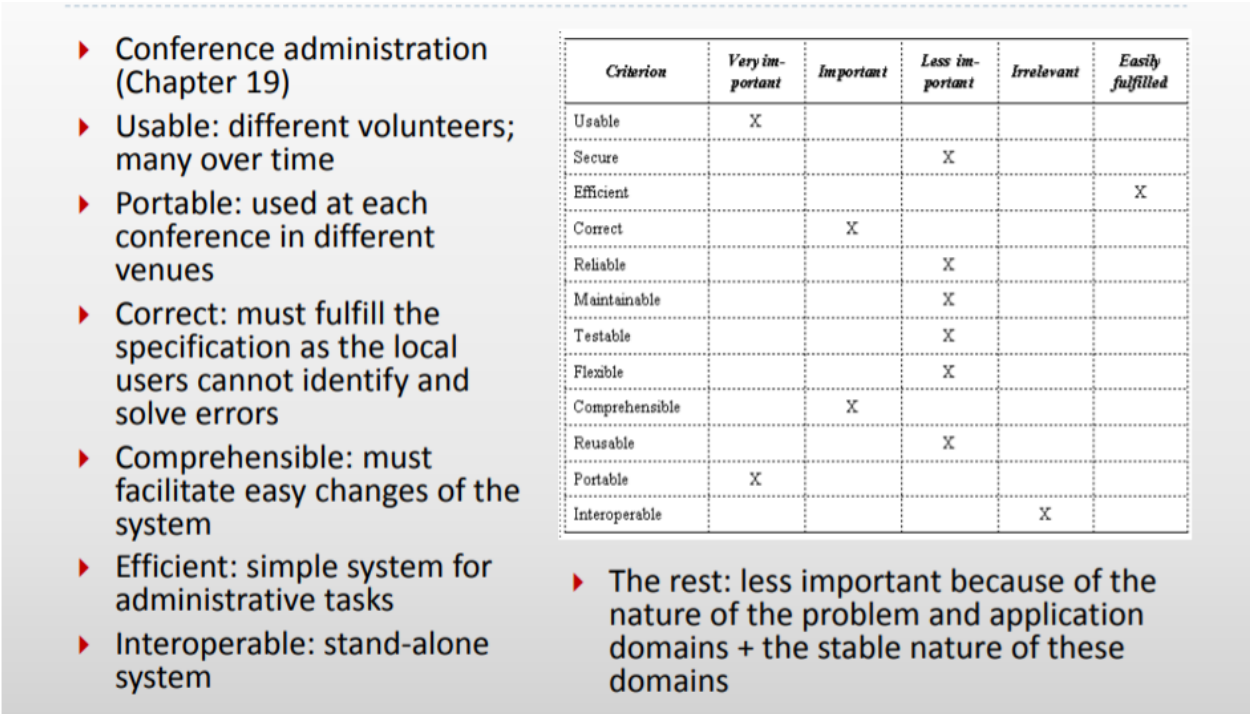
IV: Architectural Design: 9, 10: Criteria, Components.

Results



Criterion	*Very important*	*Important*	*Less important*	*Irrelevant*	*Easily fulfilled*
Usable	X				
Secure			X		
Efficient					X
Correct		X			
Reliable			X		
Maintainable			X		
Testable			X		
Flexible			X		
Comprehensible		X			
Reusable			X		
Portable	X				
Interoperable				X	

Architectural design has two views:

Component Architeture

Static .

Classes, stable aspects, related components, logical level and structure for descriptions.

Process Arcitectiure

Dynamic: what is going on over time.

Objects, dynamic aspects, coordination of processes, physical level and structure for execution.

Principles

- Define and prioritize criteria. (Focus on usability or something else)
- Bridge criteria and technical platform.
- Evaluate design early.

Objects in Analysis and Design

- Analysis:
  - Phenomena outside the computer system
  - Identity: identifies an object
  - State: the qualities that characterise an object
  - Behavior: the events an object have performed or suffered
- Design (and programing):
  - Phenomena inside the computer system
  - Identity: gets access to an object
  - State: the values of the object's attributes and object structures
  - Behavior: the operations an object can perform on request and offers to other objects (methods)

Criteria:

- General criteria. (**Usable**, secure, efficient, correct, reliable, maintainable, testable, **flexible**, **comprehensible**, reusable, portable and interoperable) (Which us these will we focus on?) (Correct = consistent based on the requirements. Fulfils the requirements)
- Specific criteria in OOA&D:
  - Usability
    - The systems as a whole
    - The users' needs
    - The technical platform
  - Flexibility
    - Consequences of changes
    - Modular design
  - Comprehensibility
    - Overview
    - Abstraction
    - Use of patterns

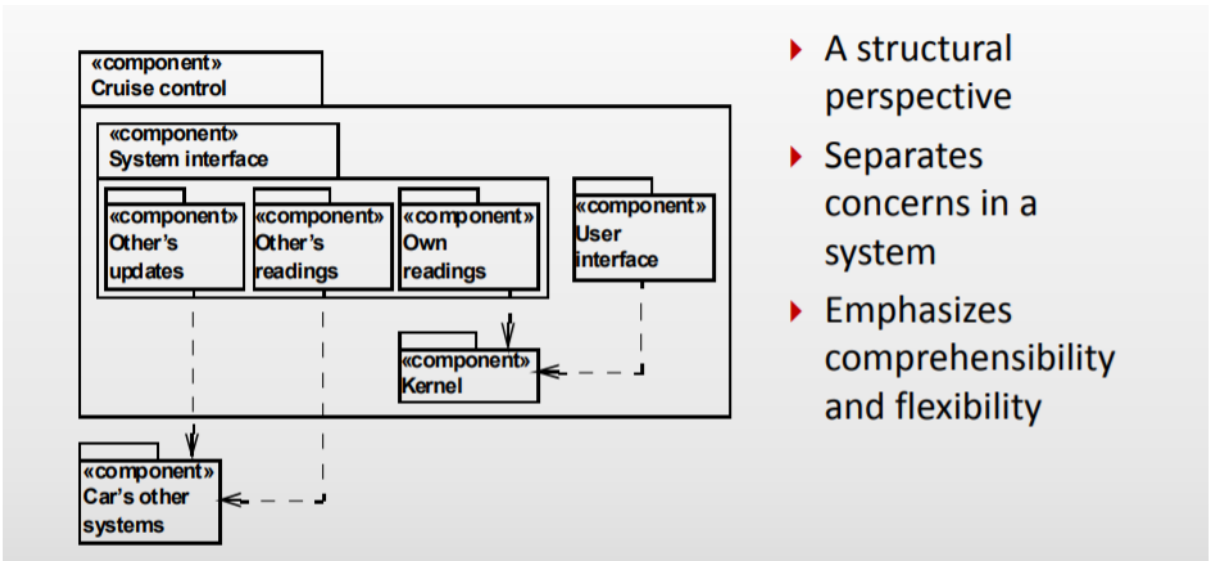
Typical conditions for design of a system's architecture

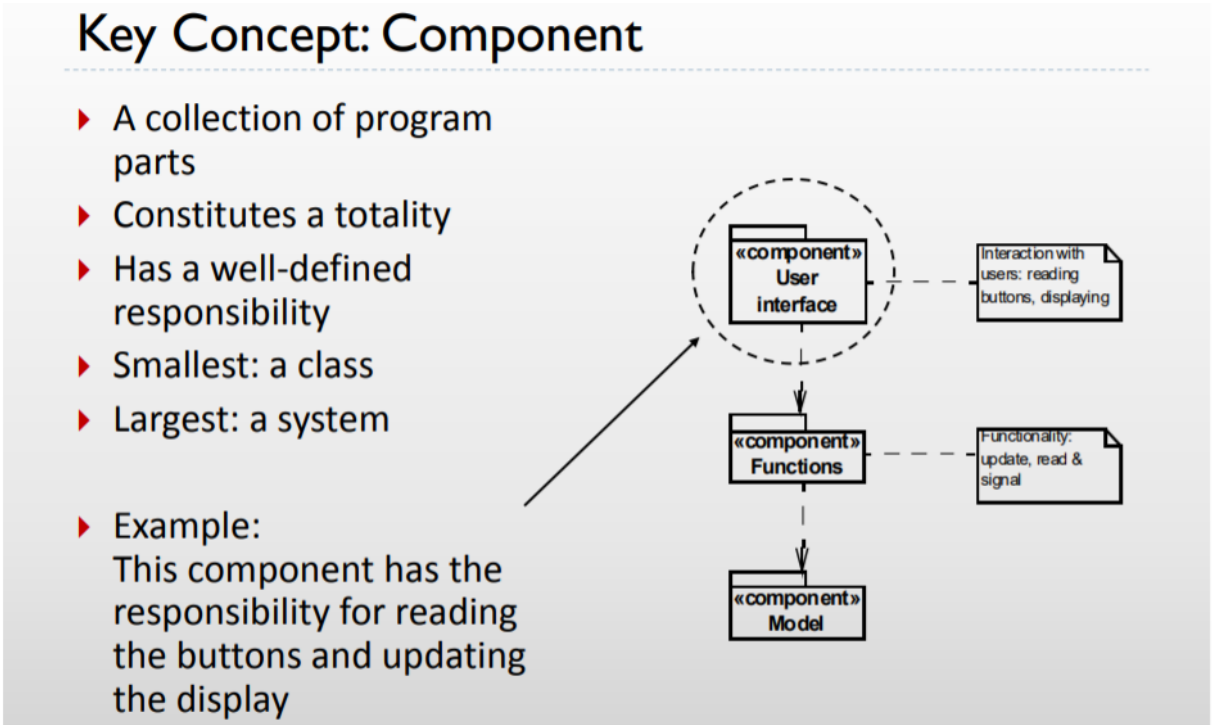
Technical	• Existing hardware, basic software, and systems. • Reuse of patterns and existing components. • Use of purchased standard components.
Organizational	• Contractual arrangements. • Plans for continued development. • Division of work between developers.
Human	• Design competences. • Experience with similar systems. • Experience with technical platform.

Criteria: Summary

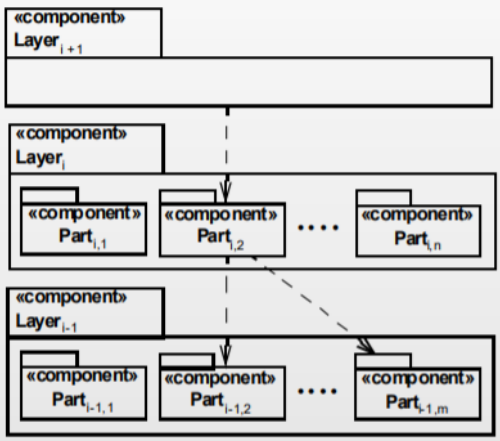
Purpose	• To set design priorities.
Concepts	• Criterion: A preferred property of an architecture. • Conditions: The technical, organizational, and human opportunities and limits involved in performing a task.
Principles	• A good design has no major weaknesses. • A good design balances several criteria. • A good design is usable, flexible, and comprehensible.
Results	• A collection of prioritized criteria.

Components activity





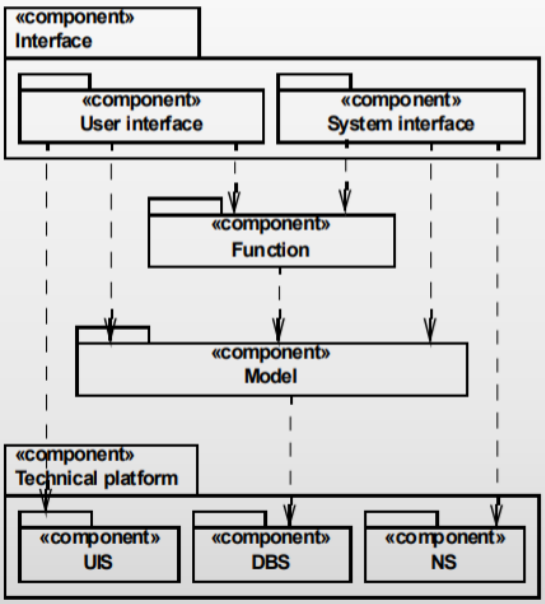
Pattern: The Layered Architecture



- Layer: describes a component's responsibility by the operations it provides to a layer above and those that are applied from the layer below
- Part: no substantial interaction with other parts in the same layer
- Closed architecture: only apply operations from an adjacent layer
  Open arcitecture: apply operations from any other layer
- Strict architecture: only apply operations from a layer below
  Relaxed architecture: apply operation from layer both above and below

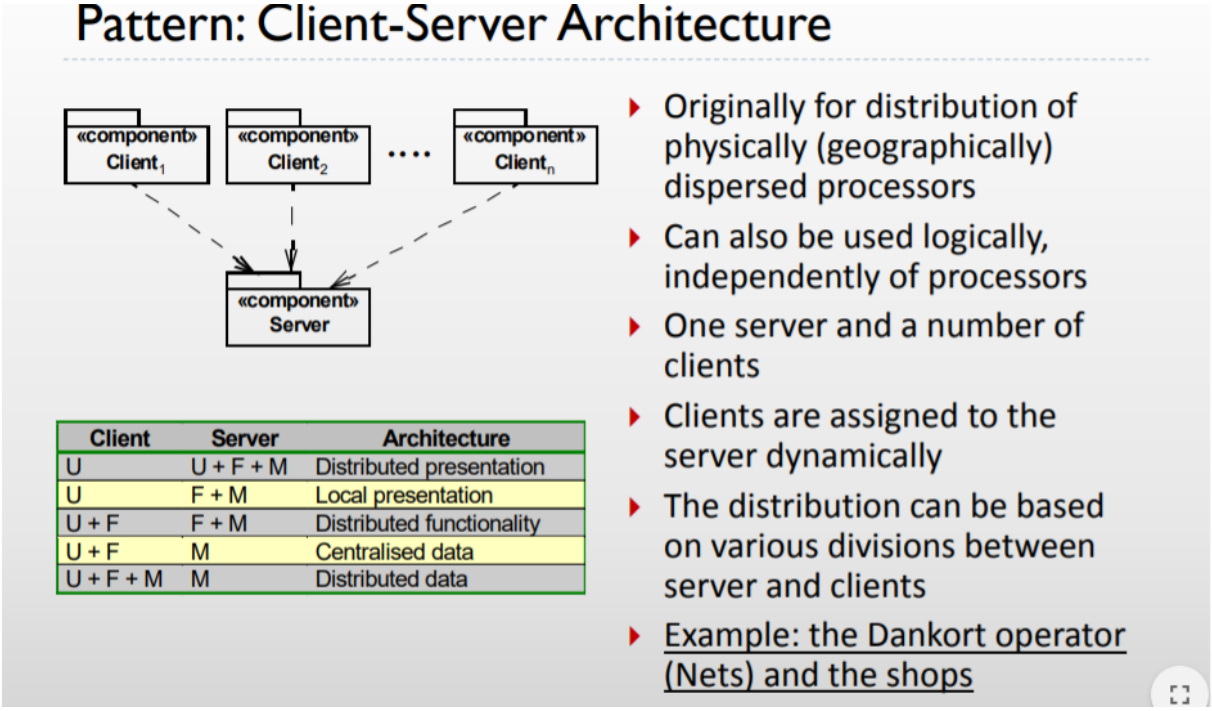
You can mix the two: Open architecture + relaxed = spaghetti code.

Pattern: The Generic Architecure



- The generic architecture reflects the division of the context into problem domain and application domain
- "Technical platform" is an extension and encapsulation of the underlying technical platform
- Example: a single Dankort terminal

NS = network system, DBS = Database system, UIS = user interface system.



U = user interface, F = functions, M = model.

It is possible to have a distributed data and for the server to also have functions. But then one would have a subset of functions.