

9 : Extreme Programming XP

IT4406 – Agile Software Development

Level II - Semester 4

Overview

- Extreme Programming (XP) is one of the agile software development methodologies.
- It provides values and principles to guide the team behavior.
- The team is expected to self-organize.
- XP teams perform nearly every software development activity simultaneously.
- Analysis, design, coding, testing and deployment occur with rapid frequency.
- The team produces potentially shippable software at the end of each iteration.

Intended Learning Outcomes

- At the end of this lesson, you will be able to;
 - Explain the XP life Cycle
 - Understand the XP team features
 - Identify key roles and responsibilities.
 - Discuss the structure of a XP team.

List of subtopics

9.1 Introduction to Extreme Programming XP

9.1.1 Introduction to XP

9.1.2 Introduction XP Lifecycle

9.1.3 The XP Team

9.1.3.1 The Whole Team

9.1.3.2 On-Site Customers

9.1.3.3 Programmers

9.1.3.4 Testers

9.1.3.5 Coaches

9.1.3.6 Other Team Members

9.1.3.7 The Project Community

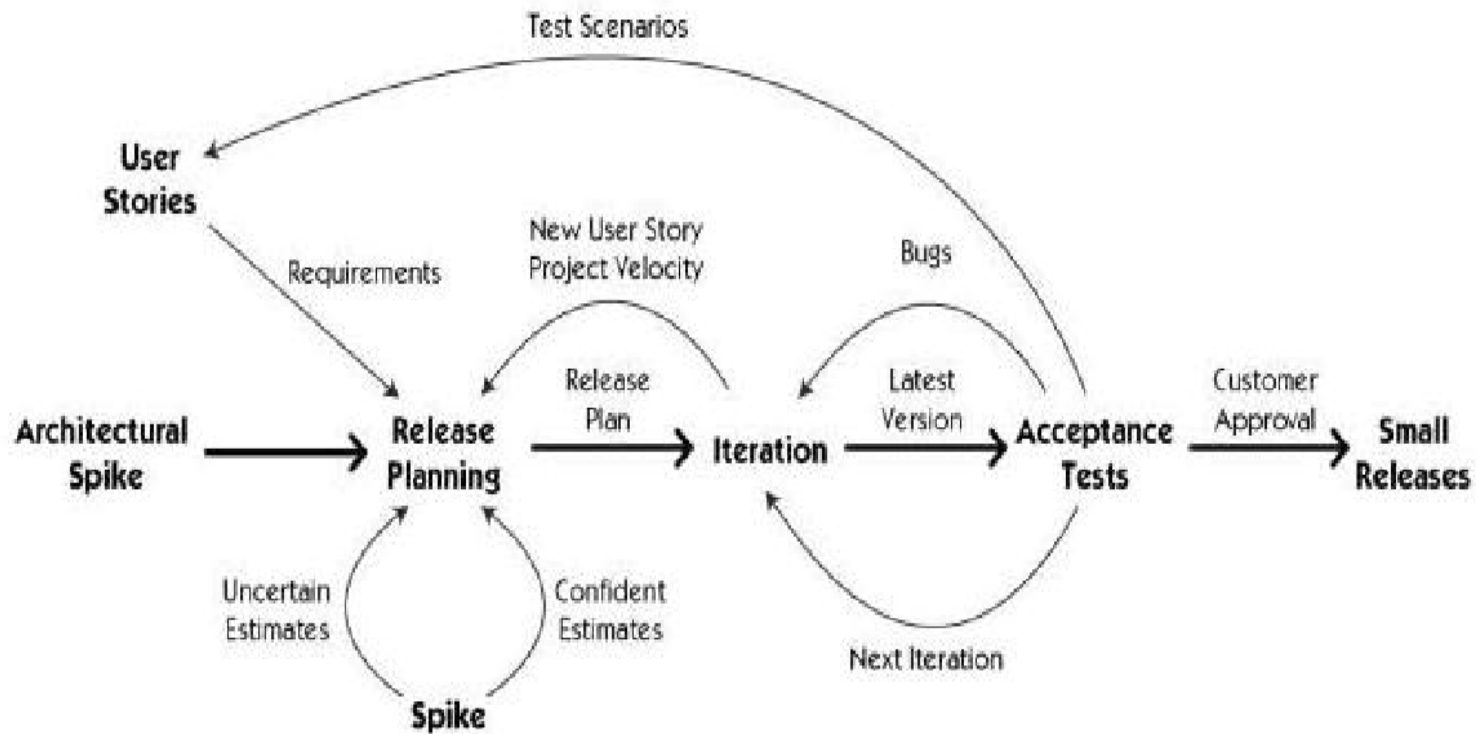
9.1.3.8 Filling Roles

9.1.3.9 Team Size

9.1.1 Introduction

- Extreme Programming eliminates
 - Analysis, design and testing phases, along with their associated documents.
- XP teams perform
 - Significant analysis, design, testing, and coding every day
- High-bandwidth communication, cross-functional teams, and practices tuned for iterative and incremental work.
- Short, timeboxed iterations provide structure, and the team produces potentially shippable software at the end of each iteration.
- Each iteration starts with a brief planning session and ends with a product demo and retrospective.

Introduction ctd.

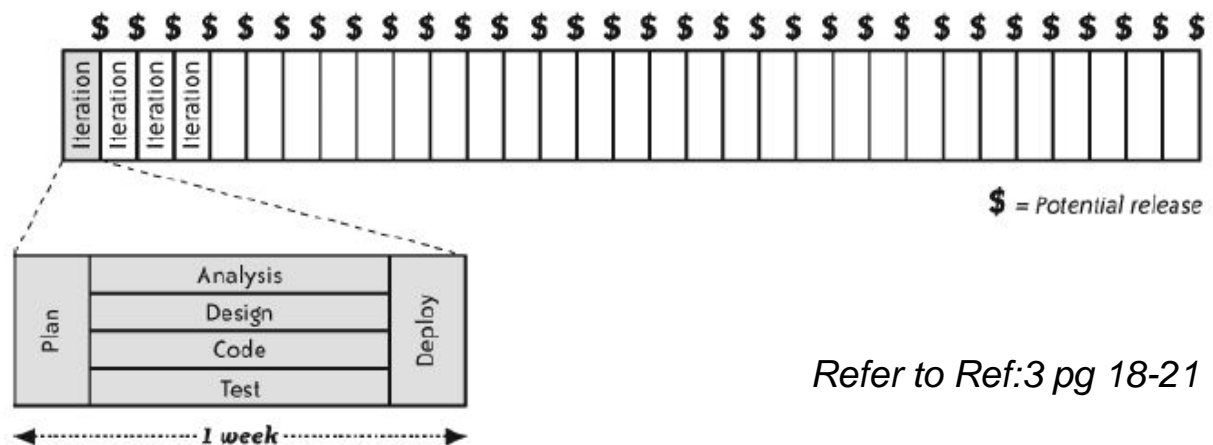


A visual process model for XP

Refer to Ref:3 pg 15-17 for a scenario

9.1.2 Introduction to XP Life Cycle

- Can eliminate
 - Requirements
 - Design
 - Testing Phases
 - Formal documents that go with them.
- XP team produces deployable software every week
- XP does it by working in iterations: week-long increments of work



Refer to Ref:3 pg 18-21

Introduction to XP Lifecycle ctd.

- Every week, the team does a bit of
 - Release Planning
 - Design
 - Coding
 - Testing
 - They work on stories:
 - Very small features or parts of features, that have customer value

Introduction to XP Lifecycle ctd.

- Every week, the team commits to delivering four to ten stories.
- Throughout the week, they work on all phases of development for each story.
- At the end of the week, they deploy their software for internal review.

Introduction to XP Lifecycle - Planning

- Every XP team includes several business experts
- On-site customers
 - Who are responsible for making business decisions.
 - Point the project in the right direction by clarifying the project vision, creating stories, constructing a release plan, and managing risks.
- Programmers
 - Provide estimates and suggestions, which are blended with customer priorities in a process called the planning game.

Introduction to XP Lifecycle - Planning ctd.

- Customers
 - continue to review and improve the vision and the release plan to account for new opportunities and unexpected events.
- The team
 - creates a detailed plan for the upcoming week at the beginning of each iteration.
 - touches base every day in a brief stand-up meeting.
 - its informative workspace keeps everyone informed about the project status.

Introduction to XP Lifecycle - Analysis

- On-site customers
 - rather than using an upfront analysis phase to define requirements sit with the team full-time
 - may or may not be real customers depending on the type of project
 - but they are the people best qualified to determine what the software should do.
 - are responsible for figuring out the requirements for the software.
 - When programmers need information, they simply ask. Customers are responsible for organizing their work so they are ready when programmers ask for information.
 - They figure out the general requirements for a story before the programmers estimate it
 - formalize tricky or difficult to understand requirements with the assistance of testers, by creating customer tests.

Introduction to XP Lifecycle - Analysis ctd

- Customers and Testers
 - create the customer tests for a story around the same time that programmers implement the story.
- For the UI,
 - customers work with the team to create sketches of the application screens.
 - Some teams include an interaction designer who's responsible for the application's UI.

Introduction to XP Lifecycle - Design and Coding

- XP uses incremental design and architecture to continuously create and improve the design in
- Small Steps.
- Test-Driven Development (TDD),
 - an activity that inextricably weaves together testing, coding, design, and architecture.
 - To support this process, programmers work in pairs,
 - ensures that one person in each pair always has time to think about larger design issues.
- Use a version control system for configuration management and maintain their own automated build.

Introduction to XP Lifecycle - Design and Coding ctd.

- Programmers integrate their code every few hours and ensure that every integration is technically capable of deployment.
- Programmers also maintain coding standards and share ownership of the code.
- The team shares a joint aesthetic for the code.
- Everyone is expected to fix problems in the code regardless of who wrote it.

Introduction to XP Lifecycle - Testing

- Each member of the team—programmers, customers, and testers—makes his own contribution to software quality.
- Produce a handful of bugs per month in completed work.
- TDD produces automated unit and integration tests.
- Customers review work in progress to ensure that the UI works the way they expect.
- They also produce examples for programmers to automate that provide examples of tricky business rules.

Introduction to XP Lifecycle - Testing ctd.

- When the testers find a bug, the team conducts root-cause analysis and considers how to improve their process to prevent similar bugs from occurring in the future.
- Testers explore the nonfunctional characteristics, such as performance and stability.
- When bugs are found, programmers create automated tests to show that the bugs have been resolved.
- The team supports their quality efforts through pair programming, energized work, and iteration slack.

Introduction to XP Lifecycle - Deployment

- XP teams keep their software ready to deploy at the end of any iteration.
- They deploy the software to internal stakeholders every week in preparation for the weekly iteration demo.
- Deployment to real customers is scheduled according to business needs
- When the project ends, the team may hand off maintenance duties to another team.
- In this case, the team creates documentation and provides training as necessary during its last few weeks.

9.1.3 The XP Team

- Team software development
 - How to design and program the software (programmers, designers, and architects)
 - Why the software is important (product manager)
 - The rules the software should follow (domain experts)
 - How the software should behave (interaction designers)
 - How the user interface should look (graphic designers)
 - Where defects are likely to hide (testers)
 - How to interact with the rest of the company (project manager)
 - Where to improve work habits (coach)
- XP acknowledges this reality by creating cross functional teams composed of diverse people

The XP Team - The Whole Team

- XP teams sit together in an open workspace.
- At the beginning of each iteration, the team meets for a series of activities:
 - an iteration demo
 - a retrospective
 - iteration planning.
- These meeting typically take two to four hours in total.
- The team also meets for daily stand-up meetings, which usually take five to ten minutes each.
- Everyone on the team plans his own work : it's as informal as somebody standing up and announcing across the shared workspace that he would like to discuss an issue.
- This self-organization is a hallmark of agile teams.

The XP Team - On-site customers

- Responsible for defining the software the team builds.
- Most important activity is release planning.
- Customers need to evangelize the project's vision;
- identify features and stories determine how to group features into small, frequent releases; manage risks; create an achievable plan by coordinating with programmers and playing the planning game.
- responsible for refining their plans by soliciting feedback from real customers and other stakeholders.
 - One of the venues for this feedback is the weekly iteration demo

The XP Team - On-site customers ctd.

- Responsible for providing programmers with requirements details upon request.
- Customers themselves act as living requirements documents, researching information in time for programmer use and providing it as needed.
 - XP uses requirements documents only as memory aids for customers.
- Help communicate requirements by creating mock-ups, reviewing work in progress, Creating detailed customer tests that clarify complex business rules.

The XP Team - On-site customers ctd.

- Typically, product managers, domain experts, interaction designers, and business analysts play the role of the on-site customer.
- One of the most difficult aspects of creating a cross-functional team is finding people qualified and willing to be on-site customers.
- A great team will produce technically excellent software without on-site customers
- Customer involvement makes a huge difference in product success

NOTE: Include exactly one product manager and enough other on-site customers for them to stay one step ahead of the programmers. As a rule of thumb, start with two on-site customers (including the product manager) for every three programmers.

The XP Team - Programmers

- Responsible for finding the most effective way of delivering the stories in the plan.
- Provide effort estimates, suggest alternatives, and help customers create an achievable plan by playing the planning game.
- Spend most of their time in pair programming.
- Using test-driven development, they write tests, implement code, refactor, and incrementally design and architect the application.
- Have to have the awareness of technical debt and its impact on development time and future maintenance costs.

The XP Team - Programmers ctd.

- Maintain a ten-minute build that can build a complete release package at any time.
- Use version control and practice continuous integration, keeping all but the last few hours' work integrated and passing its tests.
- At the beginning of the project establish coding standards.
- Have the right and the responsibility to fix any problem they see.

The XP Team - Testers

- Help customers identify holes in the requirements and assist in customer testing.
- Use exploratory testing to help the team identify whether it is successfully preventing bugs from reaching finished code.
- Provide information about the software's nonfunctional characteristics, such as performance, scalability, and stability, by using both exploratory testing and long-running automated tests.

The XP Team - Testers ctd.

- When testers find bugs, they help the rest of the team figure out what went wrong so that the team as a whole can prevent those kinds of bugs from occurring in the future.
- Require creative thinking, flexibility, and experience defining test plans.
- XP automates repetitive testing rather than performing manual regression testing.

The XP Team - Coaches

- XP leaders lead by example, helping the team reach its potential rather than creating jobs and assigning tasks.
- XP leaders are called coaches.
- Leadership roles dynamically switch from person to person as situations dictate.
- Help the team start their process by arranging for a shared workspace and making sure that the team includes the right people.
- They help set up conditions for energized work, and they assist the team in creating an informative workspace.

The XP Team - Coaches ctd.

- Help the team interact with the rest of the organization.
- Take responsibility for any reporting needed.
- Help the team members maintain their self-discipline, helping them remain in control of challenging practices such as risk management, test-driven development, slack, and incremental design and architecture.

The XP Team - Other Team Members

- Technical Writer
- Analyst
- Product Manager
 - maintain and promote the product vision
 - sharing it with stakeholders, incorporating feedback, generating features and stories, setting priorities for release planning, providing direction for the team's on-site customers, reviewing work in progress, leading iteration demos, involving real customers, and dealing with organizational politics.

The XP Team - Other Team Members ctd.

- Domain Experts
 - spend most of their time with the team, figuring out the details of upcoming stories and standing ready to answer questions when programmers ask.
 - For complex rules, they create customer tests to help convey nuances.

The XP Team

- Interaction Designers
 - focuses on understanding users, their needs, and how they will interact with the product.
 - They interview users, create user personas, review paper prototypes with users, and observing usage of actual software.
 - Graphic designers: convey ideas and moods via images and layout.
Interaction designers: focus on the types of people using the product, their needs, and how the product can most seamlessly meet those needs
- Business Analysts
 - clarify and refine customer needs,
 - Help customers think of details they might otherwise forget and help programmers express technical trade-offs in business terms.

The XP Team ctd.

- Designers and architects
 - Everybody codes and designs on an XP team.
 - Guide the incremental design and architecture efforts and by helping team members see ways of simplifying complex designs.
 - act as peers—guiding rather than dictating.
- Technical specialists
 - XP programmers are generalizing specialists. Although each person has his own area of expertise
 - everybody is expected to work on any part of the system that needs attention.

The XP Team ctd.

- The programmer-coaches
 - helps the other programmers with XP's technical practices.
 - are often senior developers and may have titles such as “technical lead” or “architect.”
 - also act as normal programmers and participate fully in software development.
- The project manager
 - usually good at coaching non-programming practices.
 - Some functional managers fit into this role as well.
 - lack the technical expertise to coach XP's programming practices.
 - Project managers may also double as customers.

The XP Team - The Project Community

- Organization's Human Resources and Facilities departments
- Human Resources : handles performance reviews and compensation. Their mechanisms may not be compatible with XP's team-based effort
- In order to use XP, you'll need the help of Facilities to create an open workspace

The XP Team - Filling Roles

- You don't have to have one person for each role—some people can fill multiple roles.
 - At a minimum, however, one person clearly designated as “product manager” (who may do other customer-y things) and one person clearly defined as “programmer-coach” (who also does programmer-y things).
 - The other roles may blend together. Product managers are usually domain experts and can often fill the project manager's shoes, too.
 - One of the customers may be able to play the role of interaction designer, possibly with the help of a UI programmer.
 - On the programming side, many programmers are generalists and understand a variety of technologies. In the absence of testers, both programmers and customers should pick up the slack.

The XP Team - Team Size

- Assume teams with 4 to 10 programmers (5 to 20 total team members).
- For new teams, four to six programmers is a good starting point.
- 6 programmers produces a team that also includes 4 customers, 1 tester, and a project manager, for a total team size of 12 people.
- Twelve people turns out to be a natural limit for team collaboration.
- XP teams can be as small as one experienced programmer and one product manager,
- The smallest team with full XP consists of five people: four programmers (one acting as coach) and one product manager (who also acts as project manager, domain expert, and tester).

The XP Team - Team Size ctd.

- Starting with 10 programmers produces a 20-person team that includes 6 customers, 3 testers, and a project manager.
- You can create even larger XP teams, but they require special practices

Summary

Extreme Programming

Short, timeboxed iterations provide structure, and the team produces potentially shippable software at the end of each iteration

XP Life Cycle

Planning , Analysis, Design & Coding, Testing, and Deployment

The XP Team

Self-organized, cross functional teams composed of diverse people