

# Improving software development practices through components

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COCLEA S.r.l.



# Outline

- Context and background
- Process change and methodology
- The experiment
  - Coupling analysis
  - Effort analysis
  - Timing consideration
  - Qualitative evaluation
  - Lessons learnt



# Context

- A case study on software process improvement
- Introduction of component-based software development
- The goal is to assess the impact of CBSD in the software development process
- In the framework of the IST EU programme (COPPER, IST#20797)



# Background

- Coclea S.r.l. is a small Italian company, offering software solutions in the area of network services
- Using object-oriented technologies and methods (Java, UML...)
- Small projects repeated and customized
- High reuse potential, but...not exploited today

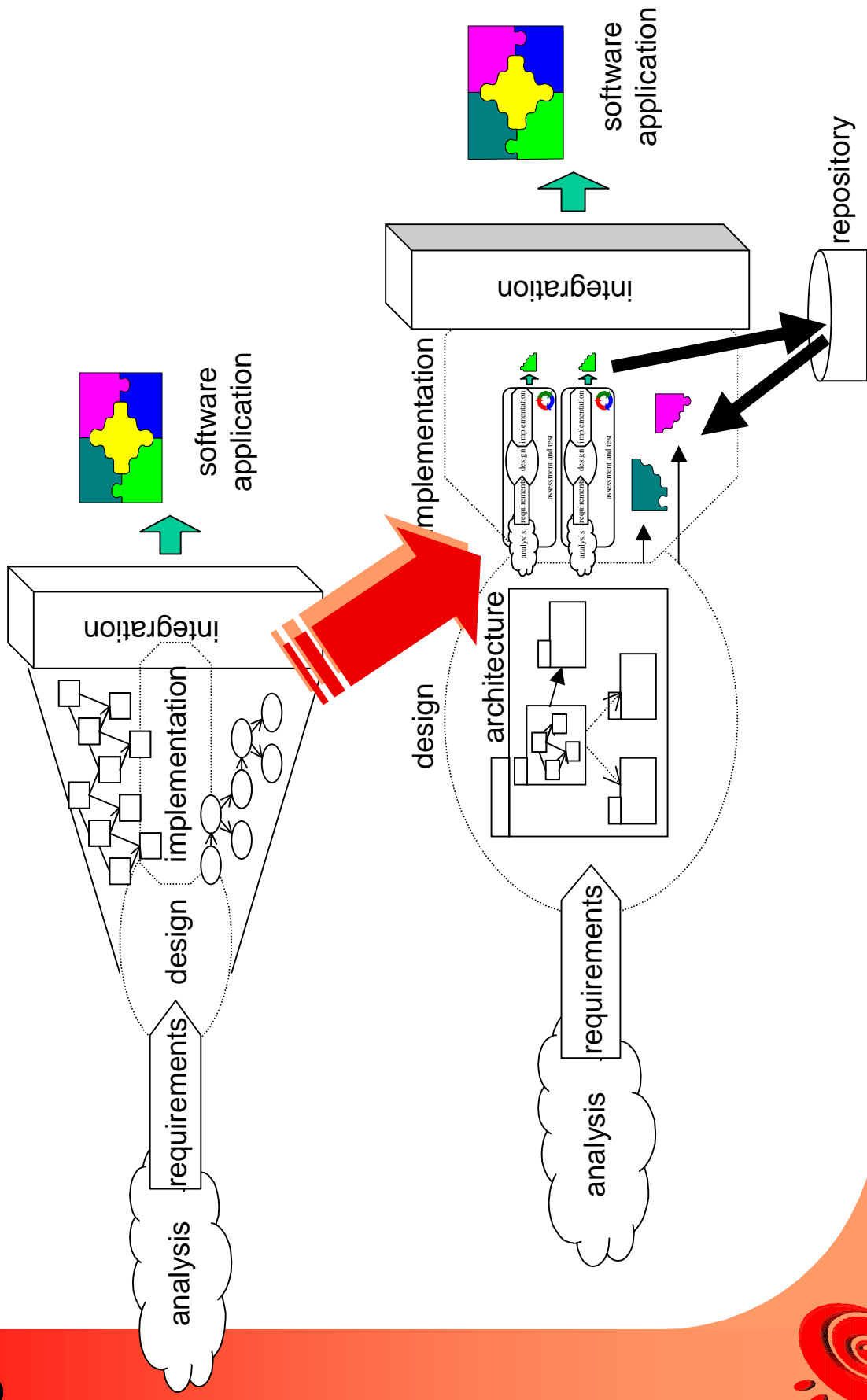


# Project Goals

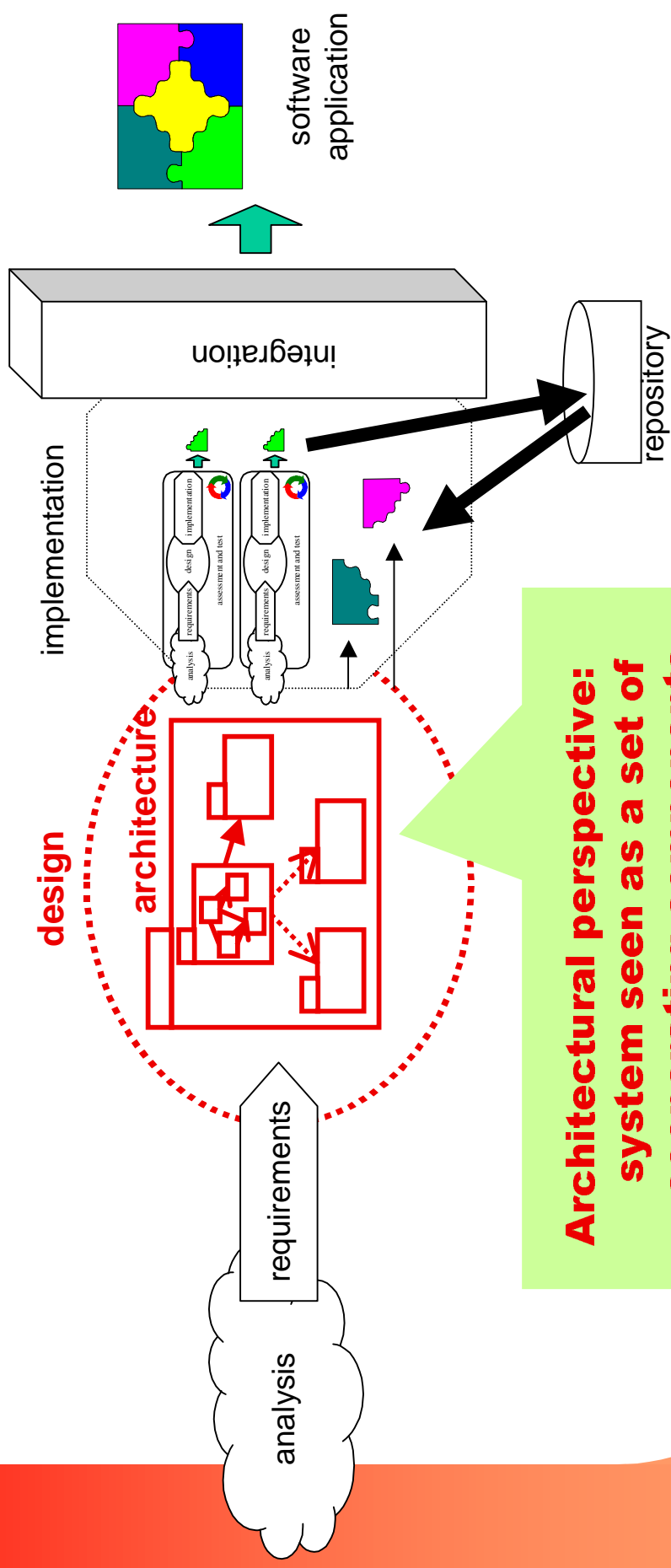
- From the *business* point of view:
  - To increase the efficiency of the software development process
- From the *technical* point of view:
  - To better software application design
  - To improve understandability of software system structures
  - To make software composition clearer, more manageable and understandable



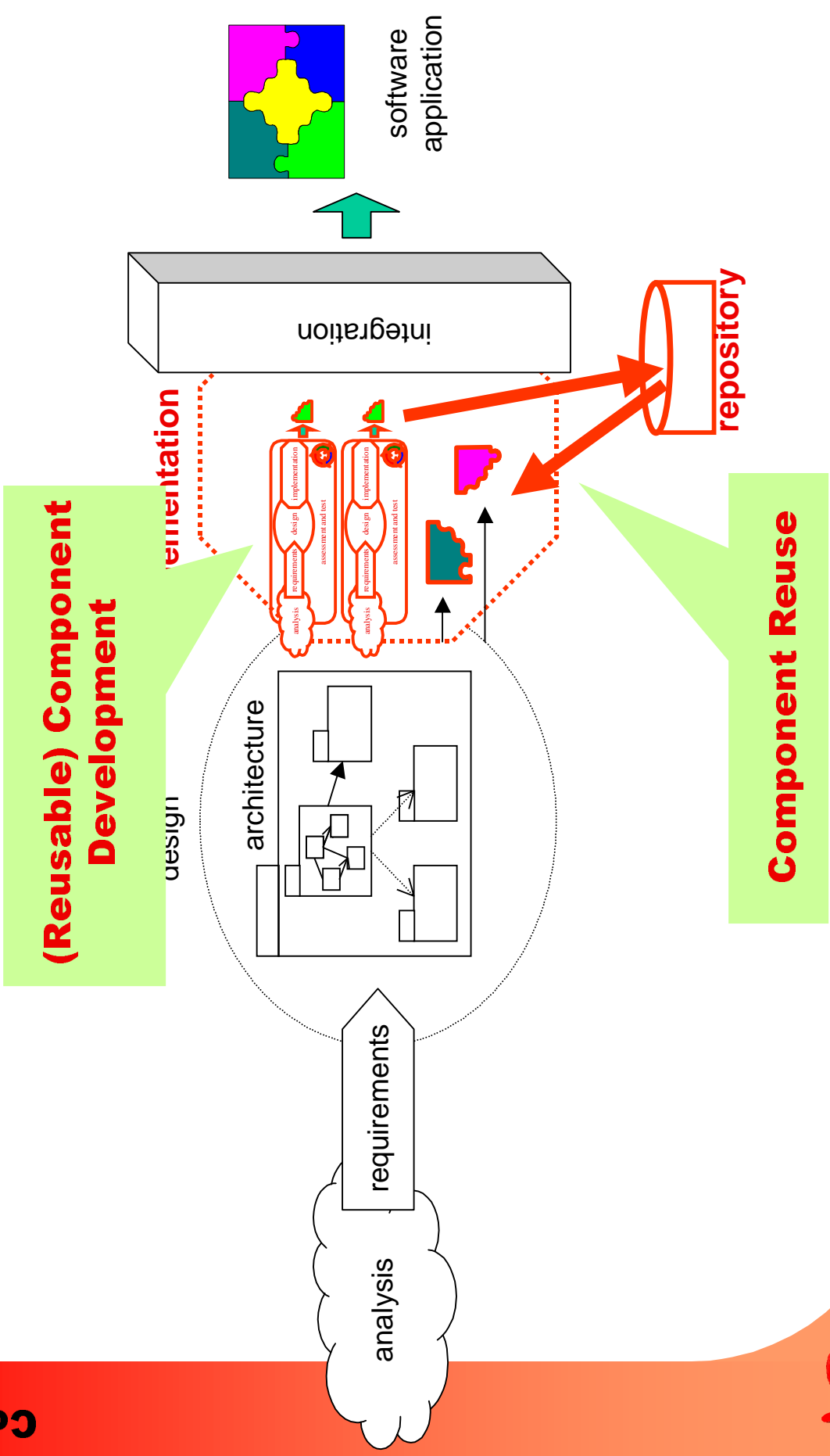
# Process change



# Approach



# Approach



# Methodology

- Three views to describe a component  
(based on *UML*):
  - **Context**: allows a software architect to evaluate if the component can be reused in a given situation
  - **Design**: allows a reuser to integrate the component in the host system
  - **Implementation**: describes the component internal structure for maintenance or future extensions

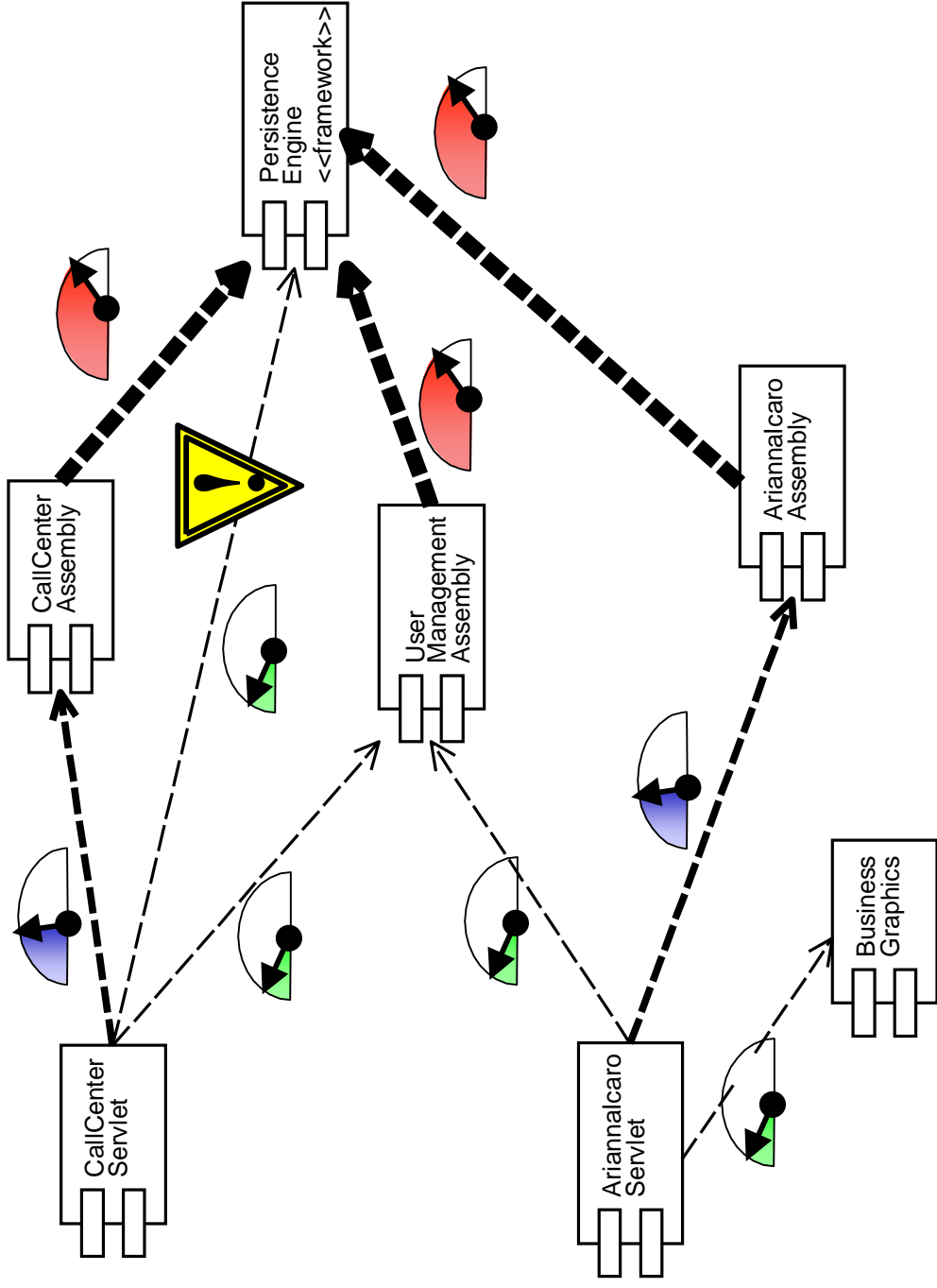


# Baseline

- Complex Intranet Web Applications, (typical projects for the firm):
  - **CallCenter**: software for call center operation management (problem tracking,...)
  - **Ariannalcaro**: management of a franchising network (especially clothing and fashion stores)



# Coupling analysis

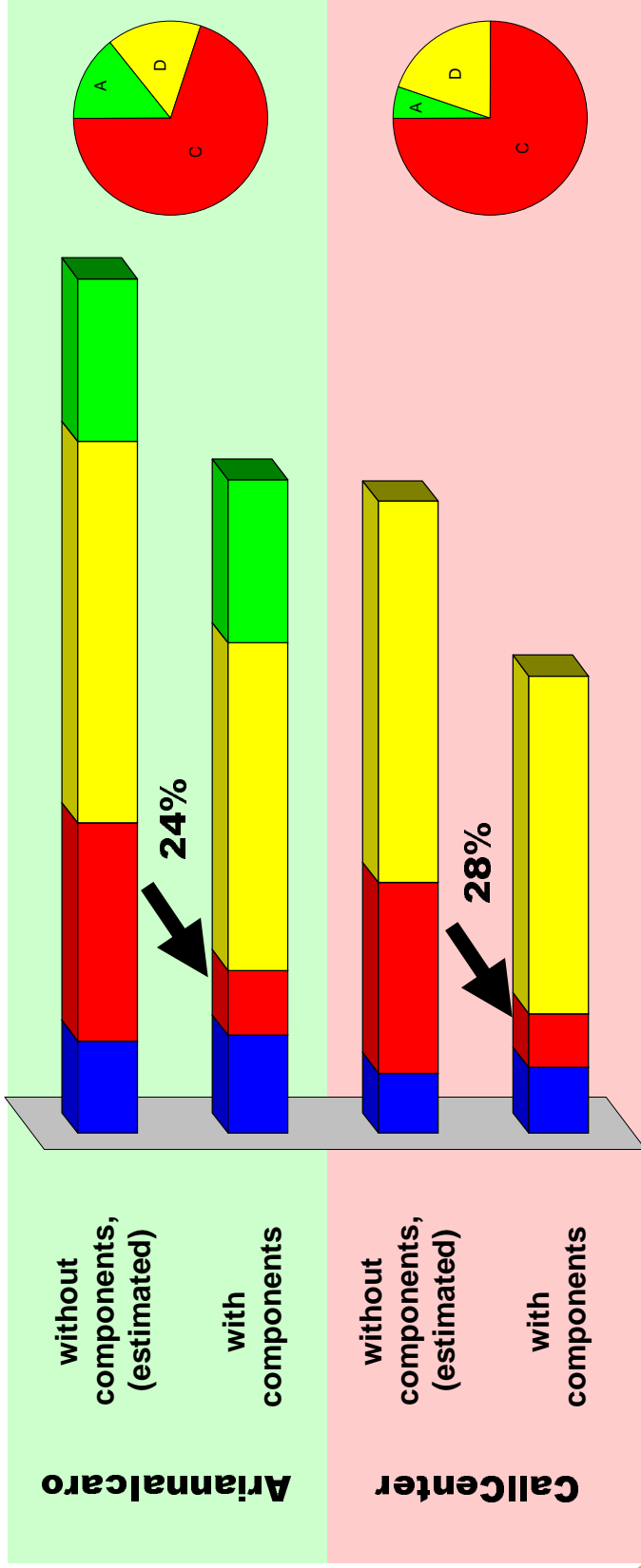
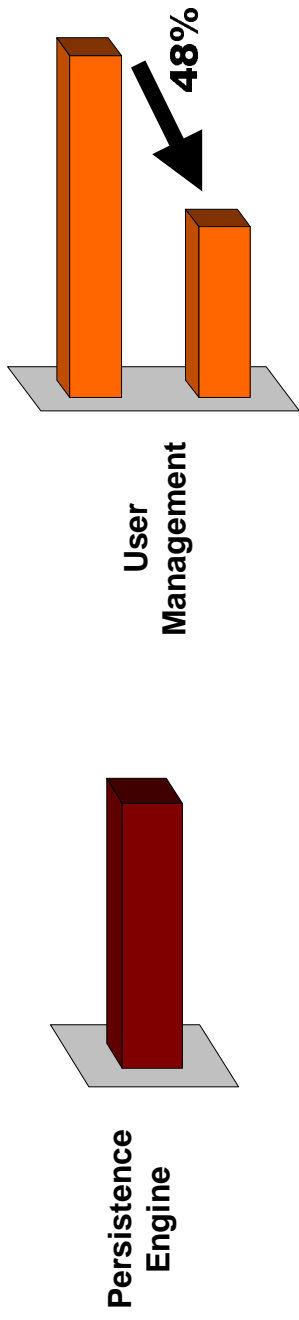


# Coupling evaluation

- In past projects we had many objects with complex communication links...
- ...the adoption of CBSD allowed to encapsulate specific system features in low-coupled components showing a high cohesion, resulting in a more modular design
- *We measured high coupling figures (an unexpected result) for a particular component showing an architectural framework role, thus employing specific (re)use mechanisms*

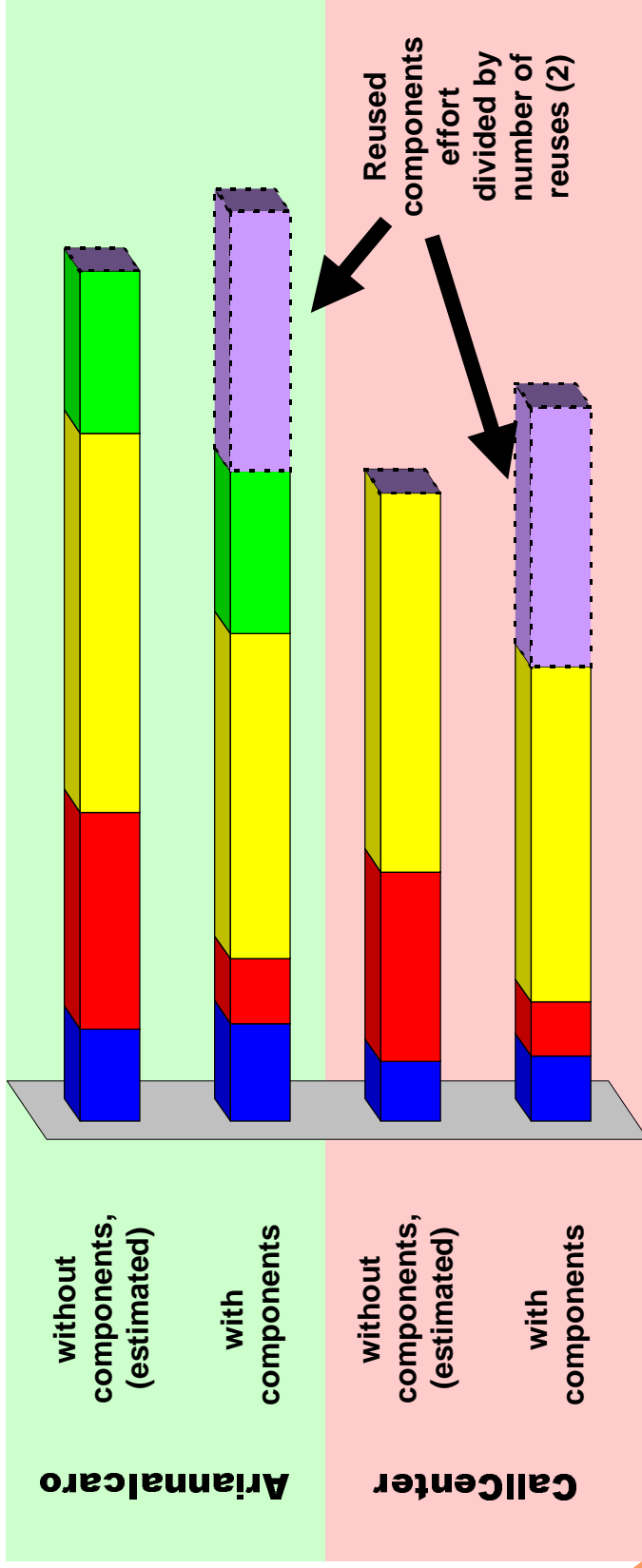


# Effort analysis

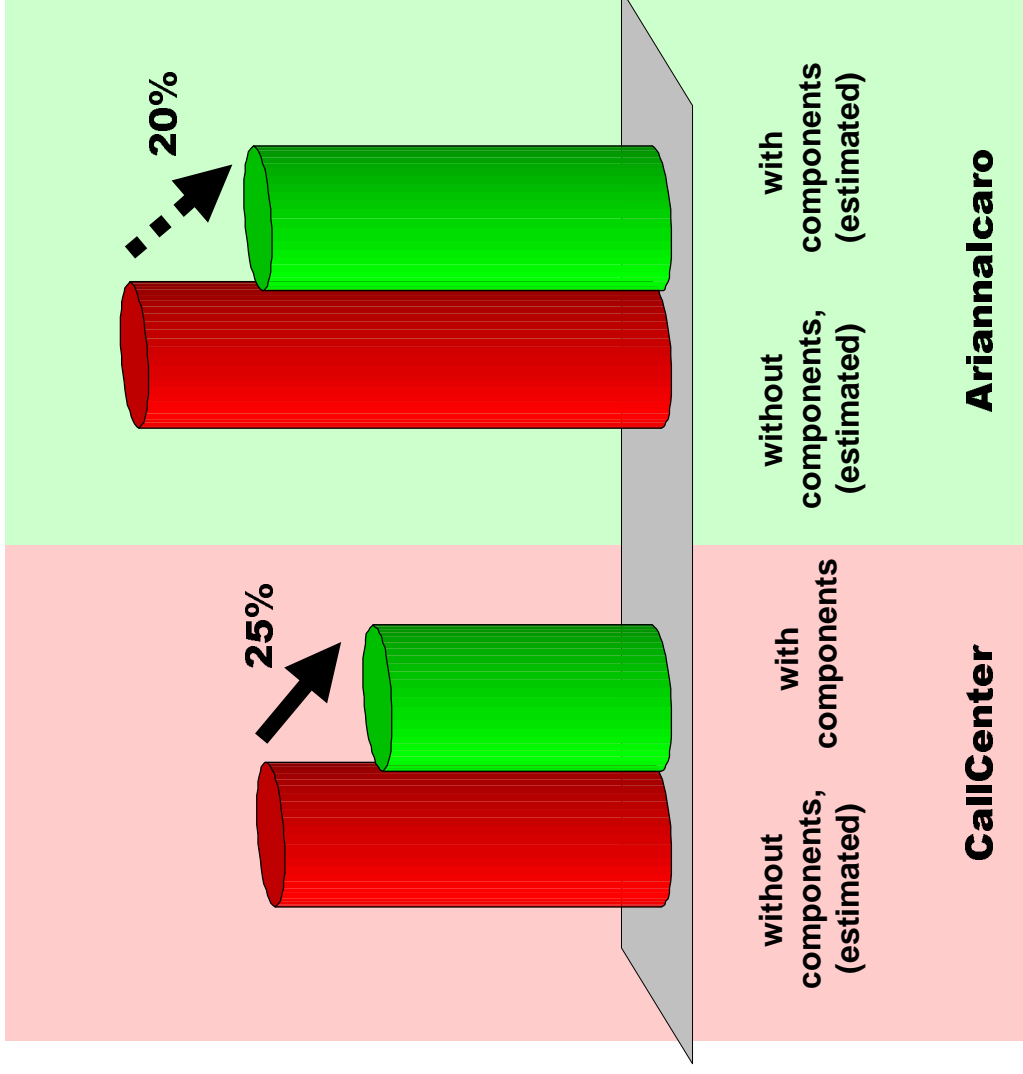


# Effort evaluation

*We estimate to reach the cut-off point with 3 reuses  
(if there are no changes to the components)*



# Time-to-market



# Qualitative evaluation

- Increased modularity
- Code and design standardization: increased maintainability and understandability
- Reused components are more stable and robust
- Improvements of components impact all the projects that reused them
- Better resource allocation and project scheduling
- Improved team work



# Lessons Learnt

- CBSD can give *effective results* also to SMEs
- A well-focused improvement action can give *early benefits*
- Technology and tool are important...but *training* is fundamental!
- Each component has a *learning curve*: the more is reused, the more efficient is its reuse (at least until its interface is stable)

