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IN5140

Smart Processes and Agile Methods in Software Engineering

Group Session 7

Large-Scale Agile and Agile Architecture

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Session 7

Use your laptop for a better expereince!

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Slides

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Discussion

Large-Scale Agile and Agile Architecture

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Software Architecture

- What is software architecture?
- What are the key characteristics of software architecture?
- What is a process to think about architecture?
  - six things that should be considered in the process of thinking about architecture

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Agile and architecture

- How is software architecture approached in the Waterfall model, and three key challenges with this model?
- How is software architecture approached in the Agile model?
- In Agile development, architecture is necessary but not sufficient—how can teams ensure ‘just enough’ architectural design without falling into big upfront design?
  - Why is it so difficult to balance the right upfront design?
- How can teams use frameworks and risk-based prioritization to manage architectural decisions, balancing cost and significance depending on the level of risk?
- Should we postpone an architectural decision?

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Agile Architecting

What is the definition of Agile Architecting?

What are its three dimensions? Explain it

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15 minute break

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Previous Exam Questions

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[Exam 2018]

What are the three problems of architecture in the Waterfall model?

upfront design to know if it is realistic focus on the wrong outcome

Big upfront Human bias Wrong focus

Architects are human, which can lead to bias decissions Wrong focus, which can lead to the wrong outcome

1. Human bias (decisons taken early impact later decisons) 2. To much focus on software product rather than the users needs 3. Deciding on everything to early

static design upfront, human , wrong outcome

wrong focus, upfront design

1. Upfront: - assumption that everything can be decided upon in advance 2. Humans have bias - humans may make sub-optimal decisions, which can lead to suboptimal choices 3. ???

it assumes "perfect" architecture is already known. reluctant to changes and advancements human mind conflict

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Architecture first?
Architects are humans.
Focus on the wrong outcome

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[Exam 2018]

What are the three problems of architecture in the Waterfall model?

- **1. Upfront Design Assumption**
  It assumes a "perfect" architecture can be known in advance, but many architectural requirements actually emerge later during implementation.

- **2. Human Bias in Decisions**
  Architects are influenced by cognitive biases (e.g., anchoring on first ideas like "let's use microservices"), which can lock projects into suboptimal directions.

- **3. Focus on the Wrong Outcome**
  Waterfall often emphasizes the technical system itself rather than delivering actual business or customer value, leading to little delivered value despite heavy upfront effort.

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2.6 **Architectural Decisions**

Select all the right sentences below:

- [ ] The Architectural Backlog should be continuously re-prioritized
- [ ] Postponing an architectural decision can increase the probability of it being correct
- [ ] The impact of failure for an architecture decision increases over time before we take it
- [ ] Architectural decisions shouldn't change

[2023]

[2023] Describe the ***Agile Architecting***-approach and its three dimensions.

Architecting (Process) - iterative changes to the architecture Architects (?) - who is responsible Acrhitecture (Product) - the architecture itself (microservice based etc...)

Agile Architecting means continuous delivery by making incremental updates taking user feedbacks and reviews in consideration. dimensions: process, organizarion, product

The agile architecting-approach means that the architecture of the software will develop interativt based on new information what come trough the process. The tre dimentions is process, product and o

means continous delivery, the 3 dimensions are product, organization(assigning roles) and process(iterative)

Agile archetecting focuses on continously delevering to the customers. This includes three dimensions: Process (archetecuring), organization (archetectures) and the product (architecture.

Agile Architecting = architecture that supports the practice of Continuous Delivery. 1) Process: be guided by agile principles in the process (iterative increments) 2) Org: and 3) Product

agile architecting follows the "just enough" and "just in time"-which implies that the structure for the system and guidelines should give the team pointers but not lock them down. Product product or

Dimensions: 1. Process: architecture that supports agile processes like lean, jit 2. Organization: architecture that is supported by organization infrastructure and architects teamwork 3. Product:

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[2023] Describe the ***Agile Architecting***-approach and its three dimensions.

Using CD to continuously in the architecture Process: Continous lifecycle to design the architecture Product: know what product the customer want Organization: roles and who does what (same goal)

1. Process, focuses on development iterativly in agile process 2. Organization, focuses on the organization around the product 3. Product, build to enable change

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1. Process (Agile Architecting)

Architecture evolves **iteratively**, adapting to new information and constraints over time. This avoids excessive upfront design and allows **continuous reprioritization** of concerns based on risk.

2. Product(Agile Archtects)

Agile architectures are built to enable change, using tactics like layered structures, service-oriented and **microservices** architectures, and **frameworks** that make scaling and evolution easier.

3. Organization(Agile Architecture)

Defines who is responsible for architecture in agile settings. **Roles** such as team, governance, and chief architects coordinate decisions, manage risks, and share architectural knowledge across teams.

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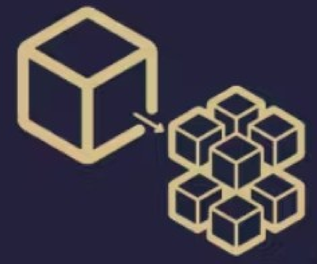
Agile Architecting: 3 dimensions

Agile Architecting

- Agile Architecting * (Process)
- Agile Architects ** (Organization)
- Agile Architecture * (Product)



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[2024]Briefly describe two challenges of not having architect roles in large-scale agile development.

Not having a blue print to start with conflict among the teams due to human bias

1) Difficulties deciding on an architecture and coordinating architecture choices across teams 2) ???

Without architect roles, large-scale agile faces fragmented decisions and technical debt. Teams lack shared vision, causing poor coordination, inconsistencies, and long-term sustainability risks.

1.There will be less structure in the project, and different tasks might not be handled in the right way. 2. Teams can be disoriented in who is responible for what.

1. Concistency and coherence in design, developers might develop things in isolation, which make inconsistensies and lack of coherence. 2...

2) Lack of someone that holds the rest "responsible" for matters related to architecture

The challenge of not having architect roles in large-scale agile development, means that the architectural design might be lacking. No "leader" roles which may lead to conflict in the team.

1. Less communication and cooperation between different groups working towards the same feature. 2.

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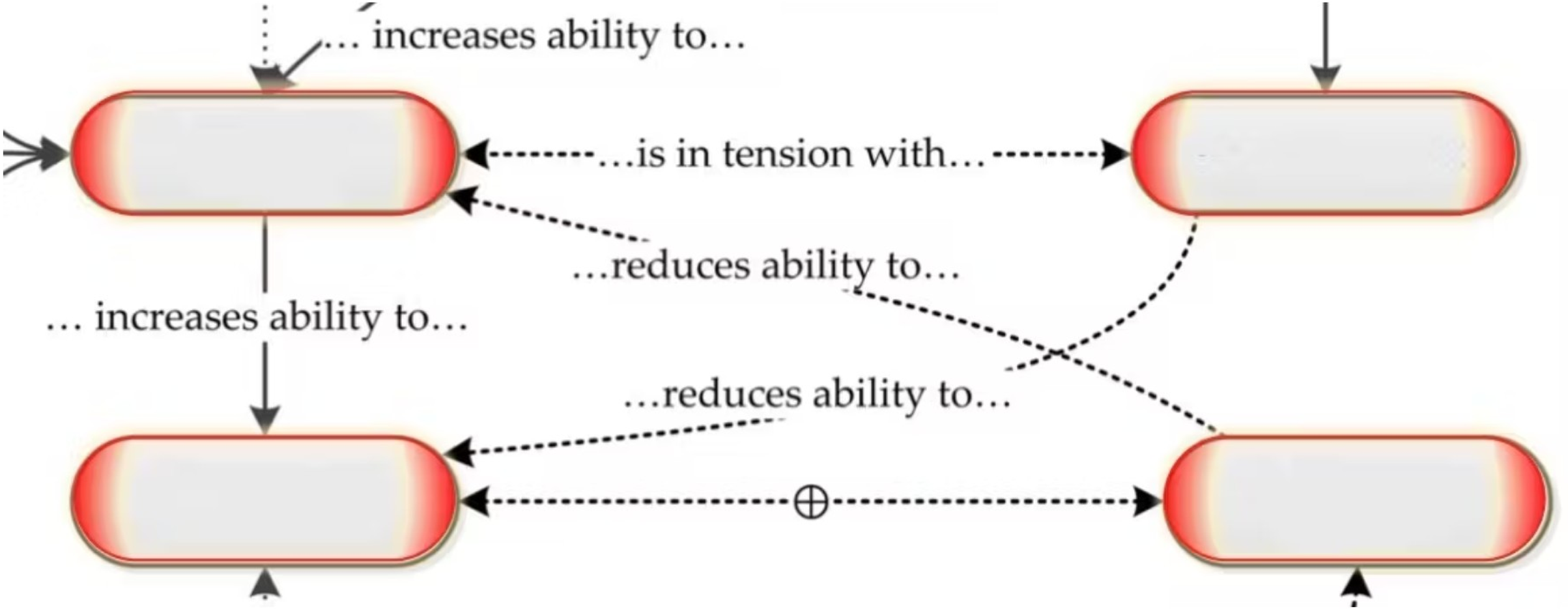

[Exam 2024] Fill in the blanks: address risk / big design up-front / respond to change / emergent architecture

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1. Lack of coordination across teams

Without architects, different teams may make conflicting architectural decisions. This leads to integration problems, duplicated work, and inconsistent system design.

2. Missing long-term perspective and risk management

Agile teams often focus on short-term delivery. Without architects, important concerns like scalability, maintainability, and technical debt may be ignored, creating costly problems later.

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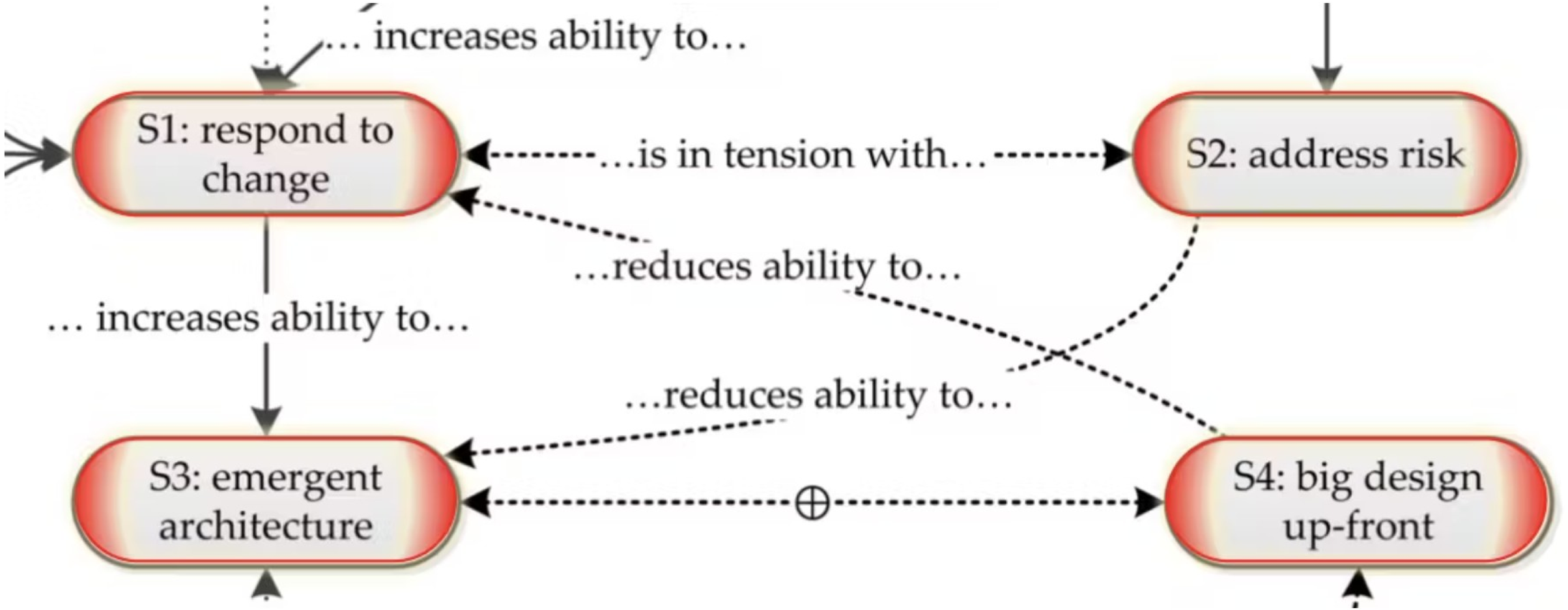

[Exam 2024] Fill in the blanks: address risk / big design up-front / respond to change / emergent architecture

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Feedback

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Group Feedback & Requests:

insightful group session covering all the major concepts from the lecture and also previous years exam questions.

good session, but maybe let people discuss together to find out the answers

I we are to do the 5 min to become expert exercise again. Some more time to prepare before presenting would be nice.

Good seminar. A bit short on time to answer the questions

I think there were a few too many questions at once in the discussion section, and it went a bit too quickly for everyone to reflect on and discuss each task. But the overall session was informative.

Maybe add more time for discussing in groups, rather than self studying and presenting

Great session, good idea to let us discuss and find our own answers to the questions. Gives better understanding for my own at least.

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Next Week

Software process modeling (BPMN)