Agile Development & DevOps

Higher National Diploma in Information Systems

Final Assessment

2022.1F

SCHOOL OF COMPUTING AND ENGINEERING

NATIONAL INSTITUTE OF BUSINESS MANAGEMENT

KURUNEGALA

Title

Title of the project: Agile Development and DevOps

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Date of the declaration: 14-03-2022

The project is submitted in partial fulfillment of the requirement of the Higher National Diploma in Information System Management – Agile Development and DevOps of National Institute of Business Management.

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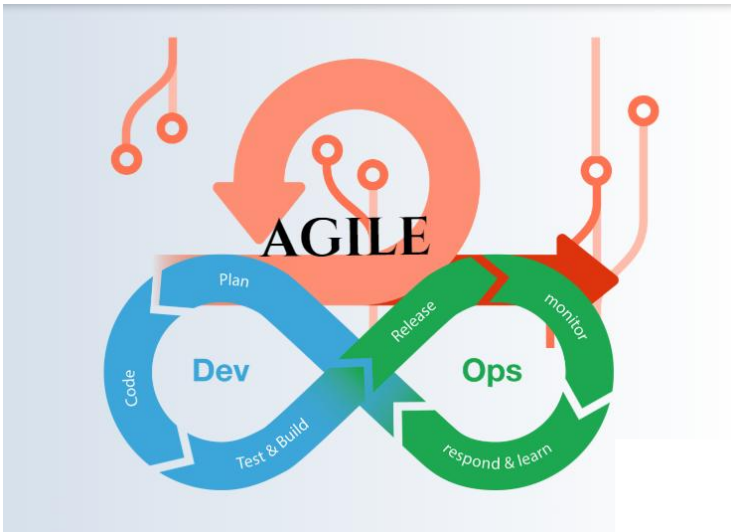
CHAPTER 1: INTRODUCTION

Day by day modern technology is getting rapidly popular among the peoples, specially among young men and woman. So, the IT company owners are eager to provide their services at its best to the customers for make sure they are remaining with as long as. In this case they are looking for best way to manage their Development in more efficiencies and keep customers attractive to IT.

As a Project Manager for Premier Software Technologies (Pvt) Ltd, I understand the importance of considering different software development methodologies to ensure faster deliveries and increase productivity. As requested by the senior management, I have conducted a feasibility study to evaluate the suitability of Agile and DevOps methodologies for our organization.

Feasibility Study:

1. Understanding Agile and DevOps methodologies.
2. Current project management methodology.
3. Evaluation of Agile and DevOps methodologies.
4. Challenges with implementing Agile and DevOps methodologies.

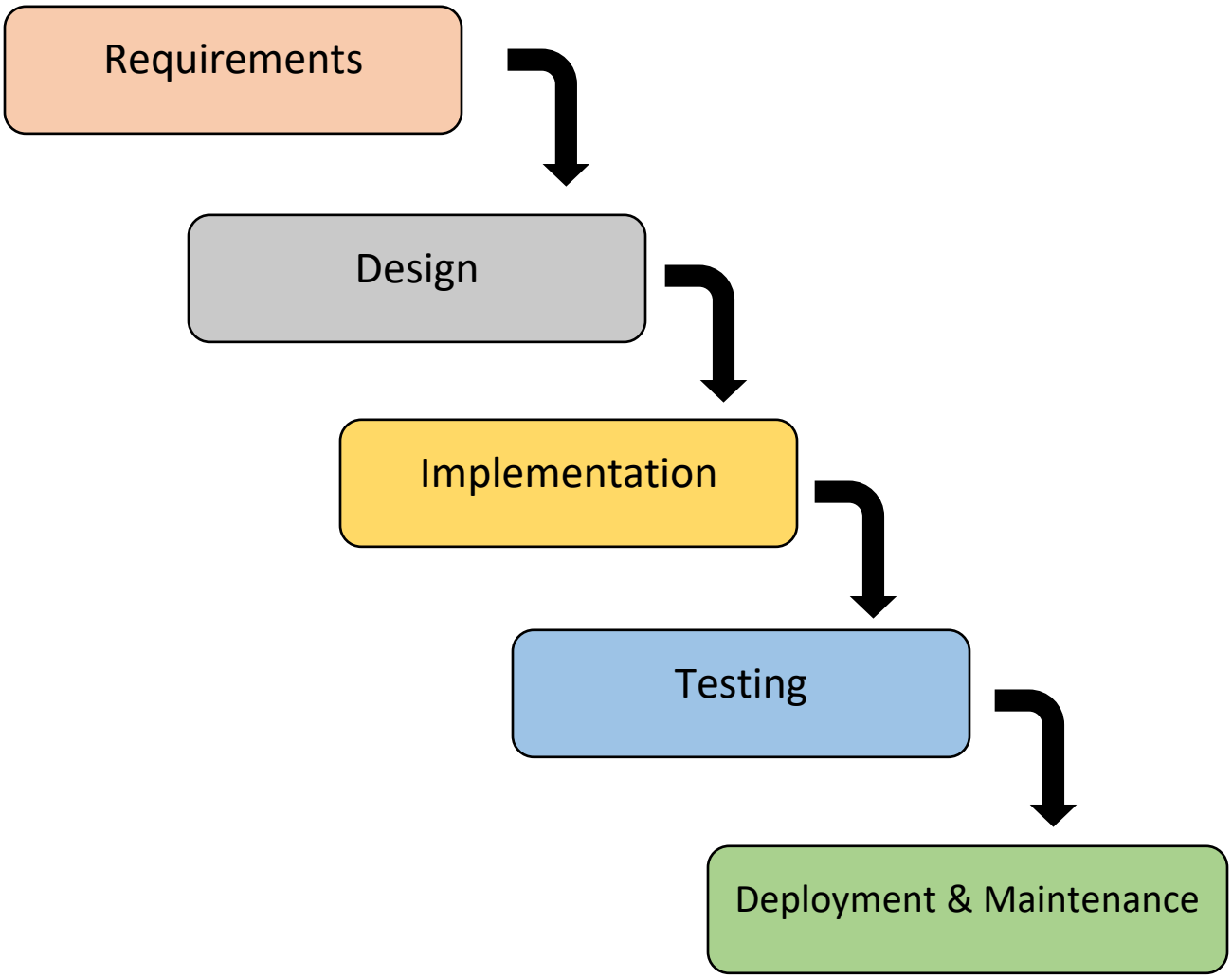


CHAPTER 2: Waterfall Methodology

Introduction of the Waterfall Methodology

The Waterfall methodology is a linear, sequential approach to software development that follows a structured process where each phase must be completed before moving on to the next phase. It is often referred to as the "traditional" or "sequential" approach to software development.

The Waterfall methodology is characterized by a series of sequential phases, including requirements gathering and analysis, design, implementation, testing, deployment and maintenance. Each phase of the process is typically completed in a sequential manner, with the output of one phase becoming the input for the next phase.



Why We Should Switch to Agile from Waterfall??

The Waterfall methodology, while widely used in the past, has several disadvantages that organizations should be aware of:

1. Limited flexibility.
2. Lack of customer involvement.
3. Slow delivery.
4. High risk.
5. Lack of collaboration.

Waterfall Methodology – Problems

1. Rigid and Inflexible
2. Lack of Collaboration
3. Late Feedback
4. Lengthy Development Cycles
5. Documentation Overload

CHAPTER 3: AGILE DEVELOPMENT

Introduction of the Agile

Agile is a software development methodology that emphasizes iterative and incremental development, customer collaboration, and the ability to respond to changing requirements. Agile was created as a response to the limitations of the traditional Waterfall methodology, which was seen as rigid, inflexible, and unable to respond to changing customer needs.

Agile Tools.

Introduction Agile Tool

1. **JIRA**

- A project management and issue tracking tool. It helps teams planning, tracking and manage Agile projects.
- Features:
  - Issue tracking
  - Boards
  - Agile Epics

2. **Trello**

- A visual project management tool. It enables teams to organize tasks and projects using boards, lists, and cards to organize work and allows teams to collaborate and track progress
- Features:
  - Automate nearly any action with Trello's Butler
  - Board, Timeline, Table, Calendar, Dashboard and Map views

3. **Asana**

- A project management tool that supports Agile methodologies with features like boards, lists, and the ability to track progress in real-time
- Features:
  - View your task in a Kanban Board, list or timeline view
  - Gantt charts with timelines

4. **ClickUp**

   - ClickUp is a cloud-based project management tool that helps teams to collaborate and manage their tasks, projects, and workflows.
   - Features:
     - Create epics
     - Use story points

5. **LeanKit**
   - LeanKit is a web-based project management and collaboration tool that is based on the principles of Lean and Kanban. It is designed to help teams visualize their work, optimize workflows, and continuously improve their processes.
   - Features:
     - Board View templates
     - Track issues and bugs

6. **Kanbanize**
   - Kanbanize is a cloud-based project management and collaboration tool that is based on the Kanban methodology. It is designed to help teams visualize their work, optimize their workflows, and continuously improve their processes.
   - Features:
     - Built-in templates for Kanban board views
     - Manage multiple workflows on one Kanban board

Benefits of using Agile Tools.

1. Improved Communication:

   Agile tools provide a centralized platform for team members to communicate and collaborate, improving transparency, and ensuring that everyone is on the same page.

2. Better Project Management:

   Agile tools enable teams to manage their projects more effectively by providing tools for tracking progress, managing tasks, and identifying roadblocks.

3. Increased Productivity:

   By streamlining workflows, automating repetitive tasks, and providing real-time visibility into project status, agile tools can help teams work more efficiently and productively.

4. Faster Time-to-Market:

   Agile tools help teams identify and address issues quickly, enabling them to deliver high-quality products faster and more reliably.

5. Flexibility and Adaptability:

   Agile tools are designed to be flexible and adaptable to changing project requirements, allowing teams to adjust their approach as needed to ensure project success.

6. Better Quality:

   Agile tools promote a culture of continuous improvement, enabling teams to deliver higher-quality products by iterating on feedback and making incremental improvements.

Benefits of adaptation Agile to NexGen company

Recommended Tool -: **JIRA**, **Trello**

1. Faster time-to-market:

   Agile tools support iterative and incremental development, allowing teams to release smaller, high-quality features more quickly, and respond faster to market demands.

2. Improved collaboration:

   Agile tools facilitate team collaboration and communication, fostering cross-functional collaboration and knowledge sharing. This can help teams work together more effectively and reduce silos.

3. Increased transparency and visibility:

   Agile tools provide real-time updates and progress tracking, which can help stakeholders stay informed about project status and potential roadblocks.

4. Better alignment with customer needs:

   Agile methodologies prioritize continuous feedback and testing, allowing teams to quickly adjust their approach to better meet customer needs.

5. Enhanced flexibility and adaptability:

   Agile tools prioritize flexibility and adaptability, allowing teams to quickly pivot and adjust their approach as needed to better meet project goals and customer needs.

6. Improved quality and reduced risk:

   Agile methodologies prioritize testing and continuous improvement, which can help teams identify and address issues early in the development process, leading to better quality products and services and reduced risk.

CHAPTER 4: DevOps Methodology

Introduction of the DevOps

DevOps is a set of practices that combines software development (Dev) and IT operations (Ops) to achieve faster and more reliable software delivery. DevOps is a culture that emphasizes collaboration, communication, and integration between software developers and IT operations professionals. The goal of DevOps is to bridge the gap between development and operations teams by creating a culture of shared responsibility, automation, and continuous improvement.

DevOps Tools.

1. Version control tool: Git (GitLab, GitHub, Bitbucket)

   - Git is a version control system used for tracking changes in source code during software development.
   - GitLab is a web-based Git repository manager that provides features such as code review, issue tracking, and continuous integration and deployment. It can be installed on-premises or used as a hosted service.
   - GitHub is a web-based hosting service for Git repositories.
   - Bitbucket is a web-based hosting service for Git and Mercurial repositories.
2. Build tool: Maven

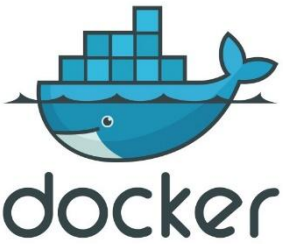
   - Maven being a build automation tool, can be used in conjunction with agile software development methodologies to improve the efficiency and effectiveness of the development process.
3. Continuous integration tool: Jenkins

- A continuous integration and continuous delivery (CI/CD) tool that automates the building, testing, and deployment of software.

4. configuration management tool: chef, Puppet, Ansible

- Chef is a configuration management tool that allows developers to automate infrastructure configuration, manage dependencies, and ensure consistent application deployments.
- Puppet is a configuration management tool that allows developers to manage infrastructure as code, automate repetitive tasks, and ensure consistency across environments.
- Ansible - a configuration management and automation tool that allows developers to manage infrastructure as code.

5. Container Platforms: Docker, Kubernetes



- Docker - a containerization platform that enables developers to package their applications and dependencies into lightweight, portable containers.
- Kubernetes - an open-source container orchestration system that automates the deployment, scaling, and management of containerized applications.

6. Communication and Collaboration: Slack

   - Slack is a communication and collaboration platform that is widely used by agile development teams. Slack is designed to provide a centralized platform for team communication, collaboration, and sharing of information, and is particularly well-suited for agile teams that need to work closely together and communicate frequently

7. Cloud computing and storage tool: AWS CodePipeline, Azure DevOps
   - AWS CodePipeline - a cloud-based continuous delivery service that automates the release process for applications and infrastructure changes.
   - Azure DevOps - a cloud-based DevOps platform that provides a complete set of tools for building, testing, and deploying applications on Microsoft Azure.

Benefits of using DevOps Tools.

1. Faster time-to-market:
   - DevOps tools enable continuous integration and continuous delivery (CI/CD), allowing teams to release smaller, high-quality features more quickly, and respond faster to market demands.
2. Improved collaboration and communication:
   - DevOps tools facilitate cross-functional collaboration and knowledge sharing, breaking down silos and enabling faster and more efficient communication between teams.
3. Enhanced quality and reliability:
   - DevOps tools automate testing and deployment processes, reducing errors and increasing the reliability and quality of software.

4. Increased scalability and flexibility:
    - DevOps tools provide automation and configuration management, making it easier for teams to scale infrastructure and respond to changing requirements quickly.
5. Better visibility and transparency:
    - DevOps tools provide real-time updates and progress tracking, which can help stakeholders stay informed about project status and potential roadblocks.

Benefits of adaptation DevOps to NexGen company

Recommended Tools -: **Jenkins**, **Docker**, **Kubernetes**

1. Faster time-to-market:
    - DevOps tools support continuous delivery and deployment, allowing teams to release features and updates to customers more quickly and frequently, and respond faster to market demands.
2. Improved collaboration and communication:
    - DevOps tools enable cross-functional collaboration and communication, breaking down silos and enabling faster and more efficient communication between teams.
3. Increased efficiency and productivity:
    - DevOps tools automate manual tasks, reducing errors and increasing the speed and efficiency of software development and deployment processes.
4. Enhanced quality and reliability:
    - DevOps tools automate testing and deployment processes, reducing errors and increasing the reliability and quality of software.
5. Better visibility and transparency:
    - DevOps tools provide real-time updates and progress tracking, which can help stakeholders stay informed about project status and potential roadblocks.
6. Increased scalability and flexibility:

- DevOps tools provide automation and configuration management, making it easier for teams to scale infrastructure and respond to changing requirements quickly.

7. Improved security:
    - DevOps tools enable teams to implement security controls and testing into the development process, reducing security risks and vulnerabilities.

CHAPTER 5: Real World Case Study

Examples:

1. Sky
    - Household name famous for its satellite TV, broadband and telephone services. The company which has launched a product like AppleTV Box has been placing agile methodology at the center of their software development approach.
2. Philips
    - This is another firm that has adopted agile principle. After numerous management structure they have introduce agile coaches. As a result of this change management teams were able to react to situation quicker.
3. VistaPrint
    - Is a go-to marketing company for small businesses. After them performing several analyses of their existing waterfall methodology they have found out they were wasting much time. They have spent 60-day cycle on 40 hours actual work. Because of that wastage this company have switched to agile methodology.
4. BBVA
    - Few years back this company has shifted to agile practices in their Spain branch. After the huge success they have decided to shit completely to agile methodology in every branch.
5. JP Morgan Chase
    - In order to help improve product development and slash the cost of training as part of a high-profile IT initiative, and agile methodology were a key part of that initiative

6. Amazon
    - Amazon has been using DevOps practices for over a decade now, allowing them to continually improve their software development processes. They have implemented a continuous delivery pipeline that allows them to deliver software updates to production quickly and frequently. This approach has helped them stay ahead of their competition and maintain their position as a market leader.
7. Microsoft
    - Microsoft has been using Agile and DevOps practices for several years now, and they have seen significant benefits from this approach. They use continuous integration and continuous delivery to deliver updates to their software products quickly and efficiently. This approach has helped them stay ahead of their competition and maintain their position as a market leader.

CHAPTER 6: CHALLENGES

Challenges and solutions the company may face during the transition

1. Cultural Resistance:
    - The transition to Agile and DevOps methodologies can be challenging for employees who are accustomed to traditional software development practices. It can be difficult to change the mindset of employees who are resistant to change. The solution is to provide training and education on the benefits of Agile and DevOps methodologies. The training should be hands-on, so employees can experience the benefits firsthand.
2. Integration with Existing Systems:
    - Agile and DevOps methodologies require a high degree of automation and integration between tools. Integrating new tools with existing systems can be challenging. The solution is to choose tools that are compatible with existing systems and provide support for integration. Also, the company should create a dedicated team responsible for tool integration.

3. Skill Gap:
    - Agile and DevOps methodologies require a different set of skills than traditional software development practices. The company may face a skill gap in employees who are not familiar with Agile and DevOps methodologies. The solution is to provide training and education on Agile and DevOps methodologies. The company can also hire employees who have experience in Agile and DevOps methodologies.
4. Resistance to Continuous Improvement:
    - Agile and DevOps methodologies require continuous improvement. Employees may resist change, and management may not be receptive to feedback. The solution is to create a culture of continuous improvement. The company should encourage employees to provide feedback and reward those who contribute to the improvement of processes.
5. Security Concerns:
    - Agile and DevOps methodologies require a high degree of automation and continuous integration. This can result in security vulnerabilities. The solution is to implement security best practices and use secure DevOps tools. The company should also create a security team responsible for identifying and addressing security vulnerabilities.