

Evaluation of Traceability Management Tools for Student Software Development

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Overview

In the software development lifecycle, traceability refers to the ability to trace artifacts - anything developers produce - back to one or more requirements.

As software projects grow in size and complexity, it becomes an increasing challenge to coordinate [1]:

- Work Requirements
- Stakeholder
- Artifacts
- Developers

Because of this, establishing a system of traceability is vital in ensuring features are designed, tested, and implemented in accordance with the agreed upon requirements.

Student developers often struggle to employ traceability in their own projects, due in part to a lack of understanding its importance and a lack of experience using tools that provide a system for traceability.

To combat this, our project set out to find ways for students to:

1. Include traceability practices in their projects.
2. Minimize the burden of evaluating and configuring traceability tools.

Methodology

After researching the concepts involved in employing traceability systems and surveying traceability tools, we developed a list of tools to be evaluated and tested.

This list was created with the purpose of selecting 3-4 tools to be used in future UAH software development classes.

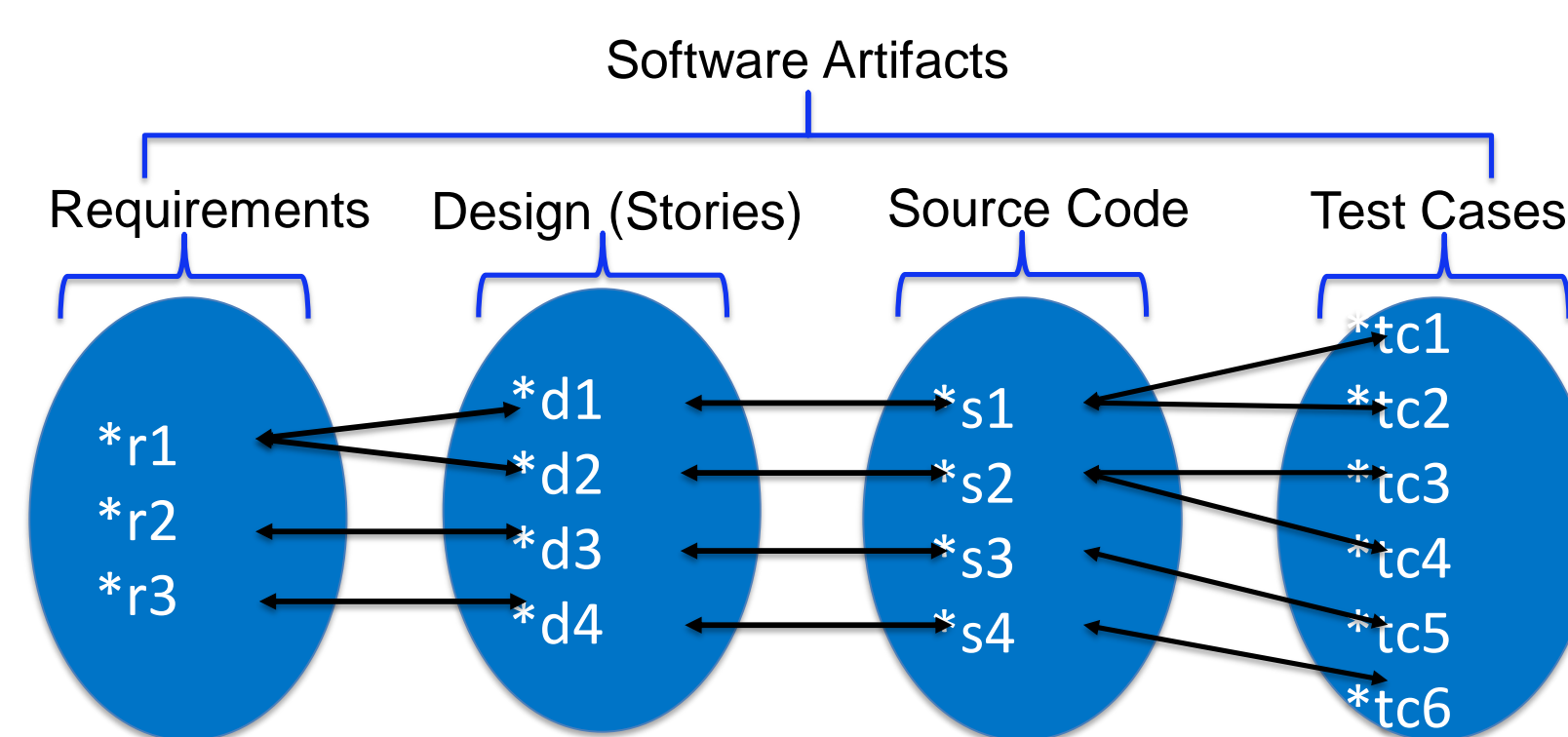


Figure 1: Traceability of software artifacts. (Adapted from [1])

Impact

In-depth users guides were created for each selected tool. These guides will be used by future UAH Computer Science students taking CS 499. Each guide instructs the student on how to best configure the tool for use in their projects, potentially saving them time and allowing them to jumpstart development.

Key Findings

While testing and evaluating tools, key features that must be present in the final selection of tools were identified.

These features include:








- Git integration
- Supports agile methodology
- Project roadmap or other visual timeline
- Documentation management
- Test management
- Version management

Many industry standard tools require a dedicated server for use. After installing Tuleap on a CentOS server, it was determined that the selected tools must instead be web-based for increased usability.

The tools had to be:

- Completely free
- Allow for collaboration with minimum 5 team members
- Web-based and cloud-hosted

The three final tools selected were Jira, Tuleap, and ClickUp. Users guides were created for each tool, which will be used by CS 499 students in their software development projects.

	Cost	Format	Collaborative	Agile Methodology	Git Integration	Project Roadmap	Requirement Management	Documents Management	Test Management	Version Management
	✓	✓	✓	✓	✓	✓	✓	✓	!	!
	✓	✓	✓	✗	✓	!	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	!	✓	✓	✗
	✓	✗	✗	✗	✗	✗	✓	✗	✓	✓
	✓	✓	✓	✓	✓	✓	✓	✓	!	!
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✗	✗	✗	!	✓	✓	✗

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