AGILE DEVELOPMENT

Common Fears for Developers

- The project will produce the wrong product.
- The project will produce a product of inferior quality.
- The project will be late.
- We'll have to work 80-hour weeks.
- We'll have to break commitments.
- We won't be having fun.

The Manifesto for Agile Software Development

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

- ***Individuals and interactions*** **over processes and tools**
- ***Working software*** **over comprehensive documentation**
- ***Customer collaboration*** **over contract negotiation**
- ***Responding to change*** **over following a plan**

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

-- Kent Beck et al.

What is "Agility"?

- Effective (rapid and adaptive) response to change
- Effective communication among all stakeholders
- Drawing the customer onto the team
- Organizing a team so that it is in control of the work performed

Yielding …

- Rapid, incremental delivery of software

An Agile Process

- Driven by customer descriptions of what is required (scenarios)
- Recognizes that plans are short-lived
- Develops software iteratively with a heavy emphasis on construction activities
- Delivers multiple ‘software increments’
- Adapts as changes occur

Principles of Agility

- 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 time scale.
- Business people and developers must work together daily throughout the project.

Principles of Agility

- 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.

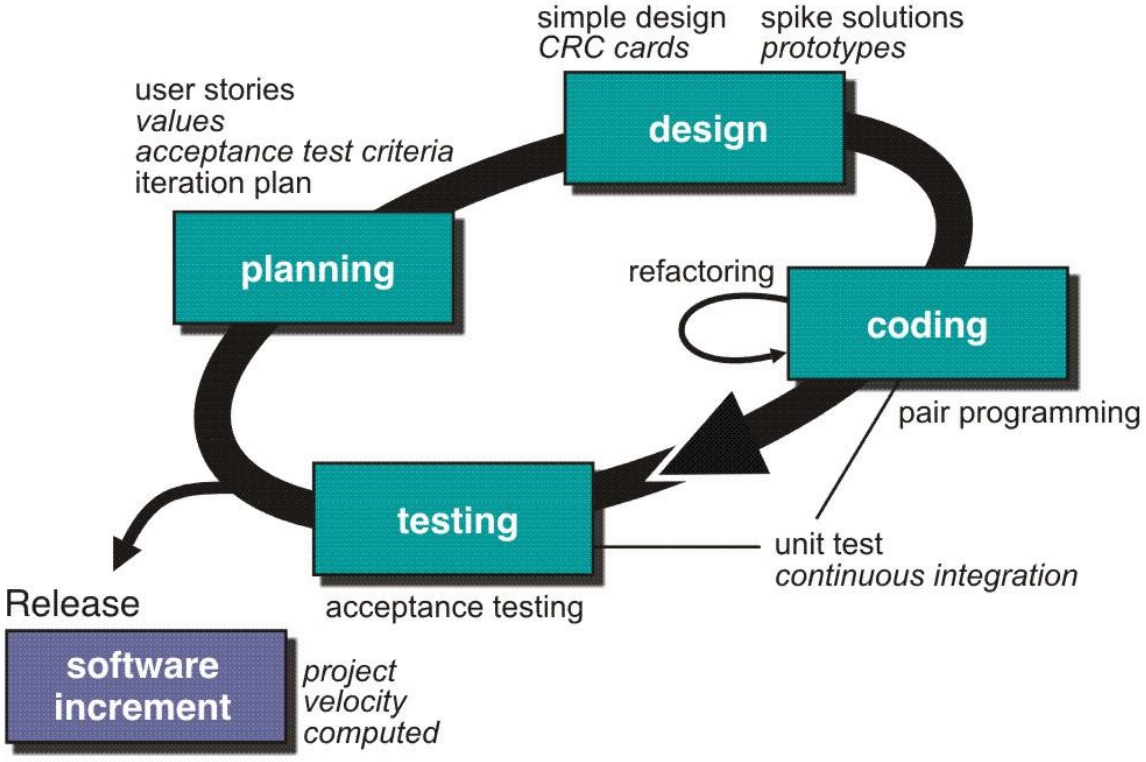
Principles of Agility

- Continuous attention to technical excellence and good design enhances agility.
- 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.

Extreme Programming (XP)

- The most widely used agile process, originally proposed by Kent Beck [BEC99]
- XP uses an object-oriented approach as its preferred development paradigm
- Defines four (4) framework activities
  - Planning
  - Design
  - Coding
  - Testing

Extreme Programming (XP)



XP - Planning

- Begins with the creation of a set of stories (also called *user stories*)
- Each story is written by the customer and is placed on an index card
- The customer assigns a value (i.e. a priority) to the story
- Agile team assesses each story and assigns a cost
- Stories are grouped to for a deliverable increment
- A commitment is made on delivery date
- After the first increment “project velocity” is used to help define subsequent delivery dates for other increments

XP - Design

- Follows the KIS (keep it simple) principle
- Encourage the use of CRC (class-responsibility-collaborator) cards
- For difficult design problems, suggests the creation of "*spike solutions*"—a design prototype
- Encourages "*refactoring*"—an iterative refinement of the internal program design
- Design occurs both before and after coding commences

XP - Coding

- Recommends the construction of a series of unit tests for each of the stories before coding commences
- Encourages "*pair programming*"
  - Mechanism for real-time problem solving and real-time quality assurance
  - Keeps the developers focused on the problem at hand
- Needs continuous integration with other portions (stories) of the s/w, which provides a "smoke testing" environment

XP - Testing

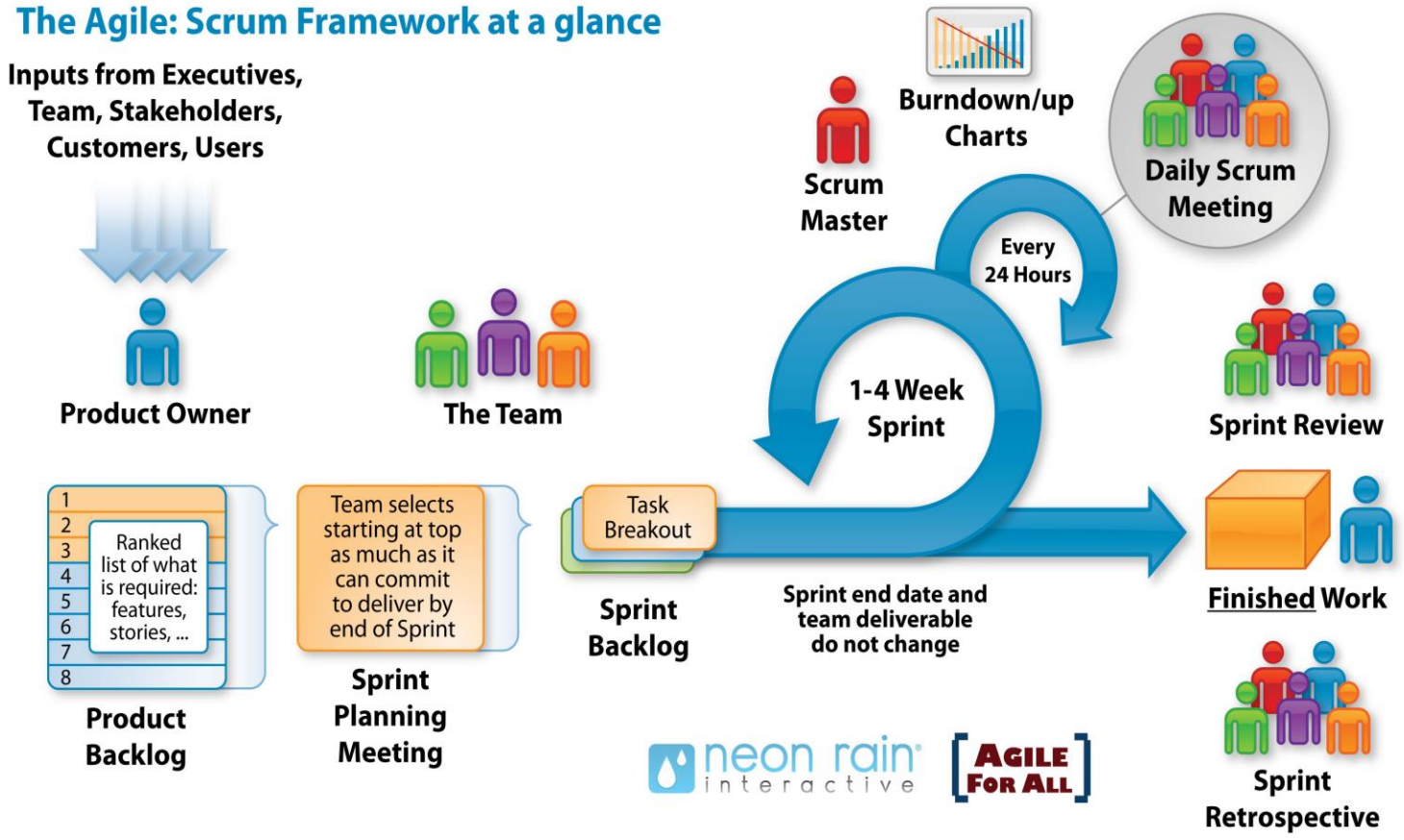
- Unit tests should be implemented using a framework to make testing automated. This encourages a regression testing strategy.
- Integration and validation testing can occur on a daily basis
- *Acceptance tests*, also called *customer tests*, are specified by the customer and executed to assess customer visible functionality
- Acceptance tests are derived from user stories

Scrum

Scrum

- A software development method Originally proposed by Schwaber and Beedle (an activity occurs during a rugby match) in early 1990.
- Scrum—distinguishing features
  - Development work is partitioned into “packets”
  - Testing and documentation are on-going as the product is constructed
  - Work units occurs in “sprints” and is derived from a “backlog” of existing changing prioritized requirements
  - Changes are not introduced in sprints (short term but stable) but in backlog.
  - Meetings are very short (15 minutes daily) and sometimes conducted without chairs (what did you do since last meeting? What obstacles are you encountering? What do you plan to accomplish by next meeting?)
  - “demos” are delivered to the customer with the time-box allocated. May not contain all functionalities. So customers can evaluate and give feedbacks.

Scrum


The Agile: Scrum Framework at a glance
Inputs from Executives, Team, Stakeholders, Customers, Users
Product Owner
The Team
Scrum Master
Burndown/up Charts
Daily Scrum Meeting
Every 24 Hours
1-4 Week Sprint
Sprint Review
1
2
3
4
5
6
7
8
Ranked list of what is required: features, stories, ...
Product Backlog
Team selects starting at top as much as it can commit to deliver by end of Sprint
Sprint Planning Meeting
Task Breakout
Sprint Backlog
Sprint end date and team deliverable do not change
Finished Work
Sprint Retrospective
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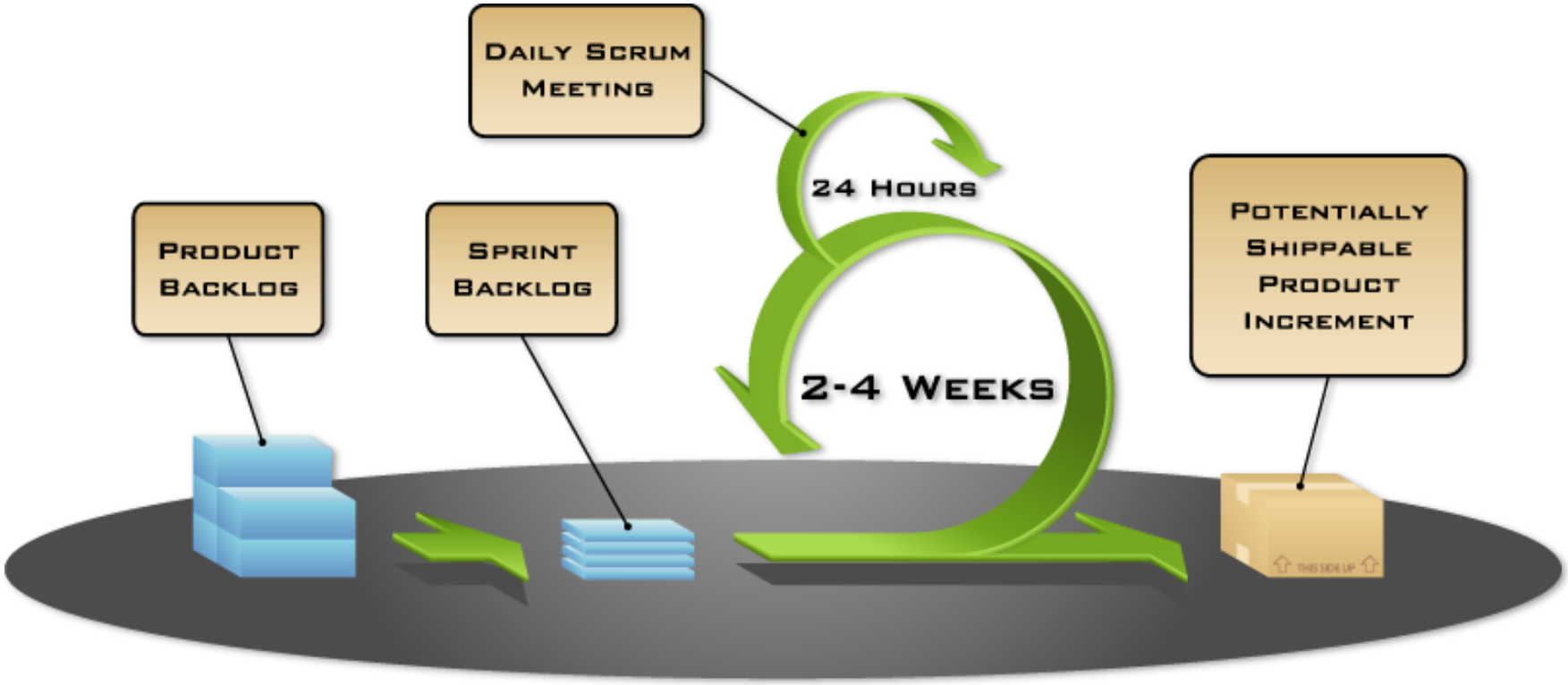
AGILE FOR ALL

How Scrum Works?



Sprints

- Scrum projects make progress in a series of “sprints”
  - Analogous to XP iterations
- Target duration is one month
  - +/- a week or two
    - But, a constant duration leads to a better rhythm
- Product is designed, coded, and tested during the sprint

Scrum's core values

- Commitment. Because we have great control over our own destiny, we become more committed to success.
- Focus. Because we focus on only a few things at a time, we work well together and produce excellent work. We deliver valuable items sooner.
- Openness. As we work together, we practice expressing how we're doing and what's in our way. We learn that it is good to express concerns so that they can be addressed.
- Respect. As we work together, sharing successes and failures, we come to respect each other and to help each other become worthy of respect.
- Courage. Because we are not alone, we feel supported and have more resources at our disposal. This gives us the courage to undertake greater challenges

- **Scrum and XP aim to deliver a high-quality product to the client as fast as possible.** Although Scrum focuses on management and productivity, whereas XP concentrates on software quality and engineering techniques.
- Sprint in Scrum usually lasts longer, about 2-4 weeks. While **XP emphasizes shorter Sprints, usually lasting 1-2 weeks.** Moreover, during Scrum's Sprint, no changes are allowed to interrupt Sprint's target. On the other hand, XP is more flexible, and customers can add changes during Sprint.
- Thirdly, prioritizing tasks occurs in different ways. In Scrum, the Product Owner, with communication with the Development Team, is responsible for priorities. In contrast, using XP, developers implement tasks in strict priority order.
- Finally, both frameworks affirm different values. **Scrum relies on openness, focus, and commitment.** However, XP depends on communication, simplicity, and feedback.

Other Agile Processes

- Adaptive Software Development (ASD)
- Dynamic Systems Development Method (DSDM)
- Crystal
- Feature Driven Development
- Agile Modeling (AM)

Problems with agile methods

- It can be difficult to keep the interest of customers / users who are involved in the process.
- Team members may be unsuited to the intense involvement that characterizes agile methods.
- Prioritizing changes can be difficult where there are multiple stakeholders.
- Maintaining simplicity requires extra work.
- Because of their focus on small, tightly-integrated teams, there are problems in scaling agile methods to large systems.
- Less emphasis on documentation - harder to maintain when you get a new team for maintenance