

<https://www.halvorsen.blog>



# Week Assignment

Source Code Control (SCC) & Bug Tracking Systems

Hans-Petter Halvorsen

# Week Assignment

## 1. Source Code Control (SCC) Systems Overview

- Everybody should collaborate creating a ~~Document~~ **Quiz** giving an overview of different SCC and Bug Tracking systems today.

## 2. Bug Tracking & Reporting in Azure DevOps-> Work Items - Bug

## 3. Cont. Implementing your System with focus on Source Code Control

- Try to use some of the more “advanced” Source Code Features in Azure DevOps



# Source Code Control (SCC) & Bug Tracking Systems

# Software Configuration Management (SCM)

- Software Configuration Management is the process of managing all the pieces and parts of artifacts produced as part of software development and support activities.
- We will focus on Tools that need to be brought in to facilitate the management of these artifacts
  - Azure DevOps is such a Tool
  - Tools for handling the Source Code – Source Code Control (SCC)
- Software Configuration Management is much more than just creating and keeping multiple versions of code or documents

# SCM Artifacts Examples

- Requirements Specifications
- Design Specifications
- **Source Code Control**
  - Programming Code, e.g., C# Code
  - Database Tables (Diagrams and SQL) and Initialization Data (SQL), e.g., Post Numbers, Stored Procedures, ...
- Executable Code, Builds
- Test Cases
- **Bugs (Bug Tracking)**
- Support Incidents

# Tools for Configuration Management

These configuration management tools may be viewed in three tiers:

1. Source Code Control (SCC) Tools, e.g., Git, SVN, CVS
2. Software Builds, Deployment, Continuous Integration (CI), e.g., Jenkins, Azure Pipelines
  - These tools make sure the software is always ready to be tested based on the updated Code base
3. Development (Bug Tracking or Issue Tracking) and Support Process Activities

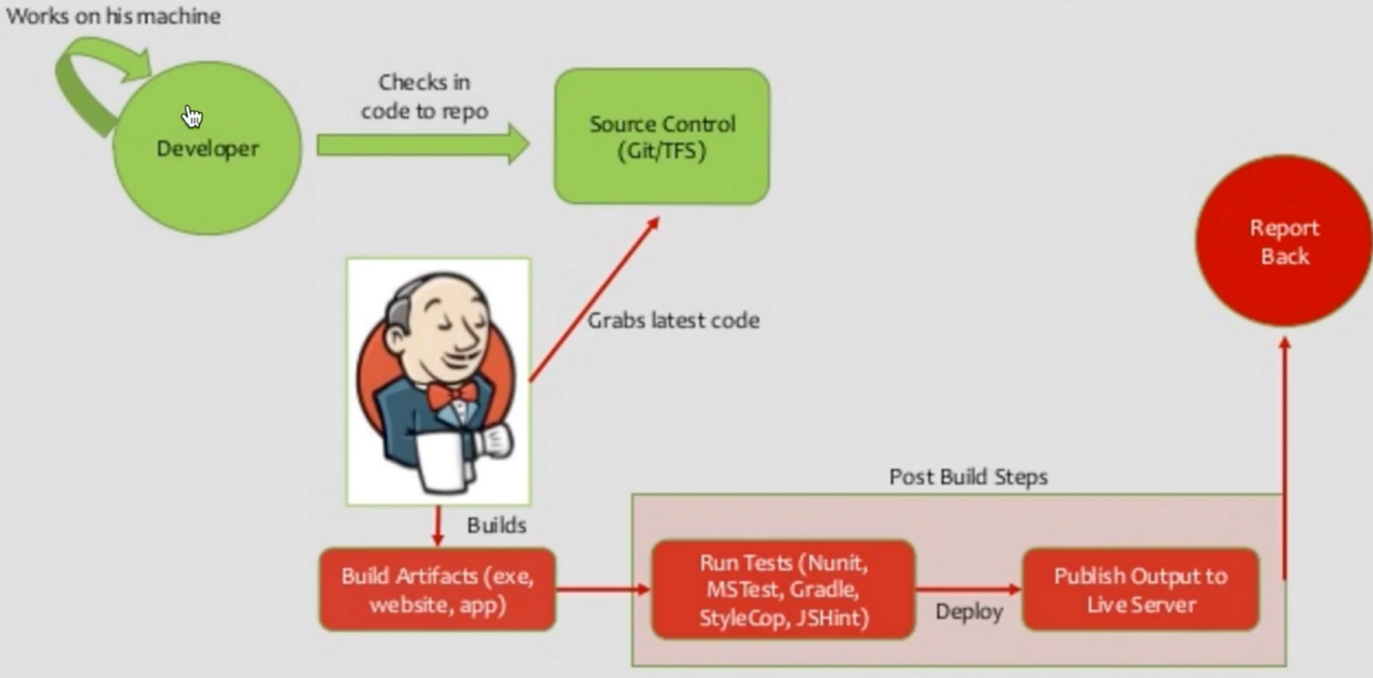


Azure DevOps has all these 3 tiers

# Jenkins



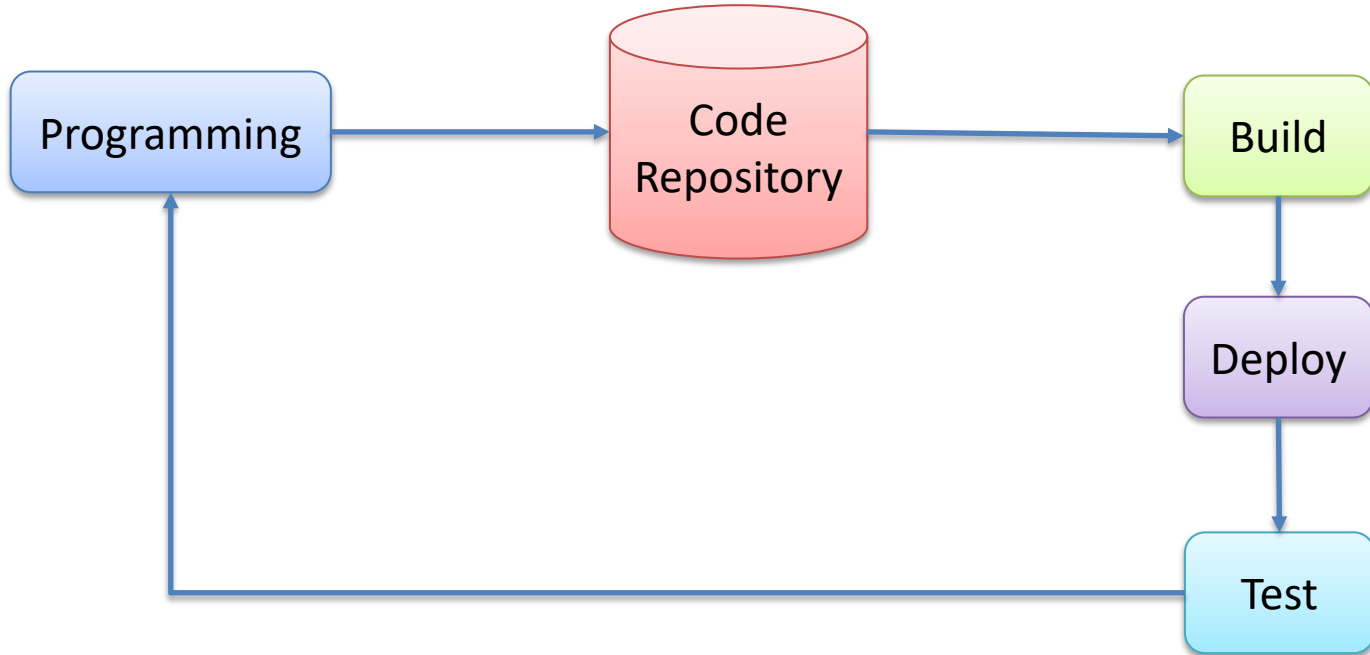
## How does Jenkins typically fit into my work?



Jenkins is a self-contained, open source automation server which can be used to automate all sorts of tasks related to building, testing, and delivering or deploying software.

# Azure Pipelines

Azure Pipelines is Microsoft's "alternative" to Jenkins, but you can also use Jenkins with Azure DevOps







# Source Code Control Systems

Hans-Petter Halvorsen

[Table of Contents](#)

Visual Studio

Team Foundation Server

# SCC Systems



Concurrent Versioning System



**Bazaar**

# Cloud-based SCC Hosting Services

- **VisuAzure DevOps**  
(<https://dev.azure.com>)



Azure DevOps

- TFVC or Git

- **GitHub** ([www.github.com](http://www.github.com))



GitHub

- GitLab ([www.gitlab.com](http://www.gitlab.com))



GitLab

- **Bitbucket** ([www.bitbucket.org](http://www.bitbucket.org))

- Mercurial or Git



Bitbucket

# Source Code Control

## SCC Repositories



**Azure DevOps**

Team Foundation Version Control (TFVC)



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## Cloud-based SCC Hosting Services (Monthly payment/5 users free of charge/free for open source projects)



**Azure DevOps**  
Services

TFVC or Git



Git or Mercurial



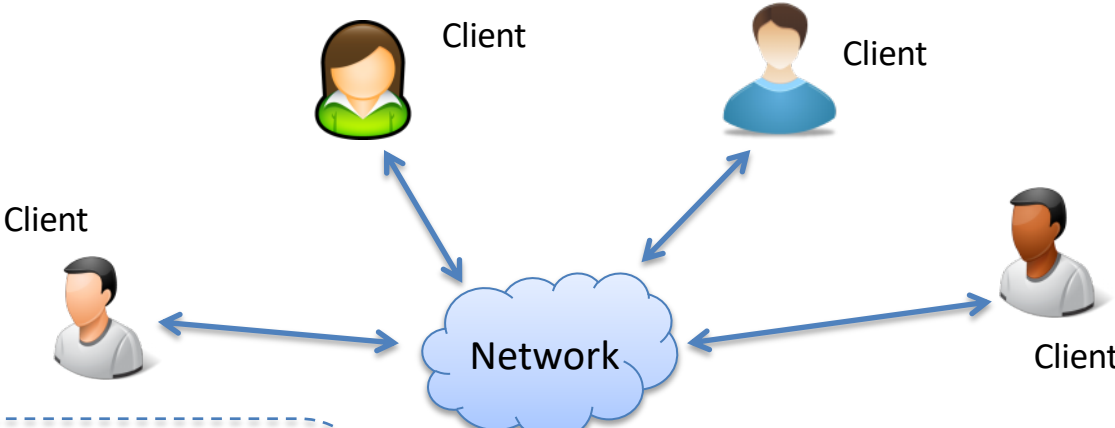
**GitHub**


Git




GitLab


# Centralized/Client–Server Architecture



 **Azure DevOps**  
Team Foundation Version Control (TFVC)

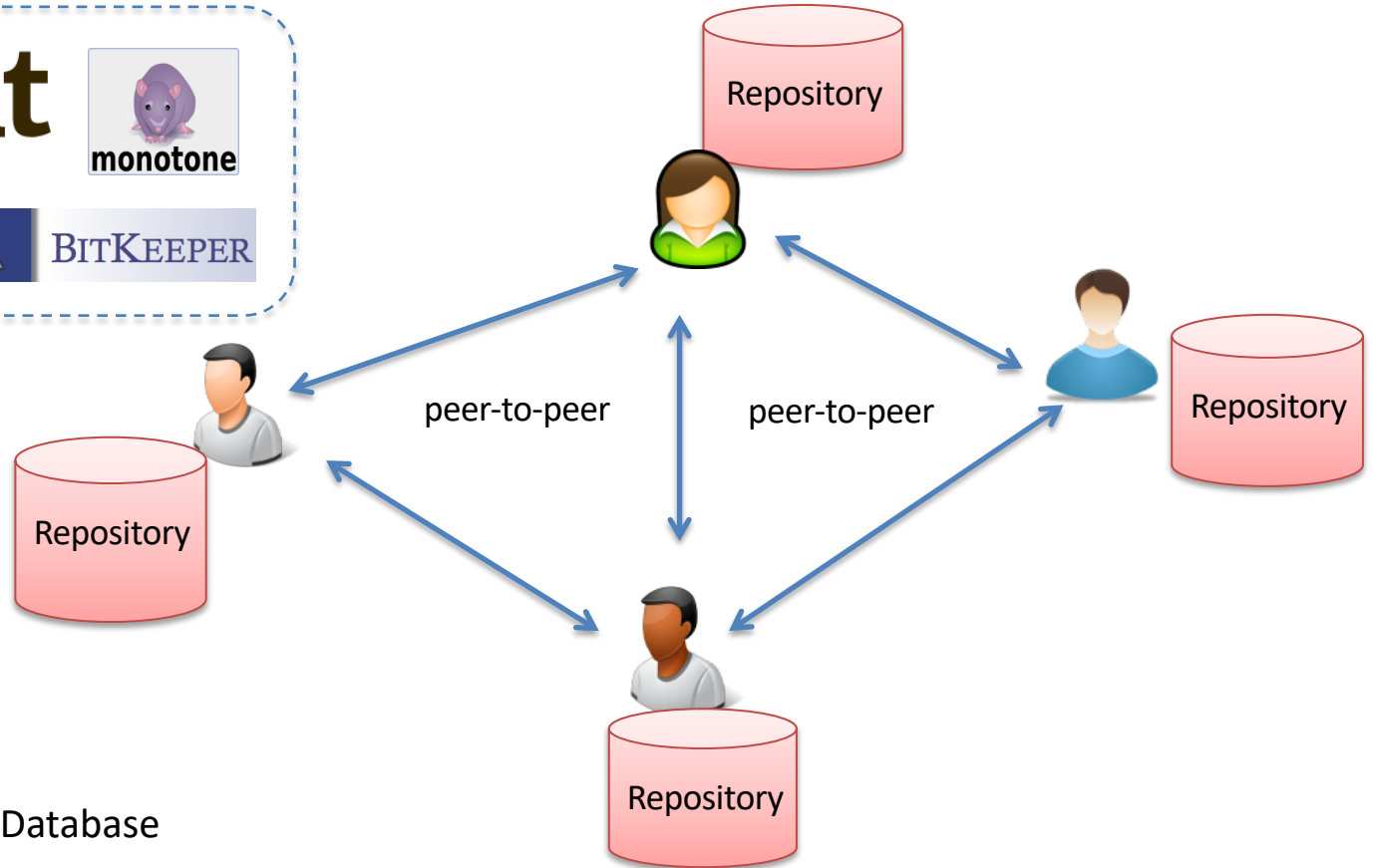






Repository: Source Code Database

# Distributed Version Control Systems



Repository: Source Code Database



# Bug Tracking Systems

Hans-Petter Halvorsen

[Table of Contents](#)

# Bug Tracking Systems

- A “bug tracking system” or “defect tracking system” is a software application that keeps track of reported software bugs in software development projects.
- It may be regarded as a type of “issue tracking system”.
- Typically bug tracking systems are integrated with other software “project management applications” – e.g., Azure DevOps, Jira, Bugzilla, etc.

[https://en.wikipedia.org/wiki/Bug\\_tracking\\_system](https://en.wikipedia.org/wiki/Bug_tracking_system)



# Bug Tracking Systems



Bugzilla



Azure DevOps

Tissue

The screenshot shows the Tissue web interface. At the top, there is an orange header with the Tissue logo and the tagline "Track your Issues and wipe your Bugs away". Below the header, a navigation menu includes "Dashboard", "Task Management", "Taskboard", and "Software". The main content area is titled "Bugs and Issues in your Project" and includes a search bar with a "New Issue" button and a "Multiple Bugs" button. The search criteria are: Software: Web App, Issue Type: Bug, Status: New, and Assigned Person: Hans-Petter Halvorsen. Below the search criteria, there is a "List of Issues" section with the text "Below you find Issues that fulfills the search criteria above:" and "0 results". A table header is visible with columns: IssueId, Issue Title, Priority, Status, and Action.

# Bug Reporting and Tracking Example

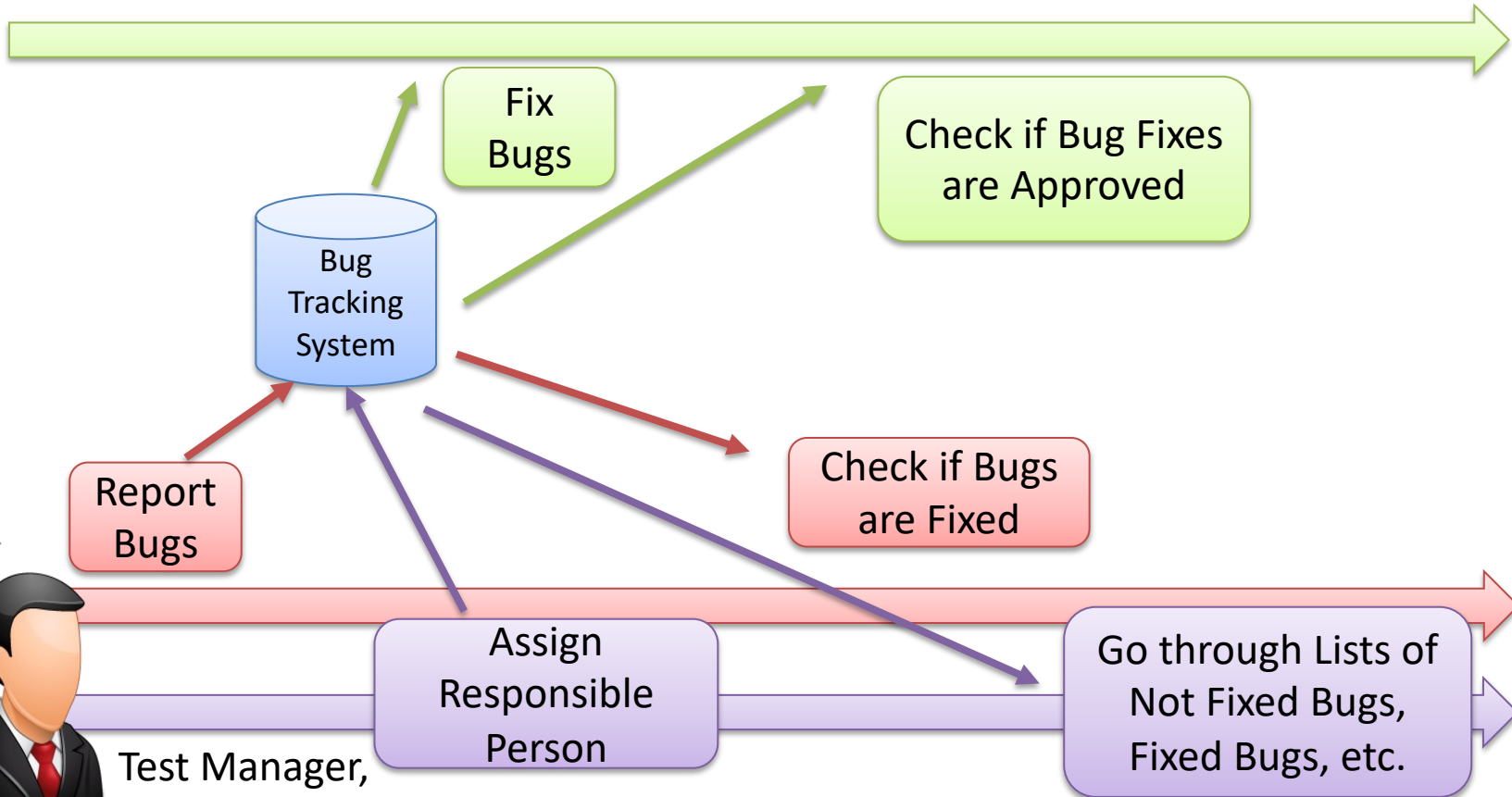
Developer

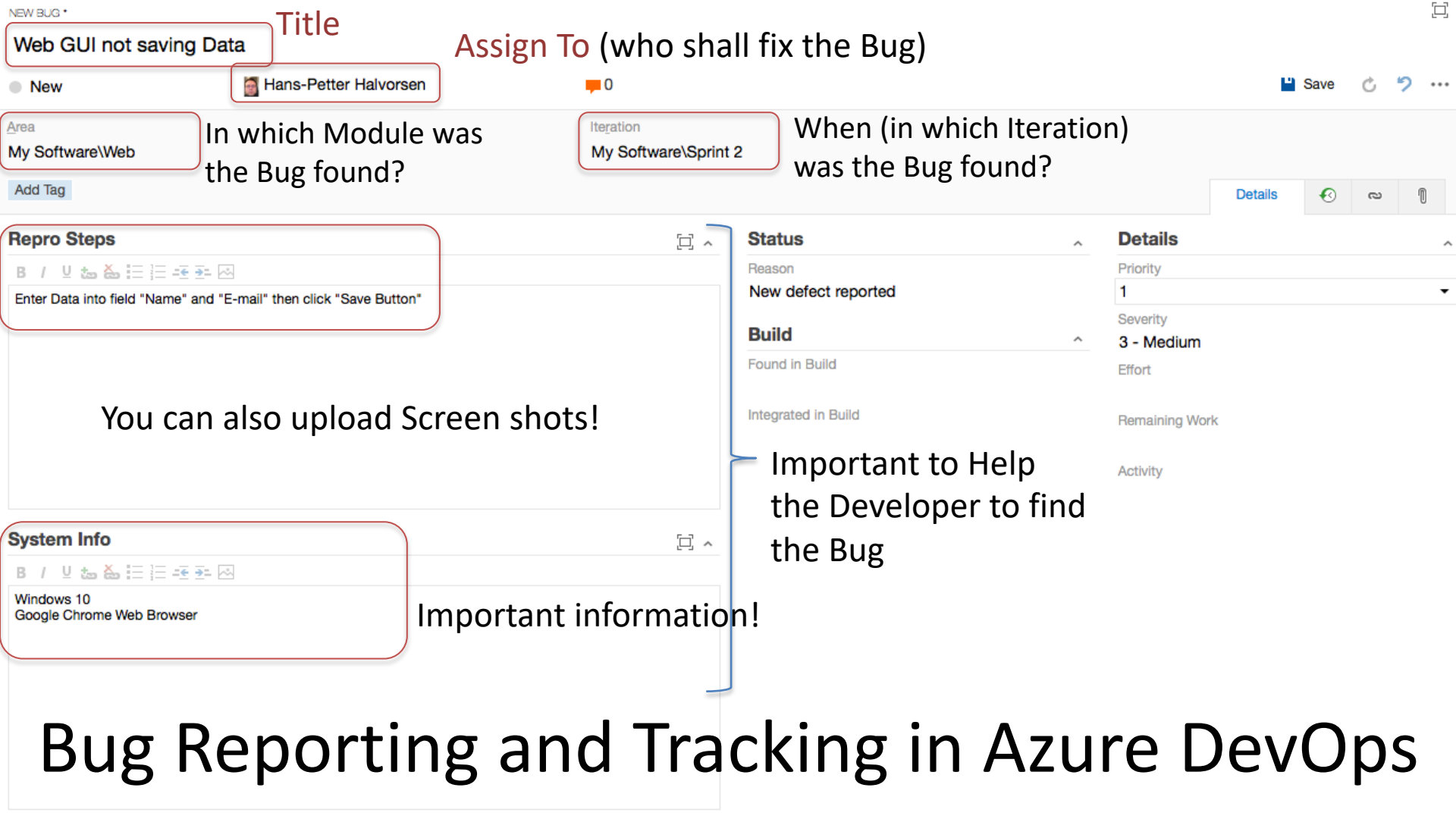


Tester



Test Manager,  
Project Manager, QA Department





Title

Assign To (who shall fix the Bug)

Web GUI not saving Data

Hans-Petter Halvorsen

0

Save

Area  
My Software\Web

In which Module was the Bug found?

Iteration  
My Software\Sprint 2

When (in which Iteration) was the Bug found?

Add Tag

Details

Repro Steps

B / U

Enter Data into field "Name" and "E-mail" then click "Save Button"

You can also upload Screen shots!

System Info

B / U

Windows 10  
Google Chrome Web Browser

Important information!

Status

Reason

New defect reported

Build

Found in Build

Integrated in Build

Important to Help the Developer to find the Bug

Details

Priority

1

Severity

3 - Medium

Effort

Remaining Work

Activity

# Bug Reporting and Tracking in Azure DevOps



# Source Code Control Systems

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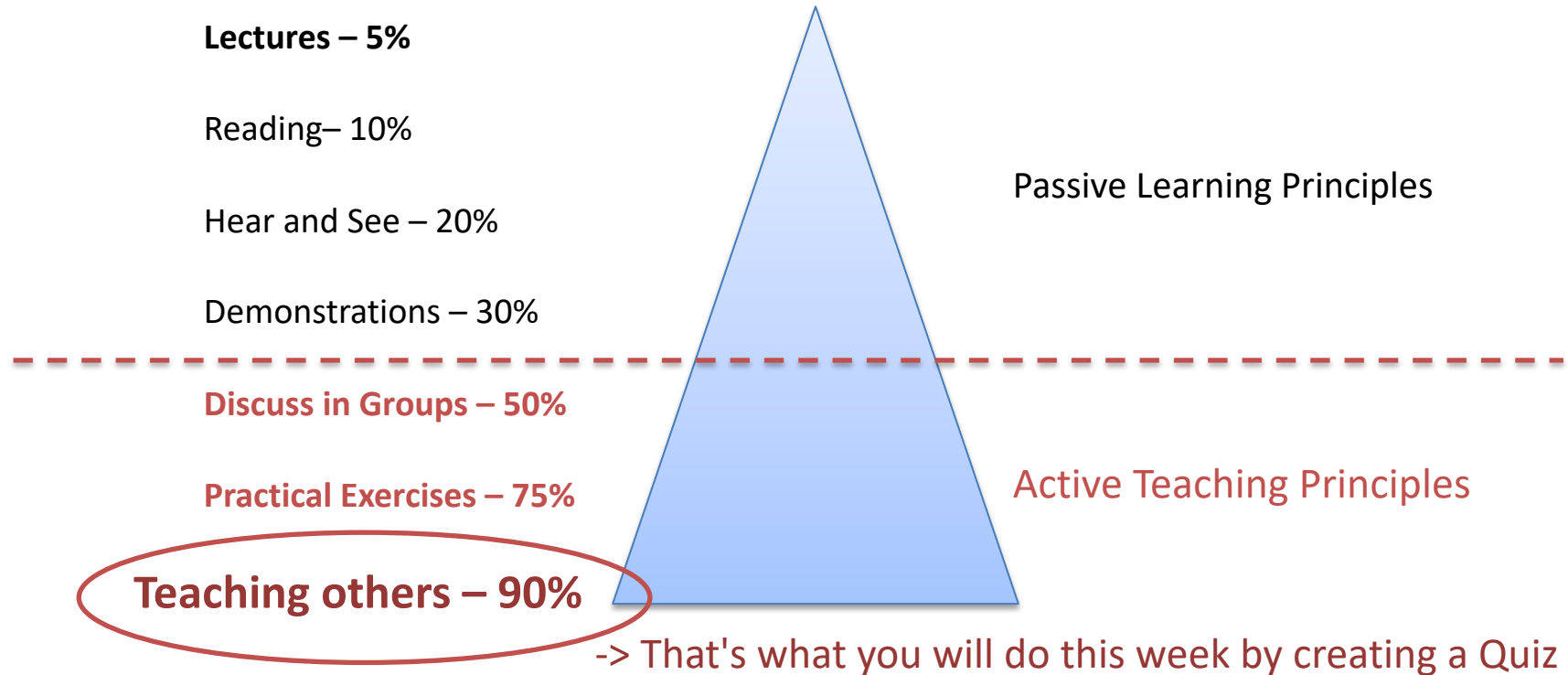
[Table of Contents](#)

# Source Code Control Systems

- Each Team should make a **Quiz** with 30+ Questions (10 Questions per Student)
- Each Team should collaborate creating a Quiz that gives an overview of SCC systems and Bug Tracking Systems today
- You may use **Microsoft Forms** in order to create the Quizzes (or other Quiz systems if you prefer, e.g., Kahoot, Google Forms, etc.)
- Everybody in the Team should work with and update the Quiz (at the same time). You can add Collaborators

# Teaching Outcome

“Traditional Lectures are passive teaching methods, where you can keep your attention for 10 minutes” Alf Inge Wang, Professor NTNU (The vendor of Kahoot)



# Quiz Execution

- Each Team should make sure the Class take their Quiz (Give them access to the link)
- After the Quizzes are finished, the Team should present the correct results.
- The person that gets the highest total score after all the Quizzes and Questions will get a prize.



# GitHub

SVN



Concurrent Versioning System



**Bazaar**





# Bug Tracking and Reporting with Azure DevOps

Hans-Petter Halvorsen

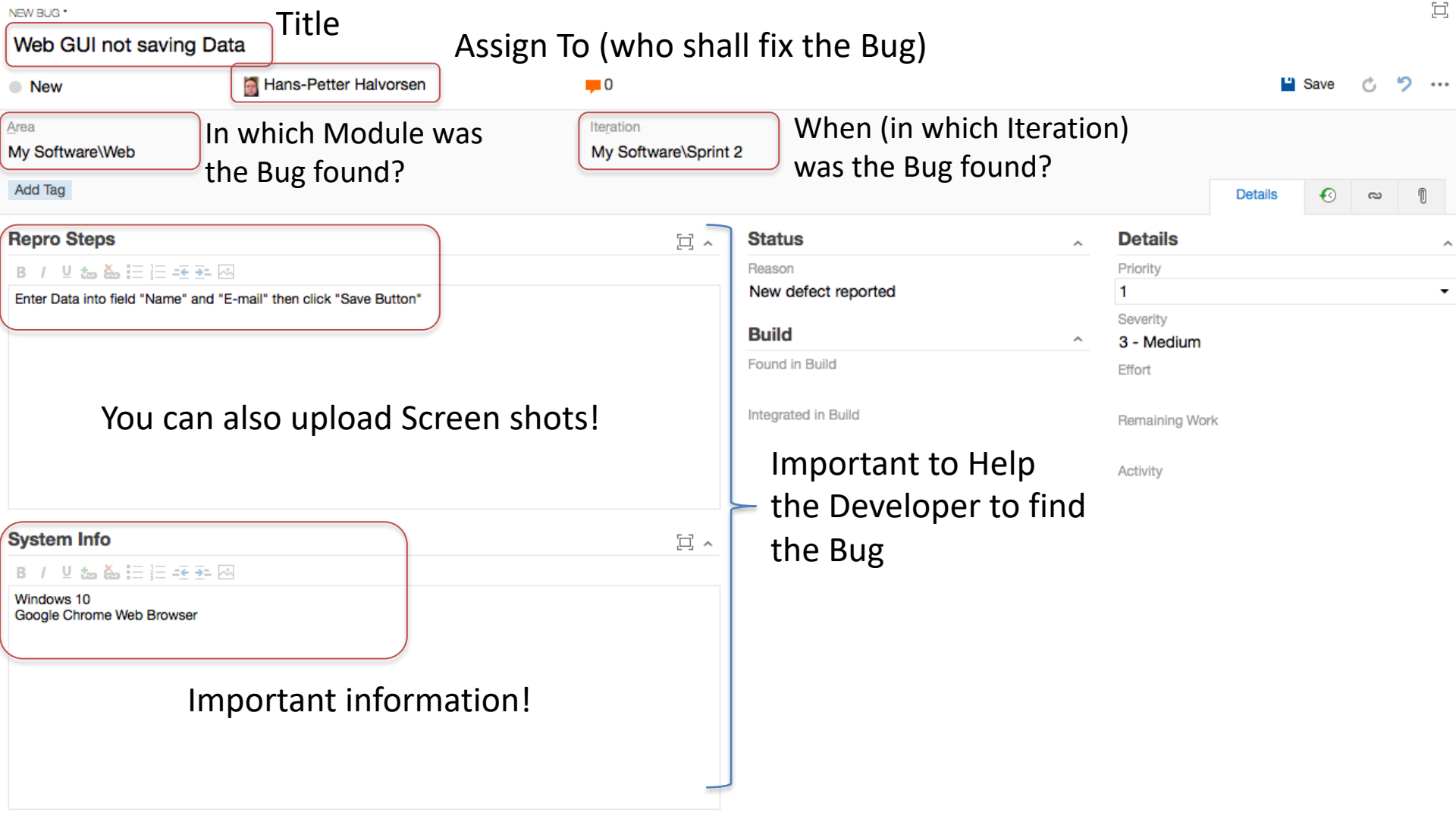
[Table of Contents](#)

# Bug Tracking and Reporting with Azure DevOps

- **Source Code:** Make sure all your code is checked in into Azure DevOps before you start
- Perform Code Review/Testing of the Application/Module to another Developer in the Team
- **Work Items:** Report Bugs, New Features, etc. as Work Items in Azure DevOps
- **Create Queries:** Make different Queries. Go through the Work Items in Azure DevOps with the Developer. Prioritize them

# Work Items and Queries

- Work Item - Bug/New Feature
  - Each member in the Group should report 2-5+ Bugs/Feature Request in AzureDevOps based on the Code Reviews
- Queries
  - Each member should create at least 1 Personal Query (My Queries) and 1 Team Query (Shared Queries)



Title

Assign To (who shall fix the Bug)

Web GUI not saving Data

Hans-Petter Halvorsen

0

Save

Area  
My Software\Web

In which Module was the Bug found?

Iteration  
My Software\Sprint 2

When (in which Iteration) was the Bug found?

Add Tag

Details

Repro Steps

B / U

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Found in Build

Integrated in Build

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1

Severity

3 - Medium

Effort

Remaining Work

Activity

Important to Help the Developer to find the Bug

# Bug Reporting and Tracking Example

Make Queries that can handle these situations!

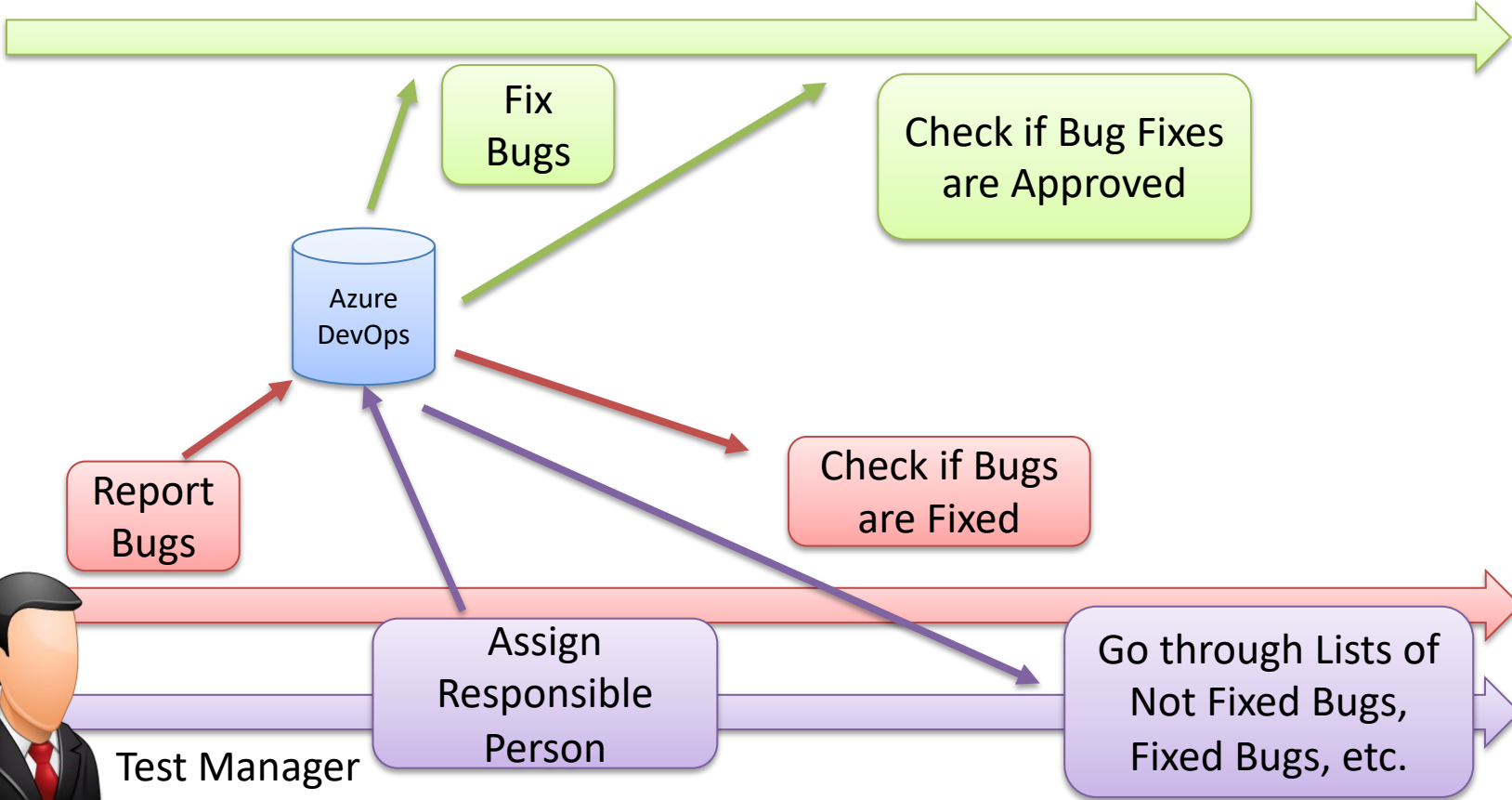
Developer



Tester



Test Manager  
or Project Manager

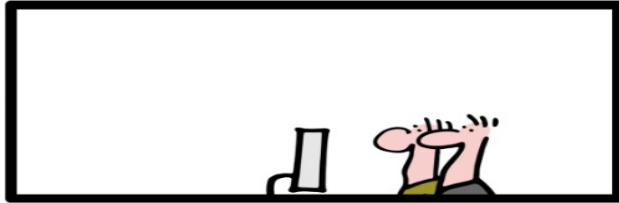
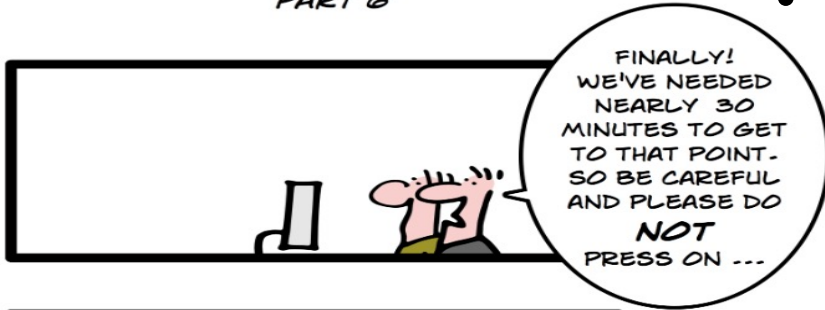


# Bugs



ONE DAY IN THE LIFE OF A CODER

PART 6



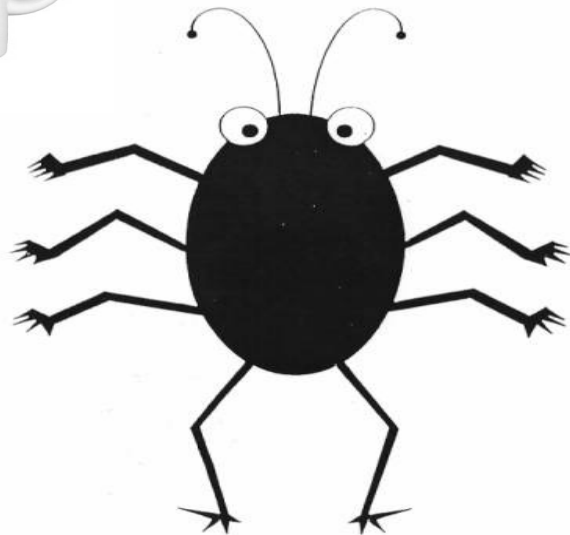
0230 PM: DEBUGGING

- A software bug is an error, flaw, failure, or fault in a computer program or system that produces an incorrect or unexpected result, or causes it to behave in unintended ways
  - They found a bug (actually a moth) inside a computer in 1947 that made the program not behaving as expected. This was the “first” real bug.
- Debugging: Find and Remove/Fix Bugs

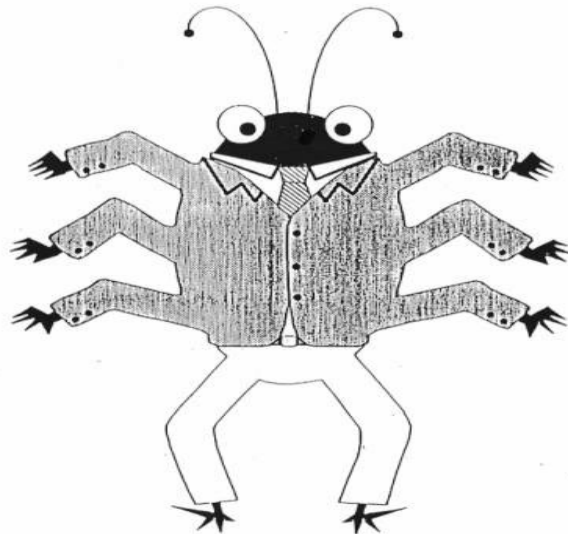


# Bugs vs. Features

“It's not a bug - it's an undocumented feature” 😊



**BUG**



**FEATURE**

“For as long as I've been a software developer and used bug tracking systems, we have struggled with the same fundamental problem in every single project we've worked on: **how do you tell bugs from feature requests?**”

# Work Items – New Bug

New Bug 1\*: WS is not working

🗑️ ✖️ ↻ ↩️ 📄 📄 Copy template URL

Tags

WS is not working

## STATUS

Assigned To   
State   
Reason

## CLASSIFICATION

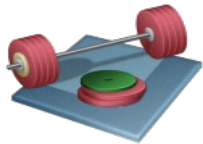
Area   
Iteration

## PLANNING

Stack Rank   
Priority   
Severity

## REPRO STEPS SYSTEM INFO TEST CASES

**B** / **U** 📄 ✖️ 📄 📄 ⚡ ⚡ 📧



Test your Application/System.  
Report Bugs in Azure DevOps

## HISTORY ALL LINKS ATTACHMENTS

**B** / **U** 📄 ✖️ 📄 📄 ⚡ ⚡ 📧

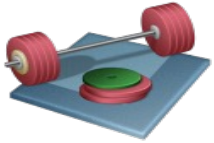
## DISCUSSION ONLY ALL CHANGES

[No entries with comments]



# Queries

- Used to find existing Work Items
- You may create different Queries to make it easy to find the Work Items you need
- Queries may be personal or visible for everybody in the project (Team Queries)



Make one or more Queries in order to find your Bugs (Bugs reported on you)

New Query 1 5 work items (1 selected)

results [editor](#)

Column Options

Type of Query Flat List of Work Items Work Items and Direct Links Tree of Work Items

Filters for top level work items

	And/Or	Field	Operator	Value
+ X	<input type="checkbox"/>	Team Project	=	@Project
+ X	<input type="checkbox"/> And	Work Item Type	=	[Any]
+ X	<input type="checkbox"/> And	State	=	[Any]
+ Add new clause				

---








Save query ↺ ↻ ✉ || Column Options

ID	Work Item...	Title	Assigned To	State	Tags
1	Bug	Database Error	Hans-Pett...	Active	
2	Task	Add Web functionality		New	
4	Test Case	Test Empty Fields	Hans-Pett...	Design	
3	Test Case	Test Web Service	Hans-Pett...	Design	
5	Bug	WS is not working		Active	

# Creating a Query - Example

results [editor](#)    | Column OptionsType of Query  Flat List of Work Items  Work Items and Direct Links  Tree of Work Items

Filters for top level work items

	(☰) And/Or	Field	Operator	Value
 	<input type="checkbox"/>	Team Project	=	@Project
 	<input type="checkbox"/> And	Work Item Type	=	[Any]
 	<input type="checkbox"/> And	State	=	[Any]
 <a href="#">Add new clause</a>				

 Save query      || Column Options

ID	Work It...	Title	Assigned To	State	Tags
▼ 1	Bug	Database Error	Hans-Pett...	Active	
2	Task	Add Web functionality		New	
4	Test Case	Test Empty Fields	Hans-Pett...	Design	
3	Test Case	Test Web Service	Hans-Pett...	Design	
5	Bug	WS is not working		Active	





# Query Variables


- @Me
- @Project
- @CurrentIteration
- @Today
- [Any]

New Query 1

4 work items (1 selected)










Results **Editor** Charts

    | Column options Copy query URL

Type of query  Flat list of work items

Query across projects

Filters for top level work items

	 And/Or	Field	Operator	Value
 	<input type="checkbox"/>	Work Item Type	=	[Any]
 	<input type="checkbox"/> And	Assigned To	=	@Me
 	<input type="checkbox"/> And	Changed Date	>=	@Today - 30
 	<input type="checkbox"/> And	Iteration Path	=	@CurrentIteration

 Add new clause



# Source Code Control in Azure DevOps

Hans-Petter Halvorsen

[Table of Contents](#)

# Source Code Control in Azure DevOps

- Use some of the more “advanced” Source Code Features in Azure DevOps (Give short Demo)
  - Branching, Merging
  - Labelling/Tag
  - Change/Change List (History)
  - Conflict
  - File Locking

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