Agile Software Development

Chapter 3.1-3.2

CMPT 276
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Based on slides from Software Engineering 9th ed, Sommerville.

Topics

1) What characterizes agile software development?
2) What to consider when choosing between plan-driven vs agile methods.

Rapid software development

- Rapid development and delivery is often the...

  for a software systems.
  - Businesses change fast; practically impossible to have stable software requirements.
  - Software has to evolve quickly to keep up.
- Agile aims at rapid software development:
  - Interleave specification, design and implementation.
  - Incrementally developed with user evaluating each version.

Agile methods

- Inspired by dissatisfaction with... in plan-driven software methods.
- Agile Methods:
  - Focus on the rather than the
  - Based on iterative approach to software development;
  - Intended to deliver working software quickly and evolve it quickly to meet changing requirements.
- Aim of agile methods:
  - Reduce overheads in the software process e.g...
  - Respond quickly to changing requirements without excessive rework.

We are uncovering better ways of developing software by doing it and helping others do it.
Through this work we have come to value:

- over processes and tools
- over comprehensive documentation
- over contract negotiation
- over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

Agile manifesto

Signed by Kent Beck, Robert Martin, Martin Fowler, and 14 other founders of Agile development.

Principles of agile methods

Principle	Description
	Customer is closely involved throughout development. They provide and prioritize new system requirements and evaluate the iterations of the system.
Incremental delivery	Software developed in increments. Customer specifies requirements to be included in each increment.
	Recognize and exploit development team's skills. Team members should be left to develop their own ways of working without prescriptive processes.
Embrace change	Expect system requirements to change; so design the system to accommodate these changes.
	Focus on simplicity in both the software being developed and in the... Actively work to eliminate complexity from the system.

Agile method applicability

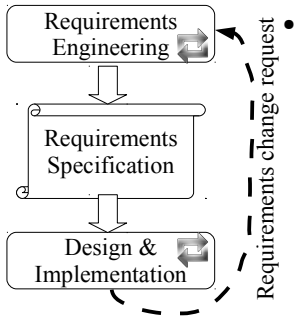
- Agile methods applicable for both:
  - Developing small or medium-sized product for sale.
  - Developing custom system with:
    - Customer willing to be involved in development process
    - Few.. affect the software.
- Problems with Agile Methods:
  - May not.. focus on small, tightly-integrated teams.
  - Difficult to keep..
  - Intense interactions may not suit development team.
  - Prioritizing changes hard with...
  - Maintaining simplicity requires extra work.

Agile methods and maintenance

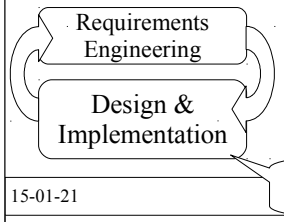
- Maintenance:
  - More $ on maintenance than on initial development.
  - To succeed, Agile methods have to support both!
- Two key issues:
  - Do agile methods create maintainable systems in spite of a lack of..
    - Good documentation supports maintenance.
    - But..
  - Are agile methods effective for evolving a system to meet changing customer needs?
    - Agile good at accommodating change.
    - But problems if original developers..

Plan-driven vs Agile Methods

Plan-driven vs agile development



- Plan-driven development
  - Each stage produces output documents:
  - Iteration within activity. Ex:
  - Plan-driven incremental development:..
- Agile development
  - Activities (specification, design, impl., test) are..
  - Requirements & design..



Choosing agile vs plan-driven

- Most projects use elements of both plan-driven and agile processes depending on:
  - Need detailed specification and design before moving to implementation? | Plan | Agile |
  - Is an incremental delivery strategy with rapid feedback realistic? | Plan | Agile |
  - Is it a small-medium size system being developed?
    - Agile most effective with small team who can... | Plan | Agile |
  - Does it require a lot of analysis before implementation?
    - e.g. real-time system with complex timing requirements. | Plan | Agile |

Choosing agile vs plan-driven

- Is it expected to be long lived where system maintainers need design docs? | Plan | Agile |
- Are good tools available to support development? | Plan | Agile |
- Is team spread out/outsourced and needs design docs to communicate? | Plan | Agile |
- Does team have a plan-based development culture (engineering)? | Plan | Agile |
- Are all team members... | Plan | Agile |
  - Agile said to need higher skill level to support developers making design decisions while coding.
- Is detailed documentation required for external regulatory approval? | Plan | Agile |

Summary

- Agile methods: incremental development focused on
  - rapid development,
  - frequent releases,
  - reducing process overheads,
  - producing high-quality code.
- They involve the customer directly in the development process.
- Use of agile vs plan-driven depends on:
  - type of software,
  - capabilities of developers,
  - team culture.