

A Reference Architecture Primer

by *Gerrit Muller* University of South-Eastern Norway-NISE

e-mail: gaudisite@gmail.com

www.gaudisite.nl

Abstract

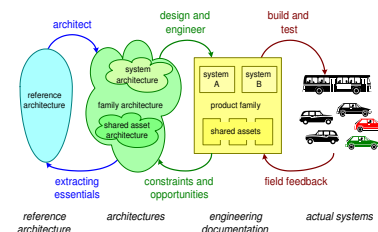
A Reference Architecture captures the essence of the architecture of a collection of systems. The purpose of a Reference Architecture is to provide guidance for the development of architectures for new versions of the system or extended systems and product families.

We provide guidelines for the content of a Reference Architecture and the process to create and maintain it. A Reference Architecture is created by capturing the essentials of existing architectures and by taking into account future needs and opportunities, ranging from specific technologies, to patterns to business models and market segments.

Distribution

This article or presentation is written as part of the Gaudí project. The Gaudí project philosophy is to improve by obtaining frequent feedback. Frequent feedback is pursued by an open creation process. This document is published as intermediate or nearly mature version to get feedback. Further distribution is allowed as long as the document remains complete and unchanged.

September 9, 2018
status: preliminary
draft
version: 0.6



1. general introduction

2. level of abstraction

3. content

4. summary

Why Reference Architectures?

When to Use Reference Architectures?

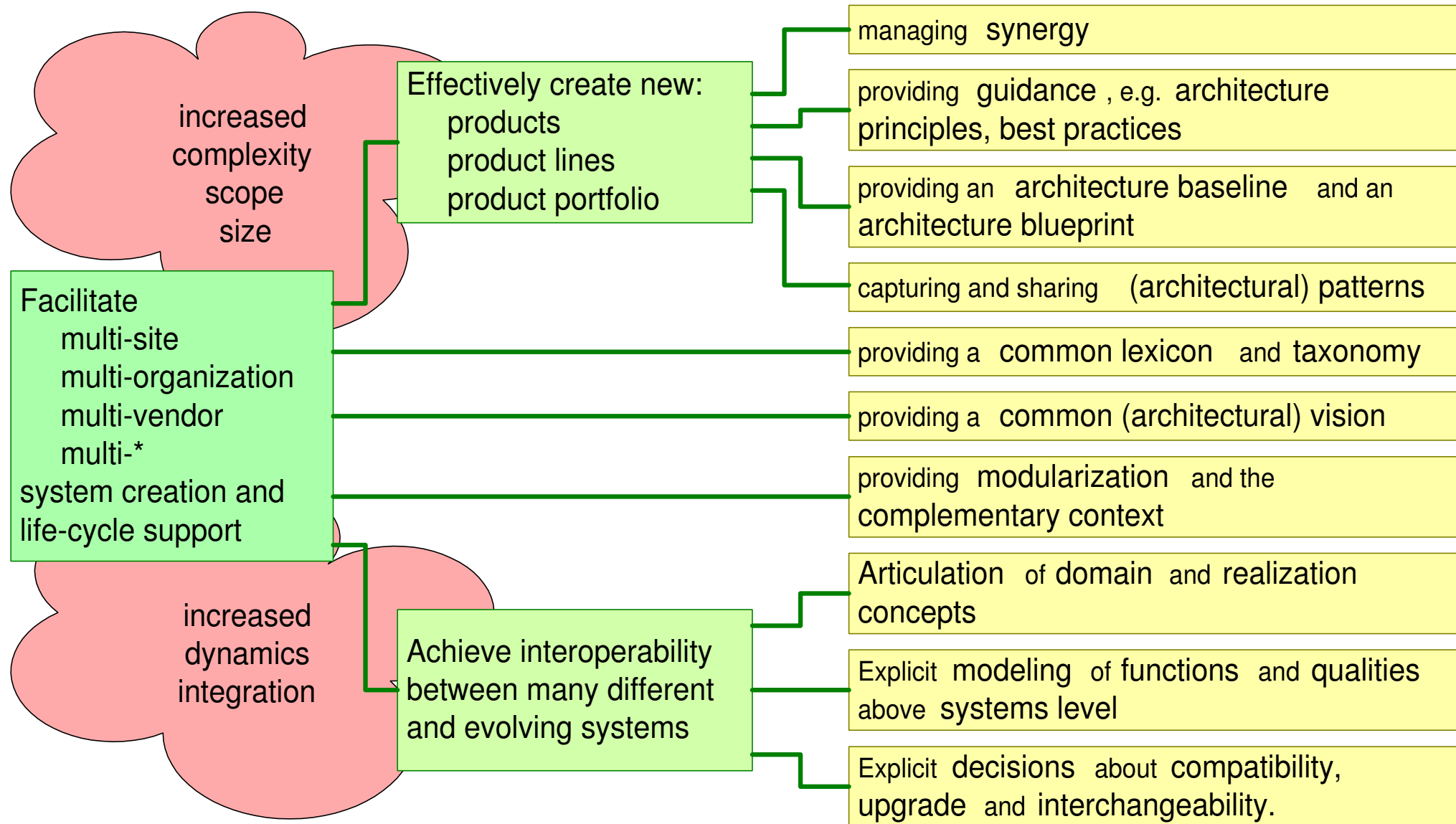
What do Reference Architectures contain?

How to use Reference Architectures?

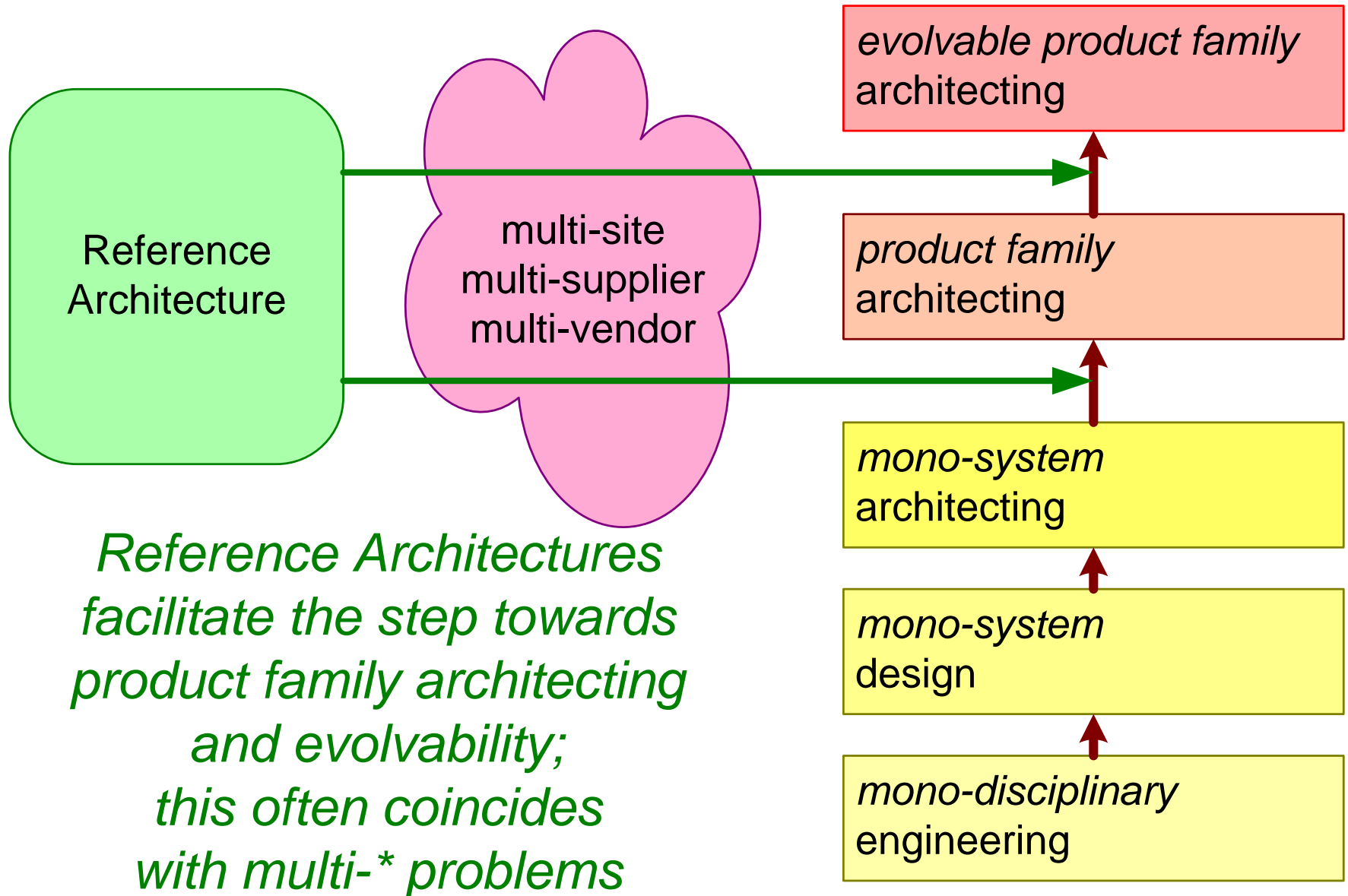
What are inputs of a Reference Architecture?

Criteria for a good Reference Architecture.

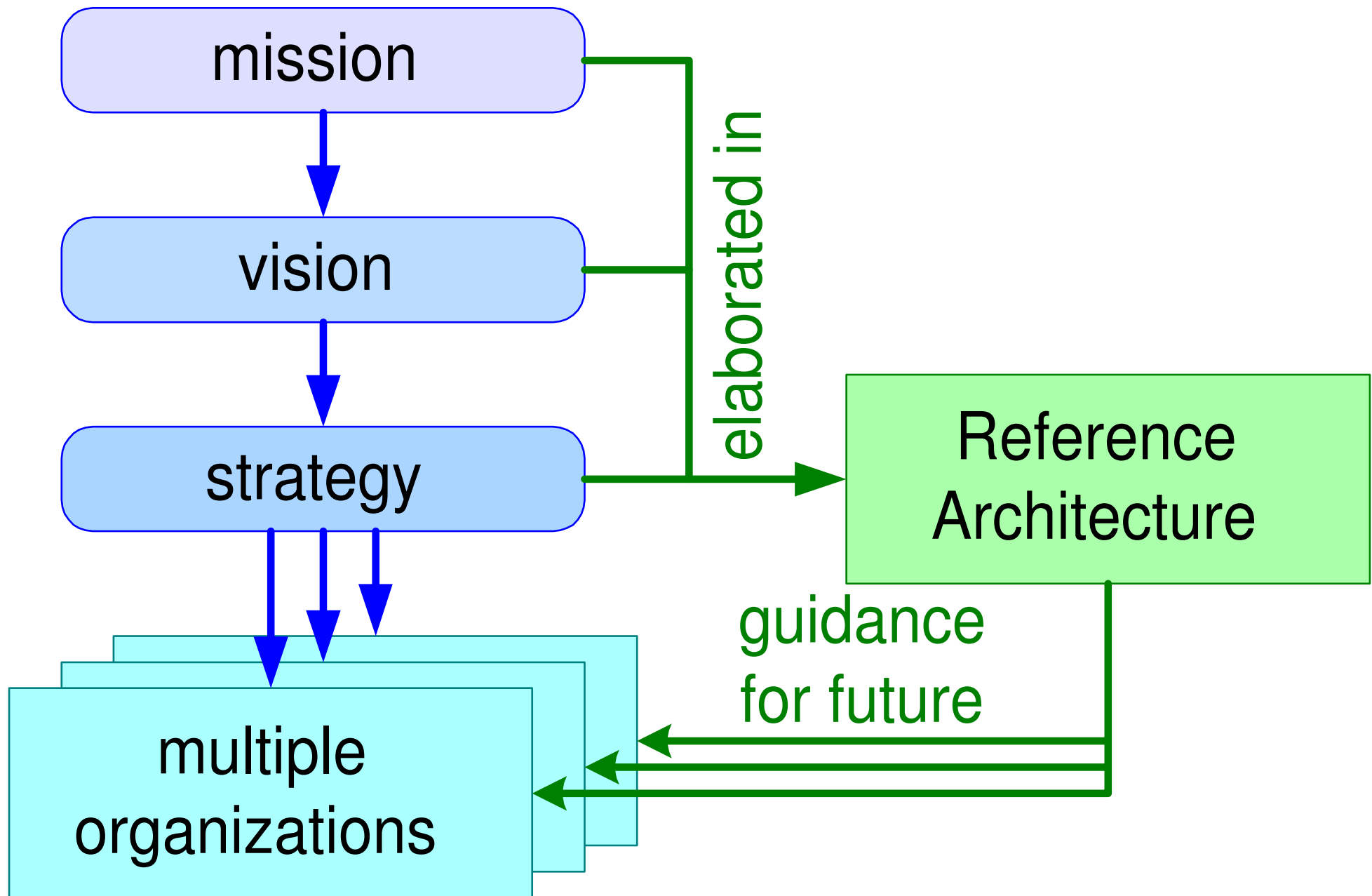
Graph of objectives of Reference Architectures



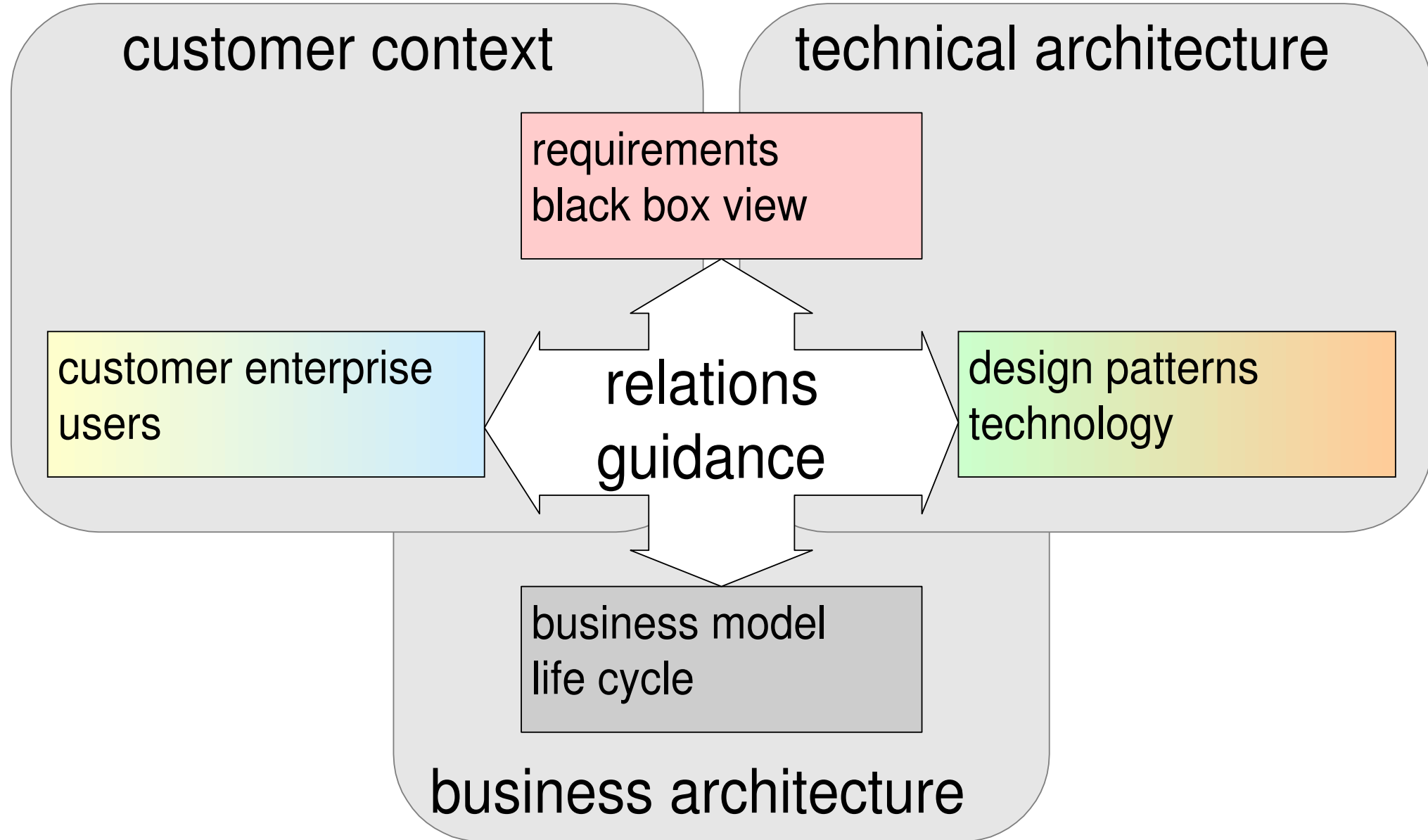
When to Use Reference Architectures



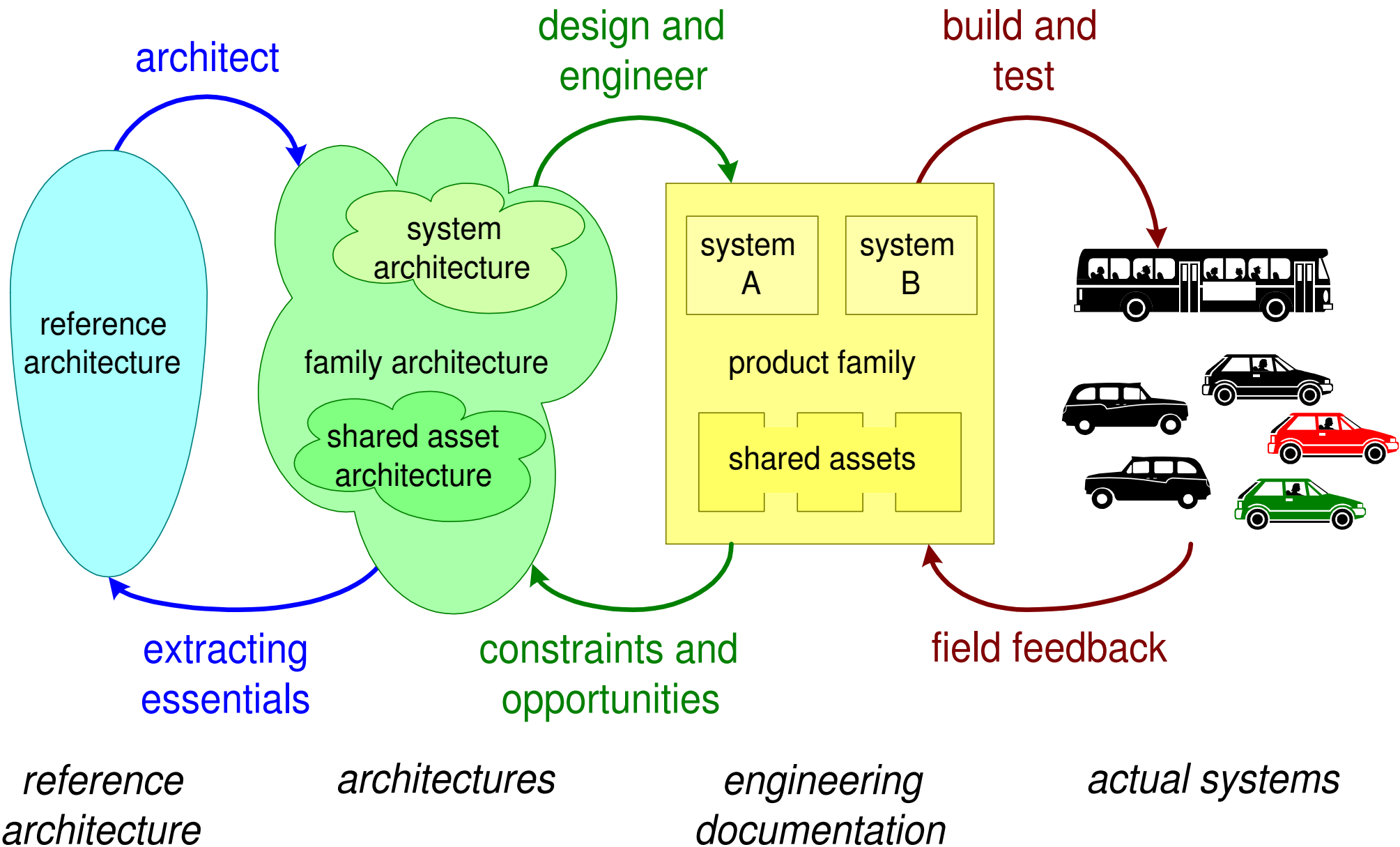
RA Elaborates Mission, Vision and Strategy



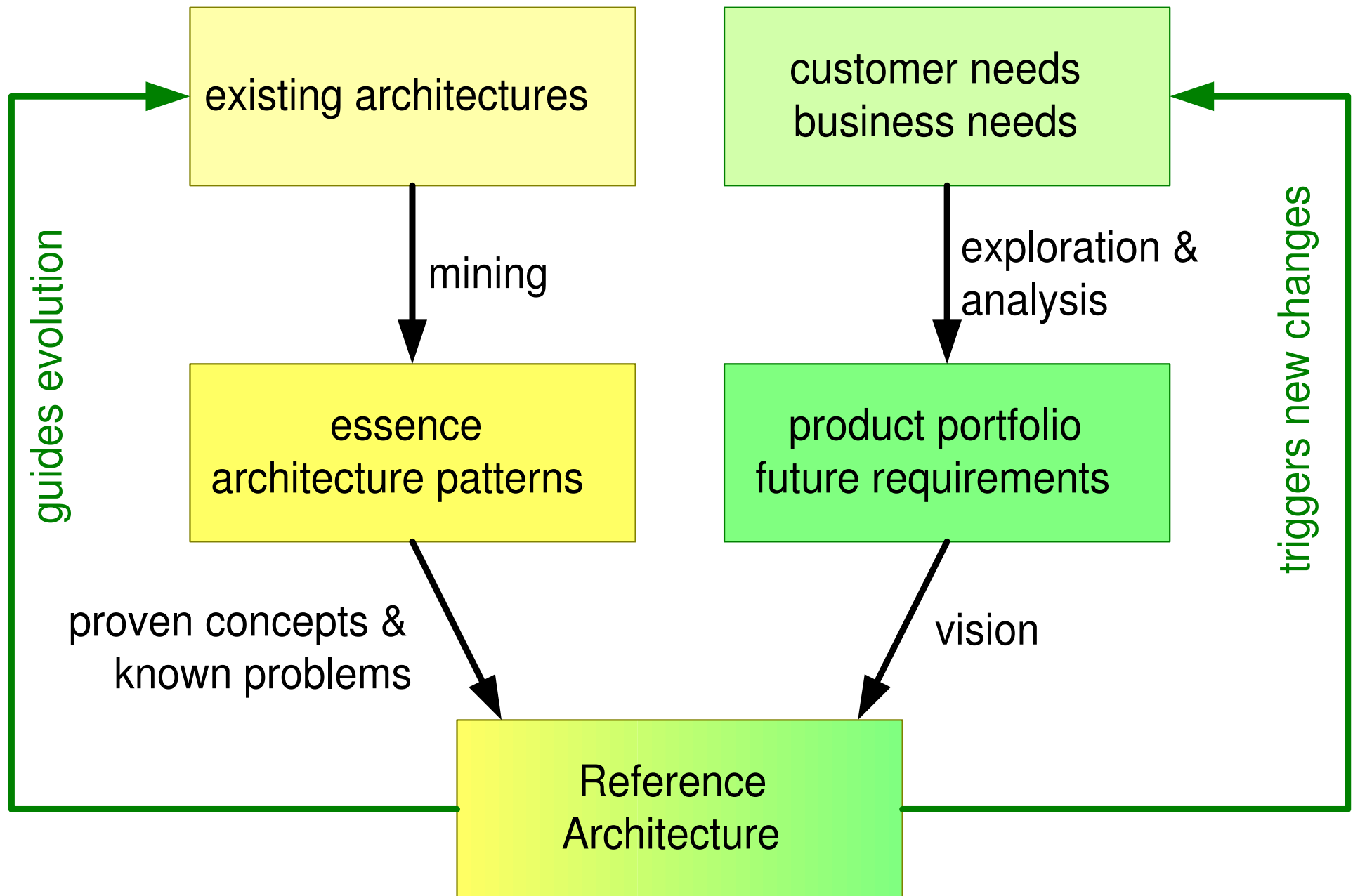
RA = Business Arch. + Technical Arch. + Customer Context



Instantiation of a RA in few Transformations



Inputs of a Reference Architecture



Criteria for a good RA

Criteria for a good Reference Architecture

- understandable for broad set of stakeholders — customers
product managers
project managers
engineers
- accessible and actually read/seen by majority of the organization ...
- addresses the key issues of the specific domain
- satisfactory quality
- acceptable
- up-to-date and maintainable
- adds value to the business

Challenge: Appropriate Level of Abstraction

Single System

Product Family in Context

Capturing the Essence

Size Considerations:

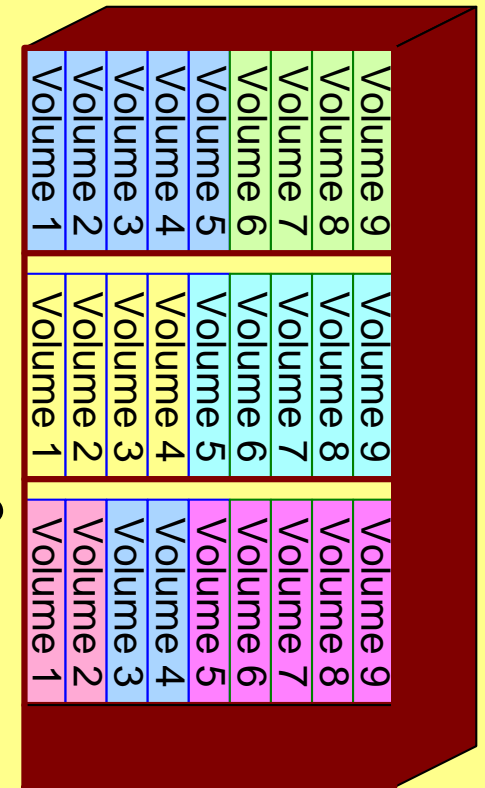
What is the appropriate level of abstraction?

How many details?

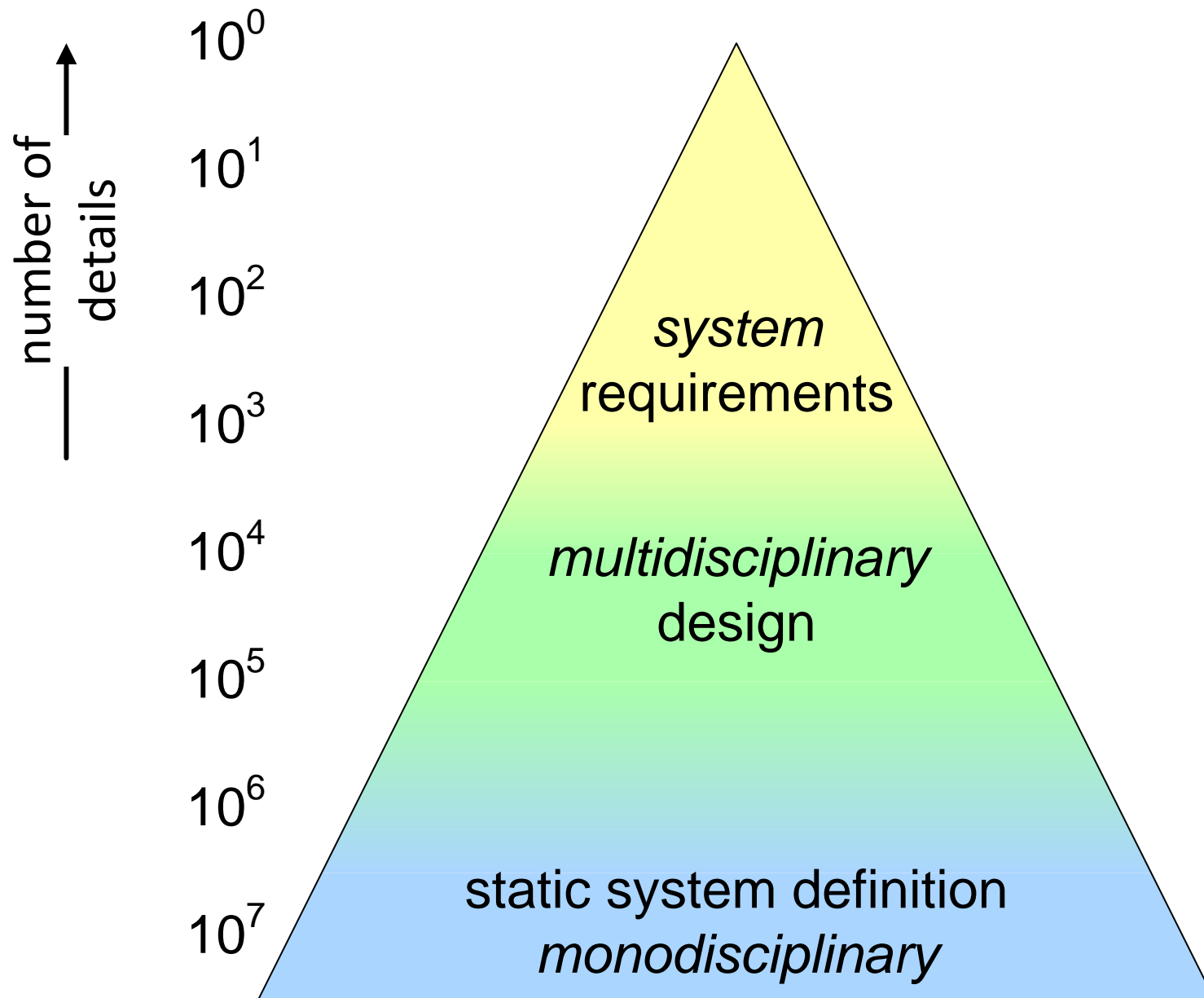
Decomposition of Large Documents



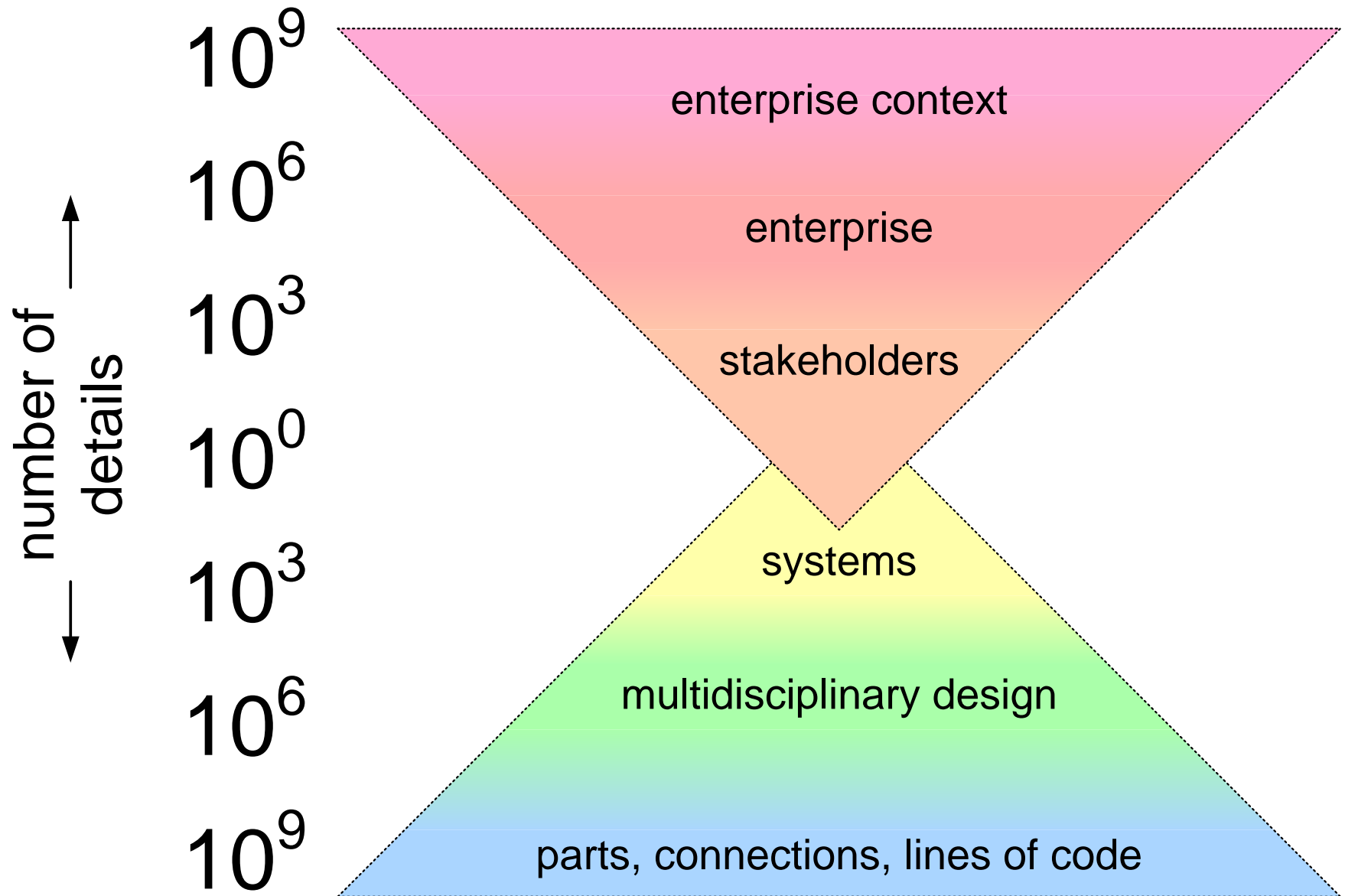
or



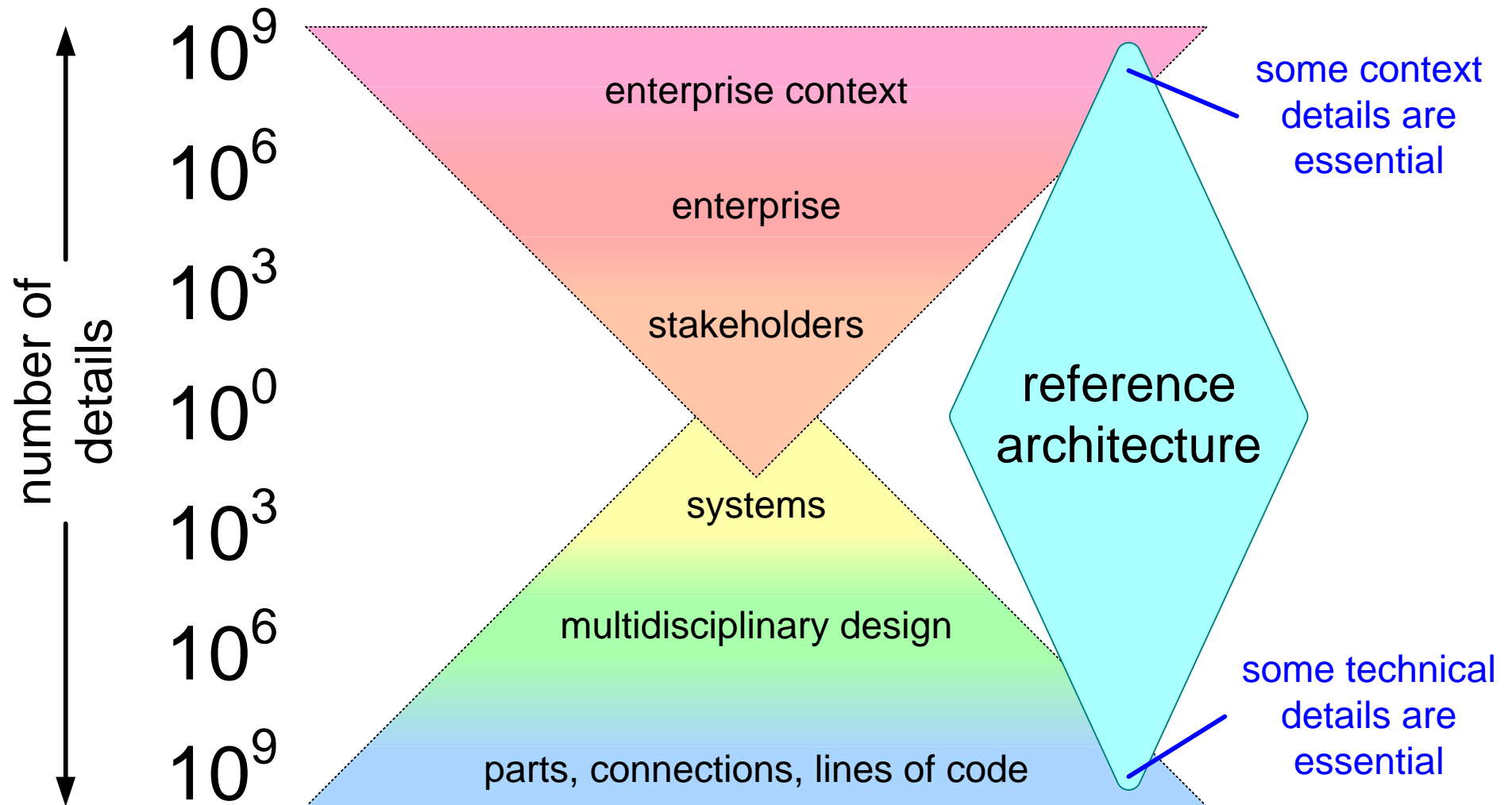
Level of Abstraction Single System



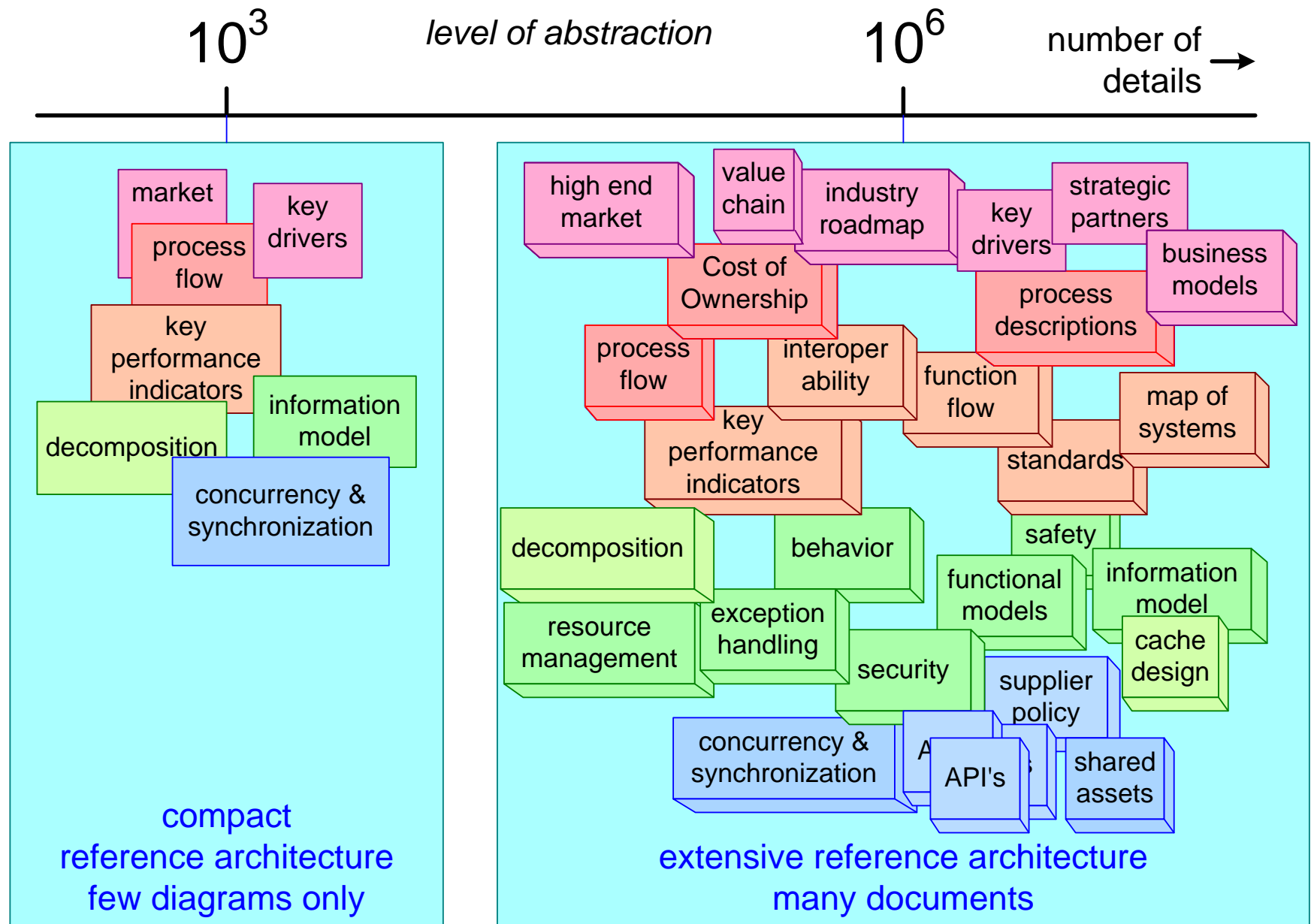
Product Family in Context



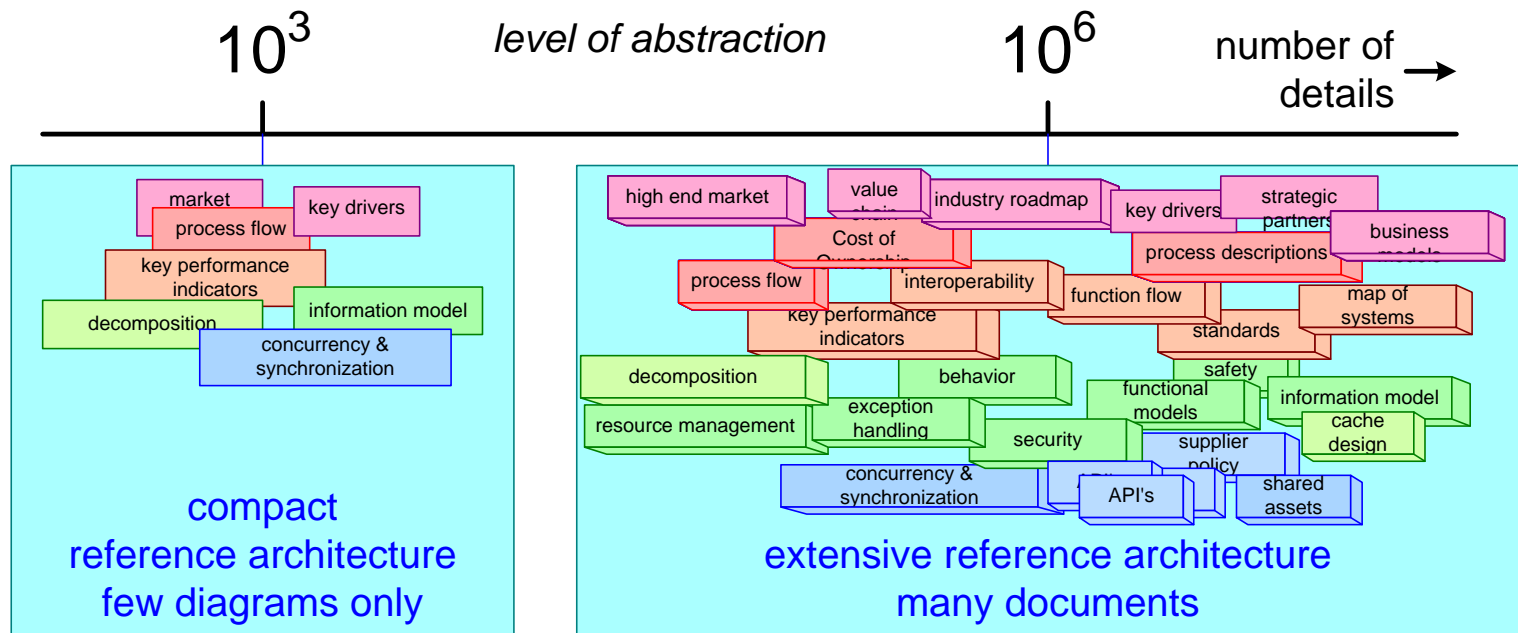
RA: Capturing the Essence



RA: level of abstraction, number of details



Size Considerations



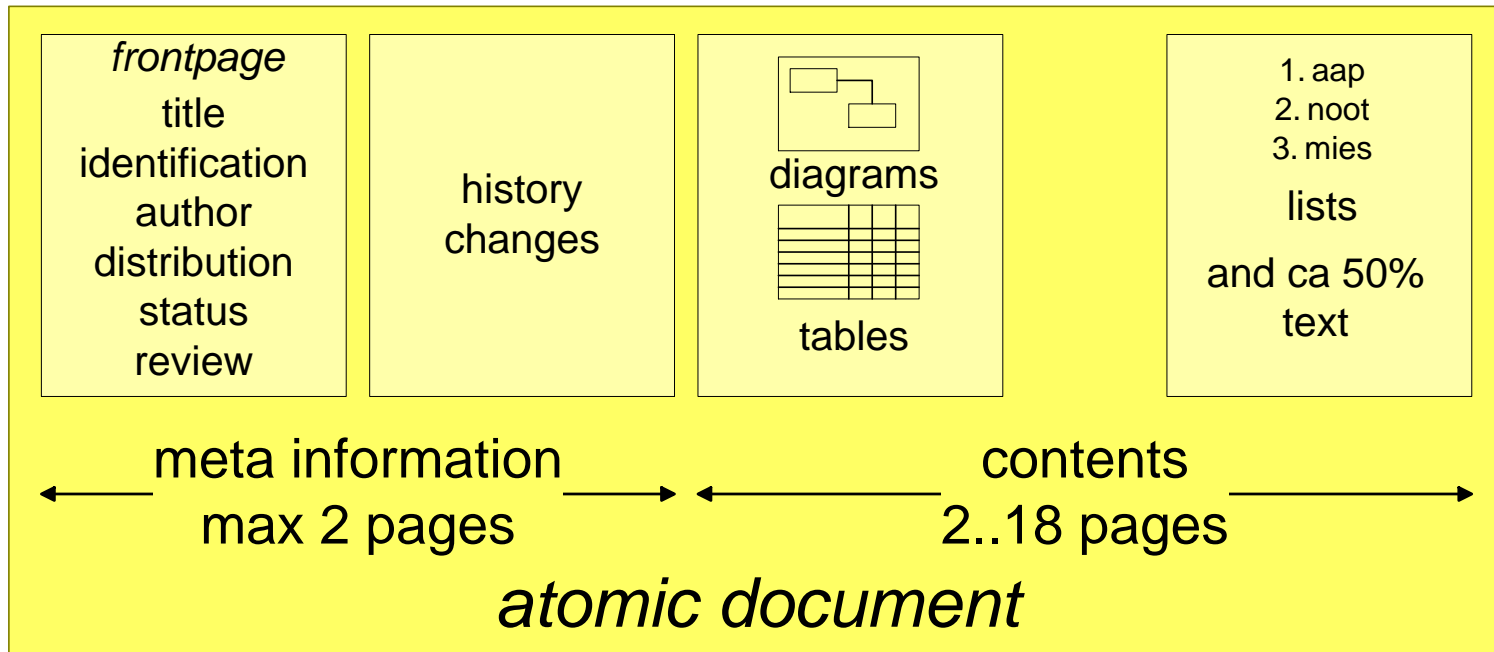
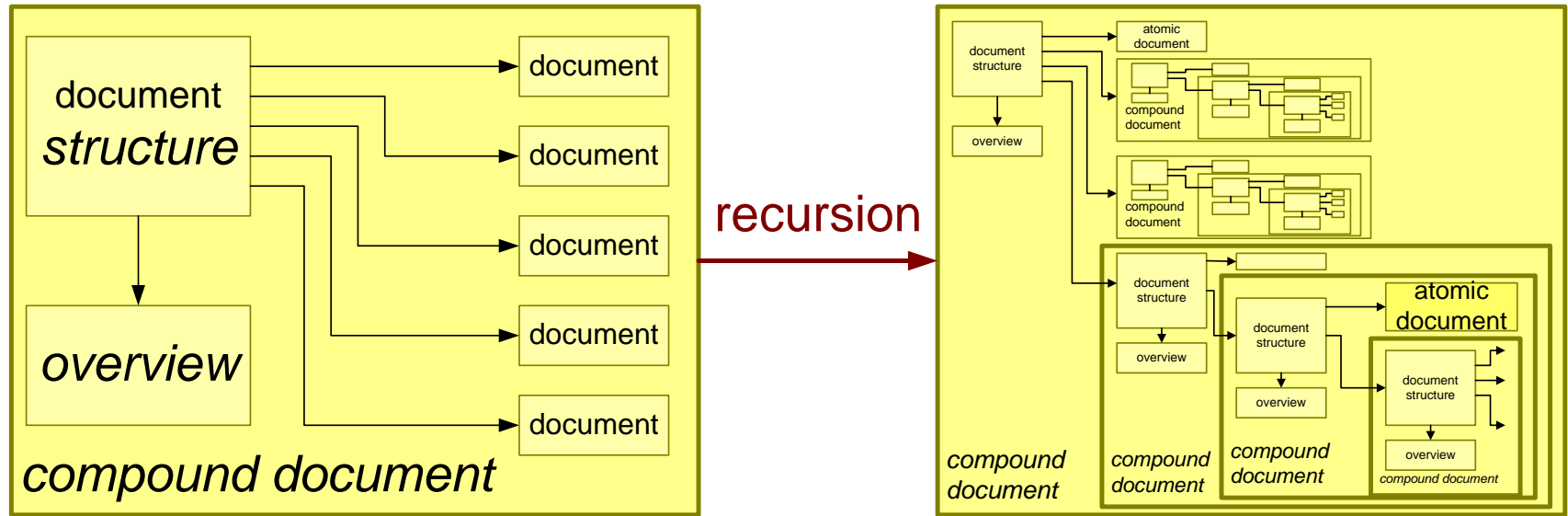
low effort to
create
maintain
read
easy to share

limited
guidance
anchor value

significant effort to
create
maintain
read
difficult to share

great
guidance
anchor value

Decomposition of Large Documents



Guidance from Best Practices

Visualizations

Structure

What content should be in Reference Architectures?

1.1 One of several prerequisites for architecture creative synthesis is the definition of **5-7 specific key drivers** that are critical for success, along with the rationale behind the selection of these items

2.1. The essence of a system can be captured in about **10 models/views**

2.2. A **diversity** of architecture descriptions and models is needed: languages, schemata and the degree of formalism.

2.3. The level of **formality** increases as we move closer to the implementation level.

from <http://www.architectingforum.org/bestpractices.shtml>

Possible useful visualizations



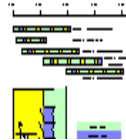
COVmotorwayManagementKeyDrivers



LWAVvalueChain



COVsuppliers



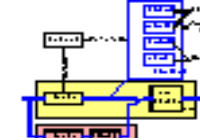
AVdynamicsURF



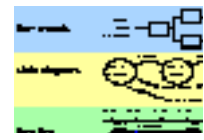
AVstakeholders



AVcontextMotorwayManagement



AVsimpleTVmodel



AVdynamicModels



AVcostBenefitModels



SHTexampleStoryLayout



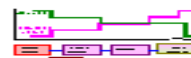
ETexampleTimeShiftingWhatIf



MICAfypicalCase



MICAfypicalTiming



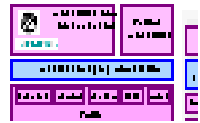
MICAfclinicalInfoFlow



MICAfrequestFlow



MICAffinancialContext



MICAfsystemLayers



MICAfreferenceModel



MICAfmarketSegmentation



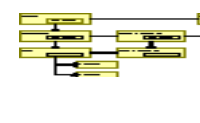
MICAfinformationLayers



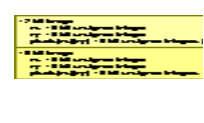
FVcommercialTree



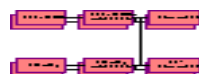
FVfeatureMatrix



FVinformationModel



FVdatamodel



CVfunctionalDecomposition



CVconstructionDecomposition



CVinformationModel



CVprocessDecomposition



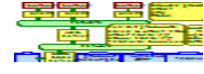
CVreconstructionPerformanceModel



CVstartUp



CVworkBreakdown



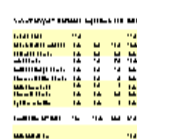
MAFTexampleWebShop



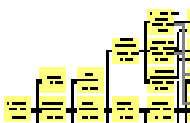
CVintegrationPlan



RVperformanceCostEffort



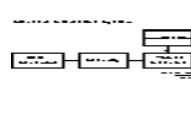
RVmemoryBudgetTable



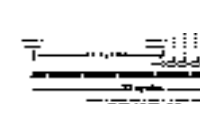
ASMLoverlayBudget



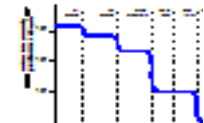
MICVpresentationPipeline



FFTSstandardInteractiveSystemAnnotated



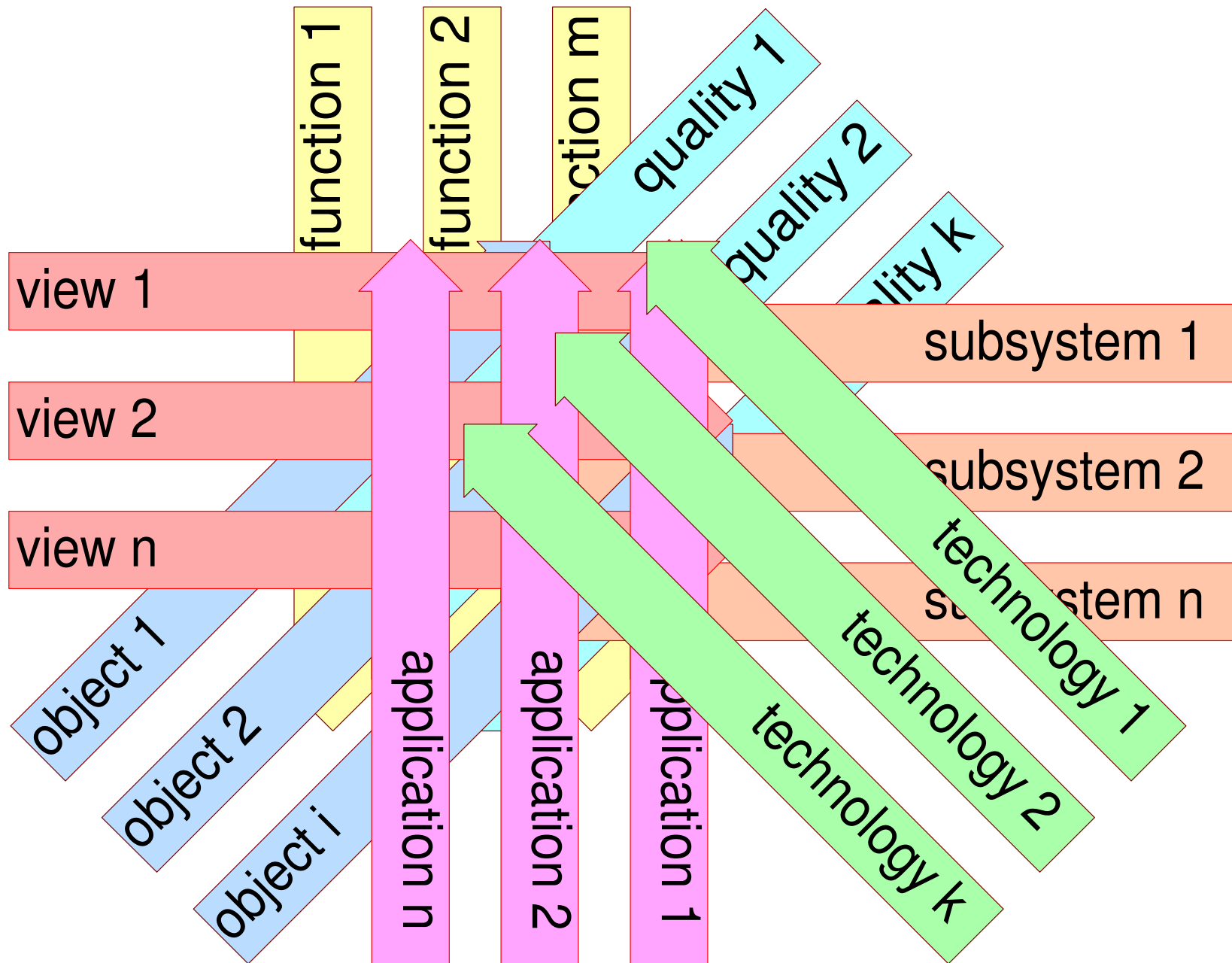
EBMmemoryTimingARM



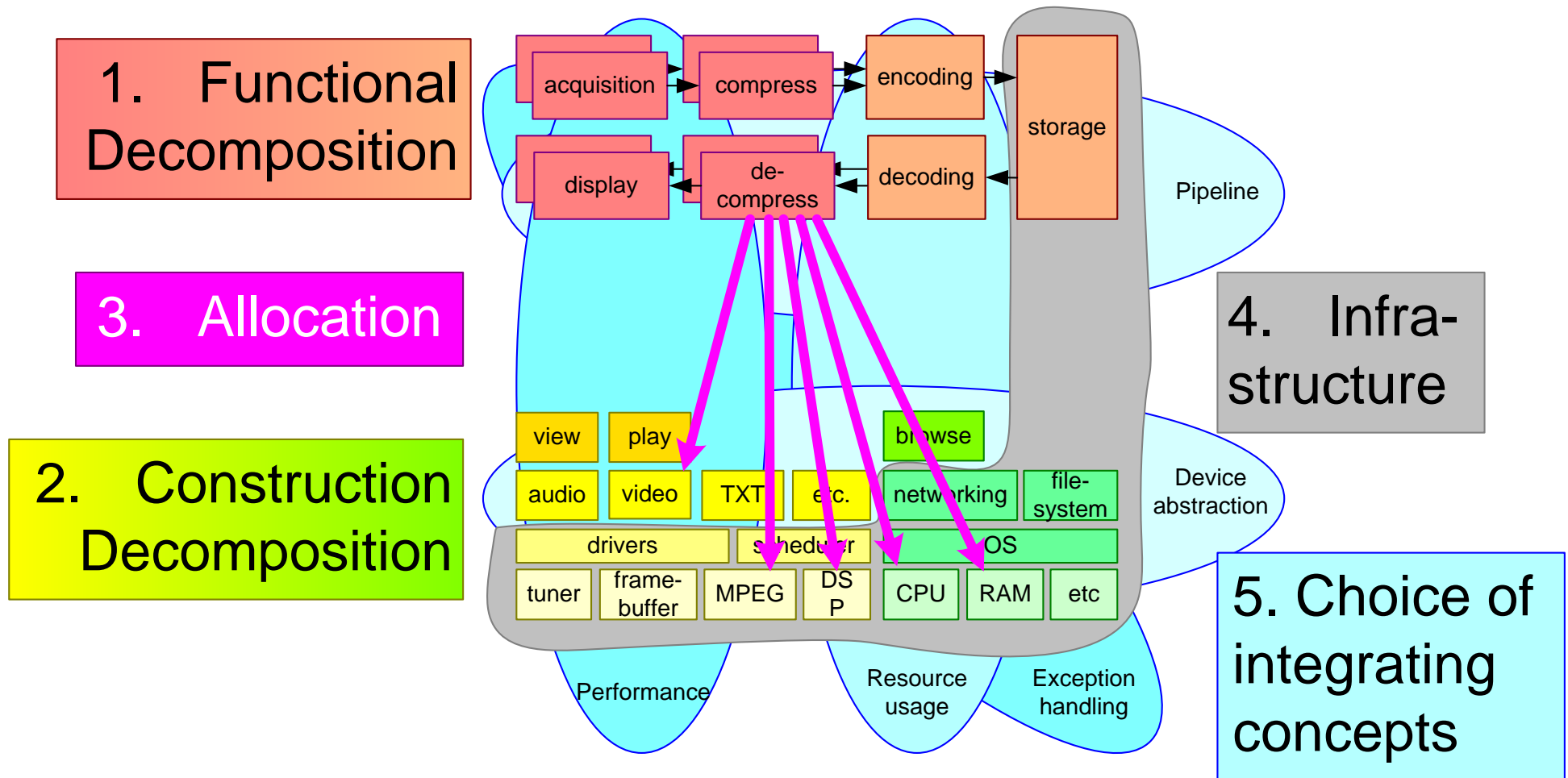
MAFTstoragePerformance

actual figures and references to their use at <http://www.gaudisite.nl/figures/<name>.html>

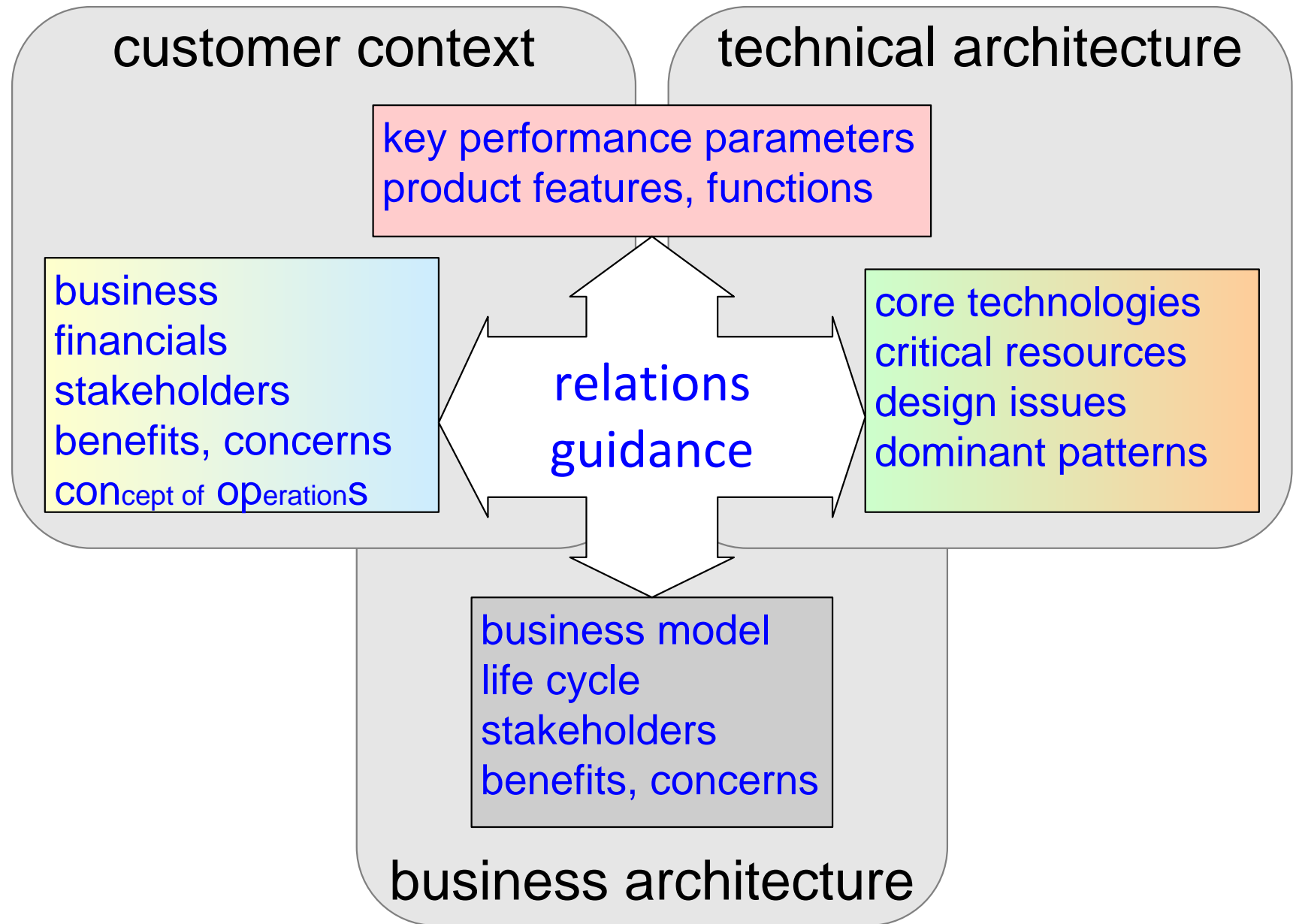
Ideal Structure does not exist



Synthesis, Integration, Relation oriented



Checklist for RA content



Summary of the role of Reference Architectures

