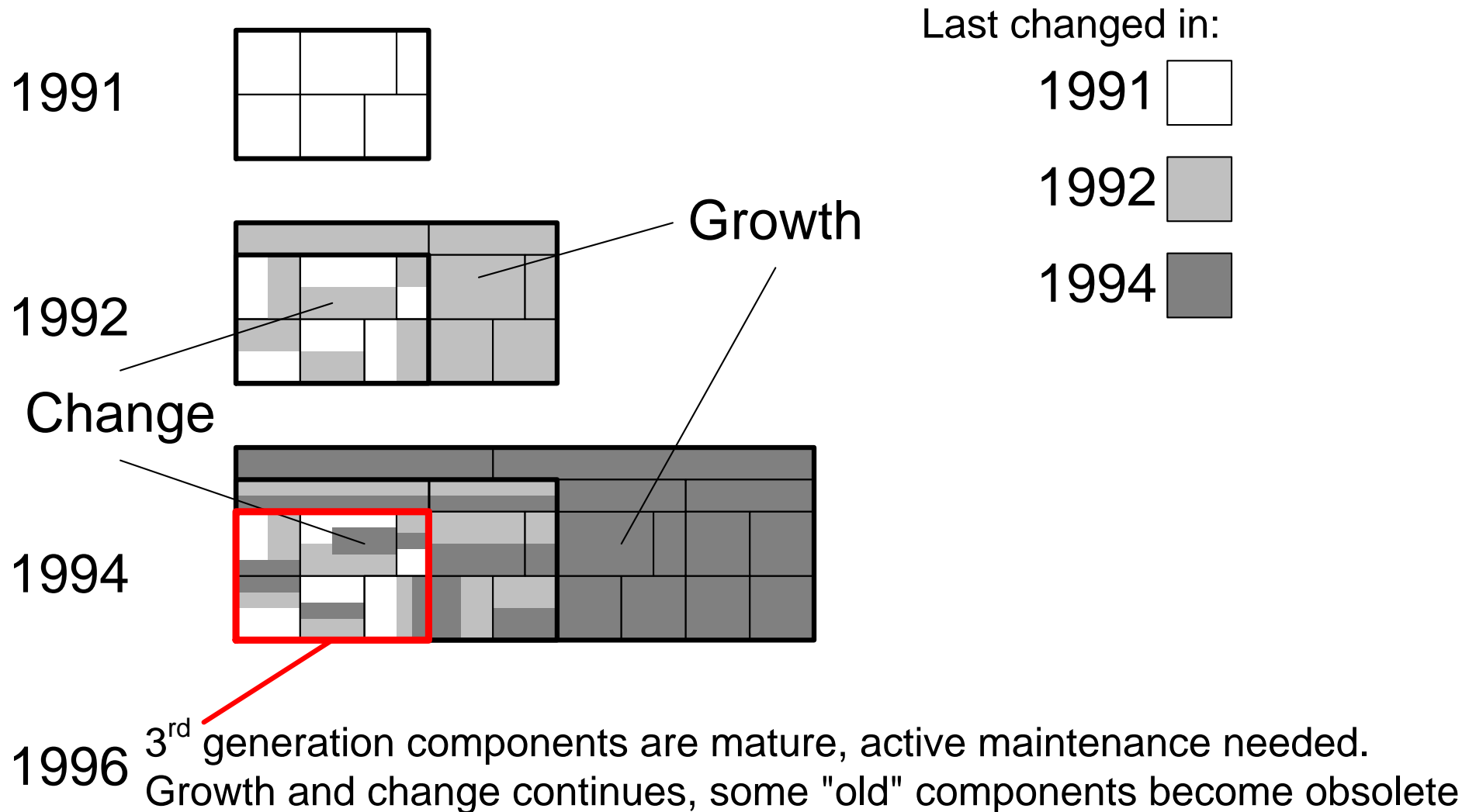
Small feedback cycles result in Faster Time to Market

Awareness of dynamics

Myth: Platforms are Stable

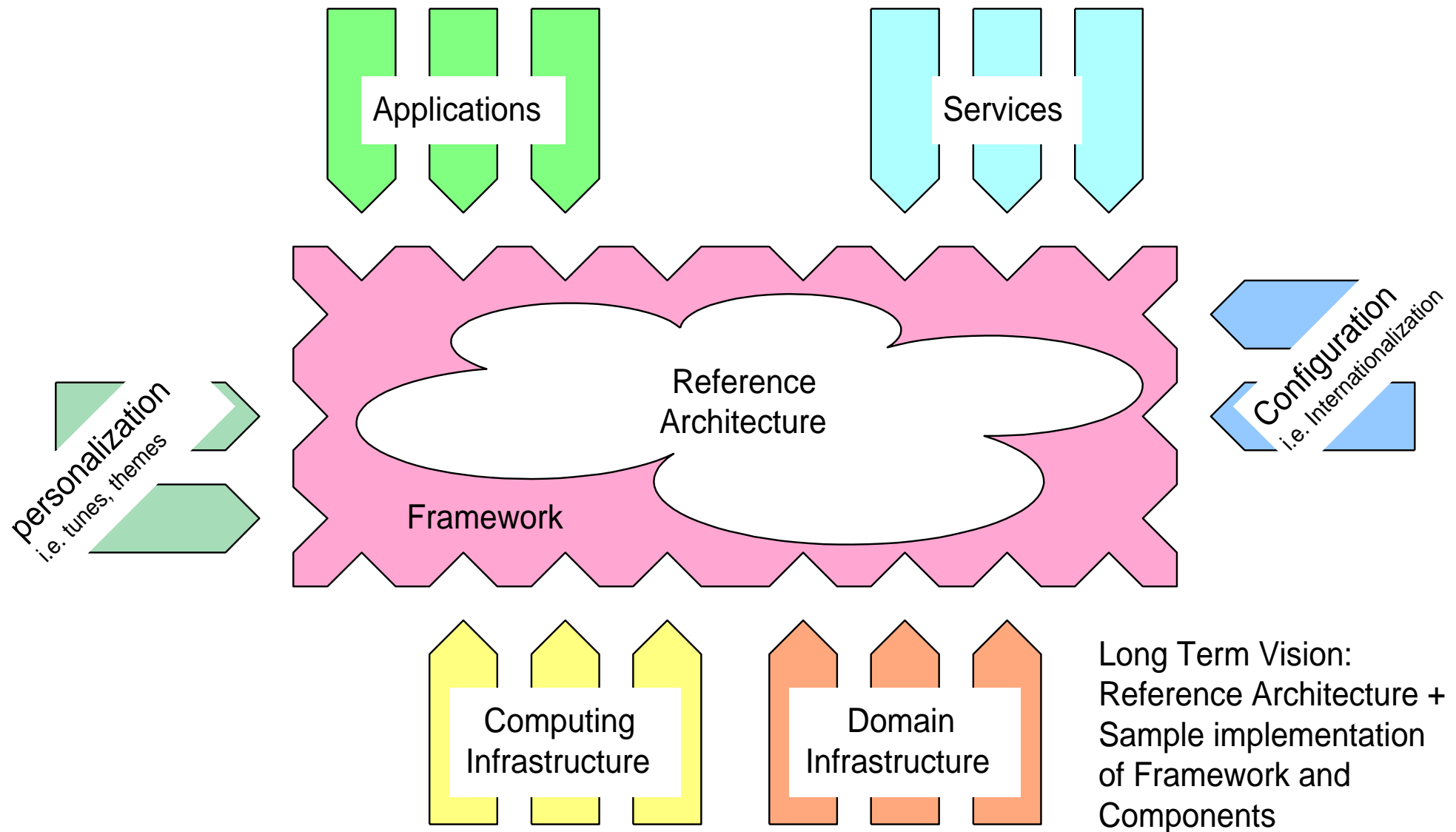


Platform Evolution (Easyvision 1991-1996)

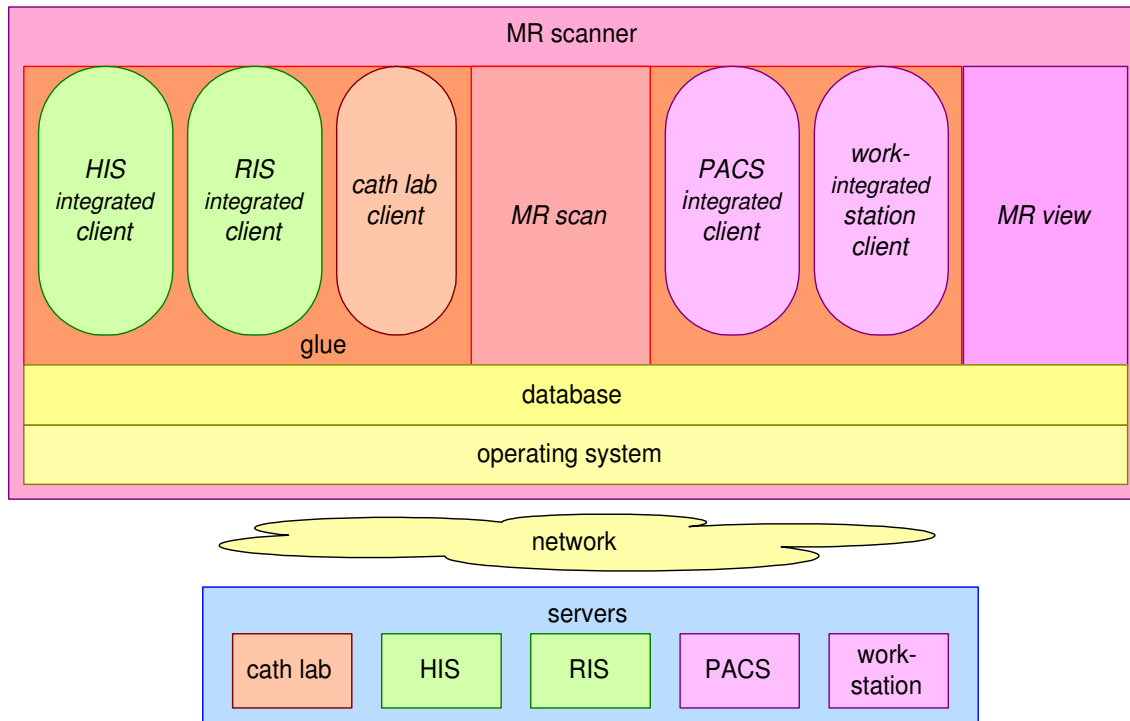


Long Term Vision

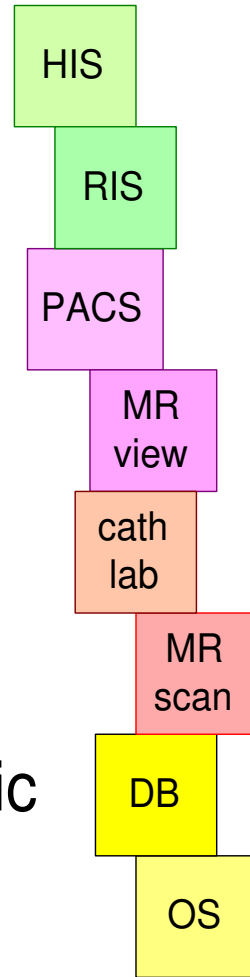
Example Long Term Vision



Don't do



Proclaimed reuse



Opportunistic Legacy Integration

Conclusion: Refactoring the Architecture is a must

