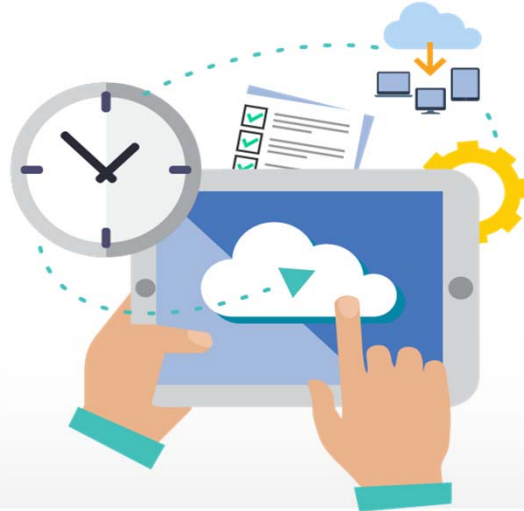# Basic Principles of Software Deployment Efficiency

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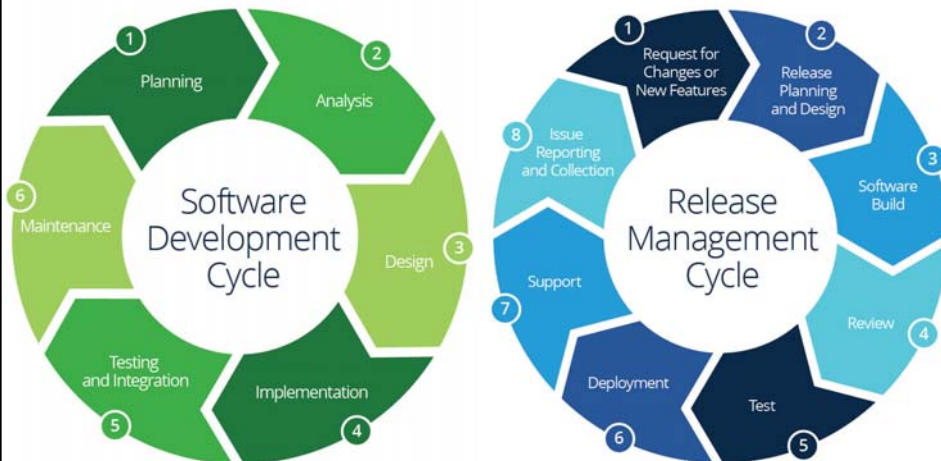# Basic Principles of Software Deployment Efficiency

https://www.smartsheet.com/release-management-process

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Release vs Deploy

The term deploy is often used interchangeably with the words release and ship, but they don't mean exactly the same thing.

Deployment represents the installation or running of a new version of code on a server — going "live" with the software.

A release is the software form of this new version. It is intended for an audience beyond developers, either others in the organization or customers.

When a customer deploys a release, it is generally described as an installation of the software.

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Software Release

A new or modified software and the process of its creation. A release constitutes a fully functional version of the software, and it is the climax of the software development and engineering processes.

- Software Versioning – unique set of numbers/letters that update sequentially
- Alpha and Beta Releases

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Software Deployment

Because every software system is typically unique, it is difficult to define the precise processes or procedures.

Should be interpreted as a general process that is customized according to specific requirements or characteristics.

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One Size Does NOT Fit All

Image from: https://www.chartingyourfinancialfuture.com/investing/when-one-size-fits-all-falls-short/

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Software Deployment

Includes but not limited to the following activities:
- Creating and maintaining up-to-date and ready-to-install software packages
- Configuring the target computers before the installation of the package
- Installing the software on the target computers
- Configuring the target computers post-installation
- Ensuring that computers have the latest version of software installed on them
- Control and visibility over the software that is installed in a network and facilitating end user's software requirements.

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Software Deployment

The process of remotely installing software on one or multiple computers within a network.
- Usually associated with large networks

All activities that make a software system available for use.
- Interrelated activities
  - Vendor side (producer)
  - Utility side (consumer)

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Efficiency

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Efficiency

- Ratio of useful output to total input
- Ratio of useful work performed by a machine or process to the total energy expended.
- Focuses on maximum results with least time and effort

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Considerations

Type of Applications
– Web Application Deployment
– Mobile Application Deployment
– Enterprise Application Deployment
– Embedded Software Deployment

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Considerations

Types of Environments
– Local Application Deployment
– Cloud Application Deployment
  • IaaS, PaaS, private/public clouds
– Virtualized Application Deployment
  • VMware, Citrix, etc.

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Considerations

Vendor Side Development & Deployment Methodologies
- Waterfall Development
- Agile Development
- Rapid Application Development (RAD)
- DevOps Development

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Vendor Side - Waterfall Development

- Traditional software development method.
- Rigid linear model that consists of sequential phases in which each must be completed first before proceeding to the next task.
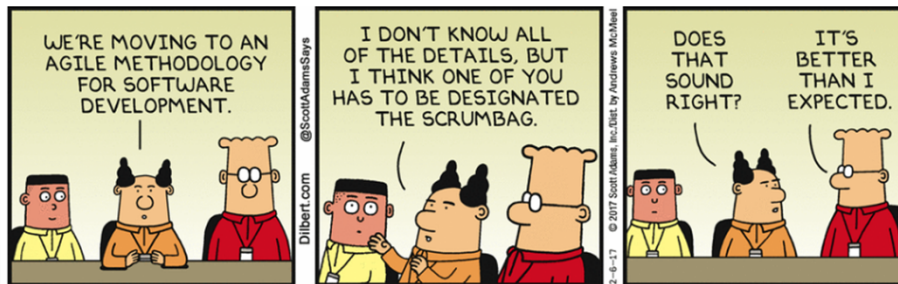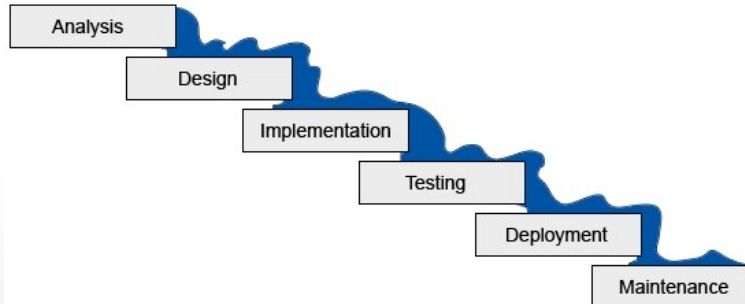
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Vendor Side - Waterfall Development

- Pros: The linear nature of this method makes it easy to understand and manage. Projects with clear objectives and stable requirements can best use the waterfall method. Less experienced project managers, project teams, and teams whose composition changes frequently may benefit the most from using the waterfall development methodology.

- Cons: It is often slow and costly due to the rigid structure and tight controls. These drawbacks led waterfall method users to the explore other software development methodologies.

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Vendor Side - Agile Development

- Different forms include scrum, crystal, extreme programming (XP), and feature-driven development (FDD).
- Requirements and project scope are delivered incrementally rather than all together before the start of the project.
- Change driven approach.
- Incorporates planning as part of the incremental activity, and resolves those plans iteratively.

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Vendor Side - Agile Development

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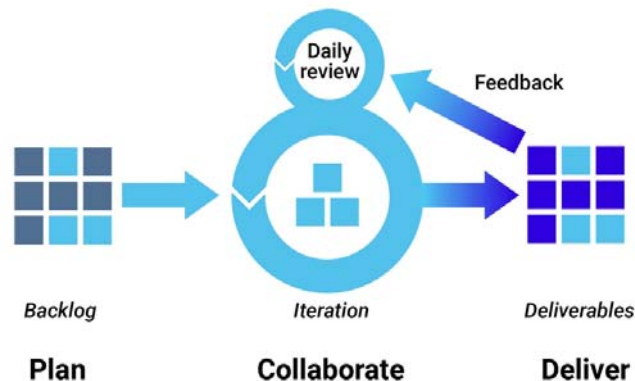
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Vendor Side - Agile Development

- Pros: attempts to minimize risk (such as bugs, cost overruns, and changing requirements) when adding new functionality by developing the software in iterations that are mini-increments of the new functionality.

- Cons: relies on real-time communication, which fails to provide new users with documentation to get up-to-speed. They require a huge time commitment from users and are labor-intensive because developers must fully complete each feature within each iteration for user approval.

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Vendor Side - Rapid Application Development (RAD)

- Condensed development process that produces a high-quality system with low investment costs.
- Allows developers to quickly adjust to shifting requirements in fast paced and changing market.
- The ability to quickly adjust is what allows such a low investment cost.

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Vendor Side - Rapid Application Development (RAD)

- Pros: Most effective for projects with a well-defined business objective and a clearly defined user group, but which are not computationally complex. It is especially useful if the project is of small to medium size and time sensitive.

- Cons: It requires a stable team composition with highly skilled developers and users who are deeply knowledgeable about the application area. Deep knowledge is essential when working on a condensed development timeline that requires approval after each construction phase.

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Vendor Side – DevOps Development

- Centered on organizational change that enhances the collaboration between the departments responsible for different segments of the development life cycle, such as development, quality assurance, and operations.

- Platforms, tools and practices emphasize collaboration between IT and development, targets application delivery with continuous testing, ongoing feature development and ongoing maintenance to deliver apps faster.

- Increases deployment frequency – faster time-to-market.

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Vendor Side – DevOps Development

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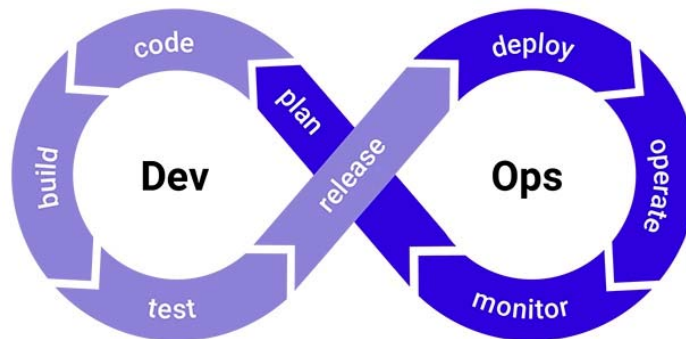Lafayette, Indiana USA | 333 Crosspark Drive
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Vendor Side – DevOps Development

- Pros: Focused on improving time to market, lowering the failure rate of new releases, shortening the lead time between fixes, and prioritizing minimal disruption and maximum reliability. Aims to automate continuous deployment to ensure everything happens smoothly and reliably.

- Cons: Continuous updates to their systems. Some industries/businesses have regulations that require extensive testing before a project can move to the operations phase. Different environments used in the different departments can allow undetected issues to slip into production.
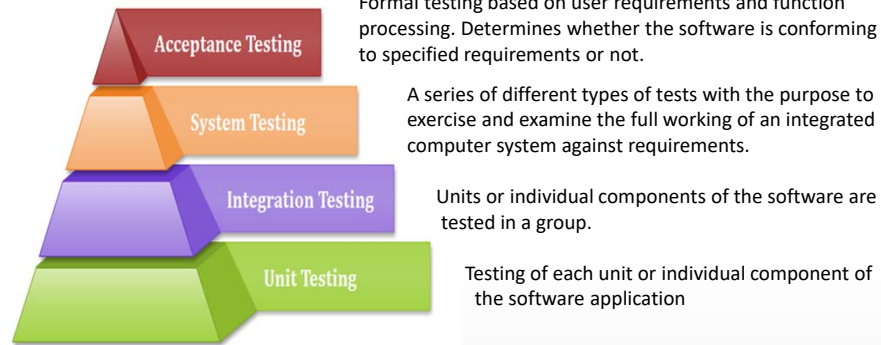
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Vendor Side Testing

Formal testing based on user requirements and function processing. Determines whether the software is conforming to specified requirements or not.

A series of different types of tests with the purpose to exercise and examine the full working of an integrated computer system against requirements.

Units or individual components of the software are tested in a group.

Testing of each unit or individual component of the software application

Image from https://www.javatpoint.com/unit-testing

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Client Side Deployment

- Deploy into User Acceptance (UA) Test Environments
- Deploy into Production Environments

Basic Considerations

- Vendor Deployment Method
- Scale
- Security and Permissions
- Testers Expertise and Availability

Basic Principles of Software Deployment Efficiency

User Acceptance Testing

- A level of software testing where a system is tested for acceptability. The purpose of this test is to evaluate the system's compliance with the business requirements and assess whether it is acceptable for delivery.
- Testing performed by the Client to certify the system with respect to the requirements that was agreed upon. This testing happens in the final phase of testing before moving the software application to the Market or Production environment.
- The main purpose of this testing is to validate the end to end business flow.
- Carried out in a separate testing environment with production like data setup.

https://glossary.istqb.org/en/search/

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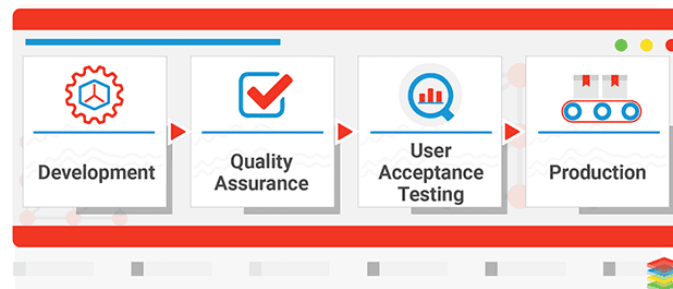
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User Acceptance Testing – Why?

- Developers code software based on requirement documents which is their "own" understanding of the requirements and may not actually be what the client needs from the software.
- Requirement changes during the course of the project and may not be communicated effectively to the developers.

Image from https://dilbert.com

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User Acceptance Testing – Prerequisites

- Business Requirements must be available.
- Application Code should be fully developed
- Unit Testing, Integration Testing & System Testing should be completed
- Regression Testing should be completed with no major defects
- No Showstoppers, High, Medium defects in System Integration Test Phase
- All the reported defects should be fixed and tested before UAT
- Traceability matrix for all testing should be completed
- UAT Environment must be ready

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User Acceptance Testing – Best Practices

- Preparation of UAT plan early in the project life cycle.
- Prepare checklists before the UAT starts.
- Conduct Pre-UAT session during system testing phase.
- Set an expectation and define the scope of UAT clearly.
- Ensure fidelity of Environments (Operating System, Updates, etc.)
  - Test Environment should mimic Production Environment
- Test a system or an application with a real-world scenario and data.
- Start thinking as an unknown user while testing the system.
- Perform Usability Testing.
- Feedback session and meetings conducted before moving to production

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User Acceptance Testing – Tester Qualities

- UAT Testers should possess good knowledge of the business. They should be independent and think as an unknown user to the system. Testers should be Analytical and Lateral thinker and combine all sorts of data to make the UAT successful.
- Testers or Business Analysts or Subject Matter Experts who understand the business requirements or flows can prepare test and data which are realistic to the business.

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User Acceptance Testing – How To

UAT is done by the intended users of the system or software and usually at the client location. Once initial pre-requisites for UAT are satisfied, the following are the tasks needed to be performed by the testers:

Step 1:   Analysis of Business Requirements

Step 2: Creation of UAT test plan

Step 3: Identify Test Scenarios and UA Test Cases

Step 4: Preparation of Test Data(Production like Data)

Step 5: Run the Test cases - Record the Results

Step 6: Confirm business objectives

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User Acceptance Testing – How To

Step 1) Analysis of Business Requirements

One of the most important activities in the UAT is to identify and develop test scenarios. These test scenarios are derived from the following documents:

- Project Charter
- Business Use Cases
- Process Flow Diagrams
- Business Requirements Document(BRD)
- System Requirements Specification(SRS)

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User Acceptance Testing – How To

Step 2) Creation of UAT Plan:

The UAT test plan outlines the strategy that will be used to verify and ensure an application meets its business requirements. It documents entry and exit criteria for UAT, Test scenarios and test cases approach and timelines of testing.

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User Acceptance Testing – How To

Step 3) Identify Test Scenarios and Test Cases:

Identify the test scenarios with respect to high-level business process and create test cases with clear test steps. Test Cases should sufficiently cover most of the UAT scenarios. Business Use cases are input for creating the test cases.

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User Acceptance Testing – How To

Step 4) Preparation of Test Data:

It is best advised to use live data for UAT (replicate production data). Data should be scrambled for privacy and security reasons. Testers should be familiar with the database flow.

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User Acceptance Testing – How To

Step 5) Run and record the results:

Execute test cases and report bugs if any. Re-test bugs once fixed.

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User Acceptance Testing – How To

Step 6) Confirm Business Objectives met:

Business Analysts or UAT Testers need to send a sign off document after the UAT testing. After sign-off, the product is good to go for production. Deliverables for UAT testing are Test Plan, UAT Scenarios & Test Cases, Test Results, & Defect Log

Exit criteria for UAT:

*   Before moving into production, following needs to be considered:
*   No critical defects open
*   Business process works satisfactorily
*   UAT Sign off meeting with all stakeholders

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