

The Architecture Definition Process

IT-architecture and user driven software design (BUITA)

11. September 2018

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Learning goals

- Know the central concepts of the software architecture definition process: stakeholder concerns, principles, decisions, process outcomes, process context, process exit criteria, architecture development approaches
- Be able to choose and use techniques for stakeholder analysis for a chosen case
- Be able to discuss and reflect on the value of stakeholder analysis and planning



Stakeholders - Revisited and in-depth

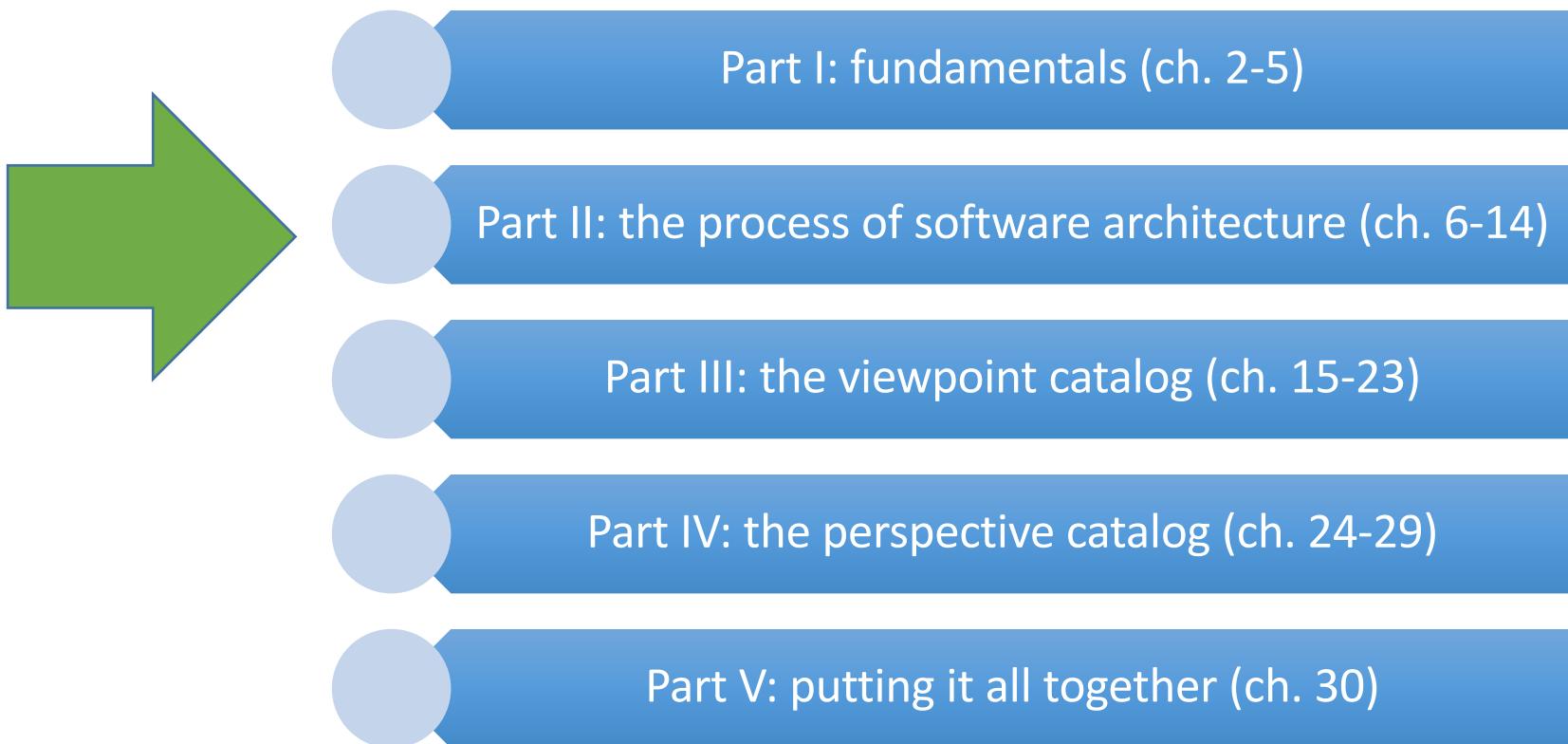


Architecture definition process,
principles and decisions



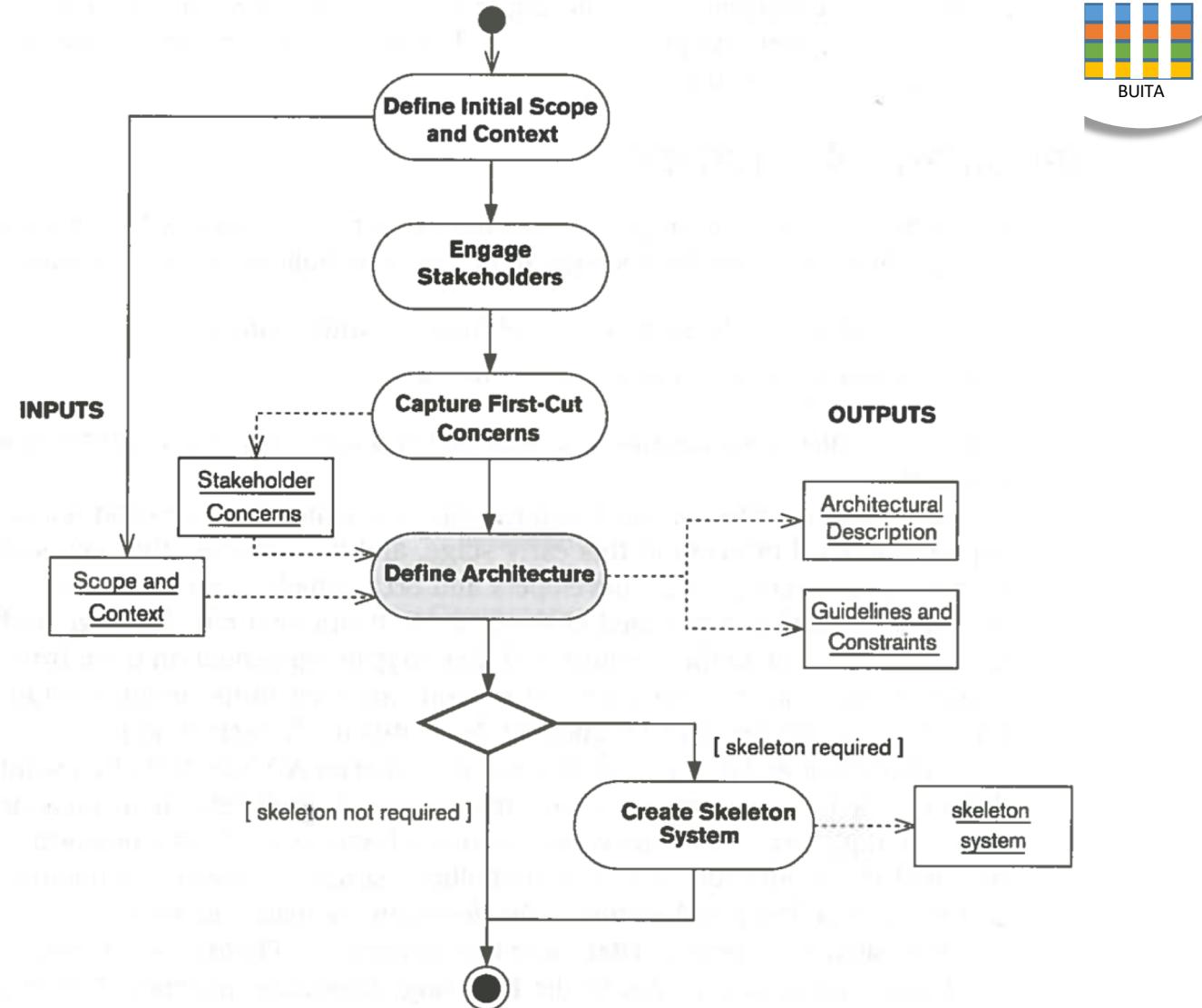
Status on groups and ideas

Course book: Software Systems Architecture



Stakeholders - Revisited and in-depth

The Architecture Definition Process



Definition of stakeholders

- A person (or a group of persons) with something ***at stake***
 - ***stake, interest, concern***
 - ***users, developers, testers, maintainers, sponsors, suppliers/contractors, QA***
- Users – at many levels
 - Management user
 - Daily user, end-user
 - Indirect user

Stakeholder types

- Acquirers – procurement of system
 - Assessors – conforming to regulations
 - Communicators – explain and communicate the system
 - Developers – construct and deploy software
 - Maintainers – manage evolution of the system once operational
 - Production engineers – construct and deploy hardware
 - Suppliers – build and supply hardware, software and/or infrastructure
 - Support staff – help users once live
 - System administrators – run the system once deployed
 - Testers – test the system before, during and after construction
 - Users – define functionality and use the system
- (A little too simplified)

The “useful” stakeholder is

- Informed
- Committed
- Authorized
- Representative
- Not always easy in some project types
 - “Proxies”

Usage and involvement of stakeholders

1. Initiation – who to talk to
2. Definition – who are they?
3. Design & Development – what visions do they have and what will change?
4. Evaluation – how usefull will their feedback be?
5. Acceptance – for go no-go decisions

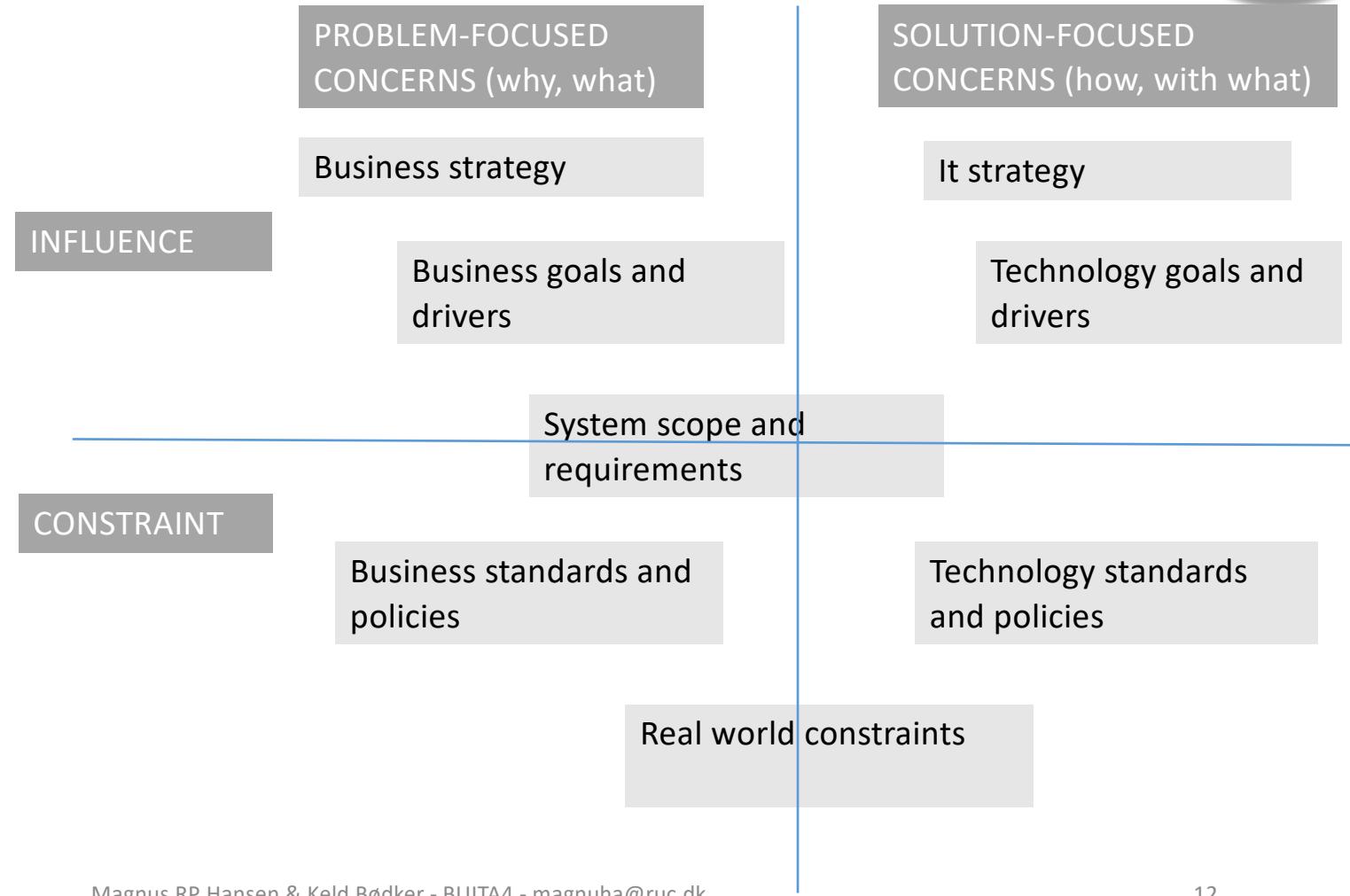
Stakeholder Concerns



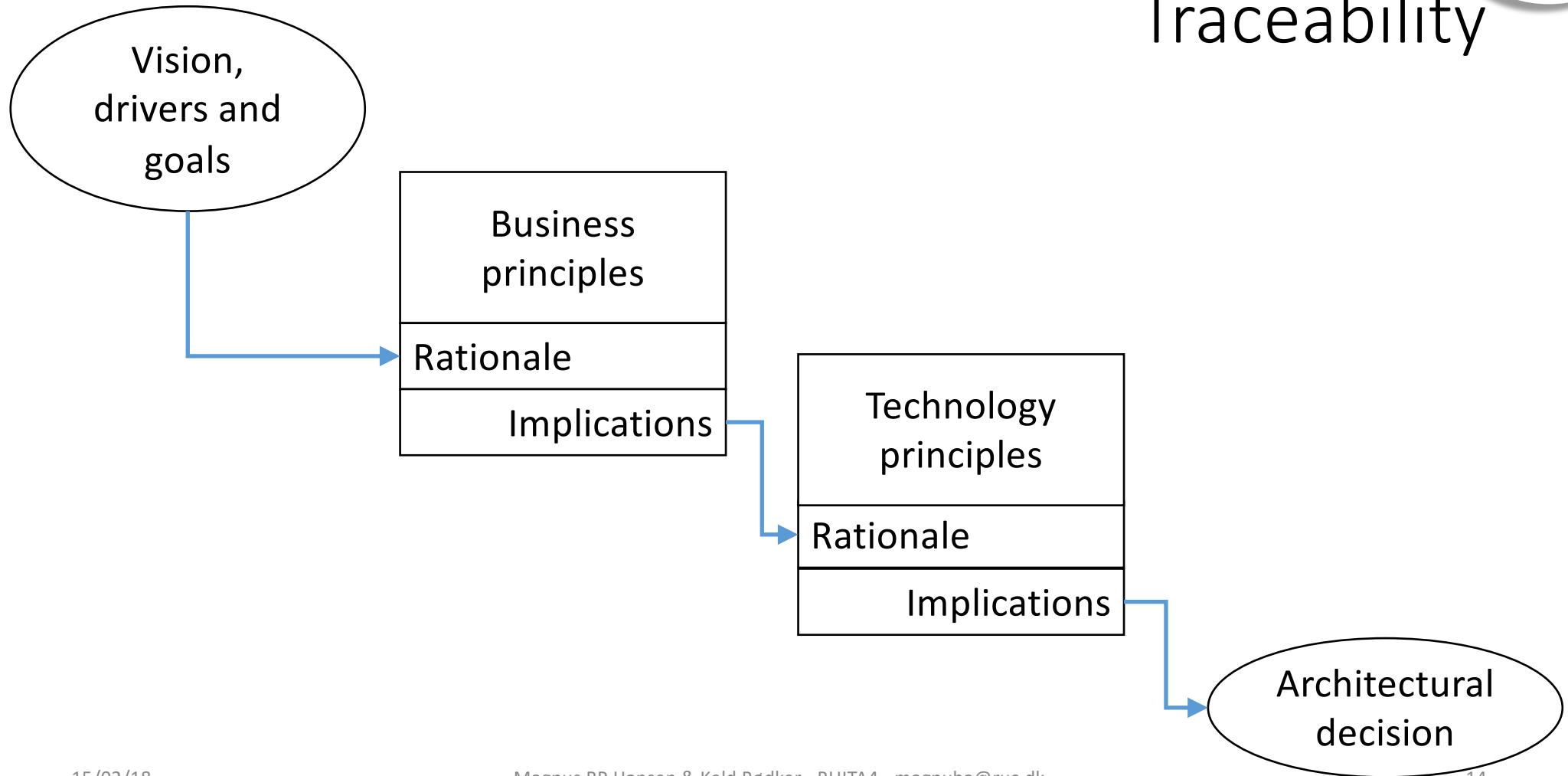
DEFINITION A **concern** about an architecture is a requirement, an objective, a constraint, an intention, or an aspiration a stakeholder has for that architecture

- A "good" concern:
- Quantified and measureable != "must be easy to use"
- Testable for evaluation purposes
- Traceable forward and backwards from goals and strategy to features

Problem space vs. Solution space concerns



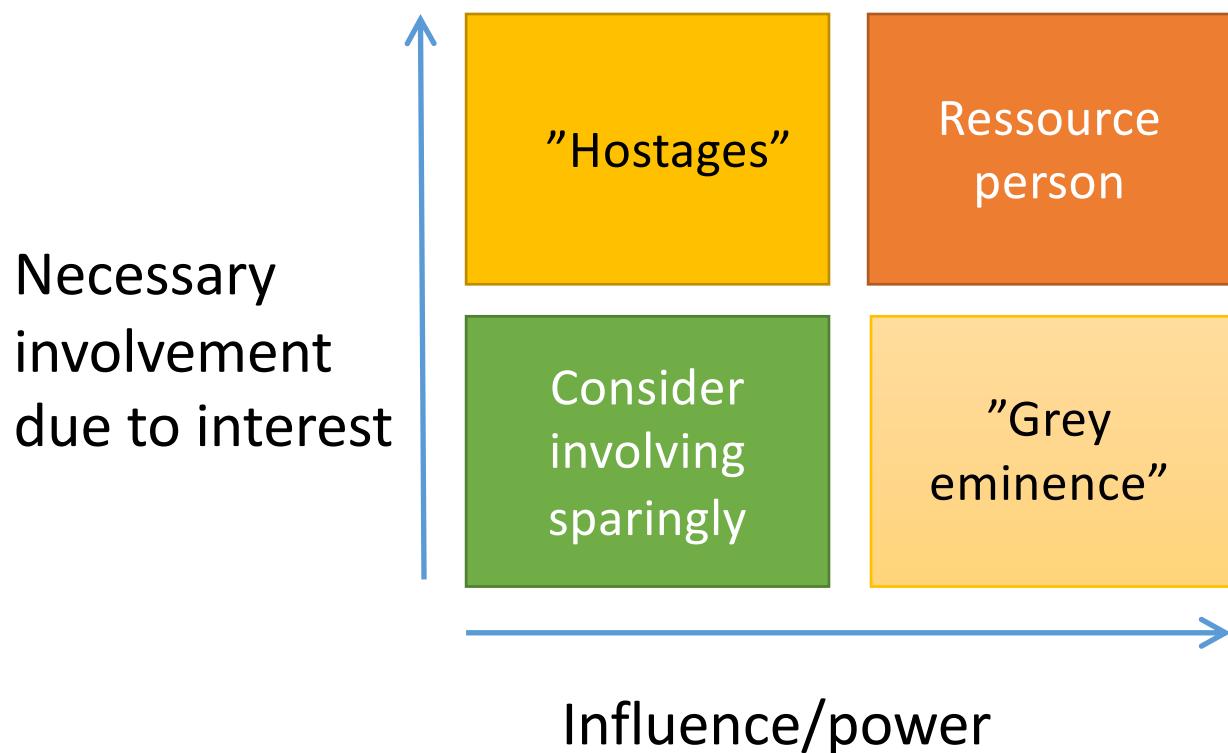
Traceability



CUT N MOVE

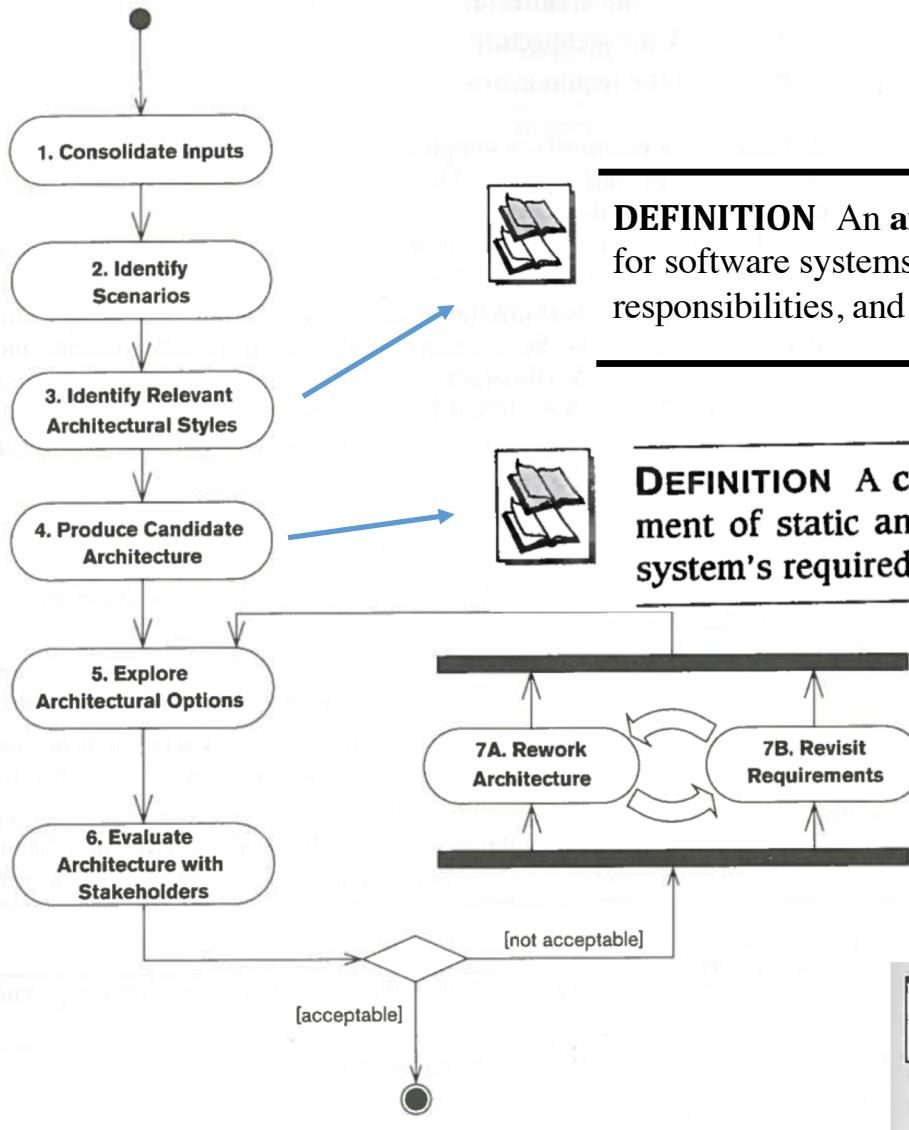
Stakeholder	Role	First Cut-Concerns (?)
Owner (Jacob Nielsen)	Acquirer	\$\$\$, customers++, regulars++, healthy competition, control of scheduling, control of materials, no cheating with tips
IT-supporter (Who?)	Maintainer Sys admin Prod. Engineer(?)	Off-site availability, “hottest and newest” tech upgrades, less support done
Receptionist	User – daily Support staff (?)	Fewer phone calls, less restocking of materials, less barber contact, more customer availability
Accountant	User – quarterly Assessor	Compliance with tax regulations, too many barber newcomers --> too much new information, more complete barber information
Barbers Old	User - daily	Reliable schedule
Barbers New	User - daily	Possibility to get better timeslots in peak periods
Customers (regulars)	User - monthly	Booking online, news and updates information
Customers (one timers)	User - seldom	Cheap, good and quick, easy and available, no waiting times

Project Management Stakeholder Mapping



- Kousholdt, 2018
- Mendelow, 1991

Architecture definition process, principles and decisions



DEFINITION An **architectural style** expresses a fundamental structural organization schema for software systems. It provides a set of predefined element types, specifies their responsibilities, and includes rules and guidelines for organizing the relationship between them

DEFINITION A **candidate architecture** for a system is a particular arrangement of static and dynamic structures that has the potential to exhibit the system's required externally visible behaviors and quality properties.

The Activities

FIGURE 7-3 DETAILS OF ARCHITECTURE DEFINITION

Guiding Principles (pp 85-86)

- Must be driven by stakeholder concerns and by balancing:
 - Communication
 - Pragmatism
 - Flexibility
 - Technology agnosticism
 - Etc.

Principles – links concerns and decisions

- DEF: An architectural principle is a fundamental statement of belief, approach, or intent that guides the definition of an architecture.
- Many available "off the shelf" – however should fit the specific situation
- Good principle:
 - Title of principle
 - Well articulated (understandable to all stakeholders)
 - Constructive (what decisions can it help stakeholders make)
 - Reasoned (motivated by business drivers, goals,,)
 - Testable (possible to "prove")
 - Significant (not a "truism" – bullshit test!)

Principle of "standardization"

- *Well articulated*: "If given the choice between self-configuration or standard, always go with standard"
- *Constructive*: helps making decisions between following existing practice or adopting other practices
- *Reasoned*: rooted in business strategy of low cost, concerns of cycle of regular updates
- *Testable*: easily determinable by updating version
- *Significant*: passes the bull-shit test, simplifies architectural options

Principle of “shared data”

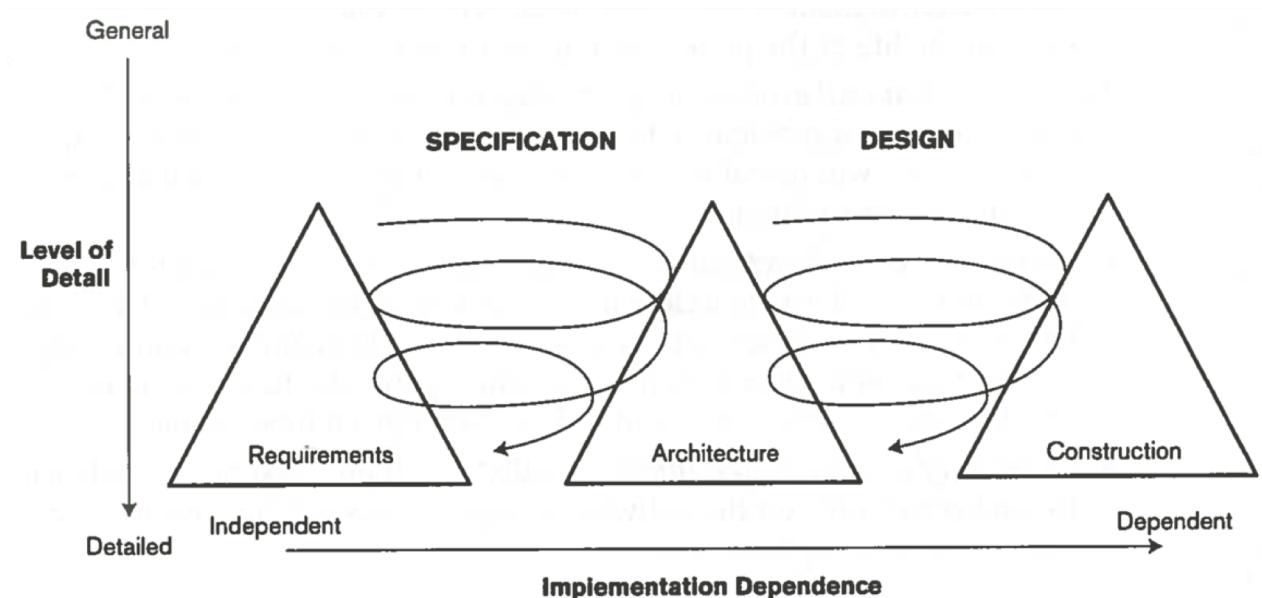
- *Well articulated*: “All data must be available to all users”
- *Constructive*: helps make decisions between ownership and access to data
- *Reasoned*: rooted in business culture of growing knowledge collectively
- *Testable*: compare data access between users
- *Significant*: not a truism since there is an opposing principle

Architectural decisions

- Answers "what", "how" and "with what"
- Traceability from concerns provided by principles, e.g.
 - "Business drivers and goals" form the rationale for a set of business principles
 - "Business principles" form the rationale for a set of technology principles
 - "Technology principles" are developed into architectural decisions
- Are specific and make it impossible to go other routes
- Examples:
 - Programming language "PHP" → principle of "Open Source" → concern of "cost"
 - Prioritizing quality properties such as performance over security → principle of instant data delivery → concern of "meeting customers' low patience"
 - Adopting the Model, View, Control pattern etc.
 - (pp. 123-128)

Process outcomes (pp 86-87)

- Clarification of requirements
- Management of stakeholders' expectations
- Identification and evaluation of architectural options



The Process Exit Criteria

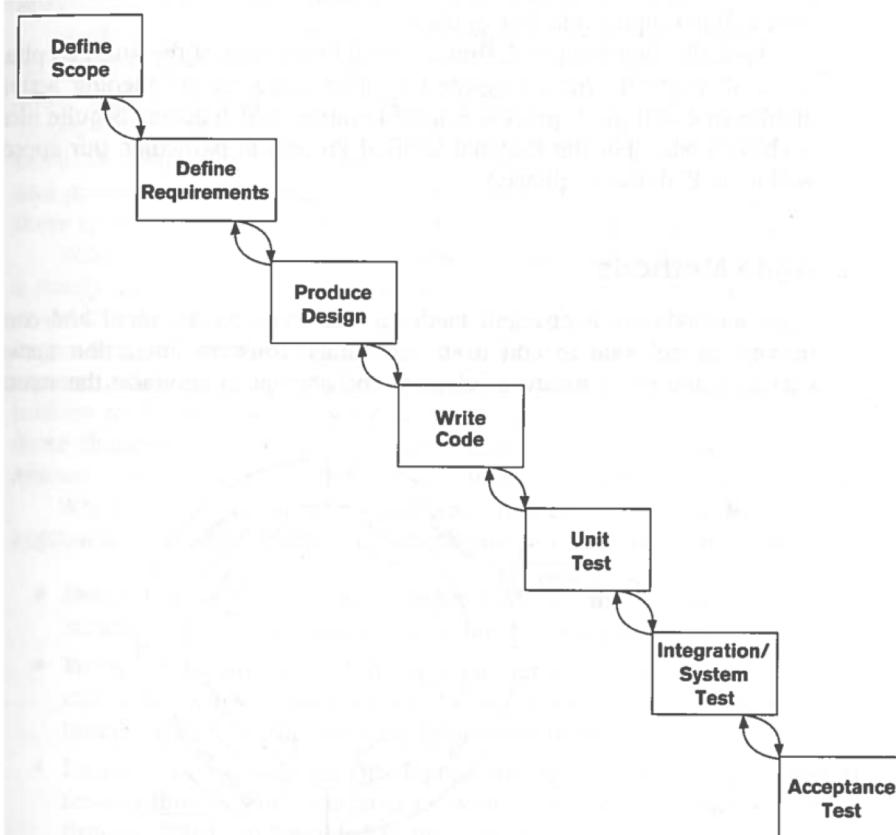
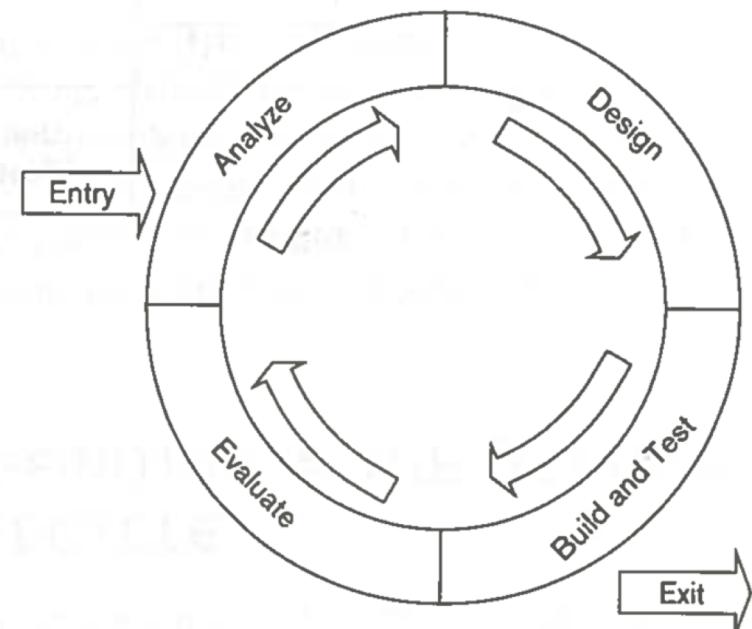


FIGURE 7-4 THE WATERFALL MODEL OF DEVELOPMENT

Vs.



ITERATIVE DEVELOPMENT

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References

- Mendelow, A. (1991) 'Stakeholder Mapping', Proceedings of the 2nd International Conference on Information Systems, Cambridge, MA (Cited in Scholes, 1998).
- Kousholdt, B. (2018) "Projektledelse".