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TAMPEREEN TEKNILLINEN YLIOPISTO

DCAR – Decision-Centric Architecture Review Introduction

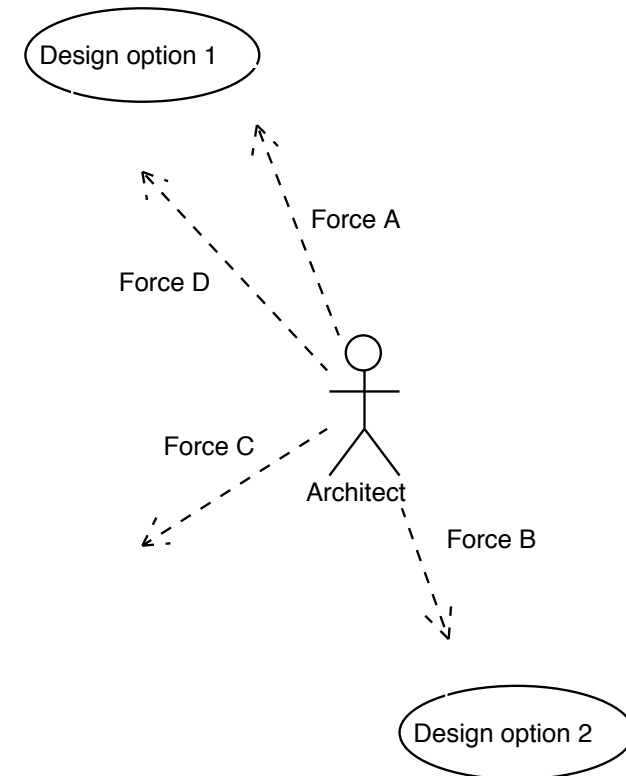


- › 10:00 – 10:15 Opening
- › 10:15 – 10:30 DCAR introduction
- › 10:30 – 10:45 Business presentation
- › 10:45 – 11:30 Architecture presentation
- › 11:30 – 12:00 Decision overview & prioritization
- › **12:00 – 12:45 Lunch**
- › 12:45 – 13:15 Decision documentation
- › 13:15 – 14:00 Decision evaluation
- › 14:00 – 14.15 Break
- › 14:15 – 15:00 Decision evaluation
- › 15:00 – 15:15 Retrospective





- › Architects make design decisions driven by a set of forces.
- › The forces pull the decision maker towards one or the other possible solution.
- › An architect tries to take into consideration all forces to make the best possible decision.

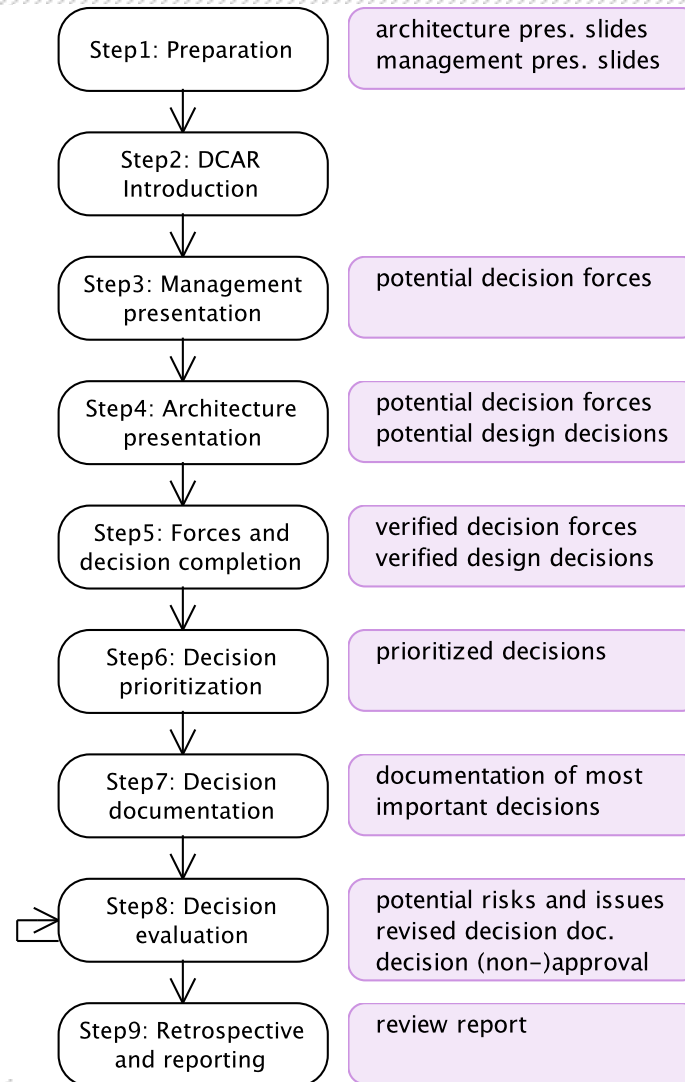




- › Typical examples of arguments refer to functional and non-functional requirements, constraints, or risks.
- › Other arguments might be related to personal preference of the architect, or business goals like quick-time-to-market or low price.
- › If a reviewer knows the important arguments behind the decisions, s/he can judge on the quality of the decision and estimate its consequences.



- › The architect of the system
- › Reviewers
 - › Familiar with the review procedure
 - › Experience in designing software architectures
- › Domain experts (recommended)
 - › have insights beneficial for eliciting decision forces
- › Non-technical stakeholders (optional)
 - › may participate if their concerns need to be validated



- › The reviewers explain the review procedure and goals to all participants



Step 3: Management presentation

10/21/18

- › A management representative introduces the business viewpoint
 - › Business drivers
 - › Market issues
 - › Customer landscape
 - › Usage scenarios
 - › Central requirements from business viewpoint





- › The architects introduce the system
 - › System objectives / architecture significant requirements
 - › Main stakeholders
 - › Main architecture decisions (i.e. architectural solutions)
 - › Rationale behind decisions
- › Reviewers may try to identify additional decisions
 - › E.g. by asking questions related to QA requirements
- › Reviewers note down decisions and potential decisions





- › Clarify architecture decisions and their relationships
 - › Create a decision relationship diagram
- › Complete and verify the forces relevant to these decisions
 - › Forces are presented as a simple bullet list
 - › Forces are formulated using domain-specific vocabulary
- › Reviewers and company stakeholders verify and complete decisions and forces



- › Identify the most important decisions
 - › e.g. business critical decisions
 - › decisions related to important QAs
 - › intensively discussed decisions
 - › expensive decisions
- › Decision Voting
 - › Each member of the review team selects the **9** most important decisions from his point of view
 - › Then they assign 100 points to a subset of these decisions based on their personal criteria for the importance of decisions
 - › All points are collected
 - › The rationale behind the individual choices is discussed
 - › The decisions with the most points are reviewed in the next step



- › The architects document each of the selected decisions using a decision description template
- › Each architect selects 1-3 decisions he or she is knowledgeable about
- › The decisions should be documented by describing
 - › the applied architectural solution
 - › the problem or issue it solves
 - › forces in favor of the solution
 - › forces against the solution
 - › a list of considered alternatives
- › The documented decisions are collected





- › In house expertise
 - › Hardware design is not our core competence
 - › Firmware level design and implementation should be sourced out, as it is not our core business.
- › Business model
 - › Producing different kinds of components would require expertise in too many different areas/domains
 - › A lot of different COTS components available
- › Requirements
 - › Short response times are required in the system
 - › The effect of faults should be isolated locally
- › Risks
 - › Used components should be technically mature
 - › Boom joints make the bus cable more vulnerable to damages





- › Constraints
 - › Typically bus length reduces maximum bus speed
 - › There should not be too many different communication protocols involved. Different communication protocols need converters in between
- › General software engineering principles
 - › The application should be divided into logical parts
 - › Locating a fault should be easy
- › Organization culture
 - › The company has always been using asynchronous CANopen



- › Each documented decision is discussed for ~10-15 minutes
- › The architects briefly present the decisions they documented
- › The reviewers try to identify additional forces in favor of or against the applied solution
- › The documentation of the decision is updated
- › All participants discuss whether the forces in favor of the decision outweigh the forces against it
- › The stakeholders decide whether the decision is good or has to be re-discussed internally (thumbs up, or thumbs down)
- › During the whole discussion, the reviewers note down potential issues

- › Organize and edit the findings of the review
 - › Decisions
 - › Alternatives considered
 - › Arguments in favor of the chosen solution
 - › Arguments against the chosen solution
 - › Issues



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Decision-centric Architecture Reviews DCAR