Agile Software Development

Mastering Agility – Part II

(Unit 6)

UNIT VI:

- ✧ Deliver Value: Exploit Your Agility,
- ✧ Only Releasable Code Has Value, Deliver Business Results,
- ✧ Deliver Frequently,
- ✧ Seek Technical Excellence :Software Doesn’t Exist,
- ✧ Design Is for Understanding,
- ✧ Design Tradeoffs, Quality with a Name, Great Design,
- ✧ Universal Design Principles,
- ✧ Principles in Practice, Pursue Mastery

Agile Methods - Commonalities

- ✧ Agile methods do share common values and principles
- ✧ From several different values and principles, we can form five themes:
  - Improve the Process
  - Rely on People
  - Eliminate Waste
  - Deliver Value
  - Seek Technical Excellence

Deliver Value

- ✧ Your software only begins to have real value when it reaches users
- ✧ That's why successful agile projects deliver value early, often, and repeatedly

Deliver Value

- ✧ Exploit Your Agility
- ✧ Only Releasable Code Has Value
- ✧ Deliver Business Results
- ✧ Deliver Frequently

Exploit Your Agility

- ✧ Agility requires you to work in small steps, not giant leaps
- ✧ A small initial investment of time and resources, properly applied, begins producing quantifiable value immediately

Exploit Your Agility – In Practice

- XP exploits agility by removing the time between taking an action and observing its results, which improves your ability to learn from this feedback
- This is especially apparent when the whole team sits together
- Developing features closely with the on-site customer allows you to identify potential misunderstandings and provides nearly instant responses to questions

Exploit Your Agility – In Practice

- ✧ XP allows changes in focus through short work cycles
- ✧ The short work unit of iterations and frequent demos and releases create a reliable rhythm to make measured process adjustments
- ✧ Slack provides spare time to make small but necessary changes within an iteration

Only Releasable Code Has Value

- Having code that meets customer needs perfectly has little value unless the customer can actually use it.
- Until your software reaches the people who need it, it has only potential value
- Delivering actual value means delivering real software
- Unreleasable code has no value
- Working software is the primary measure of your progress

Only Releasable Code Has Value – Contd.

- ✧ Only code that you can actually release to customers can provide real feedback on how well you're providing value to your customers
- ✧ That feedback is invaluable.

Only Releasable Code Has Value – In Practice

- The most important practice is that of "done done," where work is either complete or incomplete
- This unambiguous measure of progress immediately lets you know where you stand
- Test-driven development produces a safety net that catches regressions and deviations from customer requirements
- A well-written test suite can quickly identify any failures that may reduce the value of the software

Deliver Business Results

- ✧ Agile teams value working software over comprehensive documentation.
- ✧ Documentation is valuable - communicating what the software must do and how it works is important
- ✧ But your first priority is to meet your customer's needs
- ✧ The primary goal is always to provide the most valuable business results possible

Deliver Business Results - In Practice

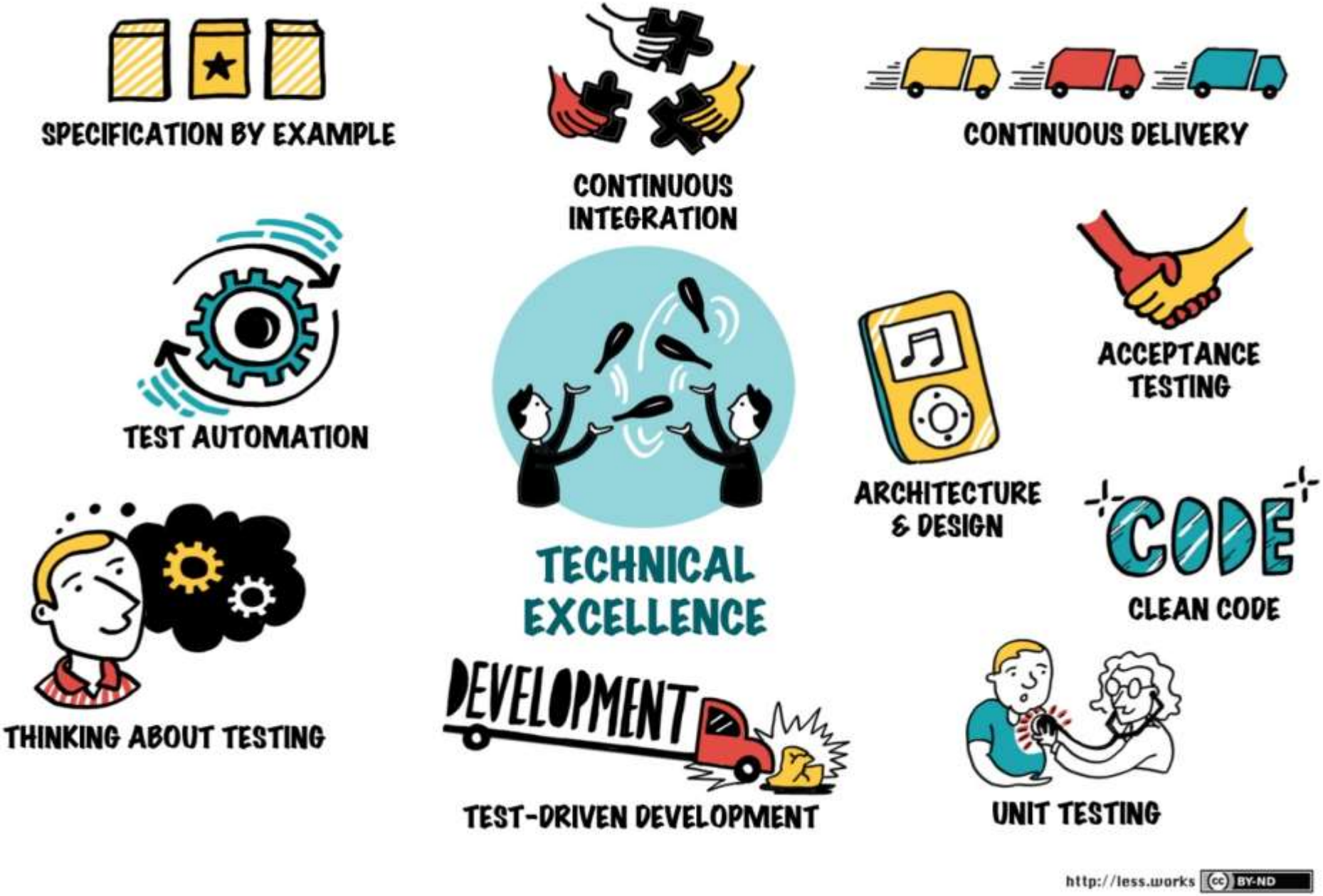
- XP encourages close involvement with actual customers by bringing them into the team, so they can measure progress and make decisions based on business value every day
  - Customer's vision provides answers to the questions most important to the project
  - XP approaches its schedule in terms of customer value
  - The team works on stories phrased from the customer's point of view and verifiable by customer testing
  - Iteration demo shows the team's current progress to stakeholders

Deliver Frequently

- ✧ Delivering working, valuable software frequently makes your software more valuable.
- ✧ Delivering working software as fast as possible enables two important feedback loops
  - One is from actual customers to the developers
    - Where the customers use the software and communicate how well it meets their need
  - The other is from the team to the customers
    - Where the team communicates by demonstrating how trustworthy and capable it is

Seek Technical Excellence

- **Technical excellence** includes personal accountability in which developers are committed to learning and improvement, and a commitment to the team and working together to get projects completed.
- Test-driven development, in particular, calls for code to be written in stages; complete one small piece of it, test it, modify it, and then move on to the next small piece of it. This leads us into the benefits of technical excellence.


SPECIFICATION BY EXAMPLE
CONTINUOUS INTEGRATION
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TEST AUTOMATION
ACCEPTANCE TESTING
ARCHITECTURE & DESIGN
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CLEAN CODE
TECHNICAL EXCELLENCE
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Seek Technical Excellence

- ✧ Software Doesn’t Exist
- ✧ Design Is for Understanding
- ✧ Design Trade-offs
- ✧ Quality with a Name
- ✧ Great Design
- ✧ Universal Design Principles
- ✧ Principles in Practice
- ✧ Pursue Mastery

Seek Technical Excellence

- ✧ What we actually write (program) is not software
- ✧ It is a very detailed specification for a program that writes the software for you
  - This special program translates your specification into machine instructions,
  - Then directs the computer's operating system to save those instructions as magnetic fields on the hard drive
- ✧ The specification is the source code
- ✧ The program that translates the specification into software is the compiler

Design Is for Understanding

- If source code is design, then what is design?
- Why do we bother with all these UML diagrams and CRC cards and discussions around a whiteboard?
- All these things are abstractions - even source code
- The reality of software's billions of evanescent electrical charges is inconceivably complex, so we create simplified models that we can understand
- Some of these models, like source code, are machine-translatable
- Others, like UML, are not - at least not yet

Design Trade-offs

- ✧ Earlier, programmers (assembly language) had to take tough decisions between space (memory) and speed

With an optimizing compiler

- ✧ C is just as good as assembly language.
- ✧ C++ adds virtual method lookups—requiring more memory and an extra level of indirection.
- ✧ Java and C# add a complete intermediate language that runs in a virtual machine atop the normal machine.

Quality with a Name

- If we're not balancing speed/space trade-offs, what are we doing?
- Actually, there is one trade-off that we make over and over again
- Java, C#, and Ruby demonstrate that we are often willing to sacrifice computer time in order to save programmer time and effort

Quality with a Name – Contd.

- ✧ Some programmers flinch at the thought of wasting computer time and making “slow” programs.
- ✧ However, wasting cheap computer time to save programmer resources is a wise design decision
- ✧ Programmers are often the most expensive component in software development

Quality with a Name – Contd.

- If software design's only real trade-off is between machine performance and programmer time
- Then the definition of "good software design" becomes crystal clear:
  - *A good software design minimizes the time required to create, modify, and maintain the software while achieving acceptable runtime performance*

Great Design

- ✧ Equating good design with the ease of maintenance is not a new idea, but stating it this way leads to some interesting conclusions
  - Design quality is people-sensitive
    - Relies so heavily on programmer time, it's very sensitive to which programmers are doing the work.
    - A good design takes this into account
  - Design quality is change-specific
    - A genuinely good design correctly anticipates the changes that actually occur

Great Design – Contd.

✧ Great designs

- Modification and maintenance time are more important than creation time
  - A good design focuses on minimizing modification and maintenance time over minimizing creation time
- Design quality is unpredictable
  - If a good design minimizes programmer time, and it varies depending on the people doing the work and the changes required, then there's no way to predict the quality of a design

Great Design – Contd.

✧ Thus, great designs

- Are easy to modify by the people who most frequently work within them
- Easily support unexpected changes
- Are easy to maintain
- Prove their value by becoming steadily easier to modify over years of changes and upgrades

Universal Design Principles

- ✧ The Source Code Is the (Final) Design
- ✧ Don’t Repeat Yourself (DRY)
- ✧ Be Cohesive
- ✧ Decouple
- ✧ Clarify, Simplify, and Refine
- ✧ Fail Fast
- ✧ Optimize from Measurements
- ✧ Eliminate Technical Debt

Principles in Practice

- These universal design principles provide good guidance, but they don't help with specific languages or platforms
- That's why you need design principles for specific languages

Pursue Mastery

- A good software design minimizes the time required to create, modify, and maintain the software while achieving acceptable runtime performance
- This definition, and the conclusions it leads to, are the most important things one should keep in mind when considering a design.

Pursue Mastery

- ✧ The same is true of agile software development.
- ✧ Ultimately, what matters is success, however you define it
- ✧ The practices, principles, and values are merely guides along the way
- ✧ Learn what the principles mean.
- ✧ Break the rules, experiment, see what works, and learn some more.
- ✧ Share your insights and passion, and learn even more

Start by following the practices rigorously

- Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
- Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
- Business people and developers must work together daily throughout the project.
- Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
- The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
- Working software is the primary measure of progress.
- Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
- Continuous attention to technical excellence and good design enhances agility.
- Simplicity–the art of maximizing the amount of work not done–is essential.
- The best architectures, requirements, and designs emerge from self-organizing teams.
- At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.